

Forklift Hydraulic Control Valves

Hydraulic Control Valve for Forklift - The function of directional control valves is to route the fluid to the desired actuator. Generally, these control valves comprise a spool located within a housing made either from steel or cast iron. The spool slides to various places in 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 by springs. In this particular position, the supply fluid is returned to the tank or blocked. If the spool is slid to one direction, 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 opposite side, the return and supply paths are switched. As soon as the spool is allowed to return to the neutral or center position, the actuator fluid paths become blocked, locking it into position.

Usually, directional control valves are designed so as to be stackable. They generally have one valve per hydraulic cylinder and one fluid input that supplies all the valves within the stack.

So as to prevent leaking and tackle 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 $25\text{ }\mu\text{m}$. So as to avoid jamming the valve's extremely sensitive parts and distorting the valve, the valve block will be mounted to the machine's frame by a 3-point pattern.

The location of the spool can be actuated by mechanical levers, hydraulic pilot pressure, or solenoids which push the spool right or left. A seal enables a part of the spool to stick out the housing where it is easy to get to the actuator.

The main valve block is usually a stack of off the shelf directional control valves chosen by capacity and flow performance. Several valves are designed to be on-off, while some are designed to be proportional, as in valve position to flow rate proportional. The control valve is among the most sensitive and costly parts of a hydraulic circuit.