INTERNAL OPERATORS

The table at right shows available internal operators and the most common spools. To specify, refer to "Typical Model Code" for the specific valve model.

Contact the Dynex sales department for availability of spool options not shown.

The function symbols in the table show solenoid or lever actuated models, as reference. Air or hydraulic actuators are also available.

Flow pattern in the center position or during crossover is determined by the spool selected. Refer to Spool Descriptions on page 5.

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). The exception are models with Code 6 operators, which are actuator centered.

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

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.

SPOOL SELECTION

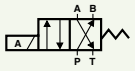
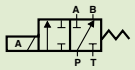
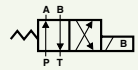
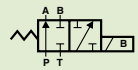
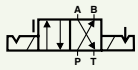
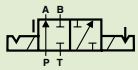
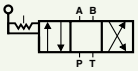
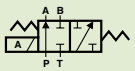
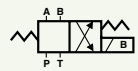
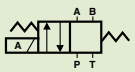
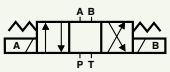
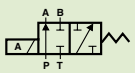
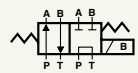
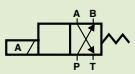
As shown in the table on page 5, identification of spools for the same function differs, depending on whether the valve is direct or pilot-operated.

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.

High pressure valves with HP03 and HP05 patterns, use Type 20 and 21 spools for models with Code 1 and Code 2 internal operators. The exception are manual lever HP03 models, which use Type 0 and 1 spools.

Type 0 and 1 spools provide the same function, but can not be interchanged with Type 20 or 21 spools.

Valve Operator Descriptions

Internal Operator Code	Actuator, Operation	Spool Types: D03 D05	Spool Types: HP03	Spool Types: HP05	Spool Types: D05H D08 D08H	Operator Function: Non-Actuated	Operator Function: Actuated	Function Symbol①
1	Single Actuator, Two Position	0 or 1	20 or 21②	20 or 21②	5 or 6	P→B	P→A	
		03	–	–	–	P→B	P→A	
2	Single Actuator, Two Position	0 or 1	20 or 21②	20 or 21②	5 or 6	P→A	P→B	
		03	–	–	–	P→A	P→B	
3	Single Actuator, Two Position③	0 or 1	0 or 1	0 or 1	5 or 6	Detented in Actuated Positions	P→A or P→B	
		03	03	–	–	Detented in Actuated Positions	P→A or P→B	
	Lever Actuator, Three Position③	All Spools	All Spools	–	All Spools	Detented in Actuated Positions	P→A or P→B	
4	Single Actuator, Two Position④	03	03	–	–	Spring Centered	P→A	
		011	011	–	56 or 58	Spring Centered	P→B	
		0, 1 or 3	0, 1 or 3	0, 1 or 3	5, 6 8 or 9	Spring Centered	P→A	
5	Double Actuator, Three Position	All Spools	All Spools	All Spools	All Spools	Spring Centered	P→A or P→B	
6⑤	Single Actuator, Two Position④	03	03	–	–	P→B	Centered	
		011	011	–	–	P→A	Centered	
		0, 1 or 3	0, 1 or 3	0, 1 or 3	–	P→B	Centered	
7	Lever Actuator, Two Position⑥	0 or 1	0 or 1	–	–	Detented in Actuated Positions	P→A or P→B	

① *Symbols show solenoid or lever actuated models, as reference. Air or hydraulic 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).*

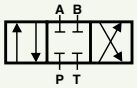
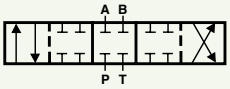
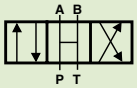
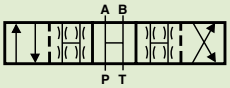
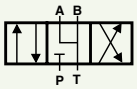
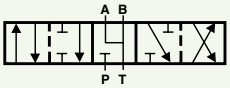
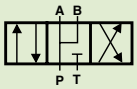
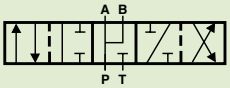
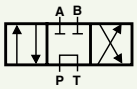
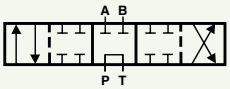
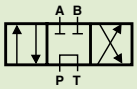
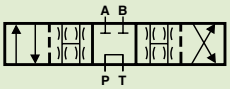
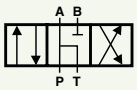
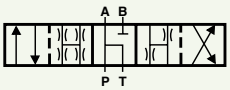
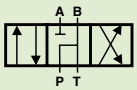
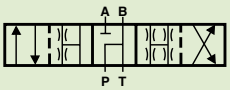
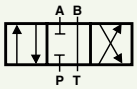
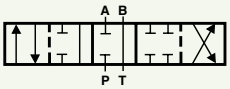
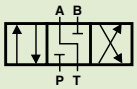
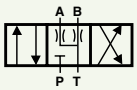
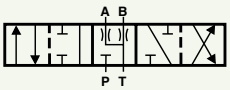
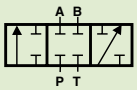
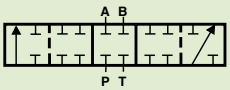
③ *Code 3 operators with solenoid, hydraulic or air-piloted actuators provide two position operation. Manual lever operated models provide three position operation.*

④ *Flow can be reversed with "R" option (i.e., with "R" in model code, Code 4 operator 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.*

Spool Descriptions

Spool 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, 20①	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, 21①	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	9②
		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	01③④	56
		Tandem center spool, as noted for Type 01 and 56 spools, but with open crossover. During transition from center to offset position, all ports are interconnected to eliminate shock in the system.	011⑤	58
		Open center spool with cylinder port B blocked and cylinder port A open to pressure and tank in the center position.	2④	–
		Open center spool with cylinder port A blocked and cylinder port B open to pressure and tank in the center position.	2R④	–
		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.	32④	–
		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.	32R④	–
		Pressure port blocked in center position. Cylinder ports partially restricted and connected to tank.	36④	–
		Closed center spool. All ports blocked in the center position. Tank port blocked in all positions.	03⑥	–

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.*

APPLICATION NOTES

Electrical Data

The tables list electrical specifications for Dynex directional valves.

D03 and HP03 valves use the same solenoids. High flow D05H, D08 and D08H valves also use this solenoid, with the D03 valve serving as a pilot valve.

D05, HP05 and VST valves use the same larger solenoid.

Mounting Position

Unrestricted for all valves.

Manual Operated Valves

Lever operated models provide a choice of four positions on either port "A" end or port "B" end of valve.

To specify handle orientation, see "Typical Model Code" for the specific valve model.

Standard Seals

All valves use Fluorocarbon (Viton® or equivalent) 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

Use filtration to provide fluid which meets these ISO Code 4406 cleanliness values:

Standard N.F.P.A. (CETOP) Patterns, 18/16/13 to 5000 psi (350 bar);

HP03 and HP05 Patterns, 18/16/13 to 5000 psi (350 bar), 17/15/12 higher than 5000 psi (350 bar);

VST Series Seated Valves, 20/18/15.

Adequate filtration is critical for spool valves held in one position for long periods under pressure. Silting may cause spool valves to stick and not shift properly. Valves should also be cycled periodically.

Pressure Surges

Consistent with standard practice, the system must 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.

Electrical Data – D03, HP03, D05H, D08 and D08H Valves

Solenoid Code①	Input Voltage (Volts)	Frequency (Hz)	Inrush Current (Amps)	Holding Current (Amps)	Holding Power (Watts)	Coil Resistance (Ohms + 10%)
24DF (Dual Frequency)	24 AC	50	9.50	2.60	27	1.67
	24 AC	60	8.60	1.75	22	1.67
115DF (Dual Frequency)	110 AC	50	1.65	0.47	23	44.2
	115 AC	60	1.55	0.40	20.5	44.2
230DF (Dual Frequency)	220 AC	50	0.86	0.22	23	150
	230 AC	60	0.80	0.18	20.5	150
460DF (Dual Frequency)	440 AC	50	0.41	0.13	23	600
	460 AC	60	0.40	0.10	21	600
12DC	12 DC	–	–	–	28	5.10
24DC	24 DC	–	–	–	28	20.60
12EP	12 DC	–	–	–	33	4.36
24EP	24 DC	–	–	–	33	17.50
110EP	110 AC	50	1.86	0.54	23	35.20
115EP	115 AC	60	1.90	0.50	23	33.50

① *Ordering codes listed are for standard wire leads. Plug-in Terminal solenoids ("Hirschmann" type) are also avaialble. See "Typical Model Code" for the specific valve model.*

Electrical Data – D05, HP05 and VST Valves

Solenoid Code①	Input Voltage (Volts)	Frequency (Hz)	Inrush Current (Amps)	Holding Current (Amps)	Holding Power (Watts)	Coil Resistance (Ohms + 10%)
24DF (Dual Frequency)	24 AC	50	23.00	4.10	38	0.56
	24 AC	60	21.00	3.15	38	0.56
115DF (Dual Frequency)	110 AC	50	4.80	0.88	37	10.20
	115 AC	60	4.30	0.72	35	10.20
230DF (Dual Frequency)	220 AC	50	2.40	0.44	37	40.80
	230 AC	60	2.20	0.36	35	40.80
460DF (Dual Frequency)	440 AC	50	1.30	0.23	37	188.50
	460 AC	60	1.20	0.20	35	188.50
12DC	12 DC	–	–	–	48	3.00
24DC	24 DC	–	–	–	48	12.00
250DC	250 DC	–	–	–	48	1300.00
12EP	12 DC	–	–	–	48	3.00
24EP	24 DC	–	–	–	48	12.00
110EP	110 AC	50	4.20	1.00	43	10.72
115EP	115 AC	60	3.90	8.90	43	10.47
220EP	220 AC	50	2.09	0.50	43	43.35

① *Ordering codes listed are for standard wire leads. Plug-in Terminal solenoids ("Hirschmann" type) are also avaialble. See "Typical Model Code" for the specific valve model.*

Drain and Pilot Connections

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

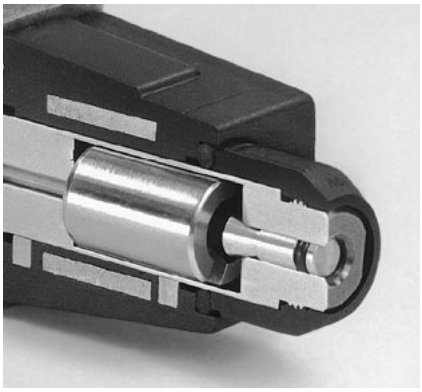
Internal drain and external pilot are optional. See "Typical Model Code" for each valve model. Also refer to the installation drawings, which indicate plug locations for various drain and pilot configurations.

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.

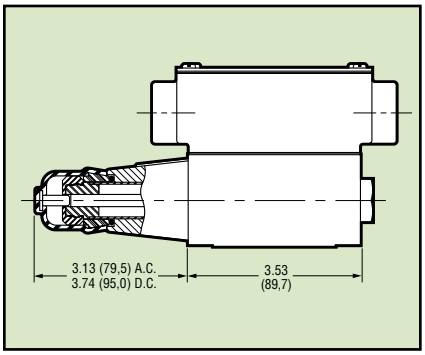


Manual Solenoid Override

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.

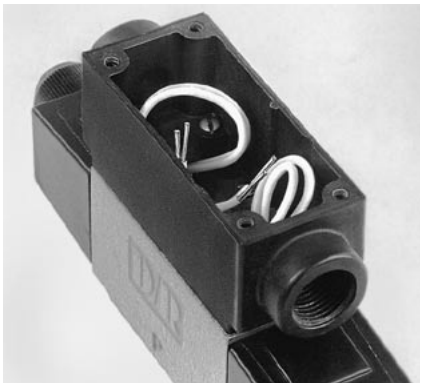
Refer to "Typical Model Code" on the appropriate page for each specific model.



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.

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

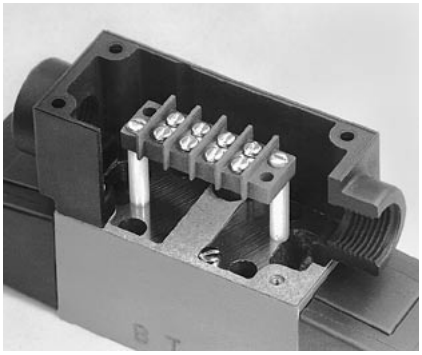


Terminal Strip

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.



ELECTRICAL OPTIONS

Connectors (3- Or 5-Pin)

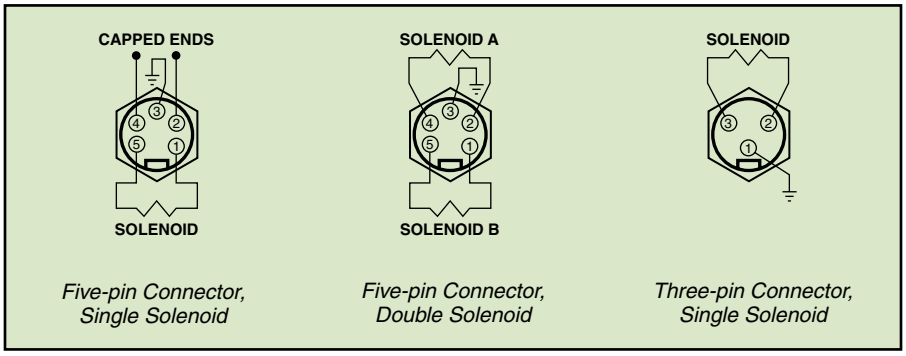
Simplify your connections and prevent wiring mistakes with quick-connect pin receptacles (N.F.P.A. standard T3.5.29-1980; A.N.S.I. standard B93.55M-1981).

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).



Five-pin Connector, Single Solenoid

Five-pin Connector, Double Solenoid

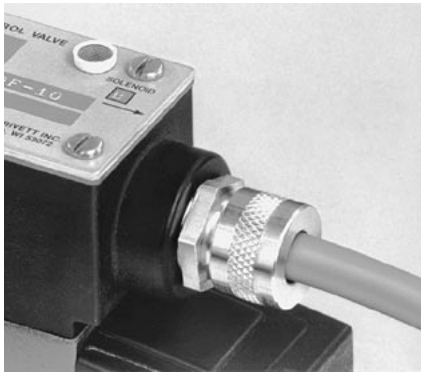
Three-pin Connector, Single Solenoid

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. 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 Form A ("Hirschmann" type).

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.