

SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



NFPA SIZE: D03 & D05

Features

1. **High Flow/ High Pressure:** Up to 25 gpm (D03) and 40 gpm (D05)/ 5000 psi working pressure*.
2. **Oil Immersed, Quiet Solenoid Design:** Moving core immersed in hydraulic oil provides quiet operation.
3. **High Tank Port Pressure:** Up to 3000 psi tank port back pressure (Check each spool type for max. allowable).
4. **Twin Tank Line Design:** Upper and lower tank line channels (Double Loop) greatly reduces pressure drop.
5. **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.)
6. **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)
7. **Maintenance:** Indicator lamps to diagnose connection; Plug-in coils provide easy changing without disturbing wiring.
8. **High Reliability:** Valve designed to last 30 million spool shifts under proper use.
9. **Bolt Kit included with valve standard**

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

Series 35
High Flow
High Pressure
Directional Valves



D05SD DIN Type



D05S Electrical Box Type



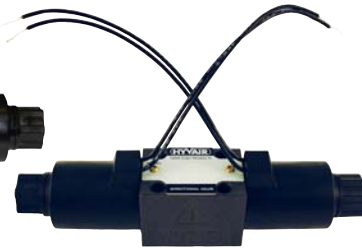
D03S Electrical Box Type



D03SD DIN Type



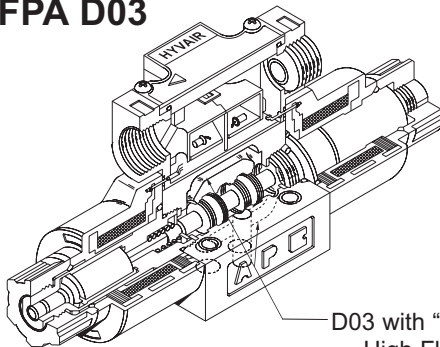
D03SDS Deutsch Socket
(D03 Only)



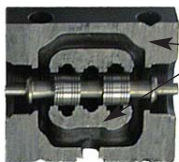
D03SL Lead Wire Type
(D05SL Lead Wire Type also available)

Internal Structure

NFPA D03



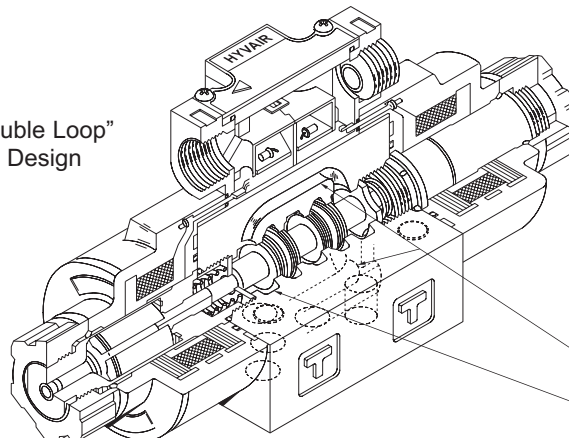
D03 with "Double Loop"
High Flow Design



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



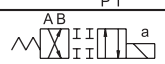
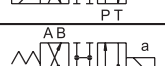
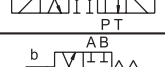
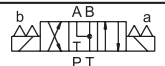
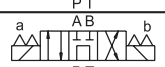
SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



Specifications

NFPA SIZE: D03 & D05

Model		D03 Series				D05 Series																		
		Standard type		Hydraulic Shockless type		Standard type				Hydraulic Shockless type														
						AC		DC & Rectified																
Symbol	Valve spool type	Max. operating pressure psi (MPa)	Max. flow l/min (gpm)	Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)	Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)	Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)	Max. operating pressure psi (Mpa)	Max. flow gpm (liters/min)													
	1A8	5000 (35)	7.9 (30)	3600 (25)	30 (7.9)	5000 (35)	10.6 (40)	5000 (35)	22.5 (85)	3600 (25)	22.5 (85)													
	1A8R						22.5 (35)																	
	3A8						22.5 (35)																	
	1A		21.1 (80)		50 (13.5)		5000 (35)		34.1 (130)		5000 (35)	42.3 (160)												
	1AR																							
	3A																							
	1AY		17.1 (65)										26.4 (100)	5000 (35)	34.1 (130)	5000 (35)	42.3 (160)							
	1ARY																							
	3AY																							
	5B		26.4 (100)															AC: 65 (17.1) DC: 80 (21.1)	5000 (35)	34.1 (130)	5000 (35)	42.3 (160)		
	5BR																							
	2J																							
	2B																							
	2T																							
	2K1																							
	2F1																							
	2K																							
	2F																							
	2H																							
	2C	3600 (25)	50 (13.2)	10.6 (40)		3600 (25)		18.5 (70)		25 (3620)													26.4 (100)	22.5 (85)
	2C5																							

Note: The maximum flow capacity is shown here. The maximum flow of each valve differs depending on pressure.
See HP (Pressure-Flow) curve for each model.



SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES

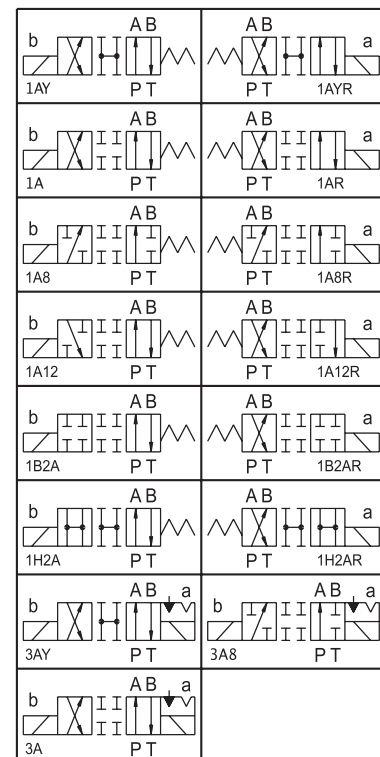
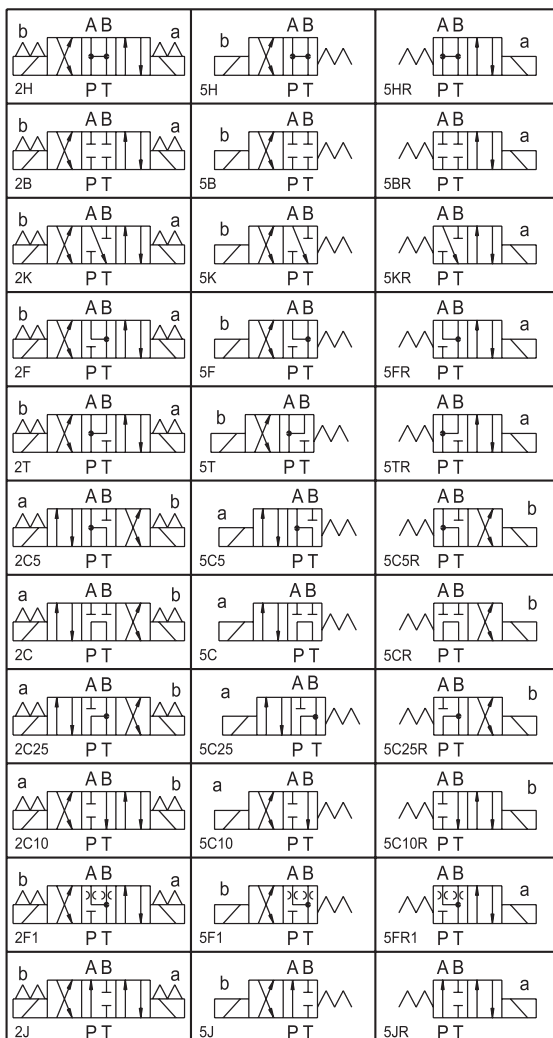


Specifications

NFPA SIZE: D03 & D05

			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)-35	
	Single solenoid		3.1 (1.4)	3.3 (1.5)		7.9 (3.6)	8.6 (3.9)-35	
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 /s ²)					
	Viscosity index		90 or above					
	Filtration		25 µm or less					

Symbols



SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



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



D03S-1*
D03S-5*



D03SD-1*
D03SD-5*



D03S-2*
D03S-3A-



D03SD-2*
D03SD-3A-



D05S-1*
D05S-5*



D05SD-1*
D05SD-5*



D05S-2*
D05S-3A-



D05SD-2*
D05SD-3A-



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

Ordering Information

D03 S-2 B-115 A-35

Size	Code	Actuator	Code	Configuration	Code	Spool Function	Voltage	Current/ Connector
D03	S	Solenoid	1	Single solenoid • 2 position spring offset	A	P to A, B to T	12	A AC
D05	SD	Soln. w/ Din Coil	2	Double solenoid • 3 position spring centered	AY	P to A, B to T	24	D DC
	SF	Hydraulic Shockless	3	Double solenoid • 2 position no center, detented	B	All Ports Blocked	115	
	SDS	Deutsch Socket (D03 only)	5	Single solenoid • 2 position spring centered	C	A & B Blocked P to T	230	
					F	A & B to T P Blocked		
					H	All Ports Open		
					K	A to T P & B Blocked		
					T	P to A & B, T Blocked		

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

Notes:
Lights included standard on
electrical box style.

Code "R" (reversed)
added behind spool
code for flow supplied
opposite of standard.
Codes 1AR & 1AYR: spool & coil reversed
Codes 2*R & 3AR: electrical box reversed
Code 5*R: coil provided on reversed b side

A spool is closed in transition
AY spool is open in transition

Mounting Bolt/ O'Ring Information

Size	Thread US Metric	Torque in-lbs/ (Nm)	O'Ring
D03	10 - 24 UNC	40 - 45 (4.5 - 5.1)	9mm I.D. x 2mm C.S.
D05	1/4 - 20 UNC	105 - 110 (11.9 - 12.4)	11.8mm I.D. x 2.4mm C.S.



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NFPA SIZE: D03 & D05

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
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

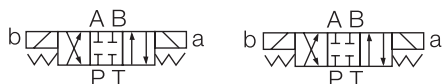
(symbols shown in simplified form)



D03SD-2B
(standard)

D03SD-2BR

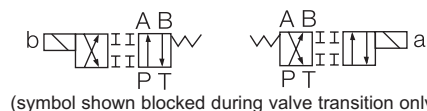
(no change to DIN coil valve, electrical box flipped for opposite coil markings)



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.



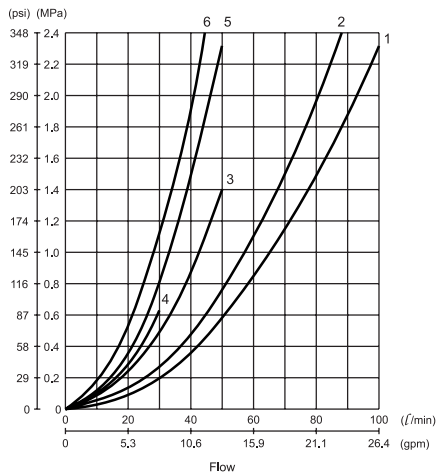
SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



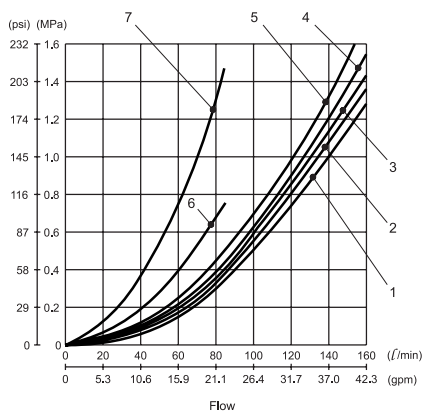
NFPA SIZE: D03 & D05

Pressure Drop Curves



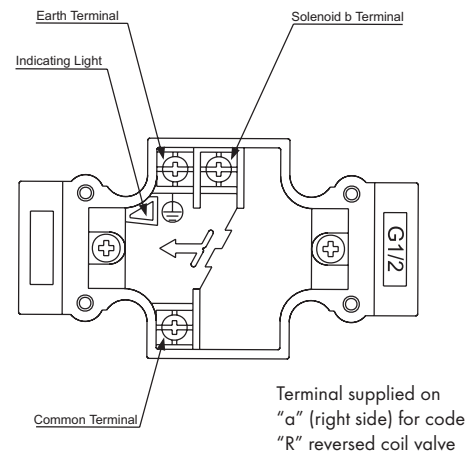
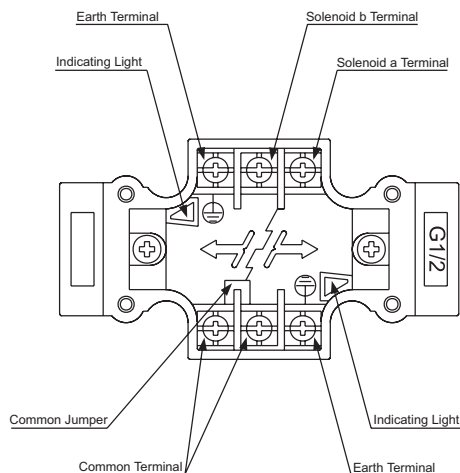
Model	Valve spool type	P→A	P→B	A→T	B→T	P→T
D03 SERIES	1A8, 1A8R, 3A8	4	4	—	—	—
	1A, 1AR	2	2	2	2	—
	3A	2	2	2	2	—
	1AY, 1AYR, 3AY	1	1	1	1	—
	2H	1	1	1	1	1
	5B, 5BR, 2B, 2F	2	2	2	2	—
	2K, 2K1	2	2	1	2	—
	2J	1	2	2	2	—
	2F	2	2	1	1	—
	2C	6	6	5	5	3
	2C5	1	6	2	5	3
	2T	1	1	2	2	—

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



SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES

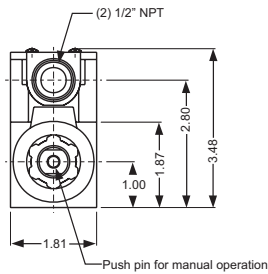


NFPA SIZE: D03 & D05

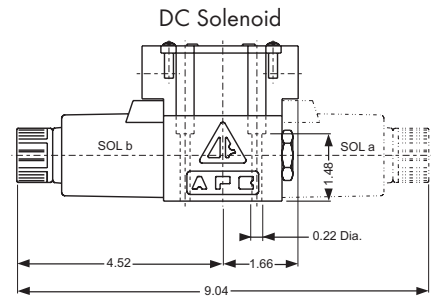
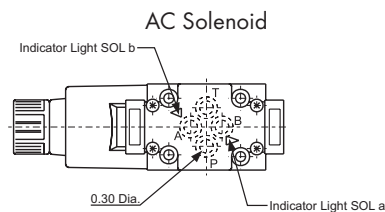
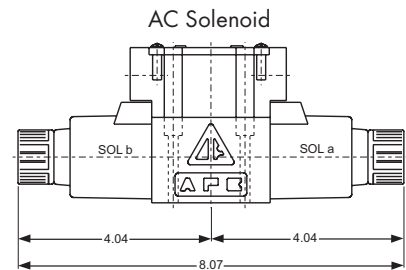
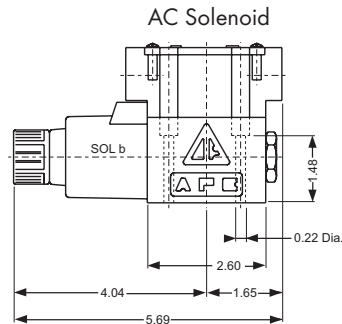
Electrical Box Type D03S D03SF

Units: Inches

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



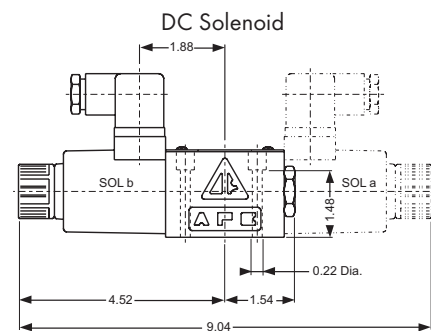
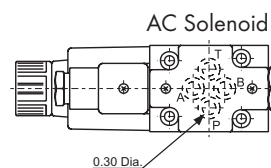
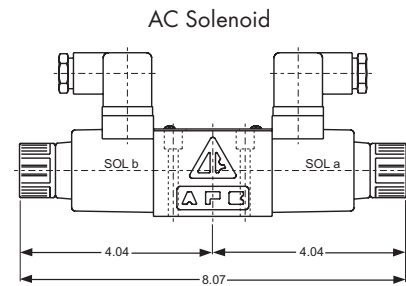
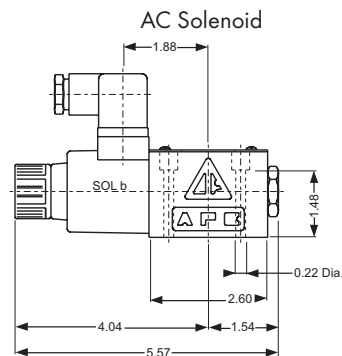
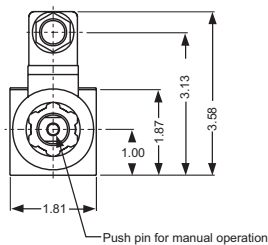
Dimensional Data



DIN Type D03SD

Units: Inches

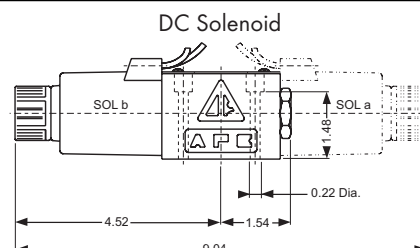
Mounting: (4) 10-24 SHCS x 1-3/4"
Torque 40-45 in-lbs



Lead Wire Type D03SL

Units: Inches

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



SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



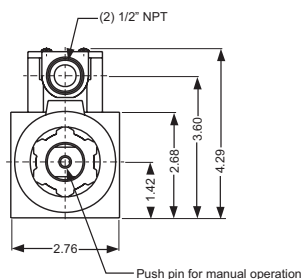
NFPA SIZE: D03 & D05

Electrical Box Type D05S D05SF

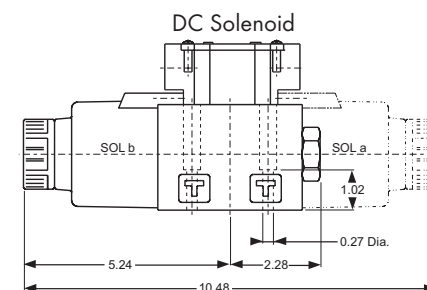
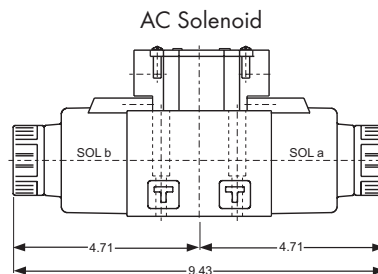
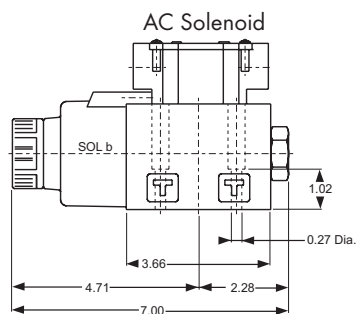
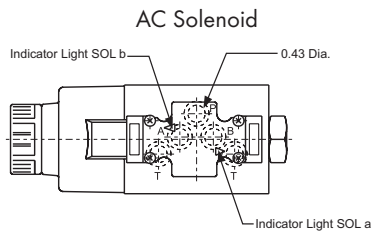
Units: Inches

Mounting: (4) 1/4-20 SHCS x 1-1/2"

Torque 105-110 in-lbs



Dimensional Data

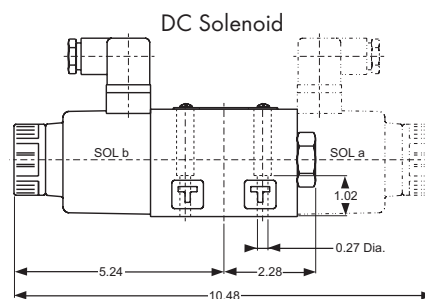
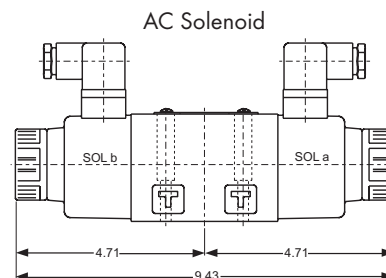
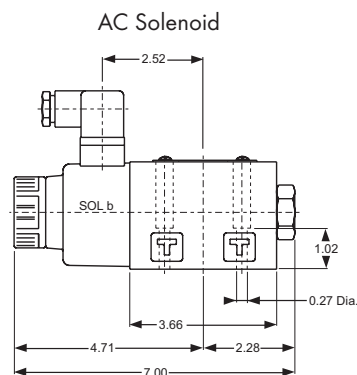
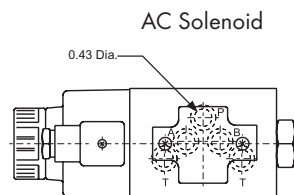
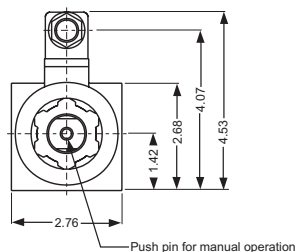


DIN Type D05SD

Units: Inches

Mounting: (4) 1/4-20 SHCS x 1-1/2"

Torque 105-110 in-lbs

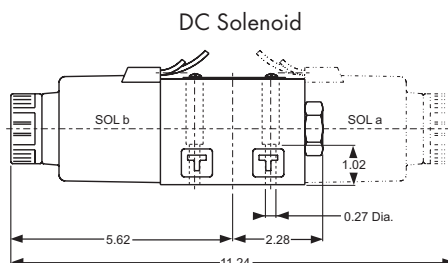


Lead Wire Type D05SL

Units: Inches

Mounting: (4) 1/4-20 SHCS x 1-1/2"

Torque 105-110 in-lbs



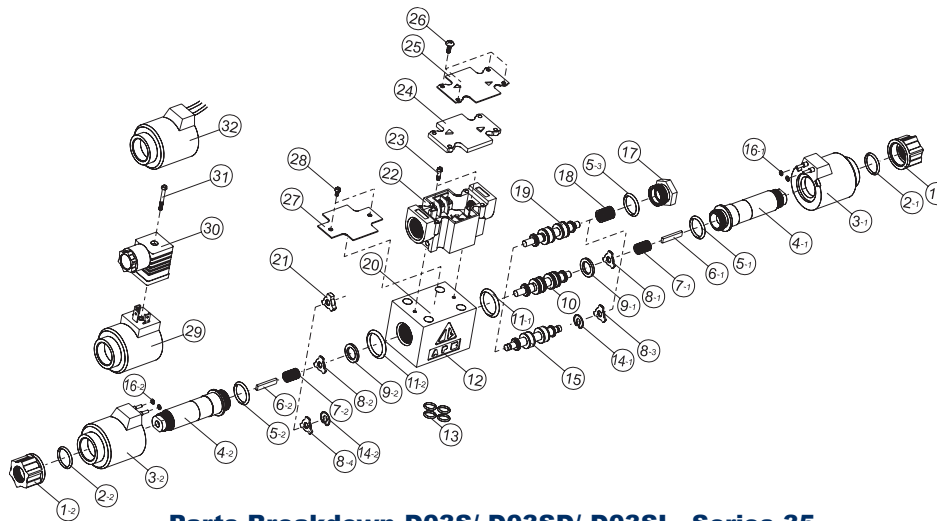
SOLENOID VALVES

D03 & D05 SERIES 35- SOLENOID VALVES



NFPA SIZE: D03 & D05

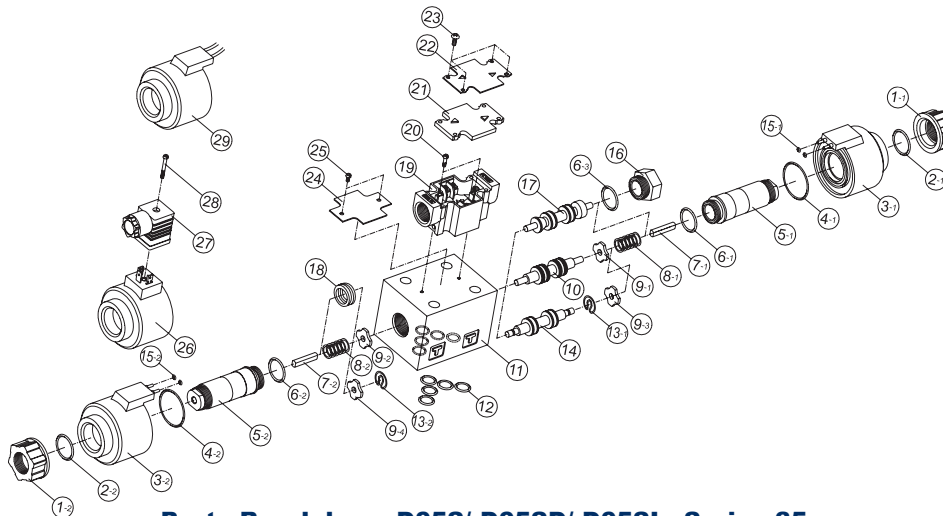
Parts Breakdown D03S/ D03SD/ D03SL Series 35



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)

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)	

