

8000 Series Cryogenic Option

Fractional Flow Control Valves

CRN Registration Number Available

FRACTIONAL FLOW CONTROL VALVES

The cryogenic option offers an 8" bonnet extension that provides protection for the packing and actuator by preventing the formation and build-up of ice, which can interfere with movement of the valve stem and affect valve performance and control. This model is for use on cryogenic services with temperatures as low as -320°F (-195°C).

The Mark 8000 Series is a heavy-duty pneumatic control valve developed for cryogenic services. It is recommended for use with process below -40°F (-40°C).

Features:

- Extended bonnet protects the packing and actuator by preventing ice build-up, which can interfere with stem movement and/or damage packing
- For services as low as -320°F (-195°C).
- Barstock construction eliminate possible porosity concerns
- For industrial process applications requiring precision low flow control and durable construction

SPECIFICATIONS

Sizes: 1/2" – 2" (DN15 – DN50)

End Connections

- Threaded – NPT, BSPT
- Raised-face flanges (300#, 600#, 900#)
- Ring-type joint flanges (150#, 300#, 600#)
- Socket weld (schedule 40, 80, or 160)
- Special connections upon request

Actuator (*Positioner required with all actuators*)

- Standard – 35M (35 in²) multi-spring
- Optional – 55M (55 in²) or 85M (85 in²). See Maximum Allowable ΔP Ratings Chart



A Division of
Richards Industrials
3170 Wasson Road
Cincinnati, OH 45209

513.533.5600
lowflow@richardsind.com

www.lowflowvalve.com

MK8000 SERIES CRYOGENIC OPTION SPECIFICATIONS

Body Material: 316 Stainless Steel

Trim Material

- 316 SST
- Monel

Bonnet Material: 316 SST

Actuator Material: Steel

Diaphragm Material: Buna-N

Stem Packing Material

- Standard – Teflon V-Rings
- Optional – braided

Service: gas or liquid

Shutoff

- Standard – ANSI Class III (Cv's < 3.5/3,01 Kv); ANSI Class IV (Cv's 3.5/3,01 Kv and higher)
- Optional – ANSI Class VI with soft RPTFE seat (consult factory for other soft seat material options)

Ranges: 3-15 (0,2-1,0); 3-9 (0,2-0,6); 9-15 (0,6-1,0); 6-30 (0,4-2,1) psi (bar). Note: valves using 55M or 85M are not available with 9-15 psi (0,6-1,0 bar) range

Valve Action

- Direct (ATC)
- Reverse (ATO)

Flow Characteristics:

- Linear
- Equal Percentage
- Quick Opening

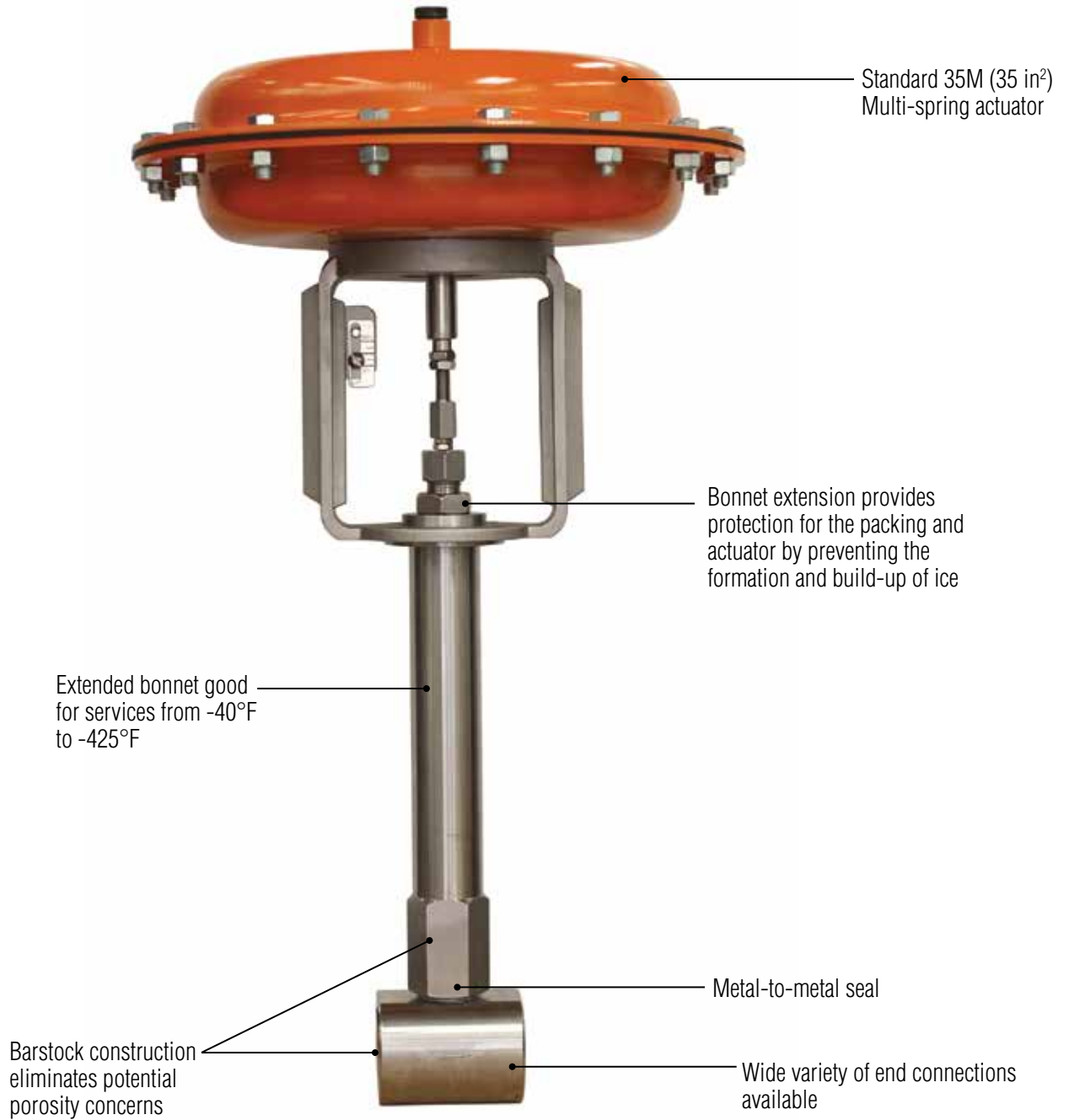
Cv (Kv) Selection

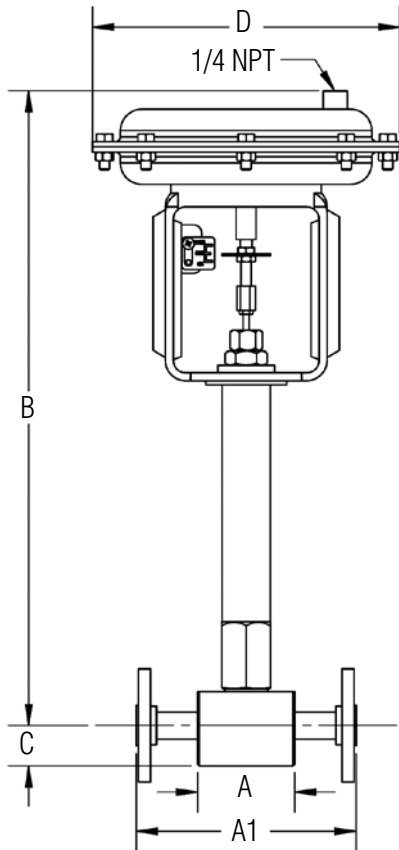
| Valve Size | Standard Cv (Kv) |
|-------------|--|
| 1/2"/DN15 | 0.05; 0.1; 0.2; 0.5; 1.0; 1.8 (0,04; 0,09; 0,17; 0,43; 0,86; 1,6) |
| 3/4"/DN20 | 1.0; 2.0; 3.0 (0,86; 1,7; 2,6) |
| 1"/DN25 | 2.0; 4.0; 4.3 (1,7; 3,4; 3,7) |
| 1-1/4"/DN32 | 4.0; 6.5; 7.1 (3,4; 5,6; 6,1) |
| 1-1/2"/DN40 | 6.5; 9.0; 17.0 (5,6; 7,7; 10,8) |
| 2"/DN50 | 9.0; 16.0; 17.0 (7,7; 13,8; 14,6) |

Maximum Allowable ΔP Ratings

| Act. Size | Cv (Kv) | Air to Open | | Air to Close | | Pos. @ 40 psi |
|--------------------------|--------------------------|----------------------|----------------|---------------|---------------|---------------|
| | | 3-15 @ 20 psi | 6-30 @ 40 psi* | 3-15 @ 20 psi | 6-30 @ 40 psi | |
| 35M | 0.05-0.2 (0,4-0,2) | 5000 (345) | 5000 (345) | 5000 (345) | 5000 (345) | N/A |
| | 0.5-1.0 (0,4-0,9) | 3030 (209) | 5000 (345) | 5000 (345) | 5000 (345) | N/A |
| | 1.25-2.0 (1,1-1,7) | 950 (66) | 1900 (131) | 1580 (109) | 3160 (218) | N/A |
| | 3.0-4.0 (2,6-3,4) | 600 (41) | 1300 (90) | 1000 (69) | 2200 (152) | N/A |
| | 4.3-6.5 (3,7-5,6) | 400 (28) | 800 (55) | 650 (45) | 1400 (97) | 3500 (241) |
| | 7.1-9.0 (6,1-7,7) | 270 (19) | 550 (38) | 450 (31) | 950 (66) | 2400 (165) |
| | 12.5-16.0 (10,8-13,8) | 150 (10) | 300 (21) | 250 (17) | 500 (34) | 1300 (90) |
| | 55M | 4.3-6.5 (3,7-5,6) | 550 (38) | 1100 (76) | 900 (62) | 1900 (131) |
| 7.1-9.0 (6,1-7,7) | | 370 (26) | 750 (52) | 600 (41) | 1250 (86) | N/A |
| 12.5-16.0 (10,8-13,8) | | 200 (14) | 400 (28) | 350 (24) | 700 (48) | N/A |
| 17.0 (14,6) | | 130 (9) | 250 (17) | 225 (16) | 448 (31) | N/A |
| 85M | | 4.3-6.5 (3,7-5,6) | 850 (59) | 1700 (117) | 1400 (97) | 2930 (202) |
| | 7.1-9.0 (6,1-7,7) | 570 (39) | 1150 (79) | 920 (63) | 1930 (133) | N/A |
| | 12.5-16.0 (10,8-13,8) | 300 (21) | 610 (42) | 540 (37) | 1080 (74) | N/A |
| | 17.0 (14,6) | 200 (14) | 380 (26) | 350 (24) | 690 (48) | N/A |

MK8000 SERIES CRYOGENIC OPTION FEATURES & BENEFITS



MK8000 SERIES CRYOGENIC OPTION, THREADED & FSW DIMENSIONS


Dimensions shown with 8" bonnet. Contact factory for optional 14" dimensions.

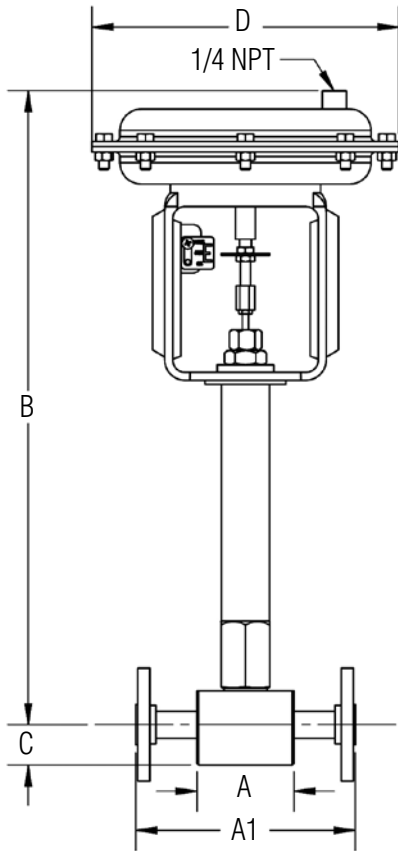
- Mark 8000CRY Series, Threaded & Socket Weld**

| VALVE SIZE | DIMENSIONS, INCHES | | | | | | | | WEIGHT, LBS | | |
|------------|--------------------|---------------|-------|-------|------|---------------|-------|-------|---------------|-----|-----|
| | A | B | | | C | D | | | ACTUATOR SIZE | | |
| | | ACTUATOR SIZE | | | | ACTUATOR SIZE | | | 35M | 55M | 85M |
| | | 35M | 55M | 85M | | 35M | 55M | 85M | 35M | 55M | 85M |
| 1/2" | 3.00 | 19.65 | 19.88 | - | 1.25 | 9.50 | 12.50 | - | 23 | 30 | 37 |
| 3/4" | 3.00 | 19.65 | 19.88 | - | 1.25 | 9.50 | 12.50 | - | 23 | 30 | 37 |
| 1" | 3.75 | 19.28 | 19.51 | 20.95 | 1.50 | 9.50 | 12.50 | 15.00 | 26 | 33 | 40 |
| 1-1/4" | 5.00 | 19.61 | 19.84 | 21.28 | 1.65 | 9.50 | 12.50 | 15.00 | 29 | 36 | 43 |
| 1-1/2" | 4.75 | - | 21.94 | 23.38 | 2.00 | - | 12.50 | 15.00 | - | 30 | 41 |
| 2" | 5.75 | - | 21.77 | 23.21 | 2.25 | - | 12.50 | 15.00 | - | 39 | 50 |

- Mark 8000CRY Series, Threaded & Socket Weld, Metric**

| VALVE SIZE | DIMENSIONS, MILLIMETERS | | | | | | | | WEIGHT, KGS | | |
|------------|-------------------------|---------------|-----|-----|------|---------------|-----|-----|---------------|-----|-----|
| | A | B | | | C | D | | | ACTUATOR SIZE | | |
| | | ACTUATOR SIZE | | | | ACTUATOR SIZE | | | 35M | 55M | 85M |
| | | 35M | 55M | 85M | | 35M | 55M | 85M | 35M | 55M | 85M |
| 1/2" | 76,2 | 499 | 505 | - | 31,8 | 241 | 318 | - | 10 | 14 | 17 |
| 3/4" | 76,2 | 499 | 505 | - | 31,8 | 241 | 318 | - | 10 | 14 | 17 |
| 1" | 95,3 | 190 | 496 | 532 | 38,1 | 241 | 318 | 381 | 12 | 15 | 18 |
| 1-1/4" | 127 | 498 | 504 | 541 | 41,9 | 241 | 318 | 381 | 13 | 16 | 20 |
| 1-1/2" | 121 | - | 557 | 594 | 50,8 | - | 318 | 381 | - | 14 | 19 |
| 2" | 146 | - | 553 | 590 | 57,2 | - | 318 | 381 | - | 18 | 23 |

MK8000 SERIES CRYOGENIC OPTION, FLANGED DIMENSIONS



- Mark 8000CRY Series, Flanged End

| VALVE SIZE | ANSI FLANGE | DIMENSIONS, INCHES | | | | | | | | | WEIGHT, LBS | | |
|------------|-------------|--------------------|-------|-------|-------|-------|-----|-------|-------|---------------|-------------|----|--|
| | | A1 | B | | | C | D | | | ACTUATOR SIZE | | | |
| | | | 35 | 55 | 85 | | 35 | 55 | 85 | 35 | 55 | 85 | |
| 1/2" | 150# | 7.00 | 19.65 | 19.88 | - | 1.25 | 9.5 | 12.50 | - | 26 | 33 | - | |
| | 300# | 7.50 | 19.65 | 19.88 | - | 1.25 | 9.5 | 12.50 | - | 27 | 34 | 41 | |
| | 600# | 8.00 | 19.65 | 19.88 | - | 1.25 | 9.5 | 12.50 | - | 29 | 36 | 43 | |
| 3/4" | 150# | 7.00 | 19.65 | 19.88 | - | 1.25 | 9.5 | 12.50 | - | 26 | 33 | 40 | |
| | 300# | 7.63 | 19.65 | 19.88 | - | 1.25 | 9.5 | 12.50 | - | 29 | 36 | 43 | |
| | 600# | 8.12 | 19.65 | 19.88 | - | 1.25 | 9.5 | 12.50 | - | 30 | 37 | 44 | |
| 1" | 150# | 7.25 | 19.28 | 19.51 | 20.95 | 1.50 | 9.5 | 12.50 | 15.00 | 30 | 37 | 44 | |
| | 300# | 7.75 | 19.28 | 19.51 | 20.95 | 1.50 | 9.5 | 12.50 | 15.00 | 33 | 40 | 47 | |
| | 600# | 8.25 | 19.28 | 19.51 | 20.95 | 1.50 | 9.5 | 12.50 | 15.00 | 34 | 41 | 48 | |
| 1-1/4" | 150# | 8.75 | 19.61 | 19.84 | 21.28 | 1.625 | 9.5 | 12.50 | 15.00 | 34 | 41 | 48 | |
| | 600# | 9.50 | 19.61 | 19.84 | 21.28 | 1.625 | 9.5 | 12.50 | 15.00 | 39 | 46 | 53 | |
| 1-1/2" | 150# | 8.75 | - | 21.94 | 23.38 | 2.00 | - | 12.50 | 15.00 | - | 48 | 55 | |
| | 300# | 9.25 | - | 21.94 | 22.38 | 2.00 | - | 12.50 | 15.00 | - | 53 | 60 | |
| | 600# | 9.88 | - | 21.94 | 22.38 | 2.00 | - | 12.50 | 15.00 | - | 57 | 64 | |
| 2" | 300# | 10.50 | - | 21.77 | 23.21 | 2.25 | - | 12.50 | 15.00 | - | 53 | 60 | |
| | 600# | 11.25 | - | 21.77 | 23.21 | 2.25 | - | 12.50 | 15.00 | - | 58 | 65 | |

- Mark 8000CRY Series, Flanged End, Metric

| VALVE SIZE | ANSI FLANGE | DIMENSIONS, MILLIMETERS | | | | | | | | | WEIGHT, KGS | | |
|------------|-------------|-------------------------|-----|-----|-----|-------|-----|-------|-----|---------------|-------------|----|--|
| | | A1 | B | | | C | D | | | ACTUATOR SIZE | | | |
| | | | 35 | 55 | 85 | | 35 | 55 | 85 | 35 | 55 | 85 | |
| 1/2" | 150# | 178 | 499 | 505 | - | 31,8 | 241 | 317,5 | - | 12 | 15 | - | |
| | 300# | 190,5 | 499 | 505 | - | 31,8 | 241 | 317,5 | - | 12 | 15 | 19 | |
| | 600# | 203,2 | 499 | 505 | - | 31,8 | 241 | 317,5 | - | 13 | 16 | 20 | |
| 3/4" | 150# | 178 | 499 | 505 | - | 31,8 | 241 | 317,5 | - | 12 | 15 | 18 | |
| | 300# | 193,8 | 499 | 505 | - | 31,85 | 241 | 317,5 | - | 13 | 16 | 20 | |
| | 600# | 206,22 | 499 | 505 | - | 31,8 | 241 | 317,5 | - | 14 | 17 | 20 | |
| 1" | 150# | 184,2 | 490 | 496 | 532 | 38,1 | 241 | 317,5 | 381 | 14 | 17 | 20 | |
| | 300# | 196,9 | 490 | 496 | 532 | 38,1 | 241 | 317,5 | 381 | 15 | 18 | 21 | |
| | 600# | 209,3 | 490 | 496 | 532 | 38,1 | 241 | 317,5 | 381 | 15 | 19 | 22 | |
| 1-1/4" | 150# | 222,3 | 498 | 504 | 541 | 41,3 | 241 | 317,5 | 381 | 15 | 19 | 22 | |
| | 600# | 241,3 | 498 | 504 | 541 | 41,3 | 241 | 317,5 | 381 | 18 | 21 | 24 | |
| 1-1/2" | 150# | 222,3 | - | 557 | 594 | 50,8 | - | 317,5 | 381 | - | 22 | 25 | |
| | 300# | 235 | - | 557 | 594 | 50,8 | - | 317,5 | 381 | - | 24 | 27 | |
| | 600# | 251 | - | 557 | 594 | 50,8 | - | 317,5 | 381 | - | 26 | 29 | |
| 2" | 300# | 266,7 | - | 553 | 590 | 57,2 | - | 317,5 | 381 | - | 24 | 27 | |
| | 600# | 285,8 | - | 553 | 590 | 57,2 | - | 317,5 | 381 | - | 26 | 29 | |

MARK 8000 SERIES ORDERING SCHEMATIC

| Model No. | Size | Body Mat'l | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|-----------|------|------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| | | | | | | | | | | | | | | | | | | | | |

| MODEL | |
|---------|------------------------------|
| 8000G | Two-Way Globe Valve |
| 8000GTP | with Top Mounted Positioner |
| 8000GSP | with Side Mounted Positioner |
| 8000GMV | with Motor Actuator |
| 8000A | Two-Way Angle Valve |
| 8000ATP | with Top Mounted Positioner |
| 8000ASP | with Side Mounted Positioner |
| 8000T | Three-Way Globe Valve |
| 8000TTP | with Top Mounted Positioner |
| 8000TSP | with Side Mounted Positioner |

| SIZE | |
|------|---------------|
| 050 | 1/2" (DN15) |
| 075 | 3/4" (DN20) |
| 100 | 1" (DN25) |
| 125 | 1-1/4" (DN32) |
| 150 | 1-1/2" (DN40) |
| 200 | 2" (DN50) |

| BODY MATERIAL | |
|---------------|--------------|
| CB | Carbon Steel |
| SB | 316SS |
| BR | Brass |
| MN | Monel |
| HC | Hastelloy C |
| A2 | Alloy 20 |
| KN | Kynar |
| PV | PVC |

| 1 & 2 END CONNECTIONS | |
|-----------------------|--------------|
| PT | FNPT |
| BT | BSPT |
| BP | BSPP |
| SW | FSW |
| R5 | 150# RF |
| J5 | 150# RTJ |
| R3 | 300# RF |
| J3 | 300# RTJ |
| R6 | 600# RF |
| J6 | 600# RTJ |
| R9 | 900# RF |
| J9 | 900# RTJ |
| R1 | 1500# RF |
| J1 | 1500# RTJ |
| R2 | 2500# RF |
| J2 | 2500# RTJ |
| B4 | BWE Sch 40 |
| B8 | BWE Sch 80 |
| B6 | BWE Sch 160 |
| ZZ | Non-standard |

| 3 & 4 BONNET/PACKING METAL BODIES | |
|-----------------------------------|-----------------------------|
| ET | 8" Extended/TFE (Cryogenic) |

MARK 8000 SERIES ORDERING SCHEMATIC

| 5 PLUG & SEAT | |
|-------------------------|---|
| Stem/Plug/Seat Material | |
| 8000G/GTP/GSP/GMV | |
| Metal Bodies | |
| A | Standard – Linear Hard |
| B | Standard – =% Hard |
| C | Standard – Q.O. Hard |
| D | Standard – Linear Soft (RPTFE) |
| E | Standard – =% Soft (RPTFE) |
| F | Standard – Q.O. Soft (RPTFE) |
| G | 316/Stellite/Stell – Linear Hard |
| H | 316/Stellite/Stell – =% Hard |
| I | 316/Stellite/Stell – Q.O. Hard |
| M | Alloy 20/AL20/AL20 – Linear Hard |
| N | Alloy 20/AL20/AL20 – % Hard |
| P | Alloy 20/AL20/AL20 – Q.O. Hard |
| Q | Alloy 20/AL20/AL20 – Linear Soft (RPTFE) |
| R | Alloy 20/AL20/AL20 – % Soft (RPTFE) |
| S | Alloy 20/AL20/AL20 – Q.O. Soft (RPTFE) |
| T | Monel/Mon/Mon – Linear Hard |
| U | Monel/Mon/Mon – =% Hard |
| V | Monel/Mon/Mon – Q.O. Hard |
| W | Monel/Mon/Mon – Linear Soft (RPTFE) |
| X | Monel/Mon/Mon – =% Soft (RPTFE) |
| Y | Monel/Mon/Mon – Q.O. Soft (RPTFE) |
| 1 | Hastelloy C/H-C/H-C – Linear Hard |
| 2 | Hastelloy C/H-C/H-C =% Hard |
| 3 | Hastelloy C/H-C/H-C – Q.O. Hard |
| 4 | Hastelloy C/H-C/H-C – Linear Soft (RPTFE) |
| 5 | Hastelloy C/H-C/H-C =% Soft (RPTFE) |
| 6 | Hastelloy C/H-C/H-C – Q.O. Soft (RPTFE) |
| Z | Non-standard |

| 6 CV (KV) | |
|-----------|--------------|
| A | 0.05 (0,043) |
| B | 0.1 (0,086) |
| C | 0.2 (0,17) |
| D | 0.5 (0,43) |
| E | 1.0 (0,86) |
| F | 2.0 (1,72) |
| G | 4.0 (3,44) |
| H | 6.5 (5,63) |
| I | 9.0 (7,74) |
| J | 16.0 (13,8) |
| K | 25 (21,5) |
| M | 1.5 (1,3) |
| N | 1.8 (1,6) |
| P | 3.0 (2,6) |
| Q | 3.5 (3,01) |
| R | 4.3 (3,7) |
| S | 7.1 (6,1) |
| T | 12.5 (10,8) |
| U | 17 (14,6) |

| 7 & 8 ACTUATOR | | | |
|----------------------|--------------|------|--------------|
| TYPE | | SIZE | |
| ALL VALVES EXCEPT SP | | | |
| D | Air-to-Close | 3 | 35M |
| R | Air-to-Open | 5 | 55M |
| FOR SP | | 8 | 85M |
| S | W/SMP | | |
| Z | Non-standard | | |
| 8000GMV | | | |
| N | On-Off | 2 | NEMA 12 |
| M | Ma/Voltage | 4 | NEMA 4 & X-P |
| ZZ | Non-standard | | |

MARK 8000 SERIES ORDERING SCHEMATIC

| 9 & 10 | | RANGE | |
|---------|--------------|----------|-----|
| | RANGE | ACTUATOR | |
| A | 3-15 DIR | 3 | 35M |
| B | 3-15 REV | 5 | 55M |
| G | 6-30 DIR | 8 | 85M |
| H | 6-30 REV | | |
| Z | Non-standard | | |
| 8000GMV | | | |
| NF | On-Off | | |
| 42 | 4-20 mA | | |
| 41 | 4-12 mA | | |
| 12 | 12-20 mA | | |
| V5 | 0-5V | | |
| V1 | 0-10V | | |
| ZZ | Non-standard | | |

| 11 & 12 | | LIMIT SWITCHES (2LS) | |
|---------|--------------|----------------------|------------------|
| | ACTUATOR | ACTION/TYPE | |
| 3 | 35M | D | Direct/Standard |
| 5 | 55M | X | Direct/X-P |
| 8 | 85M | R | Reverse/Standard |
| | | P | Reverse/X-P |
| 00 | None | | |
| ZZ | Non-standard | | |

| 13 & 14 | | SOLENOID & HARDWARE | |
|---------|----------------------|---------------------|--|
| 00 | None | | |
| SD | Standard Solenoid | | |
| WT | Water-Tight Solenoid | | |
| XP | X-Proof Solenoid | | |
| H3 | Handwheel 35M Dir | | |
| H5 | Handwheel 55M Dir | | |
| H8 | Handwheel 85M Dir | | |
| R3 | Handwheel 35M Rev | | |
| R5 | Handwheel 55MK Rev | | |
| R8 | Handwheel 85M Rev | | |
| ZZ | Non-standard | | |

| 15 | | ACCESSORIES | |
|----|--------------------------------------|-------------|--|
| 0 | None | | |
| A | Air Regulator | | |
| B | I/P 35M Act. 4-20Ma/3-15 psi | | |
| C | I/P 55M Act. 4-20Ma/3-15 psi | | |
| D | I/P 85M Act. 4-20Ma/3-15 psi | | |
| E | I/P 35M/55M/85M Act. 4-20Ma/6-30 psi | | |
| 1 | 1 Gauge for Tmp. | | |
| 2 | 2 Gauge for Tmp. | | |
| 3 | 3 Gauge for Tmp. | | |
| X | Oxygen Clean | | |
| Z | Non-standard | | |

| 16 | | ACTION | |
|----|-----------------------|--------|--|
| D | Direct (Air-To-Close) | | |
| R | Reverse (Air-To-Open) | | |

| 17 | | SMP | |
|----|----------------------------|-----|--|
| 0 | None | | |
| A | SMP Direct/Reverse 3-15 | | |
| D | SMP-IP Direct/Reverse 4-20 | | |
| G | SMP 16IQ-S Direct/Reverse | | |
| H | SMP 16IQ-B Direct/Reverse | | |
| Z | Non-standard | | |

| 18 | | PED COMPLIANCE | |
|----|---------------|----------------|--|
| 0 | Not Required | | |
| F | CE Category 1 | | |
| Z | Non-standard | | |