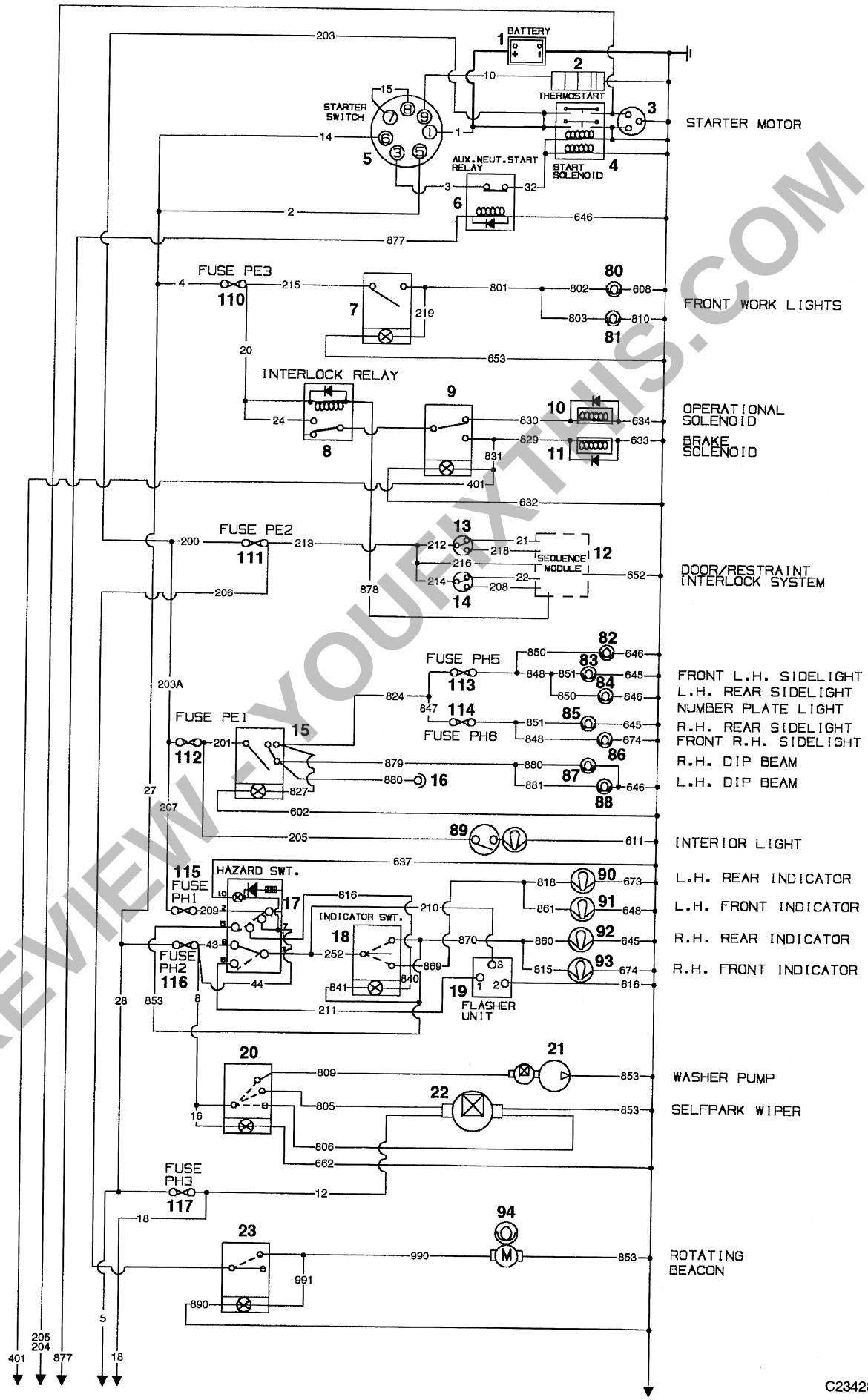
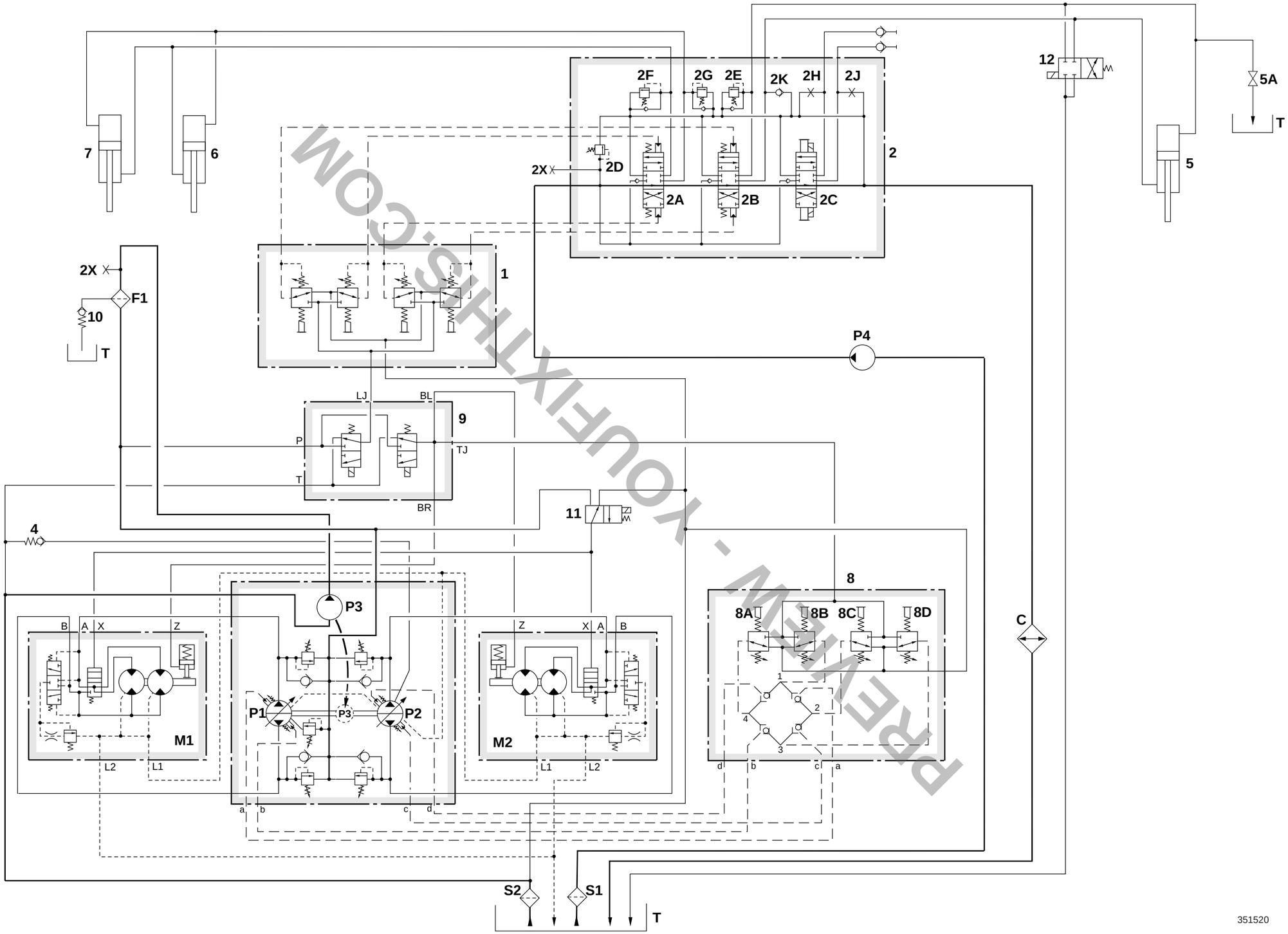
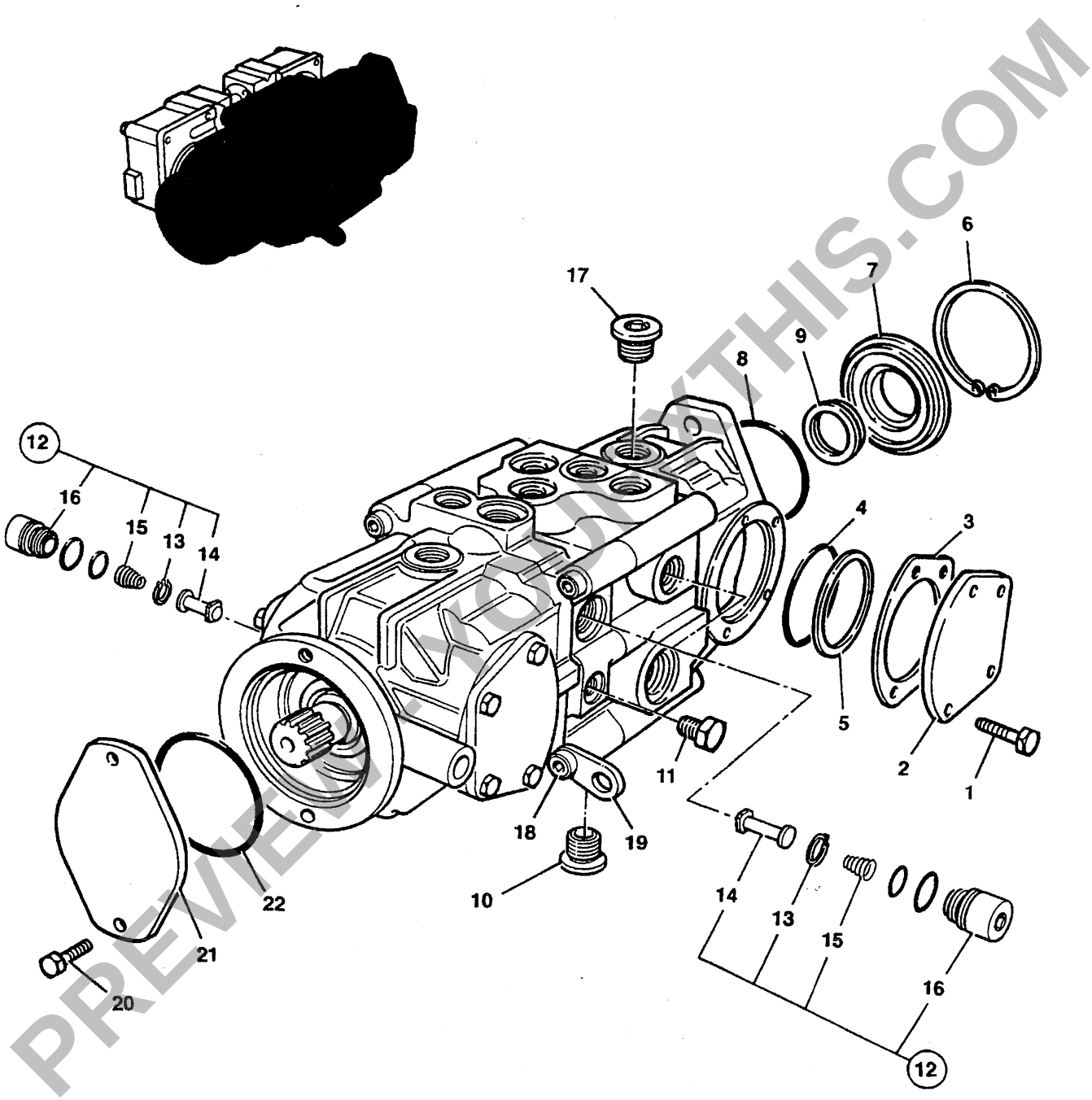


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Use only where no torque setting is specified in the text. Values are for dry threads and may be within three per cent of the figures stated. For lubricated threads the values should be REDUCED by one third.

UNF Grade 'S' Bolts

Bolt Size in	(mm)	Hexagon (A/F) in	Torque Settings Nm	kgf m	lbf ft
1/4	(6.3)	7/16	14	1.4	10
5/16	(7.9)	1/2	28	2.8	20
3/8	(9.5)	9/16	49	5.0	36
7/16	(11.1)	5/8	78	8.0	58
1/2	(12.7)	3/4	117	12.0	87
9/16	(14.3)	13/16	170	17.3	125
5/8	(15.9)	15/16	238	24.3	175
3/4	(19.0)	1 1/8	407	41.5	300
7/8	(22.2)	1 5/16	650	66.3	480
1	(25.4)	1 1/2	970	99.0	715
1 1/4	(31.7)	1 7/8	1940	198.0	1430
1 1/2	(38.1)	2 1/4	3390	345.0	2500

Metric Grade 8.8 Bolts

Bolt Size in	(mm)	Hexagon (A/F) in	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

Note: All bolts used on JCB machines are high tensile and must not be replaced by bolts of a lesser tensile specification.

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Hydrostatic Transmission

Before carrying out any problem solving or any tests on the machine, make sure that the hydraulic system is filled to the correct level with the correct grade of hydraulic oil (see Section 3) and that the system is at the correct working temperature.

PROBLEM	CAUSE
No drive in any direction	1, 2, 4, 5, 10, 16, 22, 23
No drive in either forward or reverse	6, 8, 11, 18
No spin turn either left or right	3, 4, 5, 11, 16, 18, 21
No drive on one side	5, 6, 9, 11, 18, 21, 22
Machine will not travel in straight line	3, 8, 9, 11, 16, 18, 19, 20, 21
No brakes	13, 14, 15, 17
Brakes on all the time	12, 13, 14, 15, 17
No tractive effort	4, 5, 6
Machine creeps in neutral	7

KEY TO CAUSE		REMEDY	PAGE REF.
1	No oil in hydrostatic system	Check supply of oil to pump.	
2	Door/restraint not in correct position	Ensure door closed and restraint in operating position, check electrical wiring and switches as required.	Sect. C
3	Tyres worn or pressure incorrect	Check tyre pressures and condition.	3/9-3
4	Charge pressure incorrect	Adjust charge pressure.	E10-3, E10-10
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.	E8-4 E8-3
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.	E8-7
8	Pump servos incorrectly set	Adjust servos.	E8-5, E8-6
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.	Sect. C
15	Brake valve inoperative	Check valve (sticking spool, etc.)	E18-3
16	Brakes not released	Inspect motor brakes for seal damage. Repair as required.	E13-3, E13-7

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Service Schedules

EVERY 10 OPERATING HOURS OR DAILY whichever occurs first, for the first 50 Operating Hours only

Check (engine stopped)

1 Tightness of wheel bolts

EVERY 10 OPERATING HOURS OR DAILY whichever occurs first

Clean

1 Machine generally, including cab interior

Check (Engine Stopped)

1 Generally for damage, including ROPS/FOPS structure
2 Engine coolant level and condition
3 Hydraulic fluid level
4 Hydraulic system for leaks
5 Engine oil level and condition
6 Engine generally for leaks
7 Tyre pressures and condition
8 Windscreen washer level (if fitted)
9 Seat belt condition and security

Check (Engine Running)

1 Warning lights extinguished
2 Operation of all electrical equipment
3 Operation of all hydraulic services

Grease

1 Quickhitch pivot pins

EVERY 50 OPERATING HOURS OR WEEKLY whichever occurs first

Do the Daily jobs plus:

Check (Engine Stopped)

1 Oil cooler connections
2 Radiator hoses and condition
3 Alternator belt tension
4 Fuel filter and sedimenter (drain if necessary)

Check (Engine Running)

1 Fuel system for leaks and contamination
2 Exhaust for excessive smoke

Grease

1 Loader arm pivot points
2 Lift and compensating ram pivots

AFTER THE FIRST 100 OPERATING HOURS ONLY

Check (Engine Stopped)

1 Engine coolant level and condition
2 Fuel filter and sedimenter (drain if necessary)
3 Alternator belt tension
4 Exhaust system security
5 Radiator hoses and condition
6 Engine and pump mounting bolts for tightness
7 Drive chain case oil levels
8 Hydraulic motor mounting bolts
* 9 Torque setting of wheel hub mounting nuts

Check (Engine Running)

1 Idling speed
2 Maximum governed speed
3 Pulled down speed

Change

1 Engine oil and filter
2 Fuel filter element
3 Hydraulic fluid filter(s)

EVERY 100 OPERATING HOURS OR 2 WEEKLY whichever occurs first

Do the Daily and 50 hour jobs plus:

Clean

1 Battery terminals
2 Quickhitch square locking peg housings.

Check (Engine Stopped)

1 Condition of ram piston rods
2 Hoses and pipework for chafing and damage
3 Air cleaner hose security
4 Wiring for chafing

Change

1 Air filter outer element when operating in dusty conditions

Oil

1 All linkage points
2 Hand throttle lever
3 Throttle pedal pivot pin

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*** Up to machine number 804423**

***** ***Note:*** *System Cleanliness is to be to ISO 16/13 - See page E/2 - 1 for guidance.*

Auxiliary Pump

* Type	SP2 250/36.0, gear type
Displacement	75 litres (16.5 UK gal; 19.8 US gal) per min. at 2200 rev/min
Maximum Working Pressure	220 - 227 bar (3190 - 3292 lbf/in^2, 223 - 232 kgf/cm^2)

High-Flow Pump (up to June 1997)

* Type	Gear type 16 cc/rev
Displacement	65 litres (14.3 UK gal; 17.2 US gal) per min. at 2200 engine rev/min
Maximum Working Pressure	205 - 212 bar (2973 - 3074 lbf/in^2, 208 - 216 kgf/cm^2)

High-Flow Pump (from July 1997)

* Type	Gear type 12.8 cc/rev
Displacement	45 litres (9.8 UK gal; 11.8 US gal) per min. at 2200 engine rev/min
Maximum Working Pressure	205 - 212 bar (2973 - 3074 lbf/in^2, 208 - 216 kgf/cm^2)

Main Pump (2-off)

* Type	Tandem axial piston Series 40 M35
Displacement	35 cc/rev
Control	Servo non-feedback proportional, 18 bar (261 lbf/in^2) to give max pump displacement.
Maximum Working Pressure	414 bar (6003 lbf/in^2)
Maximum Speed	2400 rev/min
Charge Pressure (oil temperature at 50° C)	20 - 30 bar (290 - 435 lbf/in^2) at 2200 rev/min
Charge Pump Flow	38 - 40 litres (8.4 - 8.8 UK gal; 10.0 - 10.5 US gal) per min. at 2200 rev/min

*** Loader Joystick - Single lever drive control**

Output Characteristics	
- Forward/Reverse positions	5 bar (72.5 lbf/in^2) at 15% stroke, 19 bar (275 lbf/in^2) at 100% stroke.
- Left/Right positions	1 bar (14.5 lbf/in^2) at 15% stroke, 15 bar (217.5 lbf/in^2) at 100% stroke.

*** Transmission Joystick - Single lever drive control**

Output Characteristics	
- Forward/Reverse positions	5 bar (72.5 lbf/in^2) at 15% stroke, 19 bar (275 lbf/in^2) at 100% stroke.
- Left/Right positions	1 bar (14.5 lbf/in^2) at 15% stroke, 25 bar (363 lbf/in^2) at 100% stroke.

*** Servo Joysticks - Dual lever drive control**

Output Characteristics - Transmission control spools	5 bar (72.5 lbf/in^2) at 15% stroke, 15 bar (217.5 lbf/in^2) at 100% stroke.
Output Characteristics - Loader control spools	3.5 bar (51 lbf/in^2) at 15% stroke, 15 bar (217.5 lbf/in^2) at 100% stroke.

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*Typical Ram

Dismantling and Assembly

Place the ram assembly on a locally manufactured strip/rebuild bench.

Slacken the end cap **1** using a special spanner (see **Service Tools**, Section 1) and remove the piston rod assembly from the cylinder.

⚠ WARNING

If air or hydraulic pressure is used to force out the piston assembly, ensure that the end cap is securely fitted. Severe injury can be caused by a suddenly released piston rod.
HYD 1 - 2

Position the piston rod assembly on the bench in place of the ram cylinder. Remove the piston head seals **2**, **3** and **4**.

Extract dowel **5** from the piston head using a metric screw (M3) threaded into the extractor hole.

Note: Any attempt to remove the piston head without removing the dowel will cause damage to both the piston head and rod.

Remove piston head **6** from rod **7** using a special spanner (see **Service Tools**, Section 1). Remove the piston head internal 'O' ring **8**.

Remove the end cap **1** from the piston rod and remove the inner and outer seals **9**, **10** and **11**.

Ensure that all metal components are free from scoring, nicks and burrs. A damaged rod will impair the life of the inner rod and wiper seals.

Discard all seals and 'O' rings.

Assembling

Renew all seals and 'O' rings.

Thoroughly clean the threads of the piston rod, piston head, end cap and cylinder using a wire brush. Use JCB Cleaner/Degreaser to ensure that all threads are free from grease, hydraulic oil and locking fluids. Allow 15 minutes for the solvent to dry before applying JCB Activator.

Ensure that lubricants used during assembly do not come into contact with locking fluids.

Use seal fitting tool (892/00334) to fit rod seals **9** and **10**. The size (diameter) and position of pins **A** is determined by the diameter and radial width of the rod seal being fitted.

The pins are screwed into threaded holes in the tool body, the spacing of the holes is designed to suit small or large diameter rod seals.

1 Open the tool as shown at **B** and insert the new rod seal, the seal must be fitted behind the two front pins but in front of the rear pin as shown.

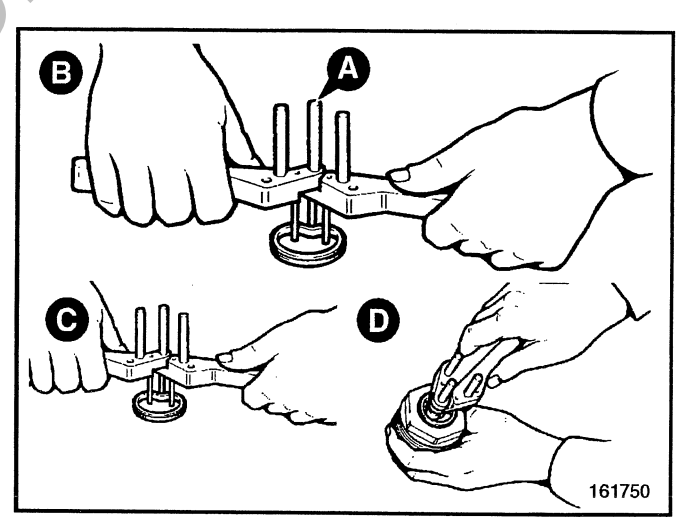
Note: Make sure the seals are fitted the correct way round, as shown at **P** and **Q**.

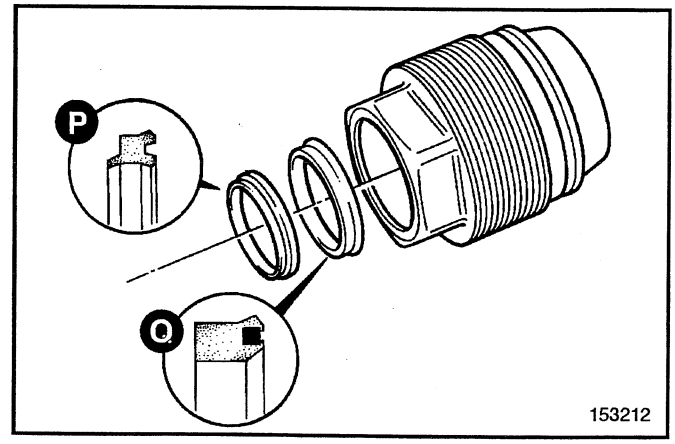
2 Close the tool as shown at **C**. The seal must form a reniform (kidney shape).

3 Before fitting the rod seals check the seal grooves are free of contamination and sharp edges.

4 Locate the seal in the end cap groove, shown at **D**, when the seal is in position, open the tool to release the seal. Make sure the seal is correctly installed in its groove and remove the tool.

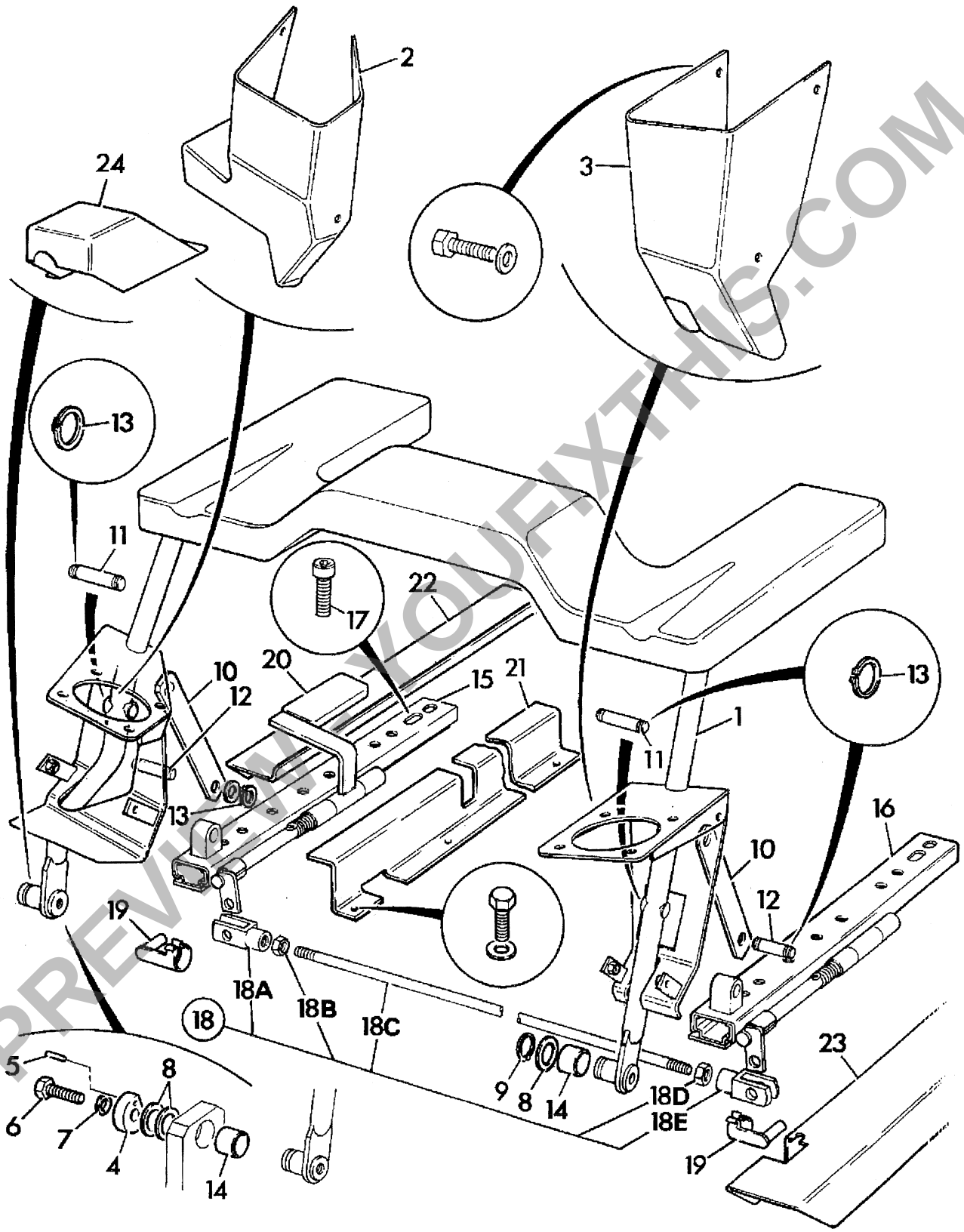
5 Fit rod wiper seal **10** into seal groove. Make sure the seal is correctly installed as shown.





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Colour Coding

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

Blue: Neutral Circuit Pressure.

Red: Pressure generated by the operation of a service. Depending on application this may be anything between Neutral Circuit Pressure and M.R.V. Operating Pressure.

Pink: Pressure that is above Neutral Circuit Pressure but lower than that denoted by Red.

Green: Exhaust

Light Green: Oil subjected to a partial vacuum due to a drop in pressure (cavitation).

Yellow: Oil trapped within a chamber or line, preventing movement of components (lock-up).

Orange: Oil pressure used in a controlling device (servo).

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* Series 40 Hydrostatic Pump

Dismantling and Assembly

The information on this page covers the dismantling and assembly of those 'auxiliary' components which are accessible without actually splitting the main unit. For each component, the numbering sequence is a guide to dismantling. The assembly procedure is a reverse of the dismantling procedure. Use new 'O' rings and lubricate components with hydraulic fluid on reassembly.

Trunnion Covers

When removing the trunnion covers **2** remove and retain shim packs **3** as a set. (Note that only the rear pump trunnion cover is shown. The front pump cover is identical, but the shim packs should not be mixed). Do not alter the shim pack thickness.

Remove and discard 'O' ring **4**.

On reassembly, lubricate the shim pack **3**. Torque tighten bolts **1** (4 off) to 24 - 30 Nm (18 - 22 lbf ft, 2.5 - 3.0 kgf m).

Shaft Seal

Remove circlip **6** from the housing. Carefully remove the seal cover **7**. (Take care not to damage the shaft or housing.) Remove the 'O' ring **8** from the seal cover and discard. Press out the seal **9** from the seal cover **7** using an arbor press and discard. Check the shaft and seal cover for damage and wear.

Note: After the seal cover **7** is removed, the shaft may be free in the housing. Do not pull the shaft out as this could dislodge internal components requiring major disassembly of the pump.

On reassembly, lubricate the new seal **9** with grease and, using the arbor press, press into the seal cover, ensuring that the seal lips face outwards. Take care not to damage the seal.

Note: Wrap the spline of the shaft with tape during assembly.

Note: If a bevelled circlip **6** is used, install the bevelled side outwards.

Check Valves

Remove the check valves **12** and place on a suitable clean surface. Inspect the valve and its mating seat in the housing for damage and foreign material.

Relief valve **14** is retained in plug **16** by circlip **13**. The valve may be pulled straight out of the plug. When refitting, install spring **15** in plug **16** with its larger diameter towards the plug, then snap valve **14** into position in the plug.

Remove and discard the 'O' rings.

On reassembly torque tighten to 41 - 68 Nm (30 - 50 lbf ft, 4 - 7 kgf m).

Rear Shaft Cover

The rear shaft cover **21** is retained by screws **20**. Remove and discard 'O' ring **22**.

Do not attempt to pull the rear pump shaft out of the housing as this could dislodge internal components requiring major disassembly of the pump.

Separating the Front and Rear Pumps

The front and rear pumps are secured together by four capscrews **18**. On reassembly, ensure that the lifting eye **19** is refitted as shown. See page E/10 - 3 for details of pump 'O' rings and locating dowels.

Torque tighten screws **18** to 47 - 61 Nm (35 - 45 lbf ft, 4.8 - 6.2 kgf m).

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