

A**Application**

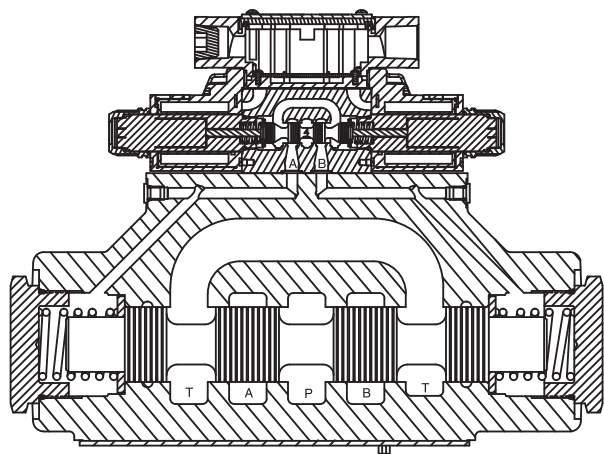
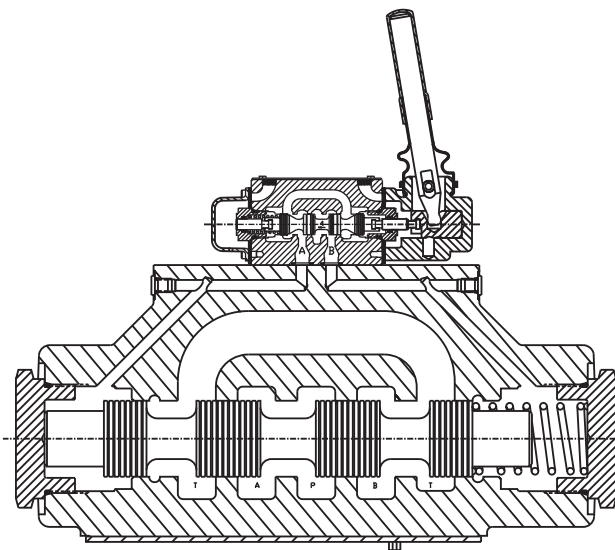
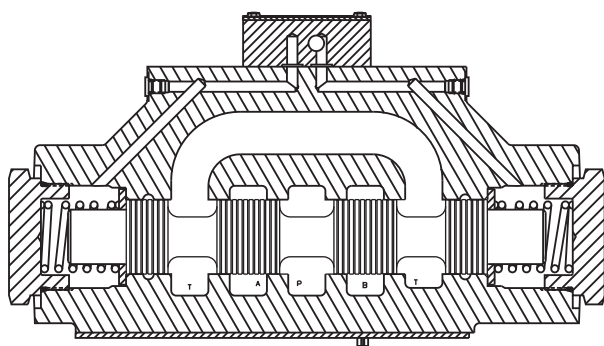
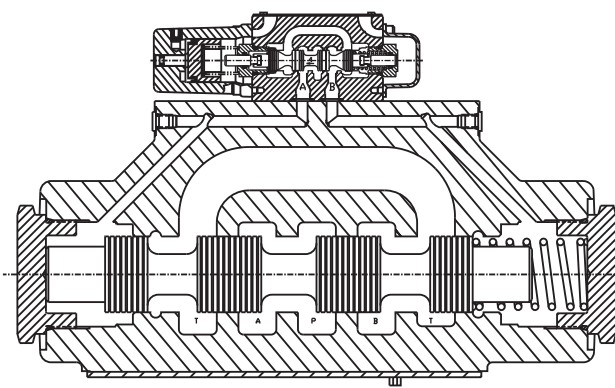
Series D101 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D10, CETOP 10 mounting pattern.

Operation

Series D101 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

- Easy access mounting bolts.
- 210 Bar (3000 PSI) pressure rating.
- Flows to 950 LPM (250 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.

**D101VW Solenoid Operated Plug-in Conduit Box****D101VL Lever Operated****D101P Oil Pilot Operated****D101VA Air Pilot Operated**

General Description

Series D101V directional control valves are 5-chamber, pilot operated, solenoid controlled valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.





Operation

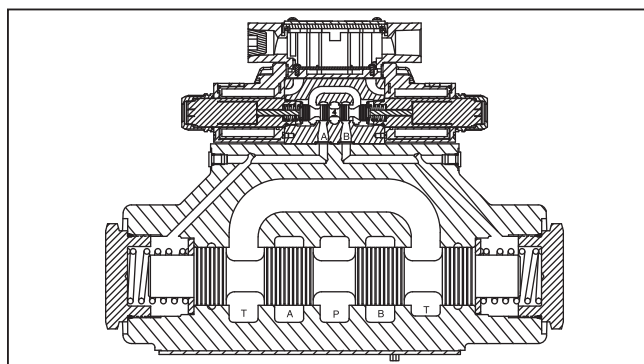
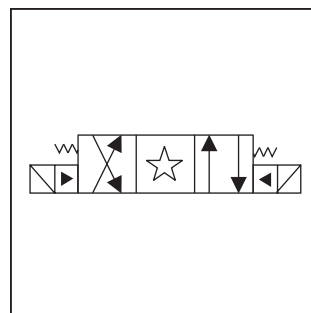
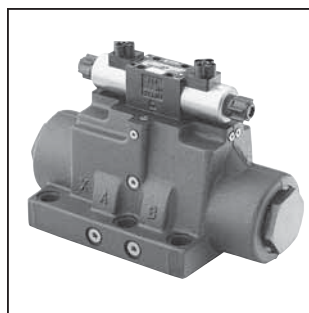
Series D101V pilot operated valves are standard with low shock spools and pilot orifice. The orifice can be removed if a faster shift is required. However, it is recommended that all systems operating above 138 Bar (2000 PSI) use the standard valve to avoid severe shock.

Features

- Low pressure drop design.
- Hardened spools provide long life.
- Fast response option available.
- Wide variety of voltages and electrical connection options.
- Explosion proof availability.
- No tools required for coil removal.

Specifications

Mounting Pattern	NFPA D10, CETOP 10, NG32
Maximum Operating Pressure	207 Bar (3000 PSI) Standard CSA  207 Bar (3000 PSI)
Maximum Tank Line Pressure	Internal Drain Model: 102 Bar (1500 PSI) AC Only 207 Bar (3000 PSI) DC Standard/AC Optional External Drain Model: 207 Bar (3000 PSI) CSA  102 Bar (1500 PSI)
Maximum Drain Pressure	102 Bar (1500 PSI) AC Only 207 Bar (3000 PSI) DC Standard/AC Optional CSA  102 Bar (1500 PSI)
Minimum Pilot Pressure	4.4 Bar (65 PSI)
Maximum Pilot Pressure	207 Bar (3000 PSI) Standard CSA  207 Bar (3000 PSI)
Nominal Flow	378 LPM (100 GPM)
Maximum Flow	See Reference Chart



Response Time

Response times (milliseconds) are measured at 205 Bar (3000 PSI) and 416 LPM (110 GPM) with various pilot pressures as indicated.

Solenoid Type	Pilot Pressure	Pull-In		Drop-Out	
		Std	Fast	Std	Fast
DC	500	180	170	195	195
	1000	130	125	195	195
	2000	100	95	195	195
AC	500	140	130	185	185
	1000	90	85	185	185
	2000	60	55	185	185

Because of the high drain line pressure transients generated during shifting, use of the fast response option is not recommended for pilot pressures exceeding 205 Bar (2000 PSI).

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D Directional Control Valve	101V Basic Valve	 Actuator	 Spool	 Style	 Pilot Supply and Drain	 Seal	 Solenoid Voltage
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NFPA D10
CETOP 10
DIN NG32
D03 Pilot

Code	Description
W*	Solenoid, Wet Pin, Screw-in
HW*	Reversed Wiring

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
1	Internal Pilot, External Drain
2	External Pilot, External Drain
3	Internal Pilot w/Check, External Drain
4#	Internal Pilot, Internal Drain
5	External Pilot, Internal Drain
6	Internal Pilot w/Check, Internal Drain

Not available with 002, 007, 008 and 009 spools.

Code	Description
A*	24/50 VAC
D	120 VDC
G	198 VDC
J	24 VDC
K	12 VDC
N**	220/50 VAC
Q*	100/60 VAC
QD†	100 VAC/50 Hz 100 VAC/60 Hz
R	24/60 VAC
T	240/60 - 220/50 VAC
U	98 VDC
Y	120/60 - 110/50 VAC
Z	250 VDC

* High Watt only.
** Explosion Proof only.
† DIN style only.

Code	Symbol	Code	Symbol
001		006	
002		007	
003		008*	
004		009**	
005		011	

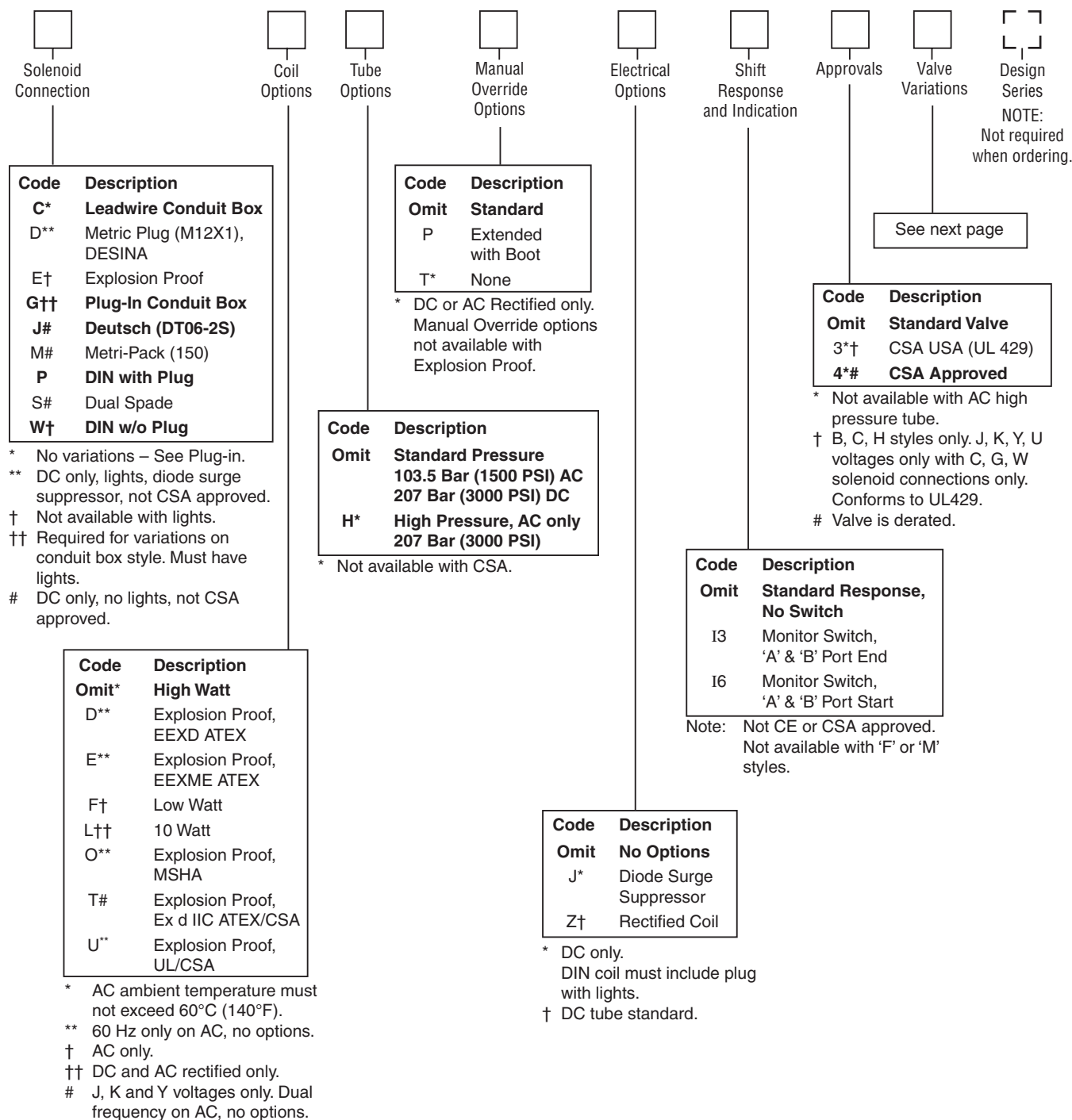
* 008 spool has closed crossover.
** 009 spool has open crossover.

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.	

* Available with 001, 002, 004 and 011 spools only.

Bold: Designates Tier I products and options.

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



Valve Weight:
Double Solenoid 35.0 kg (77.1 lbs.)
Standard Bolt Kit: BK229
Seal Kit:
Nitrile SKD101VWN91
Fluorocarbon SKD101VWV91

Bold: Designates Tier I products and options.

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

Valve Variations

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Code	Description
5*	Signal Lights – Standard
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	Manaplug (Mini) with Lights
20	Fast Response
1C**	Manaplug (Mini) Single Sol. 5-pin, with Lights
1D**	Manaplug (Micro) Single Sol. 5-pin, with Lights
1G**	Manaplug (Mini) Single Sol. 5-pin, with Stroke Adjust 'A' & 'B' End and Lights
1H**	Manaplug (Micro) Single Sol. 5-pin, with Stroke Adjust 'A' & 'B' End and Lights
1M**	Manaplug Opposite Normal
1P	Painted Body
1R	Stroke Adjust 'A' & 'B' End with Pilot Choke Meter In
3A	Pilot Choke Meter Out
3B	Pilot Choke Meter In
3C	Pilot Pressure Reducer
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	Pilot Choke Meter Out with Lights
3H*	Pilot Choke Meter In with Lights
3J*	Pilot Pressure Reducer with Lights
3K	Pilot Choke Meter Out with Stroke Adjust 'A' & 'B' End
3L**	Pilot Choke Meter Out, Stroke Adjust 'A' & 'B' End with Lights and Manaplug — Brad Harrison Mini
3M	Pilot Choke Meter Out, Pilot Pressure Reducer, Stroke Adjust 'A' & 'B' End
3R	Pilot Choke Meter Out & Pilot Pressure Reducer
3S**	Lights, Mini Manaplug, Pilot Choke Meter Out
7Y**	M12x1 Manaplug (4-pin), Special Wiring, and Lights

* DESINA, plug-in conduit box, and DIN with plug styles only.

** Must have plug-in style conduit box.

Bold: Designates Tier I products and options.

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

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Reference Data

Model	Spool Symbol	Maximum Flow, LPM (GPM) 205 Bar (3000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 205 Bar (3000 PSI) w/o Malfunction
D101V*001		946 (250)	D101V*006		946 (250)
D101V*002		946 (250)	D101V*007		303 (80)
D101V*003		946 (250)	D101V*008		492 (130)
D101V*004		946 (250)	D101V*009		
D101V*005		946 (250)	D101V*011		946 (250)

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D101VW Series Pressure Drop Chart

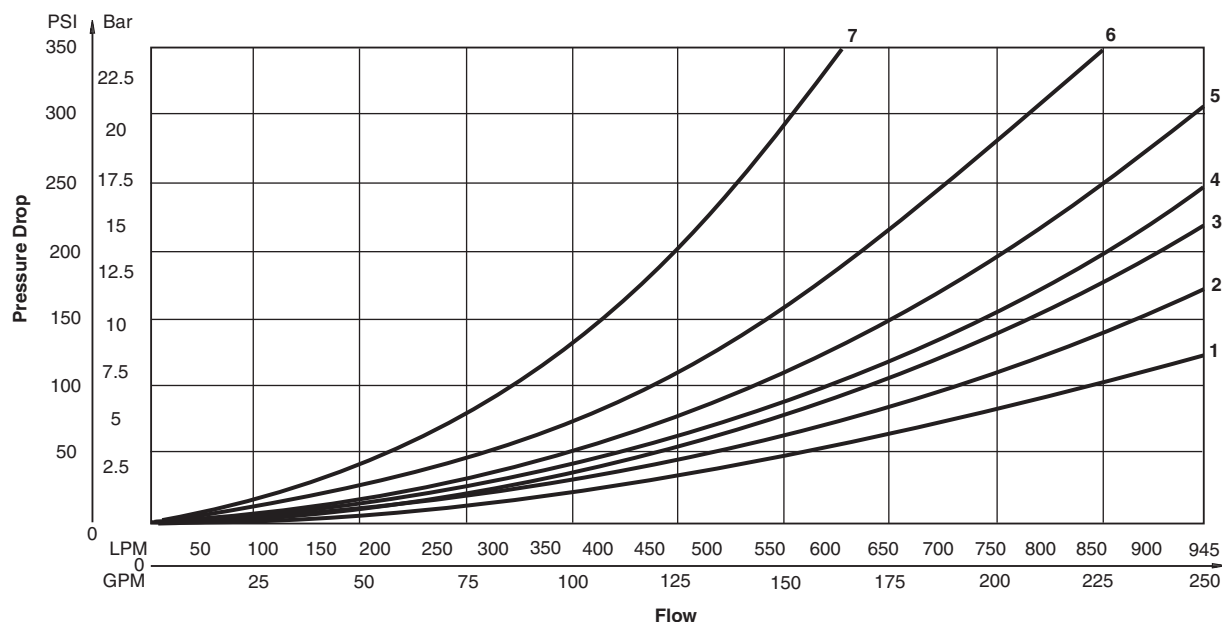
The following chart provides the flow vs. pressure drop curve reference for the Series D101VW valve by spool type.

VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141

Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.

D101VW Pressure Drop Reference Chart -- Curve Number					
Spool No.	P-A	P-B	P-T	A-T	B-T
001	4	4	—	2	3
002	3	3	3	1	2
003	4	4	—	1	3
004	4	4	—	1	2
005	3	4	—	2	3
006	3	3	—	2	3
007	4	3	7	2	2
008/009	5	5	6	2	3
011	4	4	—	2	3

Performance Curves



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Solenoid Ratings

Insulation System	Class F
Allowable Deviation from rated voltage	-15% to +10% for DC and AC rectified coils -5% to +5% for AC Coils
Armature	Wet pin type
CSA File Number	LR60407
Environmental Capability	DC Solenoids meet NEMA 4 and IP67 when properly wired and installed. Contact HVD for AC coil applications.

Explosion Proof Solenoid Ratings*

U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	Complies with ATEX EN60079-0, EN60079-1 Ex d IIC; CSA/US Ex d IIC, AEx d IIC for Class I, Zone 1, UL1203, UL1604, CSA E61241,1 Class II, Div 1

* Allowable Voltage Deviation $\pm 10\%$.

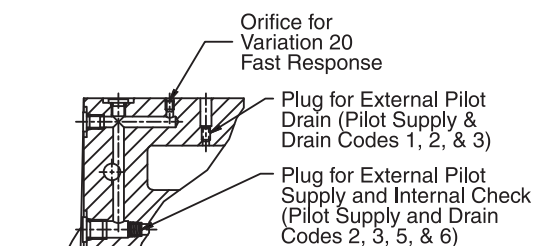
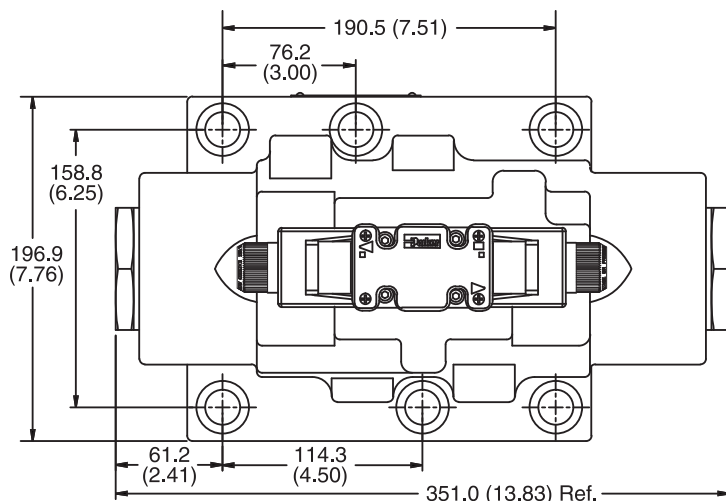
Note that Explosion Proof AC coils are single frequency only.

Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3MM	Watts	Resistance
Voltage Code	Power Code						
D	L	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 ohms
G	Omit	198 VDC	N/A	N/A	0.15 Amps	30 W	1306.80 ohms
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohms
J	Omit	24 VDC	N/A	N/A	1.32 Amps	30 W	17.27 ohms
K	L	12 VDC	N/A	N/A	0.88 Amps	10 W	12.97 ohms
K	Omit	12 VDC	N/A	N/A	2.64 Amps	30 W	4.32 ohms
L	L	6 VDC	N/A	N/A	1.67 Amps	10 W	3.59 ohms
L	Omit	6 VDC	N/A	N/A	5.00 Amps	30 W	1.20 ohms
Q	Omit	100 VAC / 60 Hz	2.05 Amps	170 VA	0.77 Amps	30 W	19.24 ohms
QD	F	100 VAC / 60 Hz	1.35 Amps	135 VA	0.41 Amps	18 W	31.20 ohms
QD	F	100 VAC / 50 Hz	1.50 Amps	150 VA	0.57 Amps	24 W	31.20 ohms
R	F	24/60 VAC, Low Watt	6.67 Amps	160 VA	2.20 Amps	23 W	1.52 ohms
T	Omit	240/60 VAC	0.83 Amps	199 VA	0.30 Amps	30 W	120.40 ohms
T	Omit	220/50 VAC	0.87 Amps	191 VA	0.34 Amps	30 W	120.40 ohms
T	F	240/60 VAC, Low Watt	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohms
T	F	220/50 VAC, Low Watt	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 ohms
U	L	98 VDC	N/A	N/A	0.10 Amps	10 W	960.00 ohms
U	Omit	98 VDC	N/A	N/A	0.31 Amps	30W	288.00 ohms
Y	Omit	120/60 VAC	1.7 Amps	204 VA	0.60 Amps	30 W	28.20 ohms
Y	Omit	110/50 VAC	1.7 Amps	187 VA	0.68 Amps	30 W	28.20 ohms
Y	F	120/60 VAC, Low Watt	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohms
Y	F	110/50 VAC, Low Watt	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 ohms
Z	L	250 VDC	N/A	N/A	0.04 Amps	10 W	6875.00 ohms
Z	Omit	250 VDC	N/A	N/A	0.13 Amps	30 W	1889.64 ohms
Explosion Proof Solenoids							
R		24/60 VAC	7.63 Amps	183 VA	2.85 Amps	27 W	1.99 ohms
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
N		220/50 VAC	0.77 Amps	169 VA	0.31 Amps	27 W	1.38 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohms
P		110/50 VAC	1.47 Amps	162 VA	0.57 Amps	27 W	34.70 ohms
K		12 VDC	N/A	N/A	2.75 Amps	33 W	4.36 ohms
J		24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohms
"ET" Explosion Proof Solenoids							
K		12 VDC	N/A	N/A	1.00 Amps	12 W	12.00 ohms
J		24 VDC	N/A	N/A	1.00 Amps	13 W	44.30 ohms
Y		120/60-50 VAC	N/A	N/A	0.16 Amps	17 W	667.00 ohms

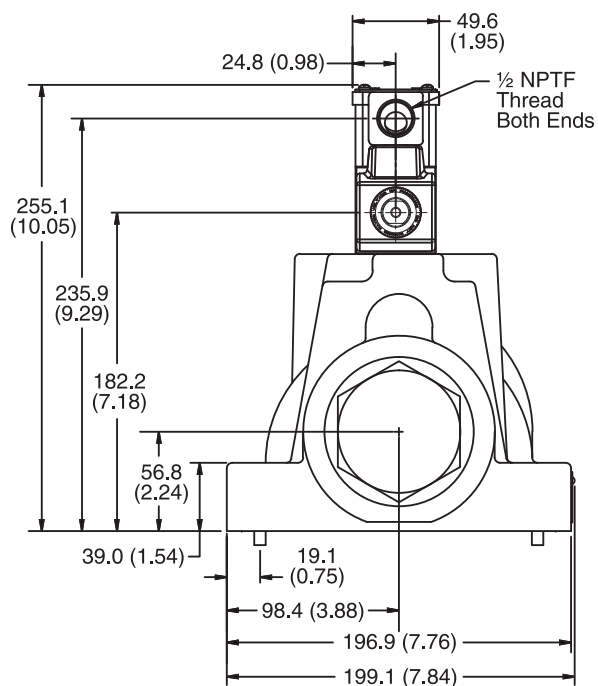
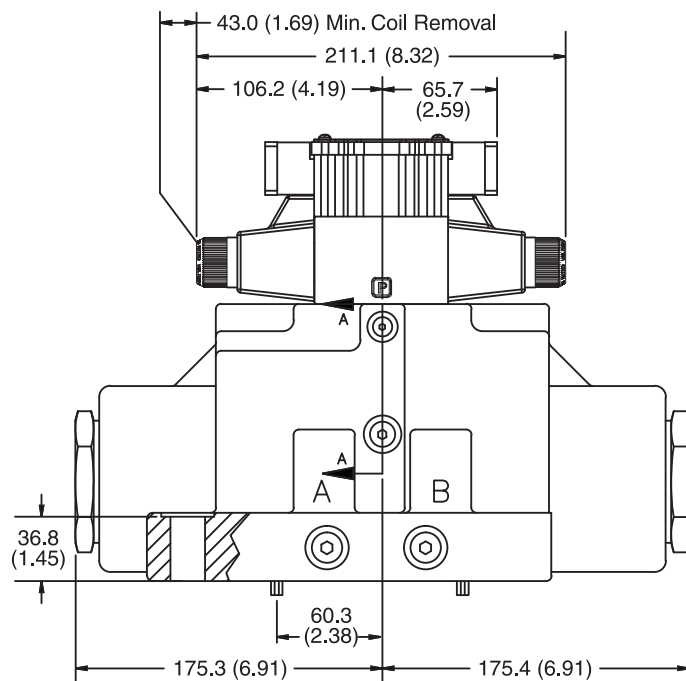
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Inch equivalents for millimeter dimensions are shown in (**)

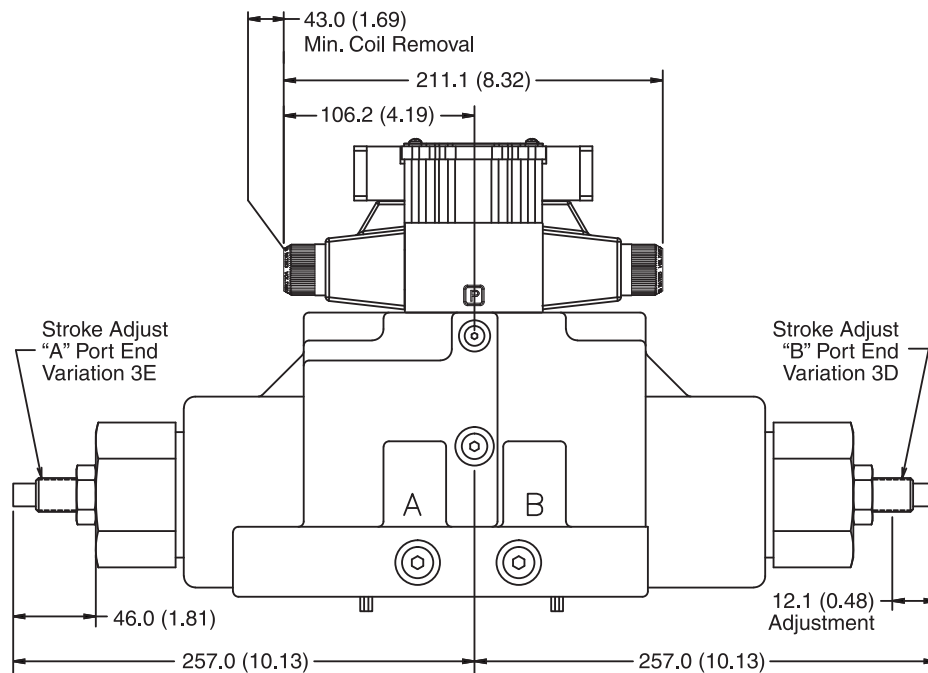
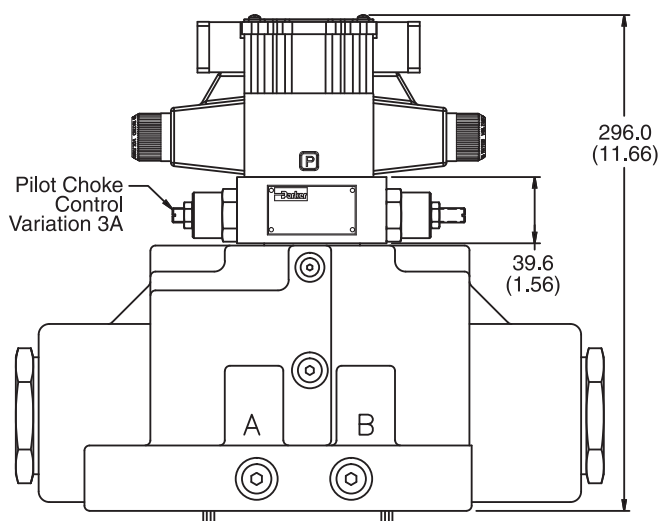
Plug-in Conduit Box, Double AC Solenoid

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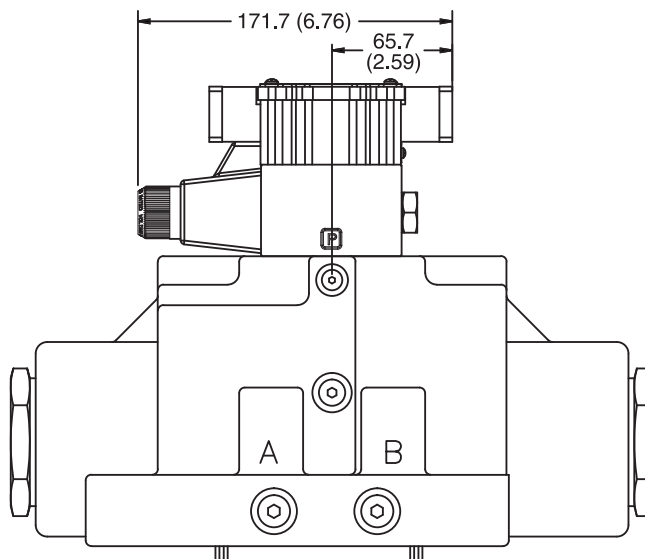
Section A-A

**Note:** 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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

A**Conduit Box and Stroke Adjust, Double AC Solenoid****Note:** 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.**Conduit Box and Pilot Choke Control, Double AC Solenoid****Note:** 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

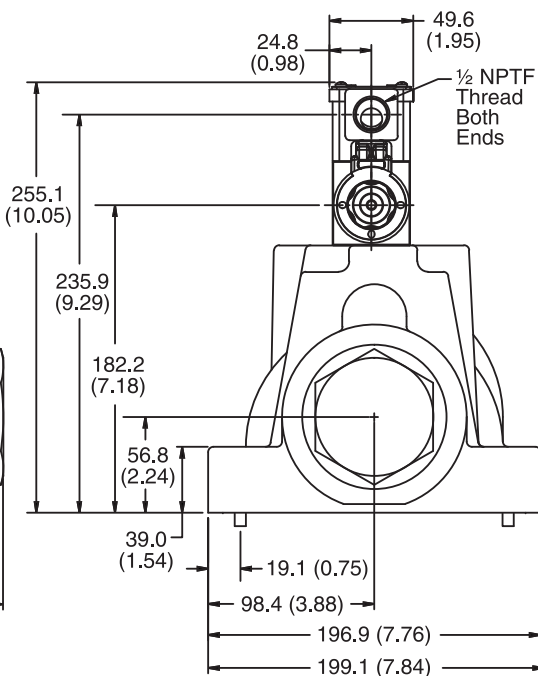
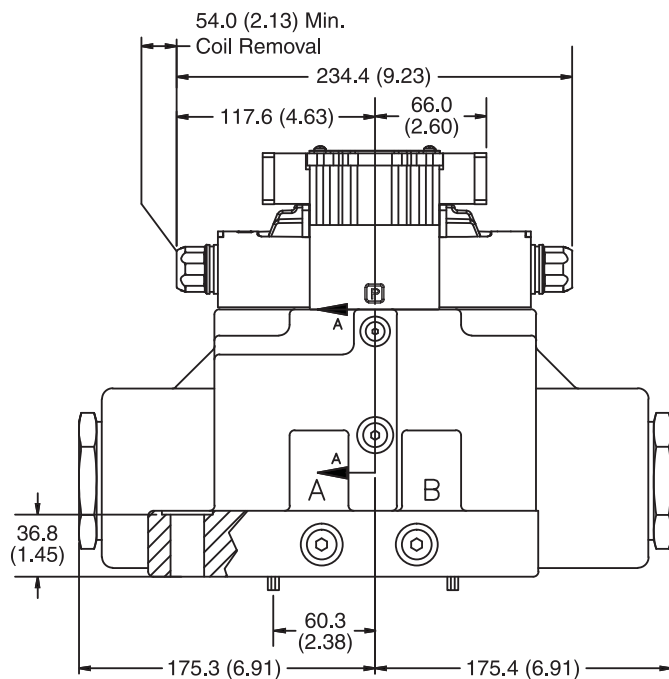
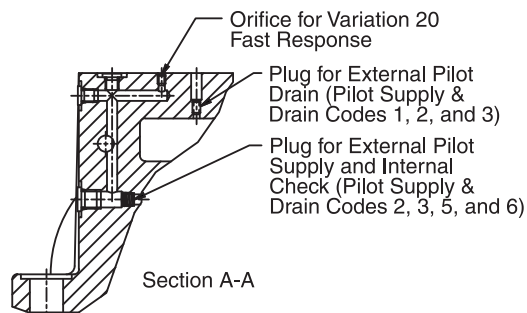
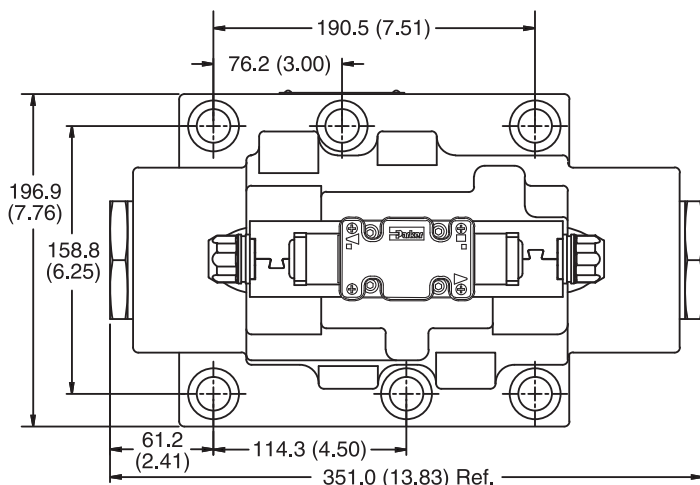
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Conduit Box, Single AC Solenoid

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

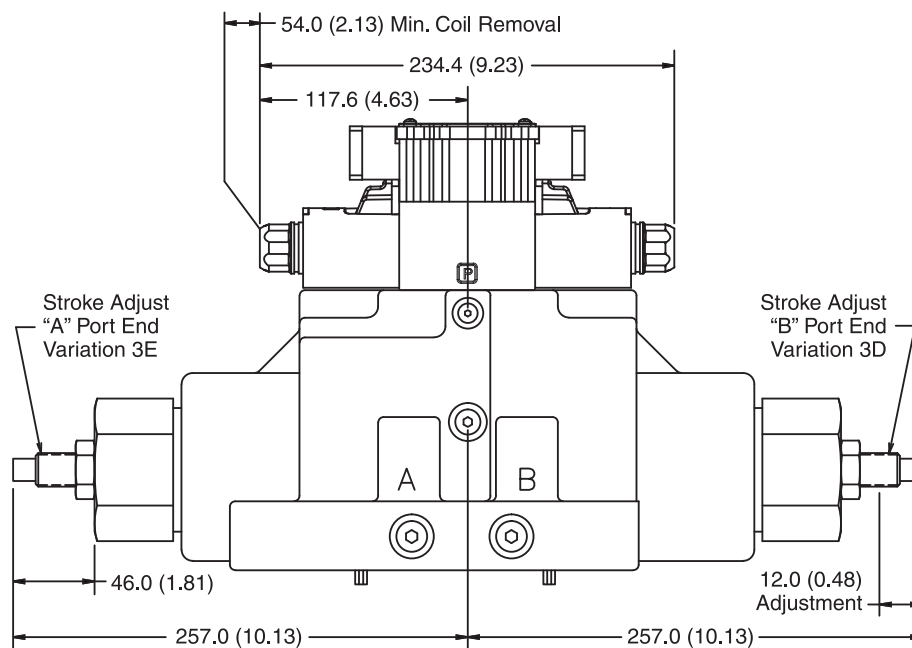
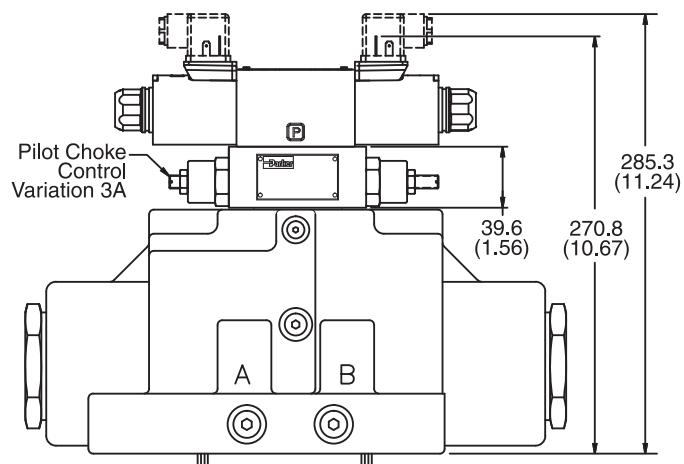
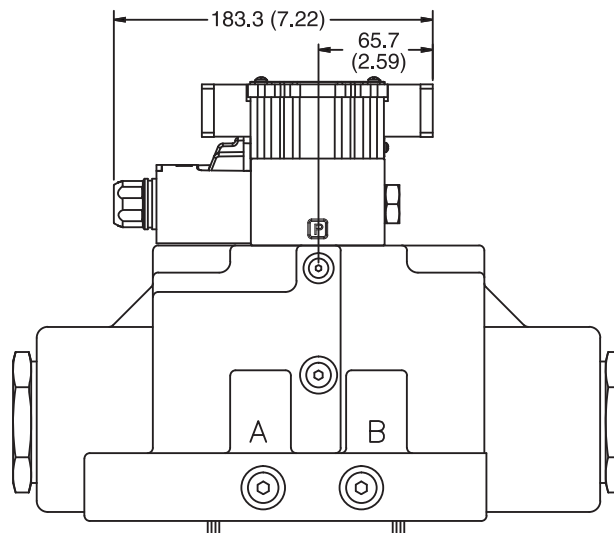
Plug-in Conduit Box, Double DC Solenoid

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Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

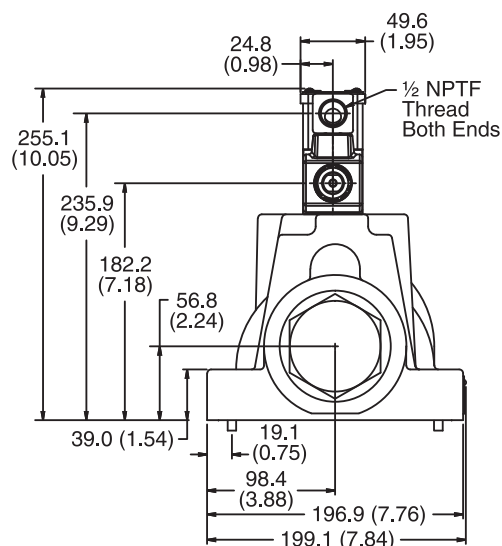
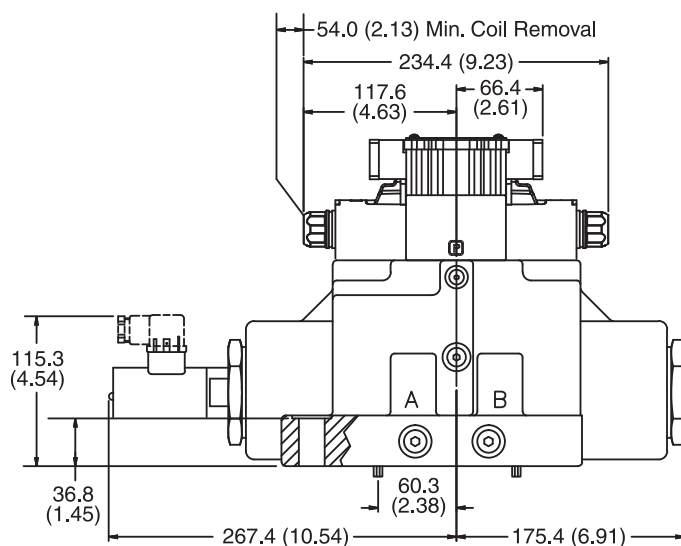
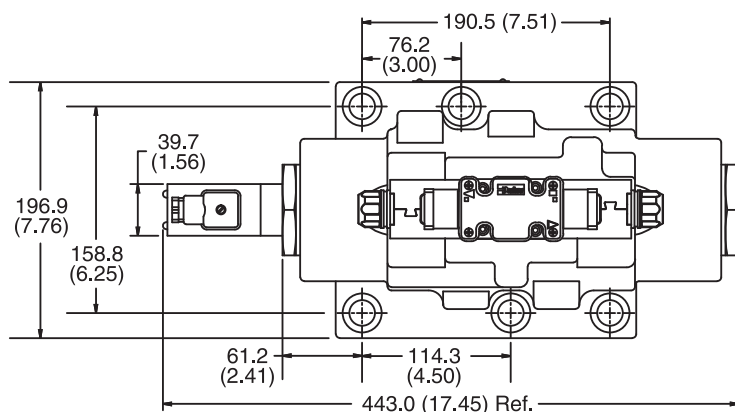
Inch equivalents for millimeter dimensions are shown in (**)

A**Plug-in Conduit Box and Stroke Adjust, Double DC Solenoid****Note:** 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.**Hirschmann and Pilot Choke Control, Double DC Solenoid****Note:** 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.**Plug-in Conduit Box, Single DC Solenoid**

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

Plug-in Conduit Box, Double DC Solenoid with Variation I3 or I6 (Monitor Switch)

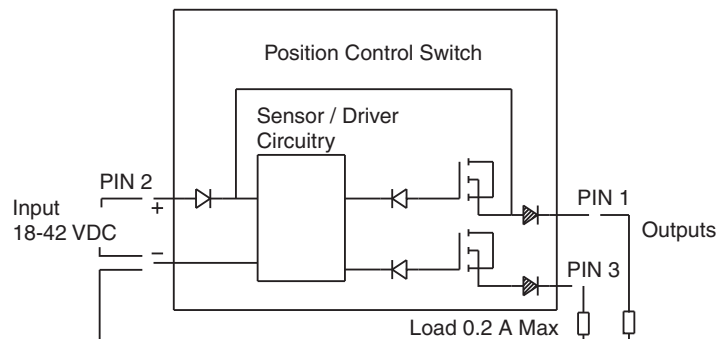

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Monitor Switch (Variation I3 and I6)

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

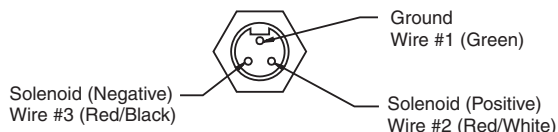
Switch Data

Pin 1 and Pin 3 have outputs equal to the input. When the monitor switch has the output to Pin 1, Pin 3 will have an output of zero, and vice-versa. When the valve is switched, Pin 1 and Pin 3 will switch outputs.

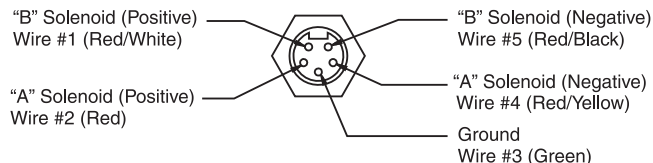


A**Manaplug (Options 6, 56, 1A & 1C)**

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

**3-Pin Manaplug (Mini) with Lights**

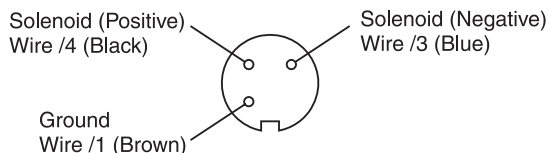
Single Solenoid Valves – Installed Opposite Side of Solenoid

**5-Pin Manaplug (Mini) with Lights**

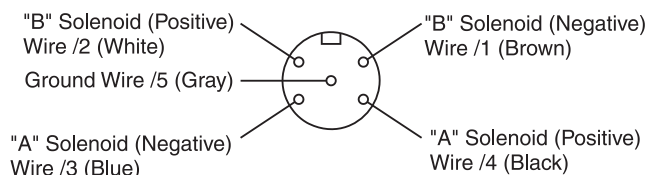
Single Solenoid Valves – Installed Opposite Side of Solenoid

Double Solenoid Valves – Installed Over "A" Solenoid

("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Micro Connector Options (7A, 7B, 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)**Manaplug – Electrical Mini Plug**

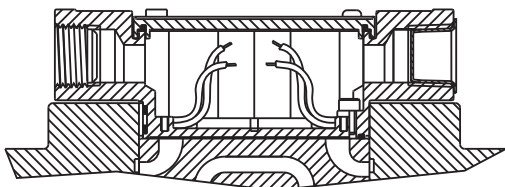
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

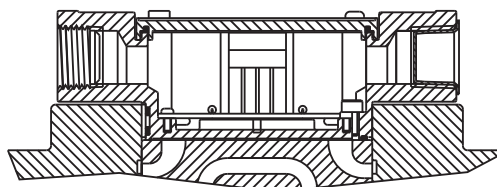
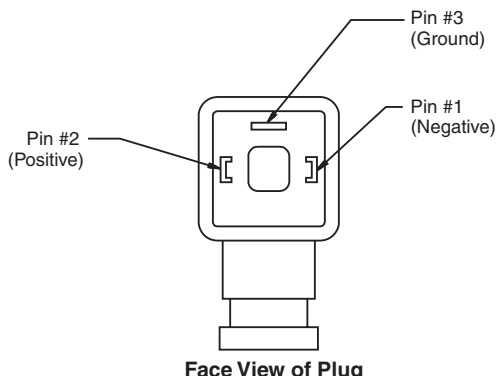
EP337-30	3 Pin Plug
EP317-30	5 Pin Plug (Double Solenoid)
EP31B-30	5 Pin Plug (Single Solenoid)

Conduit Box Option C

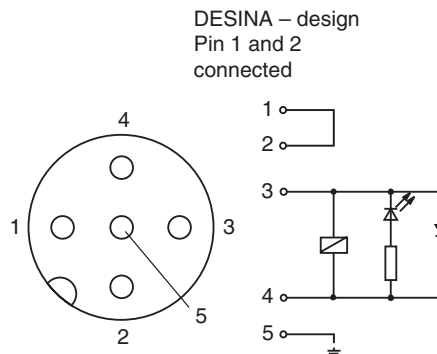
- No Wiring Options Available

**Signal Lights (Option 5) — Plug-in Only**

- LED Interface
- Meets Nema 4/IP67

**Hirschmann Plug with Lights (Option P5)**
ISO 4400/DIN 43650 Form "A"**Pins are as seen on valve (male pin connectors)****DESINA Connector (Option D)**
M12 pin assignment
Standard

- 1 = Not used
- 2 = Not used
- 3 = 0V
- 4 = Signal (24 V)
- 5 = Earth Ground

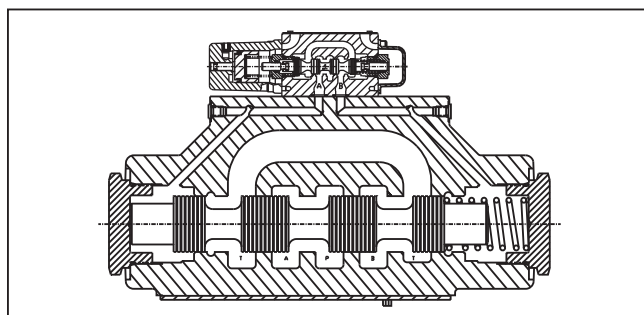
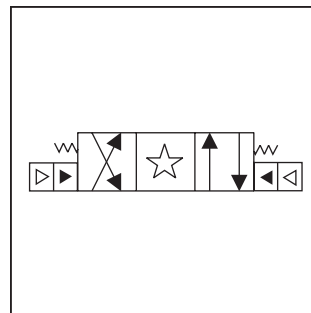
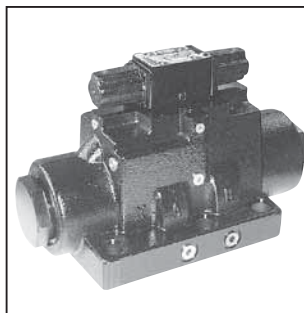


General Description

Series D101VA directional control valves are 5-chamber, air pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.

Specifications

Mounting Pattern	NFPA D10, CETOP 10, NG32
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Reference Chart
Pilot Pressure	Air Min 3.4 Bar (50 PSI) Air Max 10.2 Bar (150 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)



Features

- Low pressure drop design.
- Hardened spools provide long life.

Ordering Information

D

Directional Control Valve

101V

Basic Valve

NFPA D10
CETOP 10

A

Air Operated Pilot

Spool

Style

Pilot Supply and Drain

Seal

Code	Type
N	Nitrile
V	Fluorocarbon

Valve Variations

Design Series

NOTE:
Not required when ordering.

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

Code	Symbol
1	
2	
4	
8*	
9**	
11	

* 8 spool has closed crossover.
** 9 spool has open crossover.

Code	Description
1	Int. pilot/Ext. drain
2	Ext. pilot/Ext. drain
4#	Int. pilot/Int. drain
5	Ext. pilot/Int. drain

Not available with 2, 8 & 9 spools.

Code	Description	Symbol
B†	Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.	
C	Dbl. operator, 3 position, spring centered.	
H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.	

† Available with 1, 2, 4 & 11 spools only.

Code	Description
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends
90	1/4 BSPP Threads

This condition varies with spool code.

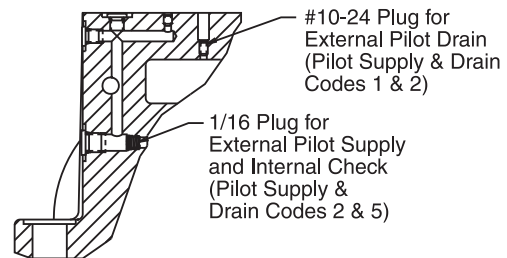
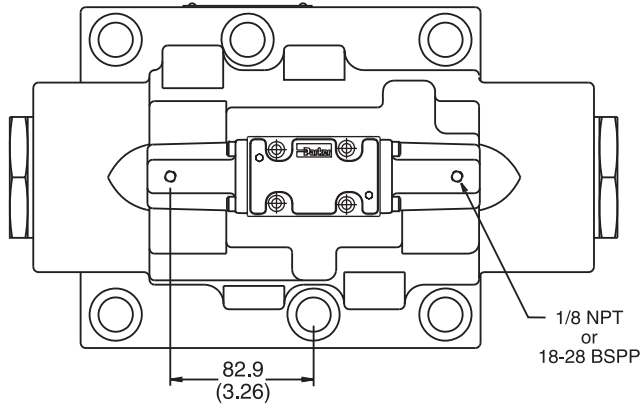
Valve Weight: 35.3 kg (77.8 lbs.)
Standard Bolt Kit: BK229
Metric Bolt Kit: BKM229

Bold: Designates Tier I products and options.

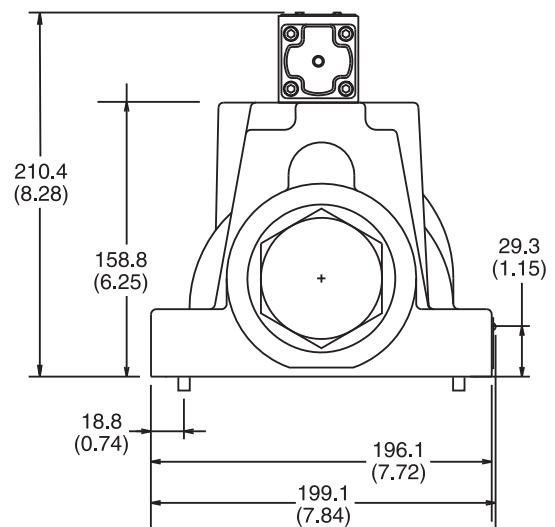
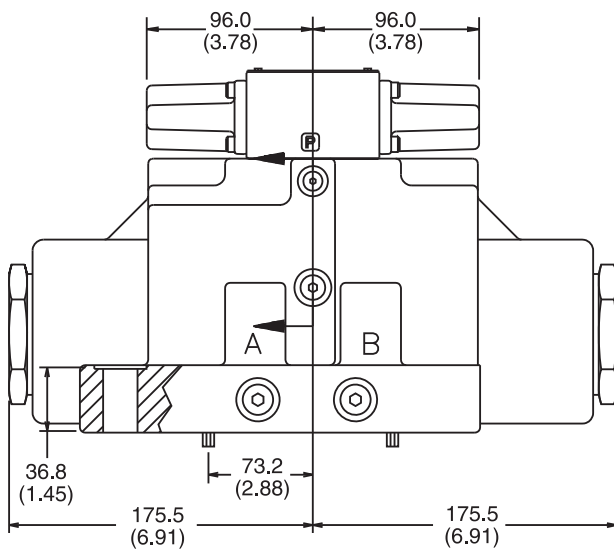
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

D101.indd, dd

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

A**Air Operated**

Section A-A

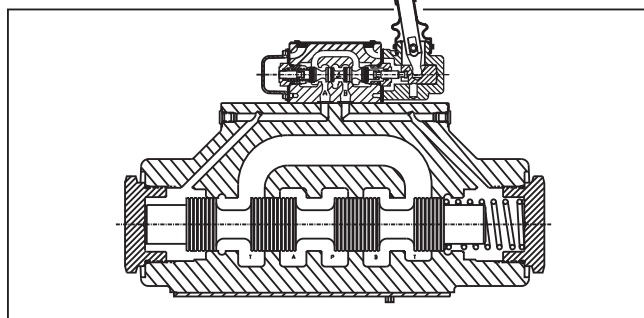
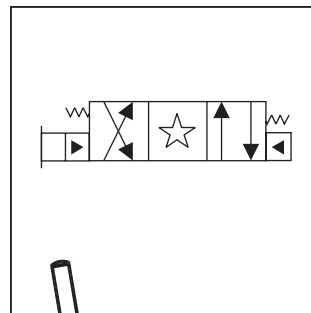
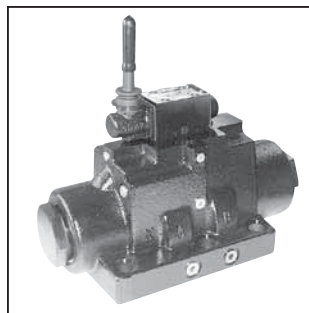
**Note:** 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

General Description

Series D101VL directional control valves are 5-chamber, lever operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.

Specifications

Mounting Pattern	NFPA D10, CETOP 10, NG32
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Reference Chart
Pilot Pressure	Oil Min 6.9 Bar (100 PSI) Oil Max 207 Bar (300 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)



Features

- Low force required to shift spool.
- Hardened spools provide long life.
- Low pressure drop design.

Ordering Information

<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;">D</div> Directional Control Valve	<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;">101V</div> Basic Valve <div style="border: 1px solid black; padding: 2px; width: 60px; margin: 0 auto;">NFPA D10 CETOP 10</div>	<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;">L</div> Lever Operated Pilot	<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;"></div> Spool	<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;"></div> Style	<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;"></div> Pilot Supply and Drain	<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;"></div> Seal	<div style="border: 1px solid black; padding: 2px; width: 30px; margin: 0 auto;"></div> Valve Variations	<div style="border: 1px dashed black; padding: 2px; width: 30px; margin: 0 auto;"></div> Design Series NOTE: Not required when ordering.
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<table border="1" style="width: 100%;"> <thead> <tr> <th>Code</th><th>Symbol</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td><td></td></tr> <tr> <td style="text-align: center;">2</td><td></td></tr> <tr> <td style="text-align: center;">4</td><td></td></tr> <tr> <td style="text-align: center;">8*</td><td></td></tr> <tr> <td style="text-align: center;">9**</td><td></td></tr> <tr> <td style="text-align: center;">11</td><td></td></tr> </tbody> </table> <p>* 8 spool has closed crossover. ** 9 spool has open crossover.</p>	Code	Symbol	1		2		4		8*		9**		11		<table border="1" style="width: 100%;"> <thead> <tr> <th>Code</th><th>Type</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">N</td><td>Nitrile</td></tr> <tr> <td style="text-align: center;">V</td><td>Fluorocarbon</td></tr> </tbody> </table> <table border="1" style="width: 100%;"> <thead> <tr> <th>Code</th><th>Supply — Drain</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td><td>Int. pilot/Ext. drain</td></tr> <tr> <td style="text-align: center;">2</td><td>Ext. pilot/Ext. drain</td></tr> <tr> <td style="text-align: center;">4#</td><td>Int. pilot/Int. drain</td></tr> <tr> <td style="text-align: center;">5</td><td>Ext. pilot/Int. drain</td></tr> </tbody> </table> <p># Not available with 2, 8 & 9 spools.</p>	Code	Type	N	Nitrile	V	Fluorocarbon	Code	Supply — Drain	1	Int. pilot/Ext. drain	2	Ext. pilot/Ext. drain	4#	Int. pilot/Int. drain	5	Ext. pilot/Int. drain	<table border="1" style="width: 100%;"> <thead> <tr> <th>Code</th><th>Description</th><th>Symbol</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">B†</td><td>Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.</td><td></td></tr> <tr> <td style="text-align: center;">C</td><td>Dbl. operator, 3 position, spring centered.</td><td></td></tr> <tr> <td style="text-align: center;">H†</td><td>Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.</td><td></td></tr> </tbody> </table> <p>† Available with 1, 2, 4 & 11 spools only.</p>	Code	Description	Symbol	B†	Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.		C	Dbl. operator, 3 position, spring centered.		H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.		<table border="1" style="width: 100%;"> <thead> <tr> <th>Code</th><th>Description</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">7</td><td>Pilot Choke — Meter Out</td></tr> <tr> <td style="text-align: center;">8</td><td>Stroke Adj. 'B' End</td></tr> <tr> <td style="text-align: center;">9</td><td>Stroke Adj. 'A' End</td></tr> <tr> <td style="text-align: center;">60</td><td>Pilot Choke — Meter In</td></tr> <tr> <td style="text-align: center;">89</td><td>Stroke Adj. 'A' & 'B' Ends</td></tr> </tbody> </table>	Code	Description	7	Pilot Choke — Meter Out	8	Stroke Adj. 'B' End	9	Stroke Adj. 'A' End	60	Pilot Choke — Meter In	89	Stroke Adj. 'A' & 'B' Ends
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Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides on #8 and #9 spools. See installation information for details.

Bold: Designates Tier I products and options.

Non-Bold: Designates Tier II products and options.

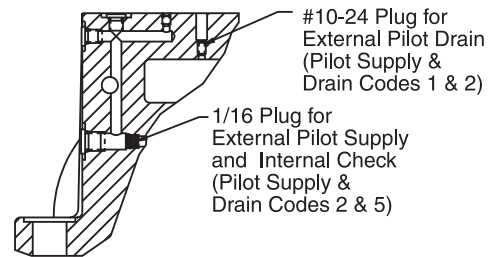
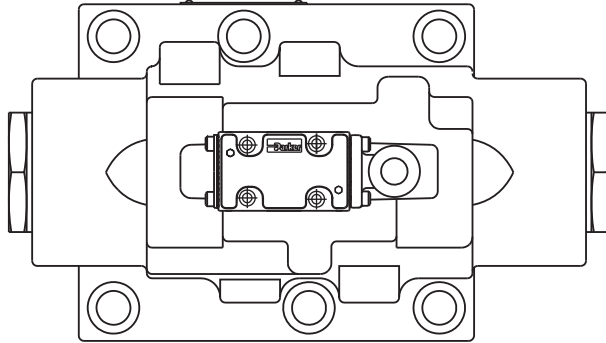
These products will have longer lead times.

Valve Weight: 35.0 kg (77.2 lbs.)

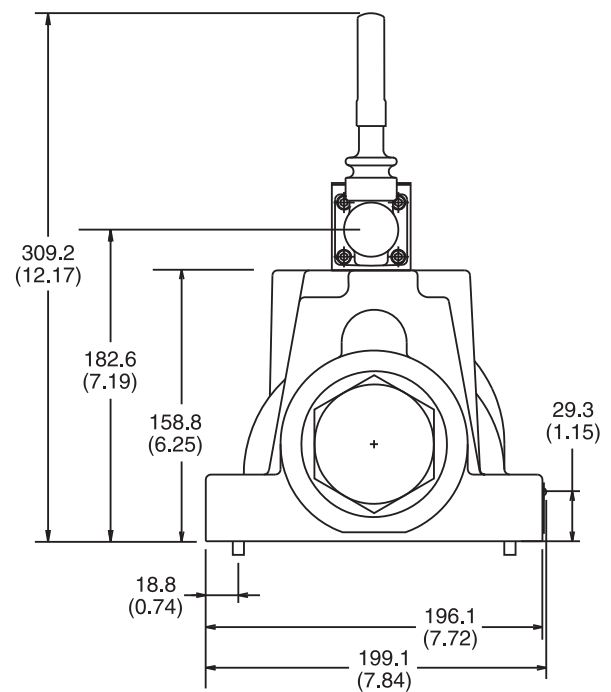
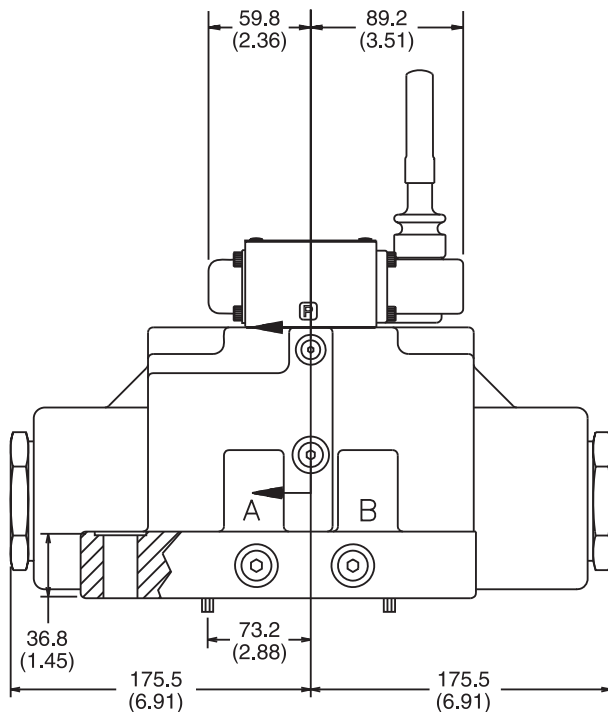
Standard Bolt Kit: BK229

Metric Bolt Kit: BKM229

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

A**Lever Operated**

Section A-A

**Note:** 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

General Description

Series D10P directional control valves are 5-chamber, pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.

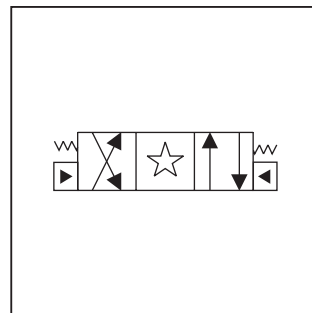
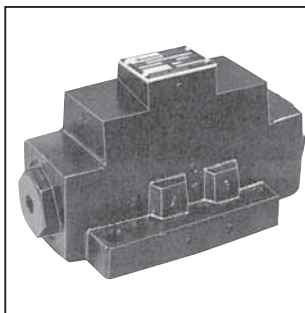
Features

- Low pressure drop design.
- Hardened spools provide long life.

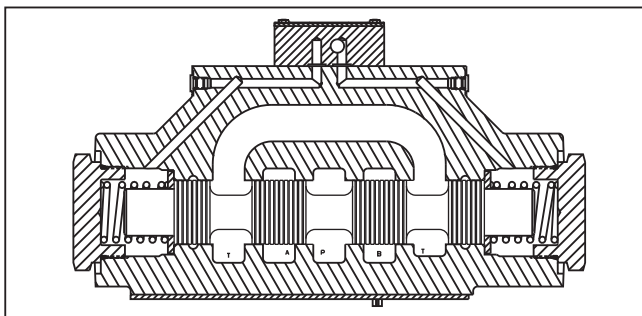
Specifications

Mounting Pattern	NFPA D10, CETOP 10, NG32
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Line Pressure	207 Bar (3000 PSI)
Max. Drain Pressure	207 Bar (3000 PSI)
Min. Pilot Pressure	4.4 Bar (65 PSI)
Max. Pilot Pressure	207 Bar (3000 PSI)
Nominal Flow	378 LPM (100 GPM)
Maximum Flow	See Reference Chart

For flow path, pilot drain and pilot pressure details, see Installation Information.



A



Response Time

Response time will vary with pilot line size, pilot line length, pilot pressure shift time and flow capacity of the control valve.

Shift Volume

The pilot chamber requires a volume of 1.51 in³ (24.75 cc) for center to end.

Ordering Information

D Directional Control Valve

10 Basic Valve
NFPA D10
CETOP 10

P Actuator
Oil Operator

Spool

Code	Symbol
1	
2	
4	
8*	
9**	
11	

* 8 spool has closed crossover.
** 9 spool has open crossover.

Style

Code	Description
2	Ext. Pilot / Ext. Drain
5#	Ext. Pilot / Int. Drain

Available in "B" & "H" styles only.

Pilot Supply and Drain

Code	Type
N	Nitrile
V	Fluorocarbon

Seal

Valve Variations

Code	Description
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends

Design Series
NOTE: Not required when ordering.

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

Valve Weight: 34.3 kg (75.7 lbs.)

Standard Bolt Kit: BK229

Metric Bolt Kit: BKM229

Code	Description	Symbol
B†	Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.	
C	Dbl. operator, 3 position, spring centered.	
H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.	

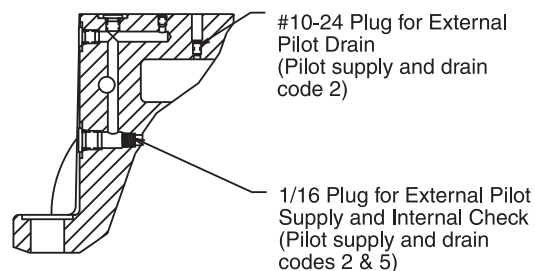
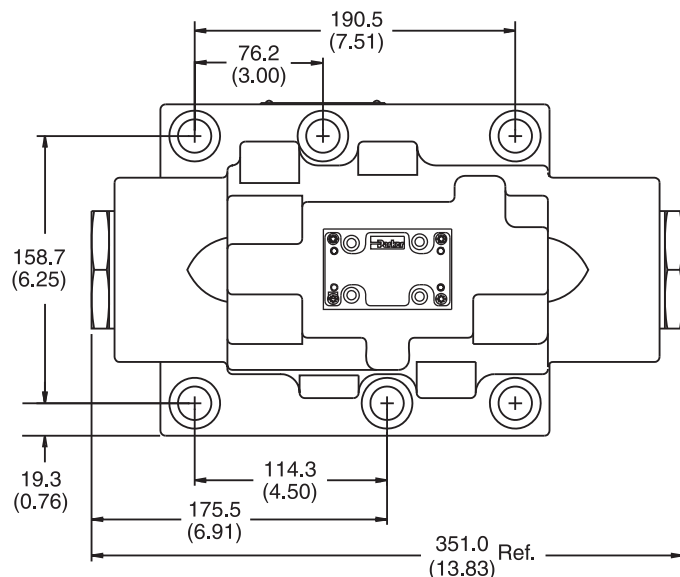
† Available with 1, 2, 4 & 11 spools only.

This condition varies with spool code.

Bold: Designates Tier I products and options.

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

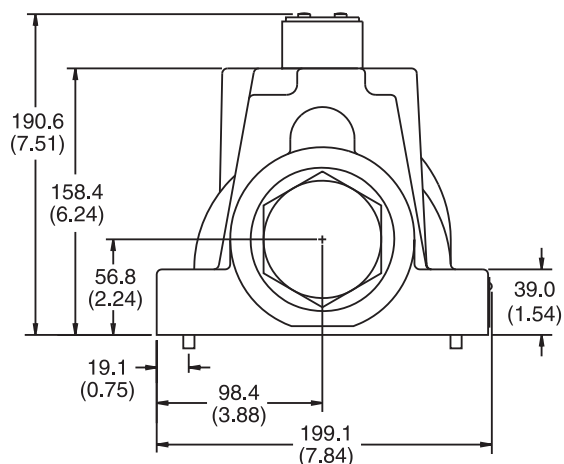
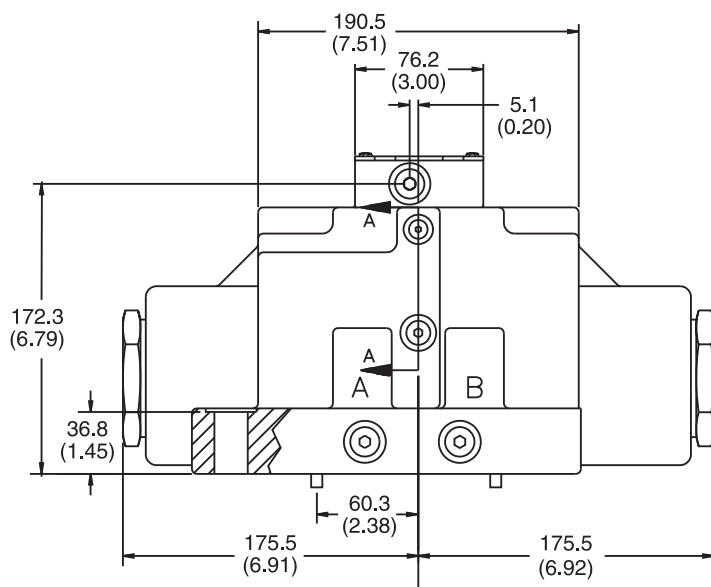
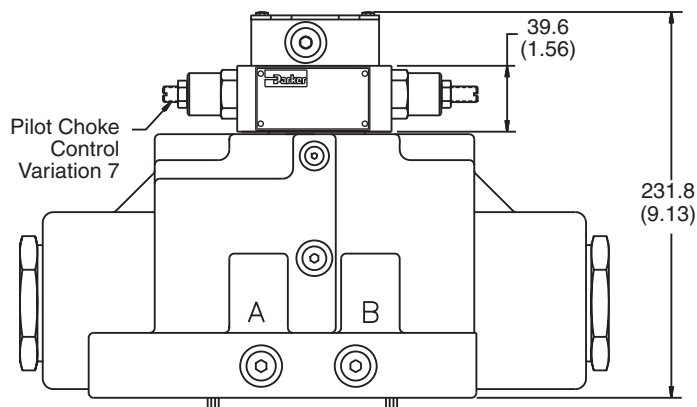
Inch equivalents for millimeter dimensions are shown in (**)

A**Standard Pilot Operated**

Section A-A



Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

**Pilot Operated with Pilot Choke Control**

Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

FOR MAXIMUM VALVE RELIABILITY, ADHERE TO THE FOLLOWING INSTALLATION INFORMATION.

The following is important installation information which applies to all directional control valves described in this catalog.

Mounting Position

Detent – Horizontal
Spring Offset – Unrestricted
Spring Centered – Unrestricted

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 operating viscosity range is from 16-220 cSt (80-1000 SSU). Oil should have maximum anti-wear properties and rust and oxidation treatment.

Fluids and Seals

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

Filtration

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

Silting

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

Special Installations

Consult your Parker representative for any application requiring the following:

- Pressure above rating.
- Fluid other than those specified.
- Oil temperature above 71.1°C (160°F).
- Flow path other than normal.

Mounting Patterns

Series	NFPA	Size
D101V*, D10P	D10	1-1/4"

Torque Specifications

The recommended torque values for the bolts which mount the valve to the manifold or subplate are as follows: 406.8 Nm (300 ft-lbs).

A

Series D101VW, D101VA, D101VL

A

Tank and Drain Line Surges

If several valves are piped with a common tank or drain line, flow surges in the line may cause an unexpected spool shift. Detent style valves are most susceptible to this. Separate tank and drain lines should be piped in installations where line surges are expected.

Electrical Characteristics (Detented Spool)

Only a momentary energizing of the solenoid is necessary to shift and hold a detented spool. Minimum duration of the signal is 0.1 seconds for DC voltages. For AC voltages the response time is 0.06 seconds. Spool position will be held provided the spool centerline is in a horizontal plane, and not shock or vibration is present to displace the spool.

Electrical Failure or Loss of Pilot Pressure (D101VA)

Should electric power fail or loss of pilot pressure occur, 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 at the same time power fails, machine actuators may continue to function in an undesirable manner or sequence.

Pilot/Drain Characteristics

Pilot Pressure: 4.4 to 207 Bar (65 to 3000 PSI)

External: An oil source sufficient to maintain minimum pilot pressure must be connected to the "X" port of the main body. When using the external pilot variation, a 1/16" pipe plug must be present in the main body pilot passage. (For details see Dimension pages.) This plug will be furnished in valves ordered with pilot code 2, 3, 5 or 6.

Internal: Flow is internally ported from the pressure port of the main valve body to the "P" port of the pilot valve. The pressure developed at the "P" port of the pilot valve must be 4.4 Bar (65 PSI) minimum at all times.

Integral Check: Valves using internal pilot and internal drain with an open center spool (spools 2, 7, 8 & 9) can be ordered with an integral check valve in the pressure port of the main valve codes 3 & 6. Pilot oil will be internally ported from the upstream side of this check to the "P" port of the pilot valve, ensuring sufficient pilot pressure. A 1/16" pipe plug will be present in the main body. The "X" port in the subplate must be plugged when using the integral check.

Pilot Valve Drain: Maximum pressure 102 Bar (1500 PSI) AC standard, 207 Bar (3000 PSI) AC optional/DC standard.

External: When using an external drain, a 10 x 24 x 0.31 long set screw must be present in the main body drain passage. (For details see Dimension pages.) This plug will be furnished in valves ordered with drain code 1, 2 or 3.

Drain flow from the pilot valve is at the "Y" port of the main body and must be piped directly to tank. Maximum drain line pressure is 102 Bar (1500 PSI) AC standard, 207 Bar (3000 PSI) AC optional/DC standard. Any drain line back pressure is additive to the pilot pressure requirement.

Internal: Drain flow from the pilot valve is internally connected to the main valve tank port. Tank and drain pressure are then identical so tank line pressure should not exceed 102 Bar (1500 PSI) AC standard, 207 Bar (3000 PSI) DC standard/AC optional. Any tank line back pressure is also additive to the pilot pressure requirement. If flow surges (a cause of pressure surges) are anticipated in the tank line, an external drain variation is recommended. The "Y" port in the subplate must be plugged when using an internal drain.

Style Code	Description	No Solenoid/Operator Energized	Solenoid/Operator A Energized	Solenoid/Operator B Energized
B	Spring Offset	P→A and B→T	—	P→B and A→T
C	Spring Centered	Centered	P→A and B→T	P→B and A→T
D	Detented	Last Position Held	P→A and B→T	P→B and A→T
E	Spring Centered	Centered	—	P→B and A→T
F†	Spring Offset, Shift to Center	P→A and B→T	—	Centered
H	Spring Offset	P→B and A→T	P→A and B→T	—
K	Spring Centered	Centered	P→A and B→T	—
M†	Spring Offset, Shift to Center	P→B and A→T	Centered	—

† D101VW only.

D101.indd, dd



Tank and Drain Line Surges

If several valves are piped with a common tank or drain line, flow surges in the line may cause an unexpected spool shift. Detent style valves are most susceptible to this. Separate tank and drain lines should be piped in installations where line surges are expected.

Loss of Pilot Pressure

Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. No spring valves will stay in the last position held. If main hydraulic flow does simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

Pilot Drain Characteristics

Pilot Pressure:

4.4 to 207 Bar (65 to 3000 PSI)

Direct pilot operated valves use the “X” and “Y” ports to supply pilot oil directly to the ends of the spool, providing spool shifting force. A block mounted on top of the valve body is internally cored to make the necessary connections. Thus when “X” is pressurized, “Y” is used as a drain; and when “Y” is pressurized, “X” becomes the drain.

Any back pressure in these lines when they are being used as a drain is additive to the pilot pressure requirement.

Internal Drain: On spring offset models, only the “X” port is pressurized, as the spring returns the spool to its at rest position. On these models, “Y” may be internally drained through the main tank passage in the valve.

Flow Path/Pilot Pressure

Style Code	Description	“X” & “Y” De-Pressurized	“X” Port Pressurized	“Y” Port Pressurized	Special Notes	Recommended Control Valve For Pilot Oil
B	Two Position Spring Offset	P→A, B→T	P→A, B→T	P→B, A→T	“X” Port may be pressurized to assist spring in returning spool to offset position (ext. only)	
C	Three Position Spring Centered	Center	P→A, B→T	P→B, A→T	Flow paths will be reversed on valves with tandem center (8 & 9) spools	
H	Two-Position Spring Offset	P→B, A→T	P→A, B→T	P→B, A→T	“Y” Port may be pressurized to assist spring in returning spool to offset position	

Subplate Mounting

NFPA D10, CETOP 10 & NG 32

A

Recommended Mounting Surface

Surface must be flat within .102 mm (0.0004 inch) T.I.R and smooth within 812.8 micro-meters (32 micro-inch). Torque bolts to 406.8 Nm (300 ft-lbs).

Mounting Position

Valve Type	Mounting Position
Detent (Solenoid)	Horizontal
Spring Offset	Unrestricted
Spring Centered	Unrestricted

**For maximum
valve reliability,
adhere to the following
installation information.**

Mounting Pattern — NFPA D10, CETOP 10 & NG32

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

