

SERVICE MANUAL

VSD05M Solenoid Actuated Directional Control Valve

“A” Design Series



CAUTION – Before performing any service operation on any Directional Control Valve, be sure that all pressure has been relieved from BOTH SIDES of the system.



CAUTION – Before performing any service operation on any Directional Control Valve, disconnect or lock off power supply.



CAUTION – Before manually actuating any Directional Control Valve, be sure that any resulting machine function will not endanger persons or equipment.

PRODUCT IDENTIFICATION

Each Directional Control Valve has an Ordering Code printed on its cover label. See Figure 1 for the location of the Ordering Code.

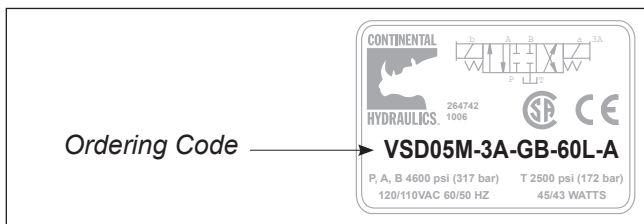


Figure 1

This Service Booklet applies to products with Ordering Codes like the sample in Figure 2 below.

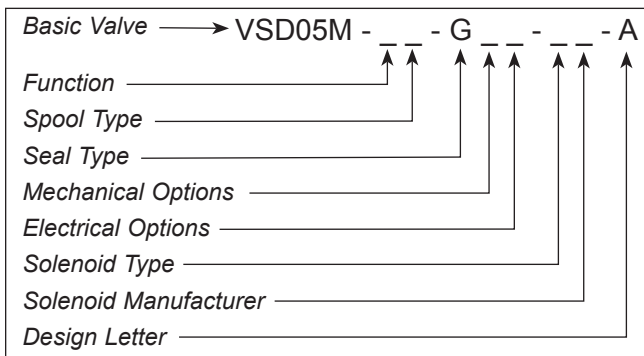


Figure 2

GENERAL SPECIFICATIONS

Petroleum, water-based fluids (not more than 40% water) and most phosphate esters. Other fluids may be acceptable, but special O-rings may be required. Viton seals standard.

FLUID TEMPERATURE RANGE

Fluid temperature up to 200° F. (93° C.) will not appreciably affect valve performance. However, for safety reasons, temperatures above 130° F. (54° C.) are not recommended.

RECOMMENDED OPERATING VISCOSITY

80 to 350 SUS (16 to 70 CS).

FILTRATION

ISO 18/16/13 or better.

MOUNTING POSITION

Any unrestricted position acceptable. Horizontal mounting preferred.

NFPA FLOW PATH/ACTUATING PATTERN

SOLENOID ACTUATED:

Actuating operator a - connects flow to cylinder port A.

Actuating operator b - connects flow to cylinder port B.

NOTE: NFPA flow path/actuating pattern is reversed for spool code “L”.

GENERAL INFORMATION

SOLENOID ACTUATED – Spring centered and spring offset valve types will be spring positioned unless actuated continuously. Detented, no-spring valves may be actuated momentarily. When solenoid is not actuated, the spool will remain in last position attained, provided there is no severe shock, vibration or pressure surge.

Pressure surges in a common tank line serving these and other valves can be great enough to cause inadvertent valve shifting. This is particularly critical in the no-spring, detented type valves. Separate tank lines may be necessary.

NOTE: Any sliding spool valve held shifted under pressure for long periods may stick and not spring return due to fluid residue formation. To prevent sticking, valves should be cycled periodically.

Preventive Maintenance

After Directional Control Valves have been put in operation, provide periodic inspection and maintenance. The check points listed below will assist you in extending the life of your Continental valves.

Fluid Operating Temperature – Fluid temperature at the reservoir during operation should be kept between 100° F. and 130° F. (37° C. and 54° C.).

Fluid Cleanliness – Control particle contamination by changing or cleaning all filter elements periodically BEFORE they become clogged and start to by-pass.

Electrical Inspection – Periodically check to assure proper voltage, and that all electrical connections are making good contact.

After Extended Shutdowns – Some types of hydraulic fluids become tacky after long periods of non-use. Manually actuate valves several times after extended shutdowns to assure that all components move freely before powering up.

CAUTION – Before manually actuating any Directional Control Valve, be sure that any resulting machine function will not endanger persons or equipment.

VSD05M Valve Repair Procedures

Disassembly And Reassembly

General

Disassembly and reassembly of Directional Control Valves is a delicate operation. Anyone attempting it must assume responsibility for the operation of the valve. Continental valves may be returned to the factory or to an Authorized Repair Center for repair. Contact your local Distributor or Continental Hydraulics for details.

If interchanging spool types or making other conversions, restamp the escutcheon plate to show the correct code. Include stops, spool, spring, and detent orientation. See Figure 2 to serve as a guide to correct numbering.

Disassembly in the field by other than an Authorized Repair Center technician, whether for repair or modification may void warranty.

Before disassembly, study the exploded view below and note the orientation and location of all parts. Note that the spring retainers are used only in the assemblies that are spring centered. Special care should be taken to avoid damage to the spool and/or body bore. Even a microscopic nick in a land on the spool or body may ruin the valve.

All valves can be disassembled and reassembled in a horizontal-mounted position, provided there is adequate space and the work area is clean.

Place the spool in a bath of clean oil to coat it with a protective film, and ease assembly. Inspect o-rings for nicks, and make sure they are well oiled. It's a good idea to replace all seals whenever the valve is disassembled.

Continental valves are precisely machined to exacting tolerances. Do not force any parts, or overtighten threaded fasteners.

Part And Assembly Identification

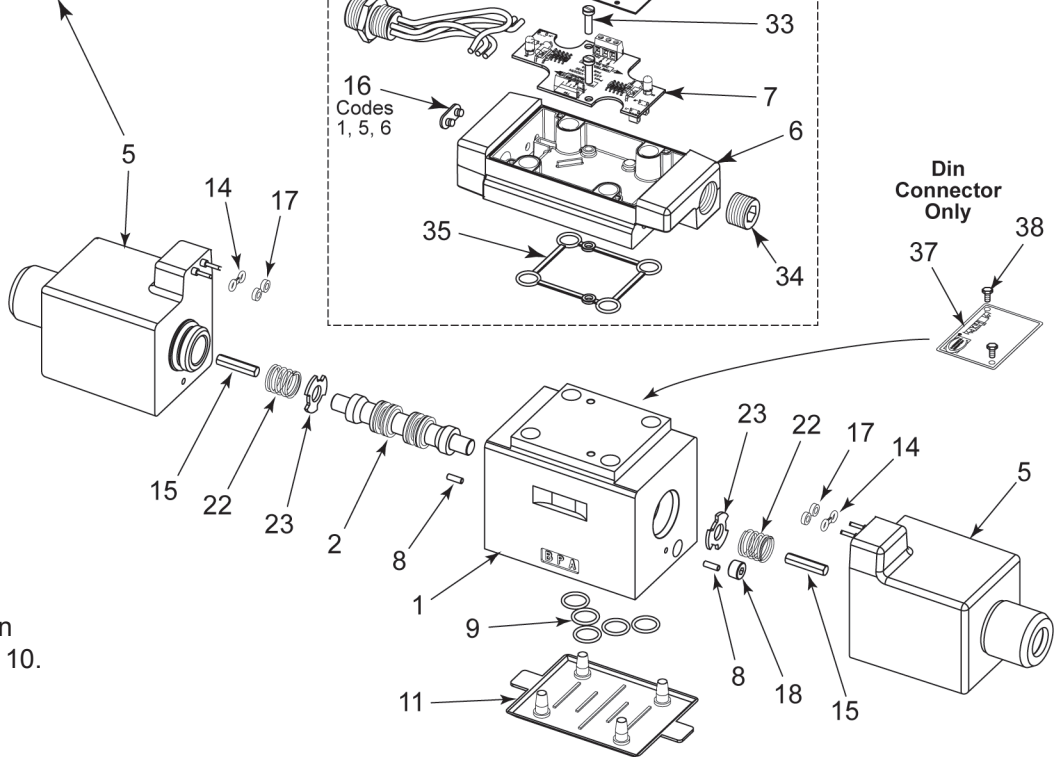
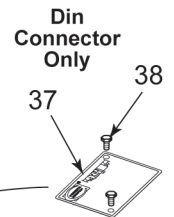
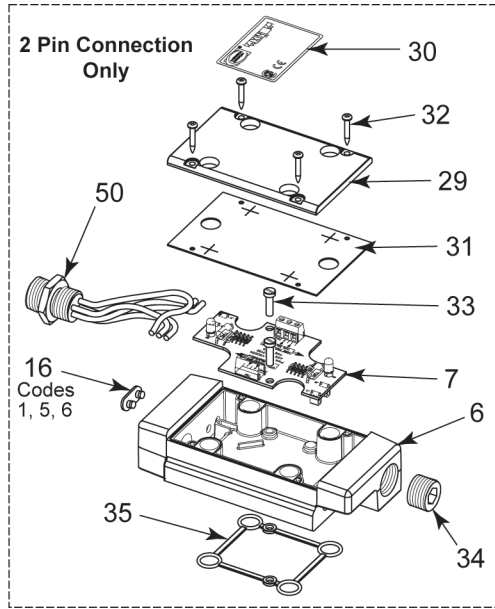
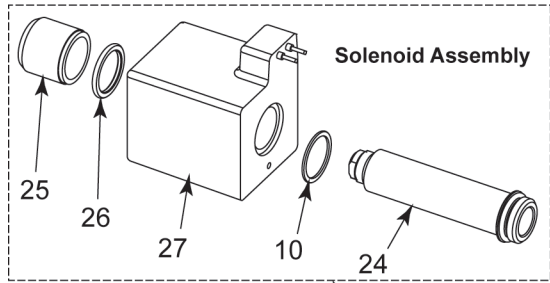
The illustrations below and the parts list that follows may be used to identify individual parts and assemblies in directional control valves.

Typical Electrical Information

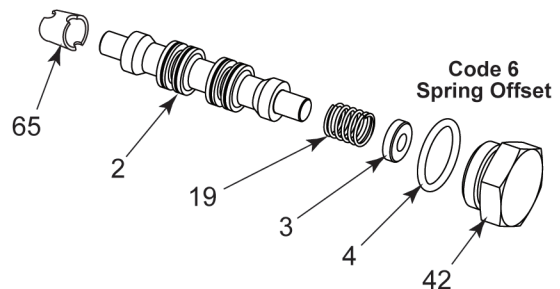
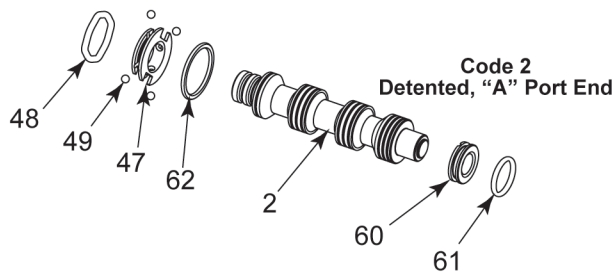
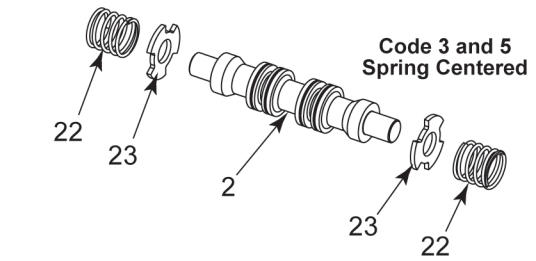
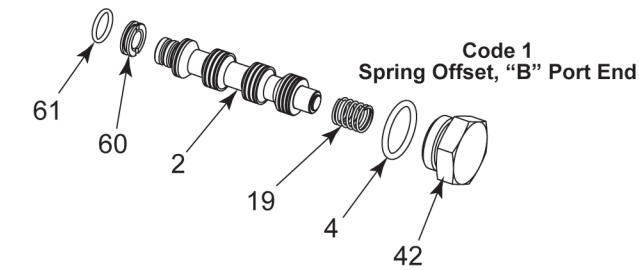
Solenoid Code		Voltage & Frequency	Voltage Limits	Resistance	Maximum Inrush Current	Holding Current	Holding Current Min. Volt.	Holding Power
Din Conn.	2 Pin	Volts - Hz.	Min. - Max.	Ohms	(Amp)	(Amp)	(Amp)	(Watts)
33L	60L	120 - 60	108 - 126	9.2	5.0	.91	.76	45
		110 - 50	99 - 116		6.2	1.1	.91	43
34L	61L	240 - 60	216 - 252	38.0	2.9	.48	.40	45
		220 - 50	198 - 231		3.0	.53	.44	43
39L*	68L*	120 - 60	108 - 132	16.4	3.7	.38	.32	22
		110 - 50	99 - 121		3.8	.41	.34	21
42L	70L	24 DC	21.6 - 26	13.1	1.8	1.8	1.7	44
44L	75L	12 DC	10.8 - 13	3.3	3.6	3.6	3.3	44

* Code 39L and 68L valves (low watt) may not shift on high viscosity (low temperature) fluids. Maximum 1000 SUS (215.7 CS) start-up recommended.

Parts Drawing



NOTE:
Parts Lists are on
pages 4 through 10.



VSD05M-1*-*-*-**-A

Item No.	Description	Qty.	Basic Ass'y.	Standard		Code WD		Code B	Code B3H B3A	Code B4 B4A	Code B5A B5H
				DIN	2-Pin	DIN	2-Pin				
1	Valve Body	1		552673	552485	552673	552485				
2	Spool - Code A	1	451033								
	Spool - Code B	1	451052								
4	O-Ring	1	109991								
5	Solenoid Assembly	1	Chart B								
6	Electrical Box	1			552668		552668				
7	Electrical Board	1			Chart B		Chart B				
8	Roll Pin	1	004223								
9	O-Ring	5	107131								
10	O-Ring	1	115787								
11	Retainer	1	450299								
13	Stencil Flow Pattern	0	Chart C								
14	Gasket, Electrical Box/Coil	1			263522		Omit				
15	Drive Pin	1	264758								
16	Grommet Plug	1			351571		351571				
17	Seal Coil Pins	2					264331				
18	Pipe Plug	1	261233								
19	Spring	1	Chart C								
29	Cover, Electrical Box (See Note 1)	1			552669		451107S				
30	Label (See Note 1)	1		Omit	264281S	Omit	Omit				
31	Gasket, Cover	1			450949		450956				
32	Screw, Cover	4			265674		265674				
33	Screw Electrical Box	2			262350		262350				
34	Pipe Plug	1			262263		262263				
35	Gasket, Electrical Box	1			351512		351512				
37	Nameplate Blank (See Note 1)	1		264809S		264809S					
38	Screw	2		258068		258068					
42	End Cap	1	351552								
44	Cap Plug Kit	1		263327		263327					
50	Receptacle, Electrical							Omit	264754	264755 (See Note 2)	264756
60	Stop	1	264727								
61	O-Ring	1	258405								
90	Bolt Kit	1	131110								
200	Adhesive, RTV Seal 732	0				135315	135315				

NOTES:

1. Specify model code when ordering a label, nameplate or cover.
2. Available with DC coils only.

VSD05M-2*-**-**-A**

Item No.	Description	Qty.	Basic Ass'y.	Standard		Code WD		Code B	Code B4 B4A	Code B5H B5A
				DIN	2-Pin	DIN	2-Pin			
1	Valve Body	1		552673	552485	552673	552485			
2	Spool - Code A	1	451033							
	Spool - Code B	1	451052							
5	Solenoid Assembly	2	Chart B							
6	Electrical Box	1			552668		552668			
7	Electrical Board	1			Chart B		Chart B			
8	Roll Pin	2	004223							
9	O-Ring	5	107131							
10	O-Ring	2	115787							
11	Retainer	1	450299							
13	Stencil Flow Pattern	0	Chart C							
14	Gasket, Electrical Box/Coil	2			263522		Omit			
15	Drive Pin - AC Coils	2	264758							
	Drive Pin - DC Coils	2	265353							
17	Seal Coil Pins	4					264331			
18	Pipe Plug	1	261233							
29	Cover, Electrical Box (See Note 1)	1			552669		451107S			
30	Label (See Note 1)	1		Omit	264281S	Omit	Omit			
31	Gasket, Cover	1			450949		450956			
32	Screw, Cover	4			265674		265674			
33	Screw, Electrical Box	2			262350		262350			
34	Pipe Plug	1			262263		262263			
35	Gasket, Electrical Box	1			351512		351512			
37	Nameplate Blank (See Note 1)	1		264809S		264809S				
38	Screw	2		258068		258068				
44	Cap Plug Kit	1		263327		263327				
46	Spacer Detent Position	1	265195							
47	Detent Retainer	1	351623							
48	Spring Detent	1	265219							
49	Ball	3	122327							
50	Receptacle, Electrical	1						Omit	264755 (See Note 2)	264756
60	Stop	1	264727							
61	O-Ring	1	258405							
62	O-Ring	1	166069							
90	Bolt Kit	1	131110							
200	Adhesive, RTV Seal 732	0				135315	135315			

NOTES:

1. Specify model code when ordering a label, nameplate or cover.
2. Available with DC coils only.

VSD05M-3*-*-**-A**

Item No.	Description	Qty.	Basic Ass'y.	Standard		Code WD		Code B	Code B4 B4A	Code B5H B5A
				DIN	2-Pin	DIN	2-Pin			
1	Valve Body	1		552673	552485	552673	552485			
2	Spool	1	Chart A							
5	Solenoid Assembly	2	Chart B							
6	Electrical Box	1			552668		552668			
7	Electrical Board	1			Chart B		Chart B			
8	Roll Pin	2	004223							
9	O-Ring	5	107131							
10	O-Ring	2	115787							
11	Retainer	1	450299							
13	Stencil Flow Pattern	0	Chart C							
14	Gasket, Electrical Box/Coil	2			263522		Omit			
15	Drive Pin	2	264758							
17	Seal Coil Pins	4					264331			
18	Pipe Plug	1	261233							
22	Spring	2	Chart C							
23	Spring Retainer	2	Chart A							
29	Cover, Electrical Box (See Note 1)	1			552669		451107S			
30	Label (See Note 1)	1		Omit	264281S	Omit	Omit			
31	Gasket, Cover	1			450949		450956			
32	Screw, Cover	4			265674		265674			
33	Screw, Electrical Box	2			262350		262350			
34	Pipe Plug	1			262263		262263			
35	Gasket, Electrical Box	1			351512		351512			
37	Nameplate Blank (See Note 1)	1		264809S		264809S				
38	Screw	2		258068		258068				
44	Cap Plug Kit	1		263327		263327				
50	Receptacle, Electrical	1						Omit	264755 (See Note 2)	264756
90	Bolt Kit	1	131110							
200	Adhesive, RTV Seal 732	0				135315	135315			

NOTES:

1. Specify model code when ordering a label, nameplate or cover.
2. Available with DC coils only.

VSD05M-5*_*_*_*_*-A

Item No.	Description	Qty.	Basic Ass'y.	Standard		Code WD		Code B	Code B3H B3A	Code B4 B4A	Code B5H B5A
				DIN	2-Pin	DIN	2-Pin				
1	Valve Body	1		552673	552485	552673	552485				
2	Spool	1	Chart A								
4	O-Ring	1	109991								
5	Solenoid Assembly	1	Chart B								
6	Electrical Box	1			552668		552668				
7	Electrical Board	1			Chart B		Chart B				
8	Roll Pin	1	004223								
9	O-Ring	5	107131								
10	O-Ring	1	115787								
11	Retainer	1	450299								
13	Stencil Flow Pattern	0	Chart C								
14	Gasket, Electrical Box/Coil	1			263522		Omit				
15	Drive Pin	1	264758								
16	Grommet Plug	1			351571		351571				
17	Seal Coil Pins	2					264331				
18	Pipe Plug	1	261233								
22	Spring	2	Chart C								
23	Spring Retainer	2	Chart A								
29	Cover, Electrical Box (See Note 1)	1			552669		451107S				
30	Label (See Note 1)	1		Omit	264281S	Omit	Omit				
31	Gasket, Cover	1			450949		450956				
32	Screw, Cover	4			265674		265674				
33	Screw, Electrical Box	2			262350		262350				
34	Pipe Plug	1			262263		262263				
35	Gasket, Electrical Box	1			351512		351512				
37	Nameplate Blank (See Note 1)	1		264809S		264809S					
38	Screw	2		258068		258068					
42	End Cap	1	351493								
44	Cap Plug Kit	1		263327		263327					
50	Receptacle, Electrical	1						Omit	264754	264755 (See Note 2)	264756
90	Bolt Kit	1	131110								
200	Adhesive, RTV Seal 732	0				135315	135315				

NOTES:

1. Specify model code when ordering a label, nameplate or cover.
2. Available with DC coils only

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Item No.	Description	Qty.	Basic Ass'y.	Standard		Code WD		Code B	Code B3H B3A	Code B4 B4A	Code B5H B5A
				DIN	2-Pin	DIN	2-Pin				
1	Valve Body	1		552673	552485	552673	552485				
2	Spool	1	Chart A								
3	Spool Stop	1	Chart C								
4	O-Ring	1	109991								
5	Solenoid Assembly	1	Chart B								
6	Electrical Box	1			552668		552668				
7	Electrical Board	1			Chart B		Chart B				
8	Roll Pin	1	004223								
9	O-Ring	5	107131								
10	O-Ring	1	115787								
11	Retainer	1	450299								
13	Stencil Flow Pattern	0	Chart C								
14	Gasket, Electrical Box/Coil	1			263522		Omit				
15	Drive Pin	1	Chart C								
16	Grommet, Plug	1			351571		351571				
17	Seal Coil Pins	2					264331				
18	Pipe Plug	1	261233								
19	Spring	1	Chart C								
29	Cover, Electrical Box (See Note 1)	1			552669		451107S				
30	Label (See Note 1)	1		Omit	264281S	Omit	Omit				
31	Gasket, Cover	1			450949		450956				
32	Screw, Cover	4			265674		265674				
33	Screw, Electrical Box	2			262350		262350				
34	Pipe Plug	1			262263		262263				
35	Gasket, Electrical Box	1			351512		351512				
37	Nameplate Blank (See Note 1)	1		264809S		264809S					
38	Screw	2		258068		258068					
42	End Cap	1	351493								
44	Cap Plug Kit	1		263327		263327					
50	Receptacle, Electrical	1						Omit	264754	264755 (See Note 2)	264756
65	Stop	1	264236								
90	Bolt Kit	1	131110								
200	Adhesive, RTV Seal 732	0				135315	135315				

NOTES:

1. Specify model code when ordering a label, nameplate or cover.
2. Available with DC coils only.

Chart A

Item 2 - Spool			Item 23 Spring Retainer
Spool Code	Part No.	Available On Valve Code	
A	451033	1, 2	N/A
A	450919	3, 5, 6	263081
B	451052	1, 2	N/A
B	450920	3, 5, 6	263081
E	450921	3, 5	263081
F	451017	3, 5	263081
F1	451021	3, 5	263081
G	450923	3, 5	263081
K	450921	3, 5	263081
L	351449	3, 5	264848

Chart B

Solenoid Code No.	Item 5 Solenoid Assembly	Item 7 Electrical Board
33	263234	
34	263235	
39	263238	
42	263239	
44	263240	
60	263330	263494
61	263331	263496
65	263332	263492
68	263333	263494
70	263241	263492
75	263242	263490

Chart C is on next page.

D05 Mounting Surface

Conforms to NFPA/T3.5.1 - 2002 D05 ISO 4401 Size 05.

Dimensions

	INCH	mm		INCH	mm
A	2.84	72.0	J	0.25	6.3
B	2.125	54.0	K	0.84	21.4
C	1.47	37.3	L	1.28	32.5
D	1.06	27.0	M	1.812	46.0
E	0.66	16.7	N	2.28	58.0
F	0.126	3.2	O	0.44	11.2
G	0.36	9.1	P	1/4-20 UNC	
H	0.23	5.8			

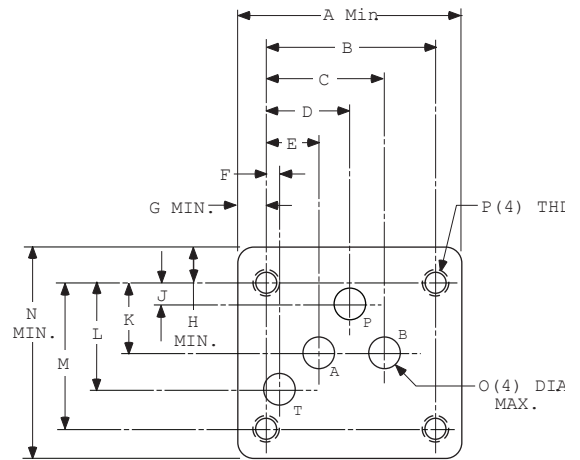


Chart C

Valve & Spool Code	Item 13 Stencil Flow Pattern	Item 19 - Spring			Item 22 - Spring		Item 65 Stop	Item 3 Spool Stop	Item 15 Code 6 Drive Pin
		All AC Codes Except 68	Code 68 Only	All DC Codes	All Codes Except 68	Code 68 Only			
1A	146149	264955	263068	264955					
1A-R	146150	264955	263068	264796					
1B	146151	264955	263068	264955					
1B-R	164529	264955	263068	264796					
2A	146158								
2A-R	263385								
2B	146159								
3A	146162				263068	264801			
3A-R	164645				263068	264801			
3B	146163				263068	264801			
3B2	256694								
3E	254861				264801	263067			
3F	146164				263067	263067			
3F-R	258968				263067	263067			
3F1	253142				264801	263067			
3G	146165				263068	263067			
3H	254593								
3J	258677								
3K	254636				264801	263067			
3L	146167				264856	264801			
3Q	263406								
5A	146168				263068	264801			
5A-R	146169				263068	264801			
5B	146170				263068	264801			
5B-R	254150				263068	264801			
5E	256571				264801	263067			
5F	146171				263067	263067			
5F-R	146172				263067	263067			
5F1	253143				264801	263067			
5F1-R	253144				264801	263067			
5G	146173				263068	263067			
5H	254953								
5J	260745								
5J-R	260024								
5K	146174				264801	263067			
5L	146175				264856	264801			
5L-R	146176				264856	264801			
5N	256750								
5N-R	260081								
5Q	264204								
6A	146177	264856					264236	264931	264776
6A-R	146178	264856					264236	264931	264776
6B	258455	264856					264236	264931	264776
6F	146179	264856					264236	264931	264776
6F-R	255618	264856					264236	264931	264776
6L	146181								
6L-R	255573								

Performance Specifications

Maximum Flow Rate - (up to)		35 gpm	132.5 lpm
Maximum Operating Pressure	P, A, B Ports*	4600 psi	317 bar
	T Port	2500 psi	172 bar
Maximum Cycle Rate	AC Solenoids	up to 9000 cycles/hour	
	DC Solenoids	up to 11,000 cycles/hour	
Mounting Surface		NFPA/3.5.1. R2 - 2002 D05 ISO 4401 Size 05	
Weight (W/Box)	AC Single Actuator	9.9 lbs.	4.5 kg
	AC Double Actuator	11.3 lbs.	5.1 kg

Troubleshooting Guide

Problem	Possible Solution
Erratic or binding valve spools.	Drain and flush the system. Disassemble the valve and check the spool and plug assemblies for burrs and other damage. Replace parts as necessary.
New valve does not function.	Improper installation. See page 1 for valve flow/actuating patterns. Check the electrical connections and circuit breakers. Confirm that hydraulic fluid type and viscosity meet specifications given on page 1.
Overhauled valve does not function.	Improper reassembly or reinstallation. See page 2 for reassembly information. See page 1 for valve flow/actuating patterns. Confirm that hydraulic fluid type and viscosity meet specifications given on page 1
Valve leakage.	Check for leaking seals. Replace as needed.
Repeated solenoid burnout.	Check voltage to determine that it is within $\pm 10\%$ of rating. See page 2. Check that the opposing solenoids are not being energized simultaneously.
Detent spool does not shift properly.	Check that the solenoid is energized long enough to ensure complete shift.
Cylinder controlled by valve won't hold its load.	Confirm that there is no internal leakage in the cylinder, and that there are no fluid leaks in the power system. If no other sources of leakage are found, disassemble the valve and check for wear or scoring on the body bore and spool. Replace defective parts.



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