

Hydraulic Control Valves for Forklift

Forklift Hydraulic Control Valve - The job of directional control valves is to route the fluid to the desired actuator. Generally, these control valves consist of a spool positioned within a housing created either of steel or cast iron. The spool slides to various positions within the housing. Intersecting channels and grooves route the fluid based on the spool's location.

The spool has a central or neutral position that is maintained with springs. In this position, the supply fluid is blocked or returned to the tank. When 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. 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 neutral or center position, the actuator fluid paths become blocked, locking it into place.

Normally, directional control valves are built so as to be stackable. They usually have a valve per hydraulic cylinder and one fluid input which supplies all the valves inside the stack.

In order to prevent leaking and tackle the high pressure, tolerances are maintained extremely tight. Usually, the spools have a clearance with the housing of less than a thousandth of an inch or 25 μm . To be able to prevent distorting the valve block and jamming the valve's extremely sensitive components, the valve block would be mounted to the machine' frame by a 3-point pattern.

Mechanical levers, solenoids or a hydraulic pilot pressure can actuate or push the spool left or right. A seal allows a portion of the spool to protrude outside the housing where it is easy to get to to the actuator.

The main valve block is usually a stack of off the shelf directional control valves chosen by capacity and flow performance. Various valves are designed to be on-off, whereas others are designed to be proportional, like in valve position to flow rate proportional. The control valve is one of the most pricey and sensitive parts of a hydraulic circuit.