Needle Valves (U Series)

Catalog 4110-U
Revised, August 2004

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

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_v: .53 to 3.55

Pressure Rating and Tubing Selection:

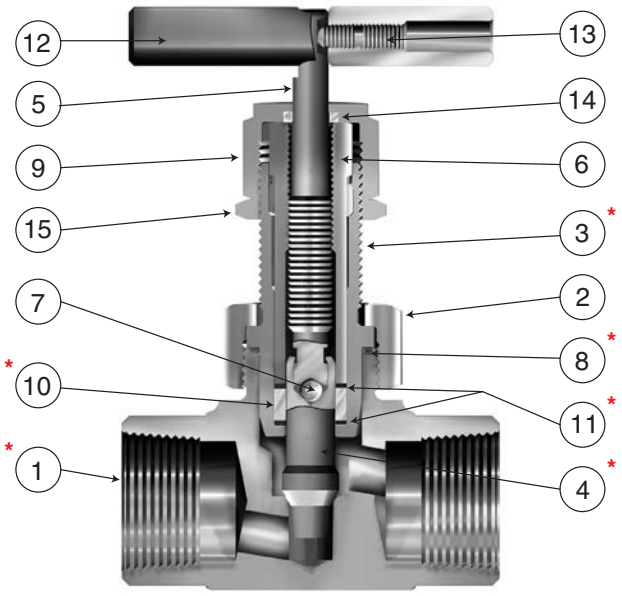
For working pressures of A-LOK® and CPI™ tube connections, please see the Instrument Tubing Selection Guide (Bulletin 4200-TS), found in the Technical Section of the Parker Instrumentation Products Master Binder, or the Parker Instrument Tube Fitting Installation Manual (Bulletin 4200-B4).

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

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



Model Shown: 16F-U16LR-G-SS

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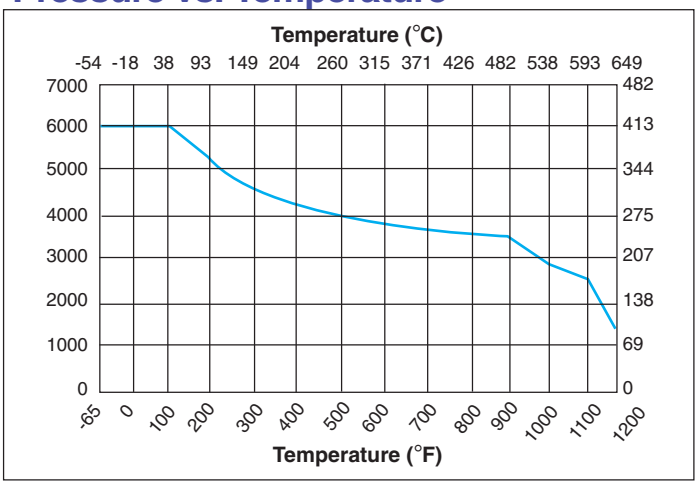
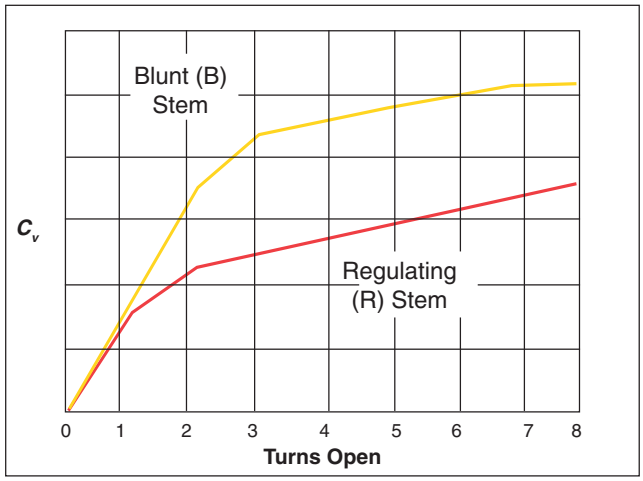
Jacksonville, Alabama

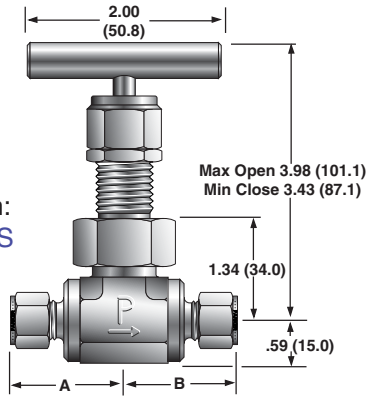
Pressure vs. Temperature



Flow Characteristics

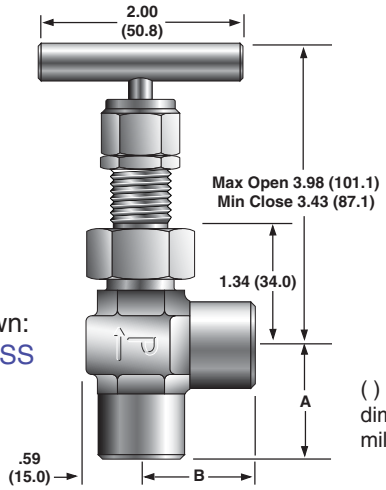


Model Shown:
4Z-U6LB-T-SS



Panel Hole Diameter:
0.65 (16.5)
Max Panel Thickness:
0.42 (10.7)

Model Shown:
4F-U6AR-T-SS



( ) Denotes dimensions in millimeters

U6 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
2F-U6LR 2F-U6LB	2F-U6AR 2F-U6AB	1/8" Female NPT		Regulating Blunt	0.188	4.8	0.58 0.69	0.83 0.50	0.77 0.91	0.70 0.42	1.00	25.4	1.00	25.4
4A-U6LR 4A-U6LB	4A-U6AR 4A-U6AB	1/4" Compression A-LOK®		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	1.38	35.1	1.38	35.1
4F-U6LR 4F-U6LB	4F-U6AR 4F-U6AB	1/4" Female NPT		Regulating Blunt	0.228	5.8	0.78 0.82	0.95 0.59	1.04 1.09	0.80 0.50	1.03	26.2	1.03	26.2
4M-U6LR 4M-U6LB	4M-U6AR 4M-U6AB	1/4" Male NPT		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	1.09	27.7	1.09	27.7
4W-U6LR 4W-U6LB	4W-U6AR 4W-U6AB	1/4" Socket Weld		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	.91	23.1	.91	23.1
4Z-U6LR 4Z-U6LB	4Z-U6AR 4Z-U6AB	1/4" Compression CPI™		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	1.38	35.1	1.38	35.1
M6A-U6LR M6A-U6LB	M6A-U6AR M6A-U6AB	6mm Compression A-LOK®		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	1.38	35.1	1.38	35.1
M6Z-U6LR M6Z-U6LB	M6Z-U6AR M6Z-U6AB	6mm Compression CPI™		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	1.38	35.1	1.38	35.1
M8A-U6LR M8A-U6LB	M8A-U6AR M8A-U6AB	8mm Compression A-LOK®		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	1.38	35.1	1.38	35.1
M8Z-U6LR M8Z-U6LB	M8Z-U6AR M8Z-U6AB	8mm Compression CPI™		Regulating Blunt	0.177	4.5	0.53 0.65	0.80 0.48	0.70 0.86	0.67 0.40	1.38	35.1	1.38	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

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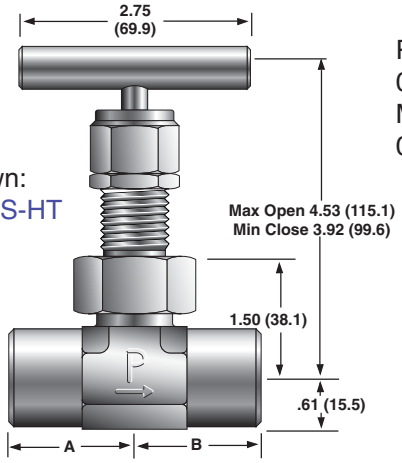
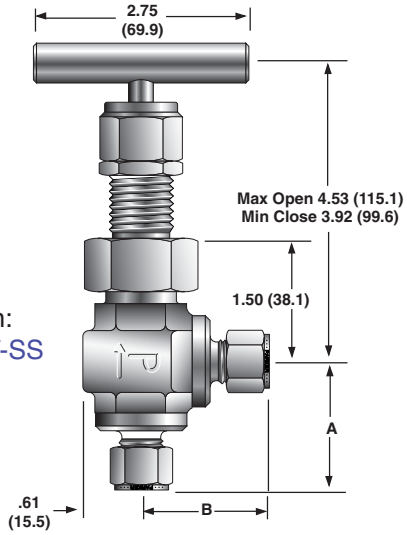
U Series Needle Valves

Model Shown:
6F-U12LB-G-SS-HT



Panel Hole Diameter:
0.83 (21.1)
Max Panel Thickness:
0.61 (15.5)

Model Shown:
M12A-U12AB-T-SS



U12 Series Dimensions / Flow Data

( ) Denotes dimensions in millimeters

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
4A-U12LR 4A-U12LB	4A-U12AR 4A-U12AB	1/4" Compression A-LOK®		Regulating Blunt	0.125	3.2	0.44 0.51	0.57 0.40	0.60 0.68	0.49 0.33	1.39	35.3	1.39	35.3
4F-U12LR 4F-U12LB	4F-U12AR 4F-U12AB	1/4" Female NPT		Regulating Blunt	0.250	6.4	0.94 1.03	0.65 0.60	1.25 1.37	0.55 0.51	1.13	28.7	1.13	28.7
4Z-U12LR 4Z-U12LB	4Z-U12AR 4Z-U12AB	1/4" Compression CPI™		Regulating Blunt	0.125	3.2	0.44 0.51	0.57 0.40	0.60 0.68	0.49 0.33	1.39	35.3	1.39	35.3
6A-U12LR 6A-U12LB	6A-U12AR 6A-U12AB	3/8" Compression A-LOK®		Regulating Blunt	0.187	4.7	0.69 0.77	0.61 0.50	0.92 1.02	0.52 0.42	1.60	40.6	1.60	40.6
6F-U12LR 6F-U12LB	6F-U12AR 6F-U12AB	3/8" Female NPT		Regulating Blunt	0.312	7.9	1.19 1.31	0.78 0.80	1.58 1.74	0.66 0.68	1.30	33.0	1.30	33.0
6W-U12LR 6W-U12LB	6W-U12AR 6W-U12AB	3/8" Tube Socket Weld		Regulating Blunt	0.228	5.8	0.85 0.94	0.64 0.57	1.13 1.25	0.54 0.48	1.13	28.7	1.13	28.7
6Z-U12LR 6Z-U12LB	6Z-U12AR 6Z-U12AB	3/8" Compression CPI™		Regulating Blunt	0.187	4.7	0.69 0.77	0.61 0.50	0.92 1.02	0.52 0.42	1.60	40.6	1.60	40.6
8A-U12LR 8A-U12LB	8A-U12AR 8A-U12AB	1/2" Compression A-LOK®		Regulating Blunt	0.250	6.4	0.94 1.03	0.65 0.60	1.25 1.37	0.55 0.51	1.49	37.8	1.49	37.8
8F-U12LR 8F-U12LB	8F-U12AR 8F-U12AB	1/2" Female NPT		Regulating Blunt	0.312	7.9	1.19 1.31	0.78 0.80	1.58 1.74	0.66 0.68	1.50	38.1	1.50	38.1
8W-U12LR 8W-U12LB	8W-U12AR 8W-U12AB	1/2" Tube Socket Weld		Regulating Blunt	0.312	7.9	1.19 1.31	0.78 0.80	1.58 1.74	0.66 0.68	1.25	31.8	1.25	31.8
8Z-U12LR 8Z-U12LB	8Z-U12AR 8Z-U12AB	1/2" Compression CPI™		Regulating Blunt	0.250	6.4	0.94 1.03	0.65 0.60	1.25 1.37	0.55 0.51	1.49	37.8	1.49	37.8
M10A-U12LR M10A-U12LB	M10A-U12AR M10A-U12AB	10mm Compression A-LOK®		Regulating Blunt	0.250	6.4	0.94 1.03	0.65 0.60	1.25 1.37	0.55 0.51	1.53	38.9	1.53	38.9
M10Z-U12LR M10Z-U12LB	M10Z-U12AR M10Z-U12AB	10mm Compression CPI™		Regulating Blunt	0.250	6.4	0.94 1.03	0.65 0.60	1.25 1.37	0.55 0.51	1.53	38.9	1.53	38.9
M12A-U12LR M12A-U12LB	M12A-U12AR M12A-U12AB	12mm Compression A-LOK®		Regulating Blunt	0.312	7.9	1.19 1.31	0.78 0.80	1.58 1.74	0.66 0.68	1.70	43.2	1.70	43.2
M12Z-U12LR M12Z-U12LB	M12Z-U12AR M12Z-U12AB	12mm Compression CPI™		Regulating Blunt	0.312	7.9	1.19 1.31	0.78 0.80	1.58 1.74	0.66 0.68	1.70	43.2	1.70	43.2
M14A-U12LR M14A-U12LB	M14A-U12AR M14A-U12AB	14mm Compression A-LOK®		Regulating Blunt	0.312	7.9	1.19 1.31	0.78 0.80	1.58 1.74	0.66 0.68	1.70	43.2	1.70	43.2
M14Z-U12LR M14Z-U12LB	M14Z-U12AR M14Z-U12AB	14mm Compression CPI™		Regulating Blunt	0.312	7.9	1.19 1.31	0.78 0.80	1.58 1.74	0.66 0.68	1.70	43.2	1.70	43.2

* 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

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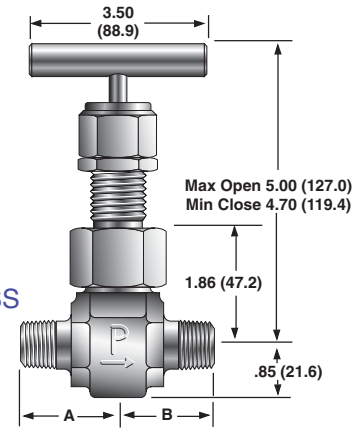
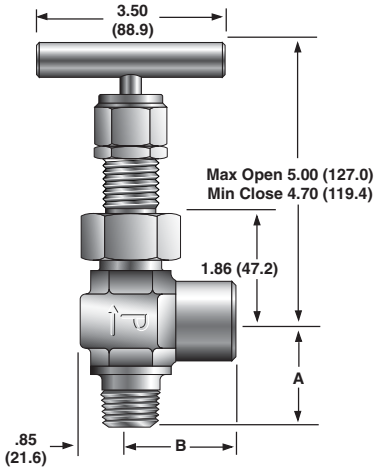


Model Shown:
16M-U16LR-G-SS

Panel Hole Diameter:
1.02 (25.9)
Max Panel Thickness:
0.62 (15.7)

( ) Denotes dimensions in millimeters



Model Shown:
16M16F-U16AB-T-SS

U16 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
8A-U16LR 8A-U16LB	8A-U16AR 8A-U16AB	1/2" Compression A-LOK®		Regulating Blunt	0.394	10.0	1.59 1.90	0.73 0.95	2.11 2.53	0.62 0.81	1.97	50.0	1.97	50.0
8F-U16LR 8F-U16LB	8F-U16AR 8F-U16AB	1/2" Female NPT		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.56	39.6	1.56	39.6
8M-U16LR 8M-U16LB	8M-U16AR 8M-U16AB	1/2" Male NPT		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.92	48.8	1.92	48.8
8PSW-U16LR 8PSW-U16LB	8PSW-U16AR 8PSW-U16AB	1/2" Pipe Socket Weld		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.56	39.6	1.56	39.6
8W-U16LR 8W-U16LB	8W-U16AR 8W-U16AB	1/2" Tube Socket Weld		Regulating Blunt	0.394	10.0	1.59 1.90	0.73 0.95	2.11 2.53	0.62 0.81	1.69	42.9	1.69	42.9
8Z-U16LR 8Z-U16LB	8Z-U16AR 8Z-U16AB	1/2" Compression CPI™		Regulating Blunt	0.394	10.0	1.59 1.90	0.73 0.95	2.11 2.53	0.62 0.81	1.97	50.0	1.97	50.0
12A-U16LR 12A-U16LB	12A-U16AR 12A-U16AB	3/4" Compression A-LOK®		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0
12F-U16LR 12F-U16LB	12F-U16AR 12F-U16AB	3/4" Female NPT		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.63	41.4	1.63	41.4
12M-U16LR 12M-U16LB	12M-U16AR 12M-U16AB	3/4" Male NPT		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.63	41.4	1.63	41.4
12PSW-U16LR 12PSW-U16LB	12PSW-U16AR 12PSW-U16AB	3/4" Pipe Socket Weld		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.56	39.6	1.56	39.6
12W-U16LR 12W-U16LB	12W-U16AR 12W-U16AB	3/4" Tube Socket Weld		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.56	39.6	1.56	39.6
12Z-U16LR 12Z-U16LB	12Z-U16AR 12Z-U16AB	3/4" Compression CPI™		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0
16A-U16LR 16A-U16LB	16A-U16AR 16A-U16AB	1" Compression A-LOK®		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0
16F-U16LR 16F-U16LB	16F-U16AR 16F-U16AB	1" Female NPT		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.81	46.0	1.81	46.0
16M-U16LR 16M-U16LB	16M-U16AR 16M-U16AB	1" Male NPT		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.81	46.0	1.81	46.0
16Z-U16LR 16Z-U16LB	16Z-U16AR 16Z-U16AB	1" Compression CPI™		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0
M12A-U16LR M12A-U16LB	M12A-U16AR M12A-U16AB	12mm Compression A-LOK®		Regulating Blunt	0.394	10.0	1.59 1.90	0.73 0.95	2.11 2.53	0.62 0.81	1.97	50.0	1.97	50.0
M12Z-U16LR M12Z-U16LB	M12Z-U16AR M12Z-U16AB	12mm Compression CPI™		Regulating Blunt	0.394	10.0	1.59 1.90	0.73 0.95	2.11 2.53	0.62 0.81	1.97	50.0	1.97	50.0
M20A-U16LR M20A-U16LB	M20A-U16AR M20A-U16AB	20mm Compression A-LOK®		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0
M20Z-U16LR M20Z-U16LB	M20Z-U16AR M20Z-U16AB	20mm Compression CPI™		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0
M25A-U16LR M25A-U16LB	M25A-U16AR M25A-U16AB	25mm Compression A-LOK®		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0
M25Z-U16LR M25Z-U16LB	M25Z-U16AR M25Z-U16AB	25mm Compression CPI™		Regulating Blunt	0.437	11.1	1.82 2.67	0.72 0.80	2.42 3.55	0.61 0.68	1.97	50.0	1.97	50.0

* 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

Parker Hannifin Corporation
Instrumentation Products Division
Jacksonville, Alabama

How to Order

The correct part number is easily derived from the following number sequence. The six product characteristics required are coded as shown below. *Note: If the inlet and outlet ports are the same, eliminate the outlet port designator.

Example:	4Z	*	-	U6A	R	-	G	-	SS
	(1)	(2)		(3)	(4)		(5)		(6)
	Inlet Port	Outlet Port		Valve Series	Stem Type		Packing		Body Material

Describes an angle pattern U6 Series needle valve equipped with 1/4" CPI™ compression inlet and outlet ports, a regulating stem type, Grafoil® packing, stainless steel construction.

(1) Inlet Port	(2) Outlet Port	(3) Valve Series	(4) Stem Type	(5) Packing	(6) Body Material
2F, 4A, 4F, 4M, 4W, 4Z, M6A, M6Z, M8A, M8Z		U6A U6L	**B** - Blunt **R** - Regulating	**T** - PTFE **G** - Grafoil®	**SS**- Stainless Steel
4A, 4F, 4Z, 6A, 6F, 6W, 6Z, 8A, 8F, 8W, 8Z, 10A, 10Z, 12A, 12Z, M10A, M10Z, M12A, M12Z, M14A, M14Z		U12A U12L			
8A, 8F, 8M, 8PSW, 8W, 8Z, 12A, 12F, 12M, 12PSW, 12W, 12Z, 16A, 16F, 16M, 16Z, M12A, M12Z, M20A, M20Z, M25A, M25Z		U16A U16L			

How to Order Options

High Temperature - Add the suffix **-HT** to the end of the part number to receive valves with a 316 stainless steel lower stem and stainless steel handle. Example: 4M-U6LB-G-SS-**HT**

Oxygen Cleaning - Add the suffix **-C3** to the end of the part number to receive valves cleaned and assembled for oxygen service in accordance with Parker Specification ES8003. Example: 8A-U12LR-T-SS-**C3**

Stainless Steel Bar Handle - To obtain valves with stainless steel bar handle, add the suffix **-ST** to the end of the part number. Example: 12Z-U16AB-T-SS-**ST**

How to Order Maintenance Kits

Stainless Steel T-Bar Handles with Handle Screw - U6: V4-BAR-HANDLE-SS; U12:U12-BAR-HANDLE-SS; U16: U16-BAR-HANDLE-SS

Aluminum T-Bar Handles with Handle Screw - U6: V4-BAR-HANDLE-AL; U12:U12-BAR-HANDLE-AL; U16: U16-BAR-HANDLE-AL

Panel Mounting Nuts - U6: U6-LOCKNUT; U12: U12-LOCKNUT; U16: U16-LOCKNUT

PTFE Packing Kits - Consists of One PTFE Packing; One Dust Seal; Maintenance Instructions. Kit-Valve Series-T. Example: **KIT-U12-T**

Grafoil® Packing Kits - Consists of One Grafoil® Packing; One Dust Seal; Maintenance Instructions. Kit-Valve Series-G. Example: **KIT-U16-G**

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