

Hydraulic Control Valve for Forklift

Hydraulic Control Valve for Forklift - The control valve is a device which directs the fluid to the actuator. This tool would consist of steel or cast iron spool that is situated within a housing. The spool slides to various places in the housing. Intersecting channels and grooves 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. If the spool is slid to one direction, the hydraulic fluid is routed to an actuator and provides a return path from the actuator to tank. If 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 center or neutral position, the actuator fluid paths become blocked, locking it into position.

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

So as to prevent leaking and deal with 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 $25\ \mu\text{m}$. To be able to avoid distorting the valve block and jamming the valve's extremely sensitive parts, the valve block would 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 portion of the spool to stick out the housing where it is easy to get to the actuator.

The main valve block is usually a stack of off the shelf directional control valves chosen by flow performance and capacity. Various valves are designed to be on-off, whereas some are designed to be proportional, as in valve position to flow rate proportional. The control valve is amongst the most expensive and sensitive parts of a hydraulic circuit.