

### Motor Controlled Ball Valves for Industrial Refrigeration

Applications, Capacities, Features, and Advantages



### HANTEMP MCBV (U.S. Patent #9,518,665)

Motor Controlled Ball Valves are gaining popularity because they are simpler than, but superior to, conventional canned-motor control valves. The nearly-zero pressure drop equates to power savings. There is little potential for puddling and liquid slugging. There is no gearing in the refrigerant fluid, which often contains dirt, debris and other contaminants. These ball valves can operate safely with most refrigerants. Actuator mounting conforms to international standard ISO 5211; thus many offthe-shelf replacement actuators could be used including electronic, and pneumatic variations. HANTEMP Controlled Ball Valves are corrosion resistant Stainless Steel and available for 3/4" to 3" pipe sizes. See also Maintenance Bulletin BV1622 with cross-sectional view and parts list.

For Suction, Hot Gas, Liquid Lines, and other.

### **SPECIFICATIONS (Mechanical)**

Body: Stainless Steel Trim: Stainless Steel Mounting Plate: Stainless Steel ISO 5211 F05 Seats & Seals: Teflon Actuator Housing: High Impact Polyamide Safe Working Pressure: 800 psig Ambient Operating Temperature: -40°F to 120°F Fluid Temperatures: -70°F to 200°F

### **SPECIFICATIONS (Electrical)**

NEMA: 6; IP67 Enclosure Operating Voltage: 24V to 240V; AC/DC Power Consumption: 20 to 50W Input Control Signals: 0-20mA; 4-20mA; 0-5VDC; 0-10VDC; or relay Output Position Control Signal: 4-20mA

### **SPECIFICATIONS (Ball Profiles)**

Open Port (OP): Maximum Flow (standard) Characterized V-Port (VP): Throttling Port Tear Drop Port (TD): Throttling Expansion Port Slotted Port (SL): Liquid Expansion Port



- STAINLESS STEEL Body; 3/4" to 3"
- Full or Characterized Ports Available
- Ammonia, Halocarbons,
  Secondary Refrigerants
- Compatible with Easy to Source
  Standard Actuators
- No reverse flow when closed







### ACTUATORS

- ISO 5211 F05 mounting pattern permits easy interchange of globally available off the shelf standardized actuators
- Built-in Manual Stem Override handle clearly indicates valve position
- Actuator and gearing isolated from refrigerant
- Speed, position, PID, and 4-20ma control available for precise modulation of flow
- Electronics easily accessible
- Power-loss close or open via optional internal battery back-up
- Electronic actuators by HANTEMP Controls (other suppliers available)
- Shock-free controlled slow opening or closing protects against liquid slugging
- Electronic or Pneumatic actuators available
- Mechanical Spring-Closing available

### HANTEMP BALL VALVES

- Zero pressure-drop to open
- Patented seating surface
- Frost-free extended neck
- · Blow-out proof, back-seated stem
- · Overcomes puddling of oil or refrigerant
- Prevents reverse flow
- Reduces opening and closing shock
- Several flow profiles (pg.16): Open (Full), Characterized V-Port, Teardrop, Slotted
- Quarter-turn from full open to closed
- High Cv for greater system efficiency
- · Full pipe area flow for suction lines
- Valve position vertical or horizontal
- Handles Ammonia, halocarbons, glycols, and other fluids and approved refrigerants
- No hydrostatic trapping
- STAINLESS STEEL body & trim

Position Indicator Removable Electronic Actuator in Protective Housing Stainless Steel Quarter-Turn Service Valve (QSV)

MCBV RR Station (optional weld-in platform) w/ Basic Electronic Actuator



# BALL VALVES MINIMIZE POSSIBLE PUDDLING/SLUGGING



Flow Comparison Between A Ball Valve (Left) and a Globe Valve (Right) Note Restricted Flow And Liquid "Puddling" In Globe Design

#### **PUDDLING & SLUGGING (GLOBE)**

Inlet flow area may be reduced by 50% and collected oil or refrigerant can possibly slug. For a "puddled" suction line the impact of slugs can rupture elbows or headers; minimize impacts by slow opening of any suction shut-off valve.

**Note:** For manual globe valves, positioning the body on its side, or in vertical pipes, is necessary to reduce puddling buildup. Conventional competitive Motorized Control Valves are generally installed in near vertical position of their globe-style seat ports.

#### **MCBV APPLICATIONS**

- 1. Low Temperature Suction Stop
- 2. Space Temperature Modulation
- 3. Shell & Tube Chiller
- 4. Plate & Frame Chiller Control
- 5. Defrost Termination Slow-Opening
- 6. Accumulator Make-Up Level
- 7. Hot Gas Modulating Defrost
- 8. Gravity Heat Pipes
- 9. Heat Recovery/Reclaim
- 10. Suction Crossover
- 11. Liquid Transfer Systems
- 12. Liquid Expansion
- 13. Liquid Overfeed
- 14. Low ΔP Suction Shut-off
- 15. Side-Port Feed
- 16. Heat Reclaim
- 17. Gravity Drain

### REPLACES

- Sealed Motor Valves
- Solenoid Valves
- Evaporator regulators
- Expansion valves
- · Butterfly valves
- Gas Powered Checks



ISO 5211 F05 Mounting Pattern Permits Convenient Interchange of Actuators



#### SUCTION SHUT-OFF: VERY LOW TEMPERATURE (BLAST, TUNNEL, AND SPIRAL FREEZERS) (See Table SS1)

Valve operating pressure-drop **for temperatures below -20°F** should be about 0.25 psi or less to avoid unnecessary power consumption by the system compressors. For example at -25°F saturated suction pressure (15.96 psia) a certain screw compressor produces for a two-stage system 169.6 tons of refrigeration. A pressure-drop of 1 psi requires operation at -27.4°F (saturation 14.96 psia) at which time the evaporator refrigeration capacity is reduced to 158.6 tons or a 7% refrigeration tons reduction. Thus 0.25 psi drop is very favorable because the tons are greatly increased.

Conventional suction shut-off valves could be manual globe, ball, or butterfly valves. If the shutoff valves are automatic such as gas operated solenoid valves of globe seat design, or internal motorized valves of globe seat design the pressure drop might expectedly be 2 psi. For the same pipe size butterfly, the drop might only be 1 psi despite obstruction of the centralized seating vane. But in the case of a full-port ball valve, the pressure drop might only be 0.25 psi because there is no obstruction. The pipe area is nearly the same size as the ball opening; for most standard gauge schedule 40 pipe the internal open diameter is nearly the same as the nominal pipe size.

Very low pressure-drop occurs through the pipe centered ball orifice. Present globe type suction valves create typically at least 2 psig drop for pilot opening or turbulence from gas-powered check opening spring. Ability to close slowly after defrost eliminates suction pressure-shock and slugging.

The suction MCBV orifice, having been closed for defrost or temperature control, can be gradually opened over a time period of 8 seconds or longer. The ball orifice is centered with the pipe, whereas globe orifices in other control valves form a dam (pg. 3) which can collect refrigerant or oil in half of the pipe.

| Evap.<br>Temp | Pressure<br>Drop | 3/   | 4"   | 1    | •    | 1-1  | /4"  | 1-1 | /2" | 2   | -   | 2-1 | /2" | 3   | <b>,</b> " |
|---------------|------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|------------|
| °F            | (psi)            | ОР   | VP   | ОР   | VP   | ОР   | VP   | ОР  | VP  | ОР  | VP  | ОР  | VP  | ОР  | VP         |
| Cv            | -                | 43.2 | 21.8 | 48.0 | 24.2 | 52.8 | 26.6 | 219 | 102 | 250 | 117 | 275 | 129 | 600 | 293        |
|               | 0.25             | 13.0 | 6.6  | 14.5 | 7.3  | 15.9 | 8.0  | 66  | 31  | 75  | 35  | 83  | 39  | 181 | 88         |
|               | 0.5              | 17.4 | 8.8  | 19.3 | 9.7  | 21.2 | 10.7 | 88  | 41  | 101 | 47  | 111 | 52  | 241 | 118        |
| -40           | 1                | 23.2 | 11.7 | 25.7 | 13.0 | 28.3 | 14.3 | 117 | 55  | 134 | 63  | 147 | 69  | 322 | 157        |
|               | 2                | 30.9 | 15.6 | 34.3 | 17.3 | 37.8 | 19.0 | 156 | 73  | 179 | 84  | 197 | 92  | 429 | 209        |
|               | 0.25             | 18.4 | 9.3  | 20.5 | 10.3 | 22.5 | 11.3 | 93  | 44  | 107 | 50  | 118 | 55  | 256 | 125        |
|               | 0.5              | 26.3 | 13.3 | 29.2 | 14.7 | 32.2 | 16.2 | 133 | 62  | 152 | 71  | 167 | 78  | 365 | 178        |
| -20           | 1                | 36.3 | 18.3 | 40.3 | 20.3 | 44.4 | 22.4 | 184 | 86  | 210 | 98  | 231 | 108 | 504 | 246        |
|               | 2                | 43.2 | 21.8 | 48.0 | 24.2 | 52.8 | 26.6 | 219 | 102 | 250 | 117 | 275 | 129 | 600 | 293        |
|               | 0.25             | 21.2 | 10.7 | 23.5 | 11.9 | 25.9 | 13.0 | 107 | 50  | 122 | 57  | 134 | 63  | 294 | 144        |
| •             | 0.5              | 30.2 | 15.2 | 33.6 | 16.9 | 36.9 | 18.6 | 153 | 72  | 175 | 82  | 193 | 90  | 420 | 205        |
| 0             | 1                | 41.7 | 21.0 | 46.3 | 23.4 | 51.0 | 25.7 | 211 | 99  | 241 | 113 | 265 | 124 | 579 | 283        |
|               | 2                | 49.6 | 25.0 | 55.2 | 27.8 | 60.7 | 30.6 | 251 | 118 | 287 | 134 | 316 | 147 | 689 | 337        |
|               | 0.25             | 27.4 | 13.8 | 30.5 | 15.4 | 33.5 | 16.9 | 139 | 65  | 159 | 74  | 175 | 81  | 381 | 186        |
| ~~            | 0.5              | 39.2 | 19.8 | 43.5 | 22.0 | 47.9 | 24.1 | 198 | 93  | 227 | 106 | 250 | 117 | 544 | 266        |
| 20            | 1                | 54.1 | 27.3 | 60.1 | 30.3 | 66.1 | 33.3 | 274 | 128 | 313 | 146 | 344 | 161 | 751 | 367        |
|               | 2                | 64.3 | 32.4 | 71.5 | 36.0 | 78.6 | 39.7 | 326 | 152 | 372 | 174 | 409 | 191 | 894 | 436        |

DRY SUCTION SHUT-OFF CAPACITIES (NOMINAL TONS); NH3

#### \*To accommodate suction with liquid overfeed, use one valve size larger Contact HANTEMP Controls with system details or for other refrigerants/fluids

OP is Open Port Ball; VP is Characterized V-Port Ball OP provides good vapor modulation



**SS1** 

### SUCTION CONTROL: MEDIUM TEMPERATURE OF VARYING EVAPORATOR LOADS (PLATE & FRAME EXCHANGERS, FLOODED CHILLERS, CARCASS CHILLERS) (See Table SS1)

For applications where the evaporator load might be quite variable or where the space or product temperature is to be controlled, a MCBV Controlled Ball Valve with a characterized V-port orifice as outlined would be recommended. Use of the VP (characterized port for HANTEMP MCBV's) will provide somewhat smoother control of evaporator for achieving desired temperature in the space or product temperature in the case of plate & frame evaporators or various fluid or gas chillers.

Since the characterized port has somewhat less flow capacity then the full circular port, this factor alone provides finer control compared to an oversized port selection. Where the valve is operating at large pressure drops, the characterized port or the tear-drop port will provide closer control, especially at light refrigeration loads. The higher pressure drop will however reduce efficiency compared to OP (open-port) ball.

### HOT GAS DEFROST (HOT GAS DEFROST, REHEAT, HEAT RECLAIM) (See Table HG1)

A typical hot gas solenoid valve will fully open in two seconds, thereby possibly causing liquid slugs to or within evaporator. This problem has in the past been partially overcome by two parallel solenoid valve stages of hot gas or by throttling the hot gas hand valve to reduce flow at the expense of defrost time.

Using a slow opening MCBV for hot gas supply avoids the rapid pressure rise, and slugging. Upon conclusion of defrost the hot gas ball valve can be smoothly and promptly closed to avoid unnecessary heating. For extreme conditions the MCBV can open even slower.

Use of a MCBV ball valve can achieve smooth and complete hot-gas defrosting of fan type room cooler evaporators where the evaporator surfaces will accumulate ice or frost to the detriment of efficient cooling. With the evaporator suction closed by a Motor Controlled Ball Valve, a suction Solenoid Valve, Regulator, or Gas Powered Check, the hot gas MCBV (with the V-port) can open at an moderate speed to gradually and smoothly adjust flow of the hot gas to provide heating and defrosting of the evaporator. The condensate conventionally exits via a Defrost Relief Regulator model A4Kt.

At termination of defrost, the suction Controlled Ball Valve (or a bleed-type GPC gas powered check) gradually opens to smoothly lower evaporator pressure and resume cooling. Suggested MCBV capacity table (HG1, pg. 6) is shown for hot gas supply. (For hot gas recovery or heat reclaim, the MCBV Open Port sized like the system's piping, can control discharge or condenser gas.)

### LIQUID CONTROL (See Table HL1 & OL1)

For conventional overfeed, or low pressure liquid feed, a hand expansion valve can be used with a liquid solenoid valve or alternatively a MCBV (Tear Drop) port having moderate opening/closing speed.

The shock of solenoid valve opening or closing for large or long liquid lines can be avoided by the use of ball valves which can be adjusted to open or close over a period of ranging from a few to several dozen seconds. This applies to overfeed liquid lines as well as high pressure liquid lines.

For conventional high pressure liquid feed for accumulator level control or for evaporator or superheat control a hand expansion valve with solenoid valve or preferably a MCBV with SL (slotted) or TD (tear drop) port could be selected.

### LIQUID LEG CONTROL

Rather than using rapid gas-powered shut-off valves, gravity flooded legs of plate coolers can use open port MCBV's to gradually open or close gravity liquid, gas, or suction lines to minimize disturbances of pressure or liquid slugs within the flooded evaporator. In addition, the lower pressure drop in these gravity legs of Ball Valves versus globe-type valves will increase refrigeration evaporator efficiency and capacity.



| HG1 HOT        | GAS NOMI | NAL DEFROST | Г САРАСІТУ І | RANGES (TON | IS); NH3  |
|----------------|----------|-------------|--------------|-------------|-----------|
| MCBV Size      | 3/4"     | 1"          | 1-1/4"       | 1-1/2"      | 2"        |
| Tons* ∆P>10psi | 15 to 35 | 18 to 45    | 21 to 55     | 60 to 140   | 75 to 180 |

### HL1 HIGH PRESSURE LIQUID MAKEUP NOMINAL CAPACITIES; NH3

|              | 100%     | OPEN; C  | CAPACITIES | TONS |              | 75% OPEN; CAPACITIES TONS |          |     |     |  |  |
|--------------|----------|----------|------------|------|--------------|---------------------------|----------|-----|-----|--|--|
| Port<br>Size | Cv<br>TD | Cv<br>SL | TD         | SL   | Port<br>Size | Cv<br>TD                  | Cv<br>SL | TD  | SL  |  |  |
| 3/4"         | 4.1      | 1.4      | 301        | 100  | 3/4"         | 2.0                       | 0.6      | 150 | 47  |  |  |
| 1"           | 4.5      | 1.5      | 334        | 111  | 1"           | 2.2                       | 0.7      | 167 | 52  |  |  |
| 1-1/4"       | 5.0      | 1.7      | 367        | 122  | 1-1/4"       | 2.5                       | 0.8      | 184 | 57  |  |  |
| 1-1/2"       | 20       | 3.1      | 1493       | 227  | 1-1/2"       | 11.5                      | 2.5      | 854 | 185 |  |  |
| 2"           | 23       | 3.5      | 1707       | 260  | 2"           | 13.2                      | 2.8      | 976 | 211 |  |  |

|              | 50%      | OPEN; C/     | APACITIES 1         | ONS                    |              | 25% OPEN; CAPACITIES TONS |              |                   |                      |
|--------------|----------|--------------|---------------------|------------------------|--------------|---------------------------|--------------|-------------------|----------------------|
| Port<br>Size | Cv<br>TD | Cv<br>SL     | TD                  | SL                     | Port<br>Size | Cv<br>TD                  | Cv<br>SL     | TD                | SL                   |
| 3/4"         | 0.7      | 0.41         | 53                  | 30                     | 3/4"         | 0.18                      | 0.14         | 13                | 10                   |
| 1"           | 0.8      | 0.45         | 59                  | 33                     | 1"           | 0.20                      | 0.15         | 15                | 11                   |
| 1-1/4"       | 0.9      | 0.50         | 65                  | 37                     | 1-1/4"       | 0.22                      | 0.17         | 16                | 12                   |
| 1-1/2"       | 4.1      | 0.95         | 305                 | 70                     | 1-1/2"       | 1.75                      | 0.32         | 130               | 23                   |
| 2"           | 4.7      | 1.08         | 349                 | 80                     | 2"           | 2.00                      | 0.36         | 148               | 27                   |
| Contact H    | ANTEMP   | Controls wit | h details or for ot | her refrigerants/fluid | ls           | Note:                     | TD is Tear D | rop Port Ball: SL | is Slotted Port Ball |

OL1

### **OVERFEED LIQUID SUPPLY - 3:1; NH3**

| 100% OPEN; CAPACITIES TONS |     |                        |     |     |     |     |  |  |  |  |
|----------------------------|-----|------------------------|-----|-----|-----|-----|--|--|--|--|
| Port                       | _   | ΔP Across Valve (psid) |     |     |     |     |  |  |  |  |
| Size                       | Cv  | 5                      | 10  | 15  | 20  | 30  |  |  |  |  |
| 3/4"                       | 4.1 | 58                     | 82  | 101 | 116 | 143 |  |  |  |  |
| 1"                         | 4.5 | 65                     | 92  | 113 | 129 | 159 |  |  |  |  |
| 1-1/4"                     | 5.0 | 71                     | 101 | 124 | 142 | 175 |  |  |  |  |
| 1-1/2"                     | 20  | 288                    | 409 | 503 | 577 | 711 |  |  |  |  |
| 2"                         | 23  | 330                    | 468 | 575 | 659 | 813 |  |  |  |  |

#### **50% OPEN; CAPACITIES TONS**

| Port   |     | ΔP Across Valve (psid) |    |     |     |     |  |  |  |
|--------|-----|------------------------|----|-----|-----|-----|--|--|--|
| Size   | Cv  | 5                      | 10 | 15  | 20  | 30  |  |  |  |
| 3/4"   | 0.7 | 10                     | 15 | 18  | 21  | 25  |  |  |  |
| 1"     | 0.8 | 11                     | 16 | 20  | 23  | 28  |  |  |  |
| 1-1/4" | 0.9 | 13                     | 18 | 22  | 25  | 31  |  |  |  |
| 1-1/2" | 4.1 | 59                     | 84 | 103 | 118 | 145 |  |  |  |
| 2"     | 4.7 | 67                     | 96 | 118 | 135 | 166 |  |  |  |

**Note:** Liquid Selections are for Tear-Drop Ball (TD) Contact HANTEMP Controls with details or for other refrigerants/fluids

| Port   | Cv   | ΔP Across Valve (psid) |     |     |     |     |  |  |  |
|--------|------|------------------------|-----|-----|-----|-----|--|--|--|
| Size   | 00   | 5                      | 10  | 15  | 20  | 30  |  |  |  |
| 3/4"   | 2.0  | 29                     | 41  | 51  | 58  | 72  |  |  |  |
| 1"     | 2.3  | 32                     | 46  | 56  | 65  | 80  |  |  |  |
| 1-1/4" | 2.5  | 36                     | 51  | 62  | 71  | 88  |  |  |  |
| 1-1/2" | 11.6 | 166                    | 235 | 289 | 331 | 408 |  |  |  |
| 2"     | 13.2 | 189                    | 268 | 330 | 378 | 466 |  |  |  |
|        |      |                        |     |     |     |     |  |  |  |

**75% OPEN: CAPACITIES TONS** 

### 25% OPEN; CAPACITIES TONS

| Port<br>Size | Cv   | 5   | ΔP Acro<br>10 | oss Valv<br>15 | e (psid)<br>20 | 30  |
|--------------|------|-----|---------------|----------------|----------------|-----|
| 3/4"         | 0.18 | 2.6 | 3.7           | 4.5            | 5.2            | 6.4 |
| 1"           | 0.20 | 2.9 | 4.1           | 5.0            | 5.7            | 7.1 |
| 1-1/4"       | 0.22 | 3.2 | 4.5           | 5.5            | 6.3            | 7.8 |
| 1-1/2"       | 1.5  | 21  | 30            | 37             | 42             | 52  |
| 2"           | 1.7  | 24  | 34            | 42             | 48             | 59  |

Note: Overfeed Rate does not control temperature

# Motor Controlled Ball Valves Vs. Motorized Control Valves

| HANTEMP MCBV<br>Motor Controlled Ball Valves | Conventional (Sealed Motor)<br>Motorized Control Valves |
|--|---|
| Standardized Electronic Actuators            | Customized Integral Motors                              |
| Actuator Located Above Ice & Frost           | Operator Could "Ice-Over"                               |
| Valve Position Visible                       | Electronic Display of Position                          |
| No Gearing In Valve                          | Gearing In Refrigerant                                  |
| Manual Position Handle                       | Separate Manual Tool                                    |
| Removable Actuators                          | Motor Replacement: Evacuate                             |
| Capable Of High Cv Flow                      | Globe V-Port Flow                                       |
| No liquid "puddling"                         | Globe Seats Obstruct Liquid                             |
| HANTEMP Stainless Steel                      | Protection Via Plating                                  |

# **VALVE CHOICES**

| Applications           | Conventional                              | New                    |  |  |
|------------------------|---|------------------------|--|--|
| Hot Gas Supply         | Solenoid Valve                            | HANTEMP MCBV           |  |  |
| Room Temperature       | Solenoid Valve or Back Pressure Regulator | HANTEMP MCBV           |  |  |
| Suction Shut-Off       | Gas Powered Valve                         | HANTEMP MCBV           |  |  |
| Liquid Line            | Solenoid Valve                            | HANTEMP MCBV           |  |  |
| <b>Reheat/Recovery</b> | Pressure Regulator w/ Shut-Off            | HANTEMP MCBV           |  |  |
| Flooded Legs           | Gas Powered Valve                         | HANTEMP MCBV           |  |  |
| <b>Chiller Suction</b> | Pressure Regulator w/ Shut-Off            | HANTEMP MCBV           |  |  |
| Manual                 | Globe Valve / Hand Expansion              | HANTEMP SSBV w/ handle |  |  |



# MCBV FLANGED INSTALLATION DIMENSIONS; 3/4" to 21/2"

Note: Flanged models are advantageous for internals servicing





| Dimensions  |             |              |             |            |              |                |  |  |  |
|---|-------------|--------------|-------------|------------|--------------|----------------|--|--|--|
| Valve Size (mm)   | A (mm)      | B (mm)       | C (mm)      | D (mm)     | E (mm)       | Weight (kg)    |  |  |  |
| <sup>3</sup> ⁄ <sub>4</sub> " - 1 <sup>1</sup> ⁄ <sub>4</sub> " (20-32) | 6.19" (157) | 8.31" (211)  | 7.00" (178) | 1.85" (50) | 9.31" (236)  | 7.8 lbs (3.5)  |  |  |  |
| 1½" - 2½" (40-65)   | 9.88" (251) | 12.50" (318) | 8.00" (203) | 2.63" (67) | 13.50" (343) | 19.2 lbs (8.7) |  |  |  |

# MCBV WELD IN-LINE INSTALLATION DIMENSIONS; 3/4" to 3"



|  | Biniensions |              |             |            |               |  |  |  |  |  |
|--|-------------|--------------|-------------|------------|---------------|--|--|--|--|--|
| Size (mm)  | A (mm) SW   | B (mm) BW    | C (mm)      | D (mm)     | Weight (kg)   |  |  |  |  |  |
| <sup>3</sup> ⁄ <sub>4</sub> " - 1¹⁄ <sub>4</sub> " (20-32) | 3.48" (88)  | 4.48" (114)  | 7.00" (178) | 1.85" (50) | 5.2 lbs (2.2) |  |  |  |  |  |
| 1½" - 2½" (40-65)  | 8.95" (227) | 9.95" (253)  | 8.00" (203) | 2.63" (67) | 13 lbs (6)    |  |  |  |  |  |
| 3" (80)  | N/A         | 12.70" (322) | 8.75" (222) | 3.25" (83) | 30 lbs (14)   |  |  |  |  |  |
|  |             |              |             |            |               |  |  |  |  |  |









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# MODULATING MAKE-UP TO ACCUMULATOR USING A HANTEMP MCBV MOTOR CONTROLLED BALL VALVE



concept drawing; not for construction





3" MCBV (w/ manual isolation Ball Valves) In Operation

### CONTROLS FOR HANTEMP MCBV BALL VALVES

Motor Controlled Ball Valves are operated via temperature, pressure, level sensors, and controlling devices. Typical basic control (similar to Honeywell, etc.) would be temperature on-off switches, like thermostats, having sensors located in the air or liquid to be controlled. Whereas such control could cause a Solenoid Valve to quickly open or close, a MCBV will move steadily between totally closed and totally open. For even smoother and more accurate control, variable output temperature controllers are available which can supply a variable signal, like 4-20mA or 0-10V which will move the MCBV proportionally and steadily toward ball open or ball closed. Such temperature controllers are readily available from Honeywell, Johnson Controls, Omega Engineering, or numerous others.

For changing load applications or precise control, more sophisticated controllers are available with built in algorithms to handle the load variances; typically these would have PID (proportional, integral, derivative) variable response capability to enable the MCBV to move its opening percentage as needed to maintain the desired temperature. There are forms of PLC's (programmable logic controllers) which can be used in combination for various desired responses. For a given MCBV the desired port opening response can be thus altered for different products, processes, or sequences, including temperature pull-down or defrosting.

Similar controllers are available for pressure (transducers) and for liquid level (probes or ball floats). HANTEMP can assist with control systems, components, and wiring schematics, or the purchase of such components. While globe-type control valves exist, they do not have the inherent simplicity, low pressure-drop, non-puddling geometry, and visibility of HANTEMP Controlled Ball Valves.

### SIZING OF CONTROL VALVES

For control valves which are to be opened wide for maximum flow at minimum pressure drop, or totally closed to halt all flow, sizing is usually no problem: the largest port size and Cv factor which cost will allow is the best. Examples are spiral freezers, blast freezing tunnels, and plate freezers (see pg. 4 & 6).





### SAFETY WARNING

Valves should be installed, maintained, and serviced only by experienced refrigeration professionals. This includes reading and understanding pertinent product safety bulletins and installation instructions. Before servicing, the valve should be isolated from the system and all refrigerant evacuated from the piping. Always wear safety glasses. Avoid system arrangements that could cause thermal or pressure shock.

### DISCLAIMER

HANTEMP Controls reserves the right to alter product design, materials, and specifications without notice, as necessary.

### WARRANTY

All HANTEMP Controls products are warranted against defects in workmanship and materials for a period of one year (90 days for electronics) from date of shipment from the factory. This warranty period is applicable only when products are properly applied, installed, operated, and serviced as specifically stated in HANTEMP Controls product bulletins unless otherwise approved in writing. Field labor and travel are not warranty included.



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