Application
Series D3 hydraulic directional control valves are high performance, direct operated 4-way valves, available in 2 or 3-position. They are manifold mounted which conform to NFPA's D05, CETOP 5, ISO NG10 mounting patterns. These valves were designed for industrial and mobile hydraulic applications which require high cycle rates, long life and high efficiency.

Operation
Series D3 directional control valves consist of a 4-chamber style body, and a case hardened sliding spool. The spool is directly shifted by a variety of operators including: solenoid, lever, cam, or air pilot.

Features
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 40 GPM depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish body.
- CSA approved and UL recognized available.
- Proportional spool available.

Introduction

Series D3

Features
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 40 GPM depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish body.
- CSA approved and UL recognized available.
- Proportional spool available.

D3W Solenoid Operated Conduit Cavity Style
- Wired in cavity.
- Easy access mounting bolts.
- 22 spool styles available.
- Three electrical connection options.
- AC and DC lights available.
- CSA approved.
- Available in low-watt DC version.

D3W Solenoid Operated Hirschmann (DIN) Style
- DIN Style (43650) Hirschmann.
- 22 spool styles available.
- No tools required for coil removal.
- Easy coil replacement.
- AC and DC lights available.
- CSA approved.
- Available in low-watt DC version.
**D3L Lever Operated**

- Spring return or detent styles available.
- Heavy duty handle design.
- High flow, low pressure drop design.

**D3A Air Operated**

- Low pilot pressure required – 4.1 Bar (60 PSI) minimum.
- High flow, low pressure drop design.

**D3C Cam Operated**

- Choice of 2 cam roller positions (D3C and D3D).
- Short stroke option.
- High flow, low pressure drop design.
Application
Series D3D hydraulic directional control valves are high performance, direct operated 4-way valves, available in 2 or 3-position. They are manifold mounted which conform to NFPA’s D05, CETOP 5, ISO NG10 mounting pattern. These valves were designed for industrial and mobile hydraulic applications which require high cycle rates, long life and high efficiency.

Operation
Series D3D directional control valves consist of a 5-chamber style body, and a case hardened sliding spool.

D3DW Solenoid Operated Hirschmann (DIN) Style

- Easy access mounting bolts.
- No tools required for coil removal.
- 22 spool styles available.
- Signal lights available.
- CSA approved.
# D3 Spool Reference Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Spool Symbol</th>
<th>Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction</th>
<th>Model</th>
<th>Spool Symbol</th>
<th>Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction</th>
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</thead>
<tbody>
<tr>
<td>D3*1</td>
<td><img src="image1" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*12</td>
<td><img src="image2" alt="Spool Symbol" /></td>
<td>D3W 95 (24) D3W*F 59 (15) D3DW 75 (19)</td>
</tr>
<tr>
<td>D3*2</td>
<td><img src="image3" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 115 (30)</td>
<td>D3*14</td>
<td><img src="image4" alt="Spool Symbol" /></td>
<td>D3W 501 (13) D3W*F 59# (15) D3DW 70† (18)</td>
</tr>
<tr>
<td>D3*3</td>
<td><img src="image5" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 120 (31)</td>
<td>D3*15</td>
<td><img src="image6" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 120 (31)</td>
</tr>
<tr>
<td>D3*4</td>
<td><img src="image7" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 59 (15) D3DW 130 (33)</td>
<td>D3*16</td>
<td><img src="image8" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
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<tr>
<td>D3*5</td>
<td><img src="image9" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*20</td>
<td><img src="image10" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
</tr>
<tr>
<td>D3*6</td>
<td><img src="image11" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*21</td>
<td><img src="image12" alt="Spool Symbol" /></td>
<td>D3W 115 (30) N/A D3DW 120 (31)</td>
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<tr>
<td>D3*7</td>
<td><img src="image13" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*22</td>
<td><img src="image14" alt="Spool Symbol" /></td>
<td>D3W 115 (30) N/A D3DW 120 (31)</td>
</tr>
<tr>
<td>D3*8</td>
<td><img src="image15" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*26</td>
<td><img src="image16" alt="Spool Symbol" /></td>
<td>D3W 115 (30) N/A D3DW 75 (19)</td>
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<tr>
<td>D3*9</td>
<td><img src="image17" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*30</td>
<td><img src="image18" alt="Spool Symbol" /></td>
<td>D3W 115 (30) N/A D3DW 75 (19)</td>
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<td>D3*10</td>
<td><img src="image19" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*81</td>
<td><img src="image20" alt="Spool Symbol" /></td>
<td>D3W 115 (30) N/A D3DW 130 (33)</td>
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<tr>
<td>D3*11</td>
<td><img src="image21" alt="Spool Symbol" /></td>
<td>D3W 150 (40) D3W*F 78 (20) D3DW 130 (33)</td>
<td>D3*82</td>
<td><img src="image22" alt="Spool Symbol" /></td>
<td>D3W 115 (30) N/A D3DW 130 (33)</td>
</tr>
</tbody>
</table>

Center or De-energized position is indicated by P, A, B & T port notation.
† 3000 PSI Max. ‡ 4300 PSI Max. # 1500 PSI Max.

# D3L, D3A, D3C Spool Reference Data (Four Chamber Body Only)

<table>
<thead>
<tr>
<th>Model</th>
<th>Spool Symbol</th>
<th>Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction</th>
<th>Model</th>
<th>Spool Symbol</th>
<th>Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>D3*1</td>
<td><img src="image23" alt="Spool Symbol" /></td>
<td>D3W 150 (40)</td>
<td>D3*20</td>
<td><img src="image24" alt="Spool Symbol" /></td>
<td>D3W 150 (40)</td>
</tr>
<tr>
<td>D3*2</td>
<td><img src="image25" alt="Spool Symbol" /></td>
<td>D3W 150 (40)</td>
<td>D3*26</td>
<td><img src="image26" alt="Spool Symbol" /></td>
<td>D3W 115 (30)</td>
</tr>
<tr>
<td>D3*4</td>
<td><img src="image27" alt="Spool Symbol" /></td>
<td>D3W 150 (40)</td>
<td>D3*30</td>
<td><img src="image28" alt="Spool Symbol" /></td>
<td>D3W 39 (10)</td>
</tr>
<tr>
<td>D3*8</td>
<td><img src="image29" alt="Spool Symbol" /></td>
<td>D3W 50 (13)</td>
<td>D3*81</td>
<td><img src="image30" alt="Spool Symbol" /></td>
<td>D3W 115 (30)</td>
</tr>
<tr>
<td>D3*9</td>
<td><img src="image31" alt="Spool Symbol" /></td>
<td>D3W 39 (10)</td>
<td>D3*82</td>
<td><img src="image32" alt="Spool Symbol" /></td>
<td>D3W 115 (30)</td>
</tr>
</tbody>
</table>

Center or De-energized position is indicated by A, B, P & T port notation.
D3W-30 DC and AC Rectified Shift Limits

Example:
Determine the maximum allowable flow of a D3W Series valve (20D) at 150 Bar (2175 PSI) supply pressure. Locate the curve marked “20D”. At 150 Bar (2175 PSI) supply pressure, the maximum flow is 98 LPM (25 GPM). At 345 Bar (5000 PSI), the flow is 72 LPM (18.5 GPM).

Important Notes for Switching Limit Charts
1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A and B ports will reduce flow to 70% of that shown.

D3W-30 Low Watt DC and AC Rectified Shift Limits

Example:
Determine the maximum allowable flow of a D3W Series valve (20D) at 150 Bar (2175 PSI) supply pressure. Locate the curve marked “20D”. At 150 Bar (2175 PSI) supply pressure, the maximum flow is 98 LPM (25 GPM). At 345 Bar (5000 PSI), the flow is 72 LPM (18.5 GPM).

Important Notes for Switching Limit Charts
1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A and B ports will reduce flow to 70% of that shown.
D3W-30 AC Shift Limits

D3W-30 Soft Shift Limits (High Watt Coil Only)

Important Notes for Switching Limit Charts
1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A and B ports will reduce flow to 70% of that shown.
D3W-30 Soft Shift Response

Response Time*
Signal to 95% spool stroke measured at 172 Bar (2500 PSI) and 65 LPM (17 GPM).

<table>
<thead>
<tr>
<th>Soft Shift Option</th>
<th>Energize</th>
<th>De-energize</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3</td>
<td>400</td>
<td>650</td>
</tr>
<tr>
<td>S4</td>
<td>320</td>
<td>550</td>
</tr>
<tr>
<td>S7</td>
<td>160</td>
<td>370</td>
</tr>
</tbody>
</table>

* For reference only. Response time varies with flow, pressure and oil viscosity.

D3DW-40 Shift Limits

Important Notes for Switching Limit Charts
1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A and B ports will reduce flow to 70% of that shown.
Pressure Drop vs. Flow

The table shown provides flow vs. pressure drop curve reference for D3 Series valves by spool type.

The chart below demonstrates graphically the performance characteristics of the D3. The low watt coil and other design features of the standard D3W****F accommodate a maximum flow of 78 LPM (20 GPM) at 207 Bar (3000 PSI).

### D3W and D3DW Pressure Drop Reference Chart

<table>
<thead>
<tr>
<th>Spool No.</th>
<th>Curve Number</th>
<th>Shifted</th>
<th>Center Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>P–A 5</td>
<td>P–B 5</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>2 4 1 1</td>
<td>1 2 3 3</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>3 5 2 3</td>
<td>— — —</td>
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<tr>
<td>3</td>
<td></td>
<td>4 4 3 3</td>
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<tr>
<td>4</td>
<td></td>
<td>5 6 2 2</td>
<td>— — —</td>
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<tr>
<td>5</td>
<td></td>
<td>6 6 2 2</td>
<td>— 4 2 2</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>7 5 4 2</td>
<td>1 3 — —</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>8 8 7 7</td>
<td>6 — — —</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>9 5 4 4</td>
<td>7 — — —</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>10 5 5 —</td>
<td>— — —</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>11 5 5 2 2</td>
<td>— — —</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>12 5 5 2 2</td>
<td>11 — —</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>13 4 5 1 2</td>
<td>3 — —</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>14 5 5 3 2</td>
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</tr>
<tr>
<td>14</td>
<td></td>
<td>15 5 6 2 2</td>
<td>— — —</td>
</tr>
<tr>
<td>15</td>
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<td>16 5 6 2 2</td>
<td>— — —</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>17 5 5 2 2</td>
<td>— — —</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>18 5 4 — 1</td>
<td>— 9 —</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>19 4 5 1</td>
<td>— — —</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td>20 5 5 —</td>
<td>— — —</td>
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<td>22 5 5 2 2</td>
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<tr>
<td>22</td>
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<td>23 5 5 2 2</td>
<td>— — —</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>24 5 5 2 2</td>
<td>— — —</td>
</tr>
</tbody>
</table>

**Note:**
For 81 and 82 spools, consult factory.

### Viscosity Correction Factor

<table>
<thead>
<tr>
<th>Viscosity (SSU)</th>
<th>% of ΔP (Approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>93</td>
</tr>
<tr>
<td>150</td>
<td>111</td>
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<tr>
<td>200</td>
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<td>350</td>
<td>137</td>
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<tr>
<td>400</td>
<td>141</td>
</tr>
</tbody>
</table>

Curves were generated using 110 SSU hydraulic oil. For any other viscosity, pressure drop will change per chart.

### Performance Curves

![Performance Curves Diagram](image-url)
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>Pull-In</th>
<th>Drop-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Energe</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>AC De-energize</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>DC Energe</td>
<td>62</td>
<td>110</td>
</tr>
<tr>
<td>DC De-energize</td>
<td>58</td>
<td>85</td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Interface</th>
<th>NFPA D05, CETOP 5, NG 10</th>
</tr>
</thead>
</table>
| Max. Operating Pressure | P, A, B: 345 Bar (5000 PSI) Standard  
|                  | CSA 207 Bar (3000 PSI)  
|                  | Tank: 103 Bar (1500 PSI) AC Standard  
|                  | 207 Bar (3000 PSI) AC Optional  
|                  | DC/AC Rectified Standard  
|                  | CSA 103 Bar (1500 PSI)  |
| CSA File Number  | LR060407                  |
| Leakage Rates   | Maximum Allowable:  
| 100 SSU @ 49°C (120°F) | 19.6 cc (0.38 Cu. in.) per Minute/ 
| Land @ 69 Bar (1000 PSI)* | 35 cc (2.19 Cu. in.) per Minute/ 
| Land @ 207 Bar (3000 PSI)* |

* #008 and #009 Spools may exceed these rates, consult factory
### Ordering Information

**Directional Control Valves**

**Series D3W**

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Code</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>6</td>
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<td>22†</td>
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<td>7</td>
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<td>26†</td>
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<td>8*</td>
<td>30**</td>
<td>9**</td>
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<td>10†</td>
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<td>††</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Bold: Designates Tier I products and options.*

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

---

**Code Description**

- **N**: Nitrile
- **V**: Fluorocarbon

**Code Description Symbol**

- **B**: Single solenoid, 2 position, spring offset. P to A and B to T in offset position.
- **C**: Double solenoid, 3 position, spring centered.
- **D**: Double solenoid, 2 position, detent.
- **E**: Single solenoid, 2 position, spring centered. P to B and A to T when energized.
- **F**: Single solenoid, 2 position. Spring offset, energized to center position. Spool spacer on A side. P to A and B to T in spring offset position.
- **H**: Single solenoid, 2 position, spring offset. P to B and A to T in offset position.
- **K**: Single solenoid, 2 position. Spring centered. P to A and B to T when energized.
- **M**: Single solenoid, 2 position, spring offset, energized to center position. Spool spacer on B side. P to B and A to T in spring offset position.

---

**Notes:**

- *Only spools 20, 26 & 30.
- **High Watt Coil.
- † 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.
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.
# DC voltage only.

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.)

Standard Bolt Kit: BK98
Metric Bolt Kit: BKM98

Mounting Bolt Kits

UNC Bolt Kits for use with D3W Directional Control Valves & Manapak/Cartpak

<table>
<thead>
<tr>
<th>Number of Manapaks/ Cartpaks</th>
<th>@ 2.00&quot; (50mm) thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

D3W Standard: BK98 BK141 BK142 BK143

1.62" 3.50" 5.50" 7.50"

Metric: BKM98 BKM141 BKM142 BKM143

40mm 90mm 140mm 190mm

D3W with explosion proof coils:

Standard: BK144 BK61 BK62 BKG3

2.37" 4.25" 6.25" 8.25"

Metric: BKM144 BKM61 BKM62 BKM63

60mm 110mm 160mm 210mm

Note: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs)

Bold: Designates Tier I products and options.

Non-Bold: Designates Tier II products and options. These products will have longer lead times.
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 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>Nominal Watts (Ref)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>120/60 110/50</td>
<td>298</td>
<td>102</td>
<td>32</td>
</tr>
<tr>
<td>T</td>
<td>240/60 220/50</td>
<td>288</td>
<td>101</td>
<td>32</td>
</tr>
<tr>
<td>E</td>
<td>24/60 24/50</td>
<td>290 381</td>
<td>110 32</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>
<tr>
<td>U</td>
<td>98 VDC</td>
<td>—</td>
<td>0.37†</td>
<td>36</td>
</tr>
<tr>
<td>Z</td>
<td>250 VDC</td>
<td>—</td>
<td>0.14†</td>
<td>36</td>
</tr>
</tbody>
</table>

† DC holding amps.

D3W Rectified AC 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>Y</td>
<td>120/60 110/50</td>
<td>—</td>
<td>.37</td>
<td>36</td>
</tr>
<tr>
<td>T</td>
<td>240/60 220/50</td>
<td>—</td>
<td>.18</td>
<td>36</td>
</tr>
<tr>
<td>YF</td>
<td>120/60 220/50</td>
<td>—</td>
<td>.18</td>
<td>18</td>
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<tr>
<td>TF</td>
<td>240/60 220/50</td>
<td>—</td>
<td>.09</td>
<td>18</td>
</tr>
</tbody>
</table>

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

Explosion Proof Solenoids

Explosion Proof Solenoid Ratings

<table>
<thead>
<tr>
<th>U.L. (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>C.S.A.</td>
<td></td>
</tr>
<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>120/60 110/50</td>
<td>266</td>
<td>82</td>
<td>36</td>
</tr>
<tr>
<td>T</td>
<td>240/60 220/50</td>
<td>266</td>
<td>82</td>
<td>36</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.
Directions Control Valves
Catalog HY14-2502/US

Dimensions
Series D3W

Inch equivalents for millimeter dimensions are shown in (**)

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)

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

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

Explosion Proof ATEX, Double Solenoid

Note: Mounting bolts included with valve.
Conduit Box, Single DC Solenoid
with Variation I7 (Monitor Switch)

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

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

Monitor Switch
(valve variation I7) Start 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.

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 IP67

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)

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

Pins are as seen on valve (male pin connectors).
Fluid Recommendations
Premium quality hydraulic oil with a viscosity range between 32-54 cSt (150-250 SSU) at 38°C (100°F) is recommended. The absolute operation viscosity range is from 16-220 cSt (80-1000 SSU). Oil should have maximum anti-wear properties and rust and oxidation treatments.

Fluids and Seals
Valves using synthetic, fire-resistant fluids require special seals. When phosphate ester or its blends are used, FLUOROCARBON seals are required. Water-glycol, water-in-oil emulsions, and petroleum oil may be used with NITRILE seals.

Temperature Recommendation
Recommended oil temperature:
-29°C to +71°C (-20°F to +160°F)

Filtration
For maximum valve and system component life, the system should be protected at a contamination level not to exceed 125 particles greater than 10 microns per milliliter of fluid. (SAE Class 4 or better, ISO Code 16/13).

Tank Line Surges
If several valves are piped with a common tank line, flow surges in the line may cause unexpected spool shift. Detent style valves are most susceptible to this. Separate tank lines should be used when line surges are expected in an application.

Recommended Mounting Position

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Recommended Mounting Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detent (Solenoid)</td>
<td>Horizontal</td>
</tr>
<tr>
<td>Spring Offset</td>
<td>Unrestricted</td>
</tr>
<tr>
<td>Spring Centered</td>
<td>Unrestricted</td>
</tr>
</tbody>
</table>

Silting
Silting can cause any sliding spool valve to stick and not spring return, if held shifted under pressure for long periods of time. The valve should be cycled periodically to prevent sticking.

Single Pass Operation
Valve flow ratings are for double pass operation (with equal flow in both paths). When using these components in single pass applications, flow capabilities may be reduced. Consult your local Parker representative for details.

Flow Path Data

<table>
<thead>
<tr>
<th>D3*</th>
<th>Operator B</th>
<th>A</th>
<th>B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: On valves with 008 or 009 spool, A and/or B operators reverse sides. Flow paths remain the same as viewed from top of valve.

Double Solenoid. With solenoid “A” energized, flow path is P→A and B→T. When solenoid “B” is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

Detent and Spring Offset. The center condition exists on detent and spring offset valves only during spool crossover. To shift and hold a detented spool, only a momentary energizing of the solenoid is necessary. The minimum duration of the signal is approximately 0.13 seconds for both AC and DC voltages. This position will be held provided the spool center line is in a horizontal plane, and no shock or vibration is present to displace the spool.

Single Solenoid. Spring offset valves can be ordered in six styles: B, E, F, H, K and M. Flow path data for the various styles are described in the order chart.

Lever Operated (on B end)
Pull lever away from valve P→A; B→T
Push lever toward valve P→B; A→T
Note: Reverse with a #8 or #9 spool.

Electrical Failure
Should electric power fail, spring offset and spring centered valves will shift to the spring held position. Detented valves will stay in the last position held before power failure. If main flow does not fail or stop simultaneously, machine actuators may continue to function in an undesirable manner or sequence.

Loss of Pilot Pressure (D3A)
Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. Detented valves will remain in the last position held. If main hydraulic flow does not simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

Torque Specifications
Torque values recommended for the bolts which mount the valve to the manifold or subplate are as follows:
1/4-20 thread (M6x1) torque 16.0 Nm (12 ft-lbs).