Service Manual

JCB 403

Section 1 - General Information

Section 2 - Care and Safety

Section 3 - Maintenance

Section A - Attachments

Section B - Body and Framework

Section C - Electrics

Section E - Hydraulics

Section K - Engine



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Safety Check List

Safety First

Safety - Yours and Others

INT-1-3-1_3

All machinery can be hazardous. When a machine is correctly operated and properly maintained, it is a safe machine to work with. But when it is carelessly operated or poorly maintained it can become a danger to you (the operator) and others.

In this manual and on the machine you will find warning messages. Read and understand them. They tell you of potential hazards and how to avoid them. If you do not fully understand the warning messages, ask your employer or JCB distributor to explain them.

But safety is not just a matter of responding to the warnings. All the time you are working on or with the machine you must be thinking what hazards there might be and how to avoid them.

Do not work with the machine until you are sure that you can control it.

Do not start any job until you are sure that you and those around you will be safe.

If you are unsure of anything, about the machine or the job, ask someone who knows. Do not assume anything.

Remember

BE CAREFUL
BE ALERT
BE SAFE

General Safety

T1-007_3

⚠ WARNING

Operator Manual

You and others can be injured if you operate or maintain the machine without first studying the Operator Manual. Read the safety instructions before operating the machine. If you do not understand anything, ask your employer or JCB dealer to explain it. Keep the Operator Manual clean and in good condition. Do not operate the machine without an Operator Manual in the cab, or if there is anything on the machine you do not understand.

INT-1-3-2_2

⚠ WARNING

Care and Alertness

All the time you are working with or on the machine, take care and stay alert. Always be careful. Always be alert for hazards.

INT-1-3-5

⚠ WARNING

Clothing

You can be injured if you do not wear the proper clothing. Loose clothing can get caught in the machinery. Wear protective clothing to suit the job. Examples of protective clothing are: a hard hat, safety shoes, safety glasses, a well fitting overall, ear-protectors and industrial gloves. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained.

INT-1-3-6

⚠ WARNING

Alcohol and Drugs

It is extremely dangerous to operate machinery when under the influence of alcohol or drugs. Do not consume alcoholic drinks or take drugs before or while operating the machine or attachments. Be aware of medicines which can cause drowsiness.

INT-1-3-9_2

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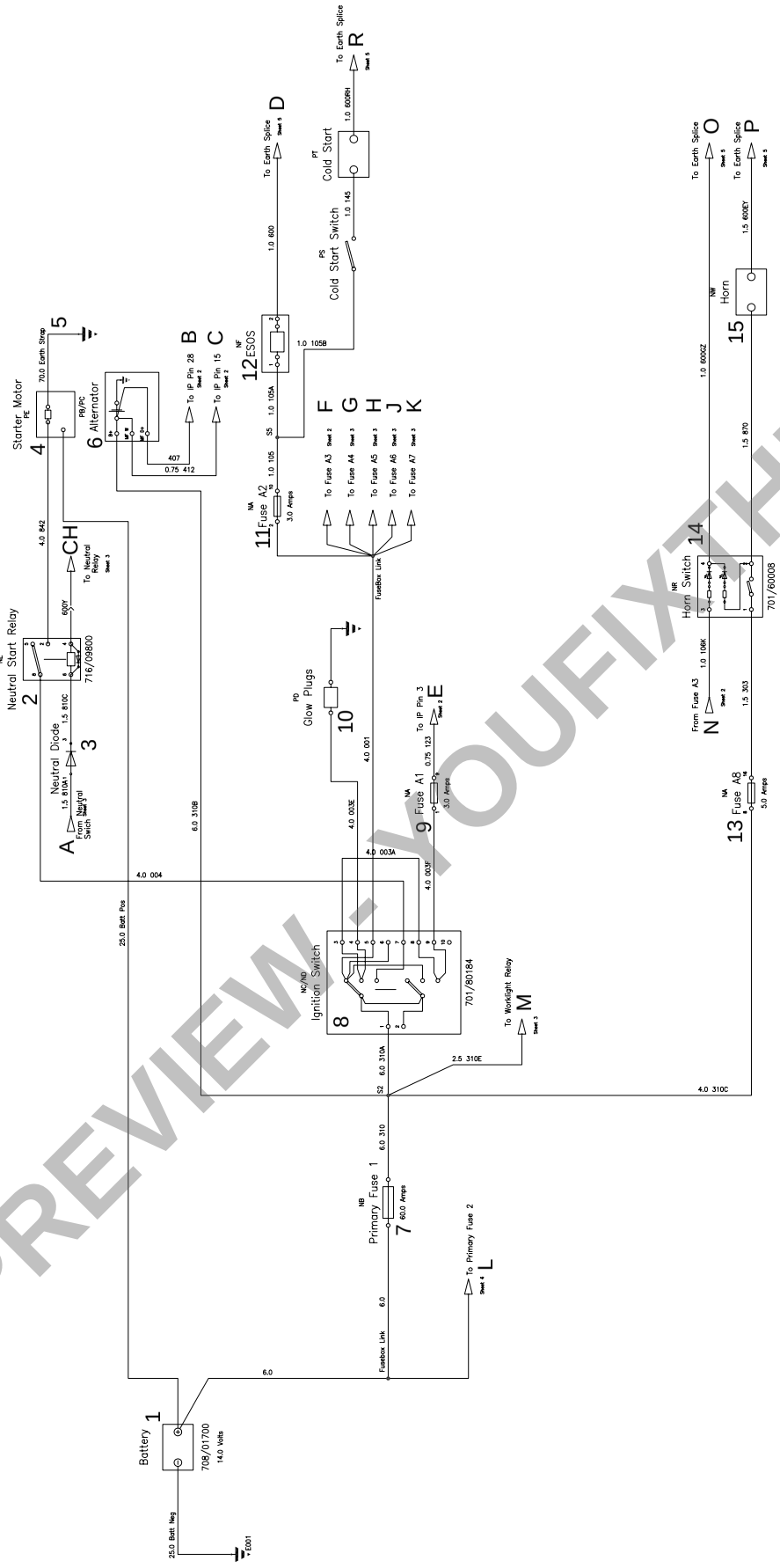


Fig 1. Fuses, Ignition Switch, ESOS, Horn

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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	**Neural:** 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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Dismantling and Assembly

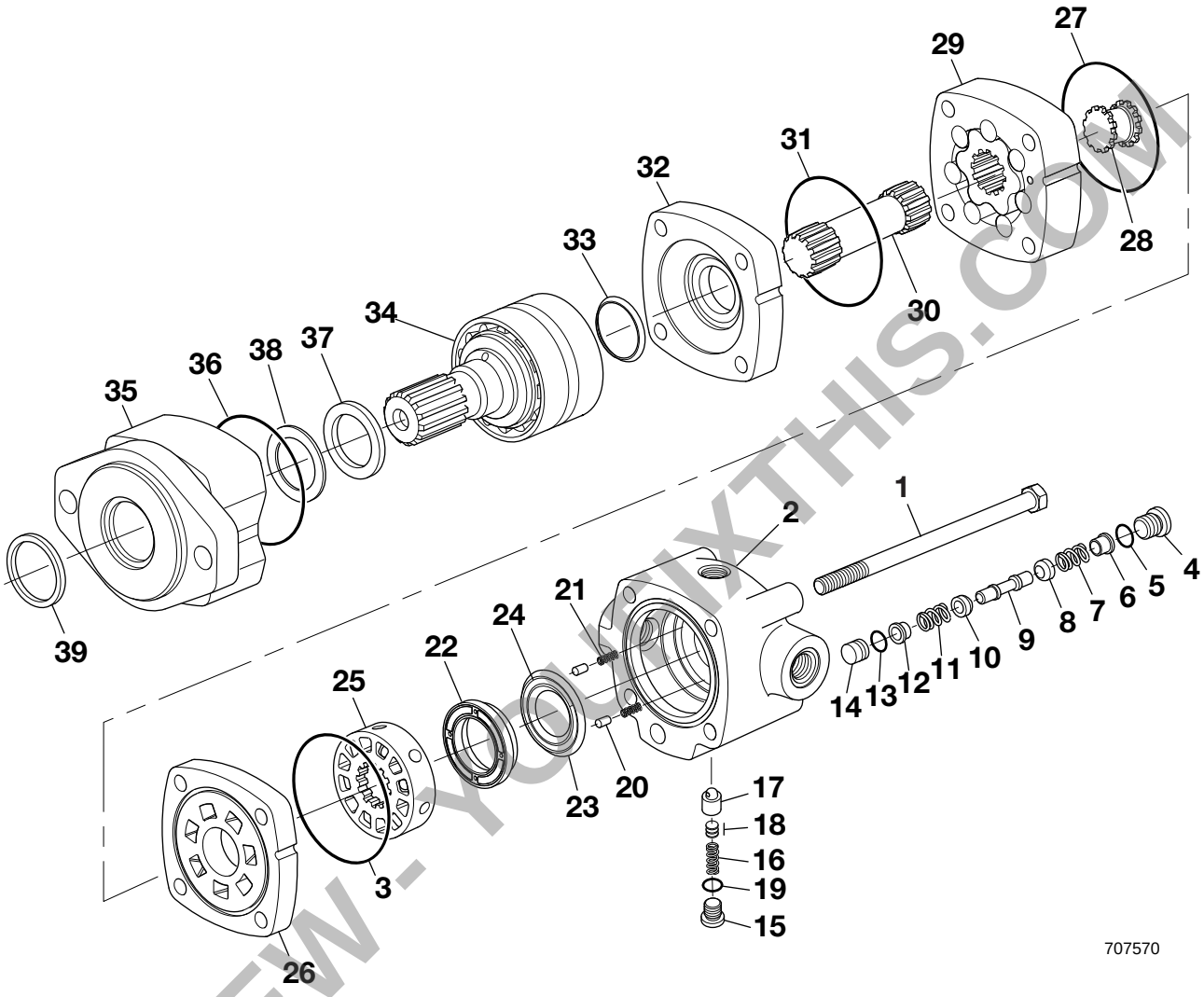


Fig 55.

Dismantling

The numerical sequence shown is a guide to dismantling. For assembly the sequence should be reversed.

Cleanliness is extremely important when repairing a hydraulic motor.

Work in a clean area. Before disconnecting the hoses, clean the port area of the motor thoroughly. Use a wire brush to remove foreign material and debris from around the exterior joints of the motor.

Check the shaft, remove all nicks, burrs or sharp edges that might damage the bearing housing seals during assembly.

Before starting the dismantling procedures, drain the oil from inside the motor.

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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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Table 1. Engine does not start or is difficult to start

Possible Cause	Action
Engine is below the starting limit temperature.	Pre-heat the engine correctly.
Incorrect engine oil viscosity or SAE class.	Drain and fill with the correct grade of oil. ***Section 3, Fluid, Lubricants and Capacities***.
Unsatisfactory quality or contaminated fuel.	Drain and fill with correct grade of clean fuel. ***Section 3, Fluid, Lubricants and Capacities***.
Battery is discharged or defective.	Charge and test the battery. ***Section C, General Information***.
Electrical cable connections to the starter electrical system are loose or oxidised.	Check and correct the connections or cables as necessary.
Starter switch, solenoid or relay is defective.	Replace the defective component.
Starter is defective or the pinion does not engage.	Check the starter motor. Repair/replace as necessary
Injector valve is defective.	Test and replace as necessary. ***Deutz Engine Manual, 9806-2295 T2, 9806-4020 T3***.
Fuel tank is empty.	Bleed the fuel system. ***Section 3, Bleeding the Fuel System***.
Fuel suction pipe is blocked.	Check.
ESOS is defective.	Check/Replace. ***Deutz Engine Manual, 9806-2295 T2, 9806-4020 T3***.
Air filter is clogged.	Check/Replace. ***Deutz Engine Manual, 9806-2295 T2, 9806-4020 T3***.
Air in the fuel system.	Bleed the fuel system. ***Section 3, Bleeding the Fuel System***.
Compression pressure is too low.	Check the compression pressure. ***Deutz Engine Manual, 9806-2295 T2, 9806-4020 T3***.
Exhaust gas back pressure is too high.	Check for a blockage.
Injection line leaks.	Check the injection line.

Table 2. Engine starts but runs irregularly or stalls

Possible Cause	Action
Unsatisfactory quality or contaminated fuel.	Drain and fill with the correct grade of clean fuel. ***Section 3, Fluid, Lubricants and Capacities***.
Injection line leaks.	Check the injection line.
Injector valve is defective.	Test and replace as necessary. ***Deutz Engine Manual, 9806-2295 T2, 9806-4020 T3***.
V-belt (Fuel pump belt drive).	Check if the V-belt is torn or loose.
Compression pressure is too low.	Check the compression pressure. ***Deutz Engine Manual, 9806-2295 T2, 9806-4020 T3***.
Air in the fuel system.	Bleed the fuel system. ***Section 3, Bleeding the Fuel System***.
Glow plugs are defective.	Change. ***Deutz Engine Manual, 9806-2295 T2, 9806-4020 T3***.
Fuel filter is contaminated.	Clean.

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Pre-Start Cold Checks, Service Points and Fluid Levels

Table 1.

	Operation	10	500(1)	1000	2000
ENGINE					
Oil Level	- Check	☐	☐	☐	☐
Oil and Filter(2)(3)	- Change		☐	☐	☐
Air Filter Dust Valve(4)	- Clean		☐	☐	☐
Air Filter Inner and Outer Element	- Check	☐	☐	☐	☐
Air Filter Inner and Outer Element(5)	- Clean			☐	☐
Fuel System for Leaks and Contamination	- Check	☐	☐	☐	☐
Fuel Filter	- Change			☐	☐
Fuel Sedimenter(5)	- Drain and Clean		☐	☐	☐
Fuel Sedimenter	- Check	☐	☐	☐	☐
Fuel Pump	- Check		☐	☐	☐
Fuel Pump	- Change			☐	☐
Fan Belt Tension/Condition (5)(6)	- Check	☐	☐	☐	☐
Radiator Hoses Condition	- Check		☐	☐	☐
Radiator	- Clean		☐	☐	☐
Coolant Level	- Check	☐	☐	☐	☐
Coolant(7)	- Change				☐
Engine Cooling System	- Clean		☐	☐	☐
Timing Belt(5)	- Check		☐	☐	☐
External Oil Leaks	- Check	☐	☐	☐	☐
Engine Mounting Components	- Check		☐	☐	☐
Pre-Heat (Glow Plugs)	- Check		☐	☐	☐
Fuel Injector (6)	- Check				☐
Injection Valve(5)	- Change				
TRANSMISSION, AXLES AND STEERING					
Wheel Motor Mounting Bolt Security	- Check		☐	☐	☐
Tyre Pressures/Condition	- Check	☐	☐	☐	☐
Wheel Nut Security	- Check	☐	☐	☐	☐

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Changing the Oil and Filter

CAUTION

Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.

2-3-3-2

1 Make the machine safe with the loader arm lowered. ⇨ *Prepare the Machine for Maintenance (3-15)*

2 Do steps **1** to **3**. ⇨ *Checking the Oil Level (3-30)*.

3 Remove the belly-panel for access.

4 Put a suitable container below the drain plug (to catch the oil).

5 Remove the drain plug and drain the oil from the sump.

6 Clean, then install the drain plug with a new seal.

Tier 2: Tighten the drain plug to 32 Nm (24 lbf ft).

Tier 3: Tighten the drain plug to 100 Nm (73 lbf ft).

7 Remove the filter canister **A**. Remember that it will be full of oil.

8 Clean the filter head **B**.

9 Add clean engine oil to the new filter canister. Wait for the oil to go through the filter element.

10 Apply a layer of clean engine oil to the seal **C** on the new filter canister.

11 Install the new filter canister, hand tight only.

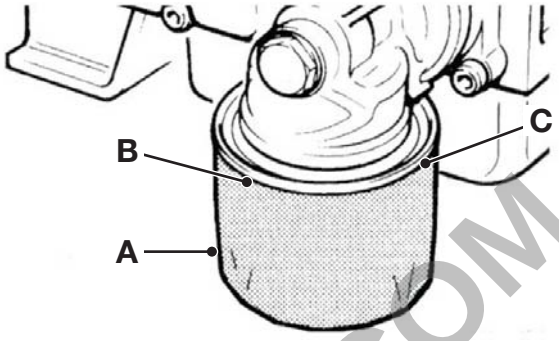
12 Fill the engine with the recommended oil through the filler point to the ''MAX'' mark on the dipstick. Clean any spilt oil.

13 Attach the filler cap and make sure its secure. ⇨ *Fluids, Lubricants and Capacities (3-11)*.

14 Start the engine, then check the system for leaks.

15 When the engine is cool, check the oil level. Close and secure the engine cover.

16 Attach the belly-panel.



C068150

Fig 16.

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Kohler

Specifications

Cylinders	3
Displacement	1649 cc (100 cu. in.)
Bore	88 mm (3.5 in.)
Stroke	90.4 mm (3.6 in.)
Rating	25.4 kW @ 1600 RPM
Maximum torque	113 Nm (83 ft. lbs.)@ 1600 RPM
Maximum torque on 3rd, 4th PTO	39.2 Nm (29 ft.lbs.) @ 3000 RPM
Oil consumption	0.019 kg (0.04 lbs.) per hour
Oil capacity - Includes the filter	9.5 L (2 gals) (or 8.8 L (1.9 gals) no filter)
Maximum allowable angle of operation (Peak values):	
Short period of operation (maximum time of 30 minutes)	25^0
Peak value (Maximum time of 1 minute)	35^0
Dry weight	156 kg (344 lbs.)
Recommended battery	12/88 V/Ah

Note: *Engine Service Manual from 1777000, Publication Number 9806/4065.*

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