March 2011 / **BULLETIN 30-10**

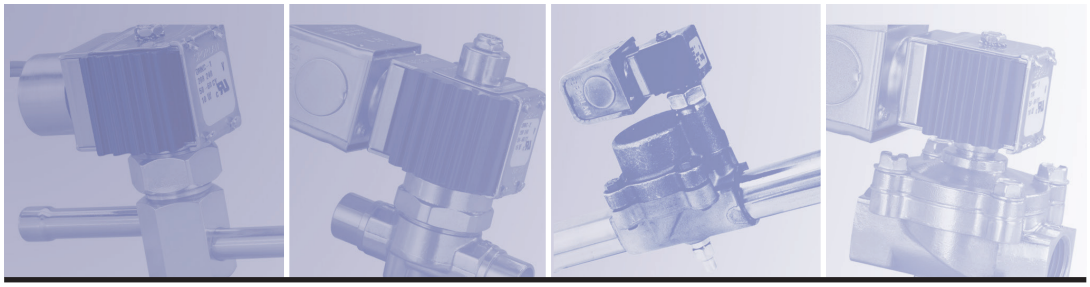
SPORLAN

Solenoid Valves

Parker

ENGINEERING YOUR SUCCESS.

Sporlan Solenoid Valves — Benefits



- Molded coil for most sizes.
- Class “F” temperature rating — Coil types MKC-1, MKC-2, and OMKC-2.
- Extremely rugged, simple design — few parts.
- “E” Series may be brazed without disassembly.
- Tight closing through use of synthetic seating material.
- Can be used with most commercially available CFC, HCFC and HFC refrigerants because of high MOPD ratings. Consult Sporlan, Washington, MO for refrigerants not listed.
- Synthetic coated metal gaskets minimize external leaks.

⚠WARNING – USER RESPONSIBILITY

Failure or improper selection or improper use of the products described herein or related items can cause death, personal injury and property damage.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

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FOR USE ON REFRIGERATION and/or AIR CONDITIONING SYSTEMS ONLY

Bulletin 30-10, February 2011, supersedes, Bulletin 30-10, April 2007 and all prior publications.

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Sporlan Solenoid Valves

SOLENOID VALVES

Installation and Service Instructions — Request Bulletin 30-11
3-Way Valves — Request Bulletin 30-20

NOT FOR USE WITH HAZARDOUS OR CORROSIVE FLUIDS

Sporlan Solenoid Valves — Features

Experience

For more than sixty-five years Sporlan has provided sound engineering principles and craftsmanship to produce top quality solenoid valves and other flow control devices for the air conditioning and refrigeration industry.

Continuing Research

Through continuing research Sporlan has produced constant product improvements as well as innovative designs. Examples of Sporlan's research developments include: synthetic coated metal gaskets; solenoid pilot control; synthetic seating; color coded lead wires; floating disc construction; extended solder type connections; Class "F" coil.

Peak Performance

To assure peak performance, Sporlan uses thoroughly proven synthetic materials, resulting in lasting valve seat tightness. The high MOPD ratings of most Sporlan Solenoid Valves allow their use on any application using the common refrigerants.

Unsurpassed Reliability

A combination of top quality materials used in both the internal and external construction ensures unsurpassed product reliability. This is verified by periodic accelerated life tests.

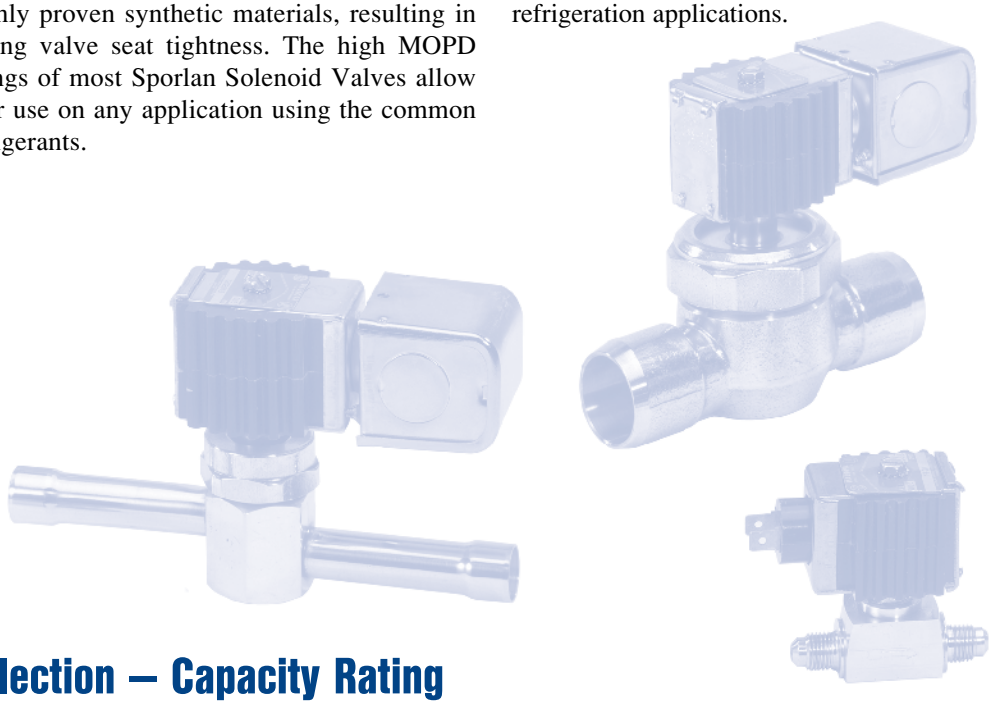
Top Quality

Testing is performed during all phases of production followed by 100% testing for body and seat tightness, electrical characteristics and valve operation.

Sporlan packaging protects this quality for the ultimate user.

Complete Line

Sporlan offers a complete line of solenoid valves to the industry. They are available in all capacities and connection sizes for air conditioning and refrigeration applications.



Selection — Capacity Rating

The following information should be available when selecting a Sporlan Solenoid Valve:

- Refrigerant or fluid to be controlled.
- Capacity required.
- MOPD – Maximum Operating Pressure Differential required.
- Electrical specifications – volts and cycles.

With this information, the correct valve can be selected from the Selection Tables.

For Liquid Line capacity data, see Page 4 and 5 and individual specification pages.

For Suction Line capacity data, see capacity tables Page 6 and 7.

For Discharge Gas capacity data, see capacity tables Page 6 and 7.

All solenoid valves are tested and rated in accordance with A.R.I. Standard No. 760-2001.

Liquid Capacity Selection Table

22, 134a, 401A, 402A

TYPE NUMBER						CONNECTIONS Inches	PORT SIZE Inches	TONS OF REFRIGERATION																			
"A" and "B" Series Valves			"E" Series Extended Connections					22					134a					401A					402A				
								PRESSURE DROP — psi*																			
Without Manual Lift Stem		With Manual Lift Stem	Without Manual Lift Stem		With Manual Lift Stem			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Normally Closed	Normally Open	Normally Closed	Normally Closed	Normally Open	Normally Closed																						
A3P1	---	---	---	---	---	3/8 NPT Female	.101	0.9	1.3	**1.6**	1.9	2.1	0.8	**1.2**	1.5	1.8	2.0	0.9	**1.3**	1.6	1.9	2.1	0.6	0.9	**1.1**	1.2	1.4
A3F1	---	---	---	---	---	1/4 SAE Flare																					
A3S1	---	---	E3S120	---	---	1/4 ODF Solder																					
	---	---	E3S130	---	---	3/8 ODF Solder																					
---	---	---	E5S120	---	---	1/4 ODF Solder	.150	1.6	2.3	**2.8**	3.3	3.6	1.5	**2.1**	2.6	3.0	3.4	1.6	**2.3**	2.8	3.3	3.7	1.1	1.5	**1.9**	2.1	2.4
---	---	---	E5S130	---	---	3/8 ODF Solder																					
B6P1	---	MB6P1	---	---	---	3/8 NPT Female	3/16	2.9	4.0	**4.9**	5.7	6.4	2.7	**3.8**	4.6	5.3	5.9	2.9	**4.1**	4.9	5.7	6.4	1.9	2.7	**3.3**	3.8	4.2
B6F1	---	MB6F1	---	---	---	3/8 SAE Flare																					
B6S1	---	MB6S1	E6S130	---	ME6S130	3/8 ODF Solder																					
	---		E6S140	---	ME6S140	1/2 ODF Solder																					
B9P2	OB9P2	MB9P2	---	---	---	3/8 NPT Female	9/32	4.7	6.6	**8.1**	9.3	10.4	4.4	**6.2**	7.5	8.7	9.7	4.7	**6.6**	8.1	9.3	10.4	3.1	4.4	**5.3**	6.2	6.9
B9F2	OB9F2	MB9F2	---	---	---	3/8 SAE Flare																					
---	---	---	E9S230	OE9S230	ME9S230	3/8 ODF Solder																					
B9S2	OB9S2	MB9S2	E9S240	OE9S240	ME9S240	1/2 ODF Solder																					
B10F2	OB10F2	MB10F2	---	---	---	1/2 SAE Flare	5/16	6.4	9.1	**11.1**	12.8	14.3	6.0	**8.5**	10.4	12.0	13.4	6.4	**9.1**	11.1	12.8	14.4	4.2	6.0	**7.3**	8.5	9.4
---	---	---	E10S240	OE10S240	ME10S240	1/2 ODF Solder																					
B10S2	OB10S2	MB10S2	E10S250	OE10S250	ME10S250	5/8 ODF Solder																					
B14P2	OB14P2	MB14P2	---	---	---	1/2 NPT Female	7/16	9.1	12.9	**15.8**	18.2	20.3	8.5	**12.0**	14.7	17.0	18.9	9.1	**12.9**	15.8	18.2	20.4	6.0	8.5	**10.4**	12.0	13.4
B14S2	OB14S2	MB14S2	E14S250	OE14S250	ME14S250	5/8 ODF Solder																					
B19S2	OB19S2	MB19S2	E19S250	OE19S250	ME19S250	5/8 ODF Solder	19/32	13.9	19.8	**24.2**	28.0	31.4	13.0	**18.4**	22.6	26.1	29.2	14.0	**19.8**	24.3	28.1	31.4	9.2	13.0	**16.0**	18.5	20.7
B19P2	OB19P2	MB19P2	---	---	---	3/4 NPT Female																					
B19S2	OB19S2	MB19S2	E19S270	OE19S270	ME19S270	7/8 ODF Solder																					
B25P2	OB25P2	MB25P2	---	---	---	1 NPT Female	25/32	23.8	33.8	**41.4**	47.8	53.5	22.2	**31.5**	38.6	44.6	49.9	23.9	**33.8**	41.4	47.9	53.6	15.7	22.2	**27.3**	31.5	35.3
B25S2	OB25S2	MB25S2	E25S270	OE25S270	ME25S270	7/8 ODF Solder																					
			E25S290	OE25S290	ME25S290	1-1/8 ODF Solder																					
---	---	---	E35S190	OE35S190	ME35S190	1-1/8 ODF Solder	1	38.9	56.8	**70.9**	83.0	93.7	36.3	**53.0**	66.2	77.4	87.4	39.0	**56.9**	71.0	83.1	93.8	25.6	37.3	**46.6**	54.5	61.5
			E35S1110	OE35S1110	ME35S1110	1-3/8 ODF Solder																					
			E42S2130	OE42S2130	ME42S2130	1-5/8 ODF Solder	1-15/16	60.9	82.3	**98.2**	111	123	56.7	**76.7**	91.5	104	114	61.0	**82.5**	98.0	112	123	40.4	54.6	**65.1**	73.8	81.4
			E42S2170	OE42S2170	ME42S2170	2-1/8 ODF Solder																					

*Do not use below 1 psi pressure drop, except Types A3 and E3 valves.
Liquid capacities for Refrigerants 22, 134a, 401A and 402A shown in the above table are based on 40°F evaporating and 100°F liquid case.

REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

Refrigerant Liquid Temperature °F ➧		40	50	60	70	80	90	100	110	120	130	140
R-22	Correction Factor	1.33	1.27	1.22	1.17	1.11	1.06	1.00	0.94	0.89	0.83	0.77
R-134a		1.39	1.33	1.26	1.20	1.13	1.07	1.00	0.93	0.87	0.80	0.73

Refrigerant Liquid Temperature °F ➧		40	50	60	70	80	90	100	110	120	130	140
R-401A	Correction Factor	1.34	1.29	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82	0.75
R-402A		1.57	1.48	1.39	1.29	1.20	1.10	1.00	0.90	0.79	0.68	0.56

These factors include corrections for liquid refrigerant density and net refrigerating effect and are based on an average evaporator temperature of 40°F. For each 10°F reduction in evaporating temperature, capacities are reduced by approximately 1-1/2%.

TYPE NUMBER						CONNECTIONS Inches	PORT SIZE Inches	TONS OF REFRIGERATION																				
"A" and "B" Series Valves			"E" Series Extended Connections					404A					407C					502					507				
Without Manual Lift Stem		With Manual Lift Stem	Without Manual Lift Stem		With Manual Lift Stem			PRESSURE DROP — psi*																				
Normally Closed	Normally Open	Normally Closed	Normally Closed	Normally Open	Normally Closed			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
A3P1	---	---	---	---	---	3/8 NPT Female	.101	0.6	0.9	**1.1**	1.2	1.4	0.8	1.2	**1.5**	1.7	1.9	0.6	0.8	**1.0**	1.2	1.4	0.6	0.8	**1.0**	1.2	1.4
A3F1	---	---	---	---	---	1/4 SAE Flare																					
A3S1	---	---	E3S120	---	---	1/4 ODF Solder																					
	---	---	E3S130	---	---	3/8 ODF Solder																					
---	---	---	E5S120	---	---	1/4 ODF Solder	.150	1.1	1.5	**1.9**	2.1	2.4	1.5	2.1	**2.6**	3.0	3.4	1.0	1.5	**1.8**	2.1	2.4	1.0	1.5	**1.8**	2.1	2.4
---	---	---	E5S130	---	---	3/8 ODF Solder																					
B6P1	---	MB6P1	---	---	---	3/8 NPT Female	3/16	1.9	2.7	**3.3**	3.8	4.2	2.6	3.7	**4.5**	5.2	5.8	1.9	2.6	**3.2**	3.7	4.1	1.9	2.6	**3.2**	3.7	4.1
B6F1	---	MB6F1	---	---	---	3/8 SAE Flare																					
B6S1	---	MB6S1	E6S130	---	ME6S130	3/8 ODF Solder																					
	---		E6S140	---	ME6S140	1/2 ODF Solder																					
B9P2	OB9P2	MB9P2	---	---	---	3/8 NPT Female	9/32	3.1	4.4	**5.4**	6.2	6.9	4.3	6.1	**7.4**	8.6	9.6	3.0	4.3	**5.2**	6.0	6.8	3.0	4.3	**5.2**	6.0	6.7
B9F2	OB9F2	MB9F2	---	---	---	3/8 SAE Flare																					
---	---	---	E9S230	OE9S230	ME9S230	3/8 ODF Solder																					
B9S2	OB9S2	MB9S2	E9S240	OE9S240	ME9S240	1/2 ODF Solder																					
B10F2	OB10F2	MB10F2	---	---	---	1/2 SAE Flare	5/16	4.2	6.0	**7.3**	8.5	9.5	5.9	8.3	**10.2**	11.8	13.2	4.2	5.9	**7.2**	8.3	9.3	4.2	5.9	**7.2**	8.3	9.3
---	---	---	E10S240	OE10S240	ME10S240	1/2 ODF Solder																					
B10S2	OB10S2	MB10S2	E10S250	OE10S250	ME10S250	5/8 ODF Solder																					
B14P2	OB14P2	MB14P2	---	---	---	1/2 NPT Female	7/16	6.0	8.5	**10.4**	12.0	13.4	8.4	11.8	**14.5**	16.7	18.7	5.9	8.4	**10.2**	11.8	13.2	5.9	8.3	**10.2**	11.8	13.2
B14S2	OB14S2	MB14S2	E14S250	OE14S250	ME14S250	5/8 ODF Solder																					
B19S2	OB19S2	MB19S2	E19S250	OE19S250	ME19S250	5/8 ODF Solder	19/32	9.2	13.1	**16.0**	18.5	20.7	12.8	18.2	**22.3**	25.8	28.8	9.0	12.8	**15.7**	18.2	20.3	9.0	12.8	**15.7**	18.1	20.3
B19P2	OB19P2	MB19P2	---	---	---	3/4 NPT Female																					
B19S2	OB19S2	MB19S2	E19S270	OE19S270	ME19S270	7/8 ODF Solder																					
B25P2	OB25P2	MB25P2	---	---	---	1 NPT Female	25/32	15.7	22.3	**27.4**	31.6	35.4	21.9	31.0	**38.0**	44.0	49.2	15.5	21.9	**26.8**	31.0	34.7	15.4	21.8	**26.8**	30.9	34.6
B25S2	OB25S2	MB25S2	E25S270	OE25S270	ME25S270	7/8 ODF Solder																					
			E25S290	OE25S290	ME25S290	1-1/8 ODF Solder																					
---	---	---	E35S190	OE35S190	ME35S190	1-1/8 ODF Solder	1	25.5	37.3	**46.5**	54.4	61.4	35.6	52.0	**64.8**	75.9	85.7	25.3	36.9	**46.0**	53.8	60.8	25.1	36.6	**45.6**	53.4	60.3
			E35S1110	OE35S1110	ME35S1110	1-3/8 ODF Solder																					
---	---	---	E42S2130	OE42S2130	ME42S2130	1-5/8 ODF Solder	1-5/16	40.8	55.2	**65.8**	74.6	82.2	56.4	76.3	**91.1**	103	114	39.5	53.4	**63.7**	72.2	79.5	39.8	53.8	**64.2**	72.8	80.2
---	---	---	E42S2170	OE42S2170	ME42S2170	2-1/8 ODF Solder																					

*Do not use below 1 psi pressure drop, except Types A3 and E3 valves.
Liquid capacities for Refrigerants 404A, 407C, 502 and 507 shown in the above table are based on 40°F evaporating and 100°F liquid.

REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

Refrigerant Liquid Temperature °F		40	50	60	70	80	90	100	110	120	130	140
R-404A	Correction Factor	1.58	1.49	1.39	1.30	1.20	1.10	1.00	0.90	0.79	0.68	0.57
R-407C		1.45	1.38	1.30	1.23	1.15	1.08	1.00	0.92	0.84	0.75	0.67

Refrigerant Liquid Temperature °F		40	50	60	70	80	90	100	110	120	130	140
R-502	Correction Factor	1.48	1.40	1.32	1.24	1.16	1.08	1.00	0.92	0.84	0.75	0.67
R-507		1.54	1.45	1.36	1.27	1.18	1.09	1.00	0.90	0.80	0.69	0.56

The **404A, 407C, 502,** and **507** factors include corrections for liquid refrigerant density and net refrigerating effect and are based on an average evaporator temperature of 40°F. For each 10°F reduction in evaporating temperature, capacities are reduced by approximately 1-1/2%.

Discharge Gas and Suction Capacities 22, 134a, 401A, 402A

VALVE SERIES	DISCHARGE GAS CAPACITIES — TONS Pressure Drop Across Valve — psi					
	2	5	10	25	50	100
REFRIGERANT 22						
A3 & E3	0.24	0.39	**0.56**	0.77	0.99	1.11
E5	0.45	0.71	**1.02**	1.83	2.36	2.69
B6 & E6	0.84	1.31	**1.85**	3.10	3.89	4.15
B9 & E9	1.35	2.13	**3.00**	4.65	6.20	7.71
B10 & E10	1.83	2.90	**4.09**	7.07	9.17	10.6
B14 & E14	2.62	4.13	**5.83**	9.72	12.8	15.5
B19 & E19	3.93	6.23	**8.84**	14.4	19.1	23.4
B25 & E25	6.74	10.7	**15.1**	23.0	30.5	37.4
E35	9.90	16.3	**23.8**	40.3	53.7	66.8
E42	21.0	33.1	**46.8**	67.2	89.0	109
REFRIGERANT 134a						
A3 & E3	0.20	0.32	**0.46**	0.60	0.71	0.72
E5	0.37	0.59	**0.84**	1.44	1.72	1.74
B6 & E6	0.70	1.09	**1.54**	2.39	2.70	2.70
B9 & E9	1.12	1.77	**2.50**	3.72	4.76	5.30
B10 & E10	1.52	2.41	**3.40**	5.56	6.74	6.92
B14 & E14	2.17	3.43	**4.84**	7.73	9.65	10.3
B19 & E19	3.26	5.17	**7.34**	11.5	14.5	15.8
B25 & E25	5.60	8.87	**12.6**	18.4	23.2	25.2
E35	8.1	13.4	**19.6**	32.1	40.8	44.9
E42	17.4	27.5	**38.9**	53.6	67.6	73.3
REFRIGERANT 401A						
A3 & E3	0.20	0.33	**0.47**	0.62	0.74	0.74
E5	0.38	0.61	**0.86**	1.48	1.77	1.81
B6 & E6	0.72	1.12	**1.58**	2.46	2.79	2.79
B9 & E9	1.15	1.82	**2.56**	3.83	4.90	5.49
B10 & E10	1.56	2.47	**3.49**	5.73	6.96	7.16
B14 & E14	2.23	3.52	**4.97**	7.95	9.96	10.6
B19 & E19	3.35	5.31	**7.53**	11.8	15.0	16.3
B25 & E25	5.74	9.11	**12.9**	18.9	23.9	26.1
E35	8.32	13.7	**20.0**	33.1	42.1	46.5
E42	17.9	28.3	**40.0**	55.1	69.7	75.9
REFRIGERANT 402A						
A3 & E3	0.21	0.34	**0.49**	0.68	0.89	1.05
E5	0.39	0.63	**0.89**	1.62	2.13	2.55
B6 & E6	0.73	1.14	**1.60**	2.76	3.55	3.99
B9 & E9	1.18	1.85	**2.61**	4.09	5.52	7.05
B10 & E10	1.60	2.52	**3.57**	6.26	8.25	9.99
B14 & E14	2.28	3.59	**5.07**	8.58	11.5	14.3
B19 & E19	3.43	5.45	**7.73**	12.7	17.1	21.5
B25 & E25	5.89	9.33	**13.2**	20.3	27.3	34.4
E35	8.82	14.5	**21.2**	35.5	47.9	61.3
E42	18.3	28.9	**40.8**	59.2	79.5	100

VALVE SERIES	SUCTION CAPACITY* — TONS 1 PSI Pressure Drop and Evaporating Temperatures				
	40°F	20°F	0°F	– 20°F	– 40°F
REFRIGERANT 22					
A3 & E3	0.11	0.09	0.07	0.05	0.04
E5	0.22	0.17	0.14	0.11	0.08
B6 & E6	0.42	0.34	0.27	0.21	0.16
B9 & E9	0.66	0.53	0.42	0.32	0.24
B10 & E10	0.91	0.73	0.57	0.44	0.33
B14 & E14	1.30	1.04	0.82	0.63	0.48
B19 & E19	1.94	1.54	1.21	0.93	0.70
B25 & E25	3.28	2.62	2.06	1.59	1.19
E35	4.60	3.61	2.78	2.10	1.54
E42	9.57	7.64	6.00	4.62	3.48
REFRIGERANT 134a					
A3 & E3	0.09	0.07	0.05	---	---
E5	0.17	0.13	0.10	---	---
B6 & E6	0.32	0.25	0.19	---	---
B9 & E9	0.51	0.39	0.30	---	---
B10 & E10	0.70	0.54	0.41	---	---
B14 & E14	1.00	0.77	0.58	---	---
B19 & E19	1.49	1.14	0.86	---	---
B25 & E25	2.53	1.94	1.46	---	---
E35	3.48	2.62	1.93	---	---
E42	7.36	5.66	4.26	---	---
REFRIGERANT 401A					
A3 & E3	0.09	0.07	0.05	---	---
E5	0.18	0.14	0.10	---	---
B6 & E6	0.34	0.26	0.20	---	---
B9 & E9	0.53	0.41	0.32	---	---
B10 & E10	0.73	0.57	0.44	---	---
B14 & E14	1.05	0.82	0.62	---	---
B19 & E19	1.55	1.21	0.92	---	---
B25 & E25	2.63	2.05	1.57	---	---
E35	3.62	2.76	2.07	---	---
E42	7.68	5.98	4.57	---	---
REFRIGERANT 402A					
A3 & E3	0.09	0.07	0.06	0.04	0.03
E5	0.19	0.15	0.11	0.08	0.06
B6 & E6	0.36	0.28	0.22	0.16	0.12
B9 & E9	0.57	0.44	0.34	0.25	0.19
B10 & E10	0.78	0.61	0.47	0.35	0.25
B14 & E14	1.11	0.87	0.67	0.50	0.37
B19 & E19	1.66	1.29	0.99	0.74	0.54
B25 & E25	2.80	2.19	1.67	1.26	0.92
E35	4.01	3.07	2.31	1.69	1.21
E42	8.18	6.37	4.88	3.66	2.67

*Minimum operating capacity is at one psi pressure drop for pilot operated valves.

EVAPORATOR TEMPERATURE CORRECTION FACTORS

Evaporator Temperature °F	40	30	20	10	0	– 10	– 20	– 30	– 40
Multiplier	1.00	0.96	0.93	0.90	0.87	0.84	0.81	0.78	0.75

Capacities based on 100°F condensing temperature, isentropic compression plus 50°F, 40°F evaporator and 65°F suction gas. For capacities at other conditions use the multipliers in table at left.

404A, 407C, 502, 507 Discharge Gas and Suction Capacities

VALVE SERIES	DISCHARGE GAS CAPACITIES — TONS Pressure Drop Across Valve — psi					
	2	5	10	25	50	100
REFRIGERANT 404A						
A3 & E3	0.22	0.35	**0.51**	0.70	0.91	1.06
E5	0.40	0.64	**0.91**	1.66	2.17	2.56
B6 & E6	0.75	1.17	**1.65**	2.82	3.60	3.99
B9 & E9	1.21	1.90	**2.68**	4.19	5.64	7.16
B10 & E10	1.64	2.59	**3.66**	6.40	8.41	10.1
B14 & E14	2.34	3.69	**5.21**	8.79	11.7	14.5
B19 & E19	3.53	5.59	**7.93**	13.0	17.4	21.8
B25 & E25	6.04	9.60	**13.6**	20.8	27.8	34.9
E35	9.03	14.9	**21.7**	36.4	49.0	62.2
E42	18.8	29.7	**41.9**	60.7	81.1	102
REFRIGERANT 407C						
A3 & E3	0.24	0.38	**0.55**	0.76	0.96	1.06
E5	0.44	0.71	**1.00**	1.80	2.31	2.58
B6 & E6	0.83	1.30	**1.83**	3.05	3.78	3.98
B9 & E9	1.34	2.10	**2.97**	4.58	6.08	7.49
B10 & E10	1.81	2.86	**4.05**	6.95	8.96	10.21
B14 & E14	2.59	4.08	**5.76**	9.57	12.6	15.0
B19 & E19	3.88	6.16	**8.74**	14.2	18.7	22.7
B25 & E25	6.66	10.6	**15.0**	22.7	29.9	36.3
E35	9.79	16.1	**23.6**	39.6	52.7	64.9
E42	20.7	32.7	**46.3**	66.1	87.3	106
REFRIGERANT 502						
A3 & E3	0.19	0.31	**0.45**	0.62	0.80	0.91
E5	0.36	0.57	**0.81**	1.47	1.90	2.20
B6 & E6	0.66	1.04	**1.46**	2.49	3.14	3.41
B9 & E9	1.07	1.69	**2.38**	3.71	4.97	6.24
B10 & E10	1.46	2.30	**3.26**	5.66	7.38	8.68
B14 & E14	2.08	3.28	**4.63**	7.77	10.3	12.6
B19 & E19	3.13	4.97	**7.05**	11.5	15.3	19.0
B25 & E25	5.37	8.51	**12.1**	18.4	24.5	30.3
E35	8.03	13.2	**19.3**	32.2	43.1	54.1
E42	16.7	26.4	**37.3**	53.7	71.4	88.4
REFRIGERANT 507						
A3 & E3	0.21	0.34	**0.49**	0.68	0.89	1.04
E5	0.39	0.63	**0.89**	1.62	2.12	2.51
B6 & E6	0.73	1.14	**1.60**	2.75	3.52	3.92
B9 & E9	1.18	1.85	**2.61**	4.09	5.50	6.99
B10 & E10	1.60	2.52	**3.57**	6.24	8.21	9.86
B14 & E14	2.28	3.59	**5.07**	8.56	11.4	14.2
B19 & E19	3.43	5.45	**7.72**	12.7	17.0	21.3
B25 & E25	5.88	9.30	**13.2**	20.3	27.1	34.1
E35	8.81	14.3	**21.2**	35.5	47.8	60.8
E42	18.3	28.9	**40.8**	59.1	79.1	99.3

VALVE SERIES	SUCTION CAPACITY* — TONS 1 PSI Pressure Drop and Evaporating Temperatures				
	40°F	20°F	0°F	– 20°F	– 40°F
REFRIGERANT 404A					
A3 & E3	0.10	0.07	0.06	0.04	0.03
E5	0.19	0.15	0.11	0.08	0.06
B6 & E6	0.36	0.28	0.22	0.16	0.12
B9 & E9	0.58	0.45	0.34	0.25	0.18
B10 & E10	0.79	0.61	0.47	0.35	0.25
B14 & E14	1.13	0.88	0.67	0.50	0.36
B19 & E19	1.69	1.30	0.99	0.74	0.53
B25 & E25	2.86	2.21	1.68	1.26	0.91
E35	4.07	3.09	2.31	1.69	1.20
E42	8.33	6.45	4.91	3.66	2.65
REFRIGERANT 407C					
A3 & E3	0.10	0.08	0.06	0.04	---
E5	0.20	0.16	0.12	0.09	---
B6 & E6	0.39	0.30	0.23	0.17	---
B9 & E9	0.62	0.48	0.36	0.27	---
B10 & E10	0.85	0.66	0.50	0.37	---
B14 & E14	1.21	0.94	0.72	0.54	---
B19 & E19	1.80	1.40	1.06	0.79	---
B25 & E25	3.06	2.37	1.81	1.35	---
E35	4.27	3.25	2.43	1.77	---
E42	8.92	6.92	5.27	3.92	---
REFRIGERANT 502					
A3 & E3	0.09	0.07	0.05	0.04	0.03
E5	0.17	0.14	0.11	0.08	0.06
B6 & E6	0.33	0.26	0.20	0.15	0.11
B9 & E9	0.52	0.41	0.32	0.24	0.18
B10 & E10	0.72	0.57	0.44	0.33	0.25
B14 & E14	1.03	0.81	0.63	0.47	0.35
B19 & E19	1.54	1.21	0.93	0.70	0.52
B25 & E25	2.60	2.04	1.58	1.19	0.88
E35	3.72	2.87	2.17	1.61	1.16
E42	7.59	5.95	4.60	3.48	2.57
REFRIGERANT 507					
A3 & E3	0.09	0.07	0.06	0.04	0.03
E5	0.19	0.15	0.11	0.08	0.06
B6 & E6	0.36	0.28	0.21	0.16	0.12
B9 & E9	0.56	0.44	0.33	0.25	0.18
B10 & E10	0.78	0.60	0.46	0.34	0.25
B14 & E14	1.11	0.86	0.66	0.49	0.36
B19 & E19	1.65	1.28	0.98	0.73	0.53
B25 & E25	2.80	2.17	1.66	1.24	0.90
E35	4.00	3.04	2.28	1.67	1.19
E42	8.16	6.33	4.83	3.61	2.62

*Minimum operating capacity is at one psi pressure drop for pilot operated valves.

EVAPORATOR TEMPERATURE CORRECTION FACTORS

Evaporator Temperature °F	40	30	20	10	0	– 10	– 20	– 30	– 40
Multiplier	1.00	0.96	0.93	0.90	0.87	0.84	0.81	0.78	0.75

Capacities based on 100°F condensing temperature, isentropic compression plus 50°F, 40°F evaporator and 65°F suction gas. For capacities at other conditions use the multipliers in table at left.

Types A3, E3 and E5 Series

22, 134a, 401A, 402A, 404A, 407C, 502, 507

Type A3P1

Type A3F1

Type E3S130
or E5S130

UL and CSA Listed
CE Approved

Application

Types A3 and E3 series are hermetic, direct-acting type solenoid valves primarily for refrigeration and air conditioning applications. The flow rate of the E3 and A3 are identical, therefore, the E3 may be freely substituted for the A3.

The **E5** series are compact solenoid valves with pilot operated disc construction and are rated at 2.8 tons R-22 at 3 psi pressure drop vs. 1.6 for the A3S1. These valves **may be mounted horizontally, on their side or in a vertical line.**

The **Types E3 and E5** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E3"** and **"E5"** series can be installed using either low or no silver content brazing alloy.

The MKC-l coil is Class "F" temperature rated and is provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

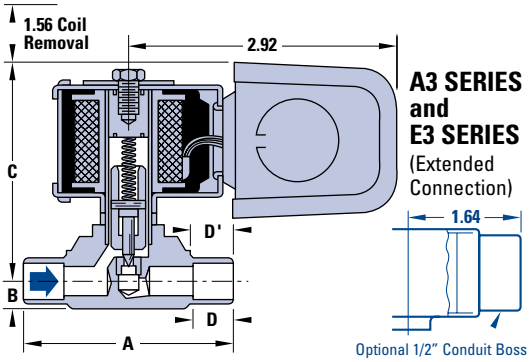
When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

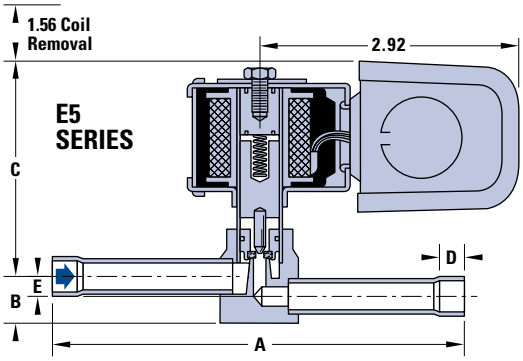
When ordering Body Assembly, specify Valve Type and Connections.

When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-1 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE		A	B	C	D FITTING DEPTH ODF	D' FITTING DEPTH ODM	E OFFSET
A3	A3P1		1.88	0.44	2.20	–		–
	A3S1	1/4 ODF	2.07	0.28	2.36	0.44		
		3/8 ODF	2.25					
	A3F1		2.38	0.22	2.42	–		
E3	E3S120		4.63	0.55	2.04	0.31	–	0.28
	E3S130		4.56	0.49	2.10			0.19
E5	E5S120		4.63	0.53	2.48			0.23
	E5S130		4.56					





Specifications – MKC-1 Coil

VALVE SERIES	TYPE	CONNECTIONS Inches Sizes shown in BLUE will be furnished unless otherwise specified.	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration								COIL RATINGS		
						REFRIGERANTS										
						22	134a	401A	402A	404A	407C	502	507			
						Pressure Drop – psi										
				AC	DC	3	2	2	3	3	3	3	3	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
A3	A3P1	3/8 NPT Female	.101	300	175	1.6	1.2	1.3	1.1	1.1	1.5	1.0	1.0	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	10	15
	A3S1	1/4 ODF - 3/8 ODM & 3/8 ODF - 1/2 ODM														
	A3F1	1/4 SAE Flare														
E3	E3S120	1/4 ODF X 1/4 ODF														
	E3S130	3/8 ODF X 3/8 ODF														
E5	E5S120	1/4 ODF X 1/4 ODF	.150	300	175	2.8	2.1	2.3	1.9	1.9	2.6	1.8	1.8			
	E5S130	3/8 ODF X 3/8 ODF														

- Maximum rated pressure 500 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- See Pages 19 and 20 for water and steam valves.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.
- For mounting holes and/or bracket information see Bulletin 30-11.
- E3 and E5 series with mounting holes are NOT standard.

22, 134a, 401A, 402A, 404A, 407C, 502, 507 — Types B6 and E6 Series

Application

Types B6 and E6 Series are compact solenoid valves with pilot operated disc construction for refrigeration and air conditioning. These valves **may be mounted horizontally, on their side or in a vertical line.** They are suitable for suction line service because very low pressure differential, 1 psi, is required for full operation.

The **Type E6** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E6"** series can be installed without disassembly using either low or no silver content brazing alloy.

The MKC-1 coil is Class "F" temperature rated and is provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

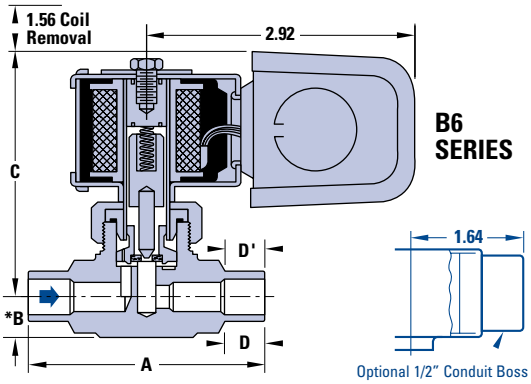
When ordering Body Assembly, specify Valve Type and Connections.

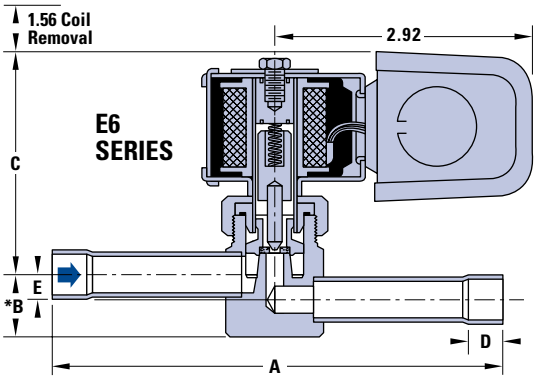
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-1 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE		A	*B	C	D FITTING DEPTH ODF	D FITTING DEPTH ODM	D' FITTING DEPTH	E OFFSET
B6	B6P1		1.94	0.44	2.66	–			–
	B6S1	3/8 ODF	2.50			0.44			
		1/2 ODF				0.50			
	B6F1					–			
E6	E6S130		4.63	0.75	2.44	0.31	–		0.31
	E6S140		5.00			0.38			

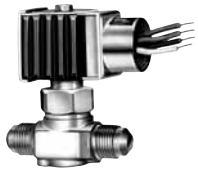
*Add 1.12" for Valves with Manual Lift Stem.






Type B6S1


Type E6S130


Type B6F1

UL and CSA Listed
CE Approved

Specifications – MKC-1 Coil

VALVE SERIES	TYPE	CONNECTIONS Inches Sizes shown in BLUE will be furnished unless otherwise specified.	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration								COIL RATINGS		
						REFRIGERANTS										
						22	134a	401A	402A	404A	407C	502	507			
						Pressure Drop – psi										
				AC	DC	3	2	2	3	3	3	3	3	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
B6	B6P1	3/8 NPT Female	3/16	300	175	4.9	3.8	4.1	3.3	3.3	4.5	3.2	3.2	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	10	15
	B6S1	3/8 ODF - 1/2 ODM & 1/2 ODF - 5/8 ODM														
	MB6S1															
	B6F1	3/8 SAE Flare														
	MB6F1															
E6	E6S130	3/8 ODF X 3/8 ODF														
	ME6S130															
	E6S140	1/2 ODF X 1/2 ODF														
	ME6S140															

- Maximum rated pressure 500 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- See Pages 19 and 20 for water and steam valves.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.
- For mounting holes and/or bracket information see Bulletin 30-11.
- E6 series with mounting holes are NOT standard.

Types B9 and E9 Series

22, 134a, 401A, 402A, 404A, 407C, 502, 507

Type OB9S2
Normally Open

Type MB9S2
Normally Closed

Type E9S240
Normally Closed

UL and CSA Listed
CE Approved

Application

Types B9 and E9 Series are compact solenoid valves with pilot operated disc construction for refrigeration and air conditioning. These valves **may be mounted horizontally, on their side or in a vertical line.** These valves are also suitable for suction line service because very low pressure differential, 1 psi, is required for full operation.

The **Type E9** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E9"** series can be installed without disassembly using either low or no silver content brazing alloy.

The MKC-2 and OMKC-2 coils are Class "F" temperature rated and are provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

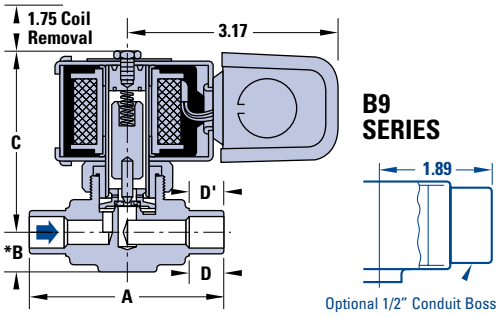
When ordering Body Assembly, specify Valve Type and Connections.

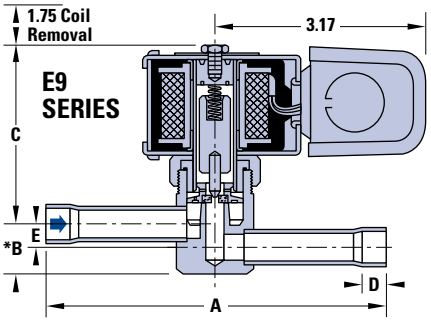
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-2 120/50-60; OMKC-2 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE	A	*B	C		D	D'	E
				NORMALLY CLOSED	NORMALLY OPEN	FITTING DEPTH ODF	FITTING DEPTH ODM	OFFSET
B9	B9P2	2.06	0.56	2.75	3.36	–		–
	B9S2	2.88				0.50		
	B9F2	2.88				–		
E9	E9S230	4.63	0.81	2.65	3.24	0.31	–	0.38
	E9S240	5.00	0.75	2.70	3.30	0.38		0.31
	E9S250	6.50	0.69	2.24	3.33	0.50		

*Add 1.12" for Valves with Manual Lift Stem.





Specifications – MKC-2 and OMKC-2 Coil

VALVE SERIES	TYPE	STANDARD CONNECTIONS Inches	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration								COIL RATINGS		
						REFRIGERANTS										
						22	134a	401A	402A	404A	407C	502	507			
						Pressure Drop – psi										
				AC	DC	3	2	2	3	3	3	3	3	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
B9	B9P2	3/8 NPT Female	9/32	300	250	8.1	6.2	6.6	5.3	5.4	7.4	5.2	5.2	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	15	18
	B9S2	1/2 ODF - 5/8 ODM		300	250											
	MB9S2															
	OB9S2			275												
	B9F2	3/8 SAE Flare		300	250											
	MB9F2															
E9	E9S230	3/8 ODF X 3/8 ODF		300	250											
	ME9S230															
	OE9S230															
	E9S240	1/2 ODF X 1/2 ODF														
	ME9S240															
	OE9S240			275												
	ME9S250	5/8 ODF X 5/8 ODF		300	250											
	OE9S250			275												

- Maximum rated pressure 500 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- See Pages 19 and 20 for water and steam valves.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.
- For mounting holes and/or bracket information see Bulletin 30-11.
- E9 series with mounting holes are NOT standard.

22, 134a, 401A, 402A, 404A, 407C, 502, 507 — Types B10 and E10 Series

Application

Types B10 and E10 Series are compact solenoid valves with pilot operated disc construction for refrigeration and air conditioning. These valves **may be mounted horizontally, on their side or in a vertical line.** They are suitable for suction line service because very low pressure differential, 1 psi, is required for full operation.

The **Type E10** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E10"** series can be installed without disassembly using either low or no silver content brazing alloy.

The MKC-2 and OMKC-2 coil are Class "F" temperature rated and are provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

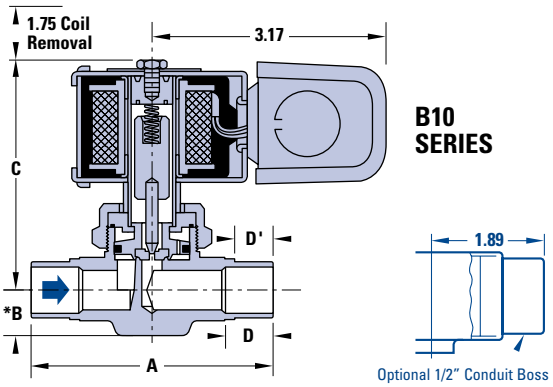
When ordering Body Assembly, specify Valve Type and Connections.

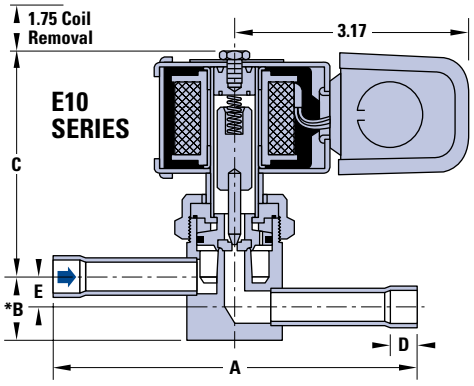
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-2 120/50-60; OMKC-2 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE	A	*B	C		D	D'	E
				NORMALLY CLOSED	NORMALLY OPEN	FITTING DEPTH ODF	FITTING DEPTH ODM	OFFSET
B10	B10S2	3.25	0.59	3.15	3.44	0.62	0.50	–
	B10F2					–		
E10	E10S240	5.00	0.86	3.13	3.42	0.38	–	0.39
	E10S250	6.50				0.50		

*Add 1.12" for Valves with Manual Lift Stem.





Type MB10S2
Normally Closed

Type E10S250
Normally Closed

Type OB10S2
Normally Open

UL and CSA Listed
CE Approved

Specifications — MKC-2 and OMKC-2 Coil

VALVE SERIES	TYPE	STANDARD CONNECTIONS Inches	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration								COIL RATINGS		
						REFRIGERANTS										
						22	134a	401A	402A	404A	407C	502	507			
						Pressure Drop – psi										
				AC	DC	3	2	2	3	3	3	3	3	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
B10	B10S2	5/8 ODF - 3/4 ODM	5/16	300	250	11.1	8.5	9.1	7.3	7.3	10.2	7.2	7.2	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	15	18
	MB10S2															
	B10F2	1/2 SAE Flare		300	250											
	MB10F2															
E10	E10S240	1/2 ODF X 1/2 ODF		300	250											
	ME10S240															
	OE10S240			275												
	E10S250	5/8 ODF X 5/8 ODF		300	250											
	ME10S250															
	OE10S250			275												

- Maximum rated pressure 500 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- See Pages 19 and 20 for water and steam valves.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.
- For mounting holes and/or bracket information see Bulletin 30-11.

Types B14 and E14 Series

22, 134a, 401A, 402A, 404A, 407C, 502, 507

Type E14S250
Normally Closed

Type MB14S2
Normally Closed

Type OB14S2
Normally Open

UL and CSA Listed
CE Approved

Application

Types B14 and E14 Series are compact solenoid valves with pilot operated disc construction for refrigeration and air conditioning. These valves **may be mounted horizontally, on their side or in a vertical line.** These valves are also suitable for suction line service because very low pressure differential, 1 psi, is required for full operation.

The **Type E14** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E14"** series can be installed without disassembly using either low or no silver content brazing alloy.

The MKC-2 and OMKC-2 coils are Class "F" temperature rated and are provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

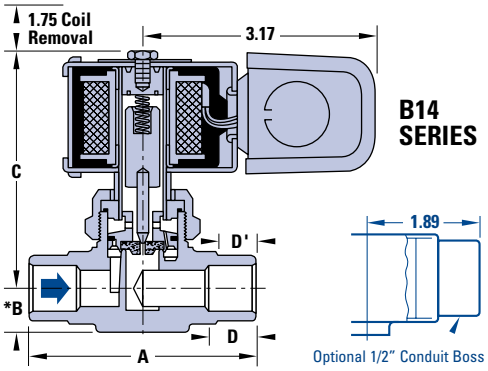
When ordering Body Assembly, specify Valve Type and Connections.

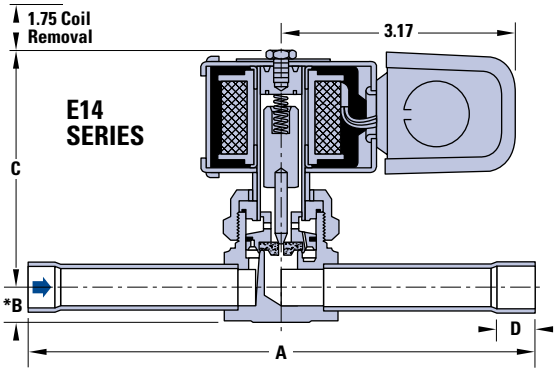
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-2 120/50-60; OMKC-2 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE	A	*B	C		D	D'
				NORMALLY CLOSED	NORMALLY OPEN	FITTING DEPTH ODF	FITTING DEPTH ODM
B14	B14P2	2.41	0.56	3.28	3.62	–	
	B14S2	3.00				0.62	0.50
E14	E14S250	6.88	0.47	3.25	3.51	0.50	–

*Add 1.12" for Valves with Manual Lift Stem.





Specifications – MKC-2 and OMKC-2 Coil

VALVE SERIES	TYPE	STANDARD CONNECTIONS Inches	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration – Pressure Drop – psi								COIL RATINGS		
						22	134a	401A	402A	404A	407C	502	507	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
				AC	DC	3	2	2	3	3	3	3	3			
B14	B14P2	1/2 NPT Female	7/16	300	250	15.8	12.0	12.9	10.4	10.4	14.5	10.2	10.2	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	15	18
	B14S2	5/8 ODF - 7/8 ODM		300	250											
	MB14S2			275												
	OB14S2															
E14	E14S250	5/8 ODF X 5/8 ODF		300	250											
	ME14S250			275												
	OE14S250															
	E14S270	7/8 ODF X 7/8 ODF		300	250											
	ME14S270															

- Maximum rated pressure 500 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- See Pages 19 and 20 for water and steam valves.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.
- For mounting holes and/or bracket information see Bulletin 30-11.

22, 134a, 401A, 402A, 404A, 407C, 502, 507 Types B19 and E19 Series

Application

Types B19 and E19 Series are pilot operated solenoid valves for refrigeration and air conditioning applications. They are suitable for suction service because very low pressure differential, 1 psi, is required for full operation. These valves **may be mounted horizontally, on their side or in a vertical line.**

The **Type E19** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E19"** series can be installed without disassembly using either low or no silver content brazing alloy.

The MKC-2 and OMKC-2 coil are Class "F" temperature rated and are provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

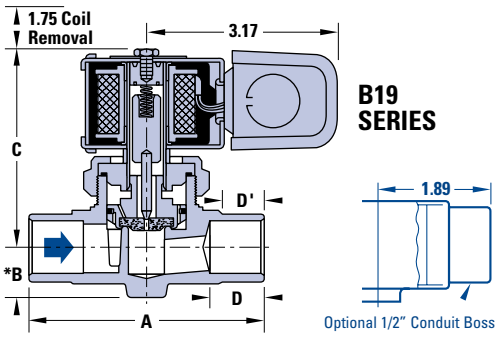
When ordering Body Assembly, specify Valve Type and Connections.

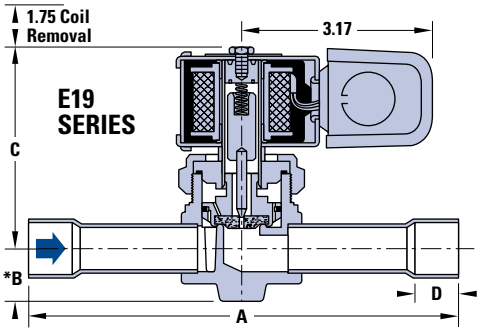
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-2 120/50-60; OMKC-2 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE		A	*B	C NORMALLY CLOSED	C NORMALLY OPEN	D FITTING DEPTH ODF	D' FITTING DEPTH ODM
B19	B19P2		3.00	0.81	3.31	3.83	–	
	B19S2	5/8 ODF	3.87				0.62	
		7/8 ODF					0.88	0.75
E19	E19S250		6.88		3.41	3.87	0.50	–
	E19S270		7.13				0.75	–

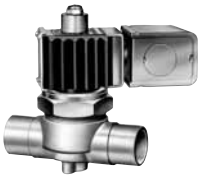
*Add 1.12" for Valves with Manual Lift Stem.





Type E19S250
Normally Closed

Type MB19S2
Normally Closed



Type OB19S2
Normally Open

UL and CSA Listed
CE Approved

Specifications – MKC-2 and OMKC-2 Coil

VALVE SERIES	TYPE	CONNECTIONS Inches Sizes shown in BLUE will be furnished unless otherwise specified.	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration REFRIGERANTS Pressure Drop – psi								COIL RATINGS		
						22	134a	401A	402A	404A	407C	502	507	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
				AC	DC	3	2	2	3	3	3	3	3			
B19	B19P2	3/4 NPT Female	19/32	300	250	24.2	18.4	19.8	16.0	16.0	22.3	15.7	15.7	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	15	18
	B19S2	7/8 ODF - 1-1/8 ODM		300	250											
	MB19S2															
	OB19S2			275												
E19	E19S250	5/8 ODF X 5/8 ODF		300	250											
	ME19S250															
	E19S270	7/8 ODF X 7/8 ODF		300	250											
	ME19S270															
	OE19S270			275												
	ME19S290	1-1/8 ODF X 1-1/8 ODF		300	250											

- Maximum rated pressure 500 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- See Pages 19 and 20 for water and steam valves.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.
- For mounting holes and/or bracket information see Bulletin 30-11.

Types B25 and E25 Series

22, 134a, 401A, 402A, 404A, 407C, 502, 507

Type MB25S2
Normally Closed

Type E25S290
Normally Closed

Type OB25S2
Normally Open

UL and CSA Listed
CE Approved

Application

Types B25 and E25 Series are pilot operated solenoid valves for refrigeration and air conditioning applications. They are suitable for suction service because very low pressure differential, 1 psi, is required for full operation. These valves **may be mounted horizontally, on their side or in a vertical line.**

The **Type E25** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E25"** series can be installed without disassembly using either low or no silver content brazing alloy.

The MKC-2 and OMKC-2 coils are Class "F" temperature rated and are provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

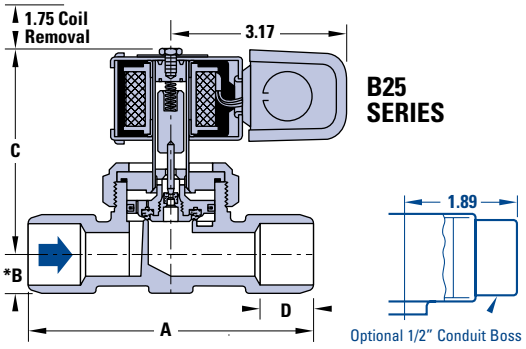
When ordering Body Assembly, specify Valve Type and Connections.

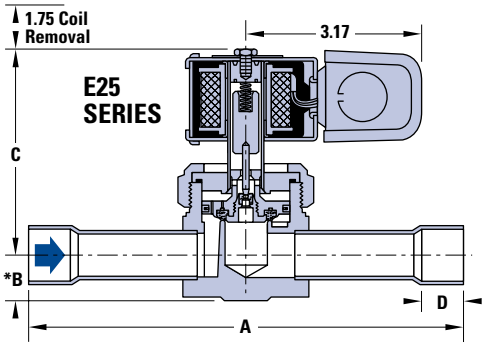
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-2 120/50-60; OMKC-2 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE		A	*B	C NORMALLY CLOSED	C NORMALLY OPEN	D FITTING DEPTH ODF
B25	B25P2		3.50	0.72	3.78	4.06	–
	B25S2	7/8 ODF	4.88				0.75
		1-1/8 ODF					0.91
E25	E25S270		7.50				0.75
	E25S290		8.50				0.91

*Add 1.12" for Valves with Manual Lift Stem.





Specifications – MKC-2 and OMKC-2 Coil

VALVE SERIES	TYPE	CONNECTIONS Inches Sizes shown in BLUE will be furnished unless otherwise specified.	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration								COIL RATINGS		
						REFRIGERANTS										
						22	134a	401A	402A	404A	407C	502	507			
						Pressure Drop – psi										
				AC	DC	3	2	2	3	3	3	3	3	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
B25	B25S2	1-1/8 ODF Solder	25/32	300	250	41.4	31.5	33.8	27.3	27.4	38.0	26.8	26.8	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	15	18
	MB25S2	7/8 ODF – 1-1/8 ODM & 1-1/8 ODF Solder														
	OB25S2	1-1/8 ODF Solder		275												
E25	E25S270	7/8 ODF X 7/8 ODF		300	250											
	ME25S270															
	OE25S270			275												
	E25S290	1-1/8 ODF X 1-1/8 ODF		300	250											
	ME25S290															
	OE25S290			275												

- Maximum rated pressure 500 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- See Pages 19 and 20 for water and steam valves.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.
- For mounting holes and/or bracket information see Bulletin 30-11.

22, 134a, 401A, 402A, 404A, 407C, 502, 507 — Types E35 Series

Application

Types E35 Series solenoid valves are pilot operated for refrigeration and air conditioning applications. They are suitable for suction service because very low pressure differential, 1 psi, is required for full operation. The **E35 Series may be mounted horizontally, on their side or in a vertical line.**

The **Type E35** series solenoid valves feature extended solder type connections as standard. One important benefit to the user is that all valves in the **"E35"** series can be installed without disassembly using either low or no silver content brazing alloy.

The MKC-1 and OMKC-1 coils are Class "F" temperature rated and are provided as standard, therefore a high temperature coil is not required for discharge service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

When ordering Body Assembly, specify Valve Type and Connections.

② 1-5/8" ODM Type L tubing may be slipped over 1-3/8" fitting, without the use of a coupling.

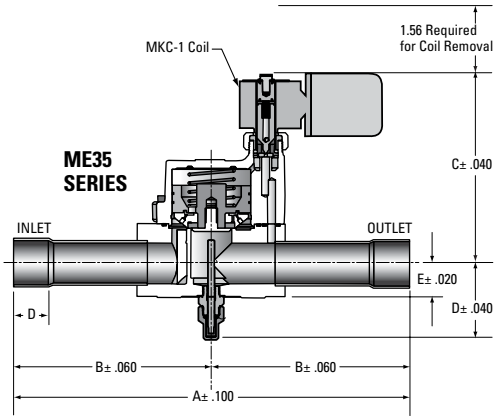
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-1 120/50-60; OMKC-1 120/50-60.

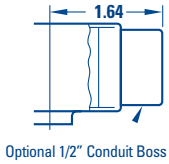
Dimensions – Inches

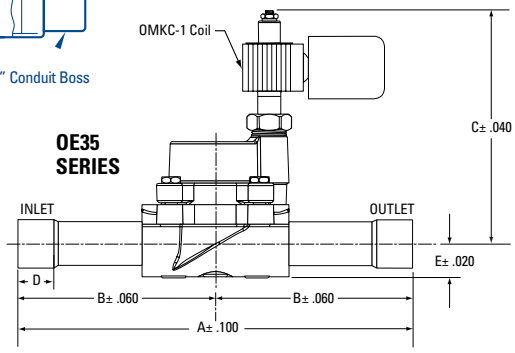
VALVE SERIES	TYPE	FITTING SIZE ODF	A	B	C NORMALLY CLOSED	C NORMALLY OPEN	D FITTING DEPTH ODF	*E
E35	E35S190	1-1/8	10.06	4.81	4.81	5.94	0.91	.84
	E35S1110	1-3/8	11.06	5.94			0.97	.84

*Add 1.12" for E35 Series Valves with Manual Lift Stem.

Type ME35S1110
Normally Closed







c UL us Listed
CE Approved

Specifications — MKC-1 and OMKC-1 Coil

VALVE SERIES	TYPE	CONNECTIONS Inches Sizes shown in BLUE will be furnished unless otherwise specified.	PORT SIZE Inches	MOPD psi AC	MOPD psi DC	NOMINAL LIQUID CAPACITIES Tons of Refrigeration – REFRIGERANTS – Pressure Drop – psi: 22	134a	401A	402A	404A	407C	502	507	COIL RATINGS STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
						3	2	2	3	3	3	3	3			
E35	E35S190	1-1/8 ODF X 1-1/8 ODF	1	300	250	70.9	53.0	56.9	46.6	46.5	64.8	46.0	45.6	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	10	15
	ME35S190															
	OE35S190			300												
	E35S1110	② 1-3/8 ODF X 1-3/8 ODF		300	250											
	ME35S1110															
	OE35S1110			300												

- Maximum rated pressure: Type E35 Series, 500 psi
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.

Type E42 Series

22, 134a, 401A, 402A, 404A, 407C, 502, 507

Type ME42S2130

UL and CSA Listed

CE Approved

Application

Type E42 Series are large capacity, pilot operated solenoid valves designed for refrigeration and air conditioning applications. Suitable for suction service because very low pressure differential, 1 psi, is required for full operation.

The **Type E42** series may be brazed into line without disassembly as valves contain extended solder type connections. Use caution to place wet rag or chills on extensions at body to prevent excessive overheating.

The **E42 Series may be mounted horizontally, on their side or in a vertical line.** The E42 series is a Class "F" temperature rated coil that is provided as standard, therefore a high temperature coil is **not** required for discharge service.

The E42 series are steel body valves and therefore are **not** recommended for water or steam service.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

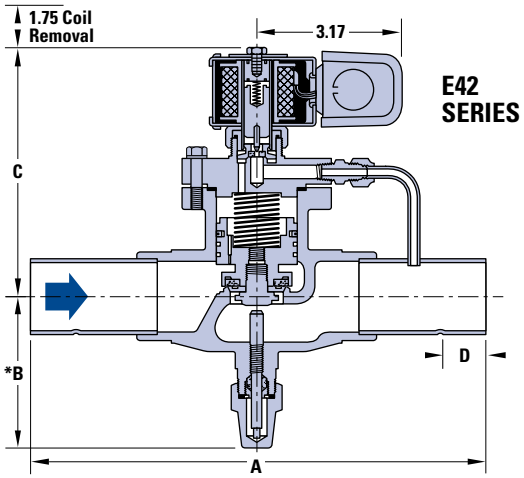
When ordering Body Assembly, specify Valve Type and Connections.

When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.
Example: MKC-2 120/50-60; OMKC-2 120/50-60.

Dimensions – Inches

VALVE SERIES	TYPE	A	*B	C		D
				NORMALLY CLOSED	NORMALLY OPEN	FITTING DEPTH ODF
E42	ME42S2130	11.06	3.53	5.70	6.31	1.09
	ME42S2170					1.34

*Deduct 2-1/8" for E42 Series Valves less Manual Lift Stem.



Specifications – MKC-2 and OMKC-2 Coil

VALVE SERIES	TYPE	STANDARD CONNECTIONS Inches	PORT SIZE Inches	MOPD psi		NOMINAL LIQUID CAPACITIES Tons of Refrigeration								COIL RATINGS		
						REFRIGERANTS										
						22	134a	401A	402A	404A	407C	502	507			
						Pressure Drop – psi										
				AC	DC	3	2	2	3	3	3	3	3	STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC
E42	E42S2130	1-5/8 ODF X 1-5/8 ODF	1-5/16	300	250	127	96.9	104	83.9	84.2	117	82.5	82.4	24/50-60 120/50-60 208-240/50-60 120-208-240/50-60	15	18
	ME42S2130															
	OE42S2130			275												
	E42S2170	2-1/8 ODF X 2-1/8 ODF		300	250											
	ME42S2170															
	OE42S2170			275												

- Maximum rated pressure 450 psi.
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- Available with conduit boss or junction box at no extra charge.
- For capacity at other pressure drops, see Pages 4 and 5.

22, 134a, 401A, 402A, 404A, 407C, 502, 507 Built-In Check Valve Series

Application

A solenoid valve with a built-in check valve is designed to replace a liquid line solenoid valve in parallel with a check valve for reverse flow. This valve may be applied in the liquid line of a supermarket case for positive shutoff during pumpdown control, while allowing full flow in the reverse direction during reverse gas defrost. It may also be used in the liquid line of a heat pump to prevent migration of refrigerant to the outdoor unit during the heating mode, while allowing full flow in the reverse direction during the cooling mode. CAUTION: This valve will not close in the reverse flow/cooling mode.

See Figure 1. The check ball is small and inserted into the pilot port of the disc. When the valve is energized for operation in the refrigeration flow direction, the pressure on top of the disc is bled off through the pilot port and the disc raises. When the evaporator goes into defrost or the heat pump switches to the cooling mode, the solenoid valve **must be energized.** The reverse flow causes the check ball to close the pilot port from the bottom, pushing the disc up, fully opening the valve.

The check valve disc also requires a modification in the stem and plunger assembly. Therefore, the disc and stem and plunger assembly must be changed to convert a standard solenoid valve to one with a built-in check valve. Internal parts kits are available for solenoid valves with the built-in check valve. See Bulletin 122, Replacement Parts.

For Supermarkets

See Figure 2. For reverse gas defrost, a liquid line solenoid valve can be installed with a check valve in parallel, to allow reverse flow to the liquid header. This adds the expense of labor and materials. Or, a Sporlan liquid line solenoid valve with the built-in check valve feature can be installed, saving time and money.

For Heat Pumps

This valve may be used on some heat pump applications when sized correctly. (Refer to capacities at 40°F evaporator temperature, see Page 18 of this Bulletin.) For heat pumps with long lines that require shut off in both directions, use two solenoid valves with the outlets pointing towards each other.

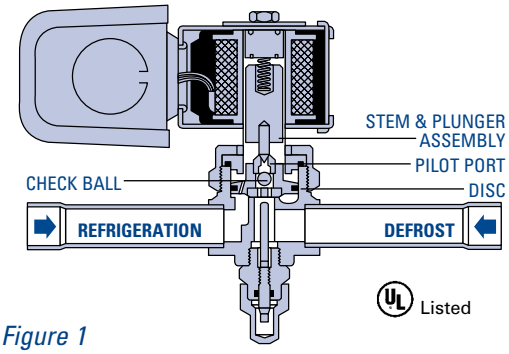


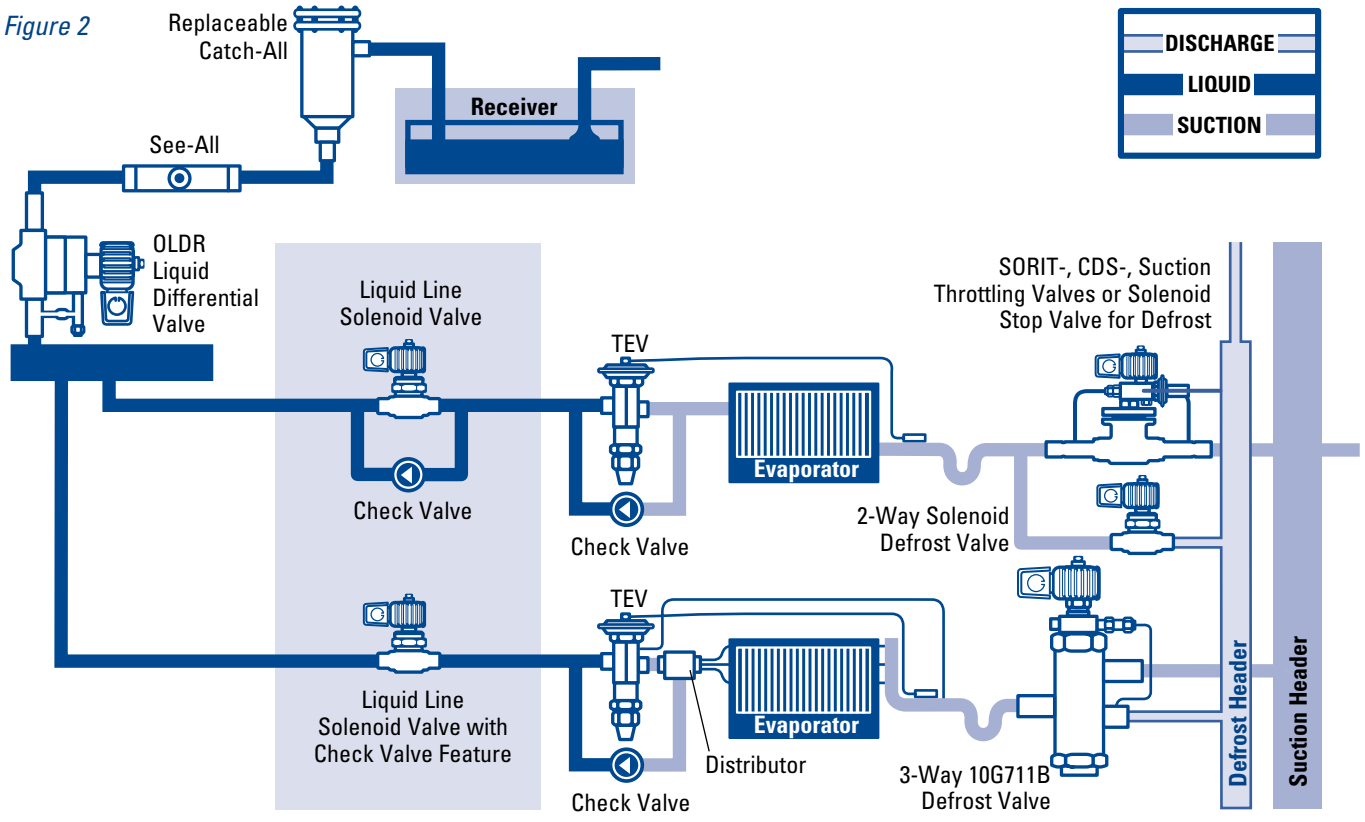
Figure 1
CME14S2* REVERSE FLOW SOLENOID VALVE

*The "C" is used in this nomenclature to represent the check valve feature. See Solenoid Valve Nomenclature, Pages 25-26.

Type CE14S250

Type CMB19S2

Figure 2



Built-In Check Valve Series

22, 134a, 401A, 402A, 404A, 407C, 502, 507

Extreme care should be taken when brazing connections to avoid damage to internal synthetic parts.

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

When ordering Body Assembly, specify Valve Type and Connections.

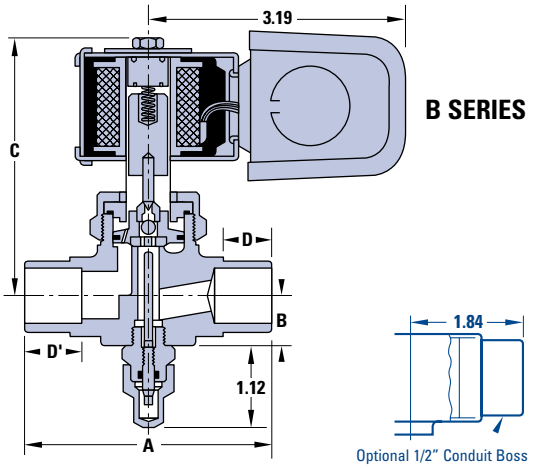
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.

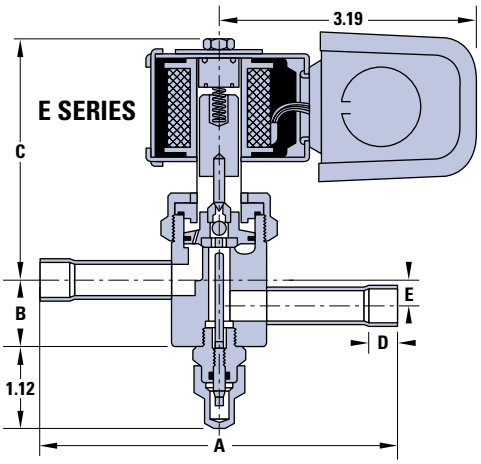
Example: CME10S250* 120/50-60
Kit: KS-CB10/CE10*

* The "C" is used in this nomenclature to represent the check valve feature. See Solenoid Valve Nomenclature, Page 26.

Dimensions – Inches

TYPE	A	B	C	D FITTING DEPTH ODF	D' FITTING DEPTH ODM	E OFFSET
C(M)E9S230	4.63	0.81	2.65	0.31	–	0.38
C(M)E9S240	5.00	0.75	2.70	0.38		0.31
C(M)E10S250	6.50	0.88	3.13	0.50	–	0.37
CB14S2	3.00	0.56	3.28	0.62	0.50	–
CE14S250	6.88	0.48	3.25	0.50	–	–
C(M)E19S270	7.13	0.81	3.31	0.75	–	–





Specifications – Reverse Refrigeration Flow, Liquid Line Capacity (Tons)**

VALVE TYPE	R-22 3 psi		R-134a 2 psi		R-401A 2 psi		R-402A 3 psi		R-404A 3 psi		R-407C 3 psi		R-502 3 psi		R-507 3 psi	
	EVAPORATOR °F															
	40	0	40	0	40	0	40	0	40	0	40	0	40	0	40	0
C(M)B9, C(M)E9	6.6	6.2	5.1	4.6	5.5	5.0	–	3.9	–	3.9	6.1	5.6	–	3.9	–	3.8
C(M)B10, C(M)E10	8.1	7.6	6.2	5.6	6.6	6.1	–	4.8	–	4.8	7.4	6.8	–	4.7	–	4.7
C(M)B14, C(M)E14	12.9	12.2	10.2	9.3	11.0	10.2	–	7.7	–	7.8	12.0	11.0	–	7.6	–	7.6
C(M)B19, C(M)E19+	9.3	8.8	6.2	5.6	6.6	6.1	–	5.4	–	5.1	8.2	7.5	–	5.5	–	5.1

** Valve sizing should be based on expected reverse liquid flow condensing capabilities of the evaporator(s) being defrosted.
+ Due to flow restrictions, C(M)E19 model capacity does not surpass C(M)E14 models until pressure drop exceeds 10 psi.
■ See Page 4 and 5 for Forward Refrigerant Flow.
■ Liquid capacities shown in the above table are based on 100°F liquid temperature entering the valves.

for Air, Water, Steam and Light Oil

Industrial Solenoid Valves

Application

These valves are suitable for most types of industrial applications. Ideal for water, glycol, most refrigerant oils and heat transfer fluids, air lines to chucking devices, steam lines, etc. Use the disc type valves for high temperature and steam applications up to 25 psia. Use the teflon diaphragm type valve for high temperature and steam applications over 5 psig (225°F) but do not exceed 10 psig (240°F). For applications above 240°F, consult Sporlan, Washington, MO. These valves **may be mounted horizontally, on their side or in a vertical line.**

Direct Acting Type

The **W3P1** is the ideal size for use on air chucking devices. Generally a very tight seat is required for this type of application. This can be achieved by using a neoprene seat in the **W3P1** in place of the standard teflon. **To order specify RW3P1.**

Disc Type

In certain areas of the country, particularly hard water localities, the integral brass seats in solenoid valves may deteriorate very rapidly. This problem is solved by using a stainless steel seat insert in the brass body in place of the usual brass seat. Valves from the **W6** series through the **W25** series have this feature. These valves are also equipped with teflon seating materials for long life. The **W14** series through the **W25** series are also equipped with a closing spring on top of the disc to assist in valve closing.

Diaphragm Type

These valves are tight seating in applications of normal differential pressure. For applications where differential pressures in the closed position are below 5 psi, it is recommended that a Buna-N diaphragm be used in place of the standard teflon diaphragm. **To order specify BR184P1 or KBR184P1.**

In certain areas of the country, particularly hard water localities, the integral brass seats in solenoid valves may deteriorate very rapidly. This problem is solved by using a stainless steel seat insert in place of the usual brass seat. **Example: KR184P1.**

Nomenclature - Diaphragm Type

K	B	R	18	4	P	1
Stainless Steel Insert Seat	Buna-N Diaphragm	Series	Port Size 1/32"	Connection Size 1/8"	Pipe Connections	MKC-1 Coil

Type W3P1
Direct Acting Type

Type R184P1
Diaphragm Type

Specifications — Reverse Refrigeration Flow, Liquid Line Capacity (Tons)**

TYPE	STANDARD CONNECTIONS Inches	PORT SIZE Inches	MOPD psi		DIAPHRAGM	STAINLESS STEEL INSERT SEAT	COIL RATINGS			
			AC	DC			STANDARD VOLTS/CYCLES	WATTS AC	WATTS DC	COIL
Disc Type										
W3P1	1/4 NPT Female	.109	150	100	—	No	24/50-60 120/50-60 208-240/50-60 Dual 120-208-240/50-60	10	15	MKC-1
W6P1	3/8 NPT Female	3/16		125		Yes		15	18	MKC-2
W14P2	1/2 NPT Female	7/16								
W19P2	3/4 NPT Female	19/32								
W25P2	1 NPT Female	25/32								
Diaphragm Type										
R183P1	3/8 NPT Female	9/16	150	60	Teflon	No	24/50-60 120/50-60 208-240/50-60 Dual 120-208-240/50-60	10	15	MKC-1
BR183P1					Buna-N					
KR183P1					Teflon	Yes				
KBR183P1					Buna-N					
R184P1	1/2 NPT Female				Teflon	No				
BR184P1					Buna-N					
KR184P1					Teflon	Yes				
KBR184P1					Buna-N					
R246P1	3/4 NPT Female	3/4			Teflon	No				
BR246P1					Buna-N					
KR246P1					Teflon	Yes				
KBR246P1					Buna-N					

- Maximum rated pressure: Type W3P1 and Diaphragm Types, 300 psi; All others - 500 psi
- Dual voltage 4-wire coils, 120-208-240/50-60 are available at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO 63090.
- Body - Brass
- Available with conduit boss or junction box at no extra charge.
- 5 psi minimum operating pressure differential W6 thru W25.

Industrial Solenoid Valves

for Air, Water, Steam and Light Oil

Ordering Instructions

When ordering complete valves, specify Valve Type, Connections, Voltage and Cycles.

When ordering Body Assembly, specify Valve Type and Connections.

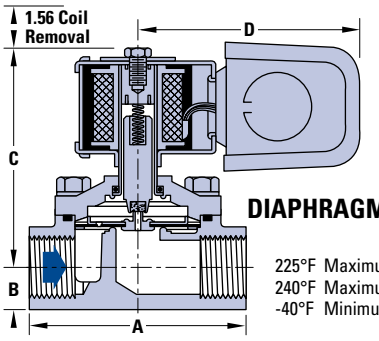
When ordering Coil Assembly ONLY, specify Coil Type, Voltage and Cycles.

Example: MKC-1 208-240/50-60;
MKC-2 120/50-60.

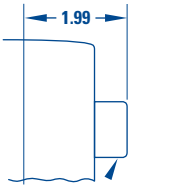
Use a SPORLAN filter or strainer in front of every industrial solenoid valve.

Dimensions – Inches

TYPE	CONNECTIONS (Pipe)	A	B	C	D
W3P1	1/4	1.88	0.44	2.20	2.89
W6P1	3/8	1.94		2.66	
W14P2	1/2	2.41	0.56	3.28	3.17
W19P2	3/4	3.00	0.81	3.31	
W25P2	1	3.50	0.72	3.78	
R183P1 Series	3/8	2.75	0.53	2.97	2.89
R184P1 Series	1/2				
R246P1 Series	3/4	3.06	0.57	3.09	

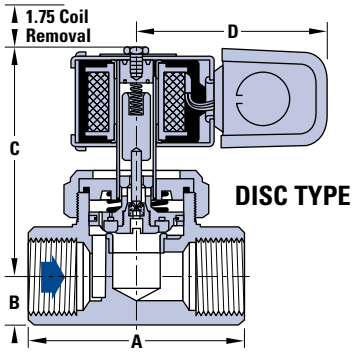


DIAPHRAGM TYPE



Optional 1/2" Conduit Boss

225°F Maximum Fluid Temperature, Buna-N Diaphragm
240°F Maximum Fluid Temperature, Teflon Diaphragm
-40°F Minimum Fluid Temperature



DISC TYPE

Capacities

Water and Air

TYPE	WATER – GPM					*AIR – CFMFA		COIL
	1 psi ΔP	3 psi ΔP	5 psi ΔP	10 psi ΔP	20 psi ΔP	5 psi ΔP	10 psi ΔP	
W3P1	0.22*	0.38*	0.5	0.7	1.2	2.4	3.4	MKC-1
W6P1	–	–	2.2	3.2	4.5	.25	10.	
W14P2	–	–	5.9	9.0	12.7	24.2	39.5	MKC-2
W19P2	–	–	8.8	12.5	19.1	1.0	61.	
W25P2	–	–	14.5	21.5	32.5	4.0	114.	
R183P1 Series	3.6	6.2	8.1	11.4	16.1	32.5	47.4	MKC-1
R184P1 Series	4.1	7.1	9.2	13.0	18.3	7.0	54.	
R246P1 Series	5.8	10.0	12.9	18.3	25.8	2.3	76.	

* Use RW3P1 to obtain tight seating below 5 psi pressure drop.

Steam – Pounds per Hour

TYPE	PRESSURE DROP ACROSS THE SOLENOID VALVE – psi										COIL
	5				10			20		25	
	PRESSURE AT INLET OF SOLENOID VALVE – psi										
	5	10	20	25	10	20	25	20	25	25	
W3P1	7.5	8.6	10.4	11.8	10.8	13.8	14.9	15.2	17.1	17.1	MKC-1
W6P1	23	26	32	37	34	44	46	49	3	5	
W14P2	77	88	107	123	109	139	155	165	179	179	MKC-2
W19P2	133	151	183	210	194	248	264	281	04	30	
W25P2	222	298	308	355	339	433	447	525	514	514	

TYPE	*POUNDS PER HOUR		COIL
	5 psi ΔP	10 psi ΔP	
R183P1	105	152	MKC-1
KR183P1			
R184P1	19	17	
KR184P1			
R246P1	168	245	
KR246P1			

For steam applications above 5 psig (225°F) and not to exceed 10 psig (240°F) use teflon diaphragm.
* Exhaust to atmosphere.

Sporlan Solenoid Valves — General

Purpose

The primary purpose of an electrically operated solenoid valve is to control automatically the flow of fluids, liquid, or gas. Sporlan Solenoid Valves may be applied on a wide variety of applications.

Basic Types

There are two basic types of solenoid valves. The most common is the normally-closed type, in which the valve opens when the coil is energized, and closes when the coil is de-energized. The other type is the normally-open valve which opens when the coil is de-energized and closes when the coil is energized. The operation of both types is discussed in the following paragraphs.

Principles of Operation

Solenoid valve operation is based on the theory of the electromagnet. The solenoid valve coil sets up a magnetic field when electrical current is flowing through it. If a magnetic metal, such as iron or steel, is introduced into the magnetic field, the pull of the field will raise the metal and center it in the hollow core of the coil. By attaching a stem to the magnetic metal or plunger, this principle is used to open the port of the valve. When the electrical circuit to the coil is broken, the magnetic field will collapse and the stem and plunger either will fall by gravity or be pushed down by the kick off spring.

Some solenoid valves are designed with a hammer blow effect. When the coil is energized, the plunger starts upward before the stem. The plunger then picks up the stem by making contact with a collar at the top. The momentum of the plunger assists in opening the valve against the unbalanced pressure across the port.

Solenoid valves are also classified according to the "stem and plunger" action. The two types are discussed in the following sections.

Direct Acting Solenoid Valves

With this type of valve, the stem and plunger assembly opens the port of the valve directly. This type of construction is limited to the smaller valves with port sizes of less than 1/4 inch. Sporlan Solenoid Valves of this design are the Types A3, E3, MA5A3, 180 Solenoid Pilot Control and W3P1.

Pilot Operated

Normally Closed Solenoid Valves

In a pilot operated valve, the stem and plunger assembly opens a pilot port. This releases the pressure on top of the disc, piston or diaphragm which then moves upward and opens the main valve port. Figure 3 illustrates the four phases of the operating cycle of a typical pilot operated valve. The operation is the same whether the valve is a disc, piston or diaphragm type.

Initially the pilot port and the main port are closed as shown in **A**. Pressure at the valve inlet is present on top of the disc as well, because of an equalizer hole drilled through the disc.

When the coil is energized, the stem and plunger assembly is lifted and the pilot port is opened — **B**. The stem and plunger assembly is centered within the coil by the magnetic field. The pilot port, if properly sized for the fluid to be handled, will relieve the pressure on top of the disc. Now the valve inlet pressure will act on a portion of the bottom of the disc, lifting the disc to open the main port — **C**. Once the port is

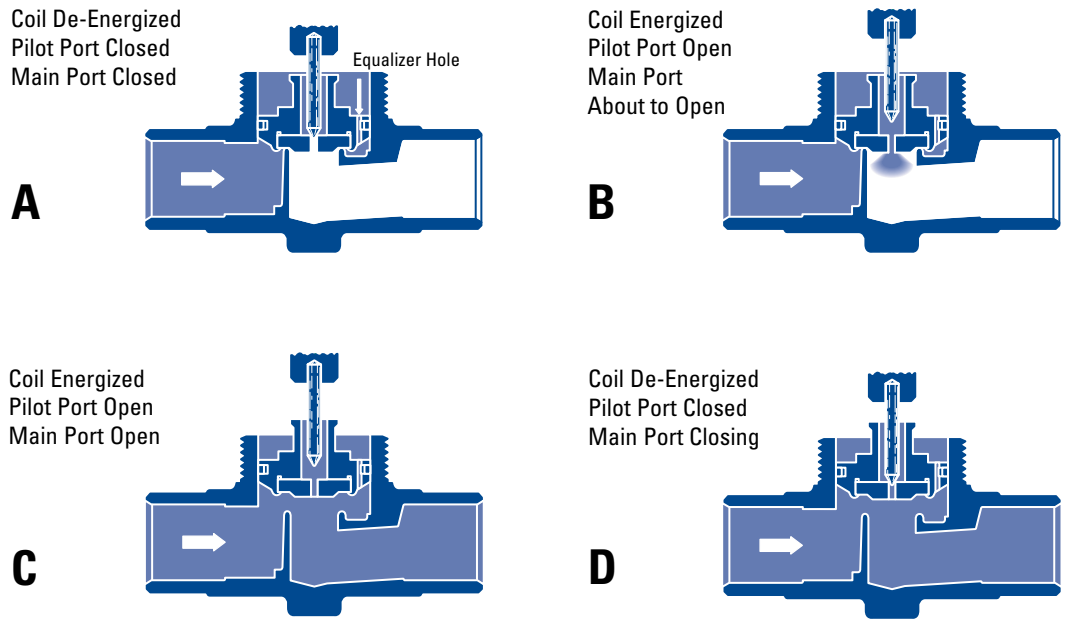


Figure 3

General

Sporlan Solenoid Valves

open, the disc is held off the seat by the pressure difference across the port. When the coil is de-energized, the stem and plunger assembly drops, due to gravity or the kick off spring, and closes the pilot port. As shown in **D** the pressure above the disc is no longer vented to the downstream side of the valve. Fluid flow and pressure drop causes the pressure above the disc to be higher than below the disc, and the disc drops, closing the main port. In some valves the plunger is spring loaded and does not rely on gravity to close. All Sporlan Solenoid Valves except the A3, E3, W3, MA5A3 and 180 SPC are pilot operated and employ either the floating disc, floating piston or floating diaphragm construction. The pilot operated valves require a very low, 1 psi, pressure differential for full operation.

Normally Open Solenoid Valves operate very similar to the normally closed type. The system pressure is utilized to open and close these valves.

The major difference in the normally open construction is that with the coil de-energized, a spring is used to push the stem and plunger assembly upward holding the pilot port open. This then allows the disc to rise, because of the pressure difference between the bottom and top of the disc, and permits flow to take place.

When the coil is energized, the stem and plunger assembly is pulled DOWN, closing the pilot port. The pressure on top of the disc then equalizes with the incoming pressure and the disc moves down closing the main port. The valve will remain closed as long as the coil is energized.

Direct-Connected Piston Assemblies, with the stem and plunger mechanically connected to the piston, are used on applications where the valve must be sized for very small pressure drop, such as on suction lines. While the pilot operated principle is still used to open the valve, the magnetic pull of the coil is utilized to hold the piston open, preventing possible pulsations. A disadvantage of the direct-connected type is the case where dirt prevents free piston movement and the plunger is unable to center itself in the coil. This will cause overheating of the coil and the danger of coil burnout is present. The "floating piston or disc" type permits independent operation of the plunger to allow a complete magnetic circuit regardless of the piston's position and thereby eliminates the possibility of coil burnout due to restricted piston or disc movement. For additional information, see Page 27, Suction Line Service.

Design

Maximum Operating Pressure Differential

The maximum pressure differential against which a solenoid valve can open is generally abbreviated MOPD. This is illustrated in Figure 4.

MOPD ratings are established at 85% of rated voltage and with a hot coil after its maximum temperature is reached. For any given valve and coil design, the factors that effect MOPD are voltage deviation and coil temperature.

Synthetic Seating

Introduced by Sporlan in 1947, synthetic seating provides permanent seat tightness. Our experience in the use of these superior seating materials provides a reliable basis for durable construction best suited for various applications.

Solenoid Coil

The interchangeability of solenoid coils is necessarily limited by considerations of the varying requirements of power and plunger movement. Nevertheless, only three coil sizes are required for the extensive line of Sporlan Solenoid Valves. Each coil is interchangeable between a number of valves within a given size range.

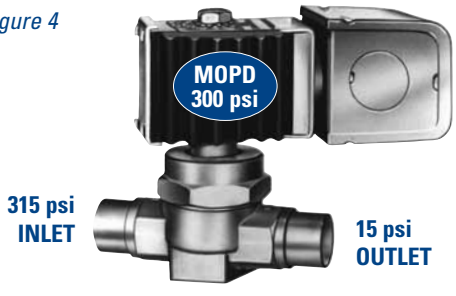
Maximum Rated Pressure

Don't confuse the MOPD rating of a valve with the maximum rated pressure. The rated pressure of a solenoid valve is a design specification indicating the maximum pressure under which the valve should be applied. Actually, the valve must be able to withstand three times its maximum rated pressure and pass fatigue cycle tests, to qualify for listing by Underwriters' Laboratories.

Manual Lift Stem

Occasionally, circumstances require that a solenoid valve be opened independently of the electrical power. Therefore, a manual lift stem is available on all valves from the B6 and E6 series up through the MA50 series.

Figure 4



Sporlan Solenoid Valves — Construction Details

VALVE SERIES	PORT SIZE Inches	TYPE OF OPERATION	COIL KIT	*BODY MATERIAL	TYPE OF SEATING		STEM AND PLUNGER ASSEMBLY	PISTON DISC OR DIAPHRAGM
					MAIN PORT	PILOT PORT		
A3P1	.101	Direct Acting	MKC-1	Brass	Synthetic to Metal	---	Stainless Steel	---
A3F1								
A3S1					Metal to Metal			
E3					Synthetic to Metal			
E5	.150	Pilot Operated				Stainless Steel Pin to Synthetic Seat		Disc
E6, ME6	3/16							
B6, MB6				Brass Forging				
B9, MB9, OB9	9/32		MKC-2 and †OMKC-2					
E9, ME9, OE9				Brass				
E10, ME10, OE10	5/16							
B10, MB10, OB10				Brass Forging				
B14, MB14, OB14, E14, ME14, OE14	7/16							
B19, MB19, OB19, E19, ME19, OE19	19/32							
B25, MB25, OB25, E25, ME25, OE25	25/32							
E35, ME35, OE35	1		MKC-1 and †OMKC-1					Piston
B33, MB33, OB33			MKC-2 and †OMKC-2	Steel Casting				
E42, ME42, OE42	1-5/16							
W3P1	.109	Direct Acting	MKC-1	Brass		---		---
W6P1	3/16	Pilot Operated		Brass Forging		Stainless Steel Pin to Synthetic Seat		Disc
W14P2	7/16		MKC-2					
W19P2	19/32							
W25P2	25/32							
R183	9/16		MKC-1			Stainless Steel Port to Synthetic Plunger Seat		Diaphragm
R184								
R246	3/4							

*All "E" Series Valves have Copper Extended Solder Type Connections.
†Normally Open Solenoid Valve ONLY.

Approximate Net and Shipping Weights‡

VALVE SERIES WITH COIL	WEIGHT – lbs.	
	NET	SHIPPING
A3, E3, E5, W3	1.0	1.2
B6, E6, W6	1.0	1.2
B9, E9	1.5	1.7
B10, E10	2.0	2.3
B14, E14, W14	2.0	2.3

VALVE SERIES WITH COIL	WEIGHT – lbs.	
	NET	SHIPPING
B19, E19, W19	2.3	2.6
B25, E25, W25	3.1	3.4
E35	5.8	6.3
E42	10	12
R18, R24	2.3	2.8

‡ Weights may vary due to connection sizes, manual lift stem, coil voltage, etc.

Construction Details

Sporlan Solenoid Valves

Sporlan Solenoid Valves are constructed to ensure long, trouble-free life. They employ proven design features for reliable performance on all applications. By using modern production equipment, Sporlan consistently provides top quality solenoid valves for air conditioning, refrigeration and other uses. Quality is maintained by strict quality control methods in all phases of production followed by detailed testing of every valve produced.

Extensive use of stainless steel, thoroughly proven synthetic materials and modern sealing methods along with top grade brass, bronze and semi-steel body materials, contribute to Sporlan's high quality product. The table on Page 23 lists the materials and construction details of Sporlan Solenoid Valves. Sporlan reserves the right to change materials that improve the quality, performance and/or integrity of the product.

Coil Construction

Sporlan solenoid coils are constructed with some of the finest materials available for electromagnet coil manufacture.

Standard Coils — The number 1 and 2 coils are wound on a molded Rynite® bobbin. The wound bobbin is then inserted into a mold in a transfer press and encapsulated with a thermoset polyester compound. The coil yoke is assembled afterward and the coils are identified as (O)MKC-1 and (O)MKC-2. The thermoset polyester is moisture proof, fungus proof and meets military specifications.

Electrical Specifications

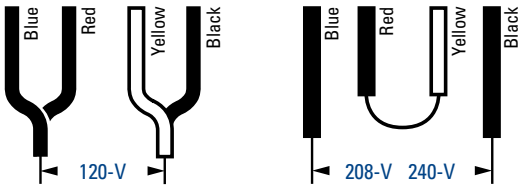
Sporlan Solenoid Valve coils are available in many voltage and cycle ratings. The standard coils required are listed on the Specification pages for the various valves. Dual voltage, direct current (DC) and other alternating current (AC) coils are available for most valve types at slight additional cost. For other voltages and cycles, consult Sporlan, Washington, MO.

Color Coded Lead Wires — For ease of identification, coils are manufactured with the following colored lead wires:

24/50-60	Orange	208-240/50-60	Red
120/50-60	Blue	Dual Voltage	Black, Blue,
208/50-60	Yellow		Yellow, Red

All other coils are supplied with black lead wires.

Wiring for Dual Voltage Coil



Leads on valves with a conduit boss are **18"** long while coil leads on valves with a junction box are **6"** in length.

Junction Box — All solenoid valves are available with either an integral junction box or a 1/2" conduit connection at no extra charge. All valves are automatically supplied with the integral junction box. If a conduit boss is required, it must be specified on the order.

All junction boxes are equipped with grounding screw provisions and marked in accordance with UL and CSA recommendations.

Conduit Boss — Nema Rating — The Standard (O)MKC-1 and (O)MKC-2 coil assemblies with conduit boss type yokes will satisfy Nema 4 and IP55 (Rain Tight) as well as Nema 1, 2, 3, 3R, 3S, 12 and 13.

DIN Connector — (O)MKC-1E and (O)MKC-2E coils with Female DIN Connectors will satisfy IP65.

Coil Interchangeability — Only two coil sizes are required with the complete line of Sporlan Solenoid Valves.

The molded MKC-1 coil will fit the old style KC-1 coil. The molded MKC-2 coil will fit the old style KC-2 coil. Since the molded coils are a complete magnetic assembly, the old housing and related parts should be discarded when replacing the old KC-1 or KC-2.

Sporlan Solenoid Valves — Electrical Specifications

Conversion from AC to DC Coils — The conversion of a solenoid valve from AC to DC service varies with the valves construction and its principle of operation. Valve series A3, E3, E5, B6, E6, B9, E9, B10, E10, B14, E14, B19, E19, B25, E25, B33, E35, E42, all of the W series industrial valves and R-Series diaphragm valves can be converted from AC to DC service by changing coils. However, it is important to note that changing from AC to DC service does lower the valve's MOPD characteristics. This should be taken into consideration since the valve may not be able to open at these lower pressure ratings on some applications.

Listed by Underwriters' Laboratories Inc., Canadian Standard Association and CE Approved.

VALVE SERIES	RATING – VOLTS/CYCLES	WATTS	COIL
A3, E3, E5, B6, E6, E35, R18, R24, W3, B5D, 8D, 12D, 10G, 16D	24/50-60, 120/50-60	10	MKC-1 and OMKC-1
	208-240/50-60		
	Dual 120-208-240/50-60		
B9, E9 B10, E10 B14, E14 B19, E19 B25, E25 B33, E42, 180 SPC	24/50-60, 120/50-60	15	MKC-2 and OMKC-2
	208-240/50-60		
	Dual 120-208-240/50-60		

Identification

UL File No. MH4576 – CSA File No. LR19953

All Sporlan solenoid valves are identified by a valve nameplate, see Figure 5. This nameplate will indicate the valve type number, maximum operating pressure differential (MOPD) and maximum rated pressure (MRP). Any valves using the MKC-1, OMKC-1, MKC-2 and OMKC-2 will have their electrical specifications shown on the face plate of the coil assembly. See Figure 6.

Ordering Instructions

The following table lists the standard coil configurations available. Other AC Voltages and Cycles may be available on special order.

When ordering any Coil Assembly, Specify Coil Size, Voltage and Cycles.

Example: MKC-1 24/50-60

THE ABOVE PREFIXES MAY BE ADDED TO BASIC VALVE TYPE NUMBER (B25S2) TO REQUEST SPECIAL FEATURES.

Coil Kits

MKC-1 and OMKC-1		
VALVE SERIES		RATING – VOLTS/CYCLES
A3	**R183**	24/50-60 120/50-60 208-240/50-60 Dual 120-208-240/50-60 12 DC 24 DC
E3	**R184**	
E5	**R246**	
B6	**8D**	
E6	**12D**	
W3	**10G**	
W6	**E35**	

MKC-2 and *OMKC-2		
VALVE SERIES		RATING – VOLTS/CYCLES
B9	**B33**	24/50-60 120/50-60 208-240/50-60 Dual 120-208-240/50-60 480/50-60 12 DC 24 DC
E9	**E42**	
B10	**180 SPC**	
E10	**16D**	
B14	**W14**	
E14	**W19**	
B19	**W25**	
E19		
B25		
E25		

*OMKC Coils used only on normally open solenoid valves.

Figure 5

Identification

Sporlan Solenoid Valves

Figure 6

MKC-1, OMKC-1, MKC-2 and OMKC-2

Nomenclature - A, B and W Series

0	D	M	B	25	S	2	*	S
Normally Open	**Disc Type** D - Direct Connected C - Built-In Check Valve	Manual Lift Stem	**Design or Series** A, B & W Series	Port Size in 1/32"	**Connections** P - Pipe F - SAE Flare S - ODF Solder	① ② Coil Size	Overall Length	Spade Coil

Normally open valves available in B9, E9 through E42 series only, and require OMKC-2 Coil Assembly. Add prefix D for direct connected assembly in MA32 and MA17A3 series. **Example: DMA32P3**.

The "E" series is identified by an expanded nomenclature compared to the "B" series. Continued is the system of

Nomenclature - E Series

0	C	M	E	10	S	2	5	0	*	S
Normally Open	Built-In Check Valve	Manual Lift Stem	Design Series	Port Size in 1/32"	**Connections** Solder	Coil Size	Connection Size in 1/8"	****Connections** 0 - ODF X ODF 1 - ODF X ODM 2 - ODM X ODF 3 - ODM X ODM	Overall Length	**Coil Connection** S - Spade E - DIN 43650A

① The MKC-1, OMKC-1, MKC-2 and OMKC-2 are fungus proof and meet MIL-I-631C.

② The standard MKC-1 and MKC-2 are class "F" rated.

* No dash number indicates standard length. Dash numbers -1, -2, -3 etc. thru -18 indicates **nonstandard longer or shorter overall lengths** -19 thru -33 indicates **other deviation from standard,** contact Sporlan, Washington, MO.

** Standard connections are ODF inlet x ODF outlet on ''E" Series valves. Minimum quantities may be required for other connections.

valve identity based on port size. In addition, the "E" series identifies the connection size and type. The advantage of the "E" series nomenclature system is that it allows ease in valve identification of the standard line and can provide considerable information about special valves supplied to manufacturers. Details of the "E" series nomenclature are given above.

Example: MEl0S250 is a valve with 5/16" port (10), manual lift stem (M), standard extended 5/8" ODF x 5/8" ODF connections (50) and standard overall length (no dash number).

Lengths and type of connections other than standard may be required to satisfy specific customer requirements. For connections and other special features consult Sporlan, Washington, MO. The specifications pages lists the standard length which applies regardless of type of end connection (ODF x ODF, ODF x ODM, ODM x ODF or ODM x ODM).

In the majority of cases, Sporlan Solenoid Valves are used for controlling the flow of refrigerants in liquid or suction lines, or in hot gas defrost circuits.

Current and Superseding Valves

CURRENT VALVE TYPE	CURRENT COIL KIT	OBSOLETE VALVE TYPE	CURRENT COIL KIT
A3, E3	MKC-1	10, †62, †11	MKC-2
E5		—	—
B6, MB6 E6, ME6		A6	MKC-1
		†12, †1210, †1240	—
B9, MB9 E9, ME9	MKC-2	A9, MA9, 14	MKC-2
B10, MB10 E10, ME10		A10, MA10	
		†20	—
B14, MB14 E14, ME14		A14, MA14	MKC-2
		†73, †72	—
B19, MB19 E19, ME19		A17, MA17, 43, 4304, 4303, 42, 4202	MKC-3*
B25, MB25 E25, ME25		A24, MA24, 53, 5304, 5303 52, 5202	
OB9, OE9 OB10, OE10 OB14, OE14 OB19, OE19 OB25, OE25 OB33 OE42	OMKC-2	—	—
OE34		EOB33, OE33	OMKC-2
E35, ME35	MKC-1	B32, MB32, MC32, 9001, 9005	MKC-3*
E35, ME35	MKC-1	(E)B33, (E)MB33, (M)E34	MKC-2
E42, ME42	MKC-2	EMB42S3	MKC-3*
180		†172, †170, †162	—
W3P1	MKC-1	—	—
W6P1		XKA	MKC-1
W14P2	MKC-2	XJQ	MKC-2
W19P2		4306-P, 4308-P	MKC-3*
W25P2		W24P3, 5306-P, 5308-P	
R183	MKC-1	W7P2	—
R184		—	
R246			

† Replacement coils no longer available.

* Please contact Parker Aftermarket Customer Service for MKC-3 coils and associated parts.

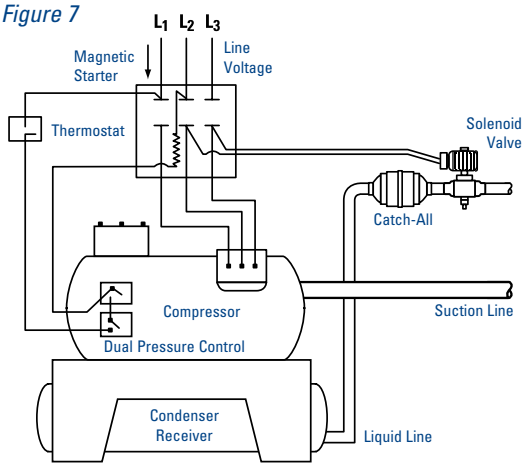
They are equally suitable for many other less common forms of refrigerant control. These applications and other related topics are discussed in the following section. For applications not covered, consult Sporlan, Washington, MO.

Liquid Line Service

The primary purpose of a solenoid valve in a refrigerant liquid line is to prevent flow into the evaporator during the off-cycle. On multiple evaporator systems, a solenoid valve may be used in each of the liquid lines leading to the individual evaporators.

The application of a liquid line solenoid valve depends mainly on the method of wiring the valve with the compressor control circuit. It may be wired so the valve

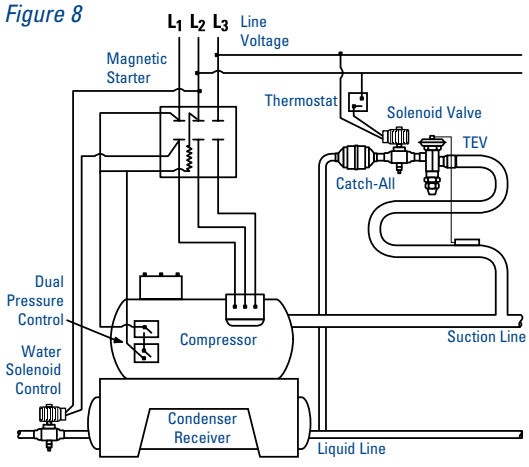
Figure 7



is energized only when the compressor is running. This type of application is illustrated in Figure 7.

Another application known as pump down control, uses a thermostat to control the solenoid valve. See Figure 8 for a wiring and valve location schematic. When the thermostat is satisfied, the valve closes and the compressor continues to run until a substantial portion of the refrigerant has been pumped from the evaporator. A low pressure cutout control is used to stop the compressor at a pre-determined evaporator pressure.

Figure 8



When the thermostat again calls for refrigeration, the solenoid valve opens - causing the evaporator pressure to rise and the compressor to start. This arrangement can be used on either single or multiple evaporators.

Suction Line Service

There are several applications, particularly on suction lines, where pressure drops in excess of 2 psi cannot be tolerated. Therefore, only valves which are capable of opening at very low pressure drops are suitable for this type of use.

All Sporlan refrigeration solenoid valves, are ideally suited for these special applications. They are capable of opening full at pressure drops of 1.0 psi.

For suction line capacities refer to the Tables on Pages 6 and 7.

High Temperature Applications

Any valves using the MKC-1, OMKC-1, MKC-2 or OMKC-2 coil may be used on fluids or gases whose temperature does not exceed 240°F, while the valve ambient is 120°F.

NOTE: The MKC-1, OMKC-1, MKC-2 and OMKC-2 molded coils are satisfactory for use with hot gas bypass and hot gas defrost applications. Their unique molded rib surface radiates heat very rapidly and therefore a high temperature coil is not required in these two sizes.

Gas Defrost Service

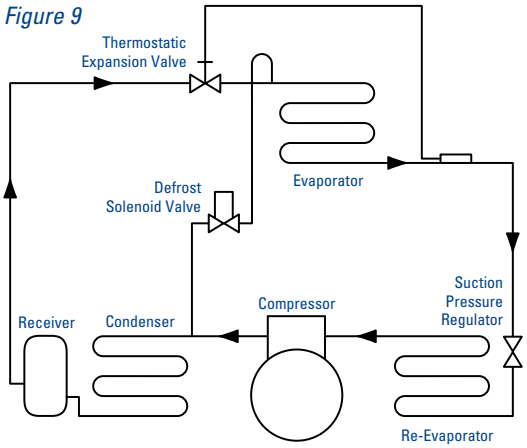
Application — Sporlan Solenoid Valves

There are several piping arrangements used for hot gas defrost systems, one of which is shown in Figure 9. A portion of the compressor discharge gas is passed through the solenoid valve into the evaporator. The solenoid valve may be controlled either manually or automatically for this duty.

Gas defrost valve selection requires a slightly different approach from the simple pressure drop versus tonnage. Be sure to consider the evaporator temperature correction factors shown at the bottom of the discharge gas capacities table in order to make certain that the valve selected does have adequate capacity.

Compressor Capacity Reduction Service

Figure 9



Sporlan Solenoid Valves may be used in conjunction with Sporlan Discharge Bypass Valves for capacity reduction service. For capacity information and further details on the Discharge Bypass Valves see Bulletin 90-40 or consult Sporlan, Washington, MO.

Water Service

See Pages 19 & 20 — Industrial Valves.

Filter-Driers are Essential

Dirt and other system contaminants present a problem for refrigeration and air conditioning controls. Since pilot operated solenoid valves operate with rather close tolerances, system cleanliness is imperative. The Sporlan ***Catch-All® Filter-Drier*** filters out minute particles of dirt and other foreign matter, thus protecting the valve.

Filtering is important on ammonia systems also. The replaceable core ***Catch-All® Filter-Driers***, designed for ammonia use, acts as a scale trap to protect system components. Therefore, we recommend using a Sporlan ***Catch-All® Filter-Drier*** ahead of every solenoid valve on all refrigeration and air conditioning applications. Contact Sporlan before adding a ***Catch-All® Filter-Drier*** in the discharge line.

Transformer Selection for Low-Voltage Control Systems

Many systems utilize low voltage controls, requiring the use of a transformer for voltage reduction, normally to 24 volts. The selection of a transformer is not accomplished by merely selecting one that has the proper voltage requirements. The volt-ampere (VA) rating is equally important. To determine the VA requirement for a specific solenoid valve, refer to the chart below. It should be noted, that insufficient transformer capacity will result in reduced operating power or lowering of the MOPD value.

If more than one solenoid valve and/or other accessories are operated from the same transformer, then the transformer VA rating must be determined by adding the individual accessories' VA requirements.

Fusing

Sporlan Solenoid Valves are not supplied with fuses. Fusing should be according to local codes. We recommend fusing the hot leg of the valve wiring with fast acting fuses and the valve should be grounded either through the fluid piping or the electrical conduit.

COIL KIT	24 VOLTS/ 50-60 CYCLES		120 VOLTS/ 50-60 CYCLES		240 VOLTS/ 50-60 CYCLES		TRANSFORMER RATING VOLTS-AMPERES
	CURRENT-AMPERES		CURRENT-AMPERES		CURRENT-AMPERES		FOR 100% OF RATED MOPD OF VALVE
	INRUSH	HOLDING	INRUSH	HOLDING	INRUSH	HOLDING	
MKC-1 OMKC-1	1.9	.63	.39	.14	.19	.09	60
MKC-2 OMKC-2	3.1	1.4	.60	.26	.31	.13	100

- All current values are based on 60 cycles.
- Volt-ampere ratings are based on inrush currents.
- Above values are based on the most severe conditions. — Consult Sporlan for coil characteristics on specific valve types.

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7. **Contingencies.** Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

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9. **Loss to 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 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.

10. **Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. 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 Products, 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.

11. **Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. **Improper use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

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16. **Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

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18. **Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. **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 Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("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 a Product sold pursuant to this Agreement 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 a Product 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 the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product 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 Products 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 Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

20. **Taxes.** Unless otherwise indicated, 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 Products.

21. **Equal Opportunity Clause.** For the performance of government contracts and where dollar value of the Products exceed $10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.

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