

Service Manual

1CX, 208S Backhoe Loader

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General Information 1
Care & Safety 2
Routine Maintenance 3
Attachments A
Body & Framework B
Electrics C
Controls D
Hydraulics E
Transmission F
Brakes G
Engine K

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Contents

	Page No.
Identifying Your Machine	1 - 1
* Torque Settings	
- Unsealed Hoses and Adapters	2 - 1
- 'O' Ring Face Seal System	2 - 3
- 'Torque Stop' Hose System	2 - 4
Service Tools	
- Numerical List	3 - 1
- Electrics	4 - 1
- Hydraulics	4 - 2
Sealing and Retaining Compounds	5 - 1

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Contents

	Page No.
Safety Notices	1 - 1
General Safety	2 - 1
* Operating Safety	2 - 2
Maintenance Safety	2 - 2
* Safety Decals	2 - 4

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Contents

	Page No.
*Fluids, Capacities and Lubricants	
Except North America	1 - 1
North America	1 - 2
Lubricants	
Health and Safety	1 - 3
Fuel System	2 - 1
Service Schedules	3 - 1
Loader Arm Safety Strut	4 - 1
Greasing	5 - 1
Body and Framework	
Oiling Control Levers	6 - 1
Checking Slew Oil Level	6 - 1
Oiling Door Hinges	6 - 1
Checking Seat Belt Condition and Security	6 - 1
Electrical System	
Battery Safety	7 - 1
Checking the Electrolyte Level	7 - 1
Changing Light Bulbs	7 - 2
Hydraulic System	
Checking the Fluid Level	8 - 1
Changing the Filter	8 - 1
Transmission	
Drive Chain Lubrication	9 - 1
- Checking the Oil Levels	9 - 1
- Adjusting the Tension	9 - 2
Tyres and Wheels	9 - 3
- Inflating the Tyres	9 - 3
- Replacing Segments of Optional Non-Inflatable Tyres	9 - 3
- Checking the Wheel Bolt Torques	9 - 3
- Tyre Table	9 - 3
Engine	
Air Filter	
- Changing the Elements	10 - 1
Checking the Oil Level - XUD engine	10 - 2
Changing the Oil and Filter - XUD engine	10 - 2
Checking the Oil Level - 100 series engine up to machine no. 807552	10 - 4
Changing the Oil and Filter - 100 series engine up to machine no. 807552	10 - 4
Checking the Oil Level - 400 series engine from machine no. 807553	10 - 5A
Changing the Oil and Filter - 400 series engine from machine no. 807553	10 - 5B
Renewing the Engine Breather from machine no. 807553	10 - 5B
Draining the Fuel Filter - XUD engine	10 - 6
Changing the Fuel Filter Element - XUD engine	10 - 6
Draining the Fuel Filter - 100 and 400 series engines	10 - 7
Changing the Fuel Filter Element - 100 and 400 series engines	10 - 7
Cooling System	10 - 8
- Cleaning the Coolant Radiator	10 - 8
- Coolant Mixtures	10 - 8
- Checking the Coolant Level - XUD engine	10 - 9
- Changing the Coolant - XUD engine	10 - 9
- Checking the Coolant Level - 100 and 400 series engines	10 - 10
- Changing the Coolant - 100 and 400 series engines	10 - 10
Checking Alternator Belt Tension	10 - 11
Adjusting the Alternator Belt	10 - 11
Fitting a New Alternator Belt	10 - 11

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***Note**: System Cleanliness is to be to ISO 16/13 - See page E/3 - 1 for guidance.*

From machine number 752463

Auxiliary Pump - Standard

Type	Gear
Displacement	48 l/min (10.5 UK gal/min, 12.7 US gal/min) at 3000 rev/min
Maximum Working Pressure	185 - 192 bar (2683 - 2785 lbf/in², 188 - 196 kgf/cm²)
Maximum Speed	3200 rpm
Maximum Input Torque	121 Nm (89 lbf ft, 12 kgf m)

Auxiliary Pump - High-Flow

Type	Tandem gear
Displacement - Front Section	90 l/min (19.8 UK gal/min, 23.8 US gal/min) at 3600 rev/min
Displacement - Rear Section	57 l/min (12.5 UK gal/min, 15 US gal/min) at 3600 rev/min
Maximum Working Pressure	185 - 192 bar (2683 - 2785 lbf/in², 188 - 196 kgf/cm²)
Maximum Speed	3600 rpm
Maximum Input Torque	121 Nm (89 lbf ft, 12 kgf m)

Main Pump (2-off)

* Type	Tandem axial piston Series 42 M28
Displacement	28 cc/rev (1.71 in³/rev)
Control	Servo non-feedback proportional, 15 bar (218 lbf/in²) to give max pump displacement.
Maximum Working Pressure	350 bar (5076 lbf/in²)
Maximum Speed	3900 rpm
Charge Pressure (oil temperature at 50° C)	
up to machine number 807734	7.5 bar (109 lb/in²) at engine idle 19.5 bar (283 lb/in²) at 3000 rev/min
from machine number 807735	11.5 bar (167 lb/in²) at engine idle 23.5 - 24 bar (340 - 348 lb/in²) at 3000 rev/min

Note: Earlier machines may be adjusted to the higher pressure if there is a requirement to raise the lift arms at engine idle.

* Servo Joysticks up to machine no. 807146

Output Characteristics - Transmission control spools	5 bar (72 lb/in²) at 15% stroke. 15 bar (217.5 lb/in²) at 95% stroke.
Output Characteristics - Loader control spools	3.3 - 3.7 bar (48 - 53 lb/in²) at 15% stroke. 14.5 - 16.5 bar (210 - 239 lb/in²) at 95% stroke.

* Servo Joysticks from machine no. 807147

Output Characteristics - Single Lever Drive Control	
Transmission for/rev (spools 2 & 4)	3.5 bar (51 lb/in²) at 15% stroke.
Transmission left/right (spools 1 & 3)	5.5 bar (80 lb/in²) at 15% stroke.
Loader	3.5 bar (51 lb/in²) at 15% stroke.
Output Characteristics - Dual Lever Drive Control	
Transmission control spools	5.5 bar (80 lb/in²) at 15% stroke.
Loader control spools	3.5 bar (51 lb/in²) at 15% stroke.

Hydraulic Motors

* Type	MCR03
Displacement	328 cc/rev (20 in³/rev)
Maximum Working Pressure	414 bar (6000 lbf/in²) continuous
Maximum Speed	237 rpm continuous
Maximum Flow	84 l/min (18.5 UK gal/min, 24 US gal/min) continuous

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Auxiliary Pump (Standard machines)

Removal and Replacement

Remove bolts **X** and lift the pump away from the main pump unit.

On replacement, torque tighten the bolts to 77 Nm (57 lbf ft, 7.9 kgf m).

Dismantling and Assembly

The numerical sequence shown on the illustration is intended as a guide to dismantling.

For assembly the sequence should be reversed.

Dismantling

Remove coupling **A** if still fitted.

Hold the body in a soft jawed vice with the mounting flange uppermost. Mark all parts to ensure correct alignment when assembling. Discard all seals and sealing rings.

Clean all parts in light aromatic kerosene, examine for damage and wear.

Damaged or worn parts must be renewed.

Inspection

It is normal for the gears to have cut a slight track in the body bore on the inlet side. The gear track wear can not be measured accurately but will be related to bearing wear. Examine the bearing bores **C** which are coated during manufacture with PTFE. If the grey PTFE is worn through so that the bronze base is visible, the complete pump must be renewed.

Renew the pump if the bearings are scored or if the gear side faces are chipped or damaged. DO NOT use any abrasives on the bearings or gears as this would destroy critical manufacturing dimensions.

Assembly

Fit the pressure loading ring/backing ring **10** and sealing rings **11** to the flange **2** and cover **8**. A little grease (JCB MPL Grease) in the grooves will help retain them.

Hold the flange **2** in a soft jawed vice with the sealing rings facing upwards and assemble the body **3**. Ensure that the body cut-in track corresponds to the inlet side of the flange.

Assemble the gear/bearing pack components **4**, **5**, **6** and **7** separately. It is important to return the flange end bearing **6** to the flange end of the unit, otherwise internal leakage can occur due to bedding in. Ensure that the bearing face recesses **B** are adjacent to the gear faces and that the relieved radii are both towards the pump outlet.

Lightly lubricate the body bore and bearings, then push the gear/bearing pack into the body.

Fit the cover **8**, ensuring the inlet side is in the correct position. Torque tighten bolts **1** to 61 - 68 Nm (45 - 50 lbf ft, 6.2 - 7.0 kgf m).

If the inlet adapter is disturbed, fit a new 'O' ring and tighten to 115 - 145 Nm (85 - 107 lbf ft, 11.7 - 14.8 kgf m). Do not overtighten.

* If the outlet adapter is disturbed, clean the threads and apply JCB Threadlocker and Sealer to two of the threads. Tighten to 95 Nm (70 lbf ft, 9.7 kgf m). Do not overtighten.

When refitting the auxiliary pump to the Hydrostatic pump, tighten mounting bolts to 77 Nm (57 lbf ft, 7.9 kgf m).

Testing

Install the pump onto a suitable test rig and test as follows.

Test Data

Oil Viscosity	40 - 45 cSt at 50 °C, (122 °F)
Oil Temperature	45 - 50 °C (113 - 122 °F) at pump inlet
Test Speed	1500 rev/min nominal

Run pump initially off load and check for leaks. Increase pressure in stages of 40 bar (600 lb/in^2, 40 kg/cm^2) and allow to run for 1 minute at each stage. This will allow components to readjust and flow readings will indicate if re-build is correct. Check pump output under the following conditions.

Pressure 230 bar (3335 lb/in^2, 230 kg/cm^2)
Minimum Flow 22 l/min (4.8 UK gal/min, 5.8 US gal/min)

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Component Key - High-flow Machine from machine no. 751012 to 752462 - Dual Lever Drive Control

C	Cooler
F1	Filter
F2	High-flow Filter
P1	Main Pump ┐ Run in Tandem
P2	Main Pump ┘
P3	Auxiliary Gear Pump
M1	Left Hand Drive Motor
M2	Right Hand Drive Motor
S1	Suction Strainer
S2	High-flow Pump Suction Strainer
T	Tank
1	Left Hand 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
2W	Pressure Test Point (High-flow Relief Valve)
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	Right Hand Joystick
9	Pressure Reducing Solenoid Valve
10	Check Valve (2 bar)
11	Filter By-pass Valve (3 bar)
12	Auxiliary Feeds
13	High-flow Pump
14	High-flow Valve
14A	High-flow Pilot Valve
14B	High-flow Control Valve
14C	High-flow Circuit Relief Valve
15	Attachment Motor
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.

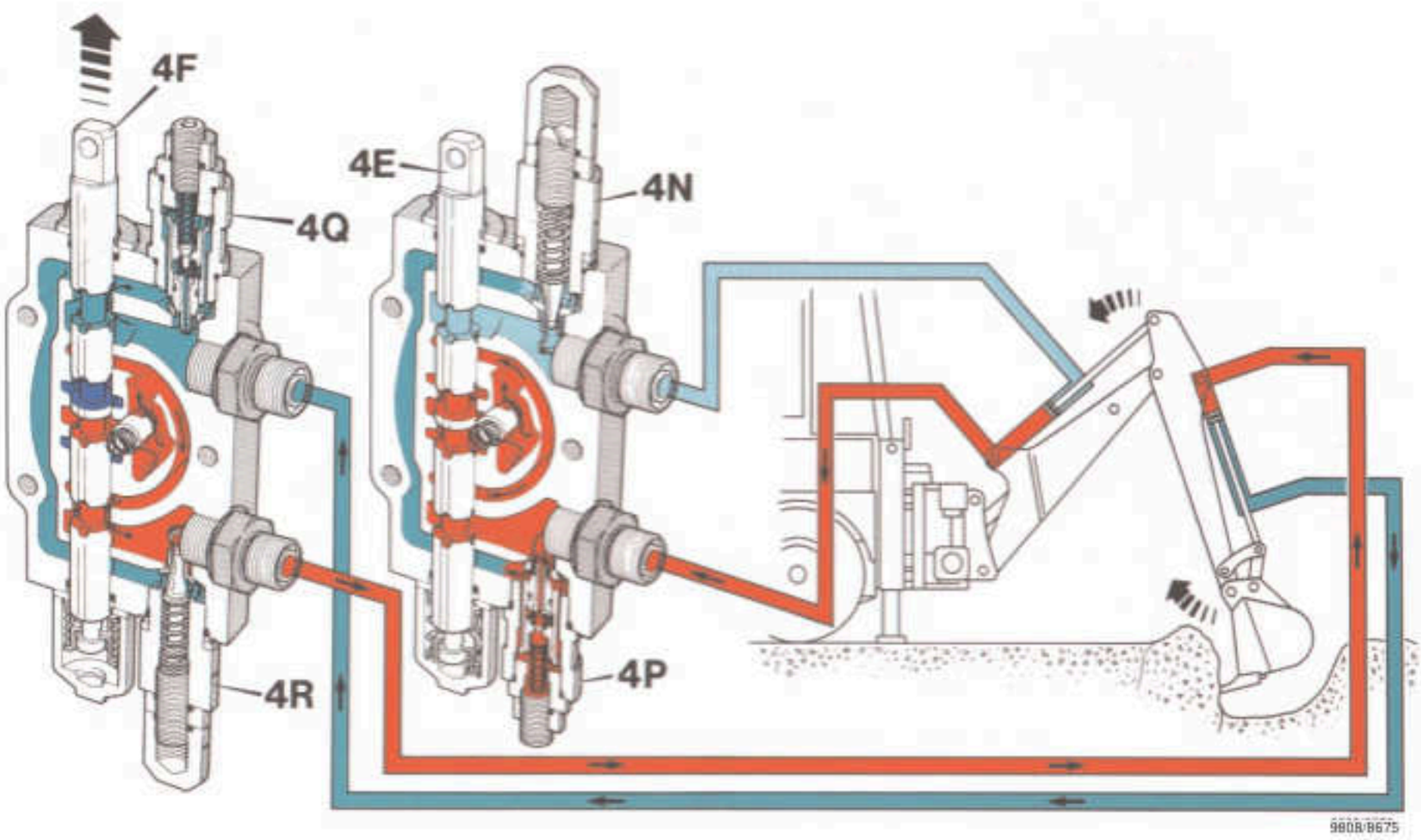
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Excavator Valve - A.R.V. Operation

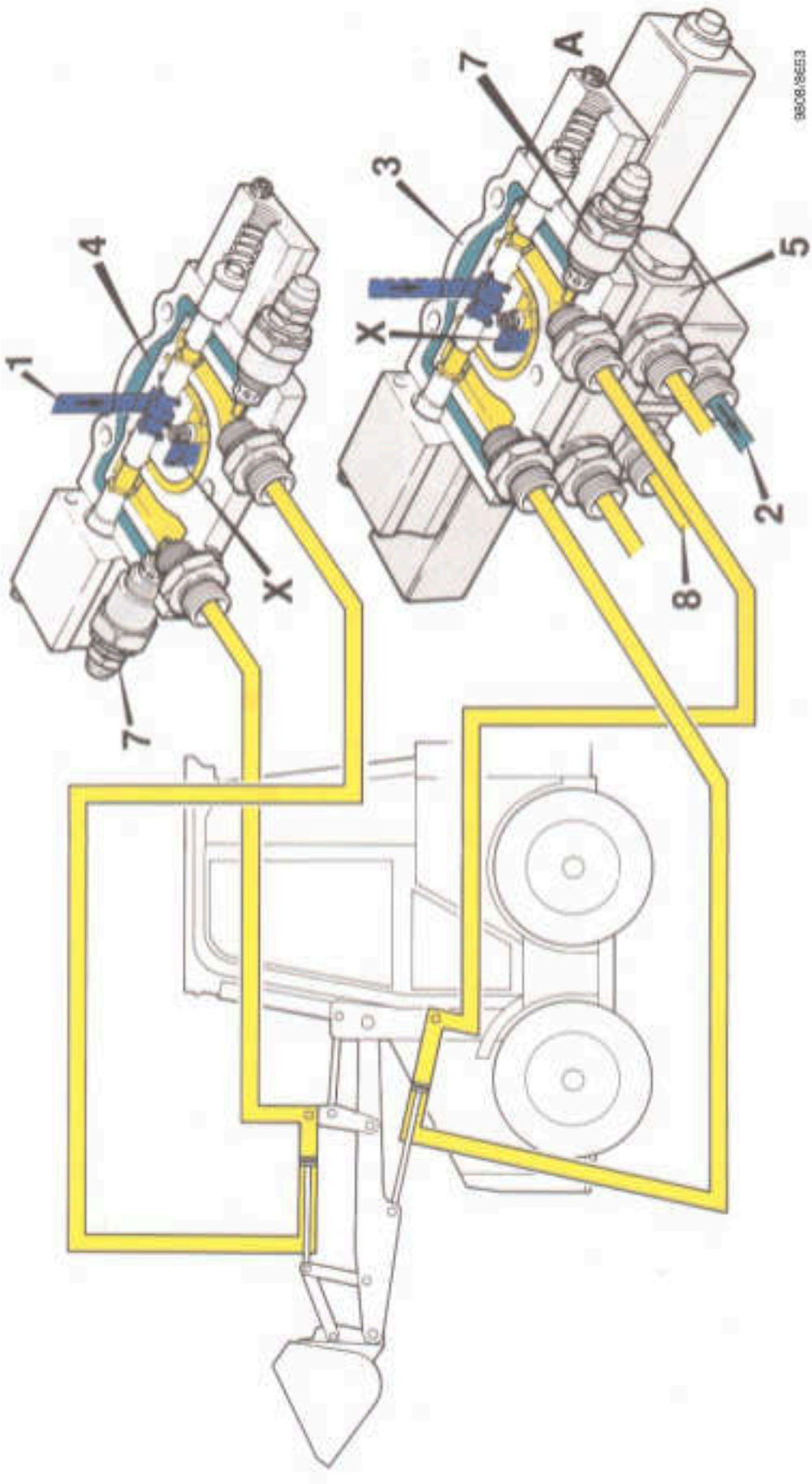
The illustration shows the bucket spool **4F** selected to operate the service against an immovable object. This forces the dipper away from the obstruction and pressurises the head side of the dipper ram.

When this pressure reaches the setting of A.R.V. **4P**, this valve opens, relieving the pressure into the exhaust gallery. Cavitation occurs in the rod side of the dipper service.

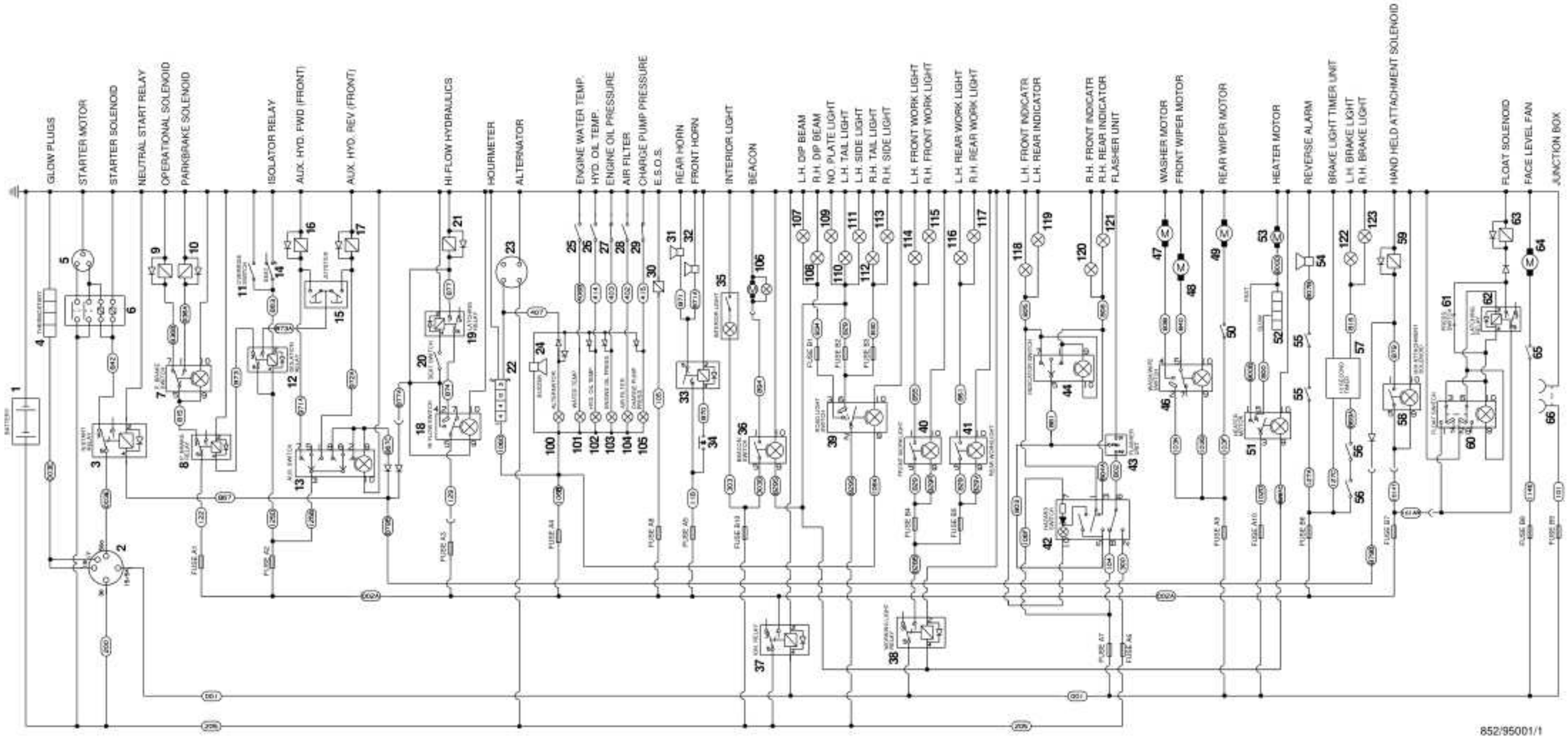
See page E/8 - 7 for detailed description of the pilot-operated A.R.V. pressure relief operations.



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