

Forklift Hydraulic Control Valves

Hydraulic Control Valve for Forklift - The function of directional control valves is to be able to route the fluid to the desired actuator. Normally, these control valves consist of a spool located within a housing made either from steel or cast iron. The spool slides to different locations within the housing. Intersecting channels and grooves direct the fluid based on the spool's location.

The spool is centrally located, held in place with springs. In this particular position, the supply fluid can be blocked and returned to the tank. If the spool is slid to a side, the hydraulic fluid is routed to an actuator and provides a return path from the actuator to tank. When the spool is moved to the other direction, the return and supply paths are switched. Once the spool is allowed to return to the center or neutral place, the actuator fluid paths become blocked, locking it into place.

The directional control is typically made to be stackable. They normally have one valve per hydraulic cylinder and one fluid input that supplies all the valves in the stack.

So as to avoid leaking and deal with the high pressure, tolerances are maintained extremely tight. Normally, the spools have a clearance with the housing of less than a thousandth of an inch or $25\text{ }\mu\text{m}$. To be able to prevent distorting the valve block and jamming the valve's extremely sensitive parts, the valve block will be mounted to the machine's frame with a 3-point pattern.

The location of the spool could be actuated by hydraulic pilot pressure, mechanical levers, or solenoids which push the spool right or left. A seal allows a portion of the spool to protrude outside the housing where it is easy to get to the actuator.

The main valve block controls the stack of directional control valves by flow performance and capacity. Some of these valves are designed to be proportional, as a valve position to the proportional flow rate, while some valves are designed to be on-off. The control valve is among the most costly and sensitive components of a hydraulic circuit.