Solenoid Operated Cartridge Valves

<table>
<thead>
<tr>
<th>Cartridge Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-way, Direct Acting, Poppet Directional Valve</td>
<td>132</td>
</tr>
<tr>
<td>2-way, Directional Spool Valve, Pilot Capacity</td>
<td>133</td>
</tr>
<tr>
<td>2-way, Soft Shift, Directional Spool Valve</td>
<td>134</td>
</tr>
<tr>
<td>3-way, 2-position, Direct Acting, Directional Poppet Valve</td>
<td>135</td>
</tr>
<tr>
<td>3-way, 2-position, Directional Spool Valve, Pilot Capacity</td>
<td>136</td>
</tr>
<tr>
<td>3-way, 2-position, Soft Shift, Directional Spool Valve</td>
<td>137</td>
</tr>
<tr>
<td>4-way, 2-position, Directional Spool Valve</td>
<td>138</td>
</tr>
<tr>
<td>4-way, 3-position, Spring Centred, Directional Spool Valve</td>
<td>139</td>
</tr>
</tbody>
</table>
Solenoid Operated Cartridge Valves

2-WAY, DIRECT ACTING, POPPET DIRECTIONAL VALVE

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.6 cc/min. at 350 bar.
- Response time - typical = 50 ms.
- Manual override force requirement = 10 kg at 350 bar.
- Manual override stroke = 2.5 mm.
- Maximum switching frequency = 15000 cycles/hr.
- Viscosity range = 10 - 600 cSt.
- The solenoid tube assembly is fatigue rated for 350 bar service.
- This valve is direct actuated and requires no minimum hydraulic pressure for operation.
- The soft shift feature results in significantly longer response time over Sun’s standard solenoid. Response time is dependant on flow, pressure, coil voltage, oil viscosity and ambient temperature. Typical response time ranges from 150 ms to 300 ms.
- A wide variety of coil termination and voltage options are available. See Sun website: Products: Accessories: Coils.

Nominal Capacity | Typical Cartridge Model Code | Capacity Control* Spool Configuration** | Cartridge Dimensions | Installation Torque (Nm) |
--- | --- | --- | --- | ---
40 L/min | DTDA -*** | T - 13A | 35.0, 22.2, 89.2, 114.3, 37.3 | 45 - 50

***An additional 50.8 mm clearance is needed for coil installation and removal.

OPTION ORDERING INFORMATION

D T D A - M *** - ***

- Control* | Spool Configuration**
--- | ---
M Manual Override | H Normally Open
X No Manual Override | C Normally Closed
S Soft Shift | 
D Twist/Lock, Dual, Manual Override | 
L Twist/Lock, Detent, Manual Override | 
T Twist/Lock, Momentary, Manual Override | 

- Coil Options**
See page 187: Coil option information for Metal Housing (Round) Solenoid Cartridges.

- Seal Material
N Buna-N
V Viton

* See page 178 for information on Control Options
** Consult the Sun website for complete information on Spool Configurations, the full line of Coil Options and Embedded Amplifier Coils/Controllers.

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Solenoid Operated Cartridge Valves
2-WAY, DIRECTIONAL SPOOL VALVE, PILOT CAPACITY

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0.6 cc/min. at 350 bar.
- Response time - typical = 50 ms.
- Manual override force requirement = 6.6 kg at 100 bar at port 1.
- Manual override stroke = 2.5 mm.
- Maximum switching frequency = 15000 cycles/hr.
- Viscosity range = 10 - 600 cSt.
- The solenoid tube assembly is fatigue rated for 350 bar service.
- This valve is direct actuated and requires no minimum hydraulic pressure for operation.
- The soft shift feature results in significantly longer response time over Sun’s standard solenoid. Response time is dependant on flow, pressure, coil voltage, oil viscosity and ambient temperature. Typical response time ranges from 150 ms to 300 ms.
- A wide variety of coil termination and voltage options are available. See Sun website: Products: Accessories: Coils.

OPTION ORDERING INFORMATION

** See page 187 for information on Control Options. ** Consult the Sun website for complete information on Spool Configurations, the full line of Coil Options and Embedded Amplifier Coils/Controllers.

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Solenoid Operated Cartridge Valves

2-WAY, SOFT SHIFT, DIRECTIONAL SPOOL VALVE

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 80 cc/min. at 210 bar.
- Response time - typical = 50 ms.
- Manual override force requirement = 10 kg at 350 bar.
- Manual override stroke = 2.5 mm.
- Maximum switching frequency = 15000 cycles/hr.
- Viscosity range = 10 - 600 cSt.
- This valve is direct actuated and requires no minimum hydraulic pressure for operation.
- The solenoid tube assembly is fatigue rated for 350 bar service.
- The soft shift feature results in significantly longer response time over Sun’s standard solenoid. Response time is dependant on flow, pressure, coil voltage, oil viscosity and ambient temperature. Typical response time ranges from 150 ms to 300 ms.
- A wide variety of coil termination and voltage options are available. See Sun website: Products: Accessories: Coils.

Performance Curves

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 L/min.</td>
<td>DLDA – ***</td>
<td>T - 13A</td>
<td>35.0 22.2 89.4 114.3 37.3 45 - 50</td>
</tr>
</tbody>
</table>

***An additional 50.8 mm clearance is needed for coil installation and removal.

OPTION ORDERING INFORMATION

- **D** = 45 L/min.
- **M** = Manual Override
- **X** = No Manual Override
- **S** = Soft Shift
- **D** = Twist/Lock, Dual, Manual Override
- **L** = Twist/Lock, Detent, Manual Override
- **T** = Twist/Lock, Momentary, Manual Override
- **N** = Buna-N
- **V** = Viton

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Solenoid Operated Cartridge Valves

3-WAY, 2-POSITION, DIRECT ACTING, DIRECTIONAL POPPET VALVE

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0,6 cc/min. at 350 bar.
- Response time - typical = 50 ms.
- Manual override force requirement = 10 kg at 350 bar.
- Manual override stroke = 2,5 mm.
- Maximum switching frequency = 15000 cycles/hr.
- Viscosity range = 10 - 600 cSt.
- This valve is direct actuated and requires no minimum hydraulic pressure for operation.
- The solenoid tube assembly is fatigue rated for 350 bar service.
- A wide variety of coil termination and voltage options are available. See Sun website: Products: Accessories: Coils.

### Nominal Capacity

**D** 30 L/min.

**X** No Manual Override

**M** Manual Override

**D** Twist/Lock, Manual Override

**L** Twist/Lock, Detent, Manual Override

**T** Twist/Lock, Momentary, Manual Override

**A** Normally Open

**Port 1 to 2, Closed 2 to 3**

**Seal Material**

**N** Buna-N

**V** Viton

### Cartridge Dimensions

<table>
<thead>
<tr>
<th>Cartridge Model Code</th>
<th>Cavity</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWDA – XAN T - 11A</td>
<td></td>
<td>M, X, D, L, T</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>34,8</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>22,2</td>
</tr>
<tr>
<td></td>
<td>c***</td>
<td>108,2</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>133,1</td>
</tr>
<tr>
<td></td>
<td>e</td>
<td>37,3</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>45 - 50</td>
</tr>
</tbody>
</table>

***An additional 50.8 mm clearance is needed for coil installation and removal.

### Performance Curves

- Valve Performance Limits at 10% Undervoltage and Stabilized Coil Temperature
- Pressure Differential vs. Flow

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Solenoid Operated Cartridge Valves

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

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 0,6 cc/min. at 350 bar.
- Response time - typical = 50 ms.
- Manual override force requirement = 6,6 kg at 100 bar at port 1.
- Maximum switching frequency = 15000 cycles/hr.
- Viscosity range = 10 - 600 cSt.
- This valve is direct actuated and requires no minimum hydraulic pressure for operation.
- The soft shift feature results in significantly longer response time over Sun’s standard solenoid. Response time is dependant on flow, pressure, coil voltage, oil viscosity and ambient temperature. Typical response time ranges from 150 ms to 300 ms.
- A wide variety of coil termination and voltage options are available. See Sun website: Products: Accessories: Coils.

OPTION ORDERING INFORMATION

DBAL - X ** Y ***

- Nominal Capacity
  - A 1 L/min.
- Control
  - X No Manual Override
  - M Manual Override
  - S Soft Shift
  - D Twist/Lock, Dual, Manual Override
  - L Twist/Lock, Devant, Manual Override
  - T Twist/Lock, Momentary, Manual Override
- Spool Configuration
  - H Normally Open Port 1 to 2, Closed 1 to 3
  - C Normally Open Port 1 to 3, Closed 1 to 2
- Coil Options
  - See page 187. Coil option information for Metal Housing (Round) Solenoid Cartridges.
- Seal Material
  - N Buna-N
  - V Viton

* See page 178 for information on Control Options

** Consult the Sun website for complete information on Spool Configurations, the full line of Coil Options and Embedded Amplifier Coils/Controllers.

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Solenoid Operated Cartridge Valves

3-WAY, 2-POSITION, SOFT SHIFT, DIRECTIONAL SPOOL VALVE

<p>| Nominal | Typical | Cavity | Installation Torque (Nm) |</p>
<table>
<thead>
<tr>
<th>Capacity</th>
<th>Cartridge Model Code</th>
<th>a</th>
<th>b</th>
<th>c***</th>
<th>d</th>
<th>M,X,S</th>
<th>D,L,T</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 L/min</td>
<td>DMDA - ***</td>
<td>35.0</td>
<td>22.2</td>
<td>108.2</td>
<td>132.8</td>
<td>37.3</td>
<td>45 - 50</td>
</tr>
</tbody>
</table>

***An additional 50.8 mm clearance is needed for coil installation and removal.

+ Only for A and N spools. View performance curves for other spool configurations.

Performance Curves

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 csft = 80 cc/min. at 210 bar.
- Response time - typical = 50 ms.
- Manual override force requirement = 10 kg at 350 bar.
- Manual override stroke = 2.5 mm.
- Maximum switching frequency = 15000 cycles/hr.
- This valve is direct actuated and requires no minimum hydraulic pressure for operation.
- The solenoid tube assembly is fatigue rated for 350 bar service.
- Spools B and R are closed in the transition between their two positions. This results in a higher performance limit at the expense of lower capacity. When used as pilot controls, where capacity is not a factor, the closed transition will provide faster and more consistent response times.
- The soft shift feature results in significantly longer response time over Sun’s standard solenoid. Response time is dependant on flow, pressure, coil voltage, oil viscosity and ambient temperature. Typical response time ranges from 150 ms to 300 ms.
- A wide variety of coil termination and voltage options are available. See Sun website: Products: Accessories: Coils.

OPTION ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control*</th>
<th>Spool Configuration**</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 45 L/min</td>
<td>M Manual Override</td>
<td>A Normally Open Port 1 to 2, Closed 2 to 3</td>
</tr>
<tr>
<td></td>
<td>X No Manual Override</td>
<td>N Normally Open Port 2 to 3, Closed 1 to 2</td>
</tr>
<tr>
<td></td>
<td>S Soft Shift</td>
<td>B Normally Open Ports 1 to 2, Closed 2 to 3, Closed Transition</td>
</tr>
<tr>
<td></td>
<td>D Dual, Manual Override</td>
<td>P Normally Open Ports 1 to 3, Closed 1 to 2</td>
</tr>
<tr>
<td></td>
<td>L TwistLock, Detent</td>
<td>R Normally Open Ports 2 to 3, Closed 1 to 2, Closed Transition</td>
</tr>
<tr>
<td></td>
<td>T Manual Override</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

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Solenoid Operated Cartridge Valves

4-WAY, 2-POSITION, DIRECTIONAL SPOLL VALVE

**Performance Curves**

**OPTION ORDERING INFORMATION**

**Valve Performance Limits at 10% Undervoltage and Stabilized Coil Temperature**

- **Maximum operating pressure**: 350 bar.
- **Maximum valve leakage at 24 cSt = 160 cc/min. at 210 bar.**
- **Manual override force requirement**: 10 kg at 350 bar.
- **Response time - typical**: 50 ms.
- **Maximum switching frequency**: 15000 cycles/hr.
- **Viscosity range**: 10 - 600 cSt.
- **This valve is direct actuated and requires no minimum hydraulic pressure for operation.**
- **The soft shift feature results in significantly longer response time over Sun standard solenoid. Response time is dependant on flow, pressure, coil voltage, oil viscosity and ambient temperature. Typical response time ranges from 150 ms to 300 ms.**
- **A wide variety of coil termination and voltage options are available.** See Sun website: Products: Accessories: Coils.

**4-WAY, 2-POSITION, DIRECTIONAL SPOOL VALVE**

- **Nominal Control Spool Configuration**
  - **Installion Torque (Nm)**
  - **DNDA-X***
  - **DNDA-SC***
  - **DNDA-SN***
  - **DNDA-***

**Valve Performance Limits at 10% Undervoltage and Stabilized Coil Temperature**

- **Nominal Capacity**: 40 L/min.
- **Cartridge Dimensions**
  - **Typical Cartridge Model Code**
  - **Cavity**
  - **DNDA-***

**Pressure Differential vs. Flow**

**OPTION ORDERING INFORMATION**

- **Nominal Capacity**: D 40 L/min.
  - **Control**
    - X No Manual Override
    - M Manual Override
    - S Soft Shift
    - D TwistLock, Dual, Manual Override
    - L TwistLock, Detent, Manual Override
    - T TwistLock, Momentary, Manual Override

**Spool Configuration**

- **DNDA-X***
- **DNDA-SC***
- **DNDA-SN***
- **DNDA-***

**Coil Options**

- **See page 187: Coil option information for Metal Housing (Round) Solenoid Cartridges.**

**Seal Material**

- N Buna-N
- V Viton

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Solenoid Operated Cartridge Valves

4-WAY, 3-POSITION, SPRING CENTRED, DIRECTIONAL SPOOL VALVE

- Maximum operating pressure = 350 bar.
- Maximum valve leakage at 24 cSt = 160 cc/min. at 210 bar.
- Response time - typical = 50 ms.
- Maximum switching frequency = 15000 cycles/hr.
- Viscosity range = 10 - 600 cSt.
- This valve is direct actuated and requires no minimum hydraulic pressure for operation.
- The solenoid tube assembly is fatigue rated for 350 bar service.
- A wide variety of coil termination and voltage options are available. See Sun website: Products: Accessories: Coils.

Performance Curves

- Nominal Capacity: 20 L/min.
- Typical Cartridge Model Code: DNDC – X**
- Cavity: T - 31A
- Cartridge Dimensions:
  - a: 84.8
  - b: 22.2
  - c**: 139.4
  - d: 37.3
- Installation Torque (Nm): 45 - 50

*** An additional 50.8 mm clearance is needed for coil installation and removal.

OPTION ORDERING INFORMATION

- Nominal Capacity: 20 L/min.
- Control*: D No Manual Override
- Spool Configuration**: A A to T Centre
  - B B to T Centre
  - C Blocked Centre
  - H Open Centre
- Spool Configuration**: R Regen Centre
  - T Tandem Centre
  - W A and B, Bleed to T Centre
  - Y A and B to T Centre
- Coil Options**: See page 187: Coil option information for Metal Housing (Round) Solenoid Cartridges.
- Sea Material: N Buna-N
  - V Viton

* See page 178 for Control Options
** Consult the Sun website for complete information on Spool Configurations, the full line of Coil Options and Embedded Amplifier Coils/Controllers.

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