Service Manual

Midi CX Backhoe Loader

Section 1 - General Information

Section 2 - Care and Safety

Section 3 - Maintenance

Section A - Attachments

Section B - Body and Framework

Section C - Electrics

Section D - Controls

Section E - Hydraulics

Section F - Transmission

Section G - Brakes

Section H - Steering

Section K - Engine



PREVIEW - YOUFIXTHIS.COM

Publication No.
9803/9400-08



Copyright © 2004 JCB SERVICE. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any other means, electronic, mechanical, photocopying or otherwise, without prior permission from JCB SERVICE.

Issued by JCB Technical Publications, JCB Aftermarket Training, Woodseat, Rocester, Staffordshire, ST14 5BW, England. Tel +44 1889 591300 Fax +44 1889 591400

World Class
Customer Support

Download full manual at youfixthis.com

Contents **Page No.**

Introduction
About this Publication ....1 - 1
Using the Service Manual ....1 - 1
Section Numbering ....1 - 1
Units of Measurement ....1 - 1
Left Side, Right Side ....1 - 2
Cab/Canopy ....1 - 2
Cross References ....1 - 2
Identifying the Machine ....1 - 3
Machine Identification Plate ....1 - 3
Component Identification Plates ....1 - 4
Fuel ....1 - 7
Types of Fuel ....1 - 7

Torque Settings
Zinc Plated Fasteners and Dacromet Fasteners ....1 - 10
Introduction ....1 - 10
Bolts and Screws ....1 - 10
Hydraulic Connections ....1 - 14
'O' Ring Face Seal System ....1 - 14
'Torque Stop' Hose System ....1 - 17

Service Tools
Numerical List ....1 - 18

Service Aids
Sealing and Retaining Compounds ....1 - 20

Terms and Definitions
Colour Coding ....1 - 21
Hydraulic Schematic Colour Codes ....1 - 21

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

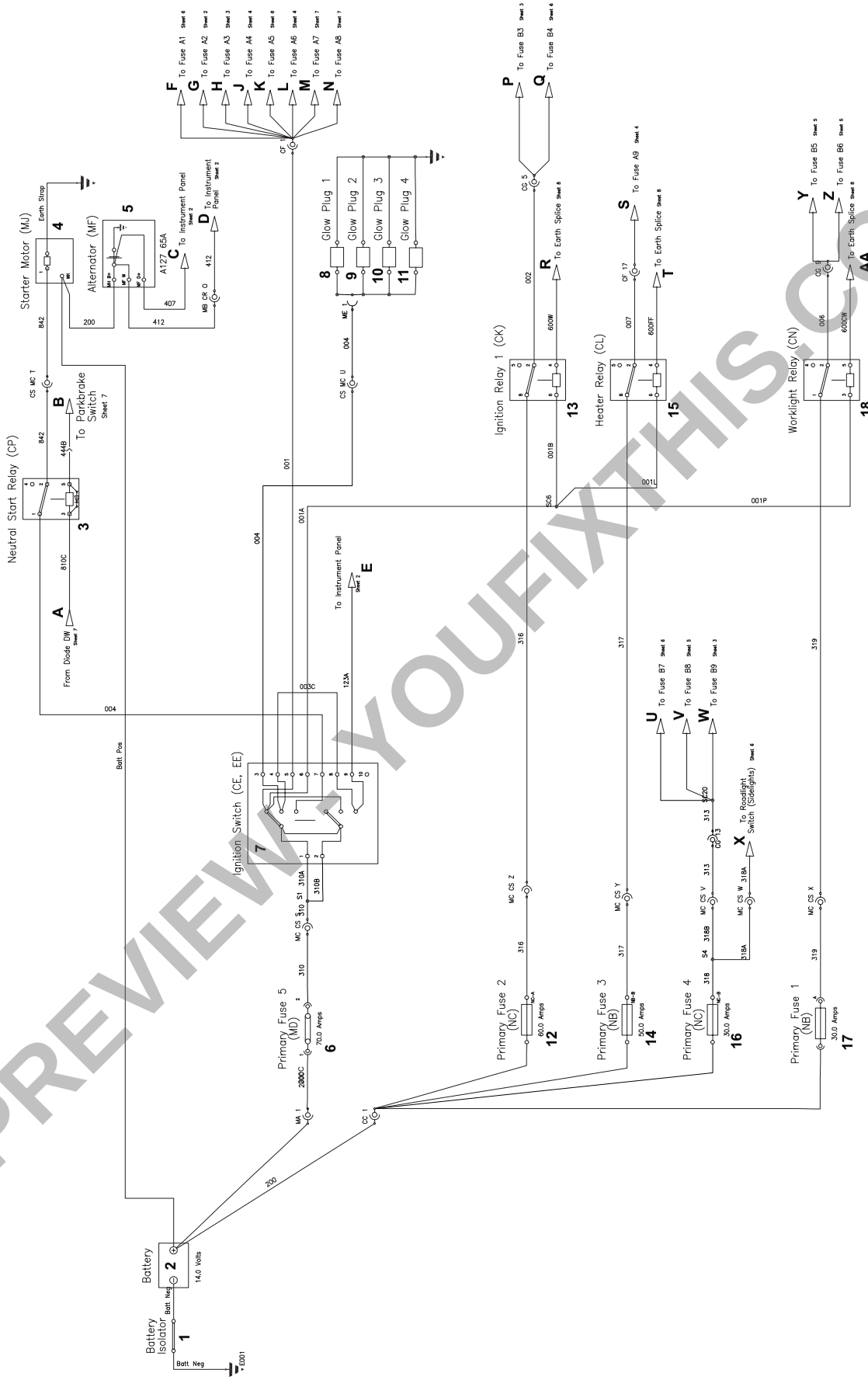


Fig 12. Primary Fuses, Ignition Switch, Ignition Relays and Starter Motor - Sheet 1 of 9

PREVIEW OF YOUFIXTHIS.COM

Download full manual at youfixthis.com

Introduction to Hydraulic Schematic Symbols

TE-001

General (Basic and Functional Symbols)

Complex hydraulic components and circuits can be described to the engineer by using graphical symbols. The following pages illustrate and give a brief description for some of the more common symbols used.

There are many symbols in use and it would be impossible to include them all here. However it should be noted that most are only variations or refinements on the basic principles explained here. If more detailed information is required you are recommended to obtain a copy of BS2917 or IS01219.

Once familiar with the symbols, the engineer can use hydraulic circuit diagrams as an aid to fault finding. It will be possible to see the complete hydraulic circuit and decipher the relationship between hydraulic components.

Table 2. General

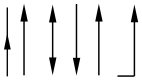
	Spring
	Flow restriction affected by viscosity
	Direction of flow
	Indication of rotation
	Indication of direction and paths of flow
	Variable control

Table 3. Rams

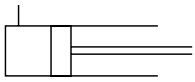
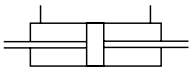
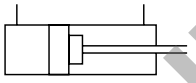
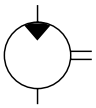
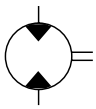
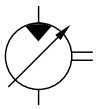
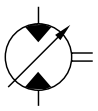
	Single acting
	Double acting
	Double ended
	Double acting with damping at rod area end

Table 4. Pumps and Motors

	Variable capacity pump two directions of flow
	Fixed capacity motor one direction of flow
	Fixed capacity motor two directions of flow
	Variable capacity motor one direction of flow
	Variable capacity motor two directions of flow

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Tool Detail Reference

Note: *Not all service tools are illustrated.*

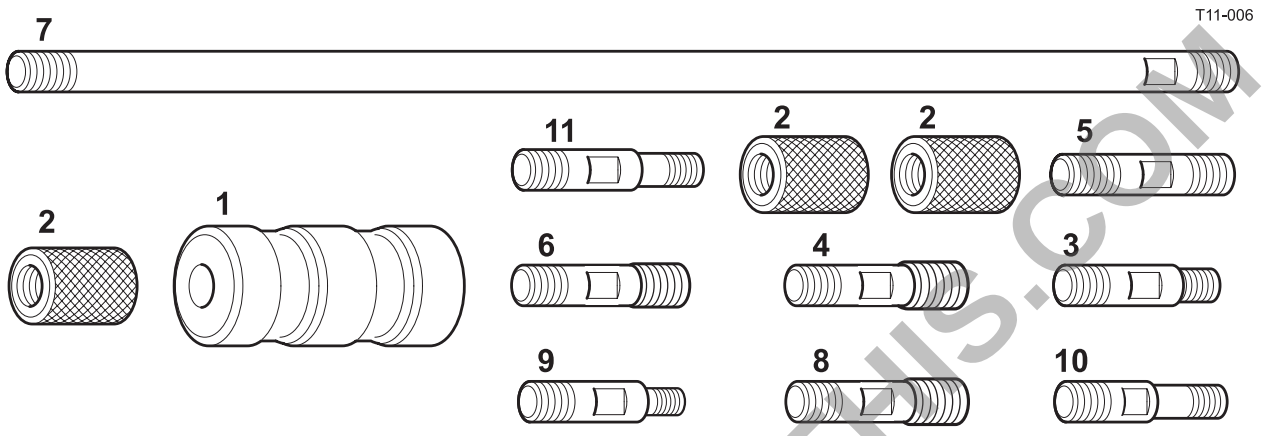


Fig 1. 993/68100 Slide Hammer Kit

1	993/68101	Slide Hammer	**7**	993/68107	Bar - M20 x M20 X 800 mm
2	993/68102	End Stops	**8**	993/68108	Adaptor - M20 x 7/8" UNF
3	993/68103	Adaptor - M20 x 5/8" UNF	**9**	993/68109	Adaptor - M20 x M12
4	993/68104	Adaptor - M20 x 1" UNF	**10**	993/68110	Adaptor - M20 x 5/8" UNF (Shoulder)
5	993/68105	Adaptor - M20 x M20	**11**	993/68111	Adaptor - M20 x 1/2" UNF
6	993/68106	Adaptor - M20 x M24			

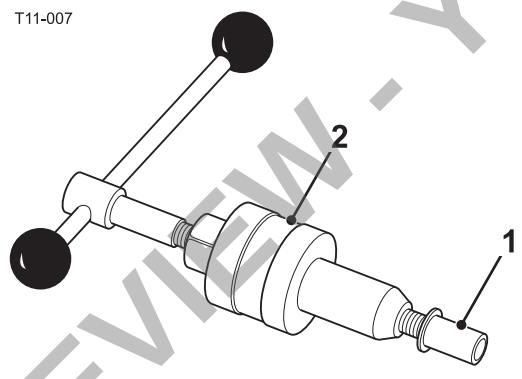


Fig 2. Rivet Nut Tool

1	826/01099	M6 x 16 mm Rivet Nut
	826/01101	M6 x 19 mm Rivet Nut
	826/01102	M8 x 18 mm Rivet Nut
	826/01103	M8 x 21 mm Rivet Nut
	826/01104	M10 x 23 mm Rivet Nut
	826/01105A	M10 x 26 mm Rivet Nut
2	-	Installation Tool available from: Bollhoff Fastenings Ltd (***www.bollhof.com***)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Zinc Plated Fasteners and Dacromet Fasteners

Table 4. Torque Settings - UNF Grade 'S' Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
in.	mm	in.	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
1/4	6.3	7/16	11.2	1.1	8.3	10.0	1.0	7.4
5/16	7.9	1/2	22.3	2.3	16.4	20.0	2.0	14.7
3/8	9.5	9/16	40.0	4.1	29.5	36.0	3.7	26.5
7/16	11.1	5/8	64.0	6.5	47.2	57.0	5.8	42.0
1/2	12.7	3/4	98.00	10.0	72.3	88.0	9.0	64.9
9/16	14.3	13/16	140.0	14.3	103.2	126.0	12.8	92.9
5/8	15.9	15/16	196.0	20.0	144.6	177.0	18.0	130.5
3/4	19.0	1 1/8	343.0	35.0	253.0	309.0	31.5	227.9
7/8	22.2	1 15/16	547.0	55.8	403.4	492.0	50.2	362.9
1	25.4	1 1/2	814.0	83.0	600.4	732.0	74.6	539.9
1 1/8	31.7	1 7/8	1181.0	120.4	871.1	1063.0	108.4	784.0
1 1/4	38.1	2 1/4	1646.0	167.8	1214.0	1481.0	151.0	1092.3

Table 5. Torque Settings - Metric Grade 8.8 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	5.8	0.6	4.3	5.2	0.5	3.8
M6	6	10	9.9	1.0	7.3	9.0	0.9	6.6
M8	8	13	24.0	2.4	17.7	22.0	2.2	16.2
M10	10	17	47.0	4.8	34.7	43.0	4.4	31.7
M12	12	19	83.0	8.5	61.2	74.0	7.5	54.6
M16	16	24	205.0	20.9	151.2	184.0	18.8	135.7
M20	20	30	400.0	40.8	295.0	360.0	36.7	265.5
M24	24	36	690.0	70.4	508.9	621.0	63.3	458.0
M30	30	46	1372.0	139.9	1011.9	1235.0	125.9	910.9
M36	36	55	2399.0	244.6	1769.4	2159.0	220.0	1592.4

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Table 8. ALL services slow to operate.

Possible Cause	Action
Insufficient hydraulic fluid.	Check for leaks and top-up the tank as required.
Suction strainer blocked.	Clean or renew suction strainer. Drain the tank and refill with clean oil of the correct grade.
Main circuit feed / return pipework or hoses leaking, damaged, trapped or kinked.	Inspect pipework and hoses, renew as required.
Insufficient output flow from pump, because the pump is not receiving the correct load sense pressure: – Due to load sense relief valve (LSRV) out of adjustment or defective.	– Renew or adjust LSRV as required, see ***Service Procedures***.
Insufficient output flow from pump, because of failure of the internal tilting swashplate mechanism due to contamination.	Renew the pump and flush the hydraulic system to remove all contamination.

Table 9. ALL services lack power, the machine is unable to lift.

Possible Cause	Action
Insufficient hydraulic fluid.	Check for leaks and top-up the tank as required.
Suction strainer blocked.	Clean or renew suction strainer. Drain the tank and refill with clean oil of the correct grade.
Main circuit feed / return pipework or hoses leaking, damaged, trapped or kinked.	Inspect pipework and hoses, renew as required.
Load sense relief valve (LSRV) out of adjustment or defective.	Renew or adjust LSRV as required, see ***Service Procedures***.

Table 10. One service fails or is slow to operate.

Possible Cause	Action
Associated service pipework or hoses leaking, damaged, trapped or kinked.	Inspect pipework and hoses, renew as required.
Auxiliary relief valve (ARV) out of adjustment or defective.	Renew the ARV (Non-adjustable)
Associated ram leaking.	Service or renew ram.
Ram rod is bent.	– Service or renew ram. Check the load sense relief valve (LSRV), and auxiliary relief valve (ARV) settings are correct. – Check the ram pivot pins are adequately greased.
Service spool not operating correctly.	Check that the control lever and associated linkage is operating the spool full displacement, rectify as required.
Pressure compensator piston sticking due to contamination.	Dismantle and inspect valve block components, rectify as required. See ***Loader Valve*** or ***Excavator Valve - Dismantle and Assemble***.
Service spool or associated load hold check valves damaged or sticking due to contamination.	Dismantle and inspect valve block components, rectify as required. See ***Loader Valve*** or ***Excavator Valve - Dismantle and Assemble***.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Fluids, Lubricants and Capacities

Note: *New engines DO NOT require a running-in period. The engine/machine should be used in a normal work cycle immediately, glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently run-in. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load).*

Table 1.

ITEM	CAPACITY		FLUID/LUBRICANT	INTERNATIONAL SPECIFICATION
	US Gal	Liters		
Fuel Tank	15.8	60	Diesel Oil	ASTM D975-66T Nos. 1D, 2D
Engine (Oil)	2.5	9.5	**JCB Extreme Performance**	SAE15W/40, ACEA E5/B3/ A3,API CH-4/SG
			(-15°C to +50°C (5°F to 122°F)	
			JCB High Performance	SAE10W/40, ACEA E2/B2/ A2,API CF-4/SJ
			(-20°C to +40°C (-4°F to 104°F)	
			! CAUTION: DO NOT USE ORDINARY ENGINE OIL	
Engine (Coolant)	3.14	11.9	**JCB Four Seasons Antifreeze & Summer Coolant/ Water & Summer Coolant/Water.** ⇒ *Coolant Mixtures (3-11)*.	ASTM D3306, BS6580
Front Axle			**JCB Gear Oil** HP90	API-GL-5
Housing	1.40	5.3		MIL-L-2105B
Hubs (x2)	0.15	0.6		
Rear Axle			**JCB Gear Oil HP Plus**	API-GL-4
Housing (includes hubs and drop box)	1.8	7.0		
Brake System			**JCB Light Hydraulic Oil**	ISO VG15
			! CAUTION: DO NOT USE ORDINARY BRAKE FLUID	
Hydraulic System			**JCB Multigrade Anti Shear Hydraulic Fluid**	ISO 11158 cat HV
Tank	11.88	45.0		DIN 51524 cat HVLP
System (incl. tank)	23.77	90.0		SS 155434 cat AV
				Denison HF-o
Grease Points	---	---	**JCB HP Grease**	Lithium complex NLGI No.2 consistency including extreme pressure additives
			or **JCB Special MPL-EP Grease**(1)	Lithium based NLGI No.2 consistency including extreme pressure additives

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Pre-start Cold Checks, Service Points and Fluid Levels

	Operation	10	50	100(1)	500	1000	2000
ENGINE							
Coolant Quality and Level	- Check	☐	☐	☐	☐	☐	
Cooling System	- Drain and Refill						☐
Oil level	- Check	☐	☐				
Oil and Filter (2)(3)	- Change				☐	☐	☐
Air Cleaner Outer Element(4)	- Change					☐	☐
Air Cleaner Inner Element	- Change						☐
Engine Fuel Filter	- Change					☐	☐
Fan Belt Tension and Condition	- Check		☐	☐	☐	☐	☐
Engine Mounting Bolts for Tightness	- Check			☐	☐	☐	☐
All Hoses - Condition	- Check			☐	☐	☐	☐
Radiator(4)	- Clean				☐	☐	☐
Breather Gauze	- Clean						☐
Valve Clearances(5)	- Check and Adjust					☐	☐
Oil Filler and Dipstick Seals(5)	- Check and Adjust						☐
TRANSMISSION, AXLES AND STEERING							
Axle Oil Level (encl. Hubs when applicable)(6)	- Check			☐	☐		
Axle Oil (incl. Hubs when applicable)(7)	- Change					☐	☐
Axle Oil - Limited Slip Differential	- Change				☐	☐	☐
Tire Pressures and Condition	- Check	☐	☐	☐	☐	☐	☐
Wheel Nut Security	- Check	☐	☐	☐	☐	☐	☐
Front Hub Bearings	- Check			☐	☐	☐	☐
Drive Shaft(8)	- Security and Grease			☐	☐	☐	☐
Steer Axle Movement and Shimming(5)	- Check			☐	☐	☐	☐
Steer Axle Pivots and Linkages(8)	- Grease			☐	☐	☐	☐
Front Axle Main Pivot	- Grease	☐	☐	☐	☐	☐	☐
HYDRAULICS							
Oil Level(9)	- Check	☐	☐	☐	☐	☐	
Oil	- Sample, Change						☐
Transmission Charge Pump Filter	- Change			☐	☐	☐	☐

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Prepare the Machine for Maintenance

Introduction

⚠ WARNING

Maintenance must be done only by suitably qualified and competent persons.

Before doing any maintenance make sure the machine is safe, it should be correctly parked on level ground.

To prevent anyone starting the engine, remove the starter key. Disconnect the battery when you are not using electrical power. If you do not take these precautions you could be killed or injured.

8-3-1-1

Make the machine safe before you start a maintenance procedure.

You can complete most of the maintenance procedures with the loader arms lowered. Unless a maintenance procedure instructs you differently, you must lower the loader arms. Refer to ***How to Make the Machine Safe (Loader Arms Lowered)***.

If you lift the loader arms to get access for maintenance, you must install the maintenance strut on the loader arm. Refer to ***How to Make the Machine Safe (Loader Arms Lifted)***.

How to Make the Machine Safe (Loader Arm Lowered)

Important: *You can complete most of the maintenance procedures with the loader arms lowered. Unless a maintenance procedure instructs you differently, you must lower the loader arms.*

1 Park the machine on level, solid ground.

If necessary, refer to ***Stopping and Parking the Machine*** in the Operator Manual.

2 Lower the loader arms.

3 Put the attachment flat on the ground.

4 Stop the engine and remove the starter key.

5 Disconnect the battery to prevent accidental operation of the engine.

6 If necessary, put chocks against the two sides of the wheels before you get below the machine.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Safety Notices

Important Information

T1-042

The Operator Manual

⚠ WARNING

You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator Manual. You must understand and follow the instructions in the Operator Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

INT-1-4-2

Do not operate the machine without an Operator Manual, or if there is anything on the machine you do not understand.

Treat the Operator Manual as part of the machine. Keep it clean and in good condition. Replace the Operator Manual immediately if it is lost, damaged or becomes unreadable.

Safety Warnings



This safety alert system identifies important safety messages in this manual. When you see this symbol, be alert, your safety is involved, carefuly read the message that follows, and inform other operators.

In this publication and on the machine, there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

⚠ DANGER

Denotes an extreme hazard exists. If proper precautions are not taken, it is highly probable that the operator (or others) could be killed or seriously injured.

INT-1-2-1

⚠ WARNING

Denotes a hazard exists. If proper precautions are not taken, the operator (or others) could be killed or seriously injured.

INT-1-2-2

⚠ CAUTION

Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator (or others) and possible damage to the machine.

INT-1-2-3

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Fuel

Types of Fuel

Acceptable and Unacceptable Fuels

T3-048

Important: *No warranty liability whatsoever will be accepted for failure of fuel injection equipment where the failure is attributed to the quality and grade of the fuel used.*

⚠ CAUTION

Consult your fuel supplier or JCB distributor about the suitability of any fuel you are unsure of.

GEN-9-2

Table 1.

Fuel Specification	Applicable Engines	Service Requirements
EN590 Diesel fuel types - Auto/C0/C1/C2/C3/C4	All	Obey the usual routine maintenance schedules and procedures.
BS2869 Class A2		
ASTM D975-076 2-D, US DF1, US DF2, US DFA		
JIS K2204 Grades 1, 2, 3 and Special Grade 3		
ASTM D975-076 1-D	All ***Important:*** *Engines operated with these fuels may have a reduced service life.*	Obey the usual routine maintenance schedules and procedures. Fuel additives are recommended for use with low sulphur fuels(1). ⇨ ***Additives (1-9)***.
MIL T38219 JP7		
NATO F63		
French EN590 (RME5) with 5% maximum		
AVTURFSII, NATO F34, JP8, MIL T83133, DERD 2463, DEF STAN 91-87	All ***Important:*** *Engines operated with these fuels may have a reduced service life.*	Obey the usual routine maintenance schedules and procedures. Fuel additives must be used(1). ⇨ ***Additives (1-9)***.
AVCAT FSII, NATO F44, JP5, MIL T5624, DERD 2452, AVTOR		
NATO F35, JET A1, DEF STAN 91-91, DERD 2494, XF63		
AVCAT, NATO F43 (obsolete), JP5 without additives		
JET A (ASTM D1655)		
ASTM D3699 Kerosene		
B5 Biodiesel - RME content blended with mineral derived diesel (5% maximum) - ASTM D6751, DIN 51606, ISO 14214	Tier 3 only(2).	You must obey special routine maintenance schedules and procedures. ⇨ ***Warranty (1-9)***.
AVTAG (obsolete)	These fuels are not acceptable with or without additives. Engines must not be operated with these fuels.	
AVTAG FSII (obsolete), NATO F40, JP4, DERD 2454		
JET B (ASTM D1655)		
BS MA100		
JIS K2203 No.2		
Unmodified vegetable oils		

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Systems Operation

General Description

Hydraulic Services System

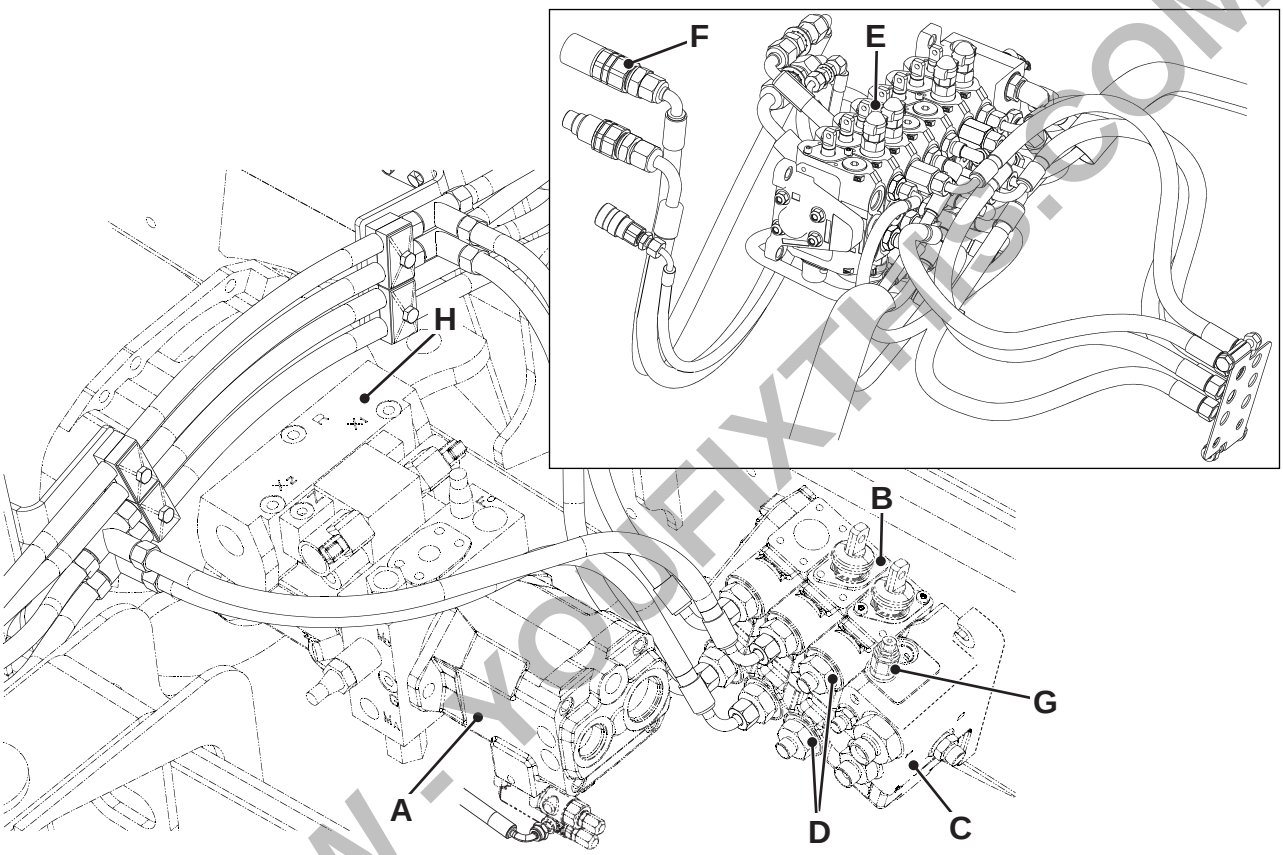


Fig 25.

The loader and backhoe (excavator) hydraulic services are operated by a `Variflow' hydraulic system, which enables precise control, and at the same time, maximises machine operating efficiency.

The engine-driven hydraulic services pump **A** is a variable displacement axial piston design. The pump output flow is regulated automatically by hydraulic load sense pressure (a demand signal) from the hydraulic services. Therefore, there is no `Neutral' circuit in this type of system.

The loader control valve block **B** incorporates a priority inlet section **C**, which houses the steer priority valve. Oil from the pump enters the loader valve and is distributed to the (priority) steer circuit and loader services as required. The loader valve block also features internal auxiliary relief valves ARV's, which are fitted inside the service ports **D**. These internal ARV's are factory set and cannot be adjusted.

The excavator control valve block **E** is mounted on the excavator rearframe. The excavator rearframe is pin-mounted to the chassis and can be quickly detached from

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Service Schedules

	Operation	10	50	100(1)	500	1000	2000
Oil Tank Suction Filter	- Change			☐	☐	☐	☐
Rams - Chrome Condition	- Check			☐	☐	☐	☐
Hydraulic Oil Cooler	- Clean				☐	☐	☐
Hydraulic Oil Strainer	- Clean						☐
BRAKES							
Brake System Fluid Level	- Check	☐	☐	☐	☐	☐	
Brake System Fluid	- Change						☐
Park Brake	- Check and Adjust			☐	☐	☐	☐
ELECTRICS							
Battery Electrolyte Level (if applicable)	- Check				☐	☐	☐
Wiring for Chaffing/Routing	- Check		☐	☐	☐	☐	☐
Battery Terminals for Condition and Tightness	- Check			☐	☐	☐	☐
BODYWORK AND CAB							
All Pins and Bushes	- Check and Grease	☐	☐	☐	☐	☐	☐
Door/Window Hinges	- Lubricate				☐	☐	☐
All Cables	- Lubricate				☐	☐	☐
Cab Heater Filter(4)	- Clean/Change				☐	☐	☐
Hydraclamps (Sideshift)	- Check and Adjust			☐	☐	☐	☐
Door - Fit and Latches	- Check			☐	☐	☐	☐
Cab Seat - Operation	- Check			☐	☐	☐	☐
Windshield Washer Fluid Level	- Check	☐	☐	☐	☐	☐	☐
Boom Lock Engagement	- Check	☐	☐	☐	☐	☐	☐
Condition of Paintwork	- Check			☐	☐	☐	☐
Machine Generally	- Check and Clean	☐	☐	☐	☐	☐	☐
Stabiliser Legs (Sideshift)	- Check and Adjust		☐	☐	☐	☐	☐
ATTACHMENTS							
Multi Purpose Shovel	- Grease	☐	☐	☐	☐	☐	☐
Backhoe & Loader Quick Hitch	- Grease	☐	☐	☐	☐	☐	☐

(1) First 100 Hours Service only, to be completed by your JCB Distributor.
(2) If operating under arduous conditions, change the engine oil and filter every 250 hours.
(3) The oil service interval will be affected if there is a high sulfer content in the fuel. Refer to Fuel System for more information.
(4) If operating in dusty working environments, change more frequently.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Notes:

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

ROPS, FOPS Structure - Checks

For the correct procedure, see ***Section 3, Routine Maintenance***.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Removal and Replacement

Boom

The procedure describes removal of the boom with the boom and dipper rams still attached.

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

Removal

1 ⇨ *Fig 6. (B-94)*. Remove the excavator bucket. Extend the excavator and put a support below it as shown.

2 Lower the stabilisers to the ground.

3 **Centremount:** Stop the engine and remove the starter key. Operate the excavator control levers back and forth several times to vent any residual hydraulic pressure. Slowly release the hydraulic tank filler cap.

Sideshift: Vent the hydraulic services and pilot circuit accumulator hydraulic pressure:

Switch the starter to ON without starting the engine. Activate the joystick controls, operate the joysticks several times to vent the hydraulic pressure from the servo system and service rams. Turn the starter switch to the OFF position and remove the key. Slowly release the hydraulic tank filler cap.

4 Disconnect all the hydraulic hoses at the kingpost bulkhead **A**. Label each hose before disconnecting to ensure correct replacement.

Plug the open ports and cap the hose ends to prevent loss of hydraulic fluid and ingress of dirt. Place a suitable receptacle beneath the kingpost to collect any hydraulic fluid spillage.

5 Remove the dipper. ⇨ *Dipper (B-95)*.

6 Wrap a suitable sling around the boom **B**, make sure that the weight of the boom is held by the sling.

7 Put a support below the boom ram **C**.

8 Remove the pivot pin retaining bolt, then use a drift to remove the boom ram (rod end) pivot pin **D**.

9 Remove the pivot pin retaining bolt, then use a drift to remove the pivot pin **E**.

Take care to retrieve the shims (if fitted). Record the locations of any shims so that they can be returned to their original positions.

10 Carefully lift the boom away from the machine.

Replacement

Replacement is the reverse of the removal sequence, but note the following:

Clean and lightly oil the pivot bores and pivot pins before fitting. Make sure that the pivot pin retaining holes align with their corresponding holes in the boom or kingpost.

On completion, operate the excavator and check for hydraulic leaks.

Check the operation of the boom lock.

Apply grease at each pivot pin grease nipple, see ***Section 3, Routine Maintenance***.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Starter Motor

TC-005

Starting Circuit Test

Before carrying out the voltmeter tests, check the battery condition and ensure that all connections are clean and tight.

To prevent the engine starting during the tests ensure that the engine stop fuse is removed, (refer to ***Fuse Identification*** page).

Check the readings in the following sequence using a voltmeter. Unless otherwise stated, the readings must be taken with the starter switch held in the 'start' position ('HS') and the transmission forward/reverse selector in neutral.

Note: *Do not operate the starter motor for more than 20 seconds at one time. Let the starter motor cool for at least two minutes between starts.*

1 Connect the voltmeter across the battery terminals. ⇒ *Fig 28. (C-38)*. Reading in 'start' position: 10.0V approximately. Minimum permissible reading in 'start' position 9.5V.

A low reading probably indicates a fault in the starter motor.

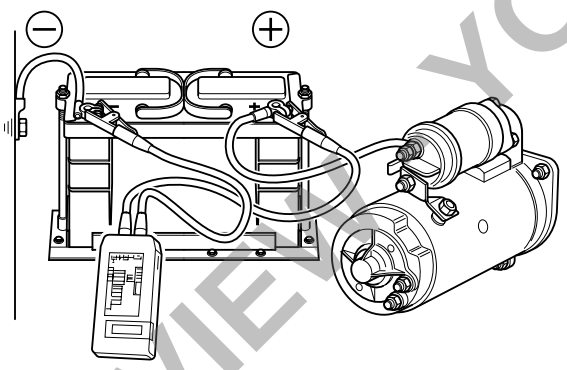


Fig 28.

2 Connect the voltmeter between the starter main terminal **29-A** and the commutator end bracket **29-B**. In the 'start' position, the reading should not be more than 0.5V below the reading obtained in Step 1. Minimum permissible reading in 'start' position 9.0V.

If the reading is within this limit, continue to Step 3. If the reading is outside the limit, proceed to Step 4 and Step 5.

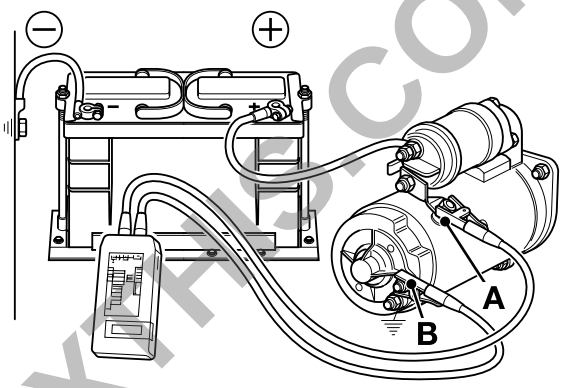


Fig 29.

3 Connect the voltmeter between the solenoid terminal **30-C** and a good earth. Minimum permissible reading in 'start' position: 8.0V.

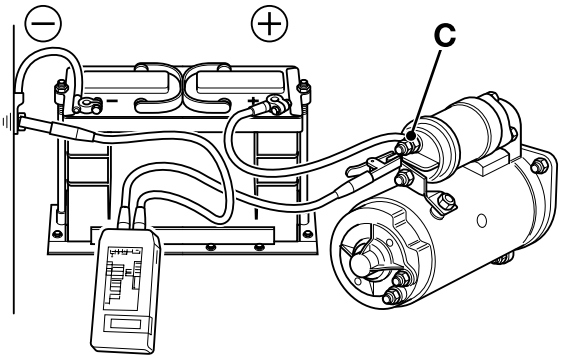


Fig 30.

a If the reading is less than specified, connect the voltmeter between the neutral start relay terminal **31-D** and earth. An increase in reading to 8.0V indicates a fault in the wiring from the start relay to the solenoid.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Section D

Controls

Service Manual - Midi CX Backhoe Loader

Section 1 - General Information

Section 2 - Care and Safety

Section 3 - Maintenance

Section A - Attachments

Section B - Body and Framework

Section C - Electrics

Section D - Controls

Section E - Hydraulics

Section F - Transmission

Section G - Brakes

Section H - Steering

Section K - Engine



PREVIEW - YOUFIXTHIS.COM

Publication No.
9803/9400-06



Copyright © 2004 JCB SERVICE. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any other means, electronic, mechanical, photocopying or otherwise, without prior permission from JCB SERVICE.

Issued by JCB Technical Publications, JCB Aftermarket Training, Woodseat, Rocester, Staffordshire, ST14 5BW, England. Tel +44 1889 591300 Fax +44 1889 591400

World Class
Customer Support

Download full manual at youfixthis.com

Combined Servo Pressure Generating Valve & Hydraclamps Valve

The servo pressure generating valve and hydraclamps valve are combined into one valve block. The valve block houses the servo pressure regulating valve **1**, a solenoid operated valve **2** for servo pilot pressure isolation, and another solenoid operated valve **3** for control of the sideshift carriage hydraclamps.

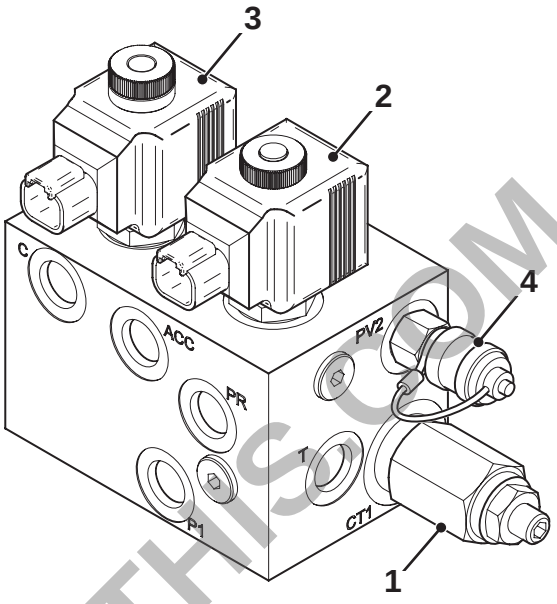
The servo pressure regulating valve **1** maintains servo pressure by regulating the incoming supply pressure from the main hydraulic system. Servo pressure can be measured at the hydraulic test point **4**.

Down stream of the pressure regulating valve is the servo accumulator (not shown) and associated non-return valve. The accumulator traps and stores servo pressure to enable the excavator services to be operated for a limited period with a stopped engine. This allows the attachments to be lowered safely to the ground should the engine stop.

The isolation solenoid valve **2** is energised by the joysticks enable selector switch in the side console. When the solenoid is energised, servo pilot pressure is directed through port `PR' to enable operation of the joystick controllers. When the solenoid is de-energised, the valve spool is spring returned to the closed position, which isolates the supply to the joystick controllers.

The hydraclamps solenoid valve **3** is energised by a switch on the RH joystick pod. When the solenoid is energised, hydraulic pressure acting on the hydraclamps through port `C' is then vented back to tank, which allows the sideshift carriage to be moved along the rearframe rails. When the solenoid is de-energised, the valve spool is spring returned to the closed position. Main system pressure is then able to pressurise the hydraclamps to hold the sideshift carriage in position.

For more details of the hydraulic circuit and valve connections, see ***Schematic Circuits***.



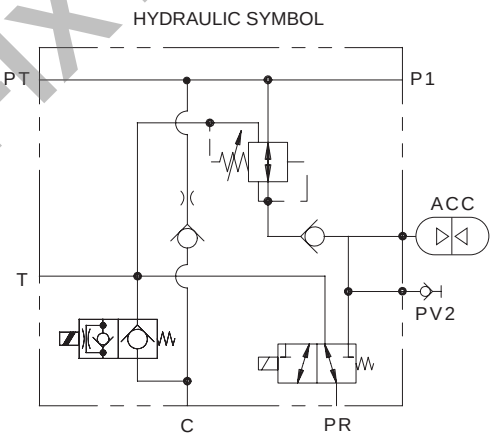


Fig 35.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Standard Spool

⇨ Fig 70. (E-83). The spool and associated components can be removed without separating the valve block sections. The spool centering spring **7** is at the bottom, therefore the spool must be removed from the bottom. It may be possible to remove the spool without removing the valve block from the machine.

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

Before commencing work, ensure that the exterior of the valve block and the working area are thoroughly cleaned and free of possible sources of contamination.

Removal

1 Operate the loader control levers back and forth several times to vent any residual hydraulic pressure. Slowly release the hydraulic tank filler cap.

2 Gain access to the valve block, and disconnect and blank any hoses or pipes which may interfere with the removal of the spool.

3 Disconnect the control rod linkage from the end of the spool.

4 Remove the screws **1**, boot **2** and plate **3**.

5 Remove the screws **4**, cover **5** and carefully withdraw the spool assembly from the bottom of the valve block.

Note: *When removing the lipseals and `O' rings **9**, use a suitably rounded tool that will not cause any damage to the seal grooves. Discard the lipseals and `O' rings.*

Dismantle

1 Hold the spool assembly in a vice using a suitable spool clamp **A**.

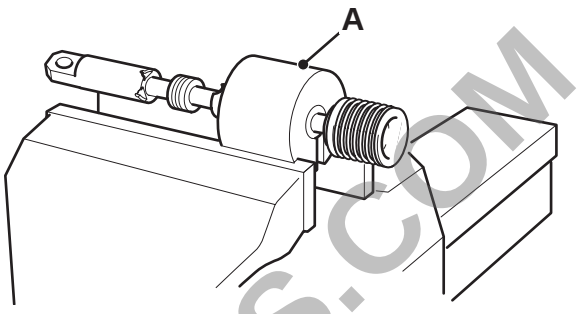


Fig 69.

2 Unscrew the spool end **6** and remove the centering spring **7** with spring retainers **8**. It may be necessary to pre-heat the spool to 200 °C in an oven or with a heat gun to remove the spool end.

3 Inspect the valve components for scratches, pitting corrosion or any other type of damage. Replace as necessary.

Assemble

Assembly is the reverse of the dismantling sequence, but note the following:

Clean the valve components in an appropriate solvent.

Lubricate parts with JCB Hydraulic Fluid before assembling. Make sure that all the parts move freely.

Apply JCB Threadlocker and Sealer to the threads of spool end **6** before fitting.

Renew the lipseals and 'O' rings **9**.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Slew Ram

Slew the excavator to the left to remove the right-hand ram, or to the right to remove the left-hand ram.

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

Removal

1 **Centremount:** Stop the engine and remove the starter key. Operate the excavator control levers back and forth several times to vent any residual hydraulic pressure. Slowly release the hydraulic tank filler cap.

Sideshift: Vent the hydraulic services and pilot circuit accumulator hydraulic pressure:

Switch the starter to ON without starting the engine. Activate the joystick controls, operate the joysticks several times to vent the hydraulic pressure from the servo system and service rams. Turn the starter switch to the OFF position and remove the key. Slowly release the hydraulic tank filler cap.

2 Disconnect the hydraulic hoses at the slew ram. Label each hose before disconnecting to ensure correct replacement. Plug the open ports and cap the hose ends to prevent loss of fluid and ingress of dirt.

3 ⇨ *Fig 104. (E-134)*. Remove the pivot pin retaining bolt **A**, then use a drift to remove the slew ram (rod end) pivot pin **B**.

4 Remove the retaining bolts **C** and trunnion plate **D**. Carefully lift the slew ram away from the machine.

Take care to retrieve the thrust washers **E**. Record the locations of the thrust washers so they can be returned to their original positions.

Note: *Remove the bearing bushes **F** only if they are damaged and need to be replaced. Make sure that the grease holes in the bushes align with their corresponding holes in the rearframe.*

Replacement

Replacement is the reverse of the removal sequence, but note the following:

Clean and lightly oil the pivot bores and pivot pins before fitting. Make sure the pivot pin retaining hole aligns with the corresponding hole in the kingpost.

Torque tighten the bolts **C**.

On completion, operate the excavator and make sure that the ram and kingpost operate freely and do not foul.

Apply grease at each pivot pin grease nipple, see ***Section 3, Routine Maintenance***.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

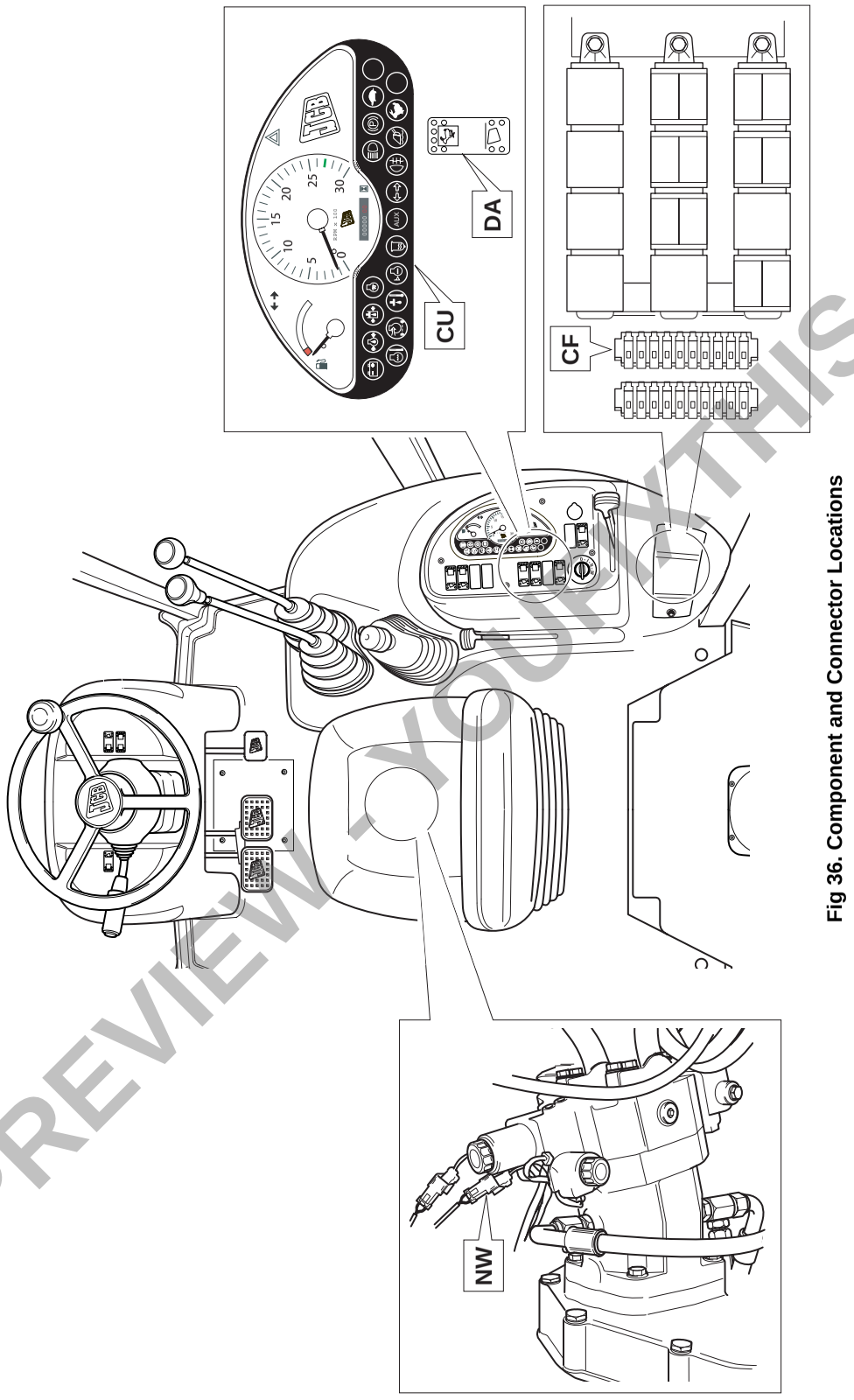


Fig 36. Component and Connector Locations

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Table 8. Brakes not releasing.

Possible Cause	Action
Brake pedal spring fault.	Fit a new spring.
Master cylinder fault (plunger stuck in bore).	Check master cylinder in single and coupled pedal modes to identify fault area, service as required.
Blocked hole in master cylinder reservoir cap.	Fit a new reservoir cap.
Brake pedal free travel incorrect.	Adjust pedal free travel.
Fluid contamination and seal damage.	Flush system and renew hydraulic seals.
Annular brake piston(s) binding in axle	– Check that correct brake fluid has been used (incorrect fluid could swell the annular brake piston seals). – Check if annular brake piston seals in good condition. – Check that annular brake piston rotates freely in its housing with no seals fitted. – Check that the annular brake piston seal retracts the piston approximately 0.5 mm (0.020 in).
Kinked or crushed brake pipes.	Check and renew pipes as required.
Friction and counter plates not free on splines or dowels.	Check friction and counter plates for free movement, renew if required - BOTH sides of relevant axle.

Table 9. Excessive brake noise in operation.

Possible Cause(1)	Action
Deterioration of axle oil or wrong type of axle oil.	Change axle oil.
Axle oil loss.	Refill axle with correct oil and check for leaks.
Friction plates worn beyond limits.	Renew friction and counter plates.
Friction and counter plates in poor condition.	Check for distortion or surface pitting and roughness of friction and counter plates (annular grooving of counter plates is acceptable).

(1) Due to the metal to metal contact of oil immersed brakes, limited noise can be heard which is consistent with this type of design - this is normal.

Table 10. Fluid loss when machine standing - overnight.

Possible Cause(1)	Action
Severe damage or slight cut or nick in the brake piston seal, see ***Service Procedures - Brake Piston Seal Leakage Test.***	Strip axle, replace seal.

(1) Confirm fault is as indicated by checking that the brake pedal DOES NOT touch the floor under constant pressure.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 24 of 622 pages

The full manual includes:

- All 622 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

JCB Midi CX Backhoe Loader Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual