

# Multifunction Power System Engine Service Procedures (Cat C1.1 Engine)

A500209: 500 Hour / 1 Year

[www.vmacair.com](http://www.vmacair.com)



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## Additional Application Information

For use with Cat powered Multifunction Power Systems (Cat C1.1 engine).

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## Important Information

The information in this manual is intended for certified VMAC installers who have been trained in installation and service procedures and/or for anyone with mechanical trade certification who has the tools and equipment to properly and safely perform the installation or service. Do not attempt installation or service without the appropriate mechanical training, knowledge and experience. Follow all safety precautions. Any fabrication for correct fit in modified vehicles, must follow industry standard "best practices".

## Notice

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# Safety

## Important Safety Notice

The information contained in this manual is based on sound engineering principles, research, extensive field experience and technical information. Information is constantly changing with the addition of new models, assemblies, service techniques and running OEM changes. If a discrepancy is found in this manual, contact VMAC Technical Support prior to initiating or proceeding with installation, service or repair. Current information may clarify the issue. Anyone with knowledge of such discrepancies, who proceeds to perform service and repair, assumes all risks.

Only proven service procedures are recommended. Anyone who departs from the specific instructions provided in this manual must first ensure that their safety and that of others is not being compromised, and that there will be no adverse effects on the operational safety or performance of the equipment.

VMAC will not be held responsible for any liability, consequential damages, injuries, loss or damage to individuals or to equipment as a result of the failure of anyone to properly adhere to the procedures set out in this manual or standard safety practices.

Safety should be the first consideration when performing any service operations. If there are any questions concerning the procedures in this manual, or more information is required, please contact VMAC Technical Support prior to beginning work.

## Safety Messages

This manual contains various warnings, cautions and notices that must be observed to reduce the risk of personal injury during installation, service or repair and the possibility that improper installation, service or repair may damage the equipment or render it unsafe.



***This symbol is used to call attention to instructions concerning personal safety. Watch for this symbol; it points out important safety precautions, it means, "Attention, become alert! Your personal safety is involved". Read the message that follows and be aware of the possibility of personal injury or death. As it is impossible to warn of every conceivable hazard, common sense and industry standard safety practices must be observed.***



***This symbol is used to call attention to instructions on a specific procedure that if not followed may damage or reduce the useful life of the compressor or other equipment.***



***This symbol is used to call attention to additional instructions or special emphasis on a specific procedure.***

# General Information

## Before Starting

Read this manual prior to beginning the installation to ensure familiarity with the components and how they will fit on the system. Identify any variations (i.e. different engine models, specific instructions for particular applications, etc.) in this manual to ensure the correct instructions are used for the application.

## Hose Information

The hoses used in VMAC compressor systems have a specific inner liner that is compatible with VMAC compressor oil. Use of hoses other than those supplied or recommended by VMAC may cause compressor damage and may void your warranty. Please contact VMAC for replacement hoses and further information.

## Ordering Parts

To order parts, contact a VMAC dealer. The dealer will ask for the VMAC serial number, part number, description and quantity. Locate the nearest dealer online at [www.vmacair.com/dealer-locator](http://www.vmacair.com/dealer-locator) or call 1-877-912-6605.



## Installation Manuals and Illustrated Parts Lists (IPL)

The installation manual and illustrated parts list are an invaluable resource for when inspecting, diagnosing or repairing the system. The installation manuals and IPL's are available free of charge from VMAC.

## VMAC Installation Manuals

<https://www.vmacair.com/support/manuals/>



## VMAC IPLs

<https://www.vmacair.com/support/ipl/>



# Special Tools Required

- None

## Torque Specifications

All fasteners must be torqued to specifications. Use manufacturers' torque values for OEM fasteners.

The torque values supplied below in Table 1 are intended for VMAC supplied components, or for use in the absence of a torque value provided by the OEM.

**Apply Loctite 242 (blue) or equivalent on all engine mounted fasteners.** Torque values are with Loctite applied unless otherwise specified.

Standard Grade 8 National Coarse Thread								
Size (in)	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4
Foot pounds (ft•lb)	9	18	35	55	80	110	170	280
Newton meter (N•m)	12	24	47	74	108	149	230	379

Standard Grade 8 National Fine Thread					
Size (in)	3/8	7/16	1/2	5/8	3/4
Foot pounds (ft•lb)	40	60	90	180	320
Newton meter (N•m)	54	81	122	244	434

Metric Class 10.9						
Size (mm)	M6	M8	M10	M12	M14	M16
Foot pounds (ft•lb)	4.5	19	41	69	104	174
Newton meter (N•m)	6	25	55	93	141	236

Table 1 — Torque Table

# Parts List

## 500 Hour / 1 Year Service Kit (A500209)

500 Hour / 1 Year Service		
QTY	Part #	Description
1	9500253	Air filter
1	9500477	Oil filter
1	9500476	Fuel filter, element
1	9500374	Fuel Filter, in-line
1	5240315	Engine oil 3.78 L (1 USG)
1	5400028	Engine oil 1 L (1 qt)

Table 2 — A500209 Service kit contents

# Maintenance and Repair Safety



*Prior to performing any service, ensure the vehicle is parked on level ground and that the transmission is in "PARK" with the parking brake applied and the wheels chocked (if applicable).*



*It is impossible to warn of all the possible hazards that may result from operating, servicing, or repairing this system. Wear all appropriate Personal Protective Equipment and follow all industry standard safety practices.*



*Confirm that the system is shutdown (not in "STANDBY") with the key in the "OFF" position, depressurized and has cooled prior to performing any service work.*



*Never use flammable solvents to clean any components. If a flammable solvent has been used, rinse the component thoroughly with water and dry it before reinstalling, it to prevent the possibility of explosion.*



*Use only genuine VMAC parts to maintain the system. Genuine VMAC parts are designed to work with the high pressure and heat generated by the compressor. Substituting genuine VMAC parts may void the warranty and could cause equipment damage, injury, or death.*



*This information is intended for people with mechanical trade certification who have the tools and equipment to properly and safely perform the service or repair. Do not attempt to service or repair this system without the appropriate mechanical training, knowledge and experience.*

*Follow all safety precautions and industry standard "best practices".*

## Safety Check List

- ☐ Open the ball valve or connect an air tool to the system to ensure all the stored air is released.
- ☐ Gently pull up on the ring, on the pressure relief valve (located inside the service panel), to confirm the system is depressurized.
- ☐ Disconnect the negative battery terminal.



*Do not use the pressure relief valve as a means of depressurizing the compressor system. Doing so will prematurely wear the internal spring or the seat, preventing the valve from maintaining normal system pressure.*

# General Service Information



***Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 7). Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.***

- ☐ If the system is cold, bring the engine to operating temperature. This will also help to suspend contaminants in the oil so that they can be removed from the system along with the old oil.
- ☐ Shut the system down.
- ☐ Ensure the system is fully depressurized prior to beginning any service work.
- ☐ Observe all safety procedures relating to moving belts, hot oil and compressed air. Use all appropriate Personal Protective Equipment and follow all industry standard safety practices.
- ☐ Check the old engine oil for any evidence of metal filings or contamination.

## Push-To-Connect Fittings (Figure 1)

- ☐ Lubricate the tube and firmly push it into the fitting so that the tube fully seats in the fitting.
- ☐ Slide the collet out, away from the body of the fitting to lock the tubing in place.
- ☐ Ensure the tube does not have any "play" to prevent the O-ring from wearing.

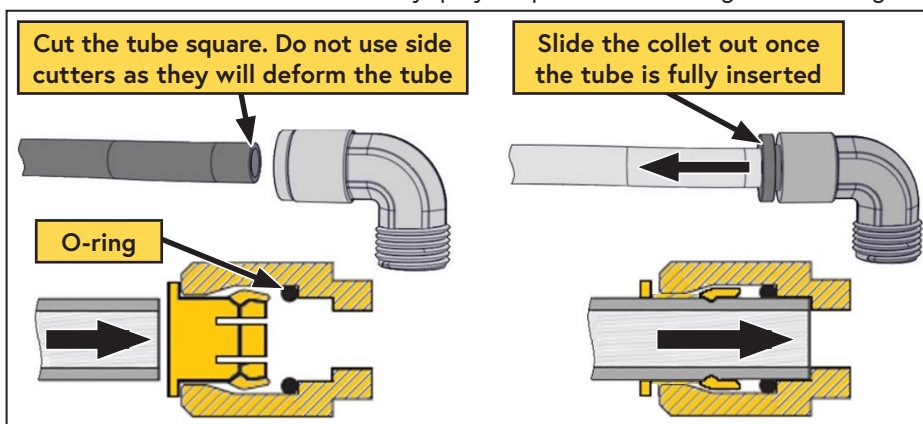


Figure 1 — Push-to-connect fittings

# Regular Inspection Instructions

## Inspecting the Drive Belt



***Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 7). Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.***

Check the Front End Accessory Drive (FEAD) belt for evidence of glazing, cracks, missing or damaged ribs or damage to the belt edges and surface. If the FEAD belt is damaged, install a new FEAD belt.

Inspect the pulley(s), idler(s), and tensioner for damage. If any of the components show cracks, chipping, impact damage or any other indications of physical damage, replace the component.

If the damage indicates possible misalignment, check the pulley/idler/tensioner alignment. If the pulleys are not properly aligned, check all fasteners to ensure that they are properly torqued and that there are no loose or worn components.

See the system specific Illustrated Parts List (IPL) for VMAC supplied part numbers.

## 500 Hour / 1 Year Service



**Read the "Maintenance and Repair Safety" section prior to performing any work on the system (beginning on page 7). Wear appropriate Personal Protective Equipment and follow all industry standard safety practices.**



**The 500 hour / 1 year Cat C1.1 Engine Service Kit (P/N: A500209) is intended to provide the components required to perform a basic engine service. These instructions are not comprehensive and are intended to supplement the Cat C1.1 Operation and Maintenance Manual (P/N: 1930372).**

**See the Cat C1.1 Operation and Maintenance Manual for a complete list of maintenance recommendations and the service interval.**



**A clean engine and generator compartment, in addition to being more efficient, makes detecting issues (i.e. oil or coolant leaks, etc.) easier. VMAC recommends cleaning the Cat MF as part of regular servicing.**

- ☐ Turn the fuel supply valve to the "OFF" position (Figure 2).

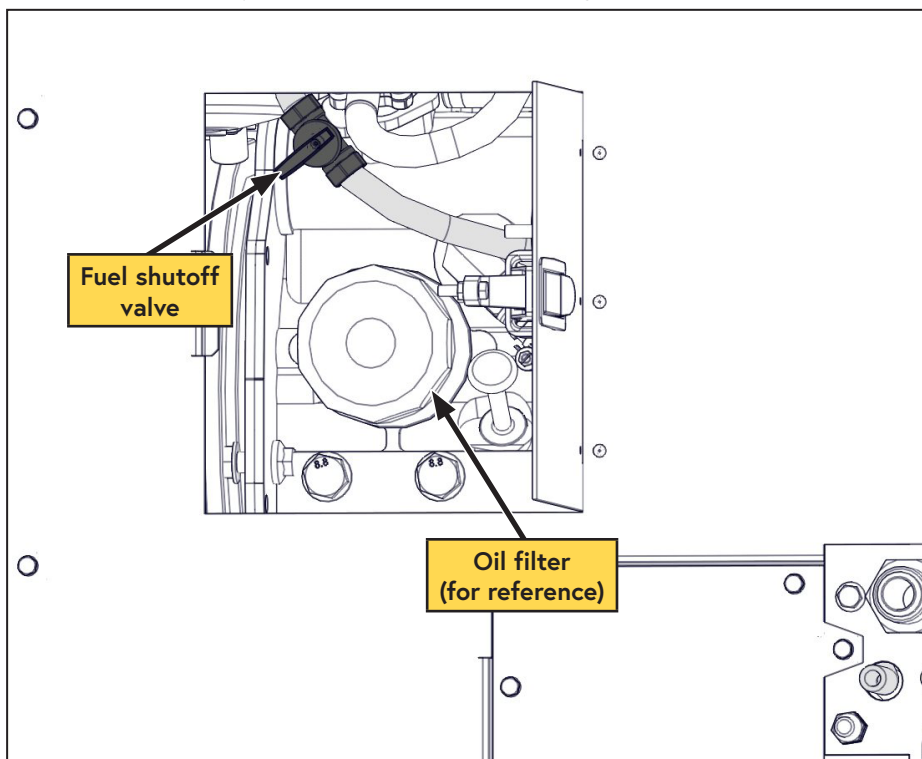
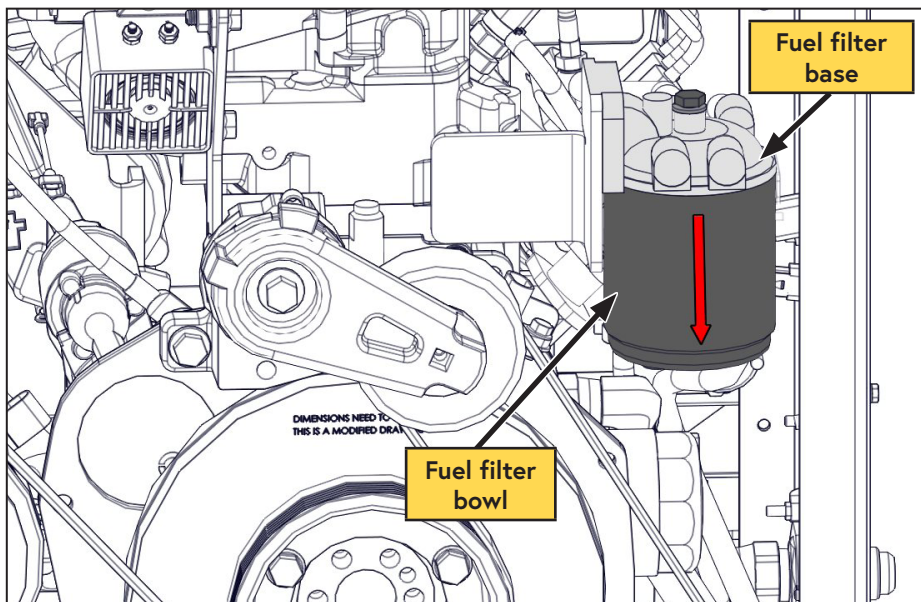


Figure 2 — Fuel shutoff valve

- ☐ Clean the area around the primary fuel filter to prevent contamination.
- ☐ Place a suitable container under the fuel filter bowl to catch any fuel that may spill.
- ☐ Remove the fuel filter bowl (Figure 3).



**Figure 3 — Remove fuel filter**

- ☐ Remove the fuel filter element from the filter base.
- ☐ Install the new fuel filter onto the filter base.
- ☐ Lubricate the O-ring with clean engine oil.



**Do not fill the filter bowl with fuel prior to reinstalling the bowl.**

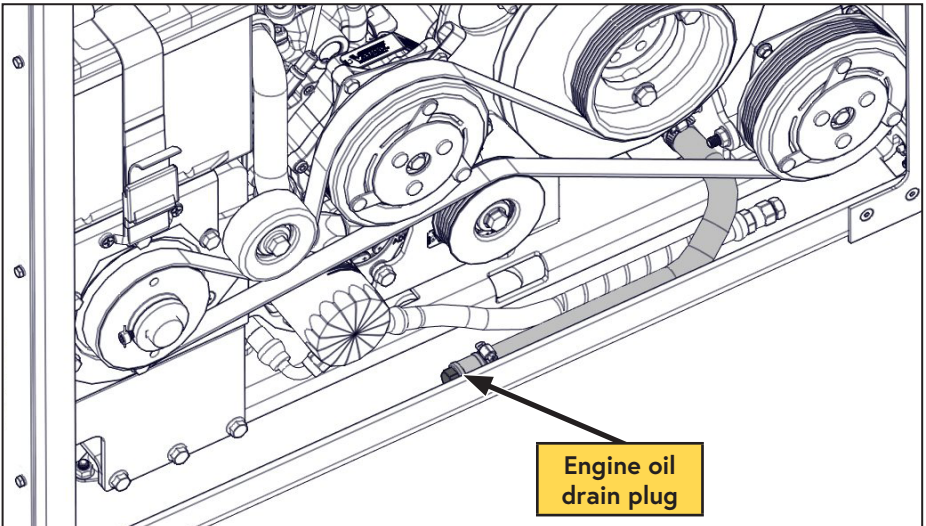
- ☐ Reinstall the fuel filter bowl onto the fuel filter base.



***The location of the inline fuel filter will vary and is dependent upon whether the Cat MF is connected to the vehicle's fuel tank or is drawing from the optional 7 gallon fuel tank (P/N: A500013).***

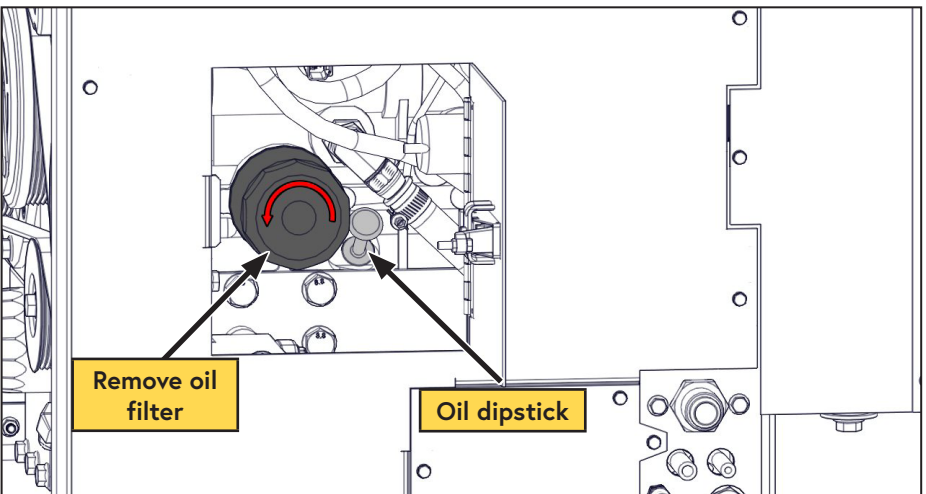
- ☐ Place appropriate absorbent material under the in-line fuel filter to collect any spills.
- ☐ Replace the inline fuel filter.
- ☐ Clean the area around the oil drain and the oil filter to prevent contamination.

- ☐ Place appropriate absorbent material under the oil filter and oil drain to collect any spills.
- ☐ Remove the oil drain plug and drain the oil into a container with a capacity of at least 1.6 USG (6 L) (Figure 4).



**Figure 4 — Drain oil**

- ☐ Replace the oil drain plug.
- ☐ Remove the engine oil filter (Figure 5).



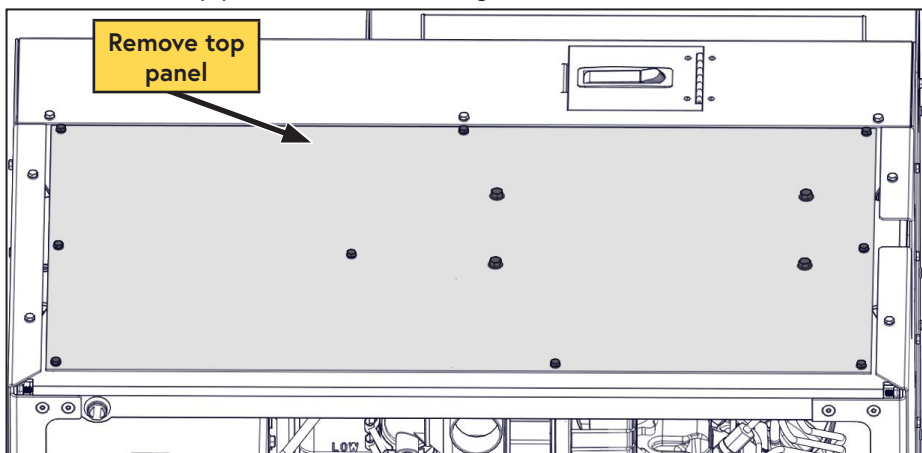
**Figure 5 — Engine oil filter**

- ☐ Clean the oil filter sealing surface of the engine block.
- ☐ Apply a thin film of clean oil to the oil filter gasket.



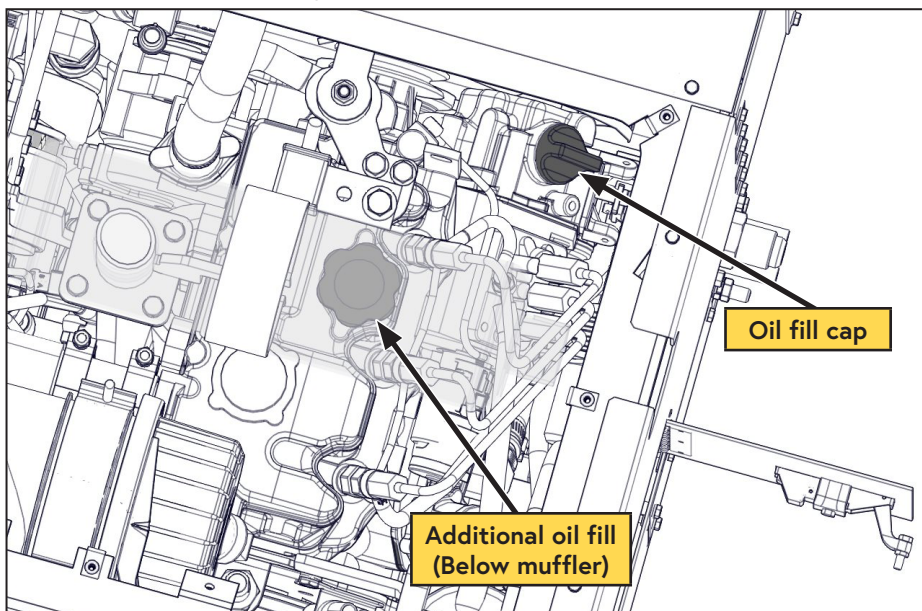
***Do not fill the oil filter with oil prior to installing it on the engine.***

- ☐ Thread the new oil filter onto the engine until the gasket contacts the engine.
- ☐ Rotate the oil filter an additional 3/4 of a turn.
- ☐ Remove the top panel of the Cat MF (Figure 6).



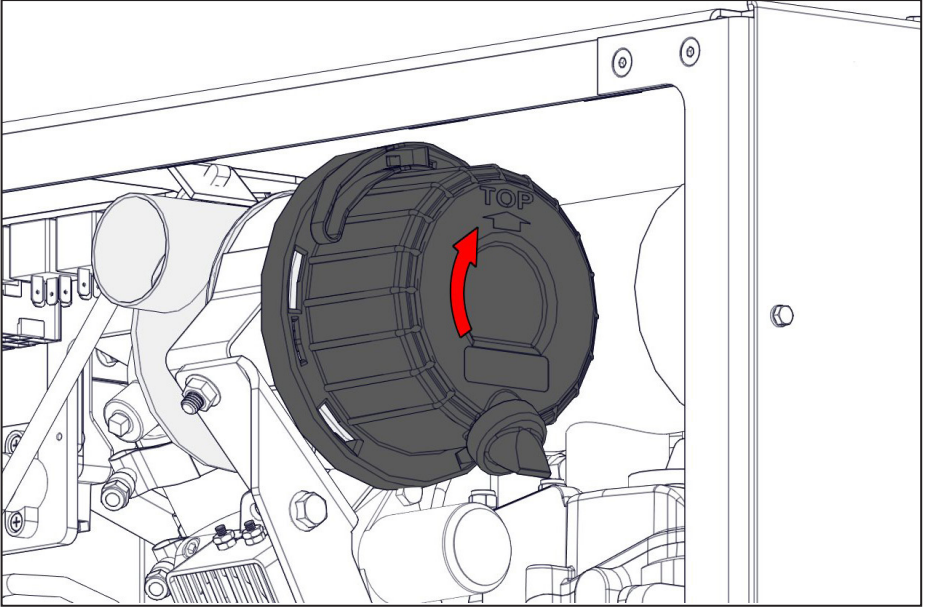
**Figure 6 — Remove top panel**

- ☐ Remove the oil fill cap, and using a funnel, add 1 USG (3.78 L) of VMAC supplied oil into the crankcase (Figure 7).



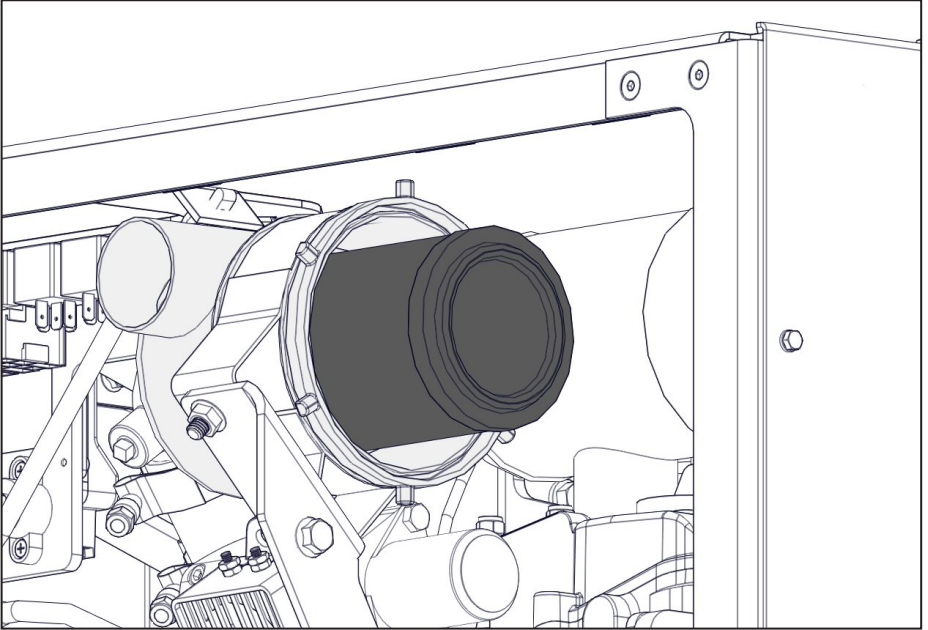
**Figure 7 — Add engine oil**

- ☐ Rotate the air filter cover clockwise until the locks disengage, then remove the cover (Figure 8).



**Figure 8 — Remove air filter cover**

- ☐ Remove the air filter and cover the engine intake with a clean cloth (Figure 9).



**Figure 9 — Remove air filter**

- ☐ Using a clean cloth, clean the inside of the air filter housing.
- ☐ Remove the clean cloth covering the engine intake and install the new air filter.
- ☐ Install the air filter cover, rotating it counterclockwise to lock it into position.
- ☐ Perform all of the additional inspections listed in the Cat C1.1 Operation and Maintenance Manual (P/N: 1930372).
- ☐ Inspect the FEAD belt for any signs of wear.
- ☐ Inspect all wire harnesses for any signs of wear. If signs of wear are present, apply protective loom as necessary and secure with rubber coated P-clips or cable ties.
- ☐ Inspect all hoses for any signs of wear. If signs of wear are present, take appropriate action to prevent further wear.
- ☐ Connect the negative battery terminal.
- ☐ With the fuel "OFF", crank the engine for 15 seconds and immediately turn the key switch to "OFF" (this prevents crankcase bearing damage).
- ☐ Turn the fuel supply valve to "ON".

#### **Prime the Fuel System:**

- ☐ Turn the key switch to the "ON" position for 2 minutes.
- ☐ Turn the key switch to the "OFF" position.
- ☐ Turn the key switch to the "ON" position.
- ☐ Start the engine and allow it to run at base rpm for 2 minutes to ensure the lubrication system and the filter are filled.
- ☐ Stop the engine and allow it to sit for a minimum of 10 minutes to allow the oil to settle.
- ☐ Check the oil level on the engine oil dipstick and add oil as necessary to ensure the level is between the "ADD" and the "FULL" marks.
- ☐ Install the Cat MF top panel.



***There is no way to clear the engine service reminder. Engine service reminders are displayed for 10 hours prior to the service being due, and for an additional 10 hours after the service was due.***

[illegible]



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