# Service Manual

# JCB Dieselmax Tier 3 SE Engine


Section 1 - General Information
Section 2 - Care and Safety
Section 3 - Routine Maintenance
Section 4 - Systems Description
Section 5 - Fault Finding
Section 6 - Test Procedures
Section 7 - Fuel System
Section 8 - Cooling System
Section 9 - Lubrication System
Section 10 - Electrical System
Section 11 - Induction and Exhaust System
Section 12 - Base Engine
Section 13 - Electronic Data Systems





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Contents Page No.

**Introduction**
About this Manual ..... 1 - 1
Using the Service Manual ..... 1 - 1
Section Numbering ..... 1 - 1
Left Side, Right Side ..... 1 - 1
Units of Measurement ..... 1 - 1
Machine Related Data ..... 1 - 2

**Cleanliness Requirements**
Effects of Contamination ..... 1 - 3
Common Rail Fuel Injection System ..... 1 - 3
Maintenance Environment, Common Rail Fuel Injection ..... 1 - 4
Cleaning the Engine ..... 1 - 6
Further Cleaning Procedures, Common Rail Fuel Injection ..... 1 - 7

**Terms and Definitions**
Acronyms and Abbreviations ..... 1 - 8

**Technical Data**
Fuel ..... 1 - 9
Acceptable and Unacceptable Fuels ..... 1 - 9
Fuel Types ..... 1 - 11
Usage and Effects of Fuels ..... 1 - 12
Sulphur Content ..... 1 - 13
Effects of Fuel Contaminates ..... 1 - 14
Basic Engine Data ..... 1 - 15
Engine Block & Bedplate Data ..... 1 - 16
Cylinder Head Data ..... 1 - 17
Inlet and Exhaust Valve Data ..... 1 - 18
Rocker Levers, Rocker Shaft and Tappets Data ..... 1 - 19
Pistons and Connecting Rods Data ..... 1 - 20
Crankshaft Data ..... 1 - 21
Camshaft Data ..... 1 - 22
Fuel System Data ..... 1 - 23
Lubrication System Data ..... 1 - 24
Cooling System Data ..... 1 - 25
Electrical Equipment Data ..... 1 - 26
Switches and Sensors ..... 1 - 26

**Identifying the Engine**
Engine Identification Plate ..... 1 - 29
Typical Engine Identification Number ..... 1 - 29
Component Labels ..... 1 - 29
Engine Component Identification ..... 1 - 30
External ..... 1 - 30

**Torque Settings**
Zinc Plated Fasteners and Dacromet Fasteners ..... 1 - 38
Introduction ..... 1 - 38
Bolts and Screws ..... 1 - 38
Hydraulic Connections ..... 1 - 42
'O' Ring Face Seal System ..... 1 - 42
'Torque Stop' Hose System ..... 1 - 45
Torque + Angle Explanation ..... 1 - 46
Torque + Angle Tightening Procedure ..... 1 - 47



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**Contents** **Page No.**

Engine Torque Figures ..... 1 - 48

**Lubricants and Capacities**
Engine Lubricating Oil ..... 1 - 62
Recommended Oils ..... 1 - 62
Engine Oil Capacity ..... 1 - 62
Coolant ..... 1 - 63
Coolant Mixtures ..... 1 - 64
Coolant Mixtures ..... 1 - 64

**Service Aids**
Sealing, Retaining and Care Compounds ..... 1 - 65

**Service Tools**
General Engine Tools ..... 1 - 66
Specialist Engine Tools ..... 1 - 68
Service Tool Drawings ..... 1 - 74
892/01146 - Core Plug Fitting Tool ..... 1 - 74
892/01147 - Crankshaft Turning Tool ..... 1 - 75
892/01148 - Timing Pin ..... 1 - 76
892/01149 - Sump Sealant Template ..... 1 - 77
892/01150 - Oil Sump Location Dowel ..... 1 - 78
892/01151 - Injector Sleeve Removal Tool ..... 1 - 79
892/01152 - Valve Stem Seal Fitting Tool ..... 1 - 80
892/01154 - FIP Cover Removal Tool ..... 1 - 81
892/01155 - FIP Gear Removal Tool ..... 1 - 82
892/01157 - Crankshaft Front Seal Fitting Tool ..... 1 - 83
892/01156 - Crankshaft Rear Seal Fitting Tool ..... 1 - 84
892/01158 - Crankshaft Rear Seal Alignment Tool ..... 1 - 85
892/01159 - Injector Seal Fitting Tool ..... 1 - 85
892/01168 - Dummy Injector ..... 1 - 86
Engine Mounting Frame ..... 1 - 87

**Service Parts and Repair Kits**
Engine Repair Parts and Kits Identification ..... 1 - 88

**Engine Lifting**
Lifting Information ..... 1 - 101

**Operating Procedures**
Starting the Engine ..... 1 - 102
Pre-Start Notes ..... 1 - 102
Start Procedure ..... 1 - 103
Engine Checks After Start-up ..... 1 - 104
Engine Running-in Procedure ..... 1 - 105
Stopping the Engine ..... 1 - 106

**Storage and Preservation**
Storage ..... 1 - 108
Preservation ..... 1 - 109
Capping Engine Openings ..... 1 - 109
Hot Test Description ..... 1 - 110



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# Inlet and Exhaust Valve Data

| | |
|---|---|
| Max lift inlet | 9.64 mm @ 101° atdc |
| Max lift exhaust | 9.84 mm @ 115° btdc |
| Inlet opens (top of ramp) | 6° btdc |
| Inlet closes | 28° abdc |
| Exhaust opens | 41° bbdc |
| Exhaust closes | 9° atdc |
| Valve stem diameter | |
| - inlet | 6.928-6.943mm (0.2727-0.2733 in) |
| - exhaust | 6.918-6.933mm (0.2724-0.2729 in) |
| Valve spring free length | 40.18mm (1.581 in) |
| Valve guide bore diameter | |
| - min | 6.958mm (0.2739 in) |
| - max | 6.968mm (0.2743 in) |
| Valve face angle | |
| - inlet | 60.5 ° |
| - exhaust | 45.17 ° |
| Valve length | 131.9-132.4 mm (5.193-5.213 in) |
| Valve sealing | stem seal with sealing washer |
| Valve head depth (below cylinder head surface) | |
| - inlet | 0.89 to 1.39mm (0.035 to 0.055 in) |
| - exhaust | 0.95 to 1.45mm (0.037 to 0.057 in) |
| Valve rim thickness | 2.98-3.38 mm (0.117-0.133 in) |



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| Fault Code | Description |
|---|---|
| E091 | Engine ECU fault - data erratic |
| E095 | Sensor supply voltage 1 (+5V) fault - voltage below normal or shorted low |
| E096 | Fuel pump control module fault - voltage above normal or shorted high |
| E097 | Fuel pump control module fault - voltage below normal or shorted low |
| E098 | Fuel pump control module, CAN fault - pump not responding correctly |
| E104 | Fuel pump control module idle fault - data erratic |
| E111 | Inlet manifold heater - relay enable fault |
| E114 | Sensor supply voltage 1 (+5V) fault - voltage above normal or shorted high |
| E119 | Water in fuel detected - no fault data only |
| E122 | Water in fuel indicator fault - voltage above normal or shorted high |
| E123 | Water in fuel indicator fault - voltage below normal or shorted low |
| E126 | Inlet manifold air pressure sensor (TMAP) fault - data erratic |
| E127 | Power supply fault - data erratic |
| E129 | Battery voltage fault - data below normal level |
| E130 | Battery voltage fault - data above normal level |
| E133 | High pressure fuel pump mechanical system not responding |
| E134 | Injector metering rail pressure sensor fault - voltage above normal or shorted high |
| E135 | Injector metering rail pressure sensor fault - voltage below normal or shorted low |
| E138 | Fuel pump calibration trim circuit fault - calibration fault |
| E142 | Fuel metering solenoid fault |
| E159 | Cylinder power imbalance - data erratic |
| E700 | High pressure fuel pump delivery pressure low - data below normal level |
| E701 | High pressure fuel solenoid valve number 1 fault - data erratic |
| E702 | High pressure fuel pump mechanical system not responding |
| E703 | High pressure fuel pump delivery pressure low - data above normal level |
| E704 | Engine knock sensor fault - abnormal pulse width or frequency |
| E705 | Minimum injector drive pulse drift - cylinder 2 - injector not responding correctly |
| E706 | Minimum injector drive pulse drift - cylinder 1 - injector not responding correctly |
| E707 | Minimum injector drive pulse drift - cylinder 3 - injector not responding correctly |
| E708 | Engine control module main relay fault - relay not responding correctly |
| E709 | Engine coolant temperature validity - no fault, temperature sensor data is plausible |
| E715 | Boost pressure validity - no fault, air pressure sensor data is plausible |
| E716 | Throttle pedal position sensor fault - data erratic |
| E718 | Engine position sensor fault (camshaft sensor) - abnormal pulse width or frequency |
| E719 | Engine speed (crankshaft position) sensor fault - no signal |
| E720 | Engine speed (crankshaft position) sensor - data erratic (target disc gap signal missing) |
| E725 | Wiring harness resistance too high or too low, cylinder 4 |
| E726 | Wiring harness resistance too high or too low, cylinder 2 |



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## Machine Connector Page

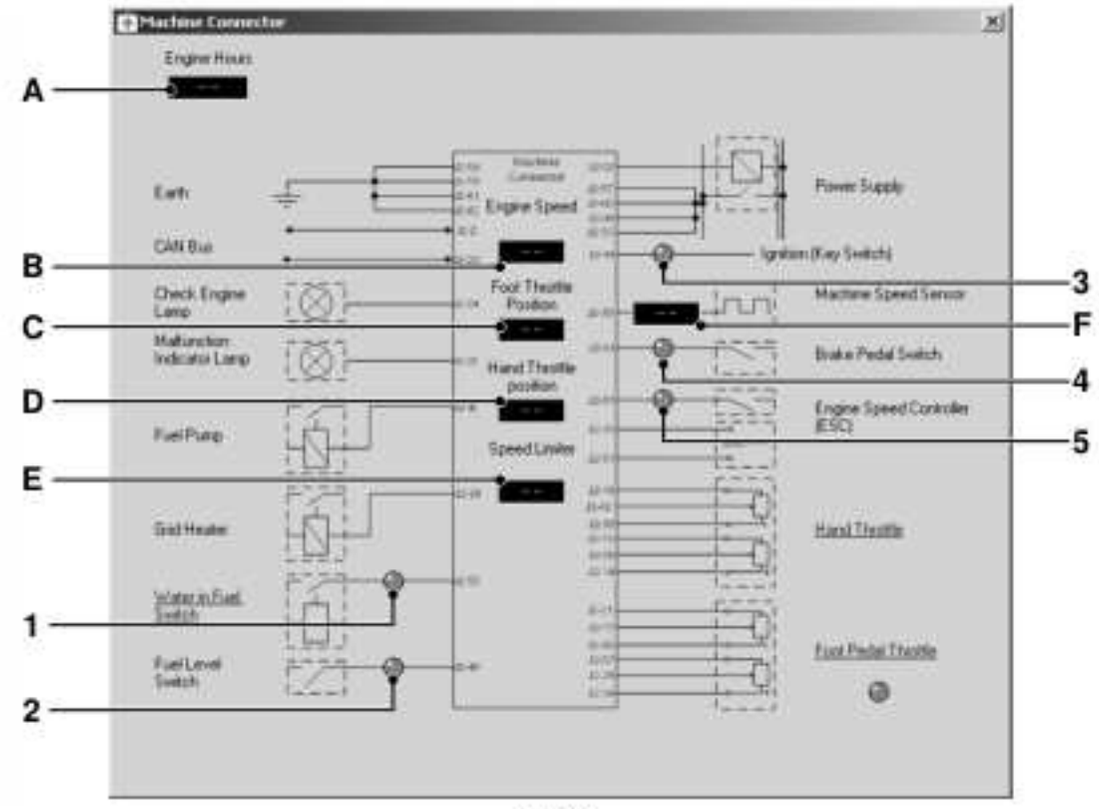



**Fig 37.**

This page displays data about the devices connected to the ECU machine harness. Sensor values being received by the ECU are displayed in data windows in real time. .

***Important:*** *The actual devices connected to the ECU by means of the the machine connector are specific to a given application. For details of the devices fitted refer to the relevant machine technical documentation.*

***Note:*** *To see the data in real time start the engine.*

| **Data Window Key**: ⇨ *Fig 37. (🗋 13-28)* | | |
|---|---|---|
| | **Value** | **No signal default value** (fault condition) |
| **A** | Engine run hours | |
| **B** | Engine speed (RPM) | 5.1 bar |
| **C** | Foot throttle position % | 102% |
| **D** | Hand throttle position % | 0% |
| **E** | Speed Limiter set value | |
| **G** | Machine ground speed | |



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## Component Location and Identification

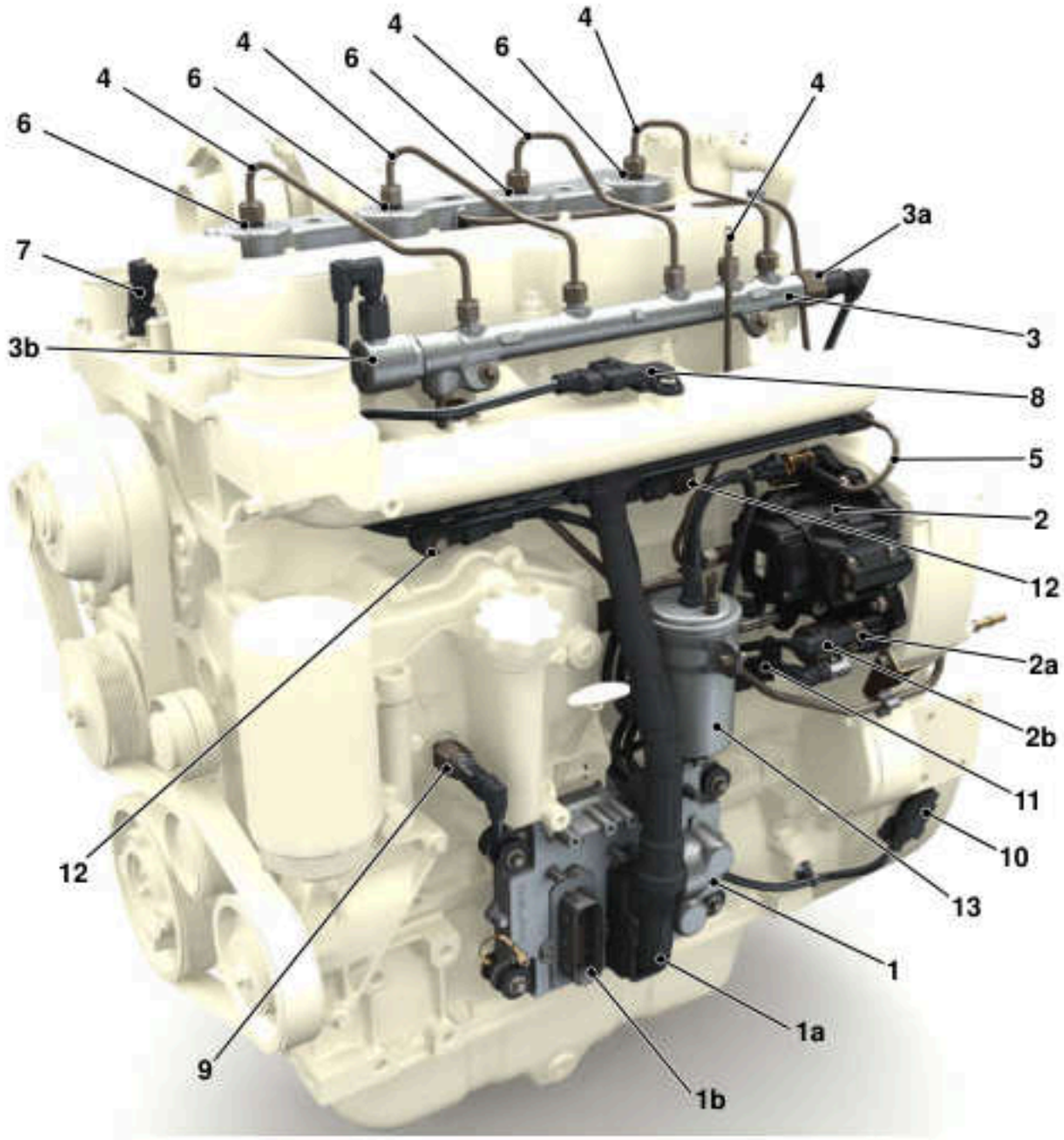



Fig 26.

⇨ *Table 18. Key (🗋 4-42)*



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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 Cold

Because the engine is cold the wax pellet **48-5** has contracted in its housing. This allows spring **48-2** to act against the thermostat body and move valve plate **48-3** up against its seat, closing the outlet port **48 -8** to the radiator. Since the bottom valve plate **48-4** is connected to the top valve plate it also moves up, opening the by-pass port **48-10**. Coolant flows from the thermostat housing inlet port **48-9** 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 **48-6**. The diaphragm reacts against the actuating rod **48-7** and both the top and bottom valve plates (**48-3** and **48-4**) move down in the thermostat body, compressing spring **48-2**. Now the outlet port **48-10** to the radiator is open and by-pass port **48 -10** is closed.

A 1.0 mm (0.039 in.) diameter orifice **48-11** allows trapped air to be expelled from the system.

**Table 29. Key**

| ⇒ *Fig 48. (🗋 4-82)* | |
|---|---|
| 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 |

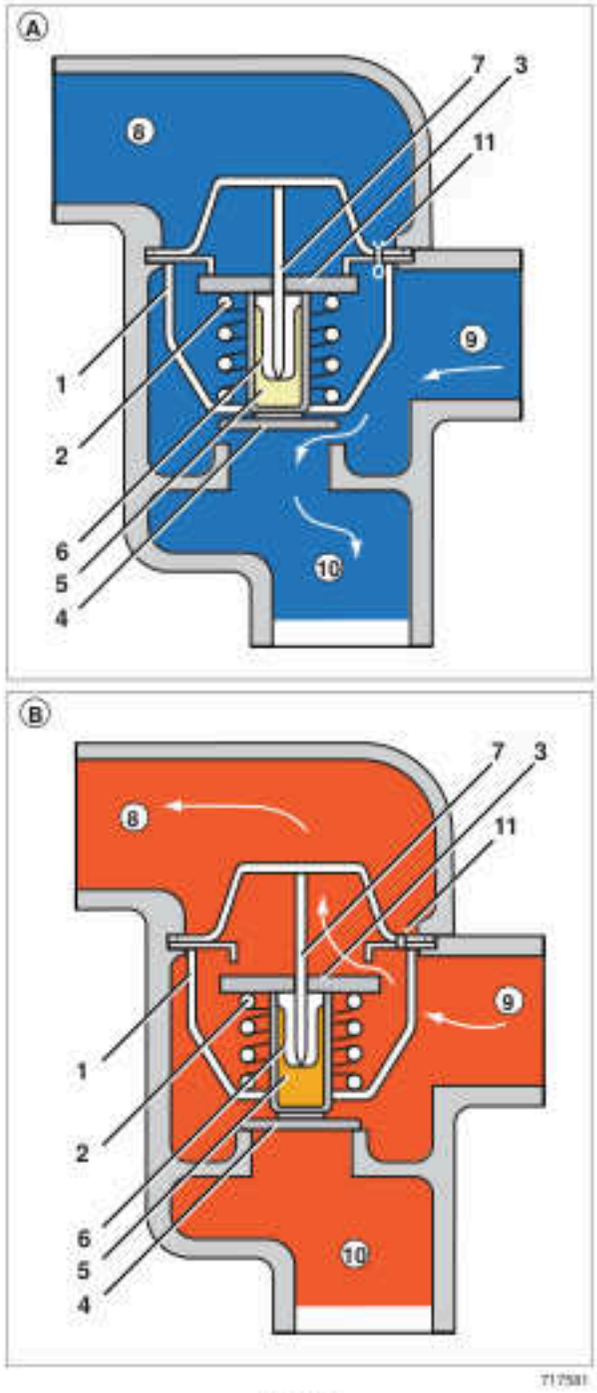



**Fig 48.**



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