

# Mark 978 Series

## Sanitary Control Valves – OR Version

The Mark 978 O-Ring Series is designed to meet the rigid specifications for sanitary process control valves for customers who prefer an O-ring style stem seal. This valve series is suitable for a wide variety of applications in the bio-pharmaceutical, pharmaceutical, cosmetic, dairy and food and beverage industries.

Conforming to ASME BPE 2014 guidelines, the MK978 is ideally suited for a wide range of flowing media in both the utility and process areas of sanitary and aseptic systems.

High rangeability, characterized trim, high capacities, superior temperature and pressure ratings along with a selection of sealing methods make the MK978 the sanitary control valve for liquid, gas and steam services.

Whether the need is to control pressure, temperature, flow, pH, or another variable, the MK978 is the right valve for your process.

### FEATURES

- FDA & USP Class VI compliance standard on all process seal and seat materials (except Buna-N)
- Self draining – Angle Body: when mounted in vertical (all sizes) or horizontal orientations
- No guiding in the wetted area – prevents particulate generation
- Mechanically polished internal components – 20Ra (0,5 µm) finish, electropolish – standard, 8 Ra (0,2µm) optional
- Wetted parts made of 100% 316L Stainless Steel barstock
- Maintenance-friendly – easy to perform sanitary maintenance with simple disassembly and reassembly
- Steel, baked corrosion resistant coated multi-spring actuators to meet a wide range of differential pressure requirements while providing excellent corrosion resistance during washdown



### AVAILABLE FINISHES

#### Body

- Standard: 20 Ra mechanical finish on internal wetted surfaces (0,5 µm); machine finish on exterior (63 RMS), and electropolished inside and out
- Optional: 20 Ra mechanical finish on external surfaces (0,5 µm); 8 Ra finish on internal or external surfaces (0,2 µm)

#### Stem

- Standard: 20 Ra mechanical finish and electropolish (0,5 µm)
- Optional: 8 Ra mechanical finish (0,2 µm)

### APPLICATIONS

A wide variety of applications exist for the MK978 in the pharmaceutical, biotech, health care, and food & beverage and other industries including:

#### Processes

- Fermenter
- Bioreactor
- Lyophilization
- Chromatography
- SIP/CIP Systems

#### Media

- Bio-process
- Caustic
- Acids
- Buffer
- Clean Steam
- WFI

**SPECIFICATIONS – O-RING STEM SEAL**

**Sizes:** 1/2" (DN15) through 2" (DN50)

**Body/Bonnet Connection:** bolted flange

**Body/Bonnet Seal**

- FDA/USP Class VI EPDM for EPDM O-Ring
- FDA/USP Class VI Viton for Viton O-Ring
- FDA/USP Class VI Jorlon for Silicon, Kalrez, Fluoraz
- Jorlon for Buna-N

**Body Material:** ASTM A479 316L SST Barstock

**Stem Material:** ASTM A479 316L SST Barstock

**Bonnet Material:** ASTM A479 316L SST Barstock

**Stem Seal**

- FDA/USP Class VI EPDM – to 275°F (+135°C)
- FDA/USP Class VI Silicon – to +450°F (+232°C)
- FDA/USP Class VI Viton® – to +400°F (+204°C)
- FDA Buna-N – to +225°F (+107°C)
- FDA/USP Class VI Kalrez® – to +450°F (+232°C)
- FDA/USP Class VI Fluoraz® – to +450°F (+232°C)

**Stem Bushing:** FDA PEEK (no process contact)

**Actuators**

Pneumatic

- 1/2" – 1" (DN15 – DN25); 35M & 55M: Steel, baked corrosion resistant coating
- 1-1/2" – 2" (DN40 – DN50); 55M & 85M: Steel, baked corrosion resistant coating

**Soft Seat Option (Cv ≥ 3.5 only)**

- PTFE FDA/USP Class VI to 252°F (122°C) continuous or 275°F (135°C) in intermittent (less than 15 min over 1 hour)
- PEEK FDA/USP Class VI to 350°F (177°C)

**Electric**

- 1/2" – 2" (DN15 – DN50)  
MV1010 Cv 0.2 – 5.0 (Kv 0,17 – 4,3)  
MV1020 All other Cv's

**Shutoff**

- Standard: ANSI Class III with metal seat
- Optional: ANSI Class VI with soft seat (Cv ≥ 3.5 only)

**Ranges:** 3-15, 6-30, 3-9\*, or 9-15\* psi (0,2-1,0; 0,4-2,0; 0,2-0,6; or 0,6-1,0 bar) (\* positioner required)

**Maximum Pressure @ 100°F (38°C):** 450 (31 bar)

High pressure versions available, contact factory for details

**Flow Characteristics:** Linear, equal percentage, or quick opening (consult factory for quick opening Cv's)

**Pressure/Temperature Rating**

- O-Ring: 450 psi up to +450°F (31 bar up to +232°C), temperature dependent upon stem seal o-ring material

**Cv (Kv) Ratings**

| Size   | Cv (Kv) Ratings  |                  |
|--------|--|------------------|
|        | Linear   | Equal Percentage |
| 1/2"   | 0.2 \ 0.5 \ 1.0 (0,17 / 0,43 \ 0,86)                     |                  |
| 3/4"   | 1.0 \ 2.0 \ 3.5 \ 5.0 (0,86 \ 1,72 \ 3,01 \ 4,30)        |                  |
| 1"     | 3.5 \ 5.0 (3,01 \ 4,30)                                  |                  |
|        | 7.5 \ 15.0 (6,45 \ 12,90)                                |                  |
| 1-1/2" | 5.0 \ 10 \ 15 \ 20 \ 30 (4,3 \ 8,6 \ 12,9 \ 17,2 \ 25,0) |                  |
| 2"     | 10 \ 15 \ 20 \ 30 (8,6 \ 12,9 \ 17,20 \ 25,80)           |                  |
|        | 40 \ 60 (34,40 \ 51,60)                                  | 40 (34,40)       |

**MAXIMUM Δ Ratings, PSI (BAR)**

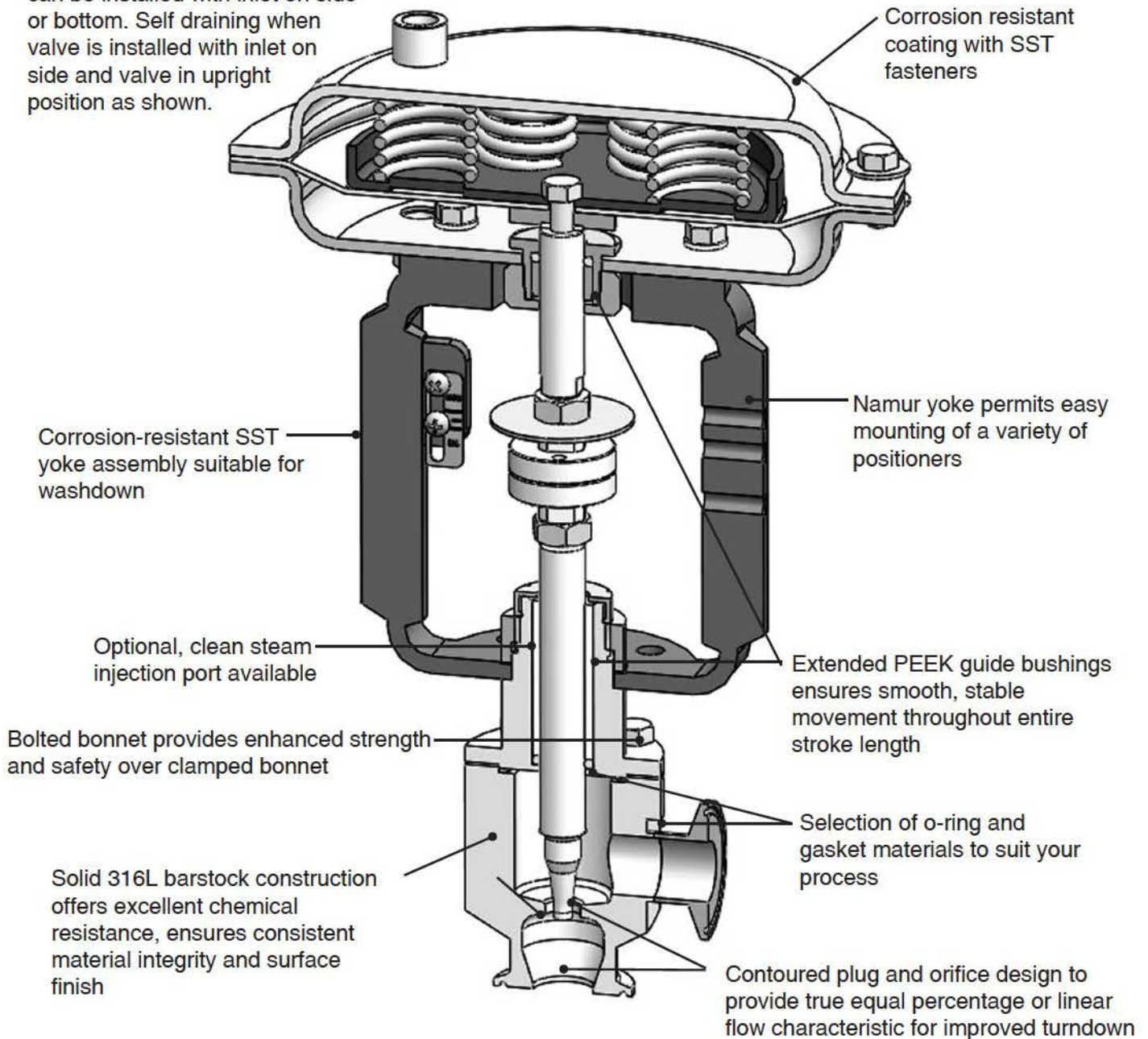
| Valve Size | Valve Cv              | Actuator Size | ATO 3-15   | ATO 6-30 or with positioner @ 40 psi | ATC 3-15 or with positioner @ 20 psi | ATC 6-30 @ 40 psi |
|------------|-----------------------|---------------|------------|--------------------------------------|--------------------------------------|-------------------|
| 1/2"       | 0.2 / 0.5 / 1.0       | 35M / 55M     | 450 (31)   | 450 (31)                             | 450 (31)                             | 450 (31)          |
| 3/4"       | 1.0 / 2.0 / 3.5 / 5.0 | 35M           | 396        | 450 (31)                             | 396 (27,3)                           | 450 (31)          |
| 3/4"       | 1.0 / 2.0 / 3.5 / 5.0 | 55M           | 450 (31)   | 450 (31)                             | 450 (31)                             | 450 (31)          |
| 1"         | 3.5 / 5.0             | 35M           | 150 (10,3) | 216 (14,9)                           | 150 (10,3)                           | 450 (31)          |
| 1"         | 3.5 / 5.0             | 55M           | 316 (21,8) | 416 (28,7)                           | 316 (21,8)                           | 450 (31)          |
| 1"         | 7.5 / 15              | 35M           | 75 (5,2)   | 120 (8,3)                            | 75 (5,2)                             | 300 (20,7)        |
| 1"         | 7.5 / 15              | 55M           | 188 (13,0) | 256 (17,7)                           | 188 (13,0)                           | 450 (31)          |
| 1-1/2"     | 5 / 10 / 15           | 55M           | 86 (5,9)   | 126 (8,7)                            | 86 (5,9)                             | 288 (19,9)        |
| 1-1/2"     | 5 / 10 / 15           | 85M           | 220 (15,2) | 288 (19,9)                           | 220 (15,2)                           | 450 (31)          |
| 1-1/2"     | 20 / 30               | 55M           | 63 (4,3)   | 97 (6,7)                             | 63 (4,3)                             | 232 (16,0)        |
| 1-1/2"     | 20 / 30               | 85M           | 176 (12,1) | 232 (16,0)                           | 176 (12,1)                           | 450 (31)          |
| 2"         | 10/15/20/30/40/60     | 55M           | 15 (1,0)   | 34 (2,3)                             | 15 (1,0)                             | 111 (7,7)         |
| 2"         | 10/15/20/30/40/60     | 85M           | 79 (5,4)   | 111 (7,7)                            | 79 (5,4)                             | 238 (16,4)        |

Note: for pressure drop capabilities of electric actuators, please consult factory

Note: 1/2" – 2" with positioner ATO actuator is bench set @ 6-30 psi/ ATC actuator is bench set @ 3-15 psi

### O-RING STEM SEAL (ANGLE STYLE (1/2"-1"))

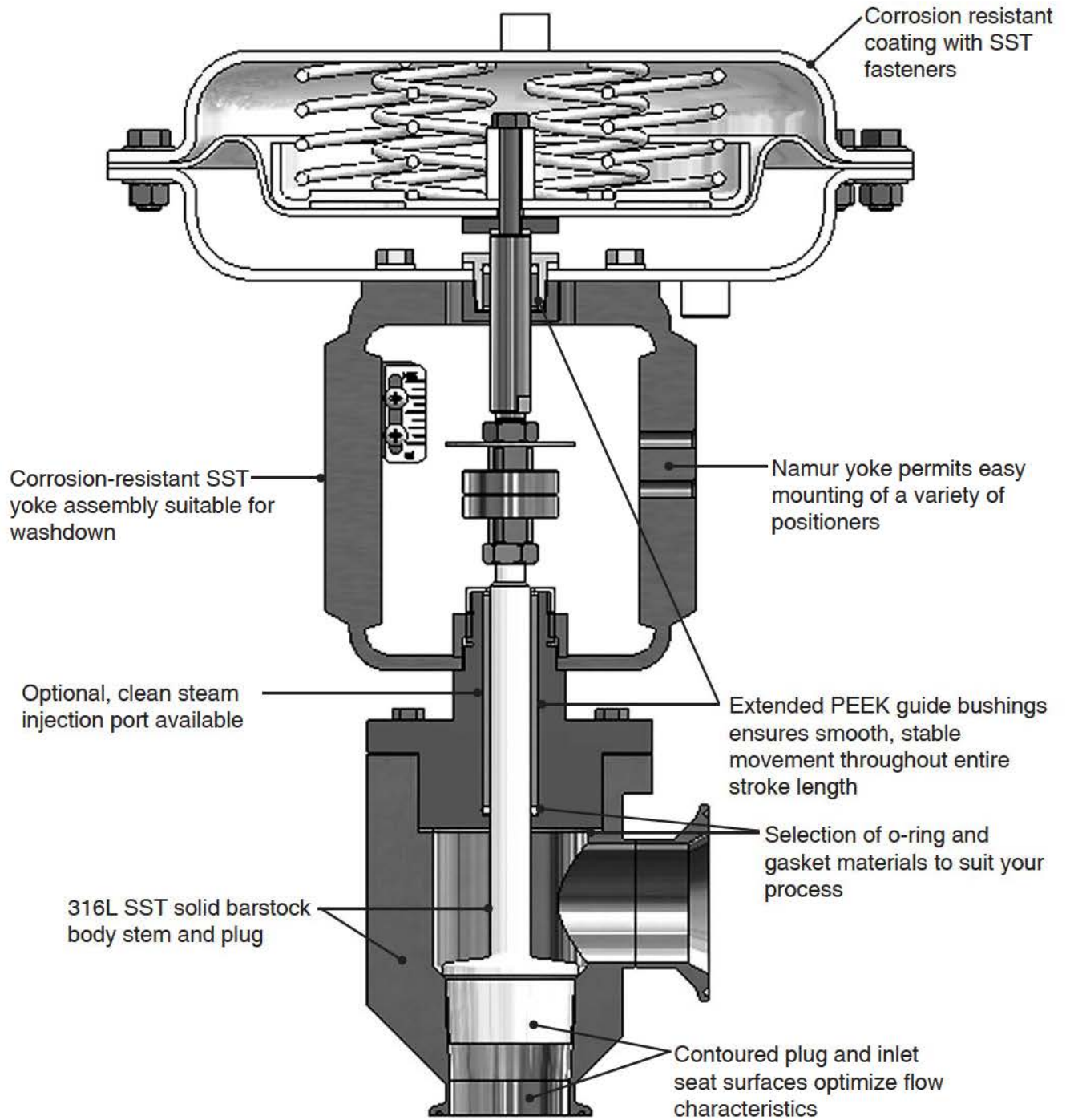
**NEW Bi-direction flow capability.** Valve can be installed with inlet on side or bottom. Self draining when valve is installed with inlet on side and valve in upright position as shown.



### SPECIFICATION

Stainless steel sanitary control valve shall be made from ASTM A479 316L barstock material, which includes body and all wetted metal parts. Control valve with the stem sealed by FDA approved and USP Class VI certified Jorlon diaphragm with lifetime warranty. The valve stem shall be supported by a one piece, SS NAMUR Yoke with two extended PEEK™ Guide bushings to provide structural rigidity and true guiding in any installation orientation. Guiding of valve stem/plug shall be outside of the wetted process areas of valve above diaphragm. Control valve shall have secondary stem seal, and extended guide bushing to provide additional support for multiple installation orientations. Valve shall be self draining in at least one orientation.

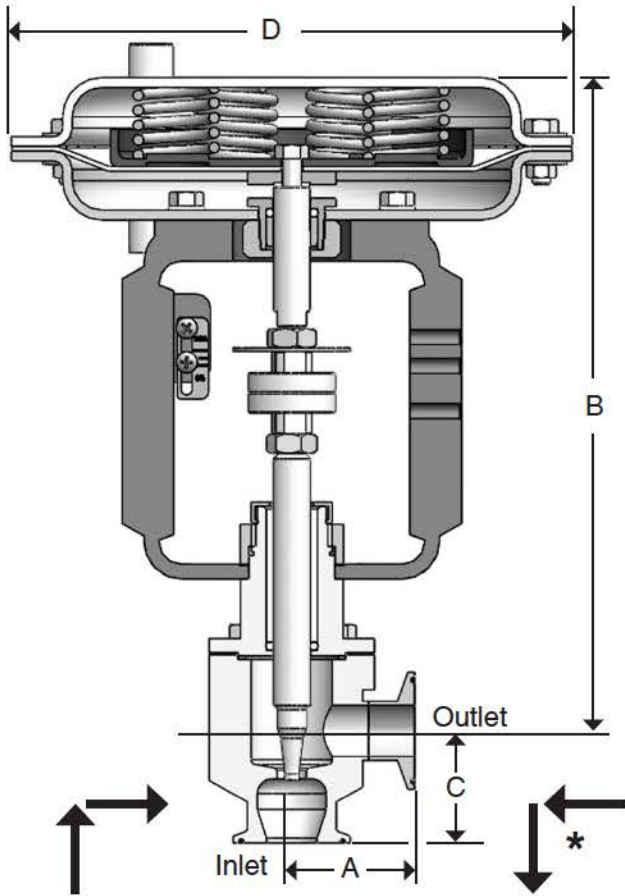
O-RING STEM SEAL (1-1/2" – 2")



SPECIFICATION

Stainless Steel sanitary control valve shall be made from ASTM A479 barstock material, which includes body and all wetted parts. Valve stem sealed by FDA/USP Class VI approved material o-ring. Guiding of valve stem/plug shall be outside of the wetted process areas of the valve above the o-ring. The control valve shall be free of threads within the wetted process area. Valve shall have one piece SS Namur Yoke enabling Namur positioner bracketing and providing stem stabilization for Horizontal mounting. Valve is self draining in any orientation.

**DIMENSIONS**



**INCHES**

| Valve Size | Dimensions |       |      |             | Weight Lbs |
|------------|------------|-------|------|-------------|------------|
|            | A          | B     | C    | D           |            |
| 1/2"       | 2.08       | 11.94 | 1.91 | 9.50 (35M)  | 27 (35M)   |
|            |            |       |      | 12.50 (55M) | 42 (55M)   |
| 3/4"       | 2.08       | 11.94 | 1.91 | 9.50 (35M)  | 27 (35M)   |
|            |            |       |      | 12.50 (55M) | 42 (55M)   |
| 1"         | 2.08       | 11.94 | 1.91 | 9.50 (35M)  | 27 (35M)   |
|            |            |       |      | 12.50 (55M) | 42 (55M)   |

**METRIC**

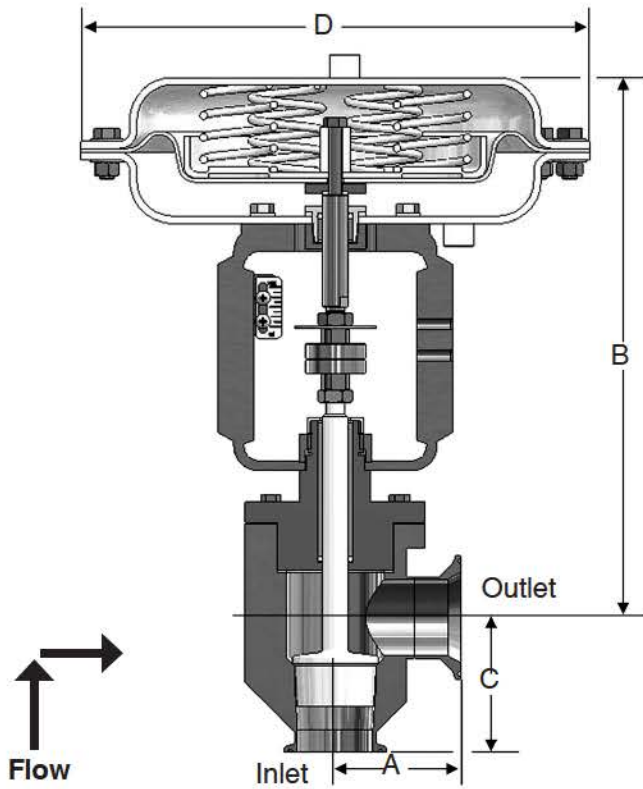
| Valve Size | Dimensions |     |    |           | Weight Kgs |
|------------|------------|-----|----|-----------|------------|
|            | A          | B   | C  | D         |            |
| DN15       | 53         | 303 | 49 | 241 (35M) | 12 (35M)   |
|            |            |     |    | 318 (55M) | 19 (55M)   |
| DN20       | 53         | 303 | 49 | 241 (35M) | 12 (35M)   |
|            |            |     |    | 318 (55M) | 19 (55M)   |
| DN25       | 53         | 303 | 49 | 241 (35M) | 12 (35M)   |
|            |            |     |    | 318 (55M) | 19 (55M)   |

Based on US tri-clamp ends. Consult factory for DIN and ISO tri-clamp end dimensions

**Installation and Drainability:**

- Valve is bi-directional, flow can enter either connection
- When valve is open, there is no hold up volume
- \* For gravity drainage from inlet to outlet, install as shown above.

**DIMENSIONS**



**INCHES**

| Valve Size | Dimensions |       |      |             | Weight Lbs |
|------------|------------|-------|------|-------------|------------|
|            | A          | B     | C    | D           |            |
| 1-1/2"     | 3.08       | 15.00 | 3.30 | 12.50 (55M) | 47 (35M)   |
|            |            |       |      | 15.00 (85M) | 57 (55M)   |
| 2"         | 3.08       | 15.00 | 3.30 | 12.50 (55M) | 47 (35M)   |
|            |            |       |      | 15.00 (85M) | 57 (55M)   |

**METRIC**

| Valve Size | Dimensions |     |    |           | Weight Kgs |
|------------|------------|-----|----|-----------|------------|
|            | A          | B   | C  | D         |            |
| DN40       | 78         | 381 | 84 | 318 (55M) | 21 (35M)   |
|            |            |     |    | 381 (85M) | 26 (55M)   |
| DN50       | 78         | 381 | 84 | 318 (55M) | 21 (35M)   |
|            |            |     |    | 381 (85M) | 26 (55M)   |

Based on US tri-clamp ends. Consult factory for DIN and ISO tri-clamp end dimensions

**Installation and Drainability:**

- Valve has no hold-up when installed as shown above, but must be drained below inlet.
- Valve will gravity drain from inlet to outlet when installed with inlet horizontal (outlet facing down)

**ORDERING SCHEMATIC - MK978E SERIES (1/2" - 1")**

| Model No | Size | Stem Seal / Seat | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----------|------|------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
|          |      |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

|        | Model                   |
|--------|-------------------------|
| 978E   | Standard                |
| 978EMV | Motor Valve             |
| 978ESP | Side Mounted Positioner |
| 978ETP | Top Mounted Positioner  |

|     | Stem Seal / Seat                                 |
|-----|--|
| OR  | O-Ring / Hard Seat                               |
| ORP | O-Ring / PEEK FDA/USP Class VI (Cv ≥ 3.5 only)   |
| ORT | O-Ring / Teflon FDA/USP Class VI (Cv ≥ 3.5 only) |

|     | Size |
|-----|------|
| 050 | 1/2" |
| 075 | 3/4" |
| 100 | 1"   |

MARK 978 SANITARY GLOBE-STYLE CONTROL VALVES - O-RING STEM SEAL

| 1,2,3,4,5,6 | 1/2" Tri-C Body, Cv, Char. Finish     |
|-------------|---------------------------------------|
| AALN1A      | 1/2" LIN Cv 0.2 20Ra int./63 RMS ext. |
| A1LN1A      | 1/2" LIN Cv 0.2 20Ra int./20Ra ext.   |
| A2LN1Ø      | 1/2" LIN Cv 0.2 8Ra int./20Ra ext.    |
| A3LN1Ø      | 1/2" LIN Cv 0.2 8Ra int./8Ra ext.     |
| A4LN1Ø      | 1/2" LIN Cv 0.2 8Ra int./63RMS ext.   |
| AAEPA1      | 1/2" EQP Cv 0.2 20Ra int./63 RMS ext. |
| A1EPA1      | 1/2" EQP Cv 0.2 20Ra int./20Ra ext.   |
| A2EP11      | 1/2" EQP Cv 0.2 8Ra int./20Ra ext.    |
| A3EP11      | 1/2" EQP Cv 0.2 8Ra int./8Ra ext.     |
| A4EP11      | 1/2" EQP Cv 0.2 8Ra int./63 RMS ext.  |
| AALN2A      | 1/2" LIN Cv 0.5 20Ra int./63RMS ext.  |
| A1LN2A      | 1/2" LIN Cv 0.5 20Ra int./20Ra ext.   |
| A2LN21      | 1/2" LIN Cv 0.5 8Ra int./20Ra ext.    |
| A3LN21      | 1/2" LIN Cv 0.5 8Ra int./8Ra ext.     |
| A4LN21      | 1/2" LIN Cv 0.5 8Ra int./63 RMS ext.  |
| AAEPA2      | 1/2" EQP Cv 0.5 20Ra int./63 RMS ext. |
| A1EPA2      | 1/2" EQP Cv 0.5 20Ra int./20Ra ext.   |
| A2EP12      | 1/2" EQP Cv 0.5 8Ra int./20Ra ext.    |
| A3EP12      | 1/2" EQP Cv 0.5 8Ra int./8Ra ext.     |
| A4EP12      | 1/2" EQP Cv 0.5 8Ra int./63 RMS ext.  |
| AALN3A      | 1/2" LIN Cv 1.0 20Ra int./63 RMS ext. |
| A1LN3A      | 1/2" LIN Cv 1.0 20Ra int./20Ra ext.   |
| A2LN31      | 1/2" LIN Cv 1.0 8Ra int./20Ra ext.    |
| A3LN31      | 1/2" LIN Cv 1.0 8Ra int./8Ra ext.     |
| A4LN31      | 1/2" LIN Cv 1.0 8Ra int./63 RMS ext.  |
| AAEPA3      | 1/2" EQP Cv 1.0 20Ra int./63 RMS ext. |
| A1EPA3      | 1/2" EQP Cv 1.0 20Ra int./20Ra ext.   |
| A2EP13      | 1/2" EQP Cv 1.0 8Ra int./20Ra ext.    |
| A3EP13      | 1/2" EQP Cv 1.0 8Ra int./8Ra ext.     |
| A4EP13      | 1/2" EQP Cv 1.0 8Ra int./63 RMS ext.  |

| 1,2,3,4,5,6 | 3/4" Tri-C Body, Cv, Char. Finish     |
|-------------|---------------------------------------|
| BALN1A      | 3/4" LIN Cv 1.0 20Ra int./63 RMS ext. |
| B1LN1A      | 3/4" LIN Cv 1.0 20Ra int./20Ra ext.   |
| B2LN1Ø      | 3/4" LIN Cv 1.0 8Ra int./20Ra ext.    |
| B3LN1Ø      | 3/4" LIN Cv 1.0 8Ra int./8Ra ext.     |
| B4LN1Ø      | 3/4" LIN Cv 1.0 8Ra int./63 RMS ext.  |
| BAEPA1      | 3/4" EQP Cv 1.0 20Ra int./63 RMS ext. |
| B1EPA1      | 3/4" EQP Cv 1.0 20Ra int./20Ra ext.   |
| B2EP11      | 3/4" EQP Cv 1.0 8Ra int./20Ra ext.    |
| B3EP11      | 3/4" EQP Cv 1.0 8Ra int./8Ra ext.     |
| B4EP11      | 3/4" EQP Cv 1.0 8Ra int./63 RMS ext.  |
| BALN2A      | 3/4" LIN Cv 2.0 20Ra int./63 RMS ext. |
| B1LN2A      | 3/4" LIN Cv 2.0 20Ra int./20Ra ext.   |
| B2LN21      | 3/4" LIN Cv 2.0 8Ra int./20Ra ext.    |
| B3LN21      | 3/4" LIN Cv 2.0 8Ra int./8Ra ext.     |
| B4LN21      | 3/4" LIN Cv 2.0 8Ra int./63 RMS ext.  |

| 1,2,3,4,5,6 | 3/4" Tri-C Body, Cv, Char. Finish     |
|-------------|---------------------------------------|
| BAEPA2      | 3/4" EQP Cv 2.0 20Ra int./63 RMS ext. |
| B1EPA2      | 3/4" EQP Cv 2.0 20Ra int./20Ra ext.   |
| B2EP12      | 3/4" EQP Cv 2.0 8Ra int./20Ra ext.    |
| B3EP12      | 3/4" EQP Cv 2.0 8Ra int./8Ra ext.     |
| B4EP12      | 3/4" EQP Cv 2.0 8Ra int./63 RMS ext.  |
| CALN3A      | 3/4" LIN Cv 3.5 20Ra int./63 RMS ext. |
| C1LN3A      | 3/4" LIN Cv 3.5 20Ra int./20Ra ext.   |
| C2LN31      | 3/4" LIN Cv 3.5 8Ra int./20Ra ext.    |
| C3LN31      | 3/4" LIN Cv 3.5 8Ra int./8Ra ext.     |
| C4LN31      | 3/4" LIN Cv 3.5 8Ra int./63 RMS ext.  |
| CAEPA3      | 3/4" EQP Cv 3.5 20Ra int./63 RMS ext. |
| C1EPA3      | 3/4" EQP Cv 3.5 20Ra int./20Ra ext.   |
| C2EP13      | 3/4" EQP Cv 3.5 8Ra int./20Ra ext.    |
| C3EP13      | 3/4" EQP Cv 3.5 8Ra int./8Ra ext.     |
| C4EP13      | 3/4" EQP Cv 3.5 8Ra int./63 RMS ext.  |
| CALN4A      | 3/4" LIN Cv 5.0 20Ra int./63 RMS ext. |
| C1LN4A      | 3/4" LIN Cv 5.0 20Ra int./20Ra ext.   |
| C2LN41      | 3/4" LIN Cv 5.0 8Ra int./20Ra ext.    |
| C3LN41      | 3/4" LIN Cv 5.0 8Ra int./8Ra ext.     |
| C4LN41      | 3/4" LIN Cv 5.0 8Ra int./63 RMS ext.  |
| CAEPA4      | 3/4" EQP Cv 5.0 20Ra int./63 RMS ext. |
| C1EPA4      | 3/4" EQP Cv 5.0 20Ra int./20Ra ext.   |
| C2EP14      | 3/4" EQP Cv 5.0 8Ra int./20Ra ext.    |
| C3EP14      | 3/4" EQP Cv 5.0 8Ra int./8Ra ext.     |
| C4EP14      | 3/4" EQP Cv 5.0 8Ra int./63 RMS ext.  |

| 1,2,3,4,5,6 | 1" Tri-C Body, Cv, Char. Finish     |
|-------------|-------------------------------------|
| DALN1A      | 1" LIN Cv 3.5 20Ra int./63 RMS ext. |
| D1LN1A      | 1" LIN Cv 3.5 20Ra int./20Ra ext.   |
| D2LN1Ø      | 1" LIN Cv 3.5 8Ra int./20Ra ext.    |
| D3LN1Ø      | 1" LIN Cv 3.5 8Ra int./8Ra ext.     |
| D4LN1Ø      | 1" LIN Cv 3.5 8Ra int./63 RMS ext.  |
| DAEPA1      | 1" EQP Cv 3.5 20Ra int./63 RMS ext. |
| D1EPA1      | 1" EQP Cv 3.5 20Ra int./20Ra ext.   |
| D2EP11      | 1" EQP Cv 3.5 8Ra int./20Ra ext.    |
| D3EP11      | 1" EQP Cv 3.5 8Ra int./8Ra ext.     |
| D4EP11      | 1" EQP Cv 3.5 8Ra int./63 RMS ext.  |
| DALN2A      | 1" LIN Cv 5.0 20Ra int./63 RMS ext. |
| D1LN2A      | 1" LIN Cv 5.0 20Ra int./20Ra ext.   |
| D2LN21      | 1" LIN Cv 5.0 8Ra int./20Ra ext.    |
| D3LN21      | 1" LIN Cv 5.0 8Ra int./8Ra ext.     |
| D4LN21      | 1" LIN Cv 5.0 8Ra int./63 RMS ext.  |
| DAEPA2      | 1" EQP Cv 5.0 20Ra int./63 RMS ext. |
| D1EPA2      | 1" EQP Cv 5.0 20Ra int./20Ra ext.   |
| D2EP12      | 1" EQP Cv 5.0 8Ra int./20Ra ext.    |
| D3EP12      | 1" EQP Cv 5.0 8Ra int./8Ra ext.     |
| D4EP12      | 1" EQP Cv 5.0 8Ra int./63 RMS ext.  |

ORDERING SCHEMATIC CONTINUED

| 1,2,3,4,5,6 | 1" Tri-C Body, Cv, Char. Finish     |
|-------------|-------------------------------------|
| EALN3A      | 1" LIN Cv 7.5 20Ra int./63 RMS ext. |
| E1LN3A      | 1" LIN Cv 7.5 20Ra int./20Ra ext.   |
| E2LN31      | 1" LIN Cv 7.5 8Ra int./20Ra ext.    |
| E3LN31      | 1" LIN Cv 7.5 8Ra int./8Ra ext.     |
| E4LN31      | 1" LIN Cv 7.5 8Ra int./63 RMS ext.  |
| EAEP3A      | 1" EQP Cv 7.5 20Ra int./63 RMS ext. |
| E1EP3A      | 1" EQP Cv 7.5 20Ra int./20Ra ext.   |
| E2EP13      | 1" EQP Cv 7.5 8Ra int./20Ra ext.    |
| E3EP13      | 1" EQP Cv 7.5 8Ra int./8Ra ext.     |
| E4EP13      | 1" EQP Cv 7.5 8Ra int./63 RMS ext.  |
| EALN4A      | 1" LIN Cv 15 20Ra int./63 RMS ext.  |
| E1LN4A      | 1" LIN Cv 15 20Ra int./20Ra ext.    |
| E2LN41      | 1" LIN Cv 15 8Ra int./20Ra ext.     |
| E3LN41      | 1" LIN Cv 15 8Ra int./8Ra ext.      |
| E4LN41      | 1" LIN Cv 15 8Ra int./63 RMS ext.   |
| EAEP4A      | 1" EQP Cv 15 20Ra int./63 RMS ext.  |
| E1EP4A      | 1" EQP Cv 15 20Ra int./20Ra ext.    |
| E2EP14      | 1" EQP Cv 15 8Ra int./20Ra ext.     |
| E3EP14      | 14" EQP Cv 15 8Ra int./8Ra ext.     |
| E4EP14      | 1" EQP Cv 15 8Ra int./63 RMS ext.   |

| 7 & 8 | Stem Seal                     |
|-------|-------------------------------|
|       | O-Ring Seal                   |
| BN    | Buna-N / FDA                  |
| EP    | EPDM / FDA & USP Class VI     |
| FZ    | Fluoraz / FDA & USP Class VI  |
| KZ    | Kalrez / FDA & USP Class VI   |
| SI    | Silicone / FDA & USP Class VI |
| VI    | Viton / FDA & USP Class VI    |

| 9 & 10 | Actuator / Range               |
|--------|--------------------------------|
|        | 978 / 978TP                    |
| 3D     | 35M 3-15 DIR                   |
| 3R     | 35M 3-15 REV                   |
| 4D     | 35M 6-30 DIR                   |
| 4R     | 35M 6-30 REV                   |
| 5D     | 55M 3-15 DIR                   |
| 5R     | 55M 3-15 REV                   |
| 6D     | 55M 6-30 DIR                   |
| 6R     | 55M 6-30 REV                   |
|        | 978SP                          |
| 3D     | 35M ALL DIR                    |
| 3R     | 35M ALL REV                    |
| 5D     | 55M ALL DIR                    |
| 5R     | 55M ALL REV                    |
|        | 978MV                          |
| 1D     | MV1010 4-20MA DIR 0.2 - 5.0 Cv |
| 1R     | MV1010 4-20MA REV 0.2 - 5.0 Cv |
| 2D     | MV1020 4-20MA DIR All Cv       |
| 2R     | MV1020 4-20MA REV All Cv       |

| 11 & 12 | Action  |
|---------|---------|
| DD      | Direct  |
| RR      | Reverse |

| 13 & 14 | Accessories              |
|---------|--------------------------|
| 00      | None                     |
| 1A      | I/P Trans. 4-20M / 3-15P |
| 2A      | Air Reg. with gage       |
| 3A      | I/P Trans. 4-20M / 6-30P |

| 15 | SMP  |
|----|--|
| 0  | None   |
| A  | SMP DIR / REV 3-15                                   |
| B  | SMP DIR / REV 3-9                                    |
| C  | SMP DIR / REV 9-15                                   |
| D  | SMP / IP DIR / REV 4-20                              |
| E  | SMP / IP DIR / REV 4-12                              |
| F  | SMP / IP DIR / REV 12-20                             |
| G  | MK16IQ - S DIR / REV 4-20 (HART®)                    |
| H  | MK16IQ - B DIR / REV 4-20 (not HART®)                |
| J  | MK16IQ - FF DIR / REV 4-20<br>(Foundation Fieldbus™) |



ORDERING SCHEMATIC - MARK 978 SERIES (1-1/2" & 2")

| Model No | Size | Stem Seal | Seat | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----------|------|-----------|------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
|          |      |           |      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

|       | Model                   |
|-------|-------------------------|
| 978   | Standard                |
| 978MV | Motor Valve             |
| 978SP | Side Mounted Positioner |
| 978TP | Top Mounted Positioner  |

|     | Size   |
|-----|--------|
| 150 | 1-1/2" |
| 200 | 2"     |

|    | Stem Seal |
|----|-----------|
| OR | O-Ring    |

|   | Seat                               |
|---|------------------------------------|
|   | Leave blank for standard Hard Seat |
| P | PEEK FDA/USP Class VI              |
| T | Teflon FDA/USP Class VI            |

| 1,2,3,4,5,6 | 1-1/2" Tri-C Body, Cv, Char. Finish     |
|-------------|---|
| FALN1A      | 1-1/2" LIN Cv 5 20Ra int./63 RMS. ext.  |
| F1LN1A      | 1-1/2" LIN Cv 5 20Ra int./20Ra ext.     |
| F2LN1Ø      | 1-1/2" LIN Cv 5 8Ra int. /20Ra ext.     |
| F3LN1Ø      | 1-1/2" LIN Cv 5 8Ra int./8Ra ext.       |
| F4LN1Ø      | 1-1/2" LIN Cv 5 8Ra int./63RMS ext.     |
| FAEPA1      | 1-1/2" EQP Cv 5 20Ra int./63 RMS ext.   |
| F1EPA1      | 1-1/2" EQP Cv 5 20Ra int./20Ra ext.     |
| F2EP11      | 1-1/2" EQP Cv 5 8Ra int./20Ra ext.      |
| F3EP11      | 1-1/2" EQP Cv 5 8Ra int./8Ra ext.       |
| F4EP11      | 1-1/2" EQP Cv 5 8Ra int./63 RMS ext.    |
| FALN2A      | 1-1/2" LIN Cv 10 20Ra int./63 RMS. ext. |
| F1LN2A      | 1-1/2" LIN Cv 10 20Ra int./20Ra ext.    |
| F2LN21      | 1-1/2" LIN Cv 10 8Ra int. /20Ra ext.    |
| F3LN21      | 1-1/2" LIN Cv 10 8Ra int./8Ra ext.      |
| F4LN21      | 1-1/2" LIN Cv 10 8Ra int./63 RMS ext.   |
| FAEPA2      | 1-1/2" EQP Cv 10 20Ra int./63 RMS. ext. |
| F1EPA2      | 1-1/2" EQP Cv 10 20Ra int./20Ra ext.    |
| F2EP12      | 1-1/2" EQP Cv 10 8Ra int. /20Ra ext.    |
| F3EP12      | 1-1/2" EQP Cv 10 8Ra int./8Ra ext.      |
| F4EP12      | 1-1/2" EQP Cv 10 8Ra int./63 RMS ext.   |
| FALN3A      | 1-1/2" LIN Cv 15 20Ra int./63 RMS. ext. |
| F1LN3A      | 1-1/2" LIN Cv 15 20Ra int./20Ra ext.    |
| F2LN31      | 1-1/2" LIN Cv 15 8Ra int. /20Ra ext.    |
| F3LN31      | 1-1/2" LIN Cv 15 8Ra int./8Ra ext.      |
| F4LN31      | 1-1/2" LIN Cv 15 8Ra int./63 RMS ext.   |

| 1,2,3,4,5,6 | 1-1/2" Tri-C Body, Cv, Char. Finish     |
|-------------|---|
| FAEPA3      | 1-1/2" EQP Cv 15 20Ra int./63 RMS. ext. |
| F1EPA3      | 1-1/2" EQP Cv 15 20Ra int./20Ra ext.    |
| F2EP13      | 1-1/2" EQP Cv 15 8Ra int. /20Ra ext.    |
| F3EP13      | 1-1/2" EQP Cv 15 8Ra int./8Ra ext.      |
| F4EP13      | 1-1/2" EQP Cv 15 8Ra int./63 RMS ext.   |
| GALN4A      | 1-1/2" LIN Cv 20 20Ra int./63 RMS. ext. |
| G1LN4A      | 1-1/2" LIN Cv 20 20Ra int./20Ra ext.    |
| G2LN41      | 1-1/2" LIN Cv 20 8Ra int. /20Ra ext.    |
| G3LN41      | 1-1/2" LIN Cv 20 8Ra int./8Ra ext.      |
| G4LN41      | 1-1/2" LIN Cv 20 8Ra int./63 RMS ext.   |
| GAEPA4      | 1-1/2" EQP Cv 20 20Ra int./63 RMS ext.  |
| G1EPA4      | 1-1/2" EQP Cv 20 20Ra int./20Ra ext.    |
| G2EP14      | 1-1/2" EQP Cv 20 8Ra int./20Ra ext.     |
| G3EP14      | 1-1/2" EQP Cv 20 8Ra int./8Ra ext.      |
| G4EP14      | 1-1/2" EQP Cv 20 8Ra int./63 RMS ext.   |
| GALN5A      | 1-1/2" LIN Cv 30 20Ra int./63 RMS. ext. |
| G1LN5A      | 1-1/2" LIN Cv 30 20Ra int./20Ra ext.    |
| G2LN51      | 1-1/2" LIN Cv 30 8Ra int. /20Ra ext.    |
| G3LN51      | 1-1/2" LIN Cv 30 8Ra int./8Ra ext.      |
| G4LN51      | 1-1/2" LIN Cv 30 8Ra int./63 RMS ext.   |
| GAEPA5      | 1-1/2" EQP Cv 30 20Ra int./63 RMS. ext. |
| G1EPA5      | 1-1/2" EQP Cv 30 20Ra int./20Ra ext.    |
| G2EP15      | 1-1/2" EQP Cv 30 8Ra int. /20Ra ext.    |
| G3EP15      | 1-1/2" EQP Cv 30 8Ra int./8Ra ext.      |
| G4EP15      | 1-1/2" EQP Cv 30 8Ra int./63 RMS ext.   |

| 1,2,3,4,5,6 | 2" Tri-C Body, Cv, Char. Finish     |
|-------------|-------------------------------------|
| HALN1A      | 2" LIN Cv 10 20Ra int./63 RMS. ext. |
| H1LN1A      | 2" LIN Cv 10 20Ra int./20Ra ext.    |
| H2LN1Ø      | 2" LIN Cv 10 8Ra int. /20Ra ext.    |
| H3LN1Ø      | 2" LIN Cv 10 8Ra int./8Ra ext.      |
| H4LN1Ø      | 2" LIN Cv 10 8Ra int./63 RMS ext.   |
| HAEPA1      | 2" EQP Cv 10 20Ra int./63 RMS. ext. |
| H1EPA1      | 2" EQP Cv 10 20Ra int./20Ra ext.    |
| H2EP11      | 2" EQP Cv 10 8Ra int. /20Ra ext.    |
| H3EP11      | 2" EQP Cv 10 8Ra int./8Ra ext.      |
| H4EP11      | 2" EQP Cv 10 8Ra int./63 RMS ext.   |
| HALN2A      | 2" LIN Cv 15 20Ra int./63 RMS. ext. |
| H1LN2A      | 2" LIN Cv 15 20Ra int./20Ra ext.    |
| H2LN21      | 2" LIN Cv 15 8Ra int. /20Ra ext.    |
| H3LN21      | 2" LIN Cv 15 8Ra int./8Ra ext.      |
| H4LN21      | 2" LIN Cv 15 8Ra int./63 RMS ext.   |

Continued on next page

**ORDERING SCHEMATIC CONTINUED (1-1/2" & 2")**

| 1,2,3,4,5,6 | 2" Tri-C Body, Cv, Char. Finish     |
|-------------|-------------------------------------|
| HAEPA2      | 2" EQP Cv 15 20Ra int./63 RMS. ext. |
| H1EPA2      | 2" EQP Cv 15 20Ra int./20Ra ext.    |
| H2EP12      | 2" EQP Cv 15 8Ra int./20Ra ext.     |
| H3EP12      | 2" EQP Cv 15 8Ra int./8Ra ext.      |
| H4EP12      | 2" EQP Cv 15 8Ra int./63 RMS ext.   |
|             |                                     |
| HALN3A      | 2" LIN Cv 20 20Ra int./63 RMS. ext. |
| H1LN3A      | 2" LIN Cv 20 20Ra int./20Ra ext.    |
| H2LN31      | 2" LIN Cv 20 8Ra int./20Ra ext.     |
| H3LN31      | 2" LIN Cv 20 8Ra int./8Ra ext.      |
| H4LN31      | 2" LIN Cv 20 8Ra int./63 RMS ext.   |
|             |                                     |
| HAEPA3      | 2" EQP Cv 20 20Ra int./63 RMS ext.  |
| H1EPA3      | 2" EQP Cv 20 20Ra int./20Ra ext.    |
| H2EP13      | 2" EQP Cv 20 8Ra int./20Ra ext.     |
| H3EP13      | 2" EQP Cv 20 8Ra int./8Ra ext.      |
| H4EP13      | 2" EQP Cv 20 8Ra int./63 RMS ext.   |
|             |                                     |
| HALN4A      | 2" LIN Cv 30 20Ra int./63 RMS. ext. |
| H1LN4A      | 2" LIN Cv 30 20Ra int./20Ra ext.    |
| H2LN41      | 2" LIN Cv 30 8Ra int./20Ra ext.     |
| H3LN41      | 2" LIN Cv 30 8Ra int./8Ra ext.      |
| H4LN41      | 2" LIN Cv 30 8Ra int./63 RMS ext.   |
|             |                                     |
| HAEPA4      | 2" EQP Cv 30 20Ra int./63 RMS. ext. |
| H1EPA4      | 2" EQP Cv 30 20Ra int./20Ra ext.    |
| H2EP14      | 2" EQP Cv 30 8Ra int./20Ra ext.     |
| H3EP14      | 2" EQP Cv 30 8Ra int./8Ra ext.      |
| H4EP14      | 2" EQP Cv 30 8Ra int./63 RMS ext.   |
|             |                                     |
| IALN5A      | 2" LIN Cv 40 20Ra int./63 RMS. ext. |
| I1LN5A      | 2" LIN Cv 40 20Ra int./20Ra ext.    |
| I2LN51      | 2" LIN Cv 40 8Ra int./20Ra ext.     |
| I3LN51      | 2" LIN Cv 40 8Ra int./8Ra ext.      |
| I4LN51      | 2" LIN Cv 40 8Ra int./63 RMS ext.   |
|             |                                     |
| IAEPA5      | 2" EQP Cv 40 20Ra int./63 RMS. ext. |
| I1EPA5      | 2" EQP Cv 40 20Ra int./20Ra ext.    |
| I2EP15      | 2" EQP Cv 40 8Ra int./20Ra ext.     |
| I3EP15      | 2" EQP Cv 40 8Ra int./8Ra ext.      |
| I4EP15      | 2" EQP Cv 40 8Ra int./63 RMS ext.   |
|             |                                     |
| IALN6A      | 2" LIN Cv 60 20Ra int./63 RMS. ext. |
| I1LN6A      | 2" LIN Cv 60 20Ra int./20Ra ext.    |
| I2LN61      | 2" LIN Cv 60 8Ra int./20Ra ext.     |
| I3LN61      | 2" LIN Cv 60 8Ra int./8Ra ext.      |
| I4LN61      | 2" LIN Cv 60 8Ra int./63 RMS ext.   |

| 7 & 8       | Stem Seal                     |
|-------------|-------------------------------|
| O-Ring Seal |                               |
| BN          | Buna-N / FDA                  |
| EP          | EPDM / FDA & USP Class VI     |
| FZ          | Fluoraz / FDA & USP Class VI  |
| KZ          | Kalrez / FDA & USP Class VI   |
| SI          | Silicone / FDA & USP Class VI |
| VI          | Viton / FDA & USP Class VI    |

| 9 & 10      | Actuator / Range         |
|-------------|--------------------------|
| 978 / 978TP |                          |
| 5D          | 55M 3-15 DIR             |
| 5R          | 55M 3-15 REV             |
| 6D          | 55M 6-30 DIR             |
| 6R          | 55M 6-30 REV             |
| 8D          | 85M 3-15 DIR             |
| 8R          | 85M 3-15 REV             |
| 9D          | 85M 6-30 DIR             |
| 9R          | 85M 6-30 REV             |
| 978SP       |                          |
| 5D          | 55M ALL DIR              |
| 5R          | 55M ALL REV              |
| 8D          | 85M ALL DIR              |
| 8R          | 85M ALL REV              |
| 978MV       |                          |
| 2D          | MV1020 4-20MA DIR All Cv |
| 2R          | MV1020 4-20MA DIR All Cv |

| 11 & 12 | Action  |
|---------|---------|
| DD      | Direct  |
| RR      | Reverse |

| 13 & 14 | Accessories              |
|---------|--------------------------|
| 00      | None                     |
| 1A      | I/P Trans. 4-20M / 3-15P |
| 2A      | Air Reg. with gage       |
| 3A      | I/P Trans. 4-20M / 6-30P |

| 15 | SMP   |
|----|---|
| 0  | None  |
| A  | SMP DIR / REV 3-15                                |
| B  | SMP DIR / REV 3-9                                 |
| C  | SMP DIR / REV 9-15                                |
| D  | SMP / IP DIR / REV 4-20                           |
| E  | SMP / IP DIR / REV 4-12                           |
| F  | SMP / IP DIR / REV 12-20                          |
| G  | MK16IQ - S DIR / REV 4-20 (HART®)                 |
| H  | MK16IQ - B DIR / REV 4-20 (not HART®)             |
| J  | MK16IQ - FF DIR / REV 4-20 (Foundation Fieldbus™) |