

# Needle Valves

Catalog 4110-NV

June 2019

aerospace  
climate control  
electromechanical  
filtration  
**fluid & gas handling**  
hydraulics  
pneumatics  
**process control**  
sealing & shielding



ENGINEERING YOUR SUCCESS.



4F-V6LQ-11AC-SS



8Z-V6LR-SS



4M-NP6LK-SSP

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\* Actual pressure rating will be determined by the valve configuration, body material, seat material and other factors.

**⚠ WARNING – USER RESPONSIBILITY**

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**Offer of Sale**

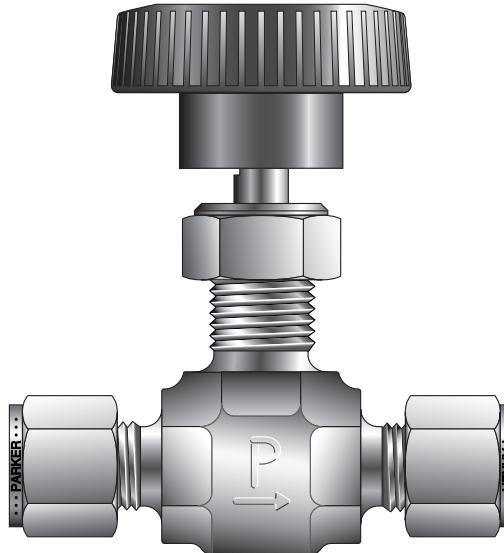
The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document or available at [www.parker.com/ipdus](http://www.parker.com/ipdus).

## Introduction

Parker V Series Needle Valves are designed for positive leak tight shut-off and regulation of fluids in process, power, and instrumentation applications. With a wide variety of port sizes and styles, temperature capabilities ranging from -65°F to 450°F (-54°C to 232°C) and pressures to 5000 psig (345 bar), V Series Needle Valves provide the user with the utmost in flexibility when designing miniaturized tubing or piping systems.

## Features

- ▶ Choice of three stem types:
  - R-Stem – All metal, blunt stem tip
  - N-Stem – All metal, tapered needle stem tip
  - K-Stem – PCTFE stem tip
- ▶ Differential hardness between the strain hardened stem and cold formed body threads provides improved cycle life
- ▶ Choice of PTFE packing or elastomeric O-ring stem seals
- ▶ 316 Stainless Steel, Brass and Monel® Alloy 400 construction
- ▶ Inline and angle patterns
- ▶ Wide variety of US Customary and SI ports
- ▶ Panel mountable
- ▶ 100% factory tested
- ▶ Optional color coded handles



Model Shown: 4Z-V4LK-SS

## Specifications

### Pressure Ratings:

316 Stainless Steel: 5000 psig (345 bar) CWP  
Brass and Monel® Alloy 400:  
3000 psig (207 bar) CWP

Orifice: 0.078" to 0.312" (2.0mm to 7.9mm)

C<sub>v</sub>: 0.12 to 1.90

Port size: 1/8" to 3/4" (3mm to 12mm)

### Temperature Ratings:

Stainless Steel and Monel® Alloy 400:  
-65°F to 450°F (-54°C to 232°C)

Brass: -65°F to 400°F (-54°C to 204°C)

PTFE Packing:

-65°F to 450°F (-54°C to 232°C)

PCTFE Stem Tip:

-65°F to 350°F (-54°C to 177°C)

Nitrile Rubber Stem Seal:

-30°F to 250°F (-34°C to 121°C)

Fluorocarbon Rubber Stem Seal:

-15°F to 400°F (-26°C to 204°C)

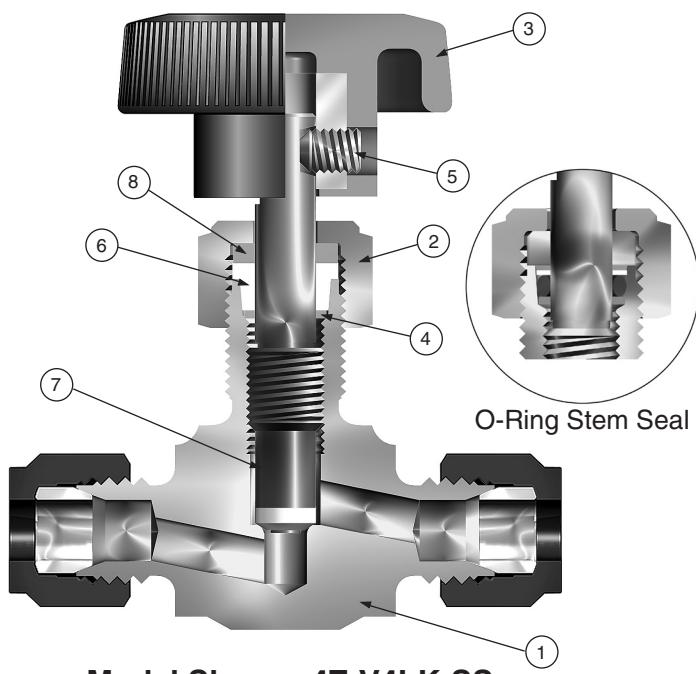
Ethylene Propylene Rubber Stem Seal:

-70°F to 275°F (-57°C to 135°C)

**Note:** When combining body, seat and seal materials, the most restrictive temperature rating becomes the limiting factor on temperature range.

Monel® Alloy 400 is the registered trademark of Special Metals Corporation.

## Materials of Construction (with PTFE Packing)

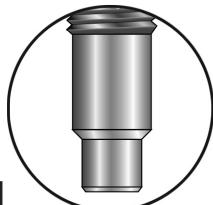


Model Shown: 4Z-V4LK-SS

## Stem Types



**K**  
PCTFE tipped

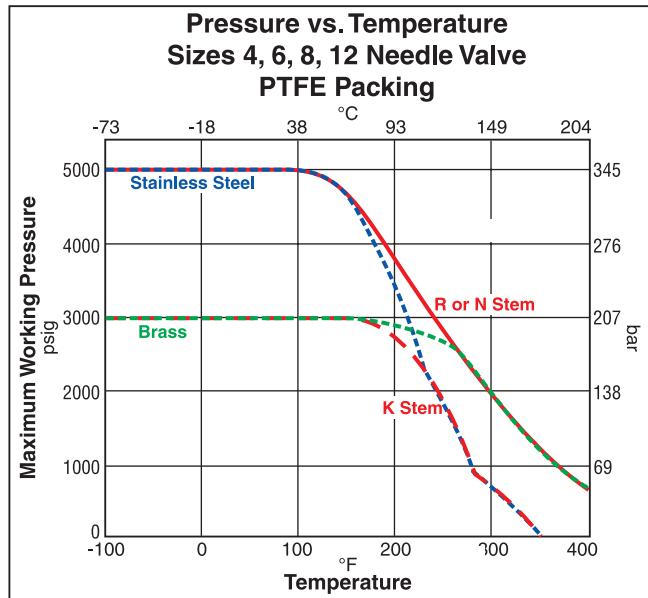
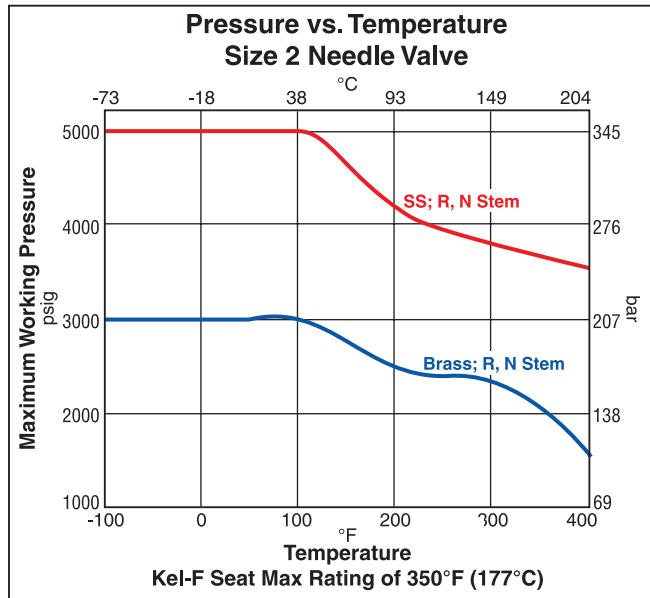


**N**  
Needle (2-1/2°)



**R**  
Blunt (30°)

## Pressure vs. Temperature



Note: To determine MPa, multiply bar by 0.1

## Materials of Construction (with PTFE Packing)

| Item # | Part Description        | Stainless Steel                       | Brass                                 | Monel® Alloy 400            |
|--------|-------------------------|---------------------------------------|---------------------------------------|-----------------------------|
| 1      | Body                    | ASTM A 182<br>Type F316               | ASTM B 283<br>Alloy C37700            | ASTM B 564<br>Alloy N04400  |
| 2      | Packing Nut             | ASTM A 479<br>Type 316                | ASTM A 479<br>Type 316                | ASTM A 479<br>Type 316      |
| 3      | Handle*                 | Nylon 6/6<br>with SS insert           | Nylon 6/6<br>with SS insert           | Nylon 6/6<br>with SS insert |
| 4      | Lower Packing<br>Washer | ASTM A 479<br>Type 316                | ASTM A 479<br>Type 316                | ASTM B 164<br>Alloy N04400  |
| 5      | Handle Screw            | Stainless Steel                       | Stainless Steel                       | Stainless Steel             |
| 6      | Packing**               | PTFE                                  | PTFE                                  | PTFE                        |
| 7      | Stem<br>(R and N Stem)  | ASTM A 276<br>Type 316                | ASTM A 276<br>Type 316                | ASTM B 164<br>Alloy N04400  |
| 7A     | Stem<br>(K Stem)        | ASTM A 276<br>Type 316,<br>with PCTFE | ASTM A 276<br>Type 316,<br>with PCTFE | ASTM B 164<br>with PCTFE    |
| 8      | Upper Packing<br>Washer | Brass                                 | Brass                                 | Brass                       |
| 9      | Panel Nut***            | 316 Stainless Steel                   | 316 Stainless Steel                   | 316 Stainless Steel         |

\* Handles for V8 and V12 Series Valves with R and N Stems are aluminum T-bars.

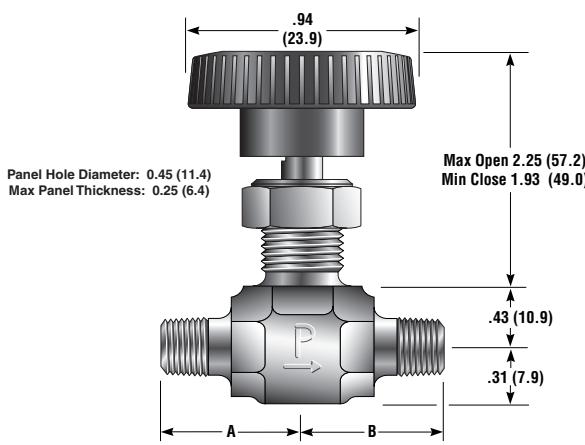
\*\* Optional O-ring elastomeric stem seals are available – See How to Order.

\*\*\* Panel Nut is nickel plated brass on V2 Series Valves. Panel Nuts must be ordered separately – See page 7.

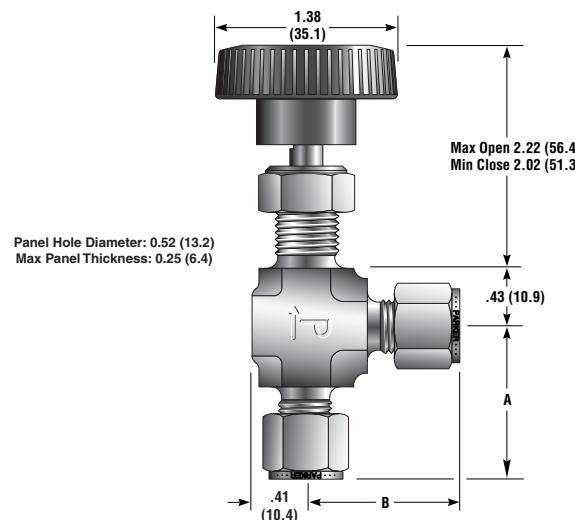
Lubrication: Perfluorinated Polyether

## Dimensions / Flow Data

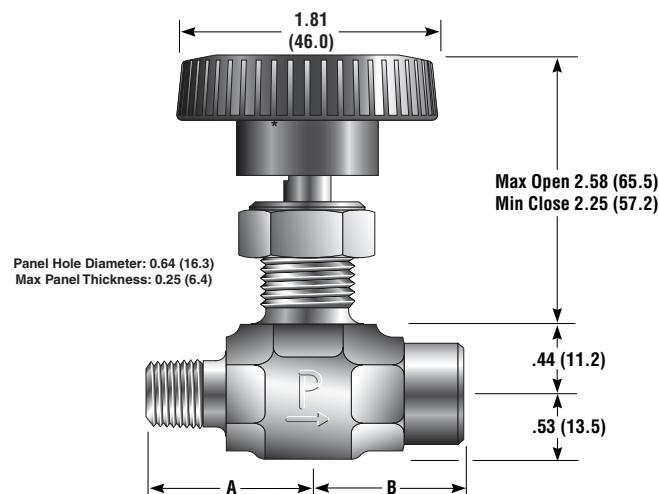
V



Model Shown: 2M-V2LN-SS



Model Shown: 4A-V4AR-BN-B



Model Shown: 6M4F-V6LR-V-SS

\* Note: Handle diameter for K Stem V6 Series Valves is 1.38 (35.4)  
( ) Denotes dimensions in millimeters

## Dimensions / Flow Data

| Basic Part Number |              | End Connections         |                 | Stem Type | Flow Data |        |       |         | Dimensions |           |             |
|-------------------|--------------|-------------------------|-----------------|-----------|-----------|--------|-------|---------|------------|-----------|-------------|
|                   |              | Inlet (Port 1)          | Outlet (Port 2) |           | Orifice   | Inline | Angle | $X_T^*$ | A† and B†  | Inch (mm) |             |
| Inline            | Angle        |                         |                 |           | Inch      | mm     | $C_V$ | $X_T^*$ | $C_V$      | $X_T^*$   | Inch (mm)   |
| 2A-V2LR-SS        | 2A-V2AR-SS   | 1/8" Compression A-LOK® |                 | Blunt     | 0.078     | 2.0    | 0.12  | 0.78    | 0.14       | 0.67      | 1.01 (25.7) |
| 2A-V2LN-SS        | 2A-V2AN-SS   |                         |                 | Needle    |           |        | 0.12  | 0.80    | 0.14       | 0.63      |             |
| 2A-V2LK-SS        | 2A-V2AK-SS   |                         |                 | PCTFE     |           |        | 0.13  | 0.83    | 0.14       | 0.63      |             |
| 2F-V2LR-SS        | 2F-V2AR-SS   | 1/8" Female NPT         |                 | Blunt     | 0.093     | 2.4    | 0.13  | 0.61    | 0.16       | 0.49      | 0.94 (23.9) |
| 2F-V2LN-SS        | 2F-V2AN-SS   |                         |                 | Needle    |           |        | 0.12  | 0.66    | 0.18       | 0.39      |             |
| 2F-V2LK-SS        | 2F-V2AK-SS   |                         |                 | PCTFE     |           |        | 0.12  | 0.73    | 0.17       | 0.54      |             |
| 2M-V2LR-SS        | 2M-V2AR-SS   | 1/8" Male NPT           |                 | Blunt     | 0.093     | 2.4    | 0.13  | 0.61    | 0.16       | 0.49      | 0.75 (19.1) |
| 2M-V2LN-SS        | 2M-V2AN-SS   |                         |                 | Needle    |           |        | 0.12  | 0.66    | 0.18       | 0.39      |             |
| 2M-V2LK-SS        | 2M-V2AK-SS   |                         |                 | PCTFE     |           |        | 0.12  | 0.73    | 0.17       | 0.54      |             |
| 2Z-V2LR-SS        | 2Z-V2AR-SS   | 1/8" Compression CPI™   |                 | Blunt     | 0.078     | 2.0    | 0.12  | 0.78    | 0.14       | 0.67      | 1.01 (25.7) |
| 2Z-V2LN-SS        | 2Z-V2AN-SS   |                         |                 | Needle    |           |        | 0.12  | 0.80    | 0.14       | 0.63      |             |
| 2Z-V2LK-SS        | 2Z-V2AK-SS   |                         |                 | PCTFE     |           |        | 0.13  | 0.83    | 0.14       | 0.63      |             |
| 2F-V4LR-SS        | 2F-V4AR-SS   | 1/8" Female NPT         |                 | Blunt     | 0.176     | 4.5    | 0.43  | 0.77    | 0.55       | 0.63      | 0.81 (20.6) |
| 2F-V4LN-SS        | 2F-V4AN-SS   |                         |                 | Needle    |           |        | 0.43  | 0.69    | 0.55       | 0.63      |             |
| 2F-V4LK-SS        | 2F-V4AK-SS   |                         |                 | PCTFE     |           |        | 0.45  | 0.55    | 0.58       | 0.68      |             |
| 4A-V4LR-SS        | 4A-V4AR-SS   | 1/4" Compression A-LOK® |                 | Blunt     | 0.176     | 4.5    | 0.43  | 0.85    | 0.55       | 0.63      | 1.15 (29.2) |
| 4A-V4LN-SS        | 4A-V4AN-SS   |                         |                 | Needle    |           |        | 0.43  | 0.77    | 0.55       | 0.63      |             |
| 4A-V4LK-SS        | 4A-V4AK-SS   |                         |                 | PCTFE     |           |        | 0.45  | 0.69    | 0.58       | 0.68      |             |
| 4M-V4LR-SS        | 4M-V4AR-SS   | 1/4" Male NPT           |                 | Blunt     | 0.176     | 4.5    | 0.43  | 0.85    | 0.55       | 0.63      | 0.94 (23.9) |
| 4M-V4LN-SS        | 4M-V4AN-SS   |                         |                 | Needle    |           |        | 0.43  | 0.77    | 0.55       | 0.63      |             |
| 4M-V4LK-SS        | 4M-V4AK-SS   |                         |                 | PCTFE     |           |        | 0.45  | 0.69    | 0.58       | 0.68      |             |
| 4Z-V4LR-SS        | 4Z-V4AR-SS   | 1/4" Compression CPI™   |                 | Blunt     | 0.176     | 4.5    | 0.43  | 0.85    | 0.55       | 0.63      | 1.15 (29.2) |
| 4Z-V4LN-SS        | 4Z-V4AN-SS   |                         |                 | Needle    |           |        | 0.43  | 0.77    | 0.55       | 0.63      |             |
| 4Z-V4LK-SS        | 4Z-V4AK-SS   |                         |                 | PCTFE     |           |        | 0.45  | 0.69    | 0.58       | 0.68      |             |
| M6A-V4LR-SS       | M6A-V4AR-SS  | 6mm Compression A-LOK®  |                 | Blunt     | 0.156     | 4.0    | 0.37  | 0.78    | 0.48       | 0.60      | 1.15 (29.2) |
| M6A-V4LN-SS       | M6A-V4AN-SS  |                         |                 | Needle    |           |        | 0.37  | 0.72    | 0.48       | 0.58      |             |
| M6A-V4LK-SS       | M6A-V4AK-SS  |                         |                 | PCTFE     |           |        | 0.39  | 0.62    | 0.51       | 0.64      |             |
| M6Z-V4LR-SS       | M6Z-V4AR-SS  | 6mm Compression CPI™    |                 | Blunt     | 0.156     | 4.0    | 0.37  | 0.78    | 0.48       | 0.60      | 1.15 (29.2) |
| M6Z-V4LN-SS       | M6Z-V4AN-SS  |                         |                 | Needle    |           |        | 0.37  | 0.72    | 0.48       | 0.58      |             |
| M6Z-V4LK-SS       | M6Z-V4AK-SS  |                         |                 | PCTFE     |           |        | 0.39  | 0.62    | 0.51       | 0.64      |             |
| 4F-V6LR-SS        | 4F-V6AR-SS   | 1/4" Female NPT         |                 | Blunt     | 0.228     | 5.8    | 0.73  | 0.90    | 1.23       | 0.50      | 0.94 (23.9) |
| 4F-V6LN-SS        | 4F-V6AN-SS   |                         |                 | Needle    |           |        | 0.55  | 0.61    | 0.92       | 0.62      |             |
| 4F-V6LK-SS        | 4F-V6AK-SS   |                         |                 | PCTFE     |           |        | 0.80  | 0.87    | 1.23       | 0.56      |             |
| 6A-V6LR-SS        | 6A-V6AR-SS   | 3/8" Compression A-LOK® |                 | Blunt     | 0.228     | 5.8    | 0.73  | 0.90    | 1.23       | 0.50      | 1.29 (32.8) |
| 6A-V6LN-SS        | 6A-V6AN-SS   |                         |                 | Needle    |           |        | 0.55  | 0.61    | 0.92       | 0.62      |             |
| 6A-V6LK-SS        | 6A-V6AK-SS   |                         |                 | PCTFE     |           |        | 0.80  | 0.87    | 1.23       | 0.56      |             |
| 6M-V6LR-SS        | 6M-V6AR-SS   | 3/8" Male NPT           |                 | Blunt     | 0.228     | 5.8    | 0.73  | 0.90    | 1.23       | 0.50      | 1.03 (26.2) |
| 6M-V6LN-SS        | 6M-V6AN-SS   |                         |                 | Needle    |           |        | 0.55  | 0.61    | 0.92       | 0.62      |             |
| 6M-V6LK-SS        | 6M-V6AK-SS   |                         |                 | PCTFE     |           |        | 0.80  | 0.87    | 1.23       | 0.56      |             |
| 6Z-V6LR-SS        | 6Z-V6AR-SS   | 3/8" Compression CPI™   |                 | Blunt     | 0.228     | 5.8    | 0.73  | 0.90    | 1.23       | 0.50      | 1.29 (32.8) |
| 6Z-V6LN-SS        | 6Z-V6AN-SS   |                         |                 | Needle    |           |        | 0.55  | 0.61    | 0.92       | 0.62      |             |
| 6Z-V6LK-SS        | 6Z-V6AK-SS   |                         |                 | PCTFE     |           |        | 0.80  | 0.87    | 1.23       | 0.56      |             |
| M10A-V6LR-SS      | M10A-V6AR-SS | 10mm Compression A-LOK® |                 | Blunt     | 0.228     | 5.8    | 0.73  | 0.90    | 1.23       | 0.50      | 1.30 (33.0) |
| M10A-V6LN-SS      | M10A-V6AN-SS |                         |                 | Needle    |           |        | 0.55  | 0.61    | 0.92       | 0.62      |             |
| M10A-V6LK-SS      | M10A-V6AK-SS |                         |                 | PCTFE     |           |        | 0.80  | 0.87    | 1.23       | 0.56      |             |
| M10Z-V6LR-SS      | M10Z-V6AR-SS | 10mm Compression CPI™   |                 | Blunt     | 0.228     | 5.8    | 0.73  | 0.90    | 1.23       | 0.50      | 1.30 (33.0) |
| M10Z-V6LN-SS      | M10Z-V6AN-SS |                         |                 | Needle    |           |        | 0.55  | 0.61    | 0.92       | 0.62      |             |
| M10Z-V6LK-SS      | M10Z-V6AK-SS |                         |                 | PCTFE     |           |        | 0.80  | 0.87    | 1.23       | 0.56      |             |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = x_T$ .

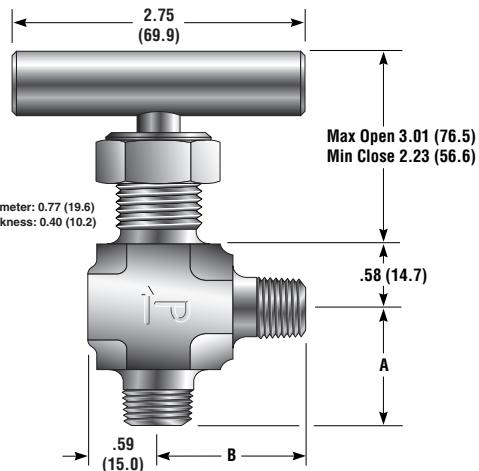
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

( ) Denotes dimensions in millimeters

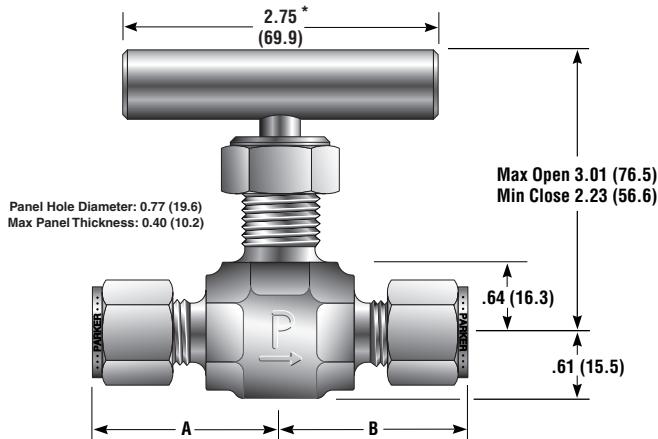
Dimensions in inches/millimeters are for reference only, subject to change.

V





Model Shown: 8M-V8AN-EPR-SS



Model Shown: 10Z-V12LN-B

## Dimensions / Flow Data - continued

| Basic Part Number |              | End Connections         |                 | Stem Type | Flow Data |     |        |         | Dimensions |         |             |
|-------------------|--------------|-------------------------|-----------------|-----------|-----------|-----|--------|---------|------------|---------|-------------|
|                   |              | Inlet (Port 1)          | Outlet (Port 2) |           | Orifice   |     | Inline |         | Angle      |         |             |
| Inline            | Angle        |                         |                 |           | Inch      | mm  | $C_v$  | $X_T^*$ | $C_v$      | $X_T^*$ | Inch (mm)   |
| 6F-V8LR-SS        | 6F-V8AR-SS   | 3/8" Female NPT         |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.34 (34.0) |
| 6F-V8LN-SS        | 6F-V8AN-SS   |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 6F-V8LK-SS        | 6F-V8AK-SS   |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| 8A-V8LR-SS        | 8A-V8AR-SS   | 1/2" Compression A-LOK® |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.53 (38.9) |
| 8A-V8LN-SS        | 8A-V8AN-SS   |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 8A-V8LK-SS        | 8A-V8AK-SS   |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| 8M-V8LR-SS        | 8M-V8AR-SS   | 1/2" Male NPT           |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.34 (34.0) |
| 8M-V8LN-SS        | 8M-V8AN-SS   |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 8M-V8LK-SS        | 8M-V8AK-SS   |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| 8Z-V8LR-SS        | 8Z-V8AR-SS   | 1/2" Compression CPI™   |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.53 (38.9) |
| 8Z-V8LN-SS        | 8Z-V8AN-SS   |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 8Z-V8LK-SS        | 8Z-V8AK-SS   |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| M12A-V8LR-SS      | M12A-V8AR-SS | 12mm Compression A-LOK® |                 | Blunt     | 0.281     | 7.1 | 1.13   | 0.79    | 1.52       | 0.66    | 1.51 (38.4) |
| M12A-V8LN-SS      | M12A-V8AN-SS |                         |                 | Needle    |           |     | 0.97   | 0.78    | 1.18       | 0.75    |             |
| M12A-V8LK-SS      | M12A-V8AK-SS |                         |                 | PCTFE     |           |     | 1.18   | 0.80    | 1.69       | 0.66    |             |
| M12Z-V8LR-SS      | M12Z-V8AR-SS | 12mm Compression CPI™   |                 | Blunt     | 0.281     | 7.1 | 1.13   | 0.79    | 1.52       | 0.66    | 1.51 (38.4) |
| M12Z-V8LN-SS      | M12Z-V8AN-SS |                         |                 | Needle    |           |     | 0.97   | 0.78    | 1.18       | 0.75    |             |
| M12Z-V8LK-SS      | M12Z-V8AK-SS |                         |                 | PCTFE     |           |     | 1.18   | 0.80    | 1.69       | 0.66    |             |
| 8F-V12LR-SS       | 8F-V12AR-SS  | 1/2" Female NPT         |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.38 (35.1) |
| 8F-V12LN-SS       | 8F-V12AN-SS  |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 8F-V12LK-SS       | 8F-V12AK-SS  |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| 10A-V12LR-SS      | 10A-V12AR-SS | 5/8" Compression A-LOK® |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.52 (38.6) |
| 10A-V12LN-SS      | 10A-V12AN-SS |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 10A-V12LK-SS      | 10A-V12AK-SS |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| 10Z-V12LR-SS      | 10Z-V12AR-SS | 5/8" Compression CPI™   |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.52 (38.6) |
| 10Z-V12LN-SS      | 10Z-V12AN-SS |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 10Z-V12LK-SS      | 10Z-V12AK-SS |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| 12A-V12LR-SS      | 12A-V12AR-SS | 3/4" Compression A-LOK® |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.52 (38.6) |
| 12A-V12LN-SS      | 12A-V12AN-SS |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 12A-V12LK-SS      | 12A-V12AK-SS |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |
| 12Z-V12LR-SS      | 12Z-V12AR-SS | 3/4" Compression CPI™   |                 | Blunt     | 0.312     | 7.9 | 1.23   | 0.87    | 1.66       | 0.72    | 1.52 (38.6) |
| 12Z-V12LN-SS      | 12Z-V12AN-SS |                         |                 | Needle    |           |     | 1.05   | 0.83    | 1.28       | 0.80    |             |
| 12Z-V12LK-SS      | 12Z-V12AK-SS |                         |                 | PCTFE     |           |     | 1.29   | 0.91    | 1.90       | 0.76    |             |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = x_T$ .

† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

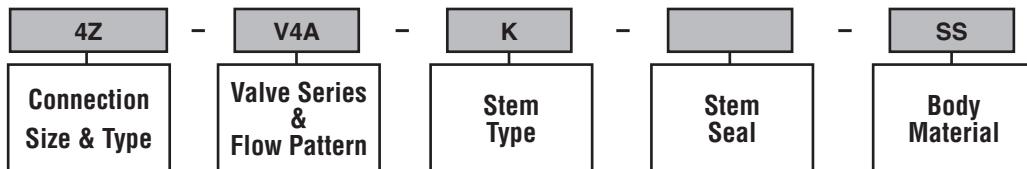
( ) Denotes dimensions in millimeters

Dimensions in inches/millimeters are for reference only, subject to change.

## How to Order

The part number sequence identifies product characteristics as shown below

**Example: 4Z-V4AK-SS** describes an angle pattern V4 Series needle valve equipped with 1/4" CPI™ compression inlet and outlet ports, a PCTFE tipped stem, PTFE seals, and stainless steel construction.



## How to Order Options

**O-Ring Packing** - Add the designator corresponding to the desired elastomer to the part number **BN** - Nitrile Rubber, **EPR** - Ethylene Propylene Rubber, or **V** - Fluorocarbon Rubber. **Example : 6A-V6LN-EPR-SS**

**Available Body Materials** - **B** (Brass) or - **M** (Monel® Alloy 400) **Example: 8Z-V8LN-B**

**Oxygen Cleaning** – Add the suffix **-C3** to the end of the part number to receive valves cleaned in accordance with ASTM G93 level C, class 500. This ASTM details cleaning methods and cleanliness levels for materials and equipment used in oxygen-enriched environments. **Example: 4A-V4AN-EPR-SS-C3**

## How to Order Components

**Colored Round Nylon Handles with Handle Screw** – Valve Series-Handle-Color (**B** - blue, **G** - green, **R** - red)  
**Example: V4-HANDLE-BLUE**

**Stainless Steel T-Bar Handles with Handle Screw** – **Examples:** V2: V2-BAR-HANDLE-SS;  
 V4: V4-BAR-HANDLE-SS; V6: V6-BAR-HANDLE-SS; V8: U12-BAR-HANDLE-SS; V12: U12-BAR-HANDLE-SS

**Aluminum T-Bar Handles with Handle Screw** – **Examples:** V2: Not available; V4: V4-BAR-HANDLE-AL;  
 V6: V4-BAR-HANDLE-AL; V8: U12-BAR-HANDLE-AL; V12: U12-BAR-HANDLE-AL

**Panel Mounting Nuts** – **Examples:** V2: 2-Panel-Nut-SS; V4: 4-Panel-Nut-SS; V6: 6-Panel-Nut-SS;  
 V8: 8-Panel-Nut-SS

## How to Order Maintenance Kits

**PTFE Packing Stem Kits** – Consists of One Stem; One PTFE Packing; One Upper Packing Washer; One Lower Packing Washer; One Packing Nut; Maintenance Instructions.

Kit-Valve Series and StemType-Body Material. **Examples: KIT-V4K-SS; KIT-V6N-B**

**Fluorocarbon Rubber Packing Stem Kits** – Consists of One Stem; One Fluorocarbon Rubber O-ring Seal; One O-ring Back-up Gland; One O-ring Gland; One Lower Packing Washer; One Packing Nut; Maintenance Instructions.

Kit-Valve Series and Stem Type-V-Body Material. **Examples: KIT-V2R-V-B; KIT-V4K-V-SS**

**Nitrile Rubber Packing Stem Kits** – Consists of One Stem; One Nitrile Rubber O-ring Seal; One O-ring Back-up Gland; One O-ring Gland; One Lower Packing Washer; One Packing Nut; Maintenance Instructions.

Kit-Valve Series and Stem Type-BN-Body Material. **Examples: KIT-V2R-BN-B; KIT-V4K-BN-SS**

**Ethylene Propylene Rubber Packing Stem Kits** – Consists of One Stem; One Ethylene Propylene Rubber O-ring Seal; One O-ring Back-up Gland; One O-ring Gland; One Lower Packing Washer; One Packing Nut; Maintenance Instructions.

Kit-Valve Series and Stem Type-EPR-Body Material. **Examples: KIT-V2R-EPR-B; KIT-V4K-EPR-SS**

## Introduction

Parker U Series Union Bonnet Valves have been engineered for use at pressures up to 6,000 (414 bar) and temperatures as high as 1,200°F (649°C). A non-rotating lower stem helps to extend packing life by removing rotation from the packing area. Stem packing below the threads isolates the thread lubricant from the flow, ensuring adequate lubrication regardless of the media.

## Features

- Union bonnet design ensures high integrity seal under severe service applications
- Packing below the power threads protects thread lubricants from media and isolates the lubricants from the media
- Dust seal in the packing nut protects stem threads from external contamination
- Stem swivel above the packing eliminates entrapment area and increases packing life
- Choice of Grafoil® or PTFE packing
- Choice of Regulating or Blunt stem types. Blunt stem type helps combat wire draw which may occur when two phase flow is present (i.e. steam service)
- 316 stainless steel construction
- Wide variety of US Customary and SI ports
- Panel mountable
- 100% factory tested

## Materials of Construction

| Item # | Description    | Material                   |
|--------|----------------|----------------------------|
| *1     | Body           | ASTM A 182, Type F316      |
| 2      | Bonnet Nut     | ASTM A 479, Type 316       |
| *3     | Bonnet         | ASTM A 479, Type 316       |
| *4     | Lower Stem*    | ASTM A 564, Type 630       |
| 5      | Upper Stem     | ASTM A 564, Type 630       |
| 6      | Stem Guide     | ASTM A 581, Type 416       |
| 7      | Ball           | 440-C Stainless Steel      |
| *8     | Bonnet Seal**  | Nickel-Chromium-Iron Alloy |
| 9      | Packing Nut    | ASTM A 479, Type 316       |
| *10    | Packing***     | Grafoil®                   |
| *11    | Packing Washer | 316 Stainless Steel        |
| 12     | Handle****     | Aluminum                   |
| 13     | Handle Screw   | 316 Stainless Steel        |
| 14     | Dust Seal***** | Nylon 6/6                  |
| 15     | Locking Nut    | Stainless Steel            |

\* Wetted parts

\* Lower Stem material is ASTM A 276 Type 316 with HT option

\*\* Not required on U6 and U12 Series which have metal-to-metal seals

\*\*\* Optional PTFE Packing is available

\*\*\*\* Handle material is stainless steel with HT option

\*\*\*\*\* Dust Seal not available with HT option

Lubrication: Molybdenum disulfide with soft metallic fillers

## Specifications

### Pressure Rating:

6000 psig (414 bar) CWP

### Temperature Rating:

PTFE packing:

-65°F to 450°F (-54°C to 232°C)

Grafoil® packing:

-65°F to 700°F (-54°C to 371°C)

Grafoil® packing with HT option:

-65°F to 1200°F (-54°C to 649°C)

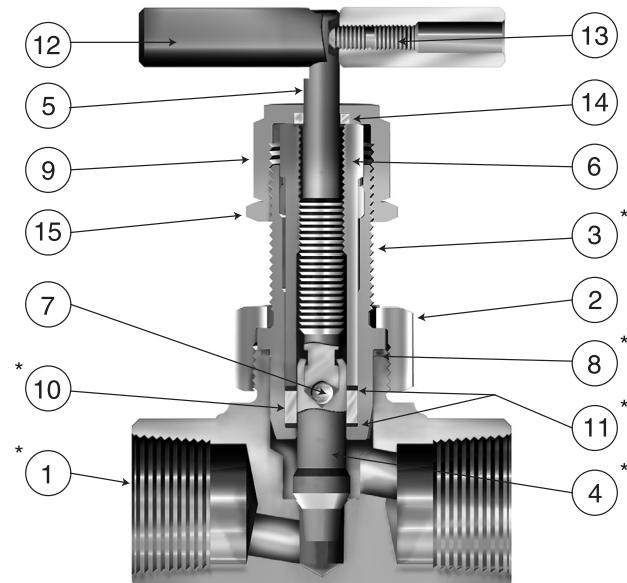
**Orifice:** .177" to .437" (4.5mm to 11.1mm)

**C<sub>v</sub>:** .53 to 3.55

### Pressure Rating and Tubing Selection:

For working pressures of A-LOK® and CPI™ tube connections, please see the Instrument Tubing Selection Guide (Bulletin 4200-TS), found in the Technical Section of the Parker Instrumentation Products Master Binder, or the Parker Instrument Tube Fitting Installation Manual (Bulletin 4200-B4).

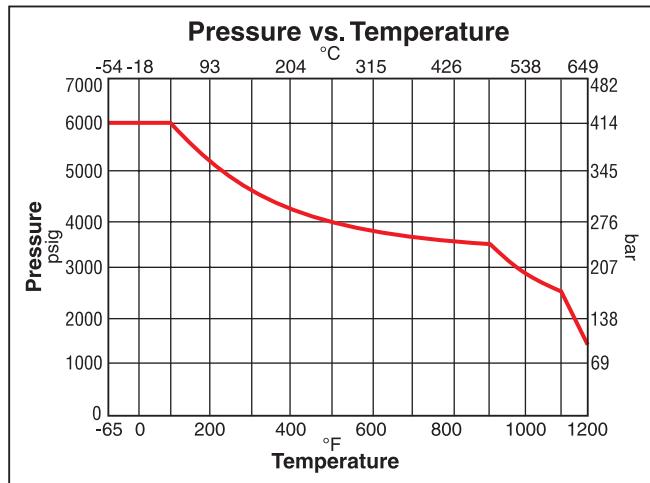
For working pressures of valves with external or internal pipe threads, please see Catalog 4260, Instrumentation Pipe Fittings.



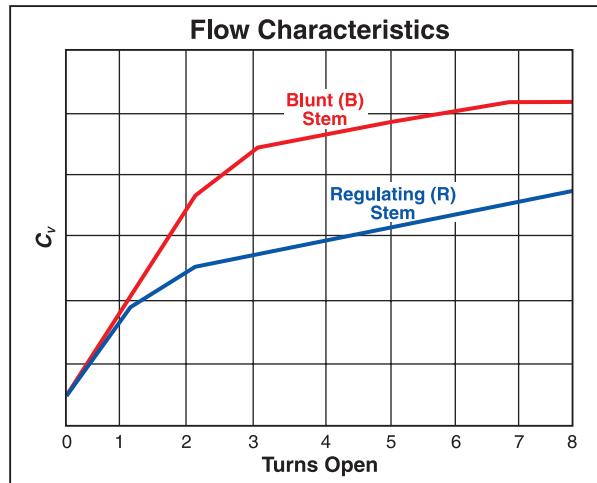
**Model Shown: 16F-U16LR-G-SS**

Grafoil® is a registered trademark GrafTech International Holdings, Inc.

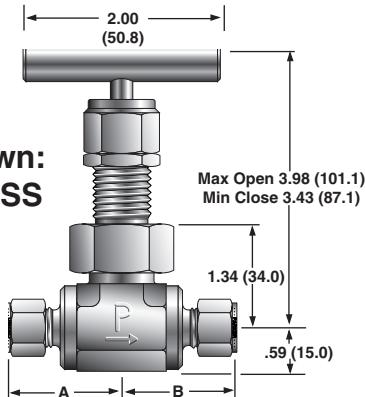
## Pressure vs. Temperature



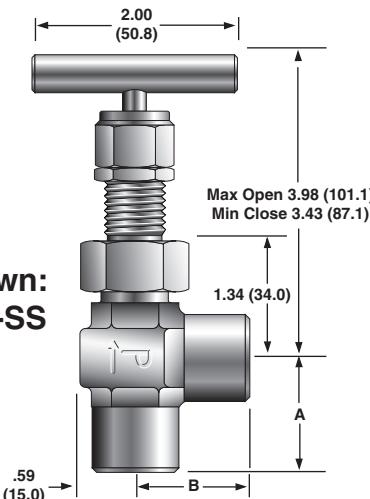
## Flow Characteristics



## Dimensions / Flow Data

Model Shown:  
4Z-U6LB-T-SS

() Denotes dimensions in millimeters

Panel Hole Diameter:  
0.65 (16.5)  
Max Panel Thickness:  
0.42 (10.7)Model Shown:  
4F-U6AR-T-SS

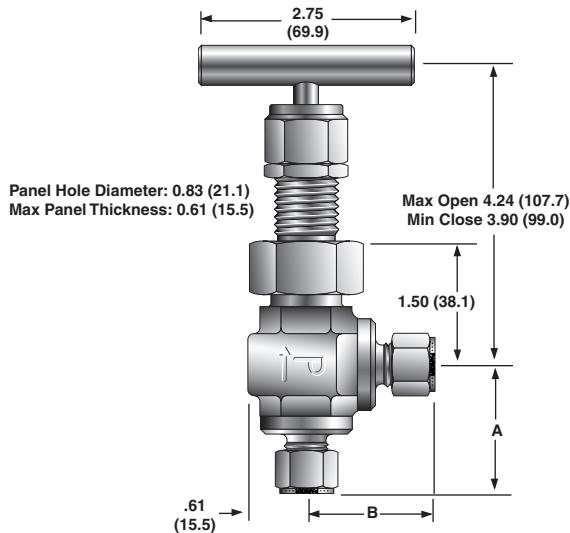
| Basic Part Number |               | End Connections         |                 | Stem Type  | Flow Data |                        |                        |           | Dimensions |      |        |
|-------------------|---------------|-------------------------|-----------------|------------|-----------|------------------------|------------------------|-----------|------------|------|--------|
|                   |               | Inlet (Port 1)          | Outlet (Port 2) |            | Orifice   | Inline                 | Angle                  | A† and B† |            |      |        |
| Inline            | Angle         | Inch                    | mm              | Regulating | Cv        | X <sub>T</sub> *<br>Cv | X <sub>T</sub> *<br>Cv | A† and B† | Inch (mm)  |      |        |
| 4A-U6LR-T-SS      | 4A-U6AR-T-SS  | 1/4" Compression A-LOK® |                 |            | 0.177     | 4.5                    | 0.53                   | 0.80      | 0.70       | 0.67 | 1.38   |
| 4A-U6LB-T-SS      | 4A-U6AB-T-SS  | Blunt                   | 0.177           | 4.5        | 0.65      | 0.48                   | 0.86                   | 0.40      | (35.1)     |      |        |
| 4F-U6LR-T-SS      | 4F-U6AR-T-SS  | 1/4" Female NPT         |                 | Regulating | 0.228     | 5.8                    | 0.78                   | 0.95      | 1.04       | 0.80 | 1.03   |
| 4F-U6LB-T-SS      | 4F-U6AB-T-SS  |                         |                 | Blunt      | 0.228     | 5.8                    | 0.82                   | 0.59      | 1.09       | 0.50 | (26.2) |
| 4W-U6LR-T-SS      | 4W-U6AR-T-SS  | 1/4" Socket Weld        |                 | Regulating | 0.177     | 4.5                    | 0.53                   | 0.80      | 0.70       | 0.67 | .91    |
| 4W-U6LB-T-SS      | 4W-U6AB-T-SS  |                         |                 | Blunt      | 0.177     | 4.5                    | 0.65                   | 0.48      | 0.86       | 0.40 | (23.1) |
| 4Z-U6LR-T-SS      | 4Z-U6AR-T-SS  | 1/4" Compression CPI™   |                 | Regulating | 0.177     | 4.5                    | 0.53                   | 0.80      | 0.70       | 0.67 | 1.38   |
| 4Z-U6LB-T-SS      | 4Z-U6AB-T-SS  |                         |                 | Blunt      | 0.177     | 4.5                    | 0.65                   | 0.48      | 0.86       | 0.40 | (35.1) |
| M6A-U6LR-T-SS     | M6A-U6AR-T-SS | 6mm Compression A-LOK®  |                 | Regulating | 0.177     | 4.5                    | 0.53                   | 0.80      | 0.70       | 0.67 | 1.38   |
| M6A-U6LB-T-SS     | M6A-U6AB-T-SS |                         |                 | Blunt      | 0.177     | 4.5                    | 0.65                   | 0.48      | 0.86       | 0.40 | (35.1) |
| M6Z-U6LR-T-SS     | M6Z-U6AR-T-SS | 6mm Compression CPI™    |                 | Regulating | 0.177     | 4.5                    | 0.53                   | 0.80      | 0.70       | 0.67 | 1.38   |
| M6Z-U6LB-T-SS     | M6Z-U6AB-T-SS |                         |                 | Blunt      | 0.177     | 4.5                    | 0.65                   | 0.48      | 0.86       | 0.40 | (35.1) |
| M8A-U6LR-T-SS     | M8A-U6AR-T-SS | 8mm Compression A-LOK®  |                 | Regulating | 0.177     | 4.5                    | 0.53                   | 0.80      | 0.70       | 0.67 | 1.38   |
| M8A-U6LB-T-SS     | M8A-U6AB-T-SS |                         |                 | Blunt      | 0.177     | 4.5                    | 0.65                   | 0.48      | 0.86       | 0.40 | (35.1) |
| M8Z-U6LR-T-SS     | M8Z-U6AR-T-SS | 8mm Compression CPI™    |                 | Regulating | 0.177     | 4.5                    | 0.53                   | 0.80      | 0.70       | 0.67 | 1.38   |
| M8Z-U6LB-T-SS     | M8Z-U6AB-T-SS |                         |                 | Blunt      | 0.177     | 4.5                    | 0.65                   | 0.48      | 0.86       | 0.40 | (35.1) |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

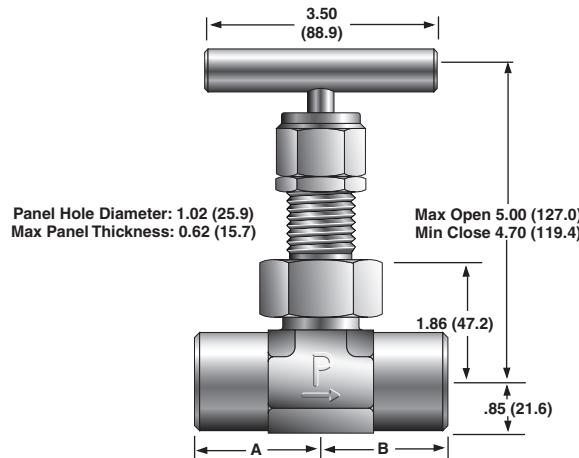
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

Dimensions in inches/millimeters are for reference only, subject to change.

## Dimensions / Flow Data



Model Shown: 8A-U12AB-T-SS



Model Shown: 16F-U16LB-G-SS-HT

( ) Denotes dimensions in millimeters

| Basic Part Number |                 | End Connections         |                 | Stem Type  | Flow Data |         |       |         | Dimensions |           |
|-------------------|-----------------|-------------------------|-----------------|------------|-----------|---------|-------|---------|------------|-----------|
|                   |                 | Inlet (Port 1)          | Outlet (Port 2) |            | Orifice   | Inline  | Angle | $C_v$   | $X_T^*$    | A† and B† |
| Inline            | Angle           | Inch                    | mm              |            | $C_v$     | $X_T^*$ | $C_v$ | $X_T^*$ | Inch (mm)  |           |
| 4F-U12LR-T-SS     | 4F-U12AR-T-SS   | 1/4" Female NPT         |                 | Regulating | 0.250     | 6.4     | 0.94  | 0.65    | 1.25       | 0.55      |
| 4F-U12LB-T-SS     | 4F-U12AB-T-SS   |                         |                 | Blunt      |           |         | 1.03  | 0.60    | 1.37       | 0.51      |
| 6A-U12LR-T-SS     | 6A-U12AR-T-SS   | 3/8" Compression A-LOK® |                 | Regulating | 0.187     | 4.7     | 0.69  | 0.61    | 0.92       | 0.52      |
| 6A-U12LB-T-SS     | 6A-U12AB-T-SS   |                         |                 | Blunt      |           |         | 0.77  | 0.50    | 1.02       | 0.42      |
| 6F-U12LR-T-SS     | 6F-U12AR-T-SS   | 3/8" Female NPT         |                 | Regulating | 0.312     | 7.9     | 1.19  | 0.78    | 1.58       | 0.66      |
| 6F-U12LB-T-SS     | 6F-U12AB-T-SS   |                         |                 | Blunt      |           |         | 1.31  | 0.80    | 1.74       | 0.68      |
| 6W-U12LR-T-SS     | 6W-U12AR-T-SS   | 3/8" Tube Socket Weld   |                 | Regulating | 0.228     | 5.8     | 0.85  | 0.64    | 1.13       | 0.54      |
| 6W-U12LB-T-SS     | 6W-U12AB-T-SS   |                         |                 | Blunt      |           |         | 0.94  | 0.57    | 1.25       | 0.48      |
| 6Z-U12LR-T-SS     | 6Z-U12AR-T-SS   | 3/8" Compression CPI™   |                 | Regulating | 0.187     | 4.7     | 0.69  | 0.61    | 0.92       | 0.52      |
| 6Z-U12LB-T-SS     | 6Z-U12AB-T-SS   |                         |                 | Blunt      |           |         | 0.77  | 0.50    | 1.02       | 0.42      |
| 8A-U12LR-T-SS     | 8A-U12AR-T-SS   | 1/2" Compression A-LOK® |                 | Regulating | 0.250     | 6.4     | 0.94  | 0.65    | 1.25       | 0.55      |
| 8A-U12LB-T-SS     | 8A-U12AB-T-SS   |                         |                 | Blunt      |           |         | 1.03  | 0.60    | 1.37       | 0.51      |
| 8F-U12LR-T-SS     | 8F-U12AR-T-SS   | 1/2" Female NPT         |                 | Regulating | 0.312     | 7.9     | 1.19  | 0.78    | 1.58       | 0.66      |
| 8F-U12LB-T-SS     | 8F-U12AB-T-SS   |                         |                 | Blunt      |           |         | 1.31  | 0.80    | 1.74       | 0.68      |
| 8W-U12LR-T-SS     | 8W-U12AR-T-SS   | 1/2" Tube Socket Weld   |                 | Regulating | 0.312     | 7.9     | 1.19  | 0.78    | 1.58       | 0.66      |
| 8W-U12LB-T-SS     | 8W-U12AB-T-SS   |                         |                 | Blunt      |           |         | 1.31  | 0.80    | 1.74       | 0.68      |
| 8Z-U12LR-T-SS     | 8Z-U12AR-T-SS   | 1/2" Compression CPI™   |                 | Regulating | 0.250     | 6.4     | 0.94  | 0.65    | 1.25       | 0.55      |
| 8Z-U12LB-T-SS     | 8Z-U12AB-T-SS   |                         |                 | Blunt      |           |         | 1.03  | 0.60    | 1.37       | 0.51      |
| M10A-U12LR-T-SS   | M10A-U12AR-T-SS | 10mm Compression A-LOK® |                 | Regulating | 0.250     | 6.4     | 0.94  | 0.65    | 1.25       | 0.55      |
| M10A-U12LB-T-SS   | M10A-U12AB-T-SS |                         |                 | Blunt      |           |         | 1.03  | 0.60    | 1.37       | 0.51      |
| M10Z-U12LR-T-SS   | M10Z-U12AR-T-SS | 10mm Compression CPI™   |                 | Regulating | 0.250     | 6.4     | 0.94  | 0.65    | 1.25       | 0.55      |
| M10Z-U12LB-T-SS   | M10Z-U12AB-T-SS |                         |                 | Blunt      |           |         | 1.03  | 0.60    | 1.37       | 0.51      |
| M12A-U12LR-T-SS   | M12A-U12AR-T-SS | 12mm Compression A-LOK® |                 | Regulating | 0.312     | 7.9     | 1.19  | 0.78    | 1.58       | 0.66      |
| M12A-U12LB-T-SS   | M12A-U12AB-T-SS |                         |                 | Blunt      |           |         | 1.31  | 0.80    | 1.74       | 0.68      |
| M12Z-U12LR-T-SS   | M12Z-U12AR-T-SS | 12mm Compression CPI™   |                 | Regulating | 0.312     | 7.9     | 1.19  | 0.78    | 1.58       | 0.66      |
| M12Z-U12LB-T-SS   | M12Z-U12AB-T-SS |                         |                 | Blunt      |           |         | 1.31  | 0.80    | 1.74       | 0.68      |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

Dimensions in inches/millimeters are for reference only, subject to change.

## Dimensions / Flow Data

| Basic Part Number |                  | End Connections         |                 | Stem Type | Flow Data        |        |                  |           | Dimensions A† and B† |
|-------------------|------------------|-------------------------|-----------------|-----------|------------------|--------|------------------|-----------|----------------------|
|                   |                  | Inlet (Port 1)          | Outlet (Port 2) |           | Orifice          | Inline | Angle            | CV        |                      |
| Inline            | Angle            | Inch                    | mm              | CV        | X <sub>T</sub> * | CV     | X <sub>T</sub> * | Inch (mm) |                      |
| 8A-U16LR-T-SS     | 8A-U16AR-T-SS    | 1/2" Compression A-LOK® | Regulating      | 0.394     | 10.0             | 1.59   | 0.73             | 2.11      | 0.62                 |
| 8A-U16LB-T-SS     | 8A-U16AB-T-SS    |                         | Blunt           |           |                  | 1.90   | 0.95             | 2.53      | 0.81                 |
| 8F-U16LR-T-SS     | 8F-U16AR-T-SS    | 1/2" Female NPT         | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 8F-U16LB-T-SS     | 8F-U16AB-T-SS    |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 8PSW-U16LR-T-SS   | 8PSW-U16AR-T-SS  | 1/2" Pipe Socket Weld   | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 8PSW-U16LB-T-SS   | 8PSW-U16AB-T-SS  |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 8W-U16LR-T-SS     | 8W-U16AR-T-SS    | 1/2" Tube Socket Weld   | Regulating      | 0.394     | 10.0             | 1.59   | 0.73             | 2.11      | 0.62                 |
| 8W-U16LB-T-SS     | 8W-U16AB-T-SS    |                         | Blunt           |           |                  | 1.90   | 0.95             | 2.53      | 0.81                 |
| 8Z-U16LR-T-SS     | 8Z-U16AR-T-SS    | 1/2" Compression CPI™   | Regulating      | 0.394     | 10.0             | 1.59   | 0.73             | 2.11      | 0.62                 |
| 8Z-U16LB-T-SS     | 8Z-U16AB-T-SS    |                         | Blunt           |           |                  | 1.90   | 0.95             | 2.53      | 0.81                 |
| 12A-U16LR-T-SS    | 12A-U16AR-T-SS   | 3/4" Compression A-LOK® | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 12A-U16LB-T-SS    | 12A-U16AB-T-SS   |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 12F-U16LR-T-SS    | 12F-U16AR-T-SS   | 3/4" Female NPT         | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 12F-U16LB-T-SS    | 12F-U16AB-T-SS   |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 12PSW-U16LR-T-SS  | 12PSW-U16AR-T-SS | 3/4" Pipe Socket Weld   | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 12PSW-U16LB-T-SS  | 12PSW-U16AB-T-SS |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 12W-U16LR-T-SS    | 12W-U16AR-T-SS   | 3/4" Tube Socket Weld   | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 12W-U16LB-T-SS    | 12W-U16AB-T-SS   |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 12Z-U16LR-T-SS    | 12Z-U16AR-T-SS   | 3/4" Compression CPI™   | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 12Z-U16LB-T-SS    | 12Z-U16AB-T-SS   |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 16A-U16LR-T-SS    | 16A-U16AR-T-SS   | 1" Compression A-LOK®   | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 16A-U16LB-T-SS    | 16A-U16AB-T-SS   |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 16F-U16LR-T-SS    | 16F-U16AR-T-SS   | 1" Female NPT           | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 16F-U16LB-T-SS    | 16F-U16AB-T-SS   |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| 16Z-U16LR-T-SS    | 16Z-U16AR-T-SS   | 1" Compression CPI™     | Regulating      | 0.437     | 11.1             | 1.82   | 0.72             | 2.42      | 0.61                 |
| 16Z-U16LB-T-SS    | 16Z-U16AB-T-SS   |                         | Blunt           |           |                  | 2.67   | 0.80             | 3.55      | 0.68                 |
| M12A-U16LR-T-SS   | M12A-U16AR-T-SS  | 12mm Compression A-LOK® | Regulating      | 0.394     | 10.0             | 1.59   | 0.73             | 2.11      | 0.62                 |
| M12A-U16LB-T-SS   | M12A-U16AB-T-SS  |                         | Blunt           |           |                  | 1.90   | 0.95             | 2.53      | 0.81                 |
| M12Z-U16LR-T-SS   | M12Z-U16AR-T-SS  | 12mm Compression CPI™   | Regulating      | 0.394     | 10.0             | 1.59   | 0.73             | 2.11      | 0.62                 |
| M12Z-U16LB-T-SS   | M12Z-U16AB-T-SS  |                         | Blunt           |           |                  | 1.90   | 0.95             | 2.53      | 0.81                 |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

Dimensions in inches/millimeters are for reference only, subject to change.

## How to Order Options

**Grafoil™ Packing** - replace **-T** with **-G** for 700°F Temperature capability.**High Temperature** - Add the suffix **-HT** for 1200°F Temperature capability. **Example :** 4M-U6LB-G-SS-HT**Oxygen Cleaning** - Add the suffix **-C3**. **Example:** 8A-U12LR-T-SS-C3.**ASME B31.1 Compliant Valves** – Add the suffix **-QC311**. **Example:** 8F-U12LR-G-SS-QC311

## How to Order Maintenance Kits

**Stainless Steel T-Bar Handles with Handle Screw** – **Examples:** U16-BAR-HANDLE-SS**Aluminum T-Bar Handles with Handle Screw** – **Examples:** U12-BAR-HANDLE-AL**Panel Mounting Nuts** – **Examples:** U6-LOCKNUT**PTFE Packing Kits** – **Example:** KIT-U12-T**Grafoil® Packing Kits** – **Example:** KIT-U16-G

Grafoil® is a registered trademark GrafTech International Holdings, Inc.

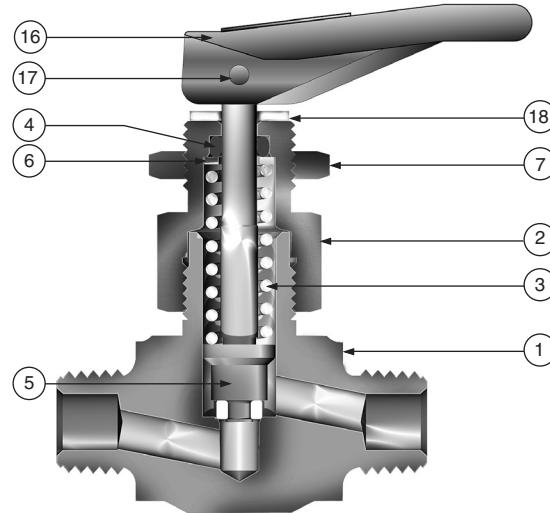
## Introduction

Parker VQ Series Toggle Valves are the right combination of performance and value for manual or pneumatic on-off control in moderate pressure and temperature applications. The manual version employs a toggle handle for quick action at pressures up to 300 psig (21 bar). Compact double acting, normally closed, and normally open pneumatically actuated versions of this valve are ideal for automatic control at pressures up to 600 psig (41 bar).

## Toggle Valve Features

- ▶ Quick acting
- ▶ Inline and angle patterns
- ▶ CPI™, A-LOK®, male and female NPT connections
- ▶ Panel mountable
- ▶ Color-coded handles
- ▶ 316 stainless steel and brass body construction
- ▶ Optional Stem seal materials - See HTO
- ▶ Optional handle positioners and anti-lock handles
- ▶ Available in normally open, normally closed, and double acting models
- ▶ Mounting bracket standard
- ▶ 100% factory tested

VQ



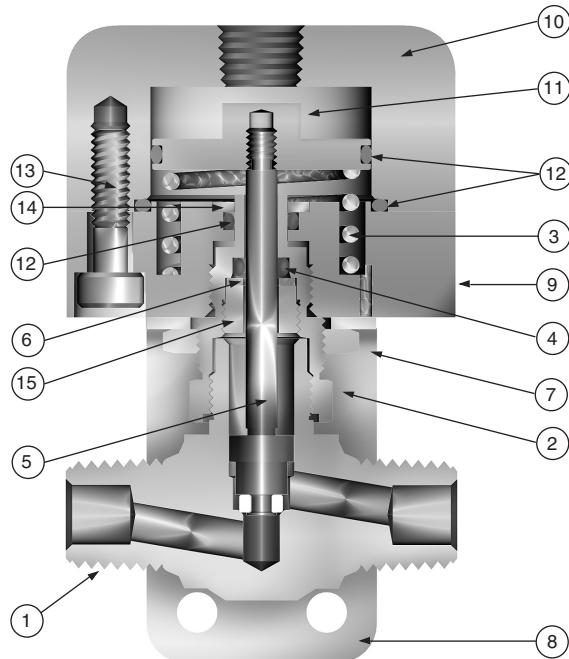
## Toggle Valve Specifications

### Pressure Rating at All Temperatures:

|                     |                       |
|---------------------|-----------------------|
| Manual              | 300 psig (21 bar) CWP |
| Actuated N.C. V4Q   | 600 psig (41 bar) CWP |
| Actuated N.C. V6Q   | 500 psig (35 bar) CWP |
| Actuated N.O & D.A. | 450 psig (31 bar) CWP |

### Temperature Ratings:

PTFE Stem Tip: -20°F to 200°F (-29°C to 93°C)  
PCTFE Stem Tip: -65°F to 200°F (-54°C to 93°C)



## Materials of Construction

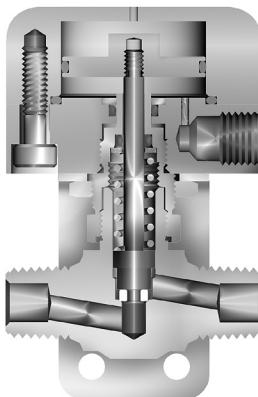
| Item # | Description      | Stainless Steel         | Brass                      |
|--------|------------------|-------------------------|----------------------------|
| 1      | Body             | ASTM A 182<br>Type F316 | ASTM B 283<br>Alloy C37700 |
| 2      | Cap              | ASTM A 479<br>Type 316  | ASTM B 453<br>Alloy C34000 |
| 3      | Spring*          | Stainless Steel         | Stainless Steel            |
| 4      | Stem Seal**      | Fluorocarbon<br>Rubber  | Fluorocarbon<br>Rubber     |
| 5      | Stem             | ASTM A 276<br>Type 316  | ASTM A 276<br>Type 316     |
| 6      | Stem Washer      | Stainless Steel         | Stainless Steel            |
| 7      | Panel/Lock Nut   | 316 Stainless Steel     | 316 Stainless Steel        |
| 8      | Mounting Bracket | Aluminum                | Aluminum                   |
| 9      | Actuator Base    | Aluminum                | Aluminum                   |
| 10     | Actuator Cap     | Aluminum                | Aluminum                   |
| 11     | Piston           | Aluminum                | Aluminum                   |
| 12     | Actuator Seals   | Fluorocarbon<br>Rubber  | Fluorocarbon<br>Rubber     |
| 13     | Screws           | Stainless Steel         | Stainless Steel            |
| 14     | Actuator Bushing | Aluminum                | Aluminum                   |
| 15     | Stem Bushing***  | ASTM A 479<br>Type 316  | ASTM A 479<br>Type 316     |
| 16     | Handle           | Nylon 6/6               | Nylon 6/6                  |
| 17     | Handle Pin       | Stainless Steel         | Stainless Steel            |
| 18     | Handle Washer    | Acetal                  | Acetal                     |

\* Spring not used on Double Acting (11AD) models

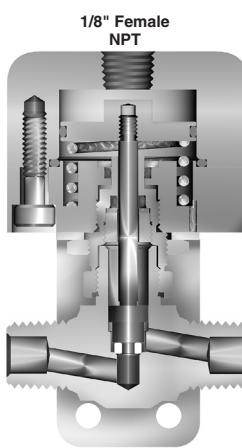
\*\* Optional stem seal materials available - See How to Order

\*\*\* Stem Bushing not used on Normally Closed (11AC) models  
Lubrication: Perfluorinated polyether

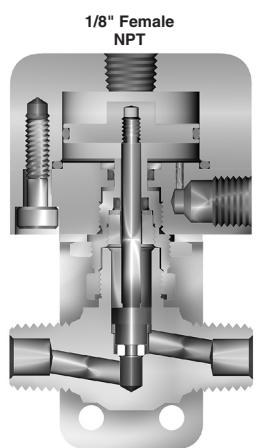
## Pneumatically Actuated Valves



Normally Closed (11AC)



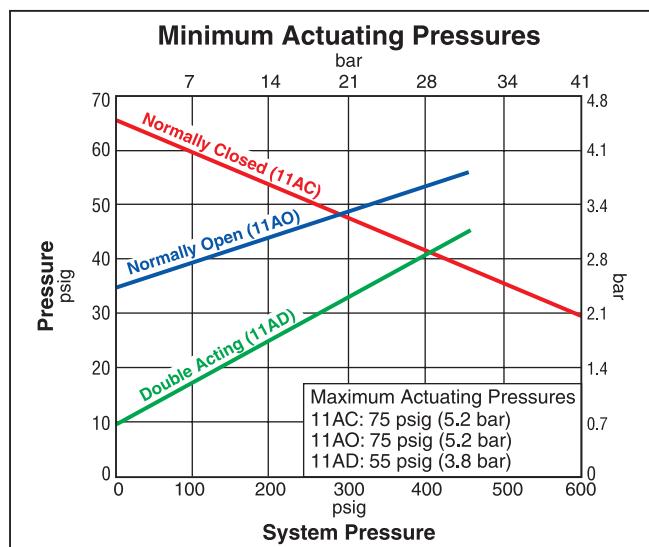
Normally Open (11AO)



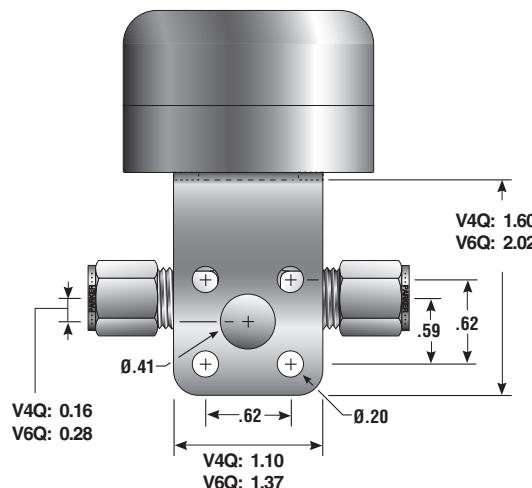
Double Acting (11AD)

VQ

## Minimum Actuating Pressures



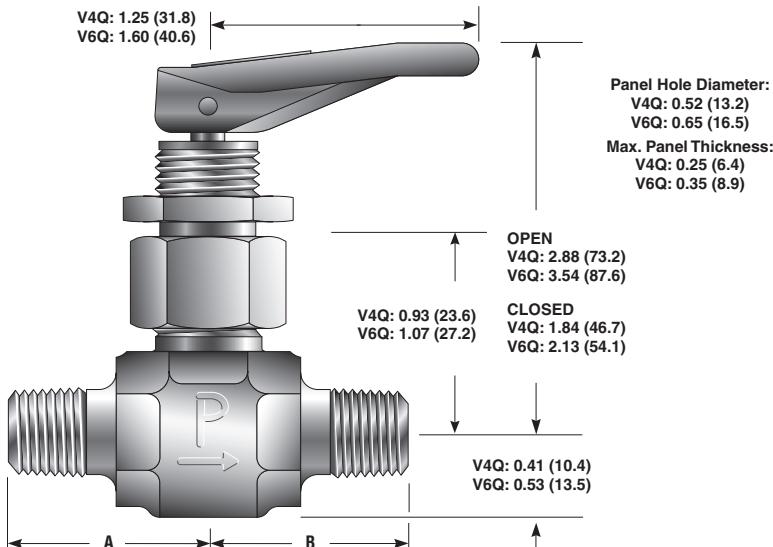
## Toggle Valve Mounting Bracket



# VQ Series Toggle Valves

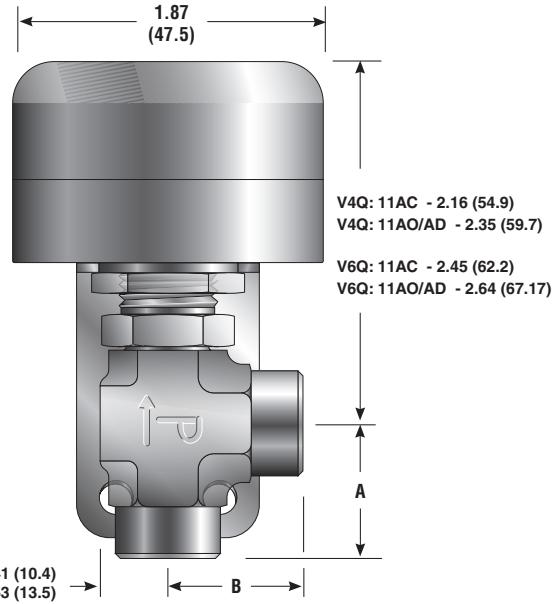
## Catalog 4110-NV

## Dimensions / Flow Data



**Model Shown: 4M-V4LQ-SSP**

( ) Denotes dimensions in millimeters



Model Shown: 4F-V6AQ-11AQ-B

## Dimensions / Flow Data

| Basic Part Number | End Connections         |                 | Flow Data |      |                | Dimensions<br>A† and B†<br>Inch (mm) | Additional Options |   |  |                           |  |  |  |  |
|-------------------|-------------------------|-----------------|-----------|------|----------------|--------------------------------------|--------------------|---|--|---------------------------|--|--|--|--|
|                   | Inlet (Port 1)          | Outlet (Port 2) | Orifice   |      | C <sub>v</sub> | X <sub>T</sub> †                     | Stem Tip           | Stem Seal   | Actuation  | Body Material             |  |  |  |  |
|                   |                         |                 | Inch      | mm   |                |                                      |                    |   |  |                           |  |  |  |  |
| 2A-V4LQ-SSP       | 1/8" Compression A-LOK® | 0.078           | 2.0       | 0.14 | 0.52           | 1.10<br>(27.9)                       | K = PCTFE          | BN = Nitrile Rubber<br>EPR = Ethylene Propylene Rubber<br>KZ = Highly Fluorinated Fluocarbon Rubber | 11AC = Normally Closed<br>11AO = Normally Opened<br>11AD = Double Acting | BP = Brass with Panel Nut |  |  |  |  |
| 2A-V4AQ-SSP       |                         |                 |           | 0.15 | 0.50           |                                      |                    |   |  |                           |  |  |  |  |
| 2F-V4LQ-SSP       | 1/8" Female NPT         | 0.176           | 4.5       | 0.36 | 0.71           | 0.8<br>(20.6)                        |                    |   |  |                           |  |  |  |  |
| 2F-V4AQ-SSP       |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |
| 2M-V4LQ-SSP       | 1/8" Male NPT           | 0.125           | 3.2       | 0.30 | 0.50           | 0.81<br>(20.6)                       |                    |   |  |                           |  |  |  |  |
| 2M-V4AQ-SSP       |                         |                 |           | 0.35 | 0.55           |                                      |                    |   |  |                           |  |  |  |  |
| 2Z-V4LQ-SSP       | 1/8" Compression CPI™   | 0.078           | 2.0       | 0.14 | 0.52           | 1.10<br>(27.9)                       |                    |   |  |                           |  |  |  |  |
| 2Z-V4AQ-SSP       |                         |                 |           | 0.15 | 0.50           |                                      |                    |   |  |                           |  |  |  |  |
| 4A-V4LQ-SSP       | 1/4" Compression A-LOK® | 0.176           | 4.5       | 0.36 | 0.71           | 1.15<br>(29.2)                       |                    |   |  |                           |  |  |  |  |
| 4A-V4AQ-SSP       |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |
| 4M-V4LQ-SSP       | 1/4" Male NPT           | 0.176           | 4.5       | 0.36 | 0.71           | 0.94<br>(23.9)                       |                    |   |  |                           |  |  |  |  |
| 4M-V4AQ-SSP       |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |
| 4Z-V4LQ-SSP       | 1/4" Compression CPI™   | 0.176           | 4.5       | 0.36 | 0.71           | 1.15<br>(29.2)                       |                    |   |  |                           |  |  |  |  |
| 4Z-V4AQ-SSP       |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |
| M6A-V4LQ-SSP      | 6mm Compression A-LOK®  | 0.176           | 4.5       | 0.36 | 0.71           | 1.13<br>(28.7)                       |                    |   |  |                           |  |  |  |  |
| M6A-V4AQ-SSP      |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |
| M6Z-V4LQ-SSP      | 6mm Compression CPI™    | 0.176           | 4.5       | 0.36 | 0.71           | 1.13<br>(28.7)                       |                    |   |  |                           |  |  |  |  |
| M6Z-V4AQ-SSP      |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |
| M8A-V4LQ-SSP      | 8mm Compression A-LOK®  | 0.176           | 4.5       | 0.36 | 0.71           | 1.13<br>(28.7)                       |                    |   |  |                           |  |  |  |  |
| M8A-V4AQ-SSP      |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |
| M8Z-V4LQ-SSP      | 8mm Compression CPI™    | 0.176           | 4.5       | 0.36 | 0.71           | 1.13<br>(28.7)                       |                    |   |  |                           |  |  |  |  |
| M8Z-V4AQ-SSP      |                         |                 |           | 0.49 | 0.64           |                                      |                    |   |  |                           |  |  |  |  |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

Dimensions in inches/millimeters are for reference only, subject to change.

## Dimensions / Flow Data

| Basic Part Number | End Connections         |                 | Flow Data |              |              | Dimensions     | Additional Options   |  |                           |           |  |  |  |  |
|-------------------|-------------------------|-----------------|-----------|--------------|--------------|----------------|--|--|---------------------------|-----------|--|--|--|--|
|                   | Inlet (Port 1)          | Outlet (Port 2) | Orifice   |              | $C_v$        | $X_T^*$        | A† and B†<br>Inch (mm)   | Stem Tip   | Stem Seal                 | Actuation |  |  |  |  |
|                   |                         |                 | Inch      | mm           |              |                |  |  |                           |           |  |  |  |  |
| 4F-V6LQ-SSP       | 1/4" Female NPT         | 0.250           | 6.4       | 0.83<br>0.92 | 0.70<br>0.68 | 1.00<br>(25.4) | K = PCTFE<br>BN = Nitrile Rubber<br>EPR = Ethylene Propylene Rubber<br>KZ = Highly Fluorinated Fluorocarbon Rubber | 11AC = Normally Closed<br>11AO = Normally Opened<br>11AD = Double Acting | BP = Brass with Panel Nut |           |  |  |  |  |
| 4F-V6AQ-SSP       |                         |                 |           |              |              |                |  |  |                           |           |  |  |  |  |
| 6A-V6LQ-SSP       | 3/8" Compression A-LOK® | 0.250           | 6.4       | 0.83<br>0.92 | 0.70<br>0.68 | 1.29<br>(32.8) |  |  |                           |           |  |  |  |  |
| 6A-V6AQ-SSP       |                         |                 |           |              |              |                |  |  |                           |           |  |  |  |  |
| 6Z-V6LQ-SSP       | 3/8" Compression CPI™   | 0.250           | 6.4       | 0.83<br>0.92 | 0.70<br>0.68 | 1.29<br>(32.8) |  |  |                           |           |  |  |  |  |
| 6Z-V6AQ-SSP       |                         |                 |           |              |              |                |  |  |                           |           |  |  |  |  |
| 8A-V6LQ-SSP       | 1/2" Compression A-LOK® | 0.250           | 6.4       | 0.83<br>0.92 | 0.70<br>0.68 | 1.37<br>(34.8) |  |  |                           |           |  |  |  |  |
| 8A-V6AQ-SSP       |                         |                 |           |              |              |                |  |  |                           |           |  |  |  |  |
| 8Z-V6LQ-SSP       | 1/2" Compression CPI™   | 0.250           | 6.4       | 0.83<br>0.92 | 0.70<br>0.68 | 1.37<br>(34.8) |  |  |                           |           |  |  |  |  |
| 8Z-V6AQ-SSP       |                         |                 |           |              |              |                |  |  |                           |           |  |  |  |  |
| M10A-V6LQ-SSP     | 10mm Compression A-LOK® | 0.250           | 6.4       | 0.83<br>0.92 | 0.70<br>0.68 | 1.30<br>(33.0) |  |  |                           |           |  |  |  |  |
| M10A-V6AQ-SSP     |                         |                 |           |              |              |                |  |  |                           |           |  |  |  |  |
| M10Z-V6LQ-SSP     | 10mm Compression CPI™   | 0.250           | 6.4       | 0.83<br>0.92 | 0.70<br>0.68 | 1.30<br>(33.0) |  |  |                           |           |  |  |  |  |
| M10Z-V6AQ-SSP     |                         |                 |           |              |              |                |  |  |                           |           |  |  |  |  |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

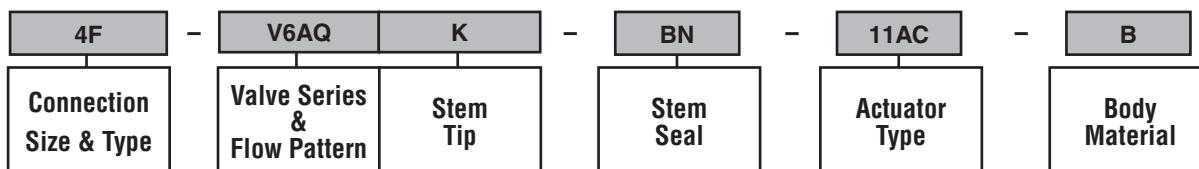
Dimensions in inches/millimeters are for reference only, subject to change.

VQ

## How to Order Toggle Valves

The part number sequence identifies product characteristics as shown in the example below.

**Example : 4F-V6AQK-BN-11AC-B** describes a V6Q Series pneumatically actuated (normally closed) angle pattern valve equipped with 1/4" Female NPT inlet and outlet ports, PCTFE Stem Tip, Nitrile Stem Seal, Brass construction with a mounting bracket.



**Oxygen Cleaning** – Add the suffix **-C3** to the end of the part number to receive valves cleaned in accordance with ASTM G93 level C, class 500. This ASTM details cleaning methods and cleanliness levels for materials and equipment used in oxygen-enriched environments. **Example: 4A-V4AQ-EPR-SSP-C3**

## How to Order Maintenance Kits

**Colored Nylon Handles with Handle Pin** – Options are BLUE, GREEN or RED. **Example: V4Q-HANDLE-BLUE**

**Handle Positioners** – Prevents handle from rotating. **Examples: Q6-HANDLE-POSITIONER**

**Anti Locking Handle** – **Example: V4Q-HANDLE-BLACK-ALH**

**Rubber Seal and Stem Kits** – **Example: KIT-V6Q-BN**

## Introduction

Parker NP6 Needle Valves are designed with packing below the stem threads and a two-piece stem. The packing below the threads protects the flow stream from thread lubricant contamination or washout and also protects the stem threads from potential damaging effects of the media. The two-piece stem produces a non-rotating lower stem for superior, repeatable sealing and reduced packing wear.

## Features

- ▶ Packing below power threads protects thread lubricants from media and isolates the media from the lubricant for severe service applications
- ▶ O-ring dust seal in bonnet protects stem threads from external contamination
- ▶ Choice of two non-rotating stem types:
  - R-Stem – All metal, blunt stem tip
  - K-Stem – PCTFE stem tip
- ▶ Non rotating lower stem extends packing and valve life
- ▶ 316 stainless steel construction
- ▶ Inline and angle patterns
- ▶ Wide variety of US Customary and SI ports
- ▶ Panel mountable
- ▶ 100% factory tested
- ▶ Optional color coded handles

NP6

## Specifications

### Pressure Rating:

6000 psig (414 bar) CWP

### Temperature Rating:

#### PTFE Packing:

-65°F to 450°F (-54°C to 232°C)

#### PCTFE:

-65°F to 350°F (-54°C to 177°C)

#### Nitrile Rubber:

-30°F to 250°F (-34°C to 121°C)

#### Ethylene Propylene Rubber:

-70°F to 275°F (-57°C to 135°C)

#### Fluorocarbon Rubber:

-15°F to 400°F (-26°C to 204°C)

#### Grafoil®:

-70°F to 700°F (-57°C to 371°C)

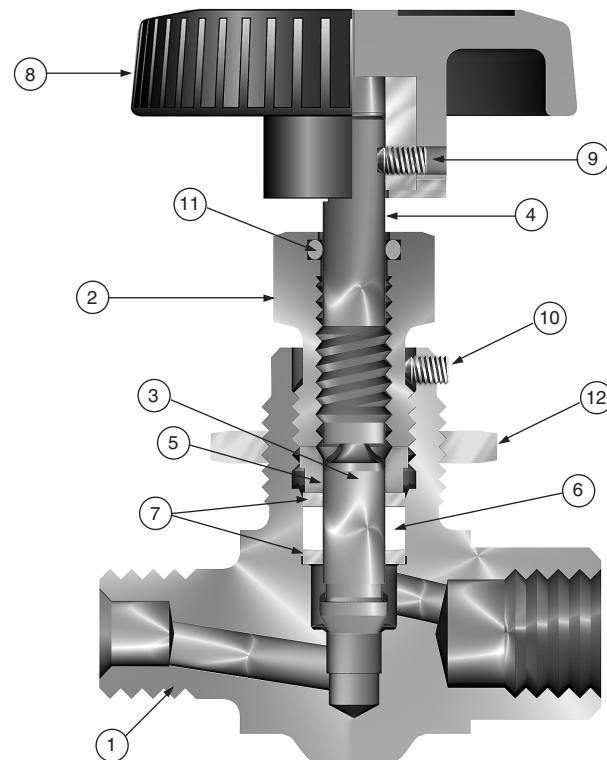
## Materials of Construction

| Item # | Description            | Material                           |
|--------|------------------------|------------------------------------|
| 1      | Body                   | ASTM A 182<br>Type F316            |
| 2      | Packing Nut            | ASTM A 479<br>Type 316             |
| 3      | Lower Stem<br>(R-Stem) | ASTM A 276<br>Type 316             |
| 3      | Lower Stem<br>(K-Stem) | ASTM A 276<br>Type 316, with PCTFE |
| 4      | Upper Stem             | ASTM A 276<br>Type 316             |
| 5      | Packing Gland          | ASTM A 276<br>Type 316             |
| 6      | Packing*               | PTFE                               |
| 7      | Packing Washer         | Stainless Steel                    |
| 8      | Handle**               | Nylon 6/6,<br>with SS Insert       |
| 9      | Handle Screw           | Stainless Steel                    |
| 10     | Packing Nut Screw      | Stainless Steel                    |
| 11     | Dust Seal              | Fluorocarbon<br>Rubber             |
| 12     | Panel Nut              | 316 Stainless Steel                |

\* Optional elastomeric stem seals and Grafoil® packing are available - See How to Order.

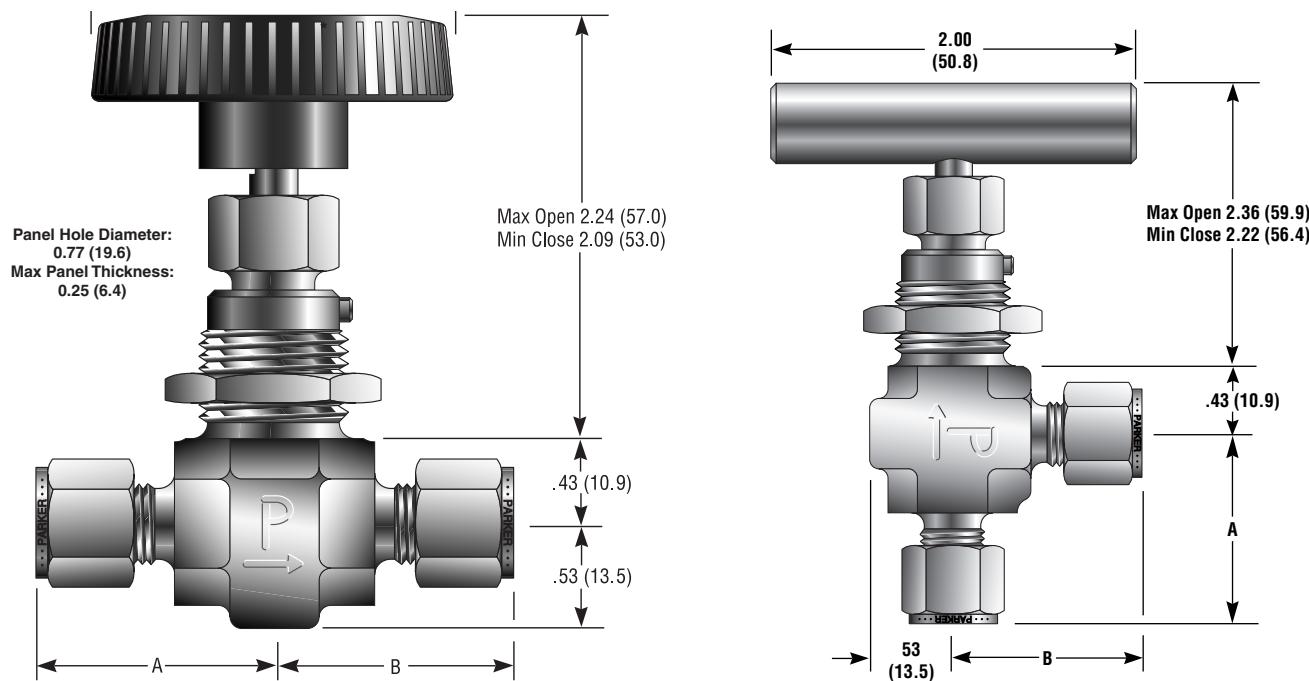
\*\* Handles for Grafoil® packed valves are aluminum T-bars.

Lubrication: Perfluorinated polyether



Grafoil® is a registered trademark of GrafTech International Holdings, Inc.

## Dimensions / Flow Data



Model Shown: 4Z-NP6LK-SSP

\* Note: Handle diameter for R Stem NP6 Series Valves is 1.81 (46.0)

Model Shown: 4Z-NP6AR-G-SSP

( ) Denotes dimensions in millimeters

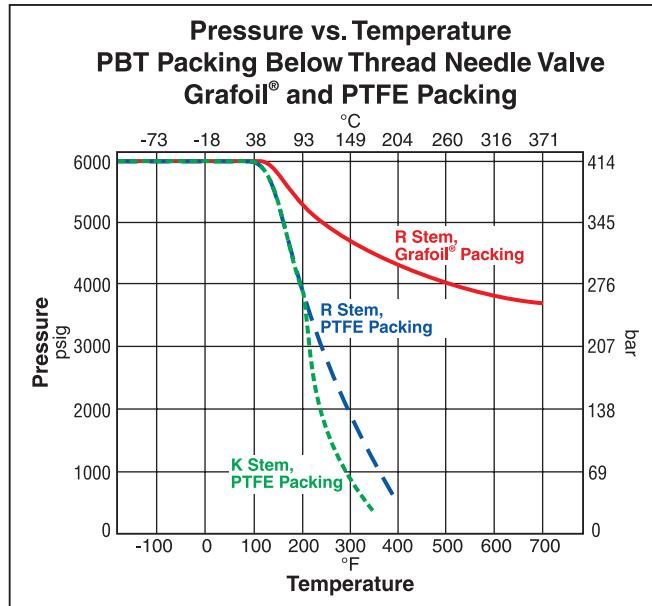
| Basic Part Number |               | End Connections         |                 | Stem Type | Flow Data |     |                |                  | Dimensions     |                  |  |
|-------------------|---------------|-------------------------|-----------------|-----------|-----------|-----|----------------|------------------|----------------|------------------|--|
| Inline            | Angle         | Inlet (Port 1)          | Outlet (Port 2) |           | Orifice   |     | Inline         |                  | Angle          |                  |  |
|                   |               |                         |                 |           | Inch      | mm  | C <sub>v</sub> | X <sub>T</sub> * | C <sub>v</sub> | X <sub>T</sub> * |  |
| 4A-NP6LR-SSP      | 4A-NP6AR-SSP  | 1/4" Compression A-LOK® |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| 4A-NP6LK-SSP      | 4A-NP6AK-SSP  |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| 4F-NP6LR-SSP      | 4F-NP6AR-SSP  | 1/4" Female NPT         |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| 4F-NP6LK-SSP      | 4F-NP6AK-SSP  |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| 4M-NP6LR-SSP      | 4M-NP6AR-SSP  | 1/4" Male NPT           |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| 4M-NP6LK-SSP      | 4M-NP6AK-SSP  |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| 4Z-NP6LR-SSP      | 4Z-NP6AR-SSP  | 1/4" Compression CPI™   |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| 4Z-NP6LK-SSP      | 4Z-NP6AK-SSP  |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| 6A-NP6LR-SSP      | 6A-NP6AR-SSP  | 3/8" Compression A-LOK® |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| 6A-NP6LK-SSP      | 6A-NP6AK-SSP  |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| 6Z-NP6LR-SSP      | 6Z-NP6AR-SSP  | 3/8" Compression CPI™   |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| 6Z-NP6LK-SSP      | 6Z-NP6AK-SSP  |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| M6A-NP6LR-SSP     | M6A-NP6AR-SSP | 6mm Compression A-LOK®  |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| M6A-NP6LK-SSP     | M6A-NP6AK-SSP |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| M6Z-NP6LR-SSP     | M6Z-NP6AR-SSP | 6mm Compression CPI™    |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| M6Z-NP6LK-SSP     | M6Z-NP6AK-SSP |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| M8A-NP6LR-SSP     | M8A-NP6AR-SSP | 8mm Compression A-LOK®  |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| M8A-NP6LK-SSP     | M8A-NP6AK-SSP |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |
| M8Z-NP6LR-SSP     | M8Z-NP6AR-SSP | 8mm Compression CPI™    |                 | Blunt     | 0.177     | 4.5 | 0.60           | 0.50             | 0.67           | 0.39             |  |
| M8Z-NP6LK-SSP     | M8Z-NP6AK-SSP |                         |                 | PCTFE     |           |     | 0.51           | 0.55             | 0.65           | 0.52             |  |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

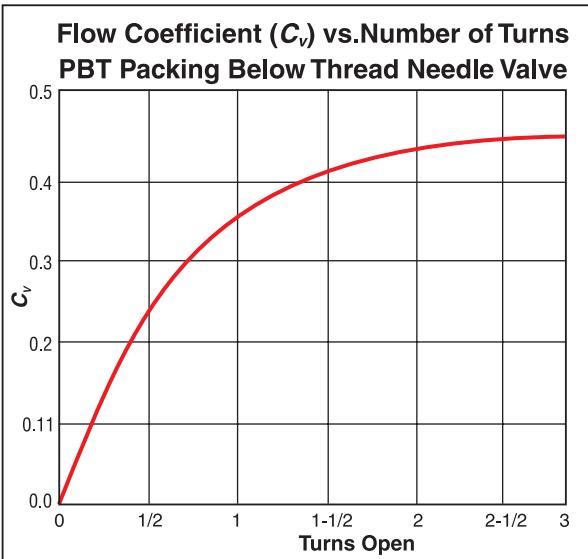
Dimensions in inches/millimeters are for reference only, subject to change.

## Pressure vs. Temperature



Note: To determine MPa, multiply bar by 0.1

## Flow Characteristics

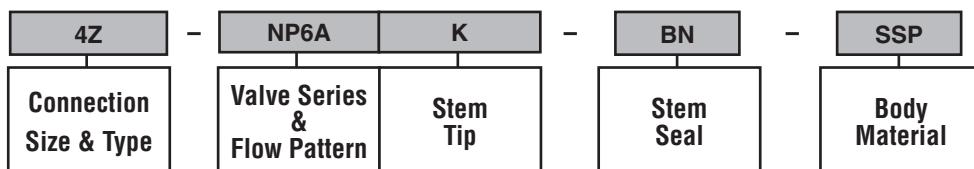


Note: When combining seat and seal materials, the most restrictive temperature rating becomes the limiting factor on temperature range.

## How to Order

The part number sequence identifies product characteristics as shown in the example below

**Example:** 4Z-NP6AK-BN-SSP describes an angle pattern NP6 Series needle valve equipped with 1/4" CPI™ compression inlet and outlet ports, a PCTFE tipped stem, Nitrile seals, and stainless steel construction with panel mounting nut.



## How to Order Options

**Optional Stem Seals** - Standard is PTFE (No Designator) Options include **-BN** (Nitrile Rubber), **-EPR** (Ethylene Propylene Rubber), **-V** (Fluorocarbon Rubber) or **-G** (Grafoil®). **Example:** 4M-NP6LR-G-SSP

**Oxygen Cleaning** – Add the suffix **-C3** to the end of the part number to receive valves cleaned in accordance with ASTM G93 level C, class 500. This ASTM details cleaning methods and cleanliness levels for materials and equipment used in oxygen-enriched environments. **Example:** M6A-NP6AK-EPR-SS-C3

NP6

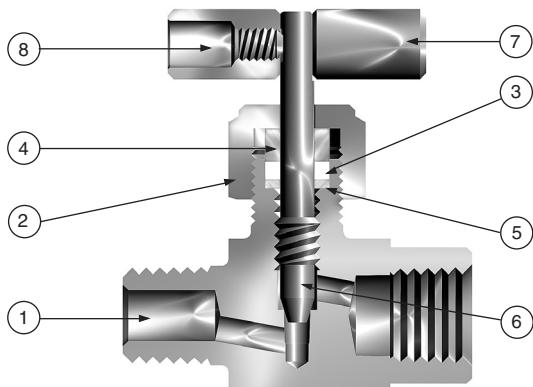
## Introduction

Parker compact SN6 Needle Valves provide shut-off and coarse regulation of liquids and gases utilized in process and instrumentation applications. These rugged valves are manufactured from stainless steel barstock and are integral bonnet designs with packing above the stem threads.

## Features

- ▶ Integral bonnet design
- ▶ 316 stainless steel construction
- ▶ Choice of two stem types:
  - R-Stem – All metal, blunt stem tip
  - K-Stem – PCTFE stem tip
- ▶ Choice of PTFE or Grafoil® packing
- ▶ Inline and angle patterns
- ▶ 100% factory tested

## Materials of Construction



**Model Shown:**  
**4F4M-SN6LR-SS**

| Item # | Description      | Material                           |
|--------|------------------|------------------------------------|
| 1      | Body             | ASTM A 182<br>Type 316             |
| 2      | Packing Nut      | ASTM A 479<br>Type 316             |
| 3      | Packing*         | PTFE                               |
| 4      | Packing Gland    | ASTM A 276<br>Type 316             |
| 5      | Packing Washer   | Stainless Steel                    |
| 6      | Stem<br>(R-Stem) | ASTM A 276<br>Type 316             |
| 7      | Stem<br>(K-Stem) | ASTM A 276<br>Type 316, with PCTFE |
| 8      | Handle**         | Aluminum                           |
| 9      | Handle Screw     | Stainless Steel                    |

\* Optional Grafoil® packing available - See How to Order.

\*\* Handles for Grafoil® packed valves and valves with R stem types are stainless steel T-bars.

Lubrication: Perfluorinated polyether.

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## Specifications

### Pressure Rating:

R Stem: 6000 psig (414 bar) CWP  
K Stem: 3000 psig (207 bar) CWP

### Temperature Rating:

PTFE Packing:  
-65°F to 450°F (-54°C to 232°C)

PCTFE Stem Tip:  
-65°F to 350°F (-54°C to 177°C)

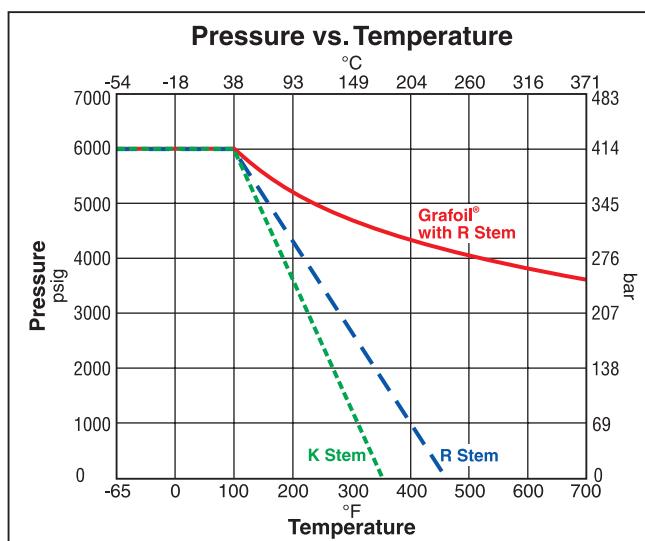
Grafoil® (G) Packing:  
-65°F to 700°F (-54°C to 371°C)

## Pressure Rating and Tubing Selection

For working pressures of A-LOK® and CPI™ tube connections, please see the Instrument Tubing Selection Guide (Bulletin 4200-TS), found in the Technical Section of the Parker Instrumentation Process Control Binder, or the Parker Instrument Tube Fitting Installation Manual (Bulletin 4200-B4).

For working pressures of valves with external or internal pipe threads, please see Catalog 4260, Instrumentation Pipe Fittings.

## Pressure vs. Temperature

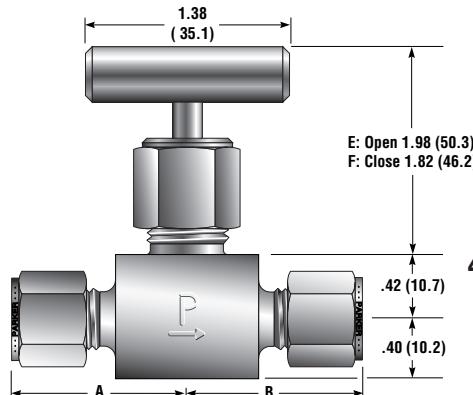


### Notes:

To determine MPa, multiply bar by 0.1

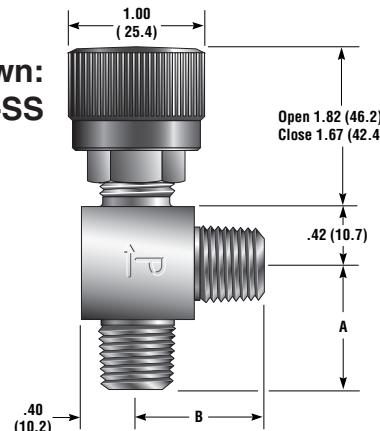
When combining seat and seal materials, the most restrictive temperature rating becomes the limiting factor on temperature range.

## Dimensions / Flow Data



Body width = .80 (20.3)

( ) Denotes dimensions in millimeters

Model Shown:  
4M-SN6AK-SSModel Shown:  
4Z-SN6LR-G-SS

| Basic Part Number |               | End Connections            |                 | Stem Type | Flow Data |     |        |         |       | Dimensions |      |      |  |
|-------------------|---------------|----------------------------|-----------------|-----------|-----------|-----|--------|---------|-------|------------|------|------|--|
| Inline            | Angle         | Inlet (Port 1)             | Outlet (Port 2) |           | Orifice   |     | Inline |         | Angle |            | A†   | B†   |  |
|                   |               |                            |                 |           | Inch      | mm  | $C_V$  | $X_T^*$ | $C_V$ | $X_T^*$    |      |      |  |
| 4A-SN6LR-SS       | 4A-SN6AR-SS   | 1/4" Compression<br>A-LOK® |                 | Blunt     | 0.125     | 3.2 | 0.29   | 0.56    | 0.34  | 0.55       | 1.17 | 29.7 |  |
| 4A-SN6LK-SS       | 4A-SN6AK-SS   |                            |                 | PCTFE     |           |     | 0.23   | 0.63    | 0.27  | 0.58       |      |      |  |
| 4F-SN6LR-SS       | 4F-SN6AR-SS   | 1/4" Female NPT            |                 | Blunt     | 0.125     | 3.2 | 0.29   | 0.56    | 0.34  | 0.55       | 0.94 | 23.9 |  |
| 4F-SN6LK-SS       | 4F-SN6AK-SS   |                            |                 | PCTFE     |           |     | 0.23   | 0.63    | 0.27  | 0.58       |      |      |  |
| 4M-SN6LR-SS       | 4M-SN6AR-SS   | 1/4" Male NPT              |                 | Blunt     | 0.125     | 3.2 | 0.29   | 0.56    | 0.34  | 0.55       | 0.99 | 25.1 |  |
| 4M-SN6LK-SS       | 4M-SN6AK-SS   |                            |                 | PCTFE     |           |     | 0.23   | 0.63    | 0.27  | 0.58       |      |      |  |
| 4Z-SN6LR-SS       | 4Z-SN6AR-SS   | 1/4" Compression CPI™      |                 | Blunt     | 0.125     | 3.2 | 0.29   | 0.56    | 0.34  | 0.55       | 1.17 | 29.7 |  |
| 4Z-SN6LK-SS       | 4Z-SN6AK-SS   |                            |                 | PCTFE     |           |     | 0.23   | 0.63    | 0.27  | 0.58       |      |      |  |
| 4M4F-SN6LR-SS     | 4M4F-SN6AR-SS | 1/4" Male NPT              | 1/4" Female NPT | Blunt     | 0.125     | 3.2 | 0.29   | 0.56    | 0.34  | 0.55       | 0.99 | 25.1 |  |
| 4M4F-SN6LK-SS     | 4M4F-SN6AK-SS |                            |                 | PCTFE     |           |     | 0.23   | 0.63    | 0.27  | 0.58       |      |      |  |

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .

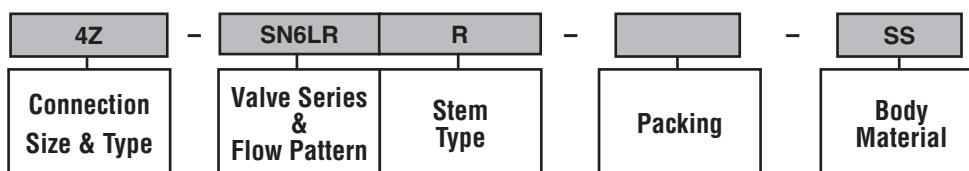
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

Dimensions in inches/millimeters are for reference only, subject to change.

SN6

## How to Order

The part number sequence identifies product characteristics as shown in the example.

**Example: 4Z-SN6LR-SS** describes an SN6 valve, inline, blunt stem, 316 SS, 1/4" CPI™ tube inlet and outlet ports, and a PTFE packing.**Note: Handles:** SN6 valves with R-Stem are standard with 316 SS T-bar handles. SN6 valves with K-Stem are standard with round anodized aluminum handles, 1.00 inch diameter. SN6 valves are not panel mountable.**Optional Packing** – Standard is PTFE (No designator). Add **-G** (Grafoil) temperature ratings to 700°F.**Example:** 4F-SN6LR-G-SS

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## Introduction

Parker Rising Plug and Gauge/Root Valves are available with a variety of seat and seal materials. They are screwed bonnet designs featuring bonnet lock plates. The PV and PVG Series of valves provide a straight-through flow path in two orifice sizes. The valves utilize a non-wetted upper stem and a non-rotating lower stem in conjunction with a tapered seat for positive shut-off and long seat life, even in particulated media.

## Features

- ▶ Bi-directional flow
- ▶ Roddable, straight through flow path
- ▶ Bonnet lock plate resists accidental bonnet disengagement
- ▶ Stem dust seal helps protect stem from external contamination
- ▶ Inlet side optional outlet – PVG 1/4" Female NPT – PVG 1/2" Female NPT
- ▶ Rugged 316 stainless steel barstock construction
- ▶ Panel mounting option
- ▶ Gauge port option
- ▶ 100% factory tested

PV

## Specifications

### Pressure Rating:

Acetal Seat (DE): 6000 psig (414 bar) CWP  
 PEEK Seat (PK): 6000 psig (414 bar) CWP  
 PCTFE Seat (K): 2200 psig (152 bar) CWP  
 PFA Seat (PFA): 750 psig (52 bar) CWP

### Temperature Rating:

#### Seats –

Acetal:  
 -20°F to 250°F (-29°C to 121°C)  
 PEEK and PFA:  
 -20°F to 400°F (-29°C to 204°C)  
 PCTFE:  
 -20°F to 200°F (-29°C to 93°C)

#### Stem Seals –

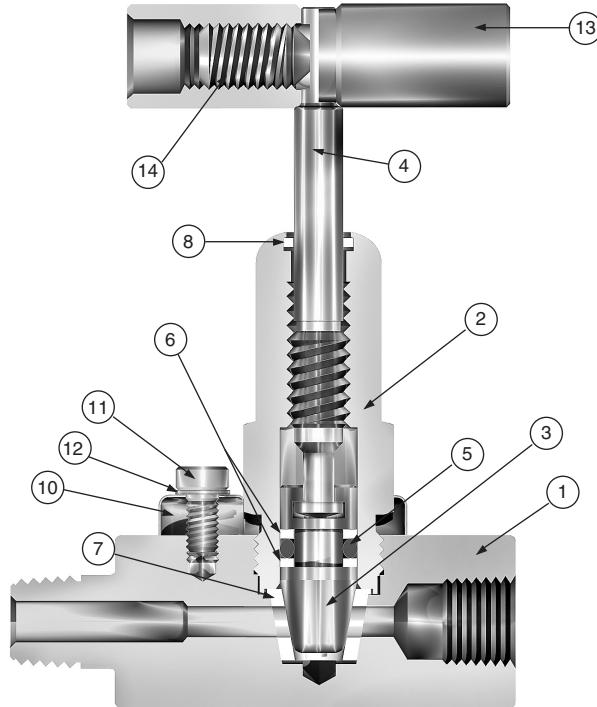
Nitrile Rubber (BN), Silicone Rubber (SI), and Ethylene Propylene Rubber (EPR):  
 -20°F to 250°F (-29°C to 121°C)  
 Fluorocarbon Rubber (V):  
 -20°F to 400°F (-29°C to 204°C)  
 Highly Fluorinated Fluorocarbon Rubber (KZ):  
 -20°F to 200°F (-29°C to 93°C)

## Flow Data

PV4:  $C_V = 0.95$ ;  $x_T = 0.43$ ; Orifice = 0.188" (4.8mm)  
 PV8:  $C_V = 2.01$ ;  $x_T = 0.33$ ; Orifice = 0.250" (6.4mm)

Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = x_T$ .

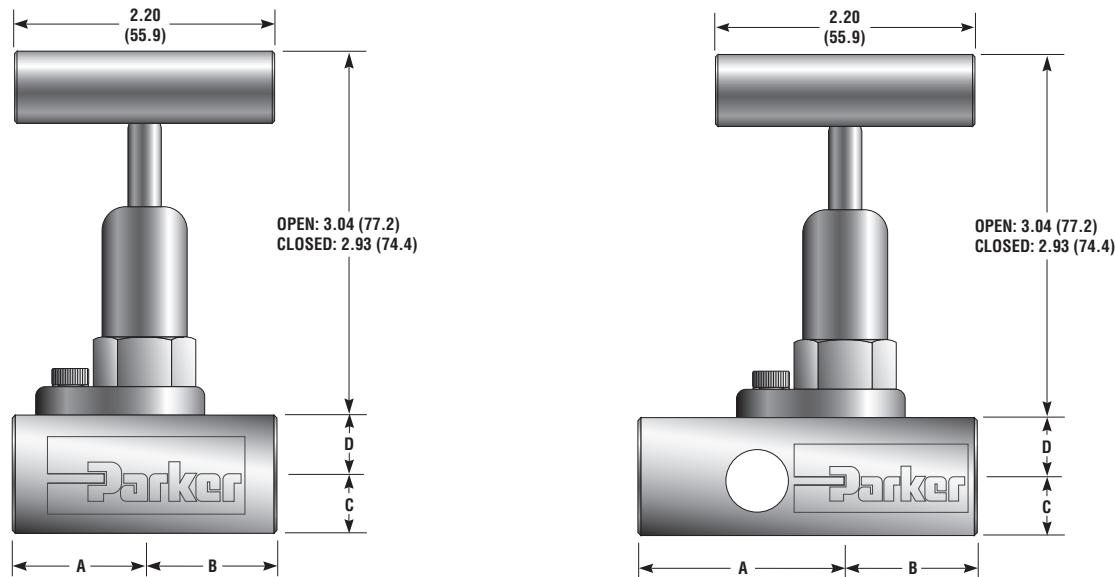
## Materials of Construction



**Model Shown:**  
**4M4F-PV4DE-BN-SS**

| Item # | Description          | Material            |
|--------|----------------------|---------------------|
| 1      | Body                 | ASTM A 479 Type 316 |
| 2      | Bonnet               | ASTM A 479 Type 316 |
| 3      | Lower Stem           | ASTM A 276 Type 316 |
| 4      | Upper Stem           | ASTM A 564 Type 316 |
| 5      | Stem Seal*           | Fluorocarbon Rubber |
| 6      | Back-up Rings        | PTFE                |
| 7      | Seat*                | Acetal              |
| 8      | Dust Seal            | PTFE                |
| 9      | Seat Pin (not shown) | Stainless Steel     |
| 10     | Lock Plate           | Stainless Steel     |
| 11     | Lock Plate Screw     | Stainless Steel     |
| 12     | Lock Washer          | Stainless Steel     |
| 13     | Handle               | Stainless Steel     |
| 14     | Handle Screw         | Stainless Steel     |

\* Optional elastomeric O-ring stem seals and polymer seat materials are available - See How to Order.  
 Lubrication: Perfluorinated polyether

**Model Shown: 4F-PV4DE-V-SS****Model Shown: 4F-PVG4PK-EPR-SS**

( ) Denotes dimensions in millimeters

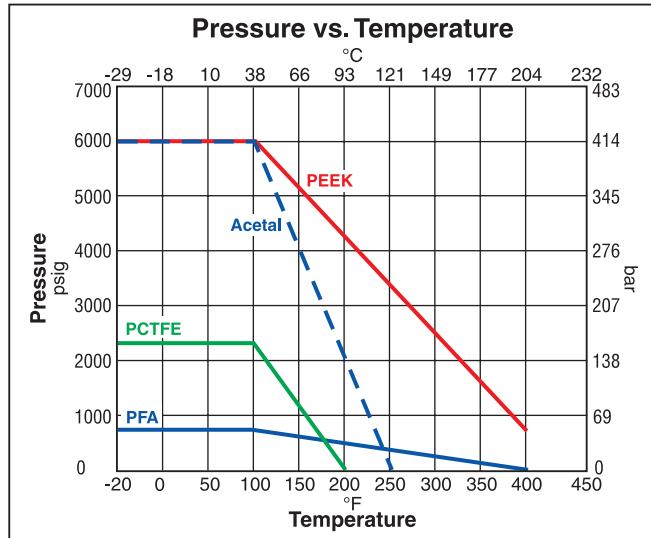
**PV****Dimensions**

| Basic Part Number | End Connection          |                 | Dimensions |      |      |      |      |      |      |      |
|-------------------|-------------------------|-----------------|------------|------|------|------|------|------|------|------|
|                   |                         |                 | A†         |      | B†   |      | C    |      | D    |      |
|                   | Inch                    | mm              | Inch       | mm   | Inch | mm   | Inch | mm   | Inch | mm   |
| 4A-PV4DE-V-SS     | 1/4" Compression A-LOK® |                 | 1.73       | 43.9 | 1.73 | 43.9 | 0.50 | 12.7 | 0.50 | 12.7 |
| 4F-PV4DE-V-SS     | 1/4" Female NPT         |                 | 1.13       | 28.7 | 1.13 | 28.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| 4F-PVG4DE-V-SS    | 1/4" Female NPT         |                 | 1.75       | 44.5 | 1.13 | 28.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| 4M4F-PV4DE-V-SS   | 1/4" Male NPT           | 1/4" Female NPT | 1.78       | 45.2 | 1.13 | 28.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| 4Z-PV4DE-V-SS     | 1/4" Compression CPI™   |                 | 1.73       | 43.9 | 1.73 | 43.9 | 0.50 | 12.7 | 0.50 | 12.7 |
| 6A-PV4DE-V-SS     | 3/8" Compression A-LOK® |                 | 1.79       | 45.5 | 1.79 | 45.5 | 0.50 | 12.7 | 0.50 | 12.7 |
| 6Z-PV4DE-V-SS     | 3/8" Compression CPI™   |                 | 1.79       | 45.5 | 1.79 | 45.5 | 0.50 | 12.7 | 0.50 | 12.7 |
| 8M4F-PV4DE-V-SS   | 1/2" Male NPT           | 1/4" Female NPT | 1.90       | 48.3 | 1.13 | 28.7 | 0.50 | 12.7 | 0.50 | 12.7 |
| 8M4F-PVG4DE-V-SS  | 1/2" Male NPT           | 1/4" Female NPT | 3.13       | 79.5 | 1.75 | 44.5 | 0.50 | 12.7 | 0.50 | 12.7 |
| 6M6F-PVG8DE-V-SS  | 3/8" Male NPT           | 3/8" Female NPT | 3.33       | 84.6 | 2.25 | 57.2 | 0.56 | 14.2 | 0.56 | 14.2 |
| 8A-PV8DE-V-SS     | 1/2" Compression A-LOK® |                 | 1.91       | 48.5 | 1.91 | 48.5 | 0.56 | 14.2 | 0.56 | 14.2 |
| 8F-PV8DE-V-SS     | 1/2" Female NPT         |                 | 1.33       | 33.8 | 1.33 | 33.8 | 0.56 | 14.2 | 0.56 | 14.2 |
| 8M8F-PV8DE-V-SS   | 1/2" Male NPT           | 1/2" Female NPT | 2.17       | 55.1 | 1.33 | 33.8 | 0.56 | 14.2 | 0.56 | 14.2 |
| 8M8F-PVG8DE-V-SS  | 1/2" Male NPT           | 1/2" Female NPT | 3.33       | 84.6 | 2.25 | 57.2 | 0.56 | 14.2 | 0.56 | 14.2 |
| 8Z-PV8DE-V-SS     | 1/2" Compression CPI™   |                 | 1.91       | 48.5 | 1.91 | 48.5 | 0.56 | 14.2 | 0.56 | 14.2 |
| 12M8F-PV8DE-V-SS  | 3/4" Male NPT           | 1/2" Female NPT | 2.17       | 55.1 | 1.33 | 25.4 | 0.56 | 14.2 | 0.56 | 14.2 |

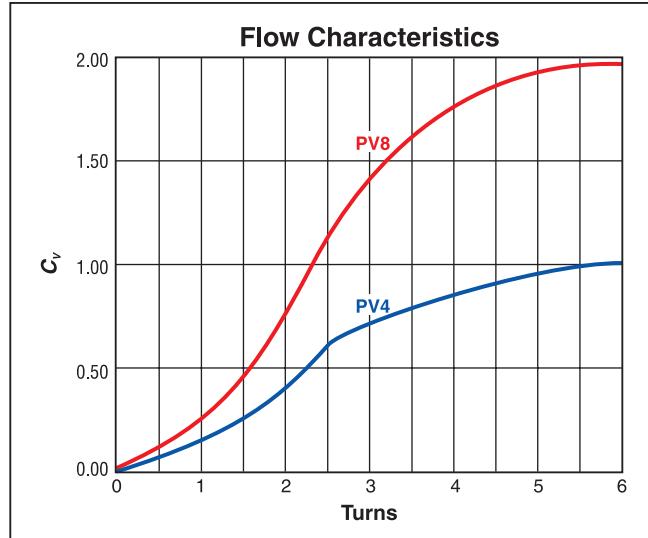
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

Dimensions in inches/millimeters are for reference only, subject to change.

## Pressure vs. Temperature



## Flow Characteristics

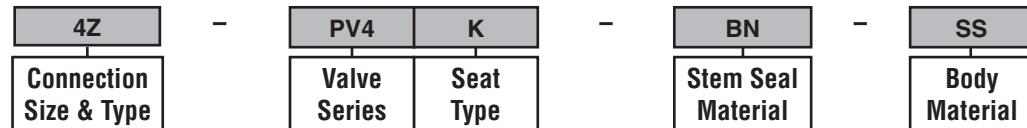


## How to Order

PV

The part number sequence identifies product characteristics as shown in the example below.

**Example : 4Z-PV4K-BN-SS** describes a PV4 Series rising stem plug valve equipped with 1/4" CPI™ compression inlet and outlet ports, a PCTFE seat, Nitrile stem seals, and stainless steel construction.



**Optional Seat Materials** - K (PCTFE), PK (PEEK) or PFA (PFA). **Example: 4F-PV4PK-V-SS**

**Optional Seal Materials** - BN (Nitrile Rubber), SI (Silicone Rubber), EPR (Ethylene Propylene Rubber, KZ (Highly Fluorinated Fluorocarbon Rubber). **Example: 4Z-PV4PFA-KZ-SS**

**Optional Panel Mounting** - **Example: 4Z-PV4DE-V-SSP**

**MAN Series Needle Valves with MPI™ Style Connections**

Pressures to 15,000 psi (1034 bar)

Parker MAN series needle valves with MPI™ tube connections are designed for multi-turn control of liquid or gas media with regulation or shutoff options for pressures up to 15,000 psi. This Double Ferrule connection delivers fast, easy make-up and reliable bubble-tight performance in either liquid or gas service. Valves are built for MPI™ tube sizes from 1/4" to 1" and include five different body patterns providing many control options.

**Features:**

- Valve flow capabilities closely match associated tubing bore sizes
- CW 316 Stainless Steel Material is Standard, 2507 Annealed Super Duplex as option
- Rising stem/barstock body design
- Non-rotating stem prevents stem/seat galling
- Metal-to-metal seating achieves bubble-tight shut-off, longer stem/seat life in abrasive flow, greater durability for repeated on/off cycles, unmatched temperature performance and excellent corrosion resistance
- Temperature range from -423°F (-252°C) to 1000°F (538°C)
- Standard PTFE packing provides dependable stem and body sealing from -423°F to 450°F, additional options include PTFE/Glass (25%) for temperatures to 600°F and Graphite Yarn for temperatures to 1000°F
- Choice of Vee (shutoff) or Regulating Flow Stem Tips
- Replaceable Seat Option available with Right Angle 2-way body style
- Optional N-Dura Stem and Seat Coating or Stellite material option for severe service available



MAN Series Needle Valve with MPI Connections

MPI



MAN Series Needle Valve Extreme Temperature shown with "-VT" (Vent) option

**Parker MPI™ Connection Benefits:**

MPI™ Connections are designed for both liquids and gases. They can be used on MPI™ 1/8th Hard tubing, Autoclave Engineers Medium Pressure Tubing, or Thick Wall Instrumentation Tubing in both 316 SS and 2507 Super Duplex materials.

- **Suparcase® Technology** creates a Corrosion Resistant Ferrule set for a strong, mechanical hold
- **Double Ferrule** design is proven but not interchangeable with standard tube fittings
- **Longer Thread Engagement** improves resistance to pressure and load on ferrules
- **Molybdenum Disulfide Coated Gland Nut** prevents galling and makes assembly easier.

## MAN Series Medium Pressure Needle Valves

(Replaces MPN Series Valves)

Standard packing materials allow service temperatures from -100°F (-73°C) to 450°F (232°C), optional materials service from -423°F (-252°C) to 1000°F (538°C). Critical service design features include packing below the stem thread and the non-rotating stem design ensures longer life in rugged conditions. MPI™ valves are available in two materials, CW 316 SS and 2507 Super Duplex.

### MPI™ Medium Pressure Valve Connection Designation

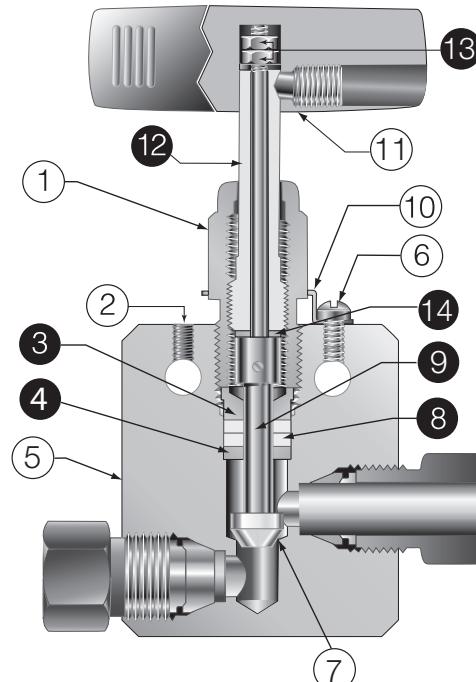
| Valve Connection | Description  | Drawing |
|------------------|--|---------|
| MP7              | Parker MPI™<br>(Medium Pressure Inverted)<br>To 15,000 PSI |         |

Selections "F" NPT Valves and "MF" Medium Pressure C&T Valves from previous MPI™ catalog are now supplied from the Parker Autoclave Engineers product catalogs: "P" Series and "20SM" Series Needle Valve brochures.

### Material of Construction

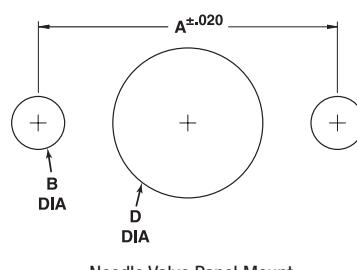
| Item# | Description                     | Material      |
|-------|---------------------------------|---------------|
| 1     | Low Friction Packing Gland      | Ampco 45      |
| 2     | Panel Mount Option              | 316 SS        |
| ③     | Packing Washer                  | Ampco 45      |
| ④     | Bottom Washer                   | 316 SS        |
| 5     | Valve Body                      | 316 SS        |
| 6     | Pan Head Screw 10-24 x 1/4"     | 18-8 SS       |
| ⑦     | Metal to Metal Seating          | 316 SS        |
| ⑧     | Adjustable Packing              | PTFE          |
| 9     | One Piece Stem                  | 316 SS        |
| 10    | Locking Device                  | 302 SS        |
| 11    | Powder Coated Handle            | 316 SS        |
| ⑫     | Stem Sleeve                     | 304 SS        |
| ⑬     | Hex Nuts                        | 300 Series SS |
| ⑭     | Thrust Washer                   | 17-4PH        |
| ●     | Replaceable Seat (version only) | 17-4PH        |

● Typical spare parts found in Repair Kit



Inlet is typically under the seat (from left side in drawing above) however valve can be used bi-directionally. Inlet is shown to keep pressure trapped under seat in closed position (preferred).

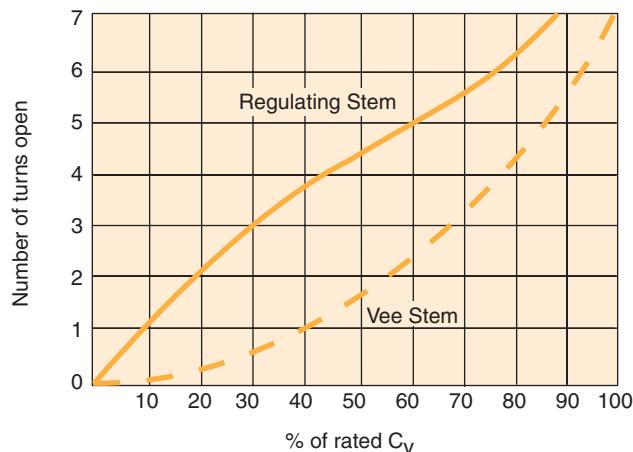
### Panel Hole Sizes



| Valve Size | Inches |     |            |      |
|------------|--------|-----|------------|------|
|            | A      | B   | Screw Size | D    |
| 4 & 6      | 1.25   | .22 | 10 - 24    | .75  |
| 8 & 9      | 1.375  | .22 | 10 - 24    | 1.00 |
| 12         | 1.75   | .22 | 10 - 24    | 1.12 |
| 16         | 2.50   | .22 | 10 - 24    | 1.62 |

## Two Way Inline Valves

### Generalized Flow Coefficient Curves (C<sub>V</sub>)



## Basic Repair Kits (316 SS)

Pick Repair Kit by matching size ie; R4 = 1/4", and add packing/temp/material suffix if other than standard 316SS & PTFE (T)

### Repair kits for LB, AB, XBI, XBO (V-Stem Versions)

R4MANB, R6MANB, R8MANB, R9MANB, R12MANB, R16MANB

### Repair kits for LR, AR, XRI, XRO (Regulating-Stem Versions)

R4MANR, R6MANR, R8MANR, R9MANR, R12MANR, R16MANR

### Repair kits for XBD 3-way 2-stem Valves (V-Stem versions)

R4MANXBD, R6MANXBD, R8MANXBD, R9MANXBD, R12MANXBD, R16MANXBD

### Repair kits for XRD 3-way 2-stem Valves (Regulating-Stem versions)

R4MANXRD, R6MANXRD, R8MANXRD, R9MANXRD, R12MANXRD, R16MANXRD

### Repair kits for ABR 2-way Replaceable Seat Valves (V-Stem versions)

R4MANABR, R6MANABR, R8MANABR, R9MANABR, R12MANABR, R16MANABR

### Repair kits for ARR 2-way Replaceable Seat Valves (Regulating-Stem versions)

R4MANARR, R6MANARR, R8MANARR, R9MANARR, R12MANARR, R16MANARR

Consult your Parker representative for other material kit numbers, and pricing. Visit [www.autoclave.com](http://www.autoclave.com) for product Operation manuals.

MPI

## How to Order MAN Series Needle Valves

The correct part number is easily derived from the following example and ordering chart. The eight product characteristics required are coded as shown in the chart.

The following example describes an MAN Series needle valve with 1/4" MPI™ connections, 2 way angle flow path, blunt (VEE) stem, PTFE packing, a stainless steel body and the option for cryogenic trim materials

| Typical part number example: <b>4MP7-MANAB-T-SS-LTB</b> (part number is created based on customer selection of product parameters, see below for example) |                             |   |              |   |                           |   |  |   |                                |   |   |
|---|-----------------------------|---|--------------|---|---------------------------|---|--|---|--------------------------------|---|---|
| 4   | MP7                         | - | MAN          | A   | B                         | - | T  | - | SS                             | - | LTB   |
| Inlet/Outlet Connection Size  | Connection Type             |   | Valve Series | Valve Type  | Stem Type                 |   | Packing Material                                       |   | Body Material                  |   | Options   |
| <b>4 = 1/4"</b>   | <b>MP7 =</b><br>Parker MPI™ |   | <b>MAN</b>   | <b>L =</b><br>2 Way Inline  | <b>B =</b><br>Blunt (Vee) |   | <b>T =</b><br>PTFE (Standard)                          |   | <b>SS =</b><br>Stainless Steel |   | <b>LTB =</b><br>Cryogenic (-100° to 0°F)                |
| <b>6 = 3/8"</b>   |                             |   |              | <b>A =</b><br>2 Way Angle   | <b>R =</b><br>Regulating  |   | <b>TG =</b><br>PTFE Glass (use with <b>HYG</b> option) |   | <b>2507 =</b><br>Super Duplex  |   | <b>LT =</b> Low Temp. Ext. (-100 to -423°F)             |
| <b>8 = 1/2"</b>   |                             |   |              | <b>X***I =</b><br>3 Way, 2 Pressure Connections                         |                           |   | <b>GY =</b><br>Graphite Yarn                           |   |                                |   | <b>HT =</b> High Temp. Ext. (800° to 1000°F)            |
| <b>9 = 9/16"</b>  |                             |   |              | <b>X***D =</b><br>3 Way, 2 Stem Connection                              |                           |   |  |   |                                |   | <b>PM =</b> Panel Mount                                 |
| <b>12 = 3/4"</b>  |                             |   |              | <b>A***R =</b><br>2 Way Angle (replaceable seat)                        |                           |   |  |   |                                |   | <b>HYG =</b><br>Hydrogen/Helium Service                 |
| <b>16 = 1"</b>  |                             |   |              | <b>X***O =</b><br>3 Way, 1 Pressure Connection<br>(** Insert Stem Type) |                           |   |  |   |                                |   | <b>XF =</b> High Strength Ferrules (sizes 12 & 16 only) |
|   |                             |   |              |   |                           |   |  |   |                                |   | <b>LD =</b> Lockout Device (clamshell)                  |

### Extreme Temperature Options:

Standard valves using PTFE packing (code "T") may be operated from -100°F (-73°C) to 450°F (232°C). High and Cryogenic temperature packing and/or extended stuffing box are available for service from -423°F (-252°C) to 1000°F (538°C) by adding the following suffixes to catalog order number: (Note: Use code "T" packing with "LTB" and "LT" Cryogenic options)

-LTB = Standard valve with Cryogenic trim materials and PTFE packing to -100°F (-73°C)

-LT = Extended stuffing box valve with PTFE packing and Cryogenic trim materials to -423°F (-252°C) (adds 3.5" to overall height of valve) use when temperature is below -100°F

-TG = Standard valve with PTFE-Glass packing from -100°F (-73°C) to 600°F (316°C)

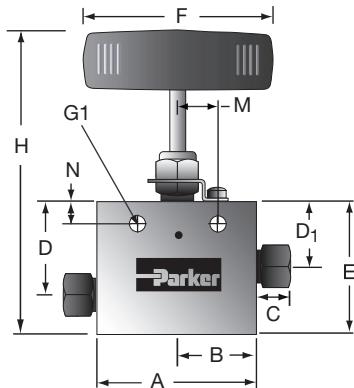
-GY = Standard valve with Graphite Braided Yarn packing to 800°F (427°C). Use when selecting HT option.

(Note: 3/4" valve rated 8000 psi (552 bar) and 1" rated 6000 psi (412 bar) max with Graphite Yarn packing)

-HT = Extended stuffing box valve with Graphite Braided Yarn packing to 1000°F (538°C) (adds 3.5" to overall height of valve) use when temperature exceeds 800°F



## Two Way Inline Valves


**Notes:**

G1 = Bracket mounting hole size  
 H = Dimension with stem in closed position  
 Panel Mount Template and drill sizes on Page 34

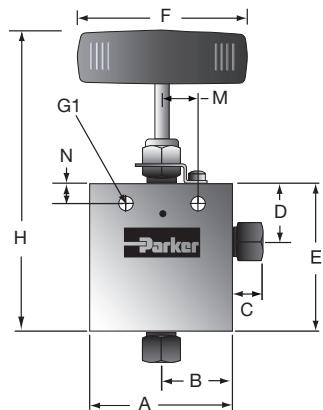
| Rated Cv<br>2-Way (Inline) |      |
|----------------------------|------|
| 4MP7                       | 0.31 |
| 6MP7                       | 0.75 |
| 8MP7                       | 1.3  |
| 9MP7                       | 1.75 |
| 12MP7                      | 2.8  |
| 16MP7                      | 5.2  |

| Parker<br>Part No. | PSI    | Connection | Inches  |      |      |      |      |      |      |       |      |      |      |      |                 |
|--------------------|--------|------------|---------|------|------|------|------|------|------|-------|------|------|------|------|-----------------|
|                    |        |            | Orifice | A    | B    | C    | D    | D1   | E    | F     | G1   | H    | M    | N    | Block<br>Thick. |
| 4MP7-MANLB-T-SS    | 15,000 | 1/4" MPI   | .125    | 2.50 | 1.25 | 0.50 | 1.63 | 1.19 | 2.13 | 3.00  | 0.22 | 4.60 | 0.63 | 0.38 | 1.00            |
| 6MP7-MANLB-T-SS    | 15,000 | 3/8" MPI   | .219    | 2.50 | 1.25 | 0.63 | 1.63 | 1.19 | 2.13 | 3.00  | 0.22 | 4.60 | 0.63 | 0.38 | 1.00            |
| 8MP7-MANLB-T-SS    | 15,000 | 1/2" MPI   | .312    | 3.00 | 1.50 | 0.69 | 2.38 | 1.75 | 3.00 | 4.00  | 0.34 | 6.00 | 0.69 | 0.50 | 1.38            |
| 9MP7-MANLB-T-SS    | 15,000 | 9/16" MPI  | .359    | 3.00 | 1.50 | 0.75 | 2.38 | 1.75 | 3.00 | 4.00  | 0.34 | 6.00 | 0.69 | 0.50 | 1.38            |
| 12MP7-MANLB-T-SS   | 15,000 | 3/4" MPI   | .516    | 4.12 | 2.06 | 0.88 | 3.00 | 2.25 | 3.75 | 10.35 | 0.44 | 6.92 | 0.88 | 0.62 | 1.75            |
| 16MP7-MANLB-T-SS   | 12,500 | 1" MPI     | .688    | 4.75 | 2.38 | 1.13 | 3.75 | 2.81 | 4.75 | 10.35 | 0.56 | 8.74 | 1.25 | 1.13 | 2.00            |

For 2507 Super Duplex option, replace **-SS** with **-2507** and use **-XF** ferrule sets for sizes 12 and 16. Dimensions in inches are for reference only, subject to change.

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## Two Way Angle Valves


**Notes:**

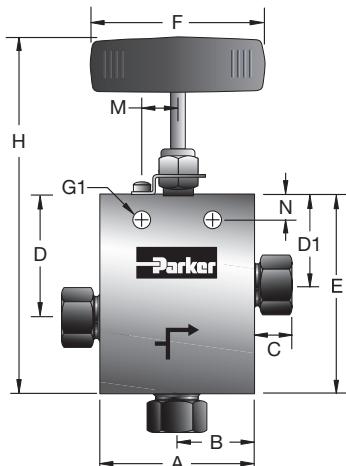
G1 = Bracket mounting hole size  
 H = Dimension with stem in closed position  
 Panel Mount Template and drill sizes on Page 34

| Rated Cv<br>2-Way (Angle) |      |
|---------------------------|------|
| 4MP7                      | 0.47 |
| 6MP7                      | 1.2  |
| 8MP7                      | 1.95 |
| 9MP7                      | 2.63 |
| 12MP7                     | 4.2  |
| 16MP7                     | 7.8  |

| Parker<br>Part No. | PSI    | Connection | Inches  |      |      |      |      |      |       |      |      |      |      |                 |
|--------------------|--------|------------|---------|------|------|------|------|------|-------|------|------|------|------|-----------------|
|                    |        |            | Orifice | A    | B    | C    | D    | E    | F     | G1   | H    | M    | N    | Block<br>Thick. |
| 4MP7-MANAB-T-SS    | 15,000 | 1/4" MPI   | .125    | 2.50 | 1.25 | 0.50 | 1.19 | 2.57 | 3.00  | 0.22 | 5.00 | 0.63 | 0.38 | 1.00            |
| 6MP7-MANAB-T-SS    | 15,000 | 3/8" MPI   | .219    | 2.50 | 1.25 | 0.63 | 1.19 | 2.57 | 3.00  | 0.22 | 5.00 | 0.63 | 0.38 | 1.00            |
| 8MP7-MANAB-T-SS    | 15,000 | 1/2" MPI   | .312    | 3.00 | 1.50 | 0.69 | 1.75 | 3.58 | 4.00  | 0.34 | 6.60 | 0.69 | 0.50 | 1.38            |
| 9MP7-MANAB-T-SS    | 15,000 | 9/16" MPI  | .359    | 3.00 | 1.50 | 0.75 | 1.75 | 3.58 | 4.00  | 0.34 | 6.60 | 0.69 | 0.50 | 1.38            |
| 12MP7-MANAB-T-SS   | 15,000 | 3/4" MPI   | .516    | 4.12 | 2.06 | 0.88 | 2.25 | 4.25 | 10.35 | 0.44 | 7.42 | 0.88 | 0.62 | 1.75            |
| 16MP7-MANAB-T-SS   | 12,500 | 1" MPI     | .688    | 4.75 | 2.38 | 1.13 | 2.81 | 5.44 | 10.35 | 0.56 | 9.43 | 1.25 | 1.13 | 2.00            |

For 2507 Super Duplex option, replace **-SS** with **-2507** and use **-XF** ferrule sets for sizes 12 and 16. Dimensions in inches are for reference only, subject to change.

## Three Way/Two Pressure Connections



### Notes:

G1 = Bracket mounting hole size  
 H = Dimension with stem in closed position  
 Panel Mount Template and drill sizes on Page 34

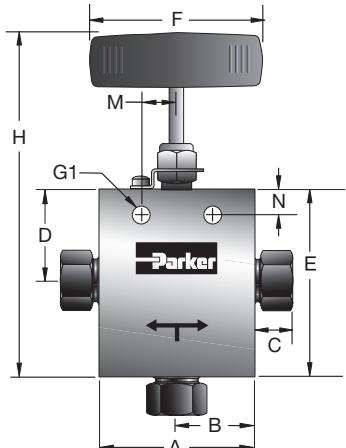
| Rated Cv<br>3-Way/2 on Pressure (Angle) |      |
|---|------|
| 4MP7                                    | 0.47 |
| 6MP7                                    | 1.2  |
| 8MP7                                    | 1.95 |
| 9MP7                                    | 2.63 |
| 12MP7                                   | 4.2  |
| 16MP7                                   | 7.8  |

| Parker<br>Part No. | PSI    | Connection | Inches  |      |      |      |      |      |      |       |      |       |      |      |                 |
|--------------------|--------|------------|---------|------|------|------|------|------|------|-------|------|-------|------|------|-----------------|
|                    |        |            | Orifice | A    | B    | C    | D    | D1   | E    | F     | G1   | H     | M    | N    | Block<br>Thick. |
| 4MP7-MANXBI-T-SS   | 15,000 | 1/4" MPI   | 0.125   | 2.50 | 1.25 | 0.50 | 1.63 | 1.19 | 2.84 | 3.00  | 0.22 | 5.30  | 0.63 | 0.38 | 1.00            |
| 6MP7-MANXBI-T-SS   | 15,000 | 3/8" MPI   | 0.219   | 2.50 | 1.25 | 0.63 | 1.63 | 1.19 | 2.84 | 3.00  | 0.22 | 5.30  | 0.63 | 0.38 | 1.00            |
| 8MP7-MANXBI-T-SS   | 15,000 | 1/2" MPI   | 0.312   | 3.00 | 1.50 | 0.69 | 2.38 | 1.75 | 3.88 | 4.00  | 0.34 | 6.90  | 0.69 | 0.50 | 1.38            |
| 9MP7-MANXBI-T-SS   | 15,000 | 9/16" MPI  | 0.359   | 3.00 | 1.50 | 0.75 | 2.38 | 1.75 | 3.88 | 4.00  | 0.34 | 6.90  | 0.69 | 0.50 | 1.38            |
| 12MP7-MANXBI-T-SS  | 15,000 | 3/4" MPI   | 0.516   | 4.12 | 2.06 | 0.88 | 3.00 | 2.25 | 5.00 | 10.35 | 0.44 | 8.17  | 0.88 | 0.62 | 1.75            |
| 16MP7-MANXBI-T-SS  | 12,500 | 1" MPI     | 0.688   | 4.75 | 2.38 | 1.13 | 3.75 | 2.82 | 6.38 | 10.35 | 0.56 | 10.37 | 1.25 | 1.13 | 2.00            |

For 2507 Super Duplex option, replace -SS with -2507 and use -XF ferrule sets for sizes 12 and 16. Dimensions in inches are for reference only, subject to change.

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## Three Way/One Pressure Connections



### Notes:

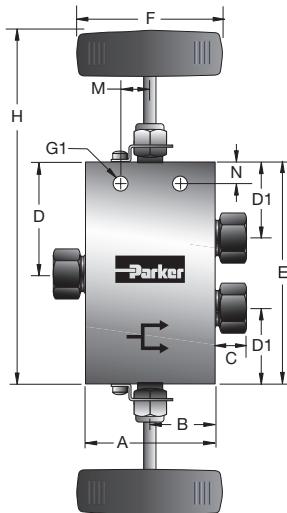
G1 = Bracket mounting hole size  
 H = Dimension with stem in closed position  
 Panel Mount Template and drill sizes on Page 34

| Rated Cv<br>3-Way/1 on Pressure (Angle) |      |
|---|------|
| 4MP7                                    | 0.47 |
| 6MP7                                    | 1.2  |
| 8MP7                                    | 1.95 |
| 9MP7                                    | 2.63 |
| 12MP7                                   | 4.28 |
| 16MP7                                   | 7.8  |

| Parker<br>Part No. | PSI    | Connection | Inches  |      |      |      |      |      |       |      |      |      |      |                 |
|--------------------|--------|------------|---------|------|------|------|------|------|-------|------|------|------|------|-----------------|
|                    |        |            | Orifice | A    | B    | C    | D    | E    | F     | G1   | H    | M    | N    | Block<br>Thick. |
| 4MP7-MANXBO-T-SS   | 15,000 | 1/4" MPI   | 0.125   | 2.50 | 1.25 | 0.50 | 1.19 | 2.57 | 3.00  | 0.22 | 5.00 | 0.63 | 0.38 | 1.00            |
| 6MP7-MANXBO-T-SS   | 15,000 | 3/8" MPI   | 0.219   | 2.50 | 1.25 | 0.63 | 1.19 | 2.57 | 3.00  | 0.22 | 5.00 | 0.63 | 0.38 | 1.00            |
| 8MP7-MANXBO-T-SS   | 15,000 | 1/2" MPI   | 0.312   | 3.00 | 1.50 | 0.69 | 1.75 | 3.63 | 4.00  | 0.34 | 6.60 | 0.69 | 0.50 | 1.38            |
| 9MP7-MANXBO-T-SS   | 15,000 | 9/16" MPI  | 0.359   | 3.00 | 1.50 | 0.75 | 1.75 | 3.63 | 4.00  | 0.34 | 6.60 | 0.69 | 0.50 | 1.38            |
| 12MP7-MANXBO-T-SS  | 15,000 | 3/4" MPI   | 0.516   | 4.12 | 2.06 | 0.88 | 2.25 | 4.25 | 10.35 | 0.44 | 7.42 | 0.88 | 0.62 | 1.75            |
| 16MP7-MANXBO-T-SS  | 12,500 | 1" MPI     | 0.688   | 4.75 | 2.38 | 1.13 | 2.81 | 5.44 | 10.35 | 0.56 | 9.43 | 1.25 | 1.13 | 2.00            |

For 2507 Super Duplex option, replace -SS with -2507 and use -XF ferrule sets for sizes 12 and 16. Dimensions in inches are for reference only, subject to change.

## Three Way/Two Stem Connections



### Notes:

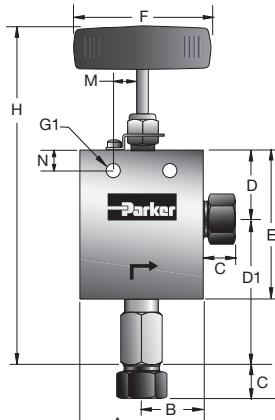
G1 = Bracket mounting hole size  
 H = Dimension with stem in closed position  
 Panel Mount Template and drill sizes on Page 34

| Rated Cv<br>3-Way/2 Stem Manifold (Inline) |      |
|--|------|
| 4MP7                                       | 0.31 |
| 6MP7                                       | 0.75 |
| 8MP7                                       | 1.3  |
| 9MP7                                       | 1.75 |
| 12MP7                                      | 2.8  |
| 16MP7                                      | 5.2  |

| Parker<br>Part No. | PSI    | Connection | Inches  |      |      |      |      |      |      |       |      |       |      |      |                 |
|--------------------|--------|------------|---------|------|------|------|------|------|------|-------|------|-------|------|------|-----------------|
|                    |        |            | Orifice | A    | B    | C    | D    | D1   | E    | F     | G1   | H     | M    | N    | Block<br>Thick. |
| 4MP7-MANXBD-T-SS   | 15,000 | 1/4" MPI   | 0.125   | 2.50 | 1.25 | 0.50 | 1.69 | 1.19 | 3.38 | 3.00  | 0.22 | 5.84  | 0.63 | 0.38 | 1.00            |
| 6MP7-MANXBD-T-SS   | 15,000 | 3/8" MPI   | 0.219   | 2.50 | 1.25 | 0.63 | 1.69 | 1.19 | 3.38 | 3.00  | 0.22 | 5.84  | 0.63 | 0.38 | 1.00            |
| 8MP7-MANXBD-T-SS   | 15,000 | 1/2" MPI   | 0.312   | 3.00 | 1.50 | 0.69 | 2.57 | 1.75 | 5.13 | 4.00  | 0.34 | 8.12  | 0.69 | 0.50 | 1.38            |
| 9MP7-MANXBD-T-SS   | 15,000 | 9/16" MPI  | 0.359   | 3.00 | 1.50 | 0.75 | 2.57 | 1.75 | 5.13 | 4.00  | 0.34 | 8.12  | 0.69 | 0.50 | 1.38            |
| 12MP7-MANXBD-T-SS  | 15,000 | 3/4" MPI   | 0.516   | 4.12 | 2.06 | 0.88 | 3.25 | 2.25 | 6.50 | 10.35 | 0.44 | 9.67  | 0.88 | 0.62 | 1.75            |
| 16MP7-MANXBD-T-SS  | 12,500 | 1" MPI     | 0.688   | 4.75 | 2.38 | 1.13 | 4.13 | 2.81 | 8.25 | 10.35 | 0.56 | 12.24 | 1.25 | 1.13 | 2.00            |

For 2507 Super Duplex option, replace -SS with -2507 and use -XF ferrule sets for sizes 12 and 16. Dimensions in inches are for reference only, subject to change.

## Two Way Angle Valves (Replaceable Seat)



### Notes:

G1 = Bracket mounting hole size  
 H = Dimension with stem in closed position  
 Panel Mount Template and drill sizes on Page 34

| Rated Cv<br>2-Way Replaceable Seat (Angle) |      |
|--|------|
| 4MP7                                       | 0.47 |
| 6MP7                                       | 1.2  |
| 8MP7                                       | 1.95 |
| 9MP7                                       | 2.63 |
| 12MP7                                      | 4.2  |
| 16MP7                                      | 7.8  |

| Parker<br>Part No. | PSI    | Connection | Inches  |      |      |      |      |      |      |       |      |       |      |      |                 |
|--------------------|--------|------------|---------|------|------|------|------|------|------|-------|------|-------|------|------|-----------------|
|                    |        |            | Orifice | A    | B    | C    | D    | D1   | E    | F     | G1   | H     | M    | N    | Block<br>Thick. |
| 4MP7-MANABR-T-SS   | 15,000 | 1/4" MPI   | 0.125   | 2.50 | 1.25 | 0.50 | 1.19 | 2.32 | 2.25 | 3.00  | 0.22 | 5.94  | 0.63 | 0.38 | 1.00            |
| 6MP7-MANABR-T-SS   | 15,000 | 3/8" MPI   | 0.219   | 2.50 | 1.25 | 0.63 | 1.19 | 2.49 | 2.25 | 3.00  | 0.22 | 6.13  | 0.63 | 0.38 | 1.00            |
| 8MP7-MANABR-T-SS   | 15,000 | 1/2" MPI   | 0.312   | 3.00 | 1.50 | 0.69 | 1.63 | 3.18 | 3.12 | 4.00  | 0.34 | 7.80  | 0.69 | 0.50 | 1.38            |
| 9MP7-MANABR-T-SS   | 15,000 | 9/16" MPI  | 0.359   | 3.00 | 1.50 | 0.75 | 1.63 | 3.18 | 3.12 | 4.00  | 0.34 | 7.80  | 7.80 | 0.50 | 1.38            |
| 12MP7-MANABR-T-SS  | 15,000 | 3/4" MPI   | 0.516   | 4.12 | 2.06 | 0.88 | 2.25 | 3.88 | 4.25 | 10.35 | 0.44 | 9.30  | 0.88 | 0.62 | 1.75            |
| 16MP7-MANABR-T-SS  | 12,500 | 1" MPI     | 0.688   | 4.75 | 2.38 | 1.13 | 2.69 | 4.94 | 5.25 | 10.35 | 0.56 | 11.62 | 1.25 | 1.13 | 2.00            |

For 2507 Super Duplex option, replace -SS with -2507 and use -XF ferrule sets for sizes 12 and 16. Dimensions in inches are for reference only, subject to change.

## MAN Series Actuators - Pneumatic, Piston Style

The need to control process and vent valves from a remote location makes air operated (pneumatic) valves a vital component to many process applications.

All MAN Series needle valves with MPI™ connections are available with Fail Open (-FO) or Fail Closed (-FC) Piston Type Actuators. Four sizes of air actuators (Medium, Heavy, Extra Heavy-Single Stage, and Extra Heavy-Two Stage) are offered to meet the service requirements of Parker MAN Series Needle Valves. Both Fail Closed (normally closed) and Fail Open (normally open) designs have overlapping piston sizes to help meet efficiency or economical requirements.

Actuators are available for Outdoor Service. These operators provide corrosion resistant components and prevent the ingress of outside elements and moisture. Limit Switch position location and Solenoid activation are available upon request.

### Features and Benefits

- Fail Open or Fail Close with spring return
- Piston actuator sizing incorporates maximum allowable air pressure of 100 psi
- Yoke design for separation of process and air pressure
- Stem Position Indicator is standard
- Anodized Aluminum Housing (for corrosion and wear resistance)
- -20°F (-29°C) to 200°F (93°C) ambient temperature range (for operation below 30°F (-1°C) dry air must be used and heat tracing is recommended)
- Remote actuation and position indication options available

### Remote On-Off

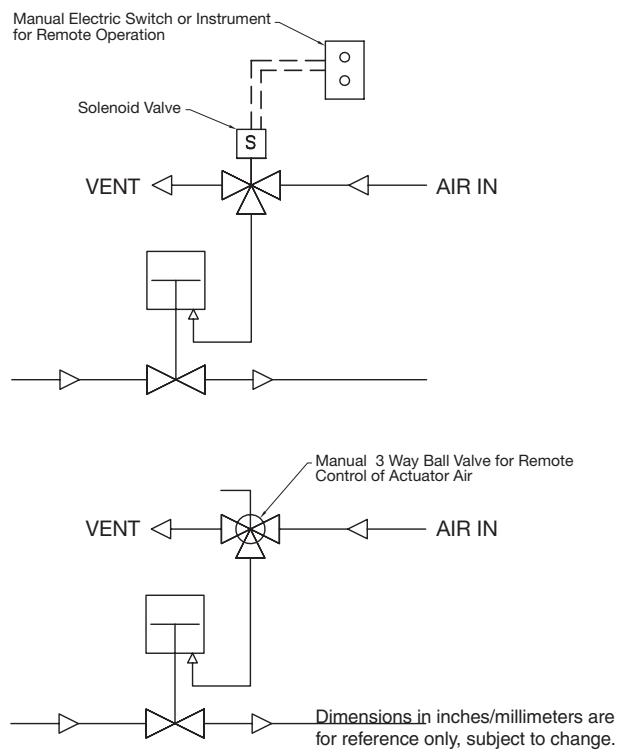
Parker MAN series air-operated needle valves (FC – Fail Close or FO-Fail Open) can be controlled by a 3-way manual air valve or by a low pressure solenoid valve. These can be actuated manually or remotely depending on application requirements.

Parker's MAN series air-operated high pressure valves permit process control from a remotely located panel without the necessity of piping high pressure lines to the control panel. Safety is greatly increased and process "hysteresis" is reduced. Prudent selection of FC or FO valves, together with the automated valve, permit the system design to "Fail Safe" in either the closed or open condition in the event of loss of air pressure, electrical failure, or malfunction.

Where explosion proof conditions are a requirement, pneumatically actuated valves should be considered. Remote mounting of the solenoid valve removes the potential from the hazardous area.



Fail Open - C1S Actuator shown



## MAN Series Actuators - Piston Style Actuators

Piston type air-operated valves offer a unique, reliable design providing for a long and dependable life. These valves are more compact than diaphragm valves and are appropriate for applications such as high-flow gas and liquid delivery systems to reactors and mixer/vaporizers.

### Features and Benefits

- Fail-Open or Fail-Close with spring return
- Yoke design for separation of process and air pressure
- Ease of stem replacement
- Stem position indicator is standard
- High actuator cycle life
- 1/8" NPT air inlet connection standard except Extra Heavy Duty has 3/8" NPT

### Air Operated Materials

Cylinder, Piston, Cover Plates, Spring Housing: Anodized aluminum (for corrosion and wear resistance).

Yoke: Painted Steel

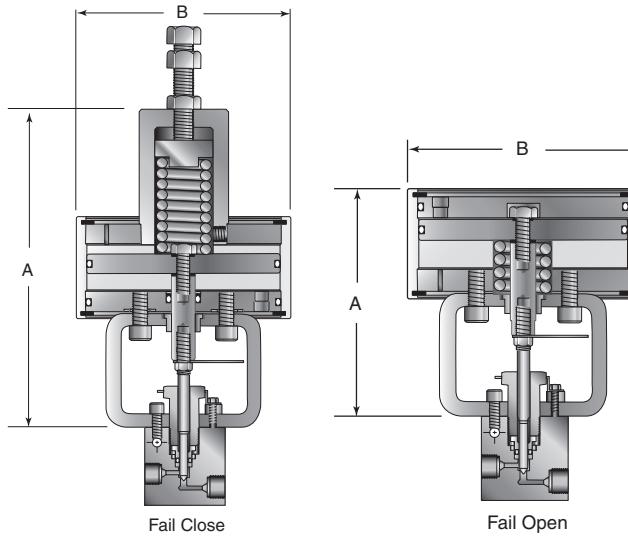
MPI

### Technical Data - Air Operator

- Maximum allowable working pressure: 100 psi (6.89 bar)
- Allowable piston temperature range: -20°F to 200°F (-29°C to 93°C), operating below 30°F (-1.1°C) with dry air only (heat trace may be needed for lower temperatures).
- Area of piston:
  - Medium duty - 19.6 sq. in (126.5 sq. cm)
  - Heavy duty - 39.2 sq. in (252.9 sq. cm)
  - Extra Heavy duty single stage - 56 sq. in (361.3 sq. cm)
  - Extra Heavy duty double stage - 112 sq. in (722.6 sq. cm)
- Approximate air usage/cycle @ 100 psi (6.89 bar):
  - Medium duty - .04 SCF (.0011 SCM)
  - Heavy duty - .08 SCF (.0022 SCM)
  - Extra Heavy duty single stage - .33 SCF (.0095 SCM)
  - Extra Heavy duty double stage - .67 SCF (.019 SCM)
- Life Cycle Tested to 100,000 cycles at 100 psi (6.89 bar) with no leakage or signs of wear or fatigue.

#### Note:

Fail Close = Air-to-Open  
Fail Open = Air-to-Close



NOTE: Air inlet for Fail Close operation is located in the back, opposite the front of valve. For other locations, consult factory. Holes supplied in yoke bracket for mounting.

| Actuator Order Suffix    |            |                 |                       |           |
|--------------------------|------------|-----------------|-----------------------|-----------|
| Duty Rating              | Type       | Ordering Suffix | Dimensions: Inches/mm |           |
|                          |            |                 | A                     | B         |
| Medium                   | Fail Close | O1S             | 8.3 (210)             | 5.7 (144) |
|                          | Fail Open  | C1S             | 5.5 (139)             | 5.7 (144) |
| Heavy                    | Fail Close | O2S             | 10.2 (260)            | 5.7 (144) |
|                          | Fail Open  | C2S             | 7.5 (190)             | 5.7 (144) |
| Extra Heavy Single Stage | Fail Close | HO1S            | 15.2 (385)            | 9.4 (240) |
|                          | Fail Open  | HC1S            | 8.6 (218)             | 9.4 (240) |
| Extra Heavy Two Stage    | Fail Close | HO2S            | 18.5 (470)            | 9.4 (240) |
|                          | Fail Open  | HC2S            | 12.0 (303)            | 9.4 (240) |

| Outdoor Service Actuators |            |                 |
|---------------------------|------------|-----------------|
| Duty Rating               | Type       | Ordering Suffix |
| Medium                    | Fail Close | O1SOD           |
|                           | Fail Open  | C1SOD           |
| Heavy                     | Fail Close | O2SOD           |
|                           | Fail Open  | C2SOD           |
| Extra Heavy Single Stage  | Fail Close | HO1SOD          |
|                           | Fail Open  | HC1SOD          |
| Extra Heavy Two Stage     | Fail Close | HO2SOD          |
|                           | Fail Open  | HC2SOD          |

## Actuator Selection - Fail Open Type MAN Series Valves

| Valve Series | Duty Rating                        | System Pressure KSI (bar) |            |            |            |            |           |           |            |                        |                     |           |
|--------------|------------------------------------|---------------------------|------------|------------|------------|------------|-----------|-----------|------------|------------------------|---------------------|-----------|
|              |                                    | 1-3 (70-210)              | 4 (275)    | 6 (410)    | 8 (550)    | 10 (690)   | 12 (830)  | 14 (970)  | 15 (1035)  | Max. Press. psi (bar)* | Stem Travel in (mm) | Flow Cv** |
| 4MP7         | Medium Duty C1S                    | 40 (2.76)                 | 40 (2.76)  | 40 (2.76)  | 40 (2.76)  | 50 (3.45)  | 60 (4.14) | 70 (4.83) | 80 (5.52)  | 15,000 (1035)          | 0.25 (6.35)         | 0.31      |
|              | Heavy Duty C2S                     | 20 (1.38)                 | 20 (1.38)  | 20 (1.38)  | 20 (1.38)  | 25 (1.72)  | 30 (2.07) | 35 (2.41) | 40 (2.76)  |                        |                     |           |
| 6MP7         | Medium Duty C1S                    | 45 (3.10)                 | 45 (3.10)  | 45 (3.10)  | 45 (3.10)  | 55 (3.79)  | 65 (4.48) | 75 (5.17) | 85 (5.86)  | 15,000 (1035)          | 0.25 (6.35)         | 0.75      |
|              | Heavy Duty C2S                     | 25 (1.72)                 | 25 (1.72)  | 25 (1.72)  | 25 (1.72)  | 30 (2.07)  | 35 (2.41) | 40 (2.76) | 45 (3.10)  |                        |                     |           |
| 8MP7         | Medium Duty C1S                    | 60 (4.14)                 | 60 (4.14)  | 65 (4.48)  | 80 (5.52)  | 100 (6.89) | -         | -         | -          | 10,700 (737)           | 0.38 (9.65)         | 1.30      |
|              | Heavy Duty C2S                     | 30 (2.07)                 | 30 (2.07)  | 30 (2.07)  | 40 (2.76)  | 50 (3.45)  | 55 (3.79) | 60 (4.14) | 70 (4.83)  | 15,000 (1035)          |                     |           |
|              | Extra Heavy Duty Single Stage HC1S | 25 (1.72)                 | 25 (1.72)  | 25 (1.72)  | 30 (2.07)  | 35 (2.41)  | 45 (3.10) | 50 (3.45) | 55 (3.79)  | 15,000 (1035)          |                     |           |
|              | Extra Heavy Duty Two Stage HC2S    | 15 (1.03)                 | 15 (1.03)  | 15 (1.03)  | 15 (1.03)  | 20 (1.38)  | 20 (1.38) | 25 (1.72) | 25 (1.72)  | 15,000 (1035)          |                     |           |
| 9MP7         | Medium Duty C1S                    | 65 (4.48)                 | 65 (4.48)  | 75 (5.17)  | 100 (6.89) | -          | -         | -         | -          | 8,600 (593)            | 0.38 (9.65)         | 1.75      |
|              | Heavy Duty C2S                     | 35 (2.41)                 | 35 (2.41)  | 40 (2.76)  | 50 (3.45)  | 55 (3.79)  | 60 (4.14) | 70 (4.83) | 75 (5.17)  | 15,000 (1035)          |                     |           |
|              | Extra Heavy Duty Single Stage HC1S | 30 (2.07)                 | 30 (2.07)  | 30 (2.07)  | 35 (2.41)  | 45 (3.10)  | 50 (3.45) | 55 (3.79) | 60 (4.14)  | 15,000 (1035)          |                     |           |
|              | Extra Heavy Duty Two Stage HC2S    | 15 (1.03)                 | 15 (1.03)  | 15 (1.03)  | 20 (1.38)  | 20 (1.38)  | 25 (1.72) | 30 (2.07) | 35 (2.41)  | 15,000 (1035)          |                     |           |
| 12MP7        | Medium Duty C1S                    | 90 (6.21)                 | 100 (6.89) | -          | -          | -          | -         | -         | -          | 4,800 (330)            | 0.44 (11.18)        | 2.80      |
|              | Heavy Duty C2S                     | 45 (3.10)                 | 45 (3.10)  | 60 (4.14)  | 80 (5.52)  | 100 (6.89) | -         | -         | -          | 10,000 (690)           |                     |           |
|              | Extra Heavy Duty Single Stage HC1S | 35 (2.41)                 | 35 (2.41)  | 50 (3.45)  | 60 (4.14)  | 70 (4.83)  | 80 (5.52) | 95 (6.55) | 100 (6.89) | 15,000 (1035)          |                     |           |
|              | Extra Heavy Duty Two Stage HC2S    | 20 (1.38)                 | 20 (1.38)  | 25 (1.72)  | 30 (2.07)  | 35 (2.41)  | 40 (2.76) | 45 (3.10) | 50 (3.45)  | 15,000 (1035)          |                     |           |
| 16MP7        | Medium Duty C1S                    | 100 (6.89)                | -          | -          | -          | -          | -         | -         | -          | 2,800 (193)            | 0.56 (14.22)        | 5.20      |
|              | Heavy Duty C2S                     | 60 (4.14)                 | 70 (4.83)  | 100 (6.89) | -          | -          | -         | -         | -          | 6,300 (435)            |                     |           |
|              | Extra Heavy Duty Single Stage HC1S | 45 (3.10)                 | 50 (3.45)  | 70 (4.83)  | 95 (6.55)  | -          | -         | -         | -          | 8,500 (585)            |                     |           |
|              | Extra Heavy Duty Two Stage HC2S    | 25 (1.72)                 | 25 (1.72)  | 35 (2.41)  | 45 (3.10)  | 55 (3.79)  | 65 (4.48) | -         | -          | 12,500 (860)           |                     |           |

MPI

## To select Needle Valve Actuator:

## Example: 8MP7-MANABR-T-SS-C2S0D

Need to know: Valve Model/Connection Size - **8MP7 Needle Valve**Indoor or Outdoor Service - **Outdoor Service**Maximum Operating Pressure: **Fluid - 12,000 psi**Maximum Available Air Pressure - **60 psi**Select Actuator Type (Fail Open or Fail Close) - **Fail Open Type**Example: Using chart on page 41 (Fail Open Actuators), select **8MP7 Section**Across top of chart, select **12 System Pressure** (12,000 psi max system pressure)Go down that column to **8MP7 Section** to first row filled with number (air pressure)First row with number is **55** – as your available **air pressure is 60 psi**, you do not have to go any further (if this number was more than 60, continue to next row)This row (**Heavy Duty Actuator**) confirms that this actuator needs 55 psi to close the 8MP7 valve at 12,000 psi and you have 60 psi available.Go to Ordering Suffix Charts on page 39 – find “**Heavy Duty**” Rating – “**Fail Open**”

Select Suffix code = -C2S0D (OD = Outdoor) and add to Needle Valve Model Number.

\*\* Cv data is for 2-way straight valves.

For angle pattern, add approximately 50% to the Cv valve.

**CAUTION:** While testing has shown O-rings to provide satisfactory service life, both cyclic and shelf life may vary widely with differing service conditions, properties of reactants, pressure and temperature cycling and age of the O-ring, **FREQUENT INSPECTIONS SHOULD BE MADE** to detect any deterioration, and O-rings replaced as required.

\*Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change. For prompt service, Parker Autoclave Engineers stocks select products. Consult your local representative.

## Actuator Selection - Fail Close Type MAN Series Valves

| Valve Series | Duty Rating                        | System Pressure KSI (bar)      |             |             |              |              |              |              | Max. Press. psi (bar) | Flow Coefficient Cv** |
|--------------|------------------------------------|--------------------------------|-------------|-------------|--------------|--------------|--------------|--------------|-----------------------|-----------------------|
|              |                                    | 1-4 (70-275)                   | 6 (410)     | 8 (550)     | 10 (690)     | 12 (830)     | 14 (970)     | 15 (1035)    |                       |                       |
| 4MP7         | Medium Duty 01S                    | Air Pressure psi (bar)         | 65 (4.48)   | 65 (4.48)   | 65 (4.48)    | 75 (5.17)    | 85 (5.86)    | 95 (6.55)    | 15,000 (1035)         | 0.31 to 0.22***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.19 (4.83) | 0.19 (4.83) | 0.19 (4.83)  | 0.25 (6.35)  | 0.31 (7.87)  | 0.38 (9.65)  |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35) | 0.25 (6.35) | 0.25 (6.35)  | 0.25 (6.35)  | 0.25 (6.35)  | 0.25 (6.35)  |                       |                       |
|              | Heavy Duty 02S                     | Air Pressure psi (bar)         | 35 (2.41)   | 35 (2.41)   | 35 (2.41)    | 40 (2.76)    | 45 (3.10)    | 50 (3.45)    | 15,000 (1035)         | 0.75 to 0.57***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.19 (4.83) | 0.19 (4.83) | 0.25 (6.35)  | 0.31 (7.87)  | 0.38 (9.65)  | 0.44 (11.18) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35) | 0.25 (6.35) | 0.25 (6.35)  | 0.25 (6.35)  | 0.25 (6.35)  | 0.19 (4.83)  |                       |                       |
| 6MP7         | Medium Duty 01S                    | Air Pressure psi (bar)         | 65 (4.48)   | 65 (4.48)   | 75 (5.17)    | 85 (5.86)    | 95 (6.55)    | 95 (6.55)    | 15,000 (1035)         | 0.75 to 0.57***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.19 (4.83) | 0.19 (4.83) | 0.25 (6.35)  | 0.31 (7.87)  | 0.38 (9.65)  | 0.44 (11.18) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35) | 0.25 (6.35) | 0.25 (6.35)  | 0.25 (6.35)  | 0.25 (6.35)  | 0.19 (4.83)  |                       |                       |
|              | Heavy Duty 02S                     | Air Pressure psi (bar)         | 35 (2.41)   | 35 (2.41)   | 40 (2.76)    | 45 (3.10)    | 50 (3.45)    | 50 (3.45)    | 15,000 (1035)         | 0.75 to 0.57***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.19 (4.83) | 0.19 (4.83) | 0.25 (6.35)  | 0.31 (7.87)  | 0.38 (9.65)  | 0.44 (11.18) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35) | 0.25 (6.35) | 0.25 (6.35)  | 0.25 (6.35)  | 0.25 (6.35)  | 0.19 (4.83)  |                       |                       |
| 8MP7         | Medium Duty 01S                    | Air Pressure psi (bar)         | 85 (5.86)   | 90 (6.21)   | 95 (6.55)    | 95 (6.55)    | -            | -            | 9,800 (675)           | 1.29 to 0.53***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.31 (7.87) | 0.34 (8.64) | 0.47 (11.94) | 0.56 (14.22) | -            | -            |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35) | 0.25 (6.35) | 0.15 (3.81)  | 0.06 (1.52)  | -            | -            |                       |                       |
|              | Heavy Duty 02S                     | Air Pressure psi (bar)         | 50 (3.45)   | 55 (3.79)   | 65 (4.48)    | 70 (4.83)    | 75 (5.17)    | 75 (5.17)    | 15,000 (1035)         | 1.29 to 0.53***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.19 (4.83) | 0.22 (5.59) | 0.28 (7.11)  | 0.34 (8.64)  | 0.44 (11.18) | 0.50 (12.70) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35) | 0.25 (6.35) | 0.25 (6.35)  | 0.25 (6.35)  | 0.19 (4.83)  | 0.12 (3.05)  |                       |                       |
|              | Extra Heavy Duty Single Stage H01S | Air Pressure psi (bar)         | 40 (2.76)   | 40 (2.76)   | 50 (3.45)    | 55 (3.79)    | 60 (4.13)    | 65 (4.48)    | 15,000 (1035)         | 1.30                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.25 (6.35) | 0.28 (7.11) | 0.38 (9.65)  | 0.47 (11.94) | 0.56 (14.22) | 0.66 (16.76) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.38 (9.65) | 0.38 (9.65) | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  |                       |                       |
|              | Extra Heavy Duty Two Stage H02S    | Air Pressure psi (bar)         | 30 (2.07)   | 35 (2.41)   | 35 (2.41)    | 40 (2.76)    | 40 (2.76)    | 45 (3.10)    | 15,000 (1035)         | 1.30                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.13 (3.30) | 0.16 (4.06) | 0.19 (4.83)  | 0.25 (6.35)  | 0.28 (7.11)  | 0.34 (8.64)  |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.38 (9.65) | 0.38 (9.65) | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  |                       |                       |

## To select Needle Valve Actuator:

Example: 8MP7-MANABR-T-SS-H01S

Need to know: Valve Model/Connection Size - **8MP7 Needle Valve**Indoor or Outdoor Service - **Indoor Service**Maximum Operating Pressure: Fluid - **12,000 psi**Maximum Available Air Pressure - **60 psi**Select Actuator Type (Fail Open or Fail Close) - **Fail Closed Type**Example: Using chart on page 44 (Fail Close Actuators), select **8MP7 Section**Across top of chart, select **12 System Pressure** (12,000 psi max system pressure)Go down that column to **8MP7 Section** to first row filled with number (air pressure)

First row with number is 75 - as your available air pressure is 60 psi, you have to go further. Next actuator (extra Heavy Duty Single Stage) H01S needs 60 psi to close at this pressure.

This row (**Extra Heavy Duty Single Stage H01S Actuator**) confirms that this actuator needs 60 psi to close the 8MP7 valve at 12,000 psi and you have 60 psi available. Go to Ordering Suffix Charts on page 39 - find "**Extra Heavy Single Stage**" Duty Rating - "**Fail Closed**" Select Suffix code = **-H01SOD (OD = Outdoor)** and add to Needle Valve Model Number.

\*\* Cv data is for 2-way straight valves.

For angle pattern, add approximately 50% to the Cv valve.

**CAUTION:** While testing has shown O-rings to provide satisfactory service life, both cyclic and shelf life may vary widely with differing service conditions, properties of reactants, pressure and temperature cycling and age of the O-ring, FREQUENT INSPECTIONS SHOULD BE MADE to detect any deterioration, and O-rings replaced as required.

\*Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change.

For prompt service, Parker Autoclave Engineers stocks select products. Consult your local representative.

## Actuator Selection - Fail Close Type MAN Series Valves

| Valve Series | Operator Duty                      | System Pressure KSI (bar)      |              |              |              |              |              |              | Max. Press. psi (bar) | Flow Coefficient Cv** |
|--------------|------------------------------------|--------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------------|-----------------------|
|              |                                    | 1-4 (70-275)                   | 6 (410)      | 8 (550)      | 10 (690)     | 12 (830)     | 14 (970)     | 15 (1035)    |                       |                       |
| 9MP7         | Medium Duty 01S                    | Air Pressure psi (bar)         | 95 (6.55)    | 95 (6.55)    | 95 (6.55)    | -            | -            | -            | 7,900 (545)           | 1.74 to 0.72***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.38 (9.65)  | 0.44 (11.18) | 0.56 (14.22) | -            | -            | -            |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35)  | 0.19 (4.83)  | 0.06 (1.52)  | -            | -            | -            |                       |                       |
|              | Heavy Duty 02S                     | Air Pressure psi (bar)         | 55 (3.79)    | 65 (4.48)    | 70 (4.83)    | 75 (5.17)    | 75 (5.17)    | 75 (5.17)    | 14,000 (965)          | 1.74 to 0.72***       |
|              |                                    | Spring Pre-Compression in (mm) | 0.22 (5.59)  | 0.28 (7.11)  | 0.34 (8.64)  | 0.44 (11.18) | 0.50 (12.70) | 0.59 (14.99) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.25 (6.35)  | 0.25 (6.35)  | 0.25 (6.35)  | 0.19 (4.83)  | 0.13 (3.30)  | 0.06 (1.52)  |                       |                       |
|              | Extra Heavy Duty Single Stage H01S | Air Pressure psi (bar)         | 45 (3.10)    | 45 (3.10)    | 55 (3.79)    | 60 (4.13)    | 65 (4.48)    | 70 (4.83)    | 15,000 (1035)         | 1.75                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.31 (7.87)  | 0.34 (8.64)  | 0.47 (11.94) | 0.59 (14.99) | 0.88 (22.35) | 1.00 (25.40) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  |                       |                       |
|              | Extra Heavy Duty Two Stage H02S    | Air Pressure psi (bar)         | 25 (1.72)    | 30 (2.07)    | 35 (2.41)    | 40 (2.76)    | 45 (3.10)    | 50 (3.45)    | 15,000 (1035)         | 1.75                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.16 (4.06)  | 0.19 (4.83)  | 0.25 (6.35)  | 0.28 (7.11)  | 0.44 (11.18) | 0.56 (14.22) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  | 0.38 (9.65)  |                       |                       |
| 12MP7        | Extra Heavy Duty Single Stage H01S | Air Pressure psi (bar)         | 55 (3.79)    | 65 (4.48)    | 80 (5.52)    | 95 (6.55)    | 100 (6.89)   | -            | 12,000 (827)          | 2.80                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.44 (11.18) | 0.63 (16.00) | 0.84 (21.34) | 1.06 (26.92) | 1.44 (36.57) | -            |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.44 (11.18) | 0.44 (11.18) | 0.44 (11.18) | 0.44 (11.18) | 0.62 (15.74) | -            |                       |                       |
|              | Extra Heavy Duty Two Stage H02S    | Air Pressure psi (bar)         | 40 (2.76)    | 50 (3.45)    | 55 (3.79)    | 60 (4.13)    | 65 (4.48)    | 70 (4.83)    | 15,000 (1035)         | 2.80                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.22 (5.59)  | 0.31 (7.87)  | 0.44 (11.18) | 0.53 (13.46) | 0.81 (20.57) | 0.84 (21.34) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.44 (11.18) | 0.44 (11.18) | 0.44 (11.18) | 0.44 (11.18) | 0.44 (11.18) | 0.44 (11.18) |                       |                       |
| 16MP7        | Extra Heavy Duty Single Stage H01S | Air Pressure psi (bar)         | 75 (5.17)    | 100 (6.89)   | -            | -            | -            | -            | 6,500 (448)           | 5.20                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.69 (17.53) | 1.13 (28.70) | -            | -            | -            | -            |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.50 (12.70) | 0.50 (12.70) | -            | -            | -            | -            |                       |                       |
|              | Extra Heavy Duty Two Stage H02S    | Air Pressure psi (bar)         | 55 (3.79)    | 65 (4.48)    | 75 (5.17)    | 85 (5.86)    | 90 (6.20)    | 90 (6.20)    | 15,000 (1035)         | 5.20                  |
|              |                                    | Spring Pre-Compression in (mm) | 0.34 (8.64)  | 0.53 (13.46) | 0.69 (17.53) | 0.88 (22.35) | 1.14 (28.95) | 1.38 (35.05) |                       |                       |
|              |                                    | Stem Travel in (mm)            | 0.50 (12.70) | 0.50 (12.70) | 0.50 (12.70) | 0.50 (12.70) | 0.38 (9.65)  | 0.12 (3.04)  |                       |                       |

\* Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower.

\*\* Cv data is for 2-way straight valves. For angle pattern, add approximately 50% to the Cv valve.

\*\*\* Cv varies because of spring compression limitations. The flow coefficient range is given for the maximum stem travel (lowest system pressure) to minimum travel (highest system pressure).

**CAUTION:** While testing has shown O-rings to provide satisfactory service life, both cyclic and shelf life may vary widely with differing service conditions, properties of reactants, pressure and temperature cycling and age of the O-ring, FREQUENT INSPECTIONS SHOULD BE MADE to detect any deterioration, and O-rings replaced as required.

All dimensions for reference only and subject to change. For prompt service, Parker Autoclave Engineers stocks select products. Consult your local representative.

MPI

## MAN Series Actuators - Electric Flow Regulating (FRC)

There is an increasing need for remote control of many valves, including Needle multi-turn style valves. Until recently, this required a combination of both pneumatic and electric systems working in tandem, which is cumbersome and expensive to operate.

Parker Autoclave Engineers has developed an All-Electric Regulating/Full Closure actuator for use with the MPI™ (Medium Pressure Inverted (Gland) connection style needle valves.

Available in Weather-Proof or Explosion-Proof versions, these actuators allow for remote control and feedback to digital control systems with just a 4-20mA signal.

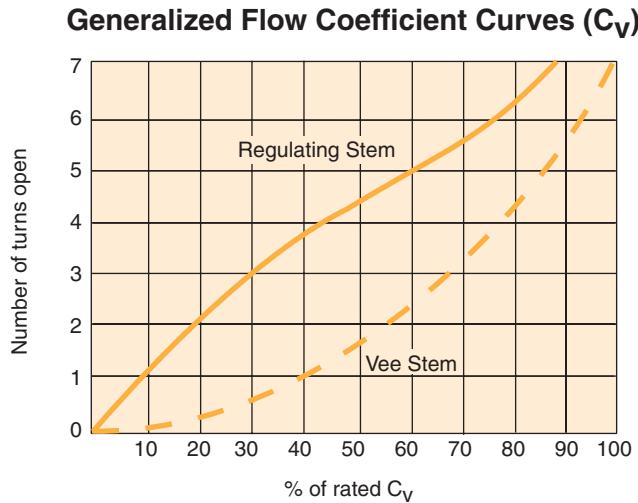
### Features and Benefits

- 24 VDC, 72 Watt Max Operation (5 wire)
- 4-20mA Remotely Powered Input Signal
- Internally Powered 4-20mA Output of Exact Position
- Oiled-For-Life Bearings (Bronze) and Gears (Sintered)
- Weather-Proof Aluminum Housing
- Explosion-Proof Cas Aluminum Anodized Nema 8/IP67 CSA Approved, Class 1 Div 1 Groups B, C, D
- Life Expectancy - 250,000 Cycles MTF

MPI

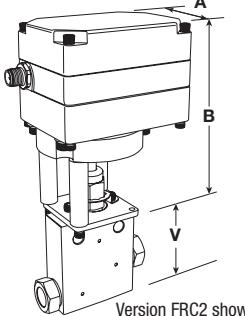
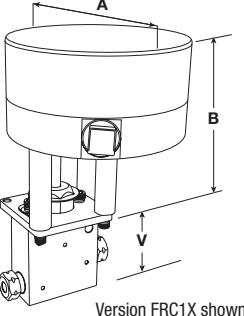


Electric Actuated Shut-Off/Flow Regulating



Explosion Proof Electric Actuated Shut-Off/Flow Regulating

## Dimensions:

| Weather-Proof Version   | Explosion-Proof Version   | Version  | A   | B                | V                |
|---|---|--|---|------------------|------------------|
|  |  | See Valve Dimension of Body Style on Pages 35-37 | Weather-Proof <b>FRC1</b>                   | 3.0" (76.2 mm)   | 3.67" (93.2 mm)  |
|   |   |  | Weather-Proof <b>FRC2</b><br>High Torque    | 3.0" (76.2 mm)   | 5.57" (141.4 mm) |
|   |   |  | Explosion-Proof <b>FRC1X</b>                | 4.25" (107.9 mm) | 4.35" (110.4 mm) |
|   |   |  | Explosion-Proof <b>FRC2X</b><br>High Torque | 4.25" (107.9 mm) | 5.86" (148.8 mm) |

## Electrical Specifications:

- Electrical Input: 24VDC only, 72 Watt maximum
- Control Input: 4-20mA
- Position Feedback: Independent 4-20mA
- Position Detection: Hall Sensors
- Motor: BLDC brushless DC motor

## Position on Powerloss:

- Remembers Last Position
- Reseats Valve if Signal is Between 3.0 and 4.16mA

## Ordering Guide:

| Example Part Number:         | 9MP7                       | — | MAN          | ARR                   | — | T                                     | — | SS             | — | LBT           | — | FRC1                              |
|------------------------------|----------------------------|---|--------------|-----------------------|---|---------------------------------------|---|----------------|---|---------------|---|-----------------------------------|
| Ordering Parameters/Options: | Valve Size Connection Type |   | Valve Series | Valve Body/ Stem Type |   | Valve Packing (-100 to 600°F Options) |   | Valve Material |   | Valve Options |   | Electric Flow Regulating Actuator |
| Table Reference: (see below) | A                          |   | B            | C                     |   | D                                     |   | E              |   | F             |   | G                                 |

Example: 9MP7-MANARR-T-SS-LBT-FRC1 = 9/16" MPI, MAN Series Needle Valve, 2 Way Angle/Regulating Stem/Replaceable Seat, 316 Stainless Steel, Cryogenic, Indoor Weather-Proof Electric Actuator

| A - Valve Size / Connection Type |           |
|----------------------------------|-----------|
| 4MP7                             | 1/4" MPI  |
| 6MP7                             | 3/8" MPI  |
| 8MP7                             | 1/2" MPI  |
| 9MP7                             | 9/16" MPI |

| B - Valve Series |                          |
|------------------|--------------------------|
| MAN              | MAN Series Needle Valves |

| C - Valve Body / Stem Type |  |
|----------------------------|--|
| LR                         | 2 Way Straight/Regulating Stem               |
| AR                         | 2 Way Angle/Regulating Stem                  |
| ARR                        | 2 Way Angle/Regulating Stem/Replaceable Seat |
| XRD <sup>1</sup>           | 3 Way/Regulating/1 Inlet - 2 Stem Outlet     |

| D - Valve Packing (-100 to 600°F Options) |   |
|---|---|
| T   | PTFE Packing: -100°F (-73°C) to 450°F (232°C) |
| TG <sup>2</sup>                           | PTFE/Glass (25%) Packing to 600°F (316°C)     |

1- XRD option would require two actuators unless otherwise specified

2- Good ventilation is required when using Valve/Actuator at extended temperatures. Actuator internal temperature cannot exceed -40° to 160°F.

## Mechanical Specifications:

- Standard Enclosure - EPD Coated NEMA 4/IP65 Equivalent
- Optional Anodized Aluminum Explosion-Proof Enclosure, Nema 8/IP67, CSA Approved for Class 1, Groups B, C, D /T6 Areas
- 500+ Positions per turn (+/- 0.25° Position Accuracy), 3243 Actuator Positions over Full Span
- Speed Range: 3 to 15 seconds/turn
- Operational Temperature -40°(-40°C) to 160°F(70°C), Valve Temperature not to exceed 600°F
- Actuator Life Expectancy: 250,000 cycles
- Gears and Bearings are Lifetime Lubricated
- 20 ft. cable included with 6 pin/5 wire connector (FRC1 and FRC2 only)

MPI

## E - Valve Material

|      |                                   |
|------|-----------------------------------|
| SS   | 316 Stainless Steel (Cold Worked) |
| 2507 | Super Duplex (Annealed)           |

## F - Valve Options

|     |  |
|-----|--|
| LBT | Cryogenic Applications to -100°F (-73°C)                                     |
| HYG | Hydrogen/Helium Applications   |
| XF  | Extra Strength Ferrule Set for sizes 12 & 16 (2507 Super Duplex Tubing Only) |

## G - Electric Flow Regulating Actuator

|        |   |
|--------|---|
| FRC1   | Indoor/Weather-Proof  |
| FRC2   | Indoor/Weather-Proof (for 8MP7 or 9MP7 Only)                                    |
| FRC1X  | Explosion-Proof - Class 1, Div. 1, Groups B, C, and D                           |
| FRC2X  | Explosion-Proof - Class 1, Div. 1, Groups B, C, and D (for 8MP7 or 9MP7 Only)   |
| FRC1Xc | Explosion-Proof with Div 2 Explosion Proof Cable Option                         |
| FRC2Xc | Explosion-Proof with Div 2 Explosion Proof Cable Option (for 8MP7 or 9MP7 Only) |

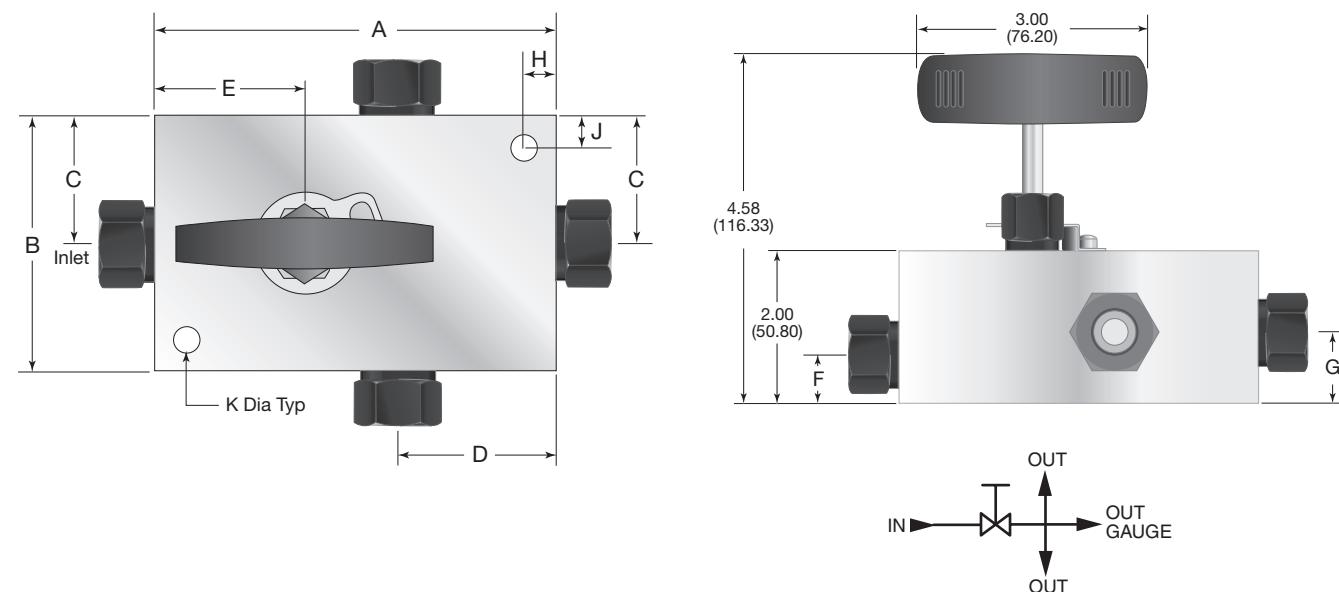
## MAGV Series Single Block and Bleed Gauge Valve

(Replaces MPGV Series Ball Valves)

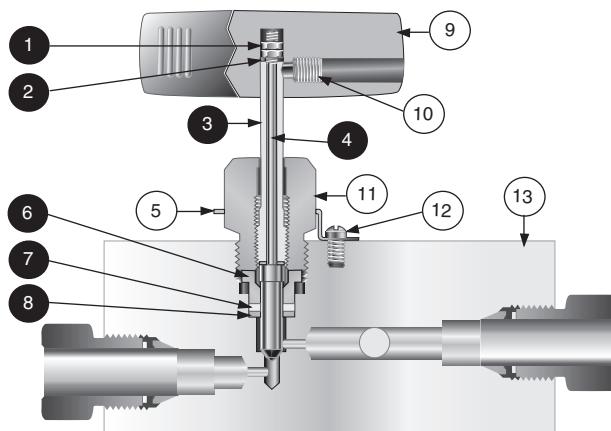
Gauge valve and Bleed valve are designed to be used together. Bleed valve can be placed in any of the three possible outlet locations as desired.

| Parker Part No. | Pressure psi (bar) | Connection | Orifice inch (mm) | Dimensions - inches (mm) |      |      |      |      |      |      |      |
|-----------------|--------------------|------------|-------------------|--------------------------|------|------|------|------|------|------|------|
|                 |                    |            |                   | A                        | B    | C    | D    | E    | F    | G    | H    |
| 6MP7-MAGV-T-SS  | 15,000 (1034)      | 3/8" MPI   | 0.125 (3.18)      | 3.63                     | 2.50 | 1.25 | 1.39 | 1.25 | 0.50 | 0.94 | 0.25 |
| 8MP7-MAGV-T-SS  | 15,000 (1034)      | 1/2" MPI   | 0.125 (3.18)      | 4.70                     | 3.00 | 1.50 | 1.88 | 1.75 | 0.65 | 0.94 | 0.38 |
| 9MP7-MAGV-T-SS  | 15,000 (1034)      | 9/16" MPI  | 0.125 (3.18)      | 4.70                     | 3.00 | 1.50 | 1.88 | 1.75 | 0.65 | 0.94 | 0.38 |

For 2507 Super Duplex option, replace -SS with -2507



### Material of Construction



| Item# | Description               | Material      |
|-------|---------------------------|---------------|
| 1     | Hex Nut                   | 300 Series SS |
| 2     | Thrust Washer             | 17-4PH        |
| 3     | Stem Sleeve               | 304 SS        |
| 4     | Stem                      | 316 SS        |
| 5     | Locking Device            | 302 SS        |
| 6     | Packing Washer            | Ampco 45      |
| 7     | Packing                   | PTFE          |
| 8     | Bottom Washer             | 316 SS        |
| 9     | Handle                    | 316 SS        |
| 10    | Pan Hd Screw 10-24 x 1/4" | 300 Series SS |
| 11    | Packing Gland             | Ampco 45      |
| 12    | Screw                     | 18-8 SS       |
| 13    | Valve Body                | 316 SS        |

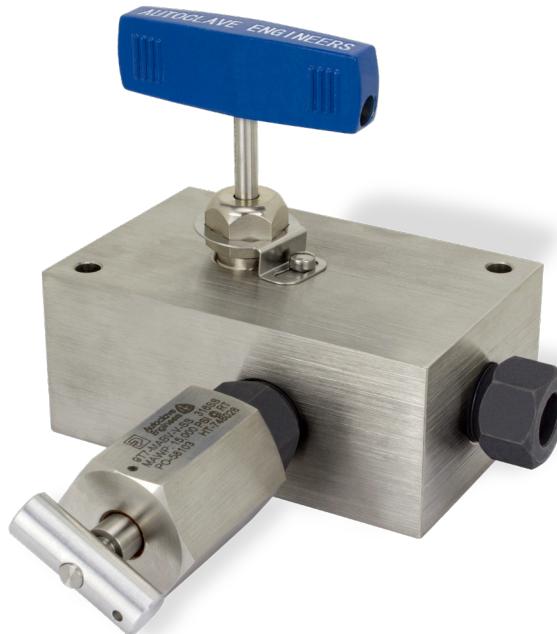
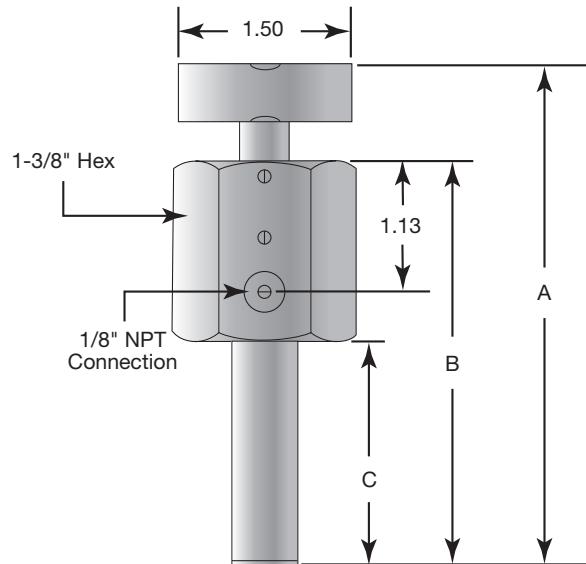
# Typical spare parts found in Repair Kit

## MABV Series Bleed Valves

(Replaces MPBV Series Ball Valves)

|                 |                    | Dimensions - inches (mm) |                   |               |              |              |
|-----------------|--------------------|--------------------------|-------------------|---------------|--------------|--------------|
| Parker Part No. | Pressure psi (bar) | Connection               | Orifice inch (mm) | A             | B            | C            |
| 6T7-MABV-V-SS   | 15,000 (1034)      | 3/8" Tube Stub           | 0.094 (2.39)      | 4.05 (102.87) | 3.22 (81.79) | 1.61 (40.89) |
| 8T7-MABV-V-SS   | 15,000 (1034)      | 1/2" Tube Stub           | 0.094 (2.39)      | 4.50 (114.30) | 3.68 (93.47) | 1.88 (47.75) |
| 9T7-MABV-V-SS   | 15,000 (1034)      | 9/16" Tube Stub          | 0.094 (2.39)      | 4.56 (115.82) | 3.74 (95.00) | 1.94 (49.28) |

For 2507 Super Duplex option, replace **-SS** with **-2507**



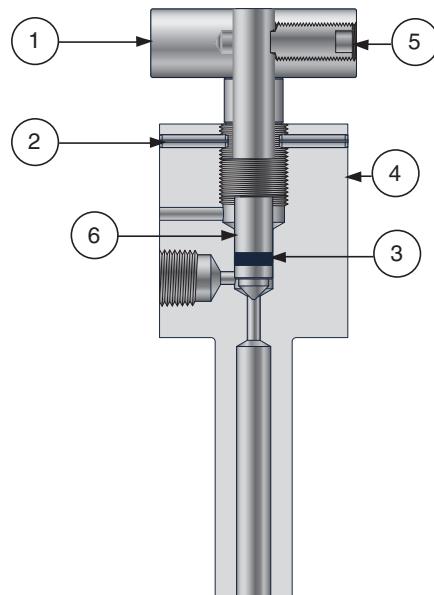
MPI

MAGV Series Gauge Valve with MABV Vent valve shown in one of three possible outlet locations.

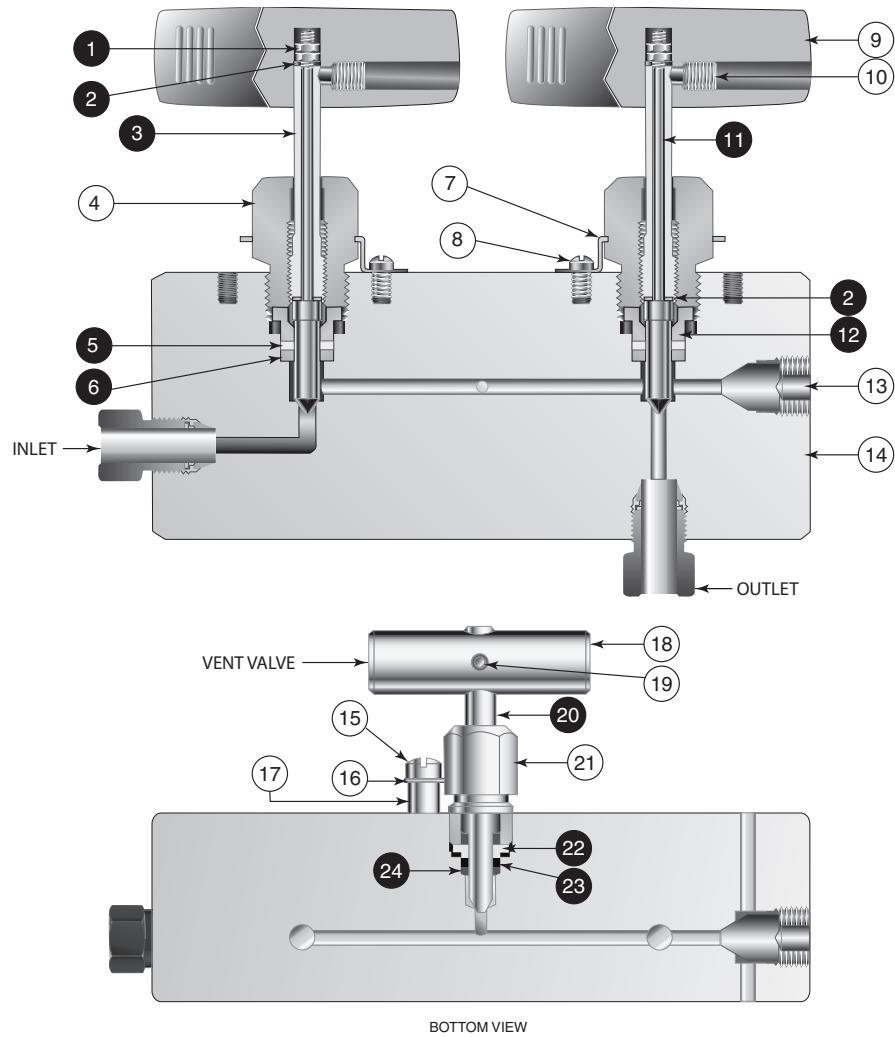
### Material of Construction

| Item# | Qty | Description          | Material            |
|-------|-----|----------------------|---------------------|
| 1     | 1   | Handle               | Aluminum            |
| 2     | 2   | Spring Pin           | 18-8 SS             |
| 3     | 1   | O-ring               | Fluorocarbon Rubber |
| 4     | 1   | Body                 | 316 SS              |
| 5     | 1   | Hex Socket Set Screw | 300 Series SS       |
| 6     | 1   | Stem                 | 316 SS              |

Note: No repair kit available, replace valve.



## MADBN Series Double Block and Bleed Needle Valves



MPI

### Material of Construction

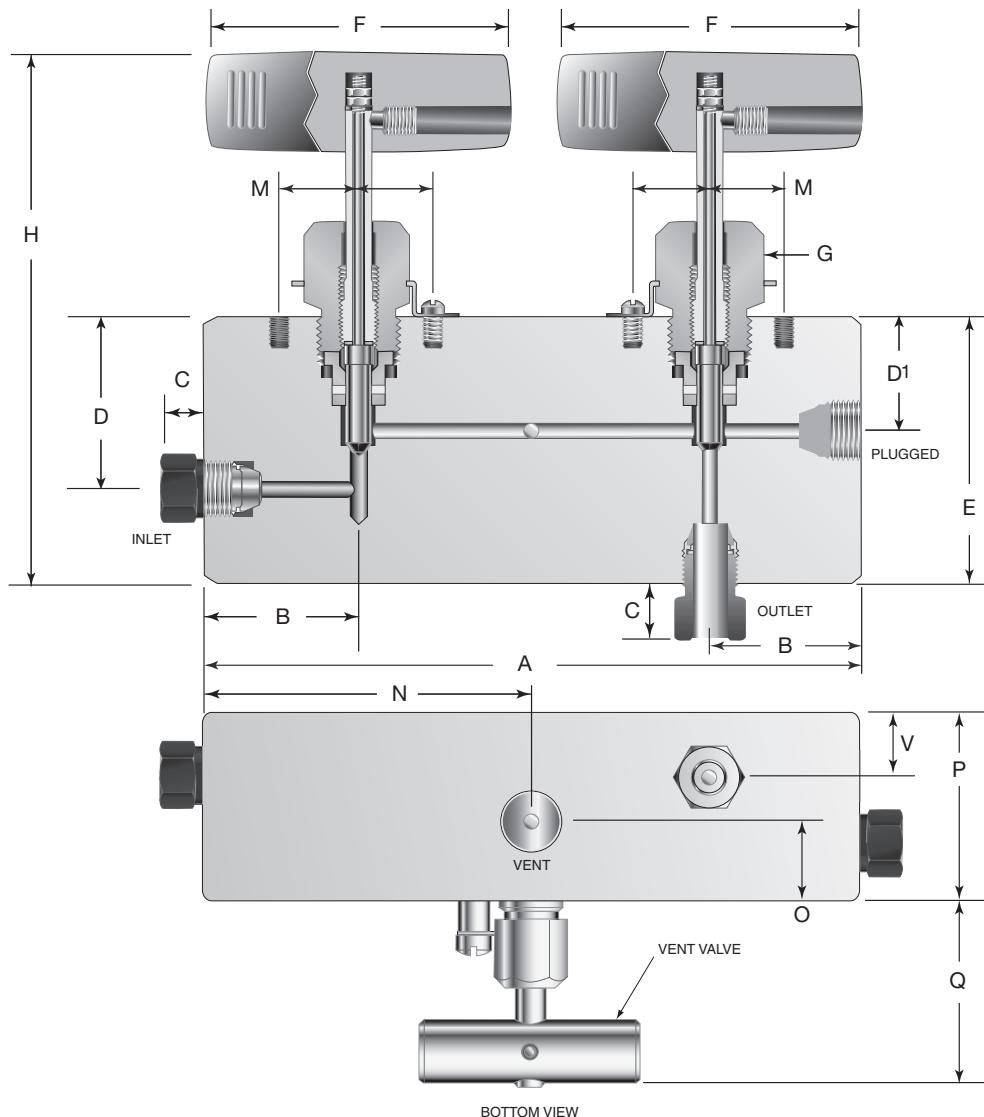
| Item# | Description               | Material  |
|-------|---------------------------|-----------|
| ①     | Hex Nut                   | Stainless |
| ②     | Thrust Washer             | 17-4PH    |
| ③     | Stem Sleeve               | 304 SS    |
| 4     | Packing Gland             | Ampco 45  |
| ⑤     | Packing                   | PTFE      |
| ⑥     | Bottom Washer             | 316 SS    |
| 7     | Locking Device            | 302 SS    |
| 8     | Pan Hd Screw 10-24 x 1/4" | 18-8 SS   |
| 9     | Handle                    | 316 SS    |
| 10    | Set Screw                 | Stainless |
| ⑪     | Stem                      | 316 SS    |
| ⑫     | Packing Washer            | Ampco 45  |

| Item# | Description                 | Material  |
|-------|-----------------------------|-----------|
| 13    | Flush Plug                  | 316 SS    |
| 14    | Body                        | 316 SS    |
| 15    | Pan Head Screw M3.5x.6x10mm | Stainless |
| 16    | Locking Device              | 316 SS    |
| 17    | Spacer                      | 316 SS    |
| 18    | Handle                      | 316 SS    |
| 19    | Spring Pin                  | 18-8 SS   |
| 20    | Stem                        | 316 SS    |
| 21    | Packing Gland               | 316 SS    |
| 22    | Packing Washer              | Ampco 45  |
| 23    | Packing                     | PTFE      |
| 24    | Bottom Washer               | 316 SS    |

## MADBN Series Double Block and Bleed Needle Valves

| Parker Part No.   | Pressure psi (bar) | Connection | Orifice inch (mm) | Dimensions - inches (mm) |              |              |              |              |              |               |              |               |              |              |              |              |              |              |
|-------------------|--------------------|------------|-------------------|--------------------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                   |                    |            |                   | A                        | B            | C            | D            | D1           | E            | F             | G            | H             | M            | N            | O            | P            | Q            | V            |
| 4MP7-MADBNLB-T-SS | 15,000 (1034)      | 1/4" MPI   | 0.093 (2.36)      | 5.75 (146.05)            | 1.25 (31.75) | 0.50 (12.70) | 1.50 (38.10) | 1.13 (28.70) | 2.38 (60.45) | 3.00 (76.20)  | 1.00 (25.40) | 4.89 (124.21) | 0.69 (17.53) | 2.88 (73.15) | 0.63 (16.00) | 1.50 (38.10) | 1.47 (37.34) | 0.50 (12.70) |
| 6MP7-MADBNLB-T-SS | 15,000 (1034)      | 3/8" MPI   | 0.093 (2.36)      | 6.00 (152.40)            | 1.38 (35.05) | 0.63 (16.00) | 1.50 (38.10) | 1.13 (28.70) | 2.38 (60.45) | 3.00 (76.20)  | 1.00 (25.40) | 4.89 (124.21) | 0.69 (17.53) | 3.00 (76.20) | 0.63 (16.00) | 1.50 (38.10) | 1.47 (37.34) | 0.50 (12.70) |
| 8MP7-MADBNLB-T-SS | 15,000 (1034)      | 1/2" MPI   | 0.093 (2.36)      | 7.50 (190.50)            | 1.50 (38.10) | 0.69 (17.53) | 2.38 (60.45) | 1.75 (44.45) | 3.58 (90.93) | 4.00 (101.60) | 1.00 (25.40) | 6.63 (168.40) | 0.69 (17.53) | 3.75 (95.25) | 0.63 (16.00) | 1.50 (38.10) | 1.47 (37.34) | 0.50 (12.70) |
| 9MP7-MADBNLB-T-SS | 15,000 (1034)      | 9/16" MPI  | 0.093 (2.36)      | 7.50 (190.50)            | 1.50 (38.10) | 0.75 (19.05) | 2.38 (60.45) | 1.75 (44.45) | 3.58 (90.93) | 4.00 (101.60) | 1.00 (25.40) | 6.63 (168.40) | 0.69 (17.53) | 3.75 (95.25) | 0.63 (16.00) | 1.50 (38.10) | 1.47 (37.34) | 0.50 (12.70) |

For 2507 Super Duplex option, replace -SS with -2507



MPI

## Notes:

G = Packing gland mounting hole drill size

H = Dimension with stem in closed position

All vent connections are 1/4" NPT

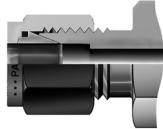
## Available End Connections

### Standard End Connections

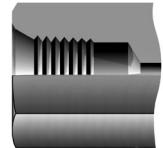
**A** – Two ferrule A-LOK® compression port



**Z** – Single ferrule CPI™ compression port



**F** – ANSI/ASME B1.20.1 internal pipe threads



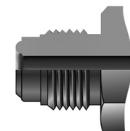
**M** – ANSI/ASME B1.20.1 external pipe threads



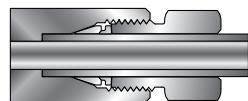
**Q** – UltraSeal face seal port



**V** – VacuSeal face seal port



**MP7** – Parker MPI™  
(Medium Pressure Inverted)



### Non-Standard End Connections

**TA** – Tube adapter connection

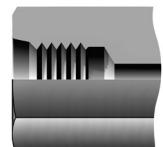
End  
Conn



**F5** – SAE J1926/2, Part 2:  
Heavy-duty (S Series) stud ends



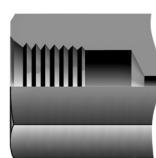
**G5** – SAE J1926/1, Part 1:  
Threaded port with O-ring seal in  
truncated housing



**L** – SAE J1453, Fitting – O-ring  
face seal – External thread with  
O-ring groove designed to seal with an  
elastomer against a sleeve



**KF** – British Standard BS 21  
(ISO 7-1), Internal pipe threads



**KM** – British Standard BS 21  
(ISO 7-1), External pipe threads



**Offer of Sale**

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods or work described will be referred to as "Products".

**1. Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at [www.parker.com/saleterms/](http://www.parker.com/saleterms/). Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.

**2. Price Adjustments; Payments.** Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

**3. Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.

**4. Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve months from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. This warranty is made only to Buyer and does not extend to anyone to whom Products are sold after purchased from Seller. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRIMES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER.** SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

**5. Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will

be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.

**6. LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

**7. Contingencies.** Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

**8. User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

**9. Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**10. Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products.

Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**11. Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

**12. Improper use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

**13. Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

**14. Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

**15. Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

**16. Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

**17. Termination.** This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may

by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

**18. Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

**19. Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

**20. Taxes.** Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

**21. Equal Opportunity Clause.** For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.

# Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 1-800-C-Parker.



## AEROSPACE

### Key Markets

- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

### Key Products

- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



## CLIMATE CONTROL

### Key Markets

- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

### Key Products

- CO<sub>2</sub> controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves



## ELECTROMECHANICAL

### Key Markets

- Aerospace
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Textile
- Wire & cable

### Key Products

- AC/DC drives & systems
- Electric actuators, gantry robots & slides
- Electrohydrostatic actuation systems
- Electromechanical actuation systems
- Human machine interface
- Linear motors
- Stepper motors, servo motors, drives & controls
- Structural extrusions



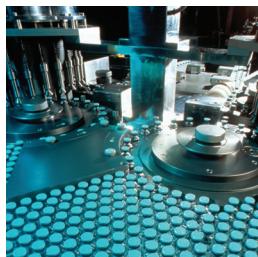
## FILTRATION

### Key Markets

- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

### Key Products

- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators



## FLUID & GAS HANDLING

### Key Markets

- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

### Key Products

- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects

## HYDRAULICS

### Key Markets

- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

### Key Products

- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects

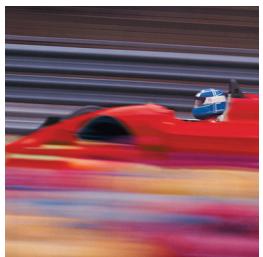
## PNEUMATICS

### Key Markets

- Aerospace
- Conveyor & material handling
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Transportation & automotive

### Key Products

- Air preparation
- Brass fittings & valves
- Manifolds
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves & controls
- Quick disconnects
- Rotary actuators
- Rubber & thermoplastic hose & couplings
- Structural extrusions
- Thermoplastic tubing & fittings
- Vacuum generators, cups & sensors



## PROCESS CONTROL

### Key Markets

- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

### Key Products

- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds

## SEALING & SHIELDING

### Key Markets

- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

### Key Products

- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management



ENGINEERING YOUR SUCCESS.

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