HANSEN TECHNOLOGIES CORPORATION

Bulletin R629b
FEB 2005

Sealed Motor Valve: 3/4" HMMR

Specifications, Applications, Service Instructions & Parts

SEALED MOTOR VALVE

**7/32" through 4"
(5 mm through 100 mm)
Motor Operated Valve
for Refrigerants
and other
Hansen Approved Fluids**

US Patent 6,460,567 B1

INTRODUCTION

The Hansen Sealed Motor Valve is a truly unique motor operated valve which eliminates the most common concern of other motor operated valves, valve stem seal leakage. The Sealed Motor Valve has no valve stem seal because the non-electric rotor is enclosed in a stainless steel can which contains the fluid pressure. The electric stator is outside the stainless steel can, and is isolated from the fluid in the valve.

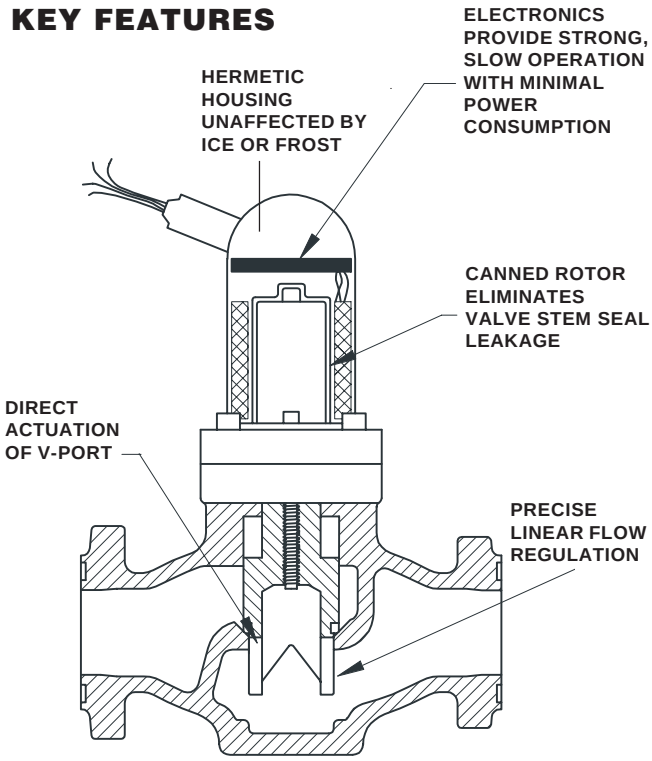
APPLICATIONS

Liquid Make-up to Accumulator
Liquid Injection to Compressors
DX Evaporators
Temperature or Pressure Control
Low or High Side Level Control
Slow Opening and Closing: Suction Stop Valve
No Pressure Drop: Gravity Drain
4-20 mA or Floating Point Control

ADDITIONAL FEATURES

- Relay input or 4-20mA for direct connection to plant PLC or computer.
- All moving parts are sealed so that frost will not affect operation.
- Tight closing Teflon seat.
- Canned rotor eliminates valve stem seal leakage.
- Controlled opening and closing minimizes liquid velocity shock, “water hammer.”
- Valve is more compact and light weight than other motor operated valves.
- Same flanges and spacing as Hansen HA4A/ HS4A pressure regulators and solenoid valves.
- Suitable for use with ammonia, R22, R134a, glycol, water, brines, and other approved refrigerants.
- Now available with optional Power-Close feature.

KEY FEATURES



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MATERIAL SPECIFICATIONS

Mechanical

Body: ductile iron, ASTM A536
Bonnet Plate: steel, zinc plated with yellow chromate
V-port Seat: Teflon
Rotor Can: stainless steel
Rotor Can O-ring: neoprene
Stator Housing: stainless steel
Safe Working Pressure: 400 psig (27 bar)
Operating Temperature: –60°F to +240°F (–50°C to +115°C)
Corrosion Protection: Zinc plating is standard up to 1¼". Acrylic enamel paint on larger sizes.

Electrical: HMMV, HMMVC, HMMR, HMMRC

Power: 24 VAC, 75 W peak, 10 W average running
Enclosure: watertight, NEMA 4X (IP65)
Cable: 7 wire, 18 AWG, length 10 feet (3 m)
mA loop impedance: 350 ohm

Electrical: HMSV, HMSVC

Power: 24 VAC, 75 W peak, 10 W average running
Enclosure: watertight, NEMA 4X (IP65)
Cable: 4 wire, 18 AWG, length 10 feet (3 m)

APPLICATIONS

The patented Hansen Sealed Motor Valve is ideal for applications where external leakage is intolerable. The valve is suitable for use with a variety of fluids, including those that are incompatible with copper, such as ammonia, because the copper windings of the motor stator are isolated from the fluid in the valve. Typical uses include slow opening solenoid valve, temperature controlled evaporator regulator, liquid injection to screw compressors, pressure control, liquid level control of pump accumulators, high side receivers or low side flooded chillers, or as a gravity drain valve.

The full ported HMMV valve series is best suited for computer controlled operations using 4-20 mA signals. The HMMV is ideal for precise temperature and pressure control, hot gas defrost, and other applications where accurate process control is required.

Model HMMR valve with expansion plug is for high pressure drop applications such as liquid makeup and liquid injection.

The HMXV valve series is suitable for liquid injection of screw compressors or direct expansion evaporators.

The full ported HMSV valve series is best suited for applications requiring open/close operation only. (Floating Point Control)

Refer to pages 3-5 for typical applications.

ADVANTAGES

No pressure drop is required to operate, unlike most pressure regulators and solenoid valves which require a minimum 2 psi pressure drop to keep the valve fully open. The Sealed Motor Valve can be used for applications which require a very low pressure drop (e.g. suction lines), or no pressure drop (e.g. equalizing or drain lines).

Valves are drop-in replacement for Hansen and R/S solenoid valves and pressure regulating valves, except for 1 1/4 port R/S.

The Sealed Motor Valve does not require stem shaft heaters like other open motorized valves.

The Sealed Motor Valve is slow opening and closing (about 15 to 45) seconds depending on valve size, which minimizes the potential for liquid velocity shock or "water hammer" often experienced with quick opening and closing solenoid valves.

POWER-CLOSE FEATURE

The Sealed Motor Valve is now available with an optional Power-Close feature, an integral battery to close the valve in the event of either 24 VAC power failure or 4-20mA control signal failure. Power-Close motors are installed on HMMVC, HMMRC, HMXVC and HMSVC. Also available is an external battery backup model HBAT, which includes battery, valve position display, and manual override of valve operation. Note: HBAT for HMMV, HMMR and HMXV only. See Bulletin R630 for more details.

VALVE SIZING

Proper valve sizing is important for smooth operation and long, trouble-free life of the valve. Therefore, capacity at both the maximum and minimum flow and Pressure Drop should be analyzed. Refer to the capacity tables on pages 6-9.

LIQUID MAKEUP LINE SIZING

Liquid lines should be adequately sized for the capacity of the valve. Listed below are the recommended capacities for liquid lines.

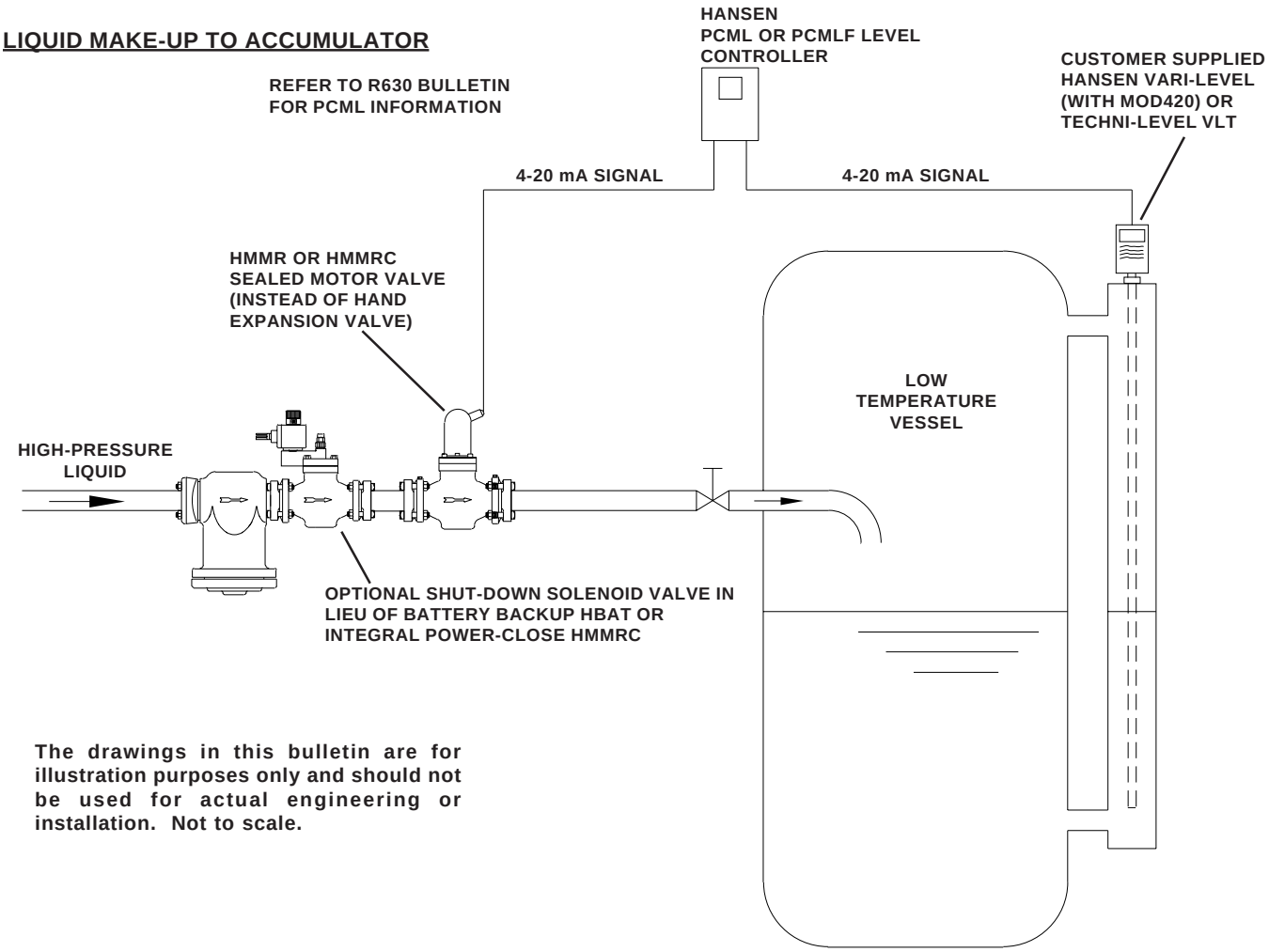
Line Size	Maximum Capacity Ammonia		Maximum Capacity R22	
1/2"	32 Tons	(112 kW)	3.0 Tons	(11 kW)
3/4"	58 Tons	(208 kW)	5.0 Tons	(18 kW)
1"	97 Tons	(340 kW)	9.0 Tons	(32 kW)
1 1/4"	179 Tons	(625 kW)	20 Tons	(70 kW)
1 1/2"	254 Tons	(890 kW)	31 Tons	(110 kW)
2"	496 Tons	(1740 kW)	72 Tons	(250 kW)
2 1/2"	729 Tons	(2550 kW)	114 Tons	(400 kW)
3"	1160 Tons	(4060 kW)	200 Tons	(400 kW)
4"	2040 Tons	(7140 kW)	360 Tons	(1260 kW)

NH_3 capacities are based on IIAR Refrigeration Piping Handbook tables. R22 capacities based on 3 ft/s liquid velocity.

For applications with a large pressure drop across the Sealed Motor Valve, attention must be paid to proper outlet line sizing to accommodate flash gas.

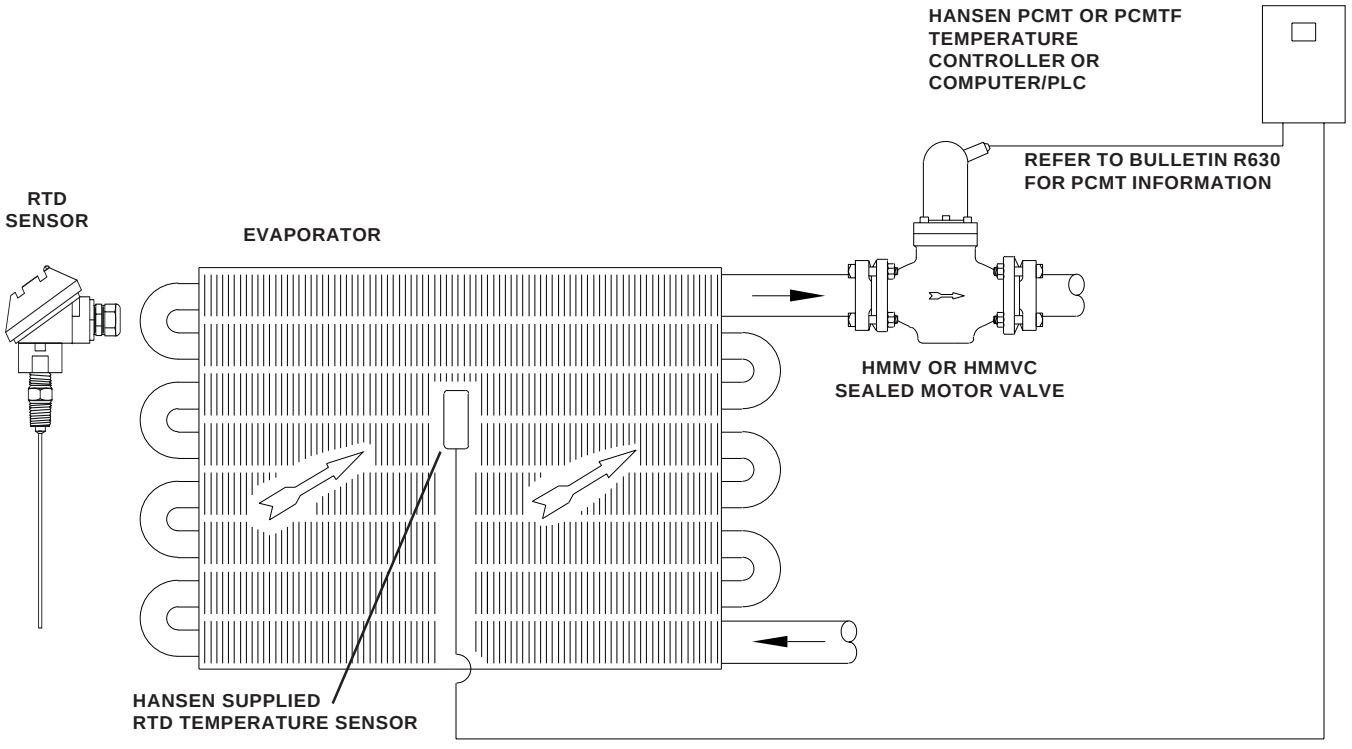
TYPICAL APPLICATIONS - SEALED MOTOR VALVE

LIQUID MAKE-UP TO ACCUMULATOR



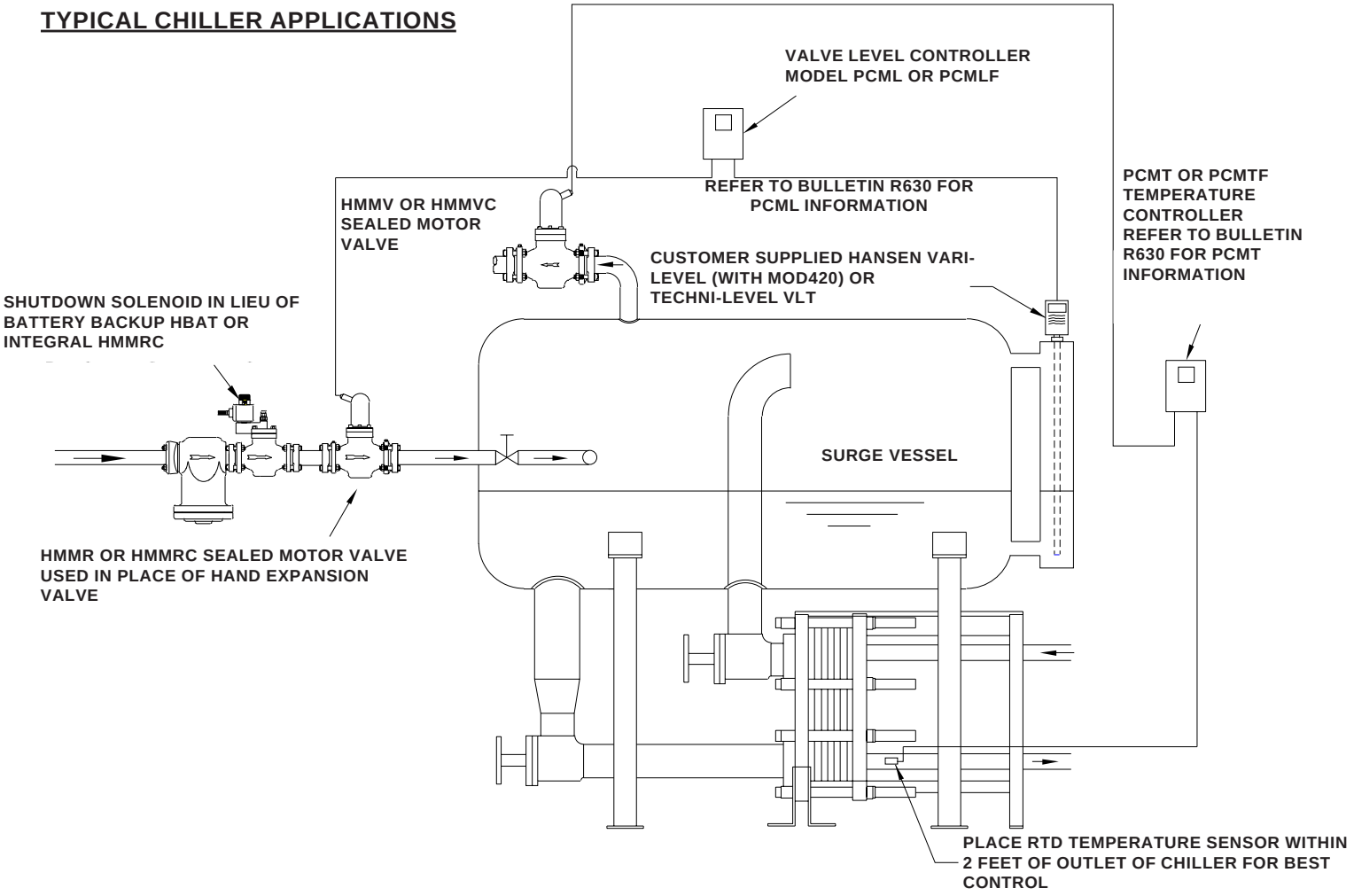
The drawings in this bulletin are for illustration purposes only and should not be used for actual engineering or installation. Not to scale.

ROOM TEMPERATURE CONTROL

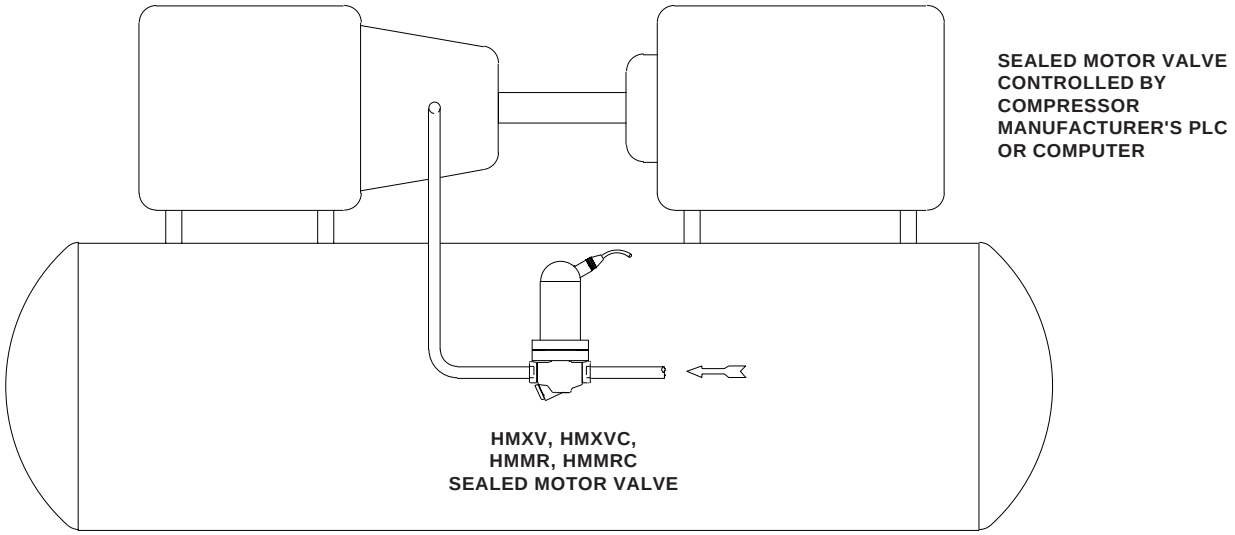


TYPICAL APPLICATIONS - SEALED MOTOR VALVE

TYPICAL CHILLER APPLICATIONS



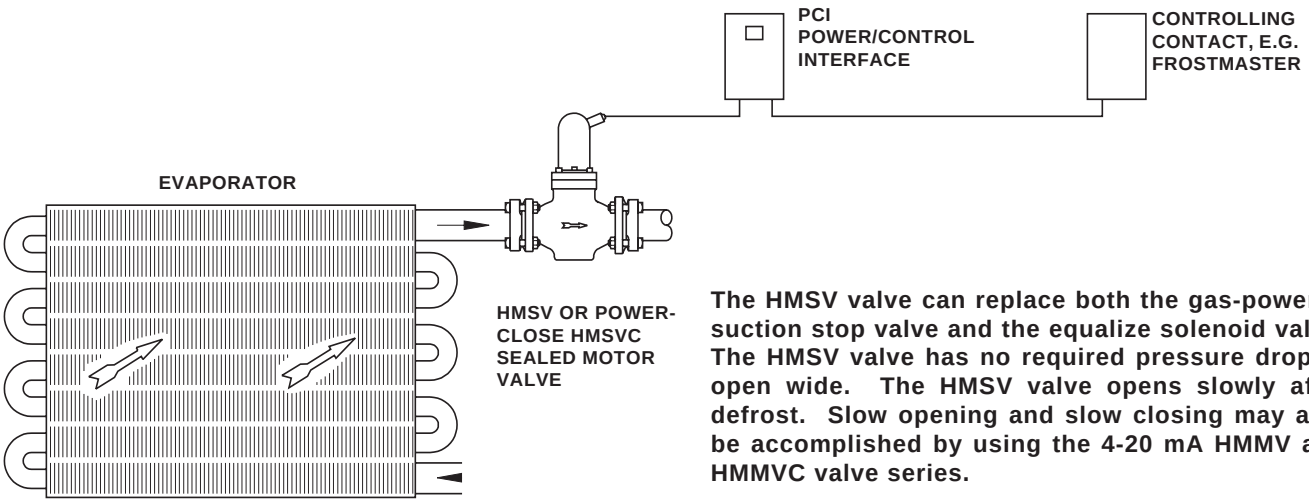
TYPICAL LIQUID INJECTION COOLING FOR SCREW COMPRESSOR APPLICATION



TYPICAL APPLICATIONS - HMSV, HMSVC SEALED MOTOR VALVE

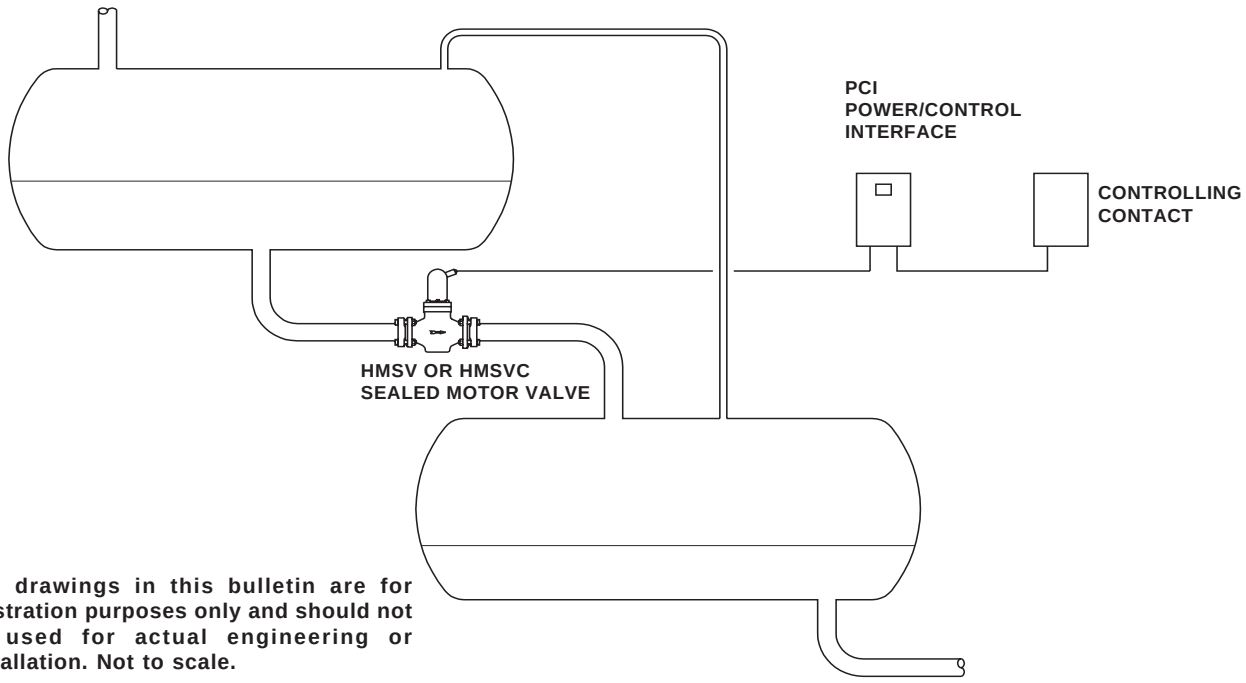
SLOW OPENING AND CLOSING VALVE

SLOW OPENING AND CLOSING: SUCTION STOP VALVE



The HMSV valve can replace both the gas-powered suction stop valve and the equalize solenoid valve. The HMSV valve has no required pressure drop to open wide. The HMSV valve opens slowly after defrost. Slow opening and slow closing may also be accomplished by using the 4-20 mA HMMV and HMMVC valve series.

NO PRESSURE DROP: GRAVITY DRAIN



The drawings in this bulletin are for illustration purposes only and should not be used for actual engineering or installation. Not to scale.

Applications shown use Hansen supplied controllers, however, the Hansen HMMV, HMMR, HMXV, HMSV valve series can be integrated into most customer control systems.

HMMV/HMMVC AND HMSV/HMSVC SUCTION VAPOR CAPACITIES

AMMONIA SUCTION VAPOR CAPACITIES, TONS (kW)

AMMONIA

Evap. Temp. °F (°C)	Pressure Drop psi (bar)	Nominal Size (mm)						
		3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
40 (5)	.25 (.02)	4.4 (17)	8.0 (31)	11 (44)	24 (93)	32 (124)	71 (277)	113 (442)
	.50 (.04)	6.2 (24)	11 (44)	16 (61)	34 (132)	45 (176)	100 (391)	160 (624)
	1.00 (.08)	8.7 (34)	16 (62)	22 (87)	48 (186)	64 (248)	141 (551)	226 (879)
	2.00 (.15)	12 (46)	22 (84)	31 (118)	67 (253)	90 (337)	199 (749)	317 (1196)
0 (-20)	.25 (.02)	2.8 (10)	5.1 (19)	7.1 (26)	15 (56)	20 (74)	45 (165)	72 (263)
	.50 (.04)	3.9 (14)	7.1 (26)	10 (36)	21 (78)	29 (104)	63 (232)	101 (370)
	1.00 (.08)	5.5 (20)	10 (36)	14 (51)	30 (109)	40 (146)	89 (325)	142 (518)
	2.00 (.15)	7.6 (22)	14 (41)	20 (57)	42 (122)	56 (162)	124 (361)	197 (577)
-40 (-40)	.25 (.02)	1.9 (7.0)	3.4 (13)	4.7 (18)	10 (39)	14 (52)	30 (115)	48 (183)
	.50 (.04)	2.6 (10)	4.7 (18)	6.6 (25)	14 (54)	19 (72)	42 (160)	67 (256)
	1.00 (.08)	3.6 (14)	6.5 (25)	9.2 (35)	20 (75)	26 (100)	58 (221)	93 (353)
	2.00 (.15)	4.8 (18)	8.8 (32)	12 (45)	26 (97)	36 (129)	79 (288)	125 (460)
Cv (Kv)		6.4 (5.5)	11.7 (10)	16.4 (14)	35 (30)	47 (40)	104 (89)	166 (142)

R-22 SUCTION VAPOR CAPACITIES, TONS (kW)

R-22

Evap. Temp. °F (°C)	Pressure Drop psi (bar)	Nominal Size (mm)						
		3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
40 (5)	.25 (.02)	1.6 (7)	2.9 (12)	4.1 (17)	8.8 (36)	12 (49)	26 (108)	42 (173)
	.50 (.04)	2.3 (9)	4.1 (17)	5.8 (24)	12 (51)	17 (70)	37 (153)	59 (244)
	1.00 (.08)	3.2 (13)	5.8 (24)	8.2 (34)	17 (72)	23 (98)	52 (215)	83 (345)
	2.00 (.15)	4.5 (18)	8.2 (33)	12 (46)	25 (46)	33 (134)	73 (293)	117 (469)
0 (-20)	.25 (.02)	1.0 (4)	1.9 (7)	2.6 (10)	5.6 (22)	7.5 (30)	17 (65)	27 (105)
	.50 (.04)	1.4 (6)	2.6 (10)	3.7 (14)	7.9 (31)	11 (42)	23 (92)	37 (147)
	1.00 (.08)	2.0 (8)	3.7 (14)	5.2 (20)	11 (43)	15 (59)	33 (129)	53 (207)
	2.00 (.15)	2.8 (11)	5.2 (19)	7.3 (27)	15 (58)	21 (80)	46 (175)	73 (280)
-40 (-40)	.25 (.02)	0.8 (3)	1.5 (6)	2.1 (8)	4.5 (17)	6.0 (24)	13 (52)	21 (83)
	.50 (.04)	1.1 (4)	2.1 (8)	2.9 (11)	6.3 (24)	8.4 (33)	19 (72)	30 (116)
	1.00 (.08)	1.6 (6)	2.9 (11)	4.1 (16)	8.7 (34)	12 (46)	26 (101)	41 (161)
	2.00 (.15)	2.2 (8)	4.0 (15)	5.6 (21)	12 (44)	16 (61)	35 (133)	57 (213)
Cv (Kv)		6.4 (5.5)	11.7 (10)	16.4 (14)	35 (30)	47 (40)	104 (89)	166 (142)

Ammonia, R-22 and R-134a capacities assume 86°F (30°C) condensing, except –40°F (-40°C) assumes +20°F (-7°C) liquid (e.g. two stage). R-404 and R-507 assume 95°F (35°C) condensing. For overfeed evaporator suction, add 20% to the evaporator load or use next larger size valve to accommodate liquid volume.

HMMV AND HMMVC SUCTION VAPOR CAPACITIES

R-134a SUCTION VAPOR CAPACITIES, TONS (kW)

Evap. Temp. °F (°C)	Pressure Drop psi (bar)	Nominal Size (mm)						
		3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
40 (5)	.25 (.02)	1.3 (5.1)	2.3 (9.3)	3.3 (13)	7.0 (28)	9.4 (38)	21 (84)	33 (134)
	.50 (.04)	1.8 (7.2)	3.3 (13)	4.6 (18)	9.9 (40)	13 (54)	29 (119)	47 (190)
	1.00 (.08)	2.5 (10)	4.6 (19)	6.5 (26)	14 (56)	19 (76)	41 (167)	66 (267)
	2.00 (.15)	3.6 (14)	6.5 (25)	9.1 (35)	19 (75)	26 (103)	58 (226)	92 (362)
0 (-20)	.25 (.02)	0.8 (2.9)	1.4 (5.2)	1.9 (7.3)	4.1 (16)	5.6 (21)	12 (47)	20 (75)
	.50 (.04)	1.1 (4.0)	1.9 (7.3)	2.7 (10)	5.8 (22)	7.8 (30)	17 (66)	28 (105)
	1.00 (.08)	1.5 (5.6)	2.7 (10)	3.8 (14)	8.2 (30)	11 (42)	24 (91)	39 (146)
	2.00 (.15)	2.1 (7.5)	3.8 (14)	5.3 (19)	11 (41)	15 (56)	34 (122)	54 (195)
-40 (-40)	.25 (.02)	0.4 (1.6)	0.7 (3.0)	1.0 (4.2)	2.2 (8.9)	3.0 (12)	6.7 (27)	11 (43)
	.50 (.04)	0.6 (2.3)	1.0 (4.1)	1.5 (5.8)	3.1 (12)	4.2 (17)	9.3 (37)	15 (59)
	1.00 (.08)	0.8 (3.1)	1.4 (5.6)	2.0 (7.9)	4.3 (17)	5.7 (23)	13 (51)	20 (81)
	2.00 (.15)	1.0 (4.0)	1.9 (7)	2.6 (10)	5.7 (22)	7.6 (30)	17 (65)	27 (104)
Cv (Kv)		6.4 (5.5)	11.7 (10)	16.4 (14)	35 (30)	47 (40)	104 (89)	166 (142)

R-134a

R-404 SUCTION VAPOR CAPACITIES, TONS (kW)

Evap. Temp. °F (°C)	Pressure Drop psi (bar)	Nominal Size (mm)						
		3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
40 (5)	.25 (.02)	1.4 (5.5)	2.5 (10)	3.5 (14)	7.5 (31)	10 (42)	22 (92)	36 (148)
	.50 (.04)	1.9 (8.0)	3.6 (14)	5.0 (20)	11 (43)	14 (59)	32 (130)	50 (209)
	1.00 (.08)	2.7 (11)	5.0 (20)	7.0 (29)	15 (61)	20 (84)	45 (184)	71 (294)
	2.00 (.15)	3.9 (15)	7.1 (28)	10 (39)	21 (84)	28 (114)	63 (251)	100 (401)
0 (-20)	.25 (.02)	0.8 (3.1)	1.5 (5.7)	2.1 (8.0)	4.5 (17)	6.0 (23)	13 (51)	21 (82)
	.50 (.04)	1.2 (4.4)	2.1 (8.1)	2.9 (11)	6.3 (24)	8.4 (33)	19 (72)	30 (116)
	1.00 (.08)	1.6 (6.2)	3.0 (11)	4.1 (16)	8.9 (34)	12 (46)	26 (102)	42 (163)
	2.00 (.15)	2.3 (8.4)	4.1 (15)	5.8 (21)	12 (46)	17 (63)	37 (138)	59 (221)
-40 (-40)	.25 (.02)	0.4 (1.8)	0.8 (3.3)	1.1 (4.6)	2.4 (10)	3.3 (14)	7.2 (30)	12 (48)
	.50 (.04)	0.6 (2.6)	1.1 (4.7)	1.6 (6.5)	3.4 (14)	4.6 (19)	10 (42)	16 (67)
	1.00 (.08)	0.9 (3.6)	1.6 (6.5)	2.2 (9.1)	4.8 (20)	6.4 (27)	14 (59)	23 (94)
	2.00 (.15)	1.2 (4.8)	2.2 (8.7)	3.1 (12)	6.6 (26)	8.9 (36)	20 (78)	31 (125)
Cv (Kv)		6.4 (5.5)	11.7 (10)	16.4 (14)	35 (30)	47 (40)	104 (89)	166 (142)

R-404

Ammonia, R-22 and R-134a capacities assume 86°F (30°C) condensing, except –40°F (-40°C) assumes +20°F (-7°C) liquid (e.g. two stage). R-404 and R-507 assume 95°F (35°C) condensing. For overfeed evaporator suction, add 20% to the evaporator load or use next larger size valve to accommodate liquid volume.

HMMV AND HMMVC SUCTION VAPOR CAPACITIES

R-507 SUCTION VAPOR CAPACITIES, TONS (kW)

R-507

Evap. Temp. °F (°C)	Pressure Drop psi (bar)	Nominal Size (mm) 3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
40 (5)	.25 (.02)	1.4 (5.9)	2.6 (11)	3.7 (15)	7.8 (32)	10 (44)	23 (96)	37 (153)
	.50 (.04)	2.0 (8.3)	3.7 (15)	5.2 (21)	11 (45)	15 (62)	33 (135)	52 (216)
	1.00 (.08)	2.8 (12)	5.2 (21)	7.3 (30)	16 (64)	21 (87)	46 (191)	74 (305)
	2.00 (.15)	4.0 (16)	7.3 (29)	10 (40)	22 (87)	29 (119)	65 (260)	104 (416)
0 (-20)	.25 (.02)	0.9 (3.3)	1.6 (6.0)	2.2 (6.4)	4.7 (18)	6.3 (25)	14 (54)	22 (87)
	.50 (.04)	1.2 (4.7)	2.2 (8.5)	3.1 (12)	8.6 (25)	8.9 (35)	20 (76)	31 (122)
	1.00 (.08)	1.7 (6.6)	3.1 (12)	4.4 (17)	9.3 (36)	13 (49)	28 (108)	44 (172)
	2.00 (.15)	2.4 (8.9)	4.4 (16)	6.1 (23)	13 (49)	18 (66)	39 (146)	62 (233)
-40 (-40)	.25 (.02)	0.5 (2.0)	0.9 (3.5)	1.2 (5.0)	2.6 (11)	3.5 (15)	7.7 (32)	12 (51)
	.50 (.04)	0.7 (2.7)	1.2 (5.0)	1.7 (7.0)	3.7 (15)	4.9 (20)	11 (45)	17 (72)
	1.00 (.08)	0.9 (3.8)	1.7 (7.0)	2.4 (9.7)	5.1 (21)	6.9 (29)	15 (63)	24 (100)
	2.00 (.15)	1.3 (5.1)	2.4 (9.3)	3.3 (13)	7.1 (28)	9.5 (38)	21 (84)	33 (134)
Cv (Kv)		6.4 (5.5)	11.7 (10)	16.4 (14)	35 (30)	47 (40)	104 (89)	166 (142)

HMMR/HMMRC AND HMXV/HMXVC LIQUID MAKE-UP CAPACITIES

US

Size (mm)	Cv	Capacity Range, Tons									
		Ammonia		R-22		R-134a		R-404		R-507	
		High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low
HMXV/A (5)	.6	45	30	9	8	8	5	6	5	8	6
HMXV/B (7)	1.1	83	55	17	15	15	10	12	10	15	11
3/4" (20)	2.2	166	110	35	30	30	20	25	20	30	22
1" (25)	3.9	294	190	60	50	50	40	45	40	50	40
1 1/4" (32)	5.5	415	270	85	70	70	50	60	50	75	55
1 1/2" (40)	12	910	580	190	150	160	110	135	110	165	120
2" (50)	16	1210	780	250	200	210	150	180	150	220	160
3" (80)	35	2640	1700	540	430	460	320	395	330	480	356
4" (100)	55	4150	2670	850	670	730	510	620	520	755	560

METRIC

Size (mm)	Kv	Capacity Range, Kw									
		Ammonia		R-22		R-134a		R-404		R-507	
		High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low	High to Intermediate	Intermediate to Low
HMXV/A (5)	.5	157	101	32	25	27	19	24	20	28	20
HMXV/B (7)	.9	290	188	60	47	50	35	44	37	52	37
3/4" (20)	1.8	584	377	120	95	100	70	88	74	105	75
1" (25)	3.3	1035	665	210	165	185	125	155	130	185	140
1 1/4" (32)	4.7	1460	940	300	235	256	180	220	185	265	195
1 1/2" (40)	10.0	3190	2050	655	515	650	390	475	400	580	430
2" (50)	13.3	4250	2740	875	685	750	520	640	530	770	575
3" (80)	30	9290	5990	1910	1500	1630	1135	1390	1160	1690	1260
4" (100)	47	14600	9400	3000	2360	2560	1780	2180	1820	2660	1960

Ammonia, R-22 and R134a capacities are based on +86°F (+30°C) saturated liquid and +20°F(-10°C) evaporating temperature, and intermediate to low capacity based on +20°F (-10°C) saturation temperature and -40°F (-40°C) evaporating temperature. R404 and R507 capacities based on +95° F (+35°C) condensing temperature.

HMMV/HMMVC AND HMSV/HMSVC HIGH PRESSURE LIQUID LINE CAPACITIES

AMMONIA HIGH PRESSURE LIQUID LINE CAPACITIES TONS (kW)

Pressure Drop psi (bar)	Nominal Size (mm)						
	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
2 (0.2)	139 (601)	255 (1093)	357 (1530)	762 (3278)	1023 (4480)	2264 (9833)	3614 (15,733)
3 (0.3)	171 (736)	312 (1338)	437 (1873)	933 (4014)	1253 (5486)	2773 (12,043)	4426 (19,269)
5 (0.4)	220 (850)	403 (1545)	564 (2163)	1205 (4635)	1618 (6335)	3580 (13,906)	5714 (22,250)

R-22 HIGH PRESSURE LIQUID LINE CAPACITIES, TONS (kW)

Pressure Drop psi (bar)	Nominal Size (mm)						
	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
2 (0.2)	29 (128)	53 (232)	75 (325)	160 (697)	214 (929)	425 (2067)	757 (3298)
3 (0.3)	36 (156)	65 (284)	92 (398)	196 (853)	263 (1138	581 (2531)	928 (4039)
5 (0.4)	46 (181)	84 (328)	118 (460)	252 (985)	339 (1314)	750 (2923)	1198 (4664)

R-134a HIGH PRESSURE LIQUID LINE CAPACITIES, TONS (kW)

Pressure Drop psi (bar)	Nominal Size (mm)						
	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
2 (0.2)	27 (118)	49 (215)	69 (301)	147 (645)	197 (859)	437 (1912)	697 (3051)
3 (0.3)	33 (145)	60 (263)	84 (368)	180 (789)	242 (1053)	535 (2342)	854 (3737)
5 (0.4)	43 (167)	78 (304)	109 (425)	232 (912)	312 (1215)	691 (2704)	1103 (4315)

R-404 HIGH PRESSURE LIQUID LINE CAPACITIES, TONS (kW)

Pressure Drop psi (bar)	Nominal Size (mm)						
	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
2 (0.2)	18 (81)	33 (147)	46 (205)	97 (440)	131 (602)	289 (1321)	461 (2113)
3 (0.3)	22 (99)	40 (180)	56 (252)	119 (539)	160 (737)	354 (1618)	565 (2588)
5 (0.4)	28 (114)	51 (208)	72 (291)	154 (623)	207 (851)	457 (1868)	730 (2989)

R-5O7 HIGH PRESSURE LIQUID LINE CAPACITIES, TONS (kW)

Pressure Drop psi (bar)	Nominal Size (mm)						
	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	3" (80)	4" (100)
2 (0.2)	18 (80)	33 (146)	46 (204)	97 (438)	131 (598)	290 (1313)	462 (2101)
3 (0.3)	22 (98)	40 (179)	56 (250)	119 (536)	160 (733)	355 (1608)	566 (2573)
5 (0.4)	29 (113)	52 (206)	72 (289)	154 (619)	207 (846)	458 (1857)	731 (2971)

Ammonia, R-22, and R-134a capacities based on +86°F(30°C) saturated liquid, and +20°F (-10°C) evaporator, and no flashing through the valve. R-404 and R-507 based on 95°F(35°C) saturated liquid temperatures.

HMMV/HMMVC AND HMSV/HMSVC HOT GAS SOLENOID DEFROST CAPACITIES

EVAPORATOR SIZE IN TONS (kW)

Refrigerant	Nominal Size (mm)				
	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)
Ammonia	9-15 (32-53)	15-28 (53-99)	28-39 (99-137)	39-73 (137-256)	73-106 (256-373)
R-22	6-8 (21-28)	8-15 (28-53)	15-20 (53-70)	20-32 (70-113)	32-47 (113-165)
R-134a	1-4 (4-14)	4-8 (14-28)	8-12 (28-42)	12-20 (42-70)	20-38 (70-134)
R-404	3-6 (11-22)	6-10 (22-35)	10-18 (35-63)	18-30 (63-106)	30-44 (106-155)
R-507	1-4 (4-14)	4-8 (14-28)	8-12 (28-42)	12-20 (42-70)	20-38 (70-134)

Evaporator tons at 10°F temperature differential, valve capacities are conservative.

OPERATION: HMMV AND HMMR

The motor shaft is coupled to a threaded stem which directly drives the valve V-port open or closed. The valve is driven by motor windings and electronics placed outside of a hermetic can and hermetically sealed in a liquid tight housing. Inside the can is a motor rotor which drives the motor shaft.

Please note that Sealed Motor Valves 2" and smaller will operate and seal with flow in either direction. 3" and 4" pressure assisted Sealed Motor Valves will only operate and seal with inlet equal to or greater than outlet pressure. Where pressure reversals are expected, a check valve at the outlet of the 3" and 4" SMV is recommended.

The HMMV and HMMR valve are electronically operated by 7 wires. Two wires provide 24 VAC to power the motor. Two wires provide a 4-20 mA input to control the opening and closing of the valve. Two additional wires provide 4-20 mA feedback of actual valve V-port position. The feedback does not have to be connected to operate the valve. The 7th wire is a ground wire.

A 4-20 mA control signal must always be maintained to keep the V-port in position. Loss of 4-20mA signal will drive the valve closed. When driven fully closed or fully open the motor will shut off. Likewise, the motor will shut off when the V-port has reached the position indicated by the 4-20mA input signal. If loss of 24 VAC power occurs, the valve remains in its current position, unless the valve is equipped with Power-Close or an external battery back-up (HBAT).

The valve is programmed to close when the signal is less than 4.8 mA (Less than 5% flow). This is to minimize seat erosion during low load conditions.

For critical applications where loss of power or control signal would present a potential operation or a safety issue, an independently controlled solenoid valve installed before the sealed motor valve is recommended.

POWER-CLOSE OPTIONS

Models HMMVC, HMMRC, HMSVC and HMXVC have an integral battery to power the valve closed in the event of loss of 24 VAC power.

HMMV/HMMVC AND HMMR/HMMRC WIRING DIAGRAM

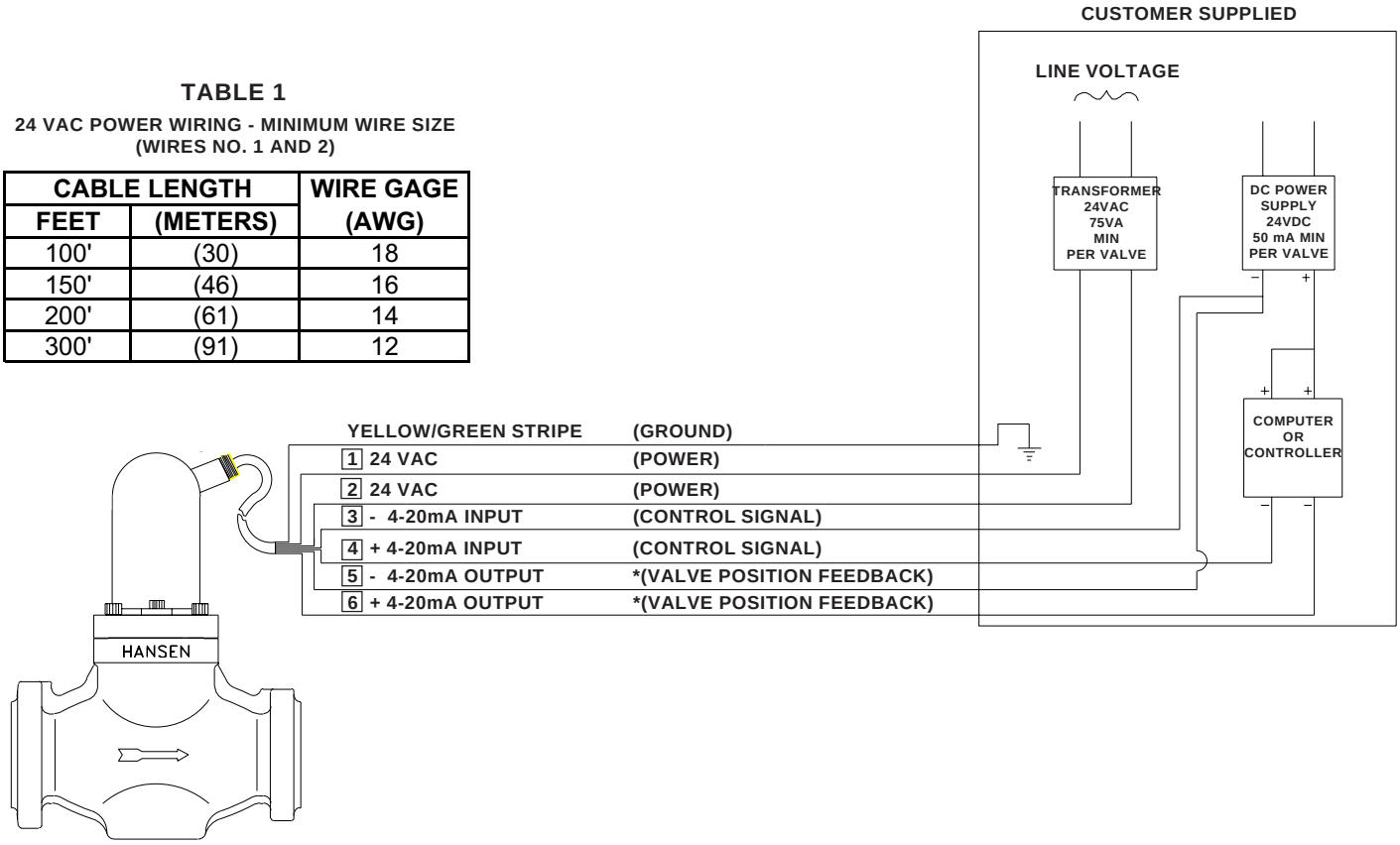
CUSTOMER SUPPLIED POWER SUPPLY AND CONTROLLER
(Modulating Control with Position Feedback)

The Valve is supplied with 10 feet of cable with 18 gage wires. For greater distance between valve and controller use wire size as shown in table 1. Do not run Sealed Motor Valve wiring with or near high voltage power wiring or VFD Controls (Variable Frequency Drives).

TABLE 1

24 VAC POWER WIRING - MINIMUM WIRE SIZE (WIRES NO. 1 AND 2)

CABLE LENGTH		WIRE GAGE
FEET	(METERS)	(AWG)
100'	(30)	18
150'	(46)	16
200'	(61)	14
300'	(91)	12



HANSEN SEALED MOTOR VALVE
HMMV/HMMVC, HMMR/HMMRC

***Use of valve position feedback is not required for operation of the valve.**

OPERATION: HMSV

The HMSV motor operates on 24 VAC. (Valves built before January 1, 2005 use 28 VDC power supply.) Electronics inside the stator housing pulse power to the motor to provide strong, slow opening and closing operation with minimal wattage.

The HMSV valve is electrically operated by three wires plus ground. Two wires provide 24 VAC input, and a third is signal, which commands the valve to either open or close. Electrically connecting the signal wire (3) to 24 VAC input wire (1) will drive the valve open. Electrically connecting the signal wire (3) to 24 VAC input wire (2) will drive the valve closed. If the signal wire (3) is not connected to either 24 VAC signal wires, the valve will remain in its last position. (Also, on loss of power the valve will remain at its last position.) If Power-Close is required, specify model HMSVC.

The locked rotor amperage is not significantly higher than the running amperage; therefore, continuing to supply power to the motor after it has fully opened or closed (stalled) is acceptable and typical for the HMSV valve. The power supply and wiring must be sized for a 75 W peak pulsed load. However, average power consumed is 10 W. Since the motor consumes minimal wattage, electrical costs and overheating are not concerns.

HMSV and HMSVC WIRING DIAGRAM

CUSTOMER SUPPLIED POWER SUPPLY AND CONTROLLER
(Slow Opening and Closing Applications)

SEE BULLETIN R630 FOR AVAILABLE CONTROLLERS

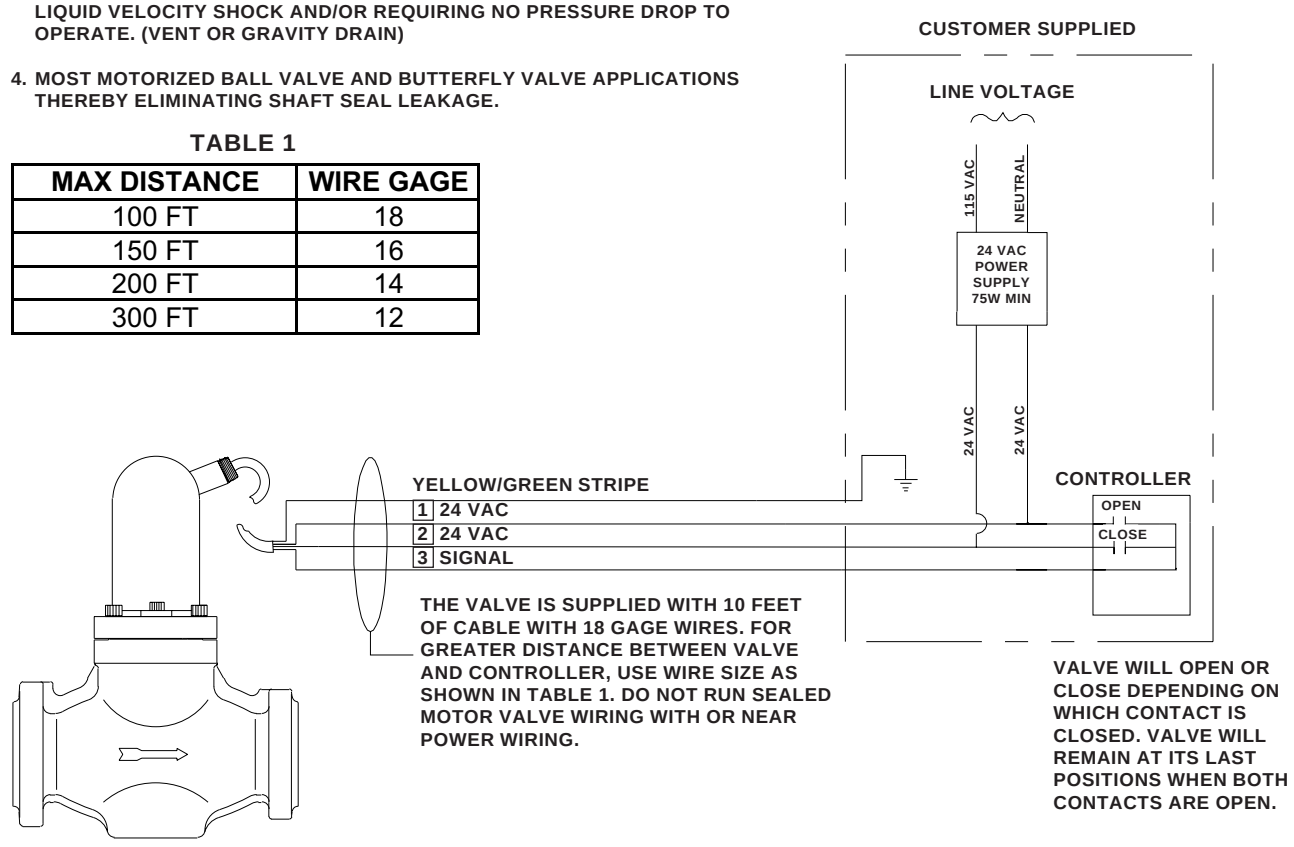
TYPICAL APPLICATIONS

IDEAL FOR REPLACEMENT OF:

1. **BOTH HOT GAS SOLENOID VALVE AND SOFT GAS SOLENOID VALVE WITH A SINGLE HANSEN SEALED MOTOR VALVE.**
2. **BOTH SUCTION SOLENOID VALVE AND EQUALIZE SOLENOID VALVE WITH A SINGLE HANSEN SEALED MOTOR VALVE.**
3. **ANY OPEN/CLOSED APPLICATION REQUIRING SLOW OPERATION TO MINIMIZE LIQUID VELOCITY SHOCK AND/OR REQUIRING NO PRESSURE DROP TO OPERATE. (VENT OR GRAVITY DRAIN)**
4. **MOST MOTORIZED BALL VALVE AND BUTTERFLY VALVE APPLICATIONS THEREBY ELIMINATING SHAFT SEAL LEAKAGE.**

TABLE 1

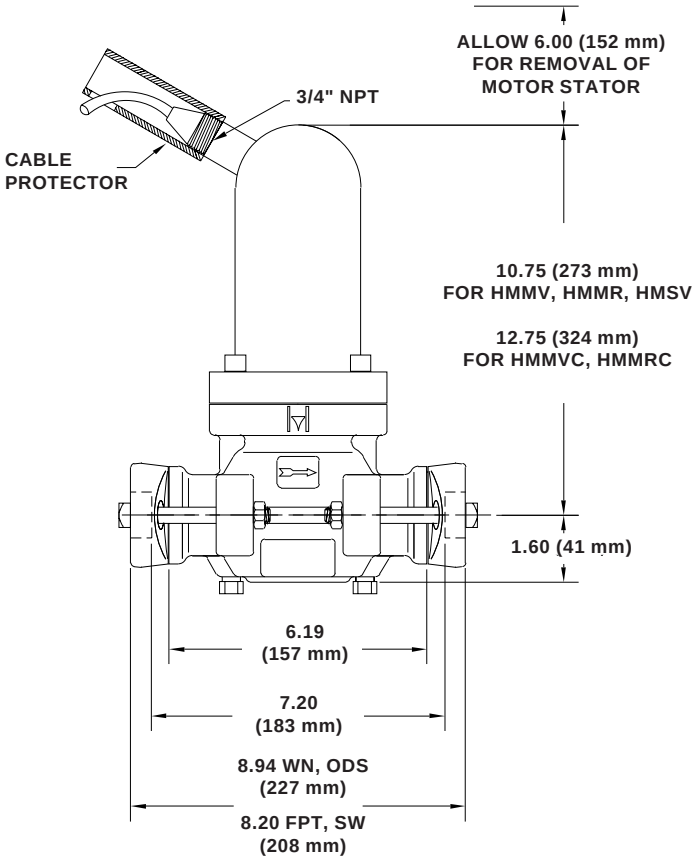
MAX DISTANCE	WIRE GAGE
100 FT	18
150 FT	16
200 FT	14
300 FT	12



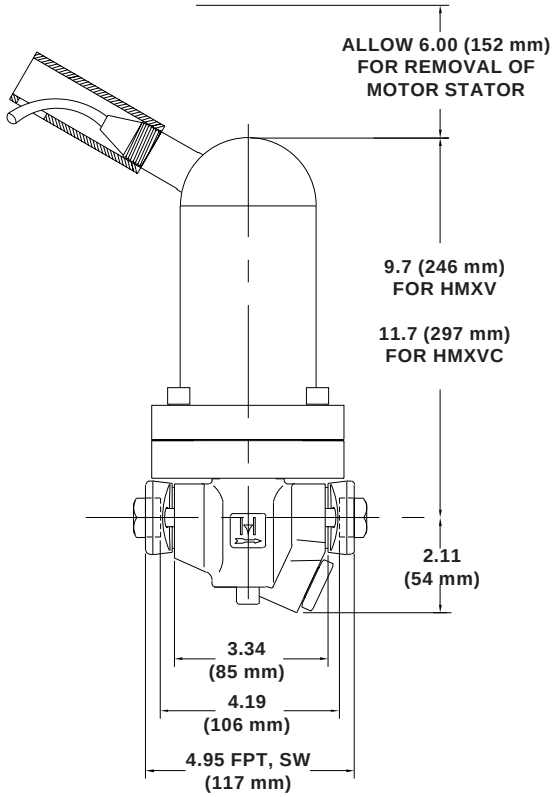
HANSEN SEALED MOTOR VALVE
HMSV/HMSVC

INSTALLATION DIMENSIONS-INCH (MM)

3/4" THROUGH 1 1/4" SEALED MOTOR VALVE



HMXV/HMXVC MOTORIZED EXPANSION VALVE



INSTALLATION

Protect the interior of valve from dirt and moisture during storage and installation. Valve should be installed so that the arrow on the valve body is in direction of normal refrigerant flow. Reverse valve below 32ºF or colder on 3/4" to 2". Do not reverse valve on 3" and 4".

Please note: valve will not backflow if in closed position. *Do not install check valves upstream of the Sealed Motor Valve without hydrostatic pressure relief.* Do not close the hand valve on inlet or outlet without making sure valve is in the open position. System should be free from dirt, weld slag and rust particles. A 60 mesh, close-coupled strainer is available for installation at inlet of valve for 3/4", 1" and 1 1/4". *Do not close-couple strainers to 1 1/2" through 4" Sealed Motor Valves.*

1/4" NPT Gauge/Purge port connections are provided on the inlet and outlet of the 3/4" thru 4" valves.

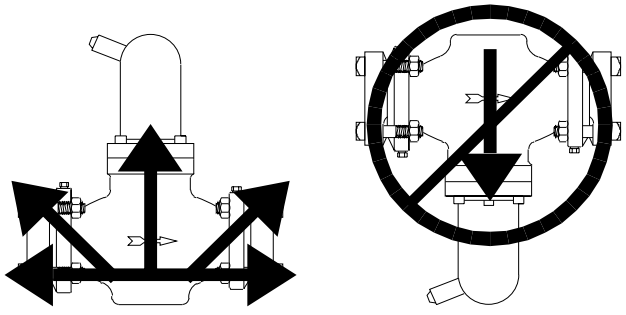
Please note that Sealed Motor Valves 2" and smaller will operate and seal with flow in either direction. 3" and 4" pressure assisted Sealed Motor Valves will only operate and seal with inlet equal to or greater than outlet pressure. Where pressure reversals are expected, a check valve at the outlet of the 3" and 4" SMV is recommended.

Pipe sizing, rating, anchoring, and similar prudent precautions should be taken to ensure "liquid hammer" will not occur when valves open or close.

For proper flange gasket sealing, care must be taken when threading or welding to assure flanges are parallel to each other and perpendicular to pipe. Also, gaskets should be lightly oiled and all bolts must be tightened evenly.

Protect cable during installation.

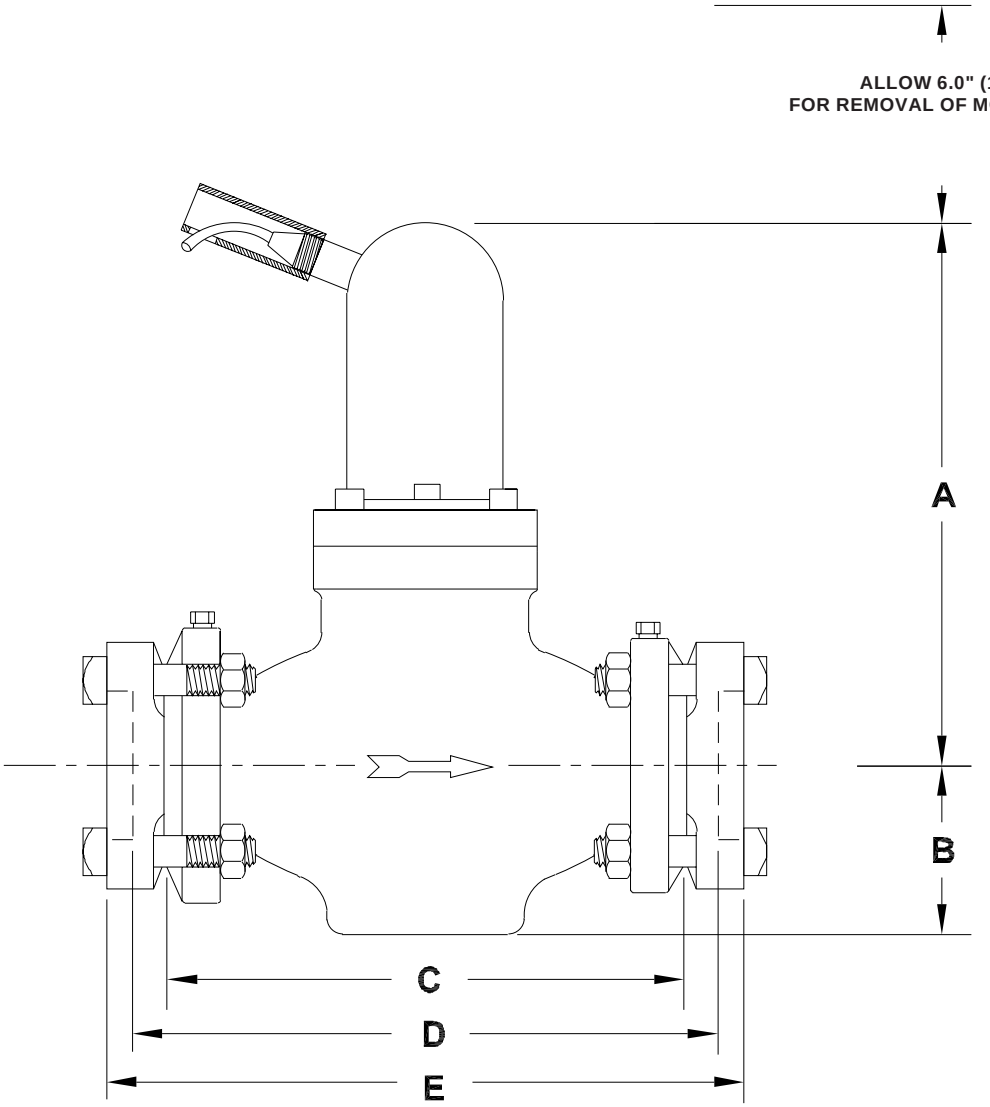
Do <u>not</u> mount the valve with the motor in the down position. The valve will <u>only</u> operate properly if the motor is mounted in a horizontal or upright position. Refer to diagrams below. Horizontal mounting of motor is satisfactory if oil and dirt are controlled.



YES **NO**

INSTALLATION DIMENSIONS-INCH (MM)

1 1/2" THROUGH 4" SEALED MOTOR VALVE



SIZE (mm)		1 1/2" (40)	2" (50)	3" (80)	4" (100)
A	HMMV HMMR HMSV	12.00 (305)	12.00 (305)	13.38 (340)	14.00 (356)
	HMMVC HMMRC	14.00 (356)	14.00 (356)	15.38 (391)	16.00 (406)
B		3.00 (76)	3.00 (76)	4.00 (102)	4.75 (121)
C		9.88 (251)	9.88 (251)	12.25 (311)	14.12 (359)
D		10.89 (277)	10.89 (277)	13.38 (340)	15.01 (381)
E FPT, SW		12.39 (315)	12.39 (315)	15.38 (391)	17.01 (432)
E WN, ODS		13.39 (340)	13.39 (340)	16.40 (417)	20.51 (521)
MAX WIDTH		4.58 (117)	4.58 (117)	6.50 (166)	8.06 (205)

RE-CALIBRATION INSTRUCTIONS FOR HMM SERIES*

Hansen Sealed Motor Valves are factory calibrated, and hold their calibration during shipment, power outages, etc. Valve disassembly or manual opening with the MOVT (Manual Operation Valve Tool) does require subsequent recalibration, therefore after removing or replacing the 4-20 mA motor of a Sealed Motor Valve, recalibrate the valve. Recalibration synchronizes the control input with the valve position; that means, for example, a 12 mA input (50%) would result in the valve moving to the half-open position.

1. **Secure the refrigeration system to allow the valve to open and close fully without causing undesirable system problems to occur.**

2. **Mount and secure the motor on the sealed motor valve. Connect electrical wiring in accordance to the valve and controller manufacturers specifications.**

3. **Install "Calibration Key" over 'X' on side of motor and secure with strap.**

4. **Increase the control input to 20 mA or slightly greater. Maintain at least 20 mA for at least two minutes. This will give the valve time to move to the wide open position and calibrate its position. Note: some computer control systems have lag times before the control input is sent to the valve.**

5. **Decrease the control input to 4 mA or less. Maintain 4 mA or less for at least two minutes. This will give the valve time to move to the completely closed position and calibrate its zero point.**

6. **Again increase the control input to at least 20 mA. Maintain at least 20 mA for at least two minutes. This will give the valve time to move to the wide open position and set its span.**

7. **The valve should now be calibrated and in the wide open position.**

8. **Remove "Calibration Key" and store. The valve will operate satisfactorily if the "Calibration Key" remains over the "X" but the valve will recalibrate each time the control input is at 4 mA or 20 mA for more than the two minutes.**

9. **Return control system to automatic operation.**

NOTE:

Recalibration requires the ability to control the 4-20 mA control input to the motor between four and twenty milliamps, and requires the ability to allow the valve to stroke fully open and closed. Only qualified refrigeration service personnel should perform this procedure, and proper precautions taken to prevent a hazardous or undesirable occurrence resulting from operating the valve from open and closed.

ELECTRICAL MAINTENANCE

Check calibration and Power-Close function on a routine basis. Check controller and controller wiring for corrosion. Check controller function.

MANUAL OPERATION VALVE TOOL

Use of the MOVT requires the removal of the power head. Do not remove the bonnet. Use extreme caution when loosening the power head screws, as the motor may contain refrigerant under pressure if a breach of the motor can has occurred (even after system evacuation). Wear protective gear and look/ listen for escaping refrigerant while carefully loosening housing screws, and breaking the pressure seal.

Remove housing and place MOVT over can. Manually operate the valve open or closed by turning the MOVT in the directions indicated on the top of the tool. Refer to Table below for number of turns to fully actuate valve. Upon re-installing the power head, recalibrate according to instructions.

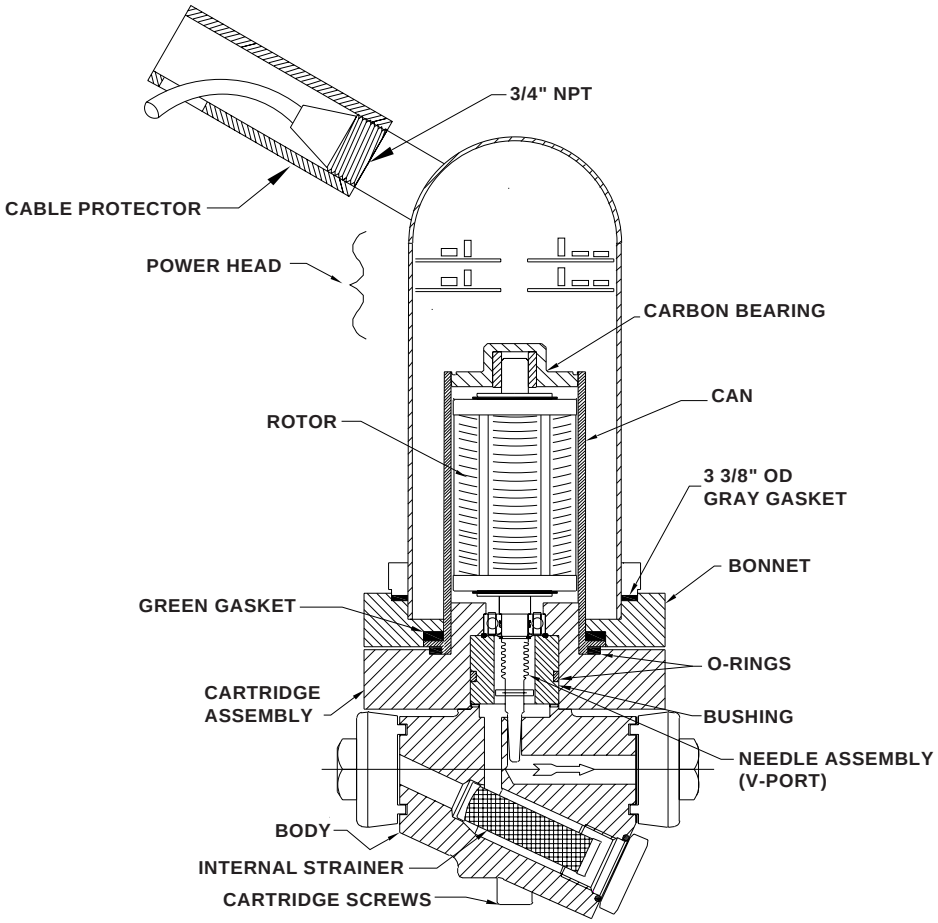
****The HMSV series do not require recalibration.***

NOTE:

Powerhead must be sealed and torqued to 15 foot lbs to prevent moisture from damaging electronics. Care must be taken not to damage or dent the can. This will make the motor inoperative.

NOMINAL SIZE INCH (mm)	# OF TURNS
7/32" (5mm)	6
9/32" (7mm)	6
3/4" THRU 1 1/4"	7
1 1/2" AND 2"	12
3"	18
4"	20

HMXV SEALED MOTOR VALVE



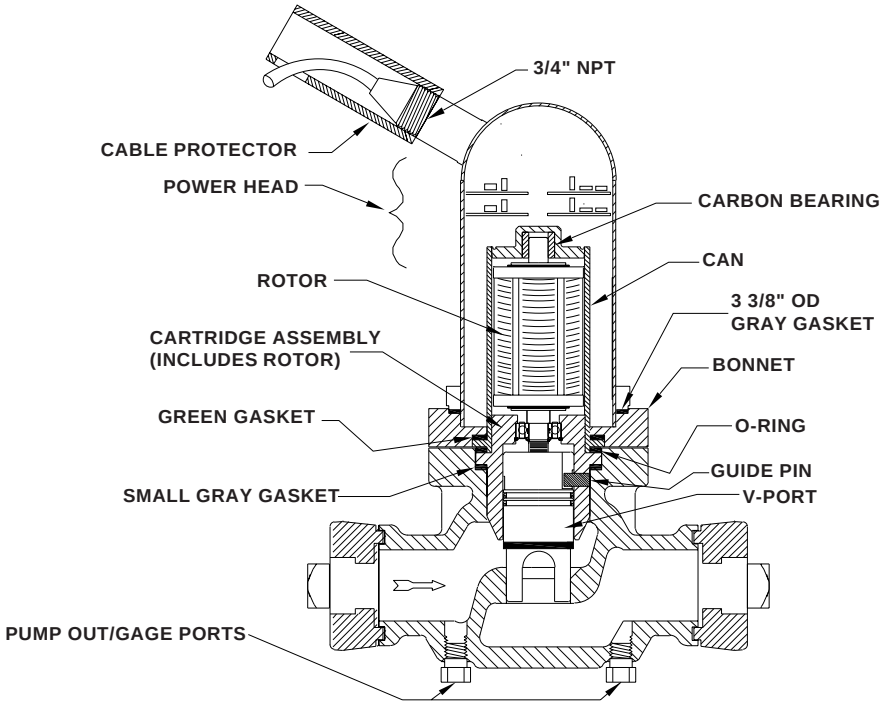
HMXV DISASSEMBLY

1. ***Isolate the valve from the refrigerant pressure and evacuate the refrigerant.***
2. **During normal circumstances the Power Head (1) is isolated from the refrigerant pressure. If abnormal conditions cause a breach in the isolating Can (5), refrigerant pressure will enter and be contained by the power head, possibly even after the valve has been isolated and evacuated of refrigerant. Always use caution when loosening the Power Head (1). Carefully loosen but do not remove the small power head screws and break the pressure seal. Observe for signs of internal pressure. After confirming no internal pressure is present, remove the bolts and the housing.**
3. **Carefully loosen the larger bonnet bolts, break gasket seal, and if no pressure is present remove the bolts and bonnet. To prevent damage to the can, reinstall Power Head (or MOVT).**
4. **Remove the isolating can (5).**
5. **Remove the two cartridge screws on underside of body. Lift off cartridge assembly from body.**
6. **Remove needle assembly by rotating rotor counterclockwise.**

HMXV REASSEMBLY

1. **Install needle assembly by aligning with rotor and turning rotor clockwise. Align pin of needle assembly with grooves in keyway bushing.**
2. **Replace gasket into groove in cartridge.**
3. **Replace cartridge assembly with care not to mar the body seat with end of needle. Replace two cartridge screws and torque to 35 ft-lbf (47 N-m).**
4. **Install o-ring onto face groove of cartridge. Check carbon bearing inside can and install can over rotor. Place green gasket over can (Important that o-ring is below can flange and seated properly in groove, and green gasket is above can flange to seal between can and bonnet).**
5. **Install bonnet over can. Before torquing large bonnet bolts, install 3 3/8" OD gray gasket, loosely install motor housing to prevent wrenching damage to can. Install large bonnet bolts and torque evenly to 35 ft-lbf (47 N-m). Install small motor housing screws and torque evenly to 15 ft-lbf (20 N-m).**
6. **Failure to seal Power Head may result in motor failure due to moisture damage.**

3/4" THROUGH 2" SEALED MOTOR VALVE



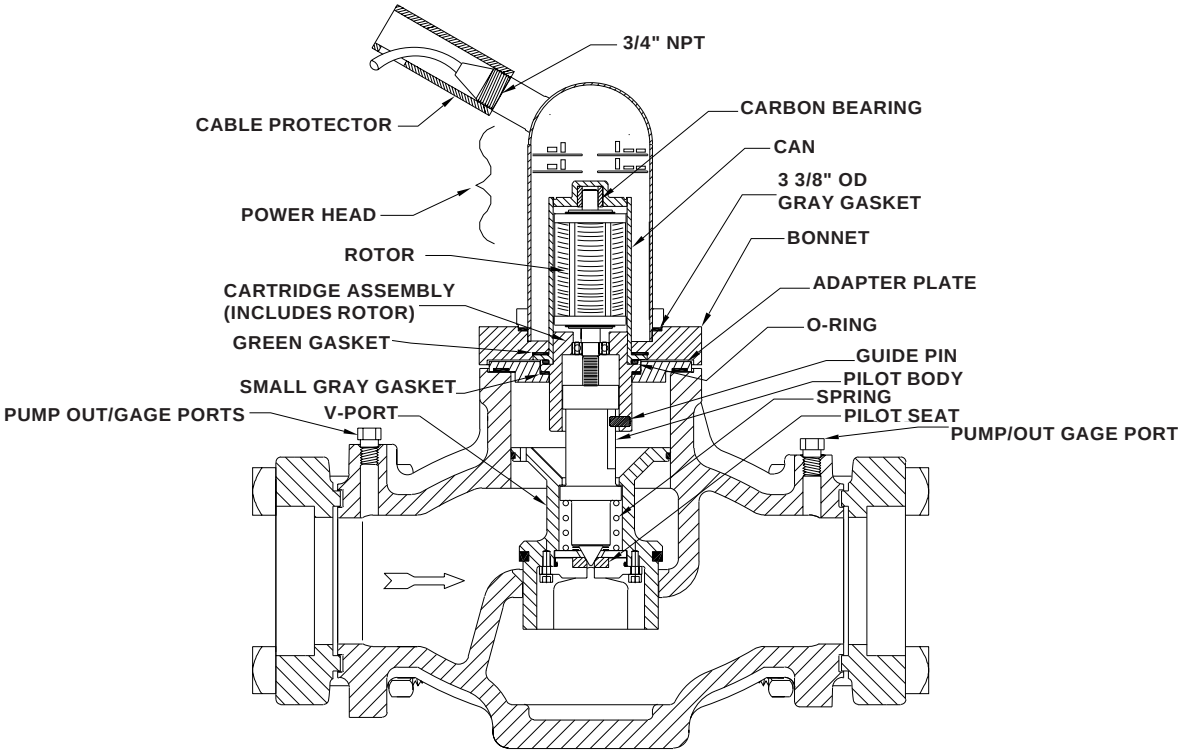
VALVE DISASSEMBLY 3/4" THRU 2"

1. ***Isolate the valve from the refrigerant pressure and evacuate the refrigerant.***
2. **During normal circumstances the Power Head (1) is isolated from the refrigerant pressure. If abnormal conditions cause a breach in the isolating Can (5), refrigerant pressure will enter and be contained by the power head, possibly even after the valve has been isolated and evacuated of refrigerant. Always use caution when loosening the Power Head (1). Carefully loosen but do not remove the small power head screws and break the pressure seal. Observe for signs of internal pressure. After confirming no internal pressure is present, remove the bolts and the housing.**
3. **Carefully loosen the larger bonnet bolts, break gasket seal, and if no pressure is present remove the bolts and bonnet. To prevent damage to the can, reinstall Power Head (or MOVT).**
4. **Remove the isolating Can (5).**
5. **Grasp the Rotor Magnets (3) and while lifting out squarely, remove the cartridge assembly, taking care not to bend the rotor shaft. If cartridge removal is difficult, remove by screwing the rotor counterclockwise and the cartridge will press out. WARNING: Don't bend shaft.**
6. **Remove the V-port (2) from the cartridge assembly by unscrewing the rotor counterclockwise.**

VALVE REASSEMBLY 3/4" THRU 2"

1. **Inspect all V-port seals for damage. Install V-port into cartridge fully supporting the v-port and cartridge while carefully aligning the threaded shaft of cartridge with the low friction nut of V-port. Carefully thread together 6-8 turns, and align the anti-rotation slot on the V-port with the anti-rotation pin of the cartridge. Fully thread the V-port into the cartridge, screwing the V-port fully into the cartridge by turning the rotor clockwise.**
2. **Place smaller gray gasket, then cartridge into the body. Install o-ring onto face groove of cartridge. Check carbon bearing inside can and install can over rotor. Place green gasket over can (Important that o-ring is below can flange and seated properly in groove, and green gasket is above can flange to seal between can and bonnet).**
3. **Install bonnet over can. Before torquing large bonnet bolts, install 3 3/8" OD gray gasket, loosely install motor housing (or MOVT) to prevent wrenching damage to can. Install large bonnet bolts and torque evenly to 35 ft-lbf (47 N-m). Install small motor housing screws and torque evenly to 15 ft-lbf (20 N-m).**
4. **Failure to seal Power Head may result in motor failure due to moisture damage.**

3" AND 4" SEALED MOTOR VALVE



VALVE DISASSEMBLY 3" THRU 4"

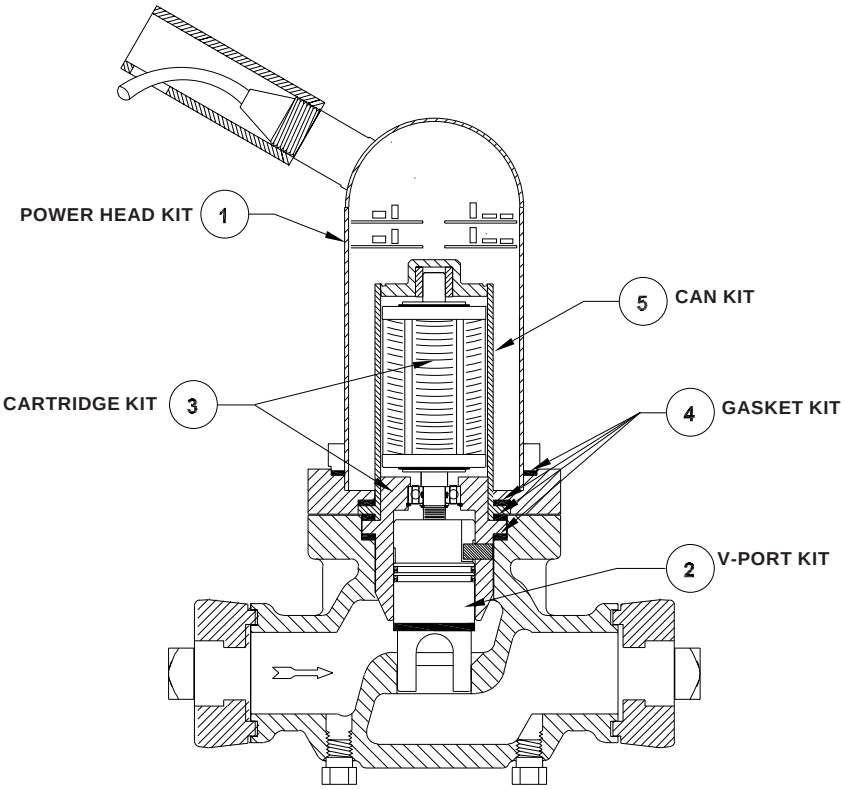
1. *Isolate the valve from the refrigerant pressure and evacuate the refrigerant.*
2. During normal circumstances the power head (1) is isolated from the refrigerant pressure. If abnormal conditions cause a breach in the isolating Can (5), refrigerant pressure will enter and be contained by the Power Head, possibly even after the valve has been isolated and evacuated of refrigerant. Always use caution when loosening the Power Head (1). Carefully loosen but do not remove the small power head screws and break the pressure seal. Observe for signs of internal pressure. After confirming no internal pressure is present, remove the bolts and the housing.
3. Carefully loosen the larger bonnet bolts, break gasket seal, and if no pressure is present remove the bolts and bonnet. To prevent damage to the can, reinstall Power Head (or MOVT).
4. Remove the isolating Can (5).
5. Grasp the Rotor Magnets (3) and remove the cartridge assembly by unscrewing the rotor counter-clockwise until the rotor shaft is free of the v-port assembly. Do not remove the v-port with the cartridge assembly.
6. Remove the adapter plate. Plate can be pried off with slip joint pliers or wrench inserted into center hole.
7. Remove the V-port (2) from the body.
8. Remove the pilot seat (6) by inverting the v-port and removing four small screws from the pilot seat retainer, enabling removal of the pilot seat, washer, spring, and pilot body. Caution: The retainer is spring loaded. Hold plate down with large Phillips screwdriver while carefully loosening screws.

VALVE REASSEMBLY 3" THRU 4"

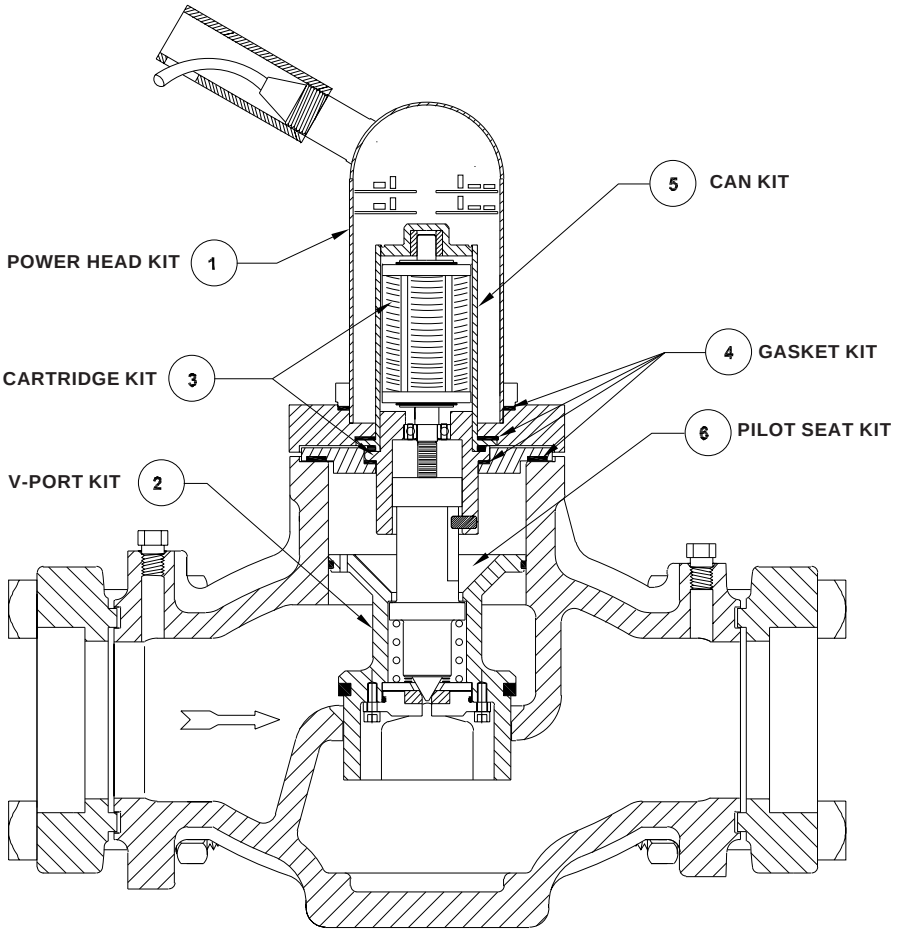
1. Assemble pilot seat in reverse order. Torque small screws to 5ft-lbf (7 N-m).
2. Inspect all V-port seals for damage. Install V-port assembly into body. Place large gasket, then adapter plate onto body.
3. Place smaller gray gasket into counterbore for cartridge. Inspect all V-port seals for damage. Install V-port into cartridge fully supporting the V-port and cartridge while carefully aligning the threaded shaft of cartridge with the low friction nut of V-port. Carefully thread together 6-8 turns, and align the anti-rotation slot on the V-port with the anti-rotation pin of the cartridge. Fully thread the V-port into the cartridge, screwing the V-port fully into the cartridge by turning the rotor clockwise. Lifting the assembly somewhat while assembling allows better viewing of alignment.
4. Install o-ring onto face groove of cartridge. Check carbon bearing inside can and install can over rotor. Place green gasket over can (Important that o-ring is below can flange and seated properly in groove, and green gasket is above can flange to seal between can and bonnet).
5. Install bonnet over can. Before torquing large bonnet bolts, install 3 3/8" OD gray gasket, loosely install motor housing to prevent wrenching damage to can. Install large bonnet bolts and torque evenly to 175 ft-lbf (237 N-m). Install small motor housing screws and torque evenly to 15 ft-lbf (20 N-m).

SEALED MOTOR VALVE PARTS LIST

3/4" THROUGH 2" SEALED MOTOR VALVE

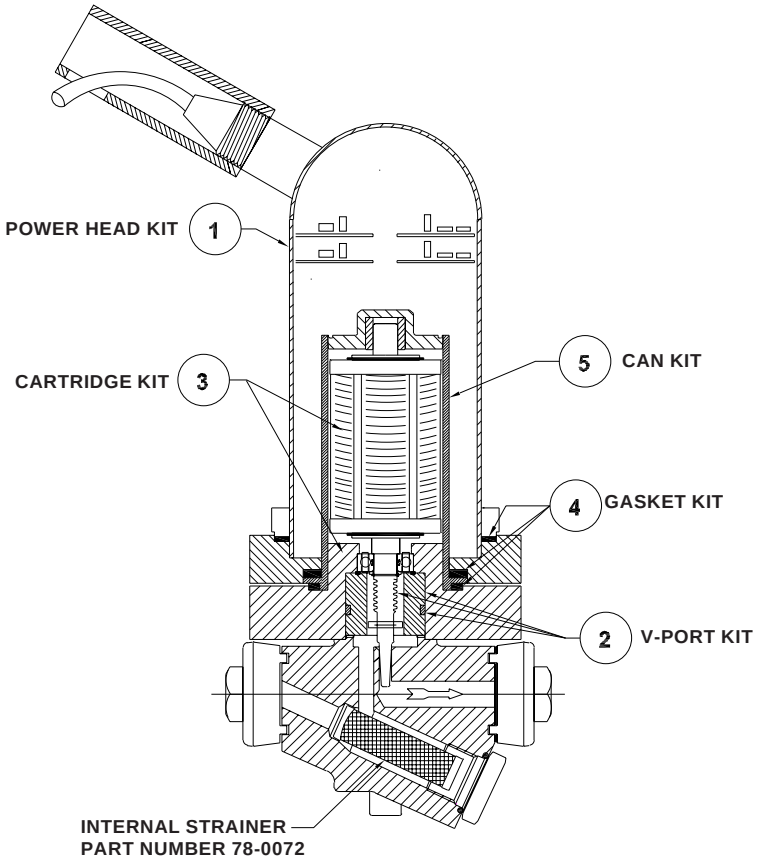


3" AND 4" SEALED MOTOR VALVE



SEALED MOTOR VALVE PARTS LIST

HMXV SEALED MOTOR VALVE



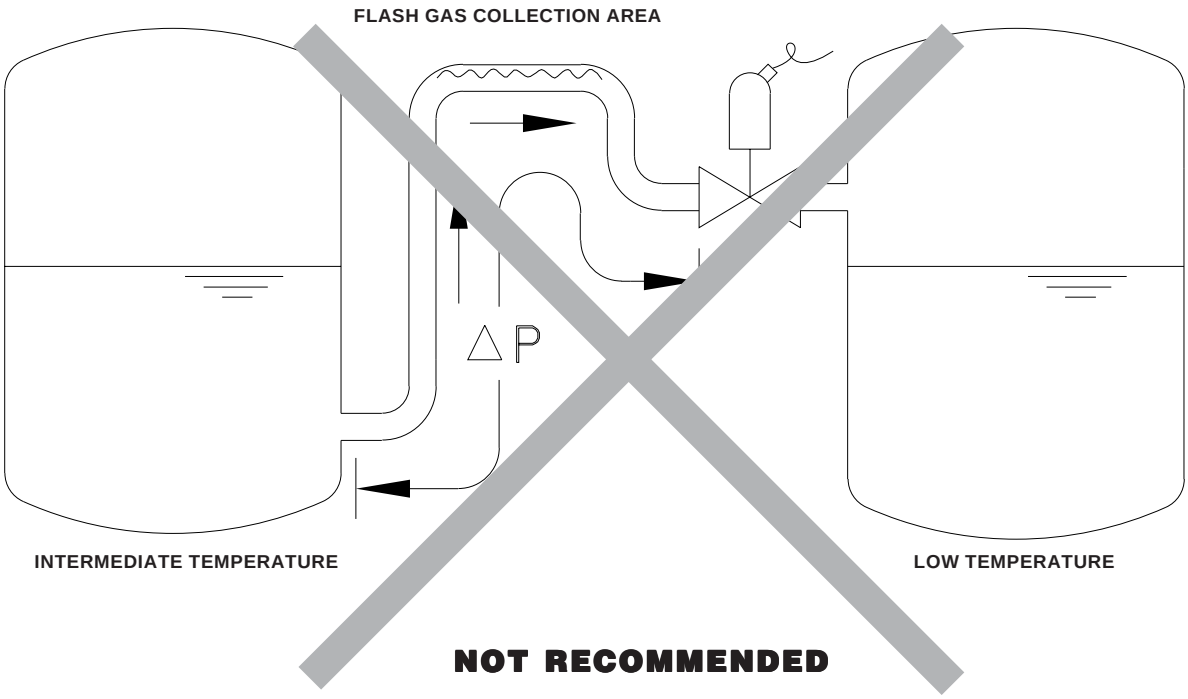
ValveType	Nominal Size Inch (mm)	1 Power Head Kit STD	1 Power Head Kit POWER-CLOSE	2 V-Port Assembly Kit	3 Cartridge Assembly Kit	4 Gasket Kit	5 Can Kit	6 Pilot Seat Kit*
HMXV	7/32" (5)	75-1171	75-1183	HMXV/A 75-1176	75-1178	75-1180	75-1177	
	9/32" (7)			HMXV/B 75-1179				
HMMV	3/4" (20)	75-1171	75-1183	75-1154	75-1167	75-1148	75-2922	
	1" (25)			75-1155				
	1 1/4" (32)			75-1156				
	1 1/2" (40)			75-1157	75-1168	75-1150		
	2" (50)			75-1166				
	3" (80)			75-1158	75-1169	75-1151		75-1149
	4" (100)			75-1159	75-1170	75-1152		75-1153
HMMR	3/4" (20)	75-1171	75-1183	75-1160	75-1167	75-1148	75-2922	
	1" (25)			75-1161				
	1 1/4" (32)			75-1154				
	1 1/2" (40)			75-1162	75-1168	75-1150		
	2" (50)			75-1163				
	3" (80)			75-1164	75-1169	75-1151		75-1149
	4" (100)			75-1165	75-1170	75-1152		75-1153
HMSV	3/4" (20)	75-1187	75-1184	75-1154	75-1167	75-1148	75-2922	
	1" (25)			75-1155				
	1 1/4" (32)			75-1156				
	1 1/2" (40)			75-1157	75-1168	75-1150		
	2" (50)			75-1166				
	3" (80)			75-1158	75-1169	75-1151		75-1149
	4" (100)			75-1159	75-1170	75-1152		75-1153

Note: All kits include gaskets needed to replace part.

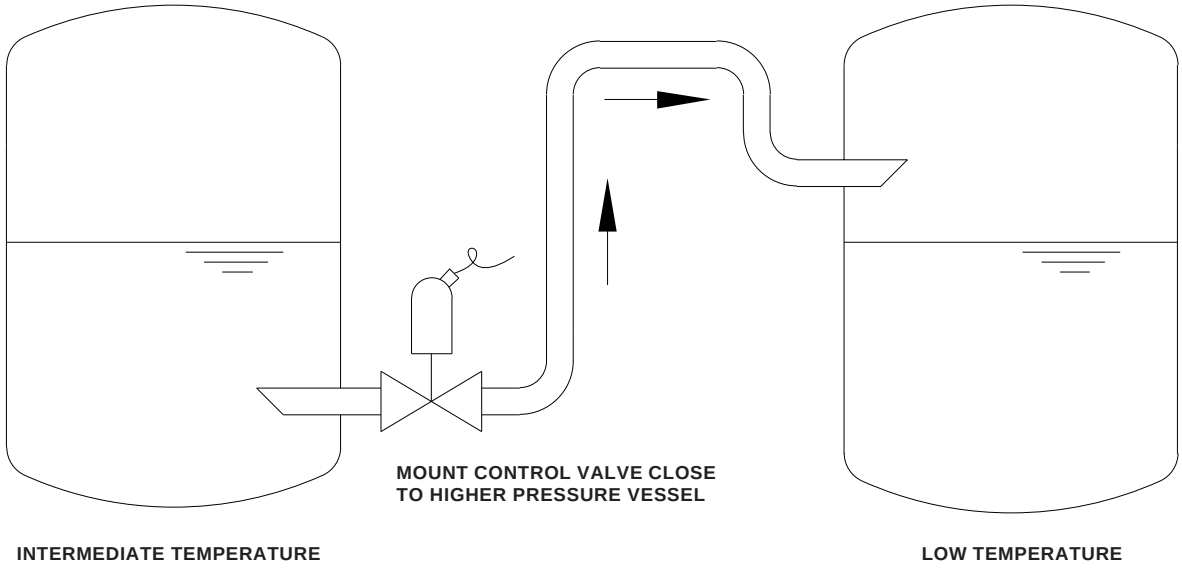
*** Included in V Port Kit**

FIGURE 1:

LIQUID FEED VALVE FROM INTERMEDIATE TO LOW TEMPERATURE VESSEL



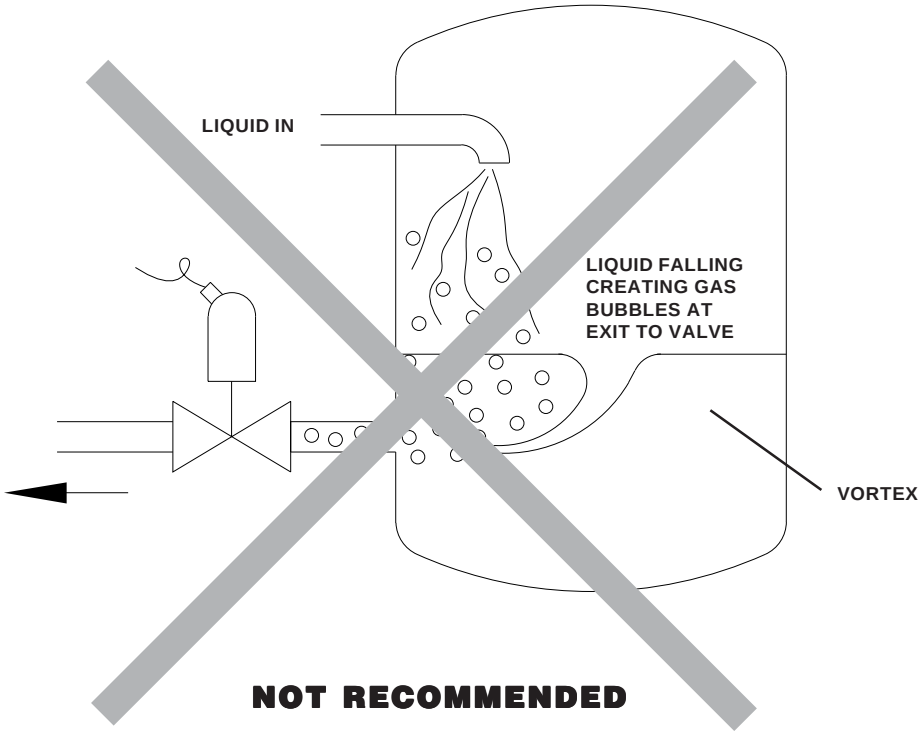
NOT RECOMMENDED



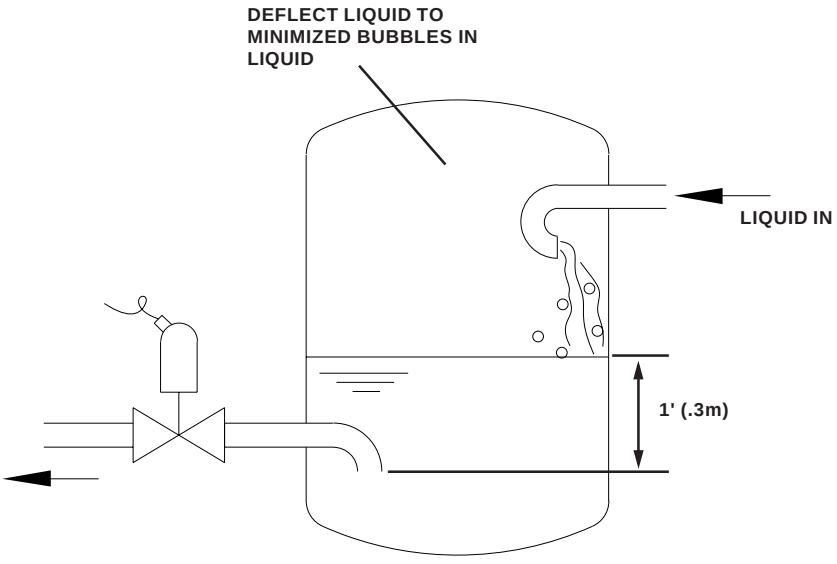
RECOMMENDED

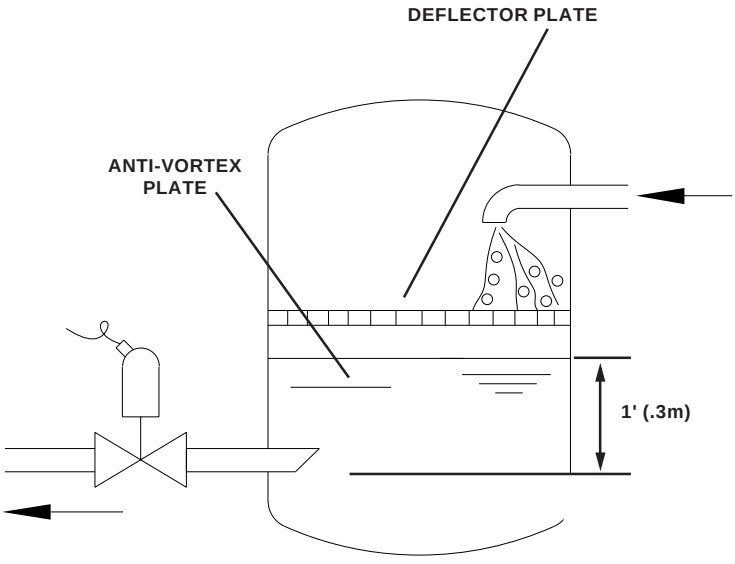
FIGURE 2:

PIPING RECOMMENDATIONS



NOT RECOMMENDED





RECOMMENDED

TROUBLESHOOTING GUIDE FOR SEALED MOTOR VALVE

When troubleshooting the operation of a sealed motor valve, it is always advisable to install gauge valves and pressure gauges upstream and downstream of the valve. Gauge ports are provided on the inlet and outlet flange of each sealed motor valve for this purpose. Determining the inlet and outlet pressure during operation of the valve will add significant value to the solution of the problem.

If the motor is removed or the valve serviced, always recalibrate the valve before returning valve to automatic operation. The HMSV series do not require recalibration.

See Bulletin R630 for troubleshooting Hansen supplied controllers.

PROBLEM	SYMPTOM	CAUSE	CHECK / DO
VALVE DOES NOT OPERATE	Motor does not pulse when milliamp signal is changing.	24 VAC lacking	Check 24VAC across valve wires #1 & #2.
		Mis-wired	Double check numbers printed on power head wires vs. wiring diagram.
		4-20ma wires reversed	Follow wiring diagram to be sure wire goes from positve on one terminal to negative terminal around the 4-20ma loop.
		No 4-20ma signal to valve	Check milliamp signal to power head on either wires 3 or 4. install milliamp meter in series with 4-20ma signal to power head to confirm proper signal.
		Loose powerhead	Rusty inside - replace.
	Valve position does not change with change to 4-20ma signal. Motor pulses.	Excess dirt in valve	Clean valve and recalibrate.
		Can dented causing interference with rotor	Replace Can and recalibrate valve. Use MOVT tool to protect Can when servicing valve.
VALVE WILL NOT CLOSE	Valve position does not change with change to 4-20ma signal. Motor pulses	Insufficient voltage	24 VAC wires undersize. Check wire size and replace if necessary.
		Shaft thread worn excessively	Remove power head. Use manual tool MOVT to rotate rotor. Rotor should rotate smoothly. If not, disassemble valve, clean valve & threads, replace V-port if threads worn excessively.
		Excess dirt or free water in valve	Clean valve and recalibrate.
VALVE WILL NOT OPEN	Valve position does not change with change to 4-20ma signal. Motor pulses	Insufficient voltage	24 VAC wires undersize. Check wire size and replace if necessary.
		Shaft thread worn excessively	Remove power head. Use manual tool MOVT to rotate rotor. Rotor should rotate smoothly. If not, disassemble valve, clean valve & threads, replace V-port if threads worn excessively.
		Excess dirt or free water in valve	Clean valve and recalibrate.
VALVE WILL NOT OPEN - 3" AND 4" SIZE ONLY	Valve position does not change with change to 4-20ma signal. Motor pulses	Outlet pressure more than 10 psi higher than inlet pressure to valve	Increase inlet pressure or decrease outlet pressure. Install check valve downstream of valve.
VALVE DOES NOT MAINTAIN TEMPERATURE	Temperature too high	Valve undersize	Run valve wide open manually to confirm valve is undersize.
		Valve not calibrated	Calibrate valve.

TROUBLESHOOTING GUIDE FOR SEALED MOTOR VALVE

PROBLEM	SYMPTOM	CAUSE	CHECK / DO
VALVE DOES NOT MAINTAIN LEVEL - MODEL HMMR	Erratic level readout, level too high or too low	Level sensing probe calibration incorrect	Recalibrate liquid level probe.
		4-20ma loop erratic	Install independent properly grounded 24VDC power supply to confirm proper reading.
	Level too low (or too high as high side control)	Valve undersize	Run valve wide open manually to confirm valve is undersize.
	Level too low	Lack of liquid	Verify liquid is present. Check for flash gas in line.
	Wide swings from set point	Valve oversize	Replace with smaller valve or V-Port.
		Pilot Vessel Undersized	Review system capacity requirements.
		Flash gas at inlet to valve	Review piping sizes, liquid level in receiver.
VALVE DOES NOT MAINTAIN PRESSURE	Pressure too high or too low	Valve undersize	Run valve wide open manually to confirm valve is undersize.
VALVE HUNTS	Does not maintain constant level	PID constants not set properly	For liquid level control, set I and D to zero, and adjust P to minimize valve position swings. Add I if valve is too "lazy".
	Does not maintain constant temperature	PID constants not set properly	Speed up temerature response by moving temperature sensor location closer or into vessel. If sensor is in a well, speed up sensor response time by using thernal oil in well. Set I and D to zero, and set P to minimize swings under load. Add I if valve is too lazy. Be wary of using auto-tuning function of controller on chiller applications.
	Does not maintain constant pressure	PID constants not set properly	For level pressure control, set I and D to zero, and adjust P to minimize valve position swings. Add I if valve is too "lazy".
	Wide swings from set point	Valve oversize	Check sizing-consider reduced V-Port.
VALVE POSITION FEEDBACK DOES NOT WORK (CUSTOMER SUPPLIED CONTROLLER)	Readout is zero	Power supply missing	Install 24VDC power supply.
	Readout incorrect	Disturbance from other devices on 4-20ma supply	Install independent 24VDC power supply to confirm proper reading.
	Readout is above 100% and does not change	Power head was removed and reinstalled	Recalibrate valve. See instructions.

CAUTION

Hansen valves are for refrigeration and other Hansen approved systems only. These instructions and related safety precautions must be read completely and understood before selecting, using, or servicing these valves. Only knowledgeable, trained refrigeration technicians should install, operate, or service these valves. Stated temperature and pressure limits should not be exceeded. Bonnets should not be removed from these valves unless the system has been evacuated to zero pressure. See also Safety Precautions in current List Price Bulletin and Safety Precautions Sheet supplied with product. Escaping refrigerant can cause injury, especially to the eyes and lungs.

WARRANTY

Hansen electrical and electronic parts are guaranteed against defective materials and workmanship for 90 days F.O.B. our plant. All other components are guaranteed for one year F.O.B. our plant. No consequential damages or field labor is included.

TYPICAL SPECIFICATIONS

Motor operated control valves shall feature direct actuation of the main valve seat by the motor shaft, a canned motor to eliminate valve stem seal leakage, a ductile iron body, and be suitable for a safe working pressure of 400 psig (27 bar), as manufactured by Hansen Technologies Corporation, or approved equal.

ORDERING INFORMATION

NOMINAL PORT SIZE INCH (mm)		FLANGE CONNECTION STYLES AND SIZES		
		SW, WN		ODS
		STANDARD	ALSO	STANDARD
7/32	(5)	1/2	3/4	7/8
9/32	(7)	1/2	3/4	7/8
3/4	(20)	3/4	1, 1 1/4	7/8
1	(25)	1	3/4, 1 1/4	1 1/8
1 1/4	(32)	1 1/4	3/4, 1	1 3/8
1 1/2	(40)	1 1/2	2	1 5/8
2	(50)	2	1 1/2	2 1/8
3	(80)	3	-	3 1/8
4	(100)	4	-	4 1/8

FPT only available 3/4", 1" and 1¼" port size.

TO ORDER:

Specify valve type (HMMV, HMMR, HMSV, HMXV), nominal port size, flange connection style and size.

Add C for Power-Close Model Number. (Example: HMMVC)

OPTIONAL CONTROLLERS

Please see Hansen Bulletin R630 for additional information regarding Hansen Sealed Motor Valve Controllers.

CATALOG NUMBER	DESCRIPTION
HMMV/HMMR OPTIONAL CONTROLLERS	
PCMT	Temperature controller with temperature sensor for fully modulating temperature control.
PCMTF	Temperature controller with sensor and valve position display for fully modulating temperature control.
PCML	Level controller for fully modulating applications. Level sensor not included.
PCMLF	Level controller with valve position display for fully modulating applications. Level sensor not included.
PCMP	Pressure controller with pressure transducer for fully modulating pressure control.
PCMPF	Pressure controller with pressure transducer and valve position display for fully modulating pressure control.
RDR	Remote digital readout displays valve position.
TR92	115VAC/230VAC:24VAC transformer for HMMV/HMMR controller power.
HBAT	Full feature manual override/fail-safe controller. Power-failure alarm, battery backup, battery charging and monitoring, with local valve position display. (HMMV, HMMR and HMXV only).
HMSV OPTIONAL CONTROLLER	
PCI	Power Control Interface for open/close applications.
SEALED MOTOR VALVE TOOLS	
MOVT	Manual Opening Valve Tool
75-1185	Calibration Key

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