General Description
Series D1VW 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 D03, CETOP 3 mounting patterns.

Features
- Soft shift available.
- 19 standard spool styles available (for other spools – Consult Factory).
- Proportional spools.
- DC surge suppression.
- Eight electrical connection options.
- AC & DC lights available (CSA approval for solenoids and lights).
- Internally ground.
- Easy access mounting bolts.
- Waterproof (meets NEMA 4, up to IP67 on some models).
- Explosion proof.
- CSA approvals.

Specifications

<table>
<thead>
<tr>
<th>Mounting Pattern</th>
<th>NFPA D03, CETOP 3, NG 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Interface</td>
<td>DIN 24340-A6</td>
</tr>
<tr>
<td></td>
<td>ISO 4401-AB-03-4-A</td>
</tr>
<tr>
<td></td>
<td>CETOP R35H 4.2-4-03,</td>
</tr>
<tr>
<td></td>
<td>NFPA D03</td>
</tr>
<tr>
<td>Maximum Pressure</td>
<td>P, A, B</td>
</tr>
<tr>
<td></td>
<td>345 Bar (5000 PSI) Standard</td>
</tr>
<tr>
<td></td>
<td>207 Bar (3000 PSI) 10 Watt</td>
</tr>
<tr>
<td></td>
<td>276 Bar (3750 PSI)</td>
</tr>
<tr>
<td></td>
<td>103 Bar (1500 PSI) AC only</td>
</tr>
<tr>
<td></td>
<td>207 Bar (3000 PSI) DC/AC Rectified Standard</td>
</tr>
<tr>
<td></td>
<td>207 Bar (3000 PSI) AC Optional</td>
</tr>
<tr>
<td></td>
<td>CSA 103 Bar (1500 PSI)</td>
</tr>
</tbody>
</table>

Leakage Rates*

<table>
<thead>
<tr>
<th>Maximum Allowable:</th>
<th>100 SSU @ 49°C (120°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.7 cc (1.2 Cu. in.) per Minute/Land @ 69 Bar (1000 PSI)*</td>
<td></td>
</tr>
<tr>
<td>73.8 cc (4.5 Cu. in.) per Minute/Land @ 207 Bar (3000 PSI)*</td>
<td></td>
</tr>
<tr>
<td>Typical:</td>
<td></td>
</tr>
<tr>
<td>4.9 cc (0.3 Cu. in.) per Minute/Land @ 69 Bar (1000 PSI)*</td>
<td></td>
</tr>
<tr>
<td>26.2 cc (1.6 Cu. in.) per Minute/Land @ 345 Bar (5000 PSI)</td>
<td></td>
</tr>
</tbody>
</table>

*#008 and #009 Spools may exceed these rates. Consult Factory

Response Time
Response time (milliseconds) at 345 Bar (5000 PSI) is 32 LPM (8.5 GPM).

<table>
<thead>
<tr>
<th>Solenoid Type</th>
<th>Pull-In</th>
<th>Drop-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>DC 10 Watt</td>
<td>61</td>
<td>22</td>
</tr>
<tr>
<td>DC 30 Watt</td>
<td>51</td>
<td>21</td>
</tr>
</tbody>
</table>

Spool Center Condition

<table>
<thead>
<tr>
<th>Orifice</th>
<th>Soft Shift</th>
<th>Size</th>
<th>Closed Energize</th>
<th>De-Energize</th>
<th>Open Energize</th>
<th>De-Energize</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2</td>
<td>0.020</td>
<td>125 ms</td>
<td>920 ms</td>
<td>200 ms</td>
<td>275 ms</td>
<td>51 ms</td>
</tr>
<tr>
<td>S5</td>
<td>0.050</td>
<td>51 ms</td>
<td>675 ms</td>
<td>50 ms</td>
<td>27 ms</td>
<td>51 ms</td>
</tr>
</tbody>
</table>

2-Position

<table>
<thead>
<tr>
<th>Energize</th>
<th>De-Energize</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2</td>
<td>69 Bar (1000 PSI)*</td>
</tr>
<tr>
<td>S5</td>
<td>26.2 cc (1.6 Cu. in.) per Minute/Land</td>
</tr>
</tbody>
</table>

U.L. recognized available - Contact the division.
No tools required for coil removal.
AC rectified coils.
**Directional Control Valves**

**Series D1V**

**Ordering Information**

**Code Description**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Nitrile</td>
</tr>
<tr>
<td>V</td>
<td>Fluorocarbon</td>
</tr>
</tbody>
</table>

* Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #008 and #009 spools. See installation information for details. To configure per DIN standards (A coil over A port, B coil over B port) code valves as D1VHW***.

**Code Description**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Solenoid, Wet Pin, Screw-in</td>
</tr>
<tr>
<td>HW</td>
<td>Reversed Wiring</td>
</tr>
</tbody>
</table>

* Contact HVD for availability.

**Code Description**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>24/50 VAC</td>
</tr>
<tr>
<td>D</td>
<td>120 VDC</td>
</tr>
<tr>
<td>G</td>
<td>198 VDC</td>
</tr>
<tr>
<td>J</td>
<td>24 VDC</td>
</tr>
<tr>
<td>K</td>
<td>12 VDC</td>
</tr>
<tr>
<td>L</td>
<td>6 VDC</td>
</tr>
<tr>
<td>N</td>
<td>220/50 VAC</td>
</tr>
<tr>
<td>P</td>
<td>110/50 VAC</td>
</tr>
<tr>
<td>Q</td>
<td>100/60 VAC</td>
</tr>
<tr>
<td>QD</td>
<td>100/60 - 100/50 VAC</td>
</tr>
<tr>
<td>R</td>
<td>24/60 VAC</td>
</tr>
<tr>
<td>T</td>
<td>240/60 - 220/50 VAC</td>
</tr>
<tr>
<td>U</td>
<td>98 VDC</td>
</tr>
<tr>
<td>Y</td>
<td>120/60 - 110/50 VAC</td>
</tr>
<tr>
<td>Z</td>
<td>250 VDC</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.
Directional Control Valves
Series D1V

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

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

---

**Code** | **Description**
---|---
C | Leadwire Conduit Box
D** | Metric Plug (M12x1), DESINA
E† | Explosion Proof
G†† | Plug-in Conduit Box
J# | Deutsch (DT06-2S)
M# | Metri-Pack (150)
P | DIN with Plug
S# | Dual Spade
W† | DIN w/o Plug
W** | High Watt
D** | Explosion Proof, EEXD ATEX
E** | Explosion Proof, EEXME ATEX
F† | Low Watt
L†† | 10 Watt
O** | Explosion Proof, MSHA
T# | Explosion Proof, Ex d IIC ATEX/CSA
U† | Explosion Proof, UL/CSA
* | AC ambient temperature must not exceed 60°C (140°F).
** | 60 Hz only on AC, no options.
† | AC only.
†† | DC and AC rectified only.
# | J, K and Y voltages only, Dual frequency on AC, no options.

---

**Code** | **Description**
---|---
C* | Omit
D** | Standard Pressure
H* | High Pressure, AC only
103.5 Bar (1500 PSI) AC
207 Bar (3000 PSI) DC

---

**Code** | **Description**
---|---
5** | Signal Lights
56* | Manaplug (Mini) with Lights
7B* | Manaplug (Micro) with Lights
1C* | Manaplug (Mini) Single Sol. 5-pin, with Lights
1D* | Manplug (Micro) Single Sol. 5-pin, with Lights
1M* | Manaplug Opposite of Normal
4D† | Twist & Lock Override
(Old 5426, 33 Ford wiring)
4E† | Push Manual Override (Old x5450)
4F | Heavy Duty Detent
1P | Painted Body
7Y* | 4-pin M12x1 Manaplug, special wiring with lights (Old B755)
* | Plug-in Conduit Box
** | Plug-in, DIN, or DESINA only
† | DC/AC Rectified only.
Not available with soft shift.
Dimensions

Directional Control Valves
Series D1V

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

**DC Plug-In Conduit Box Connector, with Lights, Double Solenoid**

- Light
- 1/2 NPTF Thd. Both Ends
- Manual Override

**DC Plug-In or Leadwire Conduit Box Connector, with or without Lights, Single Solenoid**

- Light (Plug-in Only)
- Manual Override

Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.
Inch equivalents for millimeter dimensions are shown in (**)

**DC DIN with Plug Connector, Double Solenoid**
“P” Option Shown

**Note:** 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.

**DC DIN Connector, Single Solenoid**
“P” Option Shown

**Note:** 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.
AC Leadwire Conduit Box Connector, without Lights, Double Solenoid, “C” Option

Dimensions Series D1V

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

Note: 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.

AC Leadwire Conduit Box Connector, without Lights, Single Solenoid, “C” Option

Note: 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.
AC Plug-in Conduit Box Connector, with Lights, Double Solenoid, “G” Option

Note: 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.

DC Plug-in or Leadwire Conduit Box Connector, with or without Lights and Extended Override Tubes, Double Solenoid

Note: 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.
Dimensions

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

DC Deutsch Connector, Double Solenoid

Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

DC Deutsch Connector, Single Solenoid

Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.
DC Desina Connector, Double Solenoid

Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

DC Desina Connector, Single Solenoid

Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.
Inch equivalents for millimeter dimensions are shown in ("")

**Explosion Proof, Ex d IIC ATEX/CSA, Double Solenoid**

**Explosion Proof, Ex d IIC ATEX/CSA, Single Solenoid**
Directional Control Valves
Catalog HY14-2500/US
Series D1V

Dimensions

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

Explosion Proof U.L. & C.S.A., Double Solenoid

Note: 41.0 mm (1.62") from bottom of bolt hole counterbore to bottom of valve.

Explosion Proof M.S.H.A., Double Solenoid

Note: 41.0 mm (1.62") from bottom of bolt hole counterbore to bottom of valve.

Explosion Proof, EEXD ATEX, Double Solenoid

Note: 2 black wires
1 green wire

Ground Stud with Lockwasher

Note:
41.0 mm (1.62") from bottom of bolt hole counterbore to bottom of valve.
DC Plug-in or Leadwire Conduit Box with Monitor Switch, with or without Lights, Single Solenoid

Dimensions

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

Monitor Switch

(Variation I7 and I8)

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: 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.

For repetitive switch power-up conditions, please consult factory.
Manaplug (Options 56 & 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
  - "B" Solenoid (Positive) Wire #1 (Red/White)
  - "A" Solenoid (Positive) Wire #2 (Red)
  - Ground Wire #3 (Green)

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
  - "B" Solenoid (Positive) Wire #5 (Red/Black)
  - "A" Solenoid (Negative) Wire #4 (Red/Yellow)
  - Ground Wire #3 (Green)

Conduit Box Option C
- No Wiring Options Available

Hirschmann Plug with Lights (Option P5)
ISO 4400/DIN 43650 Form “A”

Pin #1 (Negative)
Pin #2 (Positive)
Pin #3 (Ground)

Face View of Plug

Pins are as seen on valve (male pin connectors)

Micro Connector Options (7B & 1D)

3-Pin Manaplug (Micro) with Lights
- Single Solenoid Valves – Installed Opposite Side of Solenoid
  - "B" Solenoid (Positive) Wire #2 (White)
  - Ground Wire #5 (Gray)
  - "A" Solenoid (Negative) Wire #3 (Blue)

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
  - "B" Solenoid (Negative) Wire #1 (Brown)
  - Ground Wire #5 (Gray)
  - "A" Solenoid (Positive) Wire #4 (Black)

Signal Lights (Option 5) — Plug-in Only
- LED Interface
- Meets Nema 4/IP67

Hirschmann Plug with Lights (Option P5)
M12 pin assignment

Pins are as seen on valve (male pin connectors)
Mounting Bolt Kits

Bolt Kits for use with D1V Directional Control Valves, "ET" Explosion Proof & Sandwich Valves (D1V*-91, 82 & 70/75 Design, Solenoid Operated & D1V*-72 Design, Non-Solenoid Operated)

<table>
<thead>
<tr>
<th>Number of Sandwich Valves @ 40mm (1.58&quot;) thickness</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK209 1.25 in.</td>
<td>BK243 2.88 in.</td>
<td>BK225 4.38 in.</td>
<td>BK244 6.00 in.</td>
<td>BK245 7.50 in.</td>
<td></td>
</tr>
<tr>
<td>BKM209 30 mm</td>
<td>BKM243 70 mm</td>
<td>BKM225 110 mm</td>
<td>BKM244 150 mm</td>
<td>BKM245 190 mm</td>
<td></td>
</tr>
<tr>
<td>BK246 3.00 in.</td>
<td>BK247 4.62 in.</td>
<td>BK248 6.12 in.</td>
<td>BK249 7.75 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM246 75 mm</td>
<td>BKM247 115 mm</td>
<td>BKM248 155 mm</td>
<td>BKM249 195 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BK250 4.75 in.</td>
<td>BK251 6.38 in.</td>
<td>BK252 7.88 in.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM250 120 mm</td>
<td>BKM251 160 mm</td>
<td>BKM252 200 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BK253 6.50 in.</td>
<td>BK254 8.12 in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM102 170 mm</td>
<td>BKM254 205 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BK103 8.25 in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM103 210 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All bolts are SAE Grade 8, 10-24 UNC 2A thread (Metric-M5-0.8) Torque to 5.6 Nm (50 in-Lb).

Bolt Kits for use with D1V Directional Control Valves with Explosion Proof Coils & Sandwich Valves (D1V*-91, 82 & 70/75 Design) Except "ET" Coil

<table>
<thead>
<tr>
<th>Number of Sandwich Valves @ 40mm (1.58&quot;) thickness</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK50 2.00 in.</td>
<td>BK211 3.63 in.</td>
<td>BK101 5.12 in.</td>
<td>BK102 6.75 in.</td>
<td>BK103 8.25 in.</td>
<td></td>
</tr>
<tr>
<td>BKM50 50 mm</td>
<td>—</td>
<td>BKM101 130 mm</td>
<td>BKM102 170 mm</td>
<td>BKM103 210 mm</td>
<td></td>
</tr>
<tr>
<td>BK51 3.75 in.</td>
<td>BK212 5.37 in.</td>
<td>BK105 6.87 in.</td>
<td>BK106 7.75 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM51 95 mm</td>
<td>—</td>
<td>BKM105 180 mm</td>
<td>BKM106 195 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BK52 5.50 in.</td>
<td>BK213 7.13 in.</td>
<td>BK108 8.62 in.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM52 140 mm</td>
<td>—</td>
<td>BKM108 220 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BK53 7.25 in.</td>
<td>BK214 8.87 in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM53 185 mm</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BK54 9.00 in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BKM54 230 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All bolts are SAE Grade 8, 10-24 UNC 2A thread (Metric-M5-0.8) Torque to 5.6 Nm (50 in-Lb).

Sandwich Valve Dimensional Data

All D03 Sandwich valves (starting with 31 Series) including CM2, CPOM2, FM2, PRDM2 and RM2 measure 40mm (1.58") thickness.

For additional technical information about Sandwich valves, refer to the Sandwich Valve Section of this Catalog.