

Hydraulic Control Valves for Forklift

Forklift Hydraulic Control Valve - The control valve is actually a device that routes the fluid to the actuator. This device will comprise cast iron or steel spool which is situated within a housing. The spool slides to different positions in the housing. Intersecting channels and grooves route the fluid based on the spool's position.

The spool has a neutral or central location which is maintained with springs. In this location, the supply fluid is returned to the tank or blocked. When the spool is slid to one side, the hydraulic fluid is directed to an actuator and provides a return path from the actuator to tank. If the spool is transferred to the opposite direction, the supply and return paths are switched. As soon as the spool is enabled to return to the center or neutral place, the actuator fluid paths become blocked, locking it into position.

The directional control is typically designed to be stackable. They generally have one valve per hydraulic cylinder and one fluid input which supplies all the valves within the stack.

So as to prevent leaking and tackle the high pressure, tolerances are maintained extremely 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 prevent 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 can be actuated by mechanical levers, hydraulic pilot pressure, or solenoids that push the spool left or right. A seal enables 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 capacity and flow performance. Several of these valves are designed to be proportional, like a valve position to the proportional flow rate, while other valves are designed to be on-off. The control valve is one of the most sensitive and pricey components of a hydraulic circuit.