

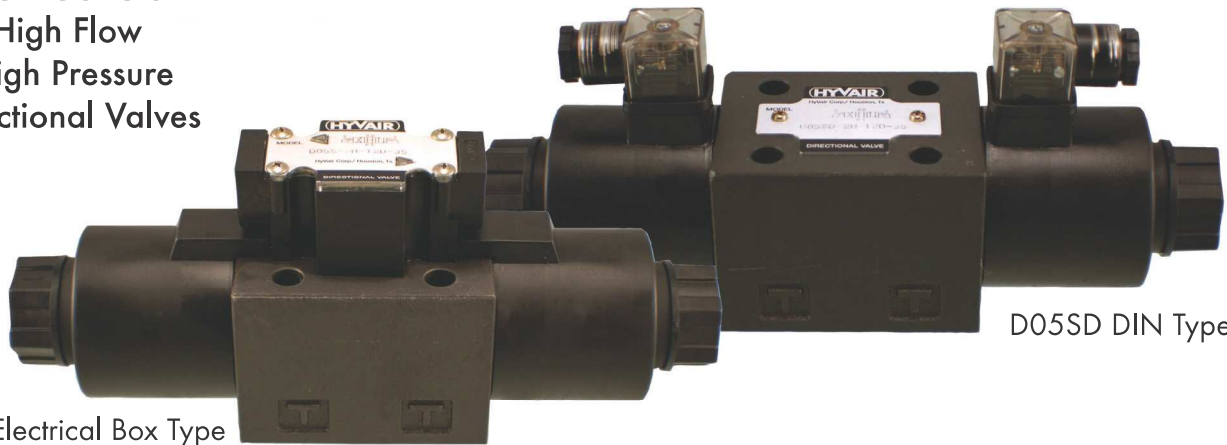
DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



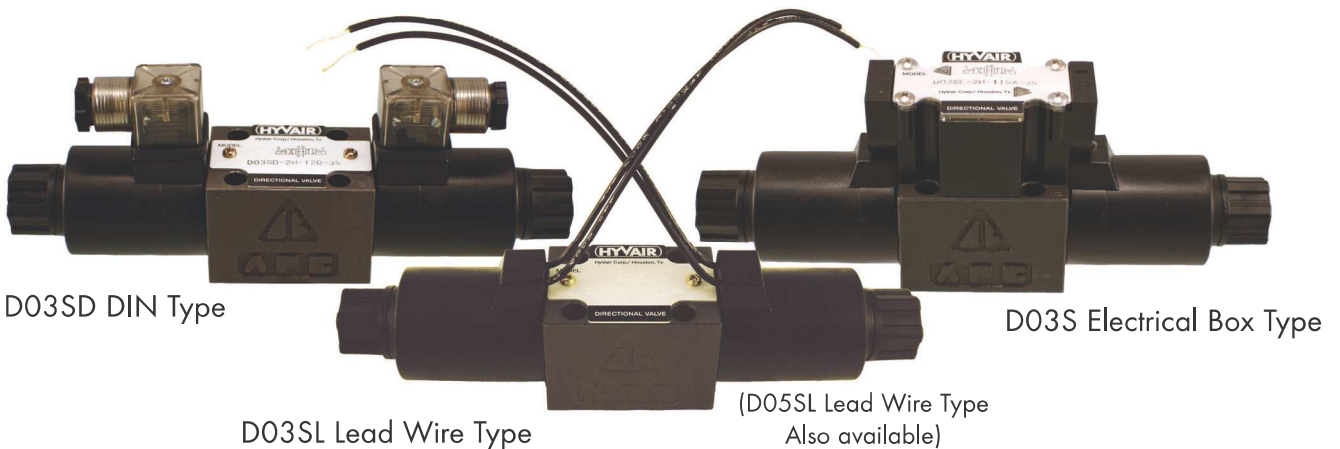
Series 35

High Flow
High Pressure
Directional Valves



D05S Electrical Box Type

D05SD DIN Type



D03SD DIN Type

D03SL Lead Wire Type

(D05SL Lead Wire Type
Also available)

D03S Electrical Box Type

FEATURES

- ✓ **High Flow/ High Pressure:** Up to 25 gpm (D03) and 40 gpm (D05)/ 5,000 psi working pressure*.
- ✓ **Oil Immersed, Quiet Solenoid Design:** Moving core immersed in hydraulic oil provides quiet operation.
- ✓ **High Tank Port Pressure:** Up to 3,000 psi tank port back pressure (Check each spool type for max. allowable)
- ✓ **Twin Tank Line Design:** Upper and lower tank line channels (Double Loop) greatly reduces pressure drop.
- ✓ **Wiring:** Electrical box with indicator lights and terminal strip connection standard. DIN connector provided standard on DIN style coils. (Connectors may optionally be supplied with lights.)
- ✓ **Hydraulic/ Electric Shockless:** Valve coils available electric shockless (rectified)- reducing voltages spikes, extending relay contact life, and providing even quieter operation. Spool shifting time is increased up to four times by metering the oil in the core tube. Option F (Electrical Box version only)
- ✓ **Maintenance:** Indicator lamps to diagnose connection; Plug-in coils provide easy changing without disturbing wiring.
- ✓ **High Reliability:** Valve designed to last 30 million spool shifts under proper use.
- ✓ **Bolt Kit included with valve standard**

*Some spools rated less- check max. pressures and flows page 4.

DIRECTIONAL CONTROL VALVES

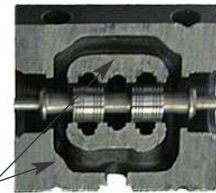
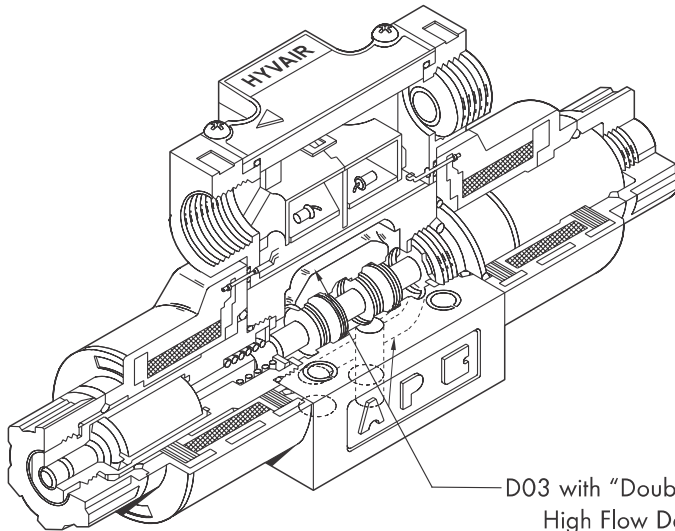
SOLENOID ACTUATED, DIRECT OPERATED



NFPA SIZE: D03 & D05

Internal Structure

NFPA D03

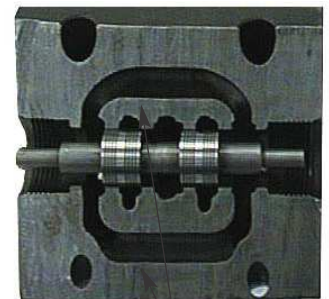
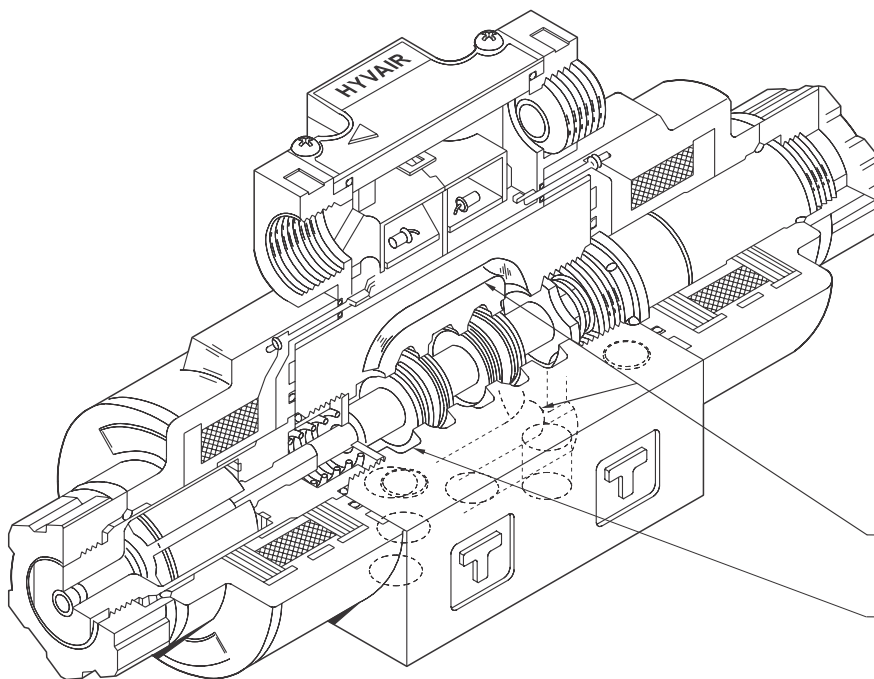


D03 with "Double Loop"
High Flow Design

Electrical box with indicator lights and terminal strip connection standard.

Electrical boxes shown with optional rectifiers.
(Code X)

NFPA D05



D05 with "Double Loop"
High Flow Design

5 Channel 6 Tooth Design

DIRECTIONAL CONTROL VALVES

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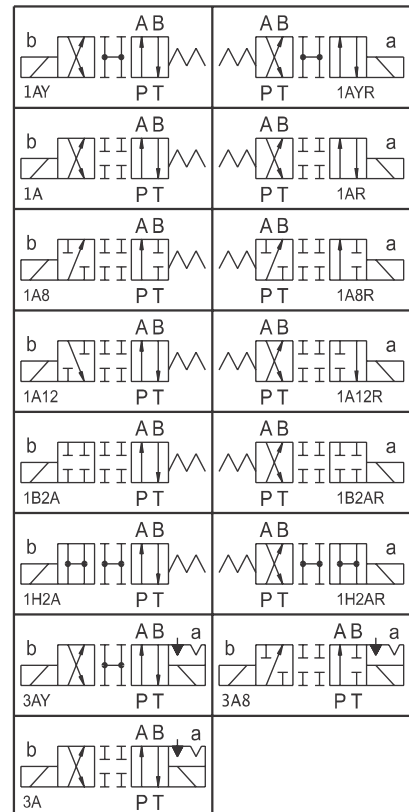
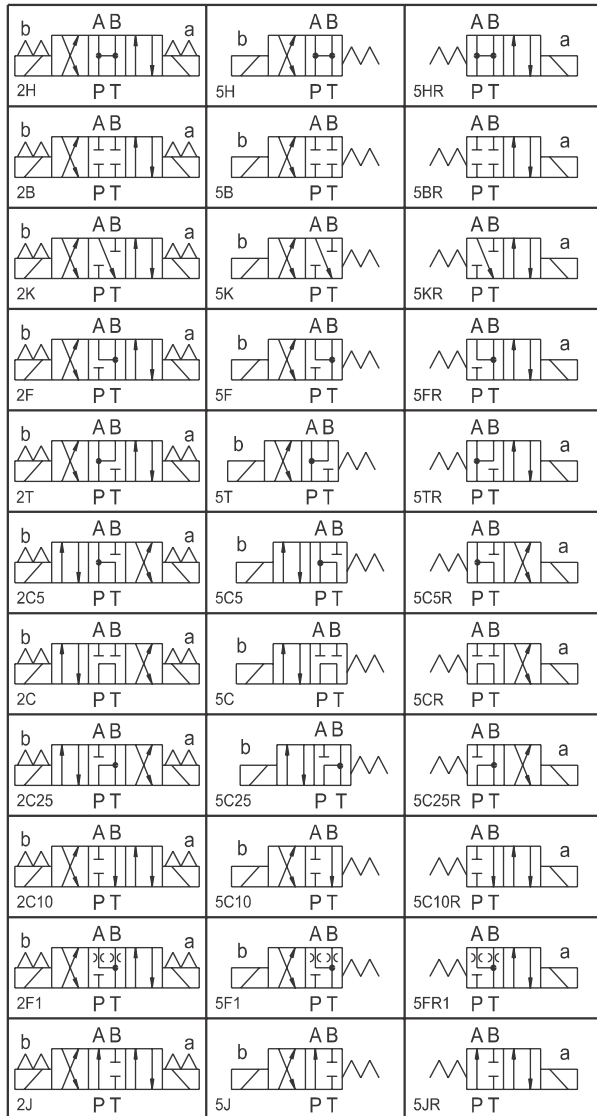


NFPA SIZE: DO3 & DO5

Specifications

		D03			D05		
		AC solenoid	DC solenoid		AC solenoid	DC solenoid	
			Built-in rectifier			Built-in rectifier	
		AC	RAC	DC	AC	RAC	DC
Max. operating pressure	P, A, B ports	5070 psi (35 Mpa)			Note: Less for some valve types such as hyd. shockless and tandem spool		
Maximum permissible back pressure	T port	3040 psi (35:21 MPa)			2320 psi (16 MPa)		
Changeover frequency (cycles/min)	Standard type	300	120	300	300	120	240
	Shockless type	—		120	—		120
Mounting Surface	Nfpa. (ISO)	T3.5.1.MR1-D03, (4401-03)			T3.5.1.MR1-D05, (4401-05)		
Internal Leakage	cu-in/min, (ml/min)	0.18, (3)			0.22, (3.5)		
Mass lbs (kg)	Double solenoids	4 (1.8)	4.4 (2.0)	9.2 (4.2)	11 (5.0)		
	Single solenoid	3.1 (1.4)	3.3 (1.5)	7.9 (3.6)	8.6 (3.9)		
Recommended operating conditions	Operating temperature range	-4 ~ 158 °F (-20 ~ 70 °C)			41 ~ 140 °F (5 ~ 60 °C)		
	Operating viscosity	80 ~ 1400 SUS (15 ~ 300 mm ² /s ²)					
	Viscosity index	90 or above					
	Filtration	25 μm or less					

Symbols



DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



NFPA SIZE: D03 & D05

Common 115 VAC Models

D03	D05	Symbol
D03S-1A-115A-35	D05S-1A-115A-35	A
D03S-1AY-115A-35	D05S-1AY-115A-35	AY
D03S-2B-115A-35	D05S-2B-115A-35	B
D03S-2C-115A-35	D05S-2C-115A-35	C
D03S-2F-115A-35	D05S-2F-115A-35	F
D03S-2H-115A-35	D05S-2H-115A-35	H
D03S-2K-115A-35	D05S-2K-115A-35	K
D03S-2T-115A-35	D05S-2T-115A-35	T
D03S-3A-115A-35	D05S-3A-115A-35	A

Common Configurations

Electrical Box

Din Coil



D0*-SP-***-DC
Single Spade Connector
Now Available

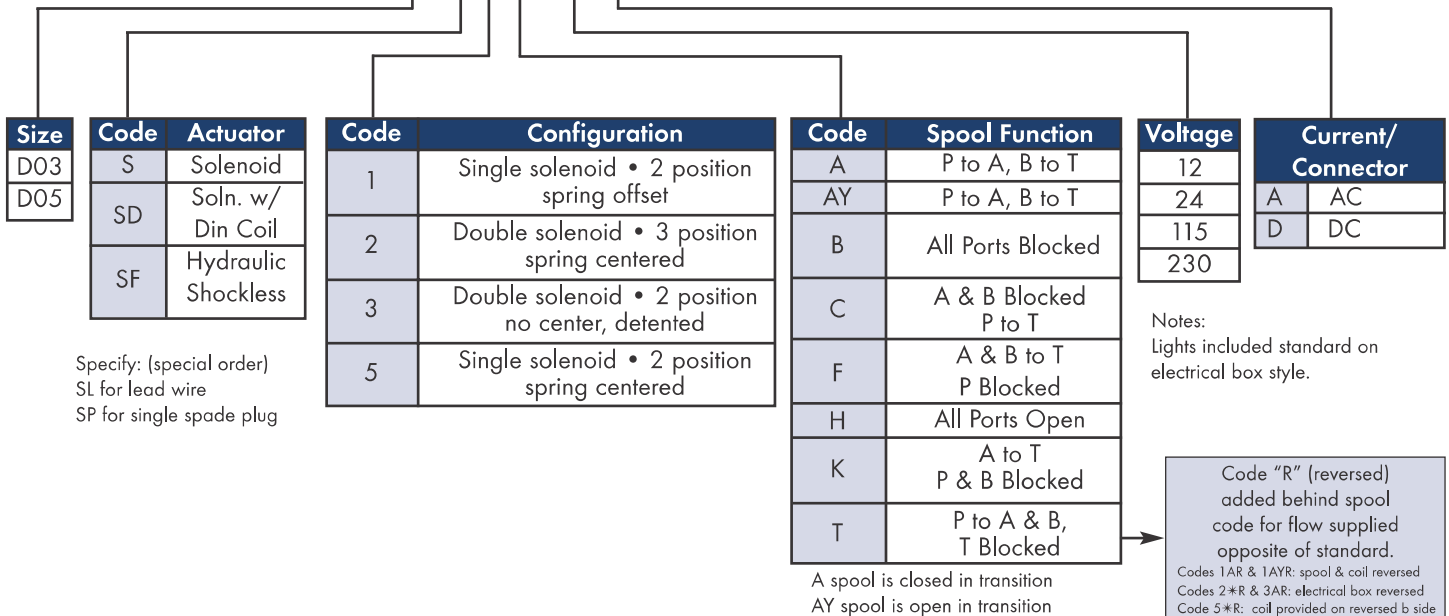
ORDERING INFORMATION



SOLENOID DIRECTIONAL VALVE PART NUMBERING SYSTEM:

D03 S-2 B-115 A-35

Example: D03 Valve, double solenoid, 3 position, spring centered, all ports blocked in center, 115 volt- ac coils



Specify: (special order)
SL for lead wire
SP for single spade plug

DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



NFPA SIZE: DO3 & DO5

Electrical Information

D03	Solenoid Coil Specifications											
Solenoid Voltage	115V-AC			230V-AC			115V-RAC (rectified)		230V-RAC (rectified)		12V-DC	24V-DC
Coil Model D03S (Elect. Box)	2BH-C1/C3			2BH-C2/C4			2BF-R1/R3		2BF-R2/R4		2BF-D1	2BF-D2
Coil Model D03SD (DIN)	2AH-C1/C3			2AH-C2/C4			2AF-R1/R3		2AF-R2/R4		2AF-D1	2AF-D2
Applied Voltage	AC110	AC120		AC220	AC240		AC110	AC120	AC220	AC240	DC12	DC24
Frequency (Hz)	50	60	60	50	60	60	50 / 60		50 / 60			
Starting Current (A)	2.2	2.0	2.2	1.1	1.0	1.0						
Holding Current (A)	0.54	0.41	0.47	0.25	0.19	0.23	0.31	0.32	0.15	0.16	2.5	1.25
Holding Power (W)	25	22	28	25	22	28	30	32	30	32	30	30
Permissible Voltage Range (V)	80-120			180-240			80-130		180-250		10.8-13.2	21.6-26.4
Insulation Resistance (MΩ)	100 or above (500V)											

D05	Solenoid Coil Specifications											
Solenoid Voltage	115V-AC			230V-AC			115V-RAC (rectified)		230V-RAC (rectified)		12V-DC	24V-DC
Coil Model D05S (Elect. Box)	3BH-C1/C3			3BH-C2/C4			3EB-R1/R3		3EB-R2/R4		3EB-D1	3EB-D2
Coil Model D05SD (DIN)	3AH-C1/C3			3AH-C2/C4			3EA-R1/R3		3EA-R2/R4		3EA-D1	3EA-D2
Applied Voltage	AC110	AC120		AC220	AC240		AC110	AC120	AC220	AC240	DC12	DC24
Frequency (Hz)	50	60	60	50	60	60	50 / 60		50 / 60			
Starting Current (A)	5.5	4.6	5.0	2.7	2.3	2.5						
Holding Current (A)	1.1	0.86	1.0	0.52	0.42	0.48	0.46	0.49	0.22	0.24	3.0	1.5
Holding Power (W)	36	34	42	36	34	32	31	34	30	33	31	36
Permissible Voltage Range (V)	80-120			180-240			80-130		180-250		10.8-13.2	21.6-26.4
Insulation Resistance (MΩ)	100 or above (500V)											

Other Configurations

Examples of Code "R" - Reversed

(symbols shown in simplified form)



D03SD-2B
(standard)



D03SD-2BR
(no change to DIN coil valve, electrical box flipped for opposite coil markings)



D03SD-1A
(standard)



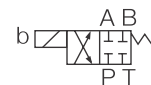
D03SD-1AR
(coil supplied reversed from normal position & spool reversed)



(symbol shown blocked during valve transition only)



D03SD-5B
(standard)



D03SD-5BR
(right or "b" coil side of valve provided)



Notes:

- DIN Coils manufactured to accept standard 3 pin DIN 43 650 and ISO 4400 connectors.
- AC Coils are rated for both 50/60Hz (rewiring not required)
- DC coils are not polarity sensitive
- Rectifier is supplied: in the electrical box- D03S, D05S in the coil (internal)- D03SD, D05SD
- Hydraulic shockless AC valves are always supplied with rectifier.
- Hydraulic shockless valves will not operate as shockless until the tank line has become filled with oil- occurs automatically after the first few cycles. Mounting valve below the reservoir oil level or using check valve ensures that the tank line remains filled.
- Do not supply electrical power to the AC coils unless the coil is mounted on the valve.
- Do not exceed voltage specifications shown above.
- Electrical power should be maintained on detented valves (spool code 3A). Detent only maintains start-up position of the valve.

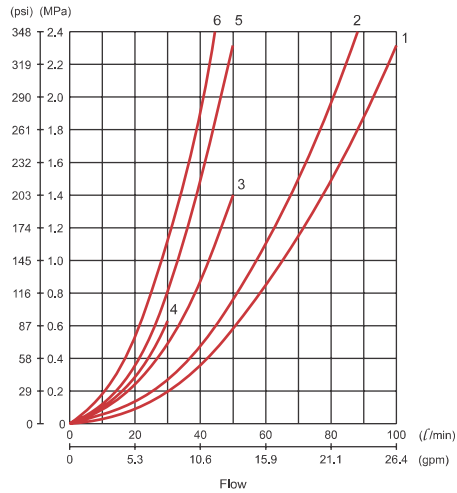
DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



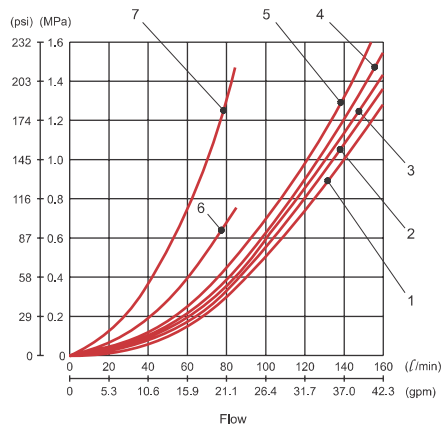
NFPA SIZE: DO3 & DO5

Pressure Drop Curves



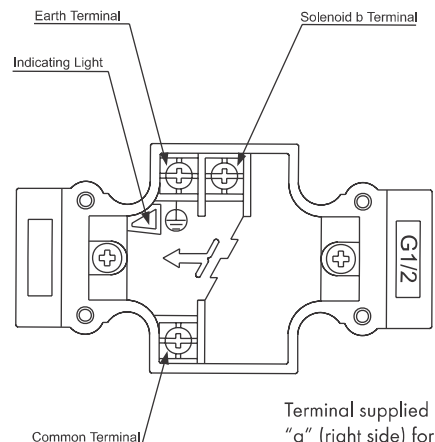
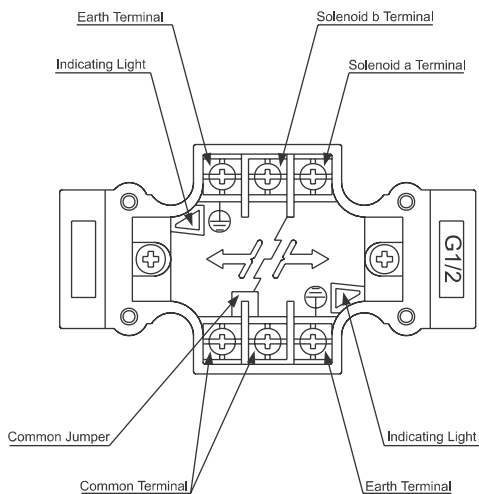
Model	Valve spool type	P→A	P→B	A→T	B→T	P→T
D03 SERIES	1A8, 1A8R, 3A8	4	4	—	—	—
	1A, 1AR	2	2	2	2	—
	3A	2	2	2	2	—
	1AY, 1AYR, 3AY	1	1	1	1	—
	2H	1	1	1	1	1
	5B, 5BR, 2B, 2F	2	2	2	2	—
	2K, 2K1	2	2	1	2	—
	2J	1	2	2	2	—
	2F	2	2	1	1	—
	2C	6	6	5	5	3
	2C5	1	6	2	5	3
	2T	1	1	2	2	—

Viscosity of hydraulic fluid 150 SUS {32 mm²/s²}



Model	Valve spool type	P→A	P→B	A→T	B→T	P→T
D05 SERIES	1A8, 1A8R, 3A8	5	5	—	—	—
	5B	—	3	3	—	—
	5BR	3	—	—	3	—
	1A, 1AR, 3A	3	3	4	4	—
	1AY, 1AYR	1	1	4	4	—
	3AY	2	2	1	1	—
	2K	3	3	1	3	—
	2J	1	3	3	3	—
	2H	1	1	1	1	1
	2B, 2K1, 2F1	3	3	3	3	—
	2F	3	3	1	1	—
	2C	7	7	7	7	6
	2C5	1	7	1	7	6
	2T	1	1	3	3	—

Viscosity of hydraulic fluid 150 SUS {32 mm²/s²}



Terminal supplied on "a" (right side) for code "R" reversed coil valve

DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



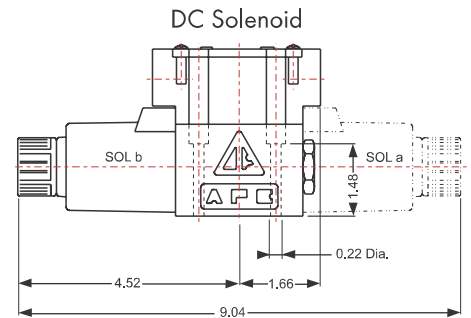
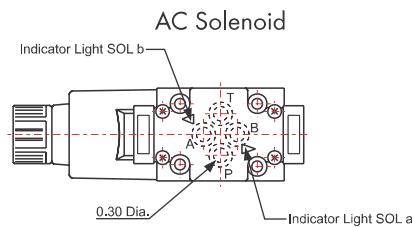
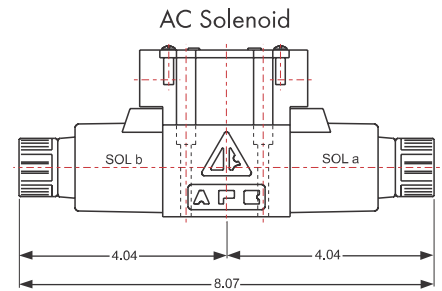
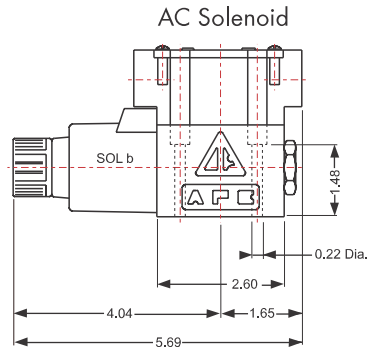
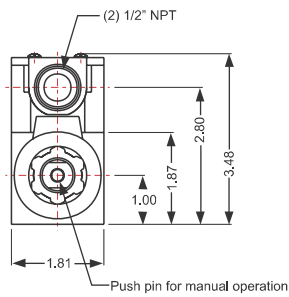
NFPA SIZE: D03

Dimensional Data

Electrical Box Type D03S D03SF

Units: Inches

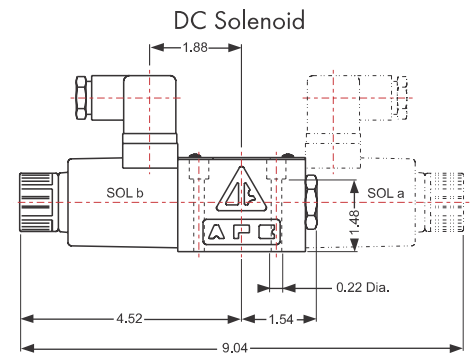
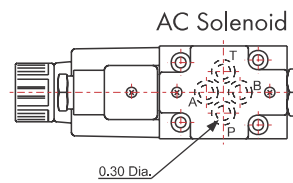
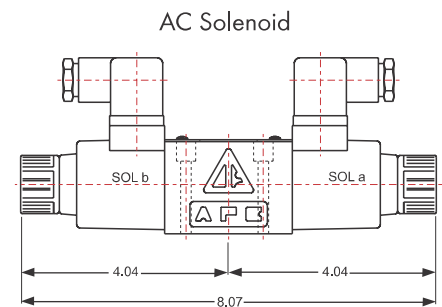
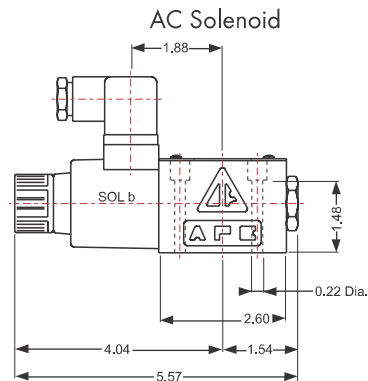
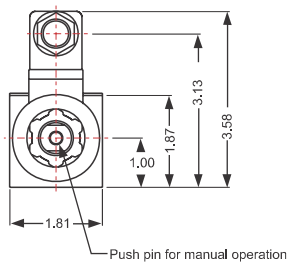
Mounting: (4) 10-24 SHCS x 1-3/4"
Torque 40-45 in-lbs



DIN Type D03SD

Units: Inches

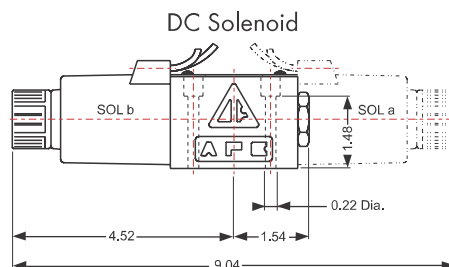
Mounting: (4) 10-24 SHCS x 1-3/4"
Torque 40-45 in-lbs



Lead Wire Type D03SL

Units: Inches

Mounting: (4) 10-24 SHCS x 1-3/4"
Torque 40-45 in-lbs



DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



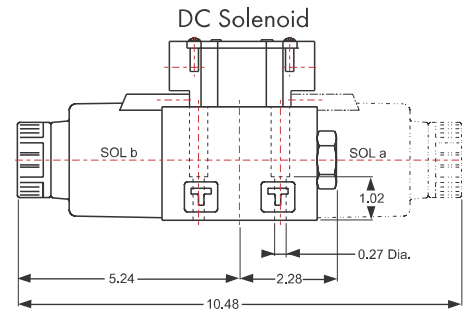
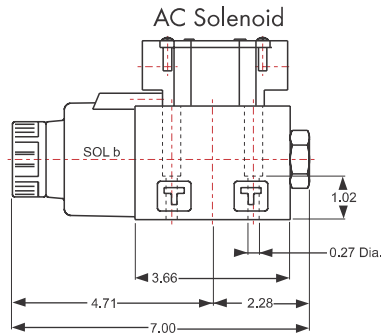
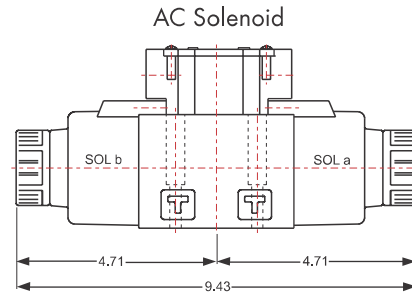
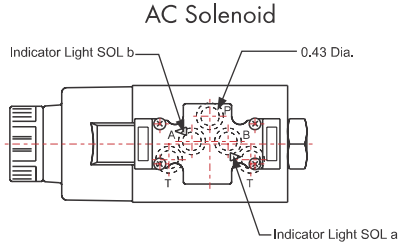
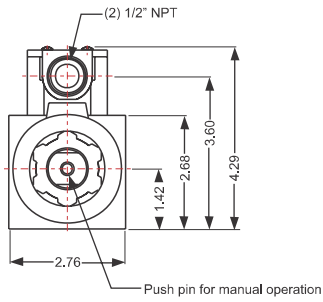
NFPA SIZE: DO5

Dimensional Data

Electrical Box Type D05S D05SF

Units: Inches

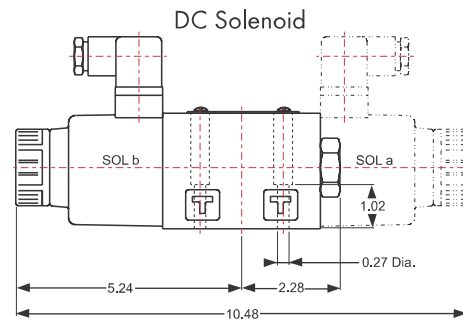
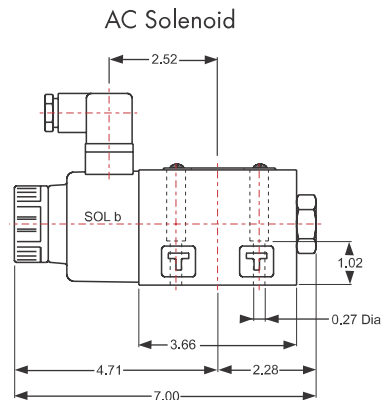
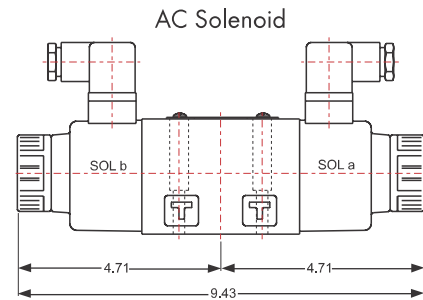
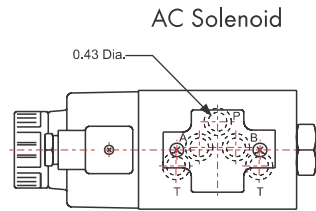
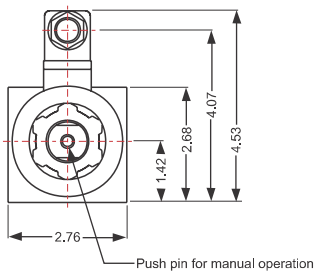
Mounting: (4) 1/4-20 SHCS x 1-1/2"
Torque 105-110 in-lbs



DIN Type D05SD

Units: Inches

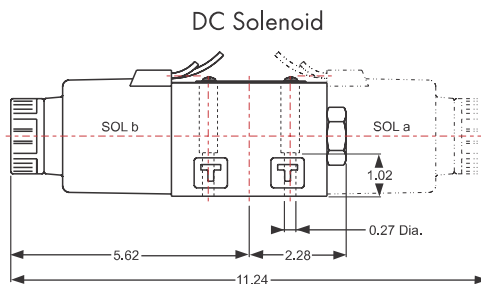
Mounting: (4) 1/4-20 SHCS x 1-1/2"
Torque 105-110 in-lbs



Lead Wire Type D05SL

Units: Inches

Mounting: (4) 1/4-20 SHCS x 1-1/2"
Torque 105-110 in-lbs



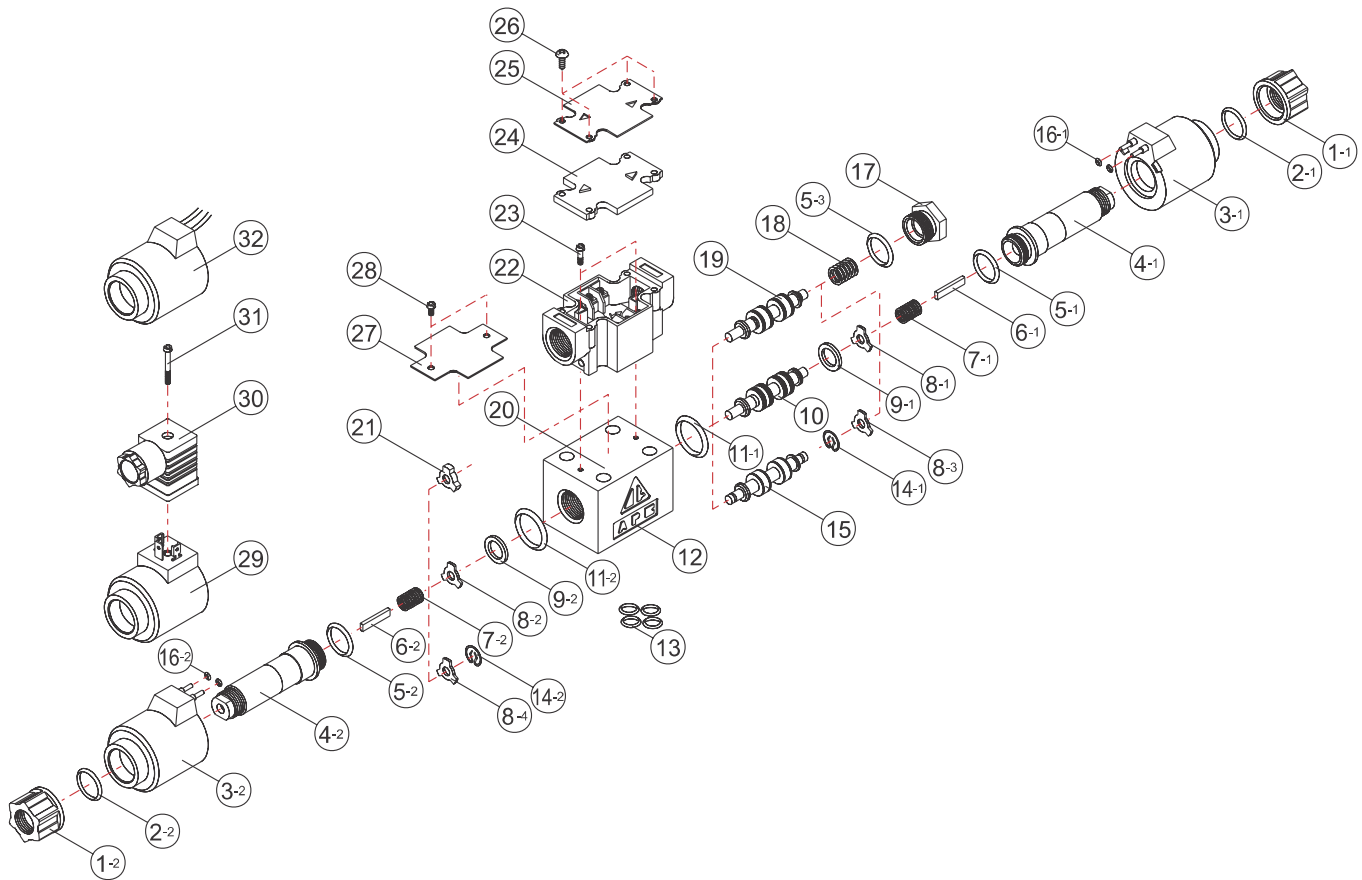
DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



NFPA SIZE: DO3

Parts Breakdown D03S/ D03SD/ D03SL Series 35



Parts Breakdown D03S/ D03SD/ D03SL Series 35

1) Solenoid Nut	9) Washer	17) Hex Plug	25) Nameplate (Elect. Box)
2) O-Ring	10) Spool (3 position)	18) Spring	26) Screw
3) Coil For Elect. Box Type)	11) O-Ring	19) Spool (2 pos. single coil)	27) Nameplate (Non-Box Type)
4) Armature (Core Tube)	12) Body	20) Body	28) Screw
5) O-Ring	13) O-Ring	21) Retainer	29) Coil (For DIN Type)
6) Push Pin	14) Concave Pin	22) Electrical Box	30) Connector
7) Spring	15) Spool (2 position detent)	23) Screw	31) Screw
8) Retainer	16) O-Ring	24) Acrylic Cover	32) Coil (For Lead Wire Type)

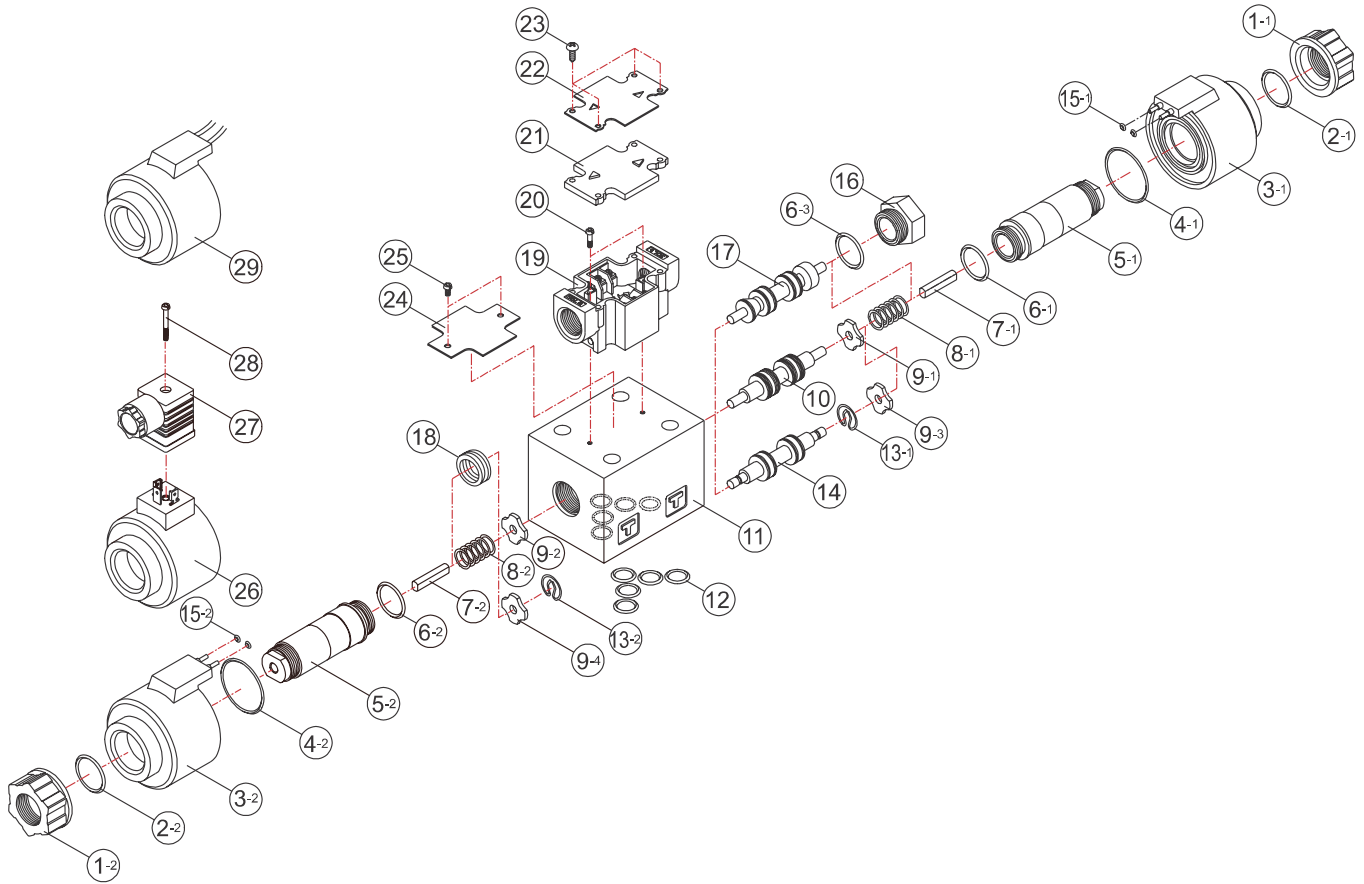
DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, DIRECT OPERATED



NFPA SIZE: DO5

Parts Breakdown D05S/ D05SD/ D05SL Series 35



Parts Breakdown D05S/ D05SD/ D05SL Series 35

1) Solenoid Nut	9) Retainer	17) Spool (2 pos. single coil)	25) Screw
2) O-Ring	10) Spool (3 position)	18) Retainer	26) Coil (For DIN Type)
3) Coil For Elect. Box Type)	11) Body	19) Joint Box	27) Connector
4) O-Ring	12) O-Ring	20) Joint Box Screw	28) Screw
5) Armature (Core Tube)	13) Concave Pin	21) Acrylic Cover	29) Coil (For Lead Wire Type)
6) O-Ring	14) Spool (2 position detent)	22) Nameplate	
7) Push Pin	15) O-Ring	23) Screw	
8) Spring	16) Hex Plug	24) Nameplate (Non-Box Type)	

DIRECTIONAL CONTROL VALVES

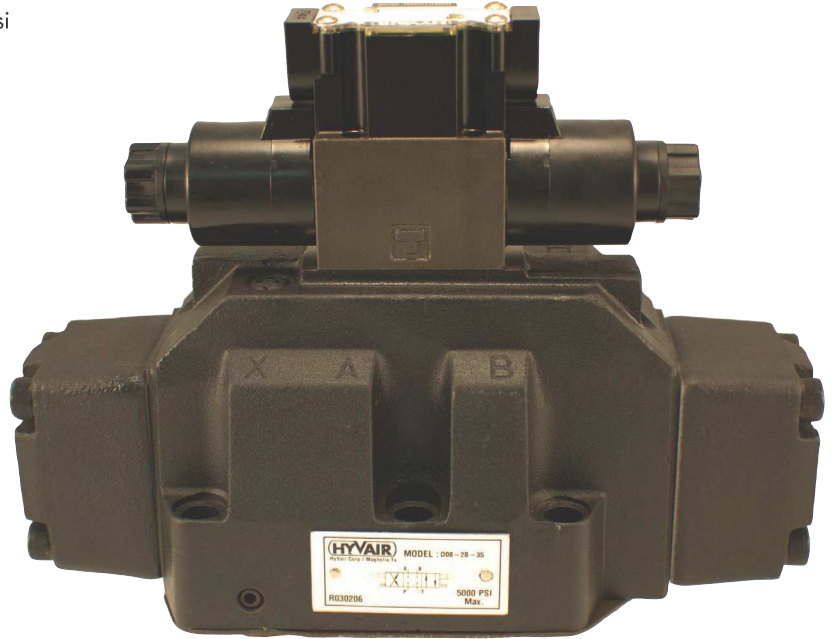
SOLENOID ACTUATED, PILOT OPERATED



NFPA SIZE: D08

FEATURES

- ✓ **High Pressure/ High Flow:** 65 gpm/ 4,500 psi
- ✓ **Pilot Operation:** Main spool controlled by D03 solenoid pilot valve- allows for addition of modular valves to reduce shifting shock.
- ✓ **Oil Immersed, Quiet Solenoid Design:** Moving core immersed in hydraulic oil provides quiet pilot operation.
- ✓ **Wiring:** Electrical box with indicator lights and terminal strip connection standard. DIN coils available and provided with DIN connector. AC DIN connectors supplied with indicator lights at no extra charge.
- ✓ **Maintenance:** Indicator lamps to diagnose connection; Plug-in coils provide easy changing.
- ✓ **High Reliability:** Valve designed to last 20 million spool shifts under proper use.



D08S- Pilot Operated Directional Valve

Specifications

Size		D08
Nominal Flow Rates	@ 4500 psi	75 gpm (284 lpm)
	@ 1000 psi	100 gpm (378 lpm)
Maximum Operating Pressure	P, A, B, Ports	4500 psi (315 bar)
	*T Port- Including Surges	2000 psi (140 bar)
Internal Leakage	@ 3000 psi	6 cu-in/ min (98 ml/ min)
Maximum Cycle Rate		150 cycles/ min
Mounting Surface	NFPA	T3.5.1.MR1-D08
	ISO	ISO 4401- 08
Weight	Single Solenoid	29 lbs (13.1 kg)
	Double Solenoid	30 lbs (13.5 kg)
Operating Conditions	Working Temperature	40- 160° F (5- 70°C)
	Operating Viscosity	80- 300 SUS (17- 65 cSt)
	Max. Start-up Viscosity	1500 SUS (315 cSt)
	Filtration	25 micron or less, (ISO 18/15)
	Recommended Fluids	Petroleum Based Fluids- ISO VG32-68, Most Vegetable Oils

*3,000 psi available- specify external drain.

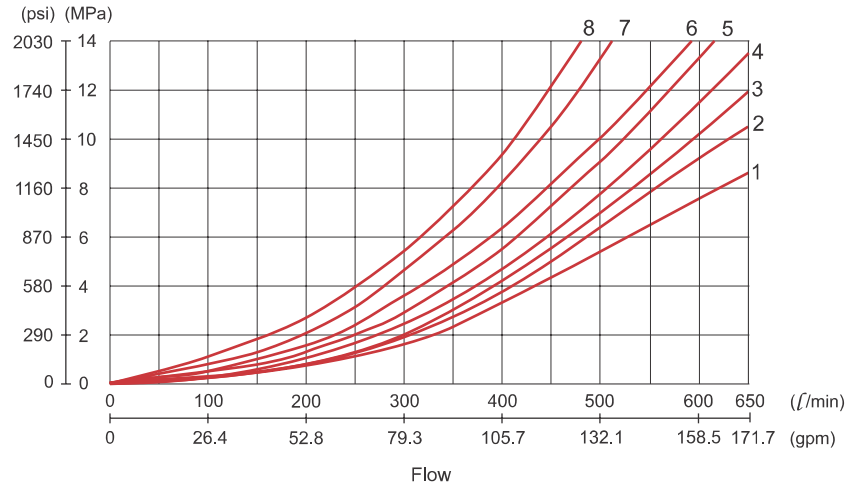
DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, PILOT OPERATED



NFPA SIZE: D08

Typical Pressure Drop Curves



For continuous flow conditions or high cycling applications, a recommended max. flow rating is: 1/2 x maximum flow rating.

Standard 115 VAC Model Codes	Symbol	Valve Spool Type	Description	Max. operating pressure psi (bar)	Max. flow gpm (lpm)	Flow Path			
						P→A	P→B	A→T	B→T
D08S-1A-115A-35 (Pilot Valve D03S-1A-115A-35)		1A	Spring Centered: All Ports Blocked/ Hydraulic Offset (Closed in Transition)	4500 (315)	75 (283)	1	1	1	3
D08S-2B-115A-35 (Pilot Valve D03S-2F-115A-35)		2B	Spring Centered: All Ports Blocked	4500 (315)	75 (283)	1	1	1	3
D08S-2C-115A-ED-35 (Pilot Valve D03S-2F-115A-35)		2C	Spring Centered: P to T, A & B Blocked	4500 (315)	65 (283)	3	1	2	4
D08S-2F-115A-35 (Pilot Valve D03S-2F-115A-35)		2F	Spring Centered: P to Blocked, A & B to T	4500 (315)	75 (283)	2	2	3	5
D08S-2H-115A-ED-35 (Pilot Valve D03S-2F-115A-35)		2H	Spring Centered: All Ports Open	4500 (315)	75 (283)	4	4	3	4
D08S-3A-115A-35 (Pilot Valve D03S-3A-115A-35)		3A	Spring Centered: All Ports Blocked/ Hydraulic Detented (Closed in Transition)	4500 (315)	75 (283)	1	1	1	3

Maximum flows may be increased by 30% (except spool 2C) if 250 psi pilot pressure is maintained.
External draining may be required where high tank line pressures exist (high flow)- the differential pressure between pilot pressure and back pressure at tank port should always be 70 psi minimum

Pilot/ Drain Configurations

Spool Codes A, B, F Supplied Internal Pilot & Internal Drain Standard

Spool Codes C and H Supplied Internal Pilot & External Drain Standard

⇒ Use 70 psi back-pressure check valve in tank port to provide shifting pressure, see page 56.

External Drain- Specify "ED" Suffix External Pilot- Specify "EP" suffix

Only use Hyvair plugs with short insertion depth.

DIRECTIONAL CONTROL VALVES

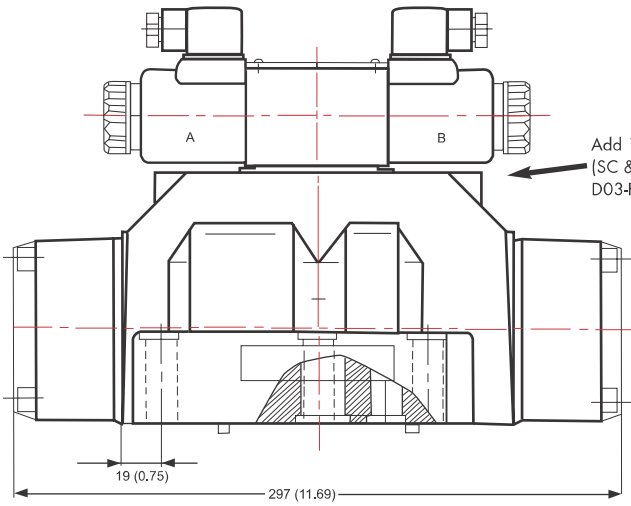
SOLENOID ACTUATED, PILOT OPERATED



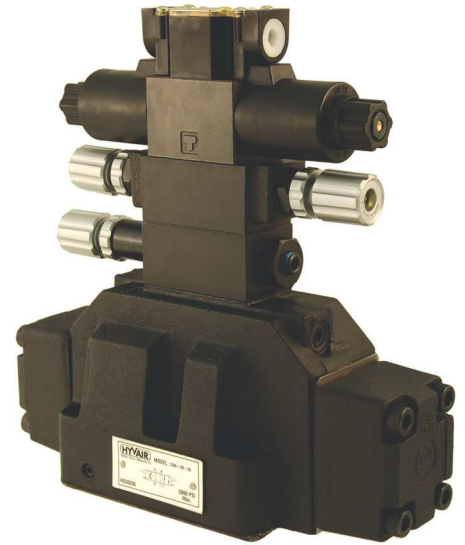
NFPA SIZE: D08

Units: mm/ (Inch)

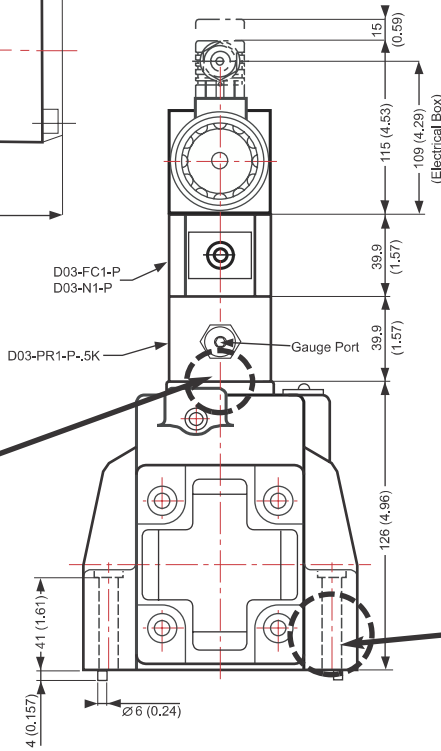
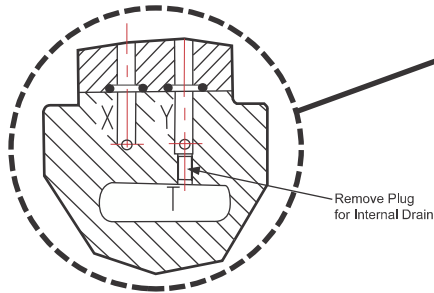
Dimensional Data



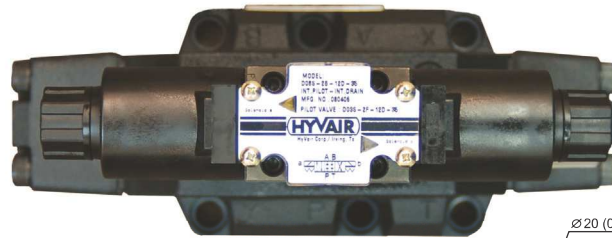
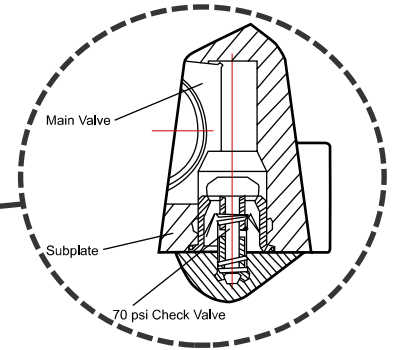
Add 1.57" per Modular Valve
(SC & SDC options), D03-N1-P,
D03-FC1- AB-MO, D03-PR1-P-5K



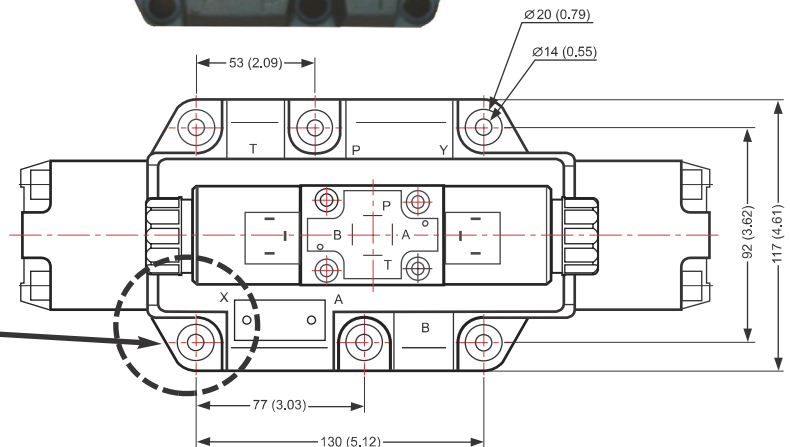
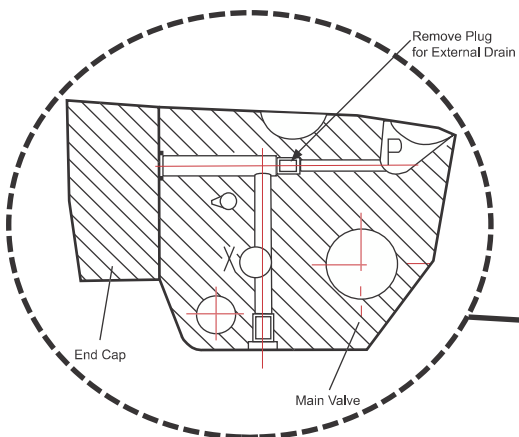
External Drain



Pre Load Check (Spools C & H Only)



External Pilot



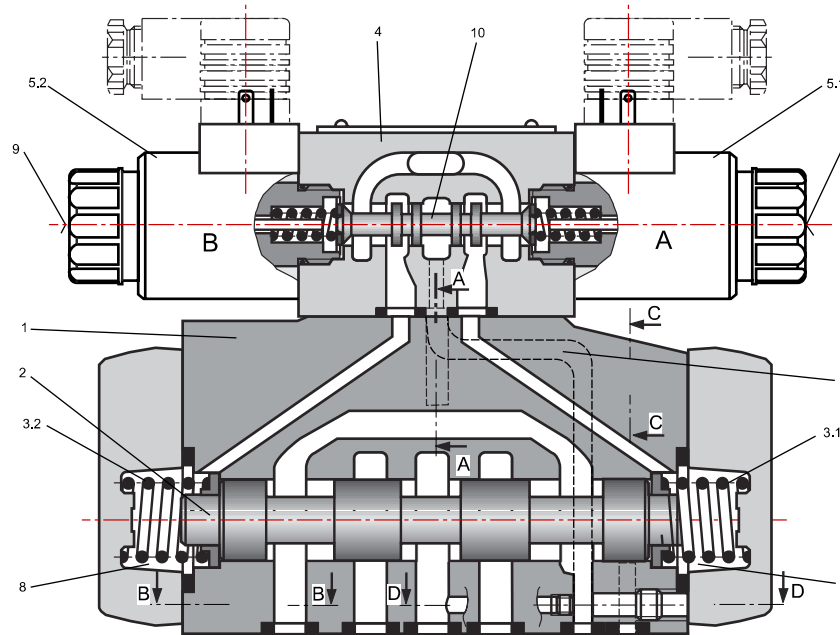
DIRECTIONAL CONTROL VALVES

SOLENOID ACTUATED, PILOT OPERATED



NFPA SIZE: D08

Cross Section



1) Main Valve with Housing	3.2) Return Spring	5.2) Solenoid	9) Manual Override
2) Main Control Spool	4) Pilot Valve	6) Spring Chamber	9) Manual Override
3.1) Return Spring	5.1) Solenoid	8) Spring Chamber	10) Pilot Spool

ORDERING INFORMATION



PILOT OPERATED DIRECTIONAL VALVE PART NUMBERING SYSTEM:

D08 S-2 B- 115 A - Options - 35

Size	Code	Actuator	Code	Configuration	Code	Spool Function	Voltage	Current
D08	S	Solenoid	1	Single solenoid • 2 position spring offset	A	P to A, B to T	12	A= AC
	SD	Soln. w/ Din Coil	2	Double solenoid • 3 position spring centered	B	All Ports Blocked	24	D= DC
	SC	Solenoid w/ *Pilot Choke	3	Double solenoid • 2 position ^{no} center, detented	C	P to T, A & B Blocked	115	
	SDC	Soln. w/ Din Coil & *Pilot Choke	5	Single solenoid • 2 position spring centered	F	P Blocked, A & B to T	230	
					H	All Ports Open		

*Pilot choke valve, (D03FC1-AB-MO- meter out flow control), provides softer shifting.

Also consider additionally using D03PR1-P-.5K pressure reducing valve if system pressure is above 1,000 psi. (See dimensional data)

Options:

"EP" suffix for External Pilot (x-port connection) "ED" suffix for External Drain (y-port connection)

At least one of these options must be used on C & H spools unless Pre Load Check (standard) is used.

DIRECTIONAL CONTROL VALVES

AIR OR OIL ACTUATED, DIRECT OPERATED



NFPA SIZE: D03 & D05



D03 and D05 Piloted Operated Valves

FEATURES

Air Pilot Operation: Standard pneumatic operators have low shifting pressures and quick response, series **A**. Series **AP** (extra strong operator return springs) offers hydraulic flow proportional to pneumatic pilot pressure and when used in conjunction with regulators can control slow shifting rate as long as 1.5 seconds if flow is restricted. Both series come with manual overrides and breather filter vents standard.

Hydraulic Pilot Operation: Standard hydraulic operators have moderate shifting pressures and quick response, series **H**.

Common Models

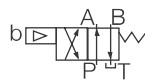
Single Operator

Pneumatic Pilot

Hydraulic Pilot



Size: **D03** **D05**
Model: D03A-1A-35 D05A-1A-35



D03 **D05**
D03H-1A-35 D05H-1A-35

Double Operators

Pneumatic Pilot

Hydraulic Pilot



Size: **D03** **D05**
Model: D03A-2B D05A-2B-35



D03 **D05**
D03H-2B-35 D05H-2B-35

Model: D03A-2F-35 D05A-2F-35



Model: D03H-2F-35 D05H-2F-35

Model: D03A-2C-35 D05A-2C



Model: D03H-2C-35 D05H-2C-35

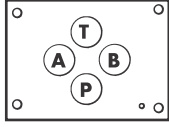
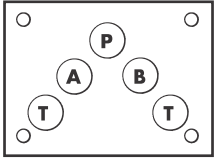
DIRECTIONAL CONTROL VALVES

AIR OR OIL ACTUATED, DIRECT OPERATED












NFPA SIZE: DO3 & DO5

Specifications

Size				
	D03		D05	
Maximum Flow Rates*	25 gpm (94 lpm)		40 gpm (151 lpm)	
Maximum Operating Pressure	P, A, B, Ports*		5000 psi (350 bar)	
	T Port- Including Surges		300 psi (20 bar)	
Internal Leakage	@ 3000 psi	0.18 cu-in/ min (3 ml/ min)	0.22 cu-in/ min (3.5 ml/ min)	
Cycle Rate	Maximum	200 cycles/ min		
Mounting Surface	NFPA	T3.5.1.MR1-D03	T3.5.1.MR1-D05	
	ISO	ISO 4401- 03	ISO 4401- 05	
Weight	Single Air Pilot	2.5 lbs (1.1 kg)	6.2 lbs (2.8 kg)	
	Double Air Pilot	3.0 lbs (1.4 kg)	6.6 lbs (3.0 kg)	
	Single Hyd. Pilot	2.3 lbs (1.05 kg)	5.9 lbs (2.4 kg)	
	Double Hyd. Pilot	2.5 lbs (1.13 kg)	6.1 lbs (2.7 kg)	
Pilot Pressures Min/Max	A Series- Standard	20/250 psi (1.4/17.5 bar)	25/250 psi (1.7/17.5 bar)	
	AP & HL Series	60/250 psi (4.1/17.5 bar)	70/250 psi (4.8/17.5 bar)	
	H Series- Standard	250/3000 psi (17/210 bar)		
Operating Conditions	Working Temperature	40- 160° F (5- 70°C)		
	Operating Viscosity	80- 300 SUS (17- 65 cSt)		
	Max. Start-up Viscosity	1500 SUS (315 cSt)		
	Filtration	25 micron or less, (ISO 18/15)		
	Recommended Fluids	Petroleum Based Fluids- ISO VG32-68, Phosphate Ester, Most Vegetable Oils, Water Based Fluids to 40% Water		

*Some spools rated less- check max. pressures and flows below. Flows are reduced if valve is used as 2 way or 3 way only- consult factory. For continuous flow conditions or high cycling applications, a recommended max. flow rating is: 1/2 x maximum flow rating.

Model Symbol	Valve Spool Type	D03A Max. flow gpm (lpm)	D05A Max. flow gpm (lpm)	Symbol	Valve Spool Type	D03A Max. flow gpm (lpm)	D05A Max. flow gpm (lpm)
	1A	20 (75)	32 (120)		2F	20 (75)	40 (150)
	1AY	20 (75)	32 (120)		2H	20 (75)	40 (150)
	2B	20 (75)	32 (120)		2K	20 (75)	40 (150)
	2C	12 (45)	17 (65)		2T	25 (94)	40 (150)
					3A	25 (45)	40 (150)

DIRECTIONAL CONTROL VALVES

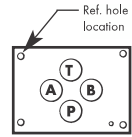
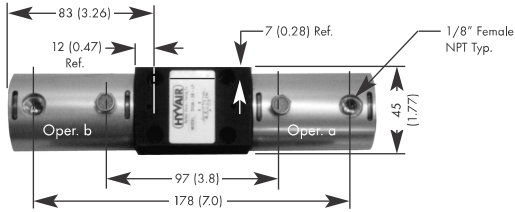
AIR OR OIL ACTUATED, DIRECT OPERATED



NFPA SIZE: DO3 & DO5

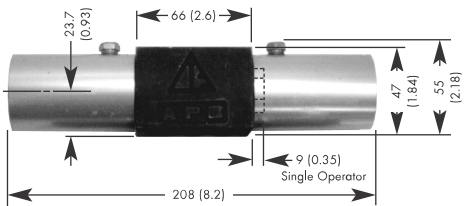
Dimensional Data- D03

Series D03A/ D03AP D03HL



NFPA: T3.5.1.MR1-D03

ISO: 4401-08



6.4mm (0.25") dia.
recessed manual
override
[standard]

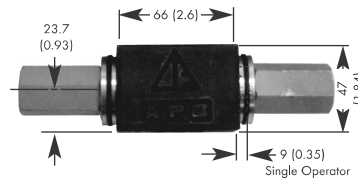
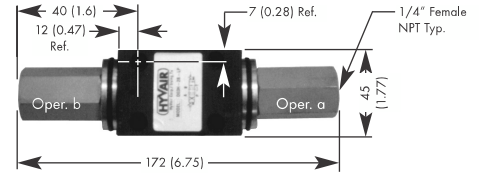
Add 35.5mm (1.4")
length for each knob
type override

D03A- Single Pilot

Units: mm/ (Inch)

Note: Use (4) 10-24 SHCS X 1-3/4"
mounting screws

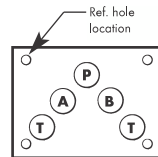
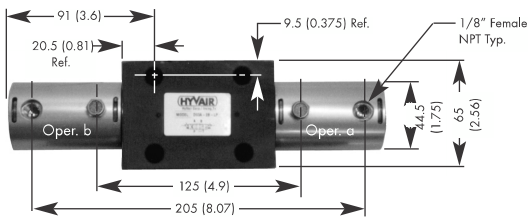
Series D03H



D03H- Single Pilot

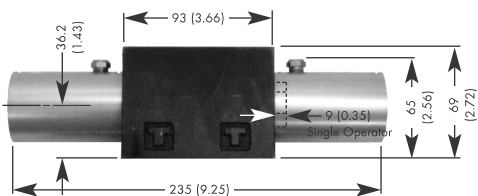
Dimensional Data- D05

Series D05A/ D05AP D05HL



NFPA: T3.5.1.MR1-D05

ISO: 4401-05



6.4mm (0.25") dia.
recessed manual
override
[standard]

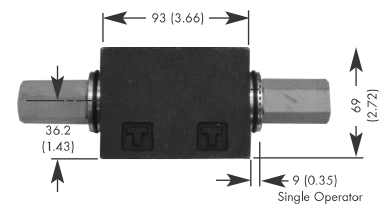
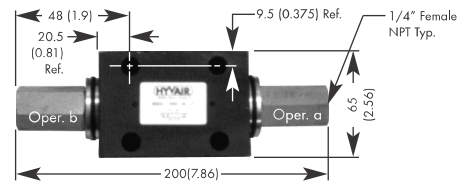
Add 35.5mm (1.4")
length for each knob
type override

D05A- Single Pilot

Units: mm/ (Inch)

Note: Use (4) 1/4-20 SHCS X 1-1/2"
mounting screws

Series D05H



D05H- Single Pilot

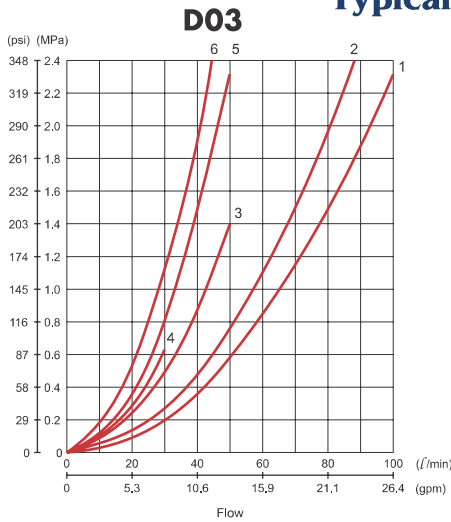
DIRECTIONAL CONTROL VALVES

AIR OR OIL ACTUATED, DIRECT OPERATED



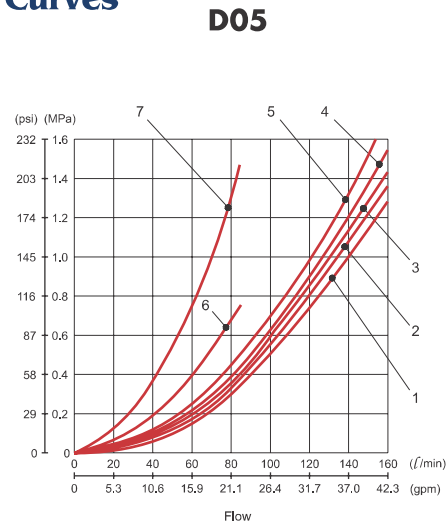
Typical Pressure Drop Curves

NFPA SIZE: DO3 & DO5



Viscosity of hydraulic fluid: 150SUS (32mm²/s)

Note: For maximum pressure and flows refer to specifications on page 15.



Description	D03 Flow Path					Valve Spool Type	D05 Flow Path				
	P→A	P→B	A→T	B→T	P→T		P→A	P→B	A→T	B→T	P→T
Spring Offset, (Closed in Transition)	2	2	2	2			3	3	4	4	
Spring Offset, (Open in Transition)	1	1	1	1			1	1	4	4	
Spring Centered, All Ports Blocked	2	2	2	2			3	3	3	3	
Spring Centered, P to T, A & B Blocked	6	6	5	5	3		7	7	7	7	6
Spring Centered, P to Blocked, A & B to T	2	2	1	1			3	3	1	1	
Spring Centered, All Ports Open	1	1	1	1	1		1	1	1	1	1
Spring Centered, P & B Blocked, A to T	2	2	1	2			3	3	1	3	
Spring Centered, P to A & B, T Blocked	1	1	2	2			1	1	3	3	
Detented (Closed in Transition)	2	2	2	2			3	3	4	4	

ORDERING INFORMATION



PILOTED DIRECTIONAL VALVE PART NUMBERING SYSTEM:

D03 A - 2 B - 35

Example: D03 valve, double air piloted, 3 position, spring centered, all ports blocked in center, with knob override.

Size	Code	Actuator	Code	Configuration	Code	Function
D03 D05	A	Air	1	Single actuator • 2 position spring offset	A	P to A, B to T
	AP	Air Proportional	2	Double actuator • 3 position spring centered	B	All Ports Blocked
	H	Hydraulic	3	Double actuator • 2 position no spring, detented	C	P to T, A & B Blocked
			5	Single actuator • 2 position spring centered	F	P Blocked, A & B to T
					H	All Ports Open
					T	P to A & B, T Blocked

DIRECTIONAL CONTROL VALVES

LEVER ACTUATED, DIRECT OPERATED



NFPA SIZE: DO3 & DO5

FEATURES

- ✓ **High Pressure, High Flow:** 7 gpm (D03) and 12 gpm (D05) at 3000 psi working pressure.
- ✓ **High Reliability:** Valve designed to last 30 million spool shifts under proper use.



D03 & D05 Manual Valves

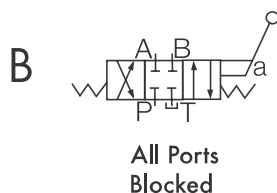
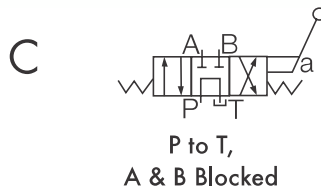
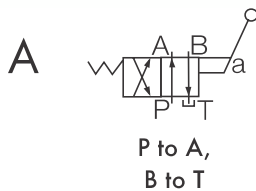
Specifications

Size		D03	D05
Nominal Flow Rates	@ 3000 psi	7 gpm (27 lpm)	12 gpm (46 lpm)
	@ 1000 psi	10 gpm (38 lpm)	18 gpm (68 lpm)
Maximum Operating Pressure	P, A, B, Ports	3000 psi (210 bar)	
	T Port- Including Surges	1000 psi (140 bar)	
Internal Leakage	@ 3000 psi	0.18 cu-in/ min (3 ml/ min)	0.22 cu-in/ min (3.5 ml/ min)
Mounting Surface	NFPA	T3.5.1.MR1-D03	T3.5.1.MR1-D05
	ISO	ISO 4401- 03	ISO 4401- 05
Weight		2.9 lbs (1.3 kg)	8.8 lbs (4 kg)
Operating Conditions	Working Temperature	40- 160° F (5- 70°C)	
	Operating Viscosity	80- 300 SUS (17- 65 cSt)	
	Max. Start-up Viscosity	1500 SUS (315 cSt)	
	Filtration	25 micron or less, (ISO 18/15)	
	Recommended Fluids	Petroleum Based Fluids- ISO VG32-68	

Spool Codes

The following examples represent most common valve spools, many other configurations are available.

(Left side of symbol is when handle is pushed, right side of symbol is handle pulled. (Symbols shown with springs, 2 & 3 position detented valves available))



DIRECTIONAL CONTROL VALVES

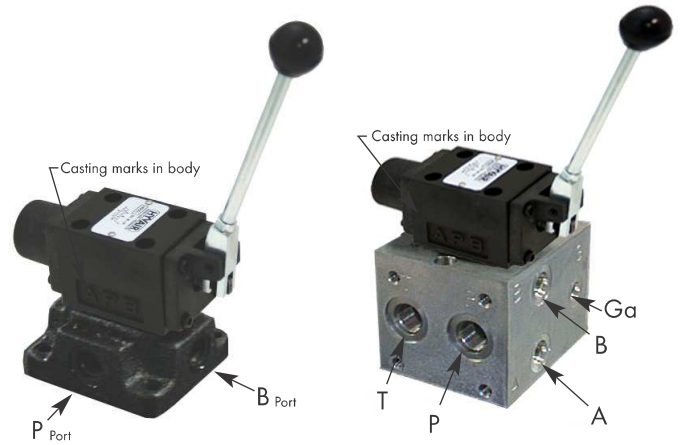
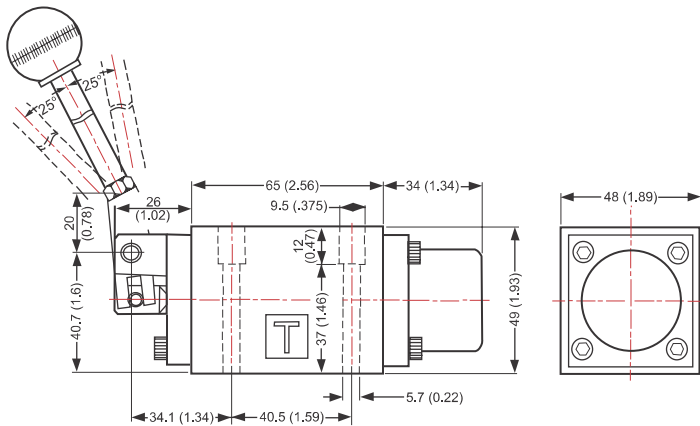
LEVER ACTUATED, DIRECT OPERATED



NFPA SIZE: DO3 & DO5

Dimensional/ Mounting Data

Series D03M



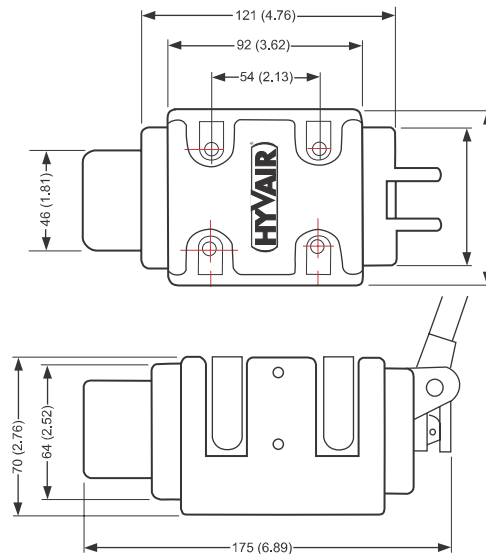
D03 Mounting Orientation

Units: mm/ (Inch)

Note: Use (4) 10-24 SHCS X 1-3/4"
mounting screws

(Handle Length= 5.5")

Series D05M



Units: mm/ (Inch)

Note: Use (4) 1/4-20 SHCS X 1-1/2"
mounting screws

(Handle Length= 7.5")

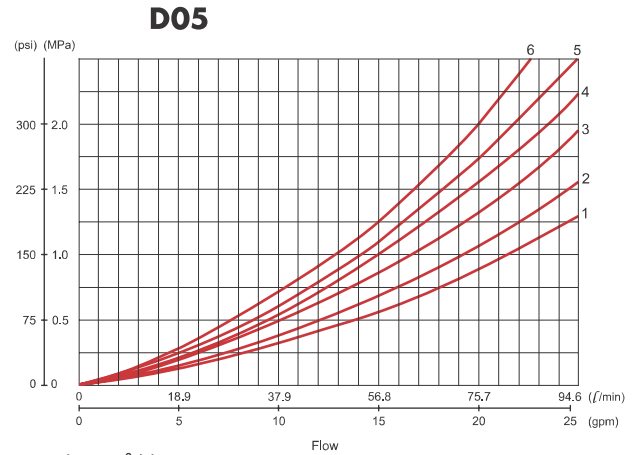
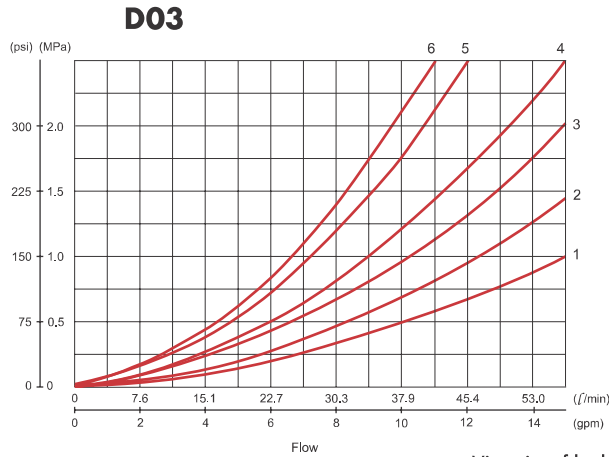
DIRECTIONAL CONTROL VALVES

LEVER ACTUATED, DIRECT OPERATED



NFPA SIZE: DO3 & DO5

Typical Pressure Drop Curves



Viscosity of hydraulic fluid: 150SUS (32mm²/s)

Spool Code	Flow Curve Number				
	Spool Shifted		Spool Centered		
	P→A	P→B	A→T	B→T	P→T
A	2	2	2	2	-
B	2	2	2	2	-
C	6	5	4	4	4
F	2	3	1	1	-
H	1	1	1	1	2
T	2	2	2	2	-

Approximate pressure drop for different specific gravity fluid:

$$\Delta P (\text{other fluid}) = \frac{\Delta P (\text{from graph}) \times SG (\text{other fluid})}{0.87}$$

Fluid Viscosities	SUS	75	100	150	200	250	300	350
	cSt	14.5	20.5	32	43	54	65	86
Multiplier		0.93	1.00	1.11	1.19	1.26	1.32	1.41

ORDERING INFORMATION



MANUAL DIRECTIONAL VALVE PART NUMBERING SYSTEM:

D03 M-2 B

Example: D03 Valve, manual type, 3 position, spring centered, all ports blocked in center

