# Needle Valves

Catalog 4110-NV

December 2010

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

Parker

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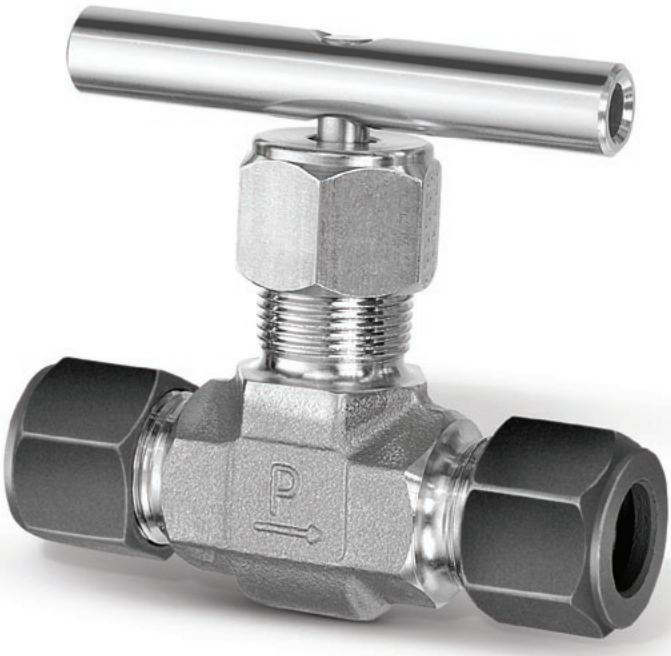




**Parker Hannifin Corporation**
Instrumentation Products Division
Jacksonville, AL USA
http://www.parker.com/ipdus

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





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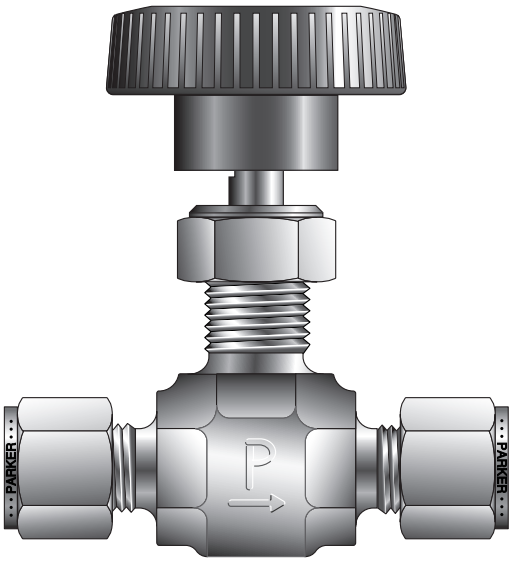
## Introduction

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, 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, Steel and Monel® Alloy 400:
3000 psig (207 bar) CWP

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

**$C_V$:** 0.12 to 1.90

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

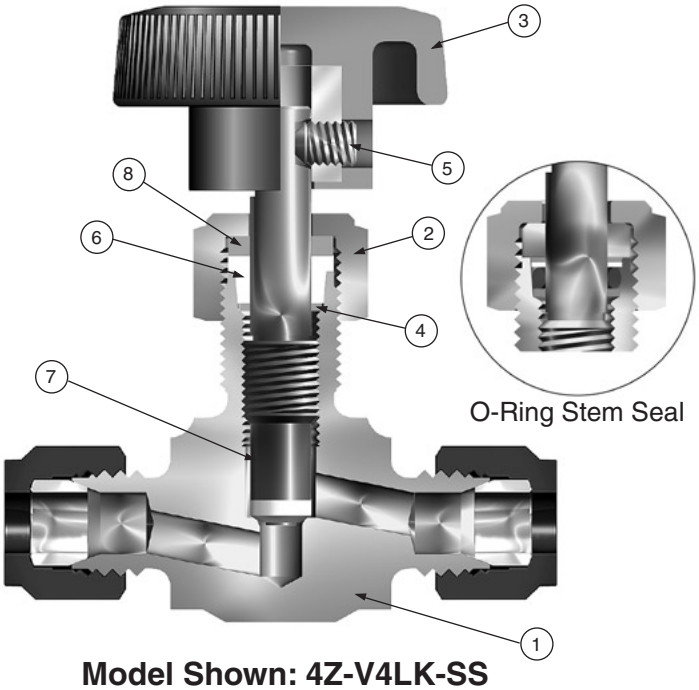
**Temperature Ratings:**

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)
Steel: -20°F to 350°F (-29°C to 177°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**



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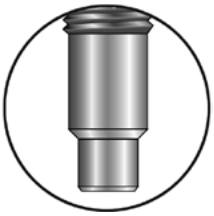
## Stem Types

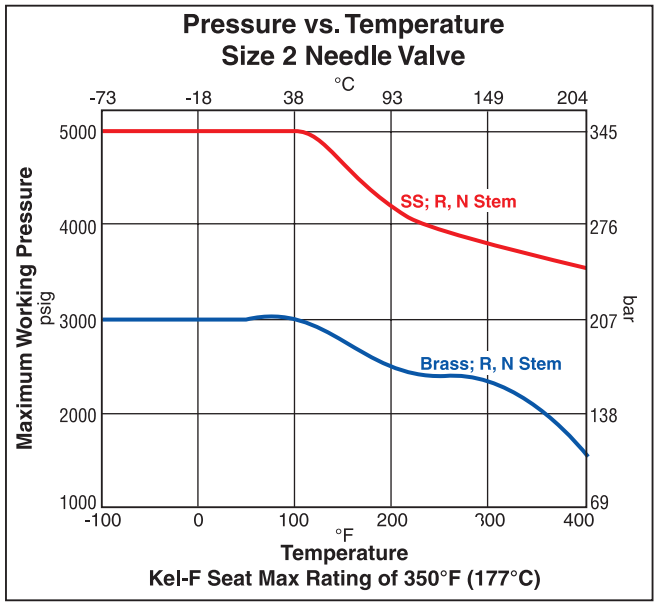
**K**
PCTFE tipped

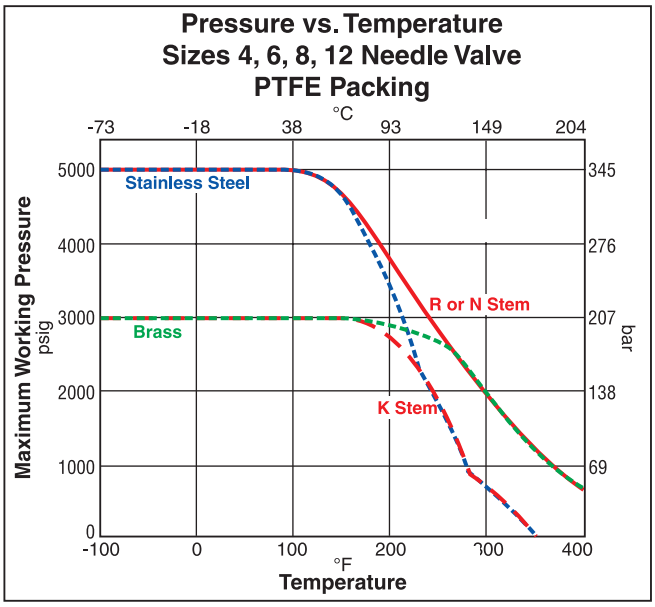


**N**
Needle (2-1/2°)

**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 | Steel | Monel® Alloy 400 |
|---|---|---|---|---|---|
| 1 | Body | ASTM A 182<br>Type F316 | ASTM B 283<br>Alloy C37700 | ASTM A 576<br>Grade 1214 | 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 | 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 | Nylon 6/6<br>with SS insert |
| 4 | Lower Packing Washer | ASTM A 479<br>Type 316 | 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 | Stainless Steel |
| 6 | Packing** | PTFE | PTFE | PTFE | PTFE |
| 7 | Stem<br>( R and N Stem) | ASTM A 276<br>Type 316 | 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 A 276<br>Type 316,<br>with PCTFE | ASTM B 164<br>with PCTFE |
| 8 | Upper Packing Washer | Brass | Brass | Brass | Brass |
| 9 | Panel Nut*** | 316 Stainless Steel | 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 10.
Lubrication: Perfluorinated Polyether



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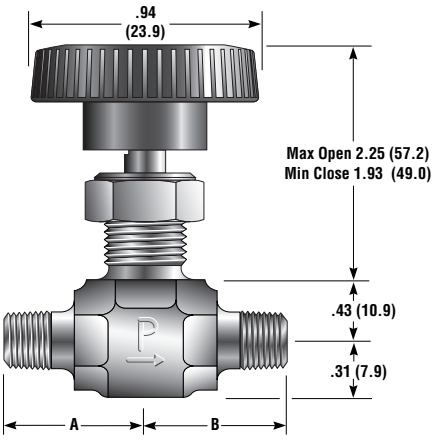
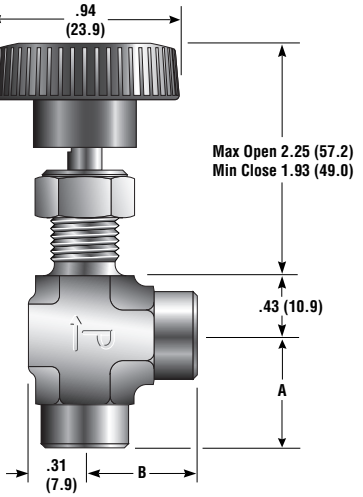
## V2 Series Dimensions / Flow Data






**Model Shown:**
**2M-V2LN-SS**

Panel Hole Diameter:
0.45 (11.4)
Max Panel Thickness:
0.25 (6.4)



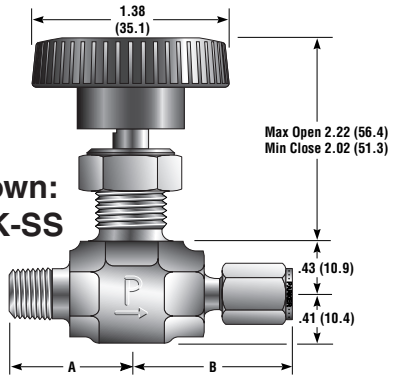

**Model Shown:**
**2F-V2AR-V-SS**

| Basic Part Number | | End Connections | | Stem | Flow Data | | | | | | Dimensions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Inlet | Outlet | | Orifice | | Inline | | Angle | | A† | | B† | |
| Inline | Angle | (Port 1) | (Port 2) | Type | Inch | mm | $C_V$ | $X_T$* | $C_V$ | $X_T$* | Inch | mm | Inch | mm |
| 2A-V2LR | 2A-V2AR | 1/8" Compression A-LOK® | | Blunt | 0.078 | 2.0 | 0.12 | 0.78 | 0.14 | 0.67 | 1.01 | 25.7 | 1.01 | 25.7 |
| 2A-V2LN | 2A-V2AN | | | Needle | | | 0.12 | 0.80 | 0.14 | 0.63 | | | | |
| 2A-V2LK | 2A-V2AK | | | PCTFE | | | 0.13 | 0.83 | 0.14 | 0.63 | | | | |
| 2F-V2LR | 2F-V2AR | 1/8" Female NPT | | Blunt | 0.093 | 2.4 | 0.13 | 0.61 | 0.16 | 0.49 | 0.94 | 23.9 | 0.94 | 23.9 |
| 2F-V2LN | 2F-V2AN | | | Needle | | | 0.12 | 0.66 | 0.18 | 0.39 | | | | |
| 2F-V2LK | 2F-V2AK | | | PCTFE | | | 0.12 | 0.73 | 0.17 | 0.54 | | | | |
| 2M-V2LR | 2M-V2AR | 1/8" Male NPT | | Blunt | 0.093 | 2.4 | 0.13 | 0.61 | 0.16 | 0.49 | 0.75 | 19.1 | 0.75 | 19.1 |
| 2M-V2LN | 2M-V2AN | | | Needle | | | 0.12 | 0.66 | 0.18 | 0.39 | | | | |
| 2M-V2LK | 2M-V2AK | | | PCTFE | | | 0.12 | 0.73 | 0.17 | 0.54 | | | | |
| 2Z-V2LR | 2Z-V2AR | 1/8" Compression CPI™ | | Blunt | 0.078 | 2.0 | 0.12 | 0.78 | 0.14 | 0.67 | 1.01 | 25.7 | 1.01 | 25.7 |
| 2Z-V2LN | 2Z-V2AN | | | Needle | | | 0.12 | 0.80 | 0.14 | 0.63 | | | | |
| 2Z-V2LK | 2Z-V2AK | | | PCTFE | | | 0.13 | 0.83 | 0.14 | 0.63 | | | | |
| 4A-V2LR | 4A-V2AR | 1/4" Compression A-LOK® | | Blunt | 0.078 | 2.0 | 0.12 | 0.78 | 0.14 | 0.67 | 1.09 | 27.7 | 1.09 | 27.7 |
| 4A-V2LN | 4A-V2AN | | | Needle | | | 0.12 | 0.80 | 0.14 | 0.63 | | | | |
| 4A-V2LK | 4A-V2AK | | | PCTFE | | | 0.13 | 0.83 | 0.14 | 0.63 | | | | |
| 4Z-V2LR | 4Z-V2AR | 1/4" Compression CPI™ | | Blunt | 0.078 | 2.0 | 0.12 | 0.78 | 0.14 | 0.67 | 1.09 | 27.7 | 1.09 | 27.7 |
| 4Z-V2LN | 4Z-V2AN | | | Needle | | | 0.12 | 0.80 | 0.14 | 0.63 | | | | |
| 4Z-V2LK | 4Z-V2AK | | | PCTFE | | | 0.13 | 0.83 | 0.14 | 0.63 | | | | |

* 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.

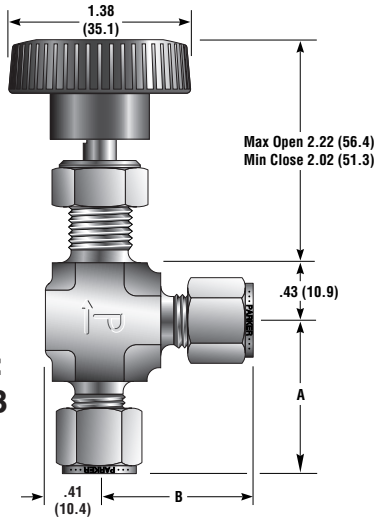
Dimensions in inches/millimeters are for reference only, subject to change.

## V4 Series




**Model Shown:**
**4M4Z-V4LK-SS**

Panel Hole Diameter:
0.52 (13.2)
Max Panel Thickness:
0.25 (6.4)




**Model Shown:**
**4A-V4AN-BN-B**

( ) Denotes dimensions in millimeters



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## V4 Series Dimensions / Flow Data

| Basic Part Number | | End Connections | | Stem | Flow Data | | | | | | Dimensions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Inlet | Outlet | | Orifice | | Inline | | Angle | | A† | | B† | |
| Inline | Angle | (Port 1) | (Port 2) | Type | Inch | mm | $C_V$ | $X_T$* | $C_V$ | $X_T$* | Inch | mm | Inch | mm |
| 2A-V4LR | 2A-V4AR | 1/8" Compression A-LOK® | | Blunt | 0.078 | 2.0 | 0.12 | 0.52 | 0.15 | 0.64 | 1.10 | 27.9 | 1.10 | 27.9 |
| 2A-V4LN | 2A-V4AN | | | Needle | | | 0.12 | 0.68 | 0.15 | 0.59 | | | | |
| 2A-V4LK | 2A-V4AK | | | PCTFE | | | 0.14 | 0.66 | 0.17 | 0.49 | | | | |
| 2F-V4LR | 2F-V4AR | 1/8" Female NPT | | Blunt | 0.176 | 4.5 | 0.43 | 0.77 | 0.55 | 0.63 | 0.81 | 20.6 | 0.81 | 20.6 |
| 2F-V4LN | 2F-V4AN | | | Needle | | | 0.43 | 0.69 | 0.55 | 0.63 | | | | |
| 2F-V4LK | 2F-V4AK | | | PCTFE | | | 0.45 | 0.55 | 0.58 | 0.68 | | | | |
| 2M-V4LR | 2M-V4AR | 1/8" Male NPT | | Blunt | 0.125 | 3.2 | 0.28 | 0.67 | 0.36 | 0.55 | 0.81 | 20.6 | 0.81 | 20.6 |
| 2M-V4LN | 2M-V4AN | | | Needle | | | 0.28 | 0.63 | 0.36 | 0.51 | | | | |
| 2M-V4LK | 2M-V4AK | | | PCTFE | | | 0.29 | 0.51 | 0.37 | 0.59 | | | | |
| 2Z-V4LR | 2Z-V4AR | 1/8" Compression CPI™ | | Blunt | 0.078 | 2.0 | 0.12 | 0.52 | 0.15 | 0.64 | 1.10 | 27.9 | 1.10 | 27.9 |
| 2Z-V4LN | 2Z-V4AN | | | Needle | | | 0.12 | 0.68 | 0.15 | 0.59 | | | | |
| 2Z-V4LK | 2Z-V4AK | | | PCTFE | | | 0.14 | 0.66 | 0.17 | 0.49 | | | | |
| 4A-V4LR | 4A-V4AR | 1/4" Compression A-LOK® | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 1.15 | 29.2 | 1.15 | 29.2 |
| 4A-V4LN | 4A-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| 4A-V4LK | 4A-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 0.68 | | | | |
| 4M-V4LR | 4M-V4AR | 1/4" Male NPT | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 0.94 | 23.9 | 0.94 | 23.9 |
| 4M-V4LN | 4M-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| 4M-V4LK | 4M-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 0.68 | | | | |
| 4W-V4LR | 4W-V4AR | 1/4" Tube Socket Weld | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 0.80 | 20.3 | 0.80 | 20.3 |
| 4W-V4LN | 4W-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| 4W-V4LK | 4W-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 0.68 | | | | |
| 4Z-V4LR | 4Z-V4AR | 1/4" Compression CPI™ | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 1.15 | 29.2 | 1.15 | 29.2 |
| 4Z-V4LN | 4Z-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| 4Z-V4LK | 4Z-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 0.68 | | | | |
| 6A-V4LR | 6A-V4AR | 3/8" Compression A-LOK® | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 1.17 | 29.7 | 1.17 | 29.7 |
| 6A-V4LN | 6A-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| 6A-V4LK | 6A-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 0.68 | | | | |
| 6Z-V4LR | 6Z-V4AR | 3/8" Compression CPI™ | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 1.17 | 29.7 | 1.17 | 29.7 |
| 6Z-V4LN | 6Z-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| 6Z-V4LK | 6Z-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 0.68 | | | | |
| M3A-V4LR | M3A-V4AR | 3mm Compression A-LOK® | | Blunt | 0.078 | 2.0 | 0.12 | 0.52 | 0.15 | 0.64 | 1.10 | 27.9 | 1.10 | 27.9 |
| M3A-V4LN | M3A-V4AN | | | Needle | | | 0.12 | 0.68 | 0.15 | 0.59 | | | | |
| M3A-V4LK | M3A-V4AK | | | PCTFE | | | 0.14 | 0.66 | 0.17 | 0.49 | | | | |
| M3Z-V4LR | M3Z-V4AR | 3mm Compression CPI™ | | Blunt | 0.078 | 2.0 | 0.12 | 0.52 | 0.15 | 0.64 | 1.10 | 27.9 | 1.10 | 27.9 |
| M3Z-V4LN | M3Z-V4AN | | | Needle | | | 0.12 | 0.68 | 0.15 | 0.59 | | | | |
| M3Z-V4LK | M3Z-V4AK | | | PCTFE | | | 0.14 | 0.66 | 0.17 | 0.49 | | | | |
| M6A-V4LR | M6A-V4AR | 6mm Compression A-LOK® | | Blunt | 0.156 | 4.0 | 0.37 | 0.78 | 0.48 | 0.60 | 1.15 | 29.2 | 1.15 | 29.2 |
| M6A-V4LN | M6A-V4AN | | | Needle | | | 0.37 | 0.72 | 0.48 | 0.58 | | | | |
| M6A-V4LK | M6A-V4AK | | | PCTFE | | | 0.39 | 0.62 | 0.51 | 0.64 | | | | |
| M6Z-V4LR | M6Z-V4AR | 6mm Compression CPI™ | | Blunt | 0.156 | 4.0 | 0.37 | 0.78 | 0.48 | 0.60 | 1.15 | 29.2 | 1.15 | 29.2 |
| M6Z-V4LN | M6Z-V4AN | | | Needle | | | 0.37 | 0.72 | 0.48 | 0.58 | | | | |
| M6Z-V4LK | M6Z-V4AK | | | PCTFE | | | 0.39 | 0.62 | 0.51 | 0.64 | | | | |
| M8A-V4LR | M8A-V4AR | 8mm Compression A-LOK® | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 1.18 | 30.0 | 1.18 | 30.0 |
| M8A-V4LN | M8A-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| M8A-V4LK | M8A-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 0.68 | | | | |
| M8Z-V4LR | M8Z-V4AR | 8mm Compression CPI™ | | Blunt | 0.176 | 4.5 | 0.43 | 0.85 | 0.55 | 0.63 | 1.18 | 30.0 | 1.18 | 30.0 |
| M8Z-V4LN | M8Z-V4AN | | | Needle | | | 0.43 | 0.77 | 0.55 | 0.63 | | | | |
| M8Z-V4LK | M8Z-V4AK | | | PCTFE | | | 0.45 | 0.69 | 0.58 | 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.



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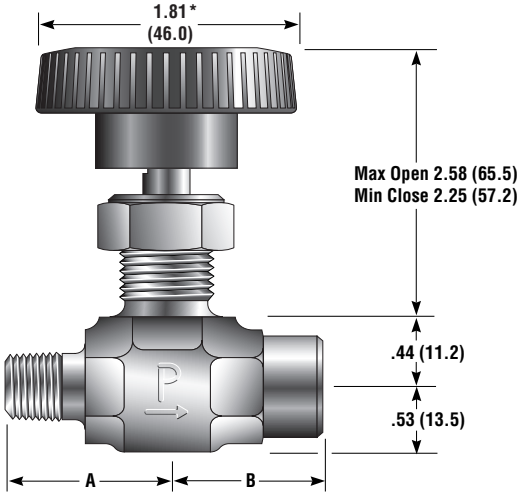
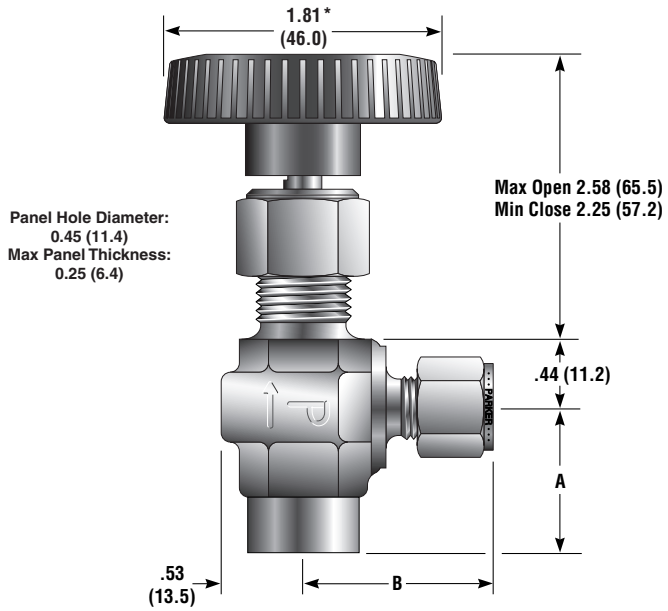
V

## V6 Series Dimensions / Flow Data




**Model Shown:**
**6M4F-V6LR-V-SS**




**Model Shown:**
**4F6Z-V6AK-SS**

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

| Basic Part Number | | End Connections | | Stem | Flow Data | | | | | | Dimensions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Orifice | | Inline | | Angle | | A† | | B† | |
| Inline | Angle | Inlet (Port 1) | Outlet (Port 2) | Type | Inch | mm | $C_V$ | $X_T$* | $C_V$ | $X_T$* | Inch | mm | Inch | mm |
| 4F-V6LR | 4F-V6AR | 1/4" Female NPT | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 0.94 | 23.9 | 0.94 | 23.9 |
| 4F-V6LN | 4F-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| 4F-V6LK | 4F-V6AK | | | PCTFE | | | 0.80 | 0.87 | 1.23 | 0.56 | | | | |
| 6A-V6LR | 6A-V6AR | 3/8" Compression A-LOK® | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 1.29 | 32.8 | 1.29 | 32.8 |
| 6A-V6LN | 6A-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| 6A-V6LK | 6A-V6AK | | | PCTFE | | | 0.80 | 0.87 | 1.23 | 0.56 | | | | |
| 6M-V6LR | 6M-V6AR | 3/8" Male NPT | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 1.03 | 26.2 | 1.03 | 26.2 |
| 6M-V6LN | 6M-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| 6M-V6LK | 6M-V6AK | | | PCTFE | | | 0.80 | 0.87 | 1.23 | 0.56 | | | | |
| 6Z-V6LR | 6Z-V6AR | 3/8" Compression CPI™ | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 1.29 | 32.8 | 1.29 | 32.8 |
| 6Z-V6LN | 6Z-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| 6Z-V6LK | 6Z-V6AK | | | PCTFE | | | 0.80 | 0.87 | 1.23 | 0.56 | | | | |
| 8A-V6LR | 8A-V6AR | 1/2" Compression A-LOK® | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 1.40 | 35.6 | 1.40 | 35.6 |
| 8A-V6LN | 8A-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| 8A-V6LK | 8A-V6AK | | | PCTFE | | | 0.80 | 0.87 | 1.23 | 0.56 | | | | |
| 8Z-V6LR | 8Z-V6AR | 1/2" Compression CPI™ | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 1.40 | 35.6 | 1.40 | 35.6 |
| 8Z-V6LN | 8Z-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| 8Z-V6LK | 8Z-V6AK | | | PCTFE | | | 0.80 | 0.87 | 1.23 | 0.56 | | | | |
| M10A-V6LR | M10A-V6AR | 10mm Compression A-LOK® | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 1.30 | 33.0 | 1.30 | 33.0 |
| M10A-V6LN | M10A-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| M10A-V6LK | M10A-V6AK | | | PCTFE | | | 0.80 | 0.87 | 1.23 | 0.56 | | | | |
| M10Z-V6LR | M10Z-V6AR | 10mm Compression CPI™ | | Blunt | 0.228 | 5.8 | 0.73 | 0.90 | 1.23 | 0.50 | 1.30 | 33.0 | 1.30 | 33.0 |
| M10Z-V6LN | M10Z-V6AN | | | Needle | | | 0.55 | 0.61 | 0.92 | 0.62 | | | | |
| M10Z-V6LK | M10Z-V6AK | | | 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.

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



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