

Hydraulic Control Valves for Forklift

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

The spool is centrally situated, held in place with 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 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 enabled to return to the neutral or center position, the actuator fluid paths become blocked, locking it into place.

Typically, directional control valves are made so as to be stackable. They normally have one valve per hydraulic cylinder and a fluid input that supplies all the valves within the stack.

In order to avoid leaking and deal with 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 $25\text{ }\mu\text{m}$. In order 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 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 portion of the spool to stick out 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, like a proportional flow rate to the valve position, whereas some valves are designed to be on-off. The control valve is one of the most expensive and sensitive components of a hydraulic circuit.