Service Manual

JCB Dieselmax Mechanical Engine

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Crankshaft Data

Main bearing journal diameter (x4)	
- min	87.98 mm (3.460 in)
- max	88.00 mm (3.464 in)
Main rear bearing journal diameter (x 1)	
- min	99.98 mm (3.936 in)
- max	100.00 mm (3.937 in)
Connecting rod bearing journal diameter	
- min	72.98 mm (2.873 in)
- max	73.00 mm (0.2755 in)
Maximum wear and ovality on journals	TBA mm
Crankshaft induction hardness	55 HRc min on surface
Thrust washer width	
- min	2.44 mm (0.096 in)
- max	2.50 mm (0.787 in)
Crankshaft end float	
- min	0.05 mm (0.002 in)
- max	0.28 mm (0.011 in)

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Electrical Components

The engine electrical components operate on a 12 volt negative earth system. The schematic and component list are typical only and should not be used as a reference for a specific machine.

It is the responsibility of the original equipment manufacturer (OEM) to provide suitable fuses and relays within the parent machine electrical system to protect the components and wiring harness.

Note: *The engine components must have separate earth wires provided as part the parent machine wiring harness.*

Table 32. Component Identification

⇨ *Fig 48. (📄 4-65)*	
Engine Components (supplied with the engine)	
1	Starter motor
2	Alternator
3	Grid heater - air intake (cold climate option)
	- Rating: 100 Amps
4	Water present switch - fuel sedimenter
5	Coolant temperature sender/switch
	- Setting: 105 - 111 °C
	- Connector: Deutsch DT 2-way
6	Lubricating oil pressure switch
	- Setting: 0.6 Bar (8.7 lb in²)
	- Connector: Deutsch DT 2-way
7	Engine shut-off solenoid
	- Connector: AMP Junior Timer 2-way
8	Cold start advance switch
	- Setting: +40 °C
	- Connector: Deutsch DT 2-way
9	Cold start advance solenoid
	- Connector: AMP Junior Timer 2-way

Table 33. System Components (part of the parent machine)

⇨ *Fig 48. (📄 4-65)*	
A	Battery Isolator (optional)
B	Battery
C	Primary fuse
D	Primary fuse (125 Amp typical)
E	Ignition switch
F	Fuse
G	Fuse (5 Amp typical)
H	Warning lamp - Alternator 'No charge'
J	Tachometer
K	Timer relay - grid heater
L	Warning lamp - 'Water in fuel'
M	Warning lamp - Coolant 'Over temperature'
N	Coolant temperature gauge
P	Warning lamp - Lubricating oil 'Pressure low'
R	Warning buzzer

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Table 23. Coolant - Over Temperature

Cause	Remedy
Incorrect coolant level (low).	Check the level, refer to ***Engine Cooling System, Section 3***. Ensure low level is not as a result of a coolant leak. ⇨ *Table 22. Coolant - Loss (5-25)*.
External radiator matrix blocked with dirt or chaff.	Clean exterior or radiator matrix.
Air flow to the radiator inadequate or restricted.	Check/repair fan shroud, anti-recirculation sealing, shutters, fan sensors, fan speeds as required. Refer to the machine manufacturer's documentation for detailed information.
Coolant pump or fan drive belts loose.	Check/correct belt tension.
Radiator hose collapsed, restricted or leaking.	Check/replace hose.
Oil level over-full.	Check oil level, refer to ***Engine Oil, Section 3***.
Cooling system pressure cap incorrect or faulty.	Replace cap with the correct rating for the system.
Over concentration of anti-freeze.	Remove part of the coolant from cooling system and replace with water. Refer to ***Coolant Mixtures, Section 3***.
Temperature sensor gauge faulty.	Verify that the gauge and temperature sensor are accurate. Refer to ***Test Procedures, Section 6***.
Thermostat faulty, incorrect or missing.	Check/replace the thermostat. Refer to ***Thermostat, Section 8***.
Air or combustion gases in the cooling system.	Make sure the fill rate is not exceeded and the correct vented thermostat is installed. If aeration continued, check for a compression leak through the head gasket.
Coolant pump faulty.	Check/replace the coolant pump. Refer to ***Coolant Pump, Section 8***.
Vent line from engine and/or radiator blocked or incorrectly routed (sudden overheating).	Check routing and operation or vent line.
Leak between the top tank and the auxiliary tank (sudden overheating).	Check for coolant leakage between radiator auxiliary tank and radiator top tank.
Cooling passages in radiator, cylinder head, head gasket or block blocked.	Flush the system and fill with clean coolant.
Fuel injection pump timing incorrect.	Injection pump timing incorrect.If the pump has recently been removed and replaced, the timing could be incorrect if the correct removal procedures were not followed. The timing can only be checked by a local FIE specialist using the appropriate equipment. Refer to ***Fuel Injection Pump, Section 7*** for removal and replacement procedures.

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Thermostat

The thermostat is of the wax element type and is configured for by-pass blanking. The thermostat functions as follows:

State A - `Closed' - Engine Cooled

Because the engine is cold the wax pellet **45-5** has contracted in its housing. This allows spring **45-2** to act against the thermostat body and move valve plate **45-3** up against its seat, closing the outlet port **45 -8** to the radiator. Since the bottom valve plate **45-4** is connected to the top valve plate it also moves up, opening the by-pass port **45-10**. Coolant flows from the thermostat housing inlet port **45-9** into the bypass gallery.

State B - `Open' - Engine Hot

When hot, the wax pellet melts. As it does so it expands and pushes against diaphragm **45-6**. The diaphragm reacts against the actuating rod **45-7** and both the top and bottom valve plates (**45-3** and **45-4**) move down in the thermostat body, compressing spring **45-2**. Now the outlet port **45-10** to the radiator is open and by-pass port **45 -10** is closed.

A 1.0 mm (0.039 in.) diameter orifice **45-11** allows trapped air to be expelled from the system.

Table 30. Key

⇒ *Fig 45. (📄 4-62)*	
1	Thermostat
2	Spring
3	Thermostat top valve plate
4	Thermostat bottom valve plate
5	Wax pellet
6	Diaphragm
7	Actuating rod
8	Outlet port - to radiator top hose
9	Inlet port - thermostat housing
10	Outlet port - by-pass gallery
11	1.0 mm (0.039 in.) diameter orifice
A	Thermostat state - `Closed' - engine cold
B	Thermostat state - `Open' - engine hot

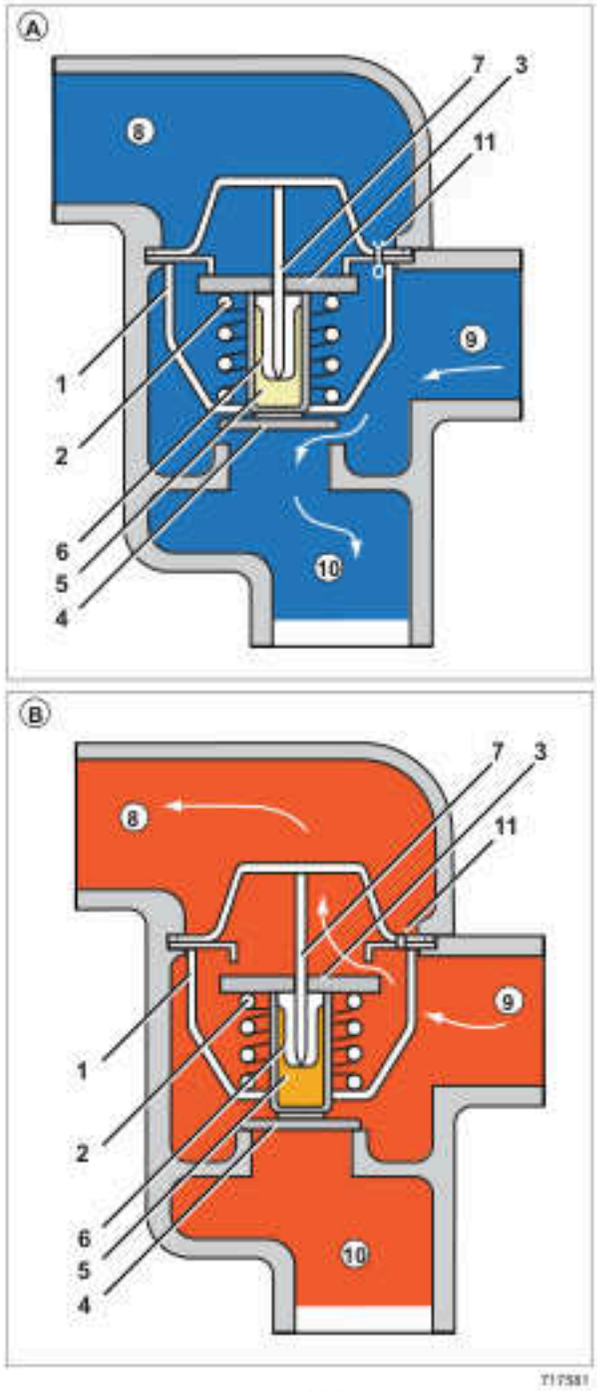


Fig 45.

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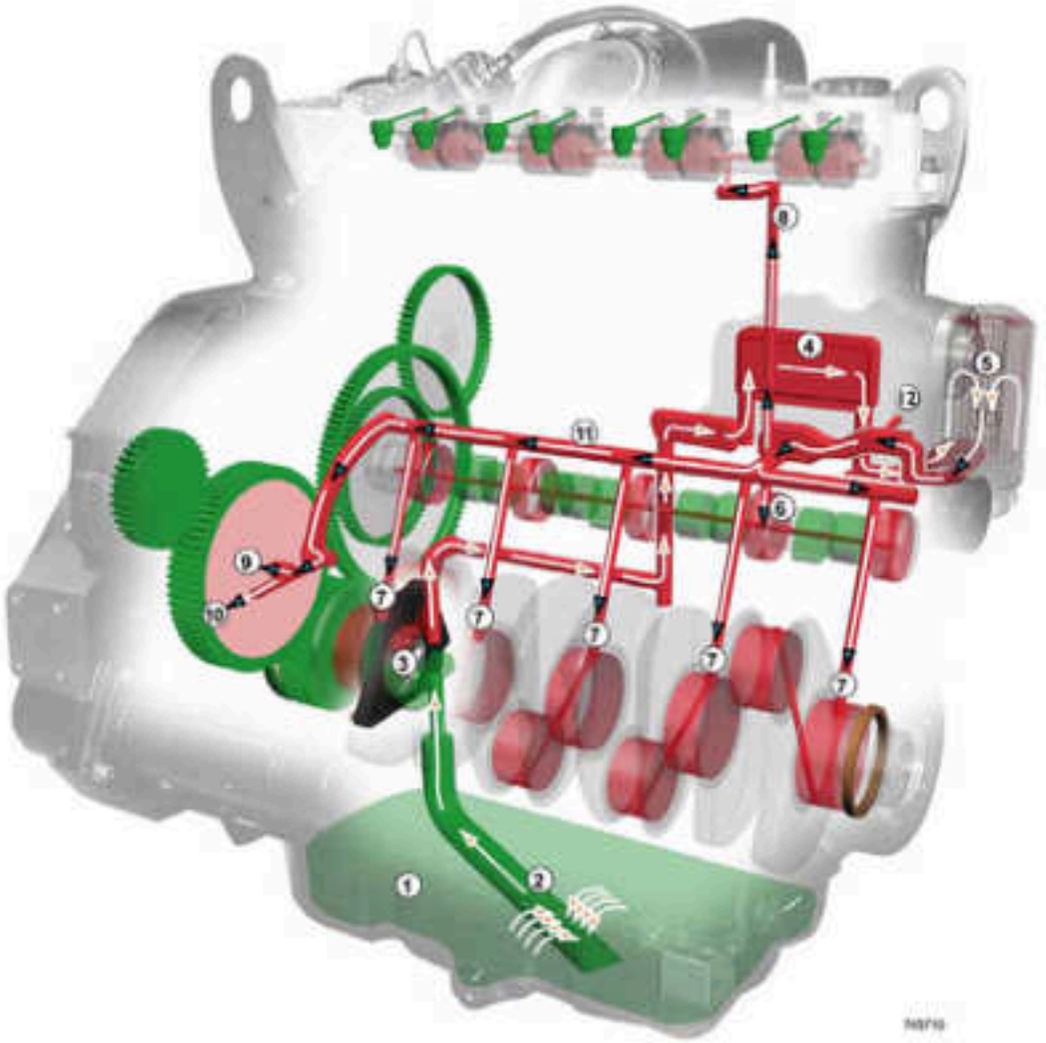


Fig 18.

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