

Hydraulic Control Valves for Forklift

Forklift Hydraulic Control Valve - The function of directional control valves is to direct the fluid to the desired actuator. Generally, these control valves consist of a spool positioned in a housing created either from steel or cast iron. The spool slides to different locations inside the housing. Intersecting channels and grooves direct the fluid based on the spool's location.

The spool is centrally positioned, held in place by springs. In this particular position, the supply fluid could be blocked and returned to the tank. When 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. If the spool is moved to the opposite side, the supply and return paths are switched. When the spool is enabled to return to the center or neutral location, the actuator fluid paths become blocked, locking it into position.

Usually, directional control valves are designed to be able to be stackable. They normally have one valve for each and every hydraulic cylinder and one fluid input which supplies all the valves inside 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 $25\text{ }\mu\text{m}$. In order to prevent distorting the valve block and jamming the valve's extremely sensitive components, the valve block would be mounted to the machine's frame by a 3-point pattern.

The position 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 part of the spool to protrude outside the housing where it is accessible to the actuator.

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