

# SERVICE MANUAL

DUMPER  
**6T-1 Front Tip, 6T-1 Swivel Tip,  
7T-1 Front Tip Hi-Viz, 9T-1 Front Tip**

EN - 9813/8950 - ISSUE 2 - 03/2018


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.

### Contents

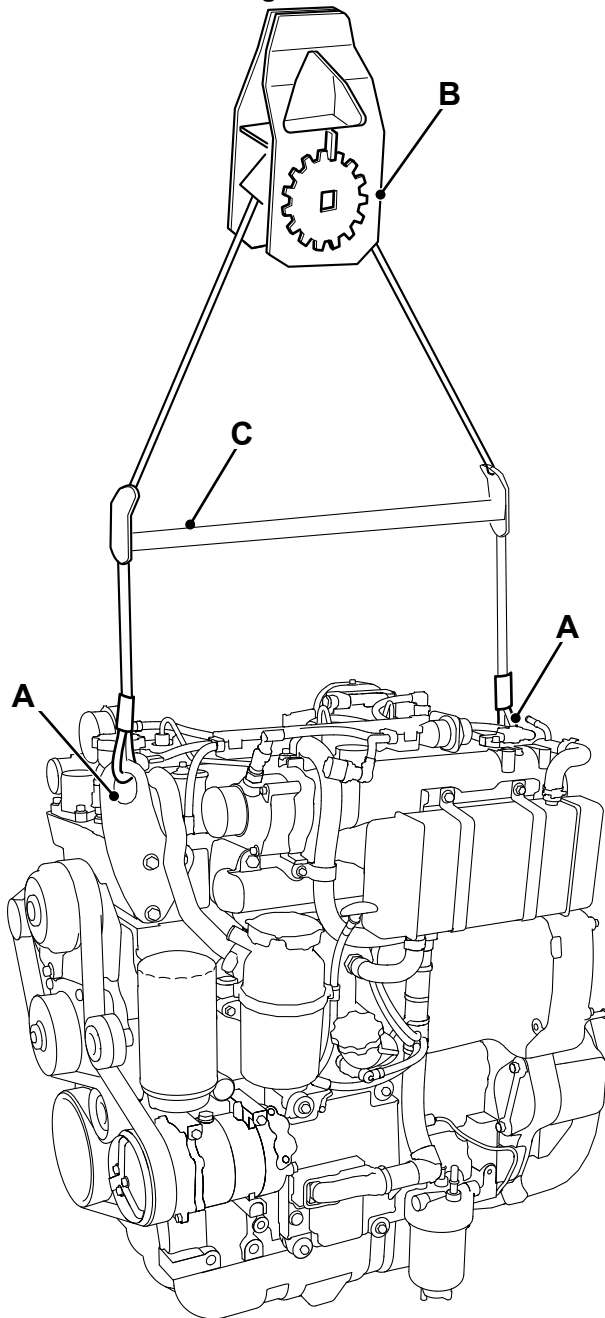
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## Before Removal

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. Disconnect and remove the battery. Refer to (PIL 33-03).
2. Drain the engine oil. Refer to (PIL 15-21).
3. Drain the engine coolant, remove the cooling pack. Refer to (PIL 21-03).
4. Discharge the hydraulic pressure. Refer to (PIL 30-00).
5. Drain the hydraulic tank. Disconnect and plug the hydraulic suction and delivery lines at the transmission pump and gear pump. Label the hoses to ensure correct reassembly. Refer to (PIL 30-00).
6. Disconnect and plug the hydraulic cooler hoses. Label the hoses to ensure correct reassembly.
7. Disconnect the exhaust system.
8. Label the cab heater hoses at the engine block connectors. Release the hose clips and remove the hoses.
9. Disconnect the wiring connections from the starter motor. Refer to (PIL 15-75).
10. Disconnect the wiring connections from the alternator. Refer to (PIL 15-72).
11. Disconnect the wiring connections from the engine sensors and actuators. Refer to (PIL 15-84).
12. Disconnect the fuel supply line at the fuel lift pump and the spill line at the fuel injection pump. Cap all hoses and ports to prevent ingress of dirt.
13. Disconnect the electrical harness at the engine harness.
14. Uncouple the electrical harness at the ECM (Engine Control Module) machine side connector. Important: Do not touch the connector pins on the ECM or harness connectors. Cover the connectors to prevent contamination.
15. Ensure that all relevant harnesses and hoses are unclipped from the engine and tied out of the way.
16. Disconnect and plug the hoses at the hydraulic pump.
17. Disconnect the wiring to the hydraulic pump.
18. Remove the gearbox to engine retaining bolts, pull the transmission and converter clear of the engine, make sure that the converter stays mounted on the gearbox shaft.
19. Attach slings to the engine lifting eyes.  
[Special Tool: Lifting Bracket Front \(Qty.: 1\)](#)  
[Special Tool: Lifting Bracket Rear \(Qty.: 1\)](#)  
[Special Tool: Engine Lifting Spreader Bar \(Qty.: 1\)](#)
20. Take the weight of the engine on the hoist and remove the engine mounting bolts.
21. Withdraw the engine in a level attitude until the hydraulic pump is clear of the chassis. Raise the engine to lift it clear of the machine.
22. Lower the engine into a suitable stand that is capable of supporting the weight of the engine.

**Figure 135.**


- A** Lifting bracket mounting bolts
- B** Lifting equipment
- C** Spreader bar

### Install

1. Replacement is a reversal of the removal procedure. Note the following:
2. Important: It is vitally important that the torque converter is installed at the gearbox and engine flywheel correctly. Failure to locate the converter correctly will result in damage to the gearbox oil pump on engine start up.

3. Fill the cooling system with the correct mix of coolant fluid. Refer to (PIL 21-00).
4. Fill and Check the hydraulic fluid level. Refer to (PIL 30-00).
5. Fill and Check the engine oil level. Make sure the correct oil is used. Refer to (PIL 75-03).
6. On completion, check the hydraulic and cooling system for leakage and levels.
7. Check the function of the drive and loader services.

**Table 35. Torque Values**

Item	Nm
A	47

## Store and Recommission

Engines should be stored in the original shipping packaging. Damaged or disturbed packaging should be made weatherproof immediately.

If an engine is shipped with oil, it should be stored in the correct (upright) position.

If an engine is shipped dry of oil, after 6 months it should be filled with oil to the correct level and re-inhibited, refer to hot test description.

All floor stock engines should be stored under cover in dry conditions and not subjected to extreme variations in temperature or humidity.

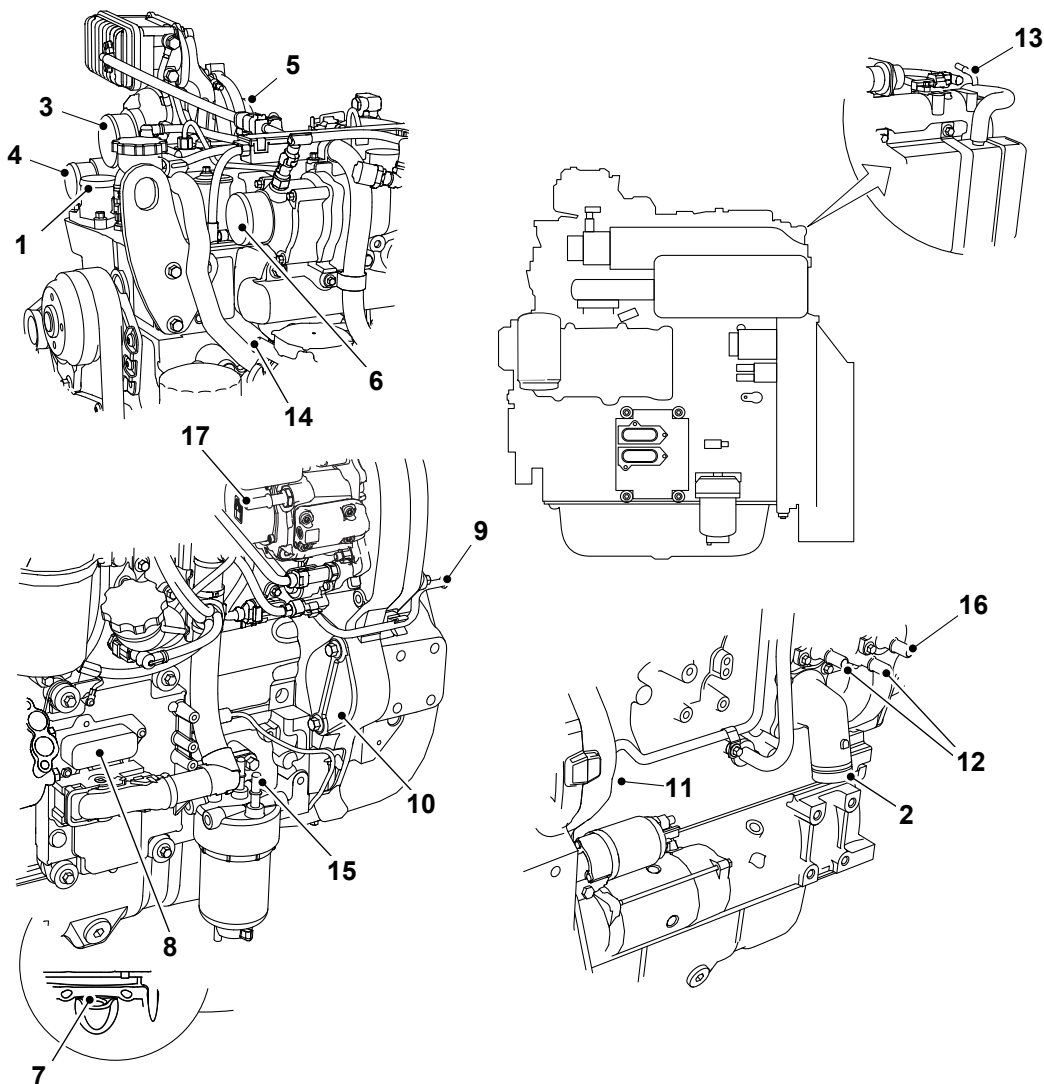
If an engine is to be placed into storage, all external signs of surface coating damage or corrosion should be cleaned and re-coated. Electrical connectors and components should be coated with a protective spray.

## Capping Engine Openings

All openings on the engine must be suitably capped to prevent ingress of water and contamination by foreign particles.

Some engine configurations may differ in detail to the illustrations shown. Make sure you identify and cap all openings.

**Figure 136. Typical engine**



- 1 Top hose cap
- 3 Turbocharger intake cap
- 5 Turbocharger exhaust outlet cap
- 7 Dipstick plug
  
- 9 Fuel spill back line cap
  
- 11 Heavy duty PTO (if installed) cap
- 13 Coolant circuit de-gas spigot
  
- 15 Low pressure fuel filter inlet spigot (engines with fuel filter attached)
- 17 Fuel pump low pressure inlet spigot (engines with no fuel filter attached)

- 2 Bottom hose cap
- 4 Turbocharger compressor outlet cap
- 6 Inlet manifold cap
- 8 ECM (Engine Control Module) machine harness connector cap
- 10 Low duty PTO (Power Take-Off) (if installed) cap
- 12 Cab heater feed and return spigots
- 14 CCV canister outlet on the closed loop breathing circuit (55kW)
- 16 SCR (Selective Catalytic Reduction) coolant feed spigot (if installed)

### 12 Month Revalidation Procedure

1. Pre-inspection:
  - 1.1. Inspect packaging for signs of damage.
  - 1.2. Inspect the caps for signs of damage.
  - 1.3. Inspect openings for signs of water or dirt ingress.
  - 1.4. Inspect the engine for signs of external corrosion.
  - 1.5. Inspect the engine for signs of fluid leaks.
2. From storage:
  - 2.1. Remove the air intake caps.
  - 2.2. Make sure the engine oil level is correct.
  - 2.3. Using a suitable power supply at the correct voltage, crank the engine over.
  - 2.4. During cranking, check that the oil pressure switch opens using a multimeter. The switch is closed when there is no or low oil pressure and opens when oil pressure reaches a set point. After three separate 20 second cranking periods, If the oil pressure switch does not open (indicating no, or low oil pressure), contact your JCB engine dealer.
  - 2.5. Recap all engine openings.
  - 2.6. Coat any exposed bare metal with a suitable product.
  - 2.7. Electrical connectors and components should be coated with a protective spray if exposed.
  - 2.8. Cover in weatherproof packaging.
  - 2.9. Place in storage, under cover on level ground or shelving.
  - 2.10. Record details of work as required.
  - 2.11. Do not expose to extremes of temperature or humidity.

**Notice:** Do not operate the starter motor for more than 20 s at one time. Let the starter motor cool for at least 2 min.

**Table 36. Oil Pressure Switch Set Points**

Oil pressure switch closed	> 0.6 bar ( 8.7 psi)
Oil pressure switch open	< 0.6 bar ( 8.7 psi)

### OEM Commissioning Check on Engine Installation After More Than 12 Months

1. Flush the coolant system with proprietary flushing solution.
2. Refill the coolant system with 50/50 mix of long life antifreeze mixture.
3. Hot test engine according to the hot test profile. Refer to Table 37.
4. Drain engine oil and replace engine oil filter.
5. Refill with the correct oil and inhibit the cooling system using the correct product.
6. Record details of work as required.

### Hot Test Description

**▲ WARNING** When using cleaning agents, solvents or other chemicals, you must adhere to the manufacturer's instructions and safety precautions.

All engines despatched from JCB will have been subjected to a hot test (checking items such as oil pressure, engines speeds, torque values etc.) and therefore the interior surfaces will have been coated with engine oil.

All coolant galleries are coated with CRODAFLUID PA75 corrosion inhibitor.

Stored engines will require re-inhibiting every 12 months, this will include hot testing the engine using a dynamometer. The hot test profile is:

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