

## Hydraulic Control Valve for Forklift

Forklift Hydraulic Control Valves - The function of directional control valves is to be able to route the fluid to the desired actuator. Generally, these control valves consist of a spool positioned in a housing made either of cast iron or steel. The spool slides to various places within the housing. Intersecting channels and grooves direct the fluid based on the spool's location.

The spool has a neutral or central location that is maintained by springs. In this position, the supply fluid is blocked or returned to the tank. If the spool is slid to a side, 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 direction, the return and supply 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 place.

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

In order to avoid leaking and deal with the high pressure, tolerances are maintained very tight. Usually, 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 distorting the valve block and jamming the valve's extremely sensitive parts, the valve block would be mounted to the machine's frame by a 3-point pattern.

The location of the spool could be actuated by mechanical levers, hydraulic pilot pressure, or solenoids which push the spool left or right. A seal enables a portion 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. Various 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 amongst the most sensitive and pricey components of a hydraulic circuit.