

Directional Valve Features, Selection and Operating Recommendations

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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.



Subplate Mounted Valves For Smooth Control to 15 000 psi (1040 bar)

Dynex offers standard pressure valves rated to 5000 psi (350 bar), which mount on N.F.P.A. (CETOP) patterns.

Dynex HP pattern sliding-spool valves operate reliably at pressures to 10 000 psi (700 bar). VST Series seated valves are rated to 15 000 psi (1040 bar).

STANDARD PRESSURE VALVES – Sliding-spool valves provide smooth, responsive control. Large internal flow passages, with uniform flow areas throughout the body coring, provide exceptionally low pressure drop.

High-force springs and solenoids, and tank return hydraulic boost passage-ways assure reliable shifting.

HP PATTERN VALVES – High pressure HP03 and HP05 valves provide true four-way control in a simple, compact package. These sliding-spool valves are available with manual, solenoid, hydraulic or air pilot operation with a range of spools and electrical options, including *UL* and *CSA* approved explosion proof solenoids.

VST SERIES VALVES – High pressure seated valves mount on the HP03 pattern. The ball-on-seat design prevents silting, assuring reliable shifting even when unactuated for long periods at high pressure. Positive sealing makes these valves ideal for circuits requiring load holding functions.

TWO WAY VALVES – Economical 4800 Series valves provide smooth two-way control. These hydraulic pilot-operated valves are available in three subplate or line-connected sizes.

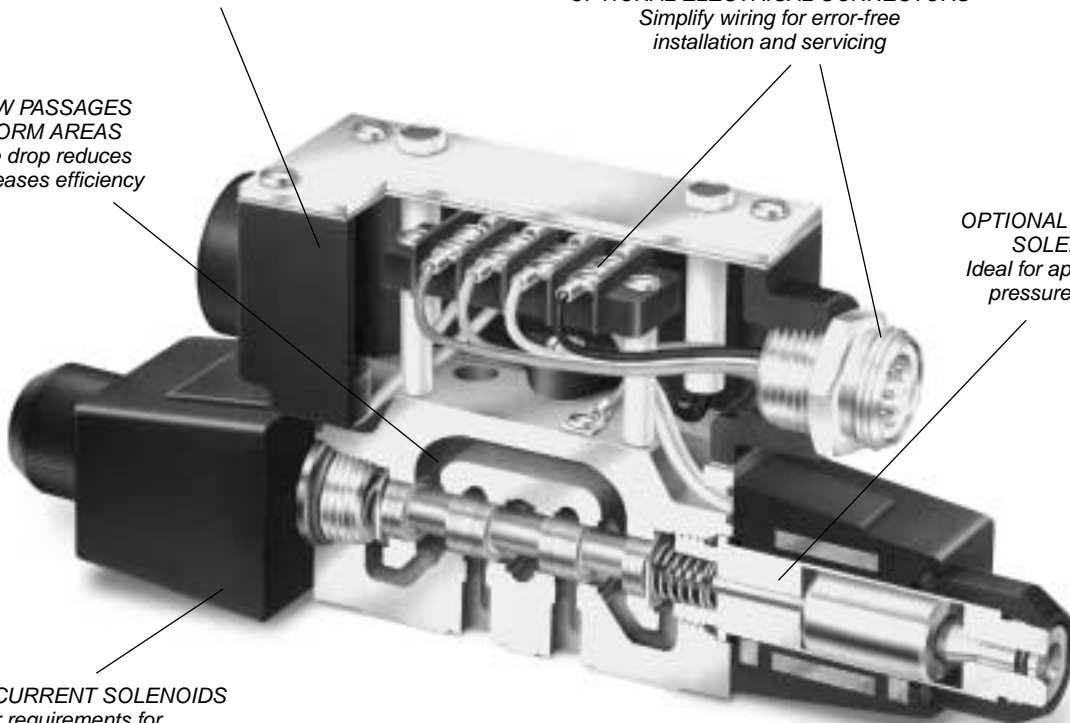
LIGHTWEIGHT, DURABLE WIRING BOX
Large wiring cavity for easy electrical connections

OPTIONAL ELECTRICAL CONNECTORS
Simplify wiring for error-free installation and servicing

LARGE FLOW PASSAGES WITH UNIFORM AREAS
Low pressure drop reduces heat loss, increases efficiency

OPTIONAL HIGH PRESSURE SOLENOID TUBES
Ideal for application on higher pressure "series" circuits

LOW HOLDING-CURRENT SOLENOIDS
Low power requirements for reduced energy usage



D03 Pattern Directional Control Valve

VALVE SELECTION

STANDARD SUBPLATE MODELS

Mounting patterns for standard pressure valves are the N.F.P.A. size designations adopted in 1984 (N.F.P.A. Standard T.3.5.1M R1-1984).

At that time, these interface designations were changed to correspond to ISO and CETOP standards.

Physically the patterns are unchanged and the newer valves are functional replacements – only the identification was revised.

STANDARD PATTERN CROSS-REFERENCE

Current Dynex Model ^①	Former Dynex Model	Current NFPA (ANSI-B93.7) Pattern	Former NFPA Pattern	ISO-4401 Size	CETOP R35H Size
D03-10	01	D03	D01	03	3
D05-10	02	D05	D02	05	5
D05H-10	02H	D05	D02	05	5
D08-10	06	D08	D06	08	8
D08H-10	06H	D08	D06	08	8

① Prefix (i.e., "D03") is the model number; suffix (i.e., "10") is the current design/modification number.

SELECTION TABLE — STANDARD AND HIGH PRESSURE MODELS

Dynex Model Number	Standard Mounting Pattern	Operator Options	Dynex Series Designation	Nominal Flow		Maximum Flow		Maximum Pressure	
				U.S. gpm	L/min	U.S. gpm	L/min	psi	bar
D03	N.F.P.A. D03 (CETOP 3)	Manual Lever	6100	8	30	15	57	5000	350
		Solenoid Direct	6500	8	30	15	57	5000	350
		External Hydraulic Pilot	6800	8	30	15	57	5000	350
		External Air Pilot	6900	8	30	15	57	5000	350
HP03	Special HP03 Pattern	Manual Lever	6100	5	19	15	57	10 000	700
		Solenoid Direct	6500	5	19	15	57	10 000	700
		External Hydraulic Pilot	6800	5	19	8	30	10 000	700
		External Air Pilot	6900	5	19	8	30	10 000	700
D05	N.F.P.A. D05 (CETOP 5) ^①	Manual Lever	6100	20	76	20	76	5000	350
		Solenoid Direct	6500	20	76	40 ^②	151 ^②	5000	350
		External Hydraulic Pilot	6800	20	76	20	76	5000	350
		External Air Pilot	6900	20	76	20	76	5000	350
HP05	Special HP05 Pattern	Solenoid Direct	6500	5	19	25	95	8000	560
		External Hydraulic Pilot	6800	5	19	10	38	8000	560
		External Air Pilot	6900	5	19	10	38	8000	560
D05H	N.F.P.A. D05 (CETOP 5) ^③	Solenoid Pilot	6600	30	114	40	151	5000	350
		External Hydraulic Pilot	6800	30	114	40	151	5000	350
		External Air Pilot	6900	30	114	40	151	5000	350
D08	N.F.P.A. D08 (CETOP 8)	Mechanical Lever	6100	40	151	90	341	5000	350
		Solenoid Pilot	6600	40	151	90	341	5000	350
		External Hydraulic Pilot	6800	40	151	90	341	5000	350
		External Air Pilot	6900	40	151	90	341	5000	350
D08H	N.F.P.A. D08 (CETOP 8)	Solenoid Pilot	6600	80	303	165	625	5000	350
		External Hydraulic Pilot	6800	80	303	165	625	5000	350
		External Air Pilot	6900	80	303	165	625	5000	350
VST Seated Valves	Special HP03 Pattern	Vent Function	VSTV	1	3,8	2	7,6	15 000	1040
		Two Position, Two-Way	VST22	5	19	10	38	10 000	700
		Two Position, Three-Way	VST23	5	19	10	38	10 000	700
03	P06 ^④			15	57	20	76	5000	350
06	P08 ^④	External Hydraulic Pilot	4800	40	151	60	227	5000	350
10	P10 ^④			90	341	150	568	5000	350

① D05 valves have the standard N.F.P.A. D05 (CETOP 5) pattern with a second "T" port into a common tank passageway, providing lower pressure drop and increased efficiency.

② Maximum flow capacity is determined by internal operator, spool type and operating pressure. Consult your Dynex sales representative for complete specifications.

③ D05H valves have the standard N.F.P.A. D05 (CETOP 5) pattern with a second "T" port into a common tank passageway, and auxiliary "X" and "Y" ports for external pilot and drain.

④ P4800 Series subplate valves mount on these standard N.F.P.A. patterns, which are more commonly found on pressure control valves. These valves are two position, two-way configuration. They are also available in flange mounted and line connected models.

Spool Description and Selection

As shown in the table, identification of spools for the same function differs, depending on whether the valve is direct or pilot-operated. Not all spool types are available for every valve size and with every internal operator.

Refer to the "Typical Model Code" for each specific model.

For other spool functions not shown, contact the Dynex sales department.

SPOOL DESCRIPTIONS

A.S.A. Symbol	Crossover Function	Description of Spool Function	Spool Type	
			D03, HP03, D05, HP05	D05H, D08, D08H
		Closed center spool. All ports blocked in center position.	0, 20 ^①	5
		Open center spool. All ports connected in center position. Allows fluid motors or cylinders to move when de-energized. Minimum shock during crossover.	1, 21 ^①	6
		Pressure port blocked in center position. Both cylinder ports connected to tank.	3	8
		Cylinder ports pressurized in center position; tank port blocked. Used for a differential circuit with single rod cylinder. Prevents motor cavitating when decelerating. Reduces crossover shock.	4	9 ^②
		Tandem center spool. Cylinder ports blocked; pressure connected to tank in center position with closed crossover. During transition from center to offset position, all ports are closed.	01 ^{③④}	56
		Tandem center spool as noted above, but with open crossover. During transition from center to offset position, all ports are interconnected to eliminate shock in the system.	011 ^⑤	58
		Open center spool with one cylinder port blocked and one open to pressure and tank in center position.	2 ^④	—
		Open center spool with one cylinder port blocked and one open to pressure and tank in center position.	2R ^④	—
		Pressure port blocked with cylinder port A blocked, cylinder port B connected to tank in center position. This blocks a cylinder or motor in one direction and blocks the pressure port.	32 ^④	—
		Pressure port blocked with cylinder port B blocked, cylinder port A connected to tank in center position. This blocks a cylinder or motor in one direction and blocks the pressure port.	32R ^④	—
		Pressure port blocked in center position. Cylinder ports partially restricted and connected to tank.	36 ^④	—
		Closed center spool. All ports blocked in center position. Tank port blocked in all positions.	03 ^⑥	—

① Type 20 and 21 spools must be specified for HP03 and HP05 model valves with Code 1 or Code 2 internal operators (except manual lever HP03 models which use Type 0 and 1 spools). Type 20 and 21 spools provide the same function, but are not interchangeable with Type 0 or 1 spools.

② Type 9 spool not available for D08H model valves.

③ Type 01 spool not available for D03 and HP03 model valves.

④ Not available for HP05 model valves.

⑤ Type 011 spool not available for D05 and HP05 model valves.

⑥ Type 03 spool available for D03 and HP03 model valves only.

Internal Operators and Application Data

INTERNAL OPERATORS

The table shows available internal operators and the most common spools. For other spool options, contact the Dynex sales department.

To specify correct valve function, it is important to refer to the “*Typical Model Code*” for each specific model.

Function symbols show solenoid actuated models, as reference. Air, hydraulic or lever actuators are also available. Flow pattern in the center position or during crossover is determined by the spool selected.

FLOW ACTUATING PATTERN

Operating actuator “A” opens flow path to port “A” (P→A). Operating actuator “B” opens flow path to port “B” (P→B). Models with Code 6 operators, which are actuator centered, are the exception.

Spring-centered or spring-offset models are spring positioned unless actuated continuously.

Code 3 operators (two position detented) hold the spool in the last actuated position. These valves can be actuated momentarily (minimum electrical signal duration, 50 ms) to shift and hold the spool in that position.

APPLICATION NOTES

Mounting Position

Unrestricted for all models.

Standard Seals

All valves use Fluorocarbon (Viton® or Fluorel®) o-rings, providing greater fluid compatibility and improved temperature range performance.

Fluid Recommendations

50 to 1500 SUS (7 to 323 cSt) viscosity; -20° to 200° F (-29° to +93° C) temperature range

Recommended Filtration

Standard N.F.P.A. (CETOP) Patterns, 25 micron or better filtration;

HP03 and HP05 Patterns, 5 micron or better filtration;

VST Seated Valves, 25 micron or better filtration

INTERNAL OPERATORS

Operator Code	Actuator, Operation	Spool Types		Operator Function		
		D03, HP03, D05, HP05	D05H, D08, D08H	Non-Actuated	Actuated	Function Symbol ^①
1	Single Actuator, Two Position	0, 20 ^② 1, 21 ^②	5 or 6	P→B	P→A	
		03	—	P→B	P→A	
2	Single Actuator, Two Position	0, 20 ^② 1, 21 ^②	5 or 6	P→A	P→B	
		03	—	P→A	P→B	
3	Double Actuator, Two Position ^③	0 or 1	5 or 6	Detented in Actuated Positions	P→A or P→B	
	Lever Operated, Three Position ^③	All Types	All Types	Detented in Actuated Positions	P→A or P→B	
4	Single Actuator, Two Position ^④	0, 1, 3	5, 6, 8 or 9	Spring Centered	P→A	
		011	56 or 58	Spring Centered	P→B	
5	Double Actuator, Three Position	All Types	All Types	Spring Centered	P→A or P→B	
6 ^⑤	Single Actuator, Two Position ^④	0, 1, 3	—	P→B	Centered	
		011	—	P→A	Centered	
7	Lever Operated, Two Position ^⑥	0 or 1	—	Detented in Actuated Positions	P→A or P→B	

① Symbols show solenoid actuated models, as reference. Air, hydraulic or lever actuators are also available.

② Type 20 and 21 spools are used for HP03 and HP05 model valves with Code 1 and Code 2 internal operators (except manual lever HP03 models which use Type 0 and 1 spools).

③ Code 3 operators with solenoid, hydraulic or air-piloted actuators provide two position operation. Manual lever operated models provide three position operation.

④ Flow can be reversed with “R” option (i.e., with “R” in model code, Code 4 operator with Type 0 spool will direct flow to port “B” [P→B] in the actuated position).

⑤ Code 6 operators not available with manual lever operated models.

⑥ Code 7 operators only available for manual lever operated D03, HP03 and D05 models.

Fine filtration is critical for spool valves held in one position for long periods under pressure. Silting may cause spool sticking and improper shifting. Valves should also be cycled periodically to prevent this problem.

Pressure Surges

Consistent with standard practice, the system should be protected from pressure surges which can affect the shifting of any spool valve. In systems with multiple valves, a separate line to tank, or to another low pressure line, is recommended. This is especially critical with detented models.

Drain and Pilot Connections

On pilot operated models, valves are supplied with external drain and internal pilot as standard.

Internal drain and external pilot are optional. See “*Typical Model Code*” in the appropriate section for each valve model. Also refer to the installation drawings, which indicate plug locations for various drain and pilot configurations.

External drain is recommended for applications with high tank pressure, to assure proper spool shifting.

Solenoid and Electrical Options

SOLENOID ADVANTAGES

Solenoid models are quiet and moisture resistant for long life. Wet armature design eliminates dynamic seals and increases the available shifting forces. Static o-rings prevent external leakage.

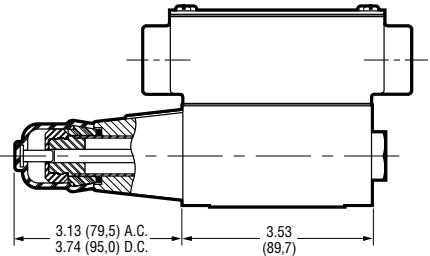


MANUAL SOLENOID OVERRIDE

Solenoid override pins are made of corrosion-resistant brass for trouble-free operation.

The “M” option, shown at right, provides convenient hand-actuated override, without the use of tools.

Refer to “*Typical Model Code*” on the appropriate page for each specific model.

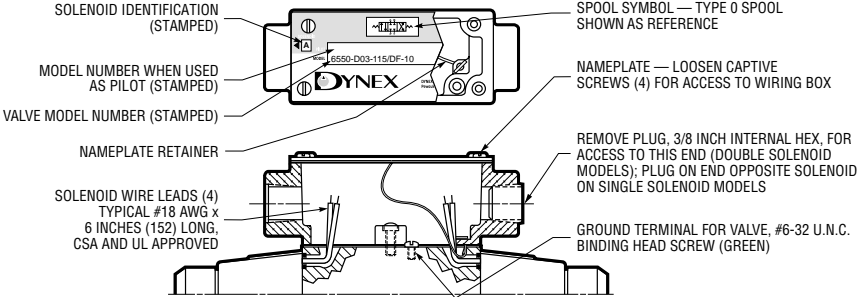
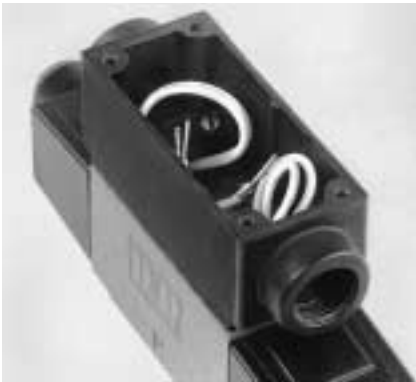


STANDARD WIRE LEADS

Standard models include *UL* listed and *CSA* approved wire leads. The valves feature large, lightweight wiring boxes, providing a rigid, strong enclosure for electrical connections.

Note that actuators are identified as “A” or “B” on the nameplate. Valve function symbols are also shown for most common models.

The nameplate retainer helps during installation, keeping the proper nameplate with each valve when wiring multiple valves.



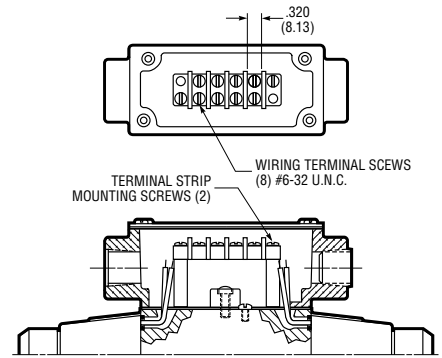
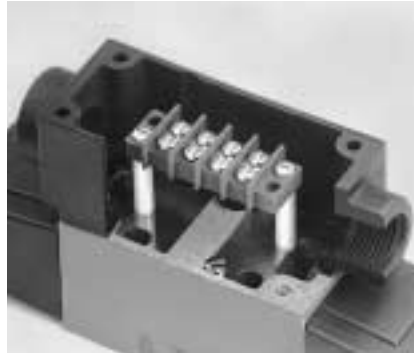
ELECTRICAL OPTIONS

TERMINAL STRIP

Connecting wire leads is easier with this convenient feature. Four sets of common terminal screws let you cut leads to desired length and make simple connections.

Access to the terminals is improved by mounting posts which raise the strip to the top of the box.

To specify terminal strip, include "T" in model code. Also available, with mounting posts and screws, in kit KV00301010.



CONNECTORS (3- OR 5-PIN)

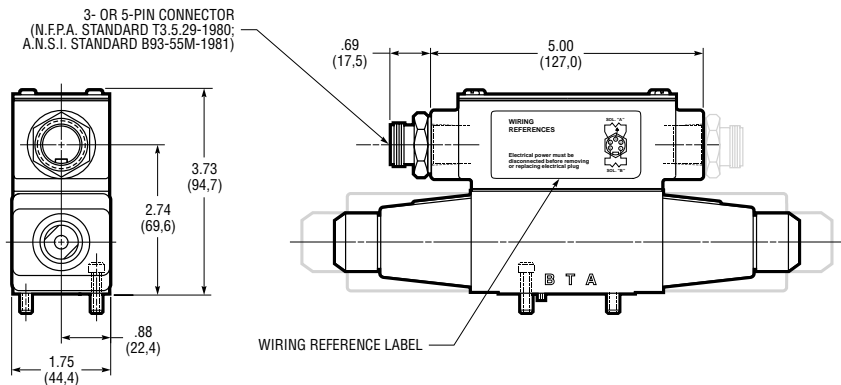
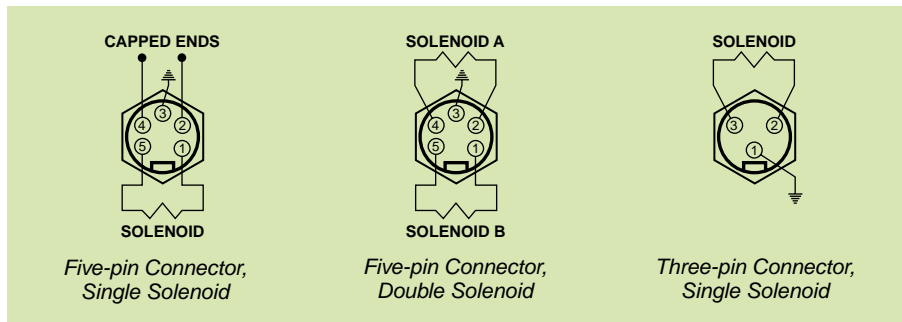
Simplify your connections and prevent wiring mistakes with quick-connect pin receptacles (N.F.P.A. standard T3.5.29-1980; A.N.S.I. standard B93.55M-1981).

Valves with these UL recognized and CSA certified connectors can be serviced without disturbing wiring.

Internal valve wiring is complete, with leads connected to a terminal strip in wiring box. All wires have UL and CSA approved solder-less terminals.

Wiring diagrams show the standard connections for 3-pin and 5-pin connectors. The commercially available mating "female" connector is not included.

For installation convenience, valves are available with connector on either end of valve. To specify connectors refer to "Typical Model Code" on the appropriate page for each specific model. The connectors are also available in kit KV00301012 (3-pin) or KV00301013 (5-pin).



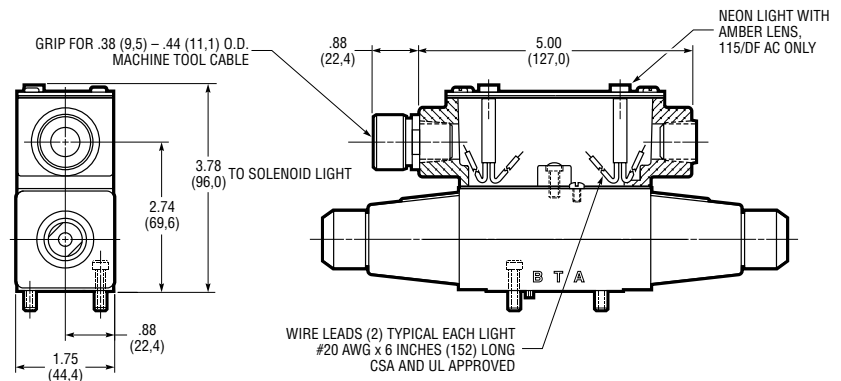
ELECTRICAL OPTIONS

CABLE GRIP AND LIGHTS

Prevent accidental electric disconnection during operation, with this optional grip for .38 to .44 inch (9,5 to 11,1 mm) O.D. machine tool cable. Cable grip is mounted in electric entry, on port "B" end of valve.

Simplify troubleshooting in your systems with bright, neon signal lights. The long-life lights give you a quick visual check for proper solenoid operation. Available in A.C. models only.

To specify cable grip, include "CG" in model code. For lights, include "SL". Also available separately as part number 17650960 (grip) or kit KV00301011 (lights).



PLUG-IN TERMINAL SOLENOIDS

Integral solenoid plugs simplify electrical connections during installation and servicing. Three terminal, bi-polar plugs fit DIN Connector Standard 43650 (Hirschmann GDM 209).

Installation is easier because valves can be mounted without removal of nameplate. Openings in nameplate provide access to mounting holes in valve bodies.

Commercially available mating plug is not included.

