What is the function of a directional control valve?

A directional control valve is the extend and retract control for your hydraulic cylinders. It provides a flow path from the pump to the cylinders and a return path from the cylinders to the fluid reservoir.

What is the flow pattern for a double acting system?

A 4-Port valve is normally required for double acting systems. Let’s look at the two control positions first. In the advance position pressure flows from the pump through the valve from “P” to “A”, “B” flows back to “T”. In the retract position “P” is flowing to “B”, “A” is returned to “T”. You need to be aware that when shifting between positions, there is a transitional state. During this transition, there is some “crosstalk” between ports allowing pressure to drop in the pressurized circuit and return to tank. The importance of this information is that you cannot pressurize a system and shift back to the closed center position to hold it clamped. Using the center position to hold is inappropriate because it removes the pump from the circuit and defeats the purpose of a live hydraulic system.

What is the purpose of the center position?

The center position on 3-Position 4-Port solenoid valves is the resting position with both solenoids de-energized. On manual valves, the center position is transitional and is often unused.

Closed center solenoid valves are used to ensure that there is no movement during a power failure (though a small amount of pressure will be lost in transition). The closed center manual valve makes no change in circuit direction in the center position.

“P” blocked center in either a manual or solenoid valve is commonly used for decoupling of palletized double acting systems. This allows the pressure to be dropped from both the “A” and “B” hoses for disconnect and reconnect under no pressure. In the center position of this valve “P” is blocked, “A”, “B” and “T” are connected.

What is the flow pattern for a single acting system?

Single acting systems typically have only two valve positions. In the advance position “P” is connected to “A.” In the retract position, “A” is connected to “T” and “P” is blocked, allowing the cylinder springs to push the fluid back to tank.

What do I need to watch for when I’m plumbing a system?

Remember that hydraulic fluid, like water, will take the path of least resistance. Plan your fluid distribution manifolds and fittings to provide for the smoothest possible flow to and from your cylinders. The best schematically designed control system can be ruined by poor plumbing implementation.

I can get a spool valve locally for a lot less money than your valve. Will it work?

You are responsible for the appropriate use of all devices. The use of spool valves invalidates the warranty on any VektorFlo® pump. If you are using a suitable industrial pump and valve, they may work. The use of a pump with an excessive flow invalidates the warranty on any VektorFlo® item. If you choose to use non-Vektek pumps and valves, you assume the responsibility for selecting appropriate sizes.

All VektorFlo® directional control valves are rated at 350 bar (35 MPa) working pressure. They typically incorporate international standard mounting and fluid flow patterns. This allows one valve sub-plate to serve as the mounting platform for any of these valves. Plumbing lines are connected to ports on the sides of the sub-plate while hold-down screws secure the top valve.

Removal and replacement is easily accomplished without disturbing system plumbing, greatly reducing chances of system contamination. Valve changeovers can be accomplished in minutes, not hours: a tremendous advantage as production downtime costs mount up.

Standardized mounting patterns also mean that valve operation can easily be upgraded from manual to electric, again without having to change system plumbing. Our electric solenoid valves are direct bolt-on replacements for our manually operated versions.

NOTE: Maximum system flow rate is 5.7 L/minute for all VektorFlo® special function valves. unless otherwise noted. Excess flow voids warranty.
## Single and Double Acting

- Maximum Operating Pressure 500 bar (50 MPa).
- Minimum Operating Pressure 10 bar (1 MPa).
- CETOP 3 adaptation.

### Model No. 47-0301-55
2-Position, 3-Port

Seat Valve
- Manually Operated.
- For Single Acting cylinders.

### Model No. 47-0331-55
2-Position, 3-Port

Seat Valve
- Solenoid Operated.
- For Single Acting cylinders.
- 24 VDC.

### Model No. 47-0341-55
2-Position, 3-Port

Seat Valve
- Pneumatically Operated.
- For Single Acting cylinders.

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Nominal Size</th>
<th>Type</th>
<th>Nominal Flow</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-0301-55</td>
<td>6</td>
<td>Seat Valve</td>
<td>12 L/m</td>
<td>444</td>
</tr>
<tr>
<td>47-0331-55</td>
<td>6</td>
<td>Seat Valve</td>
<td>12 L/m</td>
<td>740</td>
</tr>
<tr>
<td>47-0341-55</td>
<td>6</td>
<td>Seat Valve</td>
<td>12 L/m</td>
<td>459</td>
</tr>
</tbody>
</table>

### CETOP Sub-plate

Model No. 47-0941-10

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For use with the following valves:
2-Position 3-port Valve Manual, Model No. 47-1142-70
2-Port Solenoid Model Nos. 47-1112-54, 47-1112-13, 47-1115-03, 47-1115-05
3-Position 4-port Manual Model Nos. 47-1147-20 and 47-1147-40
3-Position 4-port Solenoid Model Nos. 47-1123-21 and 47-1123-40
Solenoids work with or without a shift lever and are designed and checked to VDE 0580.

- Seat valve has a manual emergency actuator.
- A check valve is incorporated in channel "P".
- Seat valve has complete hydraulic pressure compensation and negative switching.
- Position of installation is optional.

**Diagram:**

2-Position 3-Port seat valve nom. size 5
Characteristic \( \Delta p = f(Q) \)

**Specifications**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Nom. Size</th>
<th>Valve Type</th>
<th>Connection</th>
<th>Max. Oper. Pressure (bar) (MPa)</th>
<th>Nom. Flow (l/min.)</th>
<th>Viscosity (c St)</th>
<th>Ambient Temp. (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-1112-52</td>
<td>5</td>
<td>Seat</td>
<td>Manifold</td>
<td>500 bar (50 MPa)</td>
<td>12</td>
<td>10-500</td>
<td>-40 to +80</td>
</tr>
<tr>
<td>47-1112-53</td>
<td>5</td>
<td>Seat</td>
<td>Manifold</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Actuating Element**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VDC</th>
<th>P (VA)</th>
<th>Switch Time (ms)</th>
<th>Relative Duty Cycle (%)</th>
<th>Switching Frequency/ Hr.</th>
<th>Code Class</th>
<th>Wgt (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-1112-52</td>
<td>24</td>
<td>20</td>
<td>100 on 50 off</td>
<td>100 (to 35° C)</td>
<td>2000</td>
<td>IP 54</td>
<td>710</td>
</tr>
<tr>
<td>47-1112-53</td>
<td>24</td>
<td>20</td>
<td>100 on 50 off</td>
<td>100 (to 35° C)</td>
<td>2000</td>
<td>IP 54</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** The flow direction must be the direction of the arrow according to the symbol. The position of installation is optional.
Seat Valve 2-Position 3-Port Valve
- The ball, being the essential control element, is pressed either by a magnet or a spring onto the hardened ball seats.
- Seat valve has a manual emergency actuator.
- A check valve is incorporated in channel "P".
- Seat valve has complete hydraulic pressure compensation and negative switching.
- Position of installation is optional.

![Diagram of Seat Valve 2-Position 3-Port Valve]

**Specifications**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Nom. Size</th>
<th>Valve Type</th>
<th>Connection</th>
<th>Maximum Oper. Pressure (bar) (MPa)</th>
<th>Nom. Flow (l/min.)</th>
<th>Viscosity (c St)</th>
<th>Ambient Temp. (C°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-1112-56</td>
<td>4</td>
<td>Seat</td>
<td>Manifold</td>
<td>450 bar (45 MPa)</td>
<td>8</td>
<td>10-200</td>
<td>-40 to +80</td>
</tr>
<tr>
<td>47-1112-57</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Actuating Element**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>VDC</th>
<th>P (VA)</th>
<th>Switch Time (ms)</th>
<th>Relative Duty Cycle (%)</th>
<th>Switching (Freq/ Hr.)</th>
<th>Code Class</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-1112-56</td>
<td>24</td>
<td>24</td>
<td>70 on 50 off</td>
<td>100</td>
<td>2000</td>
<td>IP 65</td>
<td>600</td>
</tr>
</tbody>
</table>

**NOTE:** The flow direction must be the direction of the arrow according to the symbol. The position of installation is optional.
Directional Control Valves

Manual Seat Valve 2-Position 2-Port and 2-Position 3-Port

Manual 2-Position 2-Port Seat Valve

- Oil channel can be closed or open by means of a manual 2-Position 2-Port seat valve.
- Manual 2-Position 3-Port seat valve allows determination of oil flow direction.
- Seat valve has complete hydraulic pressure compensation and negative switching.
- Position of installation is optional.

NOTE: The flow direction must be the direction of the arrow according to the symbol. The position of installation is optional.

Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Nom. Size</th>
<th>Valve Type</th>
<th>Connection</th>
<th>Maximum Oper. Pressure (bar) (MPa)</th>
<th>Nom. Flow (l/min.)</th>
<th>Viscosity (c St)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-0301-56</td>
<td>5 Seat Plate</td>
<td>500 bar (50 MPa)</td>
<td>12</td>
<td>10-500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47-0301-57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model No. | Ambient Temp. (°C) | Actuation Type | Switching Torque (N cm) | Switching Stroke (mm) | Switching Angle | Wgt. (g) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>47-0301-56</td>
<td>-40 to +80</td>
<td>Control Knob</td>
<td>63</td>
<td>3.5</td>
<td>90°</td>
<td>400</td>
</tr>
<tr>
<td>47-0301-57</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For pipe connection in combination with:
- 3/2-way Seat Valve Model No. 47-1112-52
- 2/2-way Manual Seat Valve Model No. 47-0301-56
- 3/2-way Manual Seat Valve Model No. 47-0301-57
Control Valves: 2 Position 3-Port
Manual and Solenoid

- Available as either manual or solenoid operated.
- Efficient control solutions for single-acting systems.
- 2-Position 3-Port manual valve is equipped with colored onnet to differentiate it from the 3-Position 4-Port.
- Shear style valve design features hardened steel poppets and cast steel body.

<table>
<thead>
<tr>
<th>Manual Model No.</th>
<th>Function</th>
<th>Solenoid Voltage</th>
<th>Power Consumption</th>
<th>Duty Rating</th>
<th>Maximum Cycle Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-1142-20</td>
<td>Manual - CETOP Mounting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WARNING: Supplied with a rectified connector that must be used to insure proper valve function. The use of any other connector will void product warranty unless otherwise noted.

NOTE: The maximum system flow rate is 5.7 L/m for all VektorFlo Metric valves unless otherwise noted.

Excess flow rates will void product warranties.
Control Valves: 3-Position 4-Port Manual and Solenoid

- These valves offer the features to efficiently control a double acting workholding system. (They may also be used to control single acting systems working in opposition.)
- Valves incorporate extremely low leakage (4 drops per minute per seal) pressure balanced shear type seals and poppet designs.
- Shears and poppets are heat treated. They are spring and pressure loaded against hardened steel wear surfaces to provide positive fluid control for hundreds of thousands of cycles.
- Equipped with rotary handle, this valve has an internal rotor that snaps into position ensuring accurate alignment of flow passages.
- Extensive use of anti-friction rotary bearings allows effortless handle rotation even when operating at 350 bar (35 MPa).
- All valves incorporate lightweight aluminum alloy bodies and are furnished with required standard length mounting bolts.
- Internal design promotes improved service life.

**NOTE:** Maximum system flow rate is 5.7 l/minute for all VektorFlo® special function valves unless otherwise noted.

Excess flow voids warranty.

---

### Manual

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Center</th>
<th>Seals</th>
<th>Fluid Temp. Maximum</th>
<th>Fluid Flow Maximum</th>
<th>Tank Port Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>43-1147-20</td>
<td>Closed Center</td>
<td>NBR, PTFE</td>
<td>70°C</td>
<td>5.7 l/min</td>
<td>17 bar (1.7 MPa)</td>
</tr>
<tr>
<td>43-1147-40</td>
<td>P-Blocked Center</td>
<td>NBR, PTFE</td>
<td>70°C</td>
<td>5.7 l/min</td>
<td>17 bar (1.7 MPa)</td>
</tr>
</tbody>
</table>

### Solenoid

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Function</th>
<th>Valve Connector Part No.</th>
<th>Solenoid Voltage</th>
<th>Power Usage (watts)</th>
<th>Duty Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-1123-21</td>
<td>Closed Center</td>
<td>85-5342-91</td>
<td>24 VDC</td>
<td>27.6</td>
<td>100%</td>
</tr>
<tr>
<td>47-1123-40</td>
<td>P-Blocked Center</td>
<td>85-5342-91</td>
<td>24 VDC</td>
<td>27.6</td>
<td>100%</td>
</tr>
</tbody>
</table>