Drott
40 Crawler
Series D

Service Manual

S-406294

CASE CONSTRUCTION

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The ports of the Power Sensing Valve are identified in figure 93. The side ports are "sensing ports". These ports are in communication with the high pressure lines from the pumps to the main control valves. No flow occurs through these ports. They simply "sense" the pressure that exists in the two supply lines. The lower ports are pressure vent ports. These ports are connected in parallel with the pilot poppet in the Main Relief Valves. When sufficient pressure is present at Surface "A" and Surface "B" of the pilot piston, the piston will open and "vent" pressure from the back side of the main poppet in the Main Relief valve to tank. (For Main Relief Valve description and operation, see below). The front port on the Power Sensing Valve housing is the Tank port. In an extreme example, a pressure of 5000 psi (34 400 kPa) acting against either the piston head or the piston land can overcome the spring tension and move the piston off its seat. Under NORMAL operations, the pressure required to move the piston off its seat is split between the piston head and the piston land. When a SUM TOTAL pressure of 5000 psi is applied at the piston, it will move off its seat to open the Main Relief cartridge in the appropriate valve bank.

The Power Sensing Valve functions only when both Main Circuits are being used simultaneously and are functioning within the 2500 to 3000 psi range. The relief cartridges will remain seated as long as the SUM TOTAL of the pressure in Circuit No. 1 and Circuit No. 2 remain within limits. When total pressure of both circuits exceeds 5000 psi, the relief cartridge (in the circuit with the higher pressure) will move off its seat to open the Main Relief in the appropriate valve bank. Overall system pressure is controlled by the Main Reliefs at 3000 psi (20 680 kPa).

As an example, say Circuit No. 1 is operating at full capacity (3000 psi) and the pressure demand in Circuit No. 2 rises above 2000 psi; the Power Sensing Valve will serve as a "screwdriver" to adjust DOWN the relief setting of the Main Relief in Valve bank No. 1 by venting the oil behind the main relief poppet.

The Main Relief in valve bank No. 1 will then open at a lower pressure setting in order to compensate for the increased pressure demand in Circuit No. 2. The Power Sensing Valve will continue to decrease the Main Relief setting until pressure in both main circuits equalizes at 2500 psi (17 230 kPa), for example.

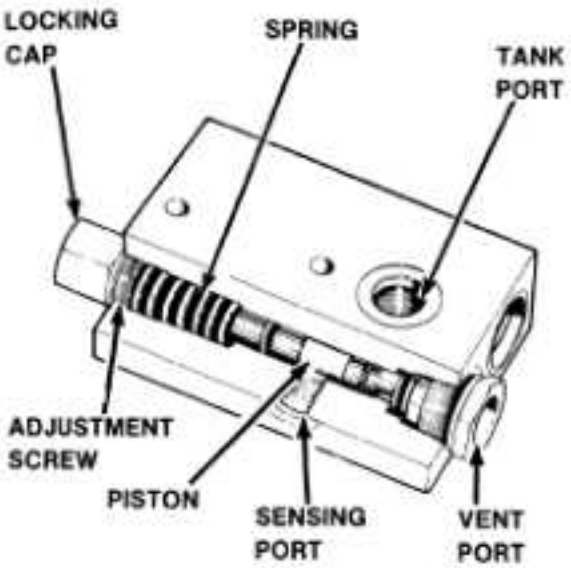


Figure 93. Cutaway View of Power Sensing Valve

Pump Circuit	40D - Summated Circuit Pressure Will Relieve at					
1	2000	2200	2400	2600	2800	3000
2	3000	2800	2600	2400	2200	2000

The table above shows the maximum pressures at which each circuit will be able to operate when both circuits are being used simultaneously. You will note that either circuit is capable of operating up to the main relief setting as long as the demands in the other circuit do not exceed the summated pressure. When demands in one circuit increase, the opposite circuit pressures must decrease in direct proportion.

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8. Leveler Hydraulics

General Description

The Leveler circuit includes the Leveler cylinders, a Lock Valve, Port 4 and 5 of the Hydraulic Swivel, the Leveler Valve and the required hydraulic lines.

Leveler Cylinders

The cylinders are single action cylinders. Oil flow to and from the cylinders is routed through the lock valve.

Leveler Lock Valve

The Lock Valve is located below the center swivel inside the leveler frame.

The Lock Valve contains a shuttle valve and two check valves. The purpose of the valve is to hold oil in the cylinders until pressure from the pump is available to operate them. Each check valve can only be opened by applying hydraulic pressure to the opposite line. Pilot pressure from one line acts on the poppet of the opposite check valve.

Because the cylinders can only be "powered down", the turntable is prevented from "dropping" to one side as it is tilted over center. With the lock valve in the circuit, as the turntable weight shifts over center, the check valve (in the retracting cylinder line) closes momentarily to allow the pump to catch up in supplying oil to the cylinder being extended. This prevents cavitaion and provides full control of the turntable tilt.

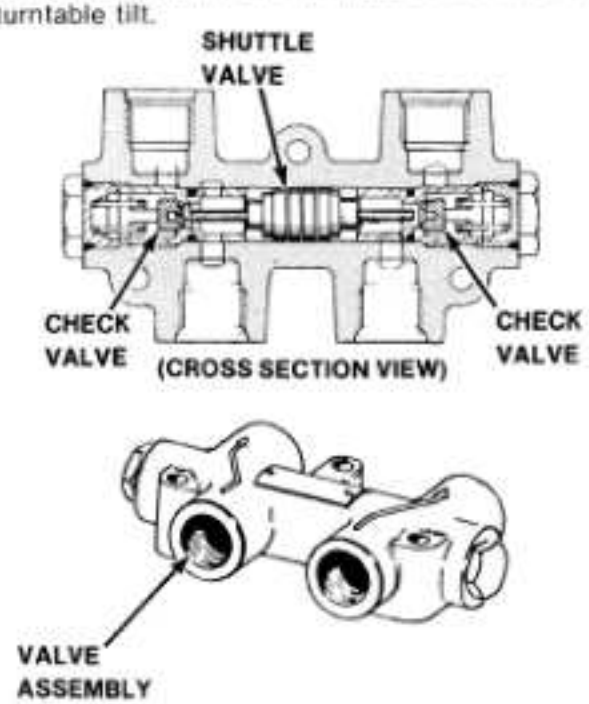


Figure 118. Leveler Lock Valve

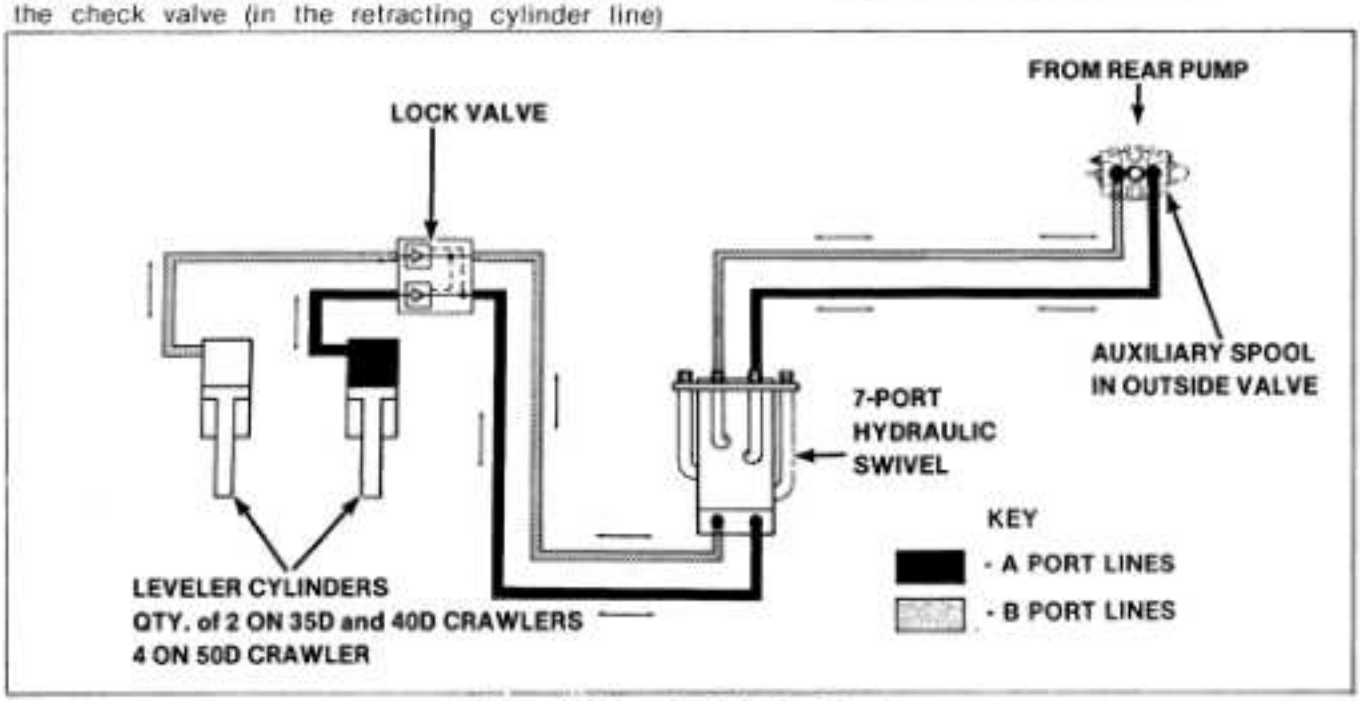


Figure 119. Leveler Cylinder Circuit

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CYLINDER CIRCUITS (CON'T.)

PROBLEM	POSSIBLE CAUSE	REMEDY
Cylinder or load "Drops" momentarily when the control spool is moved from neutral	1. Dirt in load-hold check valve	1. Disassemble and clean
	2. Scored check valve poppet or seat	2. Replace load check poppet, or lap poppet to seat
	3. Broken centering spring	3. Replace spring
Cylinder extends slowly or with jerky motion	1. See "Slow Motion" under Main Hydraulic System	1. Same as above
	2. Air entering the cylinder through leaky rod seal or head o-ring	2. Replace seal or o-ring
Excessive wear or breakage of tool linkage or pins	1. Main Relief set too high	1. Adjust main relief
	2. Port Relief set too high	2. Adjust port relief
	3. Insufficient lubrication	3. Lubricate more frequently
Fast Hoist function inoperative	1. Solenoid valve or related electrical circuit faulty	1. See Electrical System Section
	2. Air in pilot line for fast hoist	2. Open bleed screw on hydraulic end cap and bleed the line

MAIN PUMP

PROBLEM	POSSIBLE CAUSE	REMEDY
Short life of pump bearings, shafts, wear plates, etc.	1. Dirty oil	1. System should be drained, flushed and refilled. Breathers, seals and gaskets must be kept in good condition
	2. Aerated oil	2. Check for loose suction line, low oil level
	3. Wrong oil	3. Disassemble and correct
Pump takes too long to respond or fails to respond	1. Low oil supply	1. Fill to proper level
	2. Restricted pump inlet	2. Check and correct
	3. Insufficient relief valve pressure	3. Reset to correct pressure setting using accurate gauge
	4. Pump worn or damaged	4. Inspect, repair, or replace

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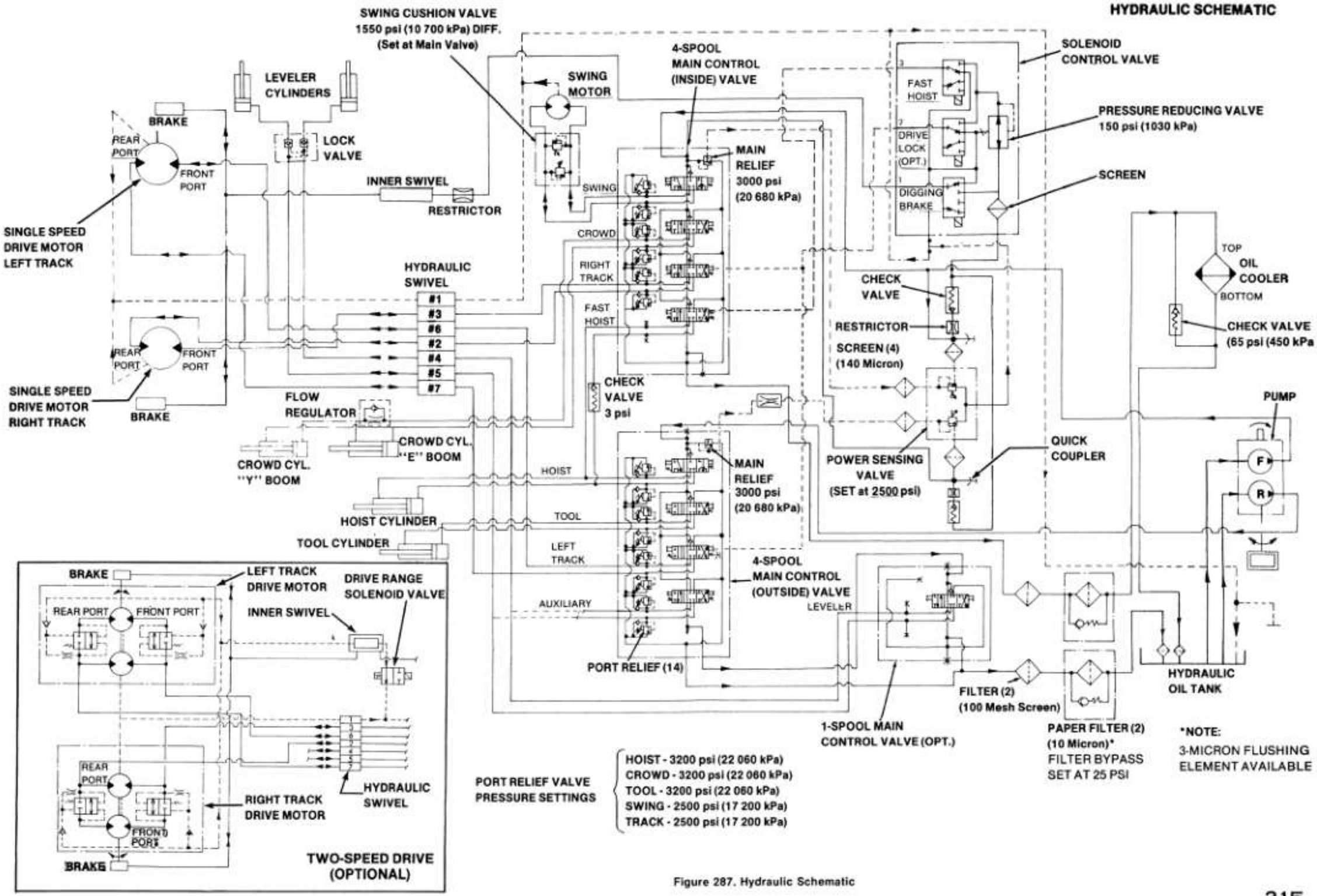


Figure 287. Hydraulic Schematic

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