

# Masoneilan™ 28000 Series Varipak™ Control Valves

Precise Microflow  
Valves with Compact  
Design and Flexible  
Capabilities.



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## Numbering system

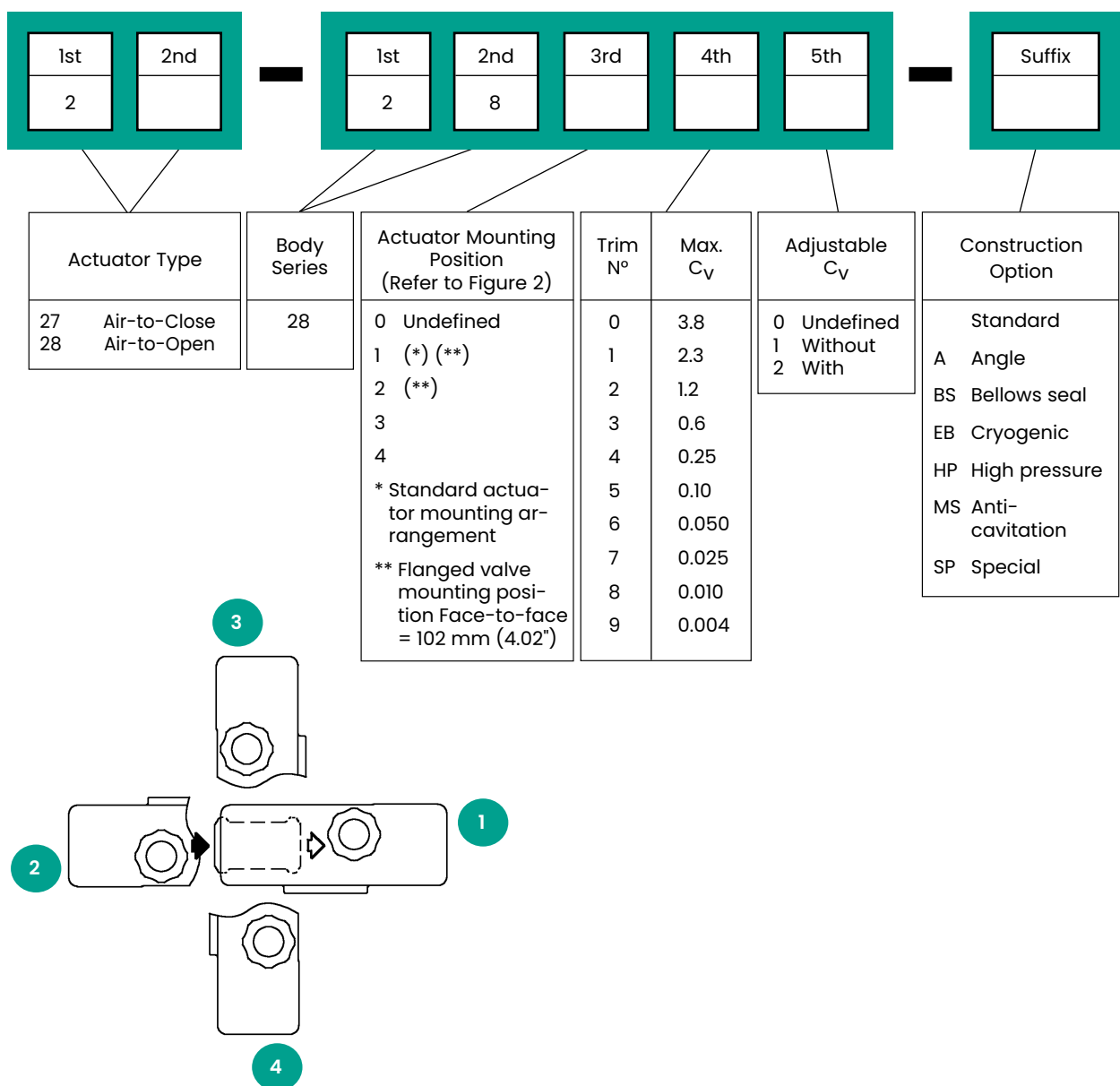


Figure 1: Actuator Mounting Positions

# Microflow Control Innovation

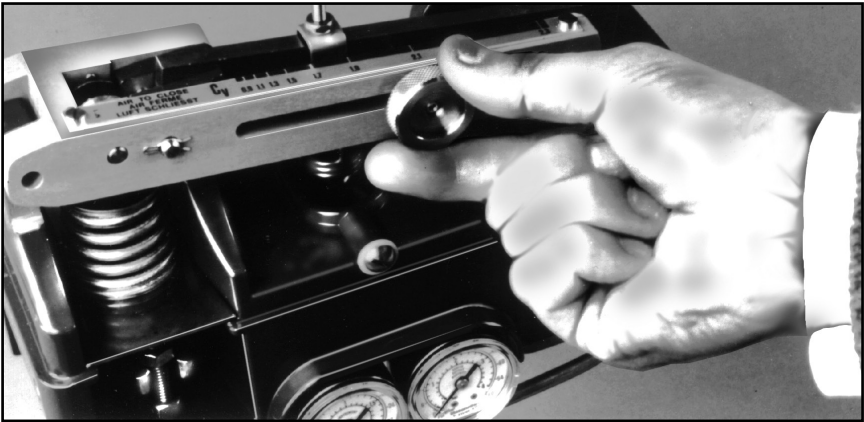
## Optimized C<sub>v</sub> Characteristics

The Varipak valve outshines conventional microflow valves with its support of a wide range of nominal C<sub>v</sub> values (from 0.0016 to 3.8), using only eight plugs and five seats.

## Precise C<sub>v</sub> Calibration and Selection – C<sub>v</sub> and F<sub>L</sub>

| Valve Sizes |             |                | Trim No. | Flow Coefficient C <sub>v</sub>         |        |        |                        |        |        |        |        |                                            | Critical Flow Factor F <sub>L</sub> |
|-------------|-------------|----------------|----------|-----------------------------------------|--------|--------|------------------------|--------|--------|--------|--------|--------------------------------------------|-------------------------------------|
|             |             |                |          | With Adjustable C <sub>v</sub> Function |        |        |                        |        |        |        |        | Without Adjustable C <sub>v</sub> Function |                                     |
| .5" (15mm)  | .75" (20mm) | 1" (25mm)      |          | Min.                                    |        |        | Risk-Free <sup>3</sup> |        |        | Max.   |        |                                            |                                     |
| •           | •           | •              | 9        | 0.0016                                  | 0.0020 | 0.0024 | 0.0028                 | 0.0032 | 0.0036 | 0.0040 | 0.0040 | 0.85                                       |                                     |
| •           | •           | •              | 8        | 0.004                                   | 0.005  | 0.006  | 0.007                  | 0.008  | 0.009  | 0.010  | 0.010  | 0.85                                       |                                     |
| •           | •           | •              | 7        | 0.010                                   | 0.013  | 0.016  | 0.019                  | 0.021  | 0.023  | 0.025  | 0.025  | 0.85                                       |                                     |
| •           | •           | •              | 6        | 0.020                                   | 0.025  | 0.030  | 0.035                  | 0.040  | 0.045  | 0.050  | 0.050  | 0.85                                       |                                     |
| •           | •           | •              | 5        | 0.04                                    | 0.05   | 0.06   | 0.07                   | 0.08   | 0.09   | 0.10   | 0.10   | 0.85                                       |                                     |
| •           | •           | •              | 4        | 0.10                                    | 0.13   | 0.16   | 0.19                   | 0.21   | 0.23   | 0.25   | 0.25   | 0.90                                       |                                     |
| •           | •           | •              | 3        | 0.25                                    | 0.30   | 0.35   | 0.40                   | 0.45   | 0.50   | 0.55   | 0.60   | 0.90                                       |                                     |
| •           | •           | •              | 2        | 0.5                                     | 0.6    | 0.7    | 0.8                    | 0.9    | 1.0    | 1.1    | 1.2    | 0.92                                       |                                     |
| •           | •           | •              | 1        | 0.9                                     | 1.1    | 1.3    | 1.5                    | 1.7    | 1.9    | 2.1    | 2.3    | 0.92                                       |                                     |
|             |             | • <sup>1</sup> | 0        | 1.5                                     | 1.9    | 2.3    | 2.6                    | 2.9    | 3.2    | 3.5    | 3.8    | 0.92                                       |                                     |

- 1. Flangeless, flanged or threaded connections.
- 2. Flangeless or threaded connections.
- 3. The "Risk-free" setting allows for easy valve capacity adjustments in the field to meet changing service conditions.



# General data

## Body

|            |                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------|
| Type:      | globe style<br>angle style optional                                                                                   |
| Sizes:     | 1" (DN 25) standard<br>1/2" (DN 15) and 3/4" (DN 20) optional                                                         |
| Materials: | Standard: type 316L St. St.<br>Optional: Monel, Hastelloy C,<br>Alloy 20, others                                      |
| Options:   | Flanged valve<br>Anti-cavitation Varilog<br>High pressure<br>Bellows seal<br>Cryogenic<br>Angle valve<br>NACE version |

## Trim

|                       |                                                                          |
|-----------------------|--------------------------------------------------------------------------|
| Plug type:            | contoured, heavy top guided<br>multi-staged anti-cavitation<br>(Varilog) |
| optional              |                                                                          |
| Seat type:            | metal seat                                                               |
| C <sub>v</sub> ratio: | 500/1 at max. C <sub>v</sub><br>200/1 at min. C <sub>v</sub>             |
| Flow characteristics: | linear (trim No. 0 to 5)<br>modified linear (trim No. 6 to 9)            |
| Flow Direction:       | flow-to-open<br>flow-to-close optional                                   |

## Actuator

|                            |                                                                 |
|----------------------------|-----------------------------------------------------------------|
| Type:                      | spring-opposed rolling diaphragm                                |
| Action:                    | direct or reverse, easily performed<br>without additional parts |
| C <sub>v</sub> adjustment: | optional adjustable knob/lever                                  |
| Handwheel:                 | optional top mounted                                            |
| Air connection:            | 1/8" NPT                                                        |

## Temperature Range/Seat Leakage

| Valve Type                      | Construction   | Temperature Range                                           |
|---------------------------------|----------------|-------------------------------------------------------------|
| Standard                        | SS 316L/SS 316 | -46°C [-50°F] to 343°C [650°F]                              |
|                                 | SS 316 + NACE  | -29°C [-20°F] to 232°C [450°F]                              |
|                                 | HASTELLOY C    | -46°C [-50°F] to 260°C [500°F]                              |
| Cryogenic extended              | SS 316L/SS 316 | -196°C [-321°F] to 343°C [650°F]                            |
| High Pressure                   | SS 316L/SS 316 | -46°C [-50°F] to 343°C [650°F]                              |
|                                 | SS 316 + NACE  | -29°C [-20°F] to 232°C [450°F]                              |
| Varilog Anti-Cavitation         | AISI 316 L     | -29°C [-20°F] to 343°C [650°F]                              |
|                                 | SS 316 + NACE  | -29°C [-20°F] to 232°C [450°F]                              |
| Bellow Seal                     | AISI 316 L     | -29°C [-20°F] to 200°C [392°F] with Pmax = 40 bar [800 psi] |
|                                 |                | -29°C [-20°F] to 100°C [212°F] with Pmax = 54 bar [580 psi] |
| Gaseous H2 (Standard)           | SS 316L/SS 316 | -46°C [-50°F] to 343°C [650°F]                              |
| Gaseous H2 (Cryogenic extended) | SS 316L/SS 316 | -100°C [-148°F] to 343°C [650°F]                            |
| Offshore construction           | SS 316L/SS 316 | -46°C [-50°F] to 343°C [650°F]                              |

### Notes:

For all valve types mentioned in the table, flow direction is Flow-to-Open.

For all valve types mentioned in the table, Class IV seat leakage is standard and Class V is optional. Seat leakage class ratings per IEC 534-4 and ANSI/FCI 70-2.

Please consult Baker Hughes for applications outside the temperature ranges mentioned in the table.

## Rating/End Connections

| Type                               | Size<br>DN (inches) | Rating      | Flanged                     |                               | Flangeless                  |                                 | Threaded | Cv Range  |
|------------------------------------|---------------------|-------------|-----------------------------|-------------------------------|-----------------------------|---------------------------------|----------|-----------|
|                                    |                     |             | Face-to-Face<br>4" (102 mm) | Face-to-Face<br>6.3" (160 mm) | Face-to-Face<br>4" (102 mm) | Face-to-Face<br>1.75" (44.5 mm) |          |           |
| Standard                           | 15 (1/2)            | CL 150-600  | X                           | X                             | X                           |                                 | X        | 0.004-2.3 |
|                                    | 20 (3/4)            | CL 900-1500 |                             | X                             | X                           |                                 | X        |           |
|                                    | 25 (1)              | CL 150-600  | X                           | X                             | X                           |                                 | X        | 0.004-3.8 |
|                                    |                     | CL 900-1500 |                             | X                             | X                           |                                 | X        |           |
| Varilog                            | 15 (1/2)            | CL 150-600  | X                           | X                             | X                           |                                 | X        | 0.004-0.6 |
|                                    | 20 (3/4)            |             |                             |                               |                             |                                 |          |           |
|                                    | 25 (1)              | CL 900-1500 |                             | X                             | X                           |                                 | X        |           |
| High Pressure                      | 25 (1)              | CL 2500     |                             |                               | X                           |                                 | X        |           |
| Standard Hastelloy<br>construction | 15 (1/2)            | CL 150-600  |                             |                               |                             | X                               |          | 0.1-0.25  |
|                                    |                     | CL 900-1500 |                             |                               |                             | X                               |          |           |
|                                    | 25 (1)              | CL 150-600  |                             |                               |                             | X                               |          | 0.1-2.3   |
|                                    |                     | CL 900-1500 |                             |                               |                             | X                               |          |           |
| Bellow Seal                        | 15 (1/2)            | CL 150-600  | X                           | X                             | X                           |                                 | X        | 0.004-2.3 |
|                                    | 20 (3/4)            |             |                             |                               |                             |                                 |          |           |
|                                    | 25 (1)              |             |                             |                               |                             |                                 |          |           |

### Notes:

The table gives the developed versions in standard materials.

Varipak valve bodies are developed for the flangeless ends, the screwed ends and the flange ends.

DN 15 (1/2") and DN 20 (3/4") flangeless and flanged body ends are developed with raised faces (RF) and ring type joint (RTJ), available as optional.

DN 25 (1") flangeless ends are developed for the majority of the gasket faces existing in the ASME, EN, DIN, AFNOR and EN standards.

DN 25 (1") flanged ends are developed with raised faces (RF) and ring type joint (RTJ), available as optional.

The surface roughness of the raised faces (RF) is Ra 3.2 to 6.3 µm (AARH=125-250 µinch) in standard.

Not Available

# Materials of construction

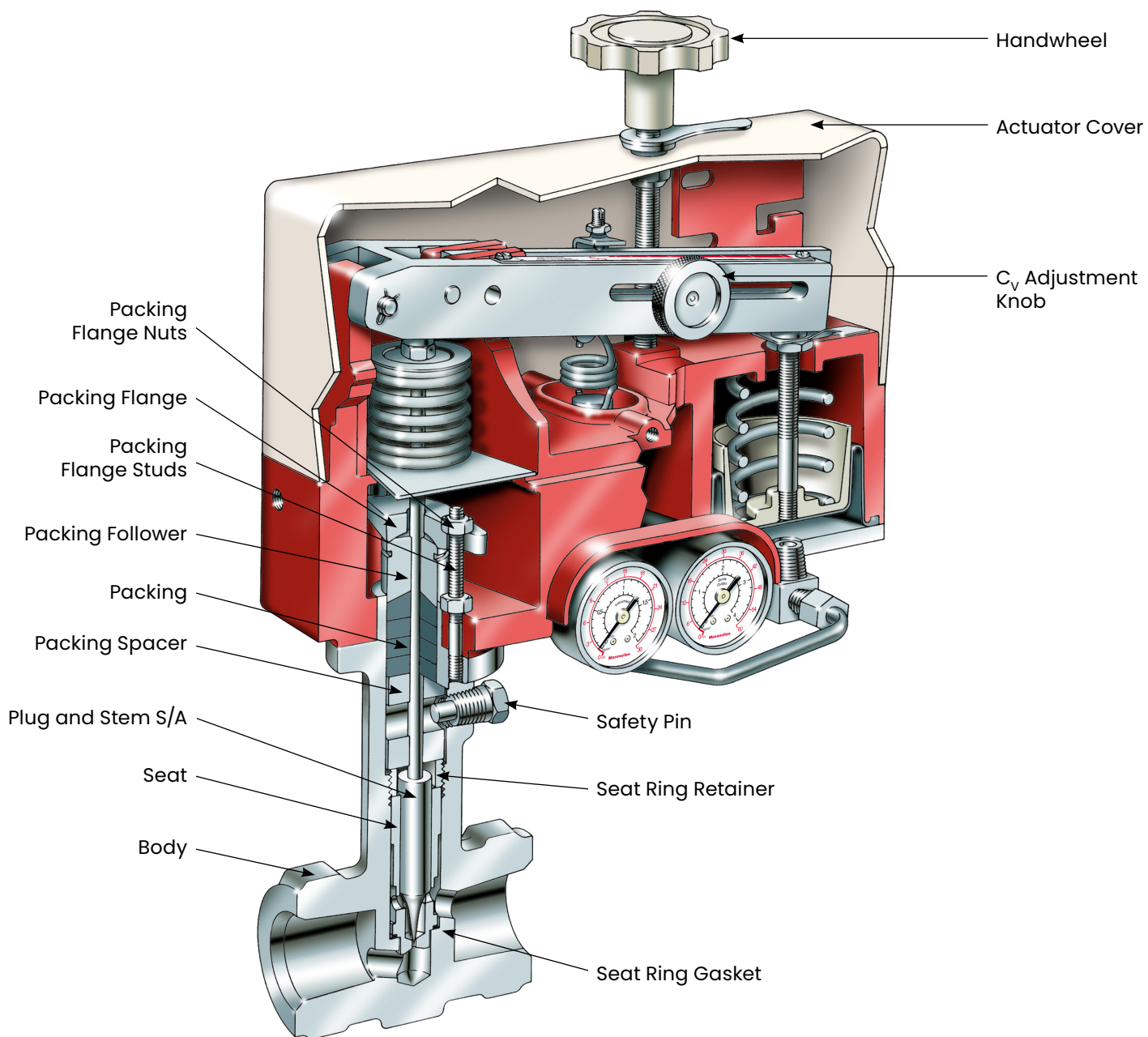


Figure 3: Sectional View

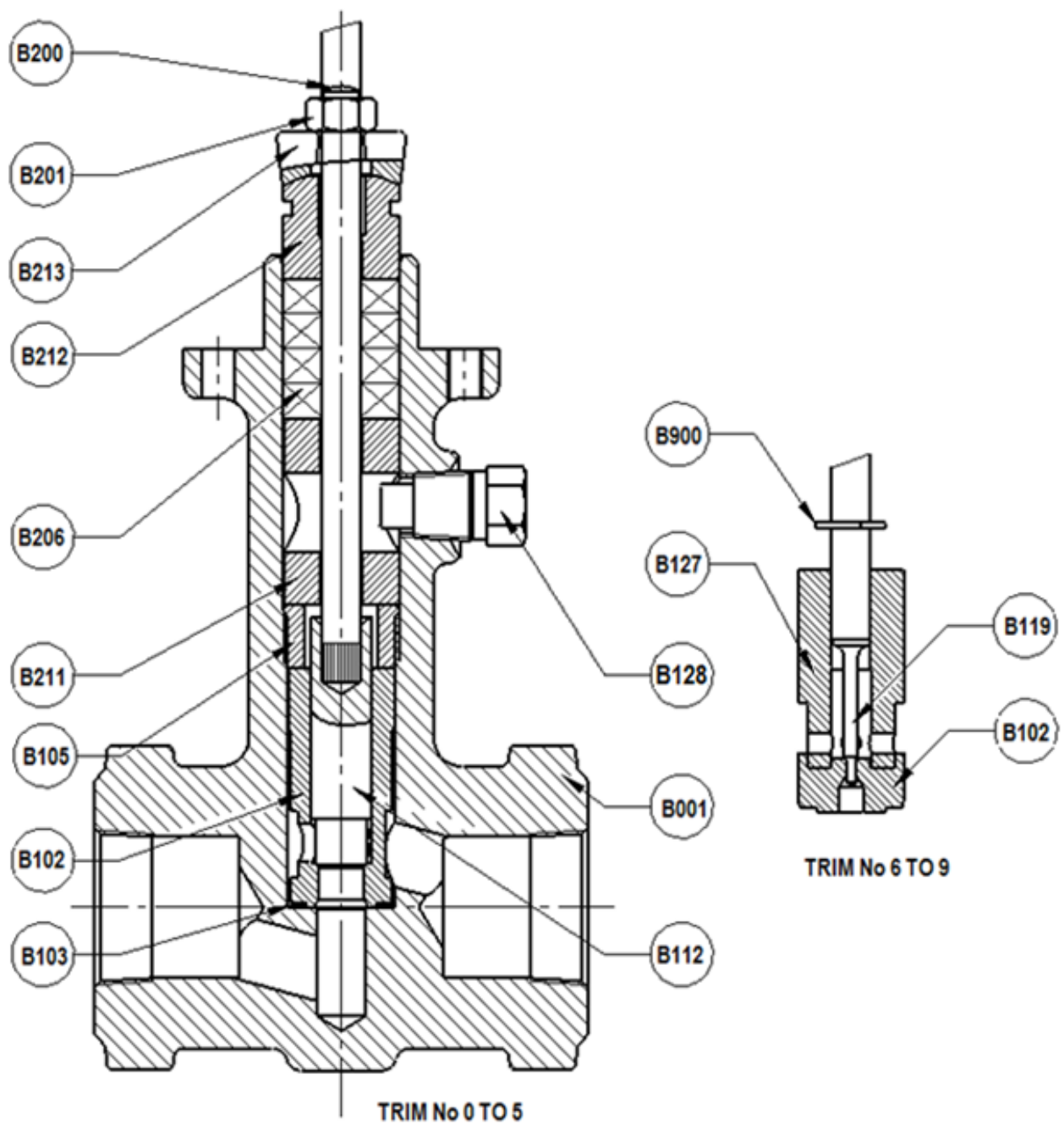


Figure 4: Standard Varipak Assembly Construction

# Materials of Construction

## Standard Valve with Stainless Steel Body<sup>(3)</sup>

| Ref. No.      | Temperature Range                                    |                             |                                              | -321°F<br>-196°C                                                                       | -50°F<br>-46°C                                                                         | +650°F<br>+343°C |
|---------------|------------------------------------------------------|-----------------------------|----------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------|
|               | Description                                          |                             |                                              | Material                                                                               |                                                                                        |                  |
| B001          | BODY (STANDARD) <sup>(4)</sup>                       |                             | ≤ CL 1500                                    |                                                                                        | ASTM A182 TY F316/F316L/1.4401/1.4404 EN 10222-5 HRC 22 MAXIMUM <sup>(2)</sup>         |                  |
|               |                                                      |                             |                                              |                                                                                        | ASTM A351 GR CF3M/EN 10213 1.4408 C≤0.03/1.4409 CMS 1040 HRC 22 MAXIMUM <sup>(1)</sup> |                  |
|               | BODY (STANDARD)                                      |                             | CL 2500                                      |                                                                                        | ASTM A182 TY F316/F316L/1.4401/1.4404 EN 10222-5 HRC 22 MAXIMUM <sup>(2)</sup>         |                  |
|               |                                                      |                             |                                              |                                                                                        | ASTM A479 TY 316/316L/1.4401/1.4404 EN 10272 <sup>(5)</sup>                            |                  |
|               | BODY (CRYOGENIC EXTENDED) <sup>(4)</sup>             |                             | ≤ CL 600                                     | ASTM A351 GR CF3M/EN 10213 1.4408 C≤0.03/1.4409 CMS 1040 HRC 22 MAXIMUM <sup>(1)</sup> |                                                                                        |                  |
| B102          | SEAT RING                                            |                             | C <sub>v</sub> MAXI ≥ 0.10<br>TRIM No 0 to 5 | STELLITE NO.6 OR EQUIVALENT                                                            | STAINLESS STEEL TYPE 630 H900                                                          |                  |
|               |                                                      |                             | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | STELLITE NO.6 OR EQUIVALENT                                                            |                                                                                        |                  |
| B103          | SEAT RING GASKET                                     |                             | C <sub>v</sub> MAXI ≤ 2.3<br>TRIM No 1 to 9  | GRAFOIL GHE SHEETS BONDED TO 316 STAINLESS STEEL                                       |                                                                                        |                  |
| B105          | SEAT RING RETAINER                                   |                             |                                              | SOLUTION ANNEALED<br>316L HRC 22 MAXIMUM<br>STAINLESS STEEL                            | 17-4 PH STAINLESS STEEL H1075                                                          |                  |
| B112          | VALVE<br>PLUG AND<br>STEM S/A                        | PLUG                        | C <sub>v</sub> MAXI ≥ 0.10<br>TRIM No 0 to 5 | STELLITE NO.6 OR EQUIVALENT                                                            |                                                                                        |                  |
|               |                                                      | STEM                        |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                                                                                        |                  |
| B119          |                                                      | CAST SOLID<br>PLUG AND STEM | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | STELLITE NO.12                                                                         |                                                                                        |                  |
| B121          | PLUG EXTENSION STEM<br>(FOR CRYOGENIC EXTENDED BODY) |                             |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                                                                                        |                  |
| B127          | SPACER, BODY                                         |                             | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | STELLITE NO.6 OR EQUIVALENT                                                            |                                                                                        |                  |
| B128          | SAFETY PIN                                           |                             | NOT APPLICABLE<br>FOR CL 2500                | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                                                                                        |                  |
| B200          | STUD, PACKING FLANGE                                 |                             | ≤ CL 900                                     | ASTM A193 GR B8 CLASS 1 HRC 22 MAXIMUM                                                 |                                                                                        |                  |
|               |                                                      |                             | CL 1500                                      | ASTM A193 GRADE B8 CLASS 2                                                             |                                                                                        |                  |
|               |                                                      |                             | CL 2500                                      |                                                                                        | ASTM B637 GR 718 AGE HARDENED + EPM 181 – CMS-2510                                     |                  |
| B201          | NUT, PACKING FLANGE                                  |                             |                                              | ASTM A194 GR 8                                                                         |                                                                                        |                  |
| B206          | PACKING SET                                          |                             | CL 2500                                      | PTFE BRAIDED LATTYFLON 3260 LM (NO EQUIVALENTS ALLOWED)                                |                                                                                        |                  |
|               |                                                      |                             | ≤ CL 1500                                    | CARBON CORE BRAIDED PTFE PACKING                                                       |                                                                                        |                  |
| B208          | ANTI-EXTRUSION RING                                  |                             | CL 2500                                      | EXFOLIATED GRAPHITE JAMES WALKER SUPAGRAF CONTROL,(NO EQUIVALENTS ALLOWED)             |                                                                                        |                  |
| B211          | LANTERN RING                                         |                             |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                                                                                        |                  |
| B212          | PACKING FOLLOWER                                     |                             |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                                                                                        |                  |
| B213          | PACKING FLANGE                                       |                             |                                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                  |                                                                                        |                  |
| B900          | CIRCLIP (EXTERNAL)<br>(FOR STANDARD BODY)            |                             | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 |                                                                                        | ASTM A564 GRADE 632 RH950                                                              |                  |
| B903<br>B903a | PIN (FOR CRYOGENIC EXTENDED BODY)                    |                             |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                                                                                        |                  |

1. Not available for threaded connections (threaded connections only for forged material).

2. Recommended for flangeless end connection.

3. Same for offshore construction.

4. In case of replacement of a standard body used for an application below -46°C, check with the customer if one of the following issues was met: freezing on the packing area, packing leakage, plug sticking. If not, standard body can be used for exact replacement. Otherwise, offer to supply the cryogenic extended body instead.

5. For printed flanged bodies only (specific to class 2500).

Not Available

# Materials of Construction

## Standard Valve with NACE Construction (MR 1075)

| Ref. No. | Temperature Range             |      |                                              | -20°F<br>-29°C                                                                         | +450°F<br>+232°C |
|----------|-------------------------------|------|----------------------------------------------|----------------------------------------------------------------------------------------|------------------|
|          | Description                   |      |                                              |                                                                                        |                  |
| B001     | BODY                          |      | ≤ CL 1500                                    | ASTM A182 TY F316/F316L/1.4401/1.4404 EN 10222-5 HRC 22 MAXIMUM <sup>(2)</sup>         |                  |
|          |                               |      |                                              | ASTM A351 GR CF3M/EN 10213 1.4408 C≤0.03/1.4409 CMS 1040 HRC 22 MAXIMUM <sup>(1)</sup> |                  |
| B102     | SEAT RING                     |      | C <sub>v</sub> MAXI ≥ 0.10<br>TRIM No 0 to 5 | BASE Ni UNS N05500 AGE HARDENED                                                        |                  |
|          |                               |      | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | STELLITE NO.6 OR EQUIVALENT                                                            |                  |
| B103     | SEAT RING GASKET              |      | C <sub>v</sub> MAXI ≤ 2.3<br>TRIM No 1 to 9  | GRAFOIL GHE SHEETS BONDED TO 316 STAINLESS STEEL                                       |                  |
| B105     | SEAT RING RETAINER            |      |                                              | BASE Ni UNS N05500 AGE HARDENED                                                        |                  |
| B112     | VALVE<br>PLUG AND<br>STEM S/A | PLUG | C <sub>v</sub> MAXI ≥ 0.10<br>TRIM No 0 to 5 | STELLITE NO.6 OR EQUIVALENT                                                            |                  |
|          |                               | STEM |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                  |
| B119     |                               |      | CAST SOLID<br>PLUG AND STEM                  | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9                                           | STELLITE NO.12   |
| B127     | SPACER, BODY                  |      | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | STELLITE NO.6 OR EQUIVALENT                                                            |                  |
| B128     | SAFETY PIN                    |      | NOT APPLICABLE<br>FOR CL 2500                | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                  |
| B200     | STUD, PACKING FLANGE          |      | ≤ CL 900                                     | ASTM A193 GR B8 CLASS 1 HRC 22 MAX                                                     |                  |
|          |                               |      | CL 1500                                      | ASTM A193 GR B8RA CLASS 1 HRC 28 MAX                                                   |                  |
| B201     | NUT, PACKING FLANGE           |      |                                              | ASTM A194 GR 8 (non exposed)                                                           |                  |
|          |                               |      |                                              | ASTM A194 GRADE 8A (exposed)                                                           |                  |
| B206     | PACKING SET                   |      | ≤ CL 1500                                    | CARBON CORE BRAIDED PTFE PACKING                                                       |                  |
| B211     | LANTERN RING                  |      |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                  |
| B212     | PACKING FOLLOWER              |      |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                  |
| B213     | PACKING FLANGE                |      |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                  |
| B900     | CIRCLIP (EXTERNAL)            |      | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | ASTM A564 GRADE 632 RH950 + HEAT TREATMENT                                             |                  |

1. Not available for threaded connections (threaded connections only for forged material).  
2. Recommended for flangeless end connection.

# Materials of Construction

## Standard Valve with Hastelloy Construction

| Ref. No. | Temperature Range                 |                                              | -50°F<br>-46°C                                                        | +500°F<br>+260°C |
|----------|-----------------------------------|----------------------------------------------|-----------------------------------------------------------------------|------------------|
|          | Description                       |                                              | Material                                                              |                  |
| B001     | BODY                              | ≤ CL 1500                                    | ASTM B574 HRc 35 MAX (UNS N06022) SOLUTION ANNEALED                   |                  |
| B002     | SEAT RING                         | C <sub>v</sub> 0.10 to 2.3<br>TRIM No 1 to 5 | HAYNES ALLOY 25 HRc 35 MAXIMUM SOLUTION ANNEALED CMS-5060             |                  |
| B103     | SEAT RING GASKET                  |                                              | FLUOROCARBON NO. 901221 - TEFLON TFE WITH 15% GLASS FIBER AND 5% MoS2 |                  |
| B105     | SEAT RING RETAINER                |                                              | HASTELLOY C-22 HRc 35 MAXIMUM                                         |                  |
| B119     | SOLID PLUG AND<br>STEM (ONE PART) | C <sub>v</sub> 0.10 to 2.3<br>TRIM No 1 to 5 | HASTELLOY C-22 HRc 35 MAXIMUM                                         |                  |
| B128     | SAFETY PIN                        |                                              | ASTM B574 HRc 35 MAX (UNS N06022) SOLUTION ANNEALED                   |                  |
| B200     | STUD, PACKING FLANGE              | ALL RATING<br>EXCEPT CL 1500                 | ASTM A193 GR B8 CLASS 1 HRc 22 MAX                                    |                  |
|          |                                   | CL 1500                                      | ASTM A193 GRADE B8 CLASS 2                                            |                  |
| B201     | NUT, PACKING FLANGE               |                                              | ASTM A194 GR 8                                                        |                  |
| B206     | PACKING SET                       |                                              | CARBON CORE BRAIDED PTFE PACKING                                      |                  |
| B211     | LANTERN RING                      |                                              | HAYNES ALLOY 25 HRc 35 MAXIMUM SOLUTION ANNEALED CMS-5060             |                  |
| B212     | PACKING FOLLOWER                  |                                              | HASTELLOY C-22 HRc 35 MAXIMUM                                         |                  |
| B213     | PACKING FLANGE                    |                                              | SOLUTION ANNEALED 316L HRc 22 MAXIMUM STAINLESS STEEL                 |                  |

# Materials of Construction

## Austenitic Stainless-Steel Construction for Gaseous Hydrogen

| Ref. No.      | Temperature Range                                    |                                              | -148°F<br>-100°C                                                                       | -50°F<br>-46°C                                                                              | +650°F<br>+343°C |
|---------------|------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------|
|               | Description                                          |                                              | Material                                                                               |                                                                                             |                  |
| B001          | BODY (STANDARD)                                      | ≤ CL 1500                                    |                                                                                        | ASTM A182 TY F316/F316L/1.4401/<br>1.4404 EN 10222-5 Hrc 22 MAXIMUM CMS-1041 <sup>(2)</sup> |                  |
|               |                                                      |                                              |                                                                                        | ASTM A351 GR CF3M/EN 10213 1.4408 C≤0.03/<br>1.4409 CMS 1040 Hrc 22 MAXIMUM <sup>(1)</sup>  |                  |
|               | BODY (CRYOGENIC EXTENDED) <sup>(3)</sup>             | ≤ CL 600                                     | ASTM A351 GR CF3M/EN 10213 1.4408 C≤0.03/1.4409 CMS 1040 HRC 22 MAXIMUM <sup>(1)</sup> |                                                                                             |                  |
| B102          | SEAT RING                                            | TRIM No 0 to 9                               | STELLITE NO.6 OR EQUIVALENT                                                            |                                                                                             |                  |
| B103          | SEAT RING GASKET                                     | C <sub>v</sub> MAXI ≤ 2.3<br>TRIM No 1 to 9  | GRAFOIL GHE SHEETS BONDED TO 316 STAINLESS STEEL                                       |                                                                                             |                  |
| B105          | SEAT RING RETAINER                                   |                                              | SUPER AUSTENITIC TYPE UNS 21800 STAINLESS STEEL                                        |                                                                                             |                  |
| B112          | VALVE<br>PLUG AND<br>STEM S/A                        | PLUG                                         | C <sub>v</sub> MAXI ≥ 0.10<br>TRIM No 0 to 5                                           | STELLITE NO.6 OR EQUIVALENT                                                                 |                  |
|               |                                                      | STEM                                         |                                                                                        | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                        |                  |
| B119          |                                                      | CAST SOLID<br>PLUG AND STEM                  | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9                                           | STELLITE NO.12                                                                              |                  |
| B121          | PLUG EXTENSION STEM<br>(FOR CRYOGENIC EXTENDED BODY) |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL Hrc 22 MAXIMUM                                   |                                                                                             |                  |
| B127          | SPACER, BODY                                         | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | STELLITE NO.6 OR EQUIVALENT                                                            |                                                                                             |                  |
| B128          | SAFETY PIN                                           |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                                                                                             |                  |
| B200          | STUD, PACKING FLANGE                                 | ≤ CL 900                                     | ASTM A193 GRADE B8 CLASS 1 Hrc 22 MAXIMUM PER CMS-2510                                 |                                                                                             |                  |
|               |                                                      | CL 1500                                      | ASTM A193 GRADE B8RA CLASS 1C Hrc 28 MAXIMUM PER CMS-2510                              |                                                                                             |                  |
| B201          | NUT, PACKING FLANGE                                  |                                              | ASTM A194 GRADE 8 PER CMS-2510                                                         |                                                                                             |                  |
| B206          | PACKING SET                                          | ≤ CL 1500                                    | CARBON CORE BRAIDED PTFE PACKING                                                       |                                                                                             |                  |
| B211          | LANTERN RING                                         |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                                                                                             |                  |
| B212          | PACKING FOLLOWER                                     |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                                                                                             |                  |
| B213          | PACKING FLANGE                                       |                                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                  |                                                                                             |                  |
| B900          | CIRCLIP (EXTERNAL)<br>(FOR STANDARD BODY)            | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 |                                                                                        | PH 15-7 MO (UNS S15700) PRECIPITATION-HARDENABLE<br>STAINLESS STEEL ALLOYS                  |                  |
| B903<br>B903a | PIN (FOR CRYOGENIC EXTENDED BODY)                    |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                   |                                                                                             |                  |

1. Not available for threaded connections (threaded connections only for forged material).

2. Recommended for flangeless end connection.

3. In case of replacement of a standard body used for an application below -46°C, check with the customer if one of the following issues was met: freezing on the packing area, packing leakage, plug sticking. If not, standard body can be used for exact replacement. Otherwise, offer to supply the cryogenic extended body instead.

Not Available

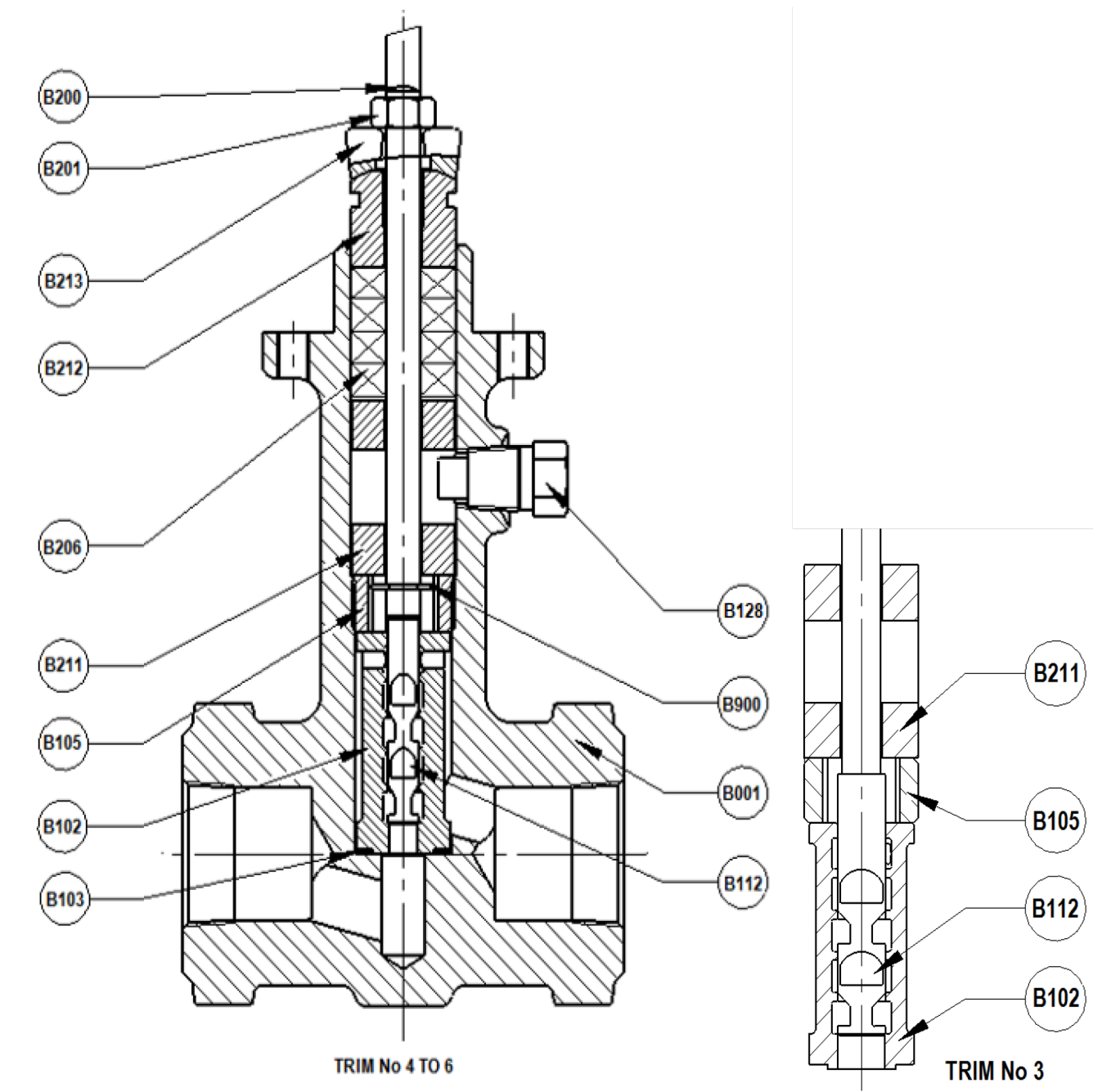


Figure 5: Varilog Assembly Construction

# Materials of Construction

## Varilog™ Valve with Stainless Steel Body

| Ref. No. | Temperature Range           |                                              | -20°F<br>-29°C                                                                          | +650°F<br>+343°C |
|----------|-----------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------|------------------|
|          | Description                 |                                              | Material                                                                                |                  |
| B001     | BODY                        |                                              | ASTM A182 TY F316/F316L/1.4401/1.4404 EN 10222-5 HRC 22 MAXIMUM CMS-1041 <sup>(2)</sup> |                  |
|          |                             |                                              | ASTM A351 GR CF3M/EN 10213 1.4408 C≤0.03/1.4409 CMS 1040 HRC 22 MAXIMUM <sup>(1)</sup>  |                  |
| B102     | SEAT RING                   |                                              | STAINLESS STEEL TYPE 630 H900                                                           |                  |
| B103     | SEAT RING GASKET            |                                              | GRAFOIL GHE SHEETS BONDED TO 316 STAINLESS STEEL                                        |                  |
| B105     | SEAT RING RETAINER          |                                              | 17-4 PH STAINLESS STEEL H1075                                                           |                  |
| B119     | VALVE PLUG (TRIM No 3 TO 6) |                                              | STELLITE NO.12                                                                          |                  |
| B128     | SAFETY PIN                  |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                    |                  |
| B200     | STUD, PACKING FLANGE        | ≤ CL 900                                     | ASTM A193 GR B8 CLASS 1 Hrc 22 MAX                                                      |                  |
|          |                             | CL 1500                                      | ASTM A193 GRADE B8 CLASS 2                                                              |                  |
| B201     | NUT, PACKING FLANGE         |                                              | ASTM A194 GR 8                                                                          |                  |
| B206     | PACKING SET                 |                                              | CARBON CORE BRAIDED PTFE PACKING                                                        |                  |
| B211     | LANTERN RING                |                                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                   |                  |
| B212     | PACKING FOLLOWER            |                                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                   |                  |
| B213     | PACKING FLANGE              |                                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                   |                  |
| B900     | CIRCLIP (EXTERNAL)          | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 6 to 9 | ASTM A564 GRADE 632 RH950                                                               |                  |

1. Not available for threaded connections (threaded connections only for forged material).
2. Recommended for flangeless end connection.

## Varilog Valve with NACE Construction (MR 1075)

| Ref. No. | Temperature Range           |                                              | -20°F<br>-29°C                                                                          | +450°F<br>+232°C |
|----------|-----------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------|------------------|
|          | Description                 |                                              | Material                                                                                |                  |
| B001     | BODY                        |                                              | ASTM A182 TY F316/F316L/1.4401/1.4404 EN 10222-5 HRC 22 MAXIMUM CMS-1041 <sup>(2)</sup> |                  |
|          |                             |                                              | ASTM A351 GR CF3M/EN 10213 1.4408 C≤0.03/1.4409 CMS 1040 HRC 22 MAXIMUM <sup>(1)</sup>  |                  |
| B102     | SEAT RING                   |                                              | BASE Ni UNS N05500 AGE HARDENED                                                         |                  |
| B103     | SEAT RING GASKET            |                                              | GRAFOIL GHE SHEETS BONDED TO 316 STAINLESS STEEL                                        |                  |
| B105     | SEAT RING RETAINER          |                                              | BASE Ni UNS N05500 AGE HARDENED                                                         |                  |
| B119     | VALVE PLUG (TRIM No 3 TO 6) |                                              | STELLITE NO.12                                                                          |                  |
| B128     | SAFETY PIN                  |                                              | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                    |                  |
| B206     | PACKING SET                 |                                              | CARBON CORE BRAIDED PTFE PACKING                                                        |                  |
| B200     | STUD, PACKING FLANGE        | ≤ CL 900                                     | ASTM A193 GR B8 CLASS 1 Hrc 22 MAXIMUM                                                  |                  |
|          |                             | CL 1500                                      | ASTM A193 GR B8RA CLASS 1 Hrc 28 MAXIMUM                                                |                  |
| B201     | NUT, PACKING FLANGE         |                                              | ASTM A194 GR 8 (non exposed)                                                            |                  |
|          |                             |                                              | ASTM A194 GRADE 8A (exposed)                                                            |                  |
| B211     | LANTERN RING                |                                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                   |                  |
| B212     | PACKING FOLLOWER            |                                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                   |                  |
| B213     | PACKING FLANGE              |                                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                   |                  |
| B900     | CIRCLIP (EXTERNAL)          | C <sub>v</sub> MAXI ≤ 0,05<br>TRIM No 4 TO 6 | PH 15-7 MO (UNS S15700) PRECIPITATION-HARDENABLE STAINLESS STEEL ALLOYS                 |                  |

1. Not available for threaded connections (threaded connections only for forged material).
2. Recommended for flangeless end connection.

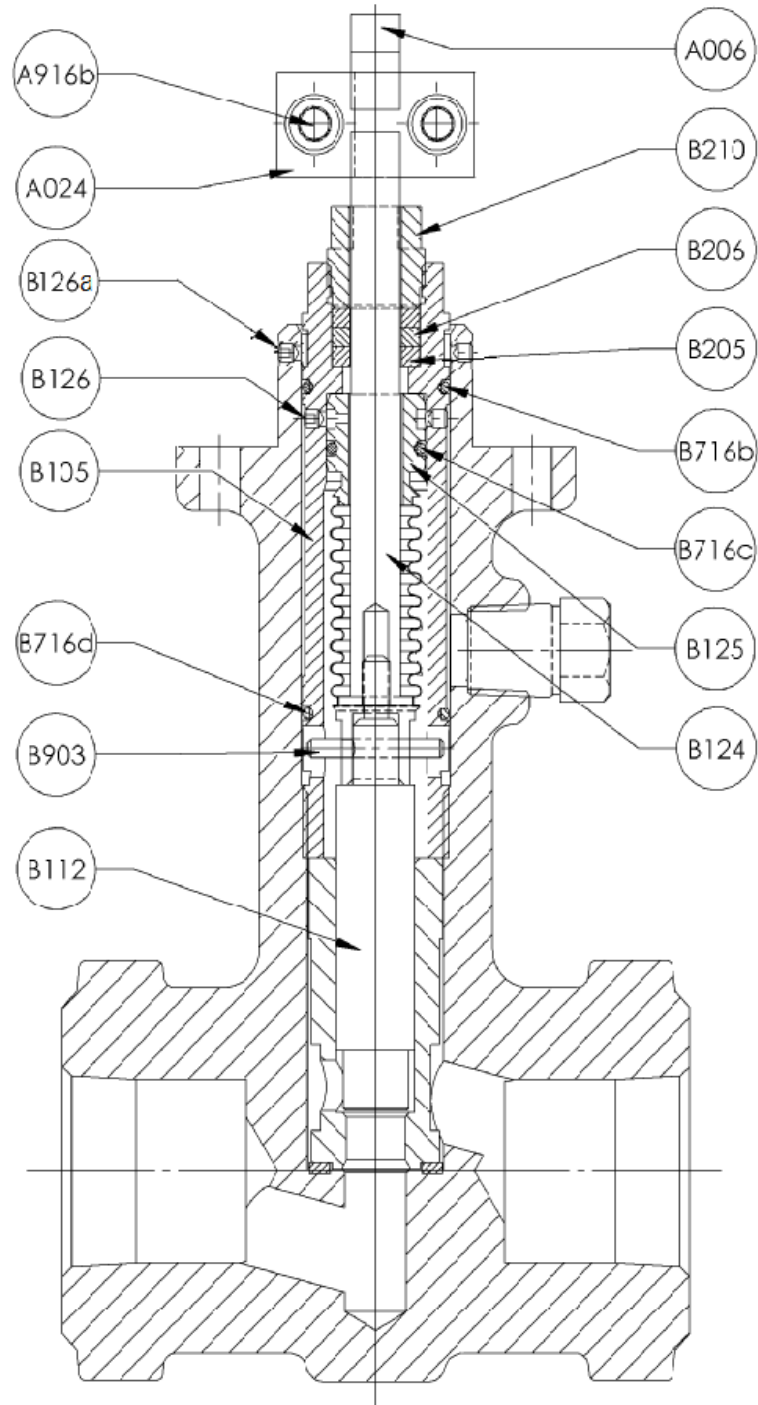


Figure 6: Bellows Seal Varipak with Stainless Steel Body

# Materials of Construction

## Bellows Seal Varipak with Stainless Steel Body

| Ref. No.       | Temperature Range         | -20°F<br>-29°C                                        | +392°F<br>+200°C |
|----------------|---------------------------|-------------------------------------------------------|------------------|
|                | Description               | Material                                              |                  |
| A006           | ACTUATOR STEM             | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM  |                  |
| A024           | STEM COUPLING             | AUSTENITIC STAINLESS STEEL                            |                  |
| A916b          | SLOTTED PAN HEAD SCREW    | AUSTENITIC STAINLESS STEEL                            |                  |
| B124           | BELLOWS STEM SUB-ASSEMBLY | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL |                  |
| B125           | BELLOWS SUB-ASSEMBLY      | GENERAL SUB-ASSEMBLIES                                |                  |
| B126<br>B126a  | RETAINING SCREW           | ISO 3506 GRADE A2-70                                  |                  |
| B205           | PACKING RETAINING RING    | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM  |                  |
| B206           | PACKING SET               | CARBON CORE BRAIDED PTFE PACKING                      |                  |
| B210           | ADJUSTMENT RING           | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL |                  |
| B716b<br>B716d | O-RING <sup>(1)</sup>     | VITON-A 65-75 SHORE A                                 |                  |
| B716c          | O-RING <sup>(1)</sup>     | VITON-A 65-75 SHORE A                                 |                  |
| B903           | GROOVED PIN               | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM  |                  |

General note: Refer to table “Standard valve with stainless steel body” for the parts not shown in this table (trim n°0 is not applicable)

1. The compatibility of the material of these O-ring gaskets with the fluid which is going through the valve must be controlled.

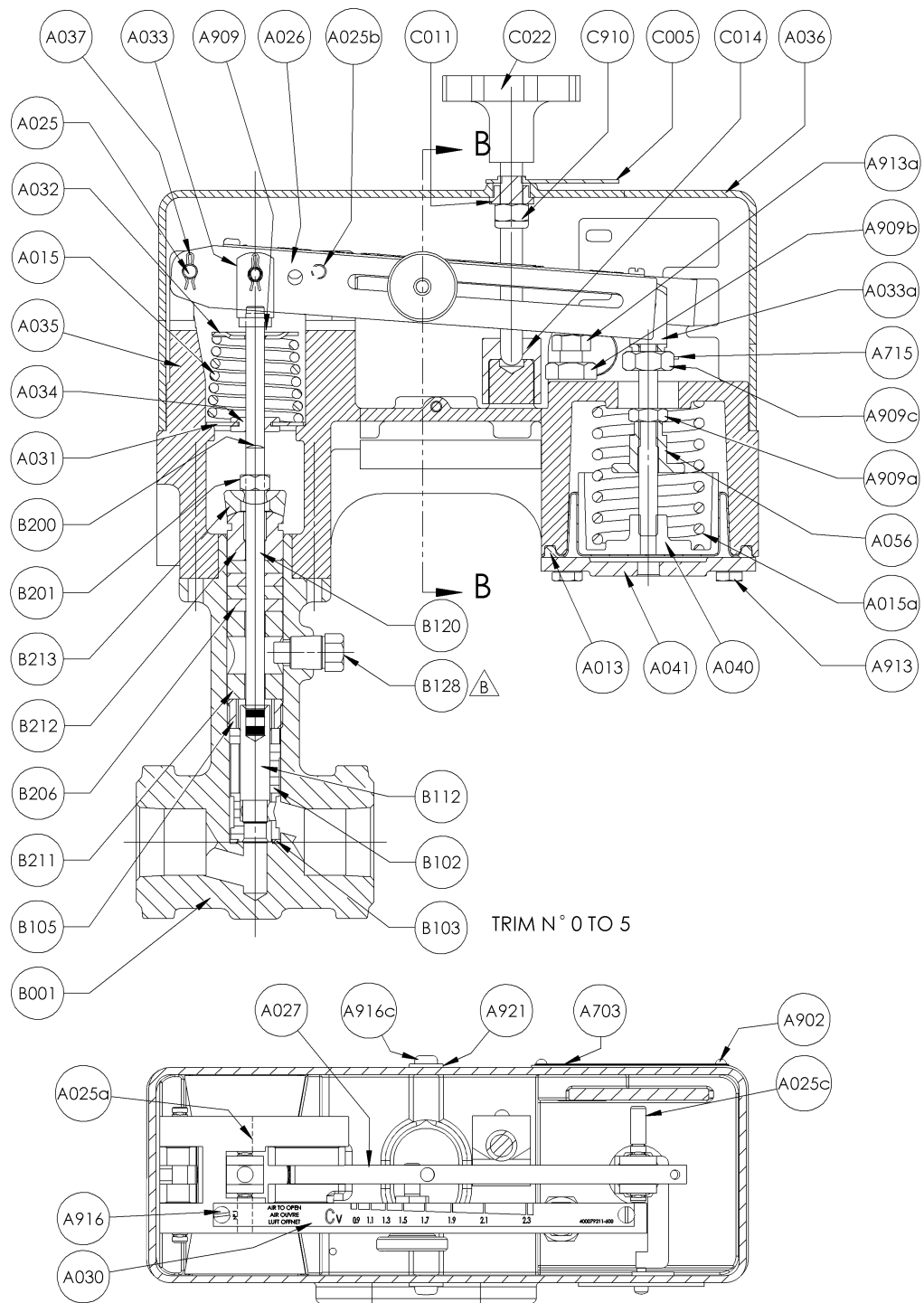


Figure 7: Standard Actuator Construction

# Materials of Construction

## Standard Actuator

| Ref. No.         | Description                                        | Material                                                           |
|------------------|----------------------------------------------------|--------------------------------------------------------------------|
| A013             | ACTUATOR STEM                                      | BUNA N RUBBER (NITRILE) WITH DACRON FABRIC PER CMS-8010 (STANDARD) |
|                  |                                                    | SILICON RUBBER WITH DACRON FABRIC PER CMS-8010 (OPTIONAL)          |
| A015             | CONICAL COMPRESSION SPRING                         | AISI 302 STAINLESS STEEL                                           |
| A015a            | ACTUATOR SPRING                                    | ASTM A228 ZINC DICHROMATE COATING                                  |
| A025             | PIVOT PIN NO 1                                     | 17-4 PH STAINLESS STEEL H1075                                      |
| A025a            | PIVOT PIN NO 2                                     | 17-4 PH STAINLESS STEEL H1075                                      |
| A025b            | PIVOT PIN NO 3                                     | 17-4 PH STAINLESS STEEL H1075                                      |
| A025c            | PIVOT PIN NO 4                                     | 17-4 PH STAINLESS STEEL H1075                                      |
| A026             | LEVER NO 1                                         | EN 573 AW-2017A T4 SULFURIC ANODIC COATED                          |
| A027             | LEVER NO 2                                         | AUSTENITIC STAINLESS STEEL                                         |
| A028             | CV ADJUSTMENT PIN                                  | X6CrMoS17 (AISI 430F)                                              |
| A029             | CV ADJUSTMENT KNOB                                 | AUSTENITIC STAINLESS STEEL                                         |
| A030             | CV ADJUSTMENT PLATE                                | ALUMINIUM                                                          |
| A031             | SUPPORT (GROMMET) PLATE                            | AUSTENITIC STAINLESS STEEL                                         |
| A032             | SPRING BUTTON                                      | AUSTENITIC STAINLESS STEEL                                         |
| A033<br>A033a    | CLEVIS                                             | CARBON STEEL (1010 TO 1030) HRc 22 MAX DICHROMATE ZINC PLATED      |
| B205             | PACKING RETAINING RING                             | SOLUTION ANNEALED 316 STAINLESS STEEL HRc 22 MAXIMUM               |
| A034             | GROMMET                                            | NITRILE ASTM D1418 CLASS 1 NBR                                     |
| A035             | ACTUATOR BRACKET                                   | EN 1676 AB-46000 PAINTED                                           |
| A036             | COVER                                              | POLYCARBONATE (LEXAN)                                              |
| A037             | RETAINER CLIP                                      | AUSTENITIC STAINLESS STEEL                                         |
| A039             | MOUNTING PLATE                                     | AUSTENITIC STAINLESS STEEL                                         |
| A040             | PISTON S/A                                         | EN 1706 AC-44100 PASSIVATED                                        |
| A041             | DIAPHRAGM COVER                                    | ASTM A36 ZINC DICHROMATE COATING                                   |
| A042             | MASONEILAN LOGO                                    | 3M NO 639 SPRINT FILM OR EQUIVALENT WITH ADHESIVE BACK             |
| A043             | COVER PLUG                                         | PLASTIC - GENERAL                                                  |
| A053             | COVER PLUG                                         | PLASTIC - GENERAL                                                  |
| A703             | SERIAL PLATE                                       | GENERAL SERVICE ANNEALED 316L ST ST HRc 22 MAXIMUM                 |
| A712             | STROKE SCALE                                       | PLASTIC - GENERAL                                                  |
| A713 (not shown) | INFORMATION PLATES (SPRING RANGE / MAX AIR SUPPLY) | VINYL WITH PRESSURE ADHESIVE (NELTAPE 100 OR EQUIVALENT)           |
| A715             | TRAVEL INDICATOR                                   | AUSTENITIC STAINLESS STEEL                                         |
| A902             | DRIVE SCREW                                        | AUSTENITIC STAINLESS STEEL                                         |
| A909             | LOCKNUT                                            | AUSTENITIC STAINLESS STEEL                                         |
| A909c            | LOCKNUT                                            | SOLUTION ANNEALED 316 STAINLESS STEEL HRc 22 MAXIMUM               |
| A913             | COVER CAP SCREW                                    | AUSTENITIC STAINLESS STEEL                                         |
| A916             | ADJUSTMENT PLATE SCREW                             | AUSTENITIC STAINLESS STEEL                                         |
| A916a            | INDICATOR PLATE SCREW                              | AUSTENITIC STAINLESS STEEL                                         |
| A916c            | COVER SCREW                                        | SOLUTION ANNEALED 316L HRc 22 MAXIMUM STAINLESS STEEL              |
| A921             | COVER WASHER                                       | NYLON - GENERAL                                                    |

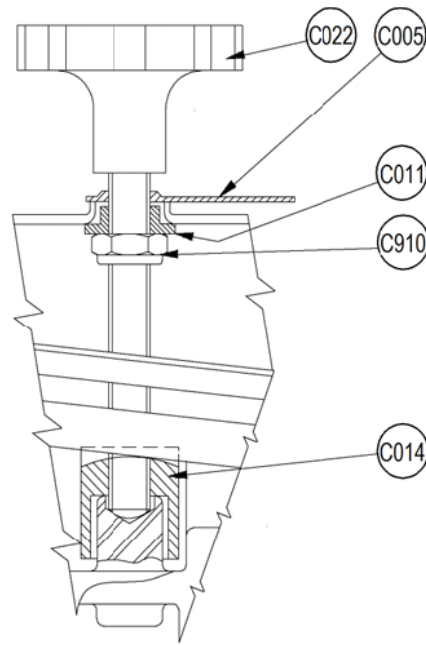
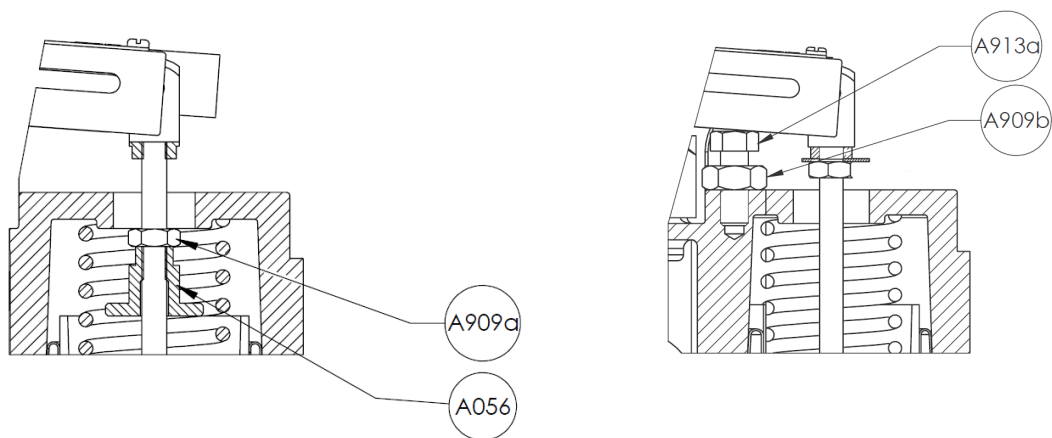


Figure 8: Handwheel Construction

# Materials of Construction

## Handwheel

| Ref. No. | Description        | Material                                                  |
|----------|--------------------|-----------------------------------------------------------|
| C005     | HANDWHEEL LOCK     | AUSTENITIC STAINLESS STEEL                                |
| C011     | HANDWHEEL BUSHING  | NYLON – GENERAL                                           |
| C014     | LEVER ARM STOP     | AUSTENITIC STAINLESS STEEL                                |
| C022     | HANDWHEEL          | LEXAN + AUSTENITIC STAINLESS STEEL                        |
| C910     | HANDWHEEL LOCK NUT | DICHROMATE ZINC PLATE PER CES-1041 CARBON STEEL CLASS 8.8 |



**Figure 9: Limit Stop Construction**

## Materials of Construction

### Limit Stop

| Ref. No. | Description      | Material                   |
|----------|------------------|----------------------------|
| A056     | LIMIT STOP       | AUSTENITIC STAINLESS STEEL |
| A909a    | LOCK NUT         | AUSTENITIC STAINLESS STEEL |
| A909b    | LOCK NUT         | AUSTENITIC STAINLESS STEEL |
| A913a    | LIMIT STOP SCREW | AUSTENITIC STAINLESS STEEL |

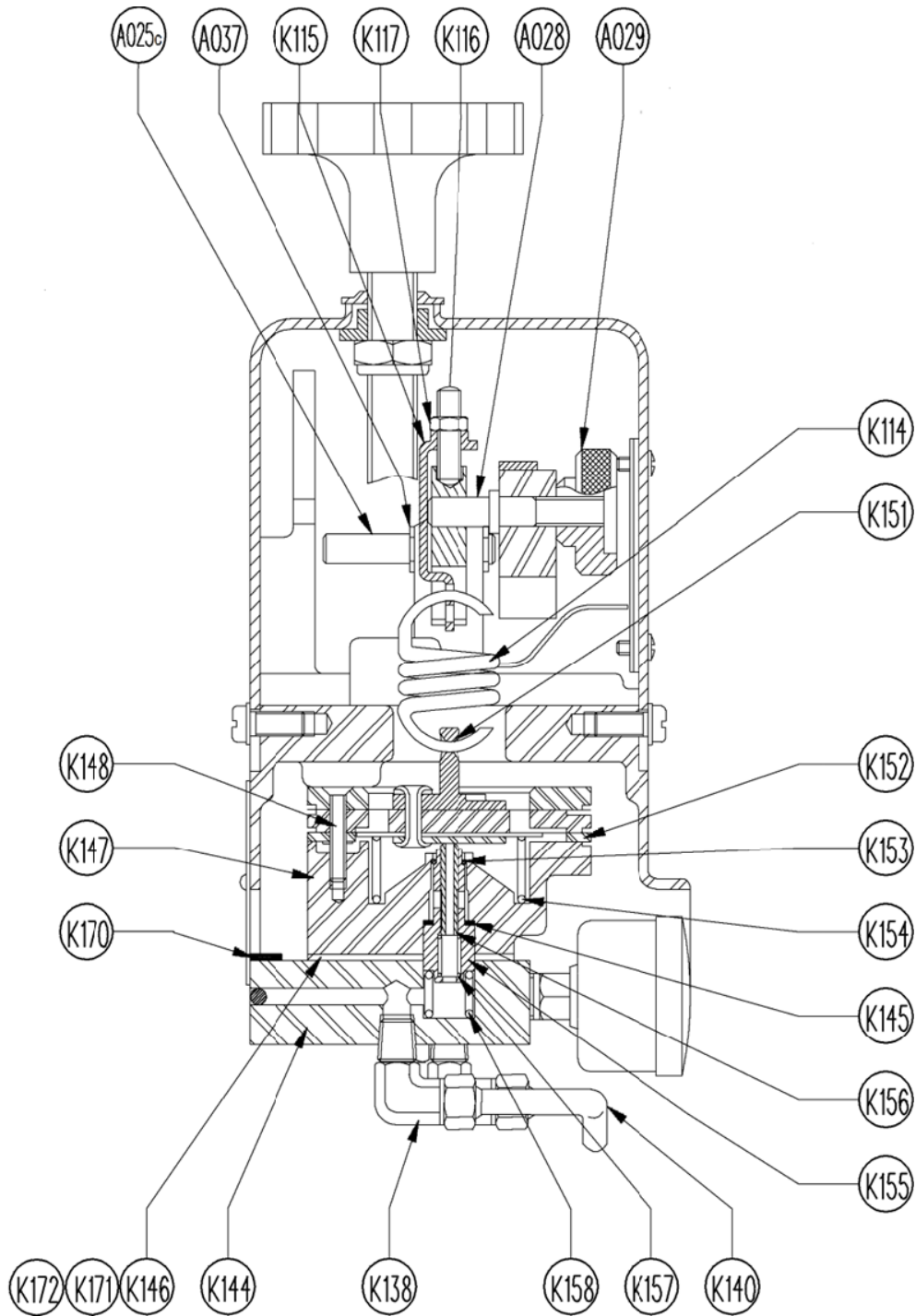


Figure 10: 7700P Positioner Construction

# Materials of Construction

## 7700P Positioner

| Ref. No. | Description           | Material                                                          |
|----------|-----------------------|-------------------------------------------------------------------|
| K114     | FORCE BALANCE SPRING  | AISI 302 STAINLESS STEEL                                          |
| K115     | SPRING CLAMP          | AUSTENITIC STAINLESS STEEL                                        |
| K116     | TAKE-UP SCREW         | AUSTENITIC STAINLESS STEEL                                        |
| K117     | LOCKNUT               | AUSTENITIC STAINLESS STEEL                                        |
| K138     | UNION ELBOW           | BRASS ANY TYPE                                                    |
| K140     | TUBING                | AUSTENITIC STAINLESS STEEL                                        |
| K144     | MANIFOLD BLOCK S/A    | ASSEMBLY                                                          |
|          | MANIFOLD BLOCK        | EN 573 AW-6063 T6 (UNS A96063) SULPHURIC ANODIC COATED            |
|          | BALL                  | AUSTENITIC STAINLESS STEEL                                        |
| K145     | WASHER                | AUSTENITIC STAINLESS STEEL                                        |
| K146     | GASKET                | PLASTIC                                                           |
| K147     | POSITIONER BODY       | EN 1676 AB-46100 PAINTED                                          |
| K148     | SCREW                 | AUSTENITIC STAINLESS STEEL                                        |
| K152     | DIAPHRAGM S/A         | ASSEMBLY                                                          |
|          | UPPER PLATE           | ASTM B211 ALLOY 7075 T6 SULPHURIC ANODIC COATED                   |
|          | BACK UP LOWER PLATE   | ASTM B211 ALLOY 7075 T6 (UNS A97075)                              |
|          | LOWER PLATE           | EN 1706 AC-43100 PASSIVATED                                       |
|          | LOWER DIAPHRAGM       | DUPONT - FAIRPRENE NO. 5029A (BUNA-N WITH NYLON FABRIC)           |
|          | MIDDLE PLATE          | EN 1706 AC-43100 PASSIVATED                                       |
|          | UPPER DIAPHRAGM       | DUPONT - FAIRPRENE NO. 5029A (BUNA-N WITH NYLON FABRIC)           |
|          | SPRING BUTTON         | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM              |
|          | DIAPHRAGM SPACER      | POLYCARBONATE (LEXAN)                                             |
|          | PLATE UPPER DIAPHRAGM | ASTM B211 ALLOY 7075 T6 SULPHURIC ANODIC COATED                   |
|          | WASHER                | AUSTENITIC STAINLESS STEEL                                        |
|          | RIVET                 | EN 573 AW-1050                                                    |
|          | SPECIAL WASHER        | B.F. GOODRICH COMPOUND NO.25866 (NEOPRENE RUBBER 85-95 DUROMETER) |
|          | GASKET                | NITRILE ASTM D1418 CLASS 1 NBR                                    |
| K153     | O-RING                | NITRILE ASTM D1418 CLASS 1 NBR                                    |
| K154     | SPRING                | ASTM A228 ZINC DICHROMATE COATING                                 |
| K155     | SLEEVE                | SOLUTION ANNEALED 303 STAINLESS STEEL                             |
| K156     | SPOOL                 | 17-4 PH STAINLESS STEEL H1075                                     |
| K157     | SPRING                | AISI 302 STAINLESS STEEL                                          |
| K158     | SPRING                | ASTM A228 ZINC DICHROMATE COATING                                 |
| K170     | SIGNAL DECAL          | ADHESIVE ALUMINUM                                                 |
| K171     | O-RING                | NITRILE ASTM D1418 CLASS 1 NBR                                    |
| K172     | O-RING                | NITRILE ASTM D1418 CLASS 1 NBR                                    |

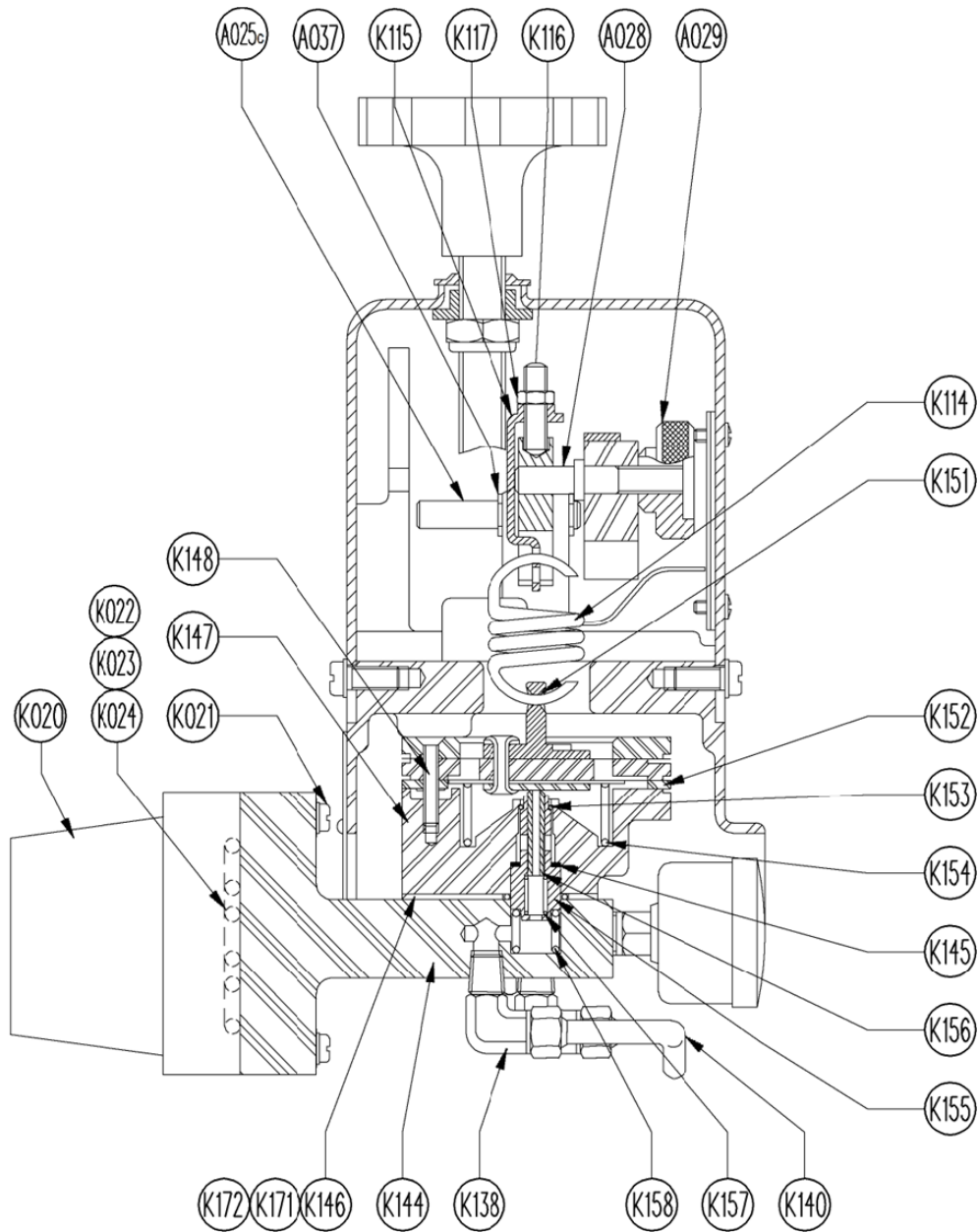


Figure 11: 7700E Positioner Construction

# Materials of Construction

## 7700E Positioner

| Ref. No. | Description                        | Material                                                          |
|----------|------------------------------------|-------------------------------------------------------------------|
| K020     | MODULE FM / CSA / ATEX 1/2"NPT/M20 | ASSEMBLY                                                          |
| K021     | 8-32 SCREW                         | AUSTENITIC STAINLESS STEEL                                        |
| K022     | O-RING                             | SILICONE RUBBER – GENERAL                                         |
| K023     | O-RING                             | SILICONE RUBBER – GENERAL                                         |
| K024     | O-RING                             | SILICONE RUBBER – GENERAL                                         |
| K031     | VENT PLUG (NOT SHOWN)              | POLYPROPYLENE, GLASS FILLED                                       |
| K114     | FORCE BALANCE SPRING               | AISI 302 STAINLESS STEEL                                          |
| K115     | SPRING CLAMP                       | AUSTENITIC STAINLESS STEEL                                        |
| K116     | TAKE-UP SCREW                      | AUSTENITIC STAINLESS STEEL                                        |
| K117     | LOCKNUT                            | AUSTENITIC STAINLESS STEEL                                        |
| K138     | UNION ELBOW                        | BRASS ANY TYPE                                                    |
| K140     | TUBING                             | AUSTENITIC STAINLESS STEEL                                        |
| K144     | MANIFOLD BLOCK S/A                 | ASSEMBLY                                                          |
|          | MANIFOLD BLOCK                     | ASTM B221 ALLOY 2014 T6 (UNS A92014) SULPHURIC ANODIC COATED      |
|          | BALL                               | AUSTENITIC STAINLESS STEEL                                        |
| K145     | WASHER                             | AUSTENITIC STAINLESS STEEL                                        |
| K146     | GASKET                             | PLASTIC                                                           |
| K147     | POSITIONER BODY                    | EN 1676 AB-46100 PAINTED                                          |
| K148     | SCREW                              | AUSTENITIC STAINLESS STEEL                                        |
| K152     | DIAPHRAGM S/A                      | ASSEMBLY                                                          |
|          | UPPER PLATE                        | ASTM B211 ALLOY 7075 T6 SULPHURIC ANODIC COATED                   |
|          | BACK UP LOWER PLATE                | ASTM B211 ALLOY 7075 T6 (UNS A97075)                              |
|          | LOWER PLATE                        | EN 1706 AC-43100 PASSIVATED                                       |
|          | LOWER DIAPHRAGM                    | DUPONT - FAIRPRENE NO. 5029A (BUNA-N WITH NYLON FABRIC)           |
|          | MIDDLE PLATE                       | EN 1706 AC-43100 PASSIVATED                                       |
|          | UPPER DIAPHRAGM                    | DUPONT - FAIRPRENE NO. 5029A (BUNA-N WITH NYLON FABRIC)           |
|          | SPRING BUTTON                      | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM              |
|          | DIAPHRAGM SPACER                   | POLYCARBONATE (LEXAN)                                             |
|          | PLATE UPPER DIAPHRAGM              | ASTM B211 ALLOY 7075 T6 SULPHURIC ANODIC COATED                   |
|          | WASHER                             | AUSTENITIC STAINLESS STEEL                                        |
|          | RIVET                              | EN 573 AW-1050                                                    |
|          | SPECIAL WASHER                     | B.F. GOODRICH COMPOUND NO.25866 (NEOPRENE RUBBER 85-95 DUROMETER) |
|          | GASKET                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |
| K153     | O-RING                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |
| K154     | SPRING                             | ASTM A228 ZINC DICHROMATE COATING                                 |
| K155     | SLEEVE                             | SOLUTION ANNEALED 303 STAINLESS STEEL                             |
| K156     | SPOOL                              | 17-4 PH STAINLESS STEEL H1075                                     |
| K157     | SPRING                             | AISI 302 STAINLESS STEEL                                          |
| K158     | SPRING                             | ASTM A228 ZINC DICHROMATE COATING                                 |
| K171     | O-RING                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |
| K172     | O-RING                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |

# Materials of Construction

## Valve Body Marine/Offshore Service Free from Aluminium Construction

For valve body construction, refer to Table “Standard Valve with Stainless Steel Body”, temperature range -46°C [-50°F] to 343°C [650°F].

| Paint System<br>(Based on customer request only)                                                                                                             | Operating temperature<br>less than 120°C                   | Operating temperature<br>more than 120°C                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------|
| ASTM A182 TY F316/F316L/1.4401/1.4404<br>EN 10222-5 HRc 22 MAXIMUM CMS-1041 or ASTM<br>A351 GR CF3M/EN 10213 1.4408 C≤0.03/1.4409 CMS<br>1040 HRC 22 MAXIMUM | Masoneilan standard -<br>Offshore/Marine-3Coat-C5/CX- PS26 | Masoneilan standard -<br>Offshore/Marine-3Coat-C5 - PS31 |

Note: Paint systems will be applicable based on customer requests.

# Materials of Construction

## 27-28 Actuator Marine/Offshore Service Free from Aluminium Construction

| Ref. No.         | Temperature Range                                  | -20°F<br>-29°C                                                     | +650°F<br>+343°C |
|------------------|----------------------------------------------------|--------------------------------------------------------------------|------------------|
|                  | Description                                        | Material                                                           |                  |
| A013             | DIAPHRAGM                                          | BUNA N RUBBER (NITRILE) WITH DACRON FABRIC PER CMS-8010 (STANDARD) |                  |
|                  |                                                    | SILICON RUBBER WITH DACRON FABRIC PER CMS-8010 (OPTIONAL)          |                  |
| A015             | CONICAL COMPRESSION SPRING                         | ASTM A313 TYPE 302 CLASS 1                                         |                  |
| A015a            | ACTUATOR SPRING                                    | ASTM A228 ZINC DICHROMATE COATING                                  |                  |
| A025             | PIVOT PIN NO 1                                     | 17-4 PH STAINLESS STEEL H1075                                      |                  |
| A025a            | PIVOT PIN NO 2                                     | 17-4 PH STAINLESS STEEL H1075                                      |                  |
| A025b            | PIVOT PIN NO 3                                     | 17-4 PH STAINLESS STEEL H1075                                      |                  |
| A025c            | PIVOT PIN NO 4                                     | 17-4 PH STAINLESS STEEL H1075                                      |                  |
| A026             | LEVER NO 1                                         | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM               |                  |
| A027             | LEVER NO 2                                         | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A028             | CV ADJUSTMENT PIN                                  | X6CrMoS17 (AISI 430F)                                              |                  |
| A029             | CV ADJUSTMENT KNOB                                 | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A030             | CV ADJUSTMENT PLATE                                | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A031             | SUPPORT (GROMMET) PLATE                            | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A032             | SPRING BUTTON                                      | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A033<br>A033a    | CLEVIS                                             | 17-4 PH STAINLESS STEEL H1075                                      |                  |
| A034             | GROMMET                                            | NITRILE ASTM D1418 CLASS 1 NBR                                     |                  |
| A035             | ACTUATOR BRACKET                                   | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL              |                  |
| A036             | COVER                                              | AUSTENITIC STAINLESS STEEL                                         |                  |
| A037             | RETAINER CLIP                                      | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A039             | MOUNTING PLATE                                     | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A040             | PISTON S/A                                         | GENERAL SUB-ASSEMBLIES                                             |                  |
|                  | PISTON                                             | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL              |                  |
|                  | STEM                                               | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM               |                  |
|                  | LOCKING NUT                                        | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM               |                  |
| A041             | DIAPHRAGM COVER                                    | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM               |                  |
| A042             | MASONEILAN LOGO                                    | 3M NO 639 SPRINT FILM OR EQUIVALENT WITH ADHESIVE BACK             |                  |
| A043             | COVER PLUG                                         | PLASTIC - GENERAL                                                  |                  |
| A053             | COVER PLUG                                         | PLASTIC - GENERAL                                                  |                  |
| A056             | LIMIT-STOP                                         | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A703             | SERIAL PLATE                                       | GENERAL SERVICE ANNEALED 316L ST ST HRC 22 MAXIMUM                 |                  |
| A712             | STROKE SCALE                                       | PLASTIC - GENERAL                                                  |                  |
| A713 (not shown) | INFORMATION PLATES (SPRING RANGE / MAX AIR SUPPLY) | VINIL WITH PRESSURE ADHESIVE (NELTAPE 100 OR EQUIV.)               |                  |
| A715             | TRAVEL INDICATOR                                   | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A902             | DRIVE SCREW                                        | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A909             | LOCKNUT                                            | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A909a            | LOCKNUT                                            | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A909b            | LOCKNUT                                            | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A909c            | LOCKNUT                                            | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A913             | COVER CAP SCREW                                    | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A913a            | LIMIT-STOP SCREW                                   | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A916             | ADJUSTMENT PLATE SCREW                             | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A916a            | INDICATOR PLATE SCREW                              | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| A916c            | COVER SCREW                                        | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL              |                  |
| A921             | COVER WASHER                                       | NYLON - GENERAL                                                    |                  |
| C005             | HANDWHEEL LOCK                                     | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| C011             | HANDWHEEL BUSHING                                  | NYLON - GENERAL                                                    |                  |
| C014             | LEVER ARM STOP                                     | 316L STAINLESS STEEL GENERAL SERVICE SOLUTION ANNEALED             |                  |
| C022             | HANDWHEEL                                          | LEXAN + AUSTENITIC STAINLESS STEEL                                 |                  |
| C910             | HANDWHEEL LOCKNUT                                  | DICHROMATE ZINC PLATE CARBON STEEL CLASS 8.8                       |                  |

# Materials of Construction

## 7700E Positioner Marine/Offshore Service Free from Aluminium Construction

| Ref. No. | Temperature Range                  | -20°F<br>-29°C                                                    | +650°F<br>+343°C |
|----------|------------------------------------|-------------------------------------------------------------------|------------------|
|          | Description                        | Material                                                          |                  |
| K020     | MODULE FM / CSA / ATEX 1/2"NPT/M20 | ASSEMBLY                                                          |                  |
| K021     | 8-32 SCREW                         | AUSTENITIC STAINLESS STEEL                                        |                  |
| K022     | O-RING                             | SILICONE RUBBER – GENERAL                                         |                  |
| K023     | O-RING                             | SILICONE RUBBER – GENERAL                                         |                  |
| K024     | O-RING                             | SILICONE RUBBER – GENERAL                                         |                  |
| K031     | VENT PLUG (not shown)              | POLYPROPYLENE, GLASS FILLED                                       |                  |
| K114     | FORCE BALANCE SPRING               | AISI 302 STAINLESS STEEL                                          |                  |
| K115     | SPRING CLAMP                       | AUSTENITIC STAINLESS STEEL                                        |                  |
| K116     | TAKE-UP SCREW                      | AUSTENITIC STAINLESS STEEL                                        |                  |
| K117     | LOCKNUT                            | AUSTENITIC STAINLESS STEEL                                        |                  |
| K138     | UNION ELBOW                        | AUSTENITIC STAINLESS STEEL                                        |                  |
| K140     | TUBING                             | AUSTENITIC STAINLESS STEEL                                        |                  |
| K144     | MANIFOLD BLOCK S/A                 | GENERAL SUB-ASSEMBLIES                                            |                  |
|          | MANIFOLD BLOCK                     | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL             |                  |
|          | BALL                               | AUSTENITIC STAINLESS STEEL                                        |                  |
| K145     | WASHER                             | AUSTENITIC STAINLESS STEEL                                        |                  |
| K146     | GASKET                             | PLASTIC                                                           |                  |
| K147     | POSITIONER BODY                    | GENERAL SERVICE ANNEALED 304L ST. ST. HRC 22 MAXIMUM              |                  |
| K148     | SCREW                              | AUSTENITIC STAINLESS STEEL                                        |                  |
| K152     | DIAPHRAGM S/A                      | GENERAL SUB-ASSEMBLIES                                            |                  |
|          | UPPER PLATE                        | GENERAL SERVICE ANNEALED 304L ST. ST. HRC 22 MAXIMUM              |                  |
|          | BACK UP LOWER PLATE                | SOLUTION ANNEALED 304L ST. ST. HRC 22 MAXIMUM                     |                  |
|          | LOWER PLATE                        | GENERAL SERVICE ANNEALED 304L ST. ST. HRC 22 MAXIMUM              |                  |
|          | LOWER DIAPHRAGM                    | DUPONT - FAIRPRENE NO. 5029A (BUNA-N WITH NYLON FABRIC)           |                  |
|          | MIDDLE PLATE                       | GENERAL SERVICE ANNEALED 304L ST. ST. HRC 22 MAXIMUM              |                  |
|          | UPPER DIAPHRAGM                    | DUPONT - FAIRPRENE NO. 5029A (BUNA-N WITH NYLON FABRIC)           |                  |
|          | SPRING BUTTON                      | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM              |                  |
|          | DIAPHRAGM SPACER                   | POLYCARBONATE (LEXAN)                                             |                  |
|          | PLATE UPPER DIAPHRAGM              | SOLUTION ANNEALED 304L ST. ST. HRC 22 MAXIMUM                     |                  |
|          | WASHER                             | AUSTENITIC STAINLESS STEEL                                        |                  |
|          | RIVET                              | AUSTENITIC STAINLESS STEEL                                        |                  |
|          | SPECIAL WASHER                     | B.F. GOODRICH COMPOUND NO.25866 (NEOPRENE RUBBER 85-95 DUROMETER) |                  |
|          | GASKET                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |                  |
| K153     | O-RING                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |                  |
| K154     | SPRING                             | ASTM A228 ZINC DICHROMATE COATING                                 |                  |
| K155     | SLEEVE                             | SOLUTION ANNEALED 303 STAINLESS STEEL                             |                  |
| K156     | SPOOL                              | 17-4 PH STAINLESS STEEL H1075                                     |                  |
| K157     | SPRING                             | AISI 302 STAINLESS STEEL                                          |                  |
| K158     | SPRING                             | ASTM A228 ZINC DICHROMATE COATING                                 |                  |
| K171     | O-RING                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |                  |
| K172     | O-RING                             | NITRILE ASTM D1418 CLASS 1 NBR                                    |                  |

# Standard Flangeless Varipak

## 28000 Series

Due to its simple, compact, and versatile stainless-steel body design, the standard flangeless Varipak valve is widely used across a variety of industries.



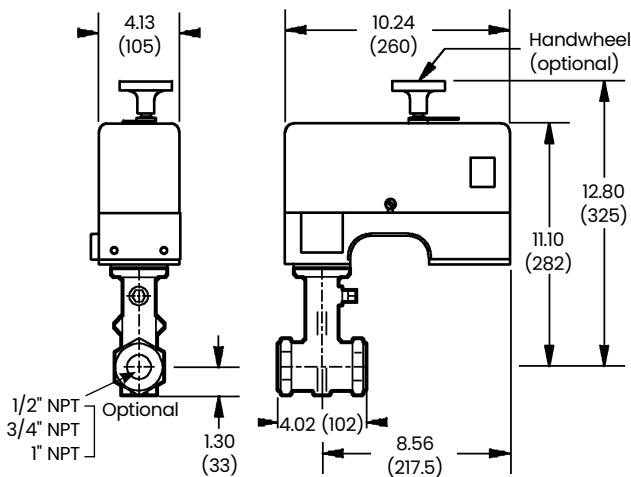
Figure 12: Standard Flangeless Varipak

## Rated C<sub>v</sub> Range/Weight

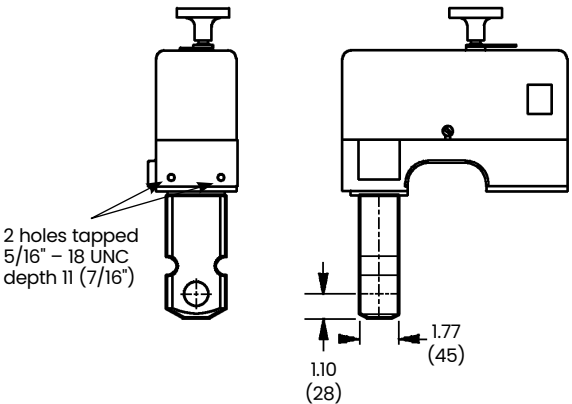
| Body/Actuator Assembly Weight | Rated C <sub>v</sub> Range      |
|-------------------------------|---------------------------------|
| 15.4 lbs (7 kg)               | 3.8 to 0.0040 (trim No. 0 to 9) |

## Dimensions – inches (mm)

Standard Varipak  
(Stainless Steel)



Bar Stock Body  
(For Non-Castable Material)



Provide a removal clearance of 5.5 inches (140 mm)

# Standard Flanged Varipak

## 28000 Series

The Varipak is also available in flanged configurations with connections and ratings as indicated in the following table.

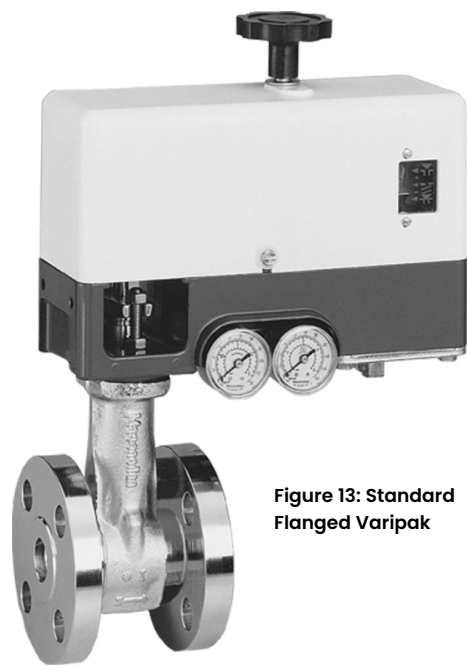


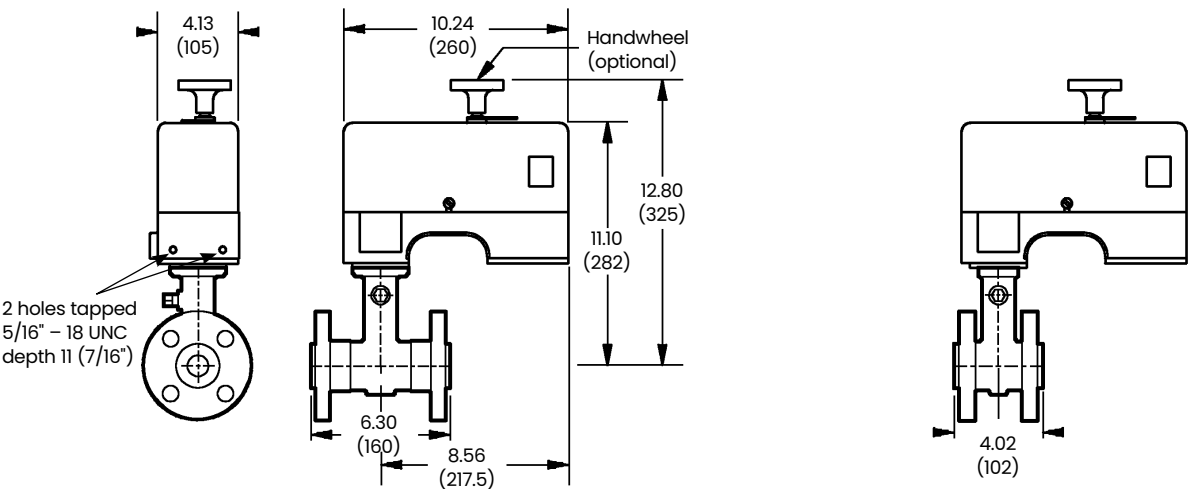
Figure 13: Standard Flanged Varipak

## Flange Ratings/Weight

| Face-to-Face Dimensions | Flange Ratings                                                                 | Body/Actuator S/A Weight <sup>1</sup> | Rated C <sub>v</sub> Range         |
|-------------------------|--------------------------------------------------------------------------------|---------------------------------------|------------------------------------|
| 4" (102mm)              | ASME Class 150-600<br>ISO PN 20-100<br>(raised face only)                      | 8 to 10 kg<br>(17.4 to 22 lbs)        | 3.8 to 0.0040<br>(trim No. 0 to 9) |
| 6.3" (160mm)            | ASME Class 150-1500<br>ISO PN 20-250<br>DIN PN 10-250<br>(RF, FF, RTS, etc...) | 10 to 12 kg<br>(22 to 26.5 lbs)       |                                    |

1. Depending on rating.

## Dimensions – inches (mm)



Provide a removal clearance of 5.5 inches (140 mm)

# Varilog Anti-Cavitation Varipak



Figure 14: Varilog Trim Subassembly

## 28000 MS Series

The **Varilog™** multi-stage trim design for the Varipak control valve provides unmatched anti-cavitation performance in low flow applications.

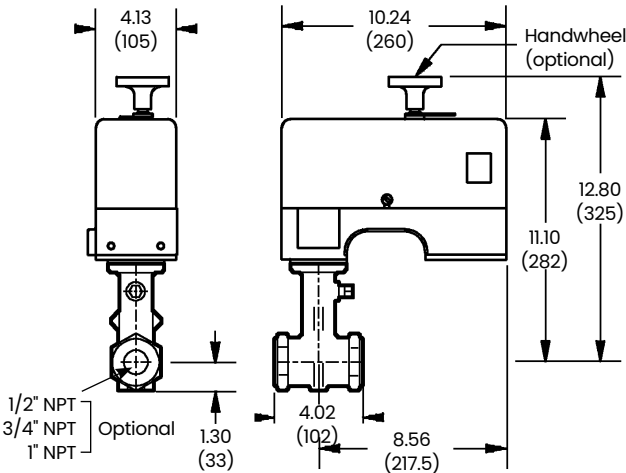
By reducing erosion and vibrations, this design helps minimize failure that is often associated with conventional single-seated valves. The Varilog trim is available with the standard Varipak body designs in either the flanged or flangeless configurations.

## Specific Characteristics

| Rated C <sub>v</sub> Range         | Critical Flow Factor F <sub>L</sub> | Temperature Range                    | Materials                                                     |
|------------------------------------|-------------------------------------|--------------------------------------|---------------------------------------------------------------|
| 0.60 to 0.050<br>(trim No. 3 to 6) | 0.98                                | -20°F to +650°F<br>(-29°C to +343°C) | Refer to Varilog Materials of Construction tables on page 13. |

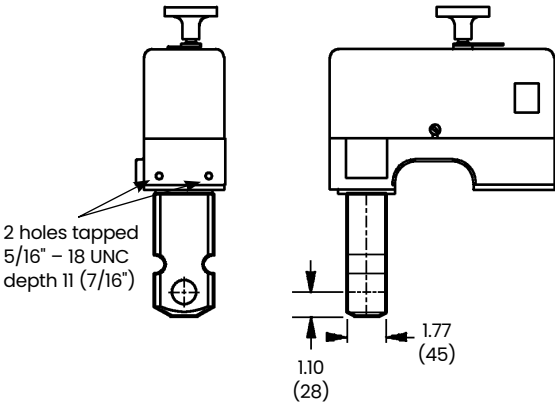
## Dimensions – inches (mm)

Standard Varipak  
(Stainless Steel)



Provide a removal clearance of 5.5 inches (140 mm)

Bar Stock Body  
(For Non-Castable Material)



# High Pressure Varipak

## 28000 HP Series

The high-pressure Varipak valve design is recommended for applications involving conditions with very high upstream pressure or pressure drop that exceeds the pressure rating of the standard Varipak body design.

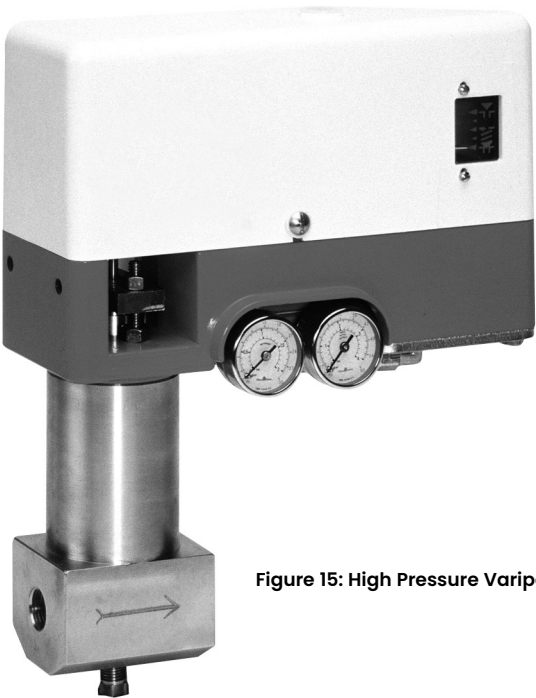
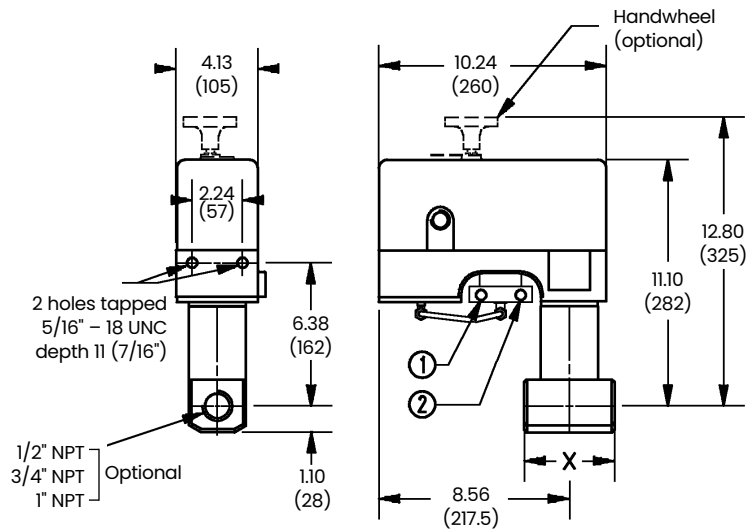


Figure 15: High Pressure Varipak

### Specific Characteristics

| Rated C <sub>v</sub> Range          | Body Rating                   | Seat Leakage | Materials                                                    |
|-------------------------------------|-------------------------------|--------------|--------------------------------------------------------------|
| 0.60 to 0.0040<br>(trim No. 3 to 9) | ASME Class 2500<br>ISO PN 420 | Class IV     | Refer to Standard Materials of Construction table on page 8. |

### Dimensions – inches (mm)



- ① 1/4" NPT Supply Connection
- ② 1/4" NPT Instrument Connection

| End Type              | Valve Size<br>DN (inches) | Face-to-Face X<br>Inches (mm) |
|-----------------------|---------------------------|-------------------------------|
| Flangeless / Threaded | 25 (1)                    | 4.02 (102)                    |
| Printed flanges       | 25 (1)                    | 2.56 (65)                     |

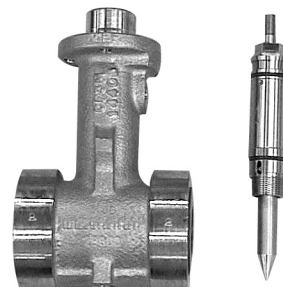
Provide a removal clearance of 5.5 inches (140 mm)

# Bellows Seal Varipak

## 28000 BS Series

For applications that require no leakage at the packing box, the Varipak valve is available with a bellows seal. This design is ideal for applications that involve the handling of flammable, toxic, or explosive fluids.

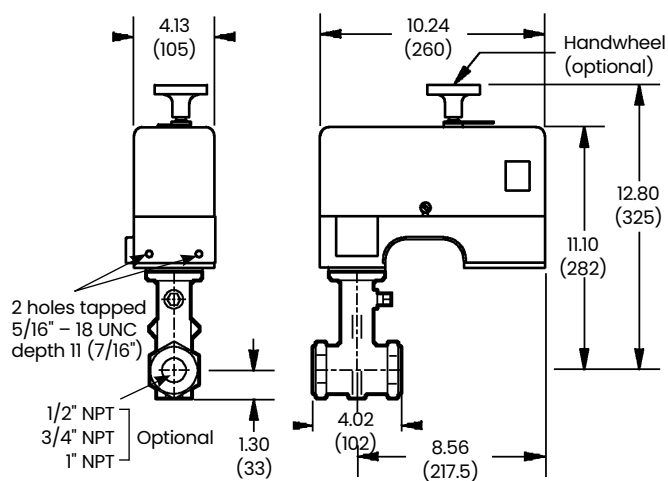
Figure 16: Plug and Bellows Sub-Assembly



## Specific Characteristics

| Rated $C_v$ Range                  | Body Rating                         | Seat Leakage | Operating Pressures                                                                    | Materials                                                         |
|------------------------------------|-------------------------------------|--------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 2.3 to 0.0040<br>(trim No. 1 to 9) | ASME Class 150-600<br>ISO PN 10-100 | Class IV     | 800 psi at +212°F<br>(55 bar at +100°C)<br><br>580 psi at +392°F<br>(40 bar at +200°C) | Refer to Bellows Seal Materials of Construction table on page 15. |

## Dimensions – inches (mm)



Provide a removal clearance of 5.5 inches (140 mm)

# Cryogenic Varipak

## 28000 EB Series

### Simplified maintenance

This Varipak control valve design meets the requirements of cryogenic processes that require thermal insulation. An insulating interface sets up between the valve body (cold zone) and the body extension located in the higher temperature area (warm zone). The valve body assembly and its thermal extension are positioned inside the cold box, and the plug can easily be removed and inspected without disturbing the valve body. This eliminates the need for any preliminary, complicated dismounting, and more importantly, prevents any interference with the cold box.

### Body

Manufactured from a material suitable for low temperatures, the valve body maintains ductility in service. It can be conveniently mounted to suit specific piping needs, as long as the angle between the valve axis and vertical does not exceed 60°.

The bonnet is located away from the cryogenic fluid, which means that the body gasket is not inside the cold zone. This design prevents any leakage of the cryogen into the insulated zone.

### Body extension

To reduce the inflow of heat by conduction, thin-walled metal tubes are used for the body extension and coupling sleeve. In addition, the annular space is reduced to exclude convection currents.

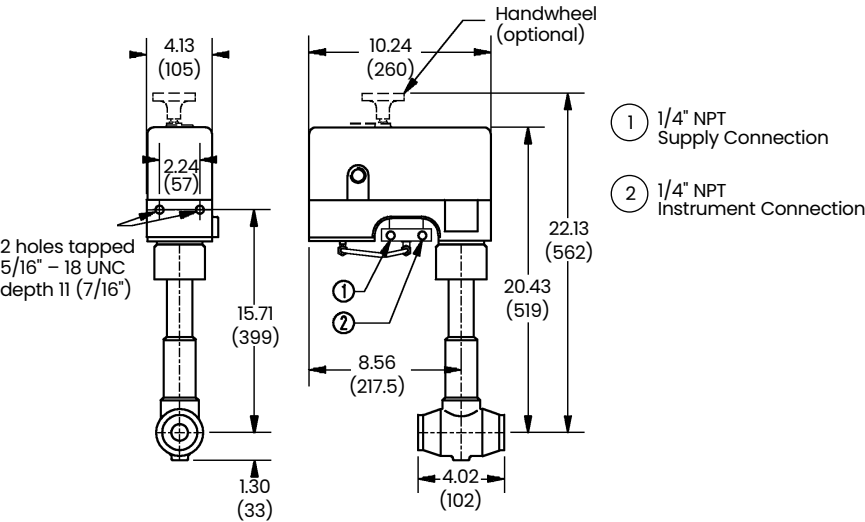
### Plug

The design of the plug allows the working parts to be accurately centered in relation to the seat and provides a uniform temperature zone for the guiding.

## Specific Characteristics

| Rated C <sub>v</sub> Range       | Temperature Range                      | Body Rating                                                                                       | Seat Leakage | Materials          |                                                                                                              |
|----------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------|--------------|--------------------|--------------------------------------------------------------------------------------------------------------|
| 3.8 to 0.10<br>(trim No. 0 to 5) | -320°F to +300°F<br>(-196°C to +150°C) | ASME Class 150-600<br>ISO PN 20-100<br>excepted trim No. 0:<br>ASME Class 150-300<br>ISO PN 20-50 | Class IV     | Body and Extension | ASTM A 182 Gr. F 316L                                                                                        |
|                                  |                                        |                                                                                                   |              | Plug/Stem          | Standard Material                                                                                            |
|                                  |                                        |                                                                                                   |              | Seat               | Trim No. 0: Standard Material<br>Trim No. 1 to 5: ASTM A 564 Gr. 630<br>Condition H900 Type 17-4 PH. St. St. |
|                                  |                                        |                                                                                                   |              | O-ring Seat Gasket | PTFE                                                                                                         |
|                                  |                                        |                                                                                                   |              | Other Parts        | Refer to Standard Materials of Construction table on page 8.                                                 |

## Dimensions – inches (mm)

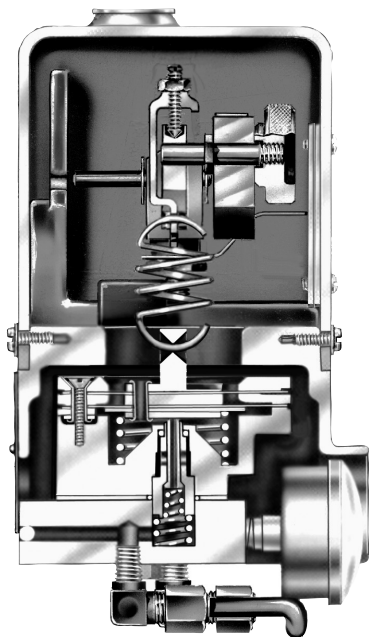


Provide a removal clearance of 5.5 inches (140 mm)



Figure 17: Cryogenic Varipak

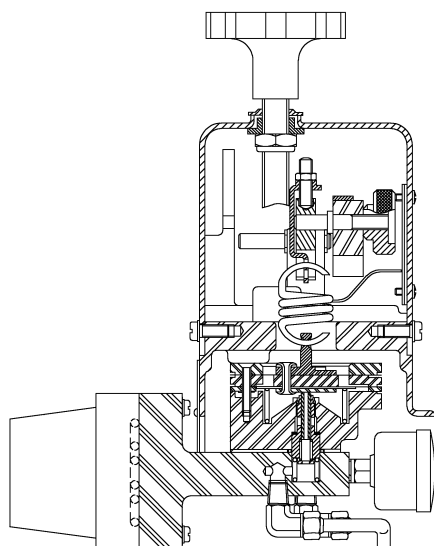
# Accessories and options



**Figure 18: Model 7700P  
Pneumatic Positioner**

## Pneumatic Positioner (Model 7700P)

|                         |                                                                                                                                                                  |                        |                                                                                                                                         |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Type                    | pneumatic, force balance                                                                                                                                         | Supply pressure effect | 0.05 percent of full stroke variation per psi supply pressure change (0.07 percent per 100 mbar)                                        |
| Mounting                | built-in bracket in actuator                                                                                                                                     | Open loop gain         | 70                                                                                                                                      |
| Action                  | direct: increasing instrument signal increases air output                                                                                                        | Linearity              | ± 0.5 percent                                                                                                                           |
| Characteristics         | linear                                                                                                                                                           | Sensitivity            | 0.1 percent                                                                                                                             |
| Instrument signal       | 3 to 15, 6 to 30 or 3 to 27 psi<br>200 to 1000, 400 to 2050 or (200 to 1850 mbar)<br>3 to 9, and 9 to 15 psi<br>(200 to 600 and 600 to 1000 mbar)<br>split range | Repeatability          | 0.1 percent                                                                                                                             |
| Connections             | 1/4" NPT instrument and supply –<br>1/8" NPT output                                                                                                              | Full stroke time       | less than one second                                                                                                                    |
| Average air consumption | 0.15 scfm at 30 psi supply<br>(0.26 Nm <sup>3</sup> /h at 2.1 bar supply)                                                                                        | Weight                 | 3.3 lbs (1.5 kg)                                                                                                                        |
| Max. air output         | 4.20 scfm (7 Nm <sup>3</sup> /h)                                                                                                                                 | Other Accessories      | Proximity sensors and limit switches<br>Digital positioners – HART and<br>Fieldbus Foundation<br>Handwheel, airsets and solenoid valves |



**Figure 19: Model 7700E  
Electropneumatic Positioner**

## Electropneumatic Positioner (Model 7700E)

|                         |                                                           |                                                       |                                                                                        |
|-------------------------|-----------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------|
| Type                    | electropneumatic, force balance                           | <b>Hazardous Location Protection</b>                  |                                                                                        |
| Mounting                | compact, without external linkage to the actuator         | ATEX Approvals (2014/34/EU Directive)                 | Explosionproof<br>No. SIRA 02 ATEX 1274<br>Intrinsic Safety<br>No. SIRA 02 ATEX 2277 X |
| Action                  | direct: increasing instrument signal increases air output | FM (Factory Mutual) Approvals                         | Explosionproof<br>Intrinsic Safety<br>Non-incendive and<br>Dust-ignitionproof          |
| Characteristics         | linear                                                    | CSA Approvals<br>(Canadian Standards Association)     | Explosionproof<br>Intrinsic Safety<br>Non-incendive                                    |
| Instrument signal       | 4–20 mA                                                   | CUTR Approvals<br>(Custom Union Technical Regulation) | Explosionproof<br>Intrinsic Safety                                                     |
| Air Connections         | 1/4" NPT supply – 1/8" NPT output                         |                                                       |                                                                                        |
| Average air consumption | 0.24 scfm (0.4 Nm <sup>3</sup> /h)                        |                                                       |                                                                                        |
| Electrical connections  | 1/2" NPT or M20                                           |                                                       |                                                                                        |
| Weight                  | 7.7 lbs (3.5 kg)                                          |                                                       |                                                                                        |

# Standard Actuator options

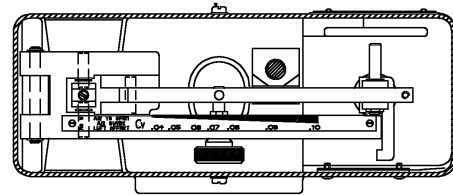
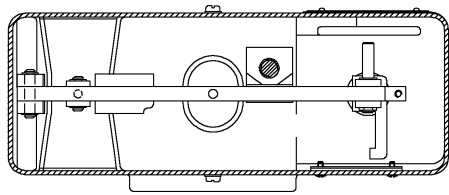
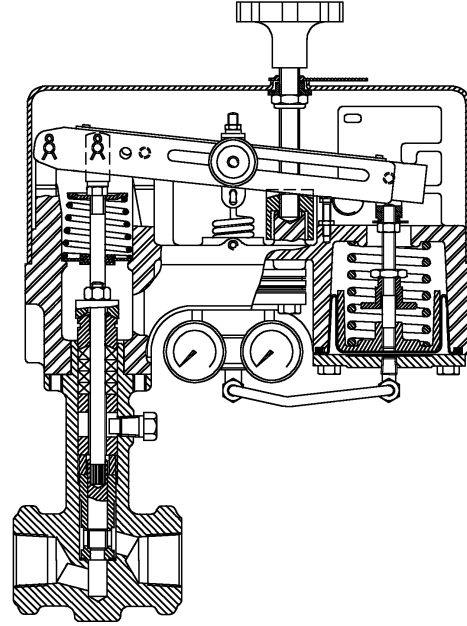
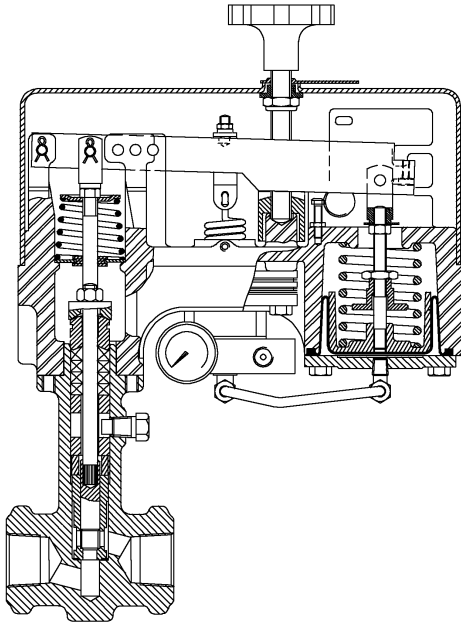


Figure 20: Non-Adjustable Cv Actuator

Figure 22: Adjustable Cv Actuator

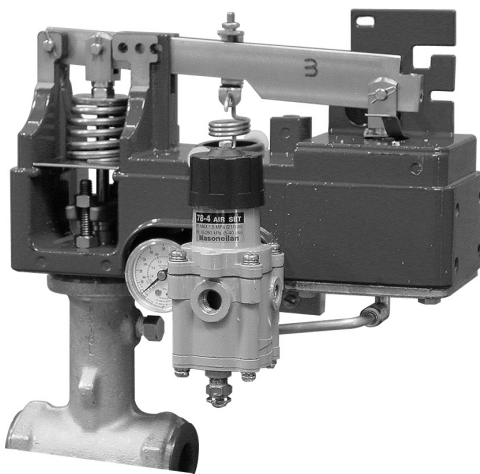
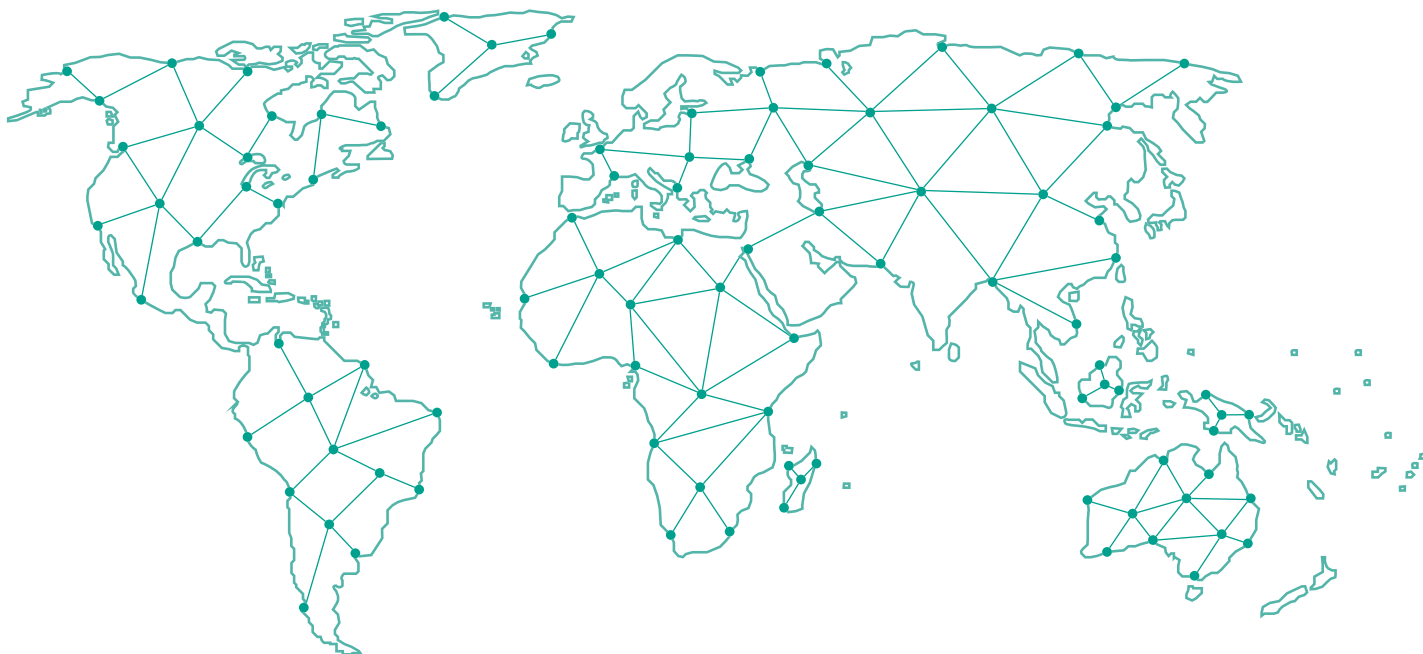


Figure 21: Varipak with Non-Adjustable Cv Actuator (cover removed)



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