

Forklift Hydraulic Control Valves

Forklift Hydraulic Control Valve - The function of directional control valves is to route the fluid to the desired actuator. Generally, these control valves comprise a spool located inside of a housing made either of cast iron or steel. The spool slides to different positions within the housing. Intersecting grooves and channels route the fluid based on the spool's position.

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 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 direction, the return and supply paths are switched. As soon as the spool is allowed to return to the neutral or center location, the actuator fluid paths become blocked, locking it into position.

Usually, directional control valves are designed in order to be stackable. They generally have a valve for every hydraulic cylinder and a fluid input which supplies all the valves in the stack.

To be able to prevent leaking and tackle the high pressure, tolerances are maintained really tight. Typically, the spools have a clearance with the housing of less than a thousandth of an inch or 25 μm . In order 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 can 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 is normally a stack of off the shelf directional control valves chosen by capacity and flow performance. Several valves are designed to be on-off, whereas some are designed to be proportional, like in valve position to flow rate proportional. The control valve is one of the most expensive and sensitive components of a hydraulic circuit.