

DESCRIPTION

The Model CBX control valve is designed specifically for cryogenic cold box applications. The unique design allows ready access to the seat ring after the body has been sealed in the cold box. A special seat extraction tool simplifies trim changing operations. Although the standard body extension is 14", lengths up to 60" are available on special order. The use of a standard threaded bonnet allows the user a choice of bonnet styles, from TFE chevron ring packing to bellows seals. An optional casing flange or weldable sleeve facilitates field mounting.

APPLICATIONS

The CBX valve is especially suited to modulating control of liquids and vapors in the cryogenic temperature range (to -450F). Although designed for cold service, the unit can also be used at elevated temperatures, such as sealed ovens.

MATERIALS OF CONSTRUCTION

Body-Bonnet

| | |
|----------------|------------------------------------|
| Body | CF3M (316L S/S) |
| Body extension | 316L S/S pipe and 316 s/s barstock |
| Bonnet | 316 S/S barstock |

Innervalue

| | |
|----------|-----------------------------------|
| Standard | 316 S/S |
| Optional | Stellite®, TFE or Kel-F soft seat |

Packing

| | |
|----------|--------------------------|
| Standard | TFE chevron rings |
| Optional | Graphite or bellows seal |

Actuator

| | |
|----------|-------------------------|
| Standard | Aluminum (epoxy coated) |
| Optional | 316 S/S |
| Hardware | 300 series S/S |

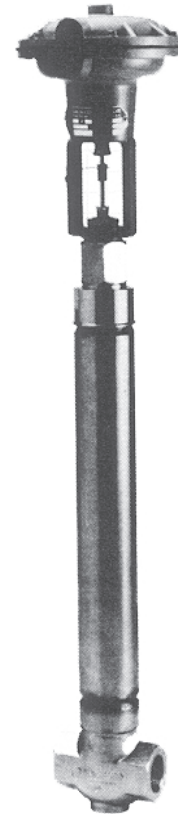
Diaphragm

| | |
|----------|----------------|
| Standard | Buna on Nylon |
| Optional | Viton on Nomex |

ACTUATOR CHOICES

| | |
|---------------|---|
| Standard | Air-to-open, Fail Close Air-to-close, Fail Open |
| Signal Ranges | 3-15#, 6-30#, (3-9# or 9-15# with positioner) |
| Accessories | top or side mounted positioner, gauges, regulator, solenoid, I/P converters, limit switches |

Note: The EVA-1 electric actuator can also be used for low pressure applications if air is not available.



STANDARD FEATURES

- Replaceable innervalue
- 316 stainless steel construction
- Wide range of innervalves and characteristics
- Guided innervalue
- Class IV seat leakage

OPTIONAL FEATURES

- Casing flange
- Weldable mounting sleeve
- Stellite innervalue material
- Soft seated innervalves
- Bellows bonnet
- Wide variety of end fittings: standard NPT or socket weld, butt weld nipples or flanges.



Description of Items

- 1: Body
- 2: Bonnet
- 3: (A&B) Innerset
- 4: Stem (lower)*
- 5: Holder (innerset)
- 6: Gasket (body-bonnet)
- 7: Adapter (packing)
- 8: Packing (TFE chevron ring)
- 9: Follower (packing)
- 10: Gland (packing)
- 11: Stem (upper)*
- 12: Locknut

*Should be purchased together

Dimensions

| | 1/2" Unit | 1" Unit |
|-------|-----------|---------|
| A | 2.75" | 4.0" |
| B | 1" | 1.5" |
| C (1) | 14" | 14" |
| D (2) | 2.25" | 2.5" |
| E | 1.688" | 1.688" |
| F | 0.875" | 0.875" |
| G | 1.44" | 2.25" |
| Ps | 1/2" NPT | 1" NPT |

(1) Ref dimension to top of casing flange
(2) Based on standard bonnet.

**1/2" Size Valve
Pressure vs. Temperature Rating**

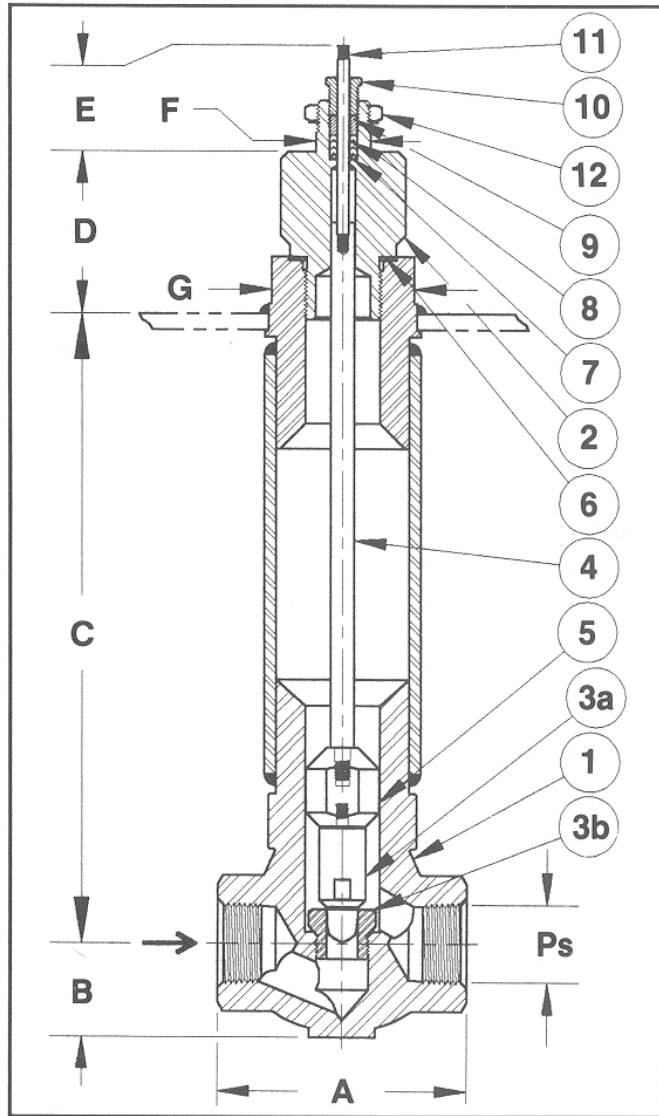
| Temp °F | Pressure in PSI | Temp °C | Pressure in Bar |
|---------|-----------------|---------|-----------------|
| 100 | 2300 | 38 | 158.5 |
| 200 | 2200 | 93 | 151.6 |
| 300 | 2000 | 149 | 137.8 |
| 400 | 1670 | 204 | 115.0 |
| 500 | 1550 | 260 | 106.8 |
| 600 | 1400 | 196 | 96.4 |
| 700 | 1300 | 371 | 89.6 |
| 800 | 1275 | 427 | 87.8 |
| 850 | 1250 | 454 | 86.1 |

Note: Unit is rated at maximum pressure at cryogenic temperatures from -450 to +100F.

**1" Size Valve
Pressure vs. Temperature Rating**

| Temp °F | Pressure in PSI | Temp °C | Pressure in Bar |
|---------|-----------------|---------|-----------------|
| 100 | 1500 | 38 | 103.3 |
| 200 | 1500 | 93 | 103.3 |
| 300 | 1400 | 149 | 96.4 |
| 400 | 250 | 204 | 17.2 |
| 500 | 250 | 260 | 17.2 |
| 600 | 250 | 196 | 17.2 |
| 700 | 250 | 371 | 17.2 |

Note: Unit is rated at maximum pressure at cryogenic temperatures from -450 to +100F.



Innerset Chart

| Valve Size | Trim Size | Cv Coef. | Rangeability Linear | Rangeability =% | Orifice Port Dia. | Port Area In2 |
|------------|-----------|----------|---------------------|-----------------|-------------------|---------------|
| 1 | 6.0 | 6.0 | 50:1 | 60:1 | 0.625" | 0.307 |
| 1 | 5.0 | 5.0 | 50:1 | 60:1 | 0.625" | 0.307 |
| 1 | 4.5 | 4.5 | 50:1 | 60:1 | 0.500" | 0.197 |
| 1 | 4.0 | 4.0 | 50:1 | 60:1 | 0.4375" | 0.1504 |
| 1 | 3.5 | 3.5 | 50:1 | 60:1 | 0.4375" | 0.1504 |
| 1/2 & 1 | A | 2.5 | 40:1 | 50:1 | 0.375" | 0.1105 |
| 1/2 & 1 | B | 2.0 | 40:1 | 50:1 | 0.375" | 0.1105 |
| 1/2 & 1 | C | 1.25 | 40:1 | 50:1 | 0.281" | 0.0621 |
| 1/2 & 1 | D | 0.8 | 40:1 | 50:1 | 0.250" | 0.0491 |
| 1/2 & 1 | E | 0.5 | 40:1 | 50:1 | 0.250" | 0.0491 |
| 1/2 & 1 | F | 0.32 | 30:1 | 40:1 | 0.156" | 0.0191 |
| 1/2 & 1 | G | 0.2 | 30:1 | 40:1 | 0.156" | 0.0191 |
| 1/2 & 1 | H | 0.13 | 30:1 | 40:1 | 0.156" | 0.0191 |
| 1/2 & 1 | I | 0.08 | 30:1 | 40:1 | 0.156" | 0.0191 |
| 1/2 & 1 | J | 0.05 | 30:1 | 40:1 | 0.156" | 0.0191 |
| 1/2 & 1 | K | 0.03 | 25:1 | N/A | 0.086" | 0.0058 |
| 1/2 & 1 | L | 0.02 | 25:1 | N/A | 0.086" | 0.0058 |
| 1/2 & 1 | M | 0.01 | 25:1 | N/A | 0.086" | 0.0058 |
| 1/2 & 1 | N | 0.006 | 25:1 | N/A | 0.086" | 0.0058 |
| 1/2 & 1 | O | 0.003 | 25:1 | N/A | 0.086" | 0.0058 |

Note: Trim sizes "K" and smaller are optional reduced trims.



Please see our website at www.badgermeter.com for specific regions and contacts.



BadgerMeter, Inc.

P.O. Box 581390, Tulsa, Oklahoma 74158
(918) 836-8411 / Fax: (918) 832-9962

www.badgermeter.com