Service Manual

Wheeled Loading Shovel - 446, 456

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Publication No.
9803/4180-11



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Issued by JCB Technical Publications, JCB Service, World Parts Centre, Beamhurst, Uttoxeter, Staffordshire, ST14 5PA, England. Tel +44 1889 565312 Fax +44 1889 565377

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Throttle Link Harness - CAD 721/12119 - Issue 1

⇨ Fig 205. (🗋 C-273)

Key to Connectors:
LA Engine Harness

Key to Connectors:
LB Foot Throttle

Fig 205. Throttle Link Harness

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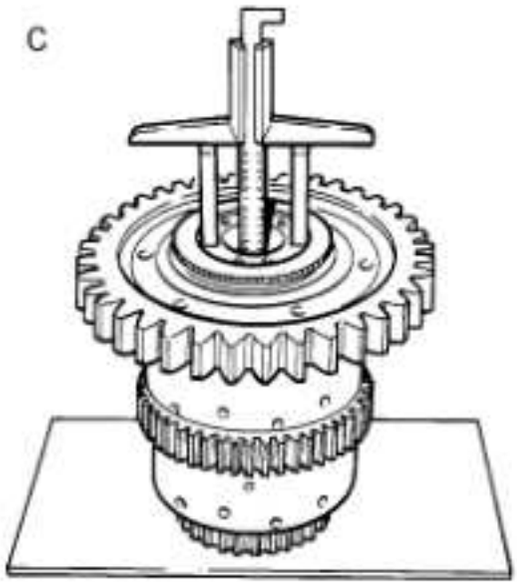


Fig 53.

e Add the median end play (0.20mm) to dimension (iii) to obtain the installation dimension.

e.g 227.20 + 0.20 = 227.40mm

f Subtract dimension (ii) from dimension (i) to obtain the housing dimension.

e.g 251.15 - 21.00 = 230.15mm

g Subtract the installation dimension from the housing dimension to calculate shim required.

e.g 230.15 - 227.40 = 2.75mm

10 Install clutch K4/K3 into gear housing. Fit thrust washer **35**, forked washer **36** and calculated shim **37**. ⇨ *Fig 54. (F-63)*.

11 Fit rectangular section rings **38** to axle **39**. Ensure they are aligned concentrically. Lubricate and fit new O-ring **40**.

12 Heat housing bores using a hot air blower. Insert axle into clutch K4/K3 until axle flange is in contact with gear housing. Fit hex. nuts **41** and torque to 23Nm (17 lbf ft).

13 Recheck clutch end play and correct if necessary.

14 Check the operation of clutches K4 and K3 using compressed air. The opening and closing of the clutches should be clearly audible.

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FC	SPN	FMI	IC	Description of the Fault Code	Reaction of the TCU	Repair Procedures
D3	5820	4	53	A Low Voltage at the Battery		
				The measured voltage at the power supply is lower than 10V (a 12V device) or lower than 18V (a 24V device)	Shift to neutral OP-Mode: TCU shutdown	Check the power supply battery Check the cables and the connectors between the batteries and the TCU
D4	5820	3	52	A High Voltage at the Battery		
				The measured voltage at the power supply is higher than 18V (a 12V device) or higher than 32.5V (a 24V device)	Shift to neutral OP-Mode: TCU shutdown	Check the power supply battery Check the cables and the connectors between the batteries and the TCU
D5	5830	2	57	An Error at the Valve Power Supply VPS1		
				The TCU switches on VPS1 but the measured VPS1 is off or the TCU switches off VPS1 and the measured VPS1 is on: -A cable/connector is defective, it has a SC to the battery or earth -The TCU has an internal defect -The permanent power supply KL30 is missing	Shift to neutral OP-Mode: TCU shutdown	Check the fuse Check the cables and the connectors between the gearbox and the TCU Replace the TCU
D6	5840	2	58	An Error at the Valve Power Supply VPS2		
				The TCU switches on VPS2 but the measured VPS2 is off or the TCU switches off VPS2 and the measured VPS2 is on: -A cable/connector is defective, it has a SC to the battery or earth -The TCU has an internal defect -The permanent power supply KL30 is missing	Shift to neutral OP-Mode: TCU shutdown	Check the fuse Check the cables and the connectors between the gearbox and the TCU Replace the TCU

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Basic Circuit

The basic circuit shows a 'standard' machine.

⇨ *Fuses and Relays 456e from 1304000 (C-14).*

Table 17.

Main Components ⇨ *Fig 116. (C-139)*

1	Battery isolator
2	Battery
3	Start relay
4	Starter motor
5	Ignition switch
6	Alternator
7	Grid heater relay
8	HVAC(1) relay
9	Ignition relay 1
10	Front work lights relay
11	Lighting relay
12	Ignition relay 2
13	Ignition relay 3

(1) Heating Ventilation Air Conditioning

Table 18.

Primary Fuses ⇨ *Fig 116. (C-139)*

PF1	Ignition relay 1/front work light circuits
PF2	Hazard indicators, beacon, Interior light, radio (24v), head light flash
PF3	Ignition/starter circuits
PF4	Grid heater relay
PF5	Lighting
PF6	HVAC circuit
PF7	Right and left hand sidelights, heated rear screen, Battery feed for EMS and ZF computer.
PF8	Engine ECU
PF9	Emergency steering circuit
PF10	Engine grid heater circuit

Table 19.

Connection:	Refer to:
C1	⇨ *Fig 117. (C-141)*
C2	⇨ *Fig 124. (C-155)*
C3	⇨ *Fig 117. (C-141)*
C4	⇨ *Fig 116. (C-139)*
C5	⇨ *Fig 117. (C-141)*
C6	⇨ *Fig 124. (C-155)*
C7	⇨ *Fig 122. (C-151)*
C8	⇨ *Fig 125. (C-157)*
C9	⇨ *Fig 128. (C-161)*
C10	⇨ *Fig 119. (C-145)*
C11	⇨ *Fig 127. (C-160)*
C12	⇨ *Fig 120. (C-147)*
C13	⇨ *Fig 120. (C-147)*
C14	⇨ *Fig 122. (C-151)*
C15	⇨ *Fig 122. (C-151)*
C16	⇨ *Fig 117. (C-141)*
C17	⇨ *Fig 118. (C-143)*
C18	⇨ *Fig 123. (C-153)*
C19	⇨ *Fig 124. (C-155)*
C20	⇨ *Fig 124. (C-155)*
C21	⇨ *Fig 122. (C-151)*
C22	⇨ *Fig 127. (C-160)*
C23	⇨ *Fig 121. (C-149)*
C24	⇨ *Fig 121. (C-149)*
C25	⇨ *Fig 124. (C-155)*
C26	⇨ *Fig 127. (C-160)*
C27	⇨ *Fig 121. (C-149)*
C28	⇨ *Fig 121. (C-149)*
C29	⇨ *Fig 122. (C-151)*
C30	⇨ *Fig 127. (C-160)*
C31	⇨ *Fig 123. (C-153)*
C32	⇨ *Fig 126. (C-159)*
C33	⇨ *Fig 120. (C-147)*
C34	⇨ *Fig 120. (C-147)*
C35	⇨ *Fig 127. (C-160)*
C36	⇨ *Fig 122. (C-151)*
C37	⇨ *Fig 121. (C-149)*
C38	⇨ *Fig 123. (C-153)*
C39	⇨ *Fig 122. (C-151)*
C40	⇨ *Fig 123. (C-153)*
C41	⇨ *Fig 124. (C-155)*
C42	⇨ *Fig 122. (C-151)*
C43	⇨ *Fig 125. (C-157)*
C44	⇨ *Fig 127. (C-160)*
C45	⇨ *Fig 122. (C-151)*
C46	⇨ *Fig 120. (C-147)*
C47	⇨ *Fig 117. (C-141)*
C48	⇨ *Fig 118. (C-143)*
C49	⇨ *Fig 119. (C-145)*

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Bleeding Procedure

If the fan does not turn, do the following procedure:

1 Open the rear grille to get access to the fan. Refer to ***Hydraulic Cooling Fan, Removal***.

2 Turn off the battery isolator switch and remove the key, then remove the rear cover from the fan box.

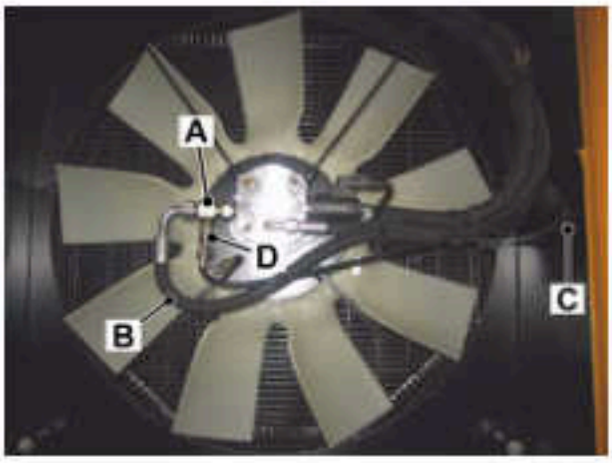
3 Connect the in-line test point **A** (816/55040) between the hydraulic feed-hose **B** and the fan motor, then tighten to the correct torque (44-50Nm). ⇨ *Fig 5. (B-81)*.

4 Connect the gauge extension hose **D** with a standard test point fitting to the in-line test point **A**.

5 Put the other end of the gauge extension hose **D** through the hole **C** in the side of the fan box.

(This hole **C** is used as access point to adjust the speed of the fan).

6 Fasten the gauge extension hose **D** to the hydraulic feed-hose **B**, to prevent it getting caught in the fan.

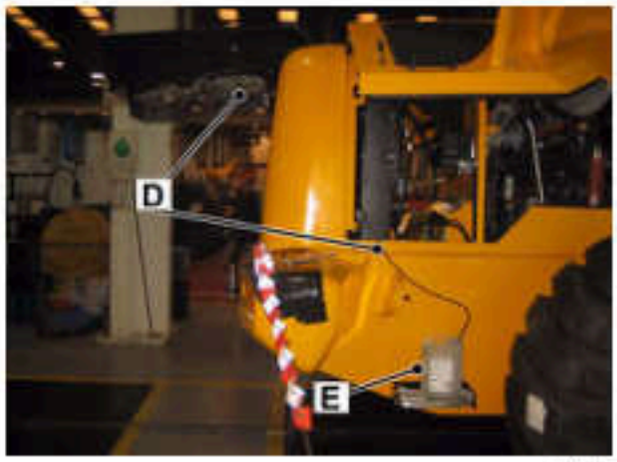


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Fig 5.

7 Put the end of the gauge extension hose **D** into a container **E** to catch the excess oil during the bleeding procedure. ⇨ *Fig 6. (B-81)*.

8 Attach the rear cover back to the fan box, turn on the battery isolator switch, then close the rear grille.



T055450

Fig 6.

9 Check the level of the hydraulic oil on the sight-gauge (top-up if required).

10 Hold the end of the gauge extension hose **D** firmly in the container **E**, then start the engine and run at idle for 10 seconds.

11 Push the throttle pedal to get maximum revolutions, then release back to idle. Repeat this procedure until oil comes out of the gauge extension hose **D** and the fan starts to turns. (If the fan does not turn, refer to ***Step 17***).

12 Stop the engine, ONLY when the end of the gauge extension hose **D** is submerged.

(Otherwise the motor will pump air back in the system and disable the fan).

13 Turn off the battery isolator switch and remove the key, then remove the rear cover.

14 Disconnect the gauge extension hose **D**.

15 Attach the rear cover and turn on the battery isolator.

16 When all of the bleeding equipment is removed, do a final check of the fan.

17 Dispose of the bled hydraulic oil responsibly.

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