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 spool valves, especially when attempting to use a “center” (or de-energized) function can cause unusual flows and pressures, resulting in unpredictable actions of clamps. The use of a pump with an excess 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.
Seat Valve 2-Position 3-Port Valve

- Solenoids work with or without a shift lever and are designed and checked to VDE 0580.
- Seat valve has 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>Nominal Size</th>
<th>Valve Type</th>
<th>Connection</th>
<th>Maximum Operating Pressure (bar) (MPa)</th>
<th>Nominal 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>Normally Opened/ Normally Closed</td>
<td>Manifold</td>
<td>500 (50)</td>
<td>12</td>
<td>10-500</td>
<td>-40 to +80°</td>
</tr>
<tr>
<td>47-1112-53</td>
<td></td>
<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>47-1112-52</td>
<td>24</td>
<td>20</td>
<td>100 on 50 off</td>
<td>100</td>
<td>2000</td>
<td>IP 54</td>
<td>710</td>
</tr>
<tr>
<td>47-1112-53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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.
Manual 2-Position 2-Port Seat Valve

Manual 2-Position 3-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>Valve Type</th>
<th>Fluid Flow Maximum (l/min)</th>
<th>Maximum Operating Pressure Bar (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-0301-00</td>
<td>2 Position 2 Port</td>
<td>5.7</td>
<td>350 (35)</td>
</tr>
<tr>
<td>47-0301-57</td>
<td>2 Position 3 Port</td>
<td>12</td>
<td>500 (50)</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
Manual Control Valve:  
2-Position, 3-Port
- For use with single acting systems.
- Heat treated rotor and poppets provide positive fluid control.
- Detented internal rotor.
- All valves ship with short and long handles.
- Handle orientation can be adjusted in 45° increments.

**NOTE:** Maximum system flow rate is 5.7 l/m for all VektorFlo® metric valves unless otherwise noted. Excess flow voids warranty.
Manual Seat Valve 3 Position 4-Port

**Manual Control Valve:**

**3-Position, 4-Port**

- These valves can be used to control a double acting workholding system. (May also be used to control single acting systems)
- Rotary handle motion uses a rotary bearing.
- Heat treated rotor and poppets are spring and pressure loaded against each other to provide positive fluid control for hundreds of thousands of cycles.
- All valves ship with short and long handles.
- Handle orientation can be adjusted in 45° increments.

### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Configuration</th>
<th>Fluid Flow Maximum</th>
<th>Tank Port Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>43-1147-21</td>
<td>Closed Center</td>
<td>5.7 l/min</td>
<td>17 Bar (1.7 MPa)</td>
</tr>
<tr>
<td>43-1147-41</td>
<td>P-Blocked Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43-1347-21</td>
<td>Closed Center</td>
<td>5.7 l/min</td>
<td>17 Bar (1.7 MPa)</td>
</tr>
<tr>
<td>43-1347-41</td>
<td>P-Blocked Center</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CETOP 3 Mount**

- 43-1147-21 Closed Center
- 41-1147-41 P-Blocked Center

**Panel Mount**

- 43-1347-21 Closed Center
- 43-1347-41 P-Blocked Center

- M5 Cap Screws Included
- Lock Nut Included
- G1/4 Port Locations Shown In Top View
- Maximum Panel Thickness 7.9
- Handle shown in A-side position
- M5 Threaded Mounting Holes

Long optional handle shipped with all models.
CETOP 3 Mounted Pressure Check Valve Sandwich Plate

- P-Check Valve prevents pressure drop in the pressure line of the valve.
- Valve plate is installed between the valve and the supply manifold.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-0347-41</td>
<td>Contains P-Check Valve Plate</td>
</tr>
</tbody>
</table>

CETOP Sub-plate

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-0941-10</td>
<td>Subplate, Valve, CETOP 3</td>
</tr>
</tbody>
</table>

P-Check

IMMV71107 REV A

Mounting Holes for M5 Socket Head Cap Screw four places

M5 X 12 deep (4X) For CETOP 3 Valve Mounting Pattern

Ø 4.1 V 4.1 Locating Hole

Pressure Port G1/4

Auxiliary 'A' Port (With G1/8 Plug)

Auxiliary 'B' Port (With G1/8 Plug)

G1/4 Tank Port

"A" Port G1/8

"B" Port G1/8

ILMV709400 REV E

Directional Control Valves

CETOP 3 Mounted Pressure Check Valve Sandwich Plate & Sub-plate
Directional Control Valves

Solenoid 2-Position, 3-Port / Solenoid 3 Position, 4-Port

Solenoid Valve: 2-Position, 3-Port

- For use with single acting systems.

**NOTE:** Maximum system flow rate is 5.7 L/m for all VektorFlo® metric valves unless otherwise noted. Excess flow voids warranty.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Function</th>
<th>Replacement Valve Connector</th>
<th>Solenoid Voltage</th>
<th>Power Consumption (watts)</th>
<th>Duty Rating</th>
<th>Maximum Cycle Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-1112-54</td>
<td>Normally Open</td>
<td>85-5342-91</td>
<td>24 VDC</td>
<td>28</td>
<td>100%</td>
<td>2000/hr</td>
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<tr>
<td>47-1112-13</td>
<td>Normally Open</td>
<td>87-1123-00</td>
<td>115VAC*</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47-1115-03</td>
<td>Normally Closed</td>
<td>85-5342-91</td>
<td>24 VDC</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47-1115-05</td>
<td>Normally Closed</td>
<td>87-1123-00</td>
<td>115VAC*</td>
<td>29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Solenoid Valve: 3-Position, 4-Port**

- These valves can be used to control a double acting workholding system. (May also be used to control single acting systems)
- Provide improved control of clamping circuits with true poppet design.
- Multiple coil voltages available.
- Internal design promotes improved service life.
- Narrow width allows mounting of multiple valves on standard CETOP 3 manifolds.
- All valves have built-in P-Block check for fail safe multi-valve operation.
- Coils can be easily replaced.

**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:** Maximum system flow rate is 5.7L/m for all VektorFlo® metric valves unless otherwise noted. Excess flow voids warranty.