

Needle Valve

NPT (Pipe Style) Threaded Connection 15,000 psi (1034 bar)

10P and 15P Series



Principle of Operation:

P Series (Pipe Style) Needle Valves are made available for those customers that prefer using pipe instead of high pressure instrumentation tubing for pressures up to 15,000 psi MAWP. Designed using high tensile strength cold worked 316 Stainless Steel material and “ANPT” (Aerospace version - compatible with all ANSI B1.20.1 NPT connections) thread form. Use only with similar valves, fittings and pipe capable of same or lower pressures.

Pipe Valve Features:

- P Series valve design provides in-line pipe connections for 1/4" to 1" pipe sizes.
- UNS S31600 cold worked 316 Stainless Steel material as standard. See Technical brochure for additional material options.
- 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 and excellent corrosion resistance. These valves can be used in liquid or gas applications.
- PTFE packing below stem threads provide dependable stem and body sealing. Optional packing materials available.
- Choice of Vee or Flow Regulating stem tips. N-Dura Coating or Stellite® material option for severe service
- Operating temperature range from -423° to 400°F (-252° to 204°C) (Limit of PTFE sealant tape)

Parker Autoclave Engineers valves are complemented by a complete line of fittings, needle and ball valves, relief and check valves.

Note:

NPT Pipe Thread Connections:

NPT threads must be sealed using a high quality PTFE tape (3 wraps minimum) and/or thread sealant paste product suitable for process temperatures. Refer to thread sealant manufacturer's instructions for application instructions. A good thread lubrication product (metal flake style) capable of process temperatures is also necessary to prevent thread galling.

Sealing performance may vary based on many factors such as pressure, temperature, media, thread quality, thread material, proper engagement, and proper use of thread sealant.

End user should limit the number of times an NPT fitting is assembled and disassembled as thread deformation during assembly will result in deteriorating seal quality over time.

All Parker Autoclave Engineers products are designed in accordance with ASME B31.3 Chapter IX High Pressure Piping standards.



ENGINEERING YOUR SUCCESS.

P Series Needle Valve: Pressures to 15,000 psi (1034 bar)

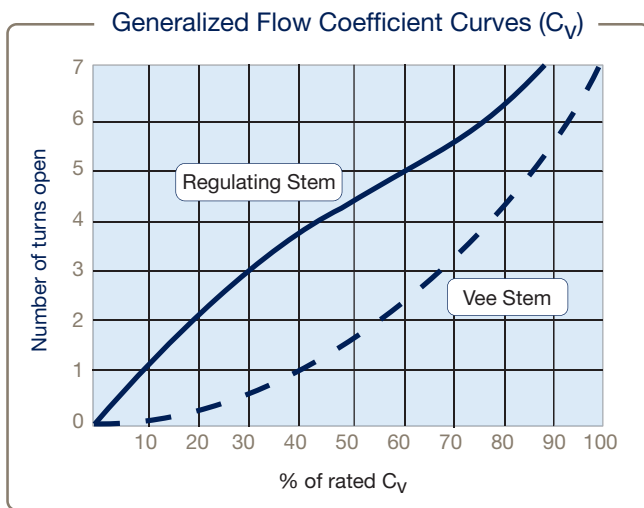


Tube Outside Diameter Size (inches)	Connection Type	Orifice Size Inches (mm)	Rated C_v^*	Pressure Rating psi (bar) @Room Temperature**
1/4	NPT	0.203 (5.16)	0.63	15,000 (1034)
3/8	NPT	0.219 (5.56)	0.75	15,000 (1034)
1/2	NPT	0.312 (7.92)	1.30	15,000 (1034)
3/4	NPT	0.438 (11.13)	2.50	10,000 (689)
1	NPT	0.562 (14.27)	4.40	10,000 (689)

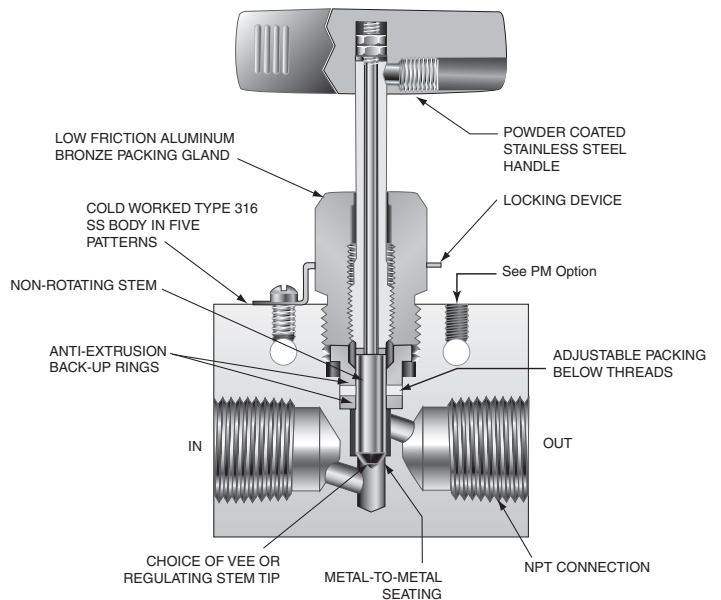
Notes

* C_v values shown are for 2-way straight valve pattern. For 2-way angle patterns, increase CV value 50%. (Based on water). Formula for converting C_v to volumetric flow can be found in Technical Information section.

** Maximum Allowable Working Pressures decrease as temperatures increase - see pressure/temperature rating guide in Technical Information section.



P Series Flow Curves for Vee and Regulating Style Stems



Valve Packing Options:

Standard Parker Autoclave Engineers valves with PTFE packing may be operated from 0°F (-18°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 800°F (427°C) by adding the following suffixes to catalog order number:

- B** Cryogenic trim materials and PTFE packing required when below 0°F (-18°C) to -100°F (-73°C)
- LT** Extended stuffing box valve with PTFE packing and Cryogenic trim materials to -423°F (-252°C)
- TG** Standard valve with PTFE-Glass packing -100°F (-73°C) to 600°F (316°C) (See also -B option above when below 0°F (-18°C))
- GY** Standard valve with Graphite Braided Yarn packing 32°F (0°C) to 800°F (427°C).

† Parker Autoclave Engineers recommends pipe connections be operated between -423°F (-252°C) and 400°F (204°C) (Temperature limit of PTFE sealant tape). For additional valve options, contact your Sales Representative.

(See "Technical Brochure" for Pressure/Temperature effect on temperatures above ambient.)

Ordering Guide:

For complete information on available stem types, optional connections and additional valve options, see Needle Valve Options section or contact your Sales Representative.

Building a Part Number: Example: 15P4071

Example Part Number:	15P	4	07	1	XX
Ordering Parameters/Options:	Valve Series	Outside Diameter Tube Size	Stem/Seat Type	Body Pattern	Options
Table Reference: (see below)	A	B	C	D	E

A - Valve Series

10P	10,000 psi P Series (Pipe Valve) Needle Valve (use with 3/4" and 1")
15P	15,000 psi P Series (Pipe Valve) Needle Valve

B - Pipe Connection Size

4	1/4" Female NPT
6	3/8" Female NPT
8	1/2" Female NPT
12	3/4" Female NPT
16	1" Female NPT

C - Stem/Seal Type (see page 8 for optional stem type description)

07	Non-Rotating Vee Stem (on-off service)
08	Non-Rotating Regulating Stem (tapered tip for regulating and shutoff)

Notes: Valve Manuals can be found on our website at www.Autoclave.com. Connection, Running and Seating Torques can be found in the product manual or in our Tools and Installation Catalog Section. Valves that have not been cycled for a substantial period of time may require higher initial actuation torque.

(See "Technical Brochure" for Pressure/Temperature effect on temperatures above ambient.)

D - Body Pattern

1	Two-Way Straight
2	Two-Way Angle
3	Three-Way, Two on Pressure
4	Three-Way, One on Pressure
5	Three-Way, Two Stem Manifold Valve

E - Options (select as many as necessary)

For additional valve options see pages 8 & 9	
PM	Panel Mount, additional screw is supplied
B	Low temperature service below 0°F (-18°C) (included in LT code)
LT	Extended packing option with PTFE packing & cryogenic materials
TG	PTFE Glass (25%) Packing (to 600°F)
GY	High Temperature Graphite Yarn Packing to 800°F
*SOG	NACE Material, Hardness Verification/Certificate
***2507	UNS 32750 2507 Super Duplex Wetted Materials
***IN625	UNS N06625 Inconel 625 Wetted Materials

Pneumatic and Electric Actuator Options - see individual brochures for Suffix Codes
Other materials available on request See Technical Brochure for common options and MAWP ratings

Notes: 316 SS valve bodies are cold worked and not suitable for use in NACE (ISO 15156) applications. If required, contact factory for options.

* SOG suffix also changes CW 316 SS Body material to Annealed 316 SS suitable for NACE service, Pressure reduction to 10,000 psi is typical.

*** Special Materials often have reduced MAWP ratings, see Technical brochure for assistance and for additional material options

Basic Repair Kits for 316 SS Material:

Basic Repair Kit for 316 SS Material

Stem Type		Pipe Size:				
		1/4"	3/8"	1/2"	3/4"	1"
2 Way Straight 2 Way Angle 3 Way, Two On 3 Way, One On	VEE	R15P407	R15P607	R15P807	R10P1207	R10P1607
	REG	R15P408	R15P608	R15P808	R10P1208	R10P1608
3 Way, 2 Stem Manifold	VEE	R15P4075	R15P6075	R15P8075	R10P12075	R10P16075
	REG	R15P4085	R15P6085	R15P8085	R10P12085	R10P16085

When ordering for valves bought with additional suffix options, please include those exact suffix codes when ordering repair kit. (Example: the stem for a manual valve and pneumatically actuated valve are different and the repair kit must include the exact actuator suffix codes).

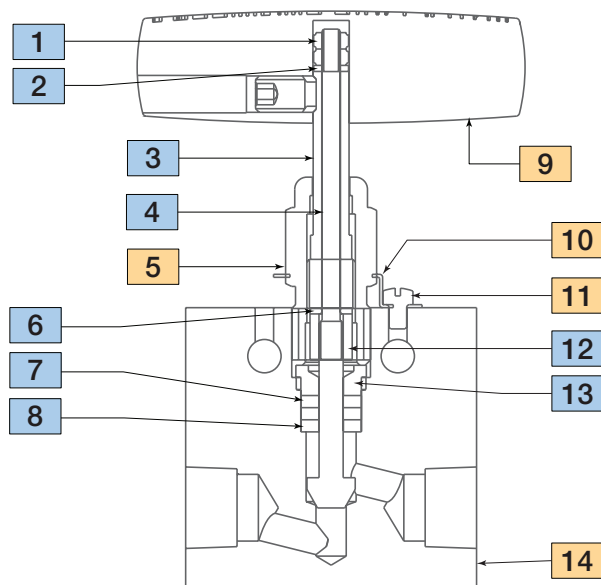
Valve Manuals can be found on our website at www.Autoclave.com.

Running and Seating Torques can be found in the product manual or in our Tools and Installation Catalog Section

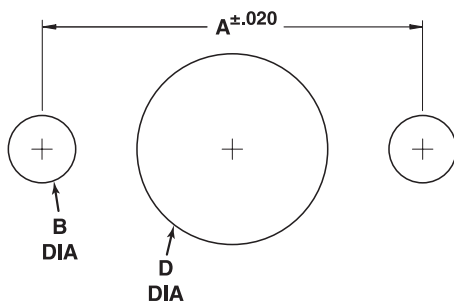
Material of Construction:

Item #	Description	Material
1	Hex Nut	300 Series SS
2	Thrust Washer	17-4 PH
3	Stem Sleeve	304 SS
4	Vee Stem (1/2" 15P shown)	316 SS
5	Packing Gland	AMPCO 18
6	Thrust Washer	17-4 PH
7	Packing Washer	PTFE
8	Bottom Washer	316 SS
9	Handle Assembly	316 SS
10	Locking Device	302 SS
11	Fill HD Screw, #10-24	18-8 SS
12	Stem Collar, (not used in 1/4" and 3/8" series)	PTFE
13	Packing Washer	AMPCO 18
14	Valve Body, (1/2" 15P shown)	316 SS

Typical spare parts found in Repair Kits



Panel Hole Size:

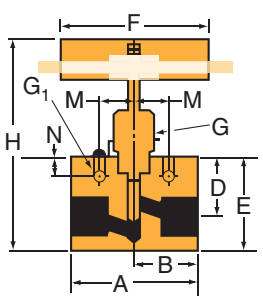


Needle Valve Panel Mount

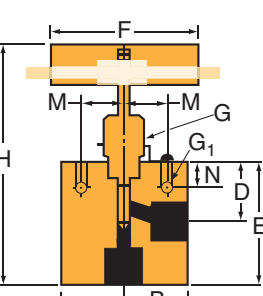
Valve Size	Inches			
	A	B	Screw Size	D
1/4" & 3/8"	1.25	.22	10 - 24	.75
1/2"	1.375	.22	10 - 24	1.00
3/4"	1.75	.22	10 - 24	1.12
1"	2.50	.22	10 - 24	1.62

Use suffix **-PM** for extra mounting hardware

P Series Needle Valve Dimensions:

2 Way Straight								
Stem Type	VEE REG	15P4071 15P4081	15P6071 15P6081	15P8071 15P8081	10P12071 10P12081	10P16071 10P16081		
Pipe Size		1/4 (6.35)	3/8 (9.53)	1/2 (12.70)	3/4 (19.05)	1 (25.40)		
Orifice Diameter		0.203 (5.16)	0.219 (5.56)	0.312 (7.92)	0.437 (11.10)	0.562 (14.27)		
Dimensions: inches (mm)		A	B	C	D	D1		
		2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	3.50 (88.90)	4.12 (104.65)		
		1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	1.75 (44.45)	2.06 (52.32)		
		-	-	-	-	-		
		1.41 (35.81)	1.41 (35.81)	2.06 (52.32)	2.63 (66.80)	3.31 (84.07)		
		-	-	-	-	-		
		2.00 (50.80)	2.00 (50.80)	2.88 (73.15)	3.75 (95.25)	4.62 (117.35)		
		3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)		
		0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)		
		0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)		
		4.63 (117.60)	4.63 (117.60)	5.93 (150.62)	7.00 (177.80)	9.00 (228.60)		
		0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)		
		0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)		
		Block Thickness		0.75 (19.05)	1.00 (25.4)	1.38 (35.05)	1.75 (44.45)	1.75 (44.45)

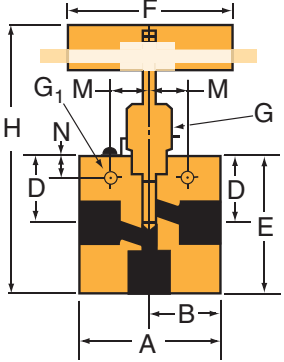
Bar Handle used on 3/4" and 1" Valves

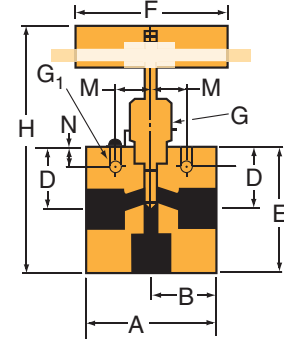
2 Way Angle								
Stem Type	VEE REG	15P4072 15P4082	15P6072 15P6082	15P8072 15P8082	10P12072 10P12082	10P16072 10P16082		
Pipe Size		1/4 (6.35)	3/8 (9.53)	1/2 (12.70)	3/4 (19.05)	1 (25.40)		
Orifice Diameter		0.203 (5.16)	0.219 (5.56)	0.312 (7.92)	0.437 (11.10)	0.562 (14.27)		
Dimensions: inches (mm)		A	B	C	D	D1		
		2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	3.50 (88.90)	4.12 (104.65)		
		1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	1.75 (44.45)	2.06 (52.32)		
		-	-	-	-	-		
		1.41 (35.81)	1.41 (35.81)	2.06 (52.32)	2.63 (66.80)	3.31 (84.07)		
		-	-	-	-	-		
		2.44 (61.98)	2.44 (61.98)	3.38 (85.85)	4.25 (107.95)	5.12 (130.05)		
		3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)		
		0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)		
		0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)		
		4.81 (122.17)	4.81 (122.17)	6.43 (163.32)	7.50 (190.50)	9.00 (228.60)		
		0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)		
		0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)		
		Block Thickness		0.75 (19.05)	1.00 (25.4)	1.38 (35.05)	1.75 (44.45)	1.75 (44.45)

Bar Handle used on 3/4" and 1" Valves

G - Packing Gland mounting hole drill size • G1 - Bracket mounting hole size • H* - Dimension is with stem in closed position
All dimensions for reference only and subject to change • For prompt service, Parker Autoclave stocks select products. Consult factory.

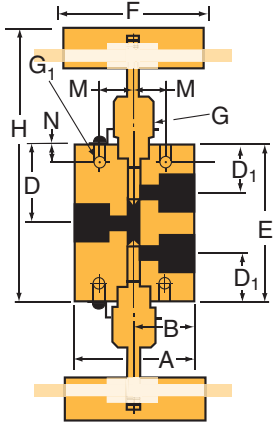
P Series Needle Valve Dimensions:

3 Way, 2 on Pressure							
Stem Type	VEE REG	15P4073 15P4083	15P6073 15P6083	15P8073 15P8083	10P12073 10P12083	10P16073 10P16083	
Pipe Size		1/4 (6.35)	3/8 (9.53)	1/2 (12.70)	3/4 (19.05)	1 (25.40)	
Orifice Diameter		0.203 (5.16)	0.219 (5.56)	0.312 (7.92)	0.437 (11.10)	0.562 (14.27)	
	Dimensions: inches (mm)	A	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	3.50 (88.90)	4.12 (104.65)
	B	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	1.75 (44.45)	2.06 (52.32)	
	C	-	-	-	-	-	
	D	1.41 (35.81)	1.41 (35.81)	2.06 (52.32)	2.65 (67.31)	3.31 (84.07)	
	D1	-	-	-	-	-	
	E	2.62 (66.55)	2.62 (66.55)	3.62 (91.95)	4.62 (117.35)	5.88 (149.35)	
	F	3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	
	G	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	
	G1	0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	
	H*	5.00 (127.00)	5.00 (127.00)	6.52 (165.61)	7.88 (200.15)	9.75 (247.65)	
	M	0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	
	N	0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	
	Block Thickness		0.75 (19.05)	1.00 (25.4)	1.38 (35.05)	1.75 (44.45)	1.75 (44.45)

3 Way, 1 on Pressure							
Stem Type	VEE REG	15P4074 15P4084	15P6074 15P6084	15P8074 15P8084	10P12074 10P12084	10P16074 10P16084	
Pipe Size		1/4 (6.35)	3/8 (9.53)	1/2 (12.70)	3/4 (19.05)	1 (25.40)	
Orifice Diameter		0.203 (5.16)	0.219 (5.56)	0.312 (7.92)	0.437 (11.10)	0.562 (14.27)	
	Dimensions: inches (mm)	A	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	3.50 (88.90)	4.12 (104.65)
	B	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	1.75 (44.45)	2.06 (52.32)	
	C	-	-	-	-	-	
	D	1.41 (35.81)	1.41 (35.81)	2.06 (52.32)	2.65 (67.31)	3.31 (84.07)	
	D1	-	-	-	-	-	
	E	2.44 (61.98)	2.44 (61.98)	3.38 (85.85)	4.25 (107.95)	5.12 (130.05)	
	F	3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	
	G	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	
	G1	0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	
	H	4.81 (122.17)	4.81 (122.17)	6.31 (160.27)	7.50 (190.50)	9.09 (230.89)	
	M	0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	
	N	0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	
	Block Thickness		0.75 (19.05)	1.00 (25.4)	1.38 (35.05)	1.75 (44.45)	1.75 (44.45)

G - Packing Gland mounting hole drill size • G1 - Bracket mounting hole size • H* - Dimension is with stem in closed position
All dimensions for reference only and subject to change • For prompt service, Parker Autoclave stocks select products. Consult factory.

P Series Needle Valve Dimensions:

3 Way, 2 Stem Manifold								
Stem Type	VEE REG	15P4075 15P4085	15P6075 15P6085	15P8075 15P8085	10P12075 10P12085	10P16075 10P16085		
Pipe Size		1/4 (6.35)	3/8 (9.53)	1/2 (12.70)	3/4 (19.05)	1 (25.40)		
Orifice Diameter		0.203 (5.16)	0.219 (5.56)	0.312 (7.92)	0.437 (11.10)	0.562 (14.27)		
Dimensions: inches (mm)								
 <p>Bar Handle used on 3/4" and 1" Valves</p>		A	2.00 (50.80)	2.50 (63.50)	3.00 (76.20)	3.50 (88.90)	4.12 (104.65)	
		B	1.00 (25.40)	1.25 (31.75)	1.50 (38.10)	1.75 (44.45)	2.06 (52.32)	
		C	-	-	-	-	-	
		D	1.69 (42.88)	1.69 (42.88)	2.56 (66.07)	3.25 (82.55)	3.75 (96.25)	
		D1	1.19 (30.18)	1.19 (30.18)	1.75 (44.45)	2.25 (57.15)	2.81 (71.42)	
		E	3.38 (85.85)	3.38 (85.85)	5.12 (130.05)	6.50 (165.10)	7.50 (190.50)	
		F	3.00 (76.20)	3.00 (76.20)	4.00 (101.60)	10.25 (260.35)	10.25 (260.35)	
		G	0.75 (19.05)	0.75 (19.05)	1.00 (25.40)	1.12 (28.45)	1.62 (41.15)	
		G1	0.22 (5.59)	0.22 (5.59)	0.34 (8.64)	0.44 (11.18)	0.56 (14.22)	
		H	5.75 (146.05)	5.75 (146.05)	8.05 (204.47)	9.75 (247.65)	11.47 (291.38)	
		M	0.62 (15.75)	0.62 (15.75)	0.69 (17.53)	0.88 (22.35)	1.25 (31.75)	
		N	0.38 (9.65)	0.38 (9.65)	0.50 (12.70)	0.63 (16.00)	1.13 (28.70)	
		Block Thickness		0.75 (19.05)	1.00 (25.4)	1.38 (35.05)	1.75 (44.45)	1.75 (44.45)

G - Packing Gland mounting hole drill size • G1 - Bracket mounting hole size • H* - Dimension is with stem in closed position
 All dimensions for reference only and subject to change • For prompt service, Parker Autoclave stocks select products. Consult factory.

Valve Options:

(For Actuator Options please reference specific Actuator brochure)



Pneumatic Valve Actuators:

The need to control process and vent valves from a remote location makes air operated valves a vital component to many processing operations. All Parker Autoclave Engineers' valves are available with piston type actuators. Five sizes of air actuators (light, mini-light, medium, heavy duty or extra heavy, single and double stage) are offered to meet the service requirements of Parker Autoclave Engineers' Low, Medium and High Pressure needle valves. Both air-to-open (normally closed) and air-to-close (normally open) designs are included in the product line. Optional air to open AND close actuators available upon request. Please see our Pneumatic Valve Actuator Brochure to help size the proper actuator for your application.



Electric Valve Actuators:

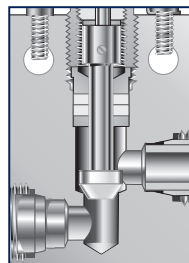
Remotely controlling process flow at high pressure enhances safety and lowers labor costs. Parker Autoclave Engineers developed a flow control valve available in several models including weatherproof and explosionproof options.

The Electrically Actuated Shut-off/Flow Regulating Actuator (FRC Series) is available for most of our Needle Valves through 1/2" pipe connection sizes and up to 15,000 psi maximum pressure. They can withstand wide process temperature ranges.

Stem Options:

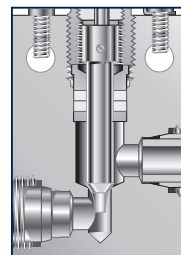
Most Parker Autoclave Engineers' valves are available with either Vee (on-off) or Regulating (Flow Control) Stems in our standard valve body as shown below. For severe service stem (and replaceable seat if ordered) can be offered with N-Dura Diamond-Like coating (-CS suffix or -CSS (coated stem & seat)) or made from Stellite (-SS or -SSRS (Stellite stem, replaceable seat)).

VEE Stem



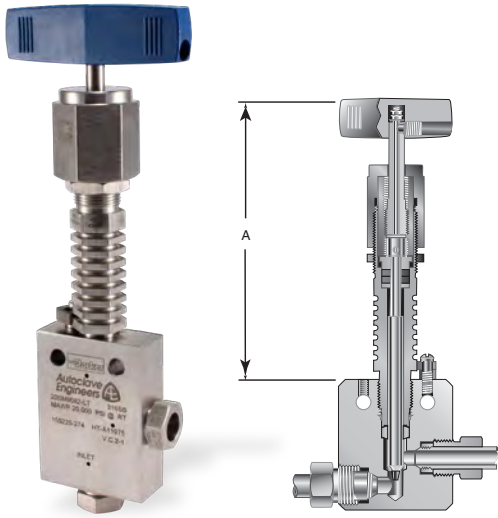
The Vee stem is used for direct on-off, metal-to-metal shut-off with quick-opening flow characteristics.

Regulating Stem



In some applications, more precise flow control is required than is possible with a Vee stem. For these cases, Autoclave offers a non-rotating, two-piece regulating stem which can be used for both control and shut-off. While it is not as precise as the control associated with the MicroMetering stem, especially with smaller flows, it does offer substantially better control than the Vee stem.

Valve Options: (For Actuator Options please reference specific Actuator brochure)



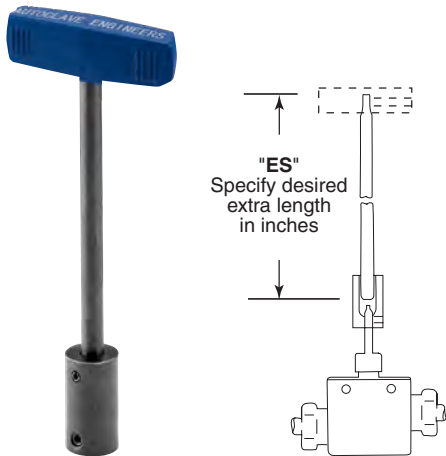
High/Low Temperature Extension:

Required with extreme temperatures to remove packing from contact with flow stream.

-LT Low Temperature (under -100°F (-73°C))

Valve Series	Outside Diameter Tube Size (inches)	Dimensions "A" inches (mm)
10P Series 15P Series	1/4"	5.50 (140)
	3/8"	6.00 (152)
	1/2"	6.60 (168)
	3/4"	7.75 (197)
	1"	9.30 (236)

LT option code includes 316 SS Trim material and PTFE packing



ES Stem Extender:

Stem extenders are offered for High and Low temperature operation or to extend through panel or barricade.

To order valve with Stem Extender, add **"ES-"** and length (6", 12", 18", 24") to beginning of valve part number e.g. ES12-15P6071. Other lengths to special order.

To order Stem Extender only, provide valve model prefix e.g. ES12-15P6. Handle not included – use same provided with original valve.



Needle Valve Clam Shell Handle Lockout:

(order separately using part numbers shown below, padlock not included)

Clam Shell Handle locks are provided to lockout valves in open or closed position preventing unauthorized personnel from actuating valve during shutdown or emergency situations. This clamshell design is available in four (4) sizes dependent on handle length:

- P/N AE004855 – 1" to 2.5" handle length
- P/N 90088 – 2.5" to 5.0" handle length
- P/N 90194 – 6.5" to 10" handle length
- P/N AE004350 – 8" to 13" handle length

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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 information call 1-800-C-Parker.

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 CLIMATE CONTROL	Agriculture Food, Beverage and Dairy Precision Cooling Transportation	Air Conditioning Life Sciences & Medical Processing	Co2 Controls Electronic Controllers Filter Driers Hand Shut-Off Valves Hose & Fittings	Pressure Regulating Valves Refrigerant Distributors Safety Relief Valves Solenoid Valves Thermostatic Expansion Valves
 ELECTRO-MECHANICAL	Aerospace Life Science & Medical Packaging Machinery Plastics Machinery & Converting Semiconductor & Electronics Factory Automation	Machine Tools Paper Machinery Primary Metals Textile Wire & Cable	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	Food & Beverage Life Sciences Mobile Equipment Power Generation Transportation	Industrial Machinery Marine Oil & Gas Process	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 and GAS HANDLING	Aerospace Agriculture Bulk Chemical Handling Construction Machinery Food & Beverage Fuel & Gas Delivery	Industrial Machinery Mobile Oil & Gas Transportation Welding	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	Aerospace Aerial lift Agriculture Construction Machinery Forestry	Industrial Machinery Mining Oil & Gas Power Generation & Energy Truck Hydraulics	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
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! CAUTION !

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