Pilot Control Valves

<table>
<thead>
<tr>
<th>Cartridge Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-position 2-way, Spool Directional Valve - Pilot Capacity</td>
<td>122</td>
</tr>
<tr>
<td>Hydraulically Operated, 2-position 2-way, Spool Directional Valve - Pilot Capacity</td>
<td>123</td>
</tr>
<tr>
<td>Air-operated, 2-position 2-way, Spool Directional Valve - Pilot Capacity</td>
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</tr>
<tr>
<td>Manually Operated, 2-position 2-way, Spool Directional Valve - Pilot Capacity</td>
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<td>2-position 3-way, Spool Directional Valve – Pilot Capacity</td>
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<tr>
<td>Hydraulically Operated, 2-position 3-way, Spool Directional Valve - Pilot Capacity</td>
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<td>Air-operated, 2-position 3-way, Spool Directional Valve - Pilot Capacity</td>
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</tr>
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<tr>
<td>Electro-proportional Pilot Relief</td>
<td>133</td>
</tr>
</tbody>
</table>
### Performance Curves

- Maximum operating pressure = 350 bar
- Maximum leakage at 32 cSt = 10 drops/min. at 350 bar
- Switching frequency = 15000 cycles/hour
- Cartridge can be installed directly into a cavity in some Sun pilot operated and ventable cartridges to provide electrically operated pilot control functions.
- Proper installation of solenoid valves requires an extra deep socket to clear the solenoid tube. Sockets are available from Snap On tools (P/N SIML280) or Sun Hydraulics (P/N 998-100-006). See www.sunhydraulics.com for details.

### Option Ordering Information

Model Codes printed in Red are Preferred Versions and most readily available

#### Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>M</th>
<th>C</th>
<th>d</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 L/min.</td>
<td>DAAA – MCN</td>
<td>T - 8A</td>
<td>19,1</td>
<td>22,4</td>
<td>75</td>
<td>80</td>
<td>31</td>
<td>35/40</td>
</tr>
<tr>
<td>1 L/min.</td>
<td>DAAA – MHN</td>
<td>T - 8A</td>
<td>19,1</td>
<td>22,4</td>
<td>75</td>
<td>80</td>
<td>31</td>
<td>35/40</td>
</tr>
<tr>
<td>1 L/min.</td>
<td>DAAC – MCN</td>
<td>T - 8A</td>
<td>19,1</td>
<td>22,4</td>
<td>75</td>
<td>80</td>
<td>31</td>
<td>35/40</td>
</tr>
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<td>1 L/min.</td>
<td>DAAC – MHN</td>
<td>T - 8A</td>
<td>19,1</td>
<td>22,4</td>
<td>75</td>
<td>80</td>
<td>31</td>
<td>35/40</td>
</tr>
</tbody>
</table>

#### Pressure vs. Flow

- Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.
Pilot Control Valves

HYDRAULICALLY OPERATED, 2-POSITION 2-WAY, SPOOL DIRECTIONAL VALVE - PILOT CAPACITY

- Maximum operating pressure = 350 bar
- Maximum leakage at 32 cSt = 0.6 cc/min at 350 bar.
- Minimum pilot pressure to operate = 14 bar
- All ports will accept 350 bar including the pilot control port.
- The preferred flow path through the valve is port 2 to port 1.
- The main stage valve should first be installed to the correct torque value followed by the T-8A pilot control section into the main stage valve to its required torque value.

OPTION ORDERING INFORMATION  Model Codes printed in Red are Preferred Versions and most readily available

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Pilot Control Valves

AIR-OPERATED, 2-POSITION 2-WAY, SPOOL DIRECTIONAL VALVE - PILOT CAPACITY

- Maximum operating pressure = 350 bar
- Maximum leakage at 32 cSt = 0.6 cc/min. at 350 bar
- Maximum pilot pressure = 5 bar
- Minimum pilot pressure to operate = 1.5 bar + port 1 pressure/7 bar
- All ports will accept 350 bar with the exception of the pilot port which accepts 35 bar maximum.
- The preferred flow path through the valve is port 2 to port 1.
- The main stage valve should first be installed to the correct torque value followed by the T-8A pilot control section into the main stage valve to its required torque value.

Performance Curves

- DAAP
  - Pressure vs. Flow
  - Nominal Pilot Port Spool Configuration Seal Capacity
    - A 1 L/min.
      - DAAP – FCN
    - E SAE-4
    - F 1/8-27 NPTF
    - P 1/8-28 BSPP
    - H Normally Open
    - C Normally Closed
    - N Buna-N
    - V Viton

Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 L/min.</td>
<td>DAAP – FCN</td>
<td>T - 8A</td>
<td>35/40</td>
</tr>
</tbody>
</table>

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Pilot Control V alves

MANUALLY OPERATED, 2-POSITION 2-WAY, SPOOL DIRECTIONAL VALVE - PILOT CAPACITY

Maximum operating pressure = 350 bar
Maximum leakage at 32 cSt = 0,6 cc/min. at 350 bar
The preferred flow path through the valve is port 2 to port 1.
The main stage valve should first be installed to the correct torque value followed by the T-8A pilot control section into the main stage valve to its required torque value.

OPTION ORDERING INFORMATION
Model Codes printed in Red are Preferred Versions and most readily available

NOTE: Designed for 10,000 cycles of operation maximum under normal conditions.

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Pilot Control V alves

2-POSITION, 3-WAY SPOOL DIRECTIONAL VALVE – PILOT CAPACITY

- Maximum operating pressure = 350 bar
- Maximum leakage at 32 cSt = 0.6 cc/min. at 350 bar
- Switching frequency = 15000 cycles/hour
- Proper installation of solenoid valves requires an extra deep socket to clear the solenoid tube. Sockets are available from Snap On tools (P/N SIML280) or Sun Hydraulics (P/N 998-100-006). See www.sunhydraulics.com for details.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

Maximum Leakage (drops/min. at 350 bar at 32 cSt / 43° C) = 10
Solenoid Connector Diameter Effective Orifice (mm) = 1.1
Operating Voltage Tolerance = ± 10%
Power (Watts) = 12
Typical response Time (ms) = 30

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Pilot Control Valves

HYDRAULICALLY OPERATED, 2-POSITION 3-WAY, SPOOL DIRECTIONAL VALVE - PILOT CAPACITY

- Maximum operating pressure = 350 bar
- Maximum leakage at 32 cSt = 0.6 cc/min. at 350 bar
- Minimum pilot pressure to operate = 14 bar
- All ports will accept 350 bar including the pilot control port.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

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Pilot Control Valves

AIR-OPERATED, 2-POSITION 3-WAY, SPOOL DIRECTIONAL VALVE - PILOT CAPACITY

- Maximum operating pressure = 350 bar
- Maximum leakage at 32 cSt = 0.6 cc/min. at 350 bar
- Maximum pilot pressure = 5 bar
- Minimum pilot pressure to operate = 1.5 bar + port 1 pressure/7 bar
- All ports will accept 350 bar with the exception of the pilot port which accepts 35 bar maximum.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.
**Pilot Control Valves**

**MANUALLY OPERATED, 2-POSITION 3-WAY, SPOOL DIRECTIONAL VALVE - PILOT CAPACITY**

- Maximum operating pressure = 350 bar
- Maximum leakage at 32 cSt = 0.6 cc/min. at 350 bar
- All ports will accept 350 bar.

**OPTION ORDERING INFORMATION**

Model Codes printed in Red are Preferred Versions and most readily available

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Pilot Port</th>
<th>Spool Configuration</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 1 L/min.</td>
<td>D</td>
<td>C</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>H</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Designed for 10,000 cycles of operation maximum under normal conditions.

**Cartridge Dimensions**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 L/min.</td>
<td>DBAM – TCN</td>
<td>T - 9A</td>
<td>27,7 28,6 61 35,6 35/40</td>
</tr>
</tbody>
</table>

**Performance Curves**

- Pressure vs. Flow

Visit [www.sunhydraulics.com](http://www.sunhydraulics.com) for detailed and complete technical information on our full line of products.
Pilot Control Valves

DIRECT ACTING, ADJUSTABLE PILOT RELIEF

Performance Curves

- Maximum operating pressure = 350 bar
- Maximum leakage = 0.3 cc/min. at reseat (reseat = 85% of cracking pressure).
- Ports 1 and 2 may be pressured to 350 bar.
- Back pressure at port 2 (outlet) is directly additive to the pressure setting at port 1 (inlet).
- The main stage valve should first be installed to the correct torque value followed by the T-8A pilot control section into the main stage valve to its required torque value.

OPTION ORDERING INFORMATION  Model Codes printed in Red are Preferred Versions and most readily available

### NOMINAL CAPACITY

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control**</th>
<th>Adjustment Range</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 10 L/min.</td>
<td>L Standard Screw</td>
<td>A 2 - 210 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td></td>
<td>C Concealed</td>
<td>B 2 - 105 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td></td>
<td>K Handknob</td>
<td>C 2 - 420 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E 2 - 55 bar</td>
<td>D 2 - 25 bar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 2 - 315 bar</td>
<td>E Option is standard set at 25 bar.</td>
<td></td>
</tr>
</tbody>
</table>

Adjustment Range Options:

B Option is standard set at 70 bar.

Customer may specify pressure setting.

** See page 162 for information on Control Options

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Pilot Control Valves

AIR-CONTROLLED, DIRECTING ACTING PILOT RELIEF

- Maximum operating pressure = 350 bar
- Maximum leakage = 0.3 cc/min. at 350 bar
- Maximum pilot pressure = 10.5 bar
- Ports 1 and 2 may be pressurized to 350 bar.
- Back pressure at port 2 has no effect on the valve setting.
- The main stage valve should first be installed to the correct torque value followed by the T-8A pilot control section into the main stage valve to its required torque value.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Port</th>
<th>Air Pilot Ratio</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 10 L/min.</td>
<td>A 1/8-27 NPTF Pilot Port</td>
<td>W 50:1</td>
<td>N Buna-N</td>
</tr>
<tr>
<td></td>
<td>B SAE-4 Pilot Port</td>
<td>Y 75:1</td>
<td>V Viton</td>
</tr>
<tr>
<td></td>
<td>D 1/8-28 BSPP Port</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Pilot Control Valves

**FULLY ADJUSTABLE NEEDLE VALVE - PILOT CAPACITY**

- Maximum operating pressure = 350 bar
- Maximum leakage at shutoff = 0.4 cc/min. at 350 bar
- Effective orifice size = 0.9 mm
- Number of counterclockwise turns fully closed to fully open = 3
- Ports 1 and 2 may be pressured to 350 bar.

---

#### OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Control</th>
<th>Maximum Orifice</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFAB-KXN</td>
<td>K Handknob</td>
<td>X 0.9 mm</td>
<td>N Buna-N</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>V Viton</td>
</tr>
</tbody>
</table>

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Pilot Control Valves

ELECTRO-PROPORTIONAL PILOT RELIEF

Maximum operating pressure = 350 bar
Maximum leakage = 24.6 cc/min at reseat
Back pressure on the tank port (port 2) is directly additive at a 1:1 ratio to the valve setting
Reseat exceeds 85% of crack
Hysteresis with dither <4%
Hysteresis with DC input <8%
Linearity with dither <2%
For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.

OPTION ORDERING INFORMATION  Model Codes printed in red are Preferred Versions and most readily available

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