

Forklift Hydraulic Control Valve

Forklift Hydraulic Control Valve - The function of directional control valves is to be able to direct the fluid to the desired actuator. Normally, these control valves consist of a spool situated in a housing created either of steel or cast iron. The spool slides to various positions in the housing. Intersecting grooves and channels direct the fluid based on the spool's location.

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

Usually, directional control valves are designed in order to be stackable. They normally have one valve for 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 very 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 avoid jamming the valve's extremely sensitive parts and distorting the valve, the valve block would be mounted to the machine's frame with a 3-point pattern.

Mechanical levers, solenoids or a hydraulic pilot pressure could actuate or 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 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 one of the most sensitive and pricey parts of a hydraulic circuit.