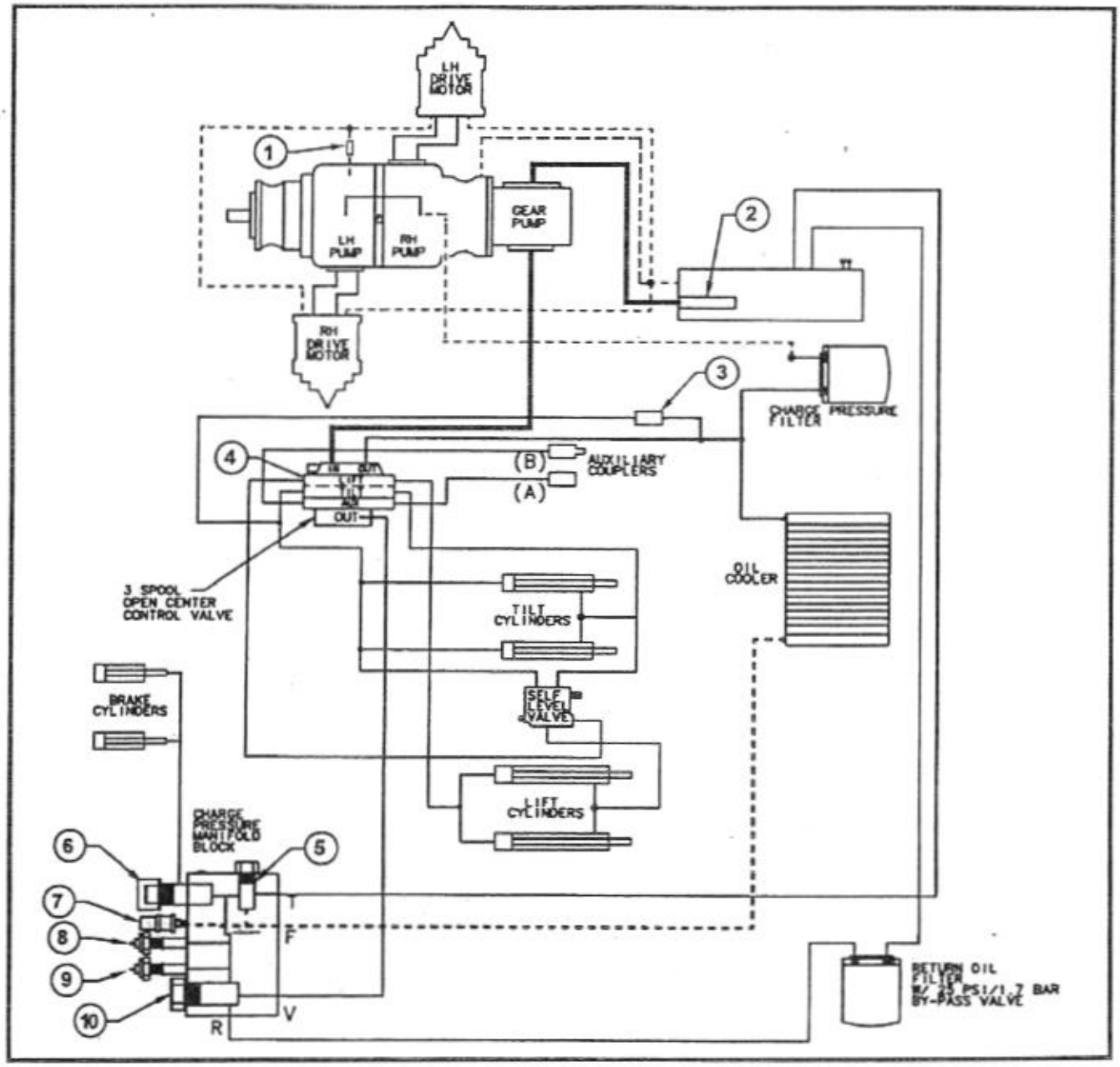
HYDRAULIC/HYDROSTATIC DRIVE
FLOW DIAGRAM



1 - Shuttle Valve Flow Control
2 - 100 Mesh Strainer
3 - Anti-Cavitation Check Valve (tilt cylinders)
4 - Main Relief 3000 PSI
5 - Charge Pressure Relief 80 PSI
6 - Brake Solenoid Valve
7 - Charge Pressure Switch
8 - Hydraulic Temperature Sender
9 - Hydraulic Temperature Switch
10 - Return Circuit Relief

HYDROSTATIC DRIVE SYSTEM
HYDROSTATIC SYSTEM CHECKS
Directional Check / Relief Valve Combination

Each directional check/relief valve in the Eaton hydrostatic pump performs two functions. The shoulder on the outside of the valve cartridge seats against a machined surface in the valve block and serves as a check valve directing charge pressure to the low pressure (inlet) side of the piston pump. The small center is the high pressure relief protecting the system from producing internal pressure greater than 4500 PSI (310.2 bar).

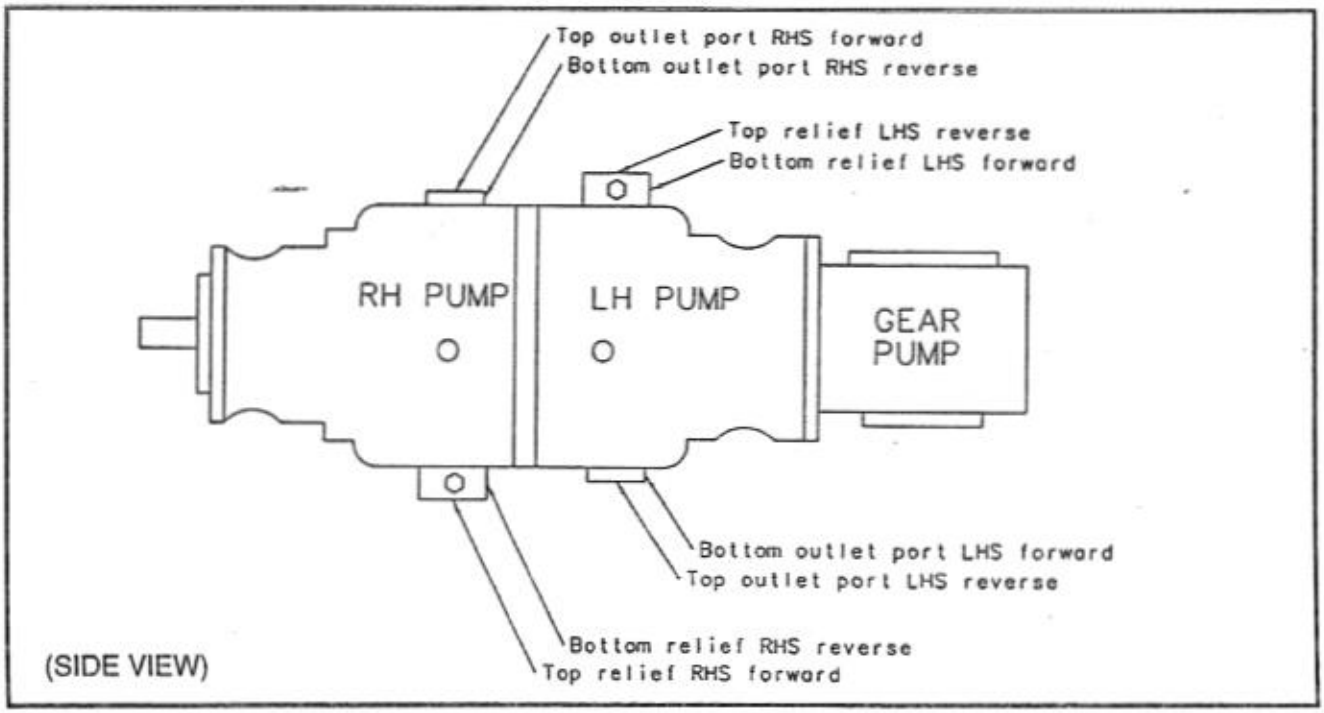
There are four directional check/relief valves located in the valve block of the hydrostatic piston pump, one for each of the outlet ports of the two piston pumps.

Loss of drive on one side of the unit indicates that one side of the hydrostatic drive system is not developing adequate pressure. Three possible reasons for loss of pressure are:

1. One of the pressure relief valves protecting that side has failed.
2. Hot oil shuttle valve on the drive motor is sticking(See Drive Motor Checks, page 5-10).
3. Excessive oil is being lost by internal leakage due to damage in the hydrostatic drive system.

If one relief valve fails, normally the machine will have good power in one direction but not the other (on one side of the machine). It is possible, but very rare, that two relief valves would fail at the same time. Such failure can be checked by simply switching relief valves from one side to the other.

If the machine will not move in either direction, oil may be going back to the reservoir through internal leakage from the hydrostatic pumps, or drive motors. It is also possible that a ruptured line may be causing external oil loss. All external leaks should be repaired prior to checking the internal workings of a hydrostatic drive system.

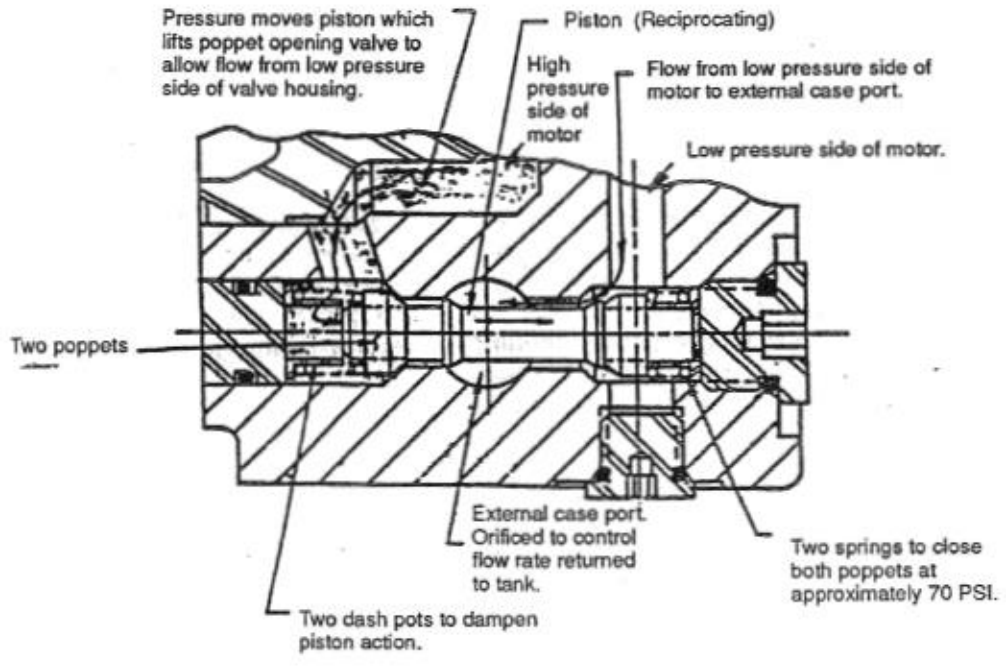


HYDROSTATIC DRIVE SYSTEM

HYDROSTATIC SYSTEM CHECKS

Drive Motor Hot Oil Shuttle Valve Check

The hot oil shuttle valve is a spring loaded spool valve located in the end cover of the drive motor. The purpose of the shuttle is to allow a small portion of the closed loop circuit oil back to the tank for cooling and filtering. (This is referred to as case drain oil.) Cooling oil must be taken from the low pressure side of the closed loop circuit. This is necessary to prevent loss of drive power. Since the motor is reversible, neither of the ports are continuously high or low pressure (they change depending on direction of travel). The spool then senses pressure differential and moves to block the high pressure port and open the low side to the tank. When sitting in neutral the spool is in the center position. There is also a flow restrictor placed in the drain line to control the amount of oil flow.



SHUTTLE VALVE FUNCTION

HYDROSTATIC DRIVE SYSTEM
HYDROSTATIC SYSTEM CHECKS

Hydrostatic Drive Motor Continued

If the shuttle valve sticks in one direction, the high pressure side of the reversible closed loop will be open to the tank and power will be lost. This will show up as a loss of power on one side and in one direction only. If you suspect a hot oil shuttle valve problem:

1. Remove the shuttle valve drain line and fitting from the drive motor.

CAUTION! Escaping hydraulic fluid under pressure can have sufficient force to penetrate the skin, causing serious personal injury.

Fluid may be hot. Allow system to cool before servicing.

2. Using a small screwdriver or "O" ring pick, work through the open port and try to move the valve or determine if the valve is off center. It should be centered and snap back to center when the screwdriver is removed.
3. If you are not able to see the shuttle valve, simply plug the drain line and motor port. Run the machine and see if it operates properly. If it does, the problem is due to foreign material being lodged in the shuttle valve. Just moving the valve manually may remove it. If so the system can be put back into service.
4. If you are unable to free the shuttle valve, remove the hex cap and use a magnet to see if it can be freed and the material removed.
5. If these attempts fail, the motor will have to be removed and disassembled to find the fault.

NOTE: Motor removal and disassembly is required to gain access to the complete valve. Only parts of it can be removed through the outside plug. (Refer to the Eaton Service Manual if this is necessary.)

NOTE: It is acceptable to plug the motor drain for testing to see if the shuttle valve is at fault. Simply plug the drain hole (dead head with a steel plug) and run the unit to determine if the drive system oil is being lost through the drain system back to the tank. If power is not regained the shuttle valve is not at fault. THIS IS FOR TESTING PURPOSES ONLY. If the machine is run for an extended period with this port plugged the drive system may overheat.

If the shuttle valve is not at fault, check directional check/relief valve cartridge in piston pump.

If problem is not found in the shuttle valve or pump relief valves, proceed with charge pressure and piston pump case drain checks. If these checks are ok, the failure is in the drive motor and it needs to be removed for service or repair.

SPECIAL NOTE: Any contamination in the drive motor is shared with the corresponding piston pump. If contamination is found, the pump should be removed, cleaned, and checked for worn or damaged parts.