

D05 Pattern Directional Control Valves

Also refer to "Directional Valve Features, Selection and Operating Recommendations" ([dynexdcvoperating.pdf](#))

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BROCHURE NOTES:

Consult the Dynex sales department for a review of any application which requires operating above the rated flows or pressures, or higher than normal operating temperatures.

Specifications shown were in effect when published. Since errors or omissions are possible, contact your sales representative for the most current specifications before ordering. Dynex reserves the right to discontinue or change designs at any time without incurring any obligation.



Valves Control Flow to 40 U.S. gpm (151 L/min)

These reliable valves operate with superior efficiency at pressures to 5000 psi (350 bar).

Exceptional flow characteristics are achieved with large internal flow passages with uniform flow areas throughout the body coring.

Efficiency is enhanced with the use of the Dynex standard subplate, which takes advantage of the valve's special double tank port design.

EFFICIENT LOW PRESSURE DROP

The result is exceptionally low loop pressure drop at 20 U.S. gpm (76 L/min) nominal flow: 80 psi (6 bar) with open center spools; 104 psi (7 bar) with closed center spools (ΔP loop = P→A + B→T).

LONG-LIFE OPERATION

Wet-armature solenoids provide low noise and leak-proof shifting. Reliable manual override is assured with non-corrosive override pins. Tapered o-ring counterbores improve sealing at the mounting surface.

A four-land spool design assures exceptionally smooth spool travel. Additional outboard lands provide greater support, eliminating spool imbalance.

HIGH PRESSURE TANK PORT

High pressure tank port capability gives you greater circuit flexibility, especially with "series" circuits.

HIGH-TORQUE MOUNTING

High-torque mounting to 12 lb-ft (16 N·m) prevents weepage between mounting surfaces, especially important when using sandwich valves.

SIMPLIFIED SERVICE

Complete spool interchangeability and a large wiring box make these valves easy to install. Servicing of solenoids is made easier with hand-tightened knurled knob lock nuts.



SPECIFICATIONS

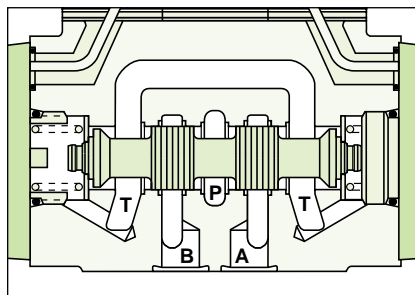
For a description of spools, operator functions, electrical options and operating recommendations refer to *dynexdcvoperating.pdf*.

Mounting

Subplate, N.F.P.A. D05 (CETOP 5) Pattern

Operator Options

6100 Series: Manual Lever;
6500 Series: Direct Solenoid;
6800 Series: Hydraulic Piloted;
6900 Series: Air Piloted



Spool travel is exceptionally smooth because of a four-land spool design which provides greater support, eliminating spool imbalance.

Rated Flow

Nominal:
20 U.S. gpm (76 L/min);
Maximum:
See "Typical Valve Performance" on page 4.

Rated Pressure

5000 psi (350 bar)

Maximum Tank Port Pressure (Port T)

Solenoid Models, Standard:
1500 psi (105 bar);
High Pressure Option ("HPT"):
A.C. Models, 2000 psi (140 bar);
D.C. Models, 2500 psi (170 bar)
Manual Lever Models:
3000 psi (210 bar)
Hydraulic Piloted Models:
3000 psi (210 bar)
Air Piloted Models:
3000 psi (210 bar)

Response Time (Full Stroke)

Solenoid Energized:
A.C., 10-20 ms; D.C., 25-35 ms
Spring Returned:
A.C., 15-20 ms; D.C., 30-40 ms

SOLENOID SPECIFICATIONS

Models are available with A.C. or D.C. solenoids.

The table shows electrical specifications for these valves.

Electrical Connections

Standard Wiring Box with leads;
 Optional Terminal Strip, Cable Grip or Pin Connector (N.F.P.A. standard T3.5-29-1980; A.N.S.I. standard B93,55M-1981);
 Optional Plug-In-Terminal Solenoids fit DIN Connector Standard 43650 (Hirschmann GDM 209)

Explosion Proof Option ("EPW")

Solenoids with special enclosures are approved by *UL* and *CSA* for use in hazardous locations. Available with A.C. or D.C. solenoids.

UL Classification:
 Class I, Group C,D;
 Class II, Group E,F,G

ELECTRICAL DATA

Solenoid Code	Input Voltage (Volts)	Frequency (Hz)	Inrush Current (Amps)	Holding Current (Amps)	Holding Power (Watts)	Coil Resistance (Ohms ± 10%)
24/DF (Dual Frequency)	24 A.C. 24 A.C.	50 60	23.00 21.00	4.10 3.15	38 38	0.56 0.56
115/DF (Dual Frequency)	110 A.C. 115 A.C.	50 60	4.80 4.30	0.88 0.72	37 35	10.20 10.20
230/DF (Dual Frequency)	220 A.C. 230 A.C.	50 60	2.40 2.20	0.44 0.36	37 35	40.80 40.80
460/DF (Dual Frequency)	440 A.C. 460 A.C.	50 60	1.30 1.20	0.23 0.20	37 35	188.50 188.50
12VDC	12 D.C.	—	—	—	48	3.00
24VDC	24 D.C.	—	—	—	48	12.00
250VDC	250 D.C.	—	—	—	48	1300.00
12VDC EPW	12 D.C.	—	—	—	48	3.00
24VDC EPW	24 D.C.	—	—	—	48	12.00
110/50 EPW	110 A.C.	50	4.20	1.00	43	10.72
115/60 EPW	115 A.C.	60	3.90	8.90	43	10.47
220/50 EPW	220 A.C.	50	2.09	0.50	43	43.35

① Ordering Codes shown are for standard wire leads with wiring box. "Plug-In-Terminal" solenoids (Hirschmann GDM 209) are also available; see "Typical Model Code" on page 8.

MANUAL LEVER MODELS

Lever operated models offer superior handle position flexibility. Choose from eight different lever locations for complete operator convenience.

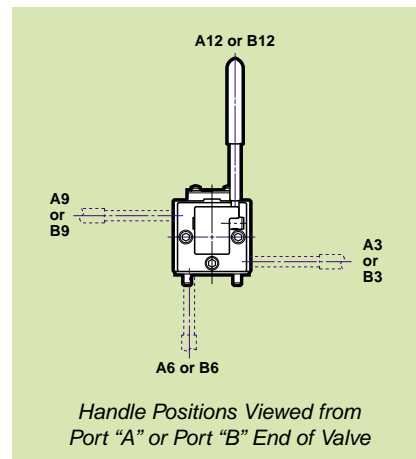
These high performance valves provide a combination of operating efficiency and circuit layout flexibility.

The valves are rated for 20 U.S. gpm (76 L/min) nominal flow at pressures to 5000 psi (350 bar). Higher intermittent flows may be possible with some models. Consult the Dynex sales department.

EASY INSTALLATION, SERVICING

With complete spool interchangeability and multiple lever positions which can be adjusted in the field, these valves are easy to install and service.

Choose from eight handle locations, with four positions on either port "A" or port "B" end of valve. To specify,



see drawing at right and "Typical Model Code" on page 31.

This feature allows you to put the handle where it's best for your circuit design, for complete operator convenience.

Changing the location is done by removing the bracket and handle assembly, and rotating it to the desired position.

Typical Valve Performance

SOLENOID MODELS

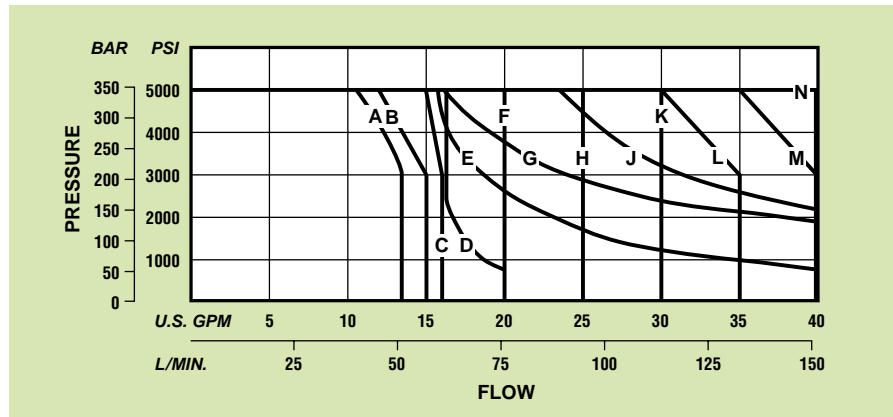
The flow capacity curves show typical performance for each internal operator and spool.

The letters in the “Flow Curve Reference” table identify the appropriate curve.

AN EXAMPLE

In the table under spool type 01, curve “F” is called out for Operator Code 4, A.C. Models. Looking at the curves, “F” indicates that the maximum flow is 20 U.S. gpm (76 L/min) up to the maximum pressure rating of 5000 psi (350 bar).

FLOW CAPACITY



FLOW CURVE REFERENCE

Operator Code	Solenoid Type	Spool Type									
		0	1	3	4	01	2	2R	32	32R	36
1	A.C.	N	B	—	—	—	A	A	K	K	E
	D.C. and “EPW”	N	C	—	—	—	A	A	J	J	G
2	A.C.	N	B	—	—	—	A	A	K	K	E
	D.C. and “EPW”	N	C	—	—	—	A	A	J	J	G
3	A.C.	N	D	—	—	—	A	A	K	K	E
	D.C. and “EPW”	N	D	—	—	—	A	A	J	J	G
4	A.C.	N	K	N	N	F	A	A	K	K	E
	D.C. and “EPW”	N	N	N	N	F	A	A	J	J	G
5	A.C.	N	K	N	N	F	A	A	K	K	E
	D.C. and “EPW”	N	N	N	N	F	A	A	J	J	G
6	A.C.	N	K	K	M	F	A	A	K	K	E
	D.C. and “EPW”	N	H	M	L	F	A	A	J	J	G

PILOT OPERATED MODELS

The maximum flow for pilot operated valves is dependent on pilot pressure.

Generally, the maximum flow for most pilot operated models is 20 U.S. gpm (76 L/min).

Minimum Pilot Pressure

The table shows the minimum pressure required to shift the spool, for various flow capacities.

These values are based on zero tank pressure. As back pressure increases above zero, the minimum pilot pressure must be increased by the same level.

Maximum Pilot Pressure

Hydraulic Piloted:
3000 psi (210 bar);
Air Piloted:
200 psi (14 bar)

Volume

Maximum required to shift spool full stroke:
Hydraulic, 0.018 in³ (0,30 cm³);
Air, 0.640 in³ (10,49 cm³)

MINIMUM PILOT PRESSURE

Series	Spool Type	Pilot Pressure At:					
		5 U.S. gpm (19 L/min)		10 U.S. gpm (38 L/min)		20 U.S. gpm (76 L/min)	
		psi	bar	psi	bar	psi	bar
6800 Series Hydraulic Piloted	0	300	20,7	310	21,4	325	22,4
	1	300	20,7	360	24,8	600	41,4
	3	300	20,7	360	24,8	600	41,4
	4	300	20,7	360	24,8	450	31,0
	01	300	20,7	360	24,8	—	—
	2 or 2R	300	20,7	360	24,8	600	41,4
	32 or 32R	300	20,7	360	24,8	600	41,4
6900 Series Air Piloted	0	25	1,7	25	1,7	25	1,7
	1	25	1,7	30	2,1	35	2,4
	3	25	1,7	30	2,1	35	2,4
	4	20	1,4	25	1,7	25	1,7
	01	25	1,7	25	1,7	—	—
	2 or 2R	25	1,7	30	2,1	35	2,4
	32 or 32R	25	1,7	30	2,1	35	2,4
36	25	1,7	30	2,1	35	2,4	

D05 PATTERN

VALVE EFFICIENCY

Exceptional flow characteristics are achieved with large internal flow passages. Efficiency is enhanced with the use of our standard subplate, which takes advantage of the valve's special double tank port design.

The result is exceptionally low pressure drop. At 20 U.S. gpm (76 L/min) flow, loop pressure drop is a low 102 psi (7,0 bar) with open center spools (Type 1) and 121 psi (8,3 bar) with closed center spools (Type 0).

Determining Pressure Drop

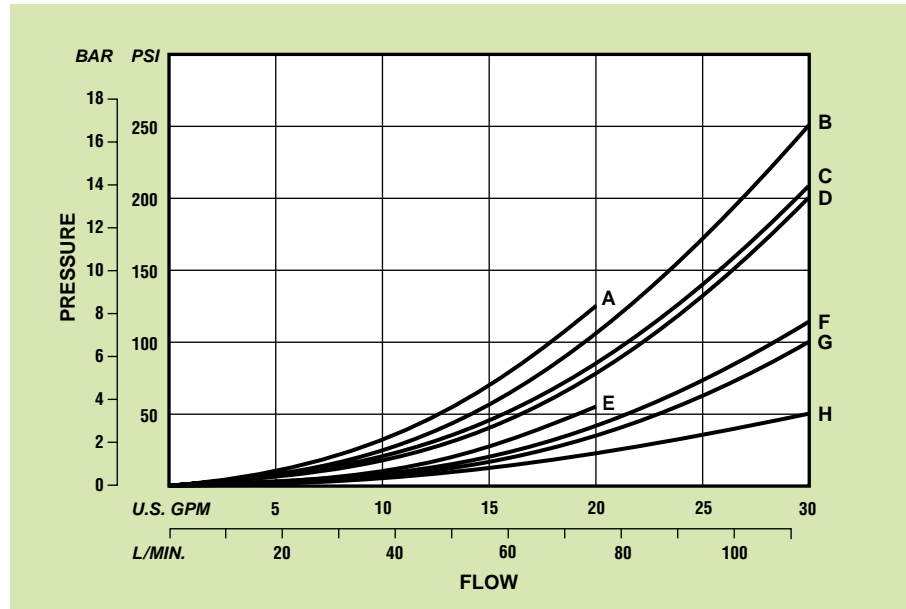
The curves show resistance to flow for various spool types. The "Curve Reference" table identifies the proper pressure drop curve for each spool and flow path.

An Example

In the table under spool Type 1, curve "D" is called out to determine the pressure drop for P→A. Looking at the curves, "D" indicates a drop of about 28 psi at 12 U.S. gpm (1,9 bar at 45 L/min)

To determine total "loop" drop, the individual pressure drops for A→B and B→T (or P→B and A→T) must be added.

PRESSURE DROP (ΔP)



CURVE REFERENCE

Flow Path	Spool Type									
	0	1	3	4	01	2	2R	32	32R	36
P→A	D	D	D	D	B	C	C	D	D	D
P→B	D	D	D	D	B	C	C	D	D	D
A→T	F	H	H	G	E	H	H	F	F	G
B→T	F	H	H	G	E	H	H	F	F	G
P→T	—	D	—	—	A	B	B	—	—	—

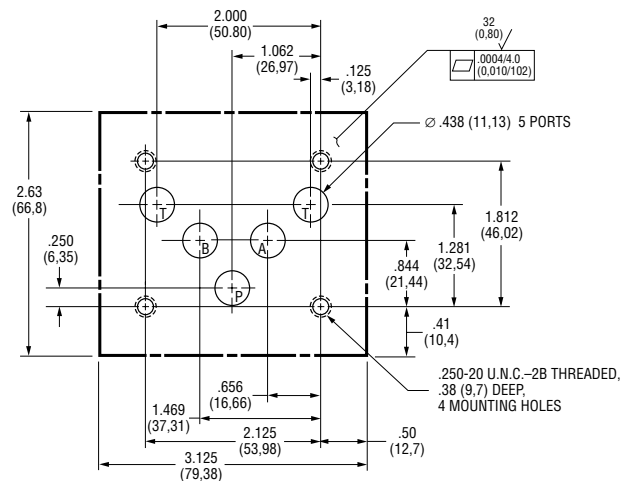
Installation and Dimensions

GENERAL VALVE MOUNTING

This valve has a second "T" port into a common tank passageway, for lower pressure drop and increased efficiency. The mounting surface drawing shows the standard N.F.P.A. D05 (CETOP 5) pattern, with the optional second "T" port.

Mounting face must be flat within 0.0004 inch/4.0 inches (0,010 mm/102 mm) with a surface finish of 32 microinch (0,80 μm) AA.

Port o-rings are included with all valves. Mounting bolts must be ordered separately, .250-20 U.N.C. Threaded x 1.00 inch (25,4 mm), Grade 8 or better; four required. Recommended mounting torque is 12 lb·ft (16 N·m) maximum.



Recommended Minimum Mounting Surface, N.F.P.A. D05 (CETOP 5) Pattern With Two Ports (T) Into Common Tank Passageway

D05 PATTERN

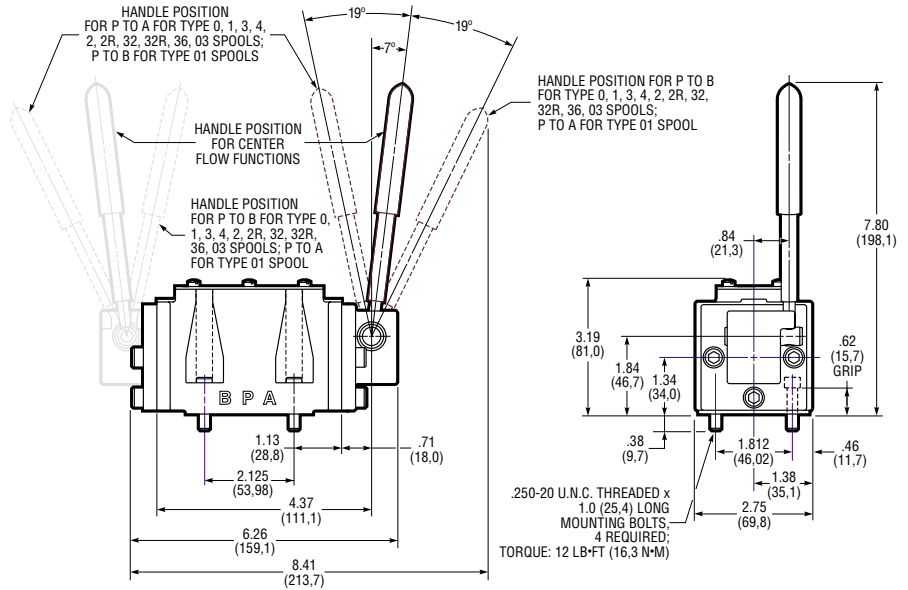
MANUAL OPERATED MODELS

Manual lever valves allow you to choose from eight handle locations, with four positions on either port "A" or port "B" end of valve. To specify, see drawing on page 26 and "Typical Model Code" on page 8.

Valves can be mounted without removing nameplate.

Weight (Mass)

7.8 lb (3,5 kg)



6100 Series, Manual Lever Operated

HYDRAULIC PILOTED MODELS

Single and double actuator models are available. Overall length of single configuration (not shown) is 6.60 inches (167,6 mm).

Valves can be mounted without removing nameplate.

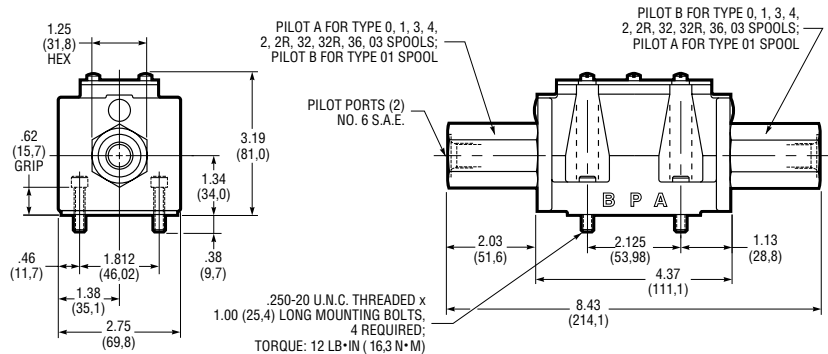
Weight (Mass)

Single Actuator:

7.1 lb (3,2 kg);

Double Actuator:

7.8 lb (3,5 kg)



6800 Series, Double Hydraulic Piloted Models

AIR PILOTED MODELS

Single and double actuator models are available. Overall length of single configuration (not shown) is 7.13 inches (181,1 mm).

Valves can be mounted without removing nameplate.

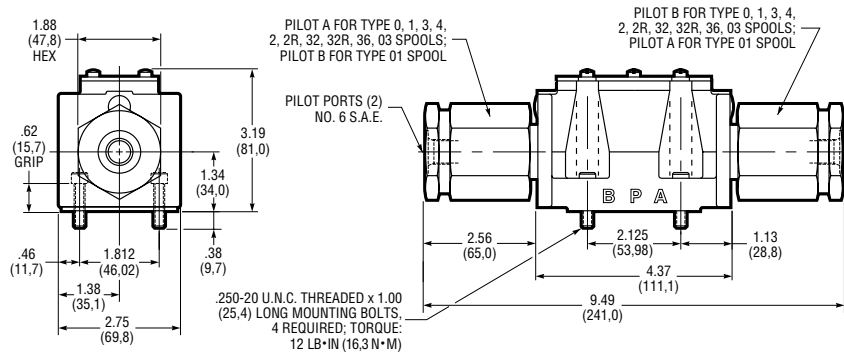
Weight (Mass)

Single Actuator:

8.0 lb (3,6 kg);

Double Actuator:

9.5 lb (4,3 kg)



6900 Series, Double Air Piloted Models

D05 PATTERN

Typical Model Code

6 5 4 0 — D05 — 115/DF — R — * — SL — 1 0

<p>Valve Type</p> <p>6 — Subplate Mounted Directional Control</p>	<p>Valve Size</p> <p>D05 — 20 U.S. gpm (76 L/min) Nominal Flow, N.F.P.A. D05 (CETOP 5) Pattern</p>	<p>Reverse Flow Operator (Code 4 and 6 Only)</p> <p>R — Code 4: Two Position; Spring Centered, Actuator Offset (P→B) Code 6: Two Position; Spring Offset (P→B), Actuator Centered</p>	<p>Modification Number</p>																								
<p>Actuator</p> <p>1 — Manual Lever 5 — Solenoid Operated 8 — Hydraulic Piloted 9 — Air Piloted</p>	<p>Internal Operator</p> <p>1 — Two Position; Spring Offset (P→B), Actuator Offset (P→A) 2 — Two Position; Spring Offset (P→A), Actuator Offset (P→B) 3 — Manual Lever Only: Three Position, Detented; Others: Two Position; Actuator Offset, Detented^① 4 — Two Position; Spring Centered, Actuator Offset (P→A)^② 5 — Three Position; Spring Centered, Actuator Offset 6 — Two Position; Spring Offset, Actuator Centered^② 7 — Manual Lever Only: Two Position, Detented</p> <p>^① Only available with Type 0 and Type 1 spools. ^② Not available with Manual Lever Operated valves.</p>	<p>Lever Position (Manual Models Only)</p> <p>A12 — 12 o'clock position, on port "A" end of valve A9 — 9 o'clock position, on port "A" end of valve A6 — 6 o'clock position, on port "A" end of valve A3 — 3 o'clock position, on port "A" end of valve B12 — 12 o'clock position, on port "B" end of valve B9 — 9 o'clock position, on port "B" end of valve B6 — 6 o'clock position, on port "B" end of valve B3 — 3 o'clock position, on port "B" end of valve</p>	<p>Design Number</p>																								
<p>Spools</p> <table border="0"> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;"></td> <td style="text-align: center;">2</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;"></td> <td style="text-align: center;">2R</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;"></td> <td style="text-align: center;">32</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;"></td> <td style="text-align: center;">32R</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;">01^①</td> <td style="text-align: center;"></td> <td style="text-align: center;">36</td> <td style="text-align: center;"></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">03</td> <td style="text-align: center;"></td> </tr> </table>		0		2		1		2R		3		32		4		32R		01 ^①		36				03		<p>Options (Solenoid Models Only)</p> <p>C — CSA and UL Recognized Coils (Etched with Symbol)^① M — Hand Actuated Manual Override^② T — Terminal Strip^{②③} CG — Cable Grip, for .38 to .44 inch (9,5 to 11,1 mm) O.D. machine tool cable^{②③} SL — Solenoid Lights (Available 115/DF A.C. Only)^{②③} HPT — High Pressure Tank Port: 2300 psi (160 bar) maximum A.C. models 3000 psi (210 bar) maximum D.C. models BH3A — 3-pin Connector (N.F.P.A. standard T3.539-1980), for single solenoid models, on port "A" end of valve^{②③④} BH3B — 3-pin Connector, for single solenoid models, on port "B" end of valve^{②③④} BH5A — 5-pin Connector, for single or double solenoid models, on port "A" end of valve^{②③④} BH5B — 5-pin Connector, for single or double solenoid models, on port "B" end of valve^{②③④}</p> <p>^① Available with 115/DF solenoids only. For other voltages, consult the Dynex sales department ^② Option not available with "EPW" solenoid models. ^③ Option not available with "Plug-In-Terminal" solenoid models. ^④ N.F.P.A. standard T3.539-1980; A.N.S.I. standard B93.55M-1981.</p>	
0		2																									
1		2R																									
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4		32R																									
01 ^①		36																									
		03																									
		<p>Electrical – Solenoid Options</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>STANDARD SOLENOIDS:</p> <p>24/DF — Dual Frequency, 24/60, 24/50 115/DF — Dual Frequency, 115/60, 110/50 230/DF — Dual Frequency, 230/60, 220/50 460/DF — Dual Frequency, 460/60, 440/50 12VDC — Direct Current, 12 Volts 24VDC — Direct Current, 24 Volts 250 VDC — Direct Current, 250 Volts 12VDC EPW — Explosion Proof Solenoids 24VDC EPW — Explosion Proof Solenoids 110/50 EPW — Explosion Proof Solenoids 115/60 EPW — Explosion Proof Solenoids 220/50 EPW — Explosion Proof Solenoids</p> </td> <td style="vertical-align: top;"> <p>PLUG-IN TERMINAL SOLENOIDS:^①</p> <p>115/HAC — Dual Frequency, 115/60, 110/50 230/HAC — Dual Frequency, 230/60, 220/50 12/HDC — Direct Current, 12 Volts 24/HDC — Direct Current, 24 Volts</p> </td> </tr> </table>		<p>STANDARD SOLENOIDS:</p> <p>24/DF — Dual Frequency, 24/60, 24/50 115/DF — Dual Frequency, 115/60, 110/50 230/DF — Dual Frequency, 230/60, 220/50 460/DF — Dual Frequency, 460/60, 440/50 12VDC — Direct Current, 12 Volts 24VDC — Direct Current, 24 Volts 250 VDC — Direct Current, 250 Volts 12VDC EPW — Explosion Proof Solenoids 24VDC EPW — Explosion Proof Solenoids 110/50 EPW — Explosion Proof Solenoids 115/60 EPW — Explosion Proof Solenoids 220/50 EPW — Explosion Proof Solenoids</p>	<p>PLUG-IN TERMINAL SOLENOIDS:^①</p> <p>115/HAC — Dual Frequency, 115/60, 110/50 230/HAC — Dual Frequency, 230/60, 220/50 12/HDC — Direct Current, 12 Volts 24/HDC — Direct Current, 24 Volts</p>																						
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^① Closed crossover

For Other Voltages, Consult the Dynex Sales Department

^① Fits DIN Connector Standard 43650 (Hirschmann GDM 209)