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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, carefully 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

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Service Schedules

Introduction

T3-036_3

⚠ 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

A badly maintained machine is a danger to the operator and the people working around him. Make sure that the regular maintenance and lubrication jobs listed in the service schedules are done to keep the machine in a safe and efficient working condition.

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hourmeter readings to correctly gauge service intervals. When there is no hourmeter fitted, use the calendar equivalents to determine the service intervals. Refer to ***Calendar Equivalents***. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

How to Use the Service Schedules

T3-012_4

In the example shown, **A** shows all service requirements to be carried out every 10 hours and **B** shows the requirements to be carried out every 500 hours.

Important: *Services should be carried out at either the hourly interval or calendar interval, whichever occurs first. Refer to* ***Calendar Equivalents****.*

Important: *The intervals given in the schedules must not be exceeded. If the machine is operated under severe conditions (high temperature, dust, water, etc.), shorten the intervals.*

Pre-start Cold Checks, Service Points and Fluid Levels

	Operation	A: 10	50	100[1]	B: 500	1000	2000	8000
ENGINE								
Coolant Quality and Level	- Check	□	□	□	□	□		
Cooling System	- Drain and Refill						□	□
Oil level	- Check	□	□					
Oil and Filter[2][3][4]	- Change				□	□	□	□
Air Cleaner Dust Valve[5]	- Change				□	□	□	□
Air Cleaner Outer Element[5]	- Change					□	□	□
Air Cleaner Inner Element	- Change						□	□
Pre-Cleaner (if fitted)	- Check			□				
Water Seperator	- Check for contamination and Drain		□	□	□	□	□	□
Engine Fuel Filter	- Change					□	□	□
Front End Accessory Drive (FEAD) Belt Condition	- Check				□	□	□	□
Front End Accessory Drive (FEAD) Belt	- Change							□
Engine Mounting Bolts for Tightness	- Check			□	□	□	□	□
All Hoses - Condition	- Check			□	□	□	□	□
Radiator[5]	- Clean				□	□	□	□
Crankcase Ventilation Filter	- Change					□	□	□

795390-1

Calendar Equivalents

T3-098

Every 10 Hours = Daily

Every 50 Hours = Weekly

Every 500 Hours = Six Months

Every 1000 Hours = Yearly

Every 2000 Hours = 2 Years

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Fluids, Lubricants and Capacities

Table 1.

ITEM	CAPACITY Litres	CAPACITY UK Gal	FLUID/LUBRICANT	JCB PART NO	Container Size (1)
Fuel Tank	45	17.6	Diesel Oil. ⇨ *Fluids, Lubricants and Capacities (13)*	-	-
Engine (Oil) (2) 1CXWS	10.5	2.3	**JCB Engine Oil EP 15W40** (-10°C to +50°C (14°F to 122°F) API CH-4/SJ, ACEA E5/E3/B3/A3	4001/1805	20 Litres
			JCB Cold Climate Engine Oil EP 5W40(-20°C to +50°C (-4°F to 122°F) API CH-4/CG-4/CF-4/CF/SJ, ACEA E2/B3/A3	4001/2705	20 Litres
Engine (Oil) (3) 1CXT	9.3	2.0	**JCB Engine Oil EP 15W40** (-10°C to +50°C (14°F to 122°F) API CH-4/SJ, ACEA E5/E3/B3/A3	4001/1805	20 Litres
			JCB Cold Climate Engine Oil EP 5W40(-20°C to +50°C (-4°F to 122°F) API CH-4/CG-4/CF-4/CF/SJ, ACEA E2/B3/A3	4001/2705	20 Litres
Engine (Coolant)(4)	11	2.4	**JCB Antifreeze HP Coolant/Water** ⇨ *Coolant Mixtures (14)*.	4006/1120	20 Litres
Hydraulic System 1CXWS	80	17.6	**JCB Optimum Performance Hydraulic Oil**	4002/2805	20 Litres
Hydraulic System 1CXT	80	17.6	**JCB Ultra Performance Hydraulic Oil**	4002/2805	20 Litres
Grease Points	---	---	**JCB Special HP Grease**	4003/2017	400g
			JCB Special MPL-EP Grease(5)	4003/1501	400g
Extending Dipper	---	---	**JCB Waxoyl**(6)	4004/0502	5 Litres
Chain Case	Fill to level plug		**JCB Engine Oil HP 10W30**	4001/1705	20 Litres
Slew Oil	Fill to level plug		**JCB Engine Oil HP 10W30**	4001/1705	20 Litres

(1) For information about the different container sizes that are available (and their part numbers), contact your JCB dealer
(2) Caution - Do not use ordinary Engine Oil.
(3) Caution - Do not use ordinary Engine Oil.
(4) It is recommended that the cooling system be filled at a maximum rate of 10 litres per minute. If the fill rate is any higher than this there is a possibility of air becoming trapped in the system.
(5) JCB HP Grease is the recommended specification grease, if using JCB Special MPL-EP then the greasing must be carried out more frequently.
(6) WARNING: Waxoyl contains turpentine substitute, which is inflammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period. Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

***Note:** No warranty liability will be accepted for engine failures where unacceptable fuel grades (or their equivalent) have been used at any stage.*

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Electrical Circuit Diagrams

From machine no. 751600 to 752370

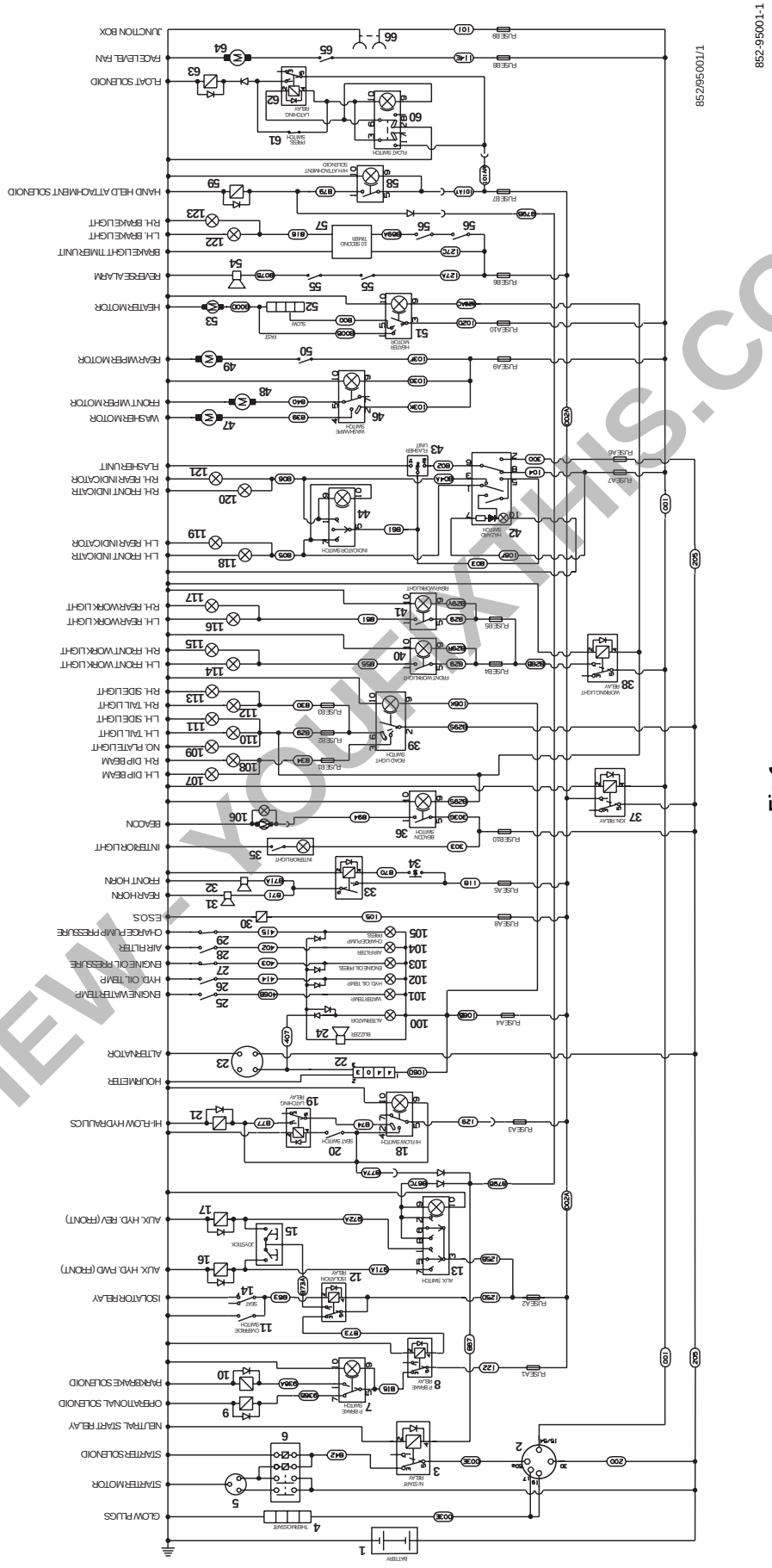


Fig 1.

⇨ *Main Components (C-24)*

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Schematic Circuits

Standard Machines - Single Lever Drive Control

From Machine no. 751012 to 752462

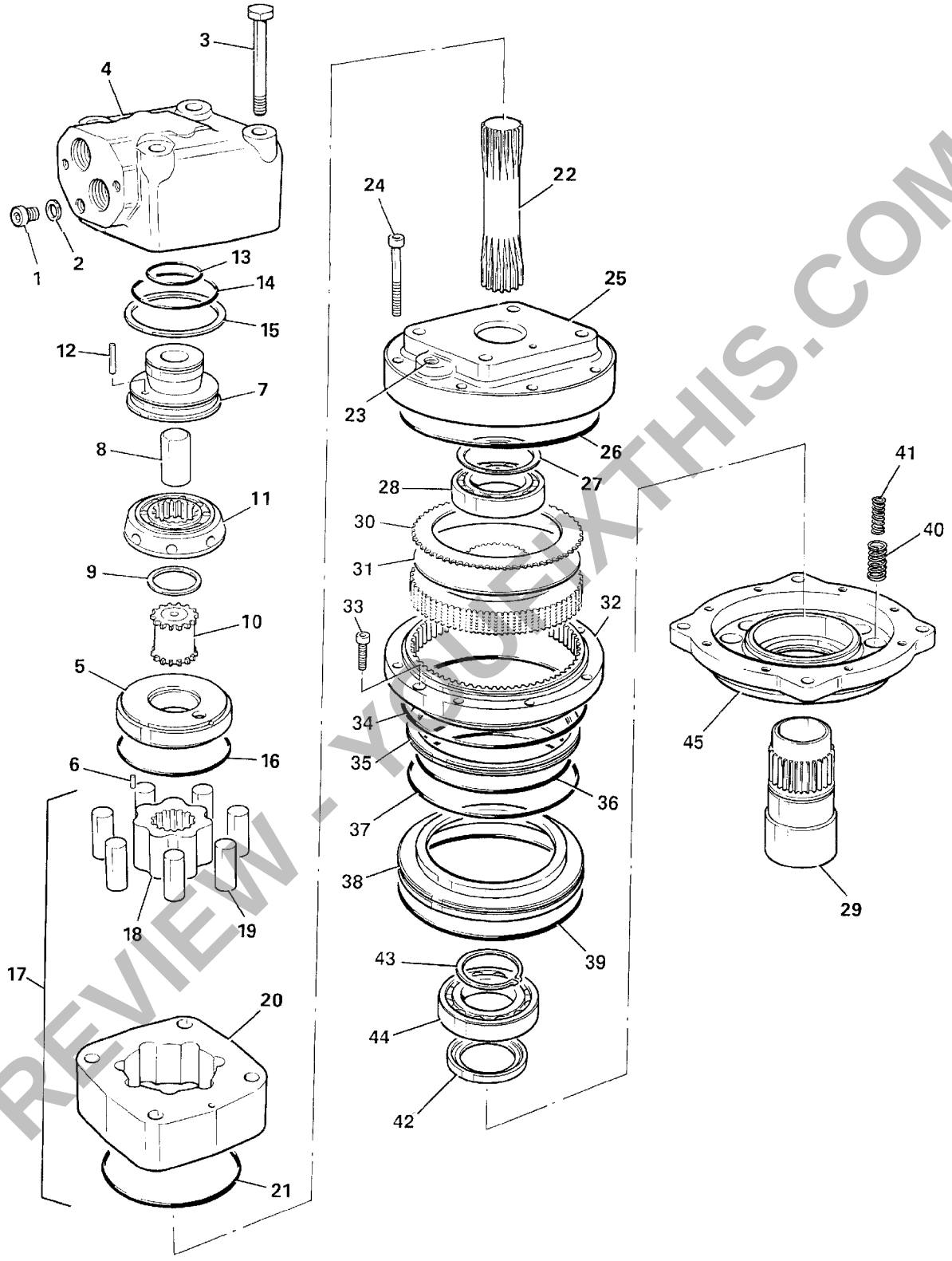
⇒ *Fig 1. (E-38)*

Table 1. Component Key

C	Cooler
F1	Filter
P1	Main Pump (Run in Tandem with P2)
P2	Main Pump (Run in Tandem with P1)
P3	Auxiliary Gear Pump
M1	Left Hand Drive Motor
M2	Right Hand Drive Motor
S1	Suction Strainer
T	Tank
1	Loader Joystick
2	Loader Valve Block
2A	Crowd Spool
2B	Lift Spool
2C	Auxiliary Spool
2D	Main Relief Valve (MRV)
2E	Crowd Ram Rod Side ARV
2F	Crowd Ram Head Side ARV
2G	Lift Ram Head Side ARV
2H	Auxiliary ARV
2J	Auxiliary ARV
2X	Pressure Test Point (Main Relief Valve)
2Y	Pressure Test Point (Transmission Charge Pressure)
2Z	Pressure Test Point (Brake Pressure) & Hand Pump Connector (Manual Brake Release)
3	Check Valve (8 bar)
4	Excavator Valve Block
4A	Slew Spool
4B	Boom Spool
4C	Stabiliser Spool
4D	Stabiliser Spool
4E	Dipper Spool
4F	Bucket Spool
4G	Auxiliary Spool
4H	Hydraclamp Valve
4J	Slew ARV
4K	Slew ARV
4L	Boom Ram Head Side ARV
4M	Boom Ram Rod Side ARV
4N	Dipper Ram Rod Side ARV
4P	Dipper Ram Head Side ARV
4Q	Bucket Ram Rod Side ARV
4R	Bucket Ram Head Side ARV
4S	Auxiliary ARV
4T	Auxiliary ARV
5	Crowd Rams
6	Manually Operated Dump Valve
7	Lift Rams
8	Drive Control Joystick
8A	Reverse Spool
8B	Left Turn Spool
8C	Forward Spool
8D	Right Turn Spool
9	Pressure Reducing Solenoid Valve
10	Check Valve (2 bar)
11	Filter By-pass Valve (3 bar)
12	Auxiliary Feeds
30	Hydraclamp
32	Stabiliser Ram
33	Stabiliser Ram
34	Slew Ram
35	Slew Ram
36	Boom Ram
37	Dipper Ram
38	Bucket Ram
50	Bi-restrictor
51	Bi-restrictor
52	One-way Restrictor

Note: *Excavator services shown here are to the JCB 'X' control pattern. For ISO '+' control pattern, components 36 and 37 are swapped over.*

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167730

Fig 5.

⇨ *Dismantling and Assembly to machine no. 751011 (E-128)*

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Zinc Plated Fasteners and Dacromet Fasteners

Table 2. 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 3. 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

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Fault Finding

Auxiliary System Faults

Auxiliary services not working (in both directions):

- Thumb-stick control switch out of tolerance - this fault will generate a blink code on the switch panel as soon as the ignition is switched on. ⇨ *Table 1. Aux Fault Blink Codes (C-53)*
- CT4/CT5 Failed. Check Blink code. ⇨ *Fig 9. (C-53)*
- Auxiliary ECU fault.

Auxiliary services work in ONE direction only:

A blink code will be generated when the Thumb-stick is moved in the non-operating direction.

- CT4/CT5 Failed. Check Blink code. ⇨ *Fig 9. (C-53)*
- Auxiliary ECU fault.

Note: *Thumb-stick 'centre position' voltage should be in the range - 2.3V to 2.7V.*

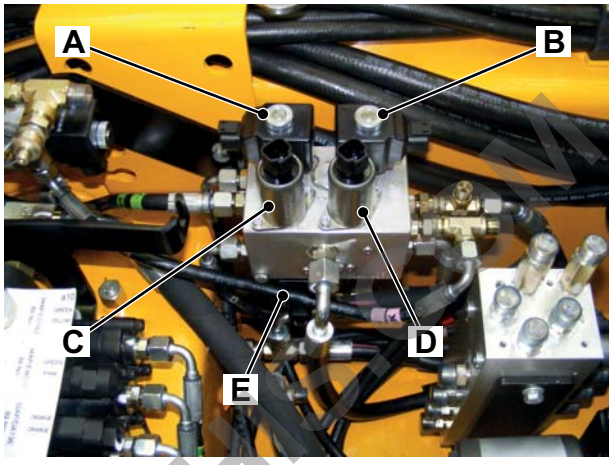


Fig 9. Combi-Valve

A	CT2 Brake Solenoid
B	CT1 Servo Isolator (feeds loader joystick pilot)
C	CT5 Aux Solenoid
D	CT4 Aux Solenoid
E	CT3 PMS Solenoid / Transmission

Table 1. Aux Fault Blink Codes

Blink Code	Fault Code	Description	Test Method	Comments
1	1 Long Flash 1 Short Flash	Joystick thumb wheel not in centre position	Held thumb wheel out of position	Fault code correct
2	1 Long Flash 2 Short Flashes	Joystick thumb wheel High or Low reading	Short pin 5 to pin 7 of thumb wheel	Fault code correct for low, does not work for high (flashes code 3)
3	1 Long Flash 3 Short Flashes	Aux 5V supply High value	12V to pin B of voltage reg	Fault code correct
4	1 Long Flash 4 Short Flashes	Right solenoid open circuit	Solenoid 1 open circuit	Solenoid 1 = CT5 fault code correct
5	1 Long Flash 5 Short Flashes	Right solenoid short or over temperature	Solenoid 1 short circuit	Fault code correct
6	1 Long Flash 6 Short Flashes	Left solenoid short or over temperature	Solenoid 2 = CT4 short	Fault code correct

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Fault Finding

Hydrostatic Transmission

Table 1.

Key to Cause		Remedy
1	No oil in hydrostatic system	Check supply of oil to pump.
2	Seat isolator not operating correctly	Ensure the seat isolator is operating correctly, check electrical wiring and switch as required.
3	Tyres worn or pressure incorrect	Check tyre pressures and condition.
4	Charge pressure incorrect	Charge pressure is controlled by the Charge Pressure Relief Valve. Carry out flow check.
5	No or low pump output	Check pump - carry out wheel speed check. If one pump suspect, swop motor feed hoses and notice if problem changes sides - if `yes', pump related fault; if `no', motor related fault.
6	A high pressure `loop' relief valve/tow valve open/set incorrectly	Replace relief valve and re-check.
7	Pump neutral position set incorrectly	Adjust servo neutral position.
8	Pump servos incorrectly set	Adjust servos
9	Feed hose failure	Check motor feed hoses.
10	No hydraulic feed to joystick	Check for feed to joystick.
11	No hydraulic feed from joystick to pump	Check for feed from joystick to pump.
12	Brake hose failure	Inspect brake hoses.
13	Brake release pressure incorrect	Check charge/brake pressure.
14	Electrical failure (brake valve circuit)	Check brake valve electrical circuit.
15	Brake valve inoperative	Check valve (sticking spool, etc.)
16	Brakes not released	Inspect motor brakes for seal damage. Repair as required.
17	Mechanical brake failure	Check brake components (worn plates, spring damage, etc.).
18	Motor leakage	Check motor case drain for confirmation of internal leakage (compare one motor with the other). Pulsing leakage indicates piston ring damage; continuous leakage, possibly more in one direction than the other, indicates distributor seal damage. On wheeled machines, check for shaft seal leakage by checking chain case oil level - increase in oil level indicates possible leakage.
19	Joystick inoperative	Check joystick (plunger movement, leaking seals, etc.)
20	Chain tension	Check chain tension.
21	Motor failure	Inspect motor for damage. Check the screen for sign of damage. Repair as required.
22	Chain/sprocket damage	Inspect chain and sprocket. Repair as required.

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Excavator Quickhitch

Introduction

The Excavator Quickhitch, which is attached to the dipper permits fast removal and installation of the bucket (and other attachments).

The Quickhitch is mechanically operated and does not require hydraulic connections.

⚠ CAUTION

When the Quick-Hitch is installed and its attachment fitted, there is a danger of the attachment hitting the underside of the boom. Operate the boom and dipper carefully when the Quick-Hitch and its attachment are fitted.

2-4-4-2

Note: *To prevent premature wear, failure and breakage, the Quickhitch assembly must be used with a rockbreaker for short periods only. If the machine is to be used for rock breaking for a long period of time, it is recommended that the rockbreaker is installed directly on the machine. When using a rockbreaker, it must be curled towards the machine (as a typical digging operation). Do not use the rockbreaker as a lever as this causes excessive loads on the locking mechanism.*

⚠ CAUTION

When the Quickhitch is fitted to the machine, allowance must be made for the weight of the Quickhitch on the rated operating load. The mass of the Quickhitch is stamped on the data plate

8-4-5-7

Installation

Note: *This operation is easier done by two people - one person to operate the controls and one to line up the pivots.*

1 Before the Quickhitch is installed, make sure that the tipping lever locking bolt assembly is attached with the nut at position **K**. ⇨ *Fig 12. (A-17)*.

2 Put the Quickhitch on hard, level ground. Use the safe and correct lifting equipment to move the Quickhitch.

3 Position the machine so that the dipper arm and Quickhitch are correctly aligned as shown.

4 Engage the dipper:

Operate the controls to line up hole **A** in the dipper arm with the holes **B** in the Quickhitch.

Insert the pivot pin **C** and secure with fasteners **H** and **D**.

5 Engage the tipping link:

Operate the controls to line up hole **E** in the tipping link with hole **F** in the Quickhitch.

Insert the pivot pin **G** and secure with fasteners **J** and **K**.

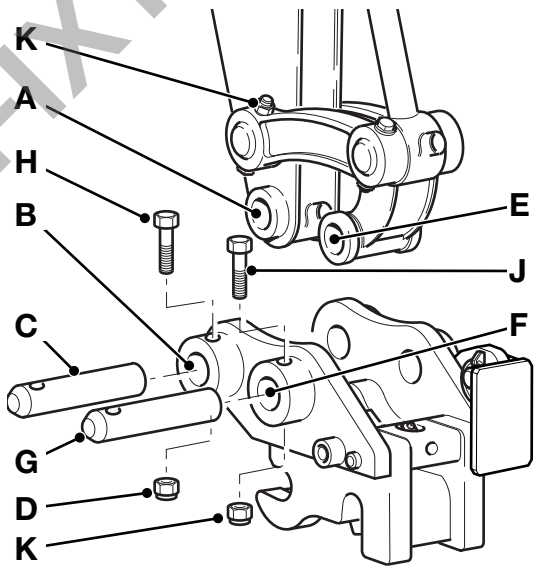


Fig 12.

Removal

The removal of the Quickhitch is a reversal of the installation procedure. Pay particular attention to safety notices.

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Terms and Definitions

Colour Coding

Hydraulic Schematic Colour Codes

T11-006

The following colour coding, used on illustrations to denote various conditions of oil pressure and flow, is standardised throughout JCB Service Publications.

Red	**Full Pressure:** Pressure generated from operation of a service. Depending on application this may be anything between neutral circuit pressure and MRV operating pressure.
Pink	**Pressure:** Pressure that is above neutral circuit pressure but lower than that denoted by Red.
Orange	**Servo:** Oil pressure used in controlling a device (servo).
Blue	**Neutral:** Neutral circuit pressure.
Green	**Exhaust**
Light Green	**Cavitation:** Oil subjected to a partial vacuum due to a drop in pressure (cavitation).
Yellow	**Lock Up:** Oil trapped within a chamber or line, preventing movement of components (lock up).

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How to Make the Machine Safe (Loader Arms Lifted)

⚠ WARNING

Raised Equipment

Never walk or work under raised equipment unless it is supported by a mechanical device. Equipment which is supported only by a hydraulic device can drop and injure you if the hydraulic system fails or if the control is operated (even with the engine stopped).

Make sure that no-one goes near the machine while you install or remove the mechanical device.

13-2-3-7_3

⚠ CAUTION

You will have to climb onto the machine to fit or remove the strut. Take care, especially if the machine is wet. Remove mud and oil before climbing onto the machine. Do not use the exhaust as a handhold. It can burn you.

5-3-1-4_1

Note: *If you lift the arm to get access for maintenance, you must install the maintenance strut on the loader arms.*

Installing the Maintenance Strut

Before fitting the safety strut remove any load on the forks empty and remove buckets or attachments.

1 Park the machine on level, solid ground.

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

2 Empty the shovel or attachment and remove it. Raise the arm just far enough to install the strut.

3 Stop the engine and remove the starter key.

4 Remove the strut **A** from its stowage position **C**.

5 Place the strut **A** around the lift ram piston rod. Secure it in position with the strap **B**. ⇒ *Fig 3. (26)*.

6 To prevent any chance of the arm creeping down and trapping your fingers, the arm should be lowered onto the strut.

Note: *Lower the arm carefully, to prevent possible damage to the strut. Stop as soon as the weight of the arm is on the strut.*

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

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

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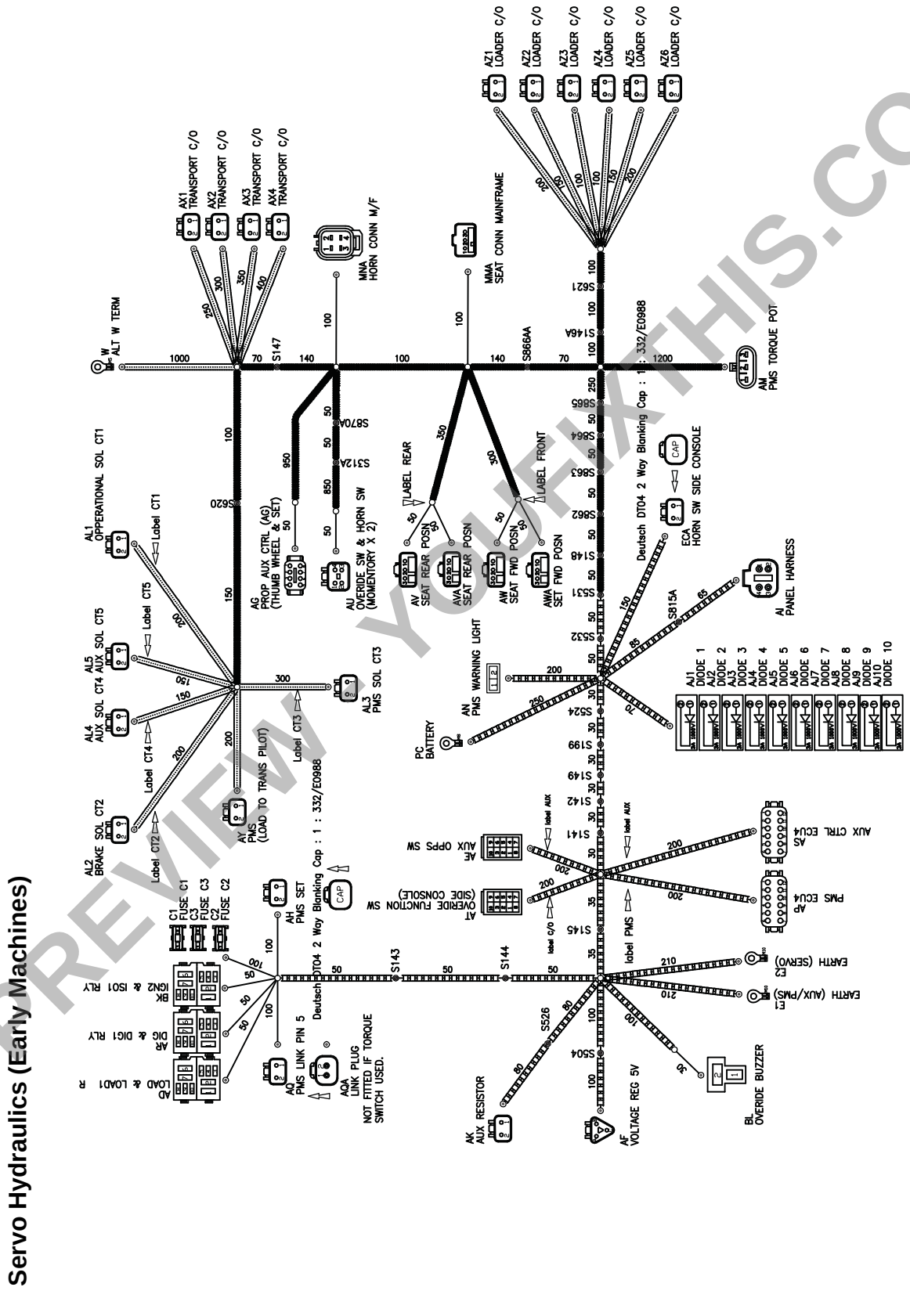


Fig 4. 333-T7366-1 (Sheet 1 of 3)

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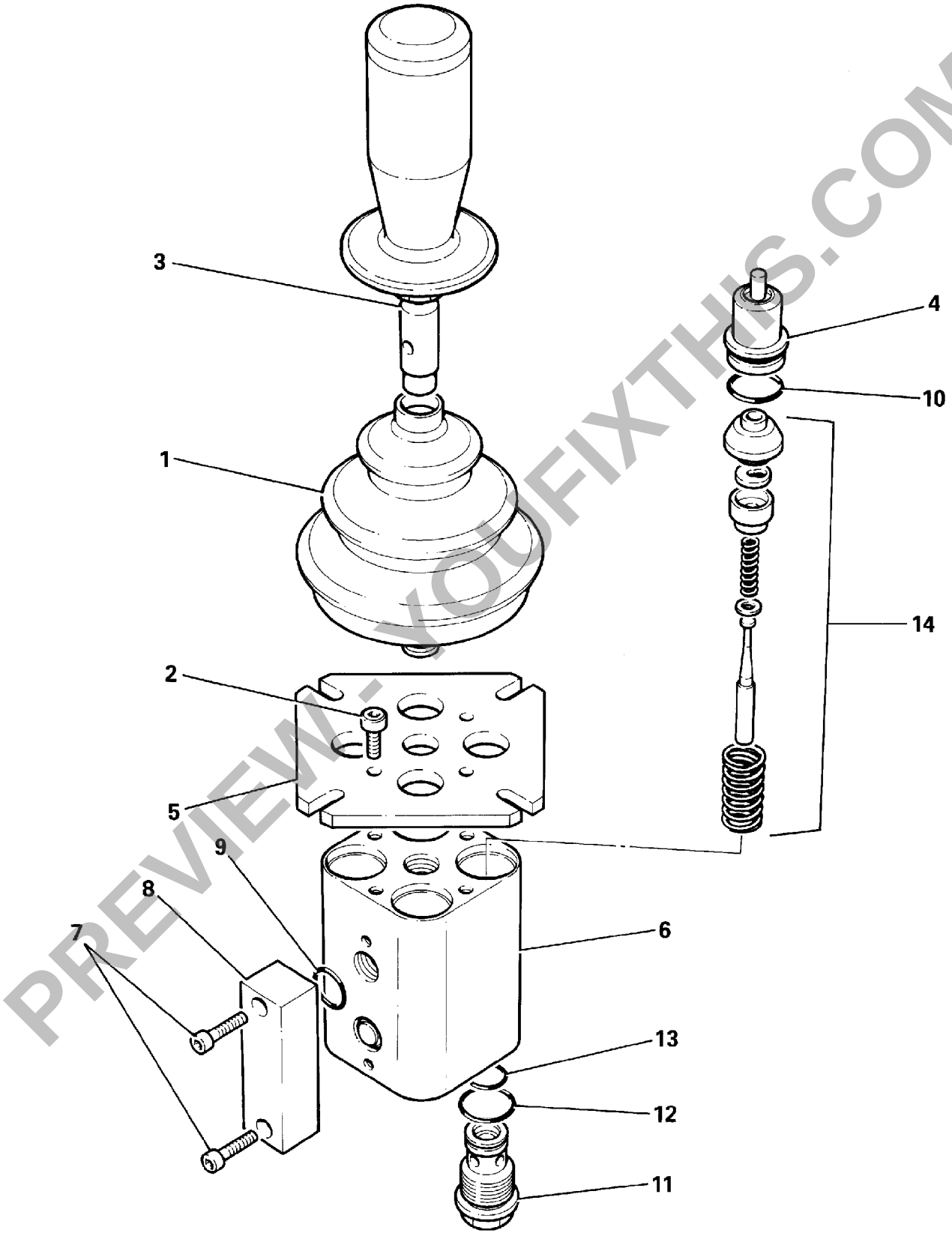
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Joystick up to machine number 807146



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