SOLENOID OPERATED CARTRIDGE VALVES

MANUAL OVERRIDES
Sun Hydraulics has been a leading designer and manufacturer of screw-in hydraulic cartridge valves and manifolds for more than 30 years. Sun has established strong recognition in international markets and built a global presence to service customers wherever they choose to manufacture.

Sun's differentiation and attention to detail that we employ in our cartridges are also applied to our manifold designs. We design a more compact manifold that dramatically reduces or eliminates the need for construction plugs and means potentially less leakage points. Our manifolds also have more direct flow paths, which along with the large diameter drilling allowed by the Sun cavity, provide lower pressure drops within the assembly. The ultimate benefit to you is greater design freedom and considerably fewer service complaints.

For our full range of Cartridges and Manifolds, call your distributor or consult the Sun website: www.sunhydraulics.com

STANDARD AND CUSTOM MANIFOLD CONFIGURATIONS

Sun Hydraulics has been registered to the International Organization of Standardization ISO 9001 Series Standards for quality.

The quality of Sun Hydraulics’ manufacturing plants has been registered to the International Organization of Standardization ISO 9001 Series Standards for quality.

Unique cavity allows optimized flow paths.
- Floating style cartridge design minimizes the effect of excessive installation torque.
- 5000 psi/350 bar operating pressure.
- Very low leakage.
- Transient voltage suppression diode is integral to DC coils.
- A wide variety of coil voltages and connector options.
- Rating to IP69K on selected coil connectors.
- Rugged manual overrides.
- The “soft-shift” option extends response time and as a result minimizes hydraulic shock in the system.

MANUAL OVERRIDES

Solenoid valves may be fitted with a manual override, with several override options being available.

- Non-fouling, pin type is standard.
- The handknob is constructed of reinforced plastic and is suitable for operation with a gloved hand.
- Hand-operated overrides are available in two types:
  - Twist and lock. Mechanically detented counterclockwise. Detented position is maintained until the knob is twisted clockwise.
  - Dual twist and lock. Momentary shift when the knob is rotated clockwise, detented when rotated counterclockwise.

For our full range of Cartridges and Manifolds, call your distributor or consult the Sun website: www.sunhydraulics.com

Sun’s valves will operate in most application environments and are especially well-suited for demanding systems requiring high performance. For our full range of solenoid cartridge valves, visit the Sun website: www.sunhydraulics.com

MANUAL OVERRIDES

Solenoid valves may be fitted with a manual override, with several override options being available.

- Non-fouling, pin type is standard.
- The handknob is constructed of reinforced plastic and is suitable for operation with a gloved hand.
- Hand-operated overrides are available in three types:
  - Twist. Momentary control. When released, the valve returns to its de-energized position.
  - Twist and lock. Mechanically detented counterclockwise. Detented position is maintained until the knob is twisted clockwise.
  - Dual twist and lock. Momentary shift when the knob is rotated clockwise, detented when rotated counterclockwise.

For our full range of Cartridges and Manifolds, call your distributor or consult the Sun website: www.sunhydraulics.com

Sun’s offering of direct acting, full- and pilot-flow solenoid cartridge valves, incorporates exceptional design features which result in superior performance characteristics:

- Unique cavity allows optimized flow paths.
- Floating style cartridge design minimizes the effect of excessive installation torque.
- 5000 psi/350 bar operating pressure.
- Very low leakage.
- Transient voltage suppression diode is integral to DC coils.
- A wide variety of coil voltages and connector options.
- Rating to IP69K on selected coil connectors.
- Rugged manual overrides.
- The “soft-shift” option extends response time and as a result minimizes hydraulic shock in the system.

For our full range of Cartridges and Manifolds, call your distributor or consult the Sun website: www.sunhydraulics.com

Sun’s valves will operate in most application environments and are especially well-suited for demanding systems requiring high performance. For our full range of solenoid cartridge valves, visit the Sun website: www.sunhydraulics.com
SOLENOID OPERATED CARTRIDGE VALVES

CAVITY AND CARTRIDGE DESIGN
All Sun solenoid valves fit the unique Sun cavity. This truly differentiated design allows much larger drill diameters; passage sizes into and out of the valve are maximized, resulting in lower oil velocities and pressure drops.

Sun’s “floating style” cartridge design offers many advantages:
- Free-floating subassembly tolerates eccentricity between cavity thread and cartridge nose.
- Tendency of internal working parts to “bind” is diminished.

The unique cavity and floating style cartridge design minimize potential cartridge binding, and allow high and consistent torque levels to be applied to every cartridge.

All Sun solenoid cartridges are rated to 5000 psi/350 bar operating pressure, with very low leakage.

COIL AND SOLENOID DESIGN
Sun solenoid valves offer industrial valve reliability in a compact, screw-in cartridge. The Sun coil employs a high efficiency, bi-metallic tube design, with a shaped pole face.

Higher performance and improved silt resistance
Lower power consumption
Higher shifting forces
Tendency of internal working parts to “bind” is diminished.

The high performance solenoid tube can be adapted to achieve a “soft-shift” function. Shock and pressure spikes that can occur in the system when the valve is shifted are reduced.

The push-type solenoid allows for a simple, reliable manual override design, with low operating force.

DC coil types incorporate an integral TVS (transient voltage suppression) diode, which eliminates “flash-back” arcing and provides over-voltage protection by suppressing damaging voltage spikes.

Sun engineers are continually developing new products. Consult the Sun website www.sunhydraulics.com for complete technical specifications on our solenoid valves, as well as up-to-date information on Sun’s full range of cartridges and manifolds.

COILS AND CONNECTOR OPTIONS

<table>
<thead>
<tr>
<th>Full Flow Solenoid Valves</th>
<th>ISO/DIN 43650</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin Spade</td>
<td>Twin Lead</td>
</tr>
<tr>
<td>115 V AC, 50/60 Hz</td>
<td>---</td>
</tr>
<tr>
<td>230 V AC, 50/60 Hz</td>
<td>12 V DC</td>
</tr>
<tr>
<td>12 V DC</td>
<td>24 V DC</td>
</tr>
<tr>
<td>36 V DC</td>
<td>36 V DC</td>
</tr>
<tr>
<td>48 V DC</td>
<td>48 V DC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILOT FLOW SOLENOID VALVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>2-way</td>
</tr>
<tr>
<td>2-way</td>
</tr>
<tr>
<td>2-way</td>
</tr>
<tr>
<td>3-way</td>
</tr>
<tr>
<td>3-way</td>
</tr>
<tr>
<td>3-way</td>
</tr>
</tbody>
</table>

Sun offers a wide variety of coils, voltages, and connectors, however, certain combinations may not be available. Please consult the Sun website.

COIL AND CONNECTOR OPTIONS

<table>
<thead>
<tr>
<th>Full Flow Solenoid Valves</th>
<th>ISO/DIN 43650</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin Spade</td>
<td>Twin Lead</td>
</tr>
<tr>
<td>115 V AC, 50/60 Hz</td>
<td>---</td>
</tr>
<tr>
<td>230 V AC, 50/60 Hz</td>
<td>12 V DC</td>
</tr>
<tr>
<td>12 V DC</td>
<td>24 V DC</td>
</tr>
<tr>
<td>36 V DC</td>
<td>36 V DC</td>
</tr>
<tr>
<td>48 V DC</td>
<td>48 V DC</td>
</tr>
</tbody>
</table>

* Integrates the coils, manual overrides, and a wider variety of connector options available on the full flow valves with the pilot flow models.

Normally open (N.O.) and normally closed (N.C.) versions have similar performance. Valves have true bi-directional operation. Alternate flow paths have similar performance.

TYPICAL MAXIMUM LEAKAGE RATES:
- All pilot valves: 10 drops/min. (0.08 cm³/min.) @ 5000 psi (350 bar)
- 2- and 3-way poppet valves: 10 drops/min. (0.08 cm³/min.) @ 5000 psi (350 bar)
- 2-, 3-, and 4-way spool valves: 5 drops/min. (0.02 cm³/min.) @ 3000 psi (210 bar)