



CPI™/A-LOK® Tube Fittings

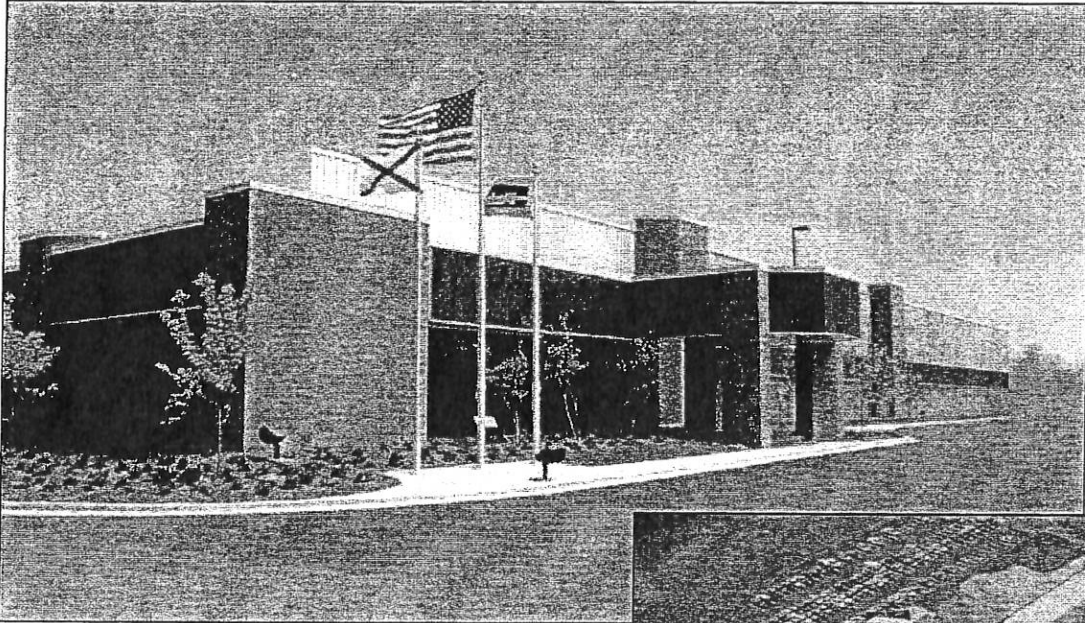
Catalog 4230/4233

June 2011

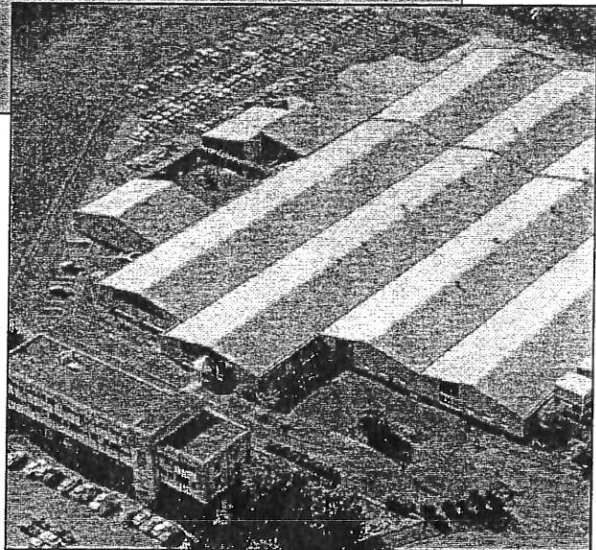
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.



Huntsville, Alabama, USA



Barnstaple, UK

WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components 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, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

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.

© Copyright 2004, 2005, 2008 Parker Hannifin Corporation. All Rights Reserved.



Parker Hannifin Corporation
Instrumentation Products Division
Huntsville, AL USA
<http://www.parker.com/ipdus>

Table of Contents

Introduction 2

Visual Index 4

Typical Raw Material Specifications 6

Tube End Dimensional Data 6

Nomenclature (How to Order) 7

CPI™/A-LOK® Options 8

Tube to Male Pipe Fittings 9

Tube to Female Pipe Fittings 21

Tube to Tube Unions 27

Port Connectors 36

37° Flare (AN) to CPI™/A-LOK® Fittings 48

Tube to O-Ring Seal Fittings 49

Tube to Welded Systems 58

Analytical Fittings 62

Barbed Fittings 67

Components 68

Assembly & Remake Instructions 75

Gaugeability Instructions 75

Instrument Tubing Selection Guide 76

Thread & Tube End Size Chart (USA) 80

Offer of Sale 84

Parker Motion & Control Technologies inside back cover



Introduction

Parker CPI™/A-LOK® Instrumentation Tube Fittings are designed as leak-free connections for process, power and instrumentation applications. These single and two ferrule fittings are manufactured to the highest quality standards and are available in a broad range of sizes, materials and configurations.

Features

The Parker CPI™/A-LOK® tube fitting has been specifically designed for use on instrumentation, process and control systems, analysers and environmental equipment employed in chemical, petroleum, power generating and pulp and paper plants. CPI™/A-LOK® fittings have also been used extensively in other applications and industries wherever high reliability and quality are required.

Materials

Parker CPI™/A-LOK® fittings are available as standard in Heat Code Traceable, 316 stainless steel. Other materials include steel, brass, aluminum, nickel-copper, Hastelloy C®, Alloy 600, Titanium, 6Mo, Incoloy 625 and 825. The raw materials used fully conform to the chemical requirements listed in Specification Table 1 found on page 6. For nuclear and other critical applications, stainless steel CPI™/A-LOK® fittings are readily available with documented heat code traceability.

Pipe Fittings/Adapters

Parker CPI™/A-LOK® tube fittings are available in combination with a variety of ISO and ANSI pipe thread configurations. For a full listing of these fittings, see Catalog 4260.

Tubing

Parker CPI™/A-LOK® tube fittings can be used with a wide variety of tubing materials and a broad range of tube wall thicknesses. CPI™/A-LOK® seals equally well on both thin wall and heavy wall tubing. **Tubing and fitting materials should be selected to be compatible with the fluid media. Due to thermal expansion characteristics and chemical stability, the tubing should be of the same material as the fitting. (The exception is brass fittings and copper tubing.)**

Torque

Parker CPI™/A-LOK® tube fittings do not twist the tubing during installation. CPI™/A-LOK® ferrule designs assure that all make and remake motion is transmitted axially to the tubing. Since no radial movement of the tubing occurs, the tubing is not stressed. The mechanical integrity of the tubing is maintained.

No Distortion

In make-up, there is no undue force in an outward direction to distort the fitting body or ferrules to cause interference between the ferrules and nut. This assures that the nut will back-off freely for disassembly and permits a greater number of easy remakes.

Sealing

Positive, reliable connections with Parker CPI™/A-LOK® fittings have been qualified by exhaustive tests and over four decades of experience in the manufacture of quality tube fittings.

Nomenclature

Parker CPI™/A-LOK® fitting part numbers are constructed from symbols that identify the size and style of the fitting and material used.

Assembly, Remake, Gaugeability

Proper assembly is the key component to a leak-free system. CPI™/A-LOK® tube fitting assembly, remake and gaugeability instructions are found on page 75 of this catalog.

Pressure Rating & Tubing Selection

For working pressures of CPI™/A-LOK® tube connections, please see pages 76–79 of this catalog, the Instrument Tubing Selection Guide (4200-TS) found in the Technical Section of your Parker Instrumentation Products Process Binder, or the Parker Instrument Tube Fitting Installation Manual (Bulletin 4200-B4).

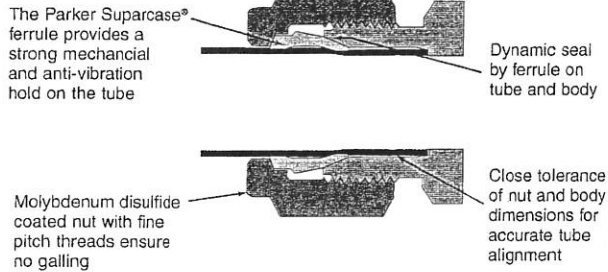
In cases where a male or female pipe thread is the second end of a Parker CPI™/A-LOK® fitting, such threads may be the pressure limiting factor of the tubing system. Pressure ratings for Pipe Ends are shown on page 79.



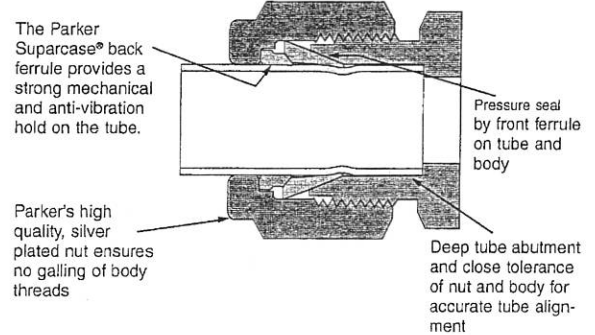
CPI™/A-LOK® Tube Fittings

Parker CPI™/A-LOK® fittings consists of precision engineered parts designed to provide secure leak-proof joints capable of satisfying high pressure, vacuum and vibration applications.

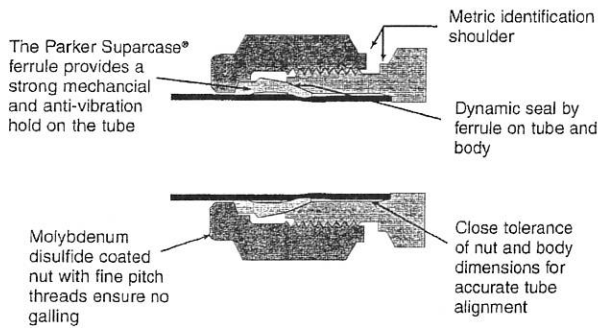
Inch — CPI™



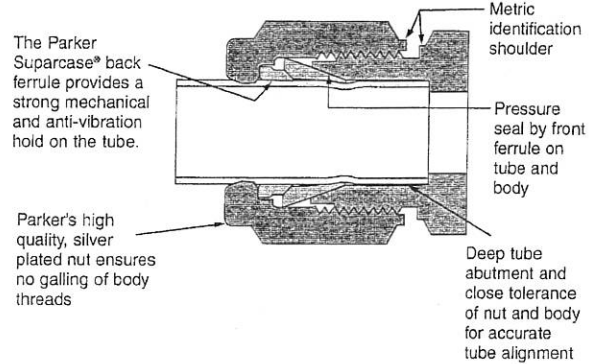
Inch — A-LOK®



Metric — CPI™



Metric — A-LOK®



Parker Instrumentation Tube Fittings are supplied complete and ready to use. The ferrule(s) swage onto the tube as it moves down the body seat creating a pressure/vacuum-tight seal on both tube and body by the interface pressure and surface finish of mating components. The Parker Supracase® ferrule (back-ferrule only on A-LOK®) creates a strong mechanical hold on the tube.

Visual Index

Tube to Male Pipe

Male Connector

FBZ, MSC
pages 9, 10,
11, 12, 13



Male Bulkhead Connector

FH2BZ, MBC
page 14



Thermocouple Connector

FH4BZ, MTC
page 15



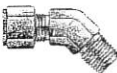
Male Elbow

CBZ, MSEL
pages 15, 16, 17



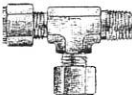
NPT Male 45° Elbow

VBZ, MVEL
page 18



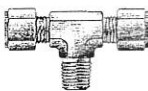
NPT Male Run Tee

RBZ, MRT
page 19



NPT Male Branch Tee

SBZ, MBT
page 20



Tube to Female Pipe

Female Connector

GBZ, FSC
pages 21, 22



Female Bulkhead Connector

GH2BZ, FBC
page 23



Gauge Connector

GBZ, FSC
pages 23, 24



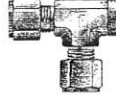
Female Elbow

DBZ, FEL
page 24



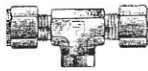
Female Run Tee

MBZ, FRT
page 25



Female Branch Tee

OBZ, FBT
page 26



Tube to Tube Unions

Union

HBZ, SC
page 27



Conversion Union

HBZ, CU
page 28



Reducing Union

HBZ, RU
page 28



Bulkhead Union

WBZ, BC
page 29



Dielectric Union Adapter, Dielectric Assembly

DEBTADELTA
page 30



Union Elbow

EBZ, EE, ELZ
pages 30, 31



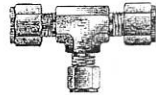
Union Tee

JBZ, ET
page 32



Drop Size Tee

JBZ, JLZ
page 33



Union Cross

KBZ, ECR
page 34



Port Connectors

Tube End Reducer

TRBZ, TUR,
TUC
pages 35, 36, 37



Tube End Bulkhead Adapter

T2H2BZ,
TUBC
page 38



Port Connector

ZPC, PC
page 38



Tube End Male Adapter

T2HF, MA
pages 39, 40,
41, 42



Tube End to SAE Straight Thread Adapter

T2HOA, TUOHA
page 43



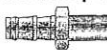
Tube End Female Adapter

T2HG, FA
pages 43, 44, 45



Push-Lok to Tube Adapter

P2T2, P2TU
page 45



Push-Lok to Male Adapter

P2HF
page 46



Push-Lok to CPI™/A-LOK®

P2BZ6, P2LZ6
page 46



Push-Lok to Port Connector

ZPB2, ZPC2
page 46



Lapped Joint Tube Adapters

LJFBZ, LJF
page 47



DP Transmitter Calibration Adapters

ZH2LX
page 47



37° Flare (AN) to CPI™/A-LOK®

37° Flare (AN) to CPI™/A-LOK®

X6HBZ6, X6TU
page 48



37° Flare Connector to CPI™/A-LOK®

XHBZ, XASC
page 48



37° Flare Bulkhead Connector to CPI™/A-LOK®

XH2BZ,
XABC
page 48



Tube to O-Ring Seal

Male Connector SAE Straight Thread

ZHBA, M1SC
page 50



Male SAE Straight Thread Elbow

C5BZ, M5SEL
page 51



Male BSPP Straight Thread Elbow

CBZ, MSEL
page 51



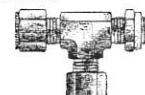
Male Run Tee SAE Straight Thread

R5BZ,
M5RT
page 52



Male BSPP Run Tee Straight Thread

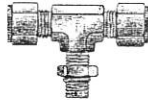
RBZ, MRT
page 52



Visual Index

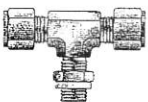
Male Branch Tee SAE Straight Thread

S5BZ,
M5BT
page 53



Male BSPP Branch Tee Straight Thread

SBZ, MBT
page 53



Long Male Connector SAE Straight Thread

ZH3BA, ZH3LA
page 54



45° Positionable Male Elbow

V5BZ, M5VEL
page 54



Male Connector to O-Ring Straight Thread

ZHBA5, M2SC
page 55



Male Connector to O-Ring Pipe Thread

ZHBF5, M3SC
page 55



Tube End to O-Ring Straight Thread

T2HOA5, M2TU
page 56



Tube End to O-Ring Pipe Thread

T2HOF5, M3TU
page 56



Pipe Thread to SAE Straight Thread Adapter

FHOA
page 57



Bulkhead to Conversion Adapter

AH2BZ, AH2LZ
page 57



Tube to Welded Systems

Socket Weld Elbow

ZEBW, ZELW
page 59



Buttweld Elbow

ZEBW2, ZELW2
page 59



Socket Weld Connector

ZHBW, ZHLW
page 60



Buttweld Connector

ZHBW2, ZHLW2
page 60, 61



Analytical Fittings

Column End Fitting — Low Internal Volume with Frit

Z2HCZ7, Z2HLZ7
page 63



Column End Fitting — Low Internal Volume

Z3HCZ7, Z3HLZ7
page 63



Column End Fitting — Low Internal Volume (without Frit)

ZHCZ7, ZHLZ7
page 64



Column End Fitting — with Frit

Z2HCZ, Z2HLZ
page 64



Column End Fitting (without Frit)

ZHCZ, ZHLZ
page 65



Union Connector — Low Dead Volume

Z7HBZ7,
Z7HLZ7
page 65



Male Connector — Low Dead Volume

FBZ7, FLZ7
page 66



Sanitary Flange Fitting

ZHBS, ZHLS
page 66



Barbed Fittings

Barbed Connector to Male Pipe

B2HF
page 67



Barbed Connector to Tube Adapter

B2HT2, B2TU
page 67



Hose Connector Sleeve

HCS
page 67



Components

Insert

TIZ
page 68



Tube Nut

BZ, NU
page 68, 69



Inverted Tube Nut

BZI
page 69



Knurled Nut

BZP
page 69



Ferrules

TZ
page 69



Front Ferrules

FF
page 70



Back Ferrules

BF
page 70



Ferrule Holder

page 70



Plug

FNZ, BLP
page 71



Cap

PNBZ, BLEN
page 71, 72



Vent Protector

MDF
page 72



Sealing Washers Bonded Seal and Copper

page 73



Bulkhead Locknut

WLZ, WLN, BN
page 74



Accessory Locknut

L5NR
page 74



Reference Material

Assembly and Remake Instructions

page 75

Gaugeability Instructions

page 75

Instrument Tubing Selection Guide

pages 76 – 79

Pipe End Pressure Ratings

page 79

Thread and Tube End Size Charts (USA/ International)

pages 80 – 82

Offer of Sale

page 84

Table 1 – Typical Raw Material Specifications

BASIC FITTING MATERIAL	MATERIAL DESIGNATOR	STRAIGHTS	SHAPES	COMMON TUBING SPECIFICATION
Brass	B	CA-360 QQ-B 626 Alloy 360 ASTM-B16 Alloy 360 CA-345 ASTM-B-453 Alloy 345	CA-377 QQ-B 626 Alloy 377 ASTM-B-124 Alloy 377 BS2872 CZ122	ASTM-B75 ASME-SB75 (TEMPER "O")
Stainless Steel (Type 316) ⁽¹⁾	A-LOK® = 316 ⁽¹⁾⁽²⁾ CPI™ = SS	ASME-SA-479 Type 316-SS BS970 316-S31 DIN 4401 ASTM A276 Type 316 ASTM/ASME-SA-182	ASME-SA-182 316 BS970 316-S31 DIN 4401	ASME-SA-213 ASTM-A-213 ASTM-A-249 ASTM-A-269 ⁽³⁾ MIL T-8504 MIL T-8506
Steel	S	ASTM-A-108 QQ-S-637	ASTM-A-576	SAE J524b SAE J525b ASTM-A-179
Aluminum	A	2017-T4 or 2024-T4 ASTM-B211 QQ-A-225/5 or 6	2014T (as fabricated) ASTM-B-211 QQ-A-225/4	303, 6061T6 ASTM-B-210
Monel® 400 – Forgings Monel® 405 – Bar Stock	M	ASTM-B-164 QQ-N-281 BS3076 NA13	ASTM-B-164 QQ-N-281 BS3076 NA13	ASTM-B-165
Hastelloy® C-276	HC	ASTM-B-574 ASTMB575	ASTM-B-574	ASTM-B-622 ASTM-B-626
Inconel® Alloy 600	IN	ASTM B-166 ASME-SB-166	ASTM-B-564	ASTM-B-163
Carpenter® 20	SS20	ASTM-B-473	ASTM-B-462 ASTM-B-472	ASTM-B-468
Titanium	T	ASTM-B-348	ASTM-B-381	ASTM-B-338
Inconel® Alloy 625	625	BS3076 NA16 ASTMB425	BS3076 NA16 ASTMB425	ASTM-B-625 ASTM-B-444 ASTM-B-423 ASTM-B-829
Incoloy® Alloy 825	825			
6MO	6MO	UNS S31254 UNS N08367 ASTM A479	UNS S31254 UNS N08367 ASTM A 479	ASTM-A-269

- (1) If more specific information, including heat code traceability, is required, your Parker Hannifin CPI™/A-LOK® distributor will provide details.
 (2) If an "L" appears in the A-LOK® fitting description, then the material designator will be "SS" (e.g., JLZ drop size tee).
 (3) Stainless steel CPI™/A-LOK® tube fittings work reliably on both seamless and welded-redrawn, fully annealed type 304, 316 and 316L tubing.
NOTE: Hastelloy® is a registered trademark of Haynes International. Inconel®, Incoloy® and Monel® are registered trademarks of Special Metals Corporation. Carpenter® is a registered trademark of CRS Holdings Inc.

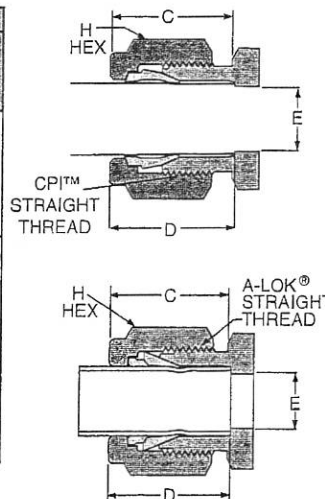
Tube End Dimensional Data

SIZE NO.	INCHES					
	TUBE O.D.	STRAIGHT THREAD	†C	H HEX	E DIA.	†D TUBE INS. DEPTH
1	1/16	10-32	.43	5/16	.052	.34
2	1/8	5/16-20	.60	7/16	.093	.50
3	3/16	3/8-20	.64	1/2	.125	.54
4	1/4	7/16-20	.70	9/16	.187	.60
5	5/16	1/2-20	.73	5/8	.250	.64
6	3/8	9/16-20	.76	11/16	.281	.67
8	1/2	3/4-20	.87	7/8	.406	.90
10	5/8	7/8-20	.87	1	.500	.96
12	3/4	1-20	.87	1-1/8	.625	.96
14	7/8	1-1/8-20	.87	1-1/4	.750	1.03
16	1	1-5/16-20	1.05	1-1/2	.875	1.24
20	1-1/4	1-5/8-20	1.52	1-7/8	1.09	1.61
24	1-1/2	1-15/16-20	1.77	2-1/4	1.34	1.96
32	2	2-5/8-20	2.47	2-3/4	1.81	2.65

NOTE: Dimensions C and D are shown in the finger-tight position.

† Average Value

Dimensions for reference only, subject to change.



SIZE NO.	MILLIMETERS					
	TUBE O.D.	STRAIGHT THREAD	†C	H HEX	E DIA.	†D TUBE INS. DEPTH
2	2mm	5/16-20	15,3	12,0	1,7	12,9
3	3mm	5/16-20	15,3	12,0	2,4	12,9
4	4mm	3/8-20	16,1	12,0	2,4	13,7
6	6mm	7/16-20	17,7	14,0	4,8	15,3
8	8mm	1/2-20	18,6	15,0	6,4	16,2
10	10mm	5/8-20	19,5	18,0	7,9	17,2
12	12mm	3/4-20	22,0	22,0	9,5	22,8
14	14mm	7/8-20	22,0	24,0	11,1	24,4
15	15mm	7/8-20	22,0	24,0	11,9	24,4
16	16mm	7/8-20	22,0	24,0	12,7	24,4
18	18mm	1-20	22,0	27,0	15,1	24,4
20	20mm	1-1/8-20	22,0	30,0	15,9	26,0
22	22mm	1-1/8-20	22,0	30,0	18,3	26,0
25	25mm	1-5/16-20	26,5	35,0	21,8	31,3

NOTE: Dimensions C and D are shown in the finger-tight position.

† Average Value

Dimensions for reference only, subject to change.

Nomenclature/How to Order

Parker CPI™/A-LOK® tube fitting part numbers are constructed using alphanumeric characters to identify the size, style and material of the fitting.

CPI™ Inch Parts

Port 1 Size Designator	Port 2 Size Designator	Thread Designator	Shape Designator	Material	Options (see page 8)
Example: 8	4		FBZ	SS	
1/2" Tube O.D.	1/4" Pipe Thread (blank – see Note 1 below)	Male Connector	Stainless Steel	(blank)	

Part Number as it is ordered (without options): 8-4 FBZ-SS. This part appears on page 9 and is a CPI™ NPT male connector.

A-LOK® Inch Parts

Port Size Designator	Shape Designator	Port 2 Size Designator	Thread Designator	Material	Options (see page 8)
Example: 8	MSC	4	N	316	
1/2" Tube O.D.	Male Connector	1/4" Pipe Thread	NPT	Stainless Steel	(blank)

Part Number as it is ordered (without options): 8MSC4N-316. This part appears on page 9 and is an A-LOK® NPT male connector.

CPI™ Metric Parts

Port 1 Size Designator	Port 2 Size Designator	Thread Size	Thread Designator	Material	Options (see page 8)
Example: GBZ	12	1/4	K	SS	
Female Connector	12mm	1/4"	BSP	Stainless Steel	(blank)

Part Number as it is ordered (without options): GBZ 12-1/4K-SS. This part appears on page 21 and is a CPI™ NPT female connector.

A-LOK® Metric Parts

Port 1 Size Designator	Shape Designator	Port 2 Size Designator	Thread Designator	Material	Options (see page 8)
Example: M12	FSC	1/4	N	316	
12mm	Female Connector	1/4"	NPT	Stainless Steel	(blank)

Part Number as it is ordered (without options): M12FSC1/4N-316. This part appears on page 21 and is a A-LOK® NPT female connector.

Body Designator: A letter or combination of letters and numbers are used to designate the type of fitting. See the visual index on pages 4–5 for body designator.

Fractional Size: Tube and pipe thread sizes are designed by the number of sixteenths of an inch (1/2" tube = 8/16" = 8) (1/4" pipe thread = 4/16" = 4).

Metric Size: Metric tube is designated in millimeters and prefixed "M" (i.e., 12mm tube – M12.) The pipe thread size is written as a fraction (i.e., 1/4 NPT = 1/4).

All Straights & Elbows: Call out largest CPI™/A-LOK® tube end size first followed by the smaller CPI™/A-LOK® tube end or pipe thread size.

Fractional Tees & Crosses: For drop size tees – first size the run (1 to 2) and then branch (3). Example – the size designator for a male run tee for 3/8" O.D. tube and 1/4" male pipe thread would be 6-4-6. For crosses – first size the run (1 to 2) and then the branch (3 to 4). For tees with all ends the same, use the tube and size before and after the style designator; i.e. 4-4-4 JBZ (CPI™), 4ET4 (A-LOK®).

Metric Tees & Crosses: For drop size tees – first size the run (1 to 2) and then branch (3). Example – the size designator for a male run tee for 6mm tube and 1/4" male pipe thread would be 6-4-6. For crosses – first size the run (1 to 2) and then the branch (3 to 4). For tees with all ends the same, use the tube end size after the style designator; i.e. JBZ 4-4-4 JBZ (CPI™), ETM4 (A-LOK®).

Material: See Table 1 on the previous page for the material symbol.

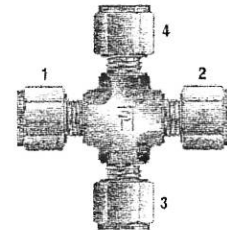
Thread Types:

N = NPT ⁽¹⁾ /National Pipe Taper	ANSI B1.20.1
K = BSP/ISO Taper	BS21, ISO7/1
R = BSP/ISO Parallel	BS2779, ISO 228/1+2, DIN 3852 FORM A ⁽²⁾
BR = BSP/ISO Parallel	BS2779, ISO 228/1+2, DIN 3852 FORM B ⁽³⁾
M = Metric Thread	ISO 6149-2
R-ED = BSPP/ISO Parallel	BS2779, ISO 228/1+2, DIN 3852 with elastic sealing washer ⁽⁴⁾
GC = BSPP Gauge Connector	B2779, ISO 228/1+2, DIN 3852

- (1) N thread designator is only used for A-LOK® nomenclature.
- (2) Form A requires the use of a bonded washer. See page 73 of this catalog.
- (3) Form B (cutting face) may be used with or without a sealing washer.
- (4) ED fittings are supplied with Nitrile sealing washers as standard. Fluorocarbon seals are available upon request.

Special Fittings: Consult the factory. If there is any question as to the fitting desired, particularly for special fitting configurations, it is suggested that a customer print be submitted.

Special Options: See the following page for available options.



Color Coding

For easy reference, table column headings are color indicated as follows:

fractional



metric



CPI™/A-LOK® Options

Parker CPI™/A-LOK® fittings may be ordered with the following options.

How to order

After the complete CPI™/A-LOK® number simply add a "dash" then the suffix for the option.

The following example is an A-LOK® male connector for 1/2" OD tube and 1/4" male pipe that has been cleaned for oxygen service. For additional options, please consult the factory.

8MSC4N-316-C

Suffix	Option	Additional Information
ZYF	Assembled with nylon ferrule(s)	
SPF	Silver plated ferrule(s)	
TF	PTFE ferrule(s)	
BP*	Bulk packed	* Indicates the quantity i.e BP50 for a fifty count package.
LWH	Lock wire hole	
BZP	Knurled nut	Replaces standard nut on CPI™/A-LOK® fittings for use on soft plastic tubing.
C	Silver plated nut	Replaces moly coated nut (BZ).
MI	Moly inside nut	
CNQ	Certified Nuclear Quality	
C1	Grade A Cleaning	Special cleaning, assembly, inspection and packaging for high purity applications.
C3	Cleaned for oxygen service	Meets the requirements of ASTM G93-88; Standard Practice for Cleaning Methods for Materials and Equipment used in Oxygen-Enriched Environments.
CNG	Compressed natural gas service	Assembled with a specific o-ring compound.
NIC	Nickel plated	
CRM	Chrome plated	
VO	Viton O-ring	
NC	NACE	MRO175-2003
NACE	NACE	MRO175-2002
DFARS	Defense Acquisition Regulations System	All components and raw material must be of US origin or from an approved country.

Gaugeable Tube Fittings and Adapter Fittings

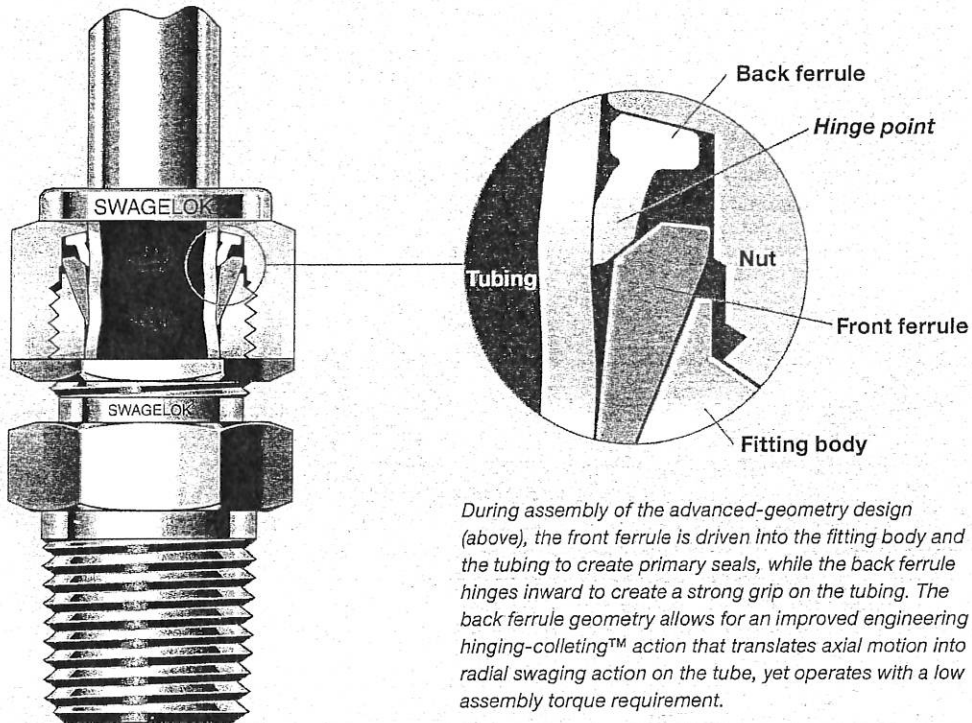


- Available in tube sizes from 1/16 to 2 in. and 2 to 50 mm
- Consistent gaugeability upon initial installation
- Easy to disconnect and retighten
- Wide variety of materials and configurations

Swagelok

Features

- Live-loaded, two-ferrule design.
- Easy to install.
- No torque is transmitted to tubing during installation.
- Swagelok® gap inspection gauge ensures sufficient pull-up upon initial installation.



During assembly of the advanced-geometry design (above), the front ferrule is driven into the fitting body and the tubing to create primary seals, while the back ferrule hinges inward to create a strong grip on the tubing. The back ferrule geometry allows for an improved engineering hinging-colletting™ action that translates axial motion into radial swaging action on the tube, yet operates with a low assembly torque requirement.

Two-Ferrule, Mechanical Grip Design

The two ferrules separate sealing and tube gripping functions; each ferrule is optimized for its function.

The front ferrule creates a seal:

- against the fitting body
- on the tubing outside diameter.

As the nut is turned, the back ferrule:

- axially advances the front ferrule
- radially applies an effective tube grip.

Advanced-Geometry, Hinging-Colletting Back Ferrule Design

This design is standard on all 1/4 to 1/2 in. and 6 to 12 mm Swagelok stainless steel tube fittings to help installers make more consistent, leak-tight tube connections.

In these sizes, a patented case hardening process and patented recessed and contoured geometry provide unique engineering to the Swagelok back ferrule. The hinging-colletting back ferrule design expands on the already robust performance of the traditional ferrule design and provides:

- excellent gas-tight sealing and tube-gripping action
- easily achieved proper installation
- consistent remakes
- excellent vibration fatigue resistance and tube support
- full compatibility with original Swagelok stainless steel tube fittings of identical sizes.

For additional information, see the *316 Stainless Steel Swagelok Tube Fittings with Advanced Geometry Back Ferrules* technical report, MS-06-16.

Swagelok

The Swagelok Tube Fitting Advantage

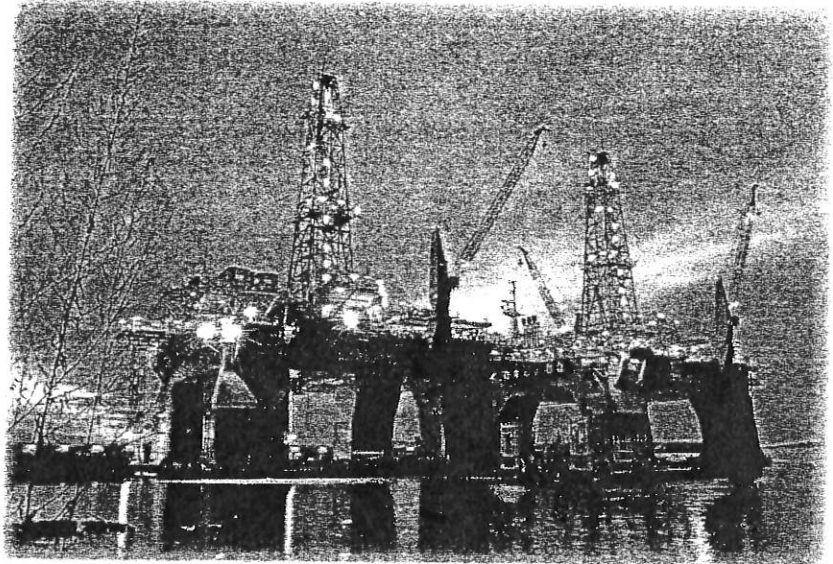
***“Over 10 000 fittings
and not a single leak.”***

That is the message one customer wanted to share, crediting Swagelok components and tube fittings along with Swagelok distributor support, as having played a major role in completing—and obtaining independent, third-party certification for—two 12 000 ton oil rigs.

And that is part of the ongoing story behind the continuous improvement efforts that Swagelok has initiated and sustained since the development and patent of the original two-ferrule tube fitting more than 50 years ago.

Today, as everyone is being called on to “do more with less” and to recognize value, Swagelok continues to improve the leak-tight design of the tube fitting for use in thousands of diverse applications—including research, analytical and process instrumentation, bioprocessing, oil and gas, power, petrochemical, and semiconductor industries—and addressing such critical issues as:

- leakage
- vibration (tube grip)
- thermal shock
- compliance with industry standards
- installation
- corrosion
- intermix/interchange.



Leakage

Excellent gas-tight sealing and consistent reassembly help ensure accurate measurements of process parameters—air, steam, fuel, and water—to keep your plant operating efficiently. Moreover, Swagelok tube fittings minimize fugitive emissions, as well as process fluid leakage and operation costs.

From 1999 through 2004, more than 250 000 fittings in gas service at more than 400 different process installations were leak tested with Swagelok Snoop® liquid leak detector. Contact your authorized Swagelok sales and service representative for more information about Swagelok Energy Emissions Surveys or to schedule a survey.

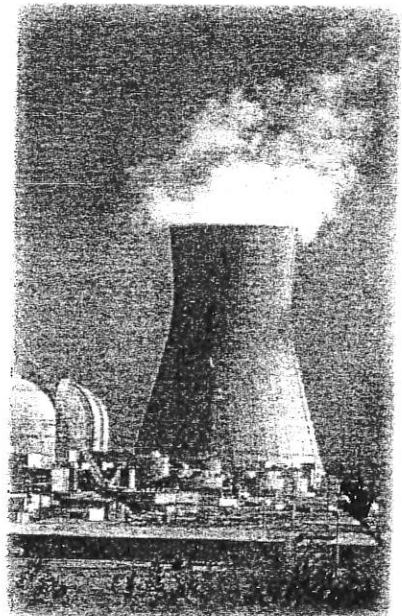
Vibration (Tube Grip)

The patented case-hardening process and back-ferrule geometry provide excellent vibration fatigue resistance and tube support—even in harsh or stressful environments, such as fuel processing or rotary equipment applications.

Swagelok has conducted rotary flex tests, which show that the Swagelok tube fitting with advanced geometry hinging-colleting back ferrule isolates and protects the stress riser that is generated along the tube during

the gripping part of assembly. The colleting portion of the back ferrule allows more material to contact the tube, for additional support. This colleting action enhances gripping performance and provides both direct and axial support to the gripping function. This design minimizes the effects of bending deflection at the point of grip on the tubing.

Contact your authorized Swagelok representative for more information about vibration test reports.



Thermal Shock

The elastic, live-loaded two-ferrule design compensates for changes in temperature during system start-up and shutdown and helps eliminate leakage related to rapid thermal expansion or contraction.

Swagelok has conducted tests that demonstrated the capability of Swagelok tube fittings to withstand thermal shock and high temperature.

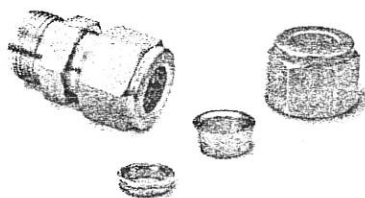
Contact your authorized Swagelok representative for more information about thermal shock test reports.

Compliance with Industry Standards

Swagelok Company works with standards organizations around the world to provide you with products that address your needs.

See **Materials**, page 8; **Thread Specifications**, page 8; and **Pressure Ratings**, page 9, for more information about the specifications to which Swagelok tube fittings are manufactured.

Contact your authorized Swagelok representative for more information about Swagelok tube fitting certifications.



Installation

The Swagelok tube fitting installation advantages:

- Easy to install
- No torque is transmitted to tubing during installation
- Swagelok gap inspection gauge assures sufficient pull-up upon initial installation.

Swagelok tube fitting components provide exceptional dimensional, metallurgical, and mechanical uniformity that allow predictable, repeatable installation.

Swagelok authorized sales and service centers offer installation training seminars that provide additional information on:

- The requirements for making safe, leak-tight connections
- A variety of tools and accessories designed for use with Swagelok tube fittings.

Corrosion

Swagelok tube fittings are available in a variety of materials, including controlled-chemistry 316 stainless steel and many other alloys for enhanced corrosion resistance in a variety of applications, including sour gas and subsea systems.

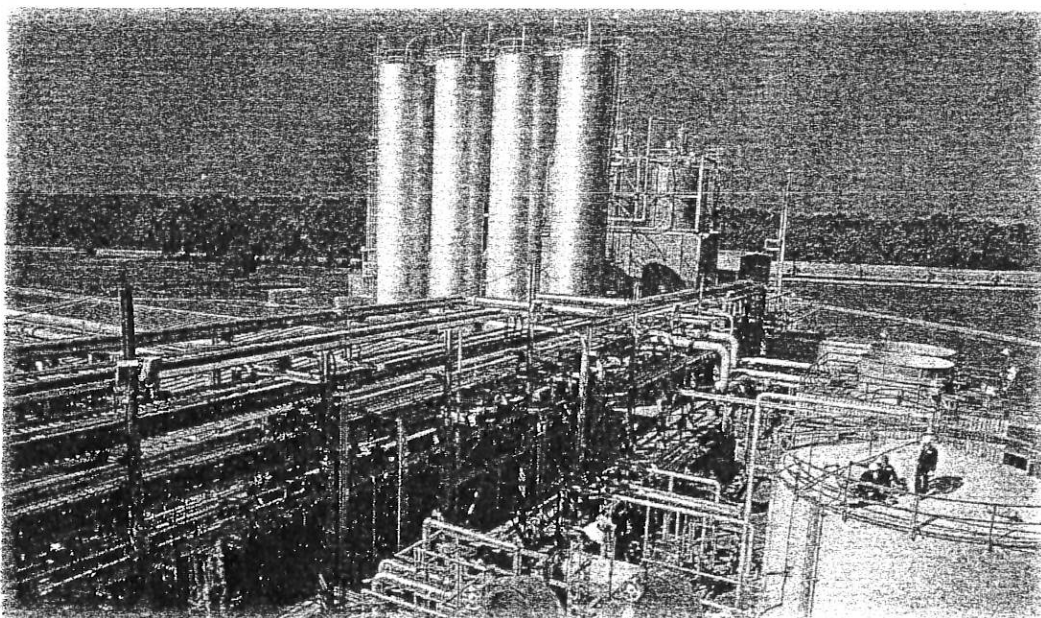
Swagelok has conducted tests in accordance with ASTM B117-95 to evaluate the corrosion resistance of Swagelok tube fittings.

Contact your authorized Swagelok representative for more information about corrosion resistance test reports.

Intermix/Interchange

This practice can be dangerous. Leak-tight seals that will withstand high pressure, vibration, vacuum, and temperature changes depend on close tolerances and consistent, exacting quality control in conjunction with good design principles. The critical interaction of precision parts is essential for reliability and safety.

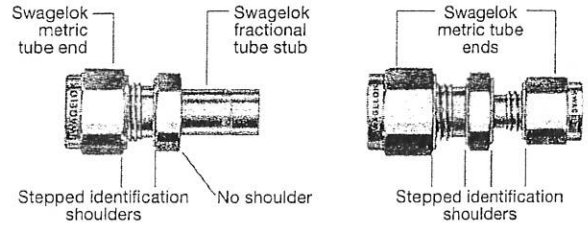
Components of other manufacturers may look like Swagelok tube fitting components—but they cannot be manufactured in accordance with Swagelok engineering standards, nor do they benefit from innovations in design and manufacture defined by 36 active Swagelok tube fitting patents issued since 1989.



Swagelok

Metric Swagelok Tube Fittings

Metric tube fittings have a stepped shoulder on the body hex. Shaped fittings, such as elbows, crosses, and tees, are stamped MM for metric tubing and have no step on the forging.



Pressure Ratings

Swagelok Tube Fitting Pressure Ratings

Swagelok tube fitting ends are rated to the working pressure of tubing as listed in *Swagelok Tubing Data*, MS-01-107. Careful selection of high-quality tubing is important when installing safe, leak-tight systems.

Pipe End (NPT and ISO 7) Pressure Ratings Basis

Pressure ratings for fittings with both tube fitting and pipe thread ends are determined by the end connection with the lower pressure rating. The table lists pressure ratings for male and female **tapered pipe thread ends**. For female and male pipe threads to have the same pressure rating in the same nominal pipe size, the female thread would require a heavier wall, resulting in a fitting too large and bulky to be practical.

Allowable Stress

Stress values are based on ASME Code for Pressure Piping B31.3, Process Piping, at ambient temperature.

Material	Allowable Stress	
	psi	bar
316 SS	20 000	1378
Brass	10 000	689
Steel	20 000	1378

Pressure Ratings

Ratings are based on ASME Code for Pressure Piping B31.3, Process Piping, at ambient temperature.

NPT/ ISO Pipe Size in.	316 SS and Carbon Steel				Brass			
	Male		Female		Male		Female	
	psig	bar	psig	bar	psig	bar	psig	bar
1/16	11 000	760	6700	460	5500	380	3300	230
1/8	10 000	690	6500	440	5000	340	3200	220
1/4	8 000	550	6600	450	4000	270	3300	220
3/8	7 800	540	5300	360	3900	270	2600	180
1/2	7 700	530	4900	330	3800	260	2400	160
3/4	7 300	500	4600	320	3600	250	2300	160
1	5 300	370	4400	300	2600	180	2200	150
1 1/4	6 000	410	5000	350	3000	200	2500	170
1 1/2	5 000	340	4600	310	2500	170	2300	150
2	3 900	270	3900	270	1900	130	1900	130

- To determine pressure ratings in accordance with ASME B31.1, Power Piping:
 - carbon steel material—multiply by 0.85.
 Stainless steel and brass material ratings remain the same.
- To determine MPa, multiply bar by 0.10.

SAE/MS Fittings Pressure Ratings Basis

Pressure ratings are based on SAE J1926/3 at ambient temperature.

SAE/MS Thread Size	Designator	316 SS and Carbon Steel			
		Nonpositionable		Positionable	
		psig	bar	psig	bar
5/16-24	2ST	4568	315	4568	315
7/16-20	4ST				
1/2-20	5ST			3626	250
9/16-18	6ST				
3/4-16	8ST	3626	250	2900	200
7/8-14	10ST				
1 1/16-12	12ST	2900	200	2320	160
1 3/16-12	14ST				
1 5/16-12	16ST	2320	160	1813	125
1 5/8-12	20ST				
1 7/8-12	24ST	1813	125	1450	100
2 1/2-12	32ST				

Some fittings with AN, O-seal, and SAE/MS ends may have lower ratings. For more information, contact your authorized Swagelok representative.

O-Seal Pressure Ratings

Stainless steel and carbon steel O-seal fittings up to 1 in. and 25 mm are rated to 3000 psig (206 bar).

Positionable, ISO/BSP Parallel Thread (PR) Pressure Ratings

Pressure ratings are at ambient temperature.

ISO/BSP Male Pipe Size in.	316 SS and Carbon Steel	
	psig	bar
1/8	4568	315
1/4		
3/8		
1/2	2320	160
3/4		
1		

Additional Ordering Information

Swagelok tube fitting ordering numbers follow the sequence shown below.

A - **B C D** - **E** - **F G**
SS - **2 0 0** - **1** - **2 RT**

A Material

- A = Aluminum
- B = Brass
- C20 = Alloy 20
- HC = Alloy C-276
- INC = Alloy 600
- M = Alloy 400
- NY = Nylon
- S = Carbon steel
- SS = 316 stainless steel
- T = PTFE
- TI = Titanium
- 625 = Alloy 625
- 825 = Alloy 825

B Size (Tube OD)

Fractional, in.	Metric, mm
1 = 1/16	2 = 2
2 = 1/8	3 = 3
3 = 3/16	4 = 4
4 = 1/4	6 = 6
5 = 5/16	8 = 8
6 = 3/8	10 = 10
8 = 1/2	12 = 12
10 = 5/8	14 = 14
12 = 3/4	15 = 15
14 = 7/8	16 = 16
16 = 1	18 = 18
18 = 1 1/8	20 = 20
20 = 1 1/4	22 = 22
24 = 1 1/2	25 = 25
32 = 2	28 = 28
	32 = 32
	38 = 38
	50 = 50

C Series

- 0 = Fractional 1/16 to 3/8 in. and 1 1/4 to 2 in.
- 1 = Fractional 1/2 to 1 1/8 in.
- M = Millimeter tube size

To order a female Swagelok tube fitting, add F.
 Example: SS-100F-1-1.

D Component

- 0 = Fitting
- 1 = Body

E Fitting Type

- 1 = Male connector
- 2 = 90° male elbow
- 3 = Tee, union
- 4 = Cross, union
- 5 = 45° male elbow
- 6 = Union
- 7 = Female connector
- 8 = Female elbow
- 9 = Elbow, union
- 11 = Bulkhead male connector
- 61 = Bulkhead union
- 71 = Bulkhead female connector
- A = Adapter
- C = Cap
- P = Plug
- PC = Port connector
- R = Reducer
- R1 = Bulkhead reducer
- 2R = Reducing elbow
- TFT = Tee, female run
- TMT = Tee, male run
- TRT = Tee, ISO/BSP parallel male positionable run
- TST = Tee, straight thread with O-ring male positionable run
- TTF = Tee, female branch
- TTM = Tee, male branch
- TTR = Tee, ISO/BSP parallel male positionable branch
- TTS = Tee, straight thread with O-ring male positionable branch

F Second End Connection Size

Add a size designator from the list at left for the second end connection or if the fitting is a reducing union.

G Second End Connection Type

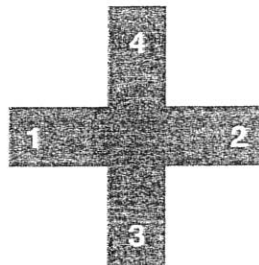
Add a second end connection type designator as needed.

- AN = 37° male AN flare
- ANF = 37° female AN flare
- BT = Bored-through fitting
- F = Female thread
- KN = Knurled nut, nylon ferrules
- KT = Knurled nut, PTFE ferrules
- M = Metric tube end
- OR = O-seal connection
- PR = ISO/BSP positionable parallel pipe thread
- RG = ISO/BSP parallel pipe thread (gauge)
- RJ = ISO/BSP parallel pipe thread (Japanese gauge)
- RP = ISO/BSP parallel pipe thread
- RS = ISO/BSP parallel pipe thread
- RT = ISO/BSP tapered pipe thread
- ST = Straight thread with O-ring (for SAE/MS)
- W = Male pipe weld/tube socket weld

Tees and Crosses

Ordering numbers for tees and crosses indicate first the size of the run (1 to 2) and then the size of the branch (3 for tees and 3 to 4 for crosses).

Example: SS-6M0-3-4TTF for a 316 SS female tee for 6 mm tube with 1/4 in. female NPT branch



Additional Sizes and Materials

Contact your authorized Swagelok representative for information about additional sizes and special alloys.

Additional Ordering Information

Swagelok tube adapter ordering numbers follow the sequence shown below.

A - **B** - **C** - **D** - **E** **F**
SS - **2** - **TA** - **1** - **4** **RT**

A Material

- A = Aluminum
- B = Brass
- C20 = Alloy 20
- HC = Alloy C-276
- INC = Alloy 600
- M = Alloy 400
- NY = Nylon
- S = Carbon steel
- SS = 316 stainless steel
- T = PTFE
- TI = Titanium
- 625 = Alloy 625
- 825 = Alloy 825

E Size (Tube OD)

Fractional, in.	Metric, mm
1 = 1/16	2 = 2
2 = 1/8	3 = 3
3 = 3/16	4 = 4
4 = 1/4	6 = 6
5 = 5/16	8 = 8
6 = 3/8	10 = 10
8 = 1/2	12 = 12
10 = 5/8	14 = 14
12 = 3/4	15 = 15
14 = 7/8	16 = 16
16 = 1	18 = 18
18 = 1 1/8	20 = 20
20 = 1 1/4	22 = 22
24 = 1 1/2	25 = 25
32 = 2	28 = 28
	32 = 32
	38 = 38
	50 = 50

C Component

- TA = Fractional tube adapter
- MTA = Metric tube adapter

D Adapter Type

- 1 = Male adapter
- 7 = Female adapter

F Second End Connection Size

Add a size designator from the list at left for the second end connection.

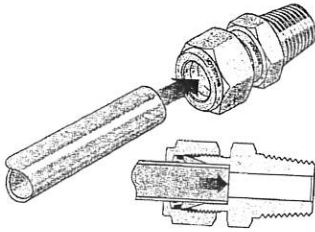
F Second End Connection Type

- Add a second end connection type designator as needed.
- AN = 37° male AN flare
 - ANF = 37° female AN flare
 - RG = ISO/BSP parallel pipe thread (gauge)
 - RJ = ISO/BSP parallel pipe thread (Japanese gauge)
 - RP = ISO/BSP parallel pipe thread
 - RS = ISO/BSP parallel pipe thread
 - RT = ISO/BSP tapered pipe thread
 - ST = Straight thread with O-ring (for SAE/MS)
 - W = Male pipe weld/tube socket weld

Installation Instructions

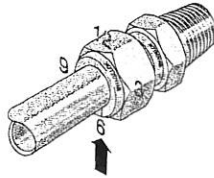
Swagelok Tube Fittings Up to 1 in./25 mm

These instructions apply both to traditional fittings and to fittings with the advanced back-ferrule geometry.

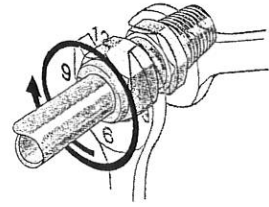


Fully insert the tube into the fitting and against the shoulder; rotate the nut finger-tight.

High-pressure applications and high safety-factor systems: Further tighten the nut until the tube will not turn by hand or move axially in the fitting.



Mark the nut at the 6 o'clock position.



While holding the fitting body steady, tighten the nut one and one-quarter turns to the 9 o'clock position.

For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the nut only three-quarters turn to the 3 o'clock position.

Swagelok Tube Fittings Over 1 in./25 mm

1. Preswage the ferrules onto the tube using a Swagelok multihead hydraulic swaging unit (MHSU).
2. Apply the lubricant packaged with the fitting lightly to the body threads and the rear surface of the back ferrule.

3. Insert the tube with preswaged ferrules into the fitting until the front ferrule seats against the fitting body; rotate the nut finger-tight.
4. Mark the nut at the 6 o'clock position.

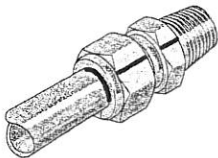
5. While holding the fitting body steady, tighten the nut one-half turn to the 12 o'clock position.

Use the Swagelok MHSU gap inspection gauge to ensure that the fitting has been tightened sufficiently.

Reassembly—All Sizes

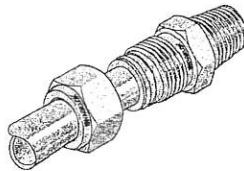
You may disassemble and reassemble Swagelok tube fittings many times.

⚠ Always depressurize the system before disassembling a Swagelok tube fitting.



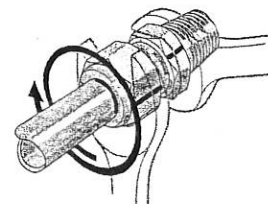
Prior to disassembly, mark the tube at the back of the nut; mark a line along the nut and fitting body flats.

Use these marks to ensure that you return the nut to the previously pulled-up position.



Insert the tube with preswaged ferrules into the fitting until the front ferrule seats against the fitting body.

Over 1 in./25 mm sizes: If needed, reapply lubricant lightly to the body threads and the rear surface of the back ferrule.



While holding the fitting body steady, rotate the nut with a wrench to the previously pulled-up position, as indicated by the marks on the tube and flats. At this point, you will feel a significant increase in resistance. Tighten the nut slightly.

⚠ Do not use the Swagelok gap inspection gauge with reassembled fittings.

O-Seal Male Connectors

1. Turn the O-seal connector into the female end until it is finger-tight.
2. Tighten the O-seal connector until it makes metal-to-metal contact with the face of the female end.
3. Tighten slightly with a wrench.

Installation Instructions

Caps and Plugs



Caps

See Swagelok tube fitting installation and reassembly, page 63.



Plugs

While holding fitting body steady, tighten the plug one-quarter turn from the finger-tight position.

For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the plug one-eighth turn.

For over 1 in./25 mm tube fittings, tighten the plug one-quarter turn.

Reassembly

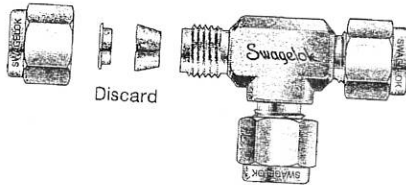
You may disassemble and reassemble Swagelok plugs many times. Make subsequent connections by slightly tightening with a wrench after snugging the nut by hand.

Port Connectors

Connect the machined ferrule end **before** connecting the tube adapter end.

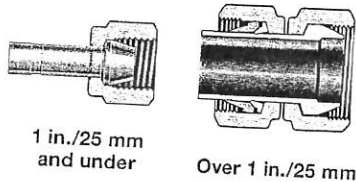
Machined Ferrule End

1. Remove the nut and ferrules from the Swagelok end connection. Discard the ferrules.

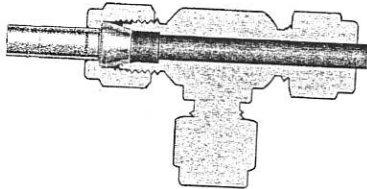


2. Slip the nut over the machined ferrule end of the port connector.

Over 1 in./25 mm sizes: The nut is preassembled on the port connector.

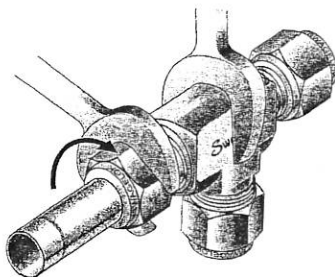


3. Insert the port connector into the end connection and finger-tighten the nut.



4. While holding fitting body steady, tighten the nut one-quarter turn.

For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the nut one-eighth turn.



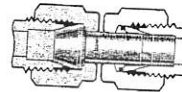
⚠ Do not use the Swagelok gap inspection gauge with machined ferrule ends.

Reassembly

You may disassemble and reassemble Swagelok port connectors many times. Make subsequent connections by slightly tightening with a wrench after snugging the nut by hand.

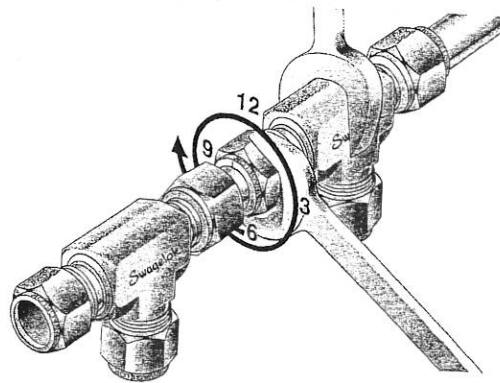
Tube Adapter End

5. Insert the tube adapter until it rests firmly on the shoulder of the Swagelok tube fitting body. Finger-tighten the nut.



Over 1 in./25 mm sizes: Remove and discard the nut and ferrules from the end connection, then insert the tube adapter.

6. Mark the nut at the 6 o'clock position. While holding fitting body steady, tighten the nut one and one-quarter turns to the 9 o'clock position.



For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the nut three-quarters turn to the 3 o'clock position.

For preswaged over 1 in./25 mm and over tube fittings, tighten the nut one-half turn to the 12 o'clock position.

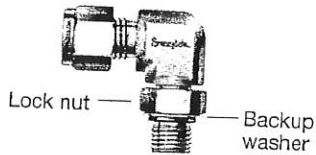
⚠ Do not use the Swagelok gap inspection gauge with preswaged tube adapter connections over 1 in./25 mm.

Reassembly

See Swagelok tube fitting reassembly, page 63.

Installation Instructions

Positionable Elbows and Tees



1. Turn the positionable end into the female fitting until the metal backup washer contacts the face of the fitting.
2. Turn the positionable end out of the female fitting (not more than one turn) until the Swagelok tube fitting end is positioned properly.
3. While holding fitting body steady, tighten the lock nut until the metal backup washer contacts the face of the fitting.

Tube Adapters

Fig. 1

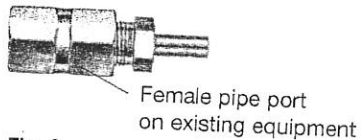
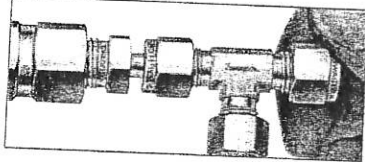


Fig. 2



Up to 1 in./25 mm

1. Install the end opposite the tube adapter end (Fig. 1).
2. Insert the tube adapter into the Swagelok tube fitting. Make sure that the tube adapter rests firmly on the shoulder of the tube fitting body and that the nut is finger-tight (Fig. 2).
3. Mark the nut at the 6 o'clock position.
4. While holding fitting body steady, tighten the nut one and one-quarter turns to the 9 o'clock position.

For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the nut only three-quarters turn to the 3 o'clock position.

Over 1 in./25 mm

Swagelok tube adapters over 1 in./25 mm are furnished with nuts and preswaged ferrules.

To assemble, follow steps 2 through 5 of the Swagelok tube fittings over 1 in./25 mm assembly instructions, page 63.

⚠ Do not use the Swagelok gap inspection gauge with preswaged tube adapter connections over 1 in./25 mm.

Reassembly

See Swagelok tube fitting reassembly, page 63.

Weld Fittings

Welding Precautions for Swagelok Tube Fittings with Weld End Connections

1. Remove the nut and ferrules.
2. Turn a Swagelok tube fitting plug or another nut onto the fitting so that it is finger-tight. This protects the threads and sealing components.
3. Provide a suitable heat sink to dissipate the heat.
4. Tack weld at four positions 90° apart to hold the fitting in place and to ensure alignment and concentricity of the components.
5. Complete the weld.
6. Remove the plug or nut and replace the nut and ferrules.

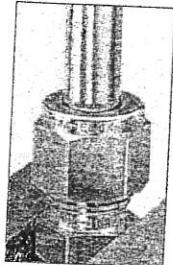
⚠ Caution: When welding carbon steel fittings, the heat often removes the protective oil from the threads. It is important to apply another lubricant, such as Goop™ thread lubricant.

Depth Marking Tool

Fig. 1



Fig. 2



1. Insert cleanly cut, fully deburred tube into the depth marking tool (DMT) until the tube is against the shoulder of the tool. Using a pen or pencil, mark the tube at the top of the DMT (Fig. 1).
2. Remove the tube from the DMT and insert it into the Swagelok fitting until it is against the shoulder

of the fitting body (Fig. 2). Rotate the nut finger-tight. If any portion of the mark on the tube can be seen above the fitting nut, the tube is not fully inserted into the fitting.

3. While holding the fitting body steady, follow Swagelok tube fitting installation instructions, page 63.

Swagelok

Installation Instructions

Preswaging Tool

Fig. 1

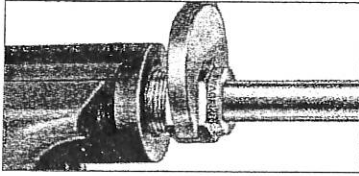


Fig. 2

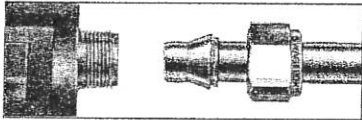
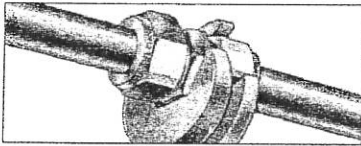
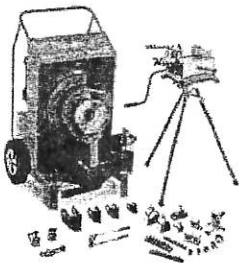


Fig. 3



1. Install the Swagelok nut and ferrules onto the preswaging tool.
 2. Insert the tube into the preswaging tool.
 3. Make sure that the tube rests firmly on the shoulder of the preswaging tool body and that the nut is finger-tight.
 4. Mark the nut at the 6 o'clock position.
 5. While holding the preswaging tool steady, tighten the nut one and one-quarter turns to the 9 o'clock position.
For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the nut only three-quarters turn to the 3 o'clock position (Fig. 1).
 6. Loosen the nut.
 7. Remove the tube with preswaged ferrules from the preswaging tool. If the tube sticks in the preswaging tool, remove the tube by gently rocking it back and forth. Do not turn the tube (Fig. 2).
 8. Insert the tube with preswaged ferrules into the fitting until the front ferrule seats against the fitting body.
 9. While holding the fitting body steady, rotate the nut with a wrench to the previously pulled-up position; at this point, you will feel a significant increase in resistance.
 10. Tighten the nut slightly (Fig. 3).
- ⚠ Do not use the Swagelok gap inspection gauge with fittings that were assembled using the preswaging tool.**



Tubing Tools and Accessories

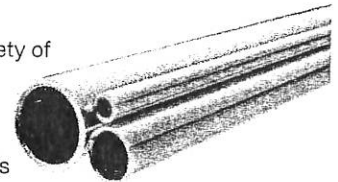
For tube benders, tube preparation tools, and tube support systems, see the Swagelok *Tubing Tools and Accessories* catalog, MS-01-179.

Tubing Products

Swagelok offers a wide variety of tubing products.

Contact your authorized Swagelok representative or see these Swagelok catalogs for more information:

- *Stainless Steel Seamless Tubing, Fractional Sizes*, MS-01-153-SCS
- *Stainless Steel Tubing, Metric Sizes*, MS-01-157-SCS
- *Stainless Steel Tubing, Imperial Sizes*, MS-01-159-SCS



Leak Detectors, Lubricants, and Sealants

For liquid leak detectors, lubricants, and sealants, see the Swagelok *Leak Detectors, Lubricants, and Sealants* catalog, MS-01-91.



Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Caution: Do not mix or interchange parts with those of other manufacturers.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

Swagelok, Hinging-Colleting, VCR, VCO, Snoop, Goop, SWAK, Ferrule-Pak—TM Swagelok Company
Krytox—TM DuPont
SAF 2507—TM Sandvik AB
© 2006–2011 Swagelok Company
Printed in U.S.A., AGS
September 2011, R14
MS-01-140

V Series Needle Valves

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.

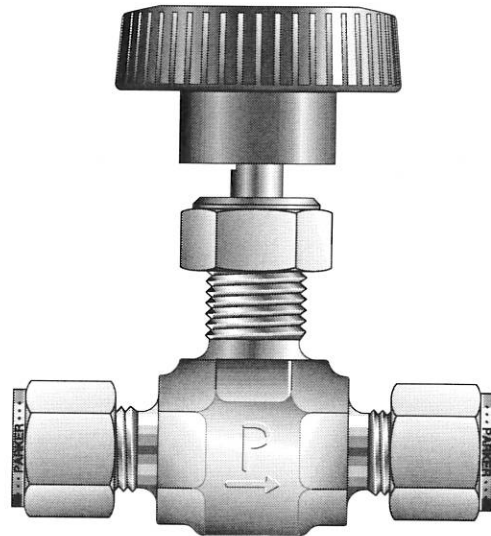
Features

- 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 Alloy 400 construction
- Inline and angle patterns
- Wide variety of US Customary and SI ports
- Panel mountable
- 100% factory tested
- Optional color coded handles

Specifications

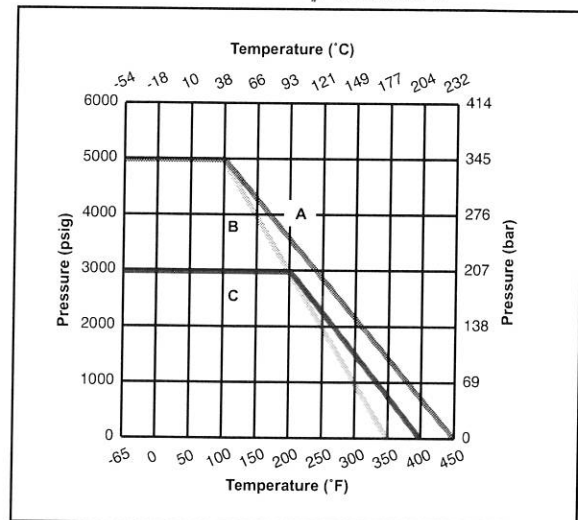
- Pressure Ratings:
 - 316 Stainless Steel:
 - 5000 psig (345 bar) CWP
 - Brass, Steel and Alloy 400:
 - 3000 psig (207 bar) CWP
- Orifice: 0.078" to 0.312" (2.0mm to 7.9mm)
- C_v : 0.12 to 1.90
- Port size: 1/8" to 3/4" (3mm to 12mm)
- Temperature Ratings:
 - Stainless Steel and Alloy 400:
 - -65 °F 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)
 - Buna-N 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.



Model Shown: 4Z-V4LK-SS

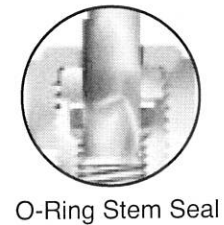
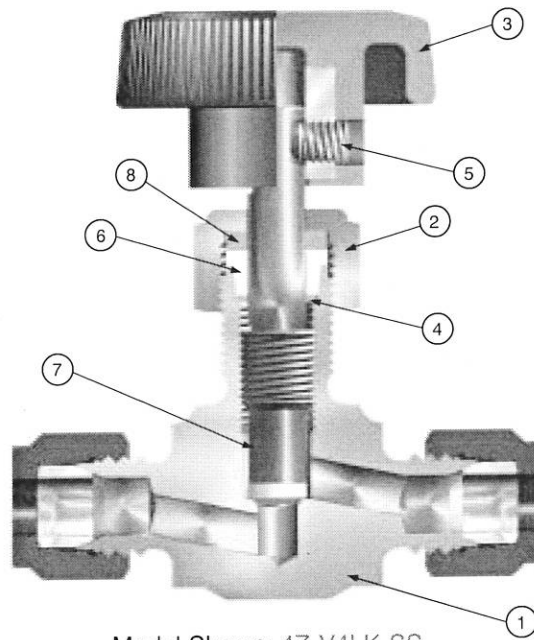
Pressure vs. Temperature



Legend: **A** - Stainless Steel with N or R stems; **B** - Stainless Steel with K stem; **C** - Brass, Steel, and Alloy 400 with N or R stems. Maximum temperature for Steel is 350 °F (177 °C)

Note: To determine MPa, multiply bar by 0.1

V Series Needle Valves



Model Shown: 4Z-V4LK-SS

Materials of Construction (with PTFE Packing)

Item #	Part Description	Stainless Steel	Brass	Steel	Alloy 400
1	Body	ASTM A 182 Type F316	ASTM B 283 Alloy C37700	ASTM A 576 Grade 1214	ASTM B 564 Alloy N04400
2	Packing Nut	ASTM A 479 Type 316	ASTM A 479 Type 316	ASTM A 479 Type 316	ASTM A 479 Type 316
3	Handle	Nylon 6/6 with SS insert	Nylon 6/6 with SS insert	Nylon 6/6 with SS insert	Nylon 6/6 with SS insert
4	Lower Packing Washer	ASTM A 479 Type 316	ASTM A 479 Type 316	ASTM A 479 Type 316	ASTM B 164 Alloy N04400
5	Handle Screw	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
6	Packing**	PTFE	PTFE	PTFE	PTFE
7	Stem (R and N Stem)	ASTM A 276 Type 316	ASTM A 276 Type 316	ASTM A 276 Type 316	ASTM B 164 Alloy N04400
7A	Stem (K Stem)	ASTM A 276 Type 316, with PCTFE	ASTM A 276 Type 316, with PCTFE	ASTM A 276 Type 316, with PCTFE	ASTM B 164 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: Graphite filled hydrocarbon

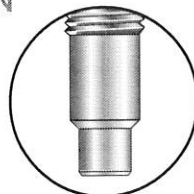
Stem Types

K



PCTFE tipped

N



Needle (2 1/2°)

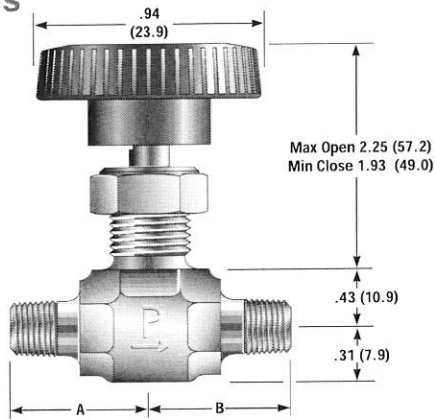
R



Blunt (30°)

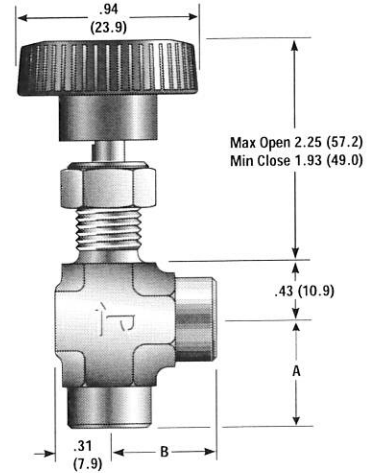
V Series Needle Valves

V2 Series



Model Shown: 2M-V2LN-B

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



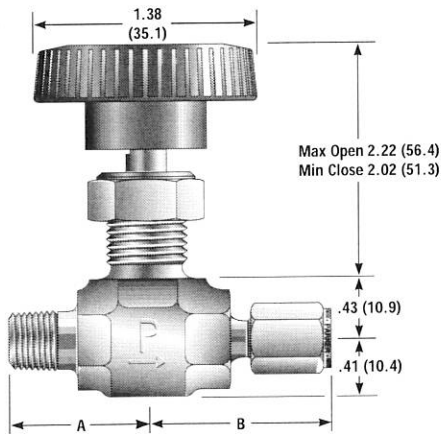
Model Shown: 2F-V2AR-V-SS

V2 Series Dimensions / Flow Data

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^*	Inch	mm	Inch	mm	
2A-V2LR 2A-V2LN 2A-V2LK	2A-V2AR 2A-V2AN 2A-V2AK	1/8" Compression A-LOK®		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.13	0.78 0.80 0.83	0.14 0.14 0.14	0.67 0.63 0.63	1.01	25.7	1.01	25.7
2F-V2LR 2F-V2LN 2F-V2LK	2F-V2AR 2F-V2AN 2F-V2AK	1/8" Female NPT		Blunt Needle PCTFE	0.093	2.4	0.13 0.12 0.12	0.61 0.66 0.73	0.16 0.18 0.17	0.49 0.39 0.54	0.94	23.9	0.94	23.9
2M-V2LR 2M-V2LN 2M-V2LK	2M-V2AR 2M-V2AN 2M-V2AK	1/8" Male NPT		Blunt Needle PCTFE	0.093	2.4	0.13 0.12 0.12	0.61 0.66 0.73	0.16 0.18 0.17	0.49 0.39 0.54	0.75	19.1	0.75	19.1
2Z-V2LR 2Z-V2LN 2Z-V2LK	2Z-V2AR 2Z-V2AN 2Z-V2AK	1/8" Compression CPI™		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.13	0.78 0.80 0.83	0.14 0.14 0.14	0.67 0.63 0.63	1.01	25.7	1.01	25.7
4A-V2LR 4A-V2LN 4A-V2LK	4A-V2AR 4A-V2AN 4A-V2AK	1/4" Compression A-LOK®		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.13	0.78 0.80 0.83	0.14 0.14 0.14	0.67 0.63 0.63	1.09	27.7	1.09	27.7
4Z-V2LR 4Z-V2LN 4Z-V2LK	4Z-V2AR 4Z-V2AN 4Z-V2AK	1/4" Compression CPI™		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.13	0.78 0.80 0.83	0.14 0.14 0.14	0.67 0.63 0.63	1.09	27.7	1.09	27.7

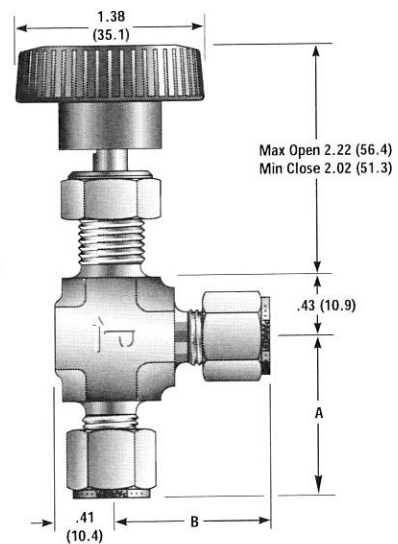
* Tested in accordance with ISA S75.02. Gas flow will be choked when $P_2 - P_1 / P_1 = X_T$.
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

V4 Series



Model Shown: 4M4Z-V4LK-SS

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



Model Shown: M6A-V4AN-BN-B

() Denotes dimensions in millimeters

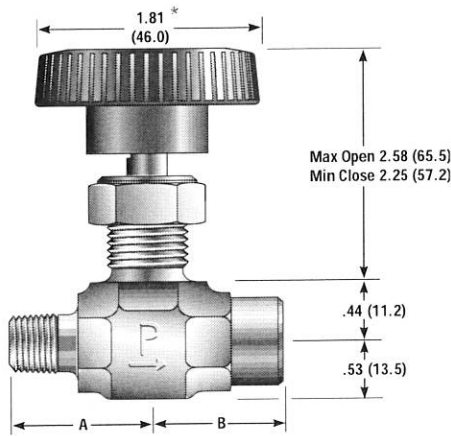
V4 Series Dimensions / Flow Data

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 *	C _v	X _T *	Inch	mm
2A-V4LR 2A-V4LN 2A-V4LK	2A-V4AR 2A-V4AN 2A-V4AK	1/8" Compression A-LOK®		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.14	0.52 0.68 0.66	0.15 0.15 0.17	0.64 0.59 0.49	1.10	27.9	1.10	27.9
2F-V4LR 2F-V4LN 2F-V4LK	2F-V4AR 2F-V4AN 2F-V4AK	1/8" Female NPT		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.77 0.69 0.55	0.55 0.63 0.58	0.63 0.63 0.68	0.81	20.6	0.81	20.6
2M-V4LR 2M-V4LN 2M-V4LK	2M-V4AR 2M-V4AN 2M-V4AK	1/8" Male NPT		Blunt Needle PCTFE	0.125	3.2	0.28 0.28 0.29	0.67 0.63 0.51	0.36 0.36 0.37	0.55 0.51 0.59	0.81	20.6	0.81	20.6
2Z-V4LR 2Z-V4LN 2Z-V4LK	2Z-V4AR 2Z-V4AN 2Z-V4AK	1/8" Compression CPI™		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.14	0.52 0.68 0.66	0.15 0.15 0.17	0.64 0.59 0.49	1.10	27.9	1.10	27.9
4A-V4LR 4A-V4LN 4A-V4LK	4A-V4AR 4A-V4AN 4A-V4AK	1/4" Compression A-LOK®		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	1.15	29.2	1.15	29.2
4M-V4LR 4M-V4LN 4M-V4LK	4M-V4AR 4M-V4AN 4M-V4AK	1/4" Male NPT		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	0.94	23.9	0.94	23.9
4W-V4LR 4W-V4LN 4W-V4LK	4W-V4AR 4W-V4AN 4W-V4AK	1/4" Tube Socket Weld		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	0.80	20.3	0.80	20.3
4Z-V4LR 4Z-V4LN 4Z-V4LK	4Z-V4AR 4Z-V4AN 4Z-V4AK	1/4" Compression CPI™		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	1.15	29.2	1.15	29.2
6A-V4LR 6A-V4LN 6A-V4LK	6A-V4AR 6A-V4AN 6A-V4AK	3/8" Compression A-LOK®		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	1.17	29.7	1.17	29.7
6Z-V4LR 6Z-V4LN 6Z-V4LK	6Z-V4AR 6Z-V4AN 6Z-V4AK	3/8" Compression CPI™		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	1.17	29.7	1.17	29.7
M3A-V4LR M3A-V4LN M3A-V4LK	M3A-V4AR M3A-V4AN M3A-V4AK	3mm Compression A-LOK®		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.14	0.52 0.68 0.66	0.15 0.15 0.17	0.64 0.59 0.49	1.10	27.9	1.10	27.9
M3Z-V4LR M3Z-V4LN M3Z-V4LK	M3Z-V4AR M3Z-V4AN M3Z-V4AK	3mm Compression CPI™		Blunt Needle PCTFE	0.078	2.0	0.12 0.12 0.14	0.52 0.68 0.66	0.15 0.15 0.17	0.64 0.59 0.49	1.10	27.9	1.10	27.9
M6A-V4LR M6A-V4LN M6A-V4LK	M6A-V4AR M6A-V4AN M6A-V4AK	6mm Compression A-LOK®		Blunt Needle PCTFE	0.156	4.0	0.37 0.37 0.39	0.78 0.72 0.62	0.48 0.48 0.51	0.60 0.58 0.64	1.15	29.2	1.15	29.2
M6Z-V4LR M6Z-V4LN M6Z-V4LK	M6Z-V4AR M6Z-V4AN M6Z-V4AK	6mm Compression CPI™		Blunt Needle PCTFE	0.156	4.0	0.37 0.37 0.39	0.78 0.72 0.62	0.48 0.48 0.51	0.60 0.58 0.64	1.15	29.2	1.15	29.2
M8A-V4LR M8A-V4LN M8A-V4LK	M8A-V4AR M8A-V4AN M8A-V4AK	8mm Compression A-LOK®		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	1.18	30.0	1.18	30.0
M8Z-V4LR M8Z-V4LN M8Z-V4LK	M8Z-V4AR M8Z-V4AN M8Z-V4AK	8mm Compression CPI™		Blunt Needle PCTFE	0.176	4.5	0.43 0.43 0.45	0.85 0.77 0.69	0.55 0.55 0.58	0.63 0.63 0.68	1.18	30.0	1.18	30.0

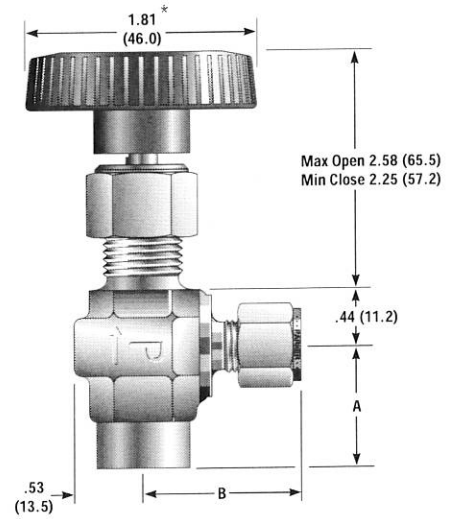
* Tested in accordance with ISA S75.02. Gas flow will be choked when $P_1 - P_2 / P_1 = x_T$.
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position.

V Series Needle Valves

V6 Series



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

V6 Series Dimensions / Flow Data

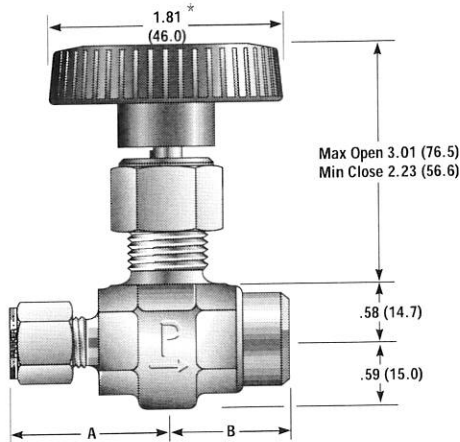
Basic Part Number		End Connections		Stem Type	Flow Data						Dimensions			
Inline	Angle	Inlet (Part 1)	Outlet (Part 2)		Orifice		Inline		Angle		AT		BT	
					Inch	mm	C_v	X_T^*	C_v	X_T^*	Inch	mm	Inch	mm
4F-V6LR 4F-V6LN 4F-V6LK	4F-V6AR 4F-V6AN 4F-V6AK	1/4" Female NPT		Blunt Needle PCTFE	0.228	5.8	0.73 0.55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

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

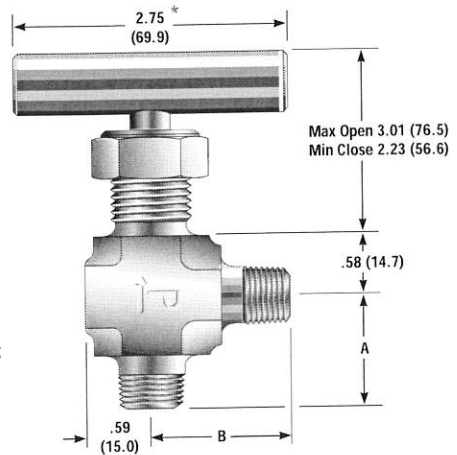
† For CPI™ and A-LOK[†], dimensions are measured with nuts in the finger tight position.

V Series Needle Valves

V8 Series



Model Shown: 8Z6F-V8LK-SS



Model Shown: 8M-V8AN-EPR-SS

Panel Hole Diameter:
0.77 (19.6)
Max Panel Thickness:
0.40 (10.2)

* Note: Handles for N or R Stem V8 Series Valves are a T-bar
() Denotes dimensions in millimeters

V8 Series Dimensions / Flow Data

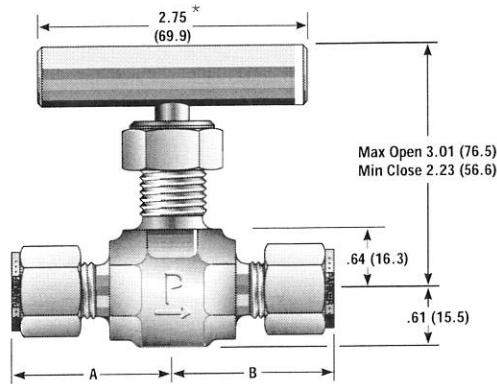
Basic		End Connections		Stem Type	Flow Data				Dimensions					
Part Number		Inlet (Port 1)	Outlet (Port 2)		Orifice		Inline		Angle		A†		B†	
Inline	Angle				Inch	mm	C_v	X_T^*	C_v	X_T^*	Inch	mm	Inch	mm
6F-V8LR 6F-V8LN 6F-V8LK	6F-V8AR 6F-V8AN 6F-V8AK	3/8" Female NPT		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.34	34.0	1.34	34.0
8A-V8LR 8A-V8LN 8A-V8LK	8A-V8AR 8A-V8AN 8A-V8AK	1/2" Compression A-LOK®		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.53	38.9	1.53	38.9
8M-V8LR 8M-V8LN 8M-V8LK	8M-V8AR 8M-V8AN 8M-V8AK	1/2" Male NPT		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.34	34.0	1.34	34.0
8Z-V8LR 8Z-V8LN 8Z-V8LK	8Z-V8AR 8Z-V8AN 8Z-V8AK	1/2" Compression CPI™		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.53	38.9	1.53	38.9
M10A-V8LR M10A-V8LN M10A-V8LK	M10A-V8AR M10A-V8AN M10A-V8AK	10mm Compression A-LOK®		Blunt Needle PCTFE	0.281	7.1	1.13 0.97 1.18	0.79 0.78 0.80	1.52 1.18 1.69	0.66 0.75 0.66	1.42	36.1	1.42	36.1
M10Z-V8LR M10Z-V8LN M10Z-V8LK	M10Z-V8AR M10Z-V8AN M10Z-V8AK	10mm Compression CPI™		Blunt Needle PCTFE	0.281	7.1	1.13 0.97 1.18	0.79 0.78 0.80	1.52 1.18 1.69	0.66 0.75 0.66	1.42	36.1	1.42	36.1
M12A-V8LR M12A-V8LN M12A-V8LK	M12A-V8AR M12A-V8AN M12A-V8AK	12mm Compression A-LOK®		Blunt Needle PCTFE	0.281	7.1	1.13 0.97 1.18	0.79 0.78 0.80	1.52 1.18 1.69	0.66 0.75 0.66	1.51	38.4	1.51	38.4
M12Z-V8LR M12Z-V8LN M12Z-V8LK	M12Z-V8AR M12Z-V8AN M12Z-V8AK	12mm Compression CPI™		Blunt Needle PCTFE	0.281	7.1	1.13 0.97 1.18	0.79 0.78 0.80	1.52 1.18 1.69	0.66 0.75 0.66	1.51	38.4	1.51	38.4

* 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.

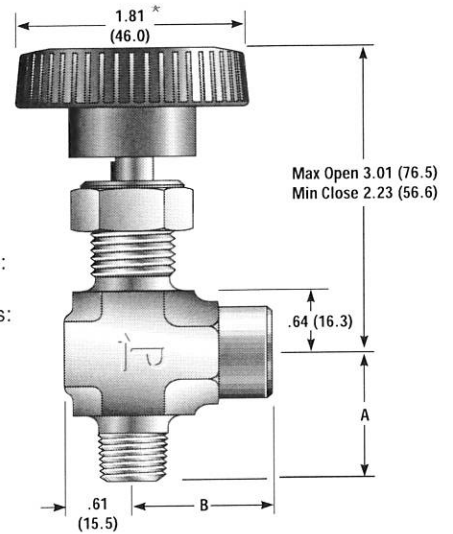
V Series Needle Valves

V12 Series



Model Shown: 10Z-V12LN-B

* Note: Handles for N or R Stem V12 Series Valves are a T-bar
() Denotes dimensions in millimeters



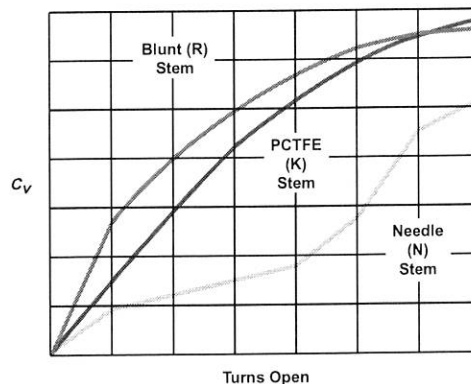
Model Shown: 8M8F-V12AK-BN-SS

V12 Series Dimensions / Flow Data

Basic		End Connections		Stem Type	Flow Data						Dimensions			
Part Number		Inlet (Port 1)	Outlet (Port 2)		Orifice		Inline		Angle		A†		B†	
Inline	Angle				Inch	mm	C_v	X_T^*	C_v	X_T^*	C_v	X_T^*	Inch	mm
8F-V12LR 8F-V12LN 8F-V12LK	8F-V12AR 8F-V12AN 8F-V12AK	1/2" Female NPT		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.38	35.1	1.38	35.1
8W-V12LR 8W-V12LN 8W-V12LK	8W-V12AR 8W-V12AN 8W-V12AK	1/2" Tube Socket Weld		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.12	28.4	1.12	28.4
10A-V12LR 10A-V12LN 10A-V12LK	10A-V12AR 10A-V12AN 10A-V12AK	5/8" Compression A-LOK®		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.52	38.6	1.52	38.6
10Z-V12LR 10Z-V12LN 10Z-V12LK	10Z-V12AR 10Z-V12AN 10Z-V12AK	5/8" Compression CPI™		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.52	38.6	1.52	38.6
12A-V12LR 12A-V12LN 12A-V12LK	12A-V12AR 12A-V12AN 12A-V12AK	3/4" Compression A-LOK®		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.52	38.6	1.52	38.6
12Z-V12LR 12Z-V12LN 12Z-V12LK	12Z-V12AR 12Z-V12AN 12Z-V12AK	3/4" Compression CPI™		Blunt Needle PCTFE	0.312	7.9	1.23 1.05 1.29	0.87 0.83 0.91	1.66 1.28 1.90	0.72 0.80 0.76	1.52	38.6	1.52	38.6

* 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.

V Series Flow Characteristics



V Series Needle Valves

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: $\frac{4Z}{\textcircled{1}}$ - $\frac{*}{\textcircled{2}}$ - $\frac{V4A}{\textcircled{3}}$ - $\frac{K}{\textcircled{4}}$ - $\frac{BN}{\textcircled{5}}$ - $\frac{SS}{\textcircled{6}}$
 Inlet Port Outlet Port Valve Series Stem Type Stem Seal Body Material

Describes a angle pattern V4 Series needle valve equipped with 1/4" CPI™ compression inlet and outlet ports, a PCTFE tipped stem, Buna-N seals, and stainless steel construction.

Example: $\frac{4M}{\textcircled{1}}$ - $\frac{4F}{\textcircled{2}}$ - $\frac{V6L}{\textcircled{3}}$ - $\frac{N}{\textcircled{4}}$ - $\frac{-}{\textcircled{5}}$ - $\frac{B}{\textcircled{6}}$
 Inlet Port Outlet Port Valve Series Stem Type Stem Seal Body Material

Describes a inline pattern V6 Series needle valve equipped with 1/4" male NPT inlet port, 1/4" female NPT outlet port, a needle stem type, PTFE stem seal, brass construction.

① Inlet Port	② Outlet Port	③ Valve Series	④ Stem Type	⑤ Stem Seal	⑥ Body Material
2A, 2F, 2M, 2Z, 4A, 4Z		V2	R - Blunt (30°) N - Needle (2 1/2°) K - PCTFE	Blank - PTFE BN- Buna-N Rubber EPR- Ethylene Propylene Rubber V- Fluorocarbon Rubber	SS- Stainless Steel S - Steel M - Alloy 400 B - Brass
2A, 2F, 2M, 2Z, 4A, 4M, 4W, 4Z, 6A, 6Z, M3A, M3Z, M6A, M6Z, M8A, M8Z		V4			
4A, 4F, 4M, 4Z, 6A, 6M, 6W, 6Z, 8A, 8Z, M8A, M8Z, M10A, M10Z, M12A, M12Z		V6			
4F, 6A, 6F, 6Z, 8A, 8M, 8Z, M10A, M10Z, M12A, M12Z		V8			
8F, 8W, 10A, 10Z, 12A, 12Z		V12			

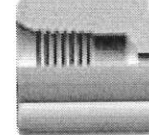
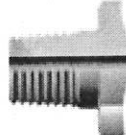
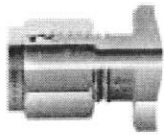
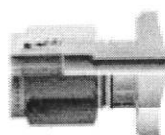
Available End Connections

Z - One ferrule CPI™ compression port

A - Two ferrule A-LOK® compression port

M - ANSI/ASME B1.20.1 External pipe threads

F - ANSI/ASME B1.20.1 Internal pipe threads



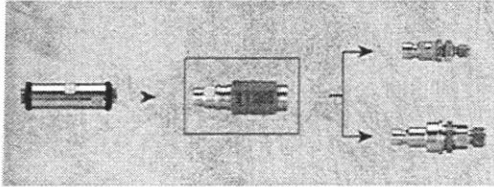
How to Order Options

Colored Round Handles – Add the designator corresponding to the correct handle color as a suffix to the part number. Black is standard, **W** - white, **B** - blue, **G** - green, **R** - red, **Y** - yellow. Example: M10A-V6LK-SS-**G**

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: 4A-V4AN-EPR-SS-**C3**

Sour Gas – To obtain valves suitable for sour gas service in accordance with NACE Standard MR0175, add the suffix **NACE** to the end of the part number. Example: 8F-V12LR-SS-**NACE**

NGV 1 type 2-3 nozzles



Blue (3000 psi - 200 bars)
Yellow (3600 psi - 250 bars)

Applications

- Designed for time fill (or fast fill), public or private use.
- Specially recommended for fleet applications (refuelling of heavy or light duty vehicles).
- High flow capability.



Double alignment guiding system ensures long life.

Great for fleets who already have a three way valve installed.

Keying system prevents higher pressure nozzle from connecting onto lower pressure receptacle.

Automatic one-hand operation, push to connect.

Ball locking for reliability.

Available from stock in 2 different service pressures.

Color coded sleeve visually identifies service pressure.

Insulated coating protects hand from cold metal.

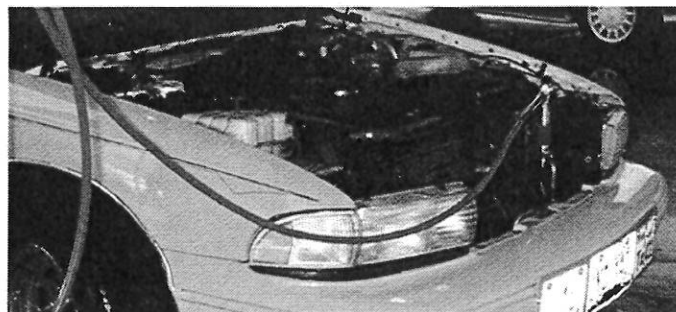
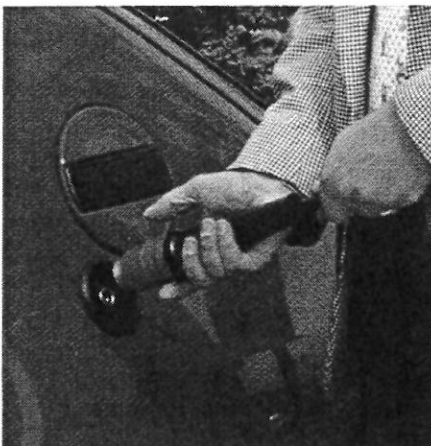
Cycle tested to withstand more than 100,000 connections.

Check valve prevents flow of gas when nozzle is disconnected.

Can be used with any type of vehicle which has an NVG 1 receptacle.

Storage requirement to protect the nozzle for water and dirt.

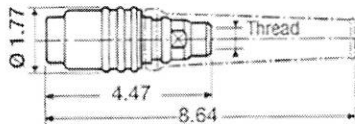










When not in use, each nozzle must be protected from water and dirt. It is why we propose the nozzle storage rack shown in the opposite page.



Technical data

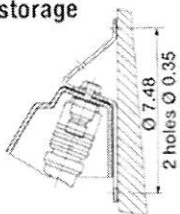
Internal diameter : 5/16" (7.5 mm).
 Flow area : 0.068 sq. in. (44 sq. mm).
 Service pressures
 (connected and disconnected) :
 3000 psi (200 bars)
 3600 psi (250 bars).

Material : stainless steel.
 Flow rate : see page 14.
 Service temperature :
 -40°F to 185°F (-40°C to 85°C).

Part numbers	THREAD	PART NUMBERS		
		BLUE 3000 psi (200 bars)	YELLOW 3600 psi (250 bars)	
1/4 BSP female thread		AGA/NGV1: N 010 231 95 CGA/NGV1: N 010 231 95 TÜV : N 003 145 93   TÜV	AGA/NGV1: N 010 232 95 	
SAE O-ring port for 3/8"OD tubing with 9/16-18 UNF female thread		9/16 - 18 UNF	AGA/NGV1: N 010 219 95 CGA/NGV1: N 010 219 95  	AGA/NGV1: N 010 220 95 
SAE O-ring port for 3/8" OD tubing with 9/16 - 18 UNF female left-handed thread		9/16 - 18 UNF LH	AGA/NGV1: N 010 229 95 CGA/NGV1: N 010 229 95 TÜV : N 002 271 95   TÜV	AGA/NGV1: N 010 230 95 
Nozzle hose guard		R 138 980 00		

Storage options

Mounting receptacle with cover
 protects nozzle from water and
 dirt when not in use.
 Contact us for other options.

Nozzle storage rack	PART NUMBERS	
	BLUE 3000 psi (200 bars)	YELLOW 3600 psi (250 bars)
	CMV 08. 9000/30	

All dimensions in inches



Bourdon Tube Pressure Gauges

All Stainless Steel Construction
Industrial Series Liquid Fillable • Type 23X.53

Pressure Gauges

Application

Suitable for corrosive environments compatible with 316 stainless steel wetted parts, dry and liquid fillable case, where vibration and/or pressure pulsation occur in liquid or gaseous media which will not obstruct the pressure system.

Sizes (All sizes not stocked)

2", 2½" and 4" (50, 63 and 100 mm)

Accuracy

2", 2½" ± 1.5% of span

4" ± 1.0% of span (ASME B40.1 Grade 1A)

Ranges (All ranges not stocked)

Vacuum / Compound to 30"HG / 0 / 200 PSI

Pressure from 15 PSI to 15,000 PSI

or other equivalent units of pressure or vacuum

Working Range

2" & 2½" Steady: 3/4 of full scale value

Fluctuating: 2/3 of full scale value

Short time: full scale value

4" Steady: Full scale value

Fluctuating: 0.9 x full scale value

Short time: 1.3 x full scale value

Operating Temperature

Ambient: -40°F to 140°F (-40°C to 60°C) ^{Note 1}

Media: max. 212°F (+100°C)

Temperature Error

Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

Standard Features

Connection

Material: 316 stainless steel

Lower mount (LM)

Center back mount (CBM) 2½"

Lower back mount (LBM) 4"

1/4" or 1/2" NPT limited to wrench flat area

Bourdon Tube

Material: 316 stainless steel

30"Hg (Vac) to 1000 PSI C-type - 2" & 2½"

30"Hg (Vac) to 1500 PSI C-type - 4"

1500 PSI to 15,000 PSI helical type - 2" & 2½"

2000 PSI to 15,000 PSI helical type - 4"

Movement

Stainless steel

Dial

White aluminum with black lettering. 2½" with stop pin.

Pointer

Black aluminum, non-adjustable

Case

304 stainless steel with vent plug and SS crimping ring.

Welded case/socket connection



Weather Protection

Weather resistant (NEMA 3 / IP 54) - dry case

Weather tight (NEMA 4X / IP 65) - liquid-filled case

Standard Scale

PSI

PSI, PSI/BAR, PSI/KPA, PSI/KG/CM² (2½" CBM)

Window Gasket

Buna-N

Case Filling

232.53 - None

233.53 - Glycerine

Window

Polycarbonate

Acrylic (4")

ORDER OPTIONS (min. order may apply)

Custom dial layout

Steel zinc plated u-clamp bracket (field installable)

Stainless steel u-clamp bracket (field installable)

Pressure compensating membrane window for filled gauges

Stainless steel polished front flange (CBM or LBM only)

Stainless steel rear flange

316 SS threaded restrictor

Glycerine, silicone, or fluorolube case filling (**Type 233.53**) ^(Note 1)

Special connections limited to wrench flat area

Other pressure scales available:

Bar, kPa, MPa, Kg/cm² and dual scales

DIN standards

Cleaned for oxygen service

Externally adjustable red drag pointer (max. hand)

Externally adjustable red mark pointer (set pointer)

Note 1 Temperature Ranges (Liquid filled gauges)

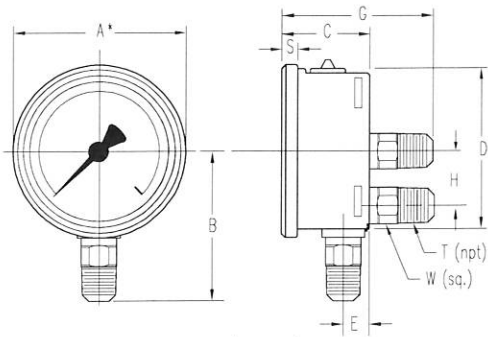
Glycerine: -4°F to 140°F (-20°C to 60°C)

Silicone: -40°F to 140°F (-40°C to 60°C)

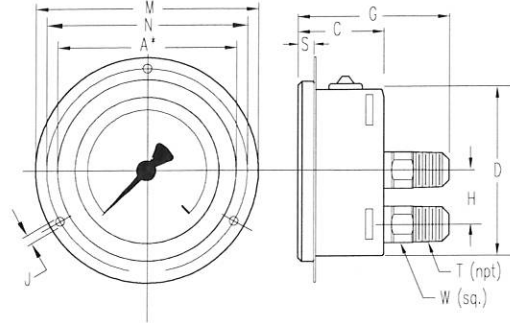
APM 23X.53

(APM 02.13)

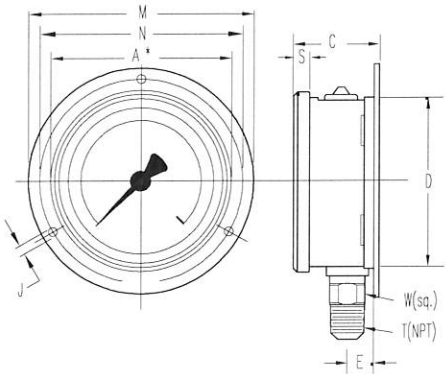
Dimensions:



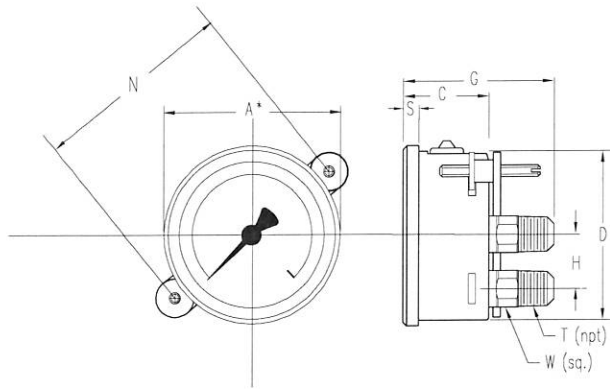
23X.53 LM/CBM/LBM



23X.53 CBM/LBM/FF



23X.53 LM/RF



23X.53 CBM/LBM/UC

A* NOMINAL SIZE

TYPE/SIZE	WEIGHT	KEY	A*	B	C	D	E	G	H	J	L	M	N	S	T	W
23X.53 2"	0.27 lbs. + 0.06 lbs. if filled	mm	50	48	30	50	12	53	--	3.6	6.5	71	60	5.5	--	14
		in	2	1.89	1.18	1.97	0.47	2.09		0.14	0.26	2.80	2.36	0.22	1/4"	0.55
23X.53 2.5"	0.36 lbs. + 0.08 lbs. if filled	mm	63	54	32	62	13	54	--	3.6	7.5	85	75	6.5	--	14
		in	2.5	2.13	1.26	2.44	0.51	2.13		0.14	0.30	3.35	2.95	0.26	1/4"	0.55
23X.53 4"	1.10 lbs. + 0.66 lbs. if filled	mm	100	87	48	100	15.5	79.5	30	4.8	9	132	116	8	--	22
		in	4	3.43	1.89	3.94	0.61	3.13	1.18	0.19	0.35	5.20	4.57	0.31	1/2"	0.87

NOTE: For 1/4" NPT connections on 3" and 4" gauges, reduce B* dimension by 5 mm / 0.02 in.

Panel cut-out dimensions: D + 1mm

THE MEASURE OF
Total Performance™

Ordering Information:

State computer part number (if available) / type number / size / range / connection size and location / options required.

Specifications given in this price list represent the state of engineering at the time of printing. Modifications may take place and the specified materials may change without prior notice

05/02



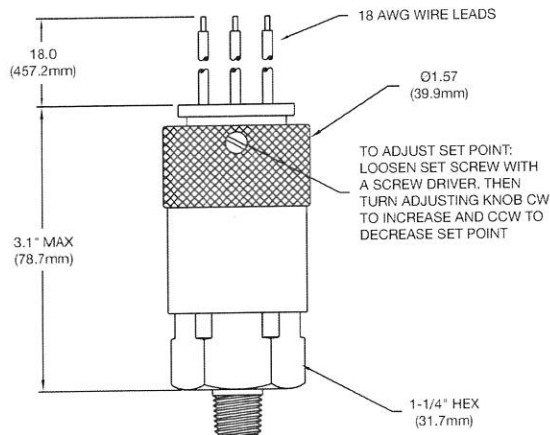
WIKAI Instrument Corporation
1000 Wiegand Boulevard
Lawrenceville, Georgia 30043-5868
Tel: 770-513-8200 Fax: 770-338-5118
<http://www.wika.com> e-mail: info@wika.com

HIGH PRESSURE SWITCH CD



Shown with Complete DIN – Electrical Option HR

Dimensions



Features

- Long life elastomer diaphragm (ranges 1 – 3)
- Proven sealed piston sensor (ranges 4 – 7)
- High quality snap action switch
- Field adjustable
- Easily customized
- Quick delivery
- NEMA 4, 13

Operating Specifications

Set Point Range	10 – 4500 PSI	(.69 – 289 Bar)
Set Point Tolerance	±5 PSI or 5%	(.34 Bar)
Maximum Operating Pressure	2000 PSI (Ranges 1 – 4)	(137 Bar)
	5000 PSI (Ranges 5 – 7)	(344 Bar)
Proof Pressure	6000 PSI (Ranges 1 – 4)	(413 Bar)
	15000 PSI (Ranges 5 – 7)	(1034 Bar)
Differential	10 – 20%	
Current Rating	5 A @ 250 VAC	
	5 A @ 30 VDC (Resistive)	
Media Connection	See Order Chart Below for Options	
Circuit Form	SPST-NO or SPST-NC	
Electrical Connection	See Order Chart Below for Options	
Diaphragm material	Buna (Ranges 1 – 3)	
	Hardened Steel Piston (Ranges 4 – 7)	
Cycle Life	1 Million	

How to Order

Example: Part Number: CD – 1B5 – 0750J / EL

CD - 1 B 5 - 0 7 5 0 J / EL - Electrical Options					
Media Connection	Circuit Form	Range	Desired Set Point	Set Point Direction	Electrical Options
Piston	A SPST-NO	1 10 – 40 PSI	10 – 4500 PSI	J Rising Adjustable	WL Wire Leads 18"
1 1/4" NPT Male	B SPST-NC	2 25 – 100 PSI		G Falling Adjustable	EL Male Conduit 1/2" – 14 With Wire Leads 18"
3 3/4" SAE Male	C SPDT	3 50 – 200 PSI			EF Female Conduit 1/2" – 14 With Wire Leads 18"
11 9/16" SAE Male		4 100 – 400 PSI			HR DIN43650A With Receptacle
Diaphragms		5 250 – 1000 PSI			HH DIN43650A Without Receptacle
1 1/4" NPT Male		6 500 – 2000 PSI			QC 1/4" Spade Connection
3 3/4" SAE Male		7 1200 – 4500 PSI			WP Weather Pack
9 3/8" NPT Male					MP Metri-Pack
11 9/16" SAE Male					WD Deutsch
					AT 10 A @ 125/250 VAC 5 A @ 30 VDC
					AU Gold Plate/Alloy for low currents

Refer to the optional specifications and media connection designations charts for pressure and vacuum switches for additional options available on this model.

OEM Pressure Transmitter Model C-10

WIKA Data Sheet C-10

Applications

- Hydraulics and pneumatics
- Mechanical engineering
- General industrial applications

Special Features

- Standard ranges from 0...100 INWC to 0...15,000 PSI
- Excellent shock and vibration resistance
- Environmental protection to NEMA 4 / IP 67
- Stainless steel case and wetted parts

Description

WIKA C-10 provides performance and economy for a wide range of OEM applications. They are especially suited to applications subject to severe mechanical shock, vibration, and electromagnetic interference. Typical applications include hydraulics and pneumatics, compressor controls, pump protection, refrigeration and air conditioning systems.

Dependable performance

The C-10 features an all-welded stainless steel measuring cell for improved media compatibility. There are no internal soft sealing materials that may react with the media or deteriorate over time. The case is also made of stainless steel and is available with environmental protection ratings up to NEMA 4 / IP 67.

Pressure ranges up to 300PSI use a piezoresistive measuring cell. The higher pressure ranges use thin film sensor technology. Both are time proven highly reliable sensor technologies.



Left: C-10 with MiniDIN connector
Right: C-10 with optional cable

Standard signal outputs of 4-20 mA and 0-10V allow the ECO-Tronic to be integrated into many existing applications. Many custom signal outputs, process connections, and electrical connections are available.

Each C-10 undergoes extensive quality control testing and calibration to achieve an accuracy of $\leq 0.50\%$ full scale. The printed circuit boards use state-of-the-art surface mount technology. Each is individually temperature compensated to assure accuracy and long-term stability even when exposed to severe ambient temperature variations.

Specifications

Model C-10

Pressure range	100INWC	5PSI	10PSI	15PSI	25PSI	30PSI	50PSI	100PSI	200PSI
Maximum pressure*	30PSI	72PSI	72PSI	72PSI	72PSI	72PSI	140PSI	240PSI	500PSI
Burst pressure**	30PSI	87PSI	87PSI	87PSI	87PSI	87PSI	170PSI	290PSI	600PSI
Pressure range	300PSI	500PSI	1000PSI	2000PSI	3000PSI	5000PSI	7500PSI	10,000PSI	15,000PSI
Maximum pressure*	500PSI	1160PSI	2900PSI	4640PSI	7250PSI	11,600PSI	17,400PSI	21,750PSI	21,750PSI
Burst pressure**	600PSI	5800PSI	11,600PSI	14,500PSI	17,400PSI	24,650PSI	34,800PSI	43,500PSI	43,500PSI

(absolute pressure references are available)

*Pressure applied up to the maximum rating will cause no permanent change in specifications but may lead to zero and span shifts

**Exceeding the burst pressure may result in destruction of the transmitter and possible loss of media

Materials			
■ Wetted parts			Stainless steel
■ Case			Stainless steel
Internal transmission fluid			Synthetic oil, only for pressure ranges up to 0 ... 300 PSI {Halocarbon oil for oxygen applications} ¹⁾
Supply voltage U_B	DC V		$10 < U_B \leq 30$ (14 ... 30 with signal output 0 ... 10 V)
Response time (10 ... 90 %)	ms		≤ 1 (≤ 10 ms at medium temperatures below -22°F (-30°C) for pressure ranges up to 300
Accuracy ²⁾	% of span	≤ 1.0	(limit point calibration)
	% of span	≤ 0.5	(BFSL)
Hysteresis	% of span	≤ 0.1	
Repeatability	% of span	≤ 0.05	
1-year stability	% of span	≤ 0.2	(at reference conditions)
Permissible temperature of			
■ Medium		$-22 \dots +212^\circ\text{F}$ ($-40 \dots +257^\circ\text{F}$)	$-30 \dots +100^\circ\text{C}$ ($-40 \dots +125^\circ\text{C}$)
■ Ambient		$-22 \dots +185^\circ\text{F}$	$-30 \dots +85^\circ\text{C}$
■ Storage		$-40 \dots +212^\circ\text{F}$	$-40 \dots +100^\circ\text{C}$
Compensated temperature range		$0 \dots +176^\circ\text{F}$	$0 \dots +80^\circ\text{C}$
Temperature coefficients(TC) within compensated temperature range:			
■ Mean TC of zero	% of span	$\leq 0.3 / 10 \text{ K}$	
■ Mean TC of range	% of span	$\leq 0.2 / 10 \text{ K}$	
CE conformity			89/336/EWG interference emission and immunity see EN 61326 97/23/EG Pressure equipment directive
Shock resistance	g		1000 according to IEC 60068-2-27 (mechanical shock)
Vibration resistance	g		20 according to IEC 60068-2-6 (vibration under resonance)
Wiring protection			Protected against reverse polarity, overvoltage and short circuiting
Ingress protection			Per IEC 60529 / EN 60529, see page 3
Weight	lb		Approximately .22

1) Media temperature for oxygen version: $-30 \dots +60^\circ\text{C}$ ($-22 \dots 140^\circ\text{F}$).

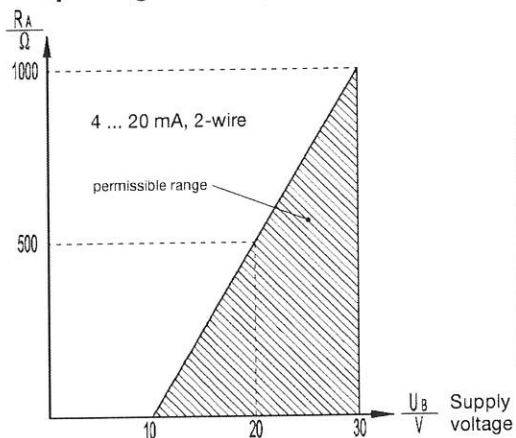
Cannot be manufactured for absolute pressure ranges < 15 PSI absolute.

2) Accuracy statement includes linearity, hysteresis and repeatability.

Limit point calibration performed in vertical mounting position with pressure connection facing down.

{ } Items in curved brackets are optional extras for additional price.

Output signal and permissible load



Output current (2-wire)
4 ... 20 mA: $R_A \leq (U_B - 10 \text{ V}) / 0.02 \text{ A}$

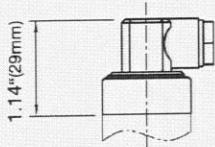
Output current (3-wire)
0 ... 20 mA: $R_A \leq (U_B - 3 \text{ V}) / 0.02 \text{ A}$

Output voltage (3-wire)
0 ... 5 V: $R_A > 5 \text{ kOhm}$
0 ... 10 V: $R_A > 10 \text{ kOhm}$

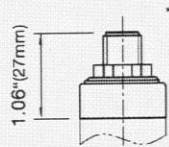
Dimensions in inches (mm)

Electrical connections

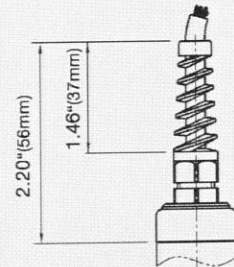
Mini L-connector
G-series
IP 65
Order code: II



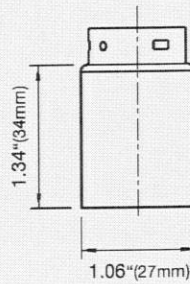
Circular connector,
5-pin, M 12x1,
IP 65
Order code: M5



Flying leads with anti kink protection
IP 67
Order code: DL

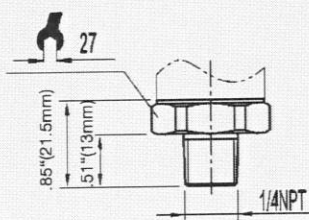


Case

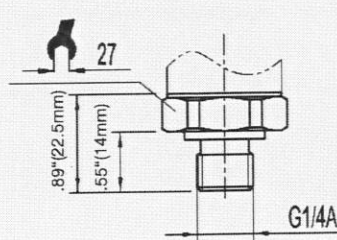


Pressure connections

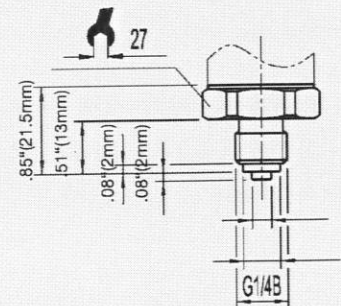
1/4" NPT male
Order code: NB



G 1/4 male
DIN 3852-E
Order code: HD



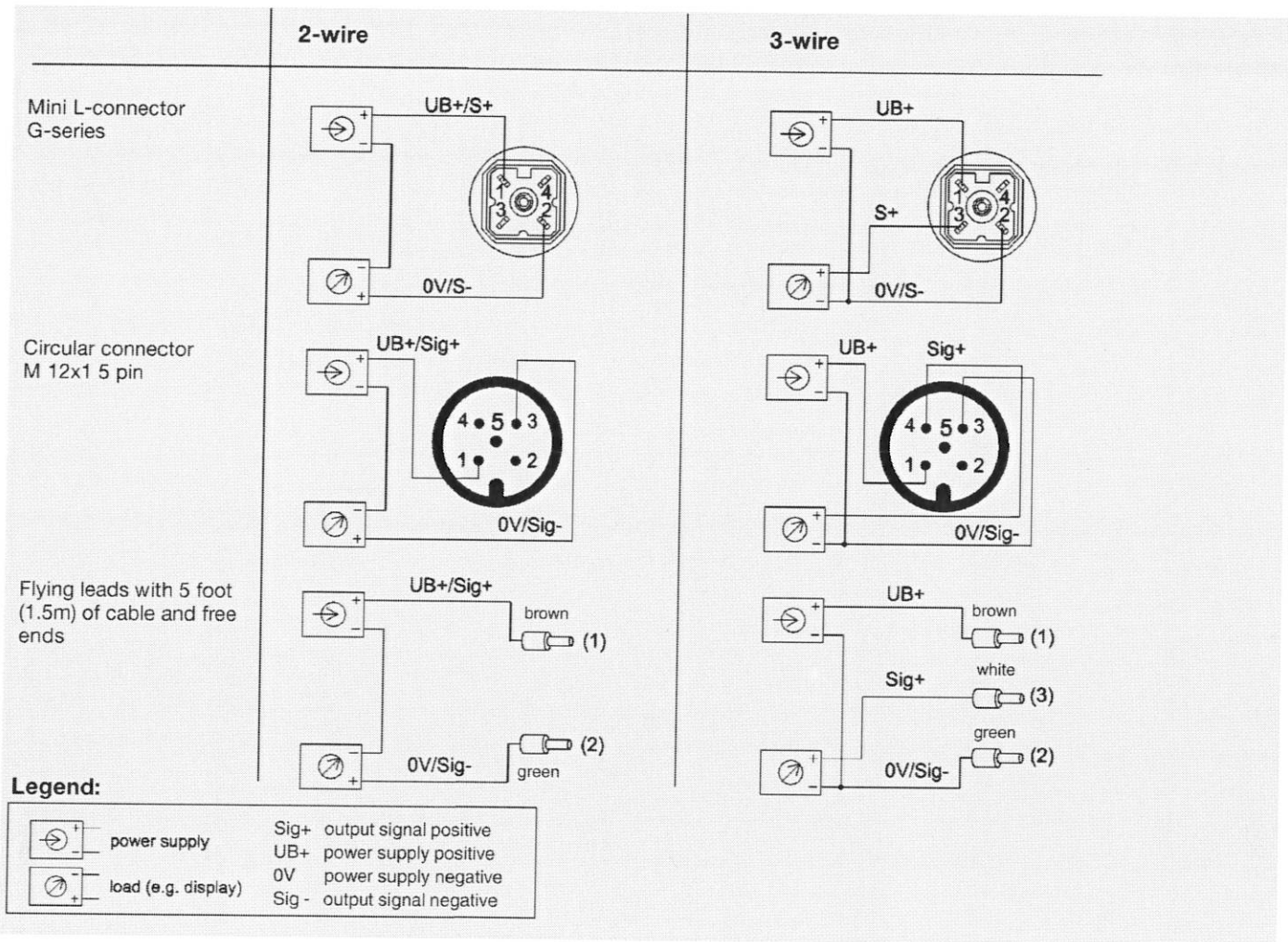
G 1/4 male
EN 837
Order code: GB



*) Matting connectors are not included

Other process connections available

Wiring details



Specifications and dimensions given in this data sheet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.



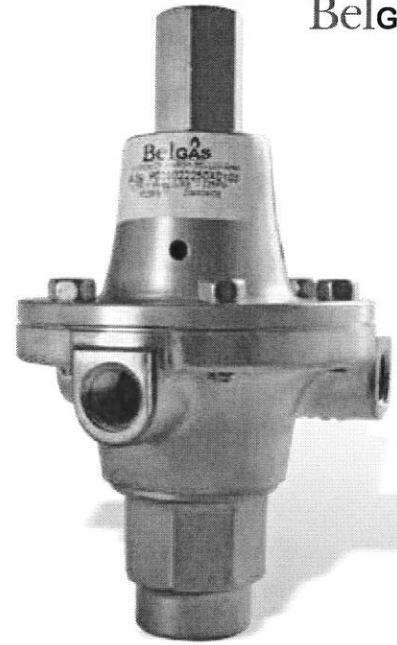
BriceBarclay
 4301 Greenbriar Dr.
 Stafford, TX 77477
 800-231-7174 / 281-240-1788
 Fax: 281-240-0656
 www.bricebarclay.com

P39 Standard Gas Regulators



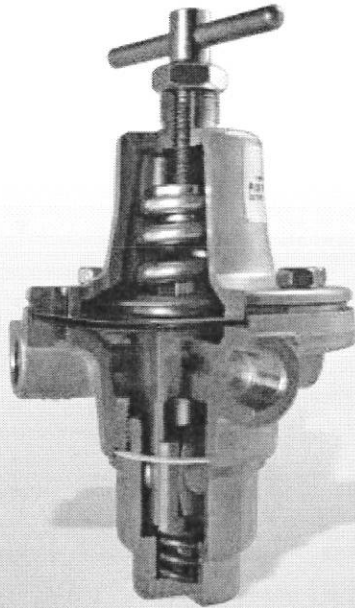
- Spare valve disks provided. Each unit comes with a 4 seat valve disk block. This block can be easily rotated 90° to provide a fresh valve disk sealing surface.
- Easily changed from tamper-resistant to T-handle adjustment or vice versa.
- Both adjustment assemblies are supplied with every unit.
- Brass casing material

The BelGas P39 regulator selection is the largest of its type in the industry. We offer this regulator in three different materials, one of which will ideally suit your application AND your budget. ALL of the P39's are offered with six different spring ranges. Our broad selection of outlet pressure spring ranges allows more precise regulation of downstream pressure, hence, better process control. Piping designs can be simplified by using any one (or all) of the 3 outlet ports that come standard on the regulator. The BelGas P39 is the ONLY regulator of this type, which has 3 outlet ports. To enhance the versatility of this regulator further, we provide you with a choice of seat materials that allows the designer to custom fit the seat material with the application.



Applications

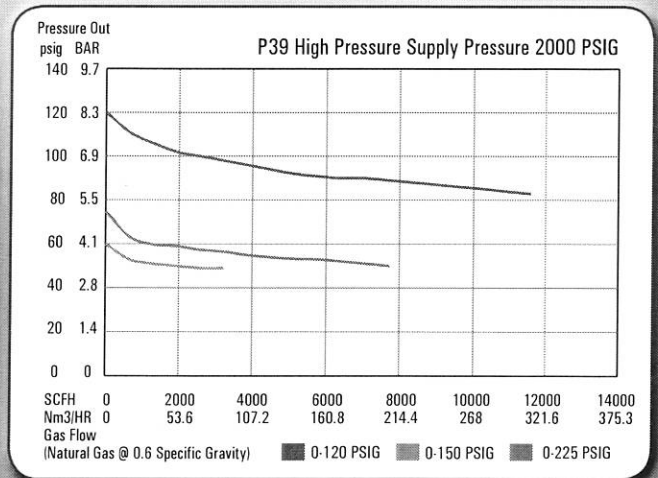
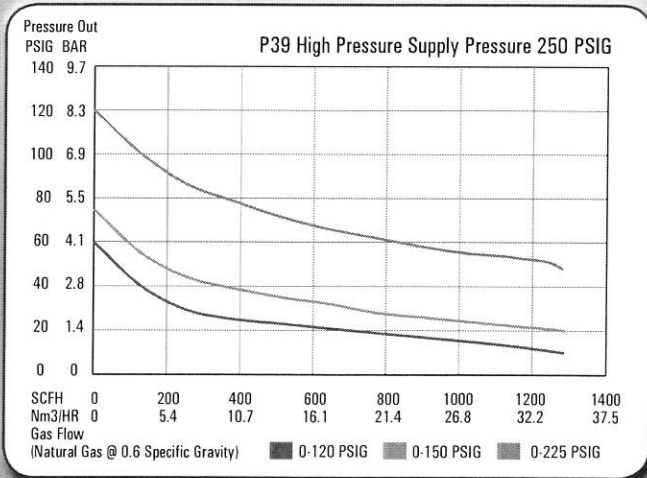
- First cut of high-pressure natural gas to control valve supply
- Natural gas instrumentation columns
- First cuts to any downstream, low flow application, such as catalytic heaters, valve actuators, pressure controllers and chemical injection pumps



Specifications

Inlet	1/4 NPT	
Outlet	1/4 NPT (3 Ports)	
Vent	4 holes (5/32" each) (STD)	
	1/4 NPT (Tapped Vent Option)	
Max Inlet	6000 PSIG, 414 BAR	
Orifice Size	5/64"	
	Cv=0.10	
Outlet Ranges		
	0 - 30 PSIG	2.1 BAR
	0 - 60 PSIG	4.1 BAR
	0 - 120 PSIG	8.3 BAR
	0 - 150 PSIG	10.3 BAR
	0 - 225 PSIG	15.5 BAR
Temp. Range	-40° F to 225° F	-46° C to 106° C
Weight Approximate		
Standard	3-1/4 lbs	1.46 kg

Flow Charts



P39 Standard Part Matrix

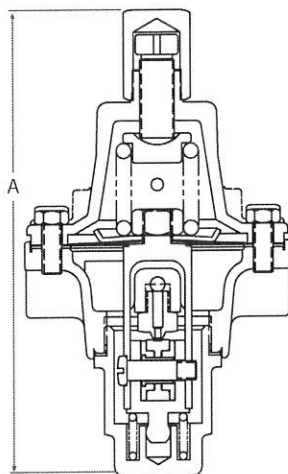
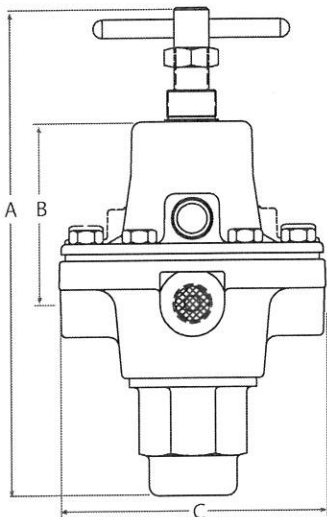
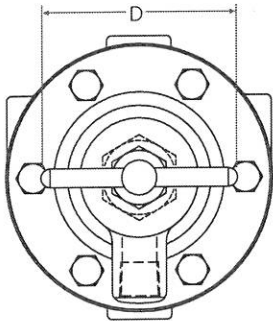
P03902	0	X	0	0
	▲	▲	▲	▲
				Spring Range
030				0-30 PSIG 0-2.1 BAR
060				0-60 PSIG 0-4.1 BAR
120				0-120 PSIG 0-8.3 BAR
150				0-150 PSIG 0-10.3 BAR
225				0-225 PSIG 0-15.5 BAR
				Version
	0			Standard
				Adjustment Method
		X		T-Bar and Adjustment Screw (Allen Head) with Tamper Resistant Cover
				Vent
			0	Standard Untapped Bonnet Vent
				Seat Material
			1	Nylon
			3	Teflon
				Port Configuration
			0	Standard
				Casing Material
			0	Brass

Materials of Construction

Brass Unit	
Body, Bonnet, Bottom Plug	Brass
Tamper Resistant Cover	Brass
Diaphragm	302 Stainless
Seals	TFE, Nitrile
Valve Spring	17-7 ^{PH} Stainless Steel
Range Spring	Spring Steel, Chrome Silicon
Seat Material	Nylon or TFE

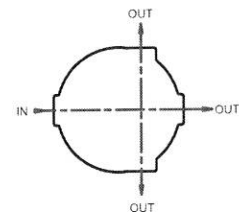
P39 Standard Dimensions

Dimensions Table		A	B	C	D
P39 w/T-Handle 0-30, 0-60, 0-120, 0-150, 0-225 PSIG range	mm	156	58	85	64
	inches	6.14	2.3	3.33	2.50
P39 w/Allen Head 0-30, 0-60, 0-120, 0-150, 0-225 PSIG range	mm	150	58	85	19
	inches	5.90	2.30	3.33	0.75



Ports

Standard



P39 Special Build Gas Regulators

Specials include these models:

- 500 PSI Outlet
- Dual Inlet Ports
- Nickel Plated and Stainless Steel
- Tapped Vent Models
(Standard on all Stainless Steel units)
- Stainless Steel Version complies with NACE MR0175



Applications

- First cut of high-pressure natural gas to control valve supply
- Natural gas instrumentation columns
- First cuts to any downstream, low flow application, such as catalytic heaters, valve actuators, pressure controllers and chemical injection pumps

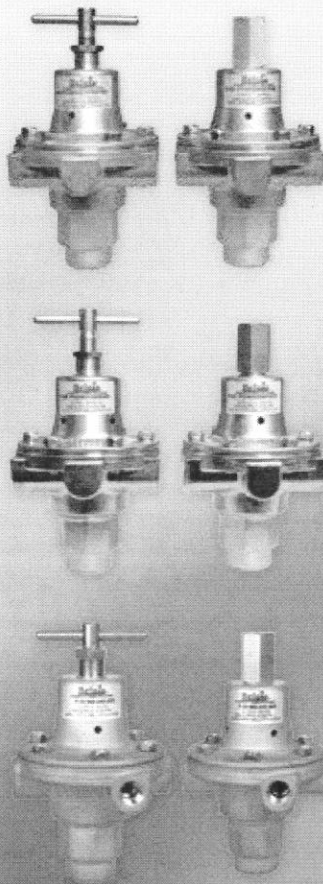
P39 Special Build Part Matrix

P03902		▲	▲	▲	▲	▲	▲	▲	Spring Range
030									0-30 PSIG 0-2.1 BAR
060									0-60 PSIG 0-4.1 BAR
120									0-120 PSIG 0-8.3 BAR
150									0-150 PSIG 0-10.3 BAR
225									0-225 PSIG 0-15.5 BAR
500									0-500 PSIG 0-34.5 BAR
Versions									
0									Standard
3									PED (for EU)
4									ENVIRO-Cap* (Water Jacket)
Adjustment Method									
0									T-Bar
1									Adjustment Screw (Allen Head) with Tamper Resistant Cover
Vent Options									
0									Standard Bonnet
1									Tapped Vent Bonnet*
Seat Material									
1									Nylon
3									Teflon (Brass units only)
4									PTFE*
Port Configuration									
0									Standard
1									Dual Inlet**
Casing Material									
0									Brass
1									Electroless Nickel
2									Stainless Steel

Materials of Construction

Brass Unit	
Body, Bonnet, Bottom Plug	Brass
Tamper Resistant Cover	Brass
Diaphragm	302 Stainless
Seals	TFE, Nitrile
Valve Spring	17-7 ^{PH} Stainless Steel
Range Spring	Spring Steel, Chrome Silicon
Seat Material	Nylon or TFE
Nickel Plated Unit	
Body, Bonnet, Bottom Plug	Nickel Plated Brass
Tamper Resistant Cover	Nickel Plated Brass
Diaphragm	302 Stainless Steel
Seals	TFE, Nitrile
Valve Spring	17-7 ^{PH} Stainless Steel (Nickel Plated)
Range Spring	Spring Steel or Chrome Silicon
Seat Material	Nylon or PTFE (316 SS Block)
Stainless Steel Unit	
Body, Bonnet, Bottom Plug	316 Stainless Steel
Tamper Resistant Cover	316 Stainless Steel
Diaphragm	Monel 400
Seals	TFE, Neoprene
Valve Spring	MP35N (UNS30035)
Range Spring	Spring Steel
Seat Material	Nylon or PTFE (316 SS block)

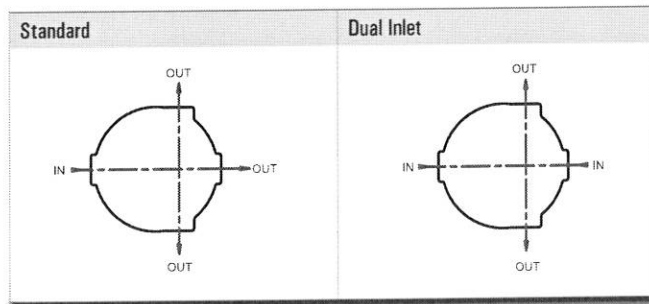
Only the P39SS Conforms to NACE MR0175



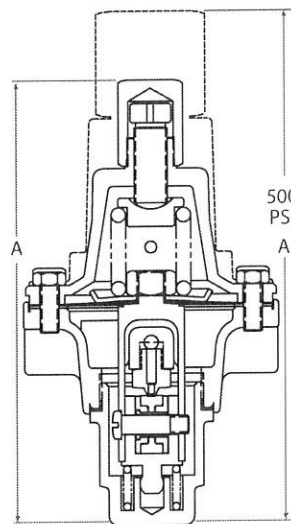
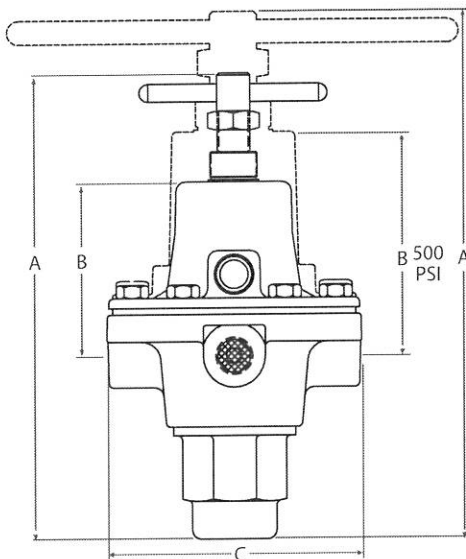
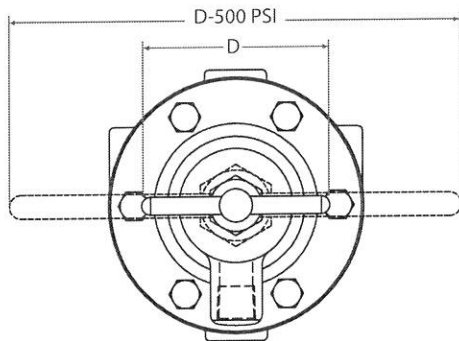
Specifications

Inlet	1/4 NPT	
Outlet	1/4 NPT (3 Ports)	
Vent	4 holes (5/32" each) (STD)	
	1/4 NPT (Tapped Vent Option)	
Max Inlet	6000 PSIG, 414 BAR	
Orifice Size	5/64"	
Outlet Ranges		
	0 - 30 PSIG	2.1 BAR
	0 - 60 PSIG	4.1 BAR
	0 - 120 PSIG	8.3 BAR
	0 - 150 PSIG	10.3 BAR
	0 - 225 PSIG	15.5 BAR
	0 - 500 PSIG	34.5 BAR
Temp. Range	-40°F to 225°F	-46°C to 106°C
Weight Approximate		
Standard	3-1/4 lbs	1.46 kg
500 PSIG	3-3/4 lbs	1.69 kg
	Cv=0.10	

Ports



P39 Special Build Gas Dimensions



Dimensions Table		A	B	C	D
P39 w/T-Handle 0-30, 0-60, 0-120, 0-150, 0-225 PSIG range	mm	156	58	85	64
	inches	6.14	2.3	3.33	2.50
P39 w/Allen Head 0-30, 0-60, 0-120, 0-150, 0-225 PSIG range	mm	150	58	85	19
	inches	5.90	2.30	3.33	0.75
P39 w/T-Handle 0-500 PSIG range	mm	177	75	85	152
	inches	6.98	2.96	3.33	6.0
P39 w/Allen Head 0-500 PSIG range	mm	172	75	85	32
	inches	6.78	2.96	3.33	1.25

MERCER VALVE CO., INC.
91 SERIES SAFETY RELIEF VALVES

INSTALLATION AND OPERATION
INSTRUCTIONS

INSTALLATION

The safety relief valve should always be installed on a tank or piping run in a vertical position with the outlet pointing in a horizontal direction. When screwing the valve into the inlet piping, always use a wrench on the inlet connection hex, never wrench on the relief valve body.

One of the most common causes of early failure of relief valves is dirt trapped on the valve seat. Welding slag and/or piping teflon tape are among the more common items that cause difficulty. It is recommended that all piping and tank systems be cleaned prior to installation of the relief valve.

A relief valve mounted on a tank should be connected with the minimum amount of piping between the tank and the valve. Further, all piping used must be equal or larger than the inlet pipe size of the relief valve, never smaller. Any restriction of the inlet to a relief valve may cause unusual valve chatter or relief capacities below the design rating of the valve which could result in serious damage. Outlet piping from the relief valve should be less than four (4) feet in length and never of a pipe size smaller than the outlet pipe size of the relief valve. Long runs of small diameter pipe on the outlet size of a relief valve will create a serious hazard to life and property.

Extreme caution is required in the outlet piping if installed outdoors where the liquids, if present, could form an ice block in the piping of the relief valve body in below freezing weather. Discharge lines must be "weather capped" and provided with a drain hole to prevent any liquid collection in the relief valve body or outlet piping. If these precautions are not taken, serious damage and injury will result.

Additional, important installation factors are contained in paragraph UG-135, Section VIII of the ASME Code.

OPERATION

Best performance in process work is usually obtained by setting the safety relief valve to open at least 10% above the operating pressure where possible. A greater margin of 20-30% is desirable, however, this setting must not exceed the maximum working pressure of the vessel. All Mercer Safety Relief Valves are checked for bubble-tight seat closures at 90% of set pressure.

In addition to checking the set pressure vs. the maximum allowable working pressure of the vessel, also check to insure that back pressure and temperature limitations of the process are consistent with valve ratings. Note that the Mercer 91 Series Valve with a viton seat is suitable for the temperature range of -20° to +400°F. Service outside of these ranges will require special materials. Further, carefully check the process, fluid input capacities to insure that the relief valve, relieving capacity is greater than the process capability.

DO NOT BREAK THE SEAL WIRE. to do so invalidates the Manufacturer's warranty to repair or replace the valve. Should resetting be required in a field emergency situation, it should be performed by qualified personnel with calibrated instrumentation. Note that the ASME Section VIII code prohibits resetting a relief valve more than $\pm 10\%$ of the original setting up to 250 PSI set pressures and $\pm 5\%$ above 250 PSI set pressures. Consult the factory for additional resetting information.

WARRANTY

Mercer warrants the goods delivered hereunder to be free from defects in material and workmanship, under normal use and service, for a period of one year after date of shipment. Mercer's obligation under this warranty is limited to repair or replacement, at Mercer's sole option, of any defective item. Mercer's liability under this warranty is conditioned upon Purchaser giving Mercer immediate written notice of any such defect. Mercer shall have the option of requiring the return of the defective part, transportation prepaid, to establish the claim. Any repair or replacement of defective goods or parts will occur at Mercer's plant in Oklahoma City, Oklahoma and Purchaser shall bear all freight costs incurred in transporting defective goods or parts to and from Mercer's plant. Mercer shall not be held liable for damages caused by delay in repair or replacement of any defective items. The provisions in the Mercer literature and specifications are descriptive only, unless expressly stated as warranties. EXCEPT FOR THE FOREGOING, MERCER EXPRESSLY DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. MERCER'S liability to the Purchaser, arising out of the supplying of the said goods or their use, whether based upon warranty, contract or negligence, shall not in any case exceed the cost of correcting defects in, or replacing, the equipment as herein provided and upon the expiration of said one year all such liability shall terminate, Mercer shall not in any event be held liable for any special, indirect or consequential damages.

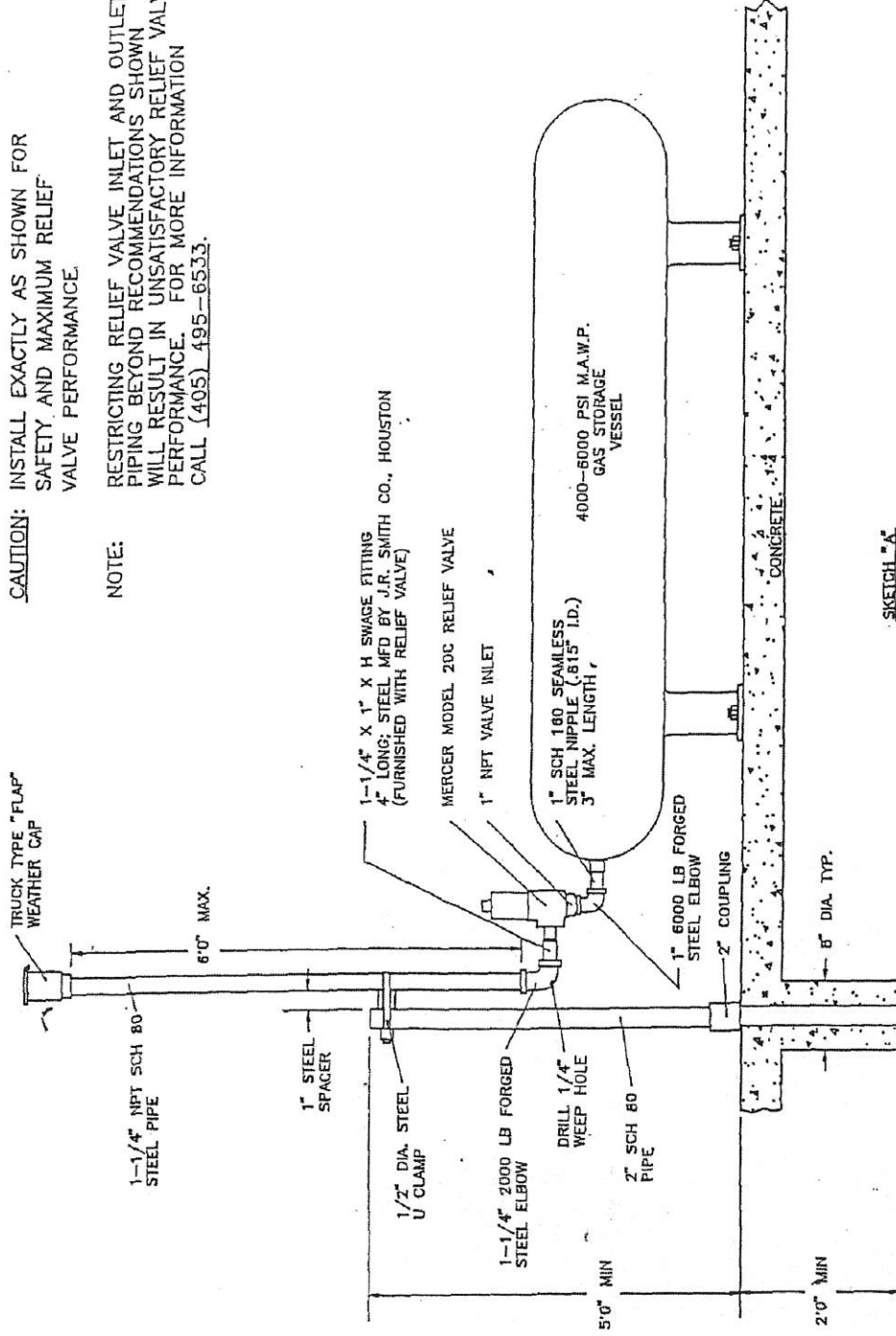
MERCER VALVE CO., INC.
9609 N.W. 4th
Oklahoma City, OK 73127
405-495-6533

FORM MCVI - 4 1 - 15 - 96

REV	DESCRIPTION	EGH	DATE
A	FIRST ISSUE	-	7/14/94

CAUTION: INSTALL EXACTLY AS SHOWN FOR SAFETY AND MAXIMUM RELIEF VALVE PERFORMANCE.

NOTE: RESTRICTING RELIEF VALVE INLET AND OUTLET PIPING BEYOND RECOMMENDATIONS SHOWN WILL RESULT IN UNSATISFACTORY RELIEF VALVE PERFORMANCE. FOR MORE INFORMATION CALL (405) 495-6533.



SKETCH "A"
RECOMMENDED INSTALLATION FOR EMERGENCY
RELIEF VALVE OPERATION

PART NO.		MATERIAL		QUANTITY	

NO. 038

WELLS ENGINEERING SERVICES
INCORPORATED
P.O. BOX 1174
TULSA, OKLAHOMA 74101
THREE PLATE INCHES & OVER
HOLLOW AT
ALL DIMENSIONS IN INCHES

DATE: 7/14/94
DRAWN BY: [Signature]
CHECKED BY: [Signature]

MERCER VALVE CO.
9100 MODEL 20C S.R.V. INSTALLATION SKETCH
HIGH PRESSURE GAS STORAGE
ENG 209

Mercer Valve 9100 Series Safety Relief Valve



Mercer Valve 9100 Series Safety Relief Valves are the "State of the Art" in soft seat, high flow rate, pressure relieving devices. This unique design was developed especially for the emerging CNG and other very high pressure applications. Advantages include:
 HIGH FLOW RATES PREMIUM QUALITY LOW COST EXTENDED SEAT LIFE ACCURATE SETTINGS LOW BLOW DOWN

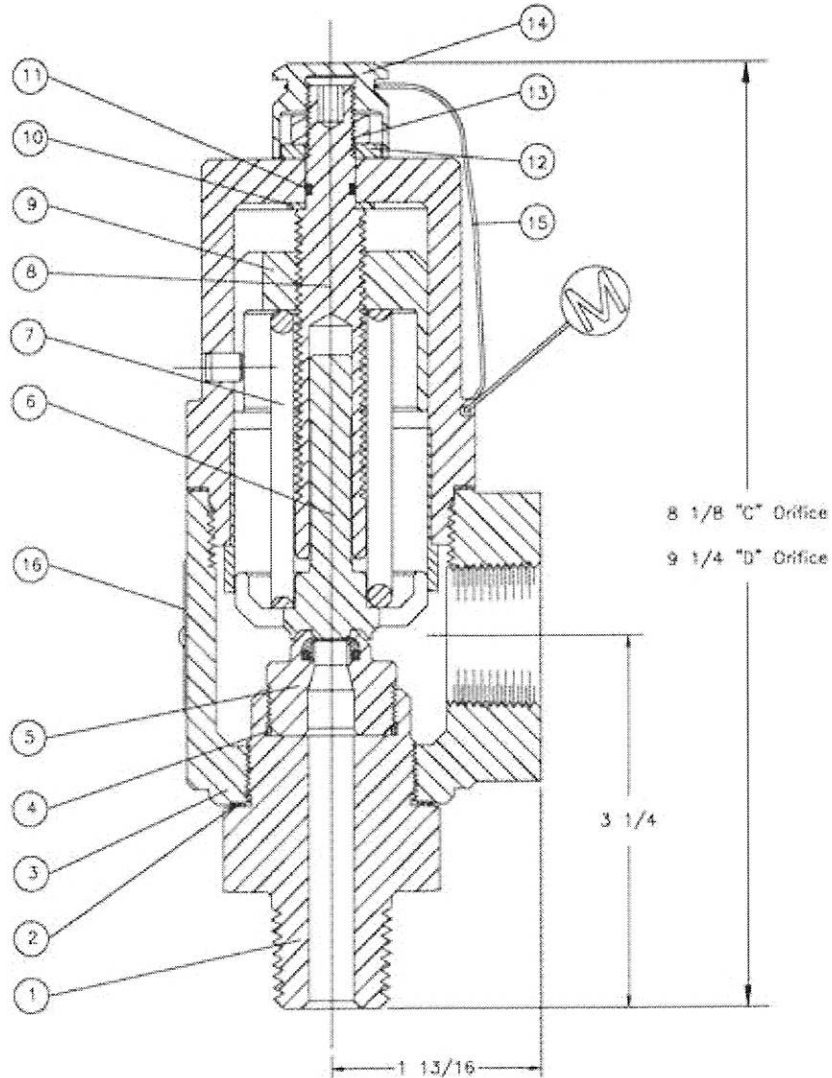
All 9100 Series Valves are built in accordance with the requirements of the ASME Boiler and Pressure Vessel Code. Capacity ratings were established by testing performed at the National Board of Boiler and Pressure Vessel Inspectors, Columbus, Ohio.

SPECIFICATIONS

Orifice Letter	C	D
Orifice Diameter (in.)	0.281	0.394
API Orifice Area (sq. in.)	---	0.110
ASME Actual Orifice Area (sq. in.)	0.062	0.122
Inlet Sizes Offered	3/4", 1"	1"
Pressure Ranges (psig)	3000-8700	3000-7500
ASME Gas "Slope" (90%)	3.100	7.210
Flow Coefficient "K" (90%) Gas	0.818	0.818
ASME Flow Coefficient "K" (90%) Liquid	0.707	0.707

Mercer Valve 9100 Series Safety Relief Valve

9100 SERIES MODEL 20



ITEM	ITEM NAME	STANDARD MATERIALS
1	INLET BASE	STAINLESS STEEL
2	BASE SEAL	SOFT CARBON STEEL
3	BODY SUBASSEMBLY	CARBON STEEL
4	O-RING	VITON
5	NOZZLE SUBASSEMBLY	STAINLESS STEEL
6	DISK SUBASSEMBLY	STAINLESS STEEL
7	SPRING	17-7 PH STAINLESS STEEL
8	ADJUSTMENT SCREW	STAINLESS STEEL
9	ADJUSTMENT BUSHING	STAINLESS STEEL
10	WASHER	STAINLESS STEEL
11	O-RING	BUNA N
12	WASHER	CARBON STEEL
13	LOCK NUT	CARBON STEEL
14	CAP	ALUMINUM
15	LOCK WIRE	STAINLESS STEEL WIRE WITH LEAD SEAL
16	NAME PLATE	STAINLESS STEEL

Mercer Valve 9100 Series Safety Relief Valve

SELECTION TABLE

Valve Size Inlet and Outlet	Available Orifice Size	Inlet/Outlet P/N: Code	Maximum Pressure Limit (psig) 1	Dimensions (in) 1/16 A x B x C	Approximate Weight (lb)
3/4" MNPT x 1" FNPT	C	M2	8700	3-1/4 x 1-13/16 x 8-1/8	4.5
3/4" MNPT x 1-1/4" FNPT	D	M2	7500	3-1/4 x 1-13/16 x 9-1/4	5
1" MNPT x 1" FNPT	C	M7	8700	3-1/4 x 1-13/16 x 8-1/8	4.5
1" MNPT x 1-1/4" FNPT	D	M7	7500	3-1/4 x 1-13/16 x 9-1/4	5
3/4" CODE 62 x 1" FNPT	C	62	6200	3-1/4 x 1-13/16 x 8-1/8	4.5
3/4" CODE 62 x 1-1/4" FNPT	D	62	6000	3-1/4 x 1-13/16 x 9-1/4	5
1" 1500lb RF x 1-1/2" 300lb RF	C, D	26	3705	5-7/8 x 5-1/2 x 11-1/2	23
1" 2500lb RF x 1-1/2" 300lb RF	C, D	76	6170	5-7/8 x 5-1/2 x 11-1/2	24
1" 1500lb RF x 2" 300lb RF	C, D	32	3705	5-1/4 x 5-1/2 x 10-7/8	24
1" 2500lb RF x 2" 300lb RF	C, D	77	6170	5-1/4 x 5-1/2 x 10-7/8	25

Notes:

1) Flanged Pressure Limits are lowered with Temperature. Pressure Limits for temperature above 100°F can be found in **ASME B16.5**

Safety Pop-Off Valves

Heavy Duty, High Capacity Safety Pop-Off Valves

Features:

- designed to protect un-fired pressure vessels from over-pressure
- all brass construction with chrome steel ball on a precision machined brass seat
- equipped with a pull ring for manual testing
- ASME Code, National Board Certified
- maximum temperature: **400°F (204°C)**

½" male NPT

Preset Pressure PSI	SCFM	<i>Brass</i> Part #
30	73	<i>SV30HD</i>
100	211	<i>SV100HD</i>
125	254	<i>SV125HD</i>
150	303	<i>SV150HD</i>
175	346	<i>SV175HD</i>
200	395	<i>SV200HD</i>



Features

- All NPT connections are in the valve body to allow in-line piping
- No Minimum Operating Pressure Differential required
- Broadest range of applications
- Mountable in any position

Construction

Valve Parts in Contact with Fluids		
Body	Brass	303 Stainless Steel
Seals and Disc	NBR or Cast UR, as Listed	
Core Tube	305 Stainless Steel	
Core and Plugnut	430F Stainless Steel	
Core Springs	302 Stainless Steel	
Shading Coil	Copper	Silver
Disc-Holder	CA	
Core Guide	CA (10.1 and 17.1 Watt only)	

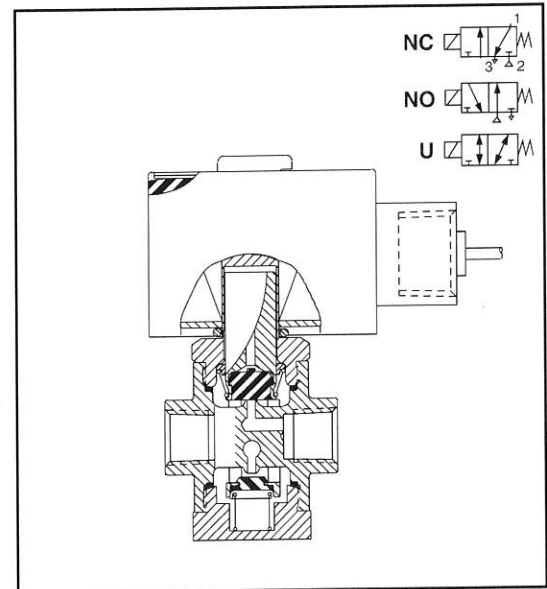
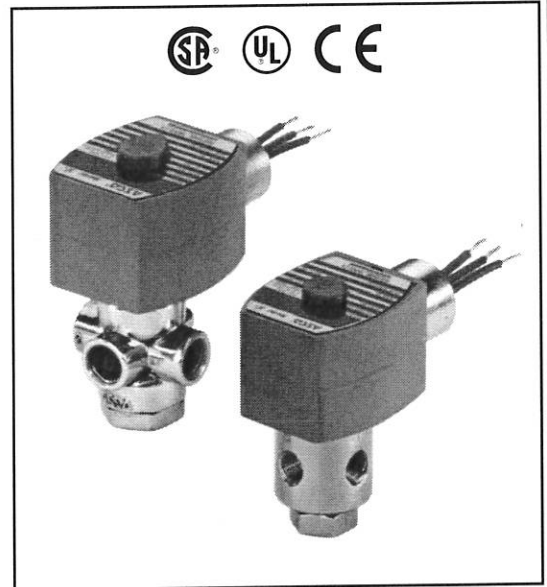
Electrical

Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part Number			
	DC Watts	AC			General Purpose		Explosionproof	
		Watts	VA Holding	VA Inrush	AC	DC	AC	DC
F	10.6	6.1	16	30	238210	238310	238214	238314
F	-	9.1	25	40	238210	-	238214	-
F	11.6	10.1	25	50	238610	238710	238614	238714
F	22.6	17.1	40	70	238610	238710	238614	238714

Standard Voltages: 24, 120, 240, 480 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz).
 6, 12, 24, 120, 240 volts DC. Must be specified when ordering. Other voltages are available when required.

Solenoid Enclosures

Standard: Watertight, Types 1, 2, 3, 3S, 4, and 4X.
Optional: Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9.
 (To order, add prefix "EF" to the catalog number.)
 See *Optional Features Section* for other available options.



Nominal Ambient Temp. Ranges

AC: 32°F to 125°F (0°C to 52°C)
 DC: 32°F to 104°F (0°C to 40°C)
Note: Some stainless steel constructions are rated -40°F (-40°C). See note ④ in specifications table.
 Refer to *Engineering Section* for details.

Approvals

CSA certified. UL listed General Purpose Valves.
 Meets applicable CE directives.
 SIL 3 capable per IEC 61508 on normally closed const.
 Third party certification provided by EXIDA.
 Refer to *Engineering Section* for details.

Specifications (English units)

Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Operating Pressure Differential (psi)						Max. Fluid Temp. °F		Brass Body		Stainless Steel Body		Watt Rating/ Class of Coil Insulation ②	
			Max. AC			Max. DC			AC	DC	Catalog Number	Const. Ref.	Catalog Number	Const. Ref.	AC	DC
			Air-Inert Gas	Water	Lt. Oil @ 300 SSU	Air-Inert Gas	Water	Lt. Oil @ 300 SSU								
UNIVERSAL OPERATION (Pressure at any port)																
1/8	3/64	0.06	175	175	175	125	125	125	140	120	8320G130 ①	1	8320G140 ①	1	9.1F	10.6F
1/8	1/16	0.09	100	100	100	65	65	65	180	120	8320G001	1	8320G041 ③	1	9.1F	10.6F
1/8	1/16	0.09	175	175	175	125	125	125	200	150	8320G212	4	8320G221 ④	4	17.1/F	22.6/F
1/8	3/32	0.12	50	50	50	50	50	50	180	120	8320G083	1	8320G087 ③	1	6.1/F	10.6/F
1/8	3/32	0.12	100	100	100	60	60	60	200	150	8320G213	4	8320G222 ④	4	17.1/F	11.6/F
1/8	1/8	0.21	30	30	30	20	20	20	180	120	8320G003	1	8320G043 ③	1	9.1/F	10.6/F
1/8	1/8	0.21	50	50	50	25	25	25	200	150	8320G214	4	8320G223 ④	4	17.1/F	11.6/F
1/4	1/16	0.09	125	130	130	75	75	75	200	150	8320G172	2	-	-	10.1/F	11.6/F
1/4	1/16	0.09	175	175	175	125	125	125	200	150	-	-	8320G230 ④	3	17.1/F	22.6/F
1/4	3/32	0.12	100	100	100	60	60	60	200	150	8320G174	2	8320G200 ③④	3	17.1/F	11.6/F
1/4	1/8	0.25	50	50	50	25	25	25	200	150	8320G176	2	8320G201 ③④	3	17.1/F	11.6/F
1/4	11/64	0.35	20	20	20	12	12	12	200	150	8320G178	2	-	-	10.1/F	11.6/F
NORMALLY CLOSED (Closed when de-energized) – PFD_{AVG} = 6.81 x 10⁻⁴																
1/8	3/64	0.06	200	200	200	200	200	200	180	120	8320G132	1	8320G142 ③	1	6.1F	10.6/F
1/8	1/16	0.09	150	125	125	125	125	125	180	120	8320G013	1	8320G045 ③	1	6.1F	10.6/F
1/8	1/16	0.09	210	225	225	160	160	160	200	150	8320G215	4	8320G224 ④	4	17.1/F	11.6/F
1/8	3/32	0.12	100	100	100	100	100	100	180	120	8320G015	1	8320G047 ③	1	6.1F	10.6/F
1/8	3/32	0.12	150	150	150	115	115	115	200	150	8320G216	4	8320G225 ④	4	10.1/F	11.6/F
1/8	1/8	0.21	40	40	40	40	40	40	180	120	8320G017	1	8320G049 ③	1	6.1F	10.6/F
1/8	1/8	0.21	85	85	85	60	60	60	200	150	8320G217	4	8320G226 ④	4	10.1/F	11.6/F
1/4	1/16	0.09	210	225	225	160	160	160	200	150	8320G182	2	8320G231 ④	3	17.1/F	11.6/F
1/4	3/32	0.12	150	150	150	115	115	115	200	150	8320G184	2	8320G202 ③④	3	10.1/F	11.6/F
1/4	1/8	0.25	85	85	85	60	60	60	200	150	8320G186	2	8320G203 ③④	3	10.1/F	11.6/F
1/4	11/64	0.35	45	45	45	25	25	25	200	150	8320G188	2	-	-	10.1/F	11.6/F
NORMALLY OPEN (Open when de-energized)																
1/8	3/64	0.06	200	200	200	200	200	200	180	120	8320G136	1	8320G146 ③	1	6.1F	10.6/F
1/8	1/16	0.09	150	125	125	125	125	125	180	120	8320G027	1	8320G051 ③	1	6.1F	10.6/F
1/8	1/16	0.09	235	250	250	160	160	160	200	150	8320G218	4	8320G227 ④	4	17.1/F	11.6/F
1/8	3/32	0.12	100	100	100	100	100	100	180	120	8320G029	1	8320G053 ③	1	6.1F	10.6/F
1/8	3/32	0.12	150	140	140	100	100	100	200	150	8320G219	4	8320G228 ④	4	10.1/F	11.6/F
1/8	1/8	0.21	40	40	40	40	40	40	180	120	8320G031	1	8320G055 ③	1	6.1F	10.6/F
1/8	1/8	0.21	70	70	70	55	55	55	200	150	8320G220	4	8320G229 ④	4	10.1/F	11.6/F
1/4	1/16	0.09	235	250	250	160	160	160	200	150	8320G192	2	8320G232 ④	3	17.1/F	11.6/F
1/4	3/32	0.12	150	140	140	100	100	100	200	150	8320G194	2	8320G204 ③④	3	10.1/F	11.6/F
1/4	1/8	0.25	70	70	70	55	55	55	200	150	8320G196	2	8320G205 ③④	3	10.1/F	11.6/F
1/4	11/64	0.35	40	40	40	30	30	30	200	150	8320G198	2	-	-	10.1/F	11.6/F

① Supplied with cast UR disc.
 ② On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts; the watt rating for the 9.1/F solenoid is 11.1 watts.
 ③ Can be used for **dry** natural gas service with the EF prefix.
 ④ Constructions standard rated -40°F (-40°C) ambient temperature. EFX prefix and TPL # not required.

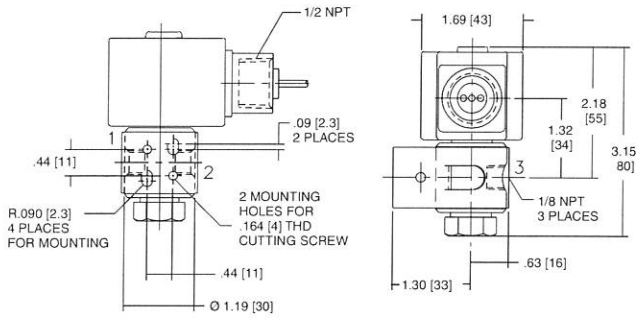
Specifications (Metric units)

Pipe Size (ins.)	Orifice Size (mm)	Kv Flow Factor (m3/h)	Operating Pressure Differential (bar)						Max. Fluid Temp. °C		Brass Body		Stainless Steel Body		Watt Rating/ Class of Coil Insulation ^②	
			Max. AC			Max. DC			AC	DC	Catalog Number	Const. Ref.	Catalog Number	Const. Ref.	AC	DC
			Air-Inert Gas	Water	Lt. Oil @ 300 SSU	Air-Inert Gas	Water	Lt. Oil @ 300 SSU								
UNIVERSAL OPERATION (Pressure at any port)																
1/8	1.2	0.05	12	12	12	9	9	9	60	49	8320G130 ①	1	8320G140 ①	1	9.1F	10.6F
1/8	1.6	0.08	7	7	7	4	4	4	82	49	8320G001	1	8320G041 ③	1	9.1F	10.6F
1/8	1.6	0.08	12	12	12	9	9	9	93	66	8320G212	4	8320G221 ④	4	17.1/F	22.6/F
1/8	2.4	0.10	3	3	3	3	3	3	82	49	8320G083	1	8320G087 ③	1	6.1/F	10.6/F
1/8	2.4	0.10	7	7	7	4	4	4	93	66	8320G213	4	8320G222 ④	4	17.1/F	11.6/F
1/8	3.2	0.18	2	2	2	1	1	1	82	49	8320G003	1	8320G043 ③	1	9.1/F	10.6/F
1/8	3.2	0.18	3	3	3	2	2	2	93	66	8320G214	4	8320G223 ④	4	17.1/F	11.6/F
1/4	1.6	0.08	9	9	9	5	5	5	93	66	8320G172	2	-	-	10.1/F	11.6/F
1/4	1.6	0.08	12	12	12	9	9	9	93	66	-	-	8320G230 ④	3	17.1/F	22.6/F
1/4	2.4	0.10	7	7	7	4	4	4	93	66	8320G174	2	8320G200 ③④	3	17.1/F	11.6/F
1/4	3.2	0.21	3	3	3	2	2	2	93	66	8320G176	2	8320G201 ③④	3	17.1/F	11.6/F
1/4	4.4	0.30	1	1	1	1	1	1	93	66	8320G178	2	-	-	10.1/F	11.6/F
NORMALLY CLOSED (Closed when de-energized) – PFD_{AVG} = 6.81 x 10⁻⁴																
1/8	1.2	0.05	14	14	14	14	14	14	82	49	8320G132	1	8320G142 ③	1	6.1F	10.6/F
1/8	1.6	0.08	10	9	9	9	9	9	82	49	8320G013	1	8320G045 ③	1	6.1F	10.6/F
1/8	1.6	0.08	14	15	15	11	11	11	93	66	8320G215	4	8320G224 ④	4	17.1/F	11.6/F
1/8	2.4	0.10	7	7	7	7	7	7	82	49	8320G015	1	8320G047 ③	1	6.1F	10.6/F
1/8	2.4	0.10	10	10	10	8	8	8	93	66	8320G216	4	8320G225 ④	4	10.1/F	11.6/F
1/8	3.2	0.18	3	3	3	3	3	3	82	49	8320G017	1	8320G049 ③	1	6.1F	10.6/F
1/8	3.2	0.18	6	6	6	4	4	4	93	66	8320G217	4	8320G226 ④	4	10.1/F	11.6/F
1/4	1.6	0.08	14	15	15	11	11	11	93	66	8320G182	2	8320G231 ④	3	17.1/F	11.6/F
1/4	2.4	0.10	10	10	10	8	8	8	93	66	8320G184	2	8320G202 ③④	3	10.1/F	11.6/F
1/4	3.2	0.21	6	6	6	4	4	4	93	66	8320G186	2	8320G203 ③④	3	10.1/F	11.6/F
1/4	4.4	0.30	3	3	3	2	2	2	93	66	8320G188	2	-	-	10.1/F	11.6/F
NORMALLY OPEN (Open when de-energized)																
1/8	1.2	0.05	14	14	14	14	14	14	82	49	8320G136	1	8320G146 ③	1	6.1F	10.6/F
1/8	1.6	0.08	10	9	9	9	9	9	82	49	8320G027	1	8320G051 ③	1	6.1F	10.6/F
1/8	1.6	0.08	16	17	17	11	11	11	93	66	8320G218	4	8320G227 ④	4	17.1/F	11.6/F
1/8	2.4	0.10	7	7	7	7	7	7	82	49	8320G029	1	8320G053 ③	1	6.1F	10.6/F
1/8	2.4	0.10	10	10	10	7	7	7	93	66	8320G219	4	8320G228 ④	4	10.1/F	11.6/F
1/8	3.2	0.18	3	3	3	3	3	3	82	49	8320G031	1	8320G055 ③	1	6.1F	10.6/F
1/8	3.2	0.18	5	5	5	4	4	4	93	66	8320G220	4	8320G229 ④	4	10.1/F	11.6/F
1/4	1.6	0.08	16	17	17	11	11	11	93	66	8320G192	2	8320G232 ④	3	17.1/F	11.6/F
1/4	2.4	0.10	10	10	10	7	7	7	93	66	8320G194	2	8320G204 ③④	3	10.1/F	11.6/F
1/4	3.2	0.21	5	5	5	4	4	4	93	66	8320G196	2	8320G205 ③④	3	10.1/F	11.6/F
1/4	4.4	0.30	3	3	3	2	2	2	93	66	8320G198	2	-	-	10.1/F	11.6/F

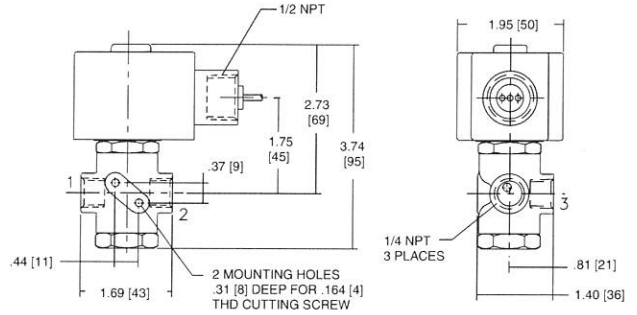
① Supplied with cast UR disc.
 ② On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts; the watt rating for the 9.1/F solenoid is 11.1 watts.
 ③ Can be used for *dry* natural gas service with the EF prefix.
 ④ Constructions standard rated -40°F (-40°C) ambient temperature. EFX prefix and TPL # not required.

Dimensions: inches (mm)

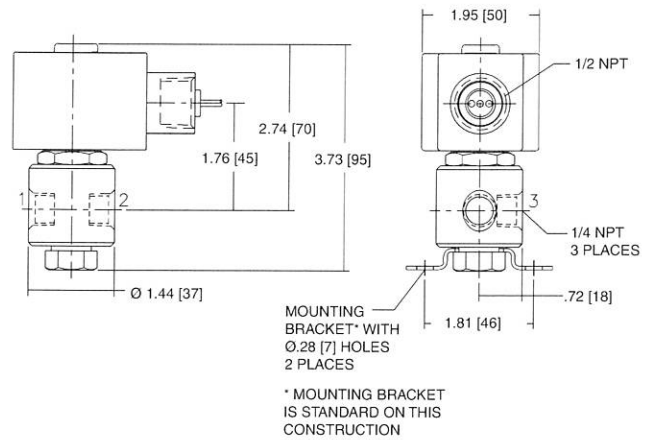
Const. Ref. 1



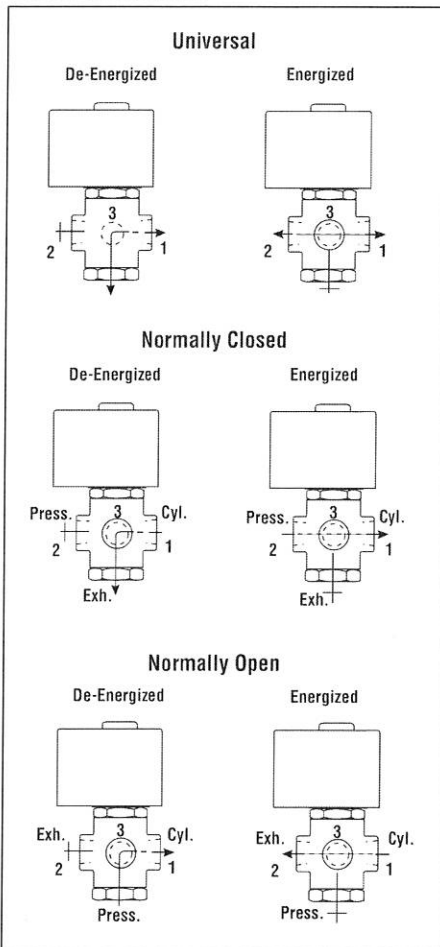
Const. Ref. 2



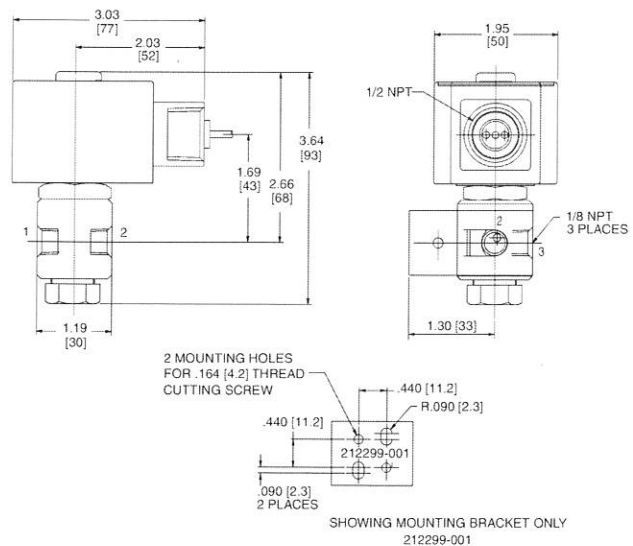
Const. Ref. 3



FLOW DIAGRAMS



Const. Ref. 4





100 Series 90 Degree Fill Valve

Application

CNG and Bio-Gas dispenser for car, bus and truck filling & CNG and Bio-Gas trailer load/unload systems.



FV103-9-000-0 90° Fill Valve

Materials

Item	Description	Material
1	90° Valve Body	6061 Aluminium
2	Valve Caps	304 Stainless Steel
3	Seats	Delrin
4	Balls	316 Stainless Steel
5	Stems	316 Stainless Steel
6	Thrusts	Delrin
7	Glands	Delrin

Item	Description	Material
8	Stem O-rings	Nitrile
9	Stem Backup	Nitrile
10	Cap & Seat O-rings	Nitrile
11	Spring Washer	304 Stainless Steel
12	Stem Nuts	304 Stainless Steel
13	Valve Handle	304 Stainless Steel
14	Handle Sleeve	Black Urethane

Product Information

All products are manufactured under ISO 9001:2008 accredited standards.

The FULL FLOW design means more gas is dispensed faster to the vehicle, maximising the number of vehicle fills per day and minimising wasted gas.

Valve designed to ANSI AGA NGV1 Standard

Valve certified to PED 97/23/EC

Port adaptors are required to attached a nozzle and are available on request. Minimum order quantity may apply.

Features & Benefits

The Oasis full flow fill valve redefines the flow rate standard for NGV gas delivery.

Intuitive fill valve operation.

All Oasis fill valves are easily serviced in the field using Oasis's product specific service kits.

Adaptors are available to extend the position of the nozzle.

Video servicing instructions available online at oasisngv.com/resources

BI-TORQ® DOUBLE ACTING ACTUATOR SIZING

AVAILABLE AIR SUPPLY PRESSURE (PSI)

MODEL	40PSI	50PSI	60PSI	70PSI	80PSI	90PSI	100PSI	115PSI
BI-32DA	34	43	55	64	71	82	87	101
BI-52DA	86	110	133	156	179	203	226	261
BI-63DA	154	196	238	280	321	363	405	468
BI-75DA	284	360	435	511	586	661	737	850
BI-85DA	408	518	629	740	851	962	1072	1238
BI-100DA	646	818	991	1163	1336	1508	1681	1939
BI-115DA	1070	1355	1640	1925	2210	2495	2780	3208
BI-125DA	1409	1783	2157	2532	2906	3280	3654	4216
BI-140DA	2009	2511	3013	3515	4018	4513	5015	5772
BI-160DA	2930	3662	4394	5127	5859	6591	7324	8422
BI-200DA	5488	6866	8239	9612	10981	12359	13732	15792
BI-270DA	12734	15919	19097	22284	25469	28654	31832	36661

ACTUATOR TORQUE OUTPUT (IN. LBS.)

FOR TORQUE VALUES OR AIR SUPPLY PRESSURES NOT LISTED, PLEASE CONSULT FACTORY

TECHNICAL DATA

ACTUATOR WEIGHTS (LBS.)

MODEL	32	52	63	75	85	100	115	125	140	160	200	270
DOUBLE ACTING	1.08	2.25	3.26	5.51	7.39	11.02	17.75	22.09	33.86	43.21	70.99	154.00
SPRING RETURN	---	2.62	3.97	6.94	9.37	14.40	23.92	26.76	45.28	65.04	111.00	192.79

ACTUATOR CYCLE TIME (SECONDS)

MODEL	32	52	63	75	85	100	115	125	140	160	200	270
CCW (DA)	0.03	0.03	0.06	0.12	0.20	0.30	0.53	0.83	0.98	1.15	1.74	4.50
CW (DA)	0.03	0.04	0.08	0.12	0.19	0.27	0.47	0.66	0.93	1.10	1.70	4.50
CCW (SR)	---	0.09	0.14	0.22	0.31	0.44	0.83	1.08	1.23	1.75	2.38	4.50
CW (SR)	---	0.09	0.14	0.22	0.33	0.46	0.78	0.90	0.97	1.34	2.19	6.20

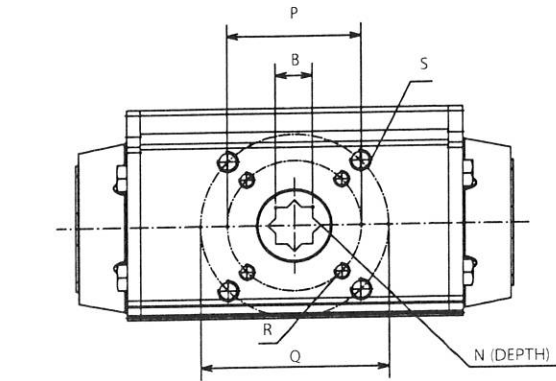
NOTE: ALL CYCLE TIMES ARE DERIVED INDEPENDENTLY OF VALVES AND ACTUATOR ACCESSORIES THAT MIGHT AFFECT OVERALL TIME PERFORMANCE.
CYCLE TIMES ARE BASED ON 80 PSI AIR SUPPLY.

ACTUATOR AIR CONSUMPTION (CUBIC INCHES)

MODEL	32	52	63	75	85	100	115	125	140	160	200	270
CCW (DA & SR)	2.318	6.590	12.143	16.232	30.206	45.340	61.023	106.852	137.91	220.052	348.080	915.359
CW (DA)	1.708	9.336	17.208	20.504	39.534	66.760	103.740	148.471	192.84	290.596	599.743	1086.226
CW (SR)	---	7.689	14.218	17.147	32.403	54.372	85.433	122.047	146.46	215.109	462.563	945.871

BI-TORQ PN-SERIES DIMENSIONAL DATA

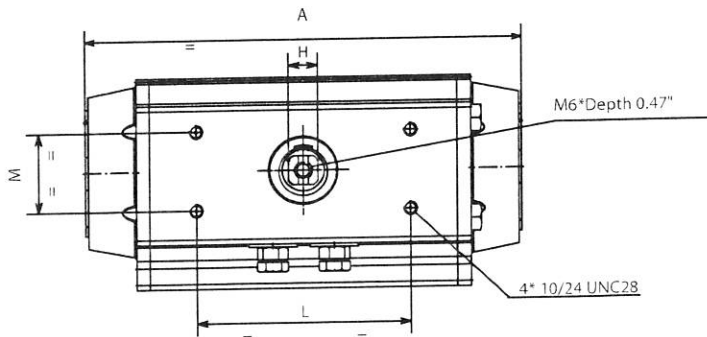
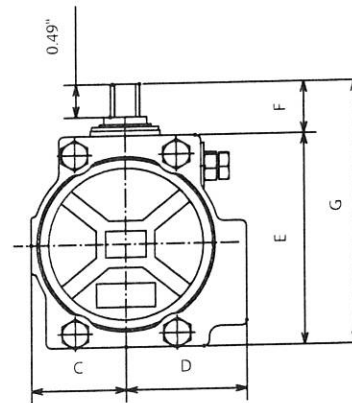
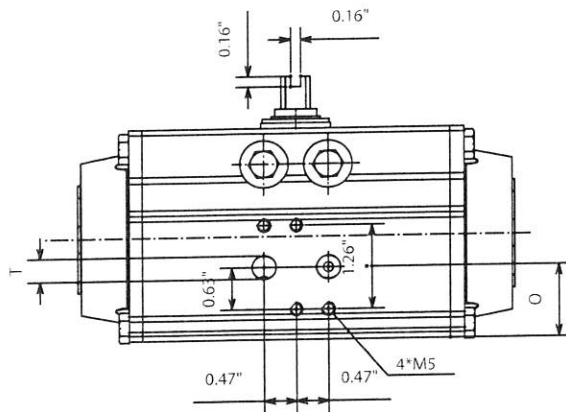
FOR ACTUATOR MODELS 52 THROUGH 140



BI-TORQ
VALVE AUTOMATION



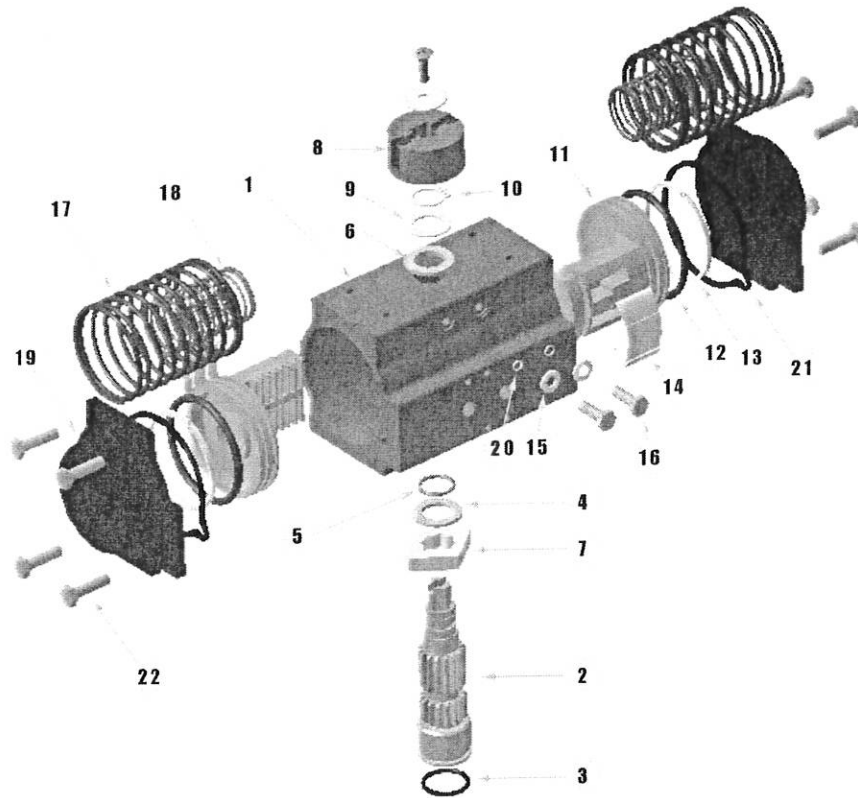
CARBO-BOND, INC.
AUTOMATED VALVE MOUNTING KITS



DIMENSIONAL DATA

	ISO 5211	A	B	C	D	E	F	G	H	K	L	M	N	O	P	Q	R (UNC)	S (UNC)	T (NPT)
PN-52	F03/F05	5.49	0.433	1.18	1.61	2.74	0.787	3.52	0.43	0.47	3.15	1.18	0.47	1.04	1.42	1.97	10-24 X 0.29	1/4-20 X 0.35	1/8"
PN-63	F05/F07	6.38	0.551	1.40	1.77	3.17	0.787	3.96	0.43	0.59	3.15	1.18	0.63	1.08	1.97	2.76	1/4-20 X 0.31	5/16-18 X 0.47	1/8"
PN-75	F05/F07	8.15	0.669	1.65	2.07	3.82	0.787	4.61	0.67	0.75	3.15	1.18	0.75	1.38	1.97	2.76	1/4-20 X 0.31	5/16-18 X 0.47	1/8"
PN-85	F05/F07	9.35	0.669	1.87	2.30	4.27	0.787	5.06	0.67	0.87	3.15	1.18	0.75	1.65	1.97	2.76	1/4-20 X 0.31	5/16-18 X 0.47	1/8"
PN-100	F07/F10	10.69	0.669	2.17	2.68	4.78	0.787	5.57	0.67	0.87	3.15	1.18	0.81	1.97	2.76	4.02	5/16-18 x 0.47	3/8-16 x 0.55	1/4"
PN-115	F07/F10	12.91	0.869	2.52	2.87	5.57	1.180	6.75	1.06	1.26	5.12	1.18	0.94	1.97	2.76	4.02	5/16-18 x 0.47	3/8-16 x 0.59	1/4"
PN-125	F07/F10	14.41	0.869	2.68	3.15	6.04	1.180	7.22	1.06	1.26	5.12	1.18	0.94	2.40	2.76	4.02	5/16-18 x 0.47	3/8-16 x 0.59	1/4"
PN-140	F10/F12	16.85	1.060	3.01	3.44	6.93	1.180	8.11	1.06	1.38	5.12	1.18	1.14	2.80	4.02	4.92	3/8-16 x 0.59	1/2-13 x 0.71	1/4"

PARTS BREAKDOWN FOR PN-52 THROUGH PN-140



PART NUMBER	DESCRIPTION	MATERIAL	TREATMENT	OPTIONAL MATERIAL	QTY. (DA)	QTY. (SR)
1	BODY	EXTRUDED ALUMINUM	HARD ANODIZED	STAINLESS	1	1
2	ANTI-BLOWOUT PINION	STEEL	NICKEL PLATED	STAINLESS	1	1
3	LOWER PINION O-RING*	NBR70	---	VITON	1	1
4	PINION SPACER RING	PTFE-15% GRAPHITE	---		1	1
5	TOP PINION O-RING	NBR70	---	VITON	1	1
6	CAM SPACER RING*	PTFE-15% GRAPHITE	---		1	1
7	STOP ADJUSTMENT	STAINLESS STEEL	---		1	1
8	POSITION INDICATOR	NYLON	---		1	1
9	PINION WASHER	STAINLESS STEEL	---		1	1
10	PINION SNAP RING	STEEL	NICKEL PLATED		1	1
11	PISTON	DIE CAST ALUMINUM	---		2	2
12	PISTON O-RING*	NBR70	---	VITON	2	2
13	ANTI-FRICTION RING*	PTFE-15% GRAPHITE	---		2	2
14	PISTON THRUST BLOCK	PTFE-15% GRAPHITE	---		2	2
15	STOP BOLT WASHER	STAINLESS STEEL	---		2	2
16	STOP BOLT	STAINLESS STEEL	---		2	2
17	EXTERNAL SPRING	STEEL	ZINC PHOSPHATE COATED		N/A	SEE SPRING CHART
18	INTERNAL SPRING	STEEL	ZINC PHOSPHATE COATED		N/A	SEE SPRING CHART
19	END CAP	DIE CAST ALUMINUM	EPOXY COATED	STAINLESS	1	1
20	STOP WASHER					
21	END CAP SEALS	NBR70	---	VITON	8	8
22	END CAP BOLTS	STAINLESS STEEL	---		8	8

*Parts subject to wear

HB Series Ball Valves

Introduction

Parker High Pressure HB4 Series Ball Valves, featuring Suparcase® ball and trunnions, provide reliable shut-off or switching functions. The Suparcase® trunnion style ball enhances the resistance of the trunnions against seizure and the resistance of the spherical ball to particle abrasion. The compact and rugged design employs spring-loaded seats for high cycle life and low operating torques at pressures up to 10,000 psig (689 bar).

Features

- Suparcase® ball/trunnion for longer cycle life
- Two-way and three-way designs
- Compact FNPT version for tight work areas
- Blow-out resistant two-piece ball/stem
- Full operating pressure at any port
- Low operating torque
- Manual, electric or pneumatic actuation
- Panel mountable to 3/8" (9.6 mm) thickness
- No packing to adjust
- Color coded fracture resistant handles
- Handle indicates direction of flow
- Positive handle stops
- Wide variety of US Customary and SI ports
- Top of stem marked to indicate flow direction
- 100% factory tested
- Compact package
- Heat code traceability

Specifications

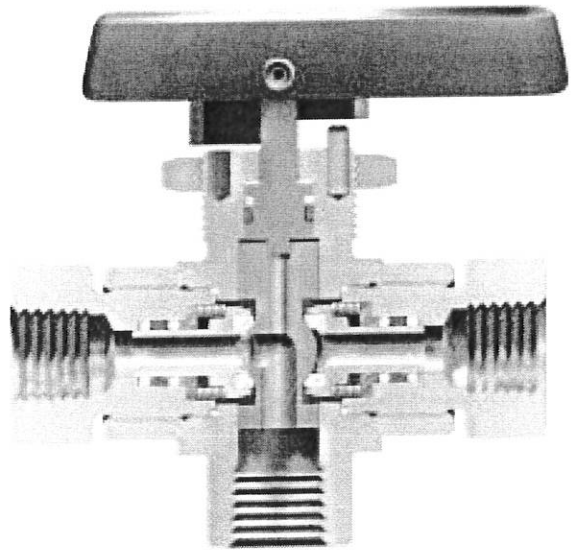
- Pressure rating: 10,000 psig (689 bar) CWP with PEEK (PKR) Seats;
6,000 psig (414 bar) CWP with PCTFE (K) Seats
- Temperature rating: -65 °F to 400 °F (-54 °C to 204 °C)
- Body material: Stainless Steel
- Body configurations: Two-way and Three-way
- Port connections: Tube compression (CPI™ / A-LOK®);
Short and Long Female NPT
- Port size: 1/8" - 1/2" (6mm to 12mm)

Flow Data

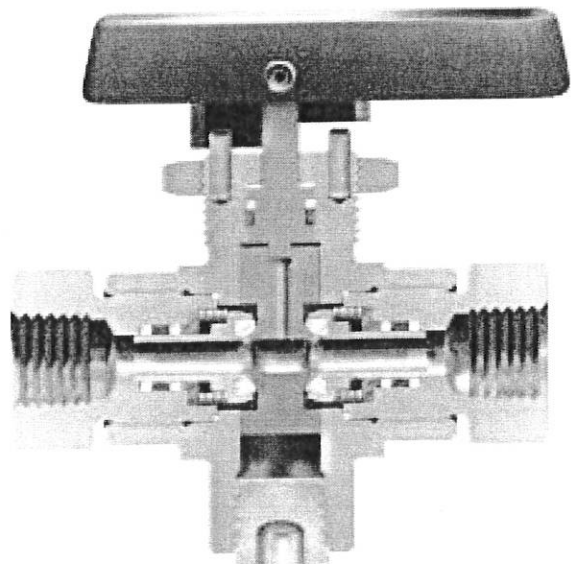
Two-way HB4L: $C_v = 1.02$; $x_T = 0.42$; Orifice = 0.188" (4.8 mm)
Three-way HB4X: $C_v = 0.62$; $x_T = 0.71$; Orifice = 0.188" (4.8 mm)
Tested in accordance with ISA S75.02. Gas flow will be choked when $P_1 - P_2 / P_1 = x_T$.

Testing

Standard production testing - valves are 100% factory tested with nitrogen at 1,000 psig (69 bar) for leakage at the seats and body seals. Both areas are required to have less than 0.1 SCCM leakage. Optional testing is available upon request. Consult your authorized Parker Instrumentation Distributor or the factory for further information.

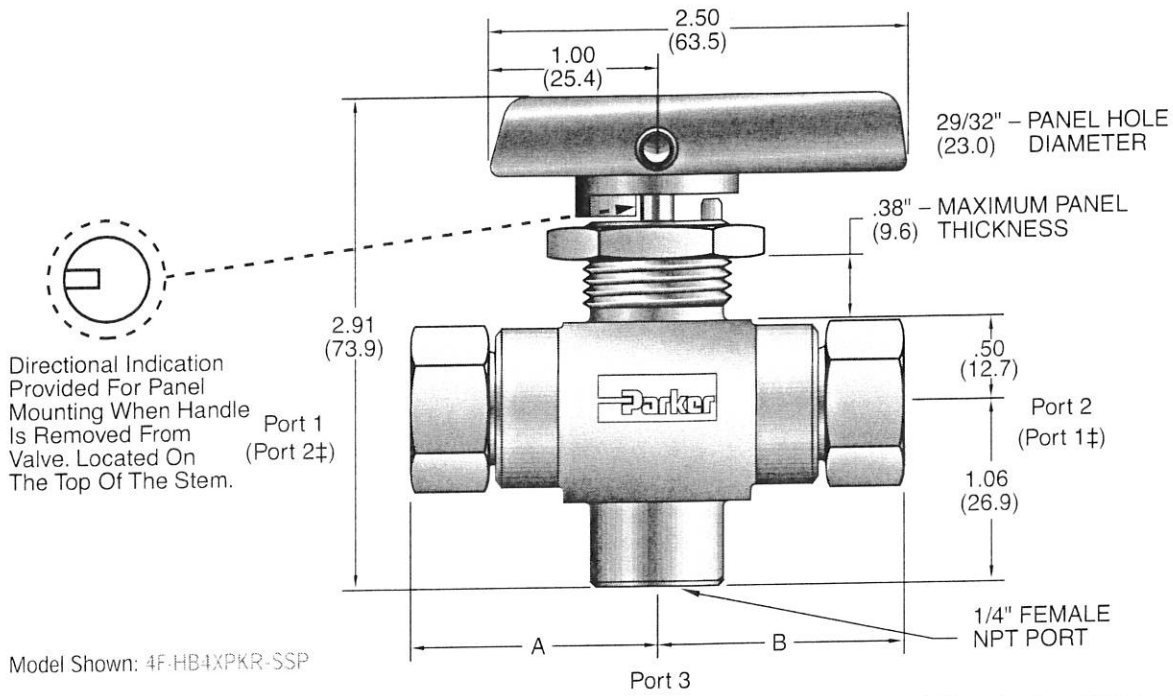


Three-way HB4X design



Two-way HB4L design

HB Series Ball Valves



() Denotes dimensions in millimeters
 ‡ For two-way valves, Port 1 is the inlet port and Port 2 is the outlet port.

Dimensions / Pressure Data

Basic Part Number*	Pressure Rating† @ 100 °F (38 °C)		End Connections		Dimensions			
			Port 1	Port 2	A††		B††	
	psig	bar			inch	mm	inch	mm
2F-HB4	10,000	689	1/8" Female NPT		1.47	37.3	1.47	37.3
4F-HB4**			1/4" Female NPT		1.47	37.3	1.47	37.3
4FL-HB4			1/4" Female NPT		1.97	50.0	1.97	50.0
4A-HB4			1/4" A-LOK® Compression		2.07	52.6	2.07	52.6
4Z-HB4			1/4" CPI™ Compression		2.07	52.6	2.07	52.6
M6A-HB4			6mm A-LOK® Compression		2.07	52.6	2.07	52.6
M6Z-HB4			6mm CPI™ Compression		2.07	52.6	2.07	52.6
6A-HB4			6,600	455	3/8" A-LOK® Compression		2.19	55.6
6Z-HB4	6,600	455	3/8" CPI™ Compression		2.19	55.6	2.19	55.6
8A-HB4	6,300	434	1/2" A-LOK® Compression		2.30	58.4	2.30	58.4
8Z-HB4	6,300	434	1/2" CPI™ Compression		2.30	58.4	2.30	58.4
M8A-HB4	7,975	550	8mm A-LOK® Compression		2.07	52.6	2.07	52.6
M8Z-HB4	7,975	550	8mm CPI™ Compression		2.07	52.6	2.07	52.6
M10A-HB4	6,525	450	10mm A-LOK® Compression		2.20	55.9	2.20	55.9
M10Z-HB4	6,525	450	10mm CPI™ Compression		2.20	55.9	2.20	55.9
M12A-HB4	6,162	425	12mm A-LOK® Compression		2.30	58.4	2.30	58.4
M12Z-HB4	6,162	425	12mm CPI™ Compression		2.30	58.4	2.30	58.4

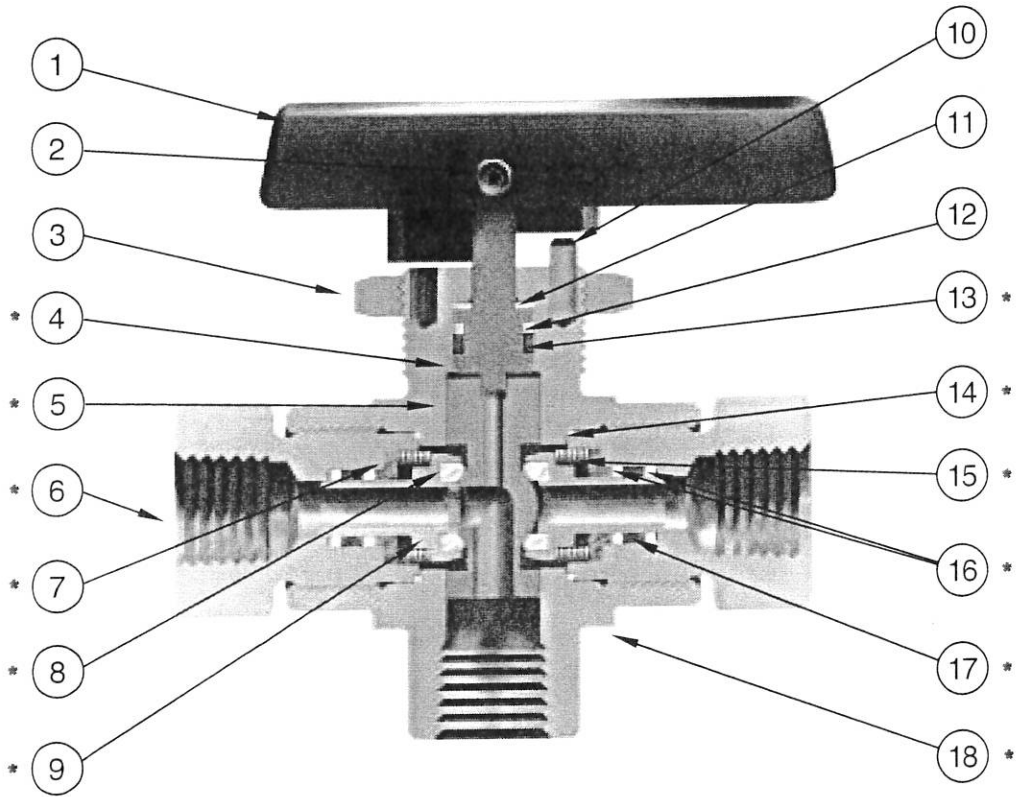
* Flow configurations are two-way (HB4L) and three-way (HB4X); Seat materials are PEEK (Polyetheretherketone) and PCTFE (Polychlorotrifluoroethylene).

** Designed with shorter end-to-end dimensions than the 4FL model to save space.

† Reduced pressure rating is determined by the maximum rated pressure of the tubing as stated in the Parker Instrument Tubing Selection Guide Bulletin 4200-TS. The working pressure ratings are limited by the seat material (PCTFE - 6,000 psig (414 bar) maximum and PEEK - 10,000 psig (689 bar) maximum) and the temperature of the application.

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

HB Series Ball Valves



Materials of Construction

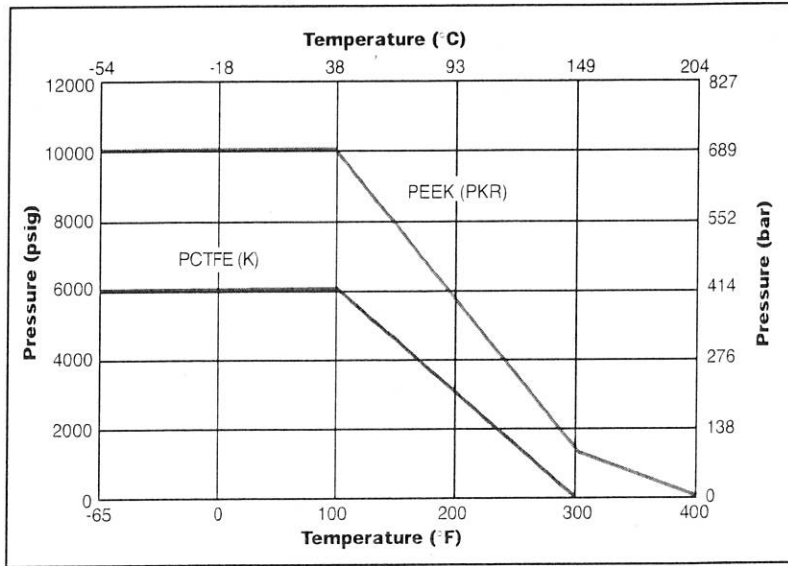
No.	Part Description	6,000 psi (414 bar)	10,000 psi (689 bar)
1	Handle/Insert	Nylon 6/6/316 SS	
2	Handle Screw	Stainless Steel	
3	Panel Nut	316 Stainless Steel	
*4	Stem	ASTM A 479 Type 316	
*5	Ball	ASTM A 479 Type 316	
*6	Port End Connector	ASTM A 479 Type 316	
*7	Spring Washer	ASTM A 479 Type 316	
*8	Seat	PCTFE	PEEK
*9	Seat Retainer	ASTM A 276 Type 316	
10	Handle Stop Pins	302 Stainless Steel	
11	Stem Washer	PEEK	
12	Stem O-ring Back-up	PTFE	
*13	Stem O-ring	Fluorocarbon Rubber**	
*14	Connector End Seal	PEEK	
*15	Spring	ASTM A 313 Type 631	
*16	Seat Retainer O-ring Back-up	PTFE	
*17	Seat Retainer O-ring	Fluorocarbon Rubber**	
*18	Valve Body	ASTM A 276 Type 316	
*19	Pipe Plug (Not shown/HB4L only)	316 Stainless Steel	

* Wetted Parts

** Optional elastomer seals available

Lubrication: Perfluorinated polyether

Pressure vs. Temperature



Note: To determine MPa, multiply bar by 0.1

This Pressure versus Temperature chart reflects the maximum temperature range of indicated materials.

When combining seat and seal materials, the most restrictive temperature rating of the seats or seals becomes the limiting factor on valve temperature range.

- Temperature Ratings:
 - Buna-N (Nitrile) Rubber: -40 °F to 250 °F (-40 °C to 121 °C)
 - Ethylene Propylene Rubber: -65 °F to 300 °F (-54 °C to 149 °C)
 - Fluorocarbon Rubber: -15 °F to 400 °F (-26 °C to 204 °C)

Flow Calculations (Two-way HB4L)

Inlet Pressure		Pressure Drop ΔP		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
psig	bar	psig	bar	gpm	m³/hr	scfm	m³/hr
100	7	1	0.1	1.0	0.2	10.8	17.4
		10	0.7	3.2	0.7	32.0	50.7
		50	3.5	7.2	1.6	50.5	76.0
1000	69	10	0.7	3.2	0.7	101.3	171.3
		100	6.9	10.2	2.3	297.7	502.3
		500	34.5	22.8	5.2	446.7	749.6
3000	207	100	6.9	10.2	2.3	542.0	919.9
		1000	69.0	32.3	7.3	1297.0	2198.9
		1500	103.4	39.5	9.0	1327.2	2248.8
6000	414	1000	69.0	32.3	7.3	2158.5	3662.7
		2000	137.9	45.6	10.4	2188.5	4388.6
		3000	206.8	55.9	12.7	2647.9	4486.8
10000	689	1000	69.0	32.3	7.3	2954.3	5020.2
		2000	137.9	45.6	10.4	3818.4	6487.0
		3000	206.8	55.9	12.7	4236.2	7194.9

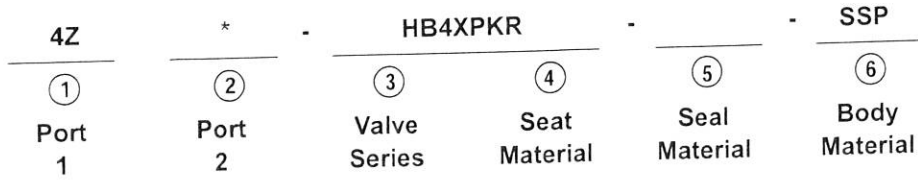
Flow Calculations (Three-way HB4X)

Inlet Pressure		Pressure Drop ΔP		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
psig	bar	psig	bar	gpm	m³/hr	scfm	m³/hr
100	7	1	0.1	0.6	0.1	6.6	10.6
		10	0.7	2.0	0.4	20.0	31.9
		50	3.5	4.4	1.0	37.1	57.4
1000	69	10	0.7	2.0	0.4	61.8	104.4
		100	6.9	6.2	1.4	187.2	316.1
		500	34.5	13.9	3.1	337.4	567.7
3000	207	100	6.9	6.2	1.4	333.1	565.4
		1000	69.0	19.6	4.5	903.4	1532.8
		1500	103.4	24.0	5.5	1004.4	1703.2
6000	414	1000	69.0	19.6	4.5	1393.5	2365.2
		2000	137.9	27.7	6.3	1803.8	3060.4
		3000	206.8	34.0	7.7	2004.9	3399.8
10000	689	1000	69.0	19.6	4.5	1858.9	3159.0
		2000	137.9	27.7	6.3	2499.6	4247.2
		3000	206.8	34.0	7.7	2903.0	4932.1

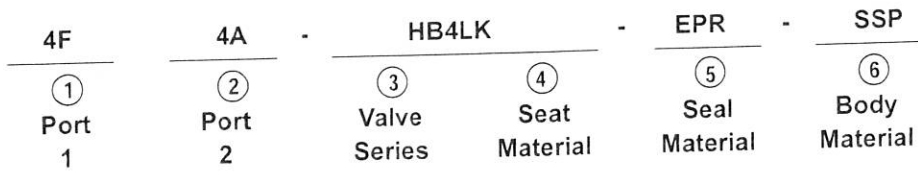
HB Series Ball Valves

How to Order

The correct part number is easily derived by following the circled number sequence. The six product characteristics required are coded as shown below. * Note: If ports 1 and 2 are the same, eliminate the port 2 designator.



Describes a HB4X, three-way ball valve with 1/4" CPI™ compression end connections for ports 1 and 2, PEEK seats and fluorocarbon rubber seals, stainless steel body construction, and a panel mounting nut. Port 3 is always a 1/4" FNPT port.

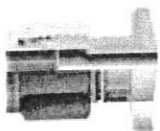


Describes a HB4L, two-way ball valve with a 1/4" female NPT port 1 and a 1/4" A-LOK® compression port 2, PCTFE seats and ethylene propylene rubber seals, stainless steel body construction, and a panel mounting nut.
 Note: Port 3 will always have a 1/4" MNPT plug when ordering a HB4L Series two-way ball valve.

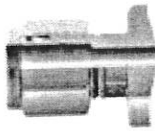
① Port 1	② Port 2	③ Valve Series	④ Seat Material	⑤ Seal Material	⑥ Body Material
2F - 1/8" Female NPT	2F - 1/8" Female NPT	HB4L (2-way)	PKR- (PEEK - Polyarylether- ketone)	Blank- (Fluorocarbon Rubber)	SSP - (Stainless Steel with Panel Nut)
4F - 1/4" Female NPT	4F - 1/4" Female NPT				
4FL - 1/4" Female NPT (Long)	4FL - 1/4" Female NPT (Long)				
4A - 1/4" A-LOK® Compression	4A - 1/4" A-LOK® Compression				
4Z - 1/4" CPI™ Compression	4Z - 1/4" CPI™ Compression				
6A - 3/8" A-LOK® Compression	6A - 3/8" A-LOK® Compression				
6Z - 3/8" CPI™ Compression	6Z - 3/8" CPI™ Compression				
8A - 1/2" A-LOK® Compression	8A - 1/2" A-LOK® Compression				
8Z - 1/2" CPI™ Compression	8Z - 1/2" CPI™ Compression				
M6A - 6mm A-LOK® Compression	M6A - 6mm A-LOK® Compression				
M6Z - 6mm CPI™ Compression	M6Z - 6mm CPI™ Compression	HB4X (3-way)	K- (PCTFE, Poly- chlorotrifluoro- ethylene)	EPR- (Ethylene Propylene Rubber)	SSP - (Stainless Steel with Panel Nut)
M8A - 8mm A-LOK® Compression	M8A - 8mm A-LOK® Compression				
M8Z - 8mm CPI™ Compression	M8Z - 8mm CPI™ Compression				
M10A - 10mm A-LOK® Compression	M10A - 10mm A-LOK® Compression				
M10Z - 10mm CPI™ Compression	M10Z - 10mm CPI™ Compression				
M12A - 12mm A-LOK® Compression	M12A - 12mm A-LOK® Compression				
M12Z - 12mm CPI™ Compression	M12Z - 12mm CPI™ Compression				

Available End Connections

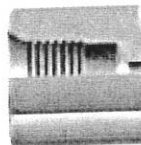
Z - One ferrule CPI™ compression port

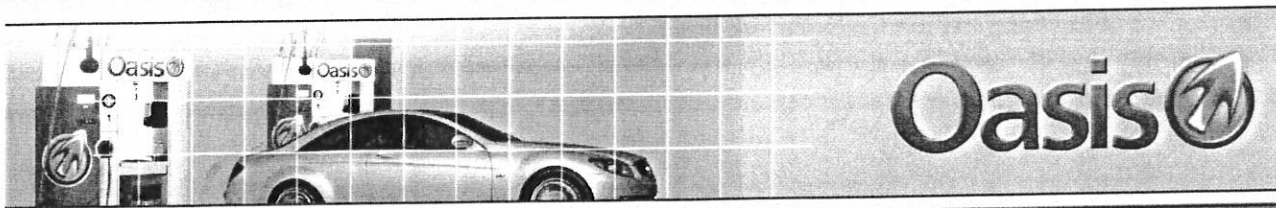


A - Two ferrule A-LOK® compression port



F - ANSI/ASME B1.20.1 internal pipe threads





Oasis

200 Series Check Valves

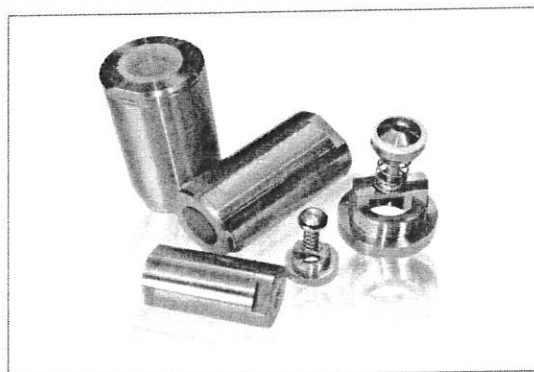
Features & Benefits

Stainless steel two-piece, serviceable check valve that sets the standard in flow rate.

Precision manufactured from certified bar stock, ensuring endurance and reliability in any application.

Suited to rapid, high frequency pulsing flow.

Easy to install service kits are readily available.



Check Valves 200 Series

Applications

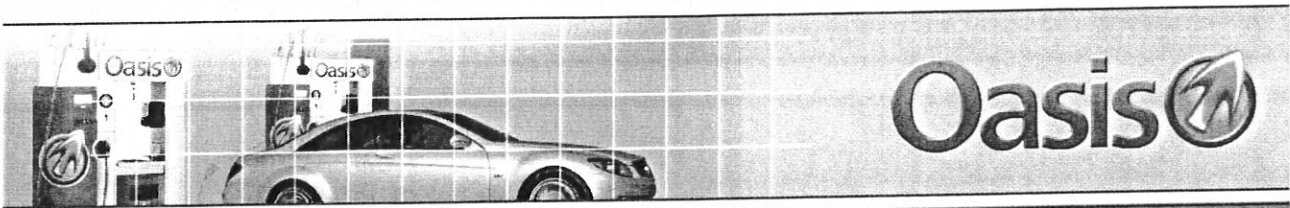
CNG Dispenser, Fill Panels, Priority Panels, Compressors, Trailers, Service Stations.

Materials

Item	Part	Material
1	Body	304 Stainless steel
2	Cap	304 Stainless steel
3	Poppet body	316 Stainless steel
4	Poppet seal	PTFE
5	Poppet retainer	316 Stainless steel
6	Poppet O-ring	Nitrile
7	Cap O-rings	Nitrile
8	Poppet spring	312 Stainless steel

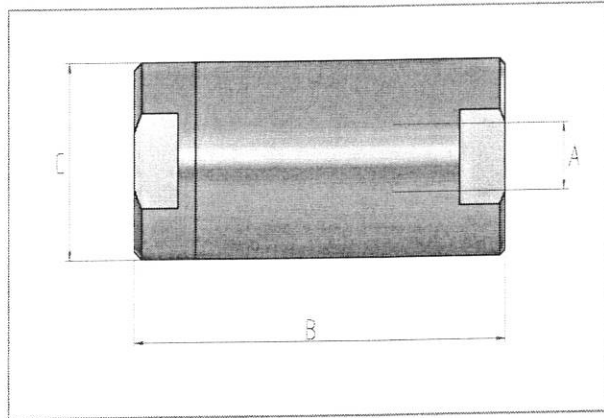
Product Information

- NPT female thread is standard configuration.
- All products are manufactured under ISO 9001:2008 accredited standards.
- Springs with different cracking pressure available upon request, minimum order quantity may apply.



Oasis

200 Series Check Valves



Dimensions (mm)

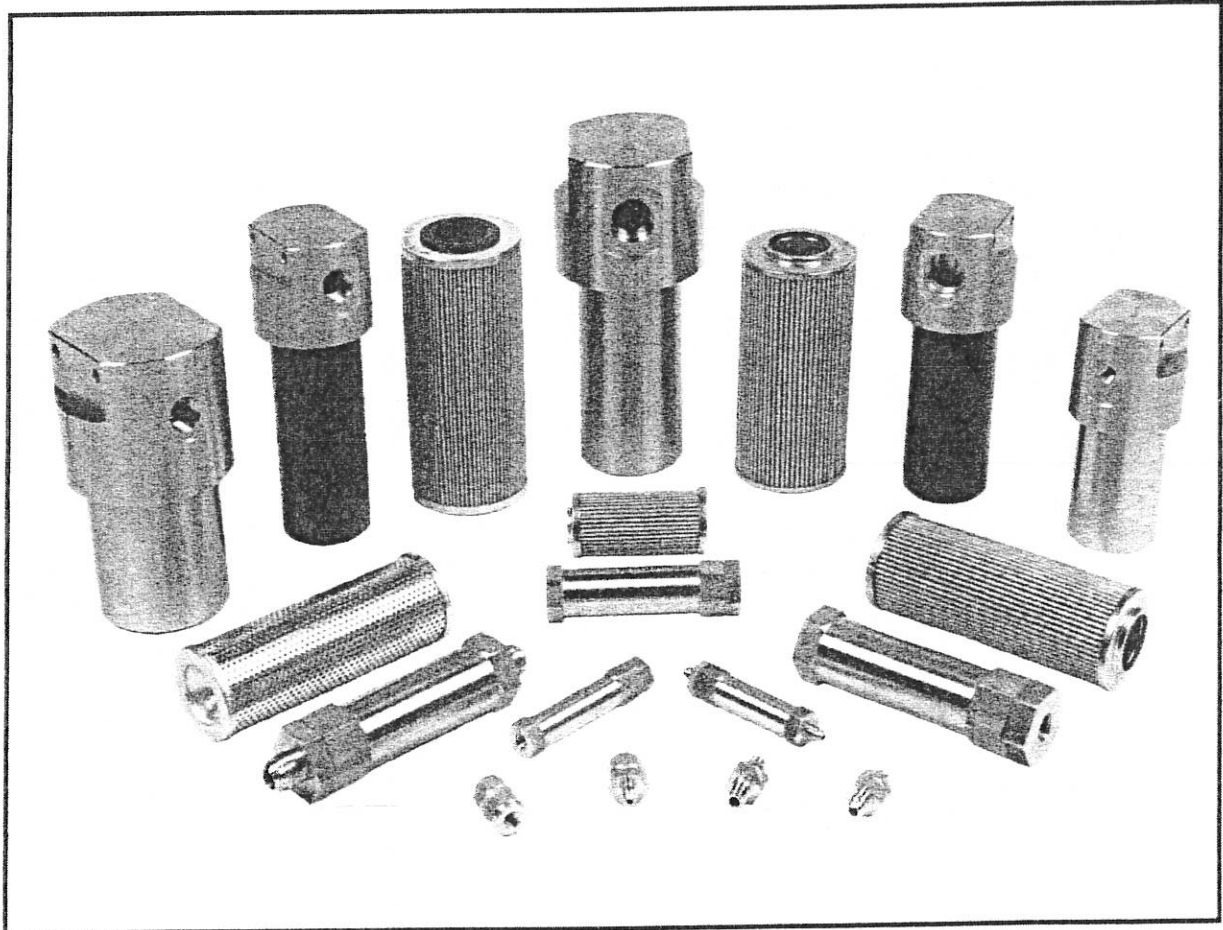
Part Code	Size	Bore A	Length B	Diameter C
CV203	3/8"	9	58	31.5
CV204	1/2"	12	73	38.2
CV206	3/4"	20	100	54.7
CV208	1"	25	109	59.8
CV212	1 1/2"	32	136	90.0

Product Specification

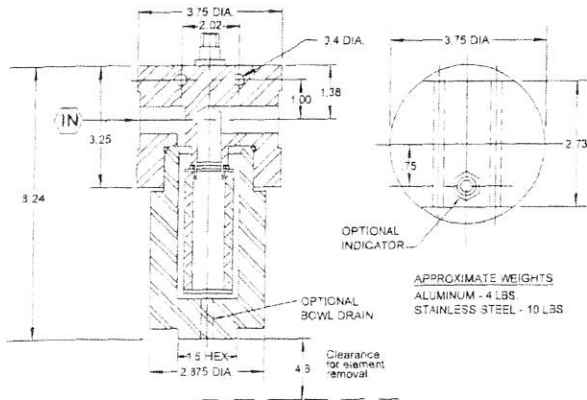
Part Code	Size	Weight Kg	Typical Min Crack Pressure Psi	Max. Operating Pressure Psi	Min Temp. °C	Max Temp. °C	Thread Type	Cv
CV203-4NTSN	3/8"	0.27	2	6000	-40	120	3/8" NPT	2.92
CV204-4NTSN	1/2"	0.48	2	6000	-40	120	1/2" NPT	5.01
CV206-4NCAN	3/4"	1.39	0.5	6000	-40	120	3/4" NPT	12.97
CV208-4NCAN	1"	1.72	0.5	6000	-40	120	1" NPT	16.92
CV212-4NTSN	1 1/2"	4.87	2	6000	-40	120	1 1/2" NPT	23.50

TGT 8500 SERIES FILTERS

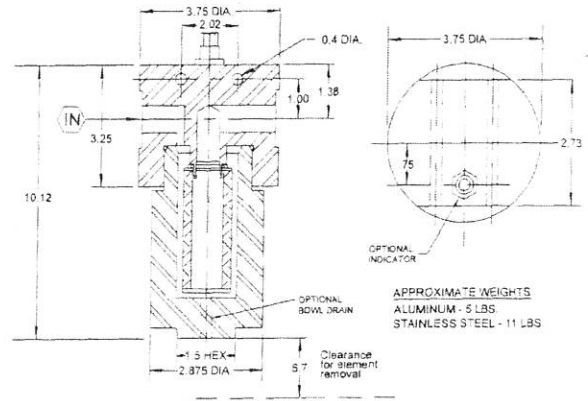
Up To 6,000 PSI



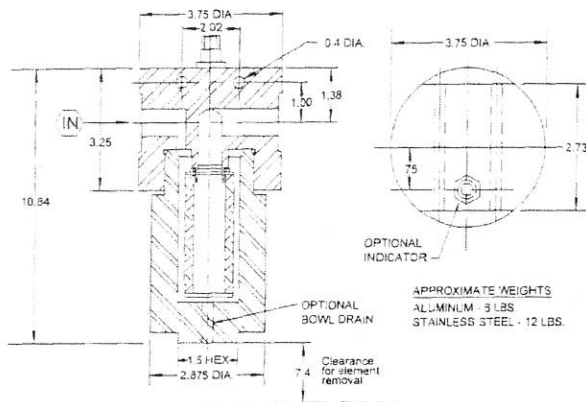
10 - GPM Size / 233 Element



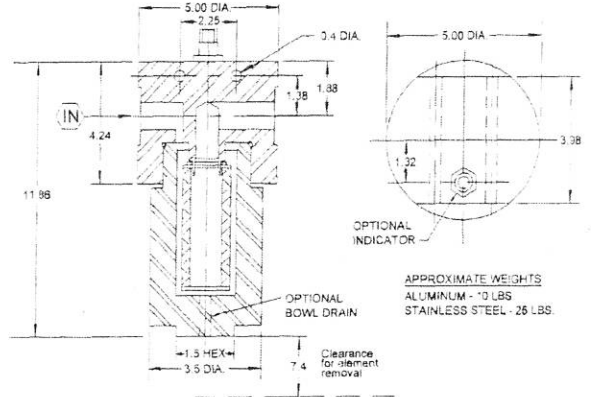
16 - GPM Size / 234 Element



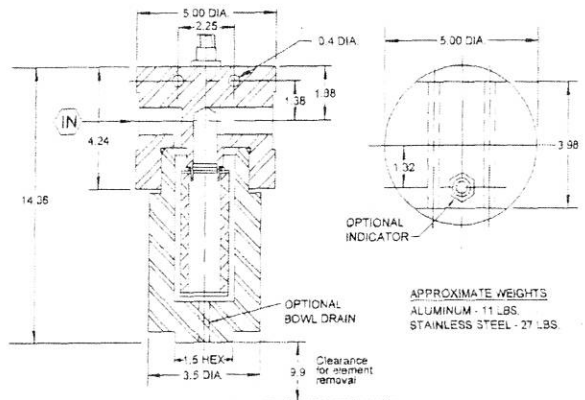
24 - GPM Size / 284 Element



35 - GPM Size / 285 Element



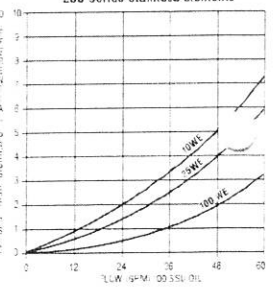
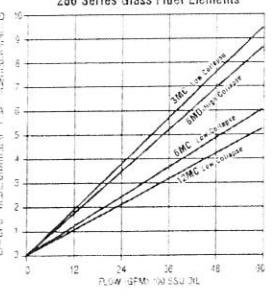
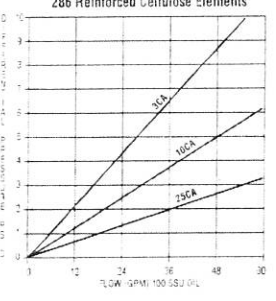
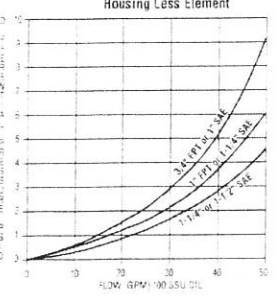
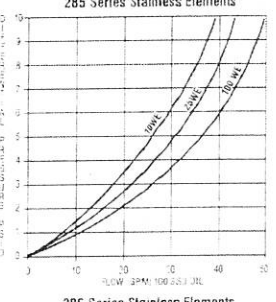
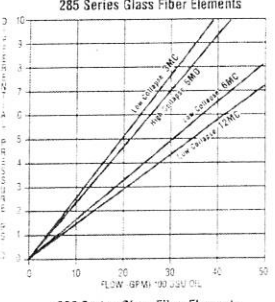
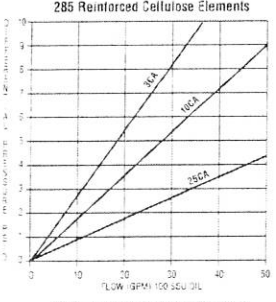
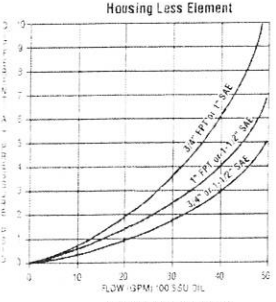
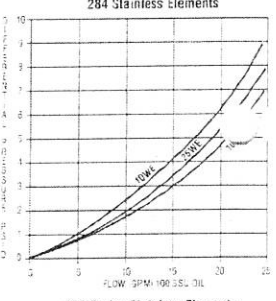
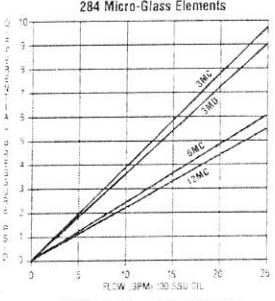
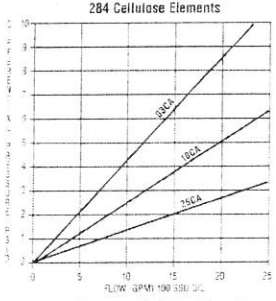
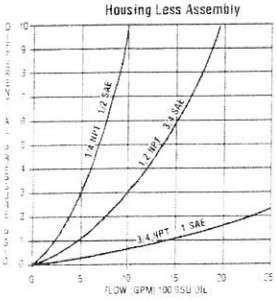
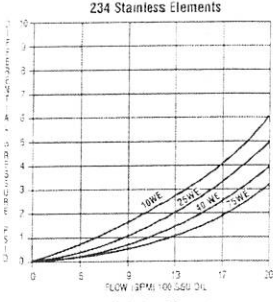
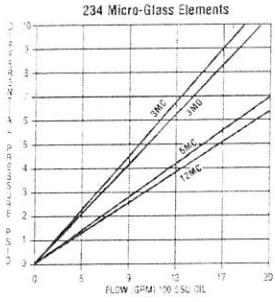
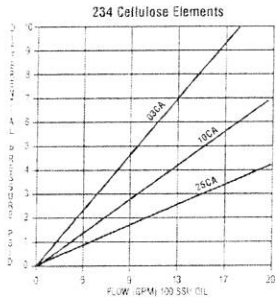
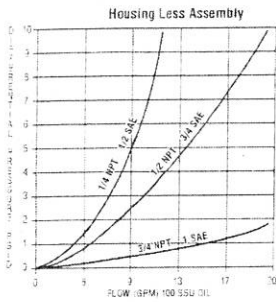
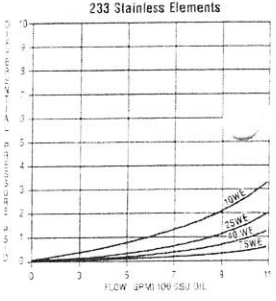
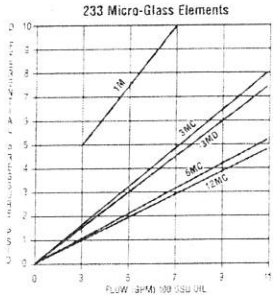
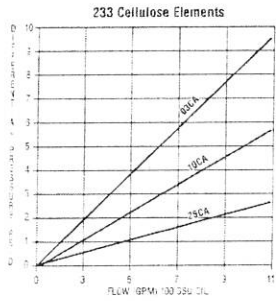
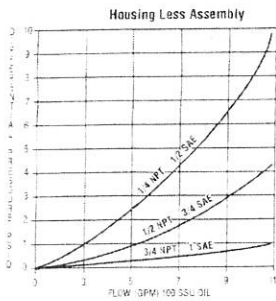
50 - GPM Size / 286 Element



Pressure Specification

Housing	A	S	G
Material	Aluminum	303 SS	316 SS
Operating (psi)	5,000	6,000	6,000
Proof (psi)	7,500	9,000	9,000
Burst (psi)	20,000	24,000	24,000

FLOW DATA (PRESSURE DROP vs. FLOW)





Parker Safety Guide for Selecting and Using Hose, Tubing, Fittings and Related Accessories

Parker Publication No. 4400-B.1
Revised: May, 2002

WARNING: Failure or improper selection or improper use of hose, tubing, fittings, assemblies or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of these Products include but are not limited to:

- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocution from high voltage electric powerlines.
- Contact with suddenly moving or falling objects that are controlled by the conveyed fluid.
- Injections by high-pressure fluid discharge.
- Dangerously whipping Hose.
- Contact with conveyed fluids that may be hot, cold, toxic or otherwise injurious.
- Sparking or explosion caused by static electricity buildup or other sources of electricity.
- Sparking or explosion while spraying paint or flammable liquids.
- Injuries resulting from inhalation, ingestion or exposure to fluids.

Before selecting or using any of these Products, it is important that you read and follow the instructions below. Only Hose from Parker's Stratoflex Products Division is approved for in flight aerospace applications, and no other Hose can be used for such in flight applications.

1.0 GENERAL INSTRUCTIONS

- 1.1 **Scope:** This safety guide provides instructions for selecting and using (including assembling, installing, and maintaining) these Products. For convenience, all rubber and/or thermoplastic products commonly called "hose" or "tubing" are called "Hose" in this safety guide. All assemblies made with Hose are called "Hose Assemblies". All products commonly called "fittings" or "couplings" are called "Fittings". All related accessories (including crimping and swaging machines and tooling) are called "Related Accessories". This safety guide is a supplement to and is to be used with, the specific Parker publications for the specific Hose, Fittings and Related Accessories that are being considered for use.
- 1.2 **Fail-Safe:** Hose, and Hose Assemblies and Fittings can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Hose or Hose Assembly or Fitting will not endanger persons or property.
- 1.3 **Distribution:** Provide a copy of this safety guide to each person that is responsible for selecting or using Hose and Fitting products. Do not select or use Parker Hose or Fittings without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- 1.4 **User Responsibility:** Due to the wide variety of operating conditions and applications for Hose and Fittings, Parker and its distributors do not represent or warrant that any particular Hose or Fitting is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
- Making the final selection of the Hose and Fitting.
 - Assuring that the user's requirements are met and that the application presents no health or safety hazards.
 - Providing all appropriate health and safety warnings on the equipment on which the Hose and Fittings are used.
 - Assuring compliance with all applicable government and industry standards.
- 1.5 **Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2.0 HOSE AND FITTING SELECTION INSTRUCTIONS

- 2.1 **Electrical Conductivity:** Certain applications require that the Hose be nonconductive to prevent electrical current flow. Other applications require the Hose and the Fitting and the Hose/Fitting interface to be sufficiently conductive to drain off static electricity. Extreme care must be exercised when selecting Hose and Fittings for these or any other applications in which electrical conductivity or nonconductivity is a factor.
- The electrical conductivity or nonconductivity of Hose and Fittings is dependent upon many factors and may be susceptible to change. These factors include but are not limited to the various materials used to make the Hose and the Fittings, fitting finish (some fitting finishes are electrically conductive while others are nonconductive), manufacturing methods (including moisture control), how the Fittings contact the Hose, age and amount of deterioration or damage or other changes, moisture content of the Hose at any particular time, and other factors. The following are considerations for electrically nonconductive and conductive Hose. For other applications consult the individual catalog pages and the appropriate industry or regulatory standards for proper selection.
- 2.1.1 **Electrically Nonconductive Hose:** Certain applications require that the Hose be nonconductive to prevent electrical current flow or to maintain electrical isolation. For these applications that require Hose to be electrically nonconductive, including but not limited to applications near high voltage electric lines, only special nonconductive Hose can be used. The manufacturer of the equipment in which the nonconductive Hose is to be used must be consulted to be certain that the Hose and Fittings that are selected are proper for the application. Do not use any Parker Hose or Fitting for any such application requiring nonconductive Hose, including but not limited to applications near high voltage electric lines, unless (i) the application is expressly approved in the Parker technical publication for the product, (ii) the Hose is marked "nonconductive", and (iii) the manufacturer of the equipment on which the Hose is to be used specifically approves the particular Parker Hose and Fitting for such use.
- 2.1.2 **Electrically Conductive Hose:** Parker manufactures special Hose for certain applications that require electrically conductive Hose. Parker manufactures special Hose for conveying paint in airless paint spraying applications. This Hose is labeled "Electrically Conductive Airless Paint Spray Hose" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in all airless paint spraying applications. Do not use any other Hose for airless paint spraying, even if electrically conductive. Use of any other Hose or failure to properly connect the Hose can cause a fire or an explosion resulting in death, personal injury, and property damage.
- Parker manufactures a special Hose for certain compressed natural gas ("CNG") applications where static electricity buildup may occur. Parker CNG Hose assemblies comply with AGA Requirements 1-93, "Hoses for Natural Gas Vehicles and Fuel Dispensers". This Hose is labeled "Electrically Conductive for CNG Use" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in, for example, high velocity CNG dispensing or transfer. Do not use any other Hose for CNG applications where static charge buildup may occur, even if electrically conductive. Use of other Hoses in CNG applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. Care must also be taken to protect against CNG permeation through the Hose wall. See section 2.6, Permeation, for more information. Parker CNG Hose is intended for dispenser and vehicle use at a maximum temperature of 180° F. Parker CNG Hose should not be used in confined spaces or unventilated areas or areas exceeding 180° F. Final assemblies must be tested for leaks. CNG Hose Assemblies should be tested on a monthly basis for conductivity per AGA 1-93. Parker manufactures special Hose for aerospace in flight applications. Aerospace in flight applications employing Hose to transmit fuel, lubricating fluids and hydraulic fluids require a special Hose with a conductive inner tube. This Hose for in flight applications is available only from Parker's Stratoflex Products Division. Do not use any other Parker Hose for in flight applications, even if electrically conductive. Use of other Hoses for in flight applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. These Hose assemblies for in flight applications must meet all applicable aerospace industry, aircraft engine, and aircraft requirements.
- 2.2 **Pressure:** Hose selection must be made so that the published maximum recommended working pressure of the Hose is equal to or greater than the maximum system pressure. Surge pressures or peak transient pressures in the system must be below the published maximum working pressure for the Hose. Surge pressures and peak pressures can usually only be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressures and cannot be used to determine surge pressures or peak transient pressures. Published burst pressure ratings for Hose is for manufacturing test purposes only and is no indication that the Product can be used in applications at the burst pressure or otherwise above the published maximum recommended working pressure.
- 2.3 **Suction:** Hoses used for suction applications must be selected to insure that the Hose will withstand the vacuum and pressure of the system. Improperly selected Hose may collapse in suction application.
- 2.4 **Temperature:** Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the Hose. Temperatures below and above the recommended limit can degrade Hose to a point where a failure may occur and release fluid. Properly insulate and protect the Hose Assembly when routing near hot objects (e.g. manifolds). Do not use any Hose in any application where failure of the Hose could result in the conveyed fluids (or vapors or mist from the conveyed fluids) contacting any open flame, molten metal, or other potential fire ignition source that could cause burning or explosion of the conveyed fluids or vapors.
- 2.5 **Fluid Compatibility:** Hose Assembly selection must assure compatibility of the Hose tube, cover, reinforcement, and Fittings with the fluid media used. See the fluid compatibility chart in the Parker publication for the product being considered or used. This information is offered only as a guide. Actual service life can only be determined by the end user by testing under all extreme conditions and other analysis.
- Hose that is chemically compatible with a particular fluid must be assembled using Fittings and adapters containing likewise compatible seals.
- 2.6 **Permeation:** Permeation (that is, seepage through the Hose) will occur from inside the Hose to outside when Hose is used with gases, liquid and gas fuels, and refrigerants (including but not limited to such materials as helium, diesel fuel, gasoline, natural gas, or LPG). This permeation may result in high concentrations of vapors which are potentially flammable, explosive, or toxic, and in loss of fluid. Dangerous explosions, fires, and other hazards can result when using the wrong Hose for such applications. The system designer must take into account the fact that this permeation will take place and must not use Hose if this permeation could be hazardous. The system designer must take into account all legal, government, insurance, or any other special regulations which govern the use of fuels and refrigerants. Never use a Hose even though the fluid compatibility is acceptable without considering the potential hazardous effects that can result from permeation through the Hose Assembly.
- Permeation of moisture from outside the Hose to inside the Hose will also occur in Hose assemblies, regardless of internal pressure. If this moisture permeation would have detrimental effects (particularly, but not limited to refrigeration and air conditioning systems), incorporation of sufficient drying capacity in the system or other appropriate system safeguards should be selected and used.
- 2.7 **Size:** Transmission of power by means of pressurized fluid vanes with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.
- 2.8 **Routing:** Attention must be given to optimum routing to minimize inherent problems (kinking or flow restriction due to Hose collapse, twisting of the Hose, proximity to hot objects or heat sources).
- 2.9 **Environment:** Care must be taken to insure that the Hose and Fittings are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals, and air pollutants can cause degradation and premature failure.
- 2.10 **Mechanical Loads:** External forces can significantly reduce Hose life or cause failure. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type Fittings or adapters may be required to insure no twist is put into the Hose. Unusual applications may require special testing prior to Hose selection.

(OVER)

- 2.11 **Physical Damage:** Care must be taken to protect Hose from wear, snagging, kinking, bending smaller than minimum bend radius, and cutting, any of which can cause premature Hose failure. Any Hose that has been kinked or bent to a radius smaller than the minimum bend radius, and any Hose that has been cut or is cracked or is otherwise damaged, should be removed and discarded.
- 2.12 **Proper End Fitting:** See instructions 3.2 through 3.5. These recommendations may be substantiated by testing to industry standards such as SAE J517 for hydraulic applications, or MIL-A-5070, AS1339, or AS3517 for Hoses from Parker's Stratoflex Products Division for aerospace applications.
- 2.13 **Length:** When establishing a proper Hose length, motion absorption, Hose length changes due to pressure, and Hose and machine tolerances and movement must be considered.
- 2.14 **Specifications and Standards:** When selecting Hose and Fittings, government, industry, and Parker specifications and recommendations must be reviewed and followed as applicable.
- 2.15 **Hose Cleanliness:** Hose components may vary in cleanliness levels. Care must be taken to insure that the Hose Assembly selected has an adequate level of cleanliness for the application.
- 2.16 **Fire Resistant Fluids:** Some fire resistant fluids that are to be conveyed by Hose require use of the same type of Hose as used with petroleum base fluids. Some such fluids require a special Hose, while a few fluids will not work with any Hose at all. See instructions 2.5 and 1.5. The wrong Hose may fail after a very short service. In addition, all liquids but pure water may burn fiercely under certain conditions, and even pure water leakage may be hazardous.
- 2.17 **Radiant Heat:** Hose can be heated to destruction without contact by such nearby items as hot manifolds or molten metal. The same heat source may then initiate a fire. This can occur despite the presence of cool air around the Hose.
- 2.18 **Welding or Brazing:** When using a torch or arc-welder in close proximity to hydraulic lines, the hydraulic lines should be removed or shielded with appropriate fire resistant materials. Flame or weld spatter could burn through the Hose and possibly ignite escaping fluid resulting in a catastrophic failure. Heating of plated parts, including Hose Fittings and adapters, above 450°F (232°C) such as during welding, brazing, or soldering may emit deadly gases.
- 2.19 **Atomic Radiation:** Atomic radiation affects all materials used in Hose assemblies. Since the long-term effects may be unknown, do not expose Hose assemblies to atomic radiation.
- 2.20 **Aerospace Applications:** The only Hose and Fittings that may be used for in flight aerospace applications are those available from Parker's Stratoflex Products Division. Do not use any other Hose or Fittings for in flight applications. Do not use any Hose or Fittings from Parker's Stratoflex Products Division with any other Hose or Fittings, unless expressly approved in writing by the engineering manager or chief engineer of Stratoflex Products Division and verified by the user's own testing and inspection to aerospace industry standards.
- 2.21 **Unlocking Couplings:** Ball locking couplings or other couplings with disconnect sleeves can unintentionally disconnect if they are dragged over obstructions or if the sleeve is bumped or moved enough to cause disconnect. Threaded couplings should be considered where there is a potential for accidental uncoupling.
- 3.0 **HOSE AND FITTING ASSEMBLY AND INSTALLATION INSTRUCTIONS**
- 3.1 **Component Inspection:** Prior to assembly, a careful examination of the Hose and Fittings must be performed. All components must be checked for correct style, size, catalog number, and length. The Hose must be examined for cleanliness, obstructions, blisters, cover looseness, kinks, cracks, cuts or any other visible defects. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion or other imperfections. Do NOT use any component that displays any signs of nonconformance.
- 3.2 **Hose and Fitting Assembly:** Do not assemble a Parker Fitting on a Parker Hose that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Do not assemble a Parker Fitting on another manufacturer's Hose or a Parker Hose on another manufacturer's Fitting unless (i) the engineering manager or chief engineer of the appropriate Parker division approves the Assembly in writing or that combination is expressly approved in the appropriate Parker literature for the specific Parker product, and (ii) the user verifies the Assembly and the application through analysis and testing. For Parker Hose that does not specify a Parker Fitting, the user is solely responsible for the selection of the proper Fitting and Hose Assembly procedures. See instruction 1.4. The Parker published instructions must be followed for assembling the Fittings on the Hose. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.
- 3.3 **Related Accessories:** Do not crimp or swage any Parker Hose or Fitting with anything but the listed swage or crimp machine and dies in accordance with Parker published instructions. Do not crimp or swage another manufacturer's Fitting with a Parker crimp or swage die unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.
- 3.4 **Parts:** Do not use any Parker Fitting part (including but not limited to socket, shell, nipple, or insert) except with the correct Parker mating parts, in accordance with Parker published instructions, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.
- 3.5 **Reusable/Permanent:** Do not reuse any field attachable (reusable) Hose Fitting that has blown or pulled off a Hose. Do not reuse a Parker permanent Hose Fitting (crimped or swaged) or any part thereof. Complete Hose Assemblies may only be reused after proper inspection under section 4.0. Do not assemble Fittings to any previously used hydraulic Hose that was in service, for use in a fluid power application.
- 3.6 **Pre-Installation Inspection:** Prior to installation, a careful examination of the Hose Assembly must be performed. Inspect the Hose Assembly for any damage or defects. Do NOT use any Hose Assembly that displays any signs of nonconformance.
- 3.7 **Minimum Bend Radius:** Installation of a Hose at less than the minimum listed bend radius may significantly reduce the Hose life. Particular attention must be given to preclude sharp bending at the Hose to Fitting juncture. Any bending during installation at less than the minimum bend radius must be avoided. If any Hose is kinked during installation, the Hose must be discarded.
- 3.8 **Twist Angle and Orientation:** Hose Assembly installation must be such that relative motion of machine components does not produce twisting.
- 3.9 **Securement:** In many applications, it may be necessary to restrain, protect, or guide the Hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.
- 3.10 **Proper Connection of Ports:** Proper physical installation of the Hose Assembly requires a correctly installed port connection insuring that no twist or torque is transferred to the Hose when the Fittings are being tightened or otherwise during use.
- 3.11 **External Damage:** Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage, or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.
- 3.12 **System Checkout:** All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Hose maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.
- 3.13 **Routing:** The Hose Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame, or sparks, a fire or explosion may occur. See section 2.4.
- 4.0 **HOSE AND FITTING MAINTENANCE AND REPLACEMENT INSTRUCTIONS**
- 4.1 Even with proper selection and installation, Hose life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible Hose failure, and experience with any Hose failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the Products so that Products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.7.
- 4.2 **Visual Inspection Hose/Fitting:** Any of the following conditions require immediate shut down and replacement of the Hose Assembly:
- Fitting slippage on Hose.
 - Damaged, cracked, cut or abraded cover (any reinforcement exposed);
 - Hard, stiff, heat cracked, or charred Hose;
 - Cracked, damaged, or badly corroded Fittings;
 - Leaks at Fitting or in Hose;
 - Kinked, crushed, flattened or twisted Hose; and
 - Blistered, soft, degraded, or loose cover.
- 4.3 **Visual Inspection All Other:** The following items must be tightened, repaired, corrected or replaced as required:
- Leaking port conditions;
 - Excess dirt buildup;
 - Worn clamps, guards or shields; and
 - System fluid level, fluid type, and any air entrapment.
- 4.4 **Functional Test:** Operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system. See section 2.2.
- 4.5 **Replacement Intervals:** Hose assemblies and elastomeric seals used on Hose Fittings and adapters will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Hose Assemblies and elastomeric seals should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage, or injury risk. See section 1.2.
- 4.6 **Hose Inspection and Failure:** Hydraulic power is accomplished by utilizing high-pressure fluids to transfer energy and do work. Hoses, Fittings, and Hose Assemblies all contribute to this by transmitting fluids at high pressures. Fluids under pressure can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure and handling the Hoses transporting the fluids. From time to time, Hose Assemblies will fail if they are not replaced at proper time intervals. Usually these failures are the result of some form of misapplication, abuse, wear, or failure to perform proper maintenance. When Hoses fail, generally the high-pressure fluids inside escape in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by "feeling" with their hands or any other part of their body. High-pressure fluids can and will penetrate the skin and cause severe tissue damage and possibly loss of limb. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid. If a Hose failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the Hose Assembly. Simply shutting down the hydraulic pump may or may not eliminate the pressure in the Hose Assembly. Many times check valves, etc., are employed in a system and can cause pressure to remain in a Hose Assembly even when pumps or equipment are not operating. Tiny holes in the Hose, commonly known as pinholes, can eject small, dangerously powerful but hard to see streams of hydraulic fluid. It may take several minutes or even hours for the pressure to be relieved so that the Hose Assembly may be examined safely. Once the pressure has been reduced to zero, the Hose Assembly may be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a Hose Assembly that has failed. Consult the nearest Parker distributor or the appropriate Parker division for Hose Assembly replacement information. Never touch or examine a failed Hose Assembly unless it is obvious that the Hose no longer contains fluid under pressure. The high-pressure fluid is extremely dangerous and can cause serious and potentially fatal injury.
- 4.7 **Elastomeric seals:** Elastomeric seals will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Elastomeric seals should be inspected and replaced.
- 4.8 **Refrigerant gases:** Special care should be taken when working with refrigeration systems. Sudden escape of refrigerant gases can cause blindness if the escaping gases contact the eye and can cause freezing or other severe injuries if it contacts any other portion of the body.
- 4.9 **Compressed natural gas (CNG):** Parker CNG Hose Assemblies should be tested after installation and before use, and at least on a monthly basis per AGA 1-93 Section 4.2 "Visual Inspection Hose/Fitting". The recommended procedure is to pressurize the Hose and check for leaks and to visually inspect the Hose for damage. **Caution:** Matches, candles, open flame or other sources of ignition shall not be used for Hose inspection. Leak check solutions should be rinsed off after use.

~ CNG ~ - Electrically
Conductive Compressed
Natural Gas Hose
3600 to 5000 psi working pressure



A



Part Number	I. D. in.	Max. O. D. in.	Max. Working Pressure psi (bar)	Min. Burst Pressure psi (bar)	Min. Bend Radius in.	Weight per 100 ft. lbs.	Wire Spring Guard Part Number*	Thermoplastic Guard Part Number	Crimp Fitting Series
#							#	#	
3CNG-4	1/4	0.52	3600 (248)	14400 (993)	2	6.2	3PSG-4	CNKG3-4-KIT	55
3CNG-6	3/8	0.77	3600 (248)	14400 (993)	2-1/2	15.0	5PSG-6	CNKG3-6-KIT	58
4CNG-6	3/8	0.77	4000 (276)	16000 (1100)	2-1/2	15.0	5PSG-6	CNKG3-6-KIT	58
5CNG-3	3/16	0.43	5000 (345)	20000 (1379)	1-1/2	5.0	3PSG-3	CNKG5-3-KIT	55
5CNG-4	1/4	0.62	5000 (345)	20000 (1379)	2	11.0	5PSG-4	CNKG5-4-KIT	58
5CNG-6	3/8	0.77	5000 (345)	20000 (1379)	3	17.0	5PSG-6	CNKG3-6-KIT	58
5CNG-8	1/2	0.89	5000 (345)	20000 (1379)	4	20.5	5PSG-8	CNKG5-8-KIT	58
5CNG-12	3/4	1.15	5000 (345)	20000 (1379)	7-1/2	24.1	-	CNKG5-12-KIT	58H
5CNG-16	1	1.59	5000 (345)	20000 (1379)	10	35.8	-	CNKG5-16-KIT	58H

*Wire spring guards must be used on ANSI/CSA design certified CNG dispenser fill hose assemblies. Covers hose sizes -3 through -8; single and multi-line bonded assemblies.

Conforms to NFPA 52, ANSI/IAS NGV 4.2-1999 • CSA 12.52-M99.

Construction: Electrically conductive polymer core tube, two or more layers of fiber reinforcement, and abrasion-resistant urethane cover. Standard cover is perforated for use with fuel.

Standard Colors: Red for 3CNG, 4CNG, 5CNG. Optional green for 5CNG-X-GRN.

Applications: Refueling hose specially designed for conveying compressed natural gas. High-strength conductive polymer core tube formulated to dissipate static electrical buildup. (Note: Each hose assembly must be properly grounded; refer to CNG Hose Assembly Instructions). Thick urethane cover for abrasion and wear resistance.

Temperature Range: -40°F to +180°F (-40°C to 82°C).
Twin-line or multi-line constructions available.

Note: All hose assemblies must be proof tested and electrically tested per NFPA 52. Each CNG kit includes a warning tag and thermoplastic hose guards. (Refer to CNG Hose Assembly Instructions (Bulletin No. 4660-CNG-PFD-2). Wire spring guards required for AGA certification in CNG dispenser applications except 5CNG-12, 5CNG-16. See "Tooling Accessories" section in this catalog for special PSG wire spring guards.

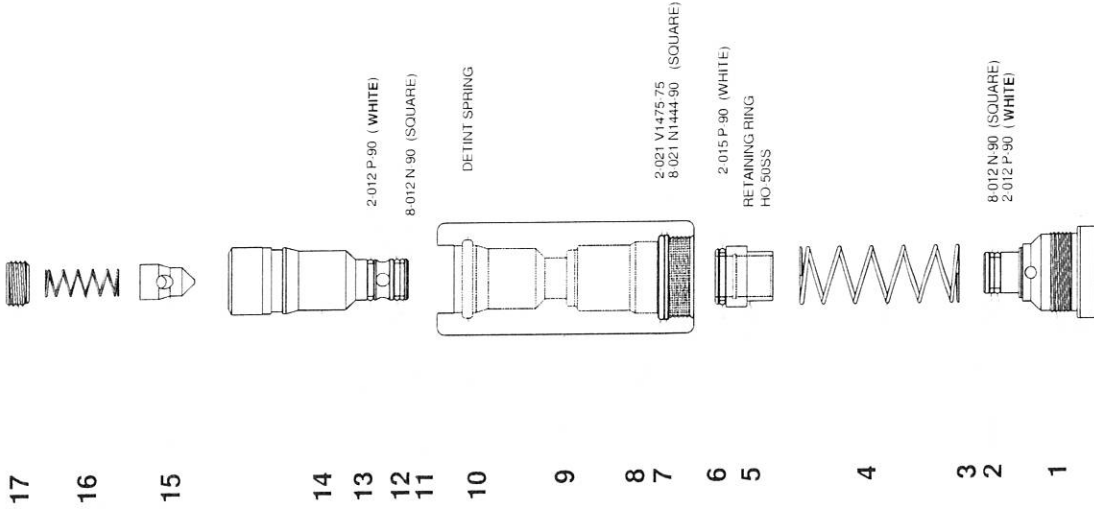
Available as factory made assemblies only through ANSI/CSA certified Parker distributors.

Not for use in airless paint spray applications.

Note: CNG hose must be assembled at an approved and audited facility.

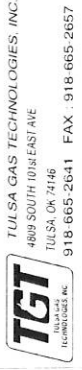
FIELD ASSEMBLY INSTRUCTION

1. INSTALL #2 O-RING (ROUND) ON TO THE #1 BOLT
2. INSTALL #3 O-RING (SQUARE) ON TO THE #1 BOLT
3. INSTALL #6 O-RING ON THE #5 SLIDE VALVE
4. INSTALL #6 O-RING (ROUND) IN THE #9 BODY
5. INSTALL #7 O-RING (SQUARE) IN THE #9 BODY
6. LUBRICATE THE O-RINGS WITH **PARKER SUPER O LUBE**
7. PUT 2 DROPS OF BLUE LOCKTIGHT ON THE THREADS OF THE #1 BOLT
8. HOLD #1 BOLT UP RIGHT AND PUT #4 SPRING
9. PUT THE #4 SPRING ON THE #1 BOLT AND #5 SLIDE VALVE ON THE SPRING
10. THREAD #9 BODY ON TO THE #1 BOLT
11. **USE AN AIR NOZZLE AND FROM THE NOTCHED END OF #9 BODY REACH DOWN TO THE INSIDE CENTER OF #1 BOLT AND BLOW THE EXCES LOCKTIGHT OUT OF THE BLEED HOLE OF #9 BODY**
12. PUT #15 POPPET VALVE IN TO #14 PROBE
13. INSTALL THE #16 SPRING INTO THE PROBE
14. THREAD #17 SPRING CAP INTO #14 PROBE TILL BOTTOMS OUT TORQUE LIGHTLY HAND TIGHT
15. INSTALL #12 O-RING (ROUND) ON TO THE PROBE
16. INSTALL #11 O-RING (SQUARE) ON THE PROBE
17. INSTALL #13 O-RING (WHITE & ROUND) ON THE PROBE
18. INSTALL #10 DETINT SPRING INTO THE #9 BODY
19. LUBRICATE THE O-RINGS ON THE PROBE #11, 12 & 13
20. INSTALL THE #14 PROBE INTO THE #9 BODY ABOUT 3/4 OF THE WAY UNTIL IT MEETS THE DETINT SPRING
21. ALIGN THE NOTCH ON THE #9 BODY WITH THE FLATS ON #14 PROBE AND WITH THE VICE GRIP TOOL OR IN A VICE, PRESS THE PROBE INTO BODY



PARKER SUPER O-LUBE ONLY

TGT-ILB-6 INLINE BREAK-AWAY



DATE: 5/22/07
DESIGNED BY: C. SEWELL
DRAWN BY: C.R.S.
DWG. NO. ILB6 EXPLODED VIEW.dcd
REV. 2
CHECKED BY:
SCALE: NONE
SHEET NO. OF