General Description

Series D3W directional control valves are high-performance, 4-chamber, direct operated, wet armature, solenoid controlled, 3 or 4-way valves. They are available in 2 or 3-position and conform to NFPA’s D05, CETOP 5 mounting patterns.

Features

- Worldwide, high flow, low pressure drop design.
- Soft shift available.
- 22 spools available including proportional.
- DC surge suppression available to protect electrical equipment.
- Three electrical connection options.
- AC & DC lights available.
- Easy access mounting bolts.
- Explosion proof availability.
- CSA approved.
- No tools required for coil removal.
- Rectified coils available for high flow AC applications.

Response Time (ms)

Signal to 95% spool stroke measured at 172 Bar (2500 PSI) and 75 LPM (20 GPM)

<table>
<thead>
<tr>
<th>Solenoid Type</th>
<th>m sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Energize</td>
<td>21</td>
</tr>
<tr>
<td>AC De-energize</td>
<td>35</td>
</tr>
<tr>
<td>DC Energize</td>
<td>110</td>
</tr>
<tr>
<td>DC De-energize</td>
<td>85</td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Interface</th>
<th>NFPA D05, CETOP 5, NG 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Operating Pressure</td>
<td></td>
</tr>
<tr>
<td>P, A, B:</td>
<td></td>
</tr>
<tr>
<td>345 Bar (5000 PSI) Standard</td>
<td></td>
</tr>
<tr>
<td>CSA @ 207 Bar (3000 PSI)</td>
<td></td>
</tr>
<tr>
<td>Tank:</td>
<td></td>
</tr>
<tr>
<td>103 Bar (1500 PSI) AC Standard</td>
<td></td>
</tr>
<tr>
<td>207 Bar (3000 PSI) AC Optional</td>
<td></td>
</tr>
<tr>
<td>DC/AC Rectified Standard</td>
<td></td>
</tr>
<tr>
<td>CSA @ 103 Bar (1500 PSI)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CSA File Number</th>
<th>LR060407</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage Rates</td>
<td></td>
</tr>
<tr>
<td>100 SSU @ 49°C (120°F)</td>
<td>Maximum Allowable:</td>
</tr>
<tr>
<td></td>
<td>19.6 cc (0.38 Cu. in.) per Minute/</td>
</tr>
<tr>
<td></td>
<td>Land @ 69 Bar (1000 PSI)*</td>
</tr>
<tr>
<td></td>
<td>35 cc (2.19 Cu. in.) per Minute/</td>
</tr>
<tr>
<td></td>
<td>Land @ 207 Bar (3000 PSI)*</td>
</tr>
</tbody>
</table>

* #008 and #009 Spools may exceed these rates, consult factory
**Directional Control Valves**  
**Series D3W**

### Ordering Information

**D**  Directional Control Valve  
**3**  Basic Valve  
**W**  Actuator  
**Spool**

**Wet armature solenoid**

**Code**  **Symbol**

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Code</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="Symbol1" /></td>
<td>14</td>
<td><img src="image2" alt="Symbol14" /></td>
</tr>
<tr>
<td>2</td>
<td><img src="image3" alt="Symbol2" /></td>
<td>15</td>
<td><img src="image4" alt="Symbol15" /></td>
</tr>
<tr>
<td>3</td>
<td><img src="image5" alt="Symbol3" /></td>
<td>16</td>
<td><img src="image6" alt="Symbol16" /></td>
</tr>
<tr>
<td>4</td>
<td><img src="image7" alt="Symbol4" /></td>
<td>20*</td>
<td><img src="image8" alt="Symbol20*" /></td>
</tr>
<tr>
<td>5</td>
<td><img src="image9" alt="Symbol5" /></td>
<td>21†</td>
<td><img src="image10" alt="Symbol21†" /></td>
</tr>
<tr>
<td>6</td>
<td><img src="image11" alt="Symbol6" /></td>
<td>22†</td>
<td><img src="image12" alt="Symbol22†" /></td>
</tr>
<tr>
<td>7</td>
<td><img src="image13" alt="Symbol7" /></td>
<td>26†</td>
<td><img src="image14" alt="Symbol26†" /></td>
</tr>
<tr>
<td>8*</td>
<td><img src="image15" alt="Symbol8" /></td>
<td>30**</td>
<td><img src="image16" alt="Symbol30**" /></td>
</tr>
<tr>
<td>9**</td>
<td><img src="image17" alt="Symbol9" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10†</td>
<td><img src="image18" alt="Symbol10†" /></td>
<td>81†</td>
<td><img src="image19" alt="Symbol81†" /></td>
</tr>
<tr>
<td>11</td>
<td><img src="image20" alt="Symbol11" /></td>
<td>82‡</td>
<td><img src="image21" alt="Symbol82‡" /></td>
</tr>
<tr>
<td>12</td>
<td><img src="image22" alt="Symbol12" /></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 8, 20 & 26 spools have closed crossover.

** 9 & 30 spools have open crossover.

† Available only with high-watt rectified AC coils or high-watt DC coils.

‡‡ Spring centered versions C, E, F, K & M only.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

### Description

- **E#**: 24/60 - 24/50 VAC
- **Y**: 120/60 - 110/50 VAC
- **T**: 240/60 - 220/50 VAC
- **K**: 12 VDC
- **J**: 24 VDC
- **D#**: 120 VDC
- **U#**: 98 VDC
- **Z#**: 250 VDC

# High Watt Coil only.

### Bold: Designates Tier I products and options.

### Non-Bold: Designates Tier II products and options. These products will have longer lead times.
Directional Control Valves
Series D3W

### Ordering Information

**Code** | **Description**
--- | ---
C** | Conduit Cavity
K | Conduit Box
J#* | Deutsch (DT06-2S)
P | Hirschmann w/Plug
W* | Hirschmann w/o Plug
E* | Explosion Proof

* Lights not available.
** No variations (See "K").
# DC voltage only.

**Code** | **Description**
--- | ---
Omit | Standard Valve
3*† | CSA US (UL429)
4* | CSA Canada

* Not available with AC high pressure tube.
† B, C, H styles only.
Y voltage with conduit connection only, must be rectified.

**Options** | **Coil** | **Tube Rating**
--- | --- | ---
F/# | High Watt | 103.5 Bar (1500 PSI) |
H | Low Watt | n/a |
H | High Watt | 207 Bar (3000 PSI) |
D† | Explosion Proof, EEXD ATEX | n/a |
U† | Explosion Proof, UL/CSA | n/a |

* Available only with J, K and Y (Rectified), T (Rectified) voltages.
# Not available with soft shift or with F and M style valves.
† Explosion proof coils are 60 Hz at standard voltage; dual rating not available.

**Valve Weight:**

- Single Solenoid:
  - AC: 4.3 kg (9.5 lbs.)
  - DC: 5.3 kg (11.6 lbs.)
- Double Solenoid:
  - AC: 5.0 kg (11.0 lbs.)
  - DC: 7.3 kg (16.0 lbs.)

**Seal Kit:**
- Nitrile: SKD3W
- Fluorocarbon: SKD3WV

**Mounting Bolt Kits**

**UNC Bolt Kits for use with D3W Directional Control Valves & Sandwich Valves**

<table>
<thead>
<tr>
<th>Number of Sandwich Valves @ 2.00” (50mm) thickness</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>D3W Standard:</td>
<td>BK98</td>
<td>BK141</td>
<td>BK142</td>
<td>BK143</td>
</tr>
<tr>
<td>Metric:</td>
<td>1.62”</td>
<td>3.50”</td>
<td>5.50”</td>
<td>7.50”</td>
</tr>
<tr>
<td>D3W with explosion proof coils Metric:</td>
<td>BK144</td>
<td>BK61</td>
<td>BK62</td>
<td>BK63</td>
</tr>
<tr>
<td>40mm</td>
<td>60mm</td>
<td>110mm</td>
<td>160mm</td>
<td>210mm</td>
</tr>
<tr>
<td>D3W Standard:</td>
<td>BK144</td>
<td>BK141</td>
<td>BK142</td>
<td>BK143</td>
</tr>
<tr>
<td>Metric:</td>
<td>4.25”</td>
<td>6.25”</td>
<td>8.25”</td>
<td></td>
</tr>
</tbody>
</table>

**Code** | **Description**
--- | ---
Omit | Standard Valve
V# | Varistor Surge Suppressor
Z | AC Rectified with MOV Surge Suppressor

* DC voltage only.

**Approvals**

- V# Varistor Surge Suppressor
- Z AC Rectified with MOV Surge Suppressor

**Design**

- Series A
- NOT: Not required when ordering.

**Code** | **Description**
--- | ---
6 | Manaplug, Brad Harrison Mini
7 | Manaplug, Brad Harrison Micro (M12x1)
56 | Manaplug (Mini) with Lights
57 | Manaplug (Micro) with Lights (M12x1)
1A | Manaplug (Mini) Single Sol. 5-Pin
1B | Manaplug (Micro) Single Sol. 5-Pin (M12x1)
1C | Manaplug (Mini) Single Sol. 5-Pin w/Lights
1D | Manaplug (Micro) Single Sol. 5-Pin w/Lights (M12x1)
1M | Manaplug Opposite Normal

**Bold:** Designates Tier I products and options.

**Non-Bold:** Designates Tier II products and options. These products will have longer lead times.

NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs)
Directional Control Valves
Series D3W

Solenoid Ratings**

<table>
<thead>
<tr>
<th>Insulation</th>
<th>Class H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowable Deviation from rated voltage</td>
<td>DC, AC Rect -10% to +15%, AC -5% to +5%</td>
</tr>
<tr>
<td>Armature</td>
<td>Wet pin type</td>
</tr>
</tbody>
</table>

** DC Solenoids available with optional molded metal oxide varistor (MOV) for surge suppression. Leadwire length 6” from coil face.

D3W****F Solenoid Electrical Characteristics‡

<table>
<thead>
<tr>
<th>Solenoid Code</th>
<th>Nominal Volts/Hz</th>
<th>In Rush Amps</th>
<th>Holding Amps</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>KF</td>
<td>12 VDC</td>
<td>—</td>
<td>1.50</td>
<td>18</td>
</tr>
<tr>
<td>JF</td>
<td>24 VDC</td>
<td>—</td>
<td>0.75</td>
<td>18</td>
</tr>
</tbody>
</table>

‡ Based on nominal voltage @ 22°C (72°F)

D3W Rectified AC Solenoid Electrical Characteristics‡

<table>
<thead>
<tr>
<th>Solenoid Code</th>
<th>Nominal Volts/Hz</th>
<th>In Rush VA</th>
<th>Holding VA</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>120/60</td>
<td>266</td>
<td>82</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>110/50</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>T</td>
<td>240/60</td>
<td>266</td>
<td>82</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>220/50</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>YF</td>
<td>120/60</td>
<td>—</td>
<td>3.00†</td>
<td>36</td>
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<tr>
<td></td>
<td>110/50</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>TF</td>
<td>240/60</td>
<td>—</td>
<td>0.18</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>220/50</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

‡ Based on nominal voltage @ 22°C (72°F)

† DC holding amps.

Explosion Proof Solenoids

Explosion Proof Solenoid Ratings

<table>
<thead>
<tr>
<th>U.L. /CSA (EU)</th>
<th>Class I, Div. 1 &amp; 2, Groups C &amp; D Class II, Div 1 &amp; 2, Groups E, F &amp; G As defined by the N.E.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX</td>
<td>Complies with ATEX requirements for: Exd, Group IIIB; EN50014: 1999+ Amds 1 &amp; 2, EN50018: 200</td>
</tr>
</tbody>
</table>

Electrical Characteristics* ED and EU†

<table>
<thead>
<tr>
<th>Solenoid Code</th>
<th>Nominal Volts/Hz</th>
<th>In Rush VA</th>
<th>Holding VA</th>
<th>Nominal Watts (Ref)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>120/60</td>
<td>266</td>
<td>82</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>110/50</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>T</td>
<td>240/60</td>
<td>266</td>
<td>82</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>220/50</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>K</td>
<td>12 VDC</td>
<td>—</td>
<td>3.00†</td>
<td>36</td>
</tr>
<tr>
<td>J</td>
<td>24 VDC</td>
<td>—</td>
<td>1.50†</td>
<td>36</td>
</tr>
<tr>
<td>D</td>
<td>120 VDC</td>
<td>—</td>
<td>0.30†</td>
<td>36</td>
</tr>
</tbody>
</table>

* Dual frequency not available on explosion proof coils.
† DC holding amps.
Hirschmann, Double AC Solenoid

Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann, Single AC Solenoid

Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.
Conduit Cavity, Double DC Solenoid

Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Conduit Cavity, Single DC Solenoid

Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.
Conduit Box, Single AC Solenoid
with Variation 6 (Manaplug) & Variation P (Extended Manual Override)

Conduit Box, Double DC Solenoid
with Variation 6 (Manaplug) & Variation P (Extended Manual Override)

Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.
Explosion Proof U.L. & CSA, Double Solenoid

Note: Mounting bolts included with valve.

Explosion Proof ATEX, Double Solenoid

Note: Mounting bolts included with valve.

Inch equivalents for millimeter dimensions are shown in ("")
Hirschmann, Single AC Solenoid with Variation I7 (Monitor Switch)

**Monitor Switch (Variation I7) End of Stroke**

This feature provides for electrical confirmation of the spool shift. This can be used in safety circuits, to assure proper sequencing, etc.

**Switch Data**

Inductive switch requiring +18-42 volt input. Outputs “A” and “B” are opposite; one at “0” voltage, the other at input voltage. During switching, “A” and “B” outputs reverse. Provides 0.4A switching current.

**Note:** 30.0mm (1.18”) from bottom of bolt hole counterbore to bottom of valve.

For repetitive switch power-up conditions, please consult factory.
Conduit Box
(connection option K)

Interface
- 152.4 cm (6.0 inch) lead wires, 18 awg.
- Meets NEMA 4 and IP65

Manaplug
(valve variations 6, 56, 1A, 1C)

Interface
- Brad Harrison Plug
- 3-Pin for Single Solenoid
- 5-Pin for Double Solenoid

3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over “A” Solenoid
(“A” and “B” Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

Hirschmann Plug with Lights (P5)

Face View of Plug
Conforms to DIN43650, ISO4400, Form A 3-Pin

Manaplug - Micro Connector
(valve variations 7, 57, 1B, 1D)

3-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over “A” Solenoid
(“A” and “B” Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)