

Hydraulic Control Valve for Forklift

Forklift Hydraulic Control Valves - The function of directional control valves is to route the fluid to the desired actuator. Usually, these control valves comprise a spool located within a housing created either of cast iron or steel. The spool slides to various places within 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 direction, the hydraulic fluid is directed to an actuator and provides a return path from the actuator to tank. When the spool is transferred to the opposite side, the return and supply paths are switched. Once the spool is allowed to return to the neutral or center location, the actuator fluid paths become blocked, locking it into position.

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

Tolerances are maintained extremely tightly, in order to handle the higher pressures and in order to avoid leaking. The spools would often have a clearance within the housing no less than $25 \text{ } \mu\text{m}$ or a thousandth of an inch. To be able to prevent distorting the valve block and jamming the valve's extremely sensitive components, the valve block would 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 right or left. A seal allows a part of the spool to protrude outside the housing where it is accessible to the actuator.

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