

Forklift Hydraulic Control Valves

Forklift Hydraulic Control Valves - The job of directional control valves is to route the fluid to the desired actuator. Usually, these control valves include a spool located within a housing created either from cast iron or steel. The spool slides to various positions in the housing. Intersecting channels and grooves direct the fluid based on the spool's position.

The spool has a central or neutral location that is maintained with springs. In this particular position, the supply fluid is blocked or returned to the tank. When the spool is slid to a direction, the hydraulic fluid is routed to an actuator and provides a return path from the actuator to tank. If the spool is transferred to the opposite direction, the return and supply paths are switched. When the spool is allowed to return to the neutral or center location, the actuator fluid paths become blocked, locking it into place.

Usually, directional control valves are made so as to be stackable. They usually have a valve for each hydraulic cylinder and one fluid input that supplies all the valves in the stack.

In order to prevent leaking and tackle the high pressure, tolerances are maintained very 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.

Solenoids, a hydraulic pilot pressure or mechanical levers may actuate or push the spool left or right. A seal enables a part of the spool to stick out the housing where it is easy to get to to the actuator.

The main valve block is generally a stack of off the shelf directional control valves chosen by flow performance and capacity. 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 costly and sensitive components of a hydraulic circuit.