Forklift Hydraulic Control Valves

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

The spool is centrally located, help in place by springs. In this particular location, the supply fluid can be blocked and returned to the tank. If the spool is slid to a side, the hydraulic fluid is directed to an actuator and provides a return path from the actuator to tank. When the spool is moved to the opposite side, the supply and return paths are switched. As soon as the spool is allowed to return to the neutral or center position, the actuator fluid paths become blocked, locking it into place.

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

In order to prevent leaking and deal with the high pressure, tolerances are maintained extremely tight. Usually, the spools have a clearance with the housing of less than a thousandth of an inch or 25 µm. So as to prevent jamming the valve's extremely sensitive components and distorting the valve, the valve block would be mounted to the machine' frame with a 3-point pattern.

Solenoids, a hydraulic pilot pressure or mechanical levers can actuate or push the spool right or left. A seal allows a part of the spool to stick out 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 flow performance and capacity. Several valves are designed to be on-off, while others are designed to be proportional, like in flow rate proportional to valve position. The control valve is among the most sensitive and pricey components of a hydraulic circuit.