SERVICE MANUAL

EXCAVATOR

JS200, JS210, JS220, JS235

EN - 9813/7300 - ISSUE 2 - 11/2017

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

Foreword

The Operator's Manual

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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.

Contents

00 - General

Introduction

The oil pump is a rotor type pump located inside the timing gear case. The pump is driven by gears via the crankshaft.

The pump consists of two rotors, one running inside the other. The outer rotor has one more lobe than the inner rotor and turns on a different axis.

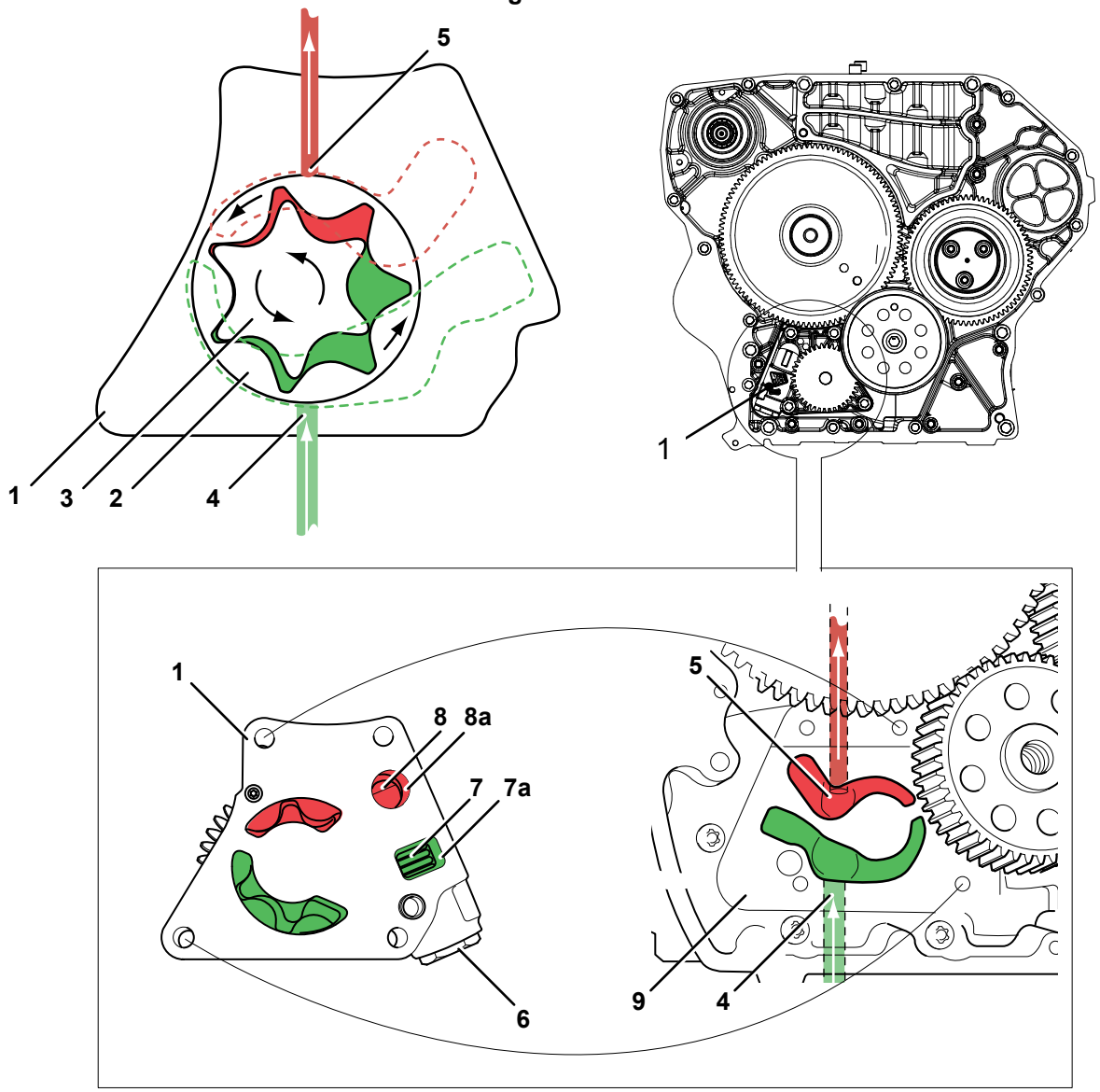
When rotated the gap between the inner and outer rotor lobes increases, drawing oil in through the inlet port. After a half rotation the gap reaches a maximum, the inlet port is closed and the outlet port opens.

Further rotation causes the gap between the lobes to diminish, forcing the oil out through the outlet port.

A pressure relief valve assembly is integral with the pump body. As oil pressure increases it acts on a spool to overcome the pressure of the spring. As the spool moves it uncovers a port allowing pressurised oil directly back to the inlet port. In practice the spool is continually opening and closing to maintain the correct oil pressure value. The valve is not adjustable.

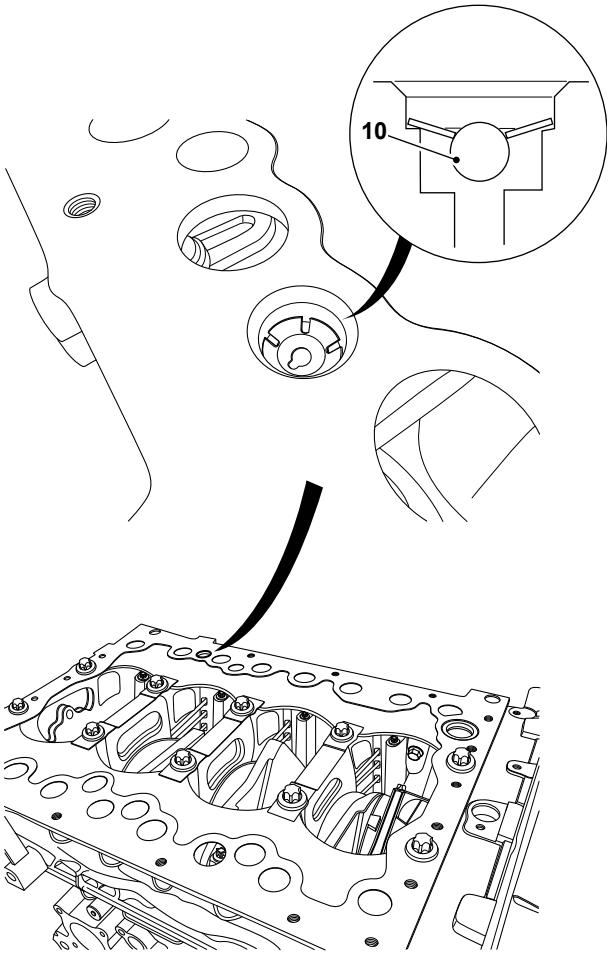
Component Identification

Figure 203.



1 Oil pump
2 Outer rotor
3 Inner rotor
4 Inlet port
5 Outlet port
6 Relief valve assembly
7 Relief valve spring
7a Relief valve port (return to inlet port 4)
8 Relief valve spool
8a Relief valve pressure port (connected to port 5)
9 Oil pump connecting ports (engine bed plate)

Figure 204.



10 CCV Anti drain back valve

Remove and Install

Special Tools

Description	Part No.	Qty.
Torque Wrench (10-100Nm)	993/70111	1

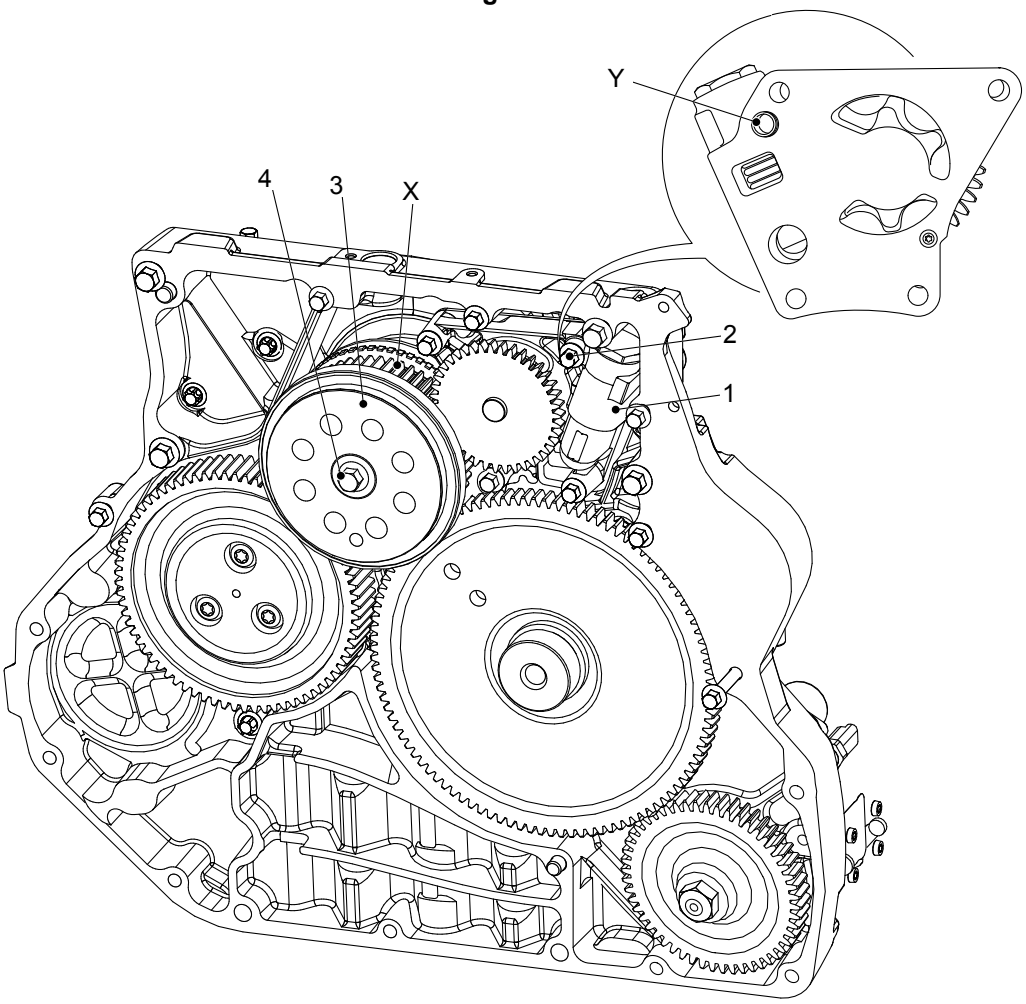
The illustrations show the engine inverted. If the oil pump is being removed prior to crankshaft or camshaft removal, the engine must be inverted. If the oil pump only is being removed (for inspection or renewal) then the engine need not be inverted.

This procedure requires service parts. Make sure you have obtained the correct service parts before you start, refer to Parts Catalogue.

Before Removal

1. Make sure that the engine is safe to work on. If the engine has been running, let it cool before you start the service work.
2. Drain the oil from the engine, refer to (PIL 15-21).
3. Remove the starter motor, refer to (PIL 15-75).
4. Remove the flywheel, refer to (PIL 15-54).
5. Remove the flywheel housing, refer to (PIL 15-54).

Figure 205.



1 Oil pump
2 Oil pump fixing bolts (x4)
3 Flywheel hub
4 Flywheel hub fixing bolt
X Crankshaft gear
Y Oil pump location dowel

Remove

1. Remove the flywheel hub fixing bolt.
2. Remove the flywheel hub. DO NOT remove the crankshaft gear.
3. Remove the oil pump fixing bolts and lift the oil pump away from the timing gear case.

The oil pump is a non-serviceable item. If the oil pump is damaged or worn it must be renewed as a complete assembly.

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following steps.
2. Make sure that all parts are clean and free from damage and corrosion.
3. Lubricate the pump rotor with clean engine oil.
4. Make sure that the oil pump location dowel locates into the hole in the gear timing case.
5. Install the flywheel hub into the crankshaft gear, locating on the dowel. Tighten the bolts to the correct torque value.

   Special Tool: Torque Wrench (10-100Nm) (Qty.: 1)

After Replacement

1. Install the flywheel housing, refer to (PIL 15-54).
2. Install the flywheel to the crankshaft hub, refer to (PIL 15-54).
3. Install the starter motor, refer to (PIL 15-75).
4. Fill the engine with engine oil, refer to (PIL 15-21).

Table 87. Torque Values

Item	Nm
2	24
4	47

00 - General

Introduction

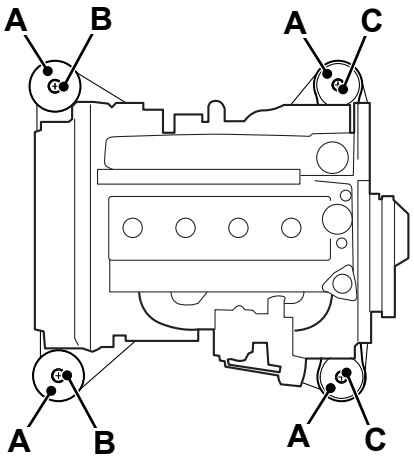
Engine mounts support the engine and in some cases the transmission, they dampen noise and vibration. The mounts isolate the engine and transmission from the chassis so that vibrations and noise are not transmitted to the rest of the machine.

Most engine mounts consist of metal attachment plates and large rubber insulator blocks. The rubber portions of the mount are flexible and provide the cushioning that dampens the engine vibrations. The metal bracket part of the mount provides the mechanical support and attachment points for the engine mounts.

Check (Condition)

1. Check the condition of the four engine mountings. Make sure that all the fixing bolts are secure and tightened to the correct torque values.
2. Make sure that the mounting components are free from defects such as splits or cracks. Replace defective components as necessary.

Figure 206.



A Engine mountings
B Fixing bolts (M20)
C Fixing bolts (M16)

Table 88. Torque Values

Item	Nm
B	476
C	244

Remove and Install

Consumables

Description	Part No.	Size
JCB Threadlocker and Sealer (Medium Strength)	4101/0250	0.01L
	4101/0251	0.05L

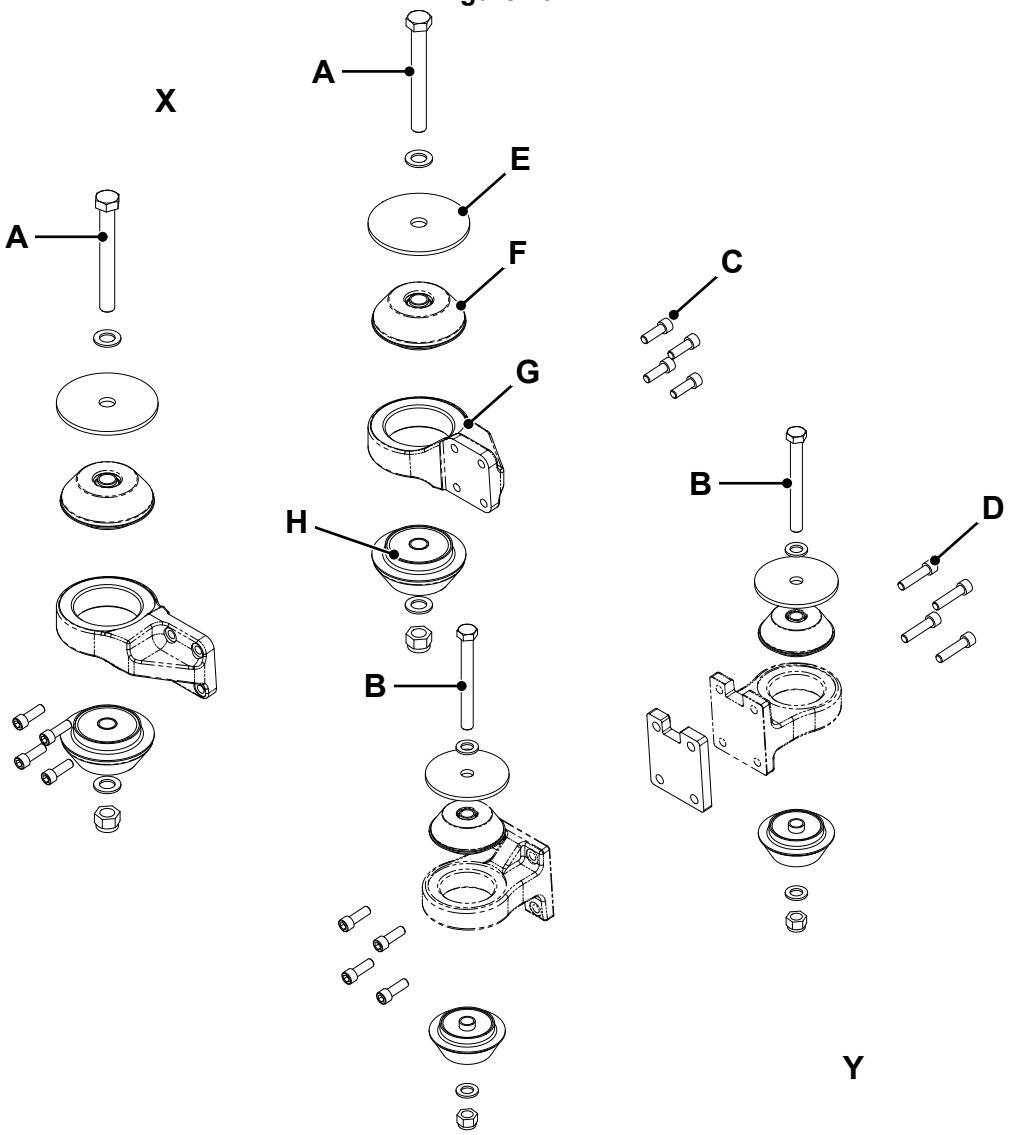
Before Removal

1. Make sure that the engine is safe to work on. If the engine has been running, let it cool before you start the service work.
2. Position the machine on firm level ground. Make the machine safe. Refer to (PIL 01-03).
3. Get access to the engine.

Remove

1. Remove the bolt 1 or bolt 2 (as applicable) and its associated plate, washer and nut from the applicable engine mount.
2. Remove the engine. Refer to (PIL 15-00). Alternatively use suitable lifting equipment to take the weight of the engine and hydraulic pump.
   2.1. Do not remove an engine mount unless the weight of the engine is safely supported.
   2.2. Remove and install only one engine mount at a time.
3. Remove the four bolts 3 or bolts 4 at the applicable mounting casting.
4. Remove the upper rubber.
5. Remove the lower rubber.
   5.1. The lower rubber is retained in the mounting casting with adhesive.

Figure 207.



A Bolts 1
B Bolts 2
C Bolts 3
D Bolts 4
E Plate
F Upper rubber
G Mounting casting
H Lower rubber
X Hydraulic pump end of the engine
Y Cooling fan end of the engine

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following steps.
2. Use suitable adhesive to retain the lower rubber in the applicable mounting casting.
3. Apply retaining compound to bolts 3 and bolts 4.

   Consumable: JCB Threadlocker and Sealer (Medium Strength)
4. Tighten bolts 1, bolts 2, bolts 3 and bolts 4 to the correct torque value.

Table 89. Torque Values

Item	Nm
A	529
B	271
C	125
D	125

00 - General

Introduction

Oil Cooler Assembly

The oil cooler and filter are incorporated in a housing that is bolted to the side of the crankcase. The housing allows transfer of lubricating oil from the crankcase to the oil cooler and filter head.

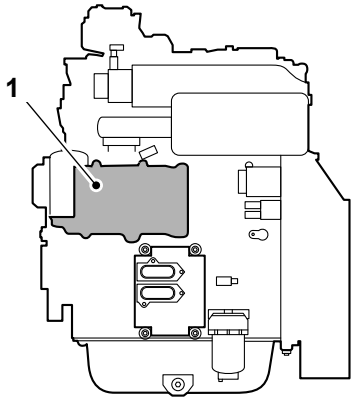
Some installations have a remote oil filter head. The oil cooler housing incorporates feed and return ports for hose connections to the filter head. A remote oil filter head is used when access to the engine is restricted.

Oil Cooler Matrix

The oil cooler matrix is a non-serviceable part and must not be removed from the housing. The housing/ cooler assembly is leak tested during manufacture to minimise the risk of cross contamination of coolant and lubricating oil.

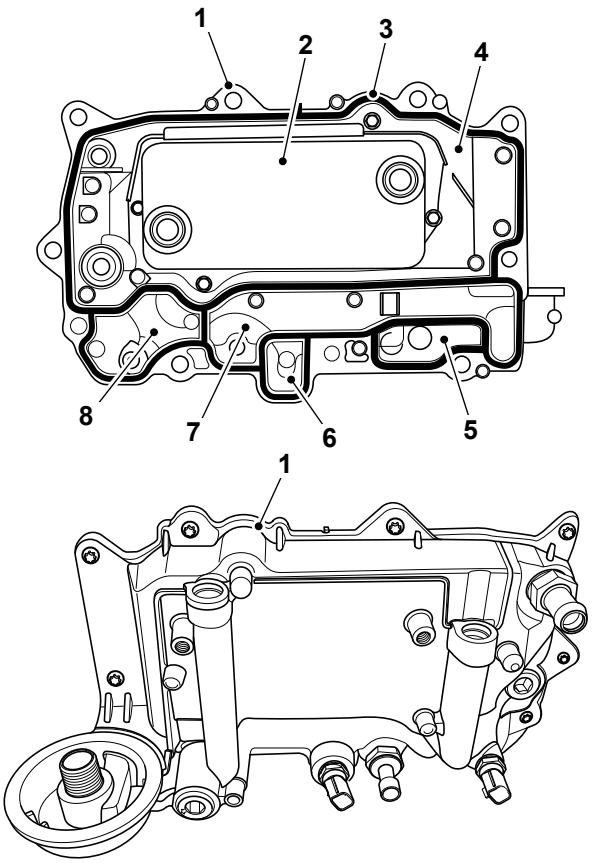
Component Identification

Figure 208.



1 Oil cooler housing

Figure 209.



1 Oil cooler housing
2 Oil cooler matrix
3 Sealing gasket (housing to crankcase)
4 Coolant gallery
5 Oil gallery (from cooler to filter head)
6 Oil fill port
7 Oil gallery (from filter head to main oil gallery)
8 Oil gallery (from pump to cooler)

Operation

The oil cooler housing allows transfer of lubricating oil from the crankcase to the oil cooler and filter head. The coolant also transfers to the housing and passes over the oil cooler matrix causing heat to exchange from the oil to the coolant.

The cooled and filtered oil then passes back into the main oil gallery into the crankcase.

An engine oil filler point is also included via cap and port which aligns with a port in the crankcase.

Check (Condition)

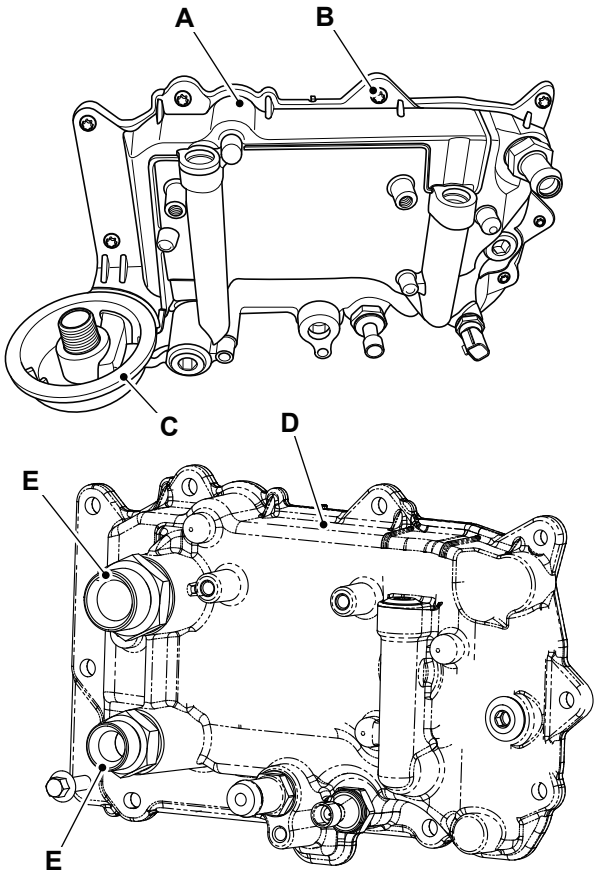
1. Inspect the sealing faces on the oil cooler matrix, oil cooler housing and the crankcase. Make sure that the faces are clean and free from scale or damage.
2. Inspect the sealing gasket and o-rings for signs of damage. If in doubt, renew the gasket or O-rings.

Remove and Install

Before Removal

1. Make sure that the engine is safe to work on. If the engine has been running, let it cool before you start the service work.
2. Drain the coolant, refer to (PIL 21-00).
3. Remove the oil filter, refer to (PIL 15-21).

Figure 210.



A Oil cooler housing (integral oil filter head)
B Oil cooler housing fixing bolts (x10)
C Oil filter head
D Oil cooler housing (remote oil filter head)
E Remote oil filter head hose ports

Remove

1. Get access to the engine.
2. If applicable, disconnect the electrical connectors at the oil pressure switch and the oil temperature sensor.
3. If applicable, label and disconnect the electrical connectors at the ECM (Engine Control Module). Do not touch the electrical pins on the ECM. Cap the connectors on the harnesses and the

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