Gold Ring™ Two-Way, Three-Way and Four-Way Solenoid Valves

Catalog 7300A 0707

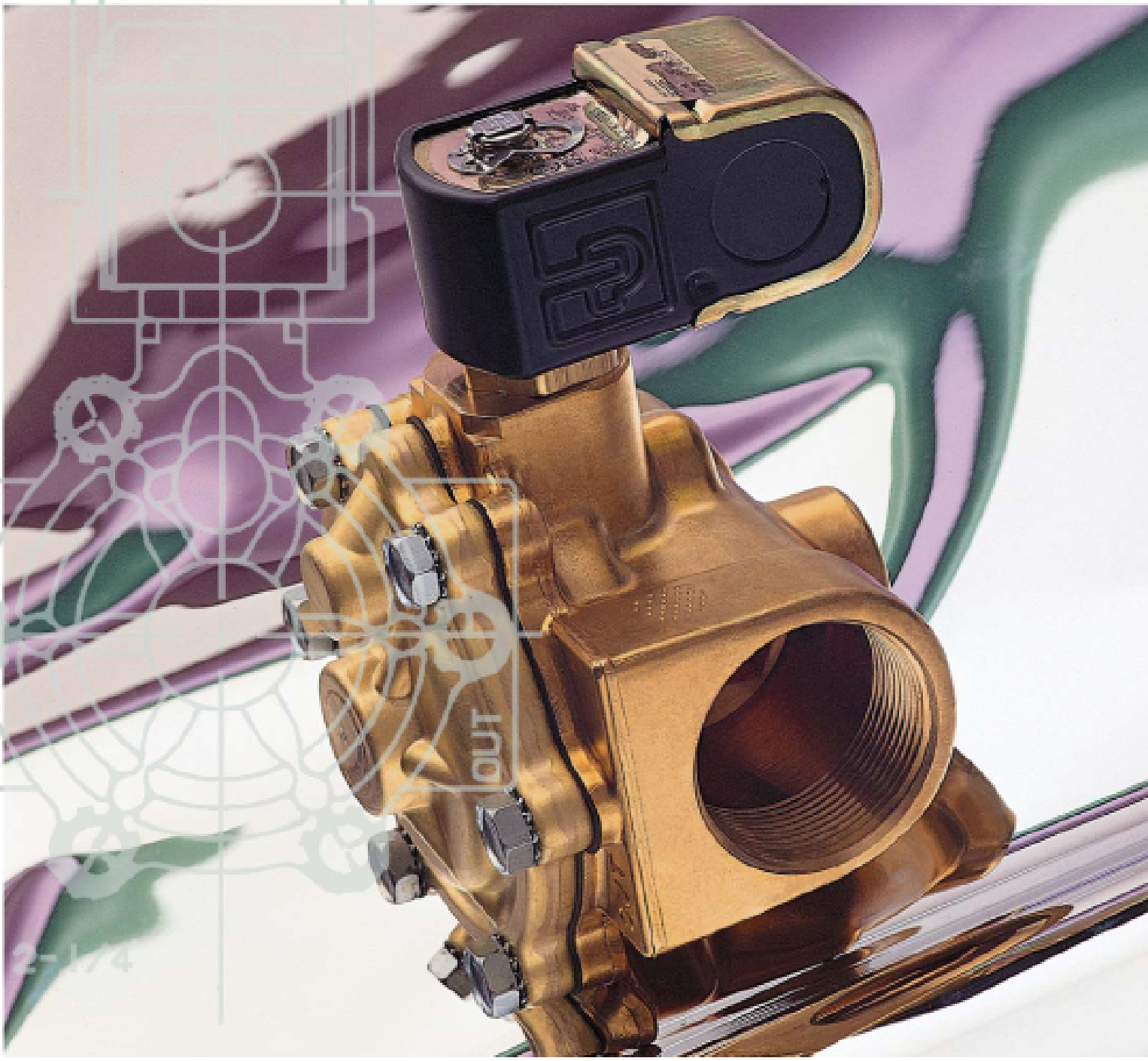


Table of Contents

Refer to Skinner Catalog for complete product offering

Introduction

Gold Ring™ products are produced by the Fluid Control Division of Parker Hannifin Corporation, the leading supplier of products controlling motion, flow and pressure. Since 1949, when Skinner first started manufacturing solenoid valves, we have been recognized as a leader in solenoid valve technology.

With vertically integrated manufacturing facilities in Madison, Mississippi, and New Britain, Connecticut, we produce a large percentage of our parts from the raw material level. This permits a high degree of control over the quality and availability of all Gold Ring products.

In additional to our full line of Gold Ring solenoid valves, our experienced design engineers—among the best in the business—allow rapid completion of customized valves for specific applications. Our well equipped manufacturing facilities and evaluation and testing laboratories ensure proper valve operation, long cycle life, and optimum reliability.

With many affiliates worldwide, an extensive Gold Ring distribution network, and a broad product line, Parker's Fluid Control Division is in a unique position to serve the world's requirements for solenoid valves.

We have people in place to help you with almost any application you can imagine. Our technical sales personnel can be reached at 1-800-VALVE05, or by fax at 860-827-2384.

For information on additional products from Parker, call toll-free at 1-800-C-Parker (1-800-272-7537).

Gold Ring Product Line

A wide range of two-way, three-way, and four-way Gold Ring solenoid valves in brass or stainless steel, along with a wide variety of seal and disc materials, ensures that we have a standard valve to fit most applications. Special purpose solenoid valves for cryogenic or vacuum service applications are also available.

If a unique application requires a unique product, our technical and manufacturing experience allows us to develop and supply the right valve for that application.

Unit valves and unit solenoids enable us to offer versatility in stocking and manufacturing requirements. With the introduction of Parker's optional Gold Ring II™ completely encapsulated solenoid, Type 4X requirements can also be met with unit valves and unit solenoids. Of course, completely assembled valves can be supplied at no extra cost. In either case, applicable agency approvals prevail.

Gold Ring Condensed Valve Listing

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU		Body Material
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	
Two-Way Normally Closed Valves AC Specifications										
1/8	02F20C1103AAF	0	0	750	51.72	750	51.72	530	36.55	BR
1/8	02F20C1106AAF	0	0	275	18.97	290	20.00	130	8.97	BR
1/8	02F20C1108AAF	0	0	155	10.69	180	12.41	140	9.66	BR
1/8	02F20C3103AAF	0	0	750	51.72	750	51.72	530	36.55	SS
1/8	02F20C3106AAF	0	0	275	18.97	290	20.00	130	8.97	SS
1/8	02F20C3108AAF	0	0	155	10.69	180	12.41	140	9.66	SS
1/4	04F20C1103AAF	0	0	750	51.72	750	51.72	500	34.48	BR
1/4	04F20C1106AAF	0	0	360	24.83	340	23.45	160	11.03	BR
1/4	04F20C1108AAF	0	0	140	9.66	165	11.38	90	6.21	BR
1/4	04F20C1108ACF	0	0	300	20.69	300	20.69	200	13.79	BR
1/4	04F20C1503ACF	0	0	1500	103.45	1500	103.45	1100	75.86	BR
1/4	04F20C2100ACF	0	0	150	10.34	150	10.34	145	10.00	BR
1/4	04F20C2114AAF	0	0	40	2.76	50	3.45	40	2.76	BR
1/4	04F20C2114BDF	0	0	100	6.90	100	6.90	100	6.90	BR
1/4	04F20C2118AAF	0	0	27	1.86	36	2.48	28	1.93	BR
1/4	04F20C2118BDF	0	0	90	6.21	80	5.52	80	5.52	BR
1/4	04F20C3114	0	0	40	2.76	50	3.45	40	2.76	SS
1/4	04F20C3114	0	0	100	6.90	100	6.90	100	6.90	SS
1/4	04F20C3118	0	0	27	1.86	36	2.48	28	1.93	SS
1/4	04F20C3118	0	0	90	6.21	80	5.52	80	5.52	SS
3/8	06F20C2108AAF	0	0	160	11.03	150	10.34	90	6.21	BR
3/8	06F20C2110ACF	0	0	150	10.34	150	10.34	145	10.00	BR
3/8	06F20C2114BDF	0	0	100	6.90	100	6.90	100	6.90	BR
3/8	06F20C2118BDF	0	0	90	6.21	80	5.52	80	5.52	BR
3/8	06F20C6108AAF	0	0	160	11.03	150	10.34	90	6.21	SS
3/8	06F20C6110ACF	0	0	150	10.34	150	10.34	145	10.00	SS
3/8	06F20C6114BDF	0	0	100	6.90	100	6.90	100	6.90	SS
3/8	06F20C6118BDF	0	0	90	6.21	80	5.52	80	5.52	SS
3/8	06F20C2120AAF	0	0	15	1.03	12	0.83	-	-	BR
3/8	06F20C2120ACF	0	0	20	1.38	20	1.38	-	-	BR
1/2	08F20C2128AAF	0	0	4	0.28	6	0.41	-	-	BR
1/2	08F20C2128ADF	0	0	15	1.03	15	1.03	-	-	BR
3/4	12F20C2148ADF	0	0	4	0.28	4	0.28	-	-	BR
3/8	06F20C6120ACF	0	0	20	1.38	20	1.38	-	-	SS
1/2	08F20C6128ADF	0	0	15	1.03	15	1.03	-	-	SS
3/4	12F20C6148ADF	0	0	4	0.28	4	0.28	-	-	SS
3/8	06F23C2140ACF	0	0	150	10.34	150	10.34	150	10.34	BR
3/8	06F22C2140AAF	5	0.34	200	13.79	135	9.31	135	9.31	BR
3/8	06F22C2140ADF	5	0.34	300	20.69	300	20.69	300	20.69	BR
1/2	08F23C2140ACF	0	0	150	10.34	150	10.34	150	10.34	BR
1/2	08F22C2140AAF	5	0.34	200	13.79	135	9.31	135	9.31	BR
1/2	08F22C2140ADF	5	0.34	300	20.69	300	20.69	300	20.69	BR
3/4	12F23C2148ACF	0	0	150	10.34	150	10.34	150	10.34	BR
3/4	12F22C2148AAF	5	0.34	200	13.79	135	9.31	135	9.31	BR
3/4	12F24C2148AAF	5	0.34	250	17.24	150	10.34	100	6.90	BR
1	16F24C2164AAF	5	0.34	150	10.34	125	8.62	100	6.90	BR
1 1/4	20F24C2172AAF	5	0.34	150	10.34	125	8.62	100	6.90	BR
1 1/2	24F24C2180AAF	5	0.34	150	10.34	125	8.62	100	6.90	BR
3	48F28C9199ACF	10	0.14	200	13.79	200	13.79	175	-	BR
3/8	06F23C6140ACF	0	0	150	10.34	150	10.34	150	10.34	SS
3/8	06F22C6140ADF	5	0.34	300	20.69	300	20.69	300	20.69	SS
1/2	08F23C6140ACF	0	0	150	10.34	150	10.34	150	10.34	SS
1/2	08F22C6140ADF	5	0.34	300	20.69	300	20.69	300	20.69	SS
3/4	12F23C6148ACF	0	0	150	10.34	150	10.34	150	10.34	SS
3/4	12F22C6148ADF	5	0.34	300	20.69	300	20.69	300	20.69	SS
1	16F24C6164AAF	5	0.34	150	10.34	125	8.62	100	6.90	SS
1 1/2	24F24C6180AAF	5	0.34	150	10.34	125	8.62	100	6.90	SS
1/4	04F25C2122CAF	5	0.34	300	20.69	300	20.69	300	20.69	BR
3/8	06F25C2122CAF	5	0.34	300	20.69	300	20.69	300	20.69	BR
3/8	06FH5C2132ACF	0	0	200	13.79	200	13.79	200	13.79	BR

Gold Ring Condensed Valve Listing continued

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU		Body Material
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	
3/8	06F25C2132ACF	1	0.07	300	20.69	235	16.21	235	16.21	BR
1/2	08FH5C2132ACF	0	0	200	13.79	200	13.79	200	13.79	BR
1/2	08F25C2132ACF	1	0.07	300	20.69	235	16.21	235	16.21	BR
3/4	12FH5C2148ACF	0	0	200	13.79	200	13.79	200	13.79	BR
3/4	12F25C2148ACF	1	0.07	300	20.69	235	16.21	235	16.21	BR
1	16F25C2164ACF	1	0.07	300	20.69	300	20.69	300	20.69	BR
1	16FH5C2164ADF	0	0	150	10.34	125	8.62	125	8.62	BR
1/4	04F25C6122CAF	5	0.34	300	20.69	300	20.69	300	20.69	SS
1/4	04F28C1D20ACF	15	1.03	1500	103.45	1500	103.45	1500	103.45	BR
3/8	06F28C1D20ACF	15	1.03	1500	103.45	1500	103.45	1500	103.45	BR
1/2	08F28C1D24ACF	25	1.72	1500	103.45	1500	103.45	1500	103.45	BR
3/4	12F28C1D48BCF	25	1.72	1000	68.97	1000	68.97	1000	68.97	BR
Two-Way Normally Open Valves AC Specifications										
1/8	02F20O1104ABF	0	0	500	34.48	300	20.69	225	15.52	BR
1/8	02F20O1106AAF	0	0	275	18.97	200	13.79	150	10.34	BR
1/8	02F20O1108AAF	0	0	125	8.62	100	6.90	85	5.86	BR
1/4	04F20O1106ACF	0	0	300	20.69	250	17.24	230	15.86	BR
1/4	04F20O1108ACF	0	0	130	8.97	110	7.59	100	6.90	BR
1/4	04F20O2118ACF	0	0	30	2.07	25	1.72	20	1.38	BR
1/8	02F20O3104ABF	0	0	500	34.48	300	20.69	225	15.52	SS
1/8	02F20O3106AAF	0	0	275	18.97	200	13.79	150	10.34	SS
1/8	02F20O3108AAF	0	0	125	8.62	100	6.90	85	5.86	SS
1/4	04F20O3108ACF	0	0	130	8.97	110	7.59	100	6.90	SS
1/4	04F20O3110ACF	0	0	85	5.86	75	5.17	60	4.14	SS
1/4	04F20O3114	0	0	65	4.48	65	4.48	60	4.14	SS
1/4	04F20O3118	0	0	45	3.10	40	2.76	35	2.41	SS
3/8	06F20O2120ADF	0	0	15	1.03	15	1.03	-	-	BR
1/2	08F20O2128ADF	0	0	15	1.03	15	1.03	-	-	BR
3/4	12F20O2148ACF	0	0	2	0.14	2	0.14	-	-	BR
3/8	06F23O2140ACF	0	0	150	10.34	150	10.34	150	10.34	BR
1/2	08F23O2140ACF	0	0	150	10.34	150	10.34	150	10.34	BR
3/4	12F23O2148ACF	0	0	150	10.34	150	10.34	150	10.34	BR
3/4	12F24O2148ACF	5	0.34	250	17.24	200	13.79	200	13.79	BR
1	16F24O2164ACF	5	0.34	125	8.62	125	8.62	125	8.62	BR
1 1/4	20F24O2172ACF	5	0.34	125	8.62	125	8.62	125	8.62	BR
1 1/2	24F24O2180ACF	5	0.34	125	8.62	125	8.62	125	8.62	BR
3	48F28O9199ACF	2	0.14	125	8.62	125	8.62	125	8.62	BR
3/8	06F23O6140ACF	0	0	150	10.34	150	10.34	150	10.34	SS
1/2	08F23O6140ACF	0	0	150	10.34	150	10.34	150	10.34	SS
3/4	12F23O6148ACF	0	0	150	10.34	150	10.34	150	10.34	SS
1	16F24O6164ACF	5	0.34	125	8.62	125	8.62	125	8.62	SS
1 1/2	24F24O6180ACF	5	0.34	125	8.62	125	8.62	125	8.62	SS
1/4	04F25O2122CCF	5	0.34	300	20.69	300	20.69	300	20.69	BR
3/8	06F25O2122CCF	5	0.34	300	20.69	300	20.69	300	20.69	BR
3/8	06F25O2132ACF	1	0.07	200	13.79	175	12.07	175	12.07	BR
1/2	08F25O2132ACF	1	0.07	200	13.79	175	12.07	175	12.07	BR
3/4	12F25O2148ACF	1	0.07	275	18.97	275	18.97	275	18.97	BR
1	16F25O2164ACF	1	0.07	300	20.69	250	17.24	230	15.86	BR
1/2	08F28O1D28ACF	25	1.72	1000	68.97	1000	68.97	1000	68.97	BR
3/4	12F28O1D48BCF	25	1.72	500	34.48	500	34.48	500	34.48	BR
Two-Way Normally Closed Valves DC Specifications										
1/8	02F20C1103A1F	0	0	500	34.48	500	34.48	500	34.48	BR
1/8	02F20C1106A1F	0	0	150	10.34	140	9.66	145	10.00	BR
1/8	02F20C1108A1F	0	0	80	5.52	80	5.52	80	5.52	BR
1/4	04F20C1106A1F	0	0	150	10.34	125	8.62	125	8.62	BR
1/4	04F20C1108A1F	0	0	65	4.48	60	4.14	60	4.14	BR

Gold Ring Condensed Valve Listing continued

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU		Body Material
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	
1/4	04F20C1108A3F	0	0	75	5.17	70	4.83	70	4.83	BR
3/8	06F20C2108A3F	0	0	75	5.17	70	4.83	70	4.83	BR
3/8	06F20C2110A3F	0	0	35	2.41	35	2.41	35	2.41	BR
3/8	06F20C2114A3F	0	0	25	1.72	25	1.72	25	1.72	BR
3/8	06F20C2118A1F	0	0	14	0.97	14	0.97	14	0.97	BR
1/8	02F20C3103A1F	0	0	500	34.48	500	34.48	500	34.48	SS
1/8	02F20C3106A1F	0	0	150	10.34	140	9.66	145	10.00	SS
1/8	02F20C3108A1F	0	0	80	5.52	80	5.52	80	5.52	SS
1/4	04F20C3114	0	0	17	1.17	20	1.38	21	1.45	SS
1/4	04F20C3114	0	0	25	1.72	25	1.72	25	1.72	SS
1/4	04F20C3118	0	0	15	1.03	16	1.10	16	1.10	SS
3/8	06F20C6108A1F	0	0	65	4.48	60	4.14	60	4.14	SS
3/8	06F20C6110A3F	0	0	35	2.41	35	2.41	35	2.41	SS
3/8	06F20C6114A3F	0	0	25	1.72	25	1.72	25	1.72	SS
3/8	06F20C6118A3F	0	0	18	1.24	15	1.03	18	1.24	SS
3/8	06F20C2120A1F	0	0	3	0.21	3	0.21	-	-	BR
3/8	06F20C2120A3F	0	0	9	0.62	9	0.62	-	-	BR
1/2	08F20C2128A3F	0	0	3	0.21	3	0.21	-	-	BR
3/8	06F20C6120A3F	0	0	3	0.21	3	0.21	-	-	SS
1/2	08F20C6128A3F	0	0	3	0.21	3	0.21	-	-	SS
3/8	06F23C2140A3F	0	0	40	2.76	40	2.76	-	-	BR
3/8	06F22C2140A3F	5	0.34	125	8.62	100	6.90	100	6.90	BR
1/2	08F22C2140A3F	5	0.34	125	8.62	100	6.90	100	6.90	BR
1/2	08F23C2140A3F	0	0	40	2.76	40	2.76	-	-	BR
3/4	12F23C2148A3F	0	0	40	2.76	40	2.76	-	-	BR
3/4	12F24C2148A3F	5	0.34	100	6.90	90	6.21	75	5.17	BR
3/4	12F24C2148A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
1	16F24C2164A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
1 1/4	20F24C2172A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
1 1/2	24F24C2180A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
2	32F24C2199A3F	2	0.14	150	10.34	150	10.34	150	10.34	BR
3	48F28C9199A3F	10	0.14	190	-	190	-	170	-	BR
3/8	06F23C6140A3F	0	0	40	2.76	40	2.76	-	-	SS
3/8	06F22C6140A3F	5	0.34	125	8.62	100	6.90	100	6.90	SS
1/2	08F23C6140A3F	0	0	40	2.76	40	2.76	-	-	SS
1/2	08F22C6140A3F	5	0.34	125	8.62	100	6.90	100	6.90	SS
3/4	12F23C6148A3F	0	0	40	2.76	40	2.76	-	-	SS
3/4	12F22C6148A3F	5	0.34	125	8.62	100	6.90	100	6.90	SS
1	16F24C6164A3F	5	0.34	125	8.62	125	8.62	125	8.62	SS
1 1/2	24F24C6180A3F	5	0.34	125	8.62	125	8.62	125	8.62	SS
1/4	04F25C2122C3F	5	0.34	275	18.97	275	18.97	275	18.97	BR
3/8	06F25C2122C3F	5	0.34	275	18.97	275	18.97	275	18.97	BR
3/8	06F25C2132A3F	1	0.07	130	8.97	130	8.97	130	8.97	BR
1/2	08F25C2132A3F	1	0.07	130	8.97	130	8.97	130	8.97	BR
3/4	12F25C2148A3F	1	0.07	70	4.83	70	4.83	70	4.83	BR
1	16F25C2164A3F	1	0.07	275	18.97	275	18.97	275	18.97	BR
1/2	08F28C1D24A3F	25	1.72	500	34.48	500	34.48	500	34.48	BR
3/4	12F28C1D48A3F	25	1.72	450	31.03	450	31.03	450	31.03	BR
Two-Way Normally Open Valves DC Specifications										
1/4	04F25O2122C3F	5	0.34	160	11.03	160	11.03	160	11.03	BR
3/8	06F25O2122A3F	1	0.07	200	13.79	175	12.07	175	12.07	BR
3/8	06F25O2132A3F	1	0.07	200	13.79	175	12.07	175	12.07	BR
1/2	08F25O2132A3F	1	0.07	200	13.79	175	12.07	175	12.07	BR
3/4	12F25O2148A3F	1	0.07	230	15.86	200	13.79	200	13.79	BR
1	16F25O2164A3F	1	0.07	200	13.79	150	10.34	125	8.62	BR
3/8	06F23O6140A3F	0	0	125	8.62	125	8.62	80	5.52	SS
1/2	08F23O6140A3F	0	0	125	8.62	125	8.62	80	5.52	SS
3/4	12F23O6148A3F	0	0	125	8.62	125	8.62	80	5.52	SS
1	16F24O6164A3F	5	0.34	125	8.62	125	8.62	125	8.62	SS
1 1/2	24F24O6180A3F	5	0.34	125	8.62	125	8.62	125	8.62	SS

Gold Ring Condensed Valve Listing continued

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU		Body Material
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	
1/2	08F23O2140A3F	0	0	125	8.62	125	8.62	80	5.52	BR
3/4	12F23O2148A3F	0	0	125	8.62	125	8.62	80	5.52	BR
3/4	12F24O2148A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
1	16F24O2164A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
1 1/4	20F24O2172A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
1 1/2	24F24O2180A3F	5	0.34	125	8.62	125	8.62	125	8.62	BR
2	32F24O2199A3F	2	0.14	125	8.62	125	8.62	125	8.62	BR
3	48F28O9199A3F	2	0.14	125	8.62	125	8.62	125	8.62	BR
3/8	06F20O2120A3F	0	0	5	0.34	3	0.21	-	-	BR
1/2	08F20O2128A3F	0	0	1	0.07	1	0.07	-	-	BR
1/8	02F20O3104A1F	0	0	400	27.59	250	17.24	150	10.34	SS
1/8	02F20O3106A1F	0	0	190	13.10	110	7.59	110	7.59	SS
1/8	02F20O3108A1F	0	0	80	5.52	60	4.14	50	3.45	SS
1/4	04F20O3108A3F	0	0	80	5.52	60	4.14	60	4.14	SS
1/4	04F20O3110	0	0	45	3.10	30	2.07	30	2.07	SS
1/8	02F20O1104A1F	0	0	400	27.59	250	17.24	150	10.34	BR
1/8	02F20O1106A1F	0	0	190	13.10	110	7.59	110	7.59	BR
1/8	02F20O1108A1F	0	0	80	5.52	60	4.14	50	3.45	BR
1/4	04F20O1103A3F	0	0	500	34.48	500	34.48	500	34.48	BR
1/4	04F20O2110A3F	0	0	45	3.10	30	2.07	30	2.07	BR

Hot Water and Steam Valves

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Steam		Hot Water		Body Material
		PSI	Bar	PSI	Bar	PSI	Bar	
Two-Way Normally Closed Valves								
AC Specifications								
1/4	04FS0C3410ACH	0	0	110	7.59	-	-	BR
3/8	06FS5C2332ACF	1	0.07	50	3.45	-	-	BR
3/8	06FS5C2432ACF	1	0.07	80	5.52	-	-	BR
3/8	06FS5C2432ACH	1	0.07	125	8.62	-	-	BR
3/8	06FS3C2340ACF	0	0	50	3.45	150	10.34	BR
1/2	08FS5C2332ACF	1	0.07	50	3.45	-	-	BR
1/2	08FS5C2432ACF	1	0.07	80	5.52	-	-	BR
1/2	08FS5C2432ACH	1	0.07	125	8.62	-	-	BR
1/2	08FS3C2340ACF	0	0	50	3.45	150	10.34	BR
3/4	12FS5C2348ACF	1	0.07	50	3.45	-	-	BR
3/4	12FS5C2448ACF	1	0.07	80	5.52	-	-	BR
3/4	12FS5C2448ACH	1	0.07	125	8.62	-	-	BR
3/4	12FS3C2348ACF	0	0	50	3.45	150	10.34	BR
1	16FS5C2364ACF	1	0.07	50	3.45	150	10.34	BR
1	16FS5C2464ACF	1	0.07	80	5.52	-	-	BR
1	16FS5C2464ACH	1	0.07	125	8.62	-	-	BR
1 1/4	20FS4C2372AAF	5	0.34	50	3.45	150	10.34	BR
1 1/2	24FS4C2380AAF	5	0.34	50	3.45	150	10.34	BR
DC Specifications								
3/8	06F22C2340A3F	5	0.34	-	-	100	6.90	BR
3/8	06F23C2340A3F	0	0	-	-	40	2.76	BR
1/2	08F22C2340A3F	5	0.34	-	-	100	6.90	BR
1/2	08F23C2340A3F	0	0	-	-	40	2.76	BR
3/4	12F22C2348A3F	5	0.34	-	-	100	6.90	BR
3/4	12F23C2348A3F	0	0	-	-	40	2.76	BR
Two-Way Normally Open								
AC Specifications								
3/8	06FS5O2432ACH	1	0.07	125	8.62	-	-	BR
1/2	08FS5O2432ACH	1	0.07	125	8.62	-	-	BR
3/4	12FS5O2448ACH	1	0.07	125	8.62	-	-	BR
1	16FS5O2464ACH	1	0.07	125	8.62	-	-	BR
1 1/2	24FS4O2380ACF	5	0.34	50	3.45	-	-	BR

Gold Ring Condensed Valve Listing continued

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU		Body Material
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	
Three-Way Normally Closed Valves										
AC Specifications										
1/8	02F30C1103AAF	0	0	200	13.79	200	13.79	200	13.79	BR
1/8	02F30C1104AAF	0	0	125	8.62	125	8.62	125	8.62	BR
1/8	02F30C1106AAF	0	0	100	6.90	100	6.90	100	6.90	BR
1/8	02F30C1108AAF	0	0	40	2.76	40	2.76	40	2.76	BR
1/4	04F30C2104AAF	0	0	125	8.62	125	8.62	125	8.62	BR
1/4	04F30C2106ACF	0	0	150	10.34	150	10.34	150	10.34	BR
1/4	04F30C2108AAF	0	0	40	2.76	40	2.76	40	2.76	BR
1/4	04F30C2111ABF	0	0	30	2.07	30	2.07	30	2.07	BR
1/8	02F30C3103AAF	0	0	200	13.79	200	13.79	200	13.79	SS
1/8	02F30C3104AAF	0	0	125	8.62	125	8.62	125	8.62	SS
1/8	02F30C3106AAF	0	0	100	6.90	100	6.90	100	6.90	SS
1/8	02F30C3108AAF	0	0	40	2.76	40	2.76	40	2.76	SS
1/4	04F30C3104AAF	0	0	125	8.62	125	8.62	125	8.62	SS
1/4	04F30C3106ACF	0	0	150	10.34	150	10.34	150	10.34	SS
1/4	04F30C3108ACF	0	0	85	5.86	85	5.86	85	5.86	SS
1/4	04F35C1116ACF	5	0.34	150	10.34	150	10.34	95	6.55	BR
1/4	04F38C1122AAF	10	0.69	200	13.79	200	13.79	200	13.79	BR
3/8	06F38C1122AAF	10	0.69	200	13.79	200	13.79	200	13.79	BR
Three-Way Normally Open Valves										
AC Specifications										
1/8	02F30O1103AAF	0	0	200	13.79	200	13.79	200	13.79	BR
1/8	02F30O1104AAF	0	0	125	8.62	125	8.62	125	8.62	BR
1/8	02F30O1106AAF	0	0	100	6.90	100	6.90	100	6.90	BR
1/8	02F30O1108AAF	0	0	40	2.76	40	2.76	40	2.76	BR
1/4	04F30O2104ADF	0	0	235	16.21	250	17.24	250	17.24	BR
1/4	04F30O2106ACF	0	0	140	9.66	140	9.66	140	9.66	BR
1/4	04F30O2108ACF	0	0	70	4.83	70	4.83	70	4.83	BR
1/4	04F30O2111ACF	0	0	40	2.76	40	2.76	40	2.76	BR
1/4	04F35O3116ACF	5	0.34	160	11.03	160	11.03	95	6.55	SS
1/4	04F35O1116ACF	5	0.34	160	11.03	160	11.03	95	6.55	BR
1/4	04F38O1122ACF	10	0.69	200	13.79	200	13.79	200	13.79	BR
3/8	06F38O1122ACF	10	0.69	200	13.79	200	13.79	200	13.79	BR
1/8	02F30O3103AAF	0	0	200	13.79	200	13.79	200	13.79	SS
1/8	02F30O3106AAF	0	0	100	6.90	100	6.90	100	6.90	SS
1/8	02F30O3108AAF	0	0	40	2.76	40	2.76	40	2.76	SS
1/4	04F30O3104AAF	0	0	125	8.62	125	8.62	125	8.62	SS
1/4	04F30O3106ACF	0	0	150	10.34	140	9.66	140	9.66	SS
1/4	04F30O3108ACF	0	0	70	4.83	70	4.83	70	4.83	SS
Three-Way Universal Valves										
AC Specifications										
1/8	02F30U1103ABF	0	0	175	12.07	175	12.07	175	12.07	BR
1/8	02F30U1104ABF	0	0	100	6.90	100	6.90	100	6.90	BR
1/8	02F30U1106AAF	0	0	50	3.45	50	3.45	50	3.45	BR
1/8	02F30U1108ABF	0	0	30	2.07	30	2.07	30	2.07	BR
1/4	04F30U2104ACF	0	0	125	8.62	130	8.97	130	8.97	BR
1/4	04F30U2106ADF	0	0	100	6.90	100	6.90	100	6.90	BR
1/4	04F30U2108ACF	0	0	50	3.45	50	3.45	50	3.45	BR
1/4	04F30U2111ACF	0	0	20	1.38	20	1.38	20	1.38	BR
1/8	02F30U3103ABF	0	0	175	12.07	175	12.07	175	12.07	SS
1/8	02F30U3106AAF	0	0	50	3.45	50	3.45	50	3.45	SS
1/8	02F30U3108ABF	0	0	30	2.07	30	2.07	30	2.07	SS
1/4	04F30U3104ABF	0	0	100	6.90	100	6.90	100	6.90	SS

Gold Ring Condensed Valve Listing continued

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD)						Body Material
				Air, Inert Gas		Water		Light Oil 300SSU		
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	
1/4	04F30U3106ADF	0	0	100	6.90	100	6.90	100	6.90	SS
1/4	04F30U3108ABF	0	0	50	3.45	50	3.45	50	3.45	SS
Three-Way Normally Closed DC Specifications										
1/8	02F30C1103A1F	0	0	200	13.79	200	13.79	200	13.79	BR
1/8	02F30C1104A1F	0	0	125	8.62	125	8.62	125	8.62	BR
1/8	02F30C1106A1F	0	0	100	6.90	100	6.90	100	6.90	BR
1/8	02F30C1108A1F	0	0	40	2.76	40	2.76	40	2.76	BR
1/4	04F30C2104A3F	0	0	160	11.03	160	11.03	160	11.03	BR
1/4	04F30C2106A3F	0	0	115	7.93	115	7.93	115	7.93	BR
1/4	04F30C2108A3F	0	0	60	4.14	60	4.14	60	4.14	BR
1/4	04F30C2111A3F	0	0	25	1.72	25	1.72	25	1.72	BR
1/8	02F30C3103A1F	0	0	200	13.79	200	13.79	200	13.79	SS
1/8	02F30C3104A1F	0	0	125	8.62	125	8.62	125	8.62	SS
1/8	02F30C3106A1F	0	0	100	6.90	100	6.90	100	6.90	SS
1/8	02F30C3108A1F	0	0	40	2.76	40	2.76	40	2.76	SS
1/4	04F30C3106A3F	0	0	115	7.93	115	7.93	115	7.93	SS
1/4	04F30C3108A3F	0	0	60	4.14	60	4.14	60	4.14	SS
1/4	04F35C1116A3F	5	0.34	115	7.93	115	7.93	60	4.14	BR
1/4	04F38C1122A3F	10	0.69	200	13.79	200	13.79	200	13.79	BR
3/8	06F38C1122A1F	10	0.69	200	13.79	200	13.79	200	13.79	BR
Three-Way Normally Open Valves DC Specifications										
1/8	02F30O1103A1F	0	0	200	13.79	200	13.79	200	13.79	BR
1/8	02F30O1104A1F	0	0	200	13.79	200	13.79	200	13.79	BR
1/8	02F30O1106A1F	0	0	100	6.90	100	6.90	100	6.90	BR
1/8	02F30O1108A1F	0	0	40	2.76	40	2.76	40	2.76	BR
1/4	04F30O2140A3F	0	0	160	11.03	160	11.03	160	11.03	BR
1/4	04F30O2106A3F	0	0	100	6.90	100	6.90	100	6.90	BR
1/4	04F30O2108A3F	0	0	55	3.79	55	3.79	55	3.79	BR
1/4	04F30O2111A3F	0	0	30	2.07	30	2.07	30	2.07	BR
1/8	02F30O3103A1F	0	0	200	13.79	200	13.79	200	13.79	SS
1/8	02F30O3104A1F	0	0	125	8.62	125	8.62	125	8.62	SS
1/8	02F30O3106A1F	0	0	100	6.90	100	6.90	100	6.90	SS
1/8	02F30O3108A1F	0	0	40	2.76	40	2.76	40	2.76	SS
1/4	04F30O3106A3F	0	0	100	6.90	100	6.90	100	6.90	SS
1/4	04F30O3108A3F	0	0	55	3.79	55	3.79	55	3.79	SS
1/4	04F35O1116A3F	5	0.34	100	6.90	100	6.90	50	3.45	BR
1/4	04F38O1122A3F	10	0.69	200	13.79	200	13.79	200	13.79	BR
3/8	06F38O1122A3F	10	0.69	200	13.79	200	13.79	200	13.79	BR
Three-Way Universal Valves DC Specifications										
1/8	02F30U1103A1F	0	0	125	8.62	125	8.62	125	8.62	BR
1/8	02F30U1104A1F	0	0	65	4.48	65	4.48	65	4.48	BR
1/8	02F30U1106A1F	0	0	50	3.45	50	3.45	50	3.45	BR
1/8	02F30U1108A1F	0	0	20	1.38	20	1.38	20	1.38	BR
1/4	04F30U2104A3F	0	0	75	5.17	75	5.17	75	5.17	BR
1/4	04F30U2106A3F	0	0	60	4.14	60	4.14	60	4.14	BR
1/4	04F30U2108A3F	0	0	25	1.72	25	1.72	25	1.72	BR
1/4	04F30U2111A3F	0	0	12	0.83	12	0.83	12	0.83	BR
1/8	02F30U3103A1F	0	0	125	8.62	125	8.62	125	8.62	SS

Gold Ring Condensed Valve Listing continued

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU		Body Material
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	
1/8	02F30U3104A1F	0	0	65	4.48	65	4.48	65	4.48	SS
1/8	02F30U3106A1F	0	0	50	3.45	50	3.45	50	3.45	SS
1/8	02F30U3108A1F	0	0	20	1.38	20	1.38	20	1.38	SS
1/4	04F30U3106A3F	0	0	60	4.14	60	4.14	60	4.14	SS
1/4	04F30U3108A3F	0	0	25	1.72	25	1.72	25	1.72	SS
Four-Way Two Position Valves AC Specifications										
1/4	04F48S2106ACF	10	0.69	150	10.34	150	10.34	150	10.34	BR
Four-Way Two Position Valves DC Specifications										
1/4	04F48S2106A3F	10	0.69	100	6.90	100	6.90	100	6.90	BR

NPT Pipe Size	Valve Part Number	Min.		Operating Pressure Differential Max. (MOPD) Cryogenic Fluids		Body Material
		PSI	Bar	PSI	Bar	
Cryogenic Two-Way Normally Closed Valves AC Specifications						
1/4	04F20C2414CDF-L	0	0	70	4.83	BR
3/8	06F20C2414CDF-L	0	0	70	4.83	BR
1/2	08FH6C2440ACF-L	10	0.69	200	13.79	BR
1/8	02F20C3503ABF-43	0	0	1000	68.97	SS

NPT Pipe Size	Valve Part Number	Operating Pressure Differential Max. (MOPD) Min.		Max.		Body Material
		PSI	Bar	PSI	Bar	
Two-Way Normally Closed Low Vacuum Valves AC Specifications						
1/4	04F20C2118AAF	0	0	15	1.03	BR
3/8	06F20C2120AAF	0	0	15	1.03	BR
1/2	08F20C2128ADF	0	0	15	1.03	BR
3/4	12F20C2148ADF	0	0	4	0.28	BR
3/4	12F23C2148ACF	0	0	15	1.03	BR
1	16FH5C2164ADF	0	0	15	1.03	BR
Two-Way Normally Open Low Vacuum Valves AC Specifications						
3/8	06F23O2140ACF	0	0	15	1.03	BR
1/2	08F23O2140ACF	0	0	15	1.03	BR
3/4	12F23O2148ACF	0	0	15	1.03	BR
Two-Way Normally Closed Medium Vacuum Valves AC Specifications						
1/4	04F20C2118AAF-S	0	0	15	1.03	BR
3/8	06F20C2120AAF-S	0	0	15	1.03	BR
1/2	08F20C2128ADF-S	0	0	15	1.03	BR
3/4	12F20C2148ADF-S	0	0	4	0.28	BR
3/4	12F23C2140ACF-S	0	0	15	1.03	BR
1	16FH5C2164ADF-S	0	0	15	1.03	BR

Gold Ring Condensed Valve Listing continued

NPT Pipe Body Size	Valve Part Number	Operating Pressure Differential Max. (MOPD)				Max. Material
				Min.		
		PSI	Bar	PSI	Bar	
Two-Way Normally Open Medium Vacuum Valves						
AC Specifications						
3/8	06F23O2140ACF-S	0	0	15	1.03	BR
1/2	08F23O2140ACF-S	0	0	15	1.03	BR
3/4	12F23O2148ACF-S	0	0	15	1.03	BR
Two-Way Normally Closed High Vacuum Valves						
AC Specifications						
1/4	04F20C2218AAF-V	0	0	15	1.03	BR
3/8	06F20C2220AAF-V	0	0	15	1.03	BR
1/2	08F20C2228ADF-V	0	0	15	1.03	BR
3/4	12F20C2248ADF-V	0	0	4	0.28	BR
3/4	12F23C2248ACF-V	0	0	15	1.03	BR
1	16FH5C2264ADF-V	0	0	15	1.03	BR
Two-Way Normally Open High Vacuum Valves						
AC Specifications						
3/8	06F23O2240ACF-V	0	0	15	1.03	BR
1/2	08F23O2240ACF-V	0	0	15	1.03	BR
3/4	12F23O2248ACF-V	0	0	15	1.03	BR

Ordering Information

Gold Ring Type I General Purpose, Splice Box, Conduit Hub and Type 4X, Gold Ring II unit solenoids and unit valves can be ordered separately for maximum inventory flexibility. No prefix or suffix required to order standard features.

To Order

Step 1: Select the Gold Ring valve required by using the appropriate valve specification table.

Step 2: Select one enclosure code, one coil termination code and one voltage code. Standard leads are 18-inches long with all enclosures, except splice box where 6-inch leads are standard.

Step 3: When separate valve and solenoid, the last two digits of the valve must match the first two digits of the solenoid.

Example: Valve: 04F20C1103AAF
Solenoid: AF 4C05

Step 4: Open frame and Types 6, 7 and 9 must be ordered factory assembled.

Solenoid Enclosure and Coil Information

Surrounding the coil is the metal solenoid enclosure and frame. Together with the plunger and pole piece, it forms the magnetic circuit that operates the valve. Without the enclosure, the magnetic circuit is not complete. Without a complete magnetic circuit, the magnetic field is reduced and valve performance suffers.

The enclosure also protects the coil from the environment. Solenoid enclosures come in a range of constructions offering varying levels of protection against the elements and other forces. NEMA identifies the different enclosures as "Types" and sets standards for their safety and performance. Following is a description of Gold Ring solenoid valve enclosures.

The National Electrical Manufacturers Association (NEMA) recommends suitable materials and components to meet each enclosure type. The enclosures listed here will only meet the applicable NEMA recommendations when properly installed and operated to NEMA specifications and in accordance with the NEC.

Condensed Listing of NEMA Enclosures

NEMA Type	Gold Ring Enclosure Code
1	P,S
2	4
3	4
3R	4
3S	4
4	P*,4
4X	4
6	W
7	E,M,Y,Z
9	E,M,Y,Z

**** With suitable connector***

Enclosure/Coil Termination Combinations

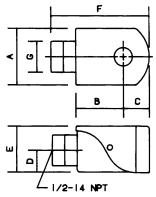
Enclosures	Enclosure Code	Coil Termination: 6" Leads	Screw	(K)	Spade (S)	DIN (H)
Gold Ring II (4)	4					X
Explosion-Proof (E)						X
316 SS Explosion-Proof (M)						X
Open Frame (O)	O		X	X		X
Encapsulated DIN (P)	p				X	
Splice Box (S)	S	X				
316 SS Submersible (U)						X
Submersible Splice Box (W)	W		X	X		X
Explosion-Proof W/Ground Lead (Y)						X

Solenoid Enclosures

Type 1, 2, 3, 3R, 3S, 4 and 4X: Gold Ring II

These completely encapsulated solenoids are suitable for Type 1; Type 2–indoor installations to provide protection against splashing; Type 3–outdoor installations for protection against rain, snow, sleet and dust; Type 3R; Type 3S; Type 4, watertight and dusttight; and Type 4X, corrosion resistant.

Gold Ring II, Types 1, 2, 3, 3R, 3S, 4, 4X



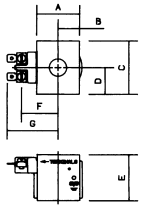
	CONDUIT HUB		GOLD RING II™
	A, B & 1 WATTAGES	C, D & 3 WATTAGES	C, D & 3 WATTAGES
A	1-9/16	1-13/16	1-13/16
B	1-5/16	1-9/16	1/2
C	25/32	27/32	2-1/8
D	5/8	23/32	23/32
E	1-9/32	1-1/2	1-1/2
F	2-13/16	3-7/32	3-7/32
G	1 DIA	1 DIA	1 DIA

Open Frame

Open Frame enclosures are unclassified by NEMA. The solenoid is open on two or more sides. They are used where space is limited and protection is afforded by mounting the solenoid in an approved panel box or other protective enclosure. Available with panel mount construction.

Material Specifications:
- Formed Sheet Carbon Steel: SAE 1008-1010
- Zinc Plated Gold Color: Federal Specification QQ-Z-325

Spade/Screw



	A, B, & 1 WATTAGES	C, D & 3 WATTAGES
A	1-3/8	1-3/8
B	11/16	11/16
C	1-9/16	1-3/4
D	25/32	7/8
E	1-1/4	1-1/2
F	1-1/8	1-3/16
G	1-5/8	1-21/32

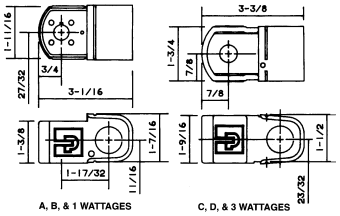
Type 1: General Purpose

Type 1 General Purpose enclosures are designed for indoor use to provide moderate protection against contact with other equipment.

Splice Box enclosures provide an integral splice box to accommodate the coil leads and incoming wires. The splice box has two standard knock-outs, one on each side.

Material Specifications:
- Formed Sheet Carbon Steel: SAE 1008-1010
- Zinc Plated Gold Color: Federal Specification QQ-Z-325
- Black Epoxy Coating on Galvanization

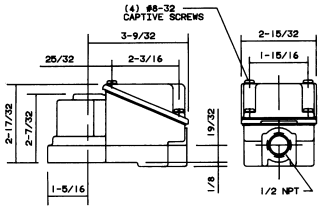
General Purpose, Type 1 Splice Box



Type 6: Submersible, Watertight, Dusttight and Sleet-Resistant

Indoor and Outdoor, Type 6 enclosures protect the coil against occasional submersion (6 ft. for 30 minutes) dust; splashing, seeping, falling or hose-directed water; external condensation; and lint.

NEMA 6 Splice Box



Solenoid Enclosures continued

DIN Connector

DIN Connector coils meet ISO4400/DIN 43650 A requirements.

	A, B & 1 WATTAGES	*C, D & 3 WATTAGES*
A	7/16	9/16
B	1-1/2	1-3/4
C	1-3/8	1-9/16
D	1-5/8	1-7/8

Connector Kits For DIN Coils

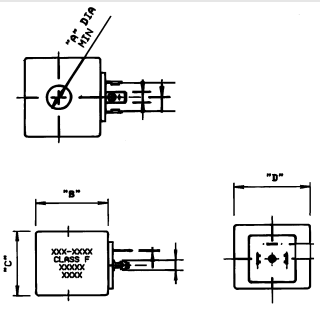
Part No.

1/2" conduit connector SA06-005

6-10mm cable gland connector SA06-004

Each kit contains a gasket and attaching screw.
Contact factory for timer information.

DIN



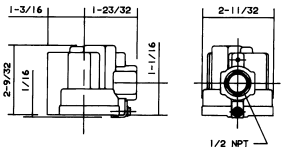
Type 7: Explosion-Proof for Indoor Hazardous Locations
Type 9: Dust-Ignition Proof

Type 7 Explosion-Proof enclosures are designed for use in gas or vapor atmospheres. Type 9 enclosures prevent explosive amounts of dust from metal, coal, cake, flour, starch or grain from entering the enclosure.

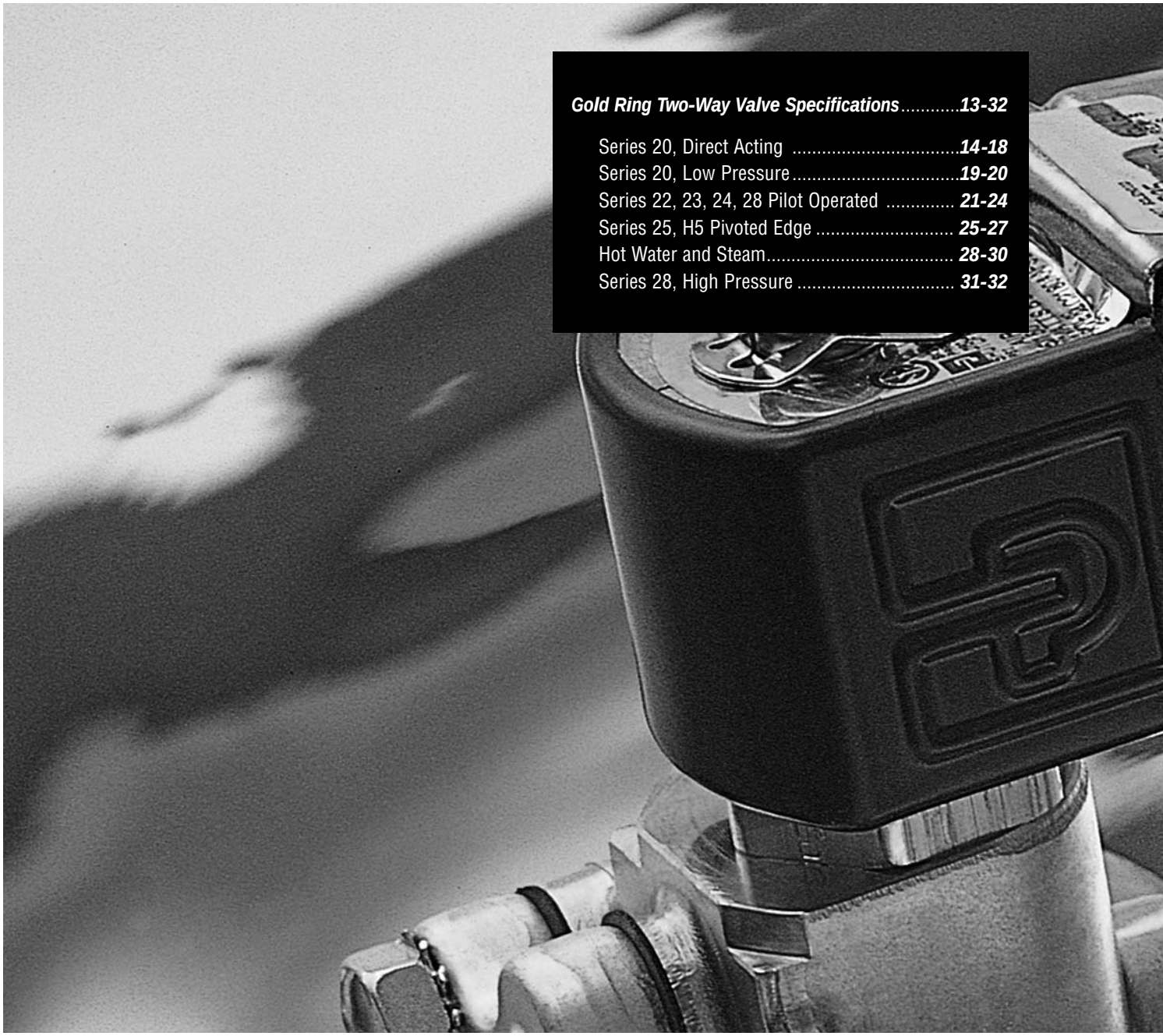
Material Specifications:

Splice Box or Explosion-Proof
Aluminum Cast: ASTM SC84A
Black Epoxy Coating
Explosion-Proof: 316 Stainless Steel
Investment Cast: ACI CF-8M
NEMA Classifications: Type 7
Class 1 Division 1 Group C and D
Type 9 Class 2 Division 1
Group E,F,G

:ainless Steel



Two-Way Valve Contents



GOLD RING Series 20

Small Two-Way Direct Acting Valves

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass, 303 Stainless Steel, 316 Stainless Steel as listed
- Seals-NBR or Urethane as listed
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper(Brass Bodies), Silver(Stainless Steel Bodies)
- Disc Holder-1/8-inch NPT Celcon, 1/4-inch Ryton

Compatible Fluids

- Gases, Fluid, Light Oils, or Vacuum from 760-23 Torr (29" Mercury) and other clean flowing media compatible with brass or stainless steel

Electrical Characteristics

Voltages

- DC, 12, 24 (other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified. For details, consult factory.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 200°F max.
- DC Voltages: 150°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- Series 20 valves may be mounted in any position. Product and mounting dimensions shown are nominal.

Applications

- Used in a variety of applications including: Material Transfer, Molding, Vending Machines, Instrumentation, Welding Equipment, Water Treatment Systems, Spray Equipment, Dental Equipment, Laundry Equipment, Food Processing Machinery.

DIRECT ACTING BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential						Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
					Min.	Max. (MOPD)									
						Air, Inert Gas		Water		Light Oil 300SSU					
	inch	mm	Cv	Kv	(PSI/Bar)	(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C		
1/8	3/64	1.19	.06	0.05	0	750	51.72	750	51.72	530	36.55	180	82	6.0	1	02F20C1103AAF
1/8	3/32	2.38	.20	0.17	0	275	18.97	290	20.00	130	8.97	180	82	6.0	1	02F20C1106AAF
1/8	1/8	3.18	.34	0.29	0	155	10.69	180	12.41	140	9.66	180	82	6.0	1	02F20C1108AAF
1/4	3/64	1.19	.06	0.05	0	750	51.72	750	51.72	500	34.48	180	82	6.0	2	04F20C1103AAF
1/4	3/64	1.19	.06	0.05	0	1500	103.45	1500	103.45	1100	75.86	140	60	11.0	3	04F20C1503ACF*
1/4	3/32	2.38	.17	0.15	0	360	24.83	340	23.45	160	11.03	180	82	6.0	2	04F20C1106AAF
1/4	1/8	3.18	.35	0.30	0	140	9.66	165	11.38	90	6.21	180	82	6.0	2	04F20C1108AAF
1/4	1/8	3.18	.35	0.30	0	300	20.69	300	20.69	200	13.79	180	82	11.0	3	04F20C1108ACF
1/4	5/32	3.97	.50	0.43	0	150	10.34	150	10.34	145	10.00	180	82	11.0	5	04F20C2110ACF
1/4	7/32	5.56	.85	0.73	0	40	2.76	50	3.45	40	2.76	180	82	6.0	4	04F20C2114AAF
1/4	7/32	5.56	.72	0.62	0	100	6.90	100	6.90	100	6.90	180	82	16.0	5	04F20C2114BDF
1/4	9/32	7.14	.96	0.83	0	27	1.86	36	2.48	28	1.93	180	82	6.0	4	04F20C2118AAF
1/4	9/32	7.14	.88	0.76	0	90	6.21	80	5.52	80	5.52	200	93	16.0	5	04F20C2118BDF
3/8	1/8	3.18	.35	0.30	0	160	11.03	150	10.34	90	6.21	180	82	6.0	6	06F20C2108AAF
3/8	5/32	3.97	.52	0.45	0	150	10.34	150	10.34	145	10.00	180	82	11.0	7	06F20C2110ACF
3/8	7/32	5.56	.72	0.62	0	100	6.90	100	6.90	100	6.90	200	93	16.0	7	06F20C2114BDF
3/8	9/32	7.14	.85	0.73	0	90	6.21	80	5.52	80	5.52	200	93	16.0	7	06F20C2118BDF

**** Valve is standard with urethane disc.***

DIRECT ACTING BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/8	1/16	1.59	.09	0.08	0	500	34.48	300	20.69	225	15.52	180	82	10.2	8	02F20O1104ABF
1/8	3/32	2.38	.15	0.13	0	275	18.97	200	13.79	150	10.34	180	82	6.0	8	02F20O1106AAF
1/8	1/8	3.18	.21	0.18	0	125	8.62	100	6.90	85	5.86	180	82	6.0	8	02F20O1108AAF
1/4	3/32	2.38	.17	0.15	0	300	20.69	250	17.24	230	15.86	180	82	11.0	9	04F20O1106ACF
1/4	1/8	3.18	.35	0.30	0	130	8.97	110	7.59	100	6.90	180	82	11.0	9	04F20O1108ACF
1/4	9/32	7.14	.96	0.83	0	30	2.07	25	1.72	20	1.38	180	82	11.0	10	04F20O2118ACF

DIRECT ACTING BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	500	34.48	500	34.48	500	34.48	120	49	9.5	1	02F20C1103A1F
1/8	3/32	2.38	.20	0.17	0	150	10.34	140	9.66	145	10.00	120	49	9.5	1	02F20C1106A1F
1/8	1/8	3.18	.34	0.29	0	80	5.52	80	5.52	80	5.52	120	49	9.5	1	02F20C1108A1F
1/4	3/32	2.38	.17	0.15	0	150	10.34	125	8.62	125	8.62	120	49	9.5	2	04F20C1106A1F
1/4	1/8	3.18	.35	0.30	0	75	5.17	70	4.83	70	4.83	150	66	11.5	3	04F20C1108A3F
3/8	1/8	3.18	.35	0.30	0	75	5.17	70	4.83	70	4.83	150	66	11.5	7	06F20C2108A3F
3/8	5/32	3.97	.52	0.45	0	35	2.41	35	2.41	35	2.41	150	66	11.5	7	06F20C2110A3F
3/8	7/32	5.56	.72	0.62	0	25	1.72	25	1.72	25	1.72	150	66	11.5	7	06F20C2114A3F
3/8	9/32	7.14	.85	0.73	0	14	0.97	14	0.97	14	0.97	120	49	9.5	6	06F20C2118A1F

DIRECT ACTING BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	1/16	1.59	.09	0.08	0	400	27.59	250	17.24	150	10.34	120	49	9.5	8	02F20O1104A1F
1/8	3/32	2.38	.15	0.13	0	190	13.10	110	7.59	110	7.59	120	49	9.5	8	02F20O1106A1F
1/8	1/8	3.18	.21	0.18	0	80	5.52	60	4.14	50	3.45	120	49	9.5	8	02F20O1108A1F
1/4	3/64	1.19	.06	0.05	0	500	34.48	500	34.48	500	34.48	140	60	11.5	9	04F20O1103A3F
1/4	1/8	3.18	.35	0.30	0	80	5.52	60	4.14	60	4.14	150	66	11.5	9	04F20O1108A3F

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

DIRECT ACTING STAINLESS STEEL VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	750	51.72	750	51.72	530	36.55	180	82	6.0	1	02F20C3103AAF
1/8	3/32	2.38	.20	0.17	0	275	18.97	290	20.00	130	8.97	180	82	6.0	1	02F20C3106AAF
1/8	1/8	3.18	.34	0.29	0	155	10.69	180	12.41	140	9.66	180	82	6.0	1	02F20C3108AAF
3/8	1/8	3.18	.35	0.30	0	160	11.03	150	10.34	90	6.21	180	82	6.0	6	06F20C6108AAF
3/8	1/8	3.18	.35	0.30	0	310	21.38	310	21.38	260	17.93	200	93	16.0	7	06F20C6108ADF

****** ***Valve is standard with urethane disc.***

DIRECT ACTING STAINLESS STEEL VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/8	1/16	1.59	.09	0.08	0	500	34.48	300	20.69	225	15.52	180	82	10.2	8	02F20O3104ABF
1/8	3/32	2.38	.15	0.13	0	275	18.97	200	13.79	150	10.34	180	82	6.0	8	02F20O3106AAF
1/8	1/8	3.18	.21	0.18	0	125	8.62	100	6.90	85	5.86	180	82	6.0	8	02F20O3108AAF
1/4	1/8	3.18	.35	0.30	0	130	8.97	110	7.59	100	6.90	200	93	11.0	13	04F20O3108ACF
1/4	5/32	3.97	.50	0.43	0	85	5.86	75	5.17	60	4.14	200	93	11.0	13	04F20O3110ACF

DIRECT ACTING STAINLESS STEEL VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

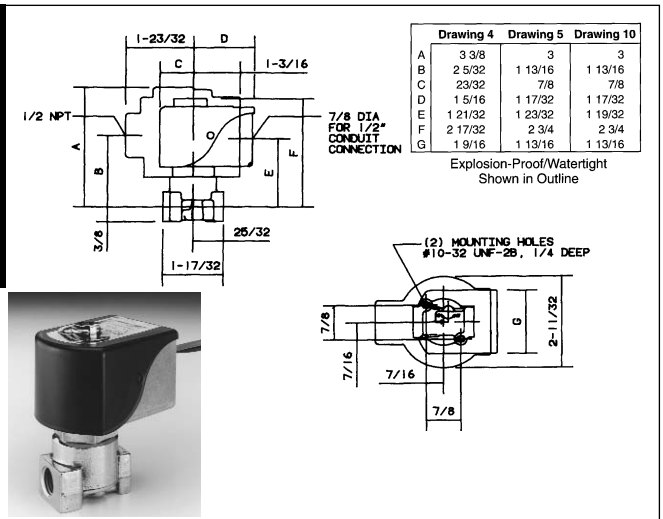
NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	500	34.48	500	34.48	500	34.48	120	49	9.5	1	02F20C3103A1F
1/8	3/32	2.38	.20	0.17	0	150	10.34	140	9.66	145	10.00	120	49	9.5	1	02F20C3106A1F
1/8	1/8	3.18	.34	0.29	0	80	5.52	80	5.52	80	5.52	120	49	9.5	1	02F20C3108A1F
3/8	1/8	3.18	.35	0.30	0	65	4.48	60	4.14	60	4.14	120	49	9.5	6	06F20C6108A1F
3/8	5/32	3.97	.52	0.45	0	35	2.41	35	2.41	35	2.41	150	66	11.5	7	06F20C6110A3F
3/8	7/32	5.56	.72	0.62	0	25	1.72	25	1.72	25	1.72	150	66	11.5	7	06F20C6114A3F
3/8	9/32	7.14	.85	0.73	0	18	1.24	15	1.03	18	1.24	150	66	11.5	7	06F20C6118A3F

DIRECT ACTING STAINLESS STEEL VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	1/16	1.59	.09	0.08	0	400	27.59	250	17.24	150	10.34	120	49	9.5	8	02F20O3104A1F
1/8	3/32	2.38	.15	0.13	0	190	13.10	110	7.59	110	7.59	120	49	9.5	8	02F20O3106A1F
1/8	1/8	3.18	.21	0.18	0	80	5.52	60	4.14	50	3.45	120	49	9.5	8	02F20O3108A1F
1/4	1/8	3.18	.35	0.30	0	80	5.52	60	4.14	60	4.14	150	66	11.5	13	04F20O3108A3F

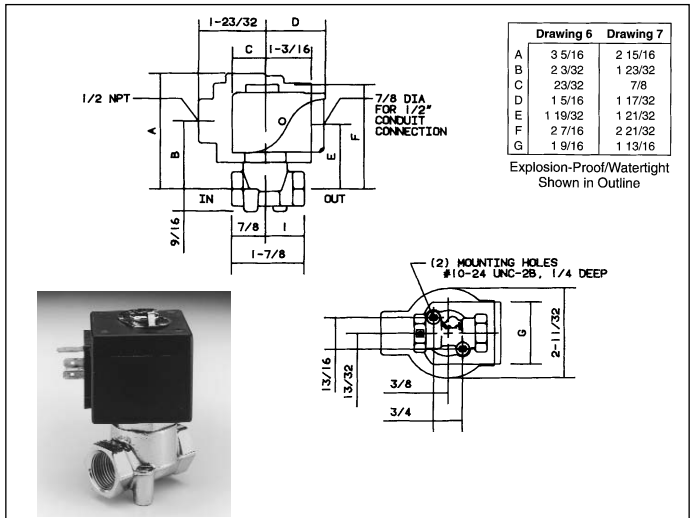
DRAWINGS



	Drawing 4	Drawing 5	Drawing 10
A	3 3/8	3	3
B	2 5/32	1 13/16	1 13/16
C	23/32	7/8	7/8
D	1 5/16	1 17/32	1 17/32
E	1 21/32	1 23/32	1 19/32
F	2 17/32	2 3/4	2 3/4
G	1 9/16	1 13/16	1 13/16

Explosion-Proof/Watertight Shown in Outline

#4, 5, 10



	Drawing 6	Drawing 7
A	3 5/16	2 15/16
B	2 3/32	1 23/32
C	23/32	7/8
D	1 5/16	1 17/32
E	1 19/32	1 21/32
F	2 7/16	2 21/32
G	1 9/16	1 13/16

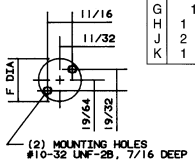
Explosion-Proof/Watertight Shown in Outline

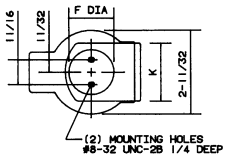
#6, 7

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

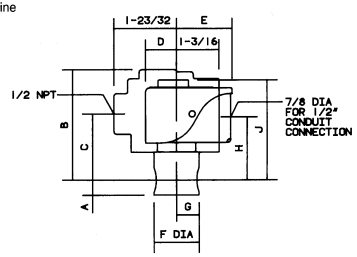
	Drawing 1	Drawing 2	Drawing 3	Drawing 9	Drawing 11	Drawing 12	Drawing 13
A	11/32	13/32	13/32	13/32	3/8	3/8	3/8
B	2 29/32	3 13/32	3 1/32	3 1/32	3 3/8	3	3
C	1 11/16	2 3/16	1 13/16	1 13/16	2 5/32	1 13/16	1 13/16
D	23/32	23/32	7/8	7/8	23/32	7/8	7/8
E	1 5/16	1 5/16	1 17/32	1 17/32	1 5/16	1 17/32	1 17/32
F	1 3/16	1 1/4	1 1/4	1 1/4	1 9/16	1 9/16	1 9/16
G	19/32	5/8	5/8	5/8	19/32	19/32	19/32
H	1 9/32	1 11/16	1 3/4	1 19/32	1 11/16	1 3/4	1 19/32
J	2 1/8	2 17/32	2 3/4	2 3/4	2 17/32	2 3/4	2 3/4
K	1 9/16	1 9/16	1 13/16	1 13/16	1 9/16	1 13/16	1 13/16

Explosion-Proof/
Watertight
Shown in Outline

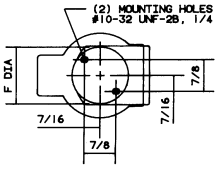




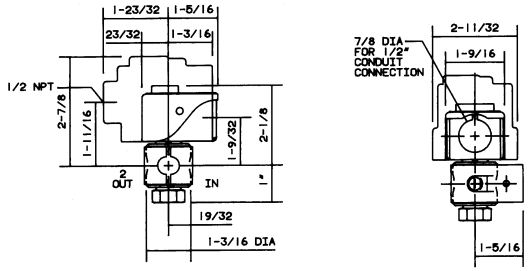
#2, 3, 9 Bottom

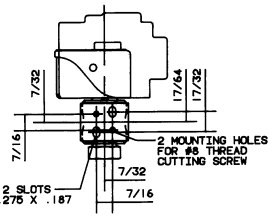


#1, 2, 3, 9, 11, 12, 13



#11, 12, 13 Bottom





#8

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass, 303 Stainless Steel, 316 Stainless Steel as listed
- Seals-NBR
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies), Silver (Stainless Steel Bodies)
- Plunger Rod & Plate-303 Stainless Steel

Compatible Fluids

- Gases, Fluid, Light Oils and other clean flowing media compatible with brass or stainless steel

Electrical Characteristics

Voltages

- DC, 12, 24, other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified. For details, consult factory.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 200°F max.
- DC Voltages: 180°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- Low Pressure Series 20 should be mounted vertical and upright. See mounting dimensions (nominal) shown here.

Applications

- Used in a variety of applications including: Low Pressure Systems (gases, fluids, light oils), Vacuum Systems 760-25 Torr (29" Mercury)-(molding, collating, material transfer).

DIRECT ACTING BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential						Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
					Min.	Max. (MOPD)									
						Air, Inert Gas		Water		Light Oil 300SSU					
	inch	mm	Cv	Kv	(PSI/Bar)	(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C		
3/8	5/16	7.94	1.10	0.95	0	15	1.03	12	0.83	-	-	180	82	6.0	14	06F20C2120AAF
3/8	5/16	7.94	1.10	0.95	0	20	1.38	20	1.38	-	-	180	82	11.0	15	06F20C2120ACF
1/2	7/16	11.11	2.80	2.41	0	4	0.28	6	0.41	-	-	180	82	6.0	16	08F20C2128AAF
1/2	7/16	11.11	2.80	2.41	0	15	1.03	15	1.03	-	-	200	93	16.0	17	08F20C2128ADF
3/4	3/4	19.05	5.00	4.31	0	4	0.28	4	0.28	-	-	180	82	16.0	18	12F20C2148ADF

These are high flow, direct acting, low pressure valves. Please verify system pressure before installing.

DIRECT ACTING BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential						Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
					Min.	Max. (MOPD)									
						Air, Inert Gas		Water		Light Oil 300SSU					
	inch	mm	Cv	Kv	(PSI/Bar)	(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C		
3/8	5/16	7.94	1.10	0.95	0	15	1.03	15	1.03	-	-	200	93	16.0	19	06F20O2120ADF
1/2	7/16	11.11	2.20	1.90	0	15	1.03	15	1.03	-	-	200	93	16.0	20	08F20O2128ADF
3/4	3/4	19.05	5.50	4.74	0	2	0.14	2	0.14	-	-	180	82	11.0	21	12F20O2148ACF

DIRECT ACTING STAINLESS STEEL VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential						Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
					Min.	Max. (MOPD)									
						Air, Inert Gas		Water		Light Oil 300SSU					
	inch	mm	Cv	Kv	(PSI/Bar)	(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C		
3/8	5/16	7.94	1.10	0.95	0	20	1.38	20	1.38	-	-	180	82	11.0	15	06F20C6120ACF
1/2	7/16	11.11	2.80	2.41	0	15	1.03	15	1.03	-	-	200	93	16.0	17	08F20C6128ADF
3/4	3/4	19.05	6.00	5.17	0	4	0.28	4	0.28	-	-	180	82	16.0	18	12F20C6148ADF

Important: For proper operation, do not exceed maximum rated pressure.

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

DIRECT ACTING BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
3/8	5/16	7.94	1.10	0.95	0	3	0.21	3	0.21	-	-	120	49	9.5	14	06F20C2120A1F
3/8	5/16	7.94	1.10	0.95	0	9	0.62	9	0.62	-	-	120	49	11.5	15	06F20C2120A3F
1/2	7/16	11.11	2.80	2.41	0	3	0.21	3	0.21	-	-	180	82	11.5	17	08F20C2128A3F

DIRECT ACTING BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

DC VALVE SPECIFICATIONS

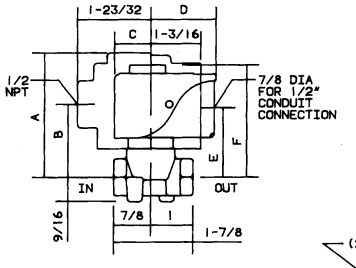
NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
3/8	5/16	7.94	1.10	0.95	0	5	0.34	3	0.21	-	-	180	82	11.5	19	06F20O2120A3F
1/2	7/16	11.11	2.20	1.90	0	1.5	0.10	1	0.07	-	-	180	82	11.5	20	08F20O2128A3F

DIRECT ACTING STAINLESS STEEL VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

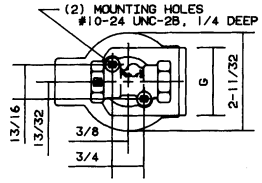
NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
3/8	5/16	7.94	1.10	0.95	0	3.0	0.21	3.0	0.21	-	-	150	66	11.5	15	06F20C6120A3F
1/2	7/16	11.11	2.8	2.41	0	3	0.21	3	0.21	-	-	180	82	11.5	17	08F20C6128A3F

DRAWINGS

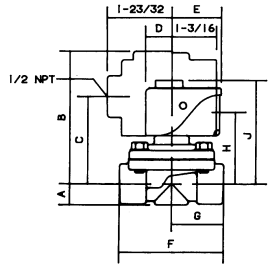


	Drawing 14	Drawing 15	Drawing 19
A	3 5/16	2 15/16	2 15/16
B	2 3/32	1 23/32	1 23/32
C	23/32	7/8	7/8
D	1 5/16	1 17/32	1 17/32
E	1 19/32	1 21/32	1 1/2
F	2 7/16	2 21/32	2 21/32
G	1 9/16	1 13/16	1 13/16

Explosion-Proof/ Watertight Shown in Outline

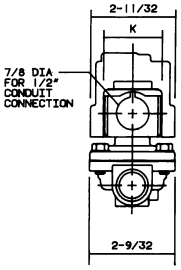


#14, 15, 19



	Drawing 16	Drawing 17	Drawing 18	Drawing 20	Drawing 21
A	9/16	9/16	11/16	9/16	11/16
B	3 9/16	3 9/16	3 21/32	3 9/16	3 21/32
C	2 11/32	2 11/32	2 7/16	2 11/32	2 7/16
D	23/32	7/8	7/8	7/8	7/8
E	1 5/16	1 17/32	1 17/32	1 17/32	1 17/32
F	2 13/16	2 13/16	2 29/32	2 13/16	2 29/32
G	1 13/32	1 13/32	1 15/32	1 13/32	1 15/32
H	1 15/16	2 1/4	2 11/32	2 1/8	2 7/32
J	2 25/32	3 9/32	3 3/8	3 9/32	3 3/8
K	1 9/16	1 13/16	1 13/16	1 13/16	1 13/16

Explosion-Proof/ Watertight Shown in Outline



#16, 17, 18, 20, 21

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass, Bronze, 316 Stainless Steel as listed
- Seals-NBR
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper(Brass Bodies), Silver(Stainless Steel Bodies)
- Disc Holder (Normally Open Valves)-Ryton
- Retaining Ring (Series 26)-PH15-7 Stainless Steel

Compatible Fluids

- Gases, Fluid, Light Oils and other clean flowing media compatible with brass or stainless steel

Electrical Characteristics

Voltages

- DC-12, 24 (other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified. For details, consult factory.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 180°F max.
- DC Voltages: 180°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- Valves should be mounted vertical and upright. See mounting dimensions (nominal) shown here.

Applications

- Used in a variety of applications including: Automated Systems, Dispensing Systems, Instrumentation, Welding Equipment, Restaurant Equipment, Food Processing Machinery, Water Treatment Systems and Laundry Equipment.

BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential								Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)										
					Min.		Air, Inert Gas		Water		Light Oil 300SSU						
	inch	mm	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/BAR)		(PSI/BAR)		°F	°C			
3/8	5/8	15.88	3.00	2.59	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	23	06F23C2140ACF
3/8	5/8	15.88	3.00	2.59	5	0.34	200	13.79	135	9.31	135	9.31	180	82	6.0	22	06F22C2140AAF
3/8	5/8	15.88	3.00	2.59	5	0.34	300	20.69	300	20.69	300	20.69	175	79	16.0	23	06F22C2140ADF
1/2	5/8	15.88	4.00	3.45	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	23	08F23C2140ACF
1/2	5/8	15.88	4.00	3.45	5	0.34	200	13.79	135	9.31	135	9.31	180	82	6.0	22	08F22C2140AAF
1/2	5/8	15.88	4.00	3.45	5	0.34	300	20.69	300	20.69	300	20.69	175	79	16.0	23	08F22C2140ADF
3/4	3/4	19.05	5.00	4.31	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	25	12F23C2148ACF
3/4	3/4	19.05	5.00	4.31	5	0.34	200	13.79	135	9.31	135	9.31	180	82	6.0	24	12F22C2148AAF
3/4	3/4	19.05	6.50	5.60	5	0.34	250	17.24	150	10.34	100	6.90	180	82	6.0	26	12F24C2148AAF
1	1	25.40	13.00	11.21	5	0.34	150	10.34	150	10.34	100	6.90	180	82	6.0	28	16F24C2164AAF
1 1/4	1 1/8	28.58	15.00	12.93	5	0.34	150	10.34	125	8.62	100	6.90	180	82	6.0	30	20F24C2172AAF
1 1/2	1 1/4	31.75	22.5	19.40	5	0.34	150	10.34	125	8.62	100	6.90	180	82	6.0	32	24F24C2180AAF
3	3	76.20	100.00	86.00	10	0.68	200	13.80	200	13.80	175	12.10	180	82	11.0	2A	48F28C9199ACF

BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential								Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)										
					Min.		Air, Inert Gas		Water		Light Oil 300SSU						
	inch	mm	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C			
3/8	5/8		3.00	2.59	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	34	06F23O2140ACF
1/2	5/8		4.00	3.45	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	34	08F23O2140ACF
3/4	3/4		5.50	4.74	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	35	12F23O2148ACF
3/4	3/4		6.50	5.60	5	0.34	250	17.24	200	13.79	200	13.79	180	82	11.0	36	12F24O2148ACF
1	1		13.00	11.21	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.0	37	16F24O2164ACF
1 1/4	1 1/8		15.00	12.93	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.0	38	20F24O2172ACF
1 1/2	1 1/4		22.50	19.40	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.0	39	24F24O2180ACF
3	3		100.00	86.00	10	0.68	125	8.62	125	8.62	125	8.62	180	82	11.0	2A	48F28O9199ACF

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
3/8	5/8	15.88	3.00	2.59	0	0.00	40	2.76	40	2.76	-		150	66	11.5	23	06F23C2140A3F
3/8	5/8	15.88	3.00	2.59	5	0.34	125	8.62	100	6.90	100	6.90	150	66	11.5	23	06F22C2140A3F
1/2	5/8	15.88	4.00	3.45	5	0.34	125	8.62	100	6.90	100	6.90	150	66	11.5	23	08F22C2140A3F
1/2	5/8	15.88	4.00	3.45	0	0.00	40	2.76	40	2.76	-	-	150	66	11.5	23	08F23C2140A3F
3/4	3/4	19.05	5.00	4.31	0	0.00	40	2.76	40	2.76	-	-	150	66	11.5	25	12F23C2148A3F
3/4	3/4	19.05	5.00	4.31	5	0.34	100	6.90	90	6.21	75	5.17	150	66	11.5	27	12F24C2148A3F
3/4	3/4	19.05	6.50	5.60	5	0.34	125	8.62	125	8.62	125	8.62	150	66	11.5	27	12F24C2148A3F
1	1	25.40	13.00	11.21	5	0.34	125	8.62	125	8.62	125	8.62	150	66	11.5	29	16F24C2164A3F
1 1/4	1 1/8	28.58	15.00	12.93	5	0.34	125	8.62	125	8.62	125	8.62	150	66	11.5	31	20F24C2172A3F
1 1/2	1 1/4	31.75	22.50	19.40	5	0.34	125	8.62	125	8.62	125	8.62	150	66	11.5	33	24F24C2180A3F
3	3	76.20	100.00	86.00	10	0.68	190	13.10	190	13.10	170	11.70	150	66	11.5	42	48F28C9199A3F

BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/2	5/8	15.88	4.00	3.45	0	0.00	125	8.62	125	8.62	80	5.52	150	66	11.5	34	08F23O2140A3F
3/4	3/4	19.05	5.50	4.74	0	0.00	125	8.62	125	8.62	80	5.52	150	66	11.5	35	12F23O2148A3F
3/4	3/4	19.05	6.5	5.60	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.5	36	12F24O2148A3F
1	1	25.40	13.00	11.21	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.5	37	16F24O2164A3F
1 1/4	1/8	28.58	15.00	12.93	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.5	38	20F24O2172A3F
1 1/2	1 1/4	31.75	22.5	19.40	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.5	39	24F24O2180A3F
3	3	76.20	100.00	86.00	10	0.68	125	8.62	125	8.62	125	8.62	150	66	11.0	42	48F28O9199A3F

STAINLESS STEEL VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
3/8	5/8	15.88	3.00	2.59	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	23	06F23C6140ACF
3/8	5/8	15.88	3.00	2.59	5	0.34	300	20.69	300	20.69	300	20.69	175	79	16.0	23	06F22C6140ADF
1/2	5/8	15.88	4.00	3.45	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	23	08F23C6140ACF
1/2	5/8	15.88	4.00	3.45	5	0.34	300	20.69	300	20.69	300	20.69	175	79	16.0	23	08F22C6140ADF
3/4	3/4	19.05	5.00	4.31	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	25	12F23C6148ACF
3/4	3/4	19.05	5.00	4.31	5	0.34	300	20.69	300	20.69	300	20.69	175	79	16	25	12F22C6148ADF
1	1	25.40	13.00	11.21	5	0.34	150	10.34	125	8.62	100	6.90	180	82	6.0	28	16F24C6164AAF
1 1/2	1 1/4	31.75	22.50	19.40	5	0.34	150	10.34	125	8.62	100	6.90	180	82	6.0	32	24F24C6180AAF

STAINLESS STEEL VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
3/8	5/8	15.88	3.00	2.59	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	34	06F23O6140ACF
1/2	1/2	12.70	4.00	3.45	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	34	08F23O6140ACF
3/4	3/4	19.05	5.00	4.31	0	0.00	150	10.34	150	10.34	150	10.34	180	82	11.0	35	12F23O6148ACF
1	1	25.40	13.00	11.21	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.0	37	16F24O6164ACF
1 1/2	1 1/4	31.75	22.50	19.40	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.0	39	24F24O6180ACF

STAINLESS STEEL VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

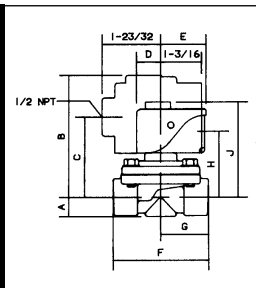
NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
3/8	5/8	15.88	3.00	2.59	0	0.00	40	2.76	40	2.76	-	-	150	66	11.5	23	06F23C6140A3F
3/8	5/8	15.88	3.00	2.59	5	0.34	125	8.62	100	6.90	100	6.90	150	66	11.5	23	06F22C6140A3F
1/2	5/8	15.88	4.00	3.45	0	0.00	40	2.76	40	2.76	-	-	150	66	11.5	23	08F23C6140A3F
1/2	5/8	15.88	4.00	3.45	5	0.34	125	8.62	100	6.90	100	6.90	150	66	11.5	23	08F22C6140A3F
3/4	3/4	19.05	5.00	4.31	0	0.00	40	2.76	40	2.76	-	-	150	66	11.5	25	12F23C6148A3F
3/4	3/4	19.05	5.00	4.31	5	0.34	100	8.62	90	6.90	75	6.90	150	66	11.5	25	12F22C6148A3F
1	1	25.40	13.00	11.21	5	0.34	125	8.62	125	8.62	125	8.62	150	66	11.5	29	16F24C6164A3F
1 1/2	1 1/4	31.75	22.50	19.40	5	0.34	125	8.62	125	8.62	125	8.62	150	66	11.5	33	24F24C6180A3F

STAINLESS STEEL VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

DC VALVE SPECIFICATIONS

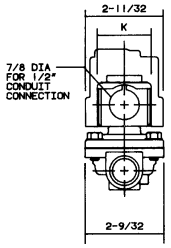
NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
3/8	5/8	15.88	3.00	2.59	0	0.00	125	8.62	125	8.62	80	5.52	150	66	11.5	34	06F23O6140A3F
1/2	5/8	15.88	4.00	3.45	0	0.00	125	8.62	125	8.62	80	5.52	150	66	11.5	34	08F23O6140A3F
3/4	3/4	19.05	5.00	4.31	0	0.00	125	8.62	125	8.62	80	5.52	150	66	11.5	35	12F23O6148A3F
1	1	25.40	13.00	11.21	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.5	37	16F24O6164A3F
1 1/2	1 1/4	31.75	22.5	19.40	5	0.34	125	8.62	125	8.62	125	8.62	180	82	11.5	39	24F24O6180A3F

DRAWINGS

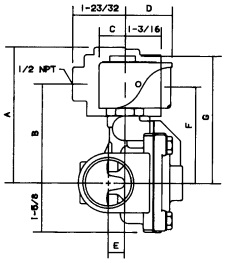


	Drawing 22	Drawing 23	Drawing 24	Drawing 25	Drawing 34	Drawing 35
A	9/16	9/16	11/16	11/16	9/16	11/16
B	3 9/16	3 9/16	3 21/32	3 21/32	3 9/16	3 21/32
C	2 11/32	2 11/32	2 7/16	2 7/16	2 11/32	2 7/16
D	23/32	7/8	23/32	7/8	7/8	7/8
E	1 5/16	1 17/32	1 5/16	1 17/32	1 17/32	1 17/32
F	2 13/16	2 13/16	2 29/32	2 29/32	2 13/16	2 29/32
G	1 13/32	1 13/32	1 15/32	1 15/32	1 13/32	1 15/32
H	1 15/16	2 1/4	2	2 11/32	2 1/8	2 7/32
J	2 25/32	3 9/32	2 7/8	3 3/8	3 9/32	3 3/8
K	1 9/16	1 13/16	1 9/16	1 13/16	1 13/16	1 13/16

Explosion-Proof/Watertight
Shown in Outline

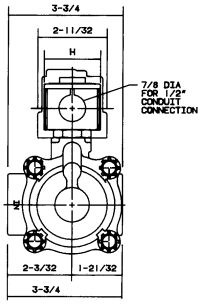


#22, 23, 24, 25, 34, 35



	Drawing 28	Drawing 29	Drawing 30	Drawing 31	Drawing 37	Drawing 38
A	4 3/4	4 15/32	4 3/4	4 15/32	4 31/32	4 21/32
B	3 17/32	3 1/4	3 17/32	3 1/4	3 23/32	3 7/16
C	23/32	7/8	23/32	7/8	23/32	7/8
D	1 5/16	1 17/32	1 5/16	1 17/32	1 5/16	1 17/32
E	15/32	15/32	17/32	17/32	3 5/16	3 17/32
F	3 1/8	3 9/32	3 1/8	3 9/32	4 5/32	4 3/8
G	3 31/32	4 3/16	3 31/32	4 3/16	1 9/16	1 13/16
H	1 9/16	1 13/16	1 9/16	1 13/16		

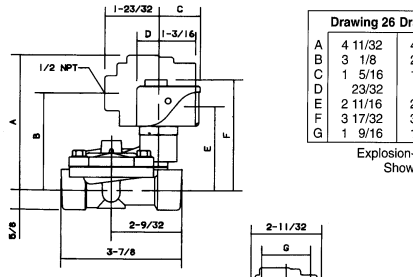
Explosion-Proof/Watertight
Shown in Outline



#28, 29, 30, 31, 37, 38

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

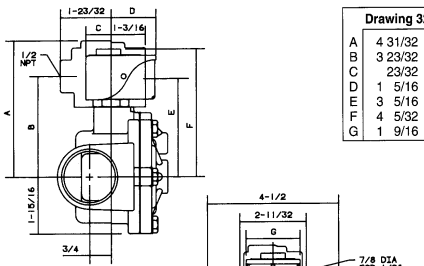
DRAWINGS



	Drawing 26	Drawing 27	Drawing 36
A	4 11/32	4 1/32	4 1/32
B	3 1/8	2 13/16	2 13/16
C	1 5/16	1 17/32	1 17/32
D	23/32	7/8	7/8
E	2 11/16	2 29/32	2 3/4
F	3 17/32	3 3/4	3 3/4
G	1 9/16	1 13/16	1 13/16

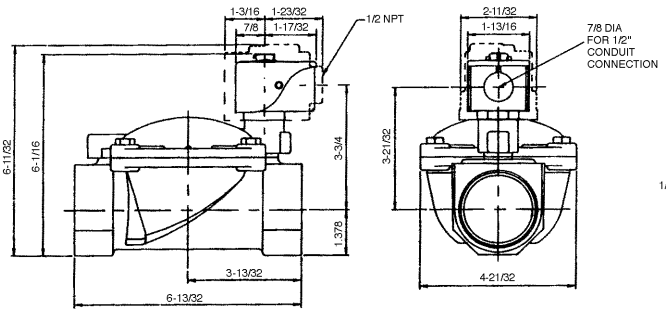
Explosion-Proof/Watertight Shown in Outline

#26, 27, 28



	Drawing 32	Drawing 33	Drawing 39
A	4 31/32	4 21/32	4 21/32
B	3 23/32	3 7/16	3 7/16
C	23/32	7/8	7/8
D	1 5/16	1 17/32	1 17/32
E	3 5/16	3 17/32	3 3/8
F	4 5/32	4 3/8	4 3/8
G	1 9/16	1 13/16	1 13/16

#32, 33, 39



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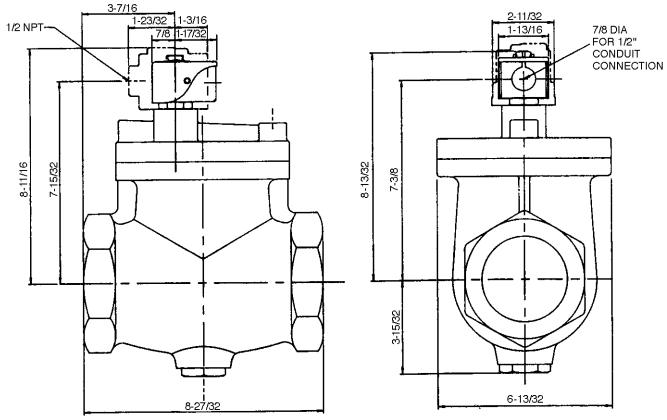


#42

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass, 316 Stainless Steel as listed
- Seals-NBR
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies), Silver (Stainless Steel Bodies)
- Disc Holder (Normally Open Valves)-Ryton
- Pilot Seats-Nickel Plated Brass
- Wire Screen-Brass or Stainless Steel

Compatible Fluids

- Gases, Fluid, Light Oils and other clean flowing media compatible with brass or stainless steel

Electrical Characteristics

Voltages

- DC-12, 24 (other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified. For details, consult factory.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 180°F max.
- DC Voltages: 180°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- Valves should be mounted vertical and upright. See mounting dimensions (nominal) shown here.

Applications

- Used in a variety of applications including: Automated Systems, Dispensing Systems, Instrumentation, Welding Equipment, Food Processing Machinery, Water Treatment Systems and Laundry Equipment.

BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential								Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)										
					Min.		Air, Inert Gas		Water		Light Oil 300SSU						
	inch	mm	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C			
1/4	11/32	8.73	1.20	1.03	5	0.34	300	20.69	300	20.69	300	20.69	180	82	6.0	46	04F25C2122CAF
3/8	11/32	8.73	1.20	1.03	5	0.34	300	20.69	300	20.69	300	20.69	180	82	6.0	47	06F25C2122CAF
1/2	1/2	12.70	3.60	3.10	0	0.00	200	13.79	200	13.79	200	13.79	180	82	11.0	48	08FH5C2132ACF
3/4	3/4	19.05	7.40	6.38	0	0.00	200	13.79	200	13.79	200	13.79	180	82	11.0	49	12FH5C2148ACF
1	1	25.40	12.2	10.52	1	0.07	300	20.69	300	20.69	300	20.69	180	82	11.0	50	16F25C2164ACF

BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential								Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)										
					Min.		Air, Inert Gas		Water		Light Oil 300SSU						
	inch	mm	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C			
1/4	11/32	8.73	1.20	1.03	5	0.34	300	20.69	300	20.69	300	20.69	180	82	11.0	51	04F25O2122CCF
3/8	11/32	8.73	1.20	1.03	5	0.34	300	20.69	300	20.69	300	20.69	180	82	11.0	52	06F25O2122CCF
3/8	1/2	12.70	3.0	2.59	1	0.07	200	13.79	175	12.07	175	12.07	180	82	11.0	53	06F25O2132ACF
1/2	1/2	12.70	3.60	3.10	1	0.07	200	13.79	175	12.07	175	12.07	180	82	11.0	53	08F25O2132ACF
3/4	3/4	19.05	7.40	6.38	1	0.07	275	18.97	275	18.97	275	18.97	180	82	11.0	54	12F25O2148ACF
1	1	25.40	12.2	10.52	1	0.07	300	20.69	250	17.24	230	15.86	180	82	11.0	55	16F25O2164ACF

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/4	11/32	8.73	1.20	1.03	5	0.34	275	18.97	275	18.97	275	18.97	150	66	11.5	56	04F25C2122C3F
3/8	11/32	8.73	1.20	1.03	5	0.34	275	18.97	275	18.97	275	18.97	150	66	11.5	57	06F25C2122C3F
3/8	1/2	12.70	3.00	2.59	1	0.07	130	8.97	130	8.97	130	8.97	180	82	11.5	48	06F25C2132A3F
1/2	1/2	12.70	3.60	3.10	1	0.07	130	8.97	130	8.97	130	8.97	180	82	11.5	48	08F25C2132A3F
3/4	3/4	19.05	7.40	6.38	1	0.07	70	4.83	70	4.83	70	4.83	150	66	11.5	49	12F25C2148A3F
1	1	25.40	12.20	10.52	1	0.07	275	18.97	275	18.97	275	18.97	180	82	11.5	50	16F25C2164A3F

BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

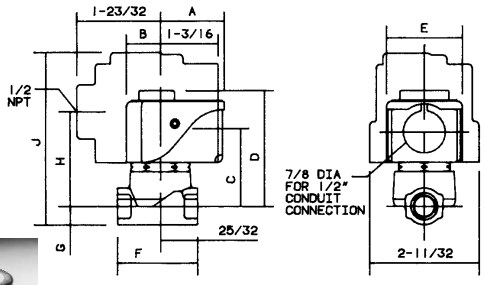
DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/4	11/32	8.73	1.20	1.03	5	0.34	160	11.03	160	11.03	160	11.03	150	66	11.5	51	04F25O2122C3F
1/2	1/2	12.70	3.60	3.10	1	0.07	200	13.79	175	12.07	175	12.07	180	82	11.5	53	08F25O2132A3F
3/4	3/4	19.05	7.40	6.38	1	0.07	230	15.86	200	13.79	200	13.79	150	66	11.5	54	12F25O2148A3F
1	1	25.40	12.20	10.52	1	0.07	200	13.79	150	10.34	125	8.62	180	82	11.5	55	16F25O2164A3F

STAINLESS STEEL VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

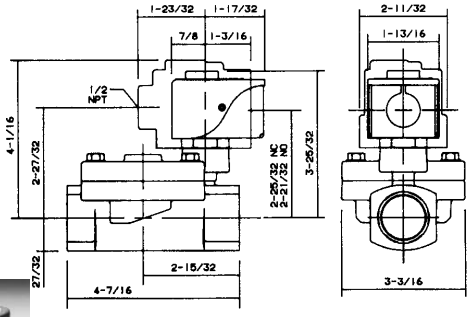
NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/4	11/32	8.73	1.20	1.03	5	0.34	300	20.69	300	20.69	300	20.69	180	82	6.0	46A	04F25C6122CAF



#46, 46A, 47, 51, 52, 56, 57

	46	46A	47	51	52	56	57
A	1 5/16	1 5/16	1 5/16	1 17/32	1 17/32	1 17/32	1 17/32
B	23/32	23/32	23/32	7/8	7/8	7/8	7/8
C	1 9/16	1 17/32	1 5/8	1 25/32	1 27/32	1 15/16	2
D	2 7/16	2 13/32	2 1/2	2 7/8	2 15/16	2 7/8	2 15/16
E	1 9/16	1 9/16	1 9/16	1 13/16	1 13/16	1 13/16	1 13/16
F	1 3/4	1 7/8	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4
G	3/8	9/16	7/16	3/8	7/16	3/8	7/16
H	1 31/32	1 15/16	2 1/32	1 31/32	2 1/32	1 31/32	2 1/32
J	3 9/16	3 17/32	3 5/8	3 9/16	3 5/8	3 9/16	3 5/8
K	1 3/16	1	13/16	13/16	13/16	13/16	13/16

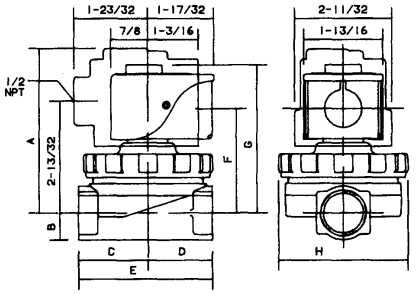
Explosion-Proof/Watertight Shown in Outline



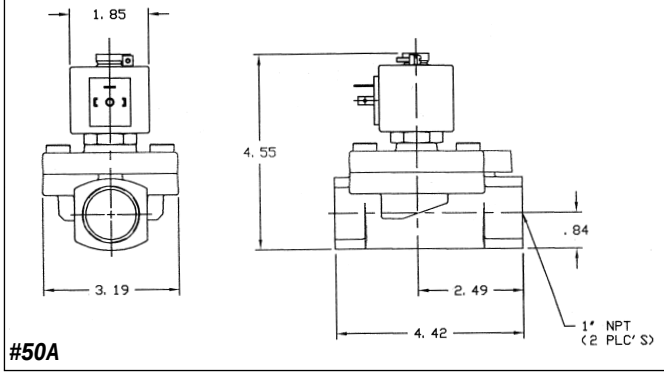
#50, 55

	Drawing 48	Drawing 49	Drawing 53	Drawing 54
A	3 5/8	3 21/32	3 5/8	3 21/32
B	1/2	5/8	1/2	5/8
C	1 5/16	1 5/8	1 5/16	1 5/8
D	1 1/8	1 1/2	1 1/8	1 1/2
E	2 7/16	3 1/8	2 7/16	3 1/8
F	2 5/16	2 11/32	2 7/32	2 1/4
G	3 5/16	3 15/32	3 5/16	3 15/32
H	2 1/4	3 1/2	2 1/4	2 29/32

Explosion-Proof/Watertight
Shown in Outline



#48, 49, 53, 54



#50A

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

GOLD RING Series S,

Two-Way
Hot Water and Steam Valves

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass, 303 Stainless Steel as listed
- Seals-Ethylene Propylene or PTFE and FKM
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies), Silver (Stainless Steel Bodies)
- Disc Holder (Normally Open Valves)- 50 psi Steam: Ryton, 125 psi Steam: 303 Stainless Steel
- Pilot Seats-Nickel Plated Brass

Compatible Fluids

- Ideal for the control of hot water and steam

Electrical Characteristics

Voltages

- DC12, 24(other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60, 440/480-50/60

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified. For details, consult factory.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 353°F max.
- DC Voltages: 150°F max.
- Ambient: 32-77°F (standard)
- For temperature variations consult the factory.

Installation

- Valves should be mounted vertical and upright. See mounting dimensions (nominal) shown here.

Applications

- Used in a variety of applications including: Dry Cleaning, Steam Irons, Steam Baths, Autoclaves, Molding, Steam Atomization, Sterilizers and Laundry Equipment.
- Series S0 Valves are direct acting valves; Series S4 and Series S5 are offset or center pilot valves; Series S3 valves are hung diaphragm with integral seats.

BRASS HOT WATER AND STEAM VALVES– NORMALLY CLOSED (ENERGIZE TO OPEN), ETHYLENE PROPYLENE OR PTFE SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential						Notes	Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)									
					Min.		Steam		Hot Water							
	inch	mm	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)			°F	°C			
1/4	5/32	3.97	.52	0.45	0	0.00	11	0.76	-	-	1	344	173	11.0	56	04FS0C3410ACH
3/8	1/2	12.70	3.00	2.59	1	0.07	50	3.45	-	-	2,4	300	149	11.0	57	06FS5C2332ACF
3/8	1/2	12.70	3.00	2.59	1	0.07	80	5.52	-	-	3	320	160	11.0	57	06FS5C2432ACF
3/8	1/2	12.70	3.00	2.59	1	0.07	125	8.62	-	-	3	353	178	11.0	57	06FS5C2432ACH
3/8	5/8	15.88	3.00	2.59	0	0.00	50	3.45	150	10.34	4	300	149	11.0	58	06FS3C2340ACF
1/2	1/2	12.70	3.60	3.10	1	0.07	50	3.45	-	-	2,4	300	149	11.0	57	08FS5C2332ACF
1/2	1/2	12.70	3.60	3.10	1	0.07	80	5.52	-	-	3	320	160	11.0	57	08FS5C2432ACF
1/2	1/2	12.70	3.60	3.10	1	0.07	125	8.62	-	-	3	353	178	11.0	57	08FS5C2432ACH
1/2	5/8	15.88	4.00	3.45	0	0.00	50	3.45	150	10.34	4	300	149	11.0	58	08FS3C2340ACF
3/4	3/4	19.05	7.40	6.38	1	0.07	50	3.45	-	-	2,4	300	149	11.0	59	12FS5C2348ACF
3/4	3/4	19.05	7.40	6.38	1	0.07	80	5.52	-	-	3	320	160	11.0	59	12FS5C2448ACF
3/4	3/4	19.05	7.40	6.38	1	0.07	125	8.62	-	-	3	353	178	11.0	59	12FS5C2448ACH
3/4	3/4	19.05	5.00	4.31	0	0.00	50	3.45	150	10.34	4	300	149	11.0	60	12FS3C2348ACF
1	1	25.40	12.20	10.52	1	0.07	50	3.45	150	10.34	4	300	149	11.0	61	16FS5C2364ACF
1	1	25.40	12.20	10.52	1	0.07	80	5.52	-	-	3	320	160	11.0	61	16FS5C2464ACF
1	1	25.40	12.20	10.52	1	0.07	125	8.62	-	-	3	353	178	11.0	61	16FS5C2464ACH
1 1/4	1 1/8	28.58	15.00	12.93	5	0.34	50	3.45	150	10.34	4	300	149	6.0	62	20FS4C2372AAF
1 1/2	1 1/2	38.10	22.50	19.40	5	0.34	50	3.45	150	10.34	4	300	149	6.0	63	24FS4C2380AAF

BRASS STEAM VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), ETHYLENE PROPYLENE OR PTFE SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Steam (PSI/BAR)		Max. (MOPD) Hot Water (PSI/Bar)		Notes	Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
3/8	1/2	12.70	3.00	2.59	1	0.07	125	8.62	-	-	3	353	178	11.0	64	06FS5O2432ACH
1/2	1/2	12.70	3.60	3.10	1	0.07	125	8.62	-	-	3	353	178	11.0	64	08FS5O2432ACH
3/4	3/4	19.05	7.40	6.38	1	0.07	125	8.62	-	-	3	353	178	11.0	65	12FS5O2448ACH
1	1	25.40	12.20	10.52	1	0.07	125	8.62	-	-	3	353	178	11.0	66	16FS5O2464ACH
1 1/2	1 1/2	38.10	22.50	19.40	5	0.34	50	3.45	-	-	4	300	149	11.0	67	24FS4O2380ACF

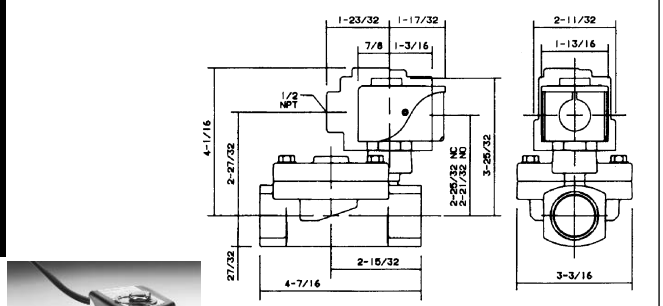
1. Valve contains stainless steel valve body.
2. Valve contains stainless steel seat and ethylene propylene elastomers.
3. Valve contains stainless steel seat and PTFE elastomers.
4. Valves with ethylene propylene elastomers are limited to 50 psi and 300°F (149°C). Do not use on higher pressure steam with pressure reducing valve, since this may result in super heated steam.

BRASS HOT WATER VALVES – NORMALLY CLOSED (FOR NORMALLY OPEN CONSULT FACTORY), ETHYLENE PROPYLENE SEALS

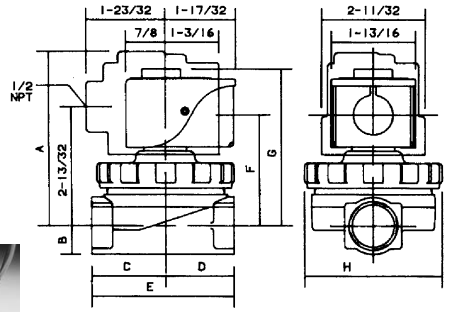
DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Steam (PSI/BAR)		Max. (MOPD) Hot Water (PSI/Bar)		Notes	Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
3/8	5/8	15.88	3.00	2.59	5	0.34	-	-	100	6.90	-	150	66	11.5	58	06F22C2340A3F
3/8	5/8	15.88	3.00	2.59	0	0.00	-	-	40	2.76	-	150	66	11.5	58	06F23C2340A3F
1/2	5/8	15.88	4.00	3.45	5	0.34	-	-	100	6.90	-	150	66	11.5	58	08F22C2340A3F
1/2	5/8	15.88	4.00	3.45	0	0.00	-	-	40	2.76	-	150	66	11.5	58	08F23C2340A3F
3/4	3/4	19.05	5.00	4.31	5	0.34	-	-	100	6.90	-	150	66	11.5	60	12F22C2348A3F
3/4	3/4	19.05	5.00	4.31	0	0.00	-	-	40	2.76	-	150	66	11.5	60	12F23C2348A3F

DRAWINGS



#61, 66



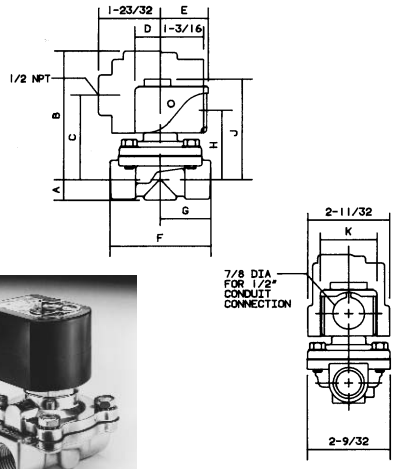
#57, 59, 64, 65

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

Series S,

Two-Way
Hot Water and Steam Valves

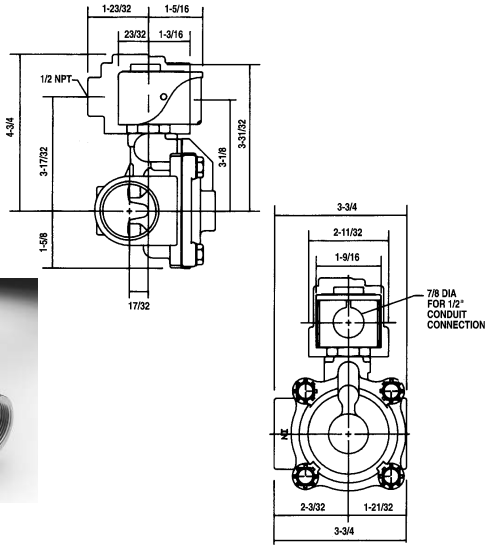
DRAWINGS



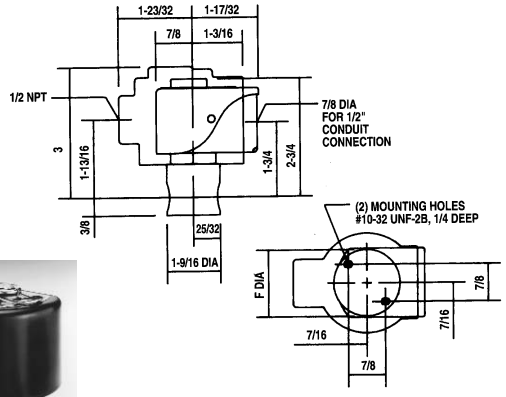
	Drawing 58	Drawing 60
A	9/16	11/16
B	3 9/16	3 21/32
C	2 11/32	2 7/16
D	7/8	7/8
E	1 17/32	1 17/32
F	2 13/16	2 29/32
G	1 13/32	1 15/32
H	2 1/4	2 11/32
J	3 9/32	3 3/8
K	1 13/16	1 13/16

Explosion-Proof/Watertight
Shown in Outline

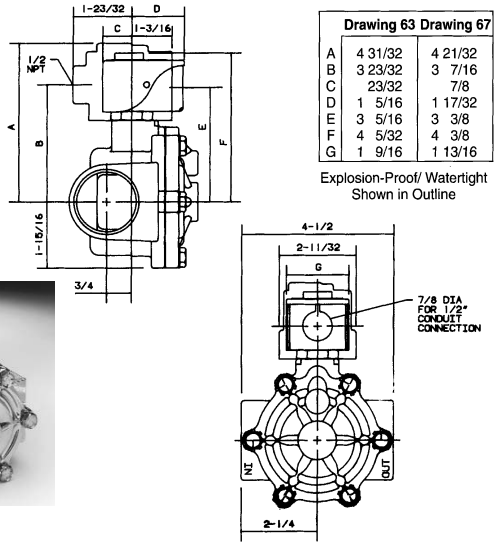
#58, 60



#62



#56



	Drawing 63	Drawing 67
A	4 31/32	4 21/32
B	3 23/32	3 7/16
C	23/32	7/8
D	1 5/16	1 17/32
E	3 5/16	3 3/8
F	4 5/32	4 3/8
G	1 9/16	1 13/16

Explosion-Proof/ Watertight
Shown in Outline

#63, 67

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass
- Seals-NBR and Urethane
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies)
- Piston-Delrin
- Piston Rings-Teflon

Compatible Fluids

- Generally installed where high pressure and large flow requirements dictate the use of piston valves

Electrical Characteristics

Voltages

- DC-12, 24 (other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 200°F max.
- DC Voltages: 150°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- Valves should be mounted vertical and upright. See mounting dimensions (nominal) shown here. For certified dimensions, consult factory.

Applications

- Used in a variety of applications including: Blow Molding, Compressors, Car Washer Equipment, and Pumps.

HIGH PRESSURE BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential								Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)										
	inch	mm	Cv	Kv	Min. (PSI/Bar)		Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		°F	°C			
1/4	5/16	7.94	1.5	1.29	15	1.03	1500	103.45	1500	103.45	1500	103.45	200	93	11.0	69A	04F28C1D20ACF
3/8	5/16	7.94	1.5	1.29	15	1.03	1500	103.45	1500	103.45	1500	103.45	200	93	11.0	69B	06F28C1D20ACF
1/2	3/8	9.53	3.2	2.76	25	1.72	1500	103.45	1500	103.45	1500	103.45	200	93	11.0	69	08F28C1D24ACF
3/4	3/4	19.05	7.8	6.72	25	1.72	1000	68.97	1000	68.97	1000	68.97	200	93	11.0	70	12F28C1D48BCF

HIGH PRESSURE BRASS VALVES – NORMALLY OPEN (ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential								Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)										
	inch	mm	Cv	Kv	Min. (PSI/Bar)		Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		°F	°C			
1/2	3/8	9.53	3.2	2.76	25	1.72	1000	68.97	1000	68.97	1000	68.97	200	93	11.0	71	08F28O1D28ACF
3/4	3/4	19.05	7.8	6.72	25	1.72	500	34.48	500	34.48	500	34.48	200	93	11.0	72	12F28O1D48BCF

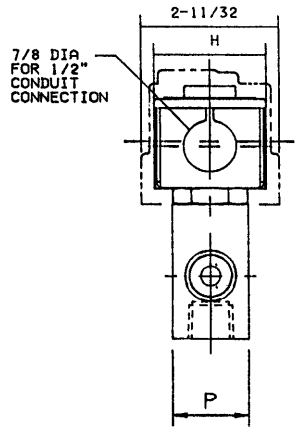
HIGH PRESSURE BRASS VALVES – NORMALLY CLOSED (ENERGIZE TO OPEN), NBR SEALS

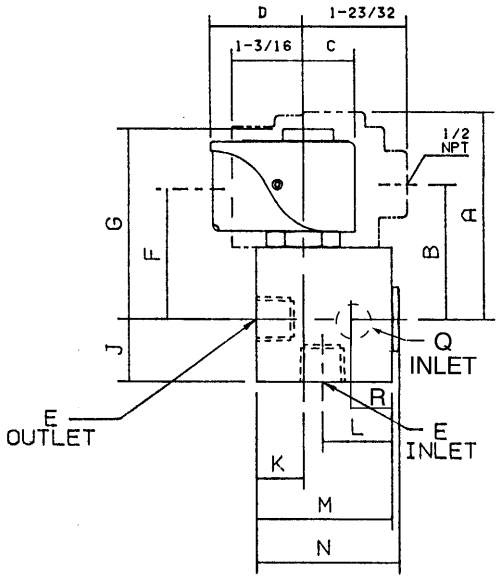
DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential								Max. Temp.		DC Watt	Const. Ref.	Valve Part Number
							Max. (MOPD)										
	inch	mm	Cv	Kv	Min. (PSI/Bar)		Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		°F	°C			
1/2	3/8	9.53	3.2	2.76	25	1.72	500	34.48	500	34.48	500	34.48	150	66	11.5	69	08F28C1D24A3F
3/4	3/4	19.05	7.8	6.72	25	1.72	450	31.03	450	31.03	450	31.03	150	66	11.5	70	12F28C1D48A3F

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

DRAWINGS





	Drawing 69	Drawing 69A	Drawing 69B	Drawing 70	Drawing 71	Drawing 72
A	3 29/64	3 1/32	3 1/32	3 27/32	3 29/64	3 27/32
B	2 1/4	1 57/64	1 57/64	2 41/64	2 1/4	2 41/64
C	7/8	7/8	7/8	7/8	7/8	7/8
D	1 17/32	1 17/32	1 17/32	1 17/32	1 17/32	1 17/32
E	1/2" NPT	----	----	3/4" NPT	1/2" NPT	3/4" NPT
F	2 11/64	1 13/16	1 13/16	2 9/16	2 1/32	2 13/32
G	3 3/16	2 3/4	2 3/4	3 37/64	3 3/16	3 37/64
H	1 13/16	1 13/16	1 13/16	1 13/16	1 13/16	1 13/16
J	1 3/64	11/16	11/16	1 13/32	1 3/64	1 13/32
K	25/32	13/16	13/16	29/32	25/32	29/32
L	63/64	----	----	2 11/32	63/64	2 11/32
M	2 1/4	2 1/4	2 1/4	3 35/64	2 1/4	3 35/64
N	2 3/8	2 13/32	2 13/32	3 47/64	2 3/8	3 47/64
P	1 1/4	1 1/2	1 1/2	2	1 1/4	2
Q	----	1/4" NPT	3/8" NPT	----	----	----
R	----	15/16	15/16	----	----	----

Explosion-Proof/Watertight
Shown in Outline

#69, 69A, 69B, 70, 71, 72

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

Three-Way Valve Contents

Small Three-Way Direct Acting Valves

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass or 303 Stainless Steel as listed
- Seals-NBR
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies), Silver (Stainless Steel Bodies)
- Disc Holder-Celcon

Electrical Characteristics

Voltages

- DC-12, 24 (other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 200°F max.
- DC Voltages: 150°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- Series 30 valves may be mounted in any position. Product and mounting dimensions shown are nominal. For certified dimensions, consult factory.

Applications

- Used in a variety of applications including: Automated Systems, Dispensing Systems, Instrumentation, Pilot Operators, Laundry Equipment, Sampling Systems, Compressors, Water Treatment, and Air Dryers.

Operating Specifications

- Normally Closed-energize to pressurize operating device. De-energized, operating device is exhausted.
- Normally Open-energize to exhaust operating device. De-energized, operating device is pressurized.
- Universal-Can be installed for either normally closed, or normally open operation. Universal mode of operation is also suitable for flow selection (pressure at port 2 and 3) or diversion (pressure at port 1).

DIRECT ACTING BRASS VALVES – NORMALLY CLOSED (PRESSURE AT 2, ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential							Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
					Min.	Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU						
	inch	mm	Cv	Kv	(PSI/Bar)	(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C			
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	180	82	6.0	73	02F30C1103AAF
1/8	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	180	82	6.0	73	02F30C1104AAF
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	180	82	6.0	73	02F30C1106AAF
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	180	82	6.0	73	02F30C1108AAF
1/4	1/16	1.59	.0	0.08	0	125	8.62	125	8.62	125	8.62	180	82	6.0	74	04F30C2104AAF
1/4	3/32	2.38	.12	0.10	0	150	10.34	150	10.34	150	10.34	200	93	11.0	75	04F30C2106ACF
1/4	1/8	3.18	.25	0.22	0	85	2.76	85	2.76	85	2.76	180	82	6.0	74	04F30C2108ACF
1/4	11/64	4.37	.35	0.30	0	45	2.07	45	2.07	45	2.07	180	82	10.2	74	04F30C2111ACF

DIRECT ACTING BRASS VALVES – NORMALLY OPEN (PRESSURE AT 3, ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential							Max. Temp.		AC Watt	Const. Ref.	Valve Part Number
					Min.	Max. (MOPD) Air, Inert Gas		Water		Light Oil 300SSU						
	inch	mm	Cv	Kv	(PSI/Bar)	(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C			
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	180	82	6.0	73	02F30O1103AAF
1/8	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	180	82	6.0	73	02F30O1104AAF
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	180	82	6.0	73	02F30O1106AAF
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	180	82	6.0	73	02F30O1108AAF
1/4	1/16	1.59	.09	0.08	0	235	16.21	250	17.24	250	17.24	200	93	16.0	75	04F30O2104ADF
1/4	3/32	2.38	.12	0.10	0	140	9.66	140	9.66	140	9.66	200	93	11.0	75	04F30O2106ACF
1/4	1/8	3.18	.25	0.22	0	70	4.83	70	4.83	70	4.83	200	93	11.0	75	04F30O2108ACF
1/4	11/64	4.37	.35	0.30	0	40	2.76	40	2.76	40	2.76	200	93	11.0	75	04F30O2111ACF

DIRECT ACTING BRASS VALVES – UNIVERSAL (PRESSURE AT ANY PORT), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	175	12.07	175	12.07	175	12.07	140	60	10.2	73	02F30U1103ABF
1/8	1/16	1.59	.09	0.08	0	100	6.90	100	6.90	100	6.90	180	82	10.2	73	02F30U1104ABF
1/8	3/32	2.38	.12	0.10	0	50	3.45	50	3.45	50	3.45	180	82	6.0	73	02F30U1106AAF
1/8	1/8	3.18	.21	0.18	0	30	2.07	30	2.07	30	2.07	180	82	10.2	73	02F30U1108ABF
1/4	1/16	1.59	.09	0.08	0	125	8.62	130	8.97	130	8.97	200	93	11.0	75	04F30U2104ACF
1/4	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	200	93	16.0	75	04F30U2106ADF
1/4	1/8	3.18	.25	0.22	0	50	3.45	50	3.45	50	3.45	200	93	16.0	75	04F30U2108ADF
1/4	11/64	4.37	.35	0.30	0	20	1.38	20	1.38	20	1.38	200	93	11.0	75	04F30U2111ACF

DIRECT ACTING BRASS VALVES – NORMALLY CLOSED (PRESSURE AT 2, ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	120	49	9.5	73	02F30C1103A1F
1/8	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	120	49	9.5	73	02F30C1104A1F
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	120	49	9.5	73	02F30C1106A1F
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	120	49	9.5	73	02F30C1108A1F
1/4	1/16	1.59	.09	0.08	0	160	11.03	160	11.03	160	11.03	150	66	11.5	75	04F30C2104A3F
1/4	3/32	2.38	12	10.34	0	115	7.93	115	7.93	115	7.93	150	66	11.5	75	04F30C2106A3F
1/4	1/8	3.18	.25	0.22	0	60	4.14	60	4.14	60	4.14	150	66	11.5	75	04F30C2108A3F
1/4	11/64	4.37	.35	0.30	0	25	1.72	25	1.72	25	1.72	150	66	11.5	75	04F30C2111A3F

DIRECT ACTING BRASS VALVES – NORMALLY OPEN (PRESSURE AT 3, ENERGIZE TO CLOSE), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	120	49	9.5	73	02F30O1103A1F
1/8	1/16	1.59	.09	0.08	0	200	13.79	200	13.79	200	13.79	120	49	9.5	73	02F30O1104A1F
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	120	49	9.5	73	02F30O1106A1F
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	120	49	9.5	73	02F30O1108A1F
1/4	1/16	1.59	.09	0.08	0	160	11.03	160	11.03	160	11.03	150	66	11.5	75	04F30O2140A3F
1/4	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	150	66	11.5	75	04F30O2106A3F
1/4	1/8	3.18	.12	0.10	0	55	3.79	55	3.79	55	3.79	150	66	11.5	75	04F30O2108A3F
1/4	11/64	4.37	.35	0.30	0	30	2.07	30	2.07	30	2.07	150	66	11.5	75	04F30O2111A3F

DIRECT ACTING BRASS VALVES – UNIVERSAL (PRESSURE AT ANY PORT), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	125	8.62	125	8.62	125	8.62	120	49	9.5	73	02F30U1103A1F
1/8	1/16	1.59	.09	0.08	0	65	4.48	65	4.48	65	4.48	120	49	9.5	73	02F30U1104A1F
1/8	3/32	2.38	.12	0.10	0	50	3.45	50	3.45	50	3.45	120	49	9.5	73	02F30U1106A1F
1/8	1/8	3.18	.21	0.18	0	20	1.38	20	1.38	20	1.38	120	49	9.5	73	02F30U1108A1F
1/4	1/16	1.59	.09	0.08	0	75	5.17	75	5.17	75	5.17	150	66	11.5	75	04F30U2104A3F
1/4	3/32	2.38	.12	0.10	0	60	4.14	60	4.14	60	4.14	150	66	11.5	75	04F30U2106A3F
1/4	1/8	3.18	.25	0.22	0	25	1.72	25	1.72	25	1.72	150	66	11.5	75	04F30U2108A3F
1/4	11/64	4.37	.35	0.30	0	12	0.83	12	0.83	12	0.83	150	66	11.5	75	04F30U2111A3F

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

DIRECT ACTING STAINLESS STEEL VALVES– NORMALLY CLOSED (PRESSURE AT 2, ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	180	82	6.0	73	02F30C3103AAF
1/8	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	180	82	6.0	73	02F30C3104AAF
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	180	82	6.0	73	02F30C3106AAF
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	180	82	6.0	73	02F30C3108AAF
1/4	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	180	82	6.0	76	04F30C3104AAF
1/4	3/32	2.38	.12	0.10	0	150	10.34	150	10.34	150	10.34	200	93	11.0	76	04F30C3106ACF
1/4	1/8	3.18	.31	0.27	0	85	5.86	85	5.86	85	5.86	200	93	11.0	76	04F30C3108ACF

DIRECT ACTING STAINLESS STEEL VALVES– NORMALLY OPEN (PRESSURE AT 3, ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	180	82	6.0	73	02F30O3103AAF
1/8	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	180	82	6.0	73	02F30O3104AAF
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	180	82	6.0	73	02F30O3106AAF
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	180	82	6.0	73	02F30O3108AAF
1/4	3/32	2.38	.12	0.10	0	150	10.34	140	9.66	140	9.66	200	93	11.0	76A	04F30O3106ACF
1/4	1/8	3.18	.31	0.27	0	70	4.83	70	4.83	70	4.83	200	93	11.0	76A	04F30O3108ACF

DIRECT ACTING STAINLESS STEEL VALVES– UNIVERSAL (PRESSURE AT ANY PORT), NBR SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	175	12.07	175	12.07	175	12.07	140	60	10.2	73	02F30U3103ABF
1/8	1/16	1.59	.09	0.08	0	100	6.90	100	6.90	100	6.90	180	82	10.2	73	02F30U3104ABF
1/8	3/32	2.38	.12	0.10	0	50	3.45	50	3.45	50	3.45	180	82	6.0	73	02F30U3106AAF
1/8	1/8	3.18	.21	0.18	0	30	2.07	30	2.07	30	2.07	180	82	10.2	73	02F30U3108ABF
1/4	3/32	2.38	12	10.34	0	100	6.90	100	6.90	100	6.90	200	93	16.0	76A	04F30U3106ADF
1/4	1/8	3.18	.31	0.27	0	50	3.45	50	3.45	50	3.45	200	93	16.0	76A	04F30U3108ADF

DIRECT ACTING STAINLESS STEEL VALVES– NORMALLY CLOSED (PRESSURE AT 2, ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Water (PSI/Bar)		Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	120	49	9.5	73	02F30C3103A1F
1/8	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	120	49	9.5	73	02F30C3104A1F
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	120	49	9.5	73	02F30C3106A1F
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	120	49	9.5	73	02F30C3108A1F
1/4	3/32	2.38	.12	0.10	0	115	7.93	115	7.93	115	7.93	150	66	11.5	76A	04F30C3106A3F
1/4	1/8	3.18	.31	0.27	0	60	4.14	60	4.14	60	4.14	150	66	11.5	76A	04F30C3108A3F

DIRECT ACTING STAINLESS STEEL VALVES – NORMALLY OPEN (PRESSURE AT 3, ENERGIZE TO CLOSE), NBR SEALS

DC VALVE SPECIFICATIONS

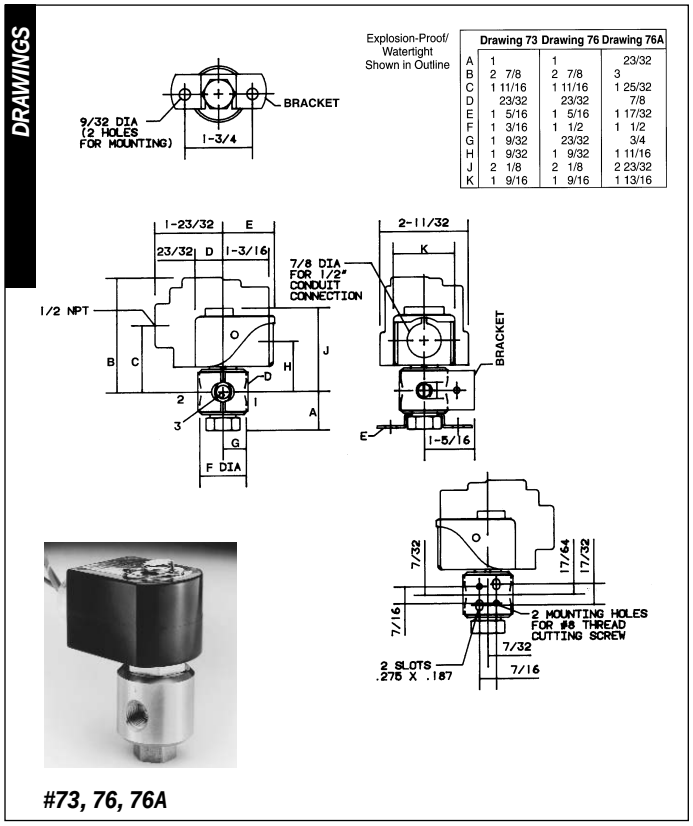
NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	200	13.79	200	13.79	200	13.79	120	49	9.5	73	02F30O3103A1F
1/8	1/16	1.59	.09	0.08	0	125	8.62	125	8.62	125	8.62	120	49	9.5	73	02F30O3104A1F
1/8	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	120	49	9.5	73	02F30O3106A1F
1/8	1/8	3.18	.21	0.18	0	40	2.76	40	2.76	40	2.76	120	49	9.5	73	02F30O3108A1F
1/4	3/32	2.38	.12	0.10	0	100	6.90	100	6.90	100	6.90	150	66	11.5	76A	04F30O3106A3F
1/4	1/8	3.18	.31	0.27	0	55	3.79	55	3.79	55	3.79	150	66	11.5	76A	04F30O3108A3F

DIRECT ACTING STAINLESS STEEL VALVES – UNIVERSAL (PRESSURE AT ANY PORT), NBR SEALS

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	125	8.62	125	8.62	125	8.62	120	49	9.5	73	02F30U3103A1F
1/8	1/16	1.59	.09	0.08	0	65	4.48	65	4.48	65	4.48	120	49	9.5	73	02F30U3104A1F
1/8	3/32	2.38	.12	0.10	0	50	3.45	50	3.45	50	3.45	120	49	9.5	73	02F30U3106A1F
1/8	1/8	3.18	.21	0.18	0	20	1.38	20	1.38	20	1.38	120	49	9.5	73	02F30U3108A1F
1/4	3/32	2.38	.12	0.10	0	60	4.14	60	4.14	60	4.14	150	66	11.5	76A	04F30U3106A3F
1/4	1/8	3.18	.31	0.27	0	25	1.72	25	1.72	25	1.72	150	66	11.5	76A	04F30U3108A3F

DRAWINGS



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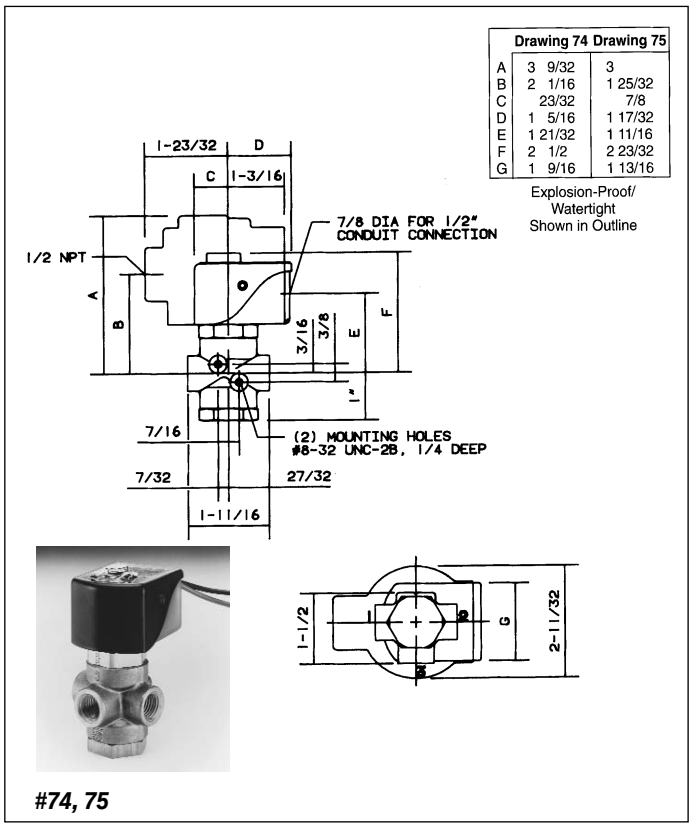

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To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Series 35: Brass,Series 38: Brass
- Seals-NBR
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies), Silver (Stainless Steel Bodies)
- Disc Holder-Cellon

Electrical Characteristics

Voltages

- DC-12, 24 (other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified. For details, consult factory.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 180°F max.
- DC Voltages: 120°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Applications

- Designed to provide large exhaust orifice for quick exhaust. Increased exhaust capacity significantly reduces cycle time for single acting spring return actuators.

QUICK EXHAUST BRASS VALVES – NORMALLY CLOSED (PRESSURE AT 2, ENERGIZE TO OPEN), NBR SEALS

AC VALVE SPECIFICATIONS

	Orifice Pressure		Orifice Exhaust		Pressure		Exhaust		Operating Pressure Differential Max. (MOPD)								Max. Temp.				
									Min.		Air, Inert Gas		Water		Light Oil 300SSU						Valve Part
NPT	inch	mm	inch	mm	Cv	Kv	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C	AC Watt	Const. Ref.	Number
1/4	3/32	2.38	1/4	6.35	.20	0.17	.73	0.15	5	0.34	150	10.34	150	10.34	95	6.55	180	82	11.0	84	04F35C1116ACF
1/4	9/32	7.14	11/32	8.73	.80	0.69	1.20	0.59	10	0.69	200	13.79	200	13.79	200	13.79	180	82	6.0	85	04F38C1122AAF
3/8	9/32	7.14	11/32	8.73	.80	0.69	1.20	0.59	10	0.69	200	13.79	200	13.79	200	13.79	180	82	6.0	85	06F38C1122AAF

QUICK EXHAUST BRASS VALVES – NORMALLY OPEN (PRESSURE AT 3, ENERGIZE TO CLOSE), NBR SEALS

AC VALVE SPECIFICATIONS

	Orifice Pressure		Orifice Exhaust		Pressure		Exhaust		Operating Pressure Differential Max. (MOPD)								Max. Temp.				
									Min.		Air, Inert Gas		Water		Light Oil 300SSU						Valve Part
NPT	inch	mm	inch	mm	Cv	Kv	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C	AC Watt	Const. Ref.	Number
1/4	3/32	2.38	1/4	6.35	.20	0.17	.73	0.63	5	0.34	160	11.03	160	11.03	95	6.55	180	82	11.0	84	04F35O1116ACF
1/4	9/32	7.14	11/32	8.73	.80	0.69	1.20	1.03	10	0.69	200	13.79	200	13.79	200	13.79	180	82	6.0	85	04F38O1122ACF
3/8	9/32	7.14	11/32	8.73	.80	0.69	1.20	1.03	10	0.69	200	13.79	200	13.79	200	13.79	180	82	6.0	85	06F38O1122ACF

QUICK EXHAUST BRASS VALVES – NORMALLY CLOSED (PRESSURE AT 2, ENERGIZE TO OPEN), NBR SEALS

DC VALVE SPECIFICATIONS

	Orifice Pressure		Orifice Exhaust		Pressure		Exhaust		Operating Pressure Differential Max. (MOPD)								Max. Temp.				
									Min.		Air, Inert Gas		Water		Light Oil 300SSU						Valve Part
NPT	inch	mm	inch	mm	Cv	Kv	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C	DC Watt	Const. Ref.	Number
1/4	3/32	2.38	1/4	6.35	.20	0.17	.73	0.63	5	0.34	115	7.93	115	7.93	60	4.14	104	40	11.5	84	04F35C1116A3F
1/4	9/32	7.14	11/32	8.73	.80	0.69	1.20	1.03	10	0.69	200	13.79	200	13.79	200	13.79	120	49	11.5	85	04F38C1122A3F
3/8	9/32	7.14	11/32	8.73	.80	0.69	1.20	1.03	10	0.69	200	13.79	200	13.79	200	13.79	120	49	11.5	85	06F38C1122A1F

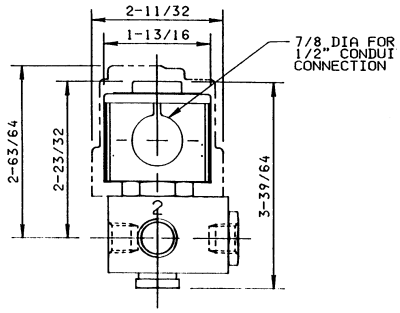
QUICK EXHAUST BRASS VALVES – NORMALLY OPEN (PRESSURE AT 3, ENERGIZE TO CLOSE), NBR SEALS

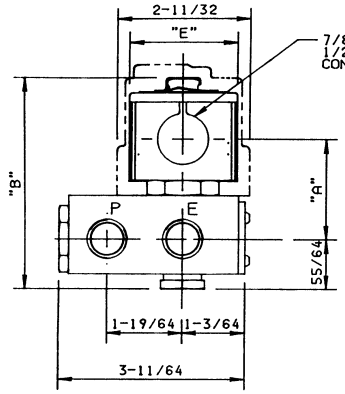
DC VALVE SPECIFICATIONS

	Orifice Pressure		Orifice Exhaust		Pressure		Exhaust		Operating Pressure Differential Max. (MOPD)								Max. Temp.				
									Min.		Air, Inert Gas		Water		Light Oil 300SSU						Valve Part
NPT	inch	mm	inch	mm	Cv	Kv	Cv	Kv	(PSI/Bar)		(PSI/BAR)		(PSI/Bar)		(PSI/BAR)		°F	°C	DC Watt	Const. Ref.	Number
1/4	3/32	2.38	1/4	6.35	.20	0.17	.73	0.63	5	0.34	100	6.90	100	6.90	50	3.45	104	40	11.5	84	04F35O1116A3F
1/4	9/32	7.14	11/32	8.73	.80	0.69	1.20	1.03	10	0.69	200	13.79	200	13.79	200	13.79	120	49	11.5	85	04F38O1122A3F
3/8	9/32	7.14	11/32	8.73	.80	0.69	1.20	1.03	10	0.69	200	13.79	200	13.79	200	13.79	120	49	11.5	85	06F38O1122A3F

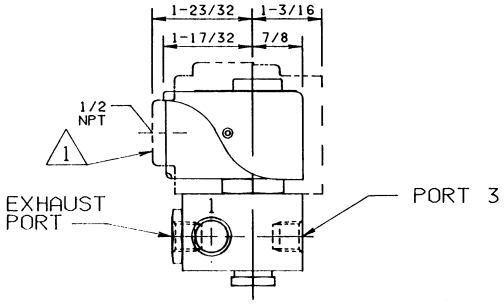
To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

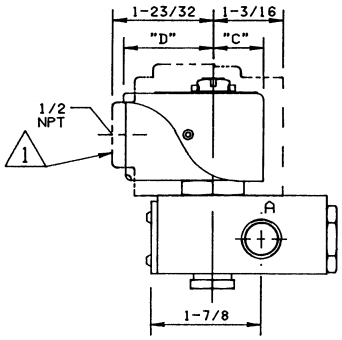
DRAWINGS

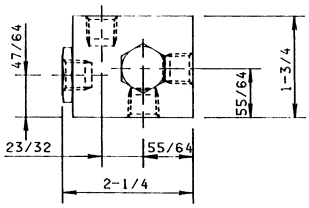


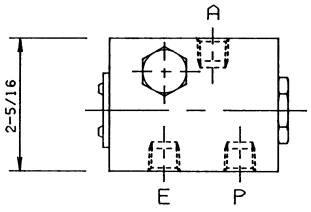


	NORMALLY CLOSED	NORMALLY OPEN
A	1-21/32	1-23/32
B	3-33/64	3-37/64
C	23/32	7/8
D	1-5/16	1-17/32
E	1-9/16	1-13/16









To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

Four-Way Valve Contents

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass
- Seals-NBR
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies)
- Disc Holder-Celcon

Compatible Fluids

- Series 48 valves are ideal for control of a variety of media including gases, fluid, light oils and other clean flowing media compatible with brass.

Electrical Characteristics

Voltages

- DC-12, 24 (other voltages available upon request)
- AC-24/60, 110/120-50/60, 220/240-50/60,

Coil

- Class F Standard, Class H Available

Agency Approvals

- Standard valves with general purpose or explosion proof solenoid enclosures are UL Listed and CSA Certified. For details, consult factory.

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 180°F max.
- DC Voltages: 104°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- For proper operation, valves should be mounted vertical and upright. Product and mounting dimensions shown are nominal.

Applications

- Used in a variety of applications including: Pilots, Air Vises, Air Motors and Dampers.

Operating Specifications

- De-energized-Pressure to "A"; "B" to exhaust.
- Energized-Pressure to "B"; "A" to exhaust.
- Avoid exhaust flow restriction.

BRASS VALVES – TWO POSITION (PRESSURE AT P), NBR SEALS

AC VALVE SPECIFICATIONS

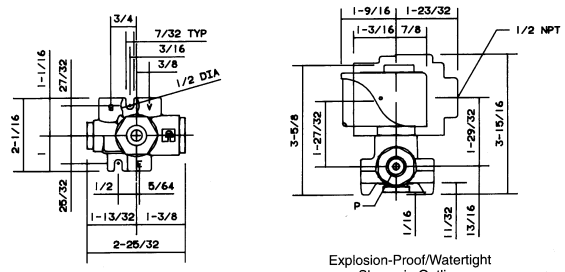
NPT Pipe Size	Orifice Diameter Pilot / Exhaust inch	Orifice Diameter Pilot / Exhaust mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	AC Watt	Const. Ref.	Valve Part Number
1/4	1/16 / 3/32	1.59/2.38	.09	0.08	10	0.69	150	10.34	150	10.34	150	10.34	180	82.22	11.0	83	04F48S2106ACF

BRASS VALVES – TWO POSITION (PRESSURE AT P), NBR SEALS

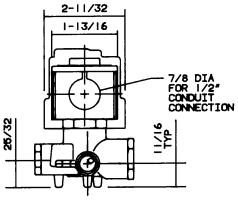
DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter Pilot / Exhaust inch	Orifice Diameter Pilot / Exhaust mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)		Max. (MOPD) Air, Inert Gas (PSI/BAR)		Max. (MOPD) Water (PSI/Bar)		Max. (MOPD) Light Oil 300SSU (PSI/BAR)		Max. Temp. °F	Max. Temp. °C	DC Watt	Const. Ref.	Valve Part Number
1/4	1/16 / 3/32	1.59/2.38	.09	0.08	10	0.69	100	6.90	100	6.90	100	6.90	104	40	11.5	83	04F48S2106A3F

DRAWINGS



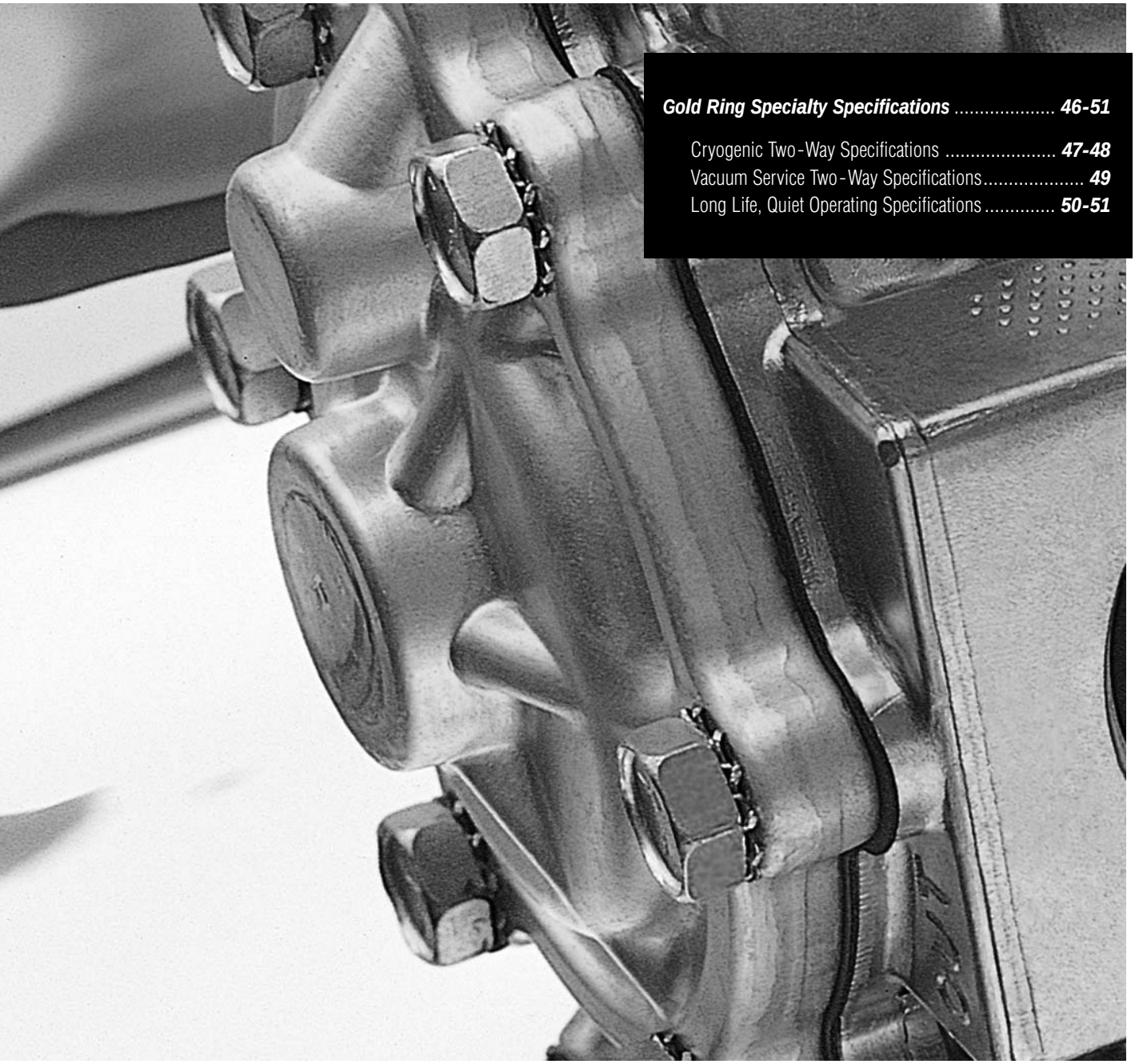
Explosion-Proof/Watertight
Shown in Outline



#83

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

Specialty Valve Contents



GOLD RING

Two-Way Normally Closed Cryogenic Service and Liquid CO_2 Valves

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass or 303 Stainless Steel as listed
- Seals-PTFE, Urethane or PCTFE, Lead-Clad Copper in 1/8-3/8-inch NPT Valves
- Plunger and Pole Piece-430FR or 49FM Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper (Brass Bodies), Silver (Stainless Steel Bodies)
- Disc Holder (Normally Open Valves)-303 Stainless Steel

Compatible Fluids

- Cryogenic Service solenoid valves are designed to withstand the severe temperatures associated with controlling cryogenic fluids at temperatures to -320°F(-196°C). Due to the sealing materials available for use at extremely low temperatures, slight leakage can be expected.

Electrical Characteristics

Voltages

- AC-24/60, 110/120-50/60, 220/240-50/60

Coil

- Class F Standard,

Miscellaneous

Temperature Ratings (media as listed)

- AC Voltages: 150°F max.
- DC Voltages: -320°F max.
- Ambient: 32-77°F (standard)
- Cryogenic and Liquid CO_2 valves are not available with explosion proof coils.

Installation

- Important: Use downstream piping with an inside diameter no larger than the valve orifice to prevent expanding CO_2 from freezing the valve. Consult factory for dimensional information.
- Valves are supplied with a mounting bracket for direct mounting. A 1/8-inch NPT port is supplied for remote mounting.

BRASS VALVES – NORMALLY CLOSED PTFE SEALS

AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter		Flow Factor		Operating Pressure Differential					Min. Temp.		Max. Temp.		AC Watt	Valve Part Number
							Max. (MOPD)								
					Min.		Cryogenic Fluids		Liquid						
	inch	mm	Cv	Kv	(PSI/Bar)		(PSI/BAR)		CO_2	°F	°C	°F	°C		
1/4	7/32	5.56	.56	0.48	0	0.00	70	4.83	-	-320	-196	150	66	16.0	04F20C2414CDF-L
3/8	7/32	5.56	.56	0.48	0	0.00	70	4.83	-	-320	-196	150	66	16.0	06F20C2414CDF-L
1/2	5/8	15.88	3.8	3.28	0	0.00	150	13.79	-	-320	-196	150	66	11.0	08FH6C2440ACF-L

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

Two-Way Cryogenic Service and Liquid CO_2 Valves

LIQUID CO_2 SERVICE STAINLESS STEEL VALVES – NORMALLY CLOSED, URETHANE SEALS

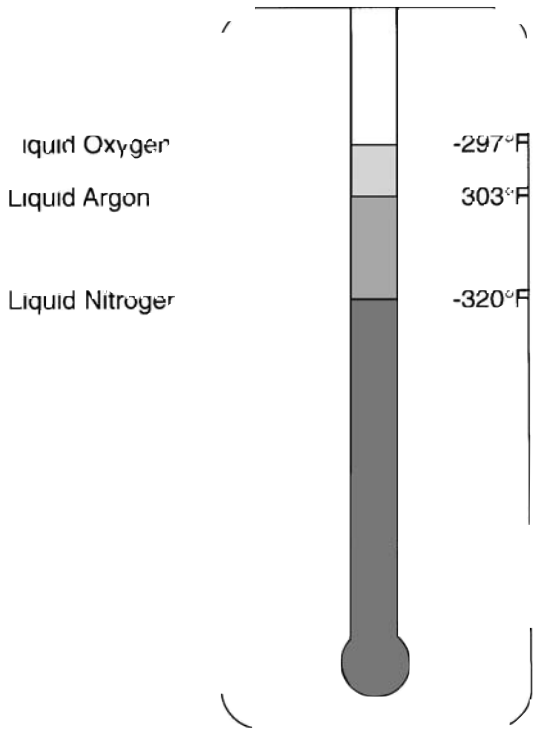
AC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Operating Pressure Differential Max. (MOPD) Liquid CO_2 (PSI/BAR)	Min. Temp. °F	Min. Temp. °C	Max. Temp. °F	Max. Temp. °C	AC Watt	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	1125 77.60	-75	-59	120	49	10.2	02F20C3503ABF-43
1/8	3/32	2.38	.20	0.17	0	300 20.69	-75	-59	120	49	10.2	02F20C3506ABF-43

DC VALVE SPECIFICATIONS

NPT Pipe Size	Orifice Diameter inch	Orifice Diameter mm	Flow Factor Cv	Flow Factor Kv	Operating Pressure Differential Min. (PSI/Bar)	Operating Pressure Differential Max. (MOPD) Liquid CO_2 (PSI/BAR)	Min. Temp. °F	Min. Temp. °C	Max. Temp. °F	Max. Temp. °C	AC Watt	Valve Part Number
1/8	3/64	1.19	.06	0.05	0	375 -	-75	-59	120	49	9.5	02F20C35O3A1F

Typical Cryogenic Temperatures



Ordering Information

Parker Gold Ring solenoid valves for cryogenic or liquid CO_2 service are available as complete valves only.

1.) Select the valve required by pipe size, C_V and pressure and temperature requirements.

2.) Select one enclosure, one coil termination and one voltage code from each column. Note: 18" leads are standard.

3.) Complete the part number with suffix L or 43 as indicated in the table. Example: 04F20C2414CDF4C05L.

GOLD RING

Two-Way Low, Medium and High Vacuum Service Valves

SPECIFICATIONS

Mechanical Characteristics

Standard Materials of Construction

- Body-Brass
- Seals-Low and Medium Vacuum : NBR, High Vacuum: FKM
- Plunger and Pole Piece-430FR Stainless Steel
- Plunger Tube-305 Stainless Steel
- Springs-302 Stainless Steel
- Shading Coil-Copper
- Disc Coil (Normally Open Valves)-Ryton

Compatibility

- Vacuum service solenoid valves are suitable for use with the following vacuum ranges as indicated in the specification table. Operating pressure differentials on some valves may render the valve unsuitable for certain vacuum applications. Verify pressure differential requirements before installing.

Low Vacuum

760 to 25 Torr (0 psi to 29 in. Hg)

Medium Vacuum

25 to 10^{-3} Torr (29 in. Hg to 1 micron)

High Vacuum

10^{-3} to 10^{-6} Torr (1 to 10-3 microns)

Electrical Characteristics

Voltages

- AC-24/60, 110/120-50/60, 220/240-50/60

Coil

- Class F Standard, Class H Available

Miscellaneous

Temperature Ratings

- AC Voltages: 180°F max.
- Ambient: 32-77°F (standard)
- For temperature variations, consult the factory.

Installation

- For proper operation, solenoid valves should be mounted vertical and upright. Dimensions are shown in the standard series section. Refer to the appropriate sections for nominal dimensions. For certified drawings, consult factory.

BRASS VALVES – NORMALLY CLOSED, NBR OR FKM SEALS

AC VALVE SPECIFICATIONS

	Orifice Diameter		Flow Factor		Operating Pressure Differential				Low Vacuum to 29" Hg	Med. Vac. to 10^{-3} Torr	High Vacuum to 10^{-6} Torr
NPT	inch	mm	Cv	Kv	Minimum (PSI/Bar)	Maximum (PSI/Bar)		AC Watt	Valve Part No.	Add Suffix	Valve Part No.
1/4	9/32	7.14	.96	0.83	0	15	1.03	6.0	04F20C2118AAF	S	04F20C2218AAF-V
3/8	5/16	7.94	1.40	1.21	0	15	1.03	6.0	06F20C2120AAF	S	06F20C2220AAF-V
1/2	7/16	11.11	2.80	2.41	0	15	1.03	16.0	08F20C2128ADF	S	08F20C2228ADF-V
3/4	3/4	19.05	5.00	4.31	0	4	0.28	16.0	12F20C2148ADF	S	12F20C2248ADF-V
3/4	3/4	19.05	5.00	4.31	0	15	1.03	11.0	12F23C2140ACF	S	12F23C2248ACF-V
1	1	25.40	12.2	10.52	0	15	1.03	16.0	16FH5C2164ADF	S	16FH5C2264ADF-V

BRASS VALVES – NORMALLY OPEN NBR OR FKM SEALS

AC VALVE SPECIFICATIONS

	Orifice Diameter		Flow Factor		Operating Pressure Differential				Low Vacuum to 29" Hg	Med. Vac. to 10^{-3} Torr	High Vacuum to 10^{-6} Torr
NPT	inch	mm	Cv	Kv	Minimum (PSI/Bar)	Maximum (PSI/Bar)		AC Watt	Valve Part No.	Add Suffix	Valve Part No.
3/8	5/8	15.88	3.00	2.59	0	15	1.03	11.0	06F23O2140ACF	S	06F23O2240ACF-V
1/2	5/8	15.88	4.00	3.45	0	15	1.03	11.0	08F23O2140ACF	S	08F23O2240ACF-V
3/4	3/4	19.05	5.00	4.31	0	15	1.03	11.0	12F23O2148ACF	S	12F23O2248ACF-V

For DC applications and stainless steel bodied valves, consult factory.

To choose a solenoid for your valve, refer to the AC or DC chart found on the flap attached to the back cover of this catalog.

Technical Information

Introduction

Solenoid valves are highly engineered products that can be utilized in many diverse and unique applications. In addition to operational functionality, it is important to consider safety, reliability, media compatibility and suitability for the operating environment when selecting the best product for a given application. This section provides a brief overview of the components and functional varieties of solenoid valves available from Parker.

General Information

Operation

Solenoid valves are electrically operated devices used to control flow. They are used for the remote on/off or directional control of liquids, gases and steam. They do not regulate flow.

Solenoid valves consist of two main elements: ***1.)*** An electrical coil in the solenoid, and ***2.)*** A valve body or pressure vessel. The solenoid is the electromagnetic unit that powers (acts to open or close) the valve. The valve is the pressure containing unit that acts to shut off or open media flow.

When the solenoid is energized by an electrical signal, current flow results in the build up of a magnetic field. The field attracts a moveable plunger in the valve. Physical movement of the plunger opens or closes a valve orifice which gives the valve on/off or directional control of media.

In general, solenoid valves are constructed to be: ***1.)*** Normally-Open, or ***2.)*** Normally-Closed. Both designations refer to action of the valve on flow when the solenoid is not energized. There would be, for example, no media flow through a normally-closed valve until the solenoid is energized.

The most common types of solenoid actuated valves are: ***1.)*** Direct-Acting, and ***2.)*** Pilot-Operated. In a direct-acting valve, the plunger is in direct contact with the body main orifice, and opens or closes the orifice. In a pilot-operated valve, the main orifice is not directly controlled by the plunger, but by a diaphragm, piston or spool. Pilot operated valves contain both a pilot and a bleed orifice.

Operational Specifications

All solenoid valves are individually rated for ***Maximum Operating Pressure Differential (MOPD)***. This is the maximum differential pressure between the inlet and outlet sides of the valve against which the solenoid can safely operate the valve.

Pilot-operated solenoid valves may also have an additional specification, ***Minimum Operating Pressure Differential (MOP)***. This is the minimum system pressure differential required to operate the valve and maintain it in the open position. MOP applies only to pilot-operated solenoid valves where system pressure is used to lift the diaphragm off the seat (normally-closed) when the solenoid is energized. Direct-acting or hung-diaphragm valves do not require a minimum operating pressure.

There will be a pressure differential ^{3}P before the solenoid of a normally-closed valve is energized. Just after flow begins moving through the valve, the pressure differential may decrease. When sizing any normally-closed, normally-open, or universal solenoid valve, pressure differential before and after flow begins must be considered.

Solenoid valves are also rated for ***Maximum Fluid (media) Temperature*** due to temperature limitations of the various disc or diaphragm materials used in their construction.

Response Time, the time necessary for a fully open valve to fully close, or the time necessary for a fully closed valve to fully open, is affected by several factors including: electrical service, media, valve, size, system pressure, pressure drop, and operating mode.

The following general response times (nominal) apply for air service using alternating current.

- Small direct-acting valves (1/8 to 1/4-inch) .5 to 10 milliseconds
- Large direct-acting valves (3/8 to 3/4-inch) 20 to 40 milliseconds
- Small pilot (diaphragm) valves (3/8 to 3/4-inch) 15 to 50 milliseconds
- Large pilot (diaphragm) valves (1 to 3-inch) 50 to 75 milliseconds

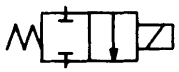
Viscous liquids have very little effect on response time on small direct-acting valves. However, on all other valves, viscous liquids may increase response time by 50 to 100 percent.

DC operated solenoid valves will generally increase response time (relative to AC operated solenoids) by as much as 50 percent. Where response time is critical, consult your authorized local Fluid Control Division distributor.

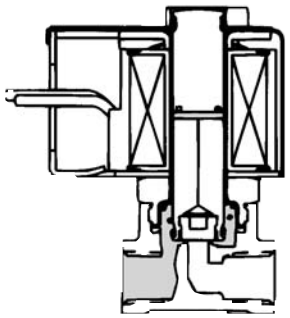
Two-Way Solenoid Valve Operation

Two-way solenoid valves have one inlet and one outlet connection with one main orifice and flow path. A normally closed valve is closed when the solenoid is de-energized, open when the solenoid is energized. A normally open valve is open when the solenoid is de-energized, closed when the solenoid is energized. Consideration should be given to the desired fail-safe condition of the valve when selecting the type of operation.

Operational Sequence: Direct-Acting Normally Closed

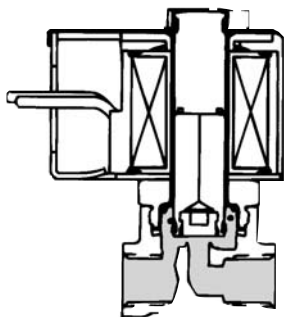


To Open: When the solenoid receives an electrical signal, a magnetic field is formed which attracts the plunger. The plunger lifts off the main orifice allowing flow through the valve.



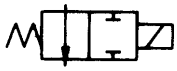
Normally Closed, De-Energized

To Close: When the solenoid is de-energized, it releases its hold on the plunger. The plunger drops and covers the main orifice.



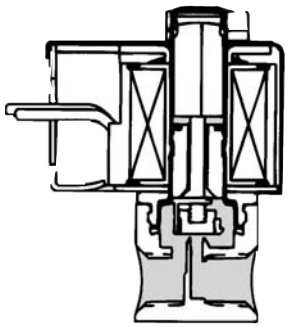
Normally Closed, Energized

Operational Sequence: Direct-Acting Normally Open



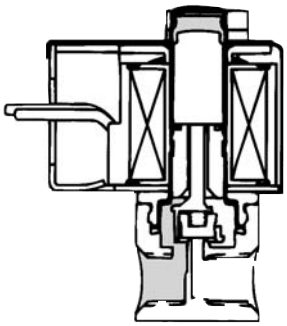
In a normally open valve, the sequence of operation is reversed from that of a normally closed valve. The main orifice is open when the solenoid is de-energized.

To Close: When the solenoid is energized, it attracts the plunger. The plunger covers the main orifice stopping media flow through the valve.



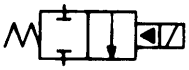
Normally Open, De-energized

To Open: When the solenoid is de-energized, it releases its hold on the plunger. The plunger uncovers the main orifice allowing flow through the valve.



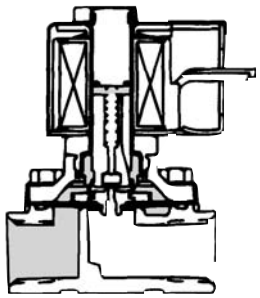
Normally Open, Energized

Operational Sequence: Pilot-Operated Normally Closed



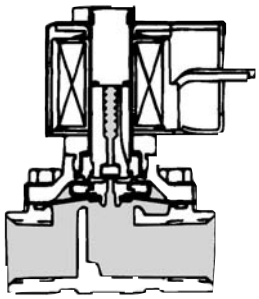
To Open: When the solenoid receives an electrical signal, a magnetic field is formed which attracts the plunger. The plunger covering the pilot orifice lifts off, causing system pressure (holding the diaphragm closed) to drop.

As system pressure on top of the diaphragm is reduced, full system pressure on the opposite side of the diaphragm acts to lift the diaphragm away from the main orifice, thus allowing full media flow through the valve. Since the bleed orifice is dimensionally smaller than the pilot orifice, system pressure cannot rebuild on top of the diaphragm as long as the pilot orifice remains open.



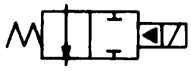
Normally Closed, De-Energized

To Close: When the solenoid is de-energized, it releases its hold on the plunger. The plunger drops and covers the main orifice. System pressure then builds up on top of the diaphragm through the bleed orifice, forcing the diaphragm down until it covers the main orifice and stops media flow through the valve.



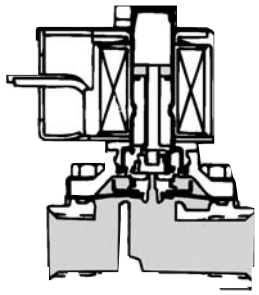
Normally Closed, Energized

Operational Sequence: Pilot-Operated Normally Open



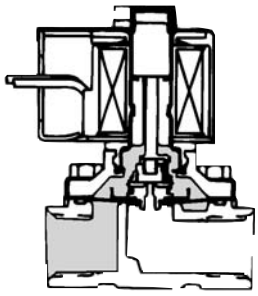
In a normally open valve, the sequence of operation is reversed from that of a normally closed valve. The main orifice is open when the solenoid is de-energized. All other relationships (e.g., the size relationship between the pilot and bleed orifice) still apply.

To Close: When the solenoid is energized, it attracts the plunger. The plunger covers the pilot orifice. System pressure then builds up on top of the diaphragm through the bleed orifice, forcing the diaphragm down until it covers the main orifice and stops media flow through the valve.



Normally Open, De-Energized

To Open: When the solenoid is de-energized, it releases its hold on the plunger. The plunger uncovers the pilot orifice causing system pressure holding the diaphragm closed to drop. As system pressure on top of the diaphragm is reduced, full system pressure on the opposite side of the diaphragm acts to lift the diaphragm away from the main orifice, thus allowing full media flow through the valve.



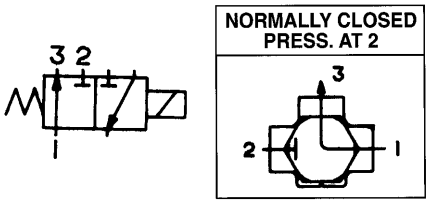
Normally Open, Energized

Three-Way Solenoid Valve Operation

The difference between two-, three- and four-way solenoid valves lies in the construction of the valve body. Three-way valves have three connections and two main orifices. One orifice is always closed, the other always open. Which orifice is open, and which is closed, determines whether the valve is operationally normally open or normally closed.

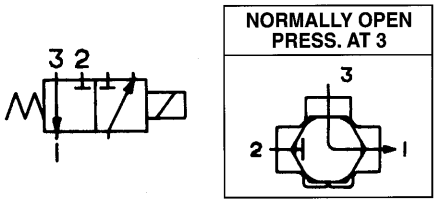
Operational Sequence:

Direct-Acting Normally Closed



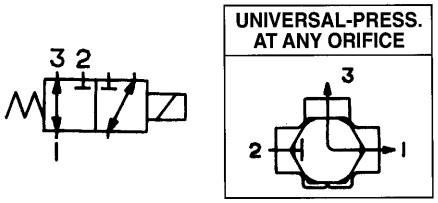
As with a normally closed, two-way valve, the system pressure orifice is closed when the solenoid is de-energized. The second orifice is open to whatever device it is connected to. When energized, the system pressure orifice is opened and the second orifice is closed. This allows system pressure to be applied to the device that was previously being exhausted through the second orifice (now closed).

Normally Open



As with a normally open, two-way valve, the system pressure orifice is open when de-energized. The second orifice is closed to whatever device it is connected to. With the solenoid energized, the system pressure orifice is closed, the second orifice opened and the device exhausted.

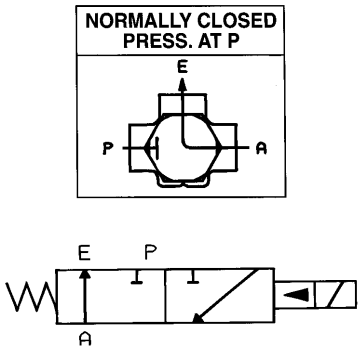
Universal Construction



This type of three-way valve may be used in either the normally closed or normally open mode. It can be piped either way. The valve can be used to divert media flow from one outlet connection to the other, or to select one or two inlet flows.

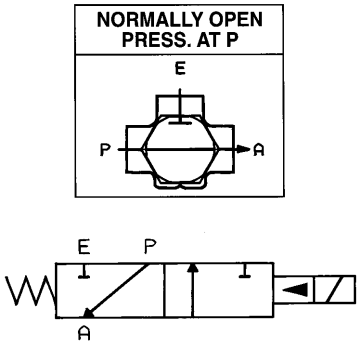
Operational Sequence:

Pilot-Operated Normally Closed



As with pilot-operated two-way valves, the plunger movement controls the pilot orifice which controls the pressure holding one of the diaphragms closed against the main orifice. As with direct-acting three-way valves, one orifice is closed when the other is open. When de-energized, flow is from the pressurized device to exhaust and the system pressure port is closed. When energized, flow is from the pressure port to the controlled device and the exhaust port is closed.

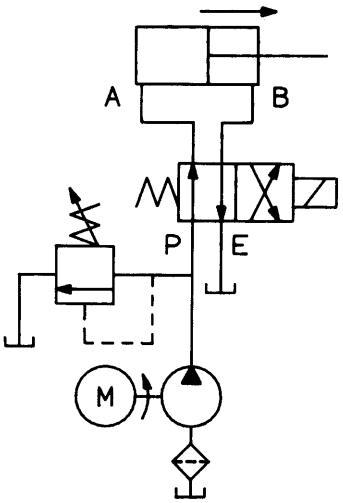
Normally Open



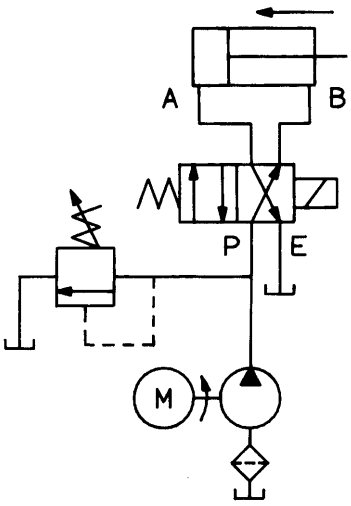
Four-Way Solenoid Valve Operation

A four-way valve is generally used to operate double-acting cylinders vs. a three-way for single-acting cylinders.

A double-acting cylinder has a port at either end of the cylinder body by which fluid can enter and exit. This allows the piston to be moved (propelled) in either direction (double-acting). To distinguish the ports on a double-acting cylinder, one is usually marked “A” and the other “B”. A four-way solenoid valve acts to change the direction of fluid flow from the “A” port to the “B” port and, therefore, change direction of the cylinder.



De-Energized



Energized

In addition to the "A" and "B" cylinder ports, the four-way valve has a pressure and exhaust port. When de-energized, the pressure port is internally connected to the "A" cylinder port, and the "B" cylinder port is internally connected to the valve's exhaust port. Energizing the four-way valve reverses the system, routing the "A" port to exhaust and the "B" port to pressure. A minimum pressure drop is required for proper operation. Care should be taken not to restrict the exhaust port.

General Data-Solenoid Coils

Power and Voltage

All coils used in Gold Ring solenoid valves are designed for continuous duty except where noted. On AC, inrush current occurs at the moment the solenoid is energized. The continuous current after inrush is holding current. Typical AC current values are shown below. DC solenoids have no inrush. Typical amp ratings for DC are determined by dividing DC watts by DC voltage.

All Gold Ring solenoid valves are tested to operate at 15% undervoltage and full pressure ratings. AC and DC voltage ratings (nominal) and normal operating ranges, as shown in the following table, are standard. For special voltages, consult the factory.

Holding and Inrush Current

Small, Direct-Acting 2-Way, 3-Way and 4-Way Series 20, 30, 35, 38, and 48 (1/8 to 3/8")

WATT RATING AND VOLT AMPERAGE

Standard Coil Insulation Class	AC Watts	AC VA Holding	AC VA Inrush
F	6	16	26
F	10.2	23	37
F	11	20	34
F	16	31	50

2-Way, Direct-Acting Series 20 (3/8 to 3/4")

WATT RATING AND VOLT AMPERAGE

Standard Coil Insulation Class	AC Watts	AC VA Holding	AC VA Inrush
F	6	16	36
F	11	20	61
F	16	31	88

Pilot 2-Way Series 22, 23, 24, 25, 26, 28, (3/8 to 1-1/2")

WATT RATING AND VOLT AMPERAGE

Standard Coil Insulation Class	AC Watts	AC VA Holding	AC VA Inrush
F (Offset Pilot)	6	16	26
F (Center Pilot)	6	16	34
F	11	20	53
F	16	31	76

AC/DC Voltage Range

All coils used in Gold Ring valves are designed for continuous duty except where noted. They can remain energized continuously without damage from overheating or mechanical failure. AC and DC voltage ratings (nominal) and normal operating ranges, as shown in the following table, are standard.

AC Nominal Voltage Rating	*AC* Normal Operating Range	*DC* Nominal Voltage Rating	*DC* Normal Operating Range
24	20-24	12	10.2-12.6
120	102-120	24	20-25
240	204-240		

All coils used in Gold Ring solenoid valves are either Class "F" or Class "H" molded epoxy, and are constructed in accordance with UL, IEEE, NEMA and other accepted standards.

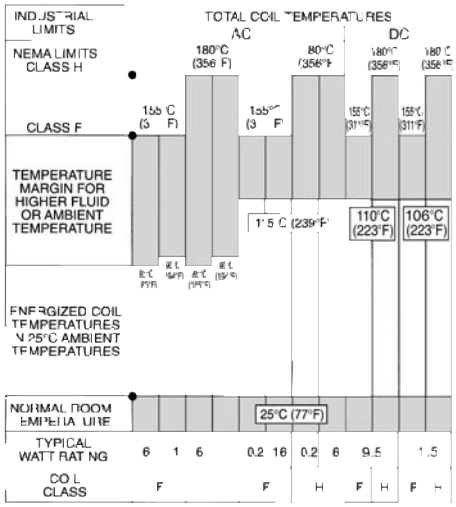
Testing

All Gold Ring solenoid valves are 100% tested. Coil insulation systems must satisfy performance standards set by the National Electrical Manufacturers Association (NEMA) and tested by Underwriter's Laboratories.

Electrical components of AC and DC coils are tested in accordance with ASTM D2307-78 and become a recognized component under U.L.1446. The procedure produces data for an evaluation which concludes, a coil with 20,000 hours continuous operation will perform within the same specifications of a zero time coil (new coil).

Temperature

Just as fluid (media) temperatures affect valve body trim; ambient, fluid and power input temperatures affect solenoid coils. The following table with ambient temperature at 77°F (25°C) shows temperature limitations of Gold Ring solenoids.



Temperature rise due to power input varies with coil design. Temperature rise due to power input and ambient temperature is directly additive and helps determine the class of coil required for specific valve applications.

When ambient temperature is greater than 25°C (77°F), add the difference of ambient and 25°C (77°F) to the energized coil temperature shown in the table.

The effect of higher fluid temperatures needs to be considered only when fluid temperature is greater than 180°F. Do not exceed the catalog maximum temperature limitation for the valve. Add the difference of your fluid temperature and 180°F to the energized coil temperature shown in the table.

Use the "Saturated Steam Temperature Table" when working with saturated steam. Do not exceed the catalog maximum temperature limitation for the valve. Add the difference of steam temperature and 180°F to the energized coil temperature shown in the table.

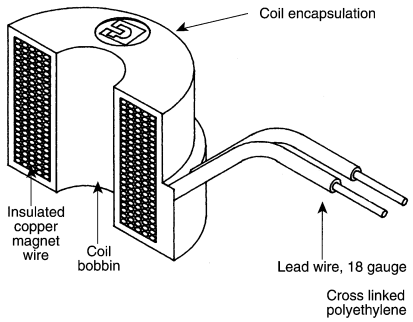
Total of additional ambient and fluid or steam temperature to the energized coil temperature shown must not exceed the industrial limit of the coil class selected.

Class "H" coil is required if total temperature exceeds "F" Class coil limits. Consult your Fluid Control Division authorized distributor if total temperature exceeds the "H" Class coil limit.

Coil Construction

All Gold Ring coils are epoxy encapsulated. This compound is waterproof and impervious to oil, dust, moisture and most corrosive fumes and vapors.

All coils used in Gold Ring valves are molded and constructed in accordance with UL, IEEE, NEMA and other accepted standards, and are 100% tested.



All coils are 100% tested.

Valve Sizing

Any given application requires proper sizing of the Gold Ring solenoid valve. If the valve selected is too small, flow conditions will not be met. If too large, system cost will be excessive. Gold Ring solenoid valves are tested and rated using the industry accepted C_v method. This method, used in both the U.S. and Europe, is both simple and accurate.

The correct size valve for an application can be determined by either using the engineered formulae shown below, or by using the curves and simplified formulae on the following pages.

Using Flow Formulas

Gases

If $P_2 > P$ critical

$$Q_m = C_v \sqrt{\frac{P_1 {}^3P}{SG}} \times \sqrt{\frac{520^*}{T}}$$

If $P_2 \leq P$ critical

$$Q_m = C_v \frac{P_1}{\sqrt{2SG}} \times \sqrt{\frac{520^*}{T}}$$

Q_m = Rate of flow SCFM (Standard Cubic Feet per Minute) at 14.7 psia and 60 degrees F (standard conditions)

C_v = Flow rating of the valve

P_1 = Upstream pressure, psia

P_2 = Downstream pressure, psia

P critical is approximate 53% P_1

^3P = Pressure drop across the valve (open position), psi

SG = Specific gravity of gas, relative to air at 14.7 psi and 60 degrees F (standard conditions)

T = Absolute (degrees Rankine) temperature in degrees F. (460 + degrees F.)

Note*: 520 is 460ÞF + 60ÞF

Liquids

$$Q = C_V \sqrt{\frac{{}^3P}{SG}}$$

Q = Rate of flow, in gallons per minute

C_V = Flow rating of the valve

^3P = Pressure drop across the valve (open position), psi

SG = Specific gravity relative to water at 60 degrees F

Steam

If $P_2 > P$ critical

$$W = 3C_V \sqrt{\frac{P_1 {}^3P}{X}}$$

If $P_2 \leq P$ critical

$$W = 3C_V \frac{P_1}{\sqrt{2x}}$$

W = Rate of flow in pounds per hour

C_V = Flow rating of valve

P_1 = Upstream pressure, psia

P_2 = Downstream pressure, psia

P critical is approximate 57% P_1

^3P = Pressure drop across the valve (open position), psi

X = Quality of steam (Fraction Dry Steam)

Critical pressure has the following significance in the flow of compressible fluids (gases and steam) through valves. Assuming a fixed upstream pressure of P_1, an increase in flow is obtained as the downstream pressure P_2 is reduced below P_1. Continuing increases in flow are experienced until P_2 is reduced to a critical value (P critical). When P_2 is reduced below P critical, no further increase in flow results. P critical can be expressed as a percentage of P_1 with approximate values (53% to 57%) given above.

Note: PSIA is absolute pressure which is gauge pressure plus atmospheric pressure (14.7 psi at sea level).

Definition of Symbols

C_V = Flow coefficient
Q_L = Liquid flow (GPM)
Q_g = Gas flow, standard cu-ft-hr (SCFH)
Q_s = Steam flow (lb./hr.)
P_1 = Inlet pressure (PSI)
P_2 = Outlet pressure (PSI)
^3P = Pressure differential (PSI) (P_1-P_2)
K_L = Liquid flow curve factor
K_g = Gas flow curve factor
K_s = Steam flow curve factor
K_{sg} = Specific gravity factor
K_t = Temperature factor

There will be a pressure differential ^3P before the solenoid of a normally closed valve is energized. Just after flow begins moving through the valve, the pressure differential may decrease.

When sizing any normally closed, normally open, or universal solenoid valve, pressure differential before and after flow begins must be considered.

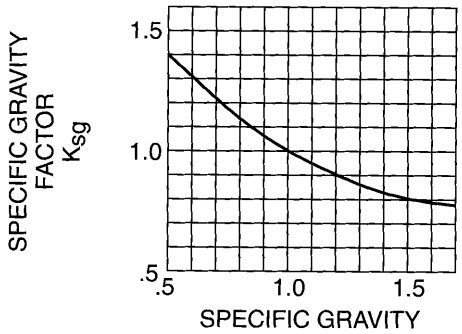
Curves to correct for specific gravity (K_{sg}) and temperature (K_t) are included. These curves apply to liquids and gases only, not saturated steam.

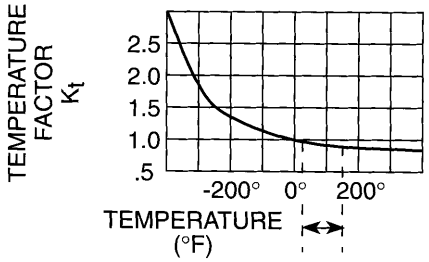
For liquids with viscosity in excess of 300 SSU, consult your Gold Ring authorized distributor or contact the factory.

The simple and easy to read flow curves for liquids, gases and steam will help in properly sizing valves.

There is a constant relationship between gas and saturated steam flow curves. The flow curve for gases can be used for steam by reading the Ks steam scale.

Specific gravity for various compounds are also included.





The correction for temperature in the range of 20°F to 150°F is very small, and, therefore, can be ignored in ordinary applications.

Basic Formulae Using Graphs

Liquid

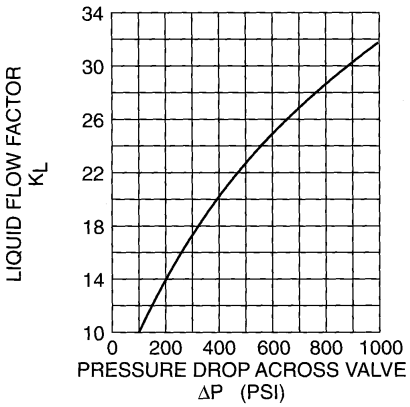
$$C_V = \frac{Q_L}{K_L \times K_{sg}}$$

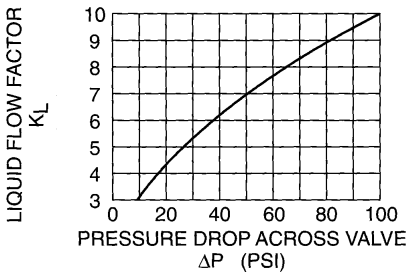
Steam

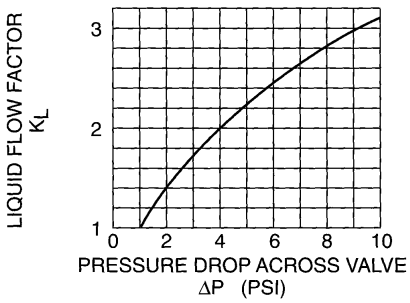
$$C_V = \frac{Q_s}{K_s}$$

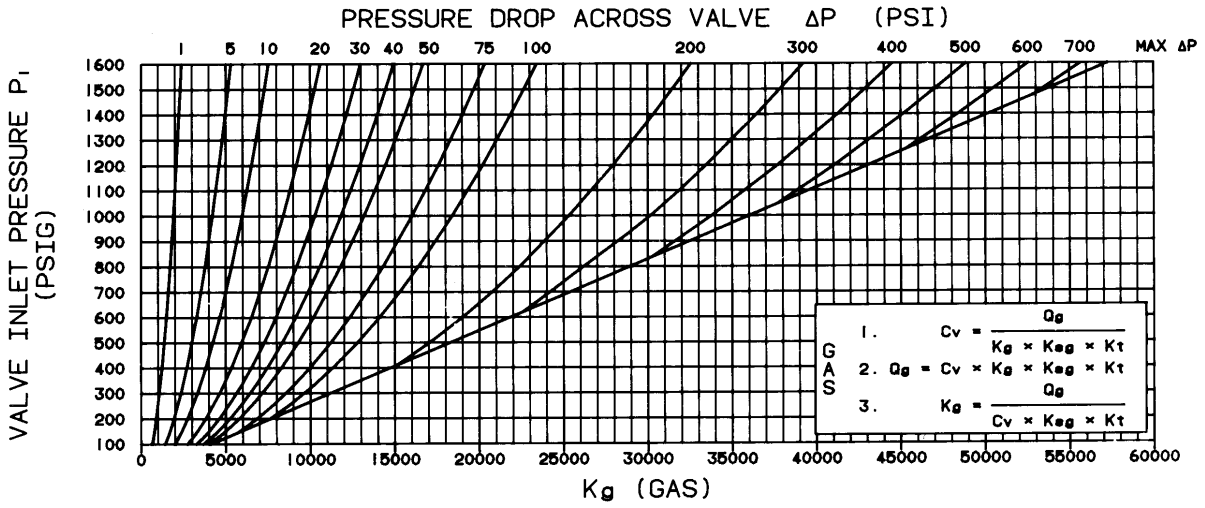
Gas

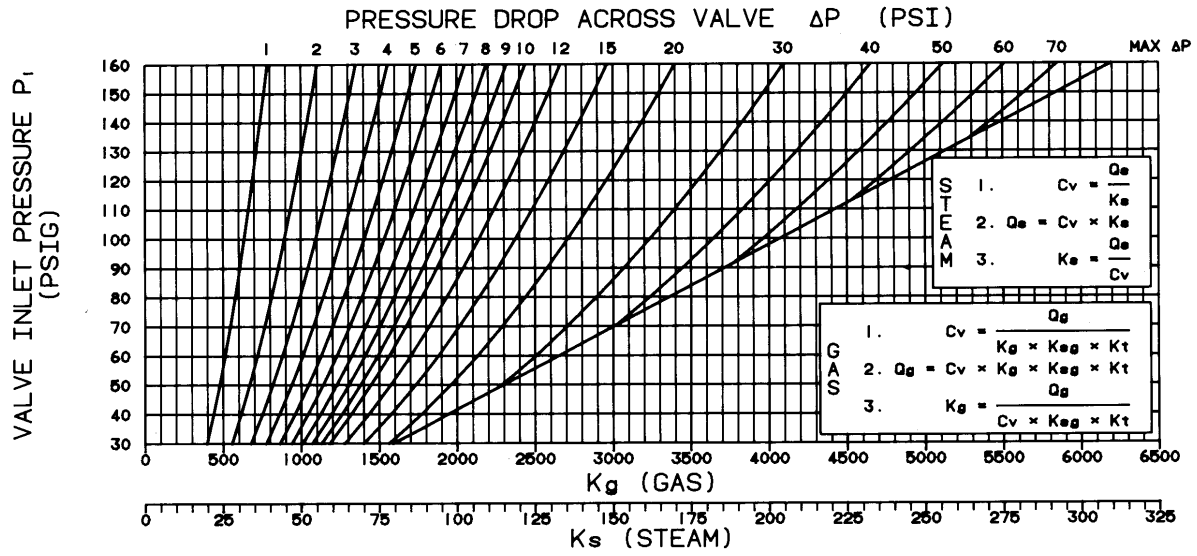
$$C_V = \frac{Q_L}{K_g \times K_{sg} \times K_t}$$

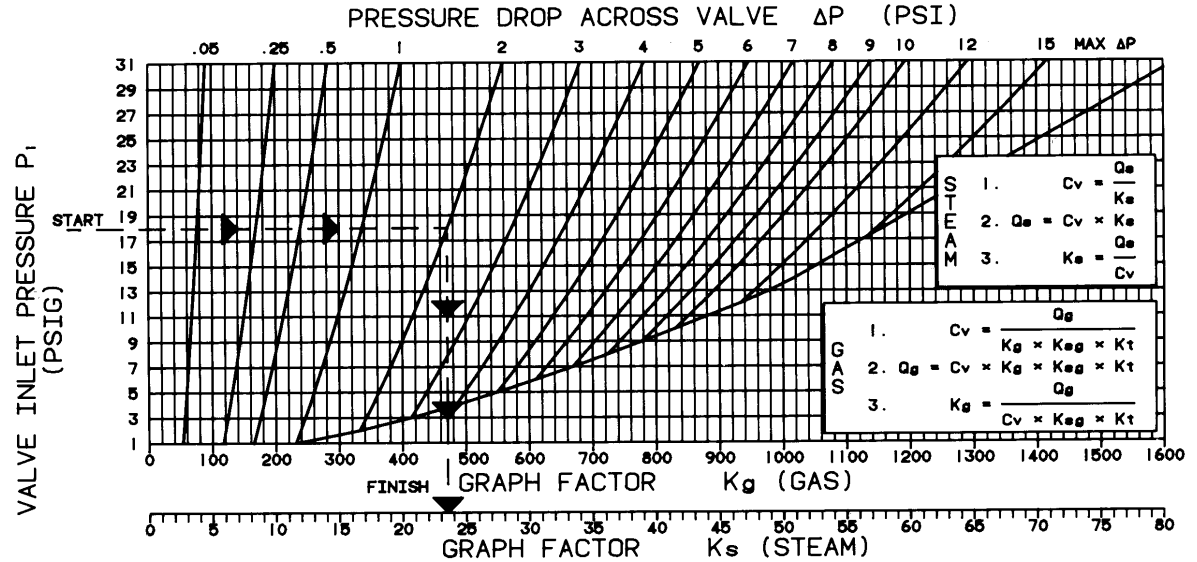












Sample Problems

Problem: Liquids

Determine C_V when the required flow is 30 GPM, media is light oil with a specific gravity of 0.82, inlet pressure (P_1) is 36 PSI and outlet pressure (P_2) is 0 (^3P = 36 PSI).

Solution

Use the formula:

$$C_V = \frac{Q_L}{K_L \times K_{sg}}$$

From the liquid flow curve using the pressure drop (36 PSI), read vertically up to the curve. Read horizontally to K_L= 6.

From the specific gravity curve using the specific gravity value (0.82), read vertically to the curve. Read horizontally to K_{sg}=1.1.

From the formula:

$$C_V = \frac{30\ (GPM)}{6 \times 1.1}$$

$$C_V = \frac{30}{6.6}$$

$$C_V = 4.5$$

Problem: Air and Gases

Determine C_V when the required flow is 700 SCFH, media is air (sg=1.0), inlet pressure (P_1) is 70 PSI, outlet pressure (P_2) is 55 PSI, ^3P (P_1 - P_2) = 15 PSI, and air is at 50°F.

Solution

Use the formula:

$$C_V = \frac{Q_g}{K_g \times K_{sg} \times K_t}$$

From the gas and steam flow curve using the inlet pressure (70 PSI), read horizontally to the curve for pressure drop (^3P=15 PSI). Read vertically down to Kg = 2025.

Air at (50°F) falls into an area of the temperature correction curve where K_t is approximately 1 and can be ignored.

$$C_V = \frac{700}{2025 \times 1.0}$$

$$C_V = \frac{700}{2025}$$

$$C_V = 0.35$$

Steam

Determine C_V when the required flow is 30 lb./hr., media is saturated steam, inlet pressure (P_1) is 80 PSI, outlet pressure (P_2) is 60 PSI and ^3P (P_1 - P_2) is 20 PSI.

Solution

Use the formula:

$$C_V = \frac{Q_S}{K_S}$$

Remembering that the gas and steam flow curves have been combined, from the gas and steam flow curve using the inlet pressure value (80 PSI) read horizontally to the curve for the pressure drop (^3P=20PSI). Read vertically down to K_S = 121.

From the formula:

$$C_V = \frac{30}{121}$$

$$C_V = 0.25$$

Formula Variations

The examples used here for liquids, gases, and steam show how to determine C_v. These same formulae can be transposed to determine other useful data once a specific value has been selected to meet the desired C_v (see formula variations table on page 59).

MEDIA	KNOWN	FIND	FORMULA	CURVE
Liquids	C_V, ^3P, K_{sg}	Q_L	$Q_L = C_V \times K_L \times K_{sg}$	Liquids
	P_1, C_V, Q_g, K_{sg}	^3P	$K_L = \frac{Q_L}{C_v \times K_{sg}}$	Liquids
	Apply K_L to the liquid factor curve with P_1 to find ^3P.			
Gases	C_V, K_g, K_{sg}, K_t	Q_g	$Q_g = C_V \times K_g \times K_{sg} \times K_t$	Gases
	P_1, C_V, Q_g, K_{sg}, K_t	^3P	$K_g = \frac{Q_g}{C_v \times K_{sg} \times K_t}$	Gases
	Apply K_g to the liquid factor curve with P_1 to find ^3P. After solving for P (pressure differential), a general rule of 2(^3P) will equal the minimum pressure for a required flow.			
Steam*	C_V, ^3P	Q_s	$Q_s = C_V \times K_s$	Gases Steam Scale
	P_1, C_V, Q_s	^3P	$K_s = \frac{Q_s}{C_v}$	Gases Steam Scale
	Apply K_s to the liquid factor curve with P_1 to find ^3P. **** In all cases, steam is considered saturated.***			

Specific Gravity For Liquids And Gases

	Liquid	Gas
Acetic Acid, 10%	1.01	-
Acetic Acid, Pure	1.06	-
Acetone	0.79	-
Acetylene	0.60	0.91
Alcohol Amyl	0.81	-
Alcohol Ethyl (Ethanol)	0.79	-
Alcohol Methyl (Methanol)	0.81	-
Ammonia	0.93	0.596
Ammonium Nitrate	1.72	-
Ammonium Phosphate	1.69	-
Argon Gas	1.40	1.379
Beer	1.01	-
Benzene Benzol (Benzene)	0.88	-
Butadiene (Gas)	0.65	2.00
Butane (L.P. Gas)	0.60	2.067
Carbon Dioxide Dry	-	1.53
Carbon Disulfide	1.26	-
Carbon Tetrachloride	1.59	-
Cellulube	0.91	-
Coffee	1.05	-
Corn Oil	0.92	-
Cottonseed Oil	0.90	-
Diesel Fuel	0.88	-
Distilled Water	1.00	0.62
Ethylene Glycol	1.11	-
Fatty Acids	0.92	-
Formaldehyde	0.82	-
Freon BF (Solvent)	1.57	-
Freon MF (Solvent)	1.48	-
Freon TF (Solvent)	1.57	-
Fuel Oils	0.88	-
Gasoline	0.68	-
Heptane (Liquid)	0.68	-
Hydraulic Oil	0.91	-
Hydrogen	0.07	0.0696
JP4-5 Fuel	0.79	-
Kerosene	0.81	-
Linseed Oil	0.94	-
Liquid petroleum Gas (LPG)	0.06	2.067
Mercury	13.6	-
Methane	0.50	0.554
Mineral Oil, USP	0.89	-
Motor Oil-SAE #10, etc.	0.89	-
Naptha	0.76	-
Natural Gas	0.55	0.554
Oxygen	1.15	1.105
Perchloroethylene	1.50	-
Petroleum Oils	0.89	-
Potassium Sulfate	1.05	-
Prestone Anti-Freeze	1.03	-
Propane	1.10	1.56
Pydraul (Mansanto)	1.28	-
Sodium Hydroxide (100%)	2.13	-
Sodium Hydroxide (50%) (Caustic Soda)	1.45	-
Steam Condensate	1.00	0.62
Stoddards Solvent	0.80	-
Sulfuric Acid (10%)	1.08	-
Toluene (Toluol)	0.87	-
Transmission Fluid (Type A)	0.90	-
Trichloroethylene	1.36	-
Turpentine	0.87	-
Vegetable oils	0.92	-
Vinegar	1.01	-
Water		
Carbonated	1.00	0.62
Distilled	1.00	0.62
Fresh	1.01	0.65
Boiler Feed	1.00	0.62
Return Condensate	1.00	0.62
Brackish	1.02	0.67
Sea	1.03	0.68

Saturated Steam Temperature Table

PSIA	PSIG	` Temp. °F	Heat of Sat. Liquid (BTU/lb)	Latent Heat of Evap. (BTU/lb)	Total Heat of Steam (BTU/lb)
15	1	213	181.2	969.7	1150.9
20	5	227	196.2	960.1	1156.3
30	15	250	218.9	945.2	1164.1
40	25	267	236.1	933.6	1169.7
50	35	281	250.2	923.9	1174.1
60	45	292	262.2	915.4	1177.6
70	55	302	272.7	907.8	1180.5
80	65	312	282.1	900.9	1183.0
90	75	320	290.7	894.6	1185.3
100	85	327	298.5	888.6	1187.1
110	95	334	305.8	883.1	1188.9
120	105	341	312.6	877.8	1190.4
130	115	347	319.0	872.8	1191.8
140	125	353	325.0	868.0	1193.0
150	135	358	330.6	863.5	1194.1

Fluid Compatibility

General Information

The following table lists many of the liquids and gases commonly considered for handling with solenoid valves. In some cases, specific limitations are listed, and in other cases, Gold Ring solenoid valves are not recommended. For media not listed in the tables, consult the factory for specific recommendations.

Trim Materials

Buna "N" (Nitrile) Symbol NBR

A soft synthetic compound, Buna "N" is the most widely used elastomer in industry today. Buna "N" is standard disc and diaphragm material in Gold Ring solenoid valves. It has excellent service characteristics for use with water, light oil and gas in a temperature range of (-10°F) to 180°F.

Ethylene Propylene Symbol EP

Introduced to the rubber industry in 1961, Ethylene Propylene is used primarily for applications involving hot water or steam service. It has excellent service characteristics for many liquids in a temperature range from (-10°F) to 300°F.

Viton* Symbol V

A soft fluoroelastomer, Viton was originally developed to handle hydrocarbons including gasoline, jet engine fuels and various solvents. It handles media in a broader temperature range than Ethylene Propylene. Its temperature range extends from (-10°F) to 350°F. Viton is also an ideal material for handling a wide range of chemical media.

Teflon* Symbol T

Another fluorocarbon, Teflon is available as a solid material or combined with fillers. Teflon will withstand chemical attack from almost any fluid. Its temperature range extends from (-320°F) to 350°F. Because it is not easily fabricated and known to have cold flow characteristics, its applications are limited.

**** DuPont Co. Trademark***

Neoprene Symbol CR

Most elastomers are resistant to either petroleum lubricants or oxygen. Neoprene has limited resistance to both. Combining wide spectrum of resistance with a temperature range of (-10°F) to 180°F account for its use in many applications.

Urethane Symbol U

A synthetic compound, Urethane is widely used where high strength and abrasive resistance are required. Its temperature range is similar to Buna "N" (-10°F) to 160°F.

Guide to Media and Material Compatibility for Gold Ring Solenoid Valves

Key:

A = Aluminum[1]

AT = Acetal

BR = Brass

C = Copper

CE = Celcon

CR = Neoprene

EP = Ethylene Propylene

NBR = Buna "N"

S = Silver

SS = Stainless Steel[2]

T = Teflon®

U = Urethane

V = Viton®

[1] ***Available by special order only.***

[2] ***Stainless Steel 302, 303, 305, 316***

Applications shown on the next page are based on known usage or authoritative sources. Factors of temperature, pressure and concentration may render material compatibility unacceptable.

Trim Material Availability by Valve Series

Pipe Size Series	Orifice NPT	Size	Food Grade EP	EP	T	V	CR	NBR
20	1/8-3/8	3/64-9/32	X	X	X*	X	X	X
20	3/8-3/4	5/16-3/4	X			X		X
22, 23, 24	3/8-1-1/2	5/8-1-1/2	X	X		X	X	X
25	1/4-3/8	11/32	X			X		X
25	3/8-1	1/2-1	X		X*			X
26	2-3	2-3				X		X
28	1/4-3/4	5/16-3/4						
30	1/8-1/4	All	X	X	X*	X	X	X
34	3/8-3/4	All	X			X		X
48	1/4	All						X

Note: Use of Teflon trim materials reduces catalog pressure ratings by 25%.
For alternate trim materials, consult factory.

SEAL MATERIAL DESIGNATIONS

ASTM Designation	Commercial Designations and/or Trade Names
NBR	Buna-N, Nitrile
EPDM	Ethylene Propylene
FKM	Fluorinated Hydrocarbon, Viton®
PCTFE	Kel-F
PTFE	Teflon®, Rulon®
PFPM	Kalrez
CR	Neoprene

Viton® and Teflon® are Dupont Co. trademarks. Rulon® AR is a Furon-Advanced Polymers Division trademark..

Materials of Construction

Liquid or Gas	Body	Trim	Shading Coil	Wetted Non-Metal	Limitations
Acetic Acid, 10%	SS	EP	S	CE	
Acetic Acid, Pure	SS	EP, T	S		Less corrosive than 10%
Acetone	SS, BR	EP, T	S, C	CE, AT	
Acetylene	SS	NBR, V	A	AT	
Alcohol Amyl	SS, BR	EP, V, T	S, C	AT	
Alcohol Ethyl (Ethanol)	SS, BR	NBR, EP, V, T	S, C	CE, AT	
Alcohol Methyl (Methanol)	SS, BR	NBR, EP, T	S, C	CE, AT	For high purity, use SS
Ammonia	SS, A	CR, T	A	CE	
Ammonium Nitrate	SS	NBR, EP, T	S	CE, AT	
Ammonium Phosphate	SS	NBR, EP, T	S	CE, AT	
Argon Gas	SS	NBR, CR	S	CE	For welding, standard brass construction acceptable.
Beer	SS, BR	NBR, T, V	C, A	CE, AT	
Benzene Benzol (Benzene)	SS, BR	V, T	S, C	CE	
Butadiene (Gas)	SS, BR	NBR, V	C	C	
Butane (L.P. Gas)	SS, BR	V, T	C, A	CE, AT	
Carbon Dioxide Dry	SS, BR	NBR, U, T	S, C	CE	
Carbon Disulfide	SS	U, V, T	A	CE, AT	
Carbon Tetrachloride	SS	V, T	S	CE, AT	
Carbonated Water	SS, BR	NBR, V, T	A		
Cellulube	SS, BR	EP, T	S, C		
Coffee	SS, BR	NBR, CR, V, T	S, C	CE	
Coke Oven Gas	SS	NBR, T, V	S	AT	
Corn Oil	SS, BR	NBR, V, T	S, C	CE, AT	
Cottonseed Oil	SS, BR	NBR, T	A	CE, AT	
Diesel Fuel	SS, BR	V, T	S, C	CE	
Distilled Water	SS	NBR, CR, T	S	CE	
Ethylene Glycol	SS, BR	NBR, EP, V, T	S, C	CE, AT	
Fatty Acids	SS	NBR, V, T	S	CE	
Formaldehyde	SS, BR	NBR, EP, U, T	S, C	CE	
Freon BF (Solvent)	SS, BR	V	S, C		
Freon MF (Solvent)	SS, BR	V	S, C		
Freon TF (Solvent)	SS, BR	NBR, V	S, C		
Fuel Oils	SS, BR	V, T	S, C	CE, AT	
Gasoline	SS, BR	V, T	S, C	CE, AT	
Grease	SS, BR	NBR, U, V, T	S	CE	
Heptane (Liquid)	SS, BR	NBR, V, T	S, C	CE	
Hydraulic Oil	SS, BR	NBR, U, V, T	S, C	CE, AT	
Hydrogen	SS, BR	NBR, V	S, C	CE, AT	Soft durameter seating
JP4-5 Fuel	SS, BR	V, T	S, C	CE, AT	
Kerosene	SS, BR	NBR, V, T	S, C	CE, AT	
Linseed Oil	SS, BR	NBR, T	S, C	CE, AT	
Liquid Petroleum Gas (LPG)	SS, BR	NBR, V	S, C		
Mercury	SS	NBR, T		CE, AT	Special construction-consult factory
Methane	SS, BR	NBR, V	S, C	CE	
Mineral Oil, USP	SS	NBR, V, T	S, C	CE	
Motor Oil-SAE #10, etc.	SS, BR	NBR, V	S, C	CE	
Naptha	SS, BR	V, T	S, C	CE	
Natural Gas	SS, BR	NBR	S, C	CE	Special construction
Oxygen	SS, BR	CR, V	S, C	CE, AT	Special cleaning
Perchloroethylene	SS, BR	V, T	S, C	CE, AT	No diaphragm valves
Petroleum Oils	SS, BR	NBR	S, C	CE	
Potassium Sulfate	SS	NBR, V, T	S, C	CE, AT	Non-compatible
Propane	SS, BR	NBR, V	C	CE, AT	Special construction
Pydraul (Mansanto)	SS, BR	V, T	S, C		
Silicone Oil	SS, BR	NBR, V	S, C	CE, AT	
Skydrol	SS, BR	EP	S, C		
Soap (Molten)	SS, BR	NBR, V, T	C	CE, AT	
Sodium Hydroxide (Caustic Soda)	SS	EP, T	S	CE	
Steam Condensate	BR	EP	C		
Stoddards Solvent	SS, BR	NBR, V			
Sulfuric Acid	A	V, T	A		Non-compatible
Toluene (Toluol)	SS, BR	V, T	S, C	CE, AT	
Transmission Fluid (Type A)	SS, BR	NBR	S, C	CE	
Trichloroethyene	SS	V,T	A	CE, AT	
Turpentine	SS, BR	NBR, T	S, C	CE	
Vegetable Oils	SS	EP, V, T	A	CE, AT	
Vinegar	SS	EP, T	S, C	AT	
Water					
Carbonated	SS, BR	NBR, V, T	C		
Distilled, Demineralized, Deionized	SS	EP, V, T	S	CE, AT	
Fresh	SS, BR	NBR, EP, V, T	S, C	CE, AT	
Boiler Feed	SS	NBR, T	S	CE	
Return Condensate	SS	NBR, EP, T	S	CE	
Brackish		T	S, C		Non-compatible
Sea		NBR, EP, V, T	S, C	CE, AT	Non-compatible

Consult factory for media not listed.

Part Number

1 & 2 Connection Size		3 Connection Type	4 Construction		5 Construction		6 Operation		7 Body Material		8 Trim		9 & 10 Orifice Size	11 Current Design Series Designation
02	1/8"	F Female Pipe Thread NPT	2	2-way	0	Direct Acting	C	Normally Closed	1	Brass (Bar Stock)	1	NBR	Valve orifice diameter in 1/64-inch increments. Example: a 1/2-inch orifice diameter has an orifice size designation of 32.	
04	1/4"		3	3-way	2	Diaphragm Center pilot	O	Normally Open	2	Brass (Forging)	2	FKM		
06	3/8"		4	4-way	3	Diaphragm Hung	U	Universal	3	303 Stainless Steel (Bar)	3	EPDM		
08	1/2"		H	Diaphragm, Hung	4	Diaphragm Offset pilot	S	4-Way Single Solenoid	5	Brass Nickel Plate	4	PTFE		
12	3/4"		5	Diaphragm, Pivoted Edge	5	Diaphragm Pivoted Edge			6	316 Stainless Steel (Cast)	5	Urethane		
16	1"		S	Steam	6	Piston			7	Aluminum (Bar Stock)	6	CR		
20	1 1/4"				8	Piston piloted			8	316 Stainless Steel (Bar)	8	FDA EPR		
24	1 1/2"								9	Bronze (Cast)	9	Kalrez		
32	2"										D	Delrin		
48	3"										K	KEL F		

12 Coil Wattage AC (nominal)		12 Coil Wattage DC (nominal)		13 Coil Class		14 Solenoid Enclosure		15 Coil Termination		16 & 17 Coil Voltage AC		16 & 17 Coil Voltage DC	
A	6 Watts	1	9.5 Watts	F	Standard (Class 155)	E	Explosion-Proof/Watertight			01	24/60	70	6
B	10.2 Watts	3	11.5 Watts	H	High Temperature (Class 180)	G	Type 1 Gen. Purpose	C	18" Leads (Standard)	02	24/50	75	12
C	11 Watts					M	316 SS Explosion-Proof/Watertight			05	110/50 120/60	80	24
D	16 Watts					O	Open Frame			10	208/60	90	120
						P	Epoxy Encapsulated	H	DIN	15	220/50 240/60	95	125
						S	Type 1 Splice Box	K	Screw	41	24/60 rectified		
						U	316 SS Explosion-Proof/Watertight	S	Spade	42	120/60 rectified		
						W	Submersible Splice Box			44	240/60 rectified		
						Y	Explosion-Proof/Watertight with Ground Lead			51	120-240/60		
						Z	Grounded M			53	240-480/60		
						4	Type 4, 4X						

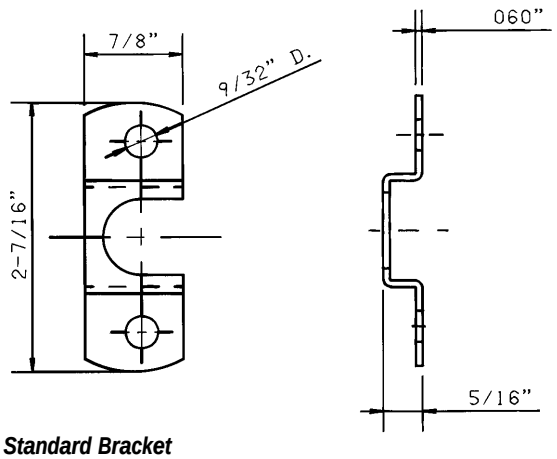
Notes:

All options are not available for all sizes and styles. Consult the appropriate sections in this catalog, or contact the factory. Minimums apply.

Options

Mounting Brackets

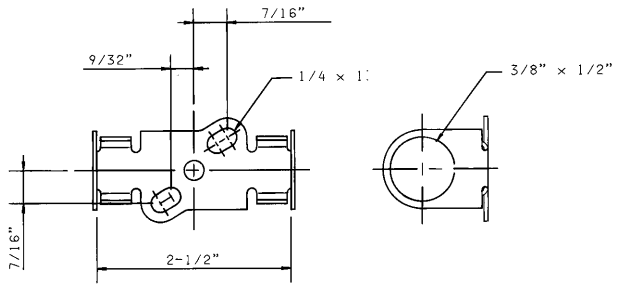
DRAWINGS



Standard Bracket

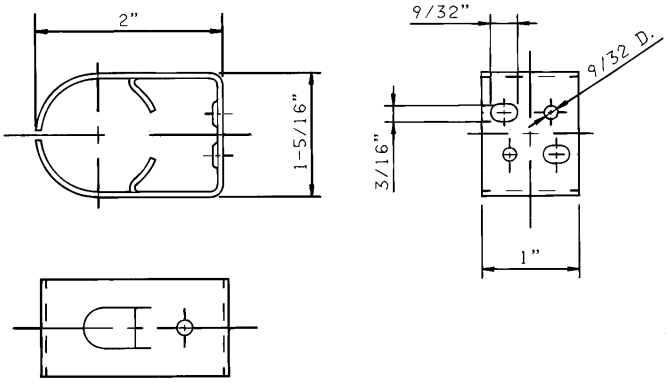
1/4" NPT Stainless Steel 3-Way
A, B or 1 wattage codes

P.N. AB99-002



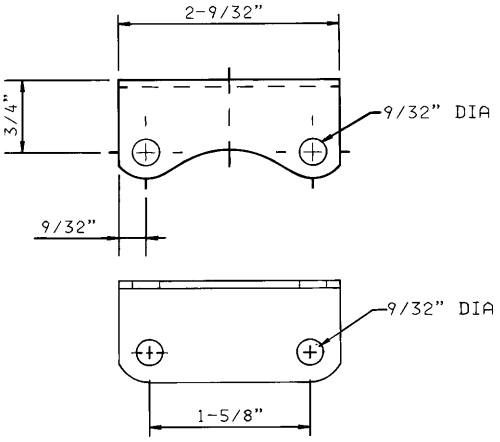
3/8" and 1/2" NPT Series S5 or 25
Available as "W" suffix option

P.N. MA99-007



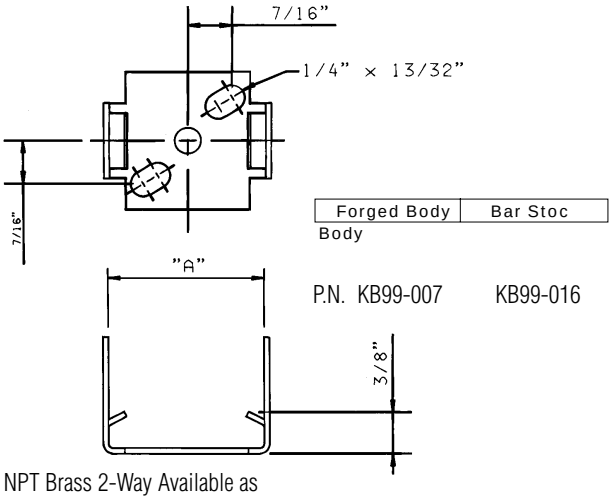
Standard Bracket
1/8" NPT 2-Way Normally Open
1/8" 3-Way

P.N. KC99-003



Series 22, 23 or 34 Available as
"W" suffix option

P.N. MA99-001



Forged Body	Bar Stoc
Body	

P.N. KB99-007 KB99-016

1/4" NPT Brass 2-Way Available as
"W" suffix option

Measures

1 inch = 25.4mm
1 inch = 2.54cm
1 U.S. gal = 3.785 liters
1 Imperial gallon = 4.546 liters

Pressure

1 psi = 0.0703 Kg/square cm
1 psi = 27.73 inches water (@60/F)
1 psi = 2.036 inches of mercury (@32/F)
1 psi = 51.7 mm of mercury (@32/F)
1 psi = 0.0689 bar

Vacuum

1 torr = 1 mm mercury
1 micron = 0.001 torr

Volumetric Flow Rate

1 Cv = 0.862 Kv
(Kv in $m^3/h5$)
1gpm = 0.00378 m^3/min

Temperature

Degrees C = (Degrees F-32) (5/9)
Degrees F = (Degrees C) (9/5) + 32

Torque

1 in lb. = 0.113 Nm
1 in lb. = 1.15 cm Kg

Unit Conversion Charts

Fractional Conversions

mm	inches	decim inches
0.79	1/32	0.031
1.59	1/16	0.063
2.38	3/32	0.094
3.18	1/8	0.125
3.97	5/32	0.156
4.76	3/16	0.188
5.56	7/32	0.219
6.35	1/4	.0250
7.14	9/32	0.281
7.94	5/16	0.313
8.73	11/32	0.344
9.53	3/8	0.375
10.3	13/32	0.406
11.1	7/16	0.438
11.9	15/32	0.469
12.7	1/2	0.500
13.5	17/32	0.531
14.3	9/16	0.563
15.1	19/32	0.594
15.9	5/8	0.625
16.7	21/32	0.656
17.5	11/16	0.688
18.3	23/32	0.719
19.1	3/4	0.750
19.8	25/32	0.781
20.6	13/16	0.813
21.4	27/32	0.844
22.2	7/8	0.875
23.0	29/32	0.906
23.8	15/16	0.938
24.6	31/32	0.969
25.4	1	1.000

Special Handling & Cleaning

Service	Description	Order By Specifying Suffix
Clean Systems	Valve components are degreased to eliminate hydrocarbons and foreign particles and are blacklight inspected. Valves are tested with clean nitrogen and are shipped in sealed bags.	H
Oxygen	Valve components are degreased to eliminate oils and foreign particles and are blacklight inspected. An oxygen compatible lubricant is used for assembly. Valves are tested with clean nitrogen, certified for oxygen service and shipped in sealed bags.	O
Degreasers	Valve components are degreased to eliminate hydrocarbons and foreign particles. They are assembled using a non-silicone base lubricant and tested with clean nitrogen. Shipped in a sealed bag.	Consult Factory

All series of valves can be ordered with special cleaning or handling. Valves for vacuum or cryogenic applications are supplied using appropriate cleaning and handling techniques.

Manual Operators

Manual operators are available for normally closed valves in the following series.

Series	Pipe Size	Screw Type (Suffix M)	Momentary to 100 psi (Suffix U)
22,23,	1/2"-3/4"	X	

Series 30 Manual Operators for Normally Closed, Normally Open or Universal Operation.
Series 20 Momentary Manual operators are available for Normally Open or Normally Closed operation (1.8" NPT)

Metal Clamp Solenoid Retainer-Suffix J

Metal solenoid retainers are available for high temperature applications or applications subject to vibration.

Troubleshooting Guide

Gold Ring solenoid valves are manufactured using the highest quality materials under close quality control. All Gold Ring valves are 100% tested prior to shipment. There are only two to four moving parts. The simplicity of operation makes Gold Ring valves reliable electro-mechanical devices. Failures, however, can occur. Experience has shown failure is usually the result of either improper installation or neglected maintenance.

This guide will assist you in properly diagnosing a failure and provide a proper solution to correct the failure.

The following general procedures must be followed whether the valve in question is direct-acting or pilot-operated.

General Troubleshooting Discussion

Note 1) If the valve fails to operate because of a burn-out or shorted coil, the cause of the burn-out must be determined before the new unit solenoid, or coil for explosion-proof valves, is installed. Usually the cause is in the mechanical portion of the unit body, therefore, the entire solenoid valve must be inspected.

Note 2) If the coil has failed, a complete Gold Ring unit solenoid, or coil for explosion-proof valves, should be installed. Be sure to turn off all electrical power in the valve circuit prior to any disassembly.

Note 3) If the solution requires the replacement of a defective part or parts, a complete Gold Ring rebuild kit should be used. Be sure all parts in the rebuild kit are installed in the valve, not only the part or parts deemed defective. As this procedure requires opening the valve body (pressure vessel), be sure to bleed all system pressure to zero. If either the plunger tube assembly or the bonnet screws are loosened to relieve trapped valve pressure, do so carefully. Do not completely remove the plunger tube assembly or the bonnet screws until the bleeding is complete. Refer to the appropriate I & M Sheet for instructions.

Note 4) In most installations, after a solenoid valve has been energized for a short time, the solenoid housing will be hot to the touch. This is not an indication of a failure or possible failure. It is perfectly normal.

Note 5) Regardless of system size, water hammer must be considered and controlled to protect piping systems and solenoid valves from its effects. Water hammer occurs when the flow of a non-compressible fluid in a pipe is abruptly stopped. Water hammer is not always identified by noise and vibration. Examine diaphragms, plunger discs and other internal parts for tears, distortion and other damage. Replace internal parts with a rebuild kit and modify the piping system. Commercially available water hammer arresters range from flexible rubber hose, a simple extension pipe to a type of permanently sealed chamber.

Hints

1.) Never replace a burned-out coil or unit solenoid until the cause of the burn-out has been determined, ie: missing parts, plugged plunger tube, worn plunger, over voltage, etc.
2.) Before reassembly of valve body, if possible, flush out inlet to valve.
3.) Use a flat screwdriver placed on top of plunger tube to test magnetic circuit.
4.) If the cause of failure is the presence of foreign matter, install a strainer or filter in the upstream (inlet) side of the valve.

Symptoms

Five basic symptoms indicate a solenoid valve is not operating properly to specifications:
1.) Failure to operate (shift position) when energized.
2.) Failure to operate (shift position) when de-energized.
3.) Internal or external leakage.
4.) Erratic flow.
5.) Excessive solenoid noise when energized even though any of the above symptoms does not exist. (In some AC installations, a very slight hum may be noticeable and is normal.)

Possible Failure Cause*

Failure Symptom*	Improper / No Voltage	Open / Shorted Coil	Faulty Electrical Circuit	Excessive Ambient / Media Temperature	Non-Compatible Media	Over Pressurization	Missing / Loose Solenoid Retainer	Incorrectly piped In System	Loose Body Assembly	Dirt In Valve / Media	Seat Erosion	Worn Disc	Worn Plunger / Tube / Pole Piece	Blocked Pilot Hole	Blocked Bleed Hole	Torn / Hole in Diaphragm	Inadequate Flow	Restricted Outlet	Restricted inlet
Fails to Close/Shift	X	X	X		X	X		X		X			X		X	X		X	X
Fails to Open/Shift	X	X	X		X	X				X			X	X		X	X	X	X
Internal Leakage					X					X	X	X	X		X	X			
External Leakage					X	X			X										
Excessive Noise/Hum	X		X			X	X			X			X						
Short Coil Life	X		X	X															
Series	All													22,23,24,25,S3,S5,26,28				34 & 48	

**** Partial list***

Note: This check list is intended to serve as a preliminary guide to common valve failure troubleshooting, and is not intended to contain recommendations for proper solenoid valve or systems operation or design. For proper solenoid valve usage, follow manufacturer's recommendations. Improper system design may result in ineffective valve operation.

Glossary of Terms

Bleed Orifice: An internal orifice which controls the closing rate of a pilot operated solenoid valve. Also called the equalizer hole.

Bonnet: The upper half of a diaphragm type solenoid valve.

Cv: See flow coefficient.

Diaphragm: An elastomeric or other material seal which covers the main orifice.

Elastomer: Material having elastic properties. These materials are generally used for sealing purposes.

Enclosure Tube Assembly: The portion of a solenoid valve which houses the plunger.

Flow Coefficient: Abbreviated Cv. The amount of flow in gpm of water that will flow through an orifice with a pressure differential of 1 psi.

Flux Frame: The magnetic steel frame surrounding the coil which provides for efficient travel of magnetic flux. Also called magnetic frame assembly.

Holding Current: The current required to hold the plunger in the energized position. Value is normally about one half of inrush current.

Inrush Current: The current at the moment of energization of AC voltage coils. This current is of greater value than holding current due to low inductance at the moment of energization. Supply transformers should be sized using this value.

Media: The fluid flowing through the valve.

MOP: Minimum operating pressure. The minimum pressure a pilot operated valve requires for proper operation.

MOPD: Maximum operating pressure differential. The maximum pressure differential between inlet and outlet that a valve is designed to operate against.

NEMA: National Electrical Manufacturers Association - Recommends suitable materials and constructions to meet coil enclosure installation types.

Pilot Orifice: An internal orifice which controls opening characteristics of a pilot operated solenoid valve. In a pilot operated solenoid, the plunger covers the pilot orifice.

Plunger: Moveable portion of a solenoid valve operator which controls media flow.

Pole Piece: The stationary half of the magnetic attractor inside the plunger tube.

Pressure Differential: The difference between inlet and outlet pressures.

Safe Working Pressure: Twenty percent of the pressure which causes external leakage. The valve is not expected to operate at this pressure unless the MOPD is a value less than the SWP.

Shading Ring: A single coil located in the pole piece in which a secondary flux wave is induced during AC current operation.

Solenoid: The electrical portion containing the coil and magnetic frame and/or enclosure.

Specific Gravity: The ratio of the mass of an equal volume of distilled water at 4°C or of a gas to an equal volume of air or hydrogen under prescribed conditions of temperature and pressure.

Viscosity: The amount of resistance to flow.

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2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment. The minimum order amount is $125.00 net, unless otherwise noted on the quotation .

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery. Shipments are made by common carrier. Any premium freight must be requested and paid for by the Buyer.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 2 years from the date of shipment to Buyer, or 2,000 hours of use, whichever expires first. Exception to this is the Angle Body Valve line has a 1 year warranty. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTA TION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTIBILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARIS. ING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEAL ING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.

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7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'events of Force Majeure]. Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

PD4099 9/88

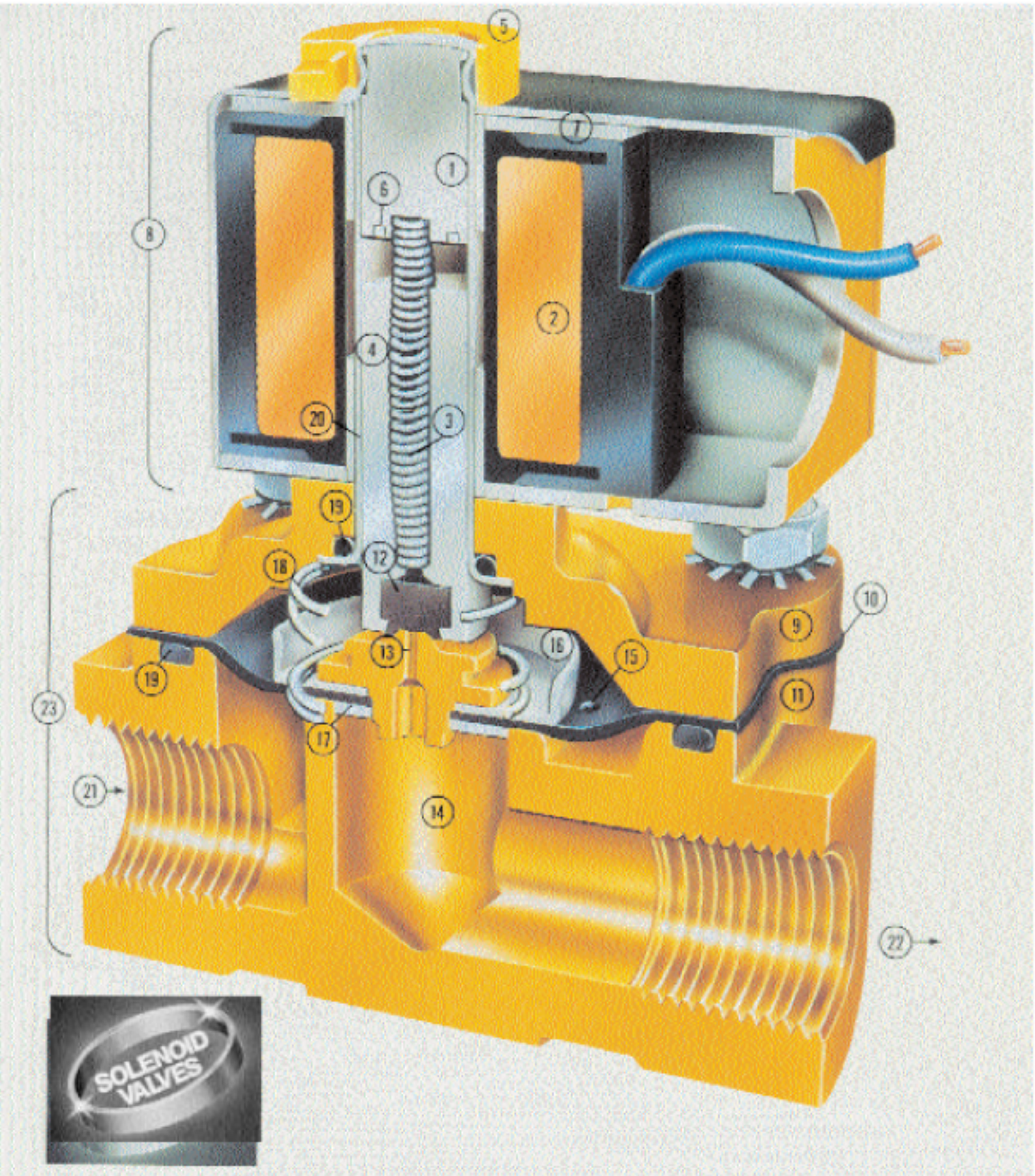
(Rev B)

Unit Solenoid

1. Pole Piece
2. Coil
3. Spring
4. Plunger
6. Shading Ring
7. Magnetic Frame Assembly
8. Unit Solenoid

Unit Valve

5. Gold Ring
9. Bonnet
10. Diaphragm
11. Valve Body
12. Disc.
13. Pilot Orifice
14. Main Orifice
15. Bleed Orifice
16. Diaphragm Cup
17. Diaphragm Support Washer
18. Diaphragm Return Assist Spring
19. O-ring Seal
20. Plunger Tube
21. Inlet
22. Outlet
23. Unit Valve



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Parker

CAT. 7900A 0707

Online: **www.parker.com/fcd**

AC Solenoid Specifications

Select One Code From Each Column

Enclosure	
4	Gold Ring II Totally Encapsulated
E	Explosion Proof Watertight
G	General Purpose
M	316 SS Explosion Proof Watertight
O	Open Frame
P	D.I.N.
S	Splice Box
U	316 SS Submersible
W	Submersible Splice Box
Y	Explosion Proof Watertight With Ground Lead
Z	M, With Ground Lead

Coil Termination	
K	Screw
S	Spade
H	D.I.N.
C*	Leads: 18”

* ***Only coil termination available for Long Life-Quiet Operating valves.***

Voltage	
01	24/60
02	24/50
05	120/60 110/50
10	208/60
15	240/60 220/50
20	480/60 440/50
51	120-240/60
53	240-480/60

Voltages for Long Life-Quiet Operating Valves	
41	24/60
42	120/60
44	240/60

DC Solenoid Specifications

Select One Code From Each Column

Enclosure	
4	Gold Ring II Totally Encapsulated
E	Explosion Proof Watertight
G	General Purpose
M	316 SS Explosion Proof Watertight
O	Open Frame
P	D.I.N.
S	Splice Box
U	316 SS Submersible
W	Submersible Splice Box
Y	Explosion Proof Watertight With Ground Lead
Z	M, With Ground Lead

Coil Termination	
K	Screw
S	Spade
H	D.I.N.
C	Leads: 18”

Voltage	
6	70
12	75
24	80
120	90
125	95

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Select One Code From Each Column

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G	General Purpose
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H	D.I.N.
C*	Leads: 18"

* *Only coil termination available for Long Life-Quiet Operating valves.*

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02	24/50
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15	240/60 220/50
20	480/60 440/50
51	120-240/60
53	240-480/60

Voltages for Long Life-Quiet Operating Valves	
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