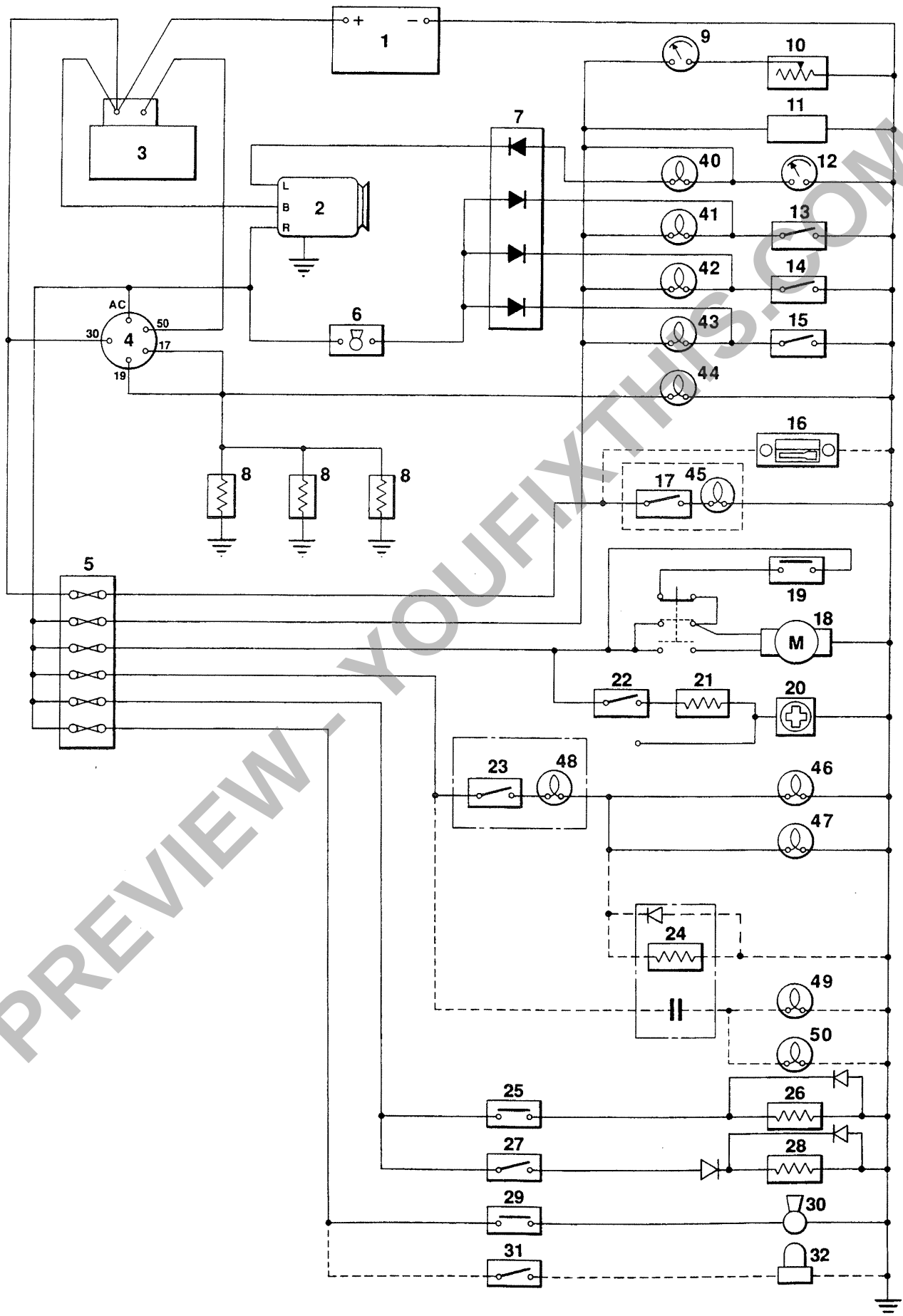
CIRCUIT DIAGRAM



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HYDRAULIC CIRCUIT (SCHEMATIC)

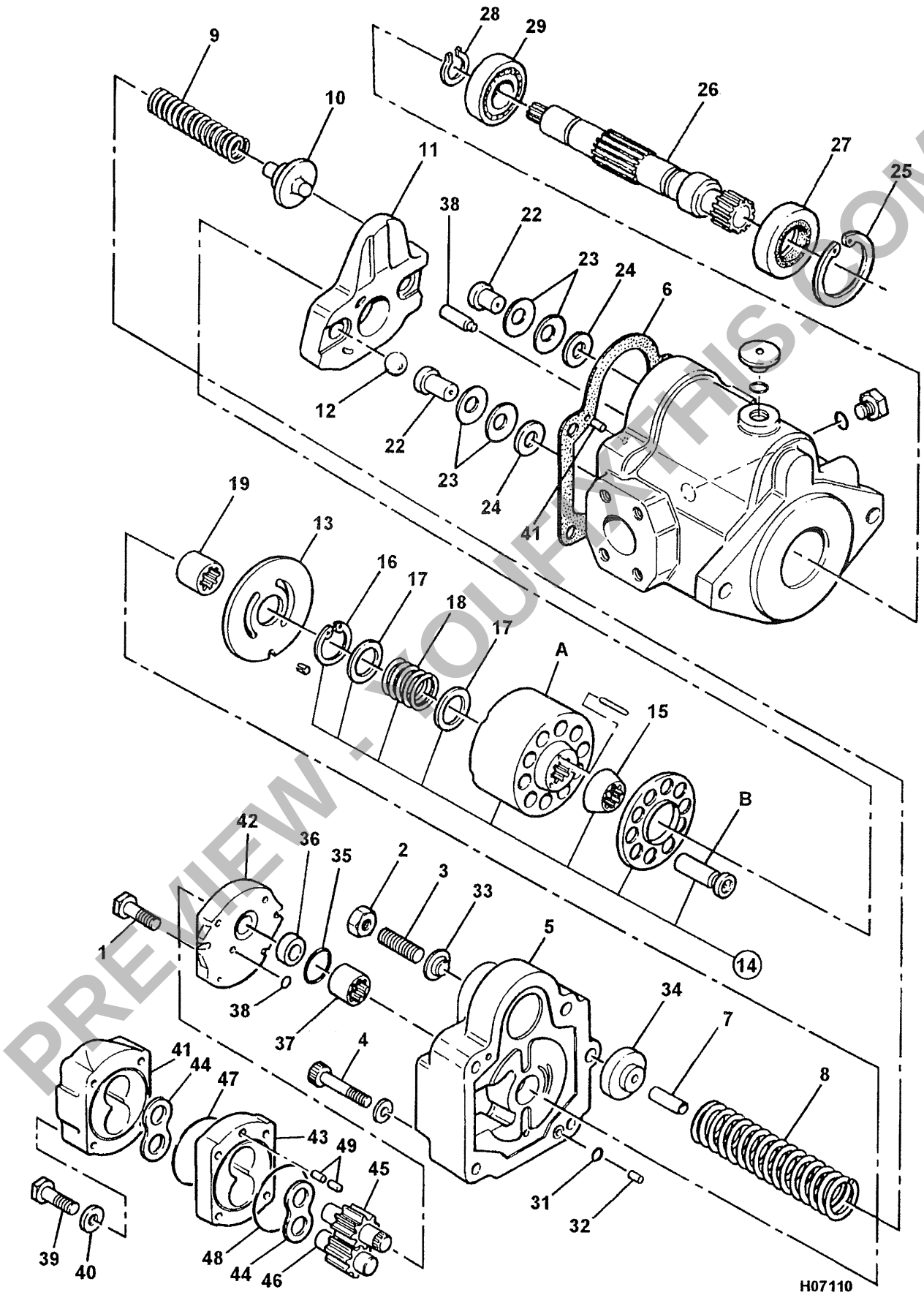
***803 Machines**

Component Key

P1 Pump Section 1
P2 Pump Section 2
P3 Pump Section 3
P4 Pump Section 4 to M665736
T Tank
E Engine
1 Main Relief Valve Test Block
1A Swing/Slew Dozer Main Relief Valve
1B Digging and Tracking Main Relief Valve
1C Servo Main Relief Valve
1D Pressure Reducing Valve
1E By-pass Filter
1F Non-return Valves
1G Gauge Connection Points
2 Valve Block
2A Auxiliary Relief Valves
2B Auxiliary Spool
2C Track Spool to M665736
2D Boom Boost Spool
2E Dipper Spool
2F Non-return Valves
2G Auxiliary Couplings (Double Acting)
2H Auxiliary Couplings (Single Acting)
3 Valve Block
3A Auxiliary Relief Valves
3B Track Spool
3C Boom Spool
3D Bucket Spool
3E Non-return Valves
3F Restrictor
4 Valve Block to M665736
4A Auxiliary Relief Valves to M665736
4B Slew Spool
4C Swing Spool
4D Dozer Spool
4E Non-return Valves to 665736
5 L.H. Track Motor
5A Counterbalance Valve
6 R.H. Track Motor
6A Counterbalance Valve
7 Slew Motor
7A Brake Valve
8 Rotary Coupling
9 Dipper Ram
10 Boom Ram
11 Bucket Ram
12 Swing Ram
13 Dozer Ram
14 R.H. Servo Hand Controller
14A Boom Control
14B Bucket Control
14C Check Valves (Standard setup)
15 L.H. Servo Hand Controller
15A Swing / Slew Control
15B Dipper Control
16 Dual Solenoid Valve
17 Return Filter
18 Suction Strainer
19 High Speed Selector
***20** Accumulator M665143 on
21 Solenoid Lock Valve
22 High Pressure Carry Over (HPCO) M666001 on
23 Servo Pressure Maintenance Valve Block M666001 on
23A Pressure Maintenance Valve M666001 on
24 Oil Cooler M666001 on

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TORQUE SETTINGS

Only use following when no setting is specified in text of manual.

CAUTION: All bolts used on JCB equipment are high tensile and must not under any circumstances be replaced with bolts of a lesser tensile specification.

Metric Grade 8.8 Bolts

Bolt Size	(mm)	Hexagon (A/F) mm	Torque Settings Nm	kgf m	lbf ft
M5	(5)	8	7	0.7	5
M6	(6)	10	12	1.2	9
M8	(8)	13	28	3.0	21
M10	(10)	17	56	5.7	42
M12	(12)	19	98	10	72
M16	(16)	24	244	25	180
M20	(20)	30	476	48	352
M24	(24)	36	822	84	607
M30	(30)	46	1633	166	1205
M36	(36)	55	2854	291	2105

TABLE OF IMPORTANT TIGHTENING TORQUES

Tightening Points	Tightening Torque Nm	kgf m	lbf ft
*Track motor to undercarriage	113	11.5	83
Retaining bolts	250	25.5	184
Track roller	244	25	180
Idler yoke	98	1 0	72
Rotary coupling mounting	56	5.7	41
Rotary coupling torque arm	35	3.6	26
Slew ring	120	12.3	89
Slew gearbox case	244	25	180
Hydraulic oil tank	56	5.7	41
Fuel tank	56	5.7	41
Hydraulic filter cover	28	3.0	21
Rod end - controls	56	5.7	41
Silencer bolt	28	3.0	21
Exhaust tail pipe	56	5.7	41
Engine shock absorber (to slew frame)	56	5.7	41
Engine shock absorber (to engine)	98	1 0	72
Engine bracket	118	12	87
Engine support (to bell housing)	98	10	72
Counterweight	98	10	72
Track gearbox cover	56	5.7	41
*Slew ring to superstructure (803)	100	10.2	74
*Slew ring to superstructure (804)	160	16.3	118
Dipper Ram			
Gland nut	300-350	30.6-35.7	240
Piston	700-750	71.4-76.5	535
Set screw	20-25	2.0-2.6	17
Bucket Ram			
Gland nut	320-370	32.6-37.8	258
Piston	1100-1200	112-122	848
Set screw	20-25	2.0-2.6	17
Boom and Swing Rams			
Gland nut	320-370	32.6-37.8	258
Piston	700-750	71.4-76.5	535
Set screw	20-25	2.0-2.6	17
Dozer Ram			
Gland nut	350-400	35.7-41	277
Piston	1100-1200	112-122	848
Set screw	20-25	2.0-2.6	17

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FAULT FINDING

Track Motor

If the problem is oil leakage,start at check 1.
If the track motor does not rotate, start at check 4.
If the vehicle will not drive straight, start at check 6.
If the high speed operation causes motor slippage,start at check 9.
If the low speed operation will not function, start at check 10.
If the gearbox (planetary gear speed reducer) is overheating, start at check 11.

CHECK		ACTION	
1	Is there oil leakage between valve and motor?	YES: NO:	Tighten bolts, or replace O-rings and and gasket. Check 2.
2	Is there oil leakage from gearbox cover?	YES: NO:	Tighten plugs, replace O-ring or replace motor kit. Check 3.
3	Is there oil leakage from floating seal?	YES:	Replace the track motor.
4	Is the track motor not rotating even though pressure is normal?	YES: NO:	Reduce load, replace valve or motor kit, or replace track motor. Check 5.
5	Is the pressure low or nil?	YES:	Check relief valve pressure, or repair pump or control valve
6	Is the drive not straight at low pressure setting?	YES: NO:	Check pump and valve for equal flow to LH and RH track motors. Check 7.
7	Is the drive not straight at high pressure setting?	YES: NO:	Check pump and valve for equal flow to both track motors, check equal drain flow from track motors, replace the valve kit or check for unequal setting pressure to track motors. Check 8.
8	Is the high speed selector valve(integral with brake valve body) not shifting?	YES:	Disassemble and clean the internal parts, checking the spring for damage or check that the bolts have been torqued correctly, to 25 to 30 Nm (2.6 - 3.0 kgf m; 19 - 21 lb ft).
9	Is the motor slipping at high speed?	YES: NO:	Check the volumetric efficiency of the hydraulic motor or replace the brake valve kit. Check 10.
10	Is the low speed drive not operating?	YES:	Inspect the hydraulic pump and check drain flow from motor.
11	Is the gearbox overheating?	YES:	Check the gear oil level and check for contamination of oil by hydraulic fluid leaking into gearbox, or replace worn bearings.

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1 - 1

FLUIDS, LUBRICANTS, CAPACITIES AND SPECIFICATIONS

1 - 1

LUBRICANTS AND CAPACITIES

Note: To promote thorough running-in, engines of new machines are fitted at the factory with JCB 10W/30 Multigrade oil. This oil should be drained after the first 100 hours operation and the engine filled with the recommended grade as shown in the engine lubrication chart. JCB 10W/30 Multigrade should also be used for the first 100 hours operation whenever a new or reconditioned engine is fitted into the machine. Alternatively, where a new or reconditioned engine requires protection against corrosion during prolonged storage, Mobilarma 524 may be used during the storage period and for the first 100 hours operation. It is essential that both these oils are replaced by the recommended lubricant after the first 100 hours operation.

ITEM	CAPACITY Litres (UK Gal) [US Gal]	FLUID / LUBRICANT	INTERNATIONAL SPECIFICATION
Fuel Tank			
802.7 M747001 on 803 to M665001 on & 666001 on 804 M734001 on	50 (11.0) [13.2]	Diesel Oil (See **Types of Fuel**)	ASTM D975-66T Nos. 1D, 2D
803 M765001 on	45 (9.9) [11.8]		
Engine (Oil)			
*First 100 hours only	4.5 (1.0) [1.2]	**JCB 10W/30 Multigrade** above - 15°C (5°F) ***JCB 5W/20 Multigrade** - 15°C to - 25°C (5 °F to - 13°F)	MIL-L-46152, API CC/SF API CC/SE (recommended)
*After first 100 hours		**JCB 15W/40 Multigrade** above - 10°C (14°F) ***JCB 5W/20 Multigrade** - 10°C to - 25°C (14°F to -13°F)	SAE15W/40, MIL-L-46152B, AP1 CD/SE MIL-L-2104D API CC/SE or API CD/SE
Engine (Coolant)			
Canopy Cab	4.5 (1.0) [1.2] 5.0 (1.1) [1.3]	**JCB Universal Antifreeze/water** (See **Coolant Mixtures**)	ASTM D3306-74
Track Gearbox (each)	1.2 (0.26) [0.3]	**JCB SAE 30 Engine Oil** (NOT Multigrade)	API CD/SF, MIL-L-46152B MIL-L-2104B
Slew Gearbox			
Lubrication to M665736	0.6 (0.13) [0.15]	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105D
*802.7 M747001 on 803 M666001 on	0.7 (0.15) [0.18]	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105D
804 M734001 on	0.7 (0.15) [0.18]	below 0°C (32°F)	
*803 M765001-027	0.7 (0.15) [0.18]	**JCB HD 140 Gear Oil** 0°C to 40°C (32°F to 104°F)	API-GL-5, MIL-L-2105D
*803 M765028 on		Lubricated from hydraulic system	
Track Idler Wheels	Sealed Unit	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105D
Track Rollers			
(bottom)	Sealed Unit	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105D
(top)	Sealed Unit	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105D
Hydraulic Tank		**JCB Hydraulic fluid 46**	
*803 to M666704	90 (20) [24]	below - 10°C (14°F)	
*804 to M734085	90 (20) [24]	**JCB Special Hydraulic Fluid**	
*802.7M747001 on	62 (14) [16.8]	over 40°C (104°F)	
*803 M666705 on	62 (14) [16.8]		
*803 M765001 on	61 (13.5)[16.2]		
*804 M734086 on	62 (14) [16.8]		

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SERVICE SCHEDULES

EVERY 10 OPERATING HOURS OR DAILY whichever occurs first

Clean

1 Machine generally

Check and adjust where necessary (engine stopped)

2 Generally for damage
3 Hydraulic oil level
4 Engine oil level
5 Engine coolant
6 Fuel system for leaks
7 Engine air filter pre-cleaner
8 Track adjustment

Check and adjust where necessary (engine running)

9 Operation of horn
10 Operation of all other electrical equipment
11 Exhaust (excessive smoke)
12 Dozer operation
13 Excavator operation
14 Track and running gear operation
15 Hourmeter operation

EVERY 50 OPERATING HOURS OR WEEKLY whichever occurs first

Do the daily jobs plus:

Clean

1 Drain and clean fuel filter
2 Drain fuel sediment bowl
3 Radiator matrix

Check and adjust where necessary (engine stopped)

4 Fan belt adjustment

Note: *Failure to maintain correct fan belt adjustment can result in damage to timing case cover.*

*FIRST 100 HOURS ONLY

Do the jobs listed in 50 hours (above) plus:

Change

1 Engine oil and filter canister
2 Slew gearbox oil (802.7 M747001 on, 803 M666001 on, 803 M765001-765027 & 804 M734001 on)

Check

3 Track tension (rubber tracks only)

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TECHNICAL DATA

Pump Type 803 to M665736
Hydraulic quadruple gear type, driven directly from the engine crankshaft.

Pump Flow Rates
At 2600 engine rev/min. and at M.R.V. Pressure

Section P1 at 172bar (2500lbf/in²).	New 14.98 litres/min. (3.3 UK gal/min. 3.96 US gal/min.)
	Service Limit 14.04 litres/min. (3.0 UK gal/min. 3.6 US gal/min.)
Section P2 & P3 at 207bar (3000lbf/in²).	New 27.46 litres/min. (6.0 UK gal/min. 7.2 US gal/min.)
	Service Limit 25.74 litres/min (5.5 UK gal/min. 6.6 US gal/min.)
Section P4 at 34.5bar (500lbf/in²).	New 3.04 litres/min (0.7 UK gal/min. 0.84 US gal/min.)
	Service Limit 2.85 litres/min (0.6 UK gal/min. 0.72 US gal/min.)

***Pump Type 802.7 M747001 on, 803 M666001 on & 803 M765001 on**
Hydraulic triple gear type, driven directly from the engine crankshaft.

***Pump Flow Rates 802.7 M747001 on**
2600 engine rev/min. and at M.R.V. pressure

Section P1 at 172bar (2500lbf/in²).	New 12.3 litres/min (2.7 UK gal/min. 3.25 US gal/min.)
	Service Limit 11.5 litres/min (2.5 UK gal/min. 3.0 US gal/min.)
Section P2 & P3 at 207bar (3000lbf/in²).	New 19.2 litres/min. (4.2 UK gal/min.5.0 US gal/min.)
	Service Limit 18.0 litres/min (4.0 UK gal/min.4.8 US gal/min.)

***Pump Flow Rates 803 M666001 on & 803 M765001 on**
2600 engine rev/min. and at M.R.V. pressure

Section P1 at 172bar (2500lbf/in²).	New 17.47 litres/min (3.8 UK gal/min. 4.6 US gal/min.)
	Service Limit 16.38 litres/min (3.6 UK gal/min.4.3 US gal/min.)
Section P2 & P3 at 207bar (3000lbf/in²).	New 27.46 litres/min. (6.0 UK gal/min. 7.2 US gal/min.)
	Service Limit 25.74 litres/min (5.5 UK gal/min.6.6 US gal/min.)

Pump Type 804 M734001 on
Single variable displacement piston type with two equal outlet flows in tandem with single gear type, driven directly from the engine crankshaft.

***Pump Flow Rates 804 M734001 on**
At 2500 engine rev/min.

PRESSURE		PUMP P1			PUMP P2 & P3		
Bar	lbf/in²	l/min	UK gal/min	US gal/min	l/min	UK gal/min	US gal/min.
0	0	22	4.8	5.8	35	8.0	9.6
100	1500	22	4.8	5.8	34	7.5	9.0
150	2200	22	4.8	5.8	32	7.0	8.4
180	2600	21	4.6	5.5	31	6.8	8.2
200	2900	21	4.6	5.5	28	6.0	7.2
220	3200	-	-	-	26	5.7	6.8

Relief Valve Operating Pressures All Machines	**803 to M665736**			***802.7 M747001 on/ 803 M666001 on *803 M765001 on**			**804 M734001 on**		
	bar	**kgf/cm²**	**lbf/in²**	**bar**	**kgf/cm²**	**lbf/in²**	**bar**	**kgf/cm²**	**lbf/in²**
Main Relief Valves (M.R.V.)									
-Swing/Slew/Dozer/Auxiliary	172	176	2500	172	176	2500	150	153	2175
-Tracks/Dipper/Boom/Bucket									
(Upper setting 803 m/c's only)	207	211	3000	207	211	3000	207	211	3000
(Lower setting 803 m/c's only)	175	180	2550	175	180	2550			
***Servo Pressures**									
-Servo Pressure Relief Valve	34.5	35	500	41.5-44.5	42-45	600-645	41.5-44.5	42-45	600-645
-Pressure Maintenance	-	-	-	30-33	30-33	435-475	30-33	30-33	435/475
Auxiliary Relief Valves (A.R.V.)									
-Boom rod and head side	248	256	3600	248	256	3600	248	256	3600
-Dipper rod and head side	248	256	3600	248	256	3600	248	256	3600
-Dozer	200	204	2900	200	204	2900	200	204	2900
-Attachments	172	176	2500	172	176	2500	140	143	2030
Cross Line Relief Valves									
-Slew	170	173	2450	170	173	2450	140	143	2030
-Slew Start Up Pressure	-	-	-	70	70	1000	70	70	1000

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SERVO CIRCUIT *803 to M665736

Section **P4** of the engine driven pump supplies oil to the servo circuit. The flow for servo actuation is very small and is dead-ended at the controls when they are in netural. Excess flow is directed from the pressure side of the pump to the suction side.

Oil is fed via a filter **10** and non-return valve **11** into accumulator **1**. This stores sufficient pressure to ensure limited operation of the controls in the event of engine or pump failure.

High speed track selector **2** and servo cab controls **3** and **4** are fed via solenoid lock valve **5** which is controlled by an isolator switch. When the left hand seat pod is in the 'down' position, the switch is closed, energising solenoid valve **5** which directs oil from line **1a** to the controls via line **5b**.

The servo cab controls direct pressure as required to operate the excavator spools in the main control valves **6** and **7**.

Solenoid lock valve **5** also supplies pressure to the dual solenoid valve **8** which operates the control valve spool for swing and slew.

When the left hand seat pod is raised, the isolator switch opens, de-energising solenoid lock valve **5**, connecting ports **B** to **A** and blocking port **C**. Pressure is exhausted to tank **T** and the servo cab controls are thereby isolated, thus preventing accidental operation of the services.

The exhaust from the hand controls is now directed to tank **T**.

SERVO HAND CONTROL CIRCUIT

The control lever is mounted on a universal joint to allow actuation of four plungers, each of which is connected, via service ports and pipework, to one end of a spool in the control valve block. Each plunger port contains a plunger with its return spring and a spool.

With the lever in neutral, oil from the pumps enters via a central port but is unable to flow any further than the spools. The service ports are connected to the tank via the hollow centre of the spool and through a cross-drilling into the annular passage which connects to a tank port.

When the lever has been moved to depress a spool, the cross-drilling is aligned with a pressure gallery, allowing pressure to actuate the relevant spool of the control valve block. Pressure from the opposite end of the main control valve spool is exhausted to tank via a hand control plunger which has remained in netural.

When pressure has increased sufficiently to overcome spool spring pressure, pressure builds up in the line, moving the spool upwards so that the cross-drilling moves up into the control housing. This reduces the flow of oil through the port to the relevant control valve, so balancing out the pressure in both this line and the line from the pump. If the control lever is moved slowly, this metering can be used to operate the relevant service gradually.

KEY TO SERVO HAND CONTROL PORTS

Servo Port	Colour	Service
3a	Yellow	
3b	No Tag	
3c	Dark Green	TBA
3d	Natural	
3e	Red	
3f	Dark Blue	
4a	Dark Green	
4b	No Tag	
4c	Purple	TBA
4d	Natural	
4e	Dark Blue	
4f	Orange	

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***SLEW MOTOR 803 to M665736 ONLY**

FAULT FINDING

Mating Parts	Nominal Clearance	Allowable Clearance
Cylinder block bore and pistons.	0.02 mm	0.05 mm
Valve body bore and plunger.	0.015 mm	0.03 mm
Valve body bore and shockless piston..	0.015 mm	0.03 mm

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FUEL SYSTEM

Bleeding

WARNING

To bleed the injectors you must turn the engine. When the engine is turning, there are parts rotating in the engine compartment.

Before starting this job, make sure that you have no loose clothing *(cuffs, ties etc)* which could get caught in rotating parts.

When the engine is turning, keep clear of rotating parts.
2-3-3-8

Should the engine fail to start, misfire, or if any part of the system has been disconnected or become empty, bleed the system as follows:-

Note: The fuel injection pump is self-bleeding when the engine is cranked.

1 Loosen vent screw **A** on top of the fuel filter.

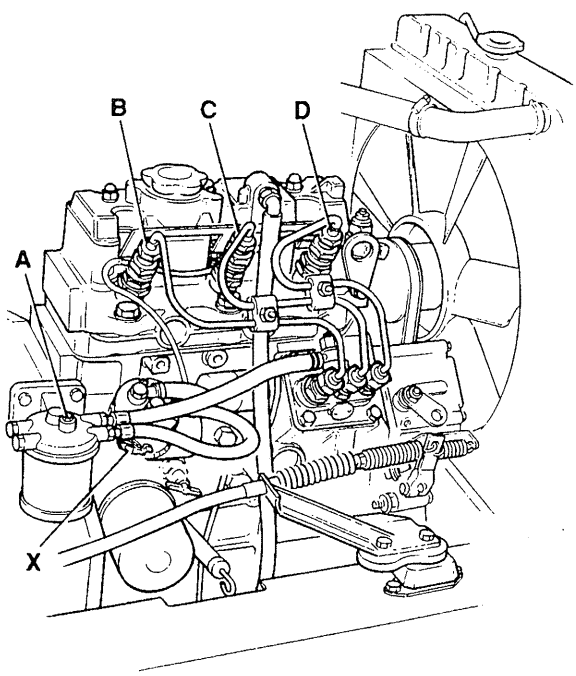
2 Operate the fuel lift pump priming lever **X** until air-free fuel flows from the filter vent point. Tighten the vent screw **A**.

Note: If the lift pump priming lever does not operate, turn the crankshaft one revolution to place the follower on the back of the cam.

3 Loosen connecting union nuts **B**, **C** and **D** at the injectors.

4 Open the throttle a little, use the starter key to turn the engine until air-free fuel flows from the connections.

5 Tighten the union nuts.



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