



SERVICE MANUAL

LOADER
432ZX PLUS

EN - 9823/0650 - ISSUE 1 - 05/2018


This manual contains original instructions, verified by the manufacturer (or their authorized representative).

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Foreword

The Operator's Manual

 You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator's Manual. You must understand and follow the instructions in the Operator's Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

Do not operate the machine without an Operator's Manual, or if there is anything on the machine you do not understand.

Treat the Operator's Manual as part of the machine. Keep it clean and in good condition. Replace the Operator's Manual immediately if it is lost, damaged or becomes unreadable.

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Introduction

This section contains basic information about the engine. For details of the maintenance procedures, refer to supplier manual.

Make sure that the correct engine service tools, consumables and torque figures are used when you perform service procedures. [Refer to: PIL 78-94-12.](#)

Renewal of oil seals, gaskets, etc, and any component showing obvious signs of wear or damage is expected as a matter of course. It is expected that components will be cleaned and lubricated where appropriate, and that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid, engine oil and ingress of dirt.

Basic Description

The 6 cylinder diesel engine has fuel ignited by compression ignition (C.I.). The engine operates on a four stroke cycle.

The engine is started by an electric starter motor. The starter motor turns the engine via a pinion and teeth on the engine flywheel.

[Refer to: PIL 15-75.](#)

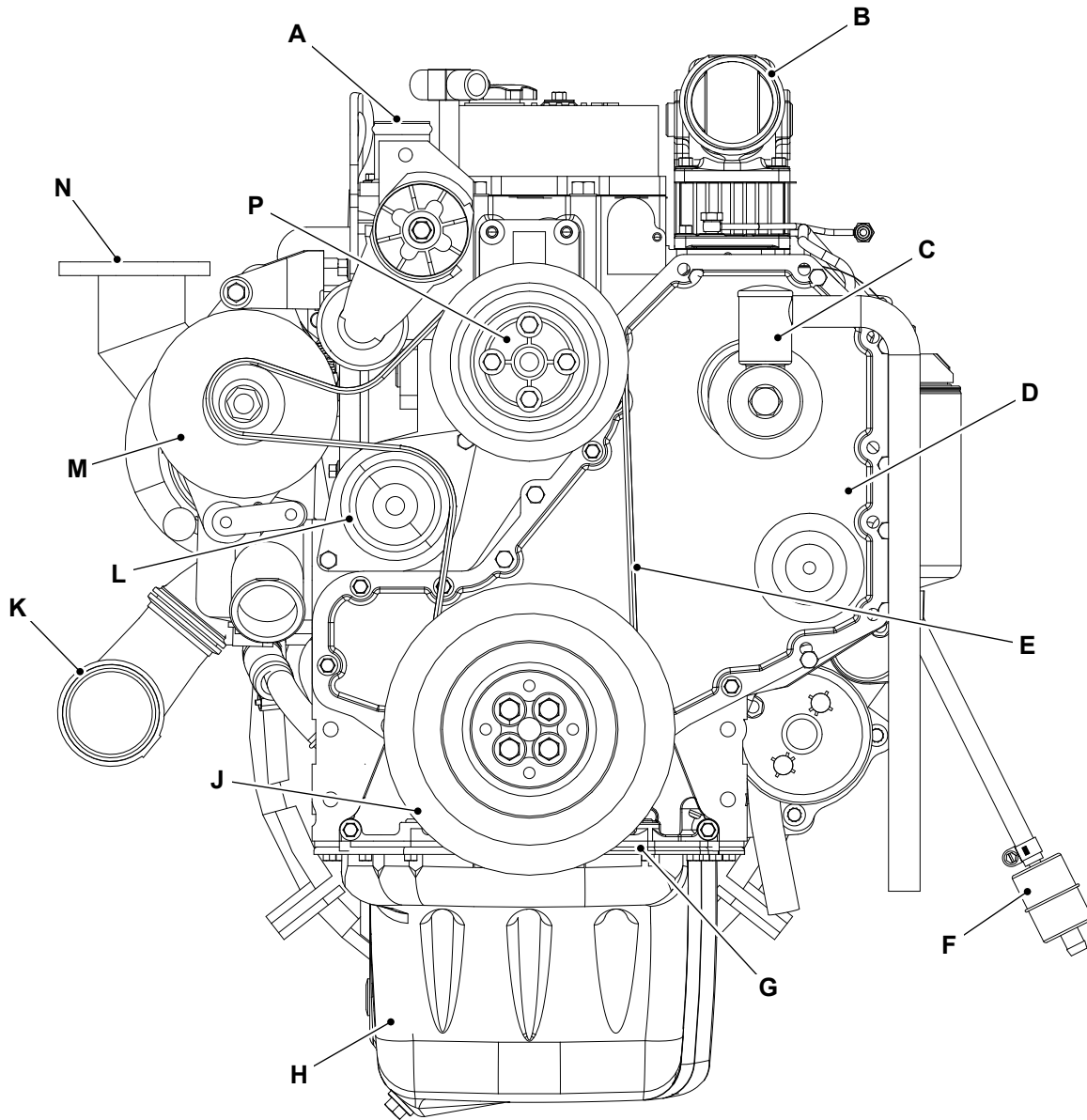
When the engine runs the crankshaft drives the camshaft via gears. The camshaft opens and closes the inlet and exhaust valves and via push rods in time with the four stroke cycle. The engine has 24 valves, 2 inlet and 2 exhaust valves for each cylinder.

The crankshaft also drives a mechanical high pressure fuel pump via gears.

Air is drawn into the engine via the inlet manifold, and exhaust gases exit via the exhaust manifold. The engine uses a turbocharger which pressurises the air at the inlet manifold.

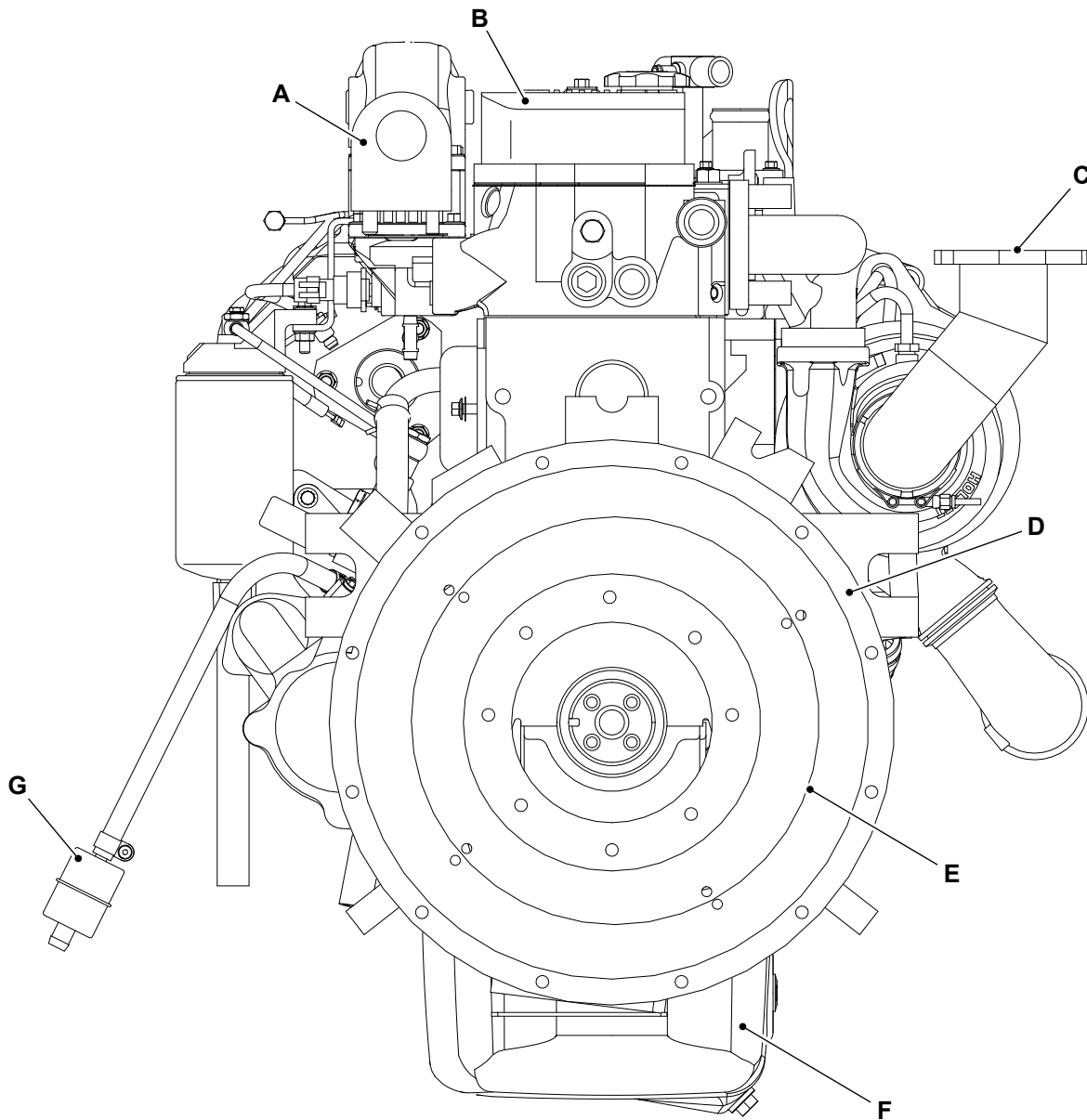
A mechanical lubrication oil pump is driven by the crankshaft via gears. The pump pressurises and circulates oil for engine lubrication and cooling purposes.

A drive belt driven by the crankshaft, drives a coolant circulation pump, alternator, radiator cooling fan and other ancillaries such as an air conditioning compressor.

Component Identification
Figure 90. Front View


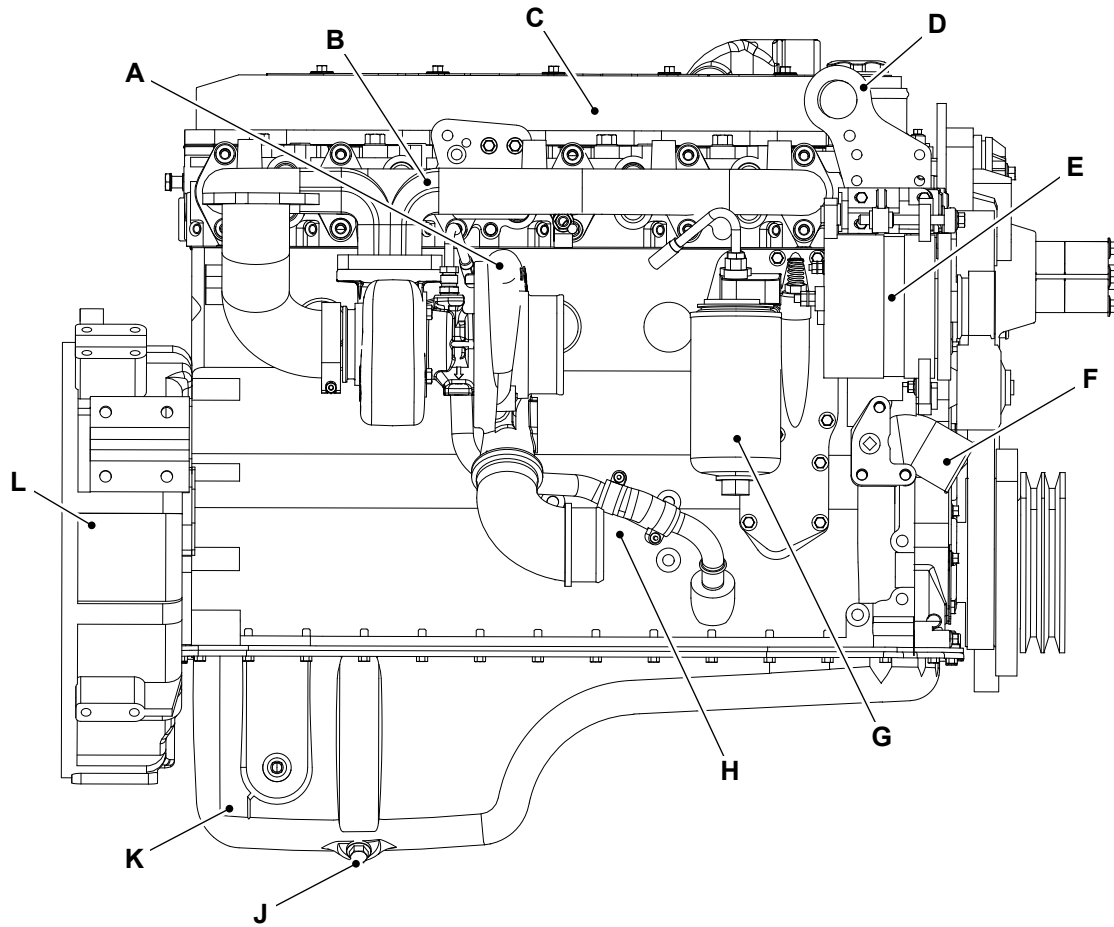
- A** Water outlet connection
- C** Crankcase breather
- E** Belt
- G** Engine front support
- J** Vibration damper
- L** Belt tensioner
- N** Exhaust outlet

- B** Air intake
- D** Gear case cover
- F** Fuel inlet
- H** Oil sump
- K** Turbo compressor outlet
- M** Alternator
- P** Fan pulley

Figure 91. Rear View

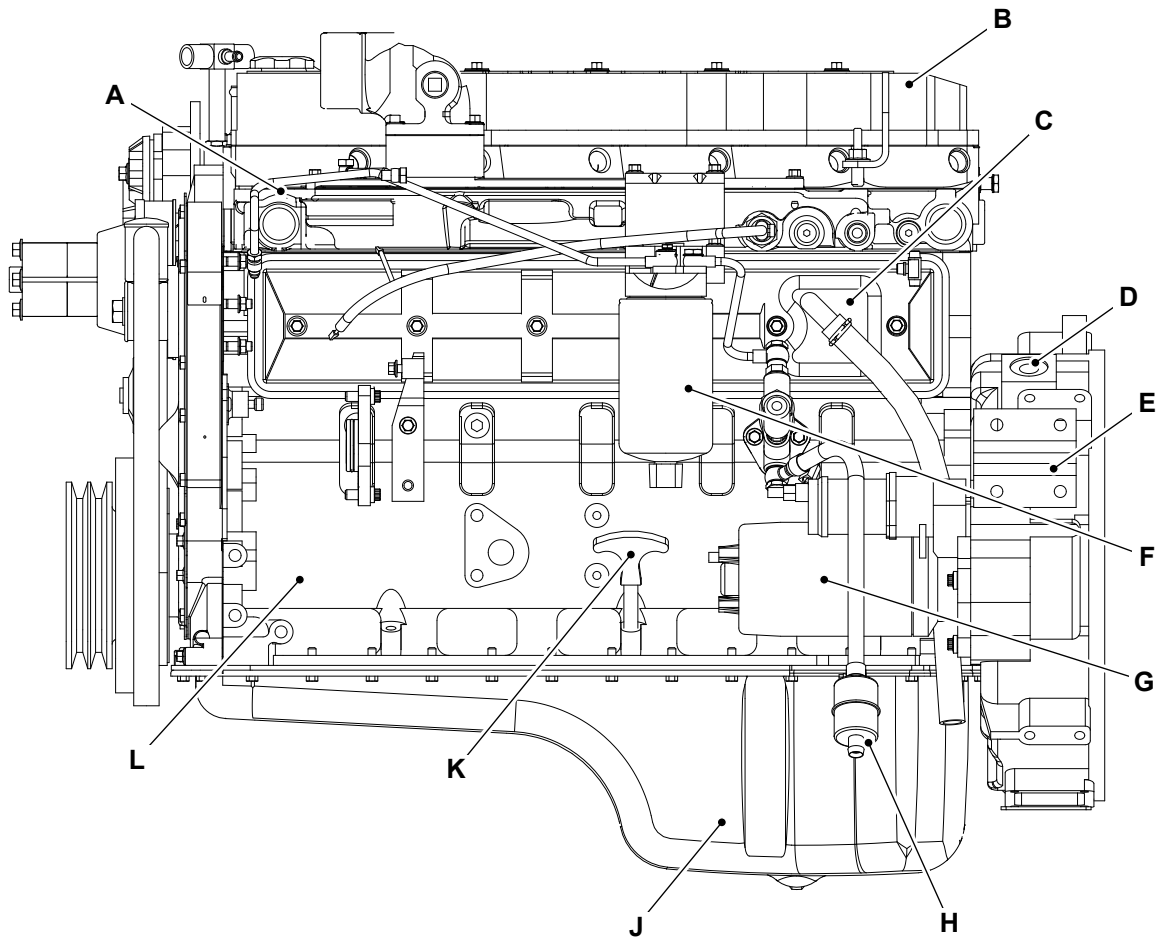
A Rear engine bracket
C Exhaust outlet
E Flywheel
G Fuel inlet

B Valve cover
D Flywheel housing
F Oil sump

Figure 92. Right Side View


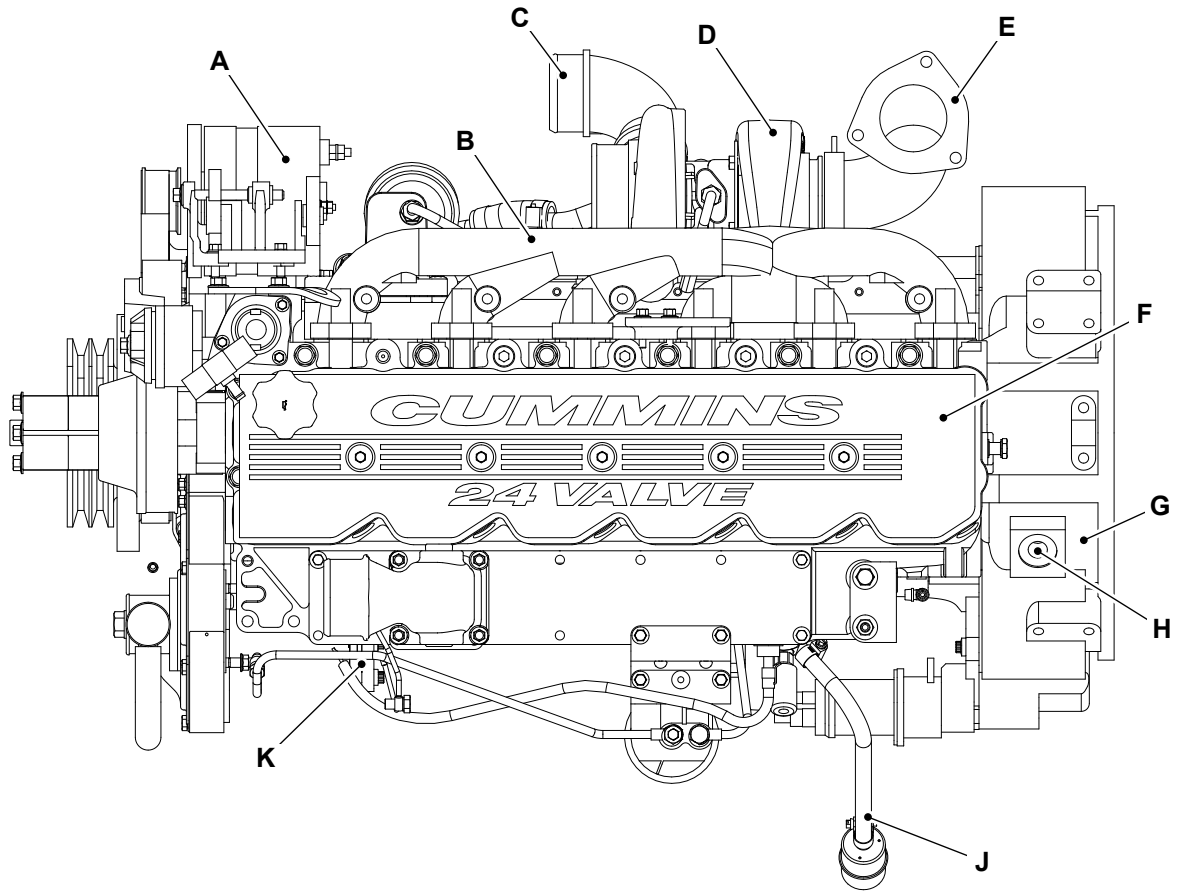
- A** Turbocharger
- C** Valve cover
- E** Alternator
- G** Engine oil cooler
- J** Engine oil drain
- L** Flywheel housing

- B** Manifold - exhaust
- D** Lifting point
- F** Water inlet connection
- H** Crankcase
- K** Oil sump

Figure 93. Left Side View


- A** Fuel pump
- C** Cam follower cover
- E** Flywheel housing
- G** Starter motor
- J** Oil sump
- L** Crankcase

- B** Valve cover
- D** Magnetic pick-up
- F** Fuel filter
- H** Fuel inlet
- K** Oil level gauge

Figure 94. Top View


- A Alternator
- C Air intake
- E Exhaust outlet
- G Flywheel housing
- J Fuel inlet

- B Manifold - exhaust
- D Turbocharger
- F Valve cover
- H Magnetic pick-up
- K Fuel pump

Drain and Fill

Refer to: PIL 15-21-00.

Clean

▲ Notice: Clean the engine before you start engine maintenance. Obey the correct procedures. Contamination of the fuel system will cause damage and possible failure of the engine.

Notice: The engine and other components could be damaged by high pressure washing systems. Special precautions must be taken if the machine is to be washed using a high pressure system.

Make sure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system. Do not aim the water jet directly at bearings, oil seals or the engine air induction system.

Before carrying out any service procedures that require components to be removed, the engine must be properly cleaned.

Cleaning must be carried out either in the area of components to be removed or, in the case of major work, or work on the fuel system, the whole engine and surrounding machine must be cleaned.

Stop the engine and allow it to cool for at least one hour. DO NOT attempt to clean any part of the engine while it is running.

1. Make sure that the electrical system is isolated.
2. Make sure that all electrical connectors are correctly coupled. If connectors are open fit the correct caps or seal with water proof tape.
3. Cover the alternator with a plastic bag to prevent water ingress.
4. Seal the engine air intake, exhaust and breather system.
5. Make sure that the oil filler caps and dipstick are correctly installed.
6. Use a low pressure water jet and soft bristle brush to soak off caked mud or dirt.
7. Apply an approved cleaning and degreasing agent with a brush. Obey the manufacturers instructions.
8. Use a pressure washer to remove the soft dirt and oil. Important: DO NOT aim the water jet directly at oil seals or electrical connectors and electronic components such as ECU (Electronic Control Unit)'s, alternator or fuel injectors. DO NOT place the jet nozzle closer than the specified distance to any part of the engine or exhaust system.

Length/Dimension/Distance: 600 mm

9. When the pressure washing is complete move the machine away from the wash area, or alternatively, clean away the material washed from the machine.
10. Before working on specific areas of the engine use a compressed air jet to dry off any moisture. When the area is dry use a soft clean brush to remove any sand or grit particles that remain.
11. When removing components be aware of any dirt or debris that may be exposed. Cover any open ports and clean away the deposits before proceeding.

Additional cleaning must be carried out prior to working on the high pressure fuel system. [Refer to: PIL 18-00-00.](#)

Health and Safety

Oil

Oil is toxic. If you swallow any oil, do not induce vomiting, seek medical advice. Used engine oil contains harmful contaminants which can cause skin cancer. Do not handle used engine oil more than necessary. Always use barrier cream or wear gloves to prevent skin contact. Wash skin contaminated with oil thoroughly in warm soapy water. Do not use petrol, diesel fuel or paraffin to clean your skin.

CAUTION! *It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants. Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.*

CAUTION! *Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.*

CAUTION! *The oil filter canister will contain some oil which could spill out when you remove the canister.*

Operation

At Engine Running

The oil pump delivers oil at pressure to the oil filter via a port. The anti-drain seal is forced off its seat and oil flows through a large area paper element. Filtered oil enters the inner part filter before leaving the filter head via a port.

At Engine Stopped

With the engine stopped oil pressure in the galleries and filter decays. The anti-drain seal falls on its seat and oil is prevented from draining from the filter assembly. The anti-drain pipe prevents approximately half the filters oil capacity from draining. These features help protect the engine from oil starvation on start up.

Check (Level)

▲ WARNING Never check the oil level or add oil with the engine running. Be careful of hot lubricating oil. Danger of scalding.

Notice: Do not exceed the maximum level of engine oil in the sump. If the maximum is exceeded, the excess must be drained to the correct level. An excess of engine oil could cause the engine speed to increase rapidly without control.

1. Make the machine safe.
[Refer to: PIL 01-03-27.](#)
2. Wait for the oil to drain back into the engine sump before you take a reading. If not, a false low reading may be recorded which can cause the engine to be overfilled.
3. Get access to the engine compartment (if applicable).
[Refer to: PIL 06-06-06.](#)
4. Remove and clean the dipstick.
[Refer to: PIL 01-09-12.](#)
5. Put the dipstick into the tube then remove the dipstick.
6. Check the oil level. The oil should be between the two marks on the dipstick.
7. If necessary, add more oil:
 - 7.1. Remove the filler cap.
[Refer to: PIL 01-09-12.](#)
 - 7.2. Add the recommended oil slowly through the filler point
[Refer to: PIL 75-00-00.](#)
 - 7.3. Install the filler cap and make sure it is tight.
8. Close and secure the engine cover (if applicable).

Remove and Install

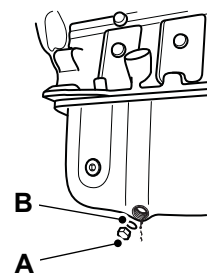
▲ CAUTION Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.

CAUTION It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

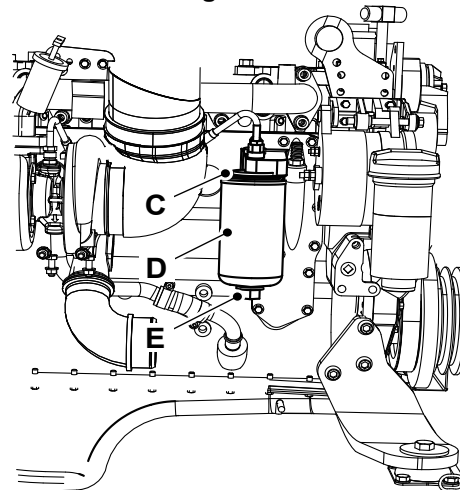
Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

Figure 95.



- A** Drain plug (Sump)
- B** O-ring

Figure 96.



- C** Drain tube
- D** Oil filter canister
- E** Filter housing drain plug

1. Make the machine safe.
[Refer to: PIL 01-03-27.](#)
2. Get access to the engine compartment.
[Refer to: PIL 06-06-06.](#)
3. Place a suitable container below the drain plug.

4. Drain the oil into a suitable container:
 - 4.1. Remove the drain plug.
 - 4.2. Remove and discard the O-ring and let the oil drain.
5. When the oil has completely drained:
 - 5.1. Clean the drain plug. Install the drain plug with a new O-ring. Tighten the drain plug to the correct torque value.
6. Remove the filter canister.
 - 6.1. Use a chain wrench if necessary.
7. Clean the seal face of the filter head.
8. Smear the new seal on the new filter canister with clean engine oil.
9. Install and tighten the new filter canister until the seal just contacts the filter head and then tighten the filter canister at least 3/4 of a turn.
10. Add the correct specification and quantity of oil through one of the filler points to the maximum mark on the dipstick.

[Refer to: PIL 75-00-00.](#)

 - 10.1. Clean any spilt oil.
11. Install the filler cap and make sure it is secure.
12. Operate the engine at idle speed until the oil pressure low warning light has extinguished and the new filter primed before the engine speed is increased above idle speed.
13. Check for leaks.
14. Check the oil level when the oil has cooled.
 - 14.1. Replenish with specific engine oil, if necessary.

00 - General

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Introduction

Engine performance and durability will be severely affected if the quality of the air intake is poor.

A dirty and blocked air cleaner element will reduce the amount of air entering the combustion chamber which can cause engine mis-firing, black smoke and low output power.

A dirty and blocked air filter can also lead to abrasion of the cylinder bores and valves (referred to as dusting). This will cause excessive oil consumption, black smoke, low output power and a reduced engine life.

In hostile environments, change the air filter elements more frequently.

In some applications, an air filter pre-cleaner can be installed.

Health and Safety

▲ **Notice:** Do not run the engine when the element has been removed.

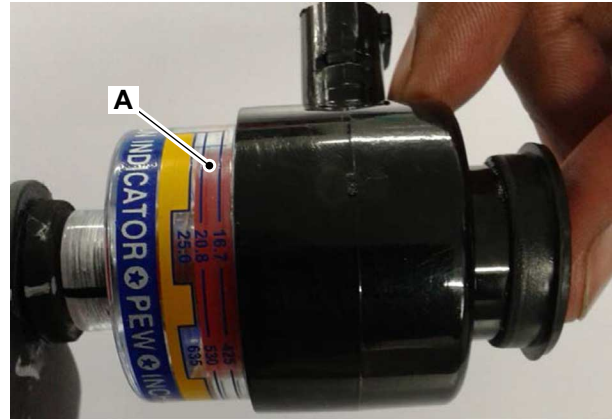
Notice: The outer element must be renewed immediately if the warning light on the instrument panel illuminates.

Clean

When the red band appears in the service indicator of the air filter, you must replace the primary element.

During the third service interval you must replace the safety element from the air cleaner assembly.

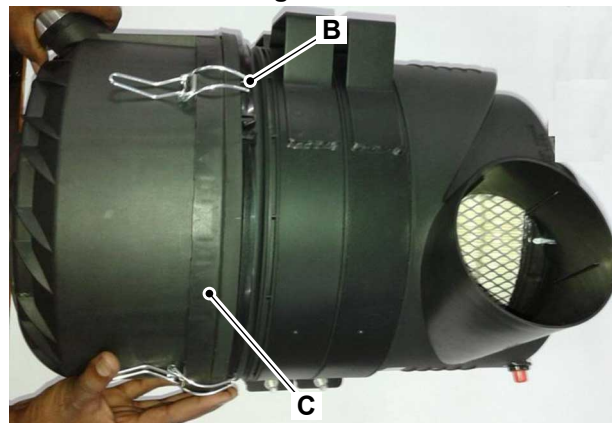
Figure 97.



A Air filter indicator

1. Make the machine safe.
[Refer to: PIL 01-03-27.](#)
2. You must not start the engine when the filter element or piping is removed.
3. Always install a new filter element, it is not recommended to clean the filter element.
4. Disengage the clamp and remove the top cover.

Figure 98.



B Clamp
 C Top cover

5. Gently twist the end of the filter to disengage the seal.
 - 5.1. Remove the filter element from the housing.

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