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Safety Check List

P9-1003_3

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

T1-043

⚠ WARNING

To operate the machine safely you must know the machine and have the skill to use it. You must abide by all relevant laws, health and safety regulations that apply to the country you are operating in. The Operator Manual instructs you on the machine, its controls and its safe operation; it is not a training manual. If you are a new operator, get yourself trained in the skills of using a machine before trying to work with it. If you don't, you will not do your job well, and you will be a danger to yourself and others.

INT-1-4-1

⚠ 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. Remove rings, watches and personal jewellery.

INT-1-3-6_2

⚠ 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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Pre-start Cold Checks, Service Points and Fluid Levels

	Operation	10	50	(1)100	500	1000	2000	6000
ENGINE								
Coolant Quality and Level	- Check	☐	☐	☐	☐	☐		
Cooling System	- Drain and Refill						☐	☐
Oil level	- Check	☐	☐					
Oil and Filter(2)(3)	- Change				☐	☐	☐	☐
Air Cleaner Dust Valve(4)	- Change				☐	☐	☐	☐
Air Cleaner Outer Element(4)	- Change				☐	☐	☐	☐
Air Cleaner Inner Element(4)	- Change						☐	☐
Pre-Cleaner (if fitted)	- Check			☐				
Water Separator and Engine Fuel Filter	- Drain		☐	☐	☐	☐	☐	☐
Water Separator Fuel Filter(5)	- Change				☐	☐	☐	☐
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(4)	- Clean				☐	☐	☐	☐
Breather Gauze	- Clean						☐	☐
Valve Clearances(6)	- Check and Adjust						☐	☐
Oil Filler and Dipstick Seals(6)	- Check and Adjust						☐	☐
Rocker Cover and Injector Seals(6)	- Change						☐	☐
Injectors(6)	- Change							☐
Injector(s) Leak Off Rail(6)	- Change							☐
High Pressure Fuel Lines(6)	- Inspect							☐
TRANSMISSION, AXLES AND STEERING								
Transmission Oil Level	- Check	☐	☐	☐	☐			
Transmission Oil(7)	- Change					☐	☐	☐
Transmission Filter	- Change			☐	☐	☐	☐	☐
Transmission Strainer	- Clean					☐	☐	☐
Front Axle Oil Level	- Check			☐	☐			
Front Axle Oil	- Change					☐	☐	☐
Rear Axle Differential Oil Level (4WD)	- Check			☐	☐			
Rear Axle Differential Oil (4WD)	- Change					☐	☐	☐
Rear Axle Hub Oil Level (4WD)	- Check			☐	☐			
Rear Axle Hub Oil (4WD)	- Change					☐	☐	☐

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Fluids, Lubricants and Capacities

JCB recommend that you use the JCB lubricants shown as they have been verified by JCB for use on JCB machines. However, you could use other lubricants that are equivalent to the JCB standards and quality or offer the same machine component protection.

Table 1.

ITEM	CAPACITY		FLUID/LUBRICANT	JCB PART NO	Container Size (1)
	Litres	UK Gallon			
Fuel Tank	88	19.3	Diesel Oil ⇨ *Acceptable and Unacceptable Fuels (3-15)*.		
Engine (Oil) (2)			**JCB Engine Oil EP 15W40** -10°C to +50°C (14°F to 122°F)	4001/1805	20 Litres
MIN.	12	2.64			
MAX.	15	3.3			
			JCB Engine Oil HP 10W30 -20°C to 40°C (-4°F to 104°F)	4001/1700	20 Litres
Engine (Coolant)	17	3.7	**JCB Antifreeze HP Coolant/Water** ⇨ *Coolant Mixtures (3-14)*	4006/1120	20 Litres
Transmission			**JCB Extreme Performance EP 10W** (3)	4000/2505	20 Litres
2WD	17.3	3.8			
4WD	18.3	4.0			
Front Axle	29.5 (6.5)	29.5 (6.5)	**JCB Gear Oil HP Plus**	4000/2205	20 Litres
Rear Axle (4WD)			**JCB Gear Oil HP90**	4000/0305	20 Litres
Differential	15	3.3			
Hubs (x2)	1.3	0.3			
Brake System			**JCB Hydraulic Fluid HP15** (4)	4002/0503	5 Litres
Hydraulic System	64	14(5)			
			JCB Hydraulic Fluid HP46 (Above 38 °C, 100 °F)	4002/0805	20 Litres
			JCB Hydraulic Fluid HP32 (Below 38 °C, 100 °F)	4002/1025	20 Litres
Grease Points and Fork Pivot pins	---	---	**JCB Special HP Grease**	4003/2017	400g
Mast Chains	---	---	**JCB Chain Lubricant**	4004/ 0237A	300ml

(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) Friction modified oils must not be used (e.g. Dexron ATF type).
(4) Caution - Do not use ordinary brake fluid.
(5) This is nominal tank capacity. The total hydraulic system capacity depends on the equipment being used. Fill and check with all rams closed. Watch level sight glass when filling.

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Changing the Oil and Filter

T3-030_2

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

1 Get access to the engine. Refer to ***Access Panels, Engine Cover***.

2 Place a container of suitable size beneath the sump drain plug **C**.

⚠ CAUTION

Oil will gush from the hole when the drain plug is removed. Hot oil and engine components can burn you. Keep to one side when you remove the plug.

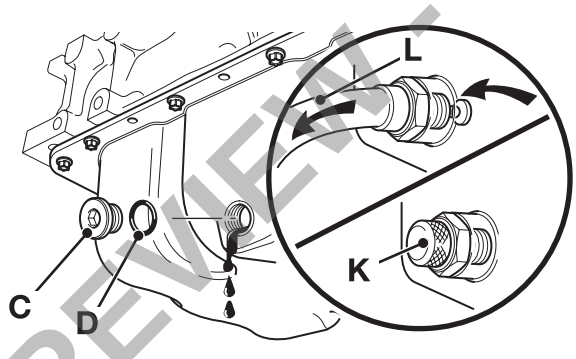
13-3-1-15

3 Drain the engine oil.

a Machine with a sump plug, remove the sump drain plug **C** and its 'O' ring **D**. Let the oil drain out, then clean and refit the drain plug with a new 'O' ring. Torque the drain plug to 40-60Nm (30-44lbf ft).

b Machines with a drain valve, remove the dust cap **K** from the sump drain port. Attach drain tube **L**. With the free end of the tube in an oil container, screw in the drain tube assembly to open the valve.

When all the oil has drained, unscrew the drain tube assembly and fit the dust cap **K**.



C012110-1

Fig 31.

4 Place a container of suitable size under drain plug **E** to catch the oil. ⇒ *Fig 32. (3-49)*.

5 Loosen and remove the filter housing drain plug **E** and its 'O' ring **J**. Let the oil fully drain, then clean and refit the drain plug with a new 'O' ring. Torque the drain plug to 40-60Nm (30-44lbf ft).

6 Unscrew the filter canister **F**, use a chain wrench if necessary.

7 Clean the seal face of the filter head **G**.

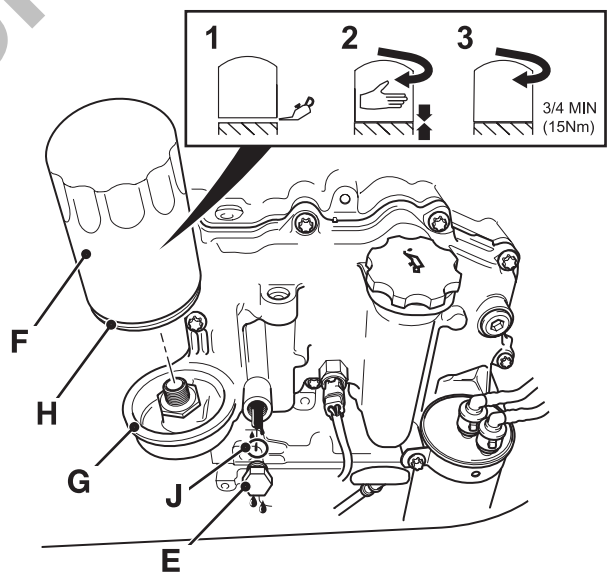
8 Smear the seal **H** on the new filter canister **F** with clean engine oil.

9 Screw the filter on until it just contacts the filter head.

10 Turn the filter at least a further 3/4 of a turn.

11 Through the top filler point, fill the engine with the recommended oil to the MAX mark on the dipstick. Refer to ***Checking the Oil Level***. Wipe off any spilt oil, refit the filler cap and make sure it is secure.

12 Operate the engine until the oil pressure low warning light has extinguished. Check for oil leakage. When the oil has cooled, check the oil level again, and if necessary top up with clean engine oil.



C012110-5

Fig 32.

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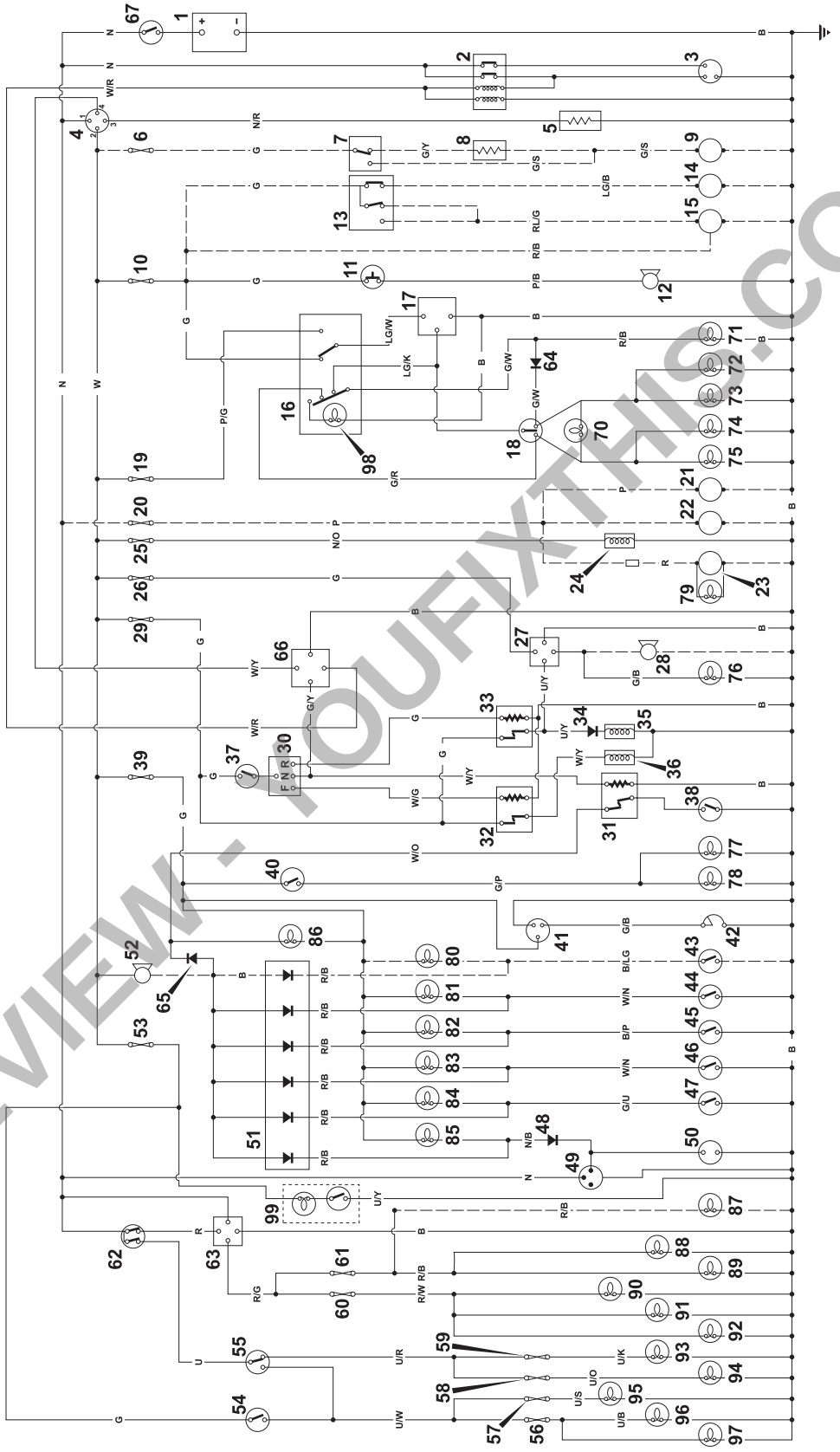


Fig 1. Machines without IP67 Electrics

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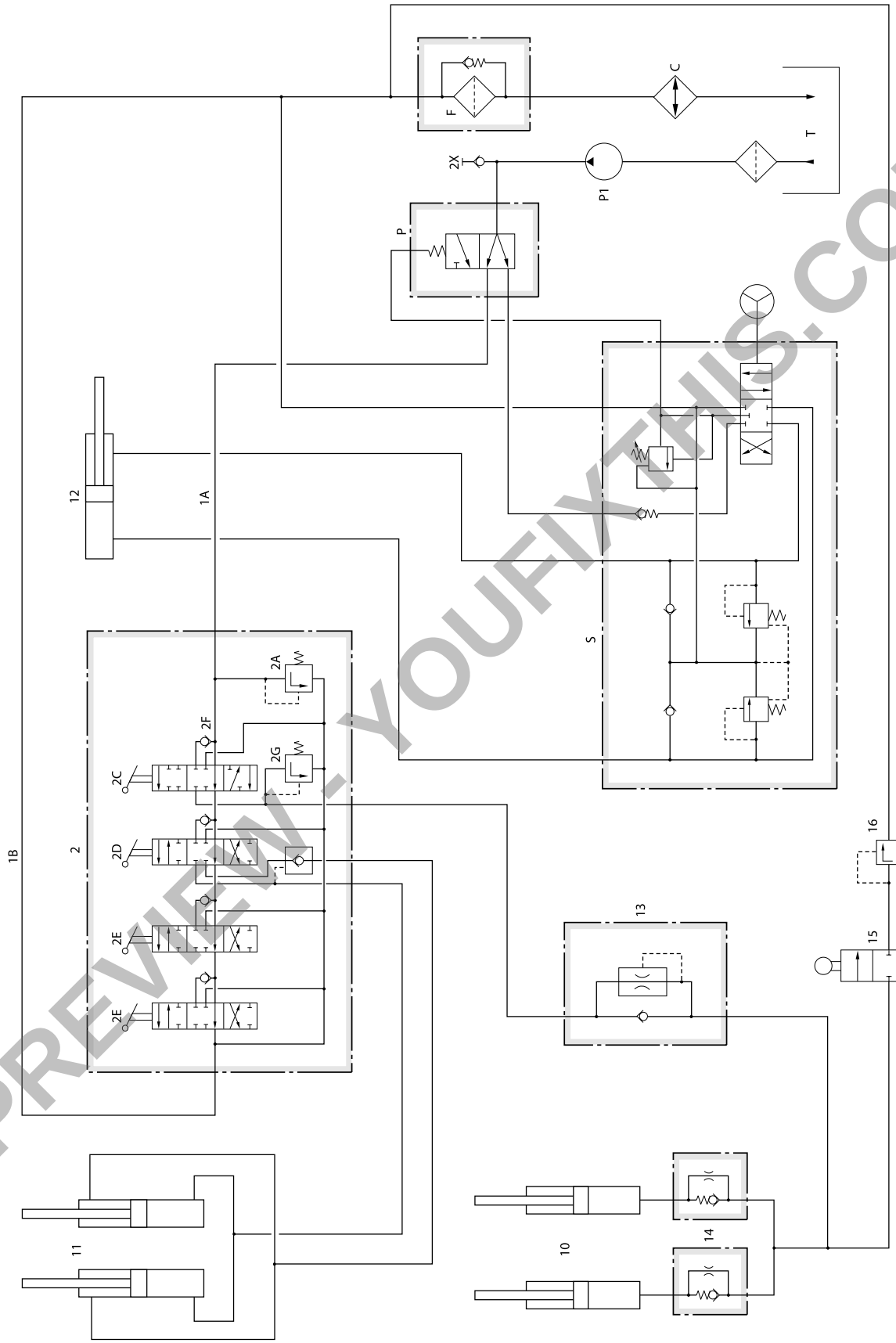


Fig 13. Machines up to SN 828755

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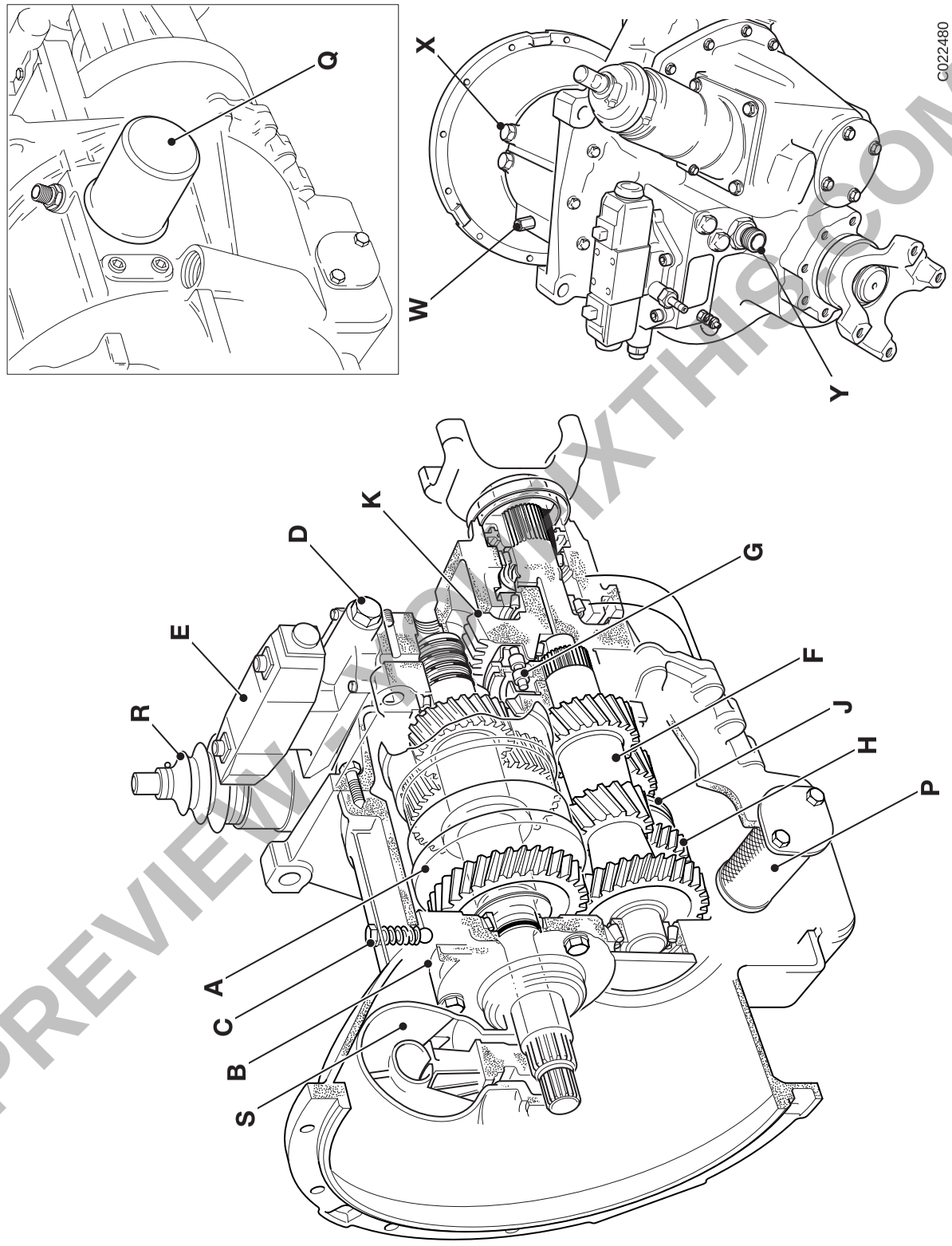


Fig 1. Synchro Shuttle Gearbox

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Fault Finding

Gearbox Fault Finding

Before carrying out the checks listed the machine should, if possible, be operated to determine the fault area(s), and bring the systems to their normal working temperatures.

Ensure that the correct quantity and grade of oil is used and that there are no obvious leaks.

A If the transmission is noisy, start at check 1.

B If the transmission is overheating, start at check 4.

C If the transmission will not pull, start at check 12.

D If there is no drive in one or both directions, start at check 17.

E If the transmission is jumping out of gear, start at check 29.

F If the transmission is sticking in gear, start at check 39.

G If ratios are 'crash changing', start at check 41.

Action		Yes	No
1	Is there noise when selecting direction?	Check 3.	Check 2.
2	Is there noise when running with direction selector in neutral and ratio selector in 1st?	Check 9.	Check 19.
3	Is there air in the hydraulic system?	Continue running to expel air.	Check 4.
4	Is the fluid level correct?	Check 5.	Check level only when machine is cold and top up as required.
5	Are the oil passages restricted?	Clear the restriction.	Check 6.
6	Is the suction strainer restricted?	Remove and clean strainer.	Check 7.
7	Is pump pressure as specified?	Check 9.	Check clutch pressure maintenance valve is free to operate.
8	When flow testing pump, is output low?	Renew pump.	Check converter sprag clutch for wear or slip.
9	Does the noise continue when direction selector is in forward or reverse?	Check 10.	Check 11.
10	Is transmission misaligned?	Renew mountings and check position.	Check 'converter out' pressure and flow.
11	Are the pump bushes worn?	Renew.	Check converter for wear or cooler for restriction to flow.
12	Is the transmission not pulling in one direction only?	Check 16.	Check 13.
13	Is the transmission not pulling in both forward and reverse?	Stall test machine, Check 14.	Check 16.
14	Is 'converter in' pressure as specified?	Check 15.	Inspect converter relief valve for damage.

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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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Service Consumables

Sealing and Retaining Compounds

T11-001_4

Table 1.

Type	Description	Part No.	Quantity
JCB Multi-Gasket	A medium strength sealant suitable for all sizes of gasket flanges, and for hydraulic fittings of 25-65 mm diameter.	4102/1212	50 ml
JCB High Strength Threadlocker	A high strength locking fluid for use with threaded components. Gasketing for all sizes of flange where the strength of the joint is important.	4102/0551	50 ml
JCB Retainer (High Strength)	For all retaining parts which are unlikely to be dismantled.	4101/0601	10 ml
		4101/0651	50 ml
JCB Threadlocker and Sealer	A medium strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50 mm diameter, and for hydraulic fittings up to 25 mm diameter.	4101/0250	10 ml
		4101/0251	50 ml
JCB Threadlocker and Sealer (High Strength)	A high strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50 mm diameter, and for hydraulic fittings up to 25 mm diameter.	4101/0550	10 ml
		4101/0552	200 ml
JCB Threadseal	A medium strength thread sealing compound.	4102/1951	50 ml
JCB Activator	A cleaning primer which speeds the curing rate of anaerobic products.	4104/0251	200 ml (Aerosol)
		4104/0253	1 ltr (Bottle)
JCB Cleaner/Degreaser	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1557	400 ml (Aerosol)
Direct Glazing Kit	For one pane of glass; comprises of: – 1 x Ultra Fast Adhesive (310 ml) – 1 x Active Wipe 205 (30 ml) – 1 x Black Primer 206J (30 ml) – plus applicator nozzle etc.	993/55700	
Ultra Fast Adhesive	For direct glazing.	4103/2109	310 ml
Active Wipe 205	For direct glazing.	4104/1203	250 ml
Black Primer 206J	For direct glazing.	4201/4906	30 ml
Clear Silicone Sealant	To seal butt jointed glass.	4102/0901	
Plastic to Metal Bonder	To seal plastic to metal joints.	4103/0956	50 g
Black Polyurethane Sealant	To finish exposed edges of laminated glass.	4102/2309	310 ml

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Service Schedules

	Operation	10	50	(1)100	500	1000	2000	6000
Mast Tilt Rams	- Grease	☐	☐	☐	☐	☐	☐	☐
Mast Lift Ram	- Grease	☐	☐	☐	☐	☐	☐	☐
Mast Chains	- Grease			☐	☐	☐	☐	☐
Mast Chains Adjustment(6)	- Check			☐	☐	☐	☐	☐
Mast Chains(6)	- Check for Wear and Stretch			☐	☐	☐	☐	☐
Mast and Carriage Rollers(6)	- Check		☐	☐	☐	☐	☐	☐
Mast Pulleys	- Check		☐	☐	☐	☐	☐	☐
Mast Roller Guides(6)	- Check			☐	☐	☐	☐	☐
Mast Sections	- Check			☐	☐	☐	☐	☐
Forks - Condition and Heel Thickness	- Check			☐	☐	☐	☐	☐
All Hinges	- Lubricate		☐	☐	☐	☐	☐	☐
All Cables	- Lubricate		☐	☐	☐	☐	☐	☐
All Linkage Points	- Lubricate		☐	☐	☐	☐	☐	☐
Roof and Screen Guards	- Check				☐	☐	☐	☐
FOPS Structure	- Check	☐	☐	☐	☐	☐	☐	☐
Windscreen Washer Fluid Level	- Check	☐	☐	☐	☐	☐	☐	☐
Condition of Paintwork	- Check			☐	☐	☐	☐	☐
Seat Belt Condition and Security (If fitted)	- Check	☐	☐	☐	☐	☐	☐	☐
Machine Generally	- Check for Damage and Clean	☐	☐	☐	☐	☐	☐	☐
ATTACHMENTS								
Optional Attachments as needed - see manufacturer's instructions	- Check			☐	☐	☐	☐	☐
For Fit and Security	- Check		☐	☐				

(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 sulphur content in the fuel. Refer to Fuel System for more information.
(4) More frequently if operating in dusty working environments.
(5) If the engine is difficult to start or the engine has poor performance, fit new filters.
(6) Jobs which should only be done by a specialist.
(7) After a major transmission repair, the new oil should be run to operating temperature and changed again to remove any contamination which entered during the repair. Change the oil and filter after a further 100 hours if the oil was heavily contaminated because of, or from the failure (e.g. water contamination).
(8) Check tightness of the wheel nuts every day for first week (when machine is new), thereafter every 50 hours.

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Air Conditioning (if fitted)

Machines with air conditioning are fitted with two additional relays **A**. The relays are located in the engine compartment, next to the battery.

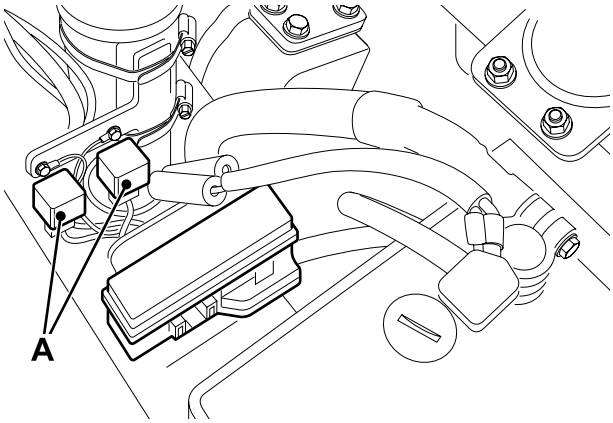


Fig 29.

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Transmission

Checking the Transmission Oil Level

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

2 Open the engine cover. ⇨ *Engine Cover (3-40)*.

3 Start and run the engine slowly for a period not exceeding five minutes. This allows the oil to fill filter, pump, torque converter, oil cooler and hoses.

4 Switch OFF the engine and remove the starter key, wait one minute.

5 Check that the oil level is between the end of the dipstick and maximum mark on the dipstick **A**.

6 Add oil as necessary. Fill through the dipstick tube to maximum dipstick level. Use only the recommended oil.

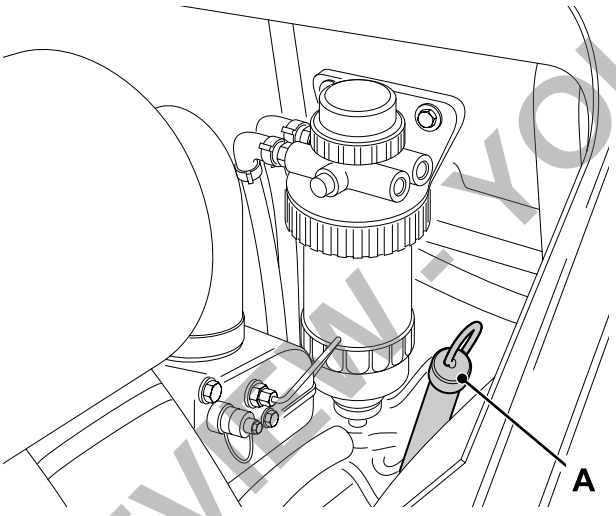


Fig 71.

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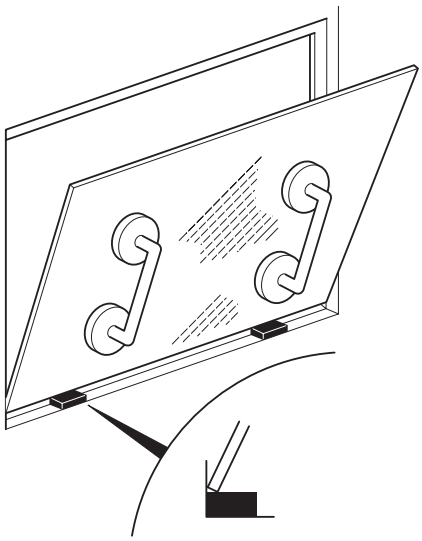


Fig 18.

c Make sure that the glass is correctly positioned, then gently press around the edges of the glass and ensure full adhesive contact is achieved. Do not press too hard or too much adhesive will squeeze out.

3 Make the inside seal smooth:

a Wearing surgical gloves, dip your finger in a soapy water solution.

b Use your finger to make the inside seal smooth.

4 All exposed edges must be sealed using Black Polyurethane Sealant (see ***Sealing and Retaining Compounds***, Section 1).

Important: *Use extreme caution when wiping the inside of the new glass - pushing too hard on the inside of the glass will affect the integrity of the bonded seal.*

5 Clean the glass after installation:

a Small amounts of sealant can be cleaned from the glass using the 'Active Wipe 205'.

b Large amounts of excess sealant should be left to 'cure' and then cut off with a sharp knife.

Note: *On completion of the glass replacement procedures, the sealant 'curing' time is 30 minutes. This means that the machine can be driven and used after 30 minutes, but it must not be used during the curing period of 30 minutes.*

c Clean the glass using a purpose made glass cleaner

6 On completion of the glass installation procedures tidy the work area:

a Remove all broken glass from the cab area.

b Remove the protective covers from the cab seat and control pedestals.

c Renew all safety and instructional labels so that the new installation conforms with the original cab installation.

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Introduction C-67
Mainframe Harness C-68
Cab Panel Harness C-84

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Service Procedures

Using a Multimeter

TC-002

In order to obtain maximum benefit from the fault finding information contained in Section C it is important that the technician fully understands the approach to fault finding and the use of the recommended test equipment, in this case a FLUKE 85 or AVO 2003 digital multimeter, or a moving pointer (analogue) multimeter. The approach is based on a fault finding check list. In tracing the fault from the symptoms displayed you will be directed to make measurements using a multimeter.

These instructions are intended to cover the use of the recommended multimeters.

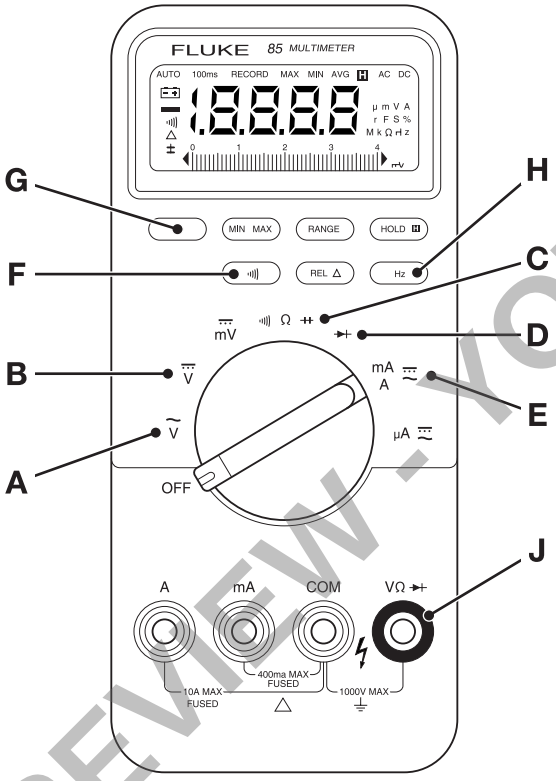


Fig 1. FLUKE 85

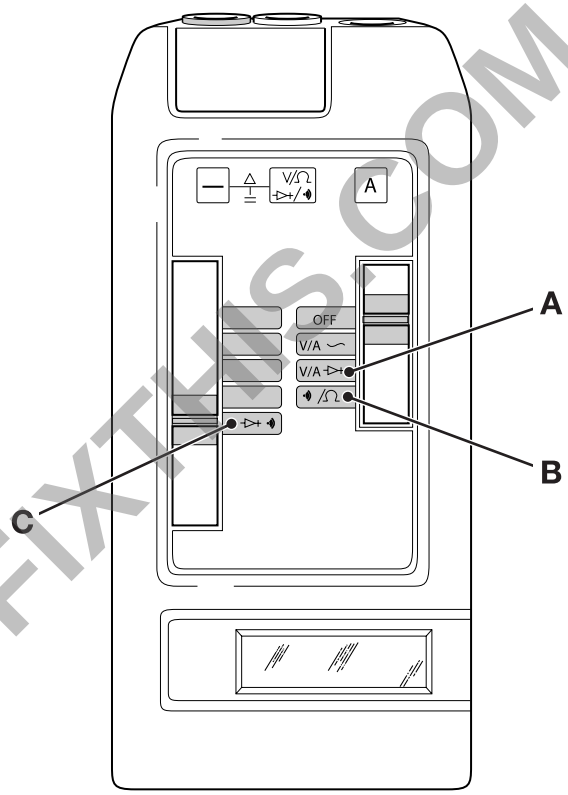


Fig 2. AVO 2003

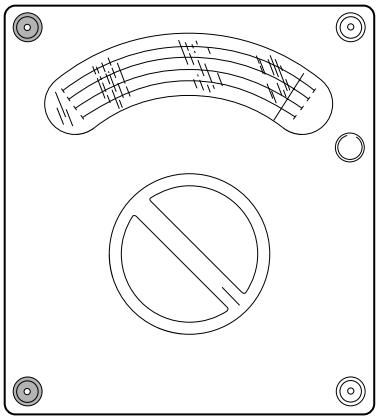


Fig 3. A Typical Analogue Meter

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MA	PANEL CONNECTOR			AG
TERM	WIRE	SIZE	DEST	TYPE
1	842	3.0	MW 1	AK
2	200B	4.0	MU 1	AK
3	200C	4.0	MU 1	AK
4	200D	4.0	MU 1	AK
A	407	1.0	MX 1	AJ
B	100A	1.0	MD 1	AJ
C	838	1.0	MD 2	AJ
D	812	1.0	MC 1	AJ
E	108	1.0	ME 1	AJ
F	811B	1.0	SB	AJ
G	894	1.0	MH 1	AJ
H	003	2.0	MK 1	AH
J	103F	1.0	MJ 1	AJ
K	839	1.0	ML 1	AJ
L	408	1.0	MM B	AJ
M	415B	1.0	MN 1	AJ
N	815	1.0	MP 1	AJ
P	404B	1.0	MR 1	AJ
R	403B	1.0	MV 1	AJ
S	406B	1.0	MY 1	AJ
T	814	1.4	MF 1	AJ
U	600J	2.0	MT 1	AH
V	835	1.0	SH	AJ
W	805F	1.0	NF 3	AJ
aa	834A	1.0	MB 2	AJ
bb	837A	1.0	MB 3	AJ
cc	830R	1.0	SE	AJ
dd	806D	1.0	SF	AJ
ee	829	1.0	SG	AJ
ff	-	-	-	-
gg	600DF	2.0	MT 1	AH
hh	105	1.0	SJ	AJ

MB	RH HEADLIGHT			G,H
TERM	WIRE	SIZE	DEST	TYPE
1	-	-	-	J
2	834A	1.0	MA aa	A,B
3	837A	1.0	MA bb	A,B
4	830D	1.0	SE	A,B
5	806E	1.0	SF	A,B
6	600AZ	1.4	SA	C,D

MC	FORWARD SOLENOID			L
TERM	WIRE	SIZE	DEST	TYPE
1	812	1.0	MA D	M,N
2	600BS	1.0	SC	M,N

MD	DUMP SW			E,F
TERM	WIRE	SIZE	DEST	TYPE
1	100A	1.0	MA B	A,B
2	838	1.0	MA C	A,B

ME	BRAKE LT SW			-
TERM	WIRE	SIZE	DEST	TYPE
1	108	1.0	MA E	AV,AS
2	816C	1.0	SD	AV,AS

MF	HORN			Y,Z
TERM	WIRE	SIZE	DEST	TYPE
1	814	1.4	MA T	AA,AB
2	600B	1.4	SA	AA,AB

MG	REVERSE SOLENOID			L
TERM	WIRE	SIZE	DEST	TYPE
1	811	1.0	SB	M,N
2	600BT	1.0	SC	M,N

MH	BEACON			AR
TERM	WIRE	SIZE	DEST	TYPE
1	894	1.0	MA G	AS
2	600DY	1.0	SA	AS

MJ	REAR WIPER			E,F
TERM	WIRE	SIZE	DEST	TYPE
1	103F	1.0	MA J	A,B
2	600BD	1.0	SA	A,B

MK	THERMOSTART			BA
TERM	WIRE	SIZE	DEST	TYPE
1	003	2.0	MA H	K

ML	WASHER PUMP			Y,Z
TERM	WIRE	SIZE	DEST	TYPE
1	839	1.0	MA K	AA,AB
2	600BG	1.0	SA	AA,AB

MM	FUEL SENDER			AC,AD
TERM	WIRE	SIZE	DEST	TYPE
A	600CE	1.0	SA	AE,AF
B	408	1.0	MA L	AE,AF

MN	TRANS OIL PRESS			L
TERM	WIRE	SIZE	DEST	TYPE
1	415B	1.0	MA M	M,N
2	600BU	1.0	SC	M,N

MP	PARK BRAKE SW			L
TERM	WIRE	SIZE	DEST	TYPE
1	815	1.0	MA N	M,N
2	600CV	1.0	SC	M,N

MR	TRANS OIL TEMP			-
TERM	WIRE	SIZE	DEST	TYPE
1	404B	1.0	MA P	AV,AS

MS	ESOS			-
TERM	WIRE	SIZE	DEST	TYPE
1	105A	1.0	SJ	AV,AS
2	600	1.0	SC	AV,AS

MT	STARTER -VE			-
TERM	WIRE	SIZE	DEST	TYPE
1	600ER	4.0	SC	AY,AU
	600EP	4.0	SA	
	600J	2.0	MA U	
	600DF	2.0	MA gg	

MU	STARTER +VE			-
TERM	WIRE	SIZE	DEST	TYPE
1	200	10.0	MX 2	AZ,BC
	200B	4.0	MA 2	
	200C	4.0	MA 3	
	200D	4.0	MA 4	

MV	ENG OIL PRESSURE			L
TERM	WIRE	SIZE	DEST	TYPE
1	403B	1.0	MA R	M,N
2	600HH	1.0	SC	M,N

MW	STARTER SOLENOID			-
TERM	WIRE	SIZE	DEST	TYPE
1	842	3.0	MA 1	AX,AV

MX	ALTERNATOR			
TERM	WIRE	SIZE	DEST	TYPE
1	407	1.0	MA A	AV,AS
2	200	10.0	MU 1	AL,BE,AU

MY	WATER TEMP SW			L
TERM	WIRE	SIZE	DEST	TYPE
1	406B	1.0	MA S	M,N
2	600CK	1.0	SA	M,N

MZ	RH NO PLT LAMP			P
TERM	WIRE	SIZE	DEST	TYPE
A	830G	1.0	SE	T,U
B	600AX	1.0	SA	T,U

NB	RH REAR LIGHTS			G,H
TERM	WIRE	SIZE	DEST	TYPE
1	816G	1.0	SD	A,B
2	830B	1.0	SE	A,B
3	806F	1.0	SF	A,B
4	835A	1.0	SH	A,B
5	811G	1.0	SB	A,B
6	600H	1.0	SC	A,B

ND	LH NO PLT LAMP			P
TERM	WIRE	SIZE	DEST	TYPE
A	829C	1.0	SG	T,U
B	600AU	1.0	SA	T,U

NE	REVERSE ALARM			E,F
TERM	WIRE	SIZE	DEST	TYPE
1	811A	1.0	SB	A,B
2	600CD	1.0	SA	A,B

NF	LH REAR LIGHTS			G,H
TERM	WIRE	SIZE	DEST	TYPE
1	816F	1.0	SD	A,B
2	829D	1.0	SG	A,B
3	805F	1.0	MA W	A,B
4	835B	1.0	SH	A,B
5	811F	1.0	SB	A,B
6	600G	1.0	SA	A,B

NG	COLD START ADV.			-
TERM	WIRE	SIZE	DEST	TYPE
1	105B	1.0	SJ	AS,AW

EARTH SPLICE		
SA		AT,AU
WIRE	SIZE	DEST
600AZ	1.4	MB 6
600B	1.4	MF 2
600DY	1.0	MH 2
600BD	1.0	MJ 2
600BG	1.0	ML 2
600CE	1.0	MM A
600EP	4.0	MT 1
600CK	1.0	MY 2
600AX	1.0	MZ B
600AU	1.0	ND B
600CD	1.0	NE 2
600G	1.0	NF 6

REVERSE SPLICE		
SB		AT,AU
WIRE	SIZE	DEST
811B	1.0	MA F
811	1.0	MG 1
811A	1.0	NE 1
811G	1.0	NB 5
811F	1.0	NF 5

EARTH SPLICE		
SC		AT,AU
WIRE	SIZE	DEST
600BS	1.0	MC 2
600BT	1.0	MG 2
600BU	1.0	MN 2
600CV	1.0	MP 2
600ER	4.0	MT 1
600HH	1.0	MV 2
600H	1.0	NB 6
600	1.0	MS 2

BRAKELIGHTS		
SD		AT,AU
WIRE	SIZE	DEST
816C	1.0	ME 2
816F	1.0	NF 1
816G	1.0	NB 1

RH SIDELIGHT		
SE		AT,AU
WIRE	SIZE	DEST
830B	1.0	NB 2
830R	1.0	MA cc
830D	1.0	MB 4
830G	1.0	MZ A

RH INDICATOR		
SF		AT,AU
WIRE	SIZE	DEST
806D	1.0	MA dd
806E	1.0	MB 5
806F	1.0	NB 3

LH SIDELIGHT		
SG		AT,AU
WIRE	SIZE	DEST
829	1.0	MA ee
829D	1.0	NF 2
829C	1.0	ND A

REAR FOG		
SH		AT,AU
WIRE	SIZE	DEST
835	1.0	MA V
835A	1.0	NB 4
835B	1.0	NF 4

ESOS		
SJ		AT,AU
WIRE	SIZE	DEST
105	1.0	MA hh
105A	1.0	MS 1
105B	1.0	NG 1

Fig 7. Mainframe Harness(721/10514 issue 1 sheet 2 of 2)

Sheet 1 of 2: ⇨ *Fig 6. (C-72)*.

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Component Basic Operation

Hydraulic Pump

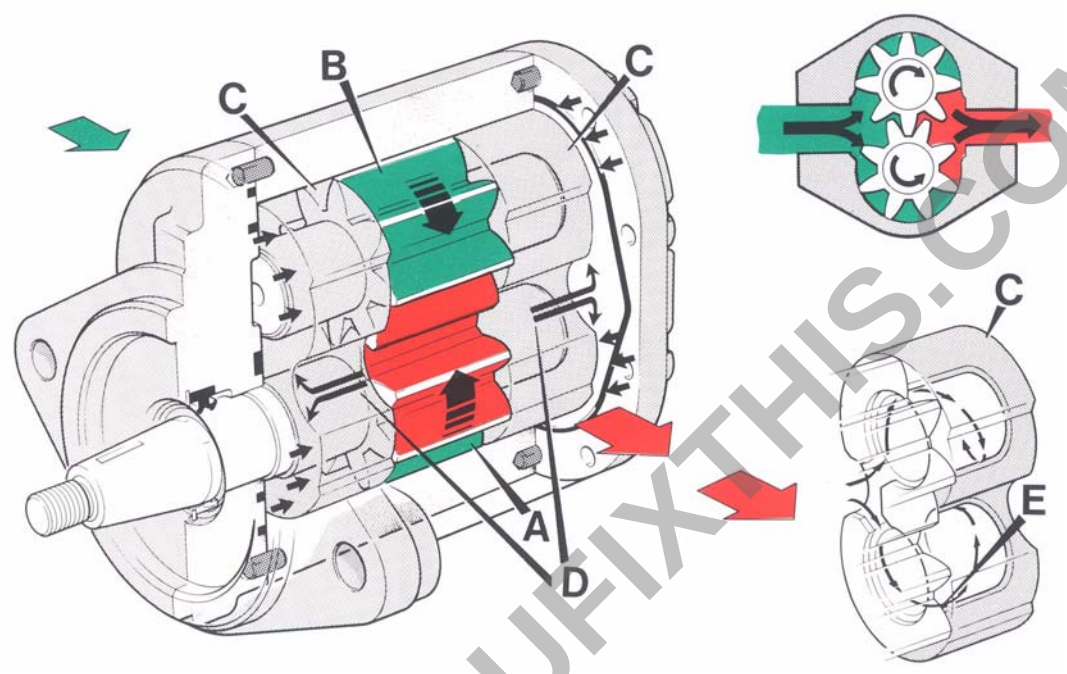


Fig 1.

The pump is a gear type, mounted at the rear of the machine and driven by the engine.

The working principle of a gear pump depends on the meshing of two spur gears **1-A** and **1-B**. Oil is picked up on the suction side of the pump by the gears and carried round between the gear teeth and the pump body. As the gears come into mesh the oil is forced out through the outlet port.

Some oil is allowed to circulate behind the bearings **1-C** to hold them against the gears and minimise oil slippage. Lubrication oil is drawn through the recess **1-D** and around the counter bore. The oil then flows along the scrolled grooves **1-E** in the bushes, induced by the viscous drag of the rotating shaft.

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Loader Valves

Removal and Replacement

Typical Machine Installation

Removal

1 Park machine on firm level ground and remove forks. Tilt mast fully forward to prevent it from tipping when hydraulic hoses are disconnected.

Note: *⇨ Fig 1. (E-44). The illustration shows the mast tilted back.*

2 Switch OFF the engine and remove the starter key. Disconnect the battery.

3 Operate the control levers in both directions to vent residual pressure.

4 Remove the spring clip **1-C** and pin **1-B** from each control lever/ valve spool spindle clevis.

5 Disconnect and plug hydraulic hoses **1-A**.

6 Undo and remove nuts **1-D** and washers **1-E**. Lift out the valve block. Remove bolts **1-F** and spacers **1-G**.

7 *⇨ Dismantling and Assembly (E-47)*, for dismantling the valve block.

Replacement

The procedure for replacing the valve block is a reversal of the removal procedure.

Important: *After replacement, check MRV and ARV pressures. ⇨ Pressure Testing (E-51).*

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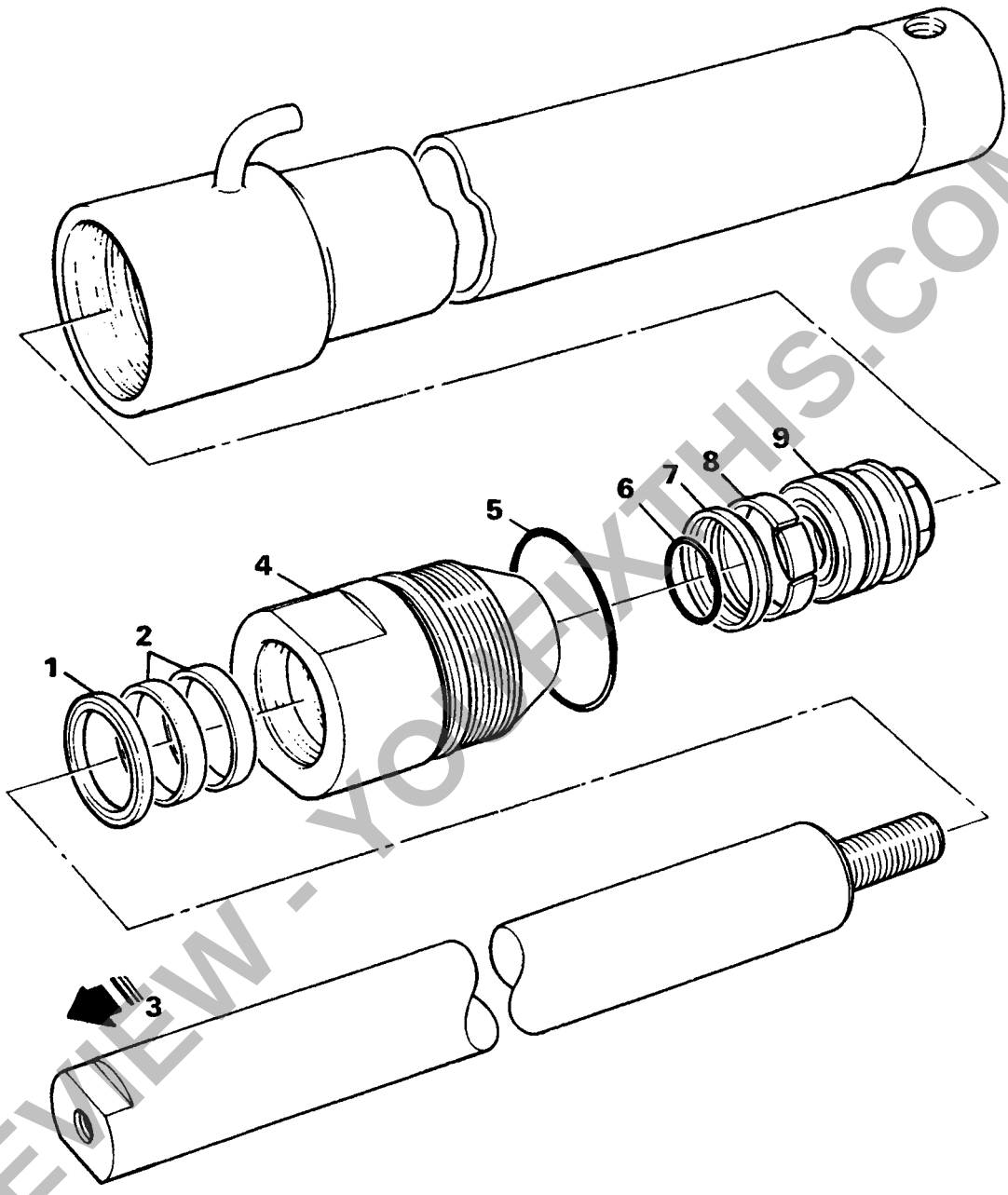


Fig 8.

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Front and Rear Axle

Cutaway of Front Axle

Note: *Machines from serial No 602798 (926) and 608419 (930) and all 940 machines (USA only) are fitted with single steer rams.*

Fig 5.

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Service Brakes

Bleeding

Single Pedal Configuration

WARNING

Before proceeding with the bleeding procedure it is important to ensure that the park brake is engaged and that one pair of wheels is blocked on both sides.

BRAK-1-2

Fill the reservoir with correct fluid, see ***Lubricants and Capacities***, Section 3). Ensure that throughout the bleeding procedure the level is not allowed to fall below the MINIMUM mark.

WARNING

Use of incorrect fluid will cause serious damage to the seals which could in turn cause brake failure.

BRAK-1-1

Unlatch pedals and bleed each brake separately as follows:

Attach a tube to bleed screw **2-A**, ensuring that the free end of the tube is immersed in fluid contained in a suitable jar.

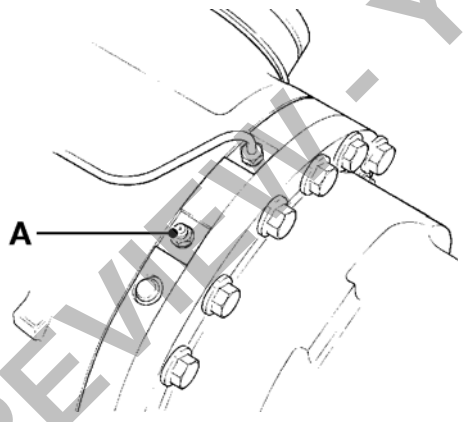


Fig 2.

Open the bleed screw and apply one rapid full stroke of the brake pedal followed by three rapid short strokes from the halfway pedal position. After the third short stroke, allow the pedal to return quickly to its stop.

Continue bleeding normally until all air is dispelled, closing the bleed screw with the pedal fully depressed.

Repeat the procedure for the second brake.

Dual Pedal Configuration

WARNING

Before proceeding with the bleeding procedure it is important to ensure that the park brake is engaged and that one pair of wheels is blocked on both sides.

BRAK-1-2

Fill the reservoir with correct fluid, see ***Lubricants and Capacities***, Section 3). Ensure that throughout the bleeding procedure the level is not allowed to fall below the MINIMUM mark.

Unlatch the pedals and bleed each brake separately as follows:

Right Hand Master Cylinder

Attach a tube to the right hand brake bleed screw **2-A**, ensuring that the free end of the tube is immersed in fluid contained in a suitable container.

Open the brake bleed screw and apply full pedal strokes of the right hand brake pedal until all air is expelled.

Close the brake bleed screw with the pedal fully depressed.

Left Hand Master Cylinder

Repeat procedure as for Right Hand Master Cylinder but use the left hand bleed screw and pedal.

Bridge Pipe

Attach a tube to either the left or right hand bake bleed screw, ensuring that the free end of the tube is immersed in fluid contained in a suitable container.

Make sure that the brake pedals are locked together.

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Basic System Operation

General Description

926 (up to SN 602749), 930 (up to SN 608299)

On the road the machine is steered by the rear wheels. (For site travel the brakes may be used to help turn the machine.) The steering is hydraulically powered by two rams on the rear axle.

Oil is delivered to the rams by a hydraulic pump mounted on the engine timing case. On the bottom end of the steering column is mounted a steering valve. This directs oil to the left or right hand ends of the steering rams, depending which way the steering wheel is turned.

The hydraulic circuit is designed so that the machine can still be steered if the engine fails (although more effort is required).

926 (from SN 602750), 930 (from SN 608300), 940, 950

On the road the machine is steered by the rear wheels. The steering is hydraulically powered by a single ram on the rear axle.

Oil is delivered to the ram by the engine driven hydraulic pump, mounted below the engine cooling fan, via a priority valve. The priority valve ensures the supply of oil to the steer circuit is maintained at the required flow demanded by the steering valve. The steering valve is mounted on the bottom end of the steering column. This directs oil to the left or right hand ends of the steering ram, depending which way the steering wheel is turned.

The hydraulic circuit is designed so that the machine can still be steered if the engine fails (although more effort is required).

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