



BV 7

HOKE
6610M4Y

PURGE VALVE – ¼" MNPT 6000 PSI STAINLESS STEEL

ANGI PART NUMBER - 330-07281

NO REBUILD KIT AVAILABLE

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Purpose:

- Hoke 6600 Series Bleed Valves allow for quick, easy manual bleed off of system pressure

Typical Applications:

- Air, Hydraulic Systems or **Natural Gas**

Technical Data: **6610 6660, 6670, and 6680 Series Bleed Valves:**

- **Maximum Operating Pressure: 6000 PSIG @ 70°F (414 Bar @ 21°C)**
- **Operating Temperature Range: -40° to 600°F (-40° to 316°C)**
- **End Connections: 1/4, 3/8, 1/2 inch Gyrolok®**

Technical Data: 6631 Series Bleed Valves:

- Maximum Operating Pressure: 5000 PSIG @ 70°F (345 Bar @ 21°C)
- Operating Temperature Range: -20° to 425°F (-29° to 218°C)
- Orifice: .125 in. (3.2mm)
- End Connections: 1/4" NPT, 1/4" Tube Stub

Features:

- Compact Installation
- 316 Stainless Steel Construction
- Straight, Union, Elbow or Tee Flow Configurations
- Integral Tube Ends

Benefits:

- Safe
- Reliable
- Gyrolok® Fitting Connections Eliminate Pipe Thread Leak Paths

Operation Instructions: (For all but the 6631 Series Valves)

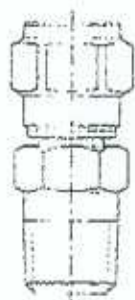
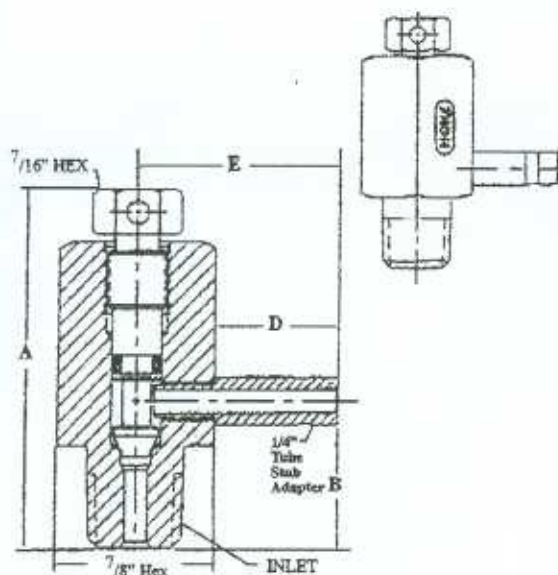
- Valve is operated by turning the bleed port nut with a wrench. Use appropriate back-up wrench to hold body, while turning bleed nut.
- As bleed nut is turned, pressure forces ball off seat. Pressure is vented through a hole drilled in the nut, angled back toward the body of the valve. Make sure flow is directed away from user.
- Those using the valves should wear protective clothing, especially goggles.
- No attempt should be made to repair or dismantle the valve.



6600 SERIES BLEED VALVE

Part Number/Ordering Chart:

Series Designation	Configuration	End Type	End Size	Material
66 - Bleed Valve	10-Straight	G-Gyrolok	4-1/4 in.	Y-316SS
	31-Directed	H-Male NPT x Tube Stub	6-3/8 in.	
	60-Elbow	M-Male NPT	8-1/2 in.	
	70-Union			
	80-Tee			



6631 Series Bleed Valves:

Hoke's 6631 Bleed Valve allows the user to direct the bled fluid as desired. To operate simply turn the 7/16" nut with a wrench or the optional loose fit handle, part number 96706-103.

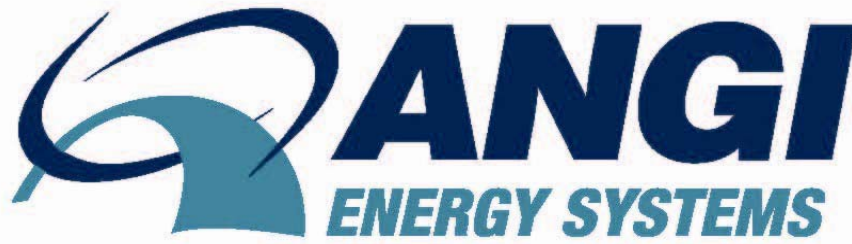
Part Number	Inlet	A (open)	B	D	
6631H4Y	1/4 Male NPT	2 (51mm)	3/4 (19mm)	11/16 (17mm)	1 1/8 (29mm)
6631H84Y	1/2 Male NPT	2 1/8 (54mm)	29/32 (23mm)	11/16 (17mm)	1 1/8 (29mm)

6610, 6660, 6670, And 6680 Series Bleed Valves:

These Hoke Valves come in a variety of configurations including Straight, Elbow, Union, and Tee. See operating instructions and technical data on front cover.

Part Number	P Thread NPT	A Open	B' Hex	C Wrench Flat
6610M4Y	1/4	1 17/32 (39mm)	5/8	9/16
6610MGY	3/8	1 19/32 (40mm)	5/8	11/16
6610M8Y	1/2	1 13/16 (46mm)	5/8	7/8

* Dimensions for reference only and are subject to change without notice.



BV 8

HOKE
6610MS4Y

PURGE VALVE - 7/16 - 20" MSAE 6000 PSI
STAINLESS STEEL

ANGI PART NUMBER - 330-07312

NO REBUILD KIT AVAILABLE

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Purpose:

- Hoke 6600 Series Bleed Valves allow for quick, easy manual bleed off of system pressure

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- Orifice: .125 in. (3.2mm)
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Features:

- Compact Installation
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- Straight, Union, Elbow or Tee Flow Configurations
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Benefits:

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Operation Instructions: (For all but the 6631 Series Valves)

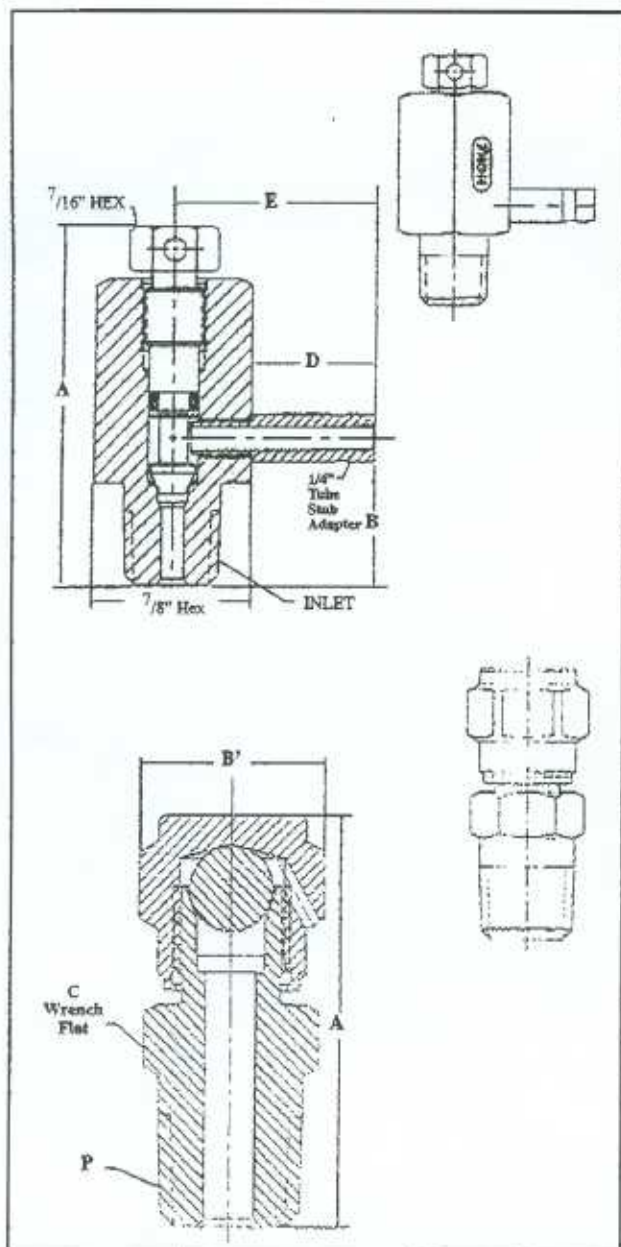
- Valve is operated by turning the bleed port nut with a wrench. Use appropriate back-up wrench to hold body, while turning bleed nut.
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	60-Elbow	M-Male NPT	8-1/2 in.	
	70-Union			
	80-Tee			



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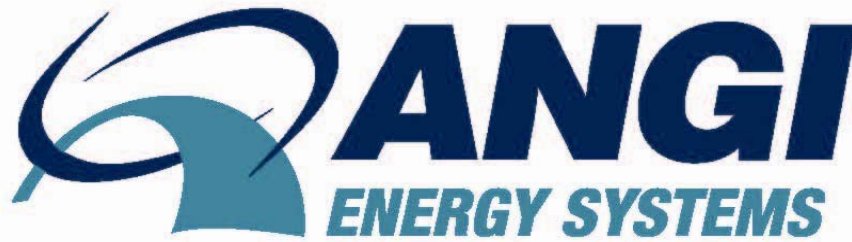
Part Number	Inlet	A (open)	B	D	W
6631H4Y	1/4 Male NPT	2 (51mm)	3/4 (19mm)	11/16 (17mm)	1 1/8 (29mm)
6631H84Y	1/2 Male NPT	2 1/8 (54mm)	29/32 (23mm)	11/16 (17mm)	1 1/8 (29mm)

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6610M4Y	1/4	1 17/32 (39mm)	5/8	9/16
6610MGY	3/8	1 19/32 (40mm)	5/8	11/16
6610M8Y	1/2	1 13/16 (46mm)	5/8	7/8

* Dimensions for reference only and are subject to change without notice.



CV 2

HOKE

6133M4Y3

1/4" MNPT CHECK VALVE 6000 PSI,
2 PSI CRACKING PRESSURE SPRING

ANGI PART NUMBER 336-02419

REBUILD KIT ASSY - 804-06816

BALL CHECK VALVE 1/4 SS 6130 SERIES – 339-06818

O’RING CHECK VALVE 6130 SERIES – 710-07377

GASKET CHECK VALVE 6130 & 6230 SERIES – 260-06819

SPRING CHECK VALVE 6100 & 6230 SERIES SS & BRASS 2 PSI –
650-06820

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Check Valves—Ball and Poppet Designs 6100—6200 Series



6133G4Y

APPLICATIONS:

- Prevents reversed flow to protect solenoids, regulators and pumps
- Locks pressure in hydraulic cylinders
- Low pressure inline relief valve
- Vent valve to purge a system

Maximum Operating Pressure:

Brass Valves: 3000 PSIG @ 70°F (211 Kg/Cm² @ 21°C)

SS Valves: 6000 PSIG @ 70°F (423Kg/Cm² @ 21°C)

Operating Temperature Range:

Buna N O-ring: -40° to 200°F (-40° to 93°C)

Viton O-ring: -20° to 350°F (-29° to 177°C)

Cracking Pressure Standard: 2 PSI (.14 Kg/Cm²)

Orifice Sizes: .187" (4.75mm), .422" (10.7mm)

Cv Factor: 0.3, 2.4

MATERIALS OF CONSTRUCTION

	Ball Type			Poppet Type
	Brass Valves	316SS Valves	Monel	316SS
Body	Brass	316SS	Monel	316SS
Ball or Poppet	302SS	316SS	Monel	316SS
Spring	302SS	316SS	Monel	316SS
O-ring seat	Buna N	Viton	Viton	Viton Buna N*
Gasket (Body)	Mylar	Teflon	Teflon	Teflon Buna N*

*For poppet check valves with 3/8 and 1/2 NPT female connections.



6253F8Y

BALL CHECK VALVES

A & B Connections	ORDER BY NUMBER			
	Brass Valves	Monel	316 SS Valves	Orifice
1/8 NPT Female	6113F2B	—	6133F2Y	.187
1/8 NPT Male	6113M2B	—	6133M2Y	.187
1/4 NPT Female	6113F4B	—	6133F4Y	.187
1/4 NPT Male	6113M4B	—	6133M4Y	.187
1/4 Gyrolok	6113G4B	6133G4M	6133G4Y	.187
3/8 Gyrolok	6113G6B	6133G6M	6133G6Y	.187
1/4 NPT Male x 1/4 Gyrolok	6113H4B	—	—	.187
6MM Gyrolok	—	—	6133G6Y/MM	.187

POPPET CHECK VALVES

A & B Connections	ORDER BY NUMBER	
	316 SS Valves	Orifice
1/4 NPT Female	6233F4Y	.187
1/4 NPT Male	6233M4Y	.187
1/4 Gyrolok	6233G4Y	.187
3/8 Gyrolok	6233G6Y	.187
1/2 NPT Female	6253F8Y	.422
1/2 Gyrolok	6253G8Y	.422

OTHER DIFFERENTIAL CRACKING PRESSURES

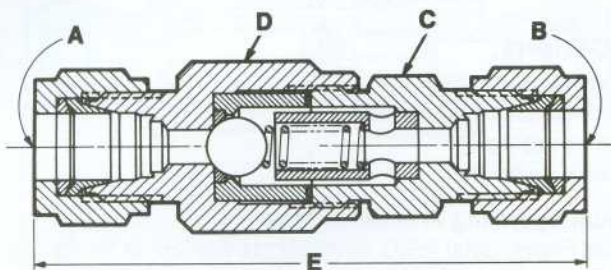
All check valves except 3/8 and 1/2 NPT female models can be furnished with other than 2 PSI cracking pressures. To order, change the fourth digit (3) of the desired valve part number as follows: Example: 6115G4B would have 10 PSI cracking pressure.

Cracking Pressure { 1/3 PSI
10 PSI
25 PSI

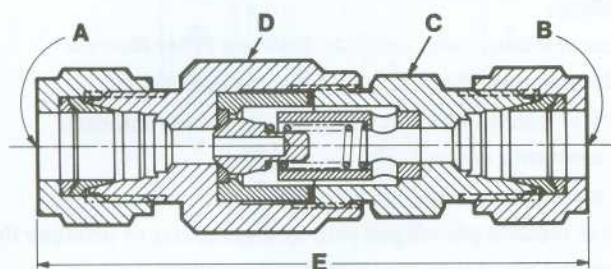
Fourth Digit { "1"
"5"
"6"

FEATURES:

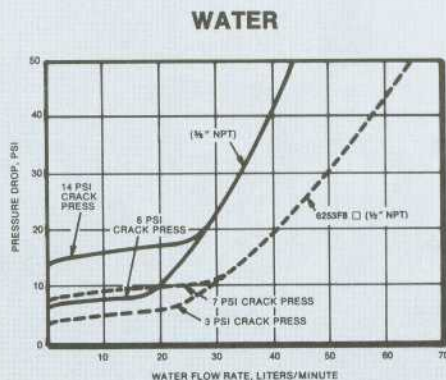
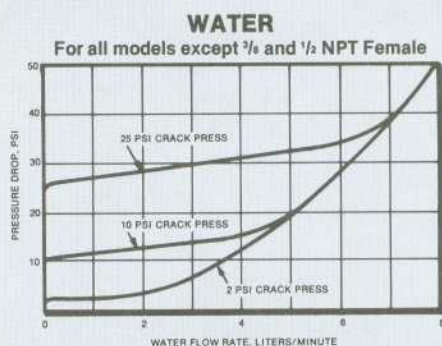
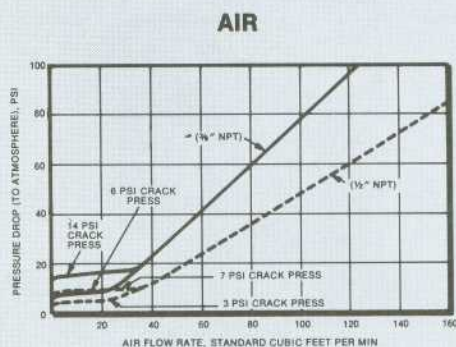
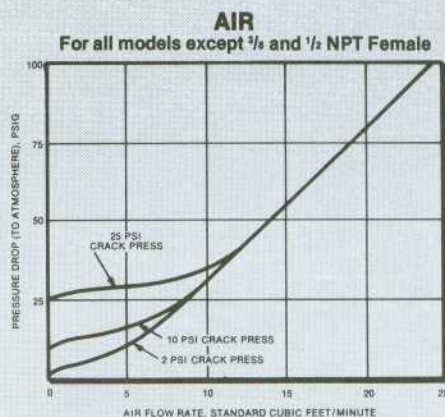
- O-ring seat provides leak-tight shut-off.
- Internal design guides flow around or inside spring, not through coils, when valve is open.
- All models are tested in production to assure a leak-tight body joint and seat.
- Ball & Poppet designs are available as standard.
- Ball type provides effective leak-tight closure with minimum flow resistance.
- Poppet models provide large flows with a minimum of chatter and fluctuation.
- Valves are available with various cracking pressures, from 1/3 to 25 PSI.
- 2-piece body permits interchangeability of end connections.



**6133G4Y
BALL TYPE**

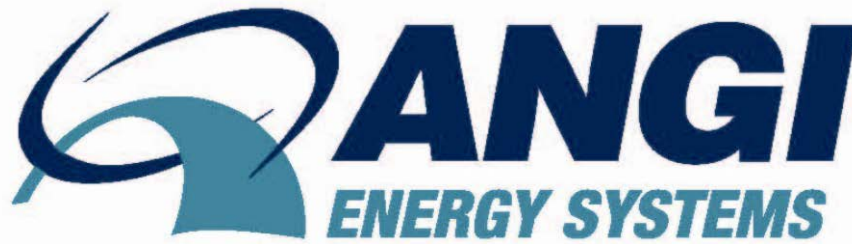


**6233G4Y
POPPET TYPE**



DIMENSIONS

Type	A & B Connections		C (Hex)	D (Hex)	E
Ball	1/8 NPT Female	mm	17	19	60
		inch	11/16	3/4	2 3/8
	1/8 NPT Male	mm	17	19	60
		inch	11/16	3/4	2 3/8
	1/4 NPT Female	mm	19	19	64
		inch	3/4	3/4	2 1/2
	1/4 NPT Male	mm	17	19	60
		inch	11/16	3/4	2 3/8
	1/4 Gyrolok	mm	17	19	70
		inch	11/16	3/4	2 3/4
Poppet	6MM Gyrolok	mm	17	19	76
		inch	11/16	3/4	3
	1/4 Gyrolok	mm	17	19	76
		inch	11/16	3/4	3
	3/8 Gyrolok	mm	25	19	79
		inch	1	3/4	3 1/8
	1/4 NPT Female	mm	19	19	64
		inch	3/4	3/4	2 1/2
	1/4 NPT Male	mm	17	19	60
		inch	11/16	3/4	2 3/8
Poppet	1/4 Gyrolok	mm	17	19	76
		inch	11/16	3/4	3
	3/8 Gyrolok	mm	25	19	79
		inch	1	3/4	3 1/8
	1/2 Female	mm	32	32	89
		inch	1 1/4	1 1/4	3 1/2



CV 90

HOKE
CVH-078

CHECK VALVE - ½" FSAE (¾" – 16 FSAE / SAE-8)
20 PSI CRACKING SPRING
6000 PSI

ANGI PART NUMBER – 336-07319

O'RING - 761-07553

SPRING - 650-07357



A division of CIRCOR International, Inc.

CVH Series Check Valves



The CVH Series Check Valves are engineered for a competitive price with no compromise of quality and performance to meet the growing requirements of instrumentation valves. The function of this valve series is to maintain system integrity by preventing back flow of a wide variety of fluids over a broad range of pressures.

- | | |
|--------------------|--|
| • High Flow | 7.4 Cv Maximum |
| • High Pressure | 0 to 6000 psig |
| • High Performance | Quick acting, zero leakage,
low maintenance |
| • Size Range | 1/8" to 1" 6mm to 25mm |

Features & Specifications

- Colored band makes the o-ring easy to identify and promotes safety
- Resilient o-ring seat provides cushioned, quiet closing and zero leakage
- Floating o-ring design – o-ring is continually cleaned and contaminants do not prevent sealing
- Various materials of construction can be used with any liquid or gas service
- Various end connections can be assembled in any system or application
- Spring-loaded poppet can be mounted in any orientation
- Full flow with minimal restriction for maximum Cv rates
- Virtually maintenance free for maximum dependability
- Pressure up to 6000 psig
- Cracking pressure range is .5 to 20psi
- Flow up to 7.4 Cv maximum
- More than 100,000 life cycles

CVH Series Check Valves

Specifications

Pressure Range	0 to 6000 PSIG/ 0 to 414 BAR
Temperature Range	-320° F to +900° F / -196° C to +482° C
Flow Range	.32 Cv to 7.4 Cv
Crack Pressure Range	.5 to 20 PSI / .035 to 1.379 BAR
Leakage	External All – zero Internal Soft seat – zero Teflon seat --< 5cc/minute Metal seat -- < 30cc/minute
Life Cycles	In excess of 100,000 cycles

Operating Temperatures

Seal Material	Temperature F	Temperature C	Color Band
Teflon®	-320° to +400°	-196° to +204°	Maroon
Chemraz	-20° to +425°	-29° to +218°	Olive
Viton®	-20° to +400°	-29° to +204°	Blue
Neoprene	-40° to +250°	-40° to +121°	Red
Ethylene Propylene	-65° to +300°	-54° to + 149°	Purple
Fluorosilicone	-80° to +350°	-62° to +177°	Black
Kalrez®	-40° to +550°	-40° to +288°	Olive
Buna-N	-65° to +275°	-54° to +135°	Green
Metal	-320° to +900°	-196° to +482°	Gold

Flow Chart

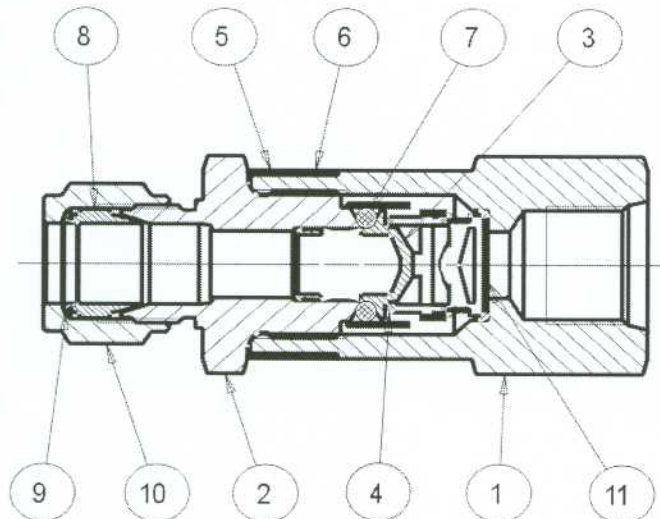
Valve Size	2	4	6	8	10	12	16
Cv	.32	.79	1.71	3.08	3.87	7.38	7.38

CVH Series Check Valves

Materials of Construction

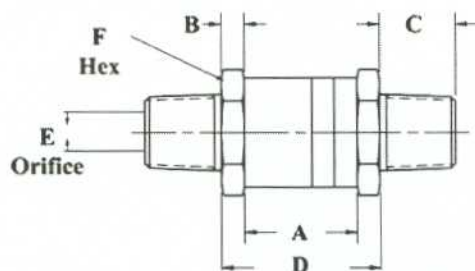
Item	Part	Standard Materials (others on request)
1.	Body* (outlet)	316 stainless steel
2.	End Adapter* (inlet)	316 stainless steel
3.	Poppet*	316 stainless steel
4.	Spring*	302 stainless steel
5.	Part Number Band	Anodized Aluminum
6.	O-ring Band	Anodized Aluminum
7.	O-ring*	Viton®
8.	Front Ferrule*	316 stainless steel
9.	Rear Ferrule	316 stainless steel
10.	Nut	316 stainless steel
11.	Spring Guide	316 stainless steel

*Wetted component



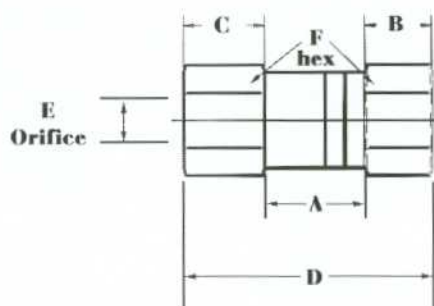
CVH Series Check Valves

Charts of Dimensions



Male NPT

Fractional (Inches)	Size	A	B	C	D	E	F
	02	0.83	0.20	0.40	1.23	.19	0.81
	04	0.83	0.20	0.59	1.23	.19	0.81
	06	1.26	0.20	0.59	1.66	.39	1.19
	08	1.26	0.20	0.77	1.66	.42	1.19
	12	2.05	0.50	0.77	3.05	.66	2.00
	16	2.05	0.50	0.98	3.05	.66	2.00



Female NPT

Fractional (Inches)	Size	A	B Inlet	C Outlet	D	E	F
	02	0.83	0.68	0.78	2.29	.19	0.81
	04	0.83	0.91	1.01	2.75	.19	0.81
	06	1.26	0.92	0.97	3.15	.39	1.19
	08	1.26	1.12	1.17	3.55	.42	1.19
	12	2.05	1.40	1.12	4.57	.66	2.00
	16	2.05	1.61	1.33	4.99	.66	2.00

CVH Series Check Valves

How to Order

CVH Y 04 G 04 M 32 010 A O H

Material

B Brass	C Carpenter 20
I Inconel	O 254 SMO CRES
M Monel	H Hastelloy C276
Y 316 SS	T Titanium

Inlet Size

02 1/8"	14 14mm
04 4mm, 1/4"	16 16mm, 1"
06 6mm, 3/8"	18 18mm
08 8mm, 1/2"	22 22mm
10 10mm	25 25mm
12 12mm, 3/4"	

Inlet Type

G Gyrolok™ Tube Fitting-Per HOKE
A Gyrolok™ Tube Adapter- Per HOKE
Z Metric Gyrolok™ Tube Fitting-Per HOKE
W Metric Gyrolok™ Tube Adapter-Per HOKE
S Male SAE-Per J514
R Female SAE-Per J1926
L Male British Parallel Pipe-Per ISO 1179
K Female British Parallel Pipe-Per ISO 1179
M Male NPT-Per ANSI/ASME B1.20.1
F Female NPT-Per ANSI/ASME B1.20.1
Q Male British Tapered Pipe ISO 7/1
P Female British Tapered Pipe ISO 7/1

Outlet Size

02 1/8"	14 14mm
04 4mm, 1/4"	16 16mm, 1"
06 6mm, 3/8"	18 18mm
08 8mm, 1/2"	22 22mm
10 10mm	25 25mm
12 12mm, 3/4"	

Hokey

Cleaning Options

O Standard **C** Cryogenic Cleaning
B Industrial Cleaning **D** NACE Compliant

Band Options

A Aluminum Bands (std.)
Y Stainless Steel Bands

Cracking Pressure

005 00.5 PSI/.035 BAR	050 05.0 PSI/0.344 BAR
010 01.0 PSI/.069 BAR	100 10.0 PSI/.688 BAR
030 03.0 PSI/0.206 BAR	200 20.0 PSI/1.379 BAR

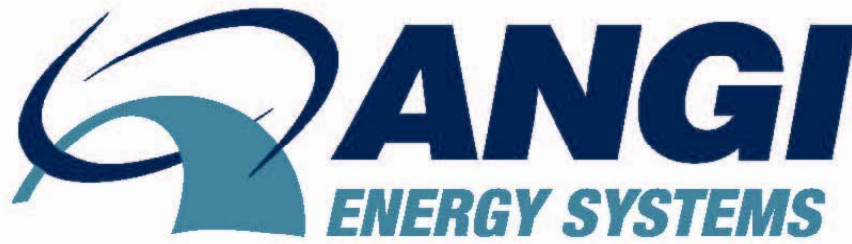
(others available on request)

Seal Materials

20 Teflon®
25 Chemraz
32 Viton®
40 Teflon® (Cryogenic Service)
53 Neoprene
62 Ethylene Propylene
64 Fluorosilicone
65 Kalrez®
77 Buna N
00 Metal (high temperature service)

Outlet Type

G Gyrolok™ Tube Fitting-Per HOKE
A Gyrolok™ Tube Adapter-Per HOKE
Z Metric Gyrolok™ Tube Fitting-Per HOKE
W Metric Gyrolok™ Tube Adapter-Per HOKE
S Male SAE-Per J514
R Female SAE-Per J1926
L Male British Parallel Pipe-Per ISO 1179
K Female British Parallel Pipe-Per ISO 1179
M Male NPT-Per ANSI/ASME B1.20.1
F Female NPT-Per ANSI/ASME B1.20.1
Q Male British Tapered Pipe ISO 7/1
P Female British Tapered Pipe ISO 7/1



DM 9

MICRO MOTION
CNG50S291NWCAEZZZ
MASS FLOW METER CNG50

ANGI PART NUMBER 902-07240

***FOR MORE INFORMATION,
PLEASE SEE THE MICROMOTION SECTION
IN THIS MANUAL***

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Product Data Sheet

PS-00408, Rev. B

October 2004

Micro Motion® CNG050

Compressed Natural Gas Flowmeter

With MVD™ Technology



Micro Motion® CNG050 flowmeters

The first full-range CNG flowmeter designed and tested specifically for compressed natural gas, resulting in better performance in CNG applications.

The CNG050 meter was specifically designed for the CNG industry to meet the challenges of measuring compressed natural gas. The meter's increased rangeability allows customers the flexibility to use the sensor for automobile or light- or heavy-duty vehicle dispenser designs.

Micro Motion CNG050 meters feature integral transmitters, making them easy to install. Offered with Series 1000 and 2000 transmitters with MVD™ Technology, customers can choose either single or multivariable output configurations with milliamp, pulse, dual pulse, digital outputs, and an integral display.

Micro Motion MVD™ Direct Connect™ Technology is making Coriolis flowmeters from Micro Motion even more suitable for CNG applications. OEMs can benefit from MVD Direct Connect Technology, which allows smart sensors to communicate directly with dispenser head electronics via Modbus — no transmitter is required!

Like all Micro Motion flowmeters, CNG050 meters offer highly accurate direct mass and volume flow measurement.

Micro Motion CNG050 meters are designed to perform in even the most harsh operating environments, and carry hazardous area approvals for the U.S.A., Canada, and Europe.

Easy to use

CNG050 meters have no moving parts, no need for periodic recalibration, non-intrusive design, and no regular maintenance requirements.

Wide rangeability

The CNG050 meter is used for both car and bus dispenser designs alike. With a 1–100 kg/min flow range, the CNG050 is truly a one-size-fits-all CNG flowmeter.

CNG station reconciliation

The AGA 11 guidelines recently published by the American Gas Association allow for the use of Coriolis meters like the Micro Motion CNG050 in the custody transfer of natural gas. Combining a low pressure check meter (such as a Micro Motion ELITE® or F-Series sensor) on the natural gas inlet with a CNG050 dispensing meter allows for true mass balancing of CNG stations.



MVD™ technology



Reduced fill times

Having a higher flow rate capacity means that vehicles can get back on the road faster than ever.

Proven technology

Micro Motion is known worldwide for increasing plant efficiency, production, and profitability. More than 400,000 Micro Motion meters are installed in applications worldwide, including 15,000 CNG applications.

Greater accuracy and versatility

Micro Motion CNG050 meters have a CNG accuracy of 0.5% of delivered batch over a flow range of 2 to 220 lbs/min (1 to 100 kg/min). This translates to reduced dispenser losses and is approved worldwide by weights and measures authorities.

Weights and measures approvals

Country	Approval
U.S.A.	NTEP
Germany	PTB
Netherlands	NMI
China	Pattern approval
Malaysia	SIRIM
India	Ministry of Consumer Affairs
Italy	Ufficio Metrico Italiano
Canada	Measurement Canada (pending)
Brazil	Inmetro (pending)

Vehicle filling

Because of its clean combustion, CNG is increasingly used as a vehicle fuel in many parts of the world. Micro Motion CNG050 meters used in dispenser stations are routinely verified (proved) against a gravimetric standard, the highest performance rating possible. In addition, the CNG050 meter can be used as a Master Meter standard, thus providing increased safety and eliminating cumbersome scale setup and venting of gas.

Micro Motion CNG050 flowmeters *continued*

Software functionality

The CNG050 sensor can be used with Micro Motion transmitter with MVD Technology. The standard software option of the Series 1000 or 2000 is most common.

A Micro Motion MVD Direct Connect pass-through I.S. barrier can also be used in public stations if it is installed in a separate, sealable housing.

Weights and measures configuration lockout

For applications that require weights and measures approval for legal trade (i.e., public CNG stations), the weights and measures configuration lockout software option for Model 2500 and 2700 transmitters should be ordered with the CNG050 sensor. The configuration lockout software option allows the transmitter to be changed from operating (secure) mode to configuration mode (and back again) using ProLink® II software. The transmitter will register flow only when in the operating (secure) mode. The transmitter will allow configuration changes and zeroing of the meter only when in configuration mode.

When the configuration lockout option is ordered, a means is provided for physically sealing the transmitter housing.

The configuration lockout software option may not be required by certain world area weights and measures authorities. The performance of the CNG050 sensor is not affected by configuration lockout, and the sensor meets batch and accuracy specifications with standard features.

Flow specifications

	Mass		Standard volume ⁽¹⁾	
	lb/min	kg/min	SCFM	Nm ³ /hr
Flow range	2 to 220	1 to 100	40 to 4444	68 to 7550
Batch accuracy⁽²⁾⁽³⁾	±0.50% of batch			
Repeatability⁽²⁾	±0.30% of rate			
Zero stability	lb/min	kg/min		
	0.02	0.009		

(1) CNG with SG = 0.66 at 60 °F (15.5 °C) and 14.73 psia (1 bar-a).

(2) In terms of percent of total batch delivered on CNG.

(3) Accuracy is under typical CNG batch/dispensing conditions. Typical batch/dispensing conditions are defined as those where the flow rate is greater than 4 lbs/min (109 kg/hr).

Pressure ratings

	psi	bar
Flow tube rating	5000	345
Pressure limits⁽¹⁾	5000	345
Union to NPT adapter piece rating⁽²⁾	4600	317
Housing rating	Housing is not rated for pressure containment.	
PED compliance	Sensor complies with council directive 97/23/EC of 29 May 1997 on Pressure Equipment	

(1) All fittings are rated to 5000 psi (345 bar) — the Union SWG type fitting according to ASME B31.3, and the SAE fitting according to SAE J1453.

(2) Pressure rating of the additional adapter piece (#12 O-ring face seal to female NPT) that is provided with process connection option 239.

Environmental limits

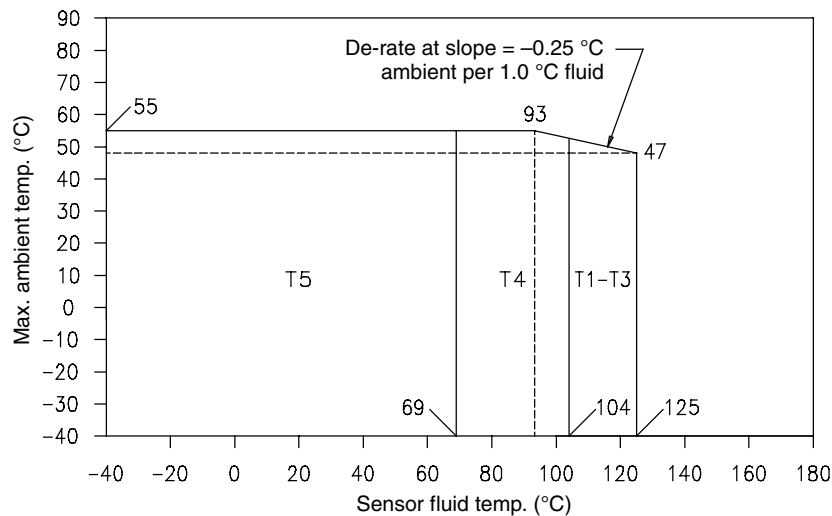
		°F	°C
Process fluid temperature limits		−40 to +257	−40 to +125
Ambient temperature limits	CSA and MMI standard (no approval)	−40 to +140	−40 to +60
	ATEX	Refer to the graph below.	
Humidity limits	5 to 95% relative humidity, non-condensing at 140 °F (60 °C)		
Vibration limits	Meets IEC 68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g		

Hazardous area classifications

CSA is a Canadian approvals agency that provides approvals accepted both in the U.S.A (C-US) and in Canada. ATEX is a European directive.

CSA Class I, Div. 1, Groups C and D
Class I, Div. 2, Groups A, B, C, and D
Class II, Div. 1, Groups E, F, and G

ATEX EEx ib IIC T1–T5⁽¹⁾
Allowable CNG050 sensor temperature rating with core processor or integrally mounted transmitter



(1) The “T” rating is defined as the maximum surface temperature of the flowmeter. The “T” rating of the hazardous area, and ambient temperatures above 47 °C, restrict the allowable temperature of the process fluid as shown in the graph above.

Materials of construction

Wetted parts⁽¹⁾	316L stainless steel
Sensor housing	304L stainless steel
Core processor housing	CF-3M stainless steel or epoxy-painted aluminum; NEMA 4X (IP65)

(1) *General corrosion guidelines do not account for cyclical stress, and therefore should not be relied upon when choosing a wetted material for your Micro Motion flowmeter. Please refer to Micro Motion's corrosion guide for material compatibility information.*

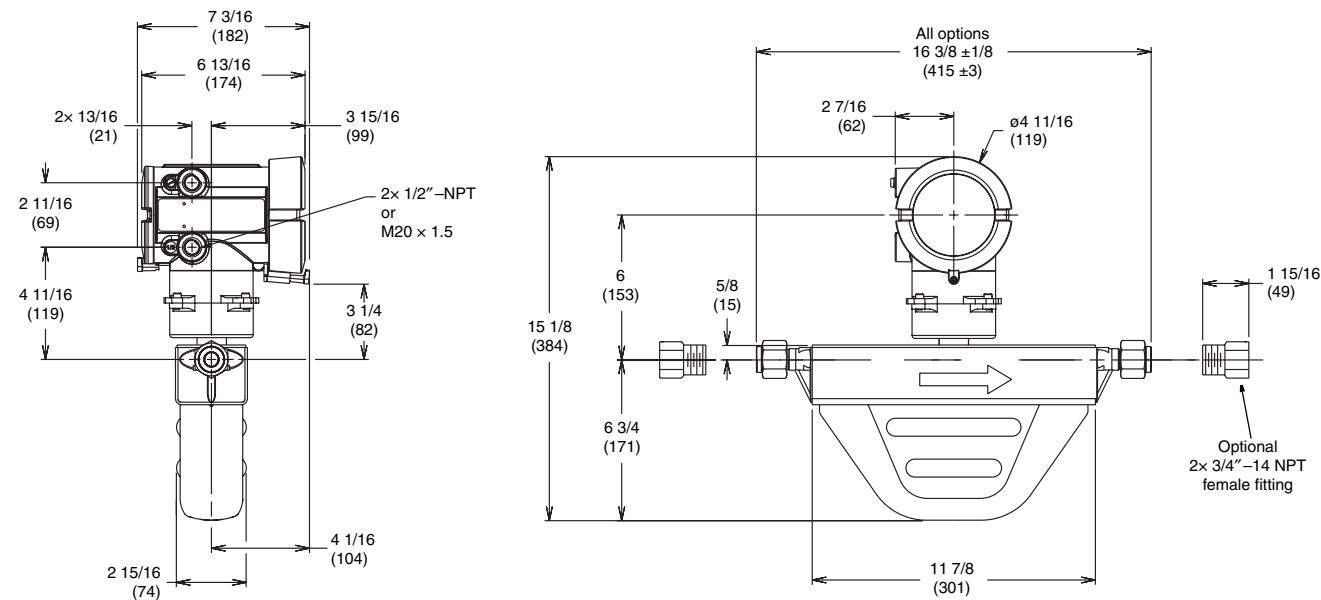
Weight

Sensor with core processor	16 lbs (7 kg)
Sensor with integrally mounted transmitter	18 lbs (8 kg)

Dimensions

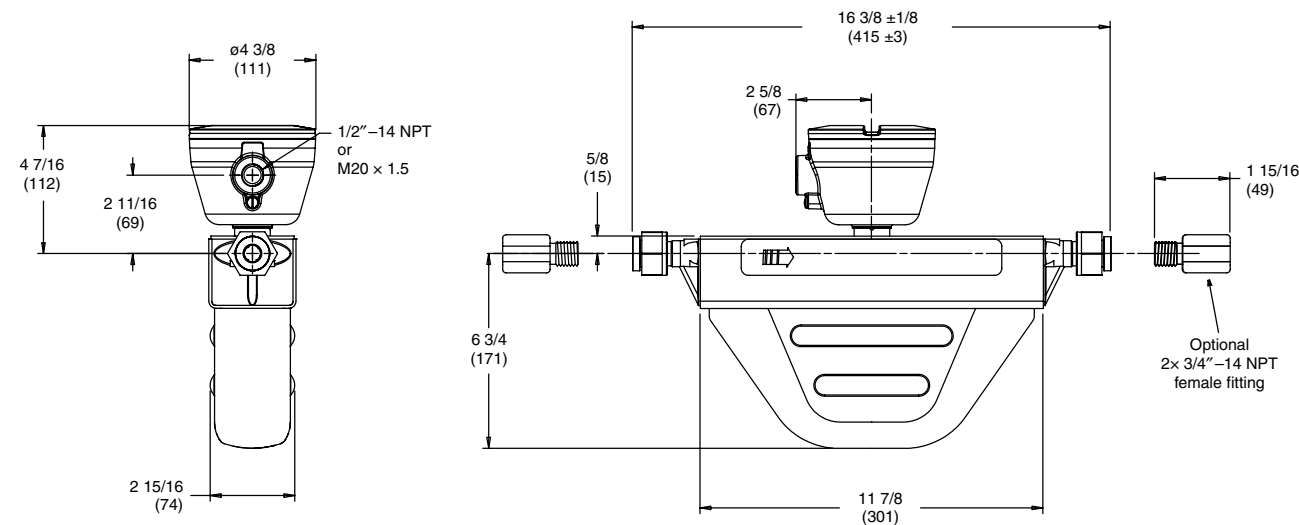
CNG050 sensor with integrally mounted Model 1700/2700 transmitter

Dimensions in inches
(mm)



CNG050 sensor with core processor

Dimensions in inches
(mm)



Ordering information

Model	Product Description
CNG050S	Micro Motion Coriolis CNG-Series sensor; 1/2-inch; 316L stainless steel
Code	Process Connections
239 ⁽¹⁾	3/4-inch NPT-female adapter; CAJON compatible size 12 VCO union fitting
290 ⁽²⁾	CAJON compatible size 12 VCO union fitting
291 ⁽²⁾	Union size 12 SAE fitting (universal thread)
Code	Case Options
N	Standard
Code	Electronics Interface
Q	4-wire epoxy-painted aluminum integral core processor for remote mount transmitters
A	4-wire stainless steel integral core processor for remote mount transmitters
C	For integrally mounted 1700/2700 transmitter
W ⁽³⁾	Epoxy-painted aluminum integral core processor for MVD Direct Connect installation
D ⁽³⁾	Stainless steel integral core processor for MVD Direct Connect installation
Code	Conduit Connections
	Electronics Interface Codes Q, A, W and D
B	1/2-inch NPT — no gland
E	M20 — no gland
F	Brass/nickel cable gland (cable diameter 0.335 to 0.394 inches [8.5 to 10.0 mm])
G	Stainless steel cable gland (cable diameter 0.335 to 0.394 inches [8.5 to 10.0 mm])
	Electronics interface Code C (Integrally mounted 1700/2700)
A	No gland
Code	Approvals ⁽³⁾
M	Micro Motion Standard (no approval)
N	Micro Motion Standard / PED compliant
C	CSA (Canada only)
A	CSA C-US (U.S.A. and Canada)
Z	ATEX - Equipment Category 2 (Zone 1) / PED compliant
Continued on next page	

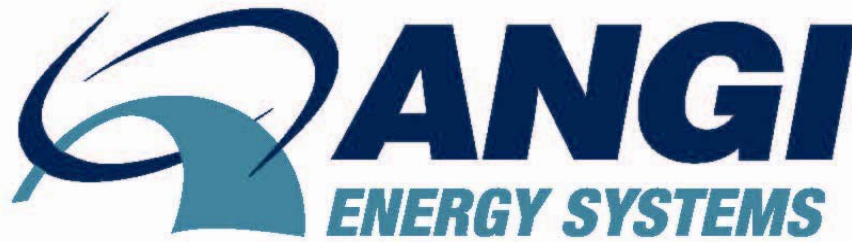
(1) 3/4-inch NPT female adapter to O-ring face seal adapter rated to 4600 psi (317 bar).

(2) Ready for face seal O-ring (not included).

(3) When electronics interface W or D is ordered with approval codes C, A, or Z, an MVD Direct Connect I.S. barrier is supplied. No barrier is supplied when ordered with approval codes M or N.

Ordering information *continued*

Code	Language
A	Danish Quick Reference Guide and English Manual
D	Dutch Quick Reference Guide and English Manual
E	English Quick Reference Guide and English Manual
F	French Quick Reference Guide and French Manual
G	German Quick Reference Guide and German Manual
H	Finnish Quick Reference Guide and English Manual
I	Italian Quick Reference Guide and English Manual
J	Japanese Quick Reference Guide and English Manual
N	Norwegian Quick Reference Guide and English Manual
O	Polish Quick Reference Guide and English Manual
P	Portuguese Quick Reference Guide and English Manual
S	Spanish Quick Reference Guide and Spanish Manual
W	Swedish Quick Reference Guide and English Manual
Code	Future Option 1
Z	Reserved for future use
Code	Future Option 2
Z	Reserved for future use
Code	Factory Options
Z	Standard product
R	Restocked product (if available)
Typical Model Number: CNG050S 290 N C A A E Z Z Z	



F 169

FINITE
JS2B-4CN

FINITE FILTER - SAE-8 JS2B GR4 COALESCING
ELEMENT 5500 PSI "ANGI SPECIAL" WHITE BODY
CNG @ 125F
348 SCFM @ 1000 PSI
1034 SCFM @ 3000 PSI

ANGI PART NUMBER - 772-07299

ELEMENT - 772-07319



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



High Pressure Compressed Air and Gas Filters

J-Series High Efficiency Filters / CNG and Alternative Fuel Filters

Bulletin 1300-250/USA



ENGINEERING YOUR SUCCESS.

Finite J-Series High Pressure Filters

Why do high pressure systems need filtration?

High pressure compressors are used in a variety of applications. Many owners, operators and designers of high pressure compressed air or gas systems rely on Parker's Finite Filter Operation for high efficiency filters. End users of high pressure compressed air, such as scuba divers and fire rescue workers, depend on high quality breathable air.

Throughout the stages of compression many contaminants can enter into the system. Excessive amounts of liquid aerosols, primarily lube oil carryover and solid particulate contamination are common in high pressure systems. In addition, higher temperature levels are possible and may cause liquid oils to varnish. This contamination can lead to poor component performance and wear that may lead to unscheduled maintenance. Even submicronic contaminants in compressed air or gas systems can foul multistage compressors, increase maintenance costs or eventually impacting your final product.

Parker's Finite Filter Operation offers a variety of high pressure compressed air and gas filters. With our wide range of elements, we have a solution for every stage of compression, as well as at the point of use. Whether you are storing high pressure air or gas or using a continuous flow, count on Parker to protect your equipment from contamination. Parker Finite is the solution to ending high pressure contamination fouling.

Parker's Finite Filter Operation's J-Series Filters are designed to filter contaminants such as rust, pipe scale, compressor lube oil, and water from compressed gases. These filters are often used in high pressure compressed natural gas (CNG) systems, not only as inter-stage filters in the multi-stage compression of the gas, but also in the storage and delivery of the gas for CNG powered vehicles.



Parker's varied media choices remove up to 99.995% of both solid and liquid aerosols, and contaminants as small as 0.01 microns in size. An activated carbon media is also available which removes oil vapor. This stage of filtration is often used as the final filter before the storage of high pressure breathing air used by scuba divers, firefighters, and others that utilize portable breathing devices.

The filter housings and the replaceable elements used in this product line have an extremely robust construction, specially designed for use in system pressures up to 5000 psig. Five housing sizes and two thread styles (NPT or SAE) are available with connections ranging from 1/4" to 2"; temperatures up to 350°F, and flows up to 26,000 SCFM at 5000 PSIG.

- CNG, alternative fuel and breathing air filters
- Pressures to 5000 PSIG
- Spheroidal Graphite Cast iron
- Coalescing, particulate and adsorption filter elements available

Filter Element Features

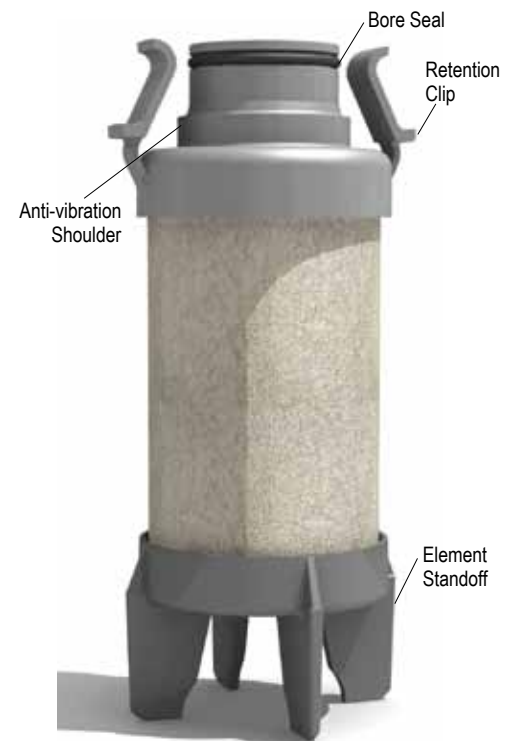
Parker Finite offers six filter media grades ensuring that we now have the correct media choice for nearly any application requirement.

Available are coalescing grades with 95% to 99.995% efficiency and pleated or UNI-CAST coalescing media designs. Additionally, a bulk liquid separator, a particulate removal and oil vapor removal choices are standard offerings.

Each element uses a retention clip design that ensures the element is seated and sealed properly. This built-in, fail-safe feature will eliminate any possibility of contaminant by-pass and is unique amongst high pressure filters.

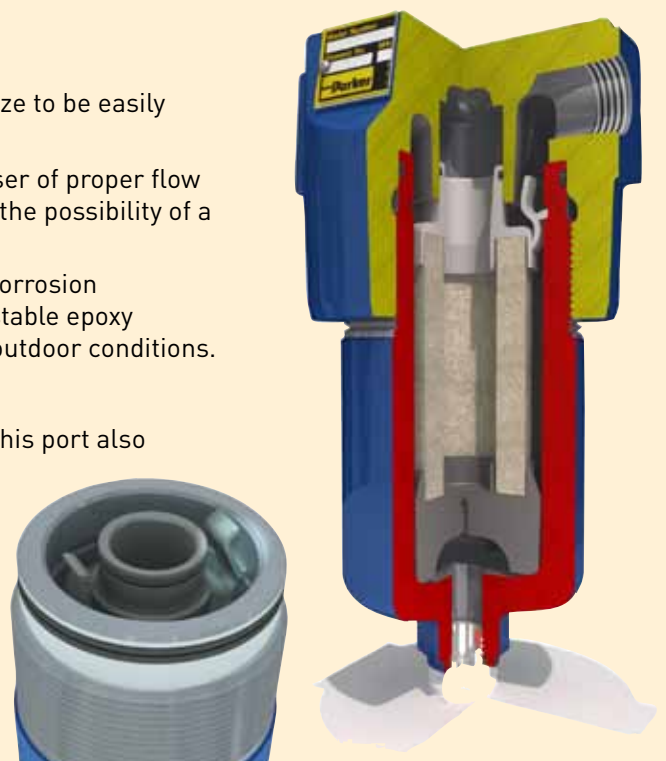
Each element is composed of internal and external plated carbon steel retainers which provide the element with a 75+ PSID burst rating. Each element also features a bore seal interface with the housing, an anti-vibration shoulder, and an integrated standoff which minimizes the likelihood of any movement of the element, even during severe system pulsations.

Element standoff lengths were designed for each housing size to allow an optimal volume of liquid contaminant to be collected in the filter's quiet zone, further minimizing any chance of contaminant carryover.



Filter Housing Features

- Robust, spheroidal graphite-cast iron offers higher mechanical strength, improved ductility, and increased shock resistance.
- Head to bowl bore seal ensures greater seal integrity.
- Threaded mounting holes on top of filter head allow each size to be easily panel mounted when line mounting is not an option.
- Engraved flow direction arrow in filter's head notifies the user of proper flow direction. One direction flow for all media choices reduces the possibility of a housing being installed improperly.
- The SG cast iron head and steel bowl are nickel plated for corrosion resistance. The completed assembly is finished with a UV stable epoxy powder paint that will allow the filter to stand-up to harsh outdoor conditions.
- An imprinted aluminum part number.
- SAE-6 steel drain plug with positive o-ring seal installed. This port also allows the easy installation of Finite's JDK5000H or JDK5000V high pressure drain kits which allow the safe removal of liquid contamination at system pressures.
- Bowls are designed to be easily tightened or loosened with a standard metric socket wrench.
- Bowls feature a slotted positional locator which enables the element to be positively retained.
- Low bowl removal clearance.



Element Types and Media Grade Options

Coalescers:

Removes: Oil, water, liquids

Coalescing elements are specially designed for the removal of liquid contaminants from gaseous flows. These media types flow from the inside of the element to the outside. Coalesced liquid collects in the bowl where it is drained, while clean air or gas exits the housing through the outlet port. Particulate contaminants are captured and held in the media.



Type C

The Finite UNI-CAST coalescing elements are made of epoxy saturated borosilicate glass microfiber and includes a polyester drain layer. (1)(2)(3)



Type 7CVP

This pleated coalescer is made of fluorocarbon saturated borosilicate glass microfiber and includes a polyester drain layer. (1)(2)(3)

Water Separator:

Removes: Bulk liquids

In this element, the gas or liquid flows from the inside of the element to the outside



Type WS

The Finite water separator element is composed of wrapped stainless steel mesh. (1)(2)(3)

Adsorber:

Removes: Oil vapor (odor)

Adsorption elements are used to remove vapors (hydrocarbon or water) that are not removed by the coalescing filter. Hydrocarbon vapors collect in the element, while clean air exits the housing through the outlet port. In this element, the air or gas flows from the inside of the element to the outside



Type A

Our Type A media is wrapped activated carbon. This element has a galvanized carbon steel inner retainer and a stainless steel perforated metal outer retaining layer. (2)(3)

Particulate:

Removes: Solid contaminants

Particulate filters in the J-Series flow from the inside of the element to the outside. Particles collect in the element, while the clean air exits through the outlet port.



Type 3P

This 3 micron absolute rated pleated element is made of cellulose. (1)(2)(3)

Notes:

- 1 Each element is retained internally and externally with galvanized carbon steel perforated metal.
- 2 A nitrile back-up ring is used to position the fluorocarbon o-ring utilized on this element.
- 3 Top and bottom end caps are made of glass filled nylon to ensure durability.

Media Grades and Specifications:

Finite media grades determine the filtration efficiency. Capture efficiencies are available up to 99.995%. Micron ratings range from 0.01 to 3 micron. The columns on the right note both the wet and dry pressure drops.

Grade Designation	Media Type	Removes...	Max. Oil Coalescing Efficiency	Micron Carryover ppm ¹	Rating (um)	Additional Pressure Pressure Drop Media Dry (PSID)	Drop Media Wet ² (PSID)
4C	Coalescing	Liquid from Gas	99.995%	0.003	0.01	1.25	3-4
7CP	Coalescing	Liquid from Gas	99.5%	0.09	0.5	0.25	0.5-0.7
10C	Coalescing	Liquid from Gas	95%	0.85	1.0	0.5	0.5
WS	Bulk Separator	Bulk Liquid from Gas	99+ ³	N.A.	100	<0.25	<0.25
3P	Particulate	Solids from Gas	N.A.	N.A.	3.0	0.25	N.A.
A	Adsorber	Vapor from Gas	99+ ⁴	N.A.	3.0	1.0	N.A.

¹Tested per ISO 12500-1 at 40 ppm inlet.

²Add dry + wet columns for total pressure drop.

³Bulk liquid removal efficiency..

⁴Oil vapor removal efficiency is given for A media.

Applications:

High Pressure (HP) Filter Applications

Test Air for HP Hydraulics	10C / 7C											
Inter-stage HP Compressor	WS / 10C											
CNG Compressor Outlet	10C	→	4C									
CNG Storage Cascades	10C	→	4C									
CNG Dispensers	10C	→	4C									
Breathing Air / SCUBA	10C	→	4C	→	A							
High Pressure "Zero Air"	10C	→	4C	→	4C	→	A					
Bulk Liquid contamination	WS	→	7C	→	4C							
Bulk solid Contamination	3P	→	7C	→	4C							
HP Air / Gas Dryer Protection	10C / 7C	→	4C	→	Dryer	→	7C / 3P					
Food Applications / Odor Removal	10C / 7C	→	4C	→	A							

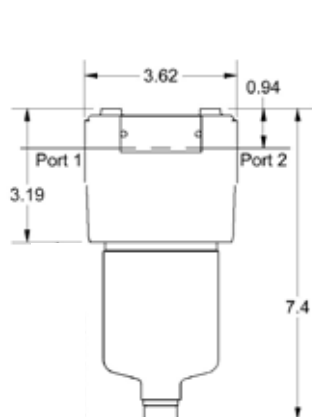


Flow Rates:

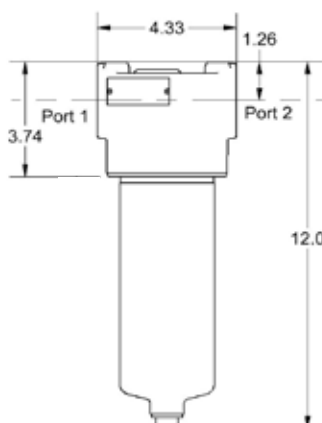
Choose Filter Size to find the corresponding flow rates

J-Series Flow Rates (SCFM)												
Model	Port	Filter Type	100 PSIG	1000 PSIG	1500 PSIG	2000 PSIG	2500 PSIG	3000 PSIG	3500 PSIG	4000 PSIG	4500 PSIG	5000 PSIG
J_1A	1/4"	4C, A	15	135	200	265	330	395	460	525	590	655
		7CP, 10C, 3P, WS	30	265	395	525	660	790	920	1050	1180	1310
J_2A	1/2"	4C, A	25	220	330	440	550	655	765	875	985	1095
		7CP, 10C, 3P, WS	50	440	660	880	1095	1315	1530	1750	1970	2185
J_2B	1/2"	4C, A	35	310	460	615	765	920	1070	1225	1380	1530
		7CP, 10C, 3P, WS	80	710	1055	1405	1755	2105	2450	2800	3150	3500
J_3B	3/4"	4C, A	60	530	790	1055	1315	1575	1840	2100	2360	2525
		7DP, 10C, 3P, WS	130	1150	1715	2285	2850	3415	3985	4550	5115	5685
J_4C	1"	4C, A	90	795	1190	1580	1975	2365	2760	3150	3540	3935
		7CP, 10C, 3P, WS	200	1770	2640	3515	4385	5255	6130	7000	7870	8745
J_6D	1-1/2"	4C, A	180	1590	2375	3160	3945	4730	5515	6300	7085	7870
		7CP, 10C, 3P, WS	400	3540	5280	7025	8770	10515	12255	14000	15745	17490
J_8E	2"	4C, A	275	2435	3630	4830	6030	7230	8425	9625	10825	12025
		7CP, 10C, 3P, WS	600	5310	7925	10540	13155	15770	18385	21000	23615	26230

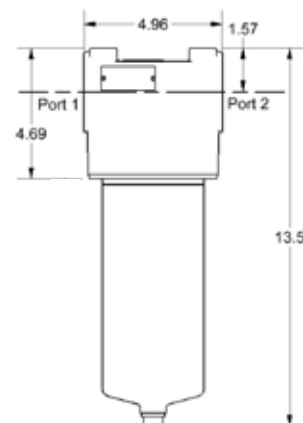
Note: These rates are based on compressed air flow. For CNG, these flows can be multiplied by a factor of 1.2.



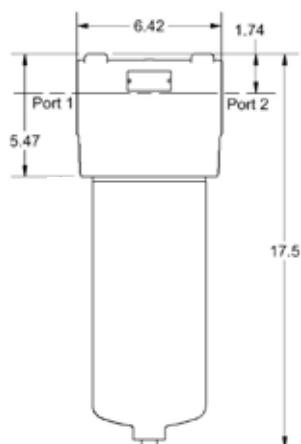
J_A Series



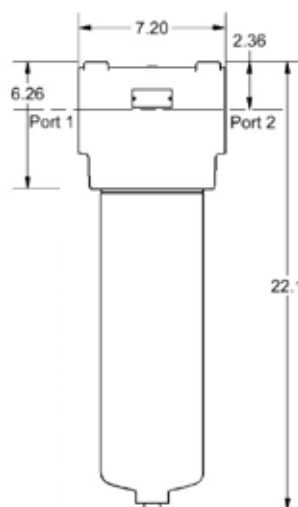
J_B Series



J_C Series



J_D Series



J_E Series

Specifications:

Model	J_1A	J_2A	J_2B	J_3B	J_4C	J_6D	J_8E
Port Size (N=NPT)	1/4" NPT	1/2" NPT	1/2" NPT	3/4" NPT	1" NPT	1-1/2" NPT	2" NPT
Port Size (S=SAE)	SAE-4	SAE-8	SAE-8	SAE-12	SAE-16	SAE-24	SAE-32
Max. Pressure	5000 PSIG	5000 PSIG	5000 PSIG	5000 PSIG	5000 PSIG	5000 PSIG	5000 PSIG
Max. Temperature	350°F	350°F	350°F	350°F	350°F	350°F	350°F
Head	SG Iron*	SG Iron*	SG Iron*	SG Iron*	SG Iron*	SG Iron*	SG Iron*
Bowl	Steel	Steel	Steel	Steel	Steel	Steel	Steel
Seals:	Fluorocarbon	Fluorocarbon	Fluorocarbon	Fluorocarbon	Fluorocarbon	Fluorocarbon	Fluorocarbon
Backing Ring	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile	Nitrile
Sump Volume	50 mL	50 mL	180 mL	180 mL	230 mL	500 mL	500 mL
Weight	9.0 lbs.	9.0 lbs.	13.0 lbs.	13.0 lbs.	21.0 lbs.	45.0 lbs.	67.0 lbs.
Port to Port	3.62"	3.62"	4.33"	4.33"	4.96"	6.42"	7.2"
Height	7.4"	7.4"	12.0"	12.0"	13.5"	17.5"	22.1"
Clearance	1.76"	1.76"	2.11"	2.11"	2.47"	2.94"	2.94"
Drain Port	SAE-6	SAE-6	SAE-6	SAE-6	SAE-6	SAE-6	SAE-6
Socket / Bowl Removal	1-1/16" HEX	1-1/16" HEX	1-1/2 HEX	1-1/2 HEX	1-1/2 HEX	1-1/2 HEX	1-1/2 HEX
Head / Bowl Torque	15-20 ft-lbs.	15-20 ft-lbs.	25-30 ft-lbs.	25-30 ft-lbs.	25-30 ft-lbs.	60-70 ft-lbs.	60-70 ft-lbs.

*Note: SG Iron is an abbreviation for Spheroidal Graphite Cast Iron

High Pressure Drains and Gauge:

JDK5000H	Horizontal Drain Kit 5000 psig
JDK5000V	Vertical Drain Kit 5000 psig
BDPI-25	Differential Pressure Gauge and Bracket

Note: Replacement Element supplied with o-ring and lube tube.

Member of



New to Come

ISO 9001:2000



How To Order

Part Numbers for Complete Assemblies:

Use the steps below to build your own part number.

For any permutation not mentioned below, please consult factory at 1-800-521-4357.

J	N	1	A	-	4	N
Series Name	Thread	Port Size	= Housing Size		Media Grade	Accessories
J	N - NPT	1 (1/4")	= A		4C	N = None
	S - SAE	2 (1/2")	= A		10C	Available
		2 (1/2")	= B		7CP	
		3 (3/4")	= B		WS	
		4 (1")	= C		3P	
		6 (1-1/2")	= D		A	
		8 (2")	= E			

Examples:

JN2A-4CN, JS6D-WSN, JN3B-3PN

Replacement Element Part Numbers:

Media Grade/Type	Series	Housing Size	Kit
4C	J	A	K
10C		B	
7CP		C	
WS		D	
3P		E	
A			

Examples:

4CJAK, WSJDK, 3PJBK

J-Series filters are used in a number of applications, ranging from breathing air for scuba divers, to high-pressure hydraulic circuit testing, to a variety of uses in the alternative fuel industry.



Worldwide Filtration Manufacturing Locations

North America

**Compressed Air Treatment
Filtration & Separation/Balston**
Haverhill, MA
978 858 0505
www.parker.com/balston

Filtration & Separation/Finite
Oxford, MI
248 628 6400
www.parker.com/finitefilter

**Purification, Dehydration &
Filtration Division**
Lancaster, NY
716 685 4040
www.parker.com/pdf

Sales Office
Charlotte, NC
704 921 9303
www.parker.com/pdf

**Engine Filtration &
Water Purification**
Racor
Modesto, CA
209 521 7860
www.parker.com/racor

Racor
Holly Springs
662 252 2656
www.parker.com/racor

Racor
Beaufort, SC
843 846 3200
www.parker.com/racor

Racor – Village Marine Tec.
Gardena, CA
310 516 9911
desalination.parker.com

Hydraulic Filtration
Hydraulic Filter
Metamora, OH
419 644 4311
www.parker.com/hydraulicfilter

Process Filtration
Process Advanced Filtration
Oxnard, CA
805 604 3400
www.parker.com/processfiltration

Europe

Compressed Air Treatment
domnick hunter Industrial
England NE
+44 (0) 191 402 9000,
www.domnickhunter.com

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Angelo di Piove Padova, Italy
+39 049 9712 111
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Essen Business Unit
Essen, Germany
T +49 2054 9340, F +49 2054 934164
www.parker.com/hzde

Parker Gas Separations
Etten- Leur, Netherlands
+31 76 508 5300

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Racor Research & Development
Stuttgart Germany
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Hydraulic Filter
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+31 26 3760376
www.parker.com/eurofilt

Urjala Operation
Urjala as Finland
+358 20 753 2500
www.parker.com/fi

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+44 1842 763299
www.parker.com/cmc

Process Filtration
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DH3 2SF England
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www.domnickhunter.com

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Mahape, Navi Mumbai 400 709 India
T +91 22 5613 7081, 82, 83, 84, 85
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Japan
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Filtration Division
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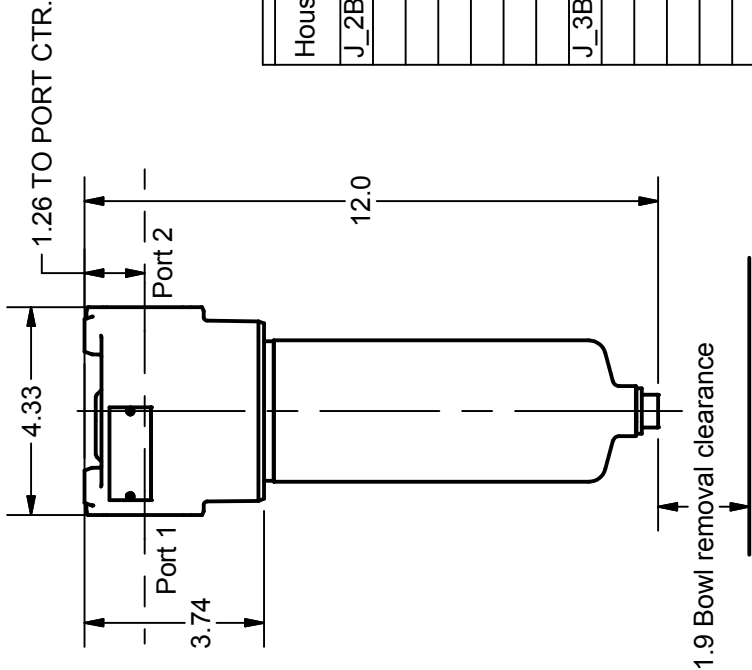
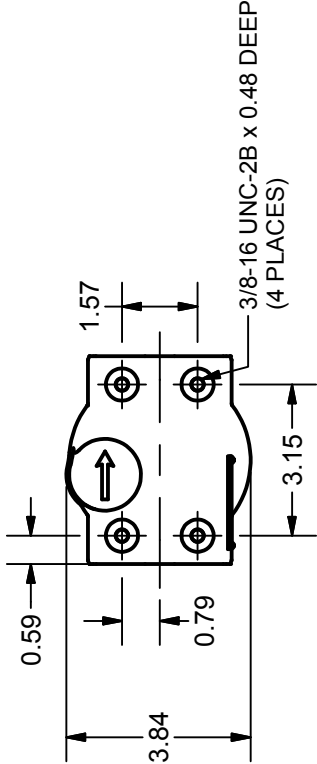
Pan American Division - Miami
Miami, FL
305 470 8800
www.parker.com/panam

Africa
Aeroporto Kempton Park,
1620 South Africa
+27 11 9610700
www.parker.com/eu

Parker Hannifin Corporation
Filtration and Separation Division
500 S. Glaspie Street
Oxford, MI 48371
phone 248 628 1850, fax 248 628 1850
1 800 521 4357 (US & Canada)
www.cngfiltration.com



ALL DIMENSIONS ARE FOR REFERENCE ONLY. OBTAIN A CERTIFIED DRAWING FROM THE FACTORY PRIOR TO USING DIMENSIONS FOR DESIGN PURPOSES.



ASSEMBLY NUMBER: J__B

PORT TYPE & SIZE NOMENCLATURE

NPT PORTS: JN2B = 1/2" NPT, JN3B = 3/4" NPT

SAE PORTS: JS2B = SAE-8 (3/4-16) JS3B = SAE-12 (1-1/16-12)

DRAIN: SAE-6 (9/16-18), PLUG INCLUDED

MAXIMUM PRESSURE: 5,000 PSIG

MAXIMUM TEMPERATURE (HOUSING ONLY): 350°F

MAX. DIFFERENTIAL PRESSURE AT ELEMENT REPLACEMENT: 10 PSID

SUMP CAPACITY: 180 ML

MOUNTING: LINE MOUNTED, VERTICAL AS SHOWN, MOUNTING HOLES PROVIDED

ASSEMBLY WEIGHT: 13.0 LBS

MATERIALS

HEAD: NICKEL-PLATED SG IRON

BOWL: NICKEL-PLATED STEEL

DRAIN PLUG: ZINC-PLATED STEEL

SEALS: FLUOROCARBON

NON-WETTED BACKING RING: NITRILE RUBBER

FILTER ELEMENT: SEE ELEMENT SPECIFICATION DRAWING

Housing P/N	Element Kit P/N	Media Type	Rated Flow at 100 PSIG	Rated Flow at 3000 PSIG	Rated Flow at 5000 PSIG
J_2B	4CJBK	Coalescer	35 SCFM	920 SCFM	1530 SCFM
	10CJBK	Pre-Coalescer	80 SCFM	2105 SCFM	3500 SCFM
	7CPJBK	Pleated Coalescer	80 SCFM	2105 SCFM	3500 SCFM
	WSJBK	SS Liquid Separator	80 SCFM	2105 SCFM	3500 SCFM
	3PJBK	Particulate Interceptor	80 SCFM	2105 SCFM	3500 SCFM
	AJBK	Activated Carbon Adsorber	35 SCFM	920 SCFM	1530 SCFM
J_3B	4CJBK	Coalescer	60 SCFM	1575 SCFM	2525 SCFM
	10CJBK	Pre-Coalescer	130 SCFM	3415 SCFM	5685 SCFM
	7CPJBK	Pleated Coalescer	130 SCFM	3415 SCFM	5685 SCFM
	WSJBK	SS Liquid Separator	130 SCFM	3415 SCFM	5685 SCFM
	3PJBK	Particulate Interceptor	130 SCFM	3415 SCFM	5685 SCFM
	AJBK	Activated Carbon Adsorber	60 SCFM	1575 SCFM	2525 SCFM

UNIT: INCHES

FILTRATION AND SEPARATION DIVISION			DRAWING No.		SIZE
TITLE J__B-SERIES SPEC. DRAWING			DR BY DDA	DATE 11/12/2010	
			CHK BY	SCALE 1/4	J__B SERIES-300
					A



G 22

WIKA
50394771

0-200 PSI/BAR PRESSURE GAUGE

ANGI PART NUMBER 741-07240

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Industrial Gauges

Type 23X.53



Type 232.53 - Dry case
Type 233.53 - Liquid filled case

- Stainless Steel Case & Crimp Ring
- Welded Case-to-Socket Connection
- Field Liquid-Fillable

The rugged construction of WIKAI Type 23X.53 stainless steel gauges provides resistance to the most corrosive media and environments. These gauges feature 316 stainless steel wetted parts and a 304 stainless steel case and crimped ring, and can be liquid-filled in the field.

Standard Features

- Nominal Case Size: 2" (53 mm) **2½"** (68 mm), 4" (100 mm)
- Case Material: 304 stainless steel
- Wetted Parts: 316 SS
- Window Type & Material: 2½" Polycarbonate; 4" Acrylic
- Removable Window: No
- Dial Material: White aluminum
- Bezel Ring Type & Material: Crimp on SS polished
- Liquid Fillable Gauge: Yes
- Case-to-Socket O-ring Material: Welded
- "Other" Gaskets/O-ring Types & Materials:
Window gasket, BUNA-N
- Pointer Material/Type: Black aluminum
- Adjustable Pointer: No
- Accuracy: $\pm 1.5\%$ of span (2" & 2½");
(4") $\pm 1.0\%$ of span-ASME B40.100 Grade 1A
- Connection locations: LM (Lower Mount),
CBM (Center Back Mount)
& LBM (Lower Back Mount) (4" only)
- Media Operating Temperature: 212°F
- Ambient Operating Temperature: -40°F to 140°F dry;
-4°F to 140°F glycerine case fill; -40°F to 140°F silicone
case fill

Type	232.53				
Connection	LM 	CBM 			
Conn. Size	1/4" NPT				
Size	2 1/2"				
Pressure Scale ¹	PSI	PSI	PSI/BAR	PSI/KPA	PSI/KG/CM ²
30" Hg	9768777	9768394			
30"-0-15 PSI					
30"-0-30 PSI	9768769	9768386			
30"-0-60 PSI	9768750	9768378			
30"-0-100 PSI					
30"-0-160 PSI	9768742	9768360			
30"-0-200 PSI					
15 PSI	9768734	9768351			
30 PSI	9768726	9768343			
60 PSI	9768718	9768335	8992848	8993089	8992962
100 PSI	9768700	9768327	8992856	8993097	8992970
160 PSI	9768696	9768319	8992865	8993101	8992988
200 PSI	9768688	9768300	8992873	8993119	8992996
300 PSI	9768670	9768297	8992881	8993127	8993004
400 PSI	9768661	9768289			
600 PSI	9768653	9768270	9779685	9779693	
800 PSI					
1,000 PSI	9768645	9768262	8992899	8993135	8993012
1,500 PSI	9768637	9768254	8992903	8993144	8993020
2,000 PSI	9768629	9768246	8992911	8993152	8993038
3,000 PSI	9768610	9768238	8992929	8993160	8993046
5,000 PSI	9768602	9768220	8992937	8993178	8993055
6,000 PSI		8993208	8992945	8993186	8993063
10,000 PSI	9768599	9768211	8992954	8993195	8993071
15,000 PSI		9779715	9776715		9779731

¹PSI/BAR² denotes dual scale; PSI outside in black, BAR inside in red; ²PSI/KPA² denotes dual scale; PSI outside in black, KPA inside in red; ³PSI/KG/CM² denotes dual scale; PSI outside in black, KG/CM² inside in red. Note: Vacuum scale: 30" Hg outside in black; 760 mm Hg inside in red. ²

Note: For options not shown - consult your WIKAI Distributor or the Factory.

Data sheet: 23X.53

For liquid filled gauges, add "-B29" to part numbers above for 2½" size or "-B34" for 4" size.

Items shown with part numbers indicate readily available standard WIKAI products. Items shown without part numbers are available on special order.

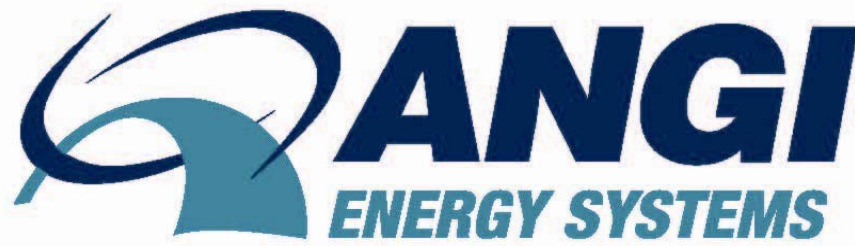
Available Options:

- "Dampened Movement" Option: Yes,
(N/A on 2½" CBM or 2" LM/CBM) & LBM
- U-Clamp Bracket: Yes (CBM only)
- Front Flange: Yes (CBM & LBM only)
- Rear Flange: Yes (LM, CBM & LBM)
- Restrictor: Yes
- Safety Glass Window: No
- Instrument Glass Window (flat glass): No
- Drag Pointer (maximum reading indicator): Yes
- Cleaned for Use in Oxygen Service: Yes
- Panel Mount Kit: Yes (see front flange or u-clamp option)
- Magnetic or Inductive Contact Switches: No
- Receiver Gauge Scales: Yes
- Special Connection: Limited to wrench flat area

Type	232.53- liquid fillable		
Connection	LM 	LM 	LBM 
Conn. Size	1/4" NPT		1/2" NPT
Size	4"		
Pressure Scale	PSI	PSI	PSI
30" Hg	9767576	9768459	9737057
30"-0-15 PSI	9737910	9768467	9737065
30"-0-30 PSI	9767398	9768475	9737073
30"-0-60 PSI	9767401	9768483	9737081
30"-0-100 PSI	9737898	9737880	9737090
30"-0-160 PSI	9767410	9768491	9737103
30"-0-200 PSI	9737901	9768505	9737111
30"-0-300 PSI	4260147		
30"-0-400 PSI	4260155		
15 PSI	9767428	9768513	9737120
30 PSI	9767436	9768521	9737138
60 PSI	9767444	9768530	9737146
100 PSI	9767452	9768548	9737154
160 PSI	9767460	9768556	9737162
200 PSI	9767479	9768564	9737170
300 PSI	9767487	9768572	9737189
400 PSI	9767495	9768580	9737197
600 PSI	9767509	9768963	9737200
800 PSI			9737219
1,000 PSI	9767517	9768858	9737227
1,500 PSI		9768866	9737235
2,000 PSI		9768807	9737243
3,000 PSI		9768874	9737251
5,000 PSI		9768823	9737260
10,000 PSI		9768831	9737278
15,000 PSI		9768840	9737286

Type	233.53- glycerine filled				
Connection	LM 	LM 	LBM 	CBM 	
Conn. Size	1/4" NPT		1/2" NPT		1/4" NPT
Size	2 1/2"	4"	4"		2 1/2"
Pressure Scale	PSI	PSI	PSI	PSI	PSI
30" Hg	9833646	9833124	9833328	9831504	9833310
30"-0-15 PSI		9831775	9833336	9831512	
30"-0-30 PSI	9833638	9832993	9833345	9831520	9833302
30"-0-60 PSI	9833620	9833000	9833353	9831538	9833298
30"-0-100 PSI		9831759	9831741	9831546	
30"-0-160 PSI	9833612	9833018	9833361	9831555	9833280
30"-0-200 PSI		9831767	9833379	9831563	
30"-0-300 PSI					
30"-0-400 PSI					
15 PSI	9833604	9833026	9833387	9831571	9833272
30 PSI	9833590	9833035	9833395	9831589	9833264
60 PSI	9833582	9833043	9833409	9831597	9833255
100 PSI	9833574	9833051	9833417	9831601	9833247
160 PSI	9833565	9833069	9833425	9831619	9833239
200 PSI	9833557	9833077	9833434	9831627	9833221
300 PSI	9833549	9833085	9833442	9831635	9833213
400 PSI	9833531	9833094	9833450	9831644	9833205
600 PSI	9833523	9833107	9833727	9831652	9833191
800 PSI					
1,000 PSI	9833515	9833115	9833697	9831678	9833183
1,500 PSI	9833506		9833701	9831686	9833175
2,000 PSI	9833493		9833655	9831695	9833166
3,000 PSI	9833485		9833719	9831708	9833158
5,000 PSI	9833476		9833663	9831716	9833140
10,000 PSI	9833468		9833671	9831725	9833132
15,000 PSI			9833689	9831733	

Type	232.53- Stock Gauges with Ammonia Scales	
Size	2 1/2"	4"
Connection	LM 	
Conn. Size	1/4" NPT	
30"-0-150 PSI / 84°F	9797144	9797127
30"-0-300 PSI / 126°F	9797152	9797135



G 30

WIKA
8992945-0003

0-6000 PSI/BAR PRESSURE GAUGE

ANGI PART NUMBER 741-07248

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Industrial Gauges

Type 23X.53



- Stainless Steel Case & Crimp Ring
- Welded Case-to-Socket Connection
- Field Liquid-Fillable

Type 232.53 - Dry case
Type 233.53 - Liquid filled case

The rugged construction of WIKAI Type 23X.53 stainless steel gauges provides resistance to the most corrosive media and environments. These gauges feature 316 stainless steel wetted parts and a 304 stainless steel case and crimped ring, and can be liquid-filled in the field.

Standard Features

- Nominal Case Size: 2" (53 mm) 2½" (68 mm), 4" (100 mm)
- Case Material: 304 stainless steel
- Wetted Parts: 316 SS
- Window Type & Material: 2½" Polycarbonate; 4" Acrylic
- Removable Window: No
- Dial Material: White aluminum
- Bezel Ring Type & Material: Crimp on SS polished
- Liquid Fillable Gauge: Yes
- Case-to-Socket O-ring Material: Welded
- "Other" Gaskets/O-ring Types & Materials:
Window gasket, BUNA-N
- Pointer Material/Type: Black aluminum
- Adjustable Pointer: No
- Accuracy: ±1.5% of span (2" & 2½");
(4") ± 1.0% of span-ASME B40.100 Grade 1A
- Connection locations: LM (Lower Mount),
CBM (Center Back Mount)
& LBM (Lower Back Mount) (4" only)
- Media Operating Temperature: 212°F
- Ambient Operating Temperature: -40°F to 140°F dry;
-4°F to 140°F glycerine case fill; -40°F to 140°F silicone
case fill

Type	232.53				
Connection	LM 	CBM 			
Conn. Size	1/4" NPT				
Size	2 1/2"				
Pressure Scale ¹	PSI	PSI	PSI/BAR	PSI/KPA	PSI/KG/CM ²
30" Hg	9768777	9768394			
30"-0-15 PSI					
30"-0-30 PSI	9768769	9768386			
30"-0-60 PSI	9768750	9768378			
30"-0-100 PSI					
30"-0-160 PSI	9768742	9768360			
30"-0-200 PSI					
15 PSI	9768734	9768351			
30 PSI	9768726	9768343			
60 PSI	9768718	9768335	8992848	8993089	8992962
100 PSI	9768700	9768327	8992856	8993097	8992970
160 PSI	9768696	9768319	8992865	8993101	8992988
200 PSI	9768688	9768300	8992873	8993119	8992996
300 PSI	9768670	9768297	8992881	8993127	8993004
400 PSI	9768661	9768289			
600 PSI	9768653	9768270	9779685	9779693	
800 PSI					
1,000 PSI	9768645	9768262	8992899	8993135	8993012
1,500 PSI	9768637	9768254	8992903	8993144	8993020
2,000 PSI	9768629	9768246	8992911	8993152	8993038
3,000 PSI	9768610	9768238	8992929	8993160	8993046
5,000 PSI	9768602	9768220	8992937	8993178	8993055
6,000 PSI		8993208	8992945	8993186	8993063
10,000 PSI	9768599	9768211	8992954	8993195	8993071
15,000 PSI		9779715	9776715		9779731

¹PSI/BAR² denotes dual scale; PSI outside in black, BAR inside in red; ²PSI/KPA² denotes dual scale; PSI outside in black, KPA inside in red; ³PSI/KG/CM² denotes dual scale; PSI outside in black, KG/CM² inside in red. Note: Vacuum scale: 30" Hg outside in black; 760 mm Hg inside in red. ²

Note: For options not shown - consult your WIKAI Distributor or the Factory.

Data sheet: 23X.53

For liquid filled gauges, add "-B29" to part numbers above for 2½" size or "-B34" for 4" size.

Items shown with part numbers indicate readily available standard WIKAI products. Items shown without part numbers are available on special order.

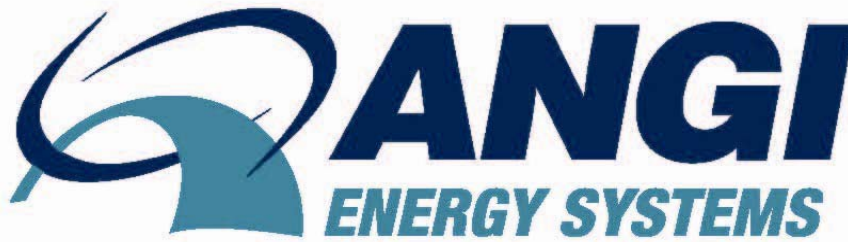
Available Options:

- "Dampened Movement" Option: Yes,
(N/A on 2½" CBM or 2" LM/CBM) & LBM
- U-Clamp Bracket: Yes (CBM only)
- Front Flange: Yes (CBM & LBM only)
- Rear Flange: Yes (LM, CBM & LBM)
- Restrictor: Yes
- Safety Glass Window: No
- Instrument Glass Window (flat glass): No
- Drag Pointer (maximum reading indicator): Yes
- Cleaned for Use in Oxygen Service: Yes
- Panel Mount Kit: Yes (see front flange or u-clamp option)
- Magnetic or Inductive Contact Switches: No
- Receiver Gauge Scales: Yes
- Special Connection: Limited to wrench flat area

Type	232.53- liquid fillable		
Connection	LM 	LM 	LBM 
Conn. Size	1/4" NPT		1/2" NPT
Size	4"		
Pressure Scale	PSI	PSI	PSI
30" Hg	9767576	9768459	9737057
30"-0-15 PSI	9737910	9768467	9737065
30"-0-30 PSI	9767398	9768475	9737073
30"-0-60 PSI	9767401	9768483	9737081
30"-0-100 PSI	9737898	9737880	9737090
30"-0-160 PSI	9767410	9768491	9737103
30"-0-200 PSI	9737901	9768505	9737111
30"-0-300 PSI	4260147		
30"-0-400 PSI	4260155		
15 PSI	9767428	9768513	9737120
30 PSI	9767436	9768521	9737138
60 PSI	9767444	9768530	9737146
100 PSI	9767452	9768548	9737154
160 PSI	9767460	9768556	9737162
200 PSI	9767479	9768564	9737170
300 PSI	9767487	9768572	9737189
400 PSI	9767495	9768580	9737197
600 PSI	9767509	9768963	9737200
800 PSI			9737219
1,000 PSI	9767517	9768858	9737227
1,500 PSI		9768866	9737235
2,000 PSI		9768807	9737243
3,000 PSI		9768874	9737251
5,000 PSI		9768823	9737260
10,000 PSI		9768831	9737278
15,000 PSI		9768840	9737286

Type	233.53- glycerine filled				
Connection	LM 	LM 	LBM 	CBM 	
Conn. Size	1/4" NPT		1/2" NPT		1/4" NPT
Size	2 1/2"	4"	4"		2 1/2"
Pressure Scale	PSI	PSI	PSI	PSI	PSI
30" Hg	9833646	9833124	9833328	9831504	9833310
30"-0-15 PSI		9831775	9833336	9831512	
30"-0-30 PSI	9833638	9832993	9833345	9831520	9833302
30"-0-60 PSI	9833620	9833000	9833353	9831538	9833298
30"-0-100 PSI		9831759	9831741	9831546	
30"-0-160 PSI	9833612	9833018	9833361	9831555	9833280
30"-0-200 PSI		9831767	9833379	9831563	
30"-0-300 PSI					
30"-0-400 PSI					
15 PSI	9833604	9833026	9833387	9831571	9833272
30 PSI	9833590	9833035	9833395	9831589	9833264
60 PSI	9833582	9833043	9833409	9831597	9833255
100 PSI	9833574	9833051	9833417	9831601	9833247
160 PSI	9833565	9833069	9833425	9831619	9833239
200 PSI	9833557	9833077	9833434	9831627	9833221
300 PSI	9833549	9833085	9833442	9831635	9833213
400 PSI	9833531	9833094	9833450	9831644	9833205
600 PSI	9833523	9833107	9833727	9831652	9833191
800 PSI					
1,000 PSI	9833515	9833115	9833697	9831678	9833183
1,500 PSI	9833506		9833701	9831686	9833175
2,000 PSI	9833493		9833655	9831695	9833166
3,000 PSI	9833485		9833719	9831708	9833158
5,000 PSI	9833476		9833663	9831716	9833140
10,000 PSI	9833468		9833671	9831725	9833132
15,000 PSI			9833689	9831733	

Type	232.53- Stock Gauges with Ammonia Scales	
Size	2 1/2"	4"
Connection	LM 	
Conn. Size	1/4" NPT	
30"-0-150 PSI / 84°F	9797144	9797127
30"-0-300 PSI / 126°F	9797152	9797135



MLV 15

ANDERSON-GREENWOOD
H5RDC-2

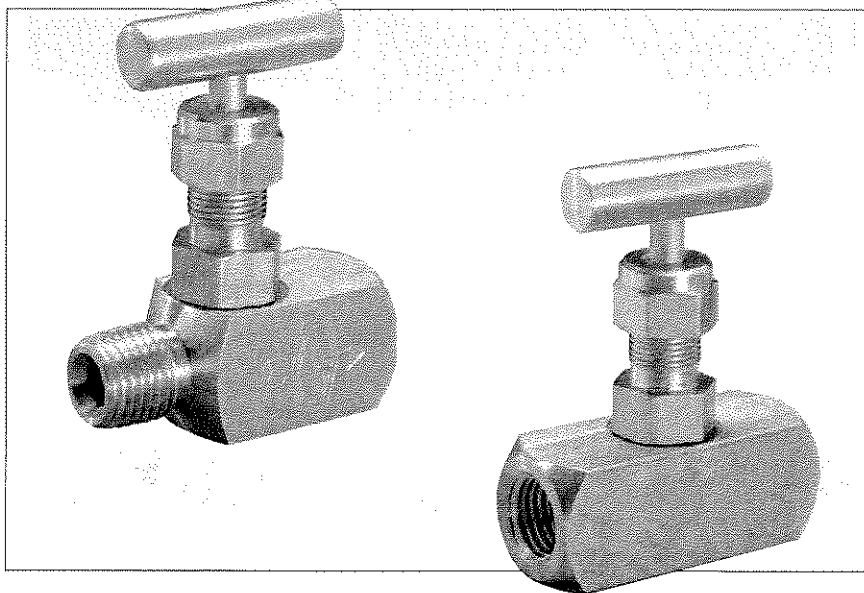
NEEDLE VALVE - 1/4" FNPT 6000 PSI CARBON STEEL MINI VALVE
COMPACT DESIGN IS 2" LONG AT MAX OPEN

ANGI PART NUMBER – 330-07385

NO REBUILD KIT AVAILABLE

Mini Valves – H5

6000 psig [414 barg]



Product Overview

The H5 Mini Valves facilitate safe, compact, and economical installations. They are excellent for straight isolation.

Valve seating is interchangeable between 'Hard' or 'Soft' without changing the bonnet assembly or removing valve from the installation. This feature of the H5 greatly extends the valve life.

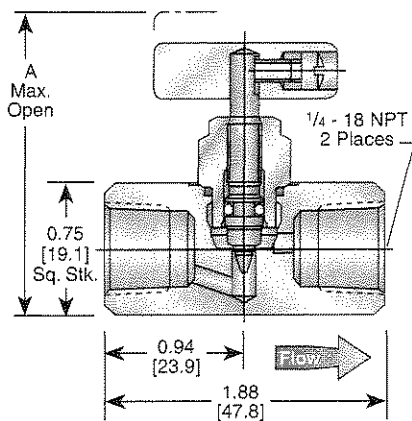
Features and Benefits

- **Packing below threads (O-ring bonnet)** prevents lubricant washout, thread corrosion, and keeps solids from entering thread area, which can cause galling. It also prevents process contamination.
- **Adjustable packing** – Teflon® and GRAFOIL® packed bonnets adjust easily, decreasing packing replacement downtime and increasing valve life.
- **Safety back seating** prevents stem blowout or accidental removal while in operation and provides a metal-to-metal secondary stem seal while in the full open position.
- **Chrome plating of 316 SS stem** prevents galling or freezing of stem threads when similar metals mate. CS valves use a 303 SS stem.
- **Rolled threads** provide additional thread strength. The stem, bonnet, and male NPT threads are rolled, not cut.
- **Mirror stem finish** burnished to a 16 RMS finish in the packing area enables smooth stem operation and extending packing life.
- **One-piece handle design** prevents loss of the valve handle due to vibration or during maintenance.
- **Soft or metal seat for bubble-tight shutoff** is field replaceable for easy maintenance.
- **Extended valve life** – if soft seat becomes damaged it can be removed, leaving a metal seated valve.

H5 Specifications³

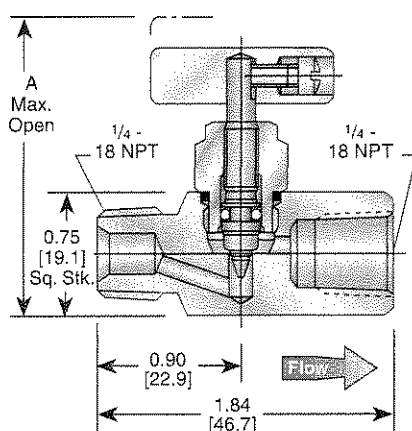
6000 psig [414 barg]

Dimensions (inches [mm])



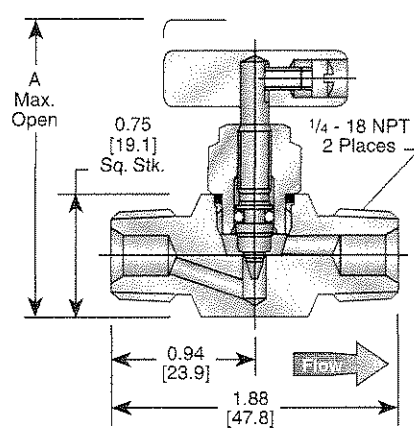
Maximum Open — Dimension A

O-ring	Teflon®	GRAFOIL®
2.00 [50.8]	2.60 [66.0]	3.07 [78.0]



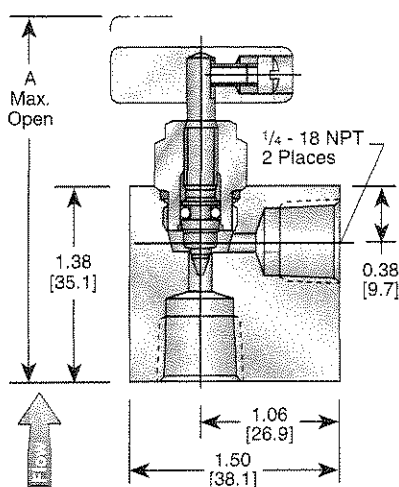
Maximum Open — Dimension A

O-ring	Teflon®	GRAFOIL®
2.00 [50.8]	2.60 [66.0]	3.07 [78.0]



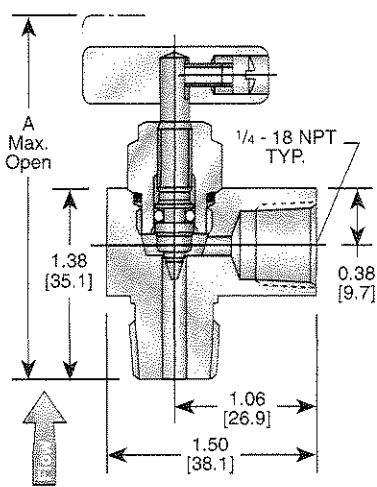
Maximum Open — Dimension A

O-ring	Teflon®	GRAFOIL®
2.00 [50.8]	2.60 [66.0]	3.07 [78.0]



Maximum Open — Dimension A

O-ring	Teflon®	GRAFOIL®
2.64 [67.1]	3.23 [82.0]	3.71 [94.2]



Maximum Open — Dimension A

O-ring	Teflon®	GRAFOIL®
2.66 [67.6]	3.26 [82.8]	3.73 [94.7]

1. Approximate valve weight: 0.5 lb [0.23 kg].
Seat orifice size 0.136-inch [3.5 mm] diameter.
2. Valve C_v Soft Seat 0.27 maximum.
Valve C_v Hard Seat 0.31 maximum.
3. For Hastelloy® and -SG3 call factory for dimensions and weights.

H5 Specifications

6000 psig [414 barg]

Standard Materials — Hard Seat

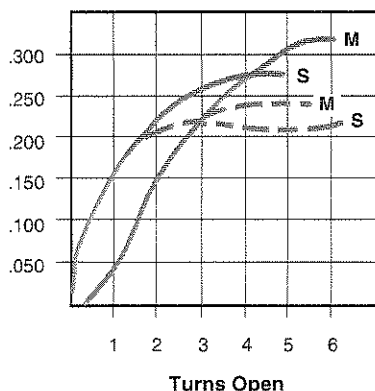
Valve	Body	Bonnet	Stem	Packing	Seat	Handle ²
CS ¹	A108	A108	A581-303	Teflon® or BUNA-N O-ring	Integral	Round
SS	A479-316	A479-316	A276-316	Teflon®, Viton® or GRAFOIL® O-ring	Integral	Tee
Brass	B16	B16	A581-303	Teflon® or BUNA-N O-ring	Integral	Round
SG ³	A479-316	A479-316	Monel® R405	Teflon® or Viton® O-ring	Integral	Tee
SG3 ⁶	Hastelloy® C-276	Hastelloy® C-276	Hastelloy® C-276	Teflon® or Viton® O-ring	Integral	Tee

Standard Materials — Soft Seat

Valve	Body	Bonnet	Stem	Packing	Flow Washer	Seat	Handle ²
CS ¹	A108	A108	A581-303	Teflon® or BUNA-N O-ring	A479-316	Delrin® ⁴	Round
SS	A479-316	A479-316	A276-316	Teflon® or Viton® O-ring	A479-316	PCTFE ⁵	Tee
Brass	B16	B16	A581-303	Teflon® or BUNA-N O-ring	A479-316	Delrin® ⁴	Round
SG ³	A479-316	A479-316	Monel® R405	Teflon® or Viton® O-ring	A479-316	PCTFE ⁵	Tee
SG3 ⁶	Hastelloy® C-276	Hastelloy® C-276	Hastelloy® C-276	Teflon® or Viton® O-ring	Hastelloy® C-276	PCTFE ⁵	Tee

1. CS is zinc cobalt plated to prevent corrosion.
2. Tee handle is SS; Round handle is CS.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. PEEK available.
5. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
6. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

H5 Metal and Soft Seated Flow Characteristics



— Angle Valve
 — Globe Valve
 M Metal Seat
 S Soft Seat

Formula

Liquids

$$C_v = Q_L \sqrt{\frac{(P_1 - P_2) (62.4)}{r}}$$

Where:

Q_L = Flow (gpm)

ρ = Density of Liquid (lb/ft³)

P_1 = Upstream Pressure (psia)

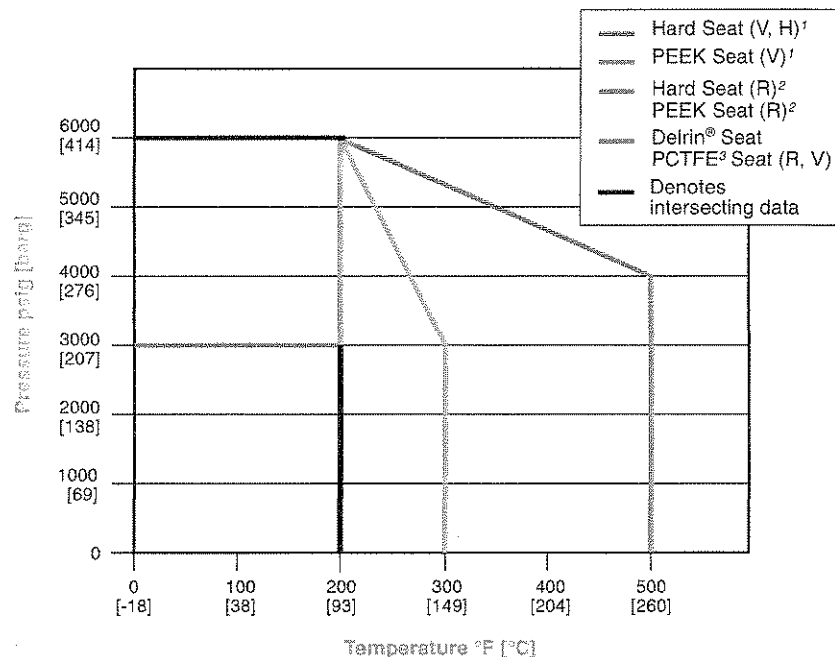
P_2 = Downstream Pressure (psia)

ρ (water) = 62.4 lb/ft³ @ 60°F [16°C]

H5 Specifications

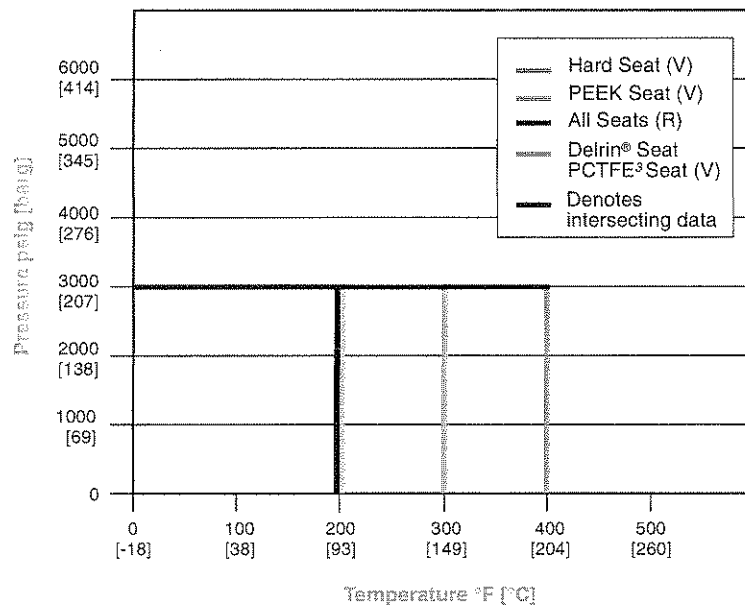
6000 psig [414 barg]

Pressure vs. Temperature - CS and SS Valves



1. (V or H) = with Teflon® or GRAFOIL® bonnet assemblies.
2. (R) = with O-ring bonnet assembly.
3. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.

Pressure vs. Temperature - Bronze Valves



H5 Specifications

6000 psig [414 barg]

Pressure and Temperature Ratings

Seat	Teflon® or GRAFOIL® Bonnet ²			
	CS and SS Valves		Brass Valves	
Hard	6000 psig @ 200°F 4000 psig @ 500°F	[414 barg @ 93°C] [276 barg @ 260°C]	3000 psig @ 400°F	[207 barg @ 204°C]
Delrin® and PCTFE ³	3000 psig @ 200°F	[207 barg @ 93°C]	3000 psig @ 200°F	[207 barg @ 93°C]
PEEK	6000 psig @ 200°F 3000 psig @ 300°F	[414 barg @ 93°C] [207 barg @ 149°C]	3000 psig @ 300°F	[207 barg @ 149°C]

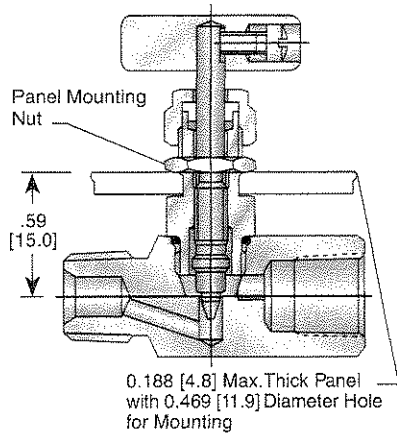
Seat	O-ring Bonnet			
	CS and SS Valves		Brass Valves	
Hard	6000 psig @ 200°F	[414 barg @ 93°C]	3000 psig @ 200°F	[207 barg @ 93°C]
Delrin® and PCTFE ³	3000 psig @ 200°F	[207 barg @ 93°C]	3000 psig @ 200°F	[207 barg @ 93°C]
PEEK	6000 psig @ 200°F	[414 barg @ 93°C]	3000 psig @ 200°F	[207 barg @ 93°C]

Notes

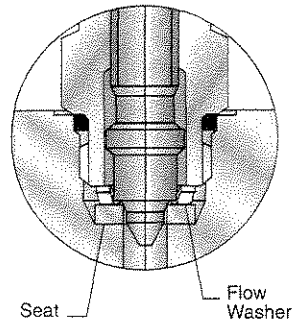
1. Pressure and temperature ratings are not shown on valve body.
2. GRAFOIL® packed bonnet comes complete with ball end stem; SS only.
3. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.

H5 Options³

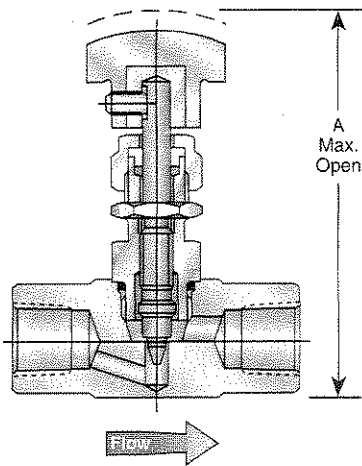
Optional Panel Mounting Nut¹ Inches [mm]



Optional Soft Seat²



Optional Phenolic Handles³



Phenolic Handles are available in 1-inch [25 mm] diameter. Colors available are green, red, and black.

Phenolic Handles facilitate repeatable flow control, as well as enhance the appearance of panels, sample cylinders, and other associated products requiring premium performance throttling and/or isolation valves.

Maximum open dimension of any H5 with Phenolic Handles is calculated by adding 0.4-inch [10.2 mm] to the 'A' reference dimension for Teflon® Stem Seal on page 36.

1. Available with Teflon® packed bonnet.
2. Available on all H5 products.
3. For Hastelloy® and -SG3 call factory for dimensions and weights.

H5 Specifications

Ordering Information

H5

V

D

S

- 22

- SG

Packing

V - Teflon® (standard for SS)

R - O-ring

H - GRAFOIL® (SS only) 500°F [260°C] max

Seat

I - Integral

D - Delrin®

E - PEEK

K - PCTFE¹ (standard for SS)

Material

B - Brass

C - CS

S - SS

J - Hastelloy

Connections (Inlet/Outlet)

2 - 1/4-inch F x 1/4-inch F

2A - 1/4-inch F x 1/4-inch F (Angle)

2M - 1/4-inch M x 1/4-inch M

22 - 1/4-inch M x 1/4-inch F

22A - 1/4-inch M x 1/4-inch F (Angle)

Options

CLC - Chlorine Cleaning

AL - Arctic Lubricant (low temperature service -70°F) - not available for CS valves

HD - Hydrostatic Testing (100%) (MSS-SP-61)

MS - Monel® Stem

OC - Oxygen Cleaning

PHB - Phenolic Black Handle (page 40)

PHG - Phenolic Green Handle (page 40)

PHR - Phenolic Red Handle (page 40)

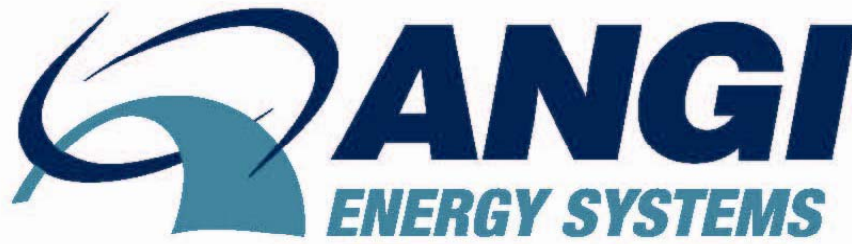
PM - Panel Mount (Teflon® packed only) (page 40)

SG - (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005

SG3 - (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])

SP - Special Requirement - please specify

1. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.



MV 1

WHITEY
SS-83XKF4
1/4" FNPT, 3-WAY, REFUELING BALL VALVE, 6000 PSI

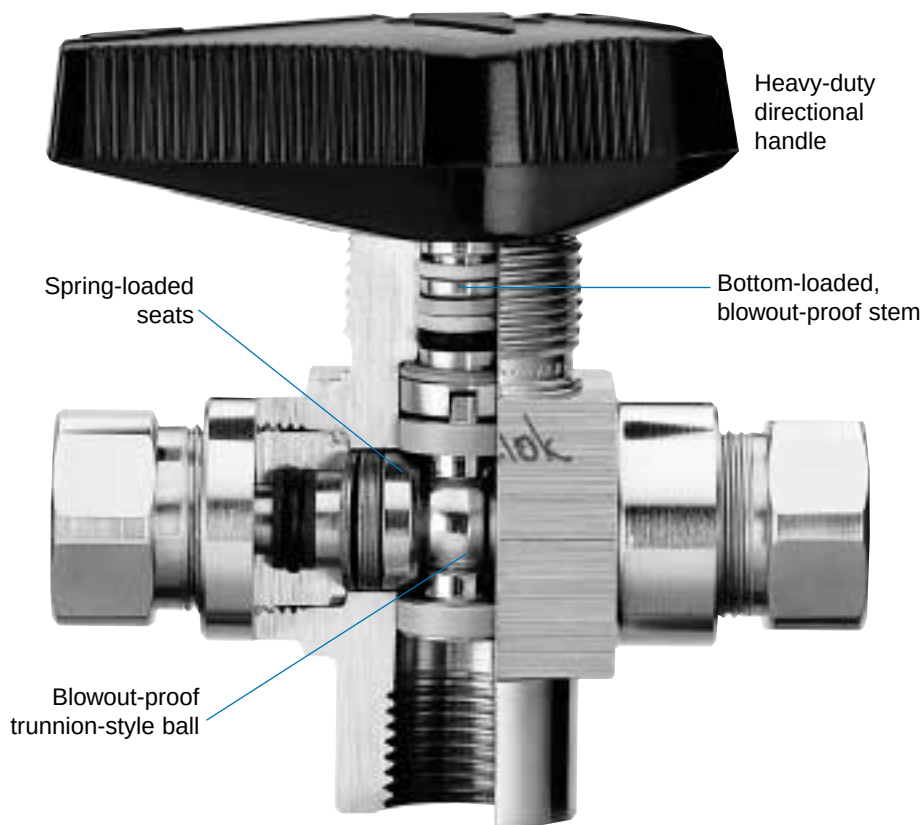
ANGI PART NUMBER 330-02488

REBUILD KIT – WHITEY 3-WAY – 761-01232

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Features

- Compact, maximum flow design
- Low operating torque
- 2- or 3-way flow patterns
- Panel mounting
- Pneumatic and electric actuators available



Technical Data

Seat Material	Temperature Rating, °F (°C)	Pressure Rating at 100°F (37°C) psig (bar)		Flow Coefficient (C _v)
		Stainless Steel	Alloy 400	
83 Series				
PCTFE, reinforced nylon	0 to 250 (-17 to 121)	6000 (413)	5000 (344)	2-way valves— 1.0 to 1.6 depending on end connection;
PEEK	0 to 450			3-way valves— 0.75
PTFE	(-17 to 232)			
1500 (103)				
H83 Series				
PEEK	0 to 450 (-17 to 232)	6000 to 10 000 (413 to 689) depending on end connection	—	2-way valves— 1.0 to 1.6 depending on end connection; 3-way valves— 0.75

Important Information About Ball Valves

- Valves that have not been cycled for a period of time may have a higher initial actuation torque.
- Swagelok ball valves are designed to be operated in a fully open or fully closed position.

Testing

Every Swagelok trunnion ball valve is factory tested with nitrogen at 1000 psig (68.9 bar). Seats have a maximum allowable leak rate of 0.1 std cm³/min. Shell testing is performed to a requirement of no detectable leakage with a liquid leak detector.

Cleaning and Packaging

Every Swagelok trunnion ball valve is cleaned and packaged in accordance with *Swagelok Standard Cleaning and Packaging (SC-10)*.

Pressure-Temperature Ratings

83 Series

Pressure-temperature ratings for 83 series valves are based on listed seat materials, fluorocarbon FKM O-rings, and reinforced PTFE backup rings.

Low-temperature L83 series ball valves are available. See page 8.

Material	316 SS		Alloy 400			
Seat Material	PCTFE, Nylon	PTFE	PEEK	PCTFE, Nylon	PTFE	PEEK
Temperature, °F (°C)	Working Pressure, psig (bar)					
0 (-17) to 100 (37)	6000 (413)	1500 (103)	6000 (413)	5000 (344)	1500 (103)	5000 (344)
150 (65)	3000 (206)	1125 (77.5)	5800 (399)	3000 (206)	1125 (77.5)	4690 (323)
200 (93)	2000 (137)	750 (51.6)	5000 (344)	2000 (137)	750 (51.6)	4390 (302)
250 (121)	1000 (68.9)	625 (43.0)	4100 (282)	1000 (68.9)	625 (43.0)	4100 (282)
300 (148)	—	500 (34.4)	3200 (220)	—	500 (34.4)	3200 (220)
350 (176)	—	375 (25.8)	2300 (158)	—	375 (25.8)	2300 (158)
400 (204)	—	250 (17.2)	1400 (96.4)	—	250 (17.2)	1400 (96.4)
450 (232)	—	125 (8.6)	500 (34.4)	—	125 (8.6)	500 (34.4)

H83 Series

Pressure-temperature ratings for H83 series valves are based on PEEK seats, fluorocarbon FKM O-rings, and reinforced PTFE backup rings.

Low-temperature LH83 series ball valves are available. See page 8.

Material	316 SS					
End Connections	F2, F4, S6MM, S4	S8MM	S12MM	S6	S8	S10MM
Temperature, °F (°C)	Working Pressure, psig (bar)					
0 (-17) to 100 (37)	10 000 (689)	7500 (516)	6600 (454)	6500 (447)	6700 (461)	6000 (413)
150 (65)	7 500 (516)	7500 (516)	6600 (454)	6500 (447)	6700 (461)	5900 (406)
200 (93)	5 000 (344)	5000 (344)	5000 (344)	5000 (344)	5000 (344)	5000 (344)
250 (121)	4 100 (282)	4100 (282)	4100 (282)	4100 (282)	4100 (282)	4100 (282)
300 (148)	3 200 (220)	3200 (220)	3200 (220)	3200 (220)	3200 (220)	3200 (220)
350 (176)	2 300 (158)	2300 (158)	2300 (158)	2300 (158)	2300 (158)	2300 (158)
400 (204)	1 400 (96.4)	1400 (96.4)	1400 (96.4)	1400 (96.4)	1400 (96.4)	1400 (96.4)
450 (232)	500 (34.4)	500 (34.4)	500 (34.4)	500 (34.4)	500 (34.4)	500 (34.4)

Flow Data at 70°F (20°C)

83 Series 2-Way

0.187 in. (4.75 mm) orifice, 1.2 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow, std ft ³ /min (std L/min)	Water Flow, U.S. gal/min (L/min)
10 (0.68)	14.0 (396)	3.8 (14.3)
50 (3.4)	36.0 (1019)	8.5 (32.1)
100 (6.8)	64.0 (1812)	12.0 (45.4)

H83 Series 2-Way

0.187 in. (4.75 mm) orifice, 1.2 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow, std ft ³ /min (std L/min)	Water Flow, U.S. gal/min (L/min)
150 (10.3)	92 (2805)	15 (56.7)
600 (41.3)	340 (9627)	29 (109)
1000 (68.9)	570 (16 140)	38 (143)

83 Series 3-Way

0.187 in. (4.75 mm) orifice, 0.75 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow, std ft ³ /min (std L/min)	Water Flow, U.S. gal/min (L/min)
10 (0.68)	8.0 (226)	2.4 (9.0)
50 (3.4)	23.0 (651)	5.3 (20.0)
100 (6.8)	40.0 (1132)	7.5 (28.3)

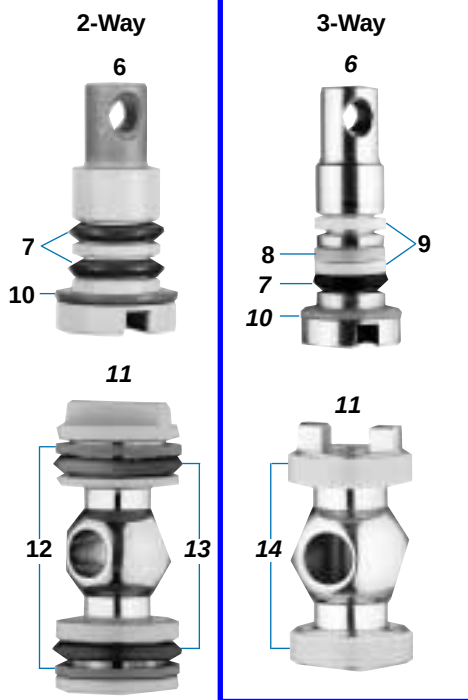
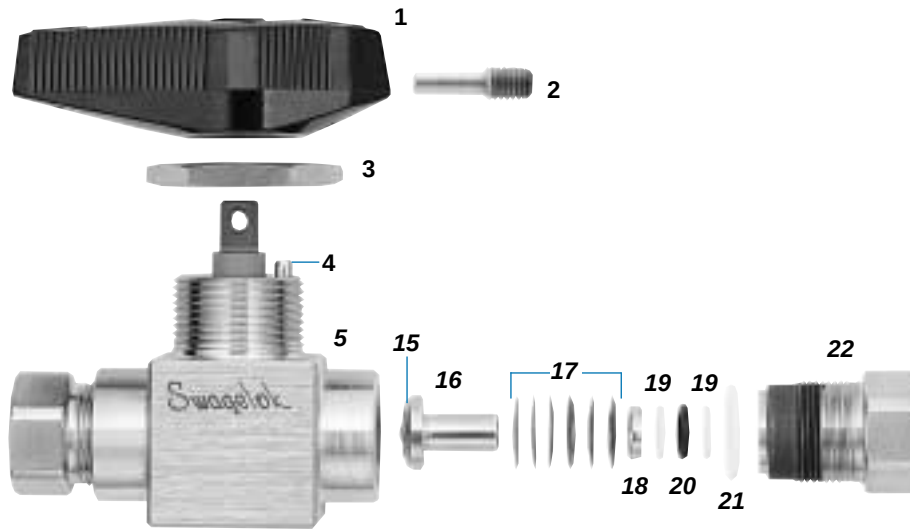
H83 Series 3-Way

0.187 in. (4.75 mm) orifice, 0.75 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow, std ft ³ /min (std L/min)	Water Flow, U.S. gal/min (L/min)
150 (10.3)	57 (1614)	9.2 (34.8)
600 (41.3)	210 (5946)	18 (69.1)
1000 (68.9)	350 (9912)	24 (90.8)

Materials of Construction

83 Series

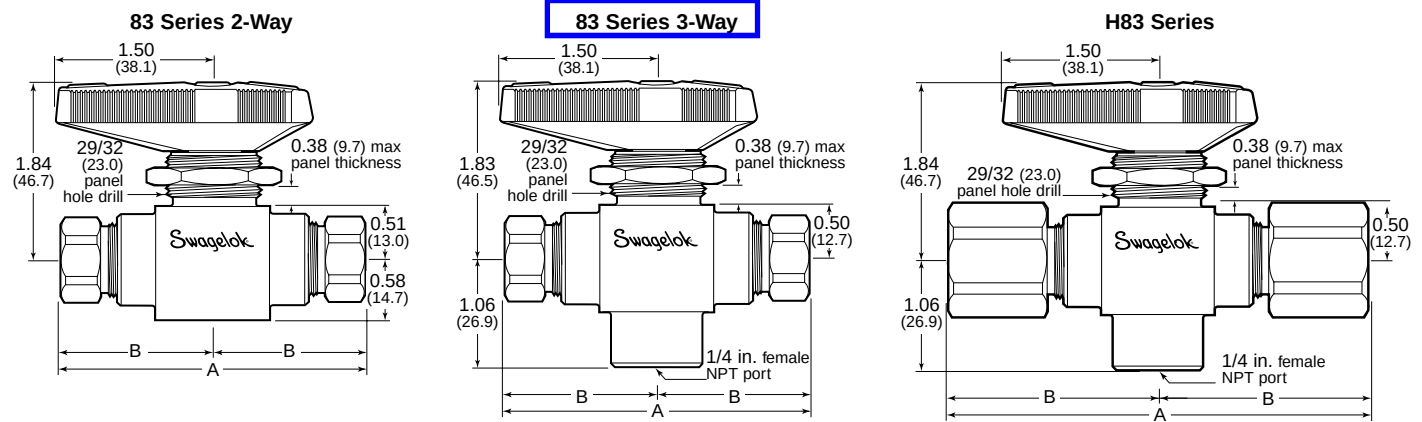


Component	Valve Body Material			
	Stainless Steel		Alloy 400	
	2-Way	3-Way	2-Way	3-Way
	Material Grade/ASTM Specification			
1 Handle	Phenolic with brass insert			
2 Set screw	17-4 PH®			
3 Panel nut	316 SS/B783			
4 Stop pin (2-way—2; 3-way—1)	Stainless steel			
5 Body	316 SS/A479		Alloy 400/B164	
6 Stem	316 SS/A276		Alloy R-405/B164	
7 Stem O-rings (2-way—2; 3-way—1)	Fluorocarbon FKM			
8 Primary stem backup ring	—	PEEK	—	PEEK
9 Secondary stem backup ring	—	PTFE/D1710	—	PTFE/D1710
10 Stem bearing	Reinforced PTFE	PEEK	Reinforced PTFE	PEEK
11 Ball ①	316 SS/A276	S21800/A276	Alloy R-405/B164	
12 Trunnion backup rings (2)	Reinforced PTFE	—	Reinforced PTFE	—
13 Trunnion O-rings (2)	Fluorocarbon FKM	—	Fluorocarbon FKM	—
14 Trunnion bearings	—	PEEK	—	PEEK
15 Seats (2)	PCTFE/AMS 3650, PTFE/D1710, reinforced nylon or PEEK			
16 Seat carriers (2)	316 SS/A276		Alloy R-405/B164	
17 Seat springs (6 with PTFE; 12 with all others)	Alloy X-750/AMS 5542J			
18 Seat carrier guides (2)	316 SS/A276		Alloy R-405/B164	
19 Seat carrier backup rings (4)	Reinforced PTFE			
20 Seat carrier O-rings (2)	Fluorocarbon FKM			
21 End screw seals (2)	PTFE/D1710			
22 End screws (2)	316 SS/A479		Alloy R-405/B164	
Lubricants	Molybdenum disulfide and fluorinated based			

Wetted components listed in *italics*.

① Ball trunnions are PTFE coated in 83 series 2-way valve.

Dimensions



End Connections		Flow Coefficient (C _v)	83 Series Valve Ordering Number	H83 Series Valve Ordering Number	Dimensions, in. (mm)	
Type	Size				A	B
2-Way Valves, 0.187 in. (4.75 mm) Orifice						
Female NPT	1/8 in.	1.2	SS-83KF2	SS-H83PF2	2.94 (74.7)	1.47 (37.3)
	1/4 in.	1.0	SS-83KF4	—		
			—	SS-H83PF4	3.93 (99.8)	1.97 (50.0)
Swagelok tube fitting	1/4 in.	1.6	SS-83KS4	SS-H83PS4	4.14 (105)	2.07 (52.6)
	3/8 in.	1.4	SS-83KS6	SS-H83PS6	4.39 (112)	2.19 (55.6)
	1/2 in.	1.0	SS-83KS8	SS-H83PS8	4.60 (117)	2.07 (52.6)
	6 mm	1.6	SS-83KS6MM	SS-H83PS6MM	4.14 (105)	
	8 mm	1.5	SS-83KS8MM	SS-H83PS8MM	4.15 (105)	2.20 (55.9)
	10 mm	1.3	SS-83KS10MM	SS-H83PS10MM	4.41 (112)	
	12 mm	1.0	SS-83KS12MM	SS-H83PS12MM	4.60 (117)	
3-Way Valves, 0.187 in. (4.75 mm) Orifice						
Female NPT	1/8 in.	0.75	SS-83XKF2	SS-H83XPF2	2.94 (74.7)	1.47 (37.3)
	1/4 in.		SS-83XKF4	—		
Swagelok tube fitting	1/4 in.		—	SS-H83XPF4	3.93 (99.8)	1.97 (50.0)
			SS-83XKS4	SS-H83XPS4	4.14 (105)	2.07 (52.6)
			SS-83XKS6	SS-H83XPS6	4.39 (112)	2.19 (55.6)
			SS-83XKS8	SS-H83XPS8	4.60 (117)	2.30 (58.4)
			SS-83XKS6MM	SS-H83XPS6MM	4.14 (105)	2.07 (52.6)
			SS-83XKS8MM	SS-H83XPS8MM	4.15 (105)	
			SS-83XKS10MM	SS-H83XPS10MM	4.41 (112)	2.20 (55.9)
			SS-83XKS12MM	SS-H83XPS12MM	4.60 (117)	2.30 (58.4)

Dimensions shown with Swagelok nuts finger-tight, where applicable. Dimensions, in inches (millimeters), are for reference only and are subject to change. For more information about pressure ratings of valves with tube fitting end connections, see *Swagelok Tubing Data* or *Metric Tubing Data*.

Ordering Information

83 Series

Select the desired valve ordering number.

Valve ordering numbers specify stainless steel material. To order valves of alloy 400 material, substitute designator **M** for **SS** in the ordering number.

Example: **M-83KF2**.

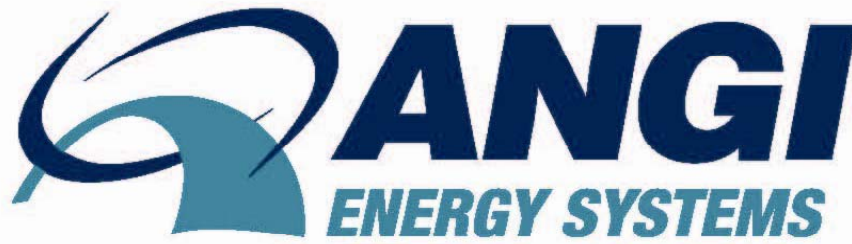
Valve ordering numbers specify a **PCTFE** seat. To order valves with other seat materials, substitute the desired designator for **K** in the ordering number.

Example: **SS-83TF2**.

Seat Material	Designator
PTFE	T
Reinforced nylon	N
PEEK	P

H83 Series

Select the desired valve ordering number.



MV 92

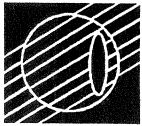
SVF

1/2" H7666MDBSE05/W/LKG HNDL
1/2" FNPT BALL VALVE, 6000 PSI
W/ LOCKING HANDLE

ANGI PART NUMBER 334-07294

REBUILD KIT – SVF 1/2" H7666MDBSE – 761-07370

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SVF Flow Controls
I N C O R P O R A T E D

H7 Series High Pressure Ball Valve

The SVF Series H7 is a high pressure ball valve designed to meet applications up to 6000 psi. The H7 features a carbon or stainless steel body and is available in a API-607 / BS-6755 / NACE MR-01-75 upon request. This engineered valve adds safety and reliability to high pressure systems and application in Offshore, Oil & Gas, Petrochemical, Power and Refining Industries.

FEATURES

$\frac{1}{2}$ " – 4"

- $\frac{1}{2}$ " – 2" 2500 ANSI (6000psi)
- 3" – 6" 1500 ANSI (3800 psi)
- Designed to ANSI B16.34 and BS 5351
- Ideal for use with hydraulics, oil & gas and compressed gas systems
- Blowout-proof stem
- Wrench Operated or Actuated
- Full range of options
- Available to NACE MR-01-75, EN10204
- Available to API-607-4 and BS 6755 Pt 2, API 6FA

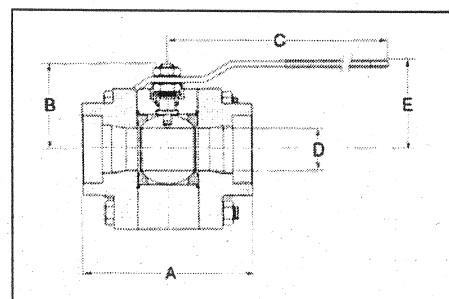
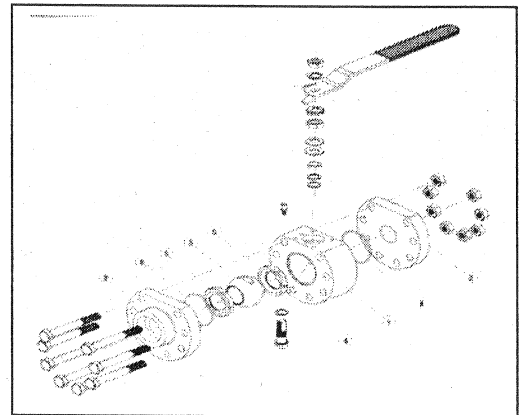
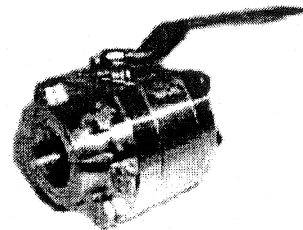
MATERIALS

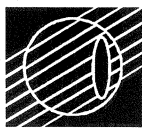
Item	Description	Materials
1	Body	Carbon Steel or 316 Stainless
2	Body Connector	Carbon Steel or 316 Stainless
3	Ball	316 Stainless
4	Stem	17- 4 Stainless
5	Valve Seat	Delrin or Peek
6	Body Connector Seal	Buna N, Viton or Graphite (Fire Safe)

DIMENSIONS & WEIGHTS (inches & pounds)

Size	A	B	C	D	Weights
$\frac{1}{2}$ "	2.78	1.5	7	.44	3.52
$\frac{3}{4}$ "	3.49	1.6	7	.56	5.28
1"	3.69	2.2	7.6	.81	9.9
1 $\frac{1}{4}$ "	4.25	2.4	7.6	1	11.88
1 $\frac{1}{2}$ "	5.04	2.9	11.3	1.25	20.9
2"	6.14	3.1	11.3	1.5	28.82
3"	8.82	5.7	15.7	2.5	85.36
4"	10.43	6.3	24	3.25	140.14

Specifications subject to change without notice

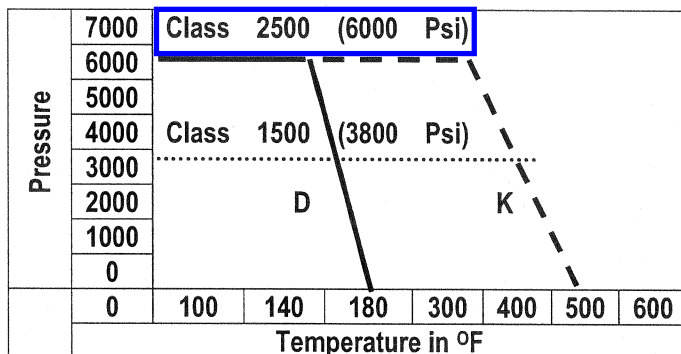




SVF Flow Controls
I N C O R P O R A T E D

H7 Series High Pressure Ball Valve

Pressure / Temperature Chart



Valve construction is a 3-piece in nominal or full port. The valves are designed in accordance with ANSI B16.34 and BS 5351. All valves have a top mounting platform for assembling actuators without interfering with the body bolts.

Torque Chart

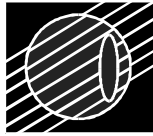
Size	Torque in Pound Inches
1/2"	150
3/4"	200
1"	320
1 1/2"	575
2"	1000

The above Torques are for Delrin Seats only.

For Peek Seats, Consult SVF
3" & Larger, Consult SVF

How to Order

Size	Series	Body & End	Ball & Stem	Seat & Seal	End Type
1/2"	H7 Standard Port	44 = Carbon Steel	6M = 316 Stainless Steel Ball,	DB = Delrin Seats w/ Buna N Seals	SE = Screwed Ends
3/4"				KG = Peek Seats w/ Graphite Seals	
1"	HB7 Full Port	66 = 316 Stainless Steel	17-4 Stainless Steel Stem	Other seals Material Available	SW = Socket Weld Ends
1 1/2"					BW = Butt Weld Ends
2"					
3"					
4"					Flange O/A



SVF Flow Controls
I N C O R P O R A T E D

**Installation, Operation & Maintenance
for SVF HIGH PRESSURE Three-Piece Series "H7" Ball Valves**

SVF Flow Controls, Inc. Ball Valves have been designed and engineered to provide long lasting and trouble free service when used in accordance with the instructions and specifications herein.

This document includes information for Series "H7" Three-Piece valves.

!!!CAUTION! Safety Precautions!!!

Before removing valve from pipeline NOTE that:

Media flowing through a valve may be corrosive, toxic, flammable, or of a contaminant or harmful nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken. It is suggested that the following minimal safety precautions be taken when handling valves.

1. Always wear eye shields.
2. Always wear gloves and overalls.
3. Wear protective footwear.
4. Wear protective headgear.
5. Ensure that running water is readily accessible.
6. Have a suitable fire extinguisher ready if media is flammable.
7. Be sure that you are aware of the fluid that has been passing through the valve before opening or dismantling any valve. Require MSDS information.

By checking line gauges ensure that no pressure is present at the valve.

Ensure that any media is released by operating valve slowly to half open position.

Ideally, the valve should be decontaminated when the ball is in the half open position.

These valves, when installed, have body connectors which form an integral part of the pipeline and the valve cannot be removed from the pipeline without being dismantled-see DISMANTLING.

Valves and accessories must not be used as a sole support of piping or human weight

Safety accessories such as safety relief (overpressure) valves are the responsibility of the system designer.

It is the user/system designer's responsibility to use insulation in high temperature applications. Refer to OSHA documents for more details.

Tools

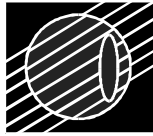
No special tools are required for maintenance of SVF Flow Controls, Inc. valves. NOTE: Valve nuts and bolting are Metric.

The following instructions refer to SVF H7 series High Pressure ball valves.

UPON RECEIPT

Prior to installation, inspect the valve for shipping damage. Keep protective covers in place until installation of valve to pipe line. During installation check to insure the handle is in the fully open position in order to prevent possible damage to the ball. After installation cycle the valve before putting into service. Do not leave the valve in the partially open position.

All standard valves may be installed for flow in either direction.



SVF Flow Controls

I N C O R P O R A T E D

Valves with screwed ends should be treated as a single unit, and should not be dismantled when installing to pipeline. Regular joining material in correct quantities should be used. The valve should be screwed on to the pipeline using a standard pipe wrench or spanner. Avoid excessive tightening.

When "back-welding" is required on screwed valves, they must be dismantled and treated as weld-end valves.

Carbon Steel valves may have a "black oxide" and oil dipped finish. This non-toxic process is performed to retard rusting. Stainless steel valves have their natural finish.

OPERATION

Valve operation works by operating the valve handle 90° turn counter-clockwise to open, and 90° turn clockwise to close. On manually operated valves the valve is open when the handle is parallel with the pipe line and closed when the handle is perpendicular to the pipe line.

A silicone based lubricant is applied to assist valve break in. The lubricant, if unacceptable, may be removed by a solvent wash.

MAINTENANCE

SVF valves have a long and trouble free life, and maintenance is seldom required. When maintenance is necessary, valves can be refurbished on site.

To extend valve performance and reduce possible plant problems, the following procedures should be followed.

Handle all parts carefully and clean before reassemble. Check ball, stem, and body bolts for wear, corrosion or damage.

PRIOR TO DISMANTLING VALVE

If leakage is noticed at the stem area, tighten the gland nut 1/6 turn at a time, until leakage ceases.

Should the leakage continue, the valve body will require to be disassembled to replace faulty stem seals.

Valves that exhibit through seat leakage or high operating torque's may be damaged.

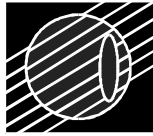
The media flowing through a pipeline may be toxic, corrosive, flammable or of a contaminant nature.

Utmost care has to be taken when there is harmful media flowing through the valve.

The following safety precautions are recommended when dismantling valves with hazardous media:

SAFETY PRECAUTIONS:

1. Always wear eye shield.
2. Always wear protective head gear.
3. Always wear protective clothing & gloves.
4. Wear protective footwear.
5. Have a suitable fire extinguisher when media is flammable.



REFURBISHING

When a valve requires to be refurbished rather than serviced, only SVF's authorized spare parts should be used.

Refurbishing kits from SVF consist of the following:

1. Seat ring x 2
2. Gland packing x 2 or 3
3. Stem thrust ring x 1
4. Body seals x 2

In addition to refurbishing or maintenance kits, spare parts available from SVF are:

Valve balls, stems, glands, bolts, screws and nuts. Should additional parts be required, it is generally recommended that the complete valve be replaced.

When ordering repair kits, give the valve size, the seat ring material required.

Follow the instructions below:

1. Cycle the valve with the line pressure fully relieved before attempting to remove the valve from the pipeline, to insure pressure has also been discharged from the valve cavity.
2. Bring the valve handle to the open position.
3. With the valve in the open position, remove body connector bolts.
4. Remove the body from between the end connectors. (1/2" H7 valve cannot be removed from line without separating the end connectors).
5. Remove and discard the seat rings and body seals.
6. Support the ball to prevent it from falling out of body and turn handle to the closed position for its removal. Set the ball aside in clean secure area for reuse.
7. Stem assembly - remove the wrench nut, serrated washer, handle, locking clip, gland nut, disk springs, gland and gland packing. Care being taken not to scratch or nick the packing bore area of the body.
8. Place all components removed, in clean secure area.
9. Push the stem down into the body and remove it to clean secure area. Discard the stem thrust ring from the stem.
10. Clean the stem and packing bore area, taking care not to damage them.
11. Lubricate the new stem thrust ring and packing, with appropriate lubricant (Molycote 33 - thin film).
12. Place the stem thrust ring on the stem and insert the stem up into the center body.
13. Insert the new packing over the stem and into the body bore. Place the gland and two disk springs onto the stem. The first spring concave side up and the second spring concave side down. (See valve illustration).
14. Thread the gland nut onto the stem. Tighten the gland nut to the torque figures (table 1).
15. Place the locking clip on the gland nut by adjusting the orientation of the nut (in the clockwise direction).
16. Place the handle, serrated washer and thread the wrench nut on the stem.
17. Bring the handle to the closed position to insert the ball.
18. Place the ball in the center body until the stem tang is engaged and bring the valve to the open position to prevent the ball from falling out.
19. Place the new body seals and new seat rings in the body.
20. Ease body assembly between body connectors, taking care not to score faces or damage seals, and reinstall body bolts and nuts.
21. Tighten the body bolts to the torque figures (table 1), and according to tightening sequence illustrated in figure 1.
22. Leave the valve in the open position for flushing the line.

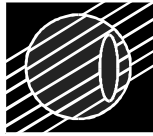


Figure1

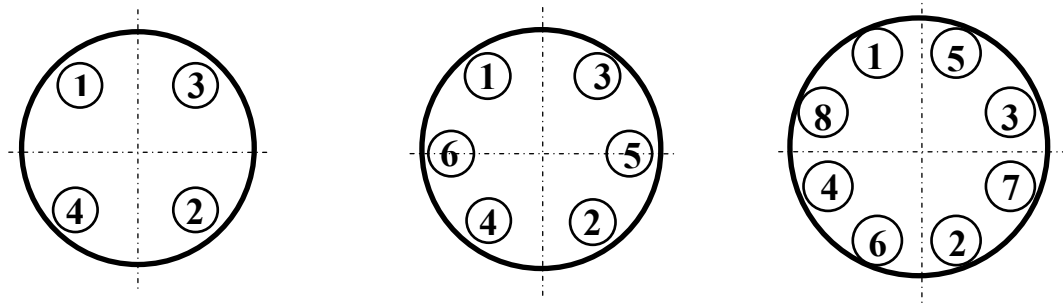
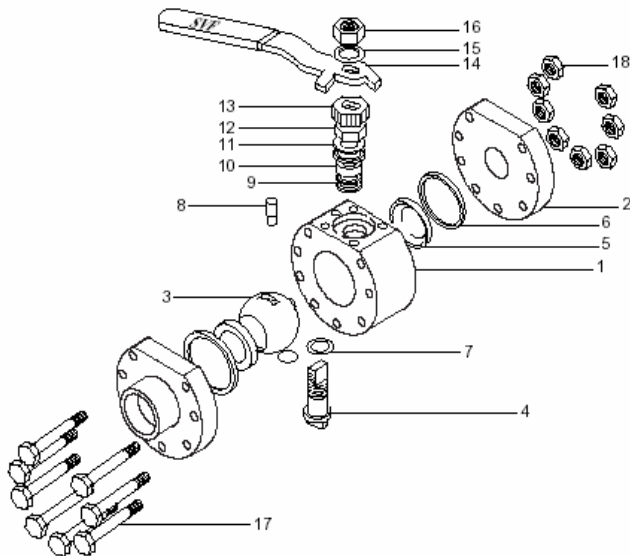


Figure 2

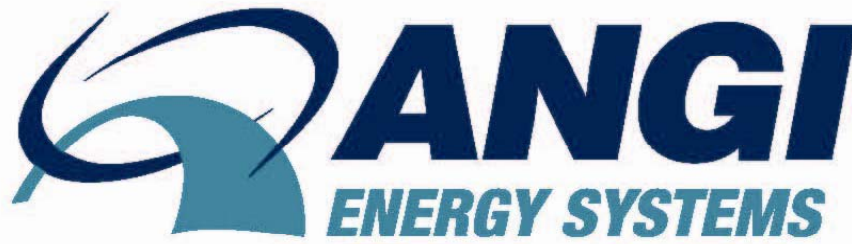
Materials of Construction



No.	Description	Material	
		Carbon Steel	Stainless
1	Body	ASTM A-105	316L SS
2	End Connector	ASTM A-105	316L SS
3	Ball	*316 SS	*316 SS
4	Stem	17-4PH SS	17-4PH SS
5	Seat	Delrin, PEEK	Delrin, PEEK
6	Seal	NBR	NBR
7	Stem Thrust Seal	Nylatron, PEEK	Nylatron, PEEK
8	Stop Pin	316	316
9	Gland Packing	**PTFE	**PTFE
10	Gland	316 SS	316 SS
11	Disc Spring	17-7PH SS	17-7PH
12	Gland Nut	C. Steel Zinc Plate	316 SS
13	Tab Washer	SS	SS
14	Wrench	C. Steel Zinc Plate	316 SS
15	Serrated Washer	SS	SS
16	Wrench Nut	C. Steel Zinc Plate	316 SS
17	Body Bolt	C. Steel Zinc Plate	316 SS
18	Body Nut	C. Steel Zinc Plate	316 SS

*17-4PH for sizes 1/2" - 3/4"

** 25% carbon filled, graphite



MV 166

SVF

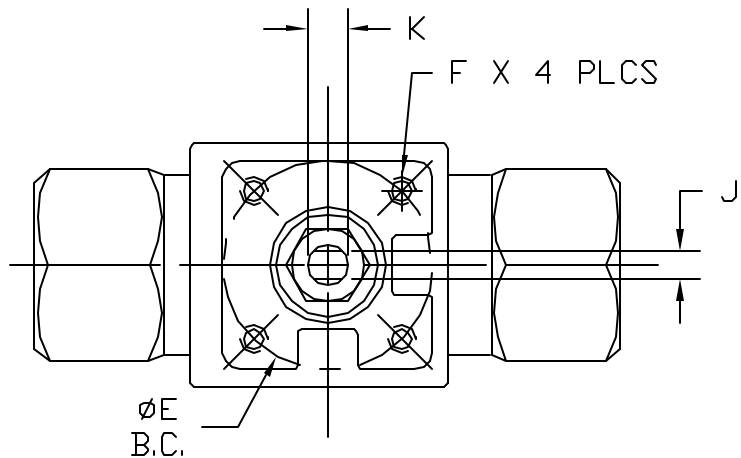
1/2" HBEV766DTSE

1/2" BALL VALVE FML, FULL PORT, SS, 6000 PSI,
2-PIECE SEAL WELDED W/ LOCKING HANDLE

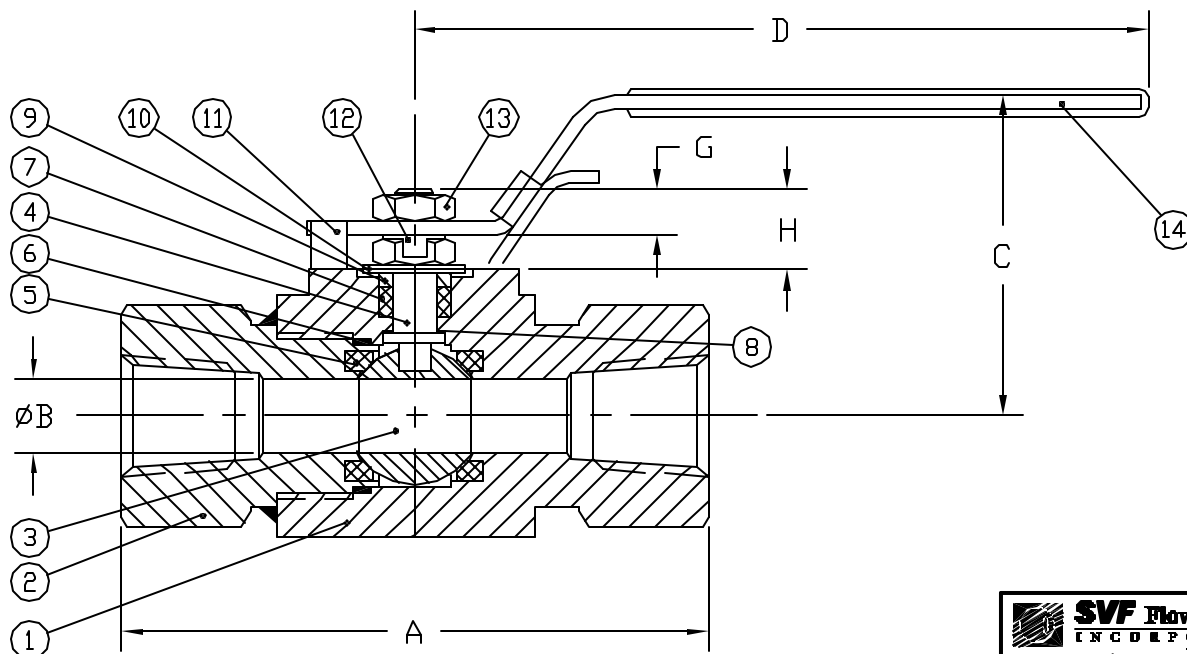
ANGI PART NUMBER 334-07362

NO REBUILD KIT AVAILABLE

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- FEATURES:
1. SEAL WELD CONSTRUCTION.
 2. BLOW-OUT PROOF STEM.
 3. FIRE SAFE TEST CERTIFIED.
 4. ISO ACTUATOR MOUNTING PADS.
 5. STANDARD LOCKING DEVICE.
 6. NACE MR01-75 COMPLIANT.

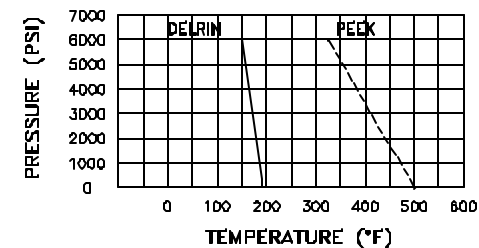


SIZE	A	ØB	C	D	ØE	F	G	H	J	K
1/4"	3.00	0.25	2.20	5.00	1.417	M5 X 0.8P	0.33	0.60	0.217	3/8"
3/8"	3.00	0.38	2.20	5.00	1.417	M5 X 0.8P	0.33	0.60	0.217	3/8"
1/2"	3.99	0.50	2.20	5.00	1.417	M5 X 0.8P	0.33	0.60	0.217	3/8"
3/4"	4.25	0.75	2.70	6.30	1.654	M5 X 0.8P	0.50	0.81	0.299	7/16"
1"	4.50	1.00	3.50	8.25	1.969	M6 X 1.0P	0.51	0.87	0.345	9/16"
1-1/2"	5.25	1.50	4.45	10.20	2.756	M8 X 1.25P	0.64	1.04	0.394	5/8"
2"	6.64	2.00	4.80	10.20	2.756	M8 X 1.25P	0.64	1.04	0.394	5/8"

MATERIALS OF CONSTRUCTION

ITEM	NAME	MATERIAL	STANDARD
1	BODY	STAINLESS STEEL	ASTM A351-CF8M
2	END CONNECTORS	STAINLESS STEEL	ASTM A351-CF8M
3	BALL	STAINLESS STEEL	ASTM A351-CF8M
4	STEM	STAINLESS STEEL	17-4PH
5	SEAT	DELRI/PEEK	
6	SEAL	PTFE	
7	STEM PACKING	GRAPHITE	
8	THRUST WASHER	PEEK	
9	PACKING GLAND	STAINLESS STEEL	
10	BELLEVILLE WASHER	STAINLESS STEEL	
11	STOP PIN	STAINLESS STEEL	
12	LOCK WASHER	STAINLESS STEEL	
13	HANDLE NUT	STAINLESS STEEL	
14	HANDLE	STAINLESS STEEL	

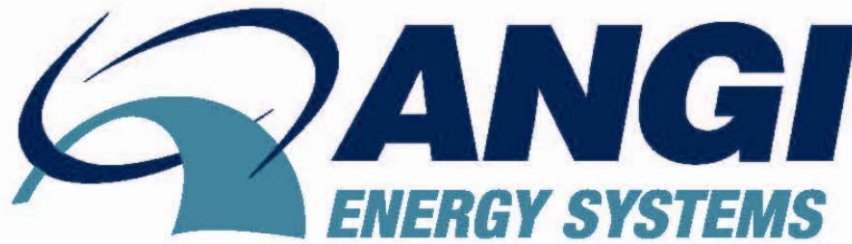
PRESSURE TEMPERATURE CHART



4. MOUNTING HARDWARES, HANDLE, GEAR OPERATOR, HANDWHEEL, ACTUATOR AND ACCESSORIES ARE MANUFACTURER'S STANDARDS WHERE APPLICABLE.
3. PRESSURE RATING CLASS 6000PSI CWP.
2. VALVES CONFORM TO ASME B16.34.
1. ALL DIMENSIONS ARE MAXIMUM, EXCEPT FACE TO FACE.
- NOTE:

 SVF Flow Controls INCORPORATED 13360 Larche Circle Santa Fe Springs, CA 90670, U.S.A. Phone: (909) 765-0768 Fax: (909) 952-5114 www.svf.net	NAME 1/4" TO 2" SERIES HBEV7 BALL VALVES		VALVE MODEL NUMBER HBEV766		
			REMARK		
	TAG NUMBER N/A	SALES ORDER NUMBER N/A	CERTIFIED BY	DATE	
	CUSTOMER NAME N/A	DRAWN BY Charles Chen	DATE 08/31/05	SCALE N.T.S.	SHEET 1 OF 1
P.O. NUMBER N/A	CHECKED BY	DATE	DRAWING NUMBER HBEV766-0520	REV. A	

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MV 286

SVF/SVF

HBEV766DTSAE05/A2S-35-12-V-NC

ACTUATOR / VALVE ASSEMBLY - SAE-8
FULL PORT 6000 PSI STAINLESS STEEL
W / A2S-35-12-V-NORMALLY CLOSED ACTUATOR

ANGI PART NUMBER – 334-07496

ACTUATOR REBUILD KIT – 761-07460

NO REBUILD KIT AVAILABLE – VALVE IS SEAL WELDED



Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

Sizes 1/2" ~ 2"

HBEV

The SVF Series HBEV high pressure, fire safe ball valve is designed to meet applications up to 6,000 psi. This high performance valve adds safety and reliability to high pressure systems and applications in a wide range of industrial applications.

SERIES HBEV DESIGN FEATURES

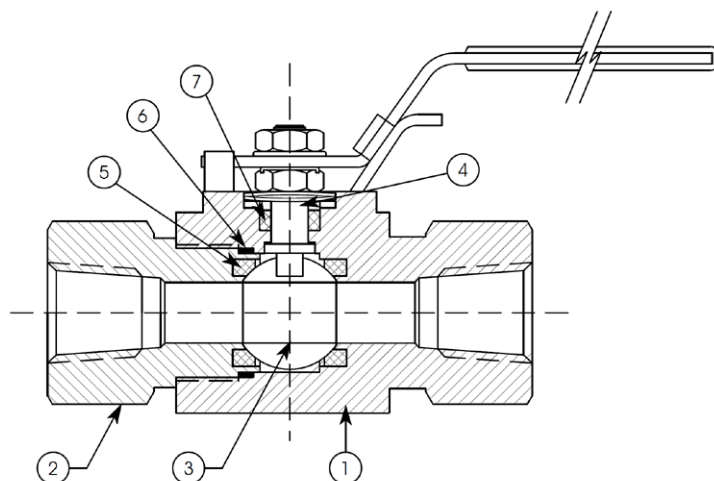
- ✓ High pressure to 6,000 psi
- ✓ Seal Welded Construction
- ✓ Full Ported flow path in a high performance design for process-quality applications
- ✓ Fire Safe certification to API-607
- ✓ Live loaded stem packing ensures seal-tight pressure even under thermal cycling
- ✓ Latch lock handle is standard
- ✓ ISO 5211 mounting pad for easy actuation
- ✓ Seat materials:
Delrin® seats standard with SE (Screwed End) valves
PEEK seats standard with SW (Socket Weld) valves.
- ✓ Stainless Steel construction



The Series HBEV Two-Piece Seal Welded Ball Valve.

MATERIALS OF CONSTRUCTION

ITEM	DESCRIPTION	MATERIALS SPECIFICATIONS (Additional options available)
1	Body	Stainless Steel (ASTM A351 CF8M)
2	End Connector	Stainless Steel (ASTM A351 CF8M)
3	Ball	Stainless Steel (ASTM A351 CF8M)
4	Stem	Stainless Steel 17-4 ph (ASTM A564 630)
5	Seat	Delrin® (Screwed End Valves), PEEK (Socket Weld Valves)
6	Body Seal	PTFE, GRAFOIL® (GRAFOIL® Body Seal only on Socket Weld Valves)
7	Stem Seal	GRAFOIL®



SPECIFICATION STANDARDS OF COMPLIANCE

SVF Series HBEV Ball Valves are available in designs that meet the following Industry Standards:

- ANSI
- ASME
- API
- NACE
- ASTM
- DIN
- ISO
- MSS

Contact SVF for specific applications

What do you need today?™

HIGH PURITY
CleanFLOW
www.CleanFLOW.net

PRO-SPEC
PROCESS SPECIFIC
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QUALITY FLOWS
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www.SVF.net

SVF Flow Controls, Inc. • 13560 Larwin Circle • Santa Fe Springs, CA 90670 • Tel: 1.800.783.7836 • FAX: 562.802.3114
Sales@SVF.net • Visit our website: www.SVF.net • © SVF Flow Controls, Inc. • Specifications subject to change without notice



Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

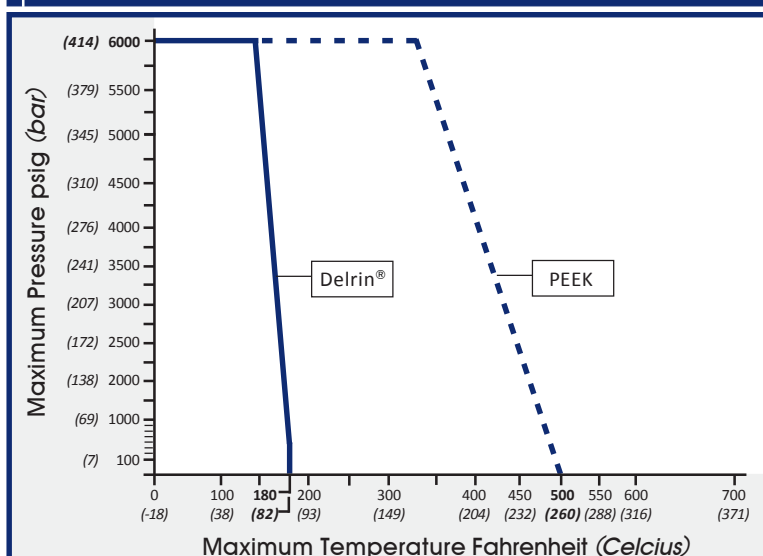
Sizes 1/2" ~ 2"

HBEV

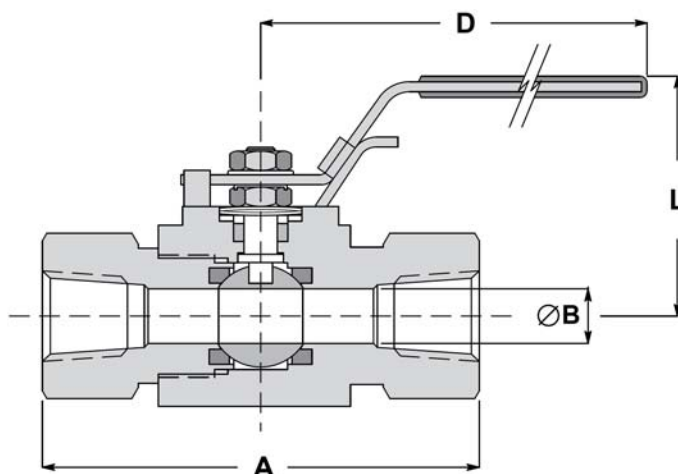
DIMENSIONS, WEIGHT, C_v, TORQUE

Size	A		B		D		L		Weight.		C _v	Torque*	
	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kg		in-lb _f	Nm
1/2"	3.99	101	0.50	12.7	5	129	2.2	57	2	0.9	10	150	17
3/4"	4.25	108	0.75	20.0	6.3	150	2.7	71	4	1.8	32	200	23
1"	4.50	114	1.00	25.4	8.25	205	3.5	82	5	2.3	57	320	36
1-1/2"	5.25	133	1.50	38.1	10.2	260	4.5	105	11	5.0	104	575	65
2"	6.64	169	2.00	50.8	10.2	260	4.8	114	17	7.7	240	1000	113

HBEV - PRESSURE/TEMPERATURE CHART



* At full differential pressure for clean fluids with Delrin® Seats



HOW TO ORDER SERIES HBEV BALL VALVES

SERIES	BODY & END MATERIAL	BALL & STEM MATERIAL	SEAT**	BODY SEAL**	ENDS**	SIZE
HBEV7 = Full Port	6 = 316 Stainless Steel ASTM A351 CF8M	6 = 316 Stainless Steel ASTM A351 CF8M Ball with Stainless Steel 17-4 ph ASTM A564 630 Stem	D = Delrin® K = PEEK	T = PTFE G = GRAFOIL®	SE = Screwed Ends (FNPT) SW = Socket Weld Ends	05 = 1/2" 07 = 3/4" 10 = 1" 15 = 1-1/2" 20 = 2"
** PEEK Seat available on SW (Socket Weld) valves only. GRAFOIL® Body Seal available on SW valves only. SW End valves have PEEK Seat and GRAFOIL® Body Seal.						
Order Example: (HBEV766DTSE05)						

Example Description:

316 Stainless Steel Body & Ends, 316 Stainless Steel Ball with 17-4ph Stem, Delrin® Seat, PTFE Body Seal, Screwed Ends (FNPT), 1/2" Size

HBEV7	6	6	D	T	SE	05
-------	---	---	---	---	----	----

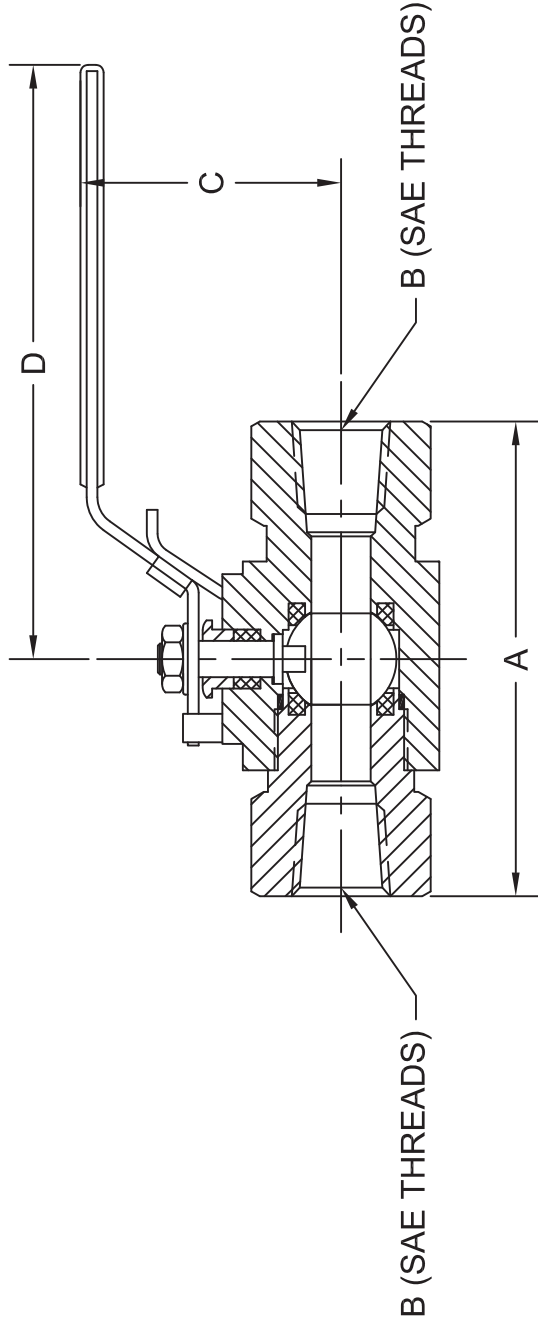
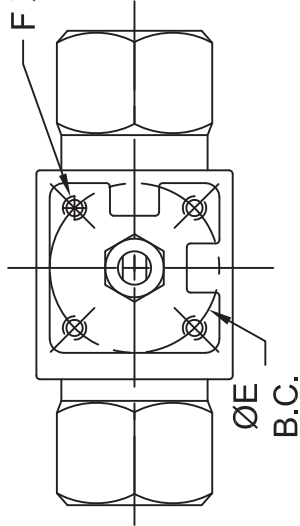
Data subject to change. Visit www.SVF.net for the latest updates on this Data Sheet. All Data Sheets posted on our website supersede all prior publications • [Document #SVF_HBEV_Data_Sheet • HBEV Data Sheet - 06/31/2011]

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REVISIONS

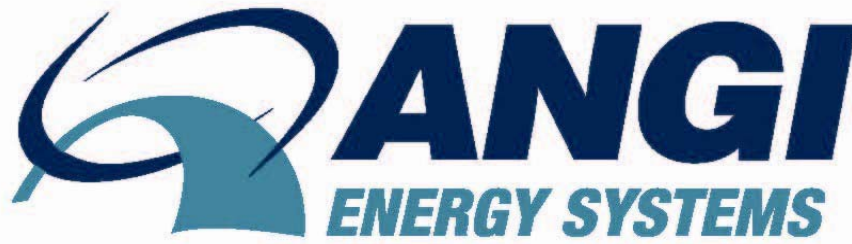
REV	ECO	DESCRIPTION	DATE	APPROVED
A		NEW RELEASE	5-18-2011	-

F X 4 PLCS



SIZE	A	B	C	D	ØE	F
1/2"	3.99	SAE 8	2.24	5.00	1.417	M5 X 0.8P
1"	4.50	SAE 16	3.23	8.10	1.653	M5 X 0.8P

SVF Flow Controls, Inc. 13560 Larwin Circle Santa Fe Springs, CA 90670 1.800.783.7836 www.SVF.net	DRAWN BY	DATE		
	V. ALVARADO	5-18-2011		
	CHECKED	DATE		
	APPROVED	DATE		
	SIZE & SERIES ID		DWG. NO.:	
1/2" & 1" HBEV		HBEV SAE0510		
PART NO.		SCALE		
-		N.T.S.		
SHEET		1 OF 1		



PR 13

MECO
5648-9717

125 PSI PRESSURE REGULATOR

ANGI PART NUMBER 500-01674

REBUILD KIT ASSY - MECO PRIMARY REGULATOR – 840-04319

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NGV REGULATORS & ENVIRO-CAP®

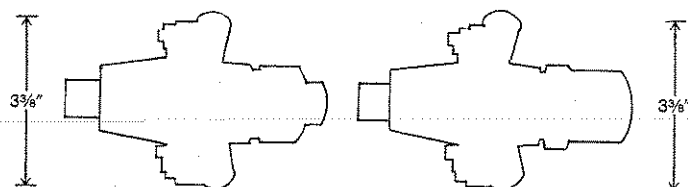
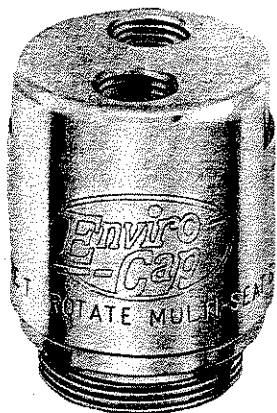
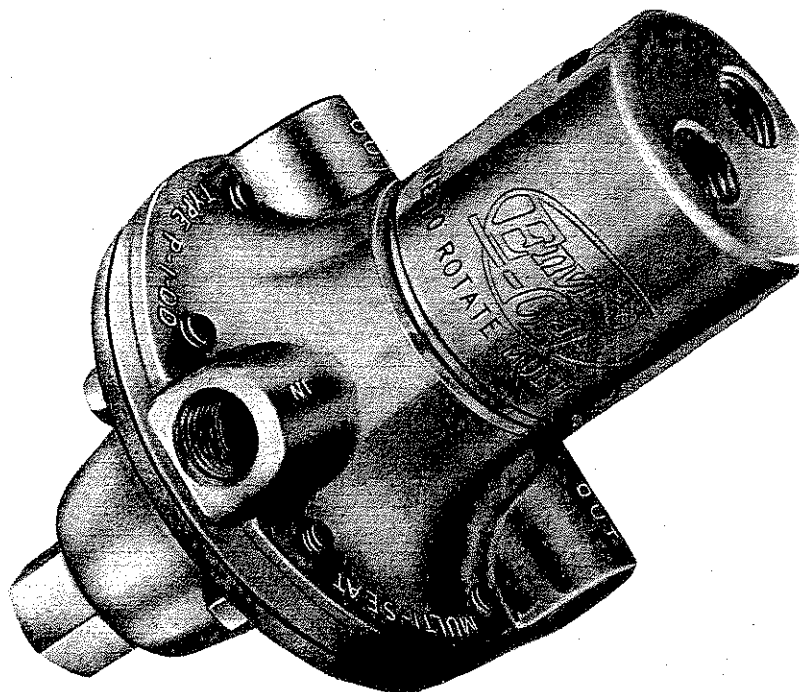
TYPE "P-NGV"

THE DEPENDABILITY OF THE "YOKE" TYPE REGULATOR IS IDEALLY SUITED AS THE HIGH PRESSURE REGULATOR IN POSITIVE PRESSURE NGV SYSTEMS. RATED FOR INLET PRESSURES TO 5,500 PSI, DELIVERY PRESSURES BETWEEN 2 AND 500 PSI ARE RELIABLY ACHIEVED.

A SPECIAL FEATURE IS THE DIA-BLOK CONSTRUCTION. THE DIAPHRAGM IS CONNECTED TO THE SEAT BLOCK BY MEANS OF A YOKE. THIS ONE PIECE ACTION PROVIDES INSTANT RESPONSE TO VARIATIONS IN DEMAND AND INSURES INSTANTANEOUS AND POSITIVE SHUTOFF.

THE ENVIRO-CAP CAN BE USED TO RETROFIT ANY MECO TYPE "P" REGULATOR WHERE FREEZING AND RESULTING ERRATIC GAS FLOW IS A PROBLEM.

ENGINE COOLANT IS CIRCULATED THROUGH THE BACK CAP TO PREVENT "FREEZE-UP" AND MAINTAIN A UNIFORM GAS FLOW. CONNECTIONS TO THE ENGINE COOLING SYSTEM ARE THROUGH 1/4" NPT PORTS.



Standard Type P
NGV Regulator

Type P NGV Regulator
with ENVIRO-CAP

SPECIFICATIONS:

Maximum Inlet Pressure: 5,500 psi

Delivery Pressure Ranges:

Standard	Optional
0-125 psi	0-30 psi
0-150 psi	0-50 psi
0-225 psi	0-500 psi

Ports:

1/4" NPT Female

Effective Diaphragm Size:

2 3/16" diameter

Materials of Construction:

Body Forged Brass

Bonnet Forged Brass

Diaphragm ... Stainless Steel

Seat Nylon

Seals Teflon & SBR

Nozzle Stainless Steel

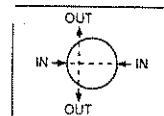
Inlet Filter ... Sintered Bronze

Options: (at extra cost)

Mounting bolts and nuts

Ordering Information

PORTING STYLE P-1-DD



Stock No.	Max. Outlet Pressure	Connections		Enviro-Cap	Wt.
		Inlet	Outlet		
8429	125 psi	(2) 1/4" NPTF	(2) 1/4" NPTF	YES	3 1/2 #
8431	150 psi				
8433	225 psi				
8440	125 psi	(2) 1/4" NPTF	(2) 1/4" NPTF	NO	3 1/4 #
8441	150 psi				
8442	225 psi				
4534	ENVIRO-CAP, WATER HEATED BACK CAP ONLY				

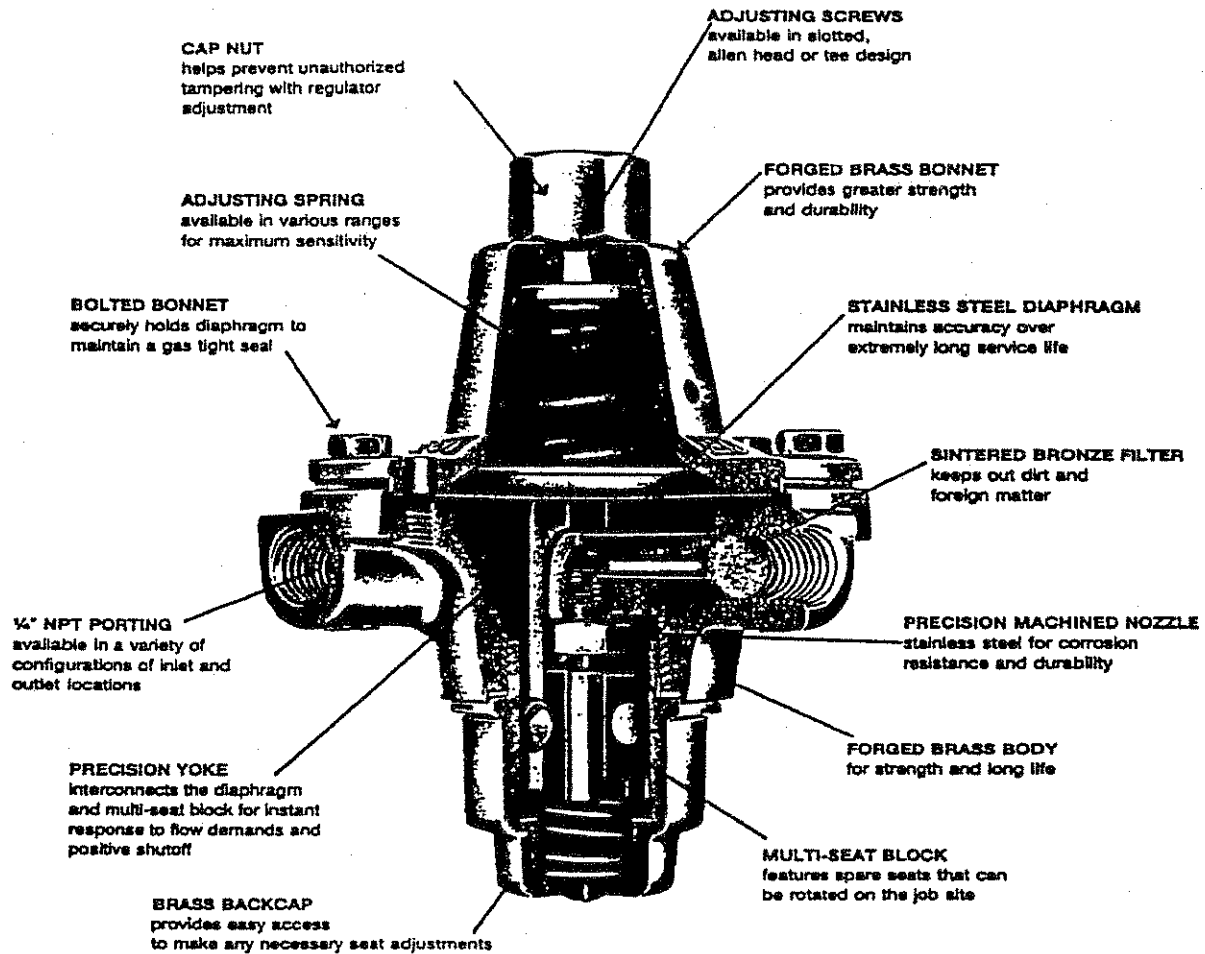
These are MECO's standard models. Additional models with other outlet pressure ranges, other porting and accessories are also available. Please consult with us on your custom regulator application.

MECO Regulators are included in kits certified by A.G.A. and C.A.R.B. MECO Regulators are approved by the Railroad Commission of Texas and are also available with Underwriters Laboratories (UL) Listing. Additional certifications may be applicable; please consult MECO for current listings.

Control Gas Regulator



YOKE TYPE REGULATORS



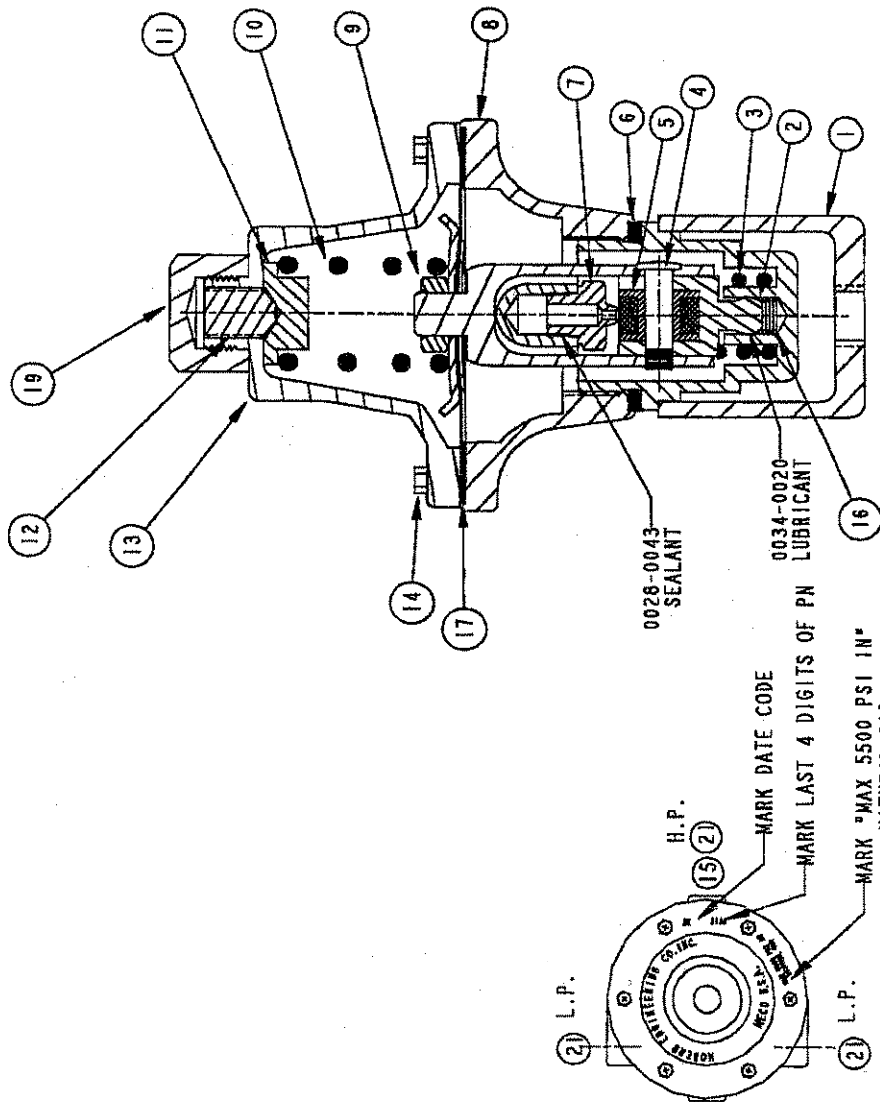
THE TYPE P HIGH PRESSURE REGULATORS . . . fill numerous needs throughout industry. Time proven for reliability and service, these regulators are designed around the special DIA-BLOCK feature. The diaphragm and seat block are directly connected by a precision machined YOKE. Any action on the diaphragm is instantly transmitted to the seat. The results being a high degree of sensitivity and accuracy.

MULTI-SEAT BLOCK . . . contains four seating surfaces which can be easily revolved as needed. No special tools are required to make this change. Various seating materials are available

DWG. NO. 5648-9777

NOTES

1. TEST REGULATOR PER 0090-0040, SHEET 2 PROCEDURE 11.2.
2. MARK REGULATOR PER DETAIL "A" BELOW.
3. SEE DWG 0093-0416 FOR TORQUE REQUIREMENTS.
4. USE 0034-0020 LUBRICANT AND 0028-0043 SEALANT WHERE SHOWN.



REVISIONS

SYM	REF.	DATE	SYM	DATE	SYM	REF.	DATE
DWG	RELEASE		B	E960	10-00		
E0	E542	11-99	C	F305B	12-01		
A	E675	8-00					

28	LUBRICANT	0034-0020	A/R
27	SEALANT	0028-0043	A/R
26			
25	INSTRUCTION MANUAL	0056-1625	I
24			
23			
22			
21	CAPLUG	1417-0005	3
20			
19	BONNET NUT	5213-5274	I
18			
17	DIAPHRAGM GASKET	5213-5269	I
16	O-RING	5199-2135	4
15	FILTER	5213-5215	I
14	BONNET SCREW	5213-5145	6
13	BONNET	5203-5419	I
12	ADJUSTING SCREW	5204-5279	I
11	SPRING BUTTON	5213-5259	I
10	BONNET SPRING (GREY)	5205-5400	I
9	DIAPH-YOKE ASSY	5232-4564	I
8	BODY	5202-5411	I
7	NOZZLE	5213-5161	I
6	BACK CAP GASKET	5213-5429	I
5	SEAT BLOCK ASSEMBLY	5233-4521	I
4	YOKE CLAMPING SCREW	5213-5181	I
3	BACK CAP SPRING	5205-5177	I
2	YOKE GUIDE	5213-5182	I
1	BACK CAP ASSEMBLY	5235-4534	I

BILL OF MATERIALS

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VICTOR®
VICTOR EQUIPMENT COMPANY
DENTON TEXAS

DRAWN BY E. BRADFORD		DATE 11-5-99	TITLE SPECIAL P REGULATOR NRG PRESET 125 PSI	
CHECKED BY L. TURNER	DATE 11-99			
APPROVED BY L. TURNER	DATE 11-99	SIZE B	DWG. NO. 5648-9777	
MATERIAL 70420		FINISH		
REF. DATA		SHEET 1 OF 1		

DETAIL A

NOTES

REVISIONS						
STN	REF.	DATE	STN	REF.	DATE	DATE
A	E514	9-99	C	E572	12/99	
REV & REDWN						
B	E516	10-99	D	E605	01-00	

TEST PROCEDURE MECO PRESET REGULATORS

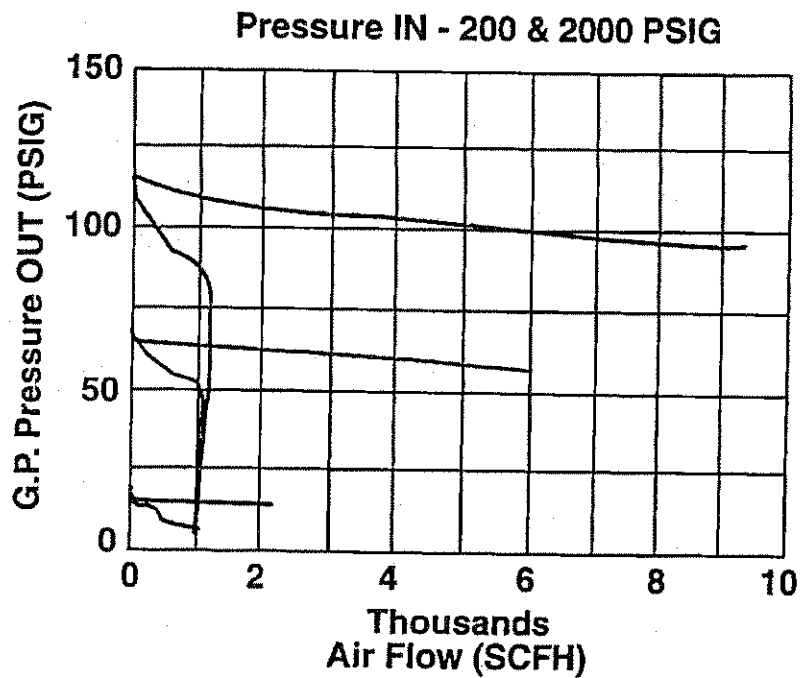
1. INSTALL A TEST GUN WITH A #52 (.0635) ORIFICE TO REGULATOR OUTLET. USE A J PSIG OUTLET GAUGE FOR TESTS.
2. PRESSURIZE THE REGULATOR WITH A PSIG OF OIL FREE AIR OR DRY NITROGEN.
3. LEAK TEST: ADJUST THE REGULATOR TO DELIVER H PSIG. CLOSE THE INLET VALVE AND TURN THE ADJUSTING SCREW ONE TURN COUNTER CLOCKWISE. OBSERVE BOTH GAUGES FOR 5 MINUTES. NO CHANGE IN EITHER GAUGE READING IS PERMITTED. A LEAK TEST MAY BE PERFORMED BY OTHER MEANS PROVIDED THE LEAK RATE USING AIR DOES NOT EXCEED K PER MINUTE.
4. DROP TEST: ADJUST THE REGULATOR TO DELIVER H PSIG STATIC. OPEN THE TEST GUN. THE DROP ON THE OUTLET TEST GAUGE MUST NOT EXCEED L PSIG.
5. SLOW SHUT-OFF/CREEP TEST: ADJUST THE REGULATOR TO DELIVER H PSIG FLOWING. CLOSE THE TEST GUN AND OBSERVE THE DELIVERY PRESSURE READING FOR 5 MINUTES. AN INITIAL SLOW SHUT-OFF INCREASE OF M PSIG DURING THE FIRST MINUTE IS PERMISSIBLE. NO FURTHER CREEP IS PERMISSIBLE DURING THE NEXT 4 MINUTES.
6. PRESET THE REGULATOR TO N PSIG STATIC.

A	H	J	K	L	M	N	PROC. NUMBER
TEST PRESSURE PSIG	PRESSURE SETTING FOR TESTS	PRESS. GAUGE FOR TEST	LEAK TEST	DROP TEST	CREEP TEST	FINAL PRESET	
3600±200	225 PSIG	400 PSIG	10 SCC	15 PSIG	3 PSIG	225±5 PSIG	11
3600±200	125 PSIG	200 PSIG	10 SCC	10 PSIG	3 PSIG	125±5 PSIG	112
3600±200	50 PSIG	100 PSIG	10 SCC	5 PSIG	3 PSIG	50±3 PSIG	113
3600±200	150 PSIG	200 PSIG	10 SCC	10 PSIG	3 PSIG	150±5 PSIG	114
3600±200	40 PSIG	100 PSIG	10 SCC	5 PSIG	3 PSIG	40 ±5 PSIG	115
3600±200	35 PSIG	100 PSIG	10 SCC	5 PSIG	3 PSIG	35 ±5 PSIG	116
3600±200	60 PSIG	100 PSIG	10 SCC	5 PSIG	3 PSIG	60 ±3 PSIG	117

70420 REF. DATA		MATERIAL	INLESS SPECIFIER BREAM ALL FEMER .015-.018 MACHINED SURFACES .125 ALL FEATURES WITH A COMMON ASSE MOST OR CHAMFER WITHIN .250 P.I.A.B. TOLERANCES .1 .125 .150 .175 .200 .250 .315 .375 .4375 .500 .5625 .625 .6875 .750 .8125 .875 .9375 1.000 1.125 1.250 1.375 1.500 1.625 1.750 1.875 2.000 2.125 2.250 2.375 2.500 2.625 2.750 2.875 3.000 3.125 3.250 3.375 3.500 3.625 3.750 3.875 4.000 4.125 4.250 4.375 4.500 4.625 4.750 4.875 5.000 5.125 5.250 5.375 5.500 5.625 5.750 5.875 6.000 6.125 6.250 6.375 6.500 6.625 6.750 6.875 7.000 7.125 7.250 7.375 7.500 7.625 7.750 7.875 8.000 8.125 8.250 8.375 8.500 8.625 8.750 8.875 9.000 9.125 9.250 9.375 9.500 9.625 9.750 9.875 10.000 10.125 10.250 10.375 10.500 10.625 10.750 10.875 11.000 11.125 11.250 11.375 11.500 11.625 11.750 11.875 12.000 12.125 12.250 12.375 12.500 12.625 12.750 12.875 13.000 13.125 13.250 13.375 13.500 13.625 13.750 13.875 14.000 14.125 14.250 14.375 14.500 14.625 14.750 14.875 15.000 15.125 15.250 15.375 15.500 15.625 15.750 15.875 16.000 16.125 16.250 16.375 16.500 16.625 16.750 16.875 17.000 17.125 17.250 17.375 17.500 17.625 17.750 17.875 18.000 18.125 18.250 18.375 18.500 18.625 18.750 18.875 19.000 19.125 19.250 19.375 19.500 19.625 19.750 19.875 20.000 20.125 20.250 20.375 20.500 20.625 20.750 20.875 21.000 21.125 21.250 21.375 21.500 21.625 21.750 21.875 22.000 22.125 22.250 22.375 22.500 22.625 22.750 22.875 23.000 23.125 23.250 23.375 23.500 23.625 23.750 23.875 24.000 24.125 24.250 24.375 24.500 24.625 24.750 24.875 25.000 25.125 25.250 25.375 25.500 25.625 25.750 25.875 26.000 26.125 26.250 26.375 26.500 26.625 26.750 26.875 27.000 27.125 27.250 27.375 27.500 27.625 27.750 27.875 28.000 28.125 28.250 28.375 28.500 28.625 28.750 28.875 29.000 29.125 29.250 29.375 29.500 29.625 29.750 29.875 30.000 30.125 30.250 30.375 30.500 30.625 30.750 30.875 31.000 31.125 31.250 31.375 31.500 31.625 31.750 31.875 32.000 32.125 32.250 32.375 32.500 32.625 32.750 32.875 33.000 33.125 33.250 33.375 33.500 33.625 33.750 33.875 34.000 34.125 34.250 34.375 34.500 34.625 34.750 34.875 35.000 35.125 35.250 35.375 35.500 35.625 35.750 35.875 36.000 36.125 36.250 36.375 36.500 36.625 36.750 36.875 37.000 37.125 37.250 37.375 37.500 37.625 37.750 37.875 38.000 38.125 38.250 38.375 38.500 38.625 38.750 38.875 39.000 39.125 39.250 39.375 39.500 39.625 39.750 39.875 40.000 40.125 40.250 40.375 40.500 40.625 40.750 40.875 41.000 41.125 41.250 41.375 41.500 41.625 41.750 41.875 42.000 42.125 42.250 42.375 42.500 42.625 42.750 42.875 43.000 43.125 43.250 43.375 43.500 43.625 43.750 43.875 44.000 44.125 44.250 44.375 44.500 44.625 44.750 44.875 45.000
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Flow Data (SCFH)

Meco "P" Series Cylinder Regulator Single Stage/Heavy Duty



Reference: "P" Regulator Section A, Page 37

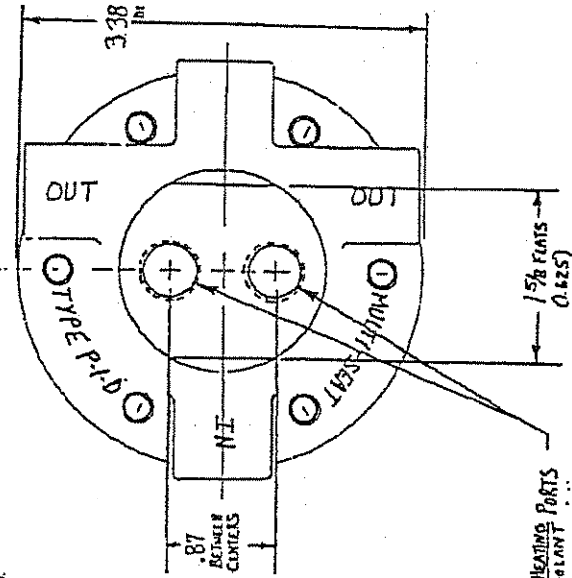
OUTLET MEASURE PORT
1/4" NPT

— BONNET SCREW (6 REQ'D) — (NOTE: SET SCREW NOT CAN
EQUALLY SPACED ON 2.75 IN. BOLT CIRCLE — ALSO BE USED — SEE ATTACHED)
1/4-20 UNC TH'D. — 3/8 IN. X HEAD

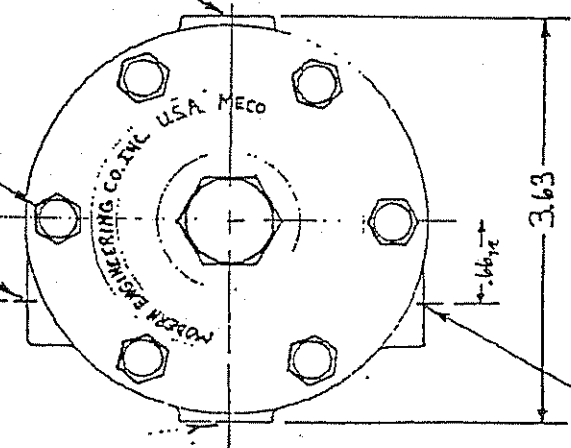
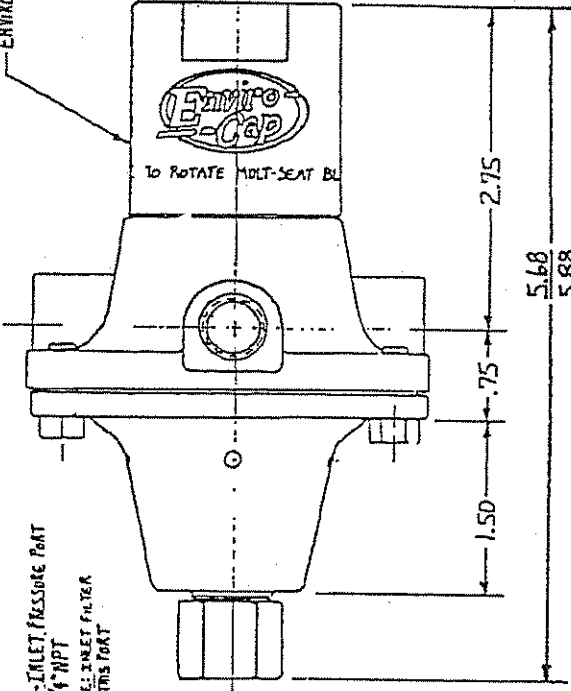
— INLET/OUTLET OPTIMUM
PRESSURE PORT — 1/4" NPT

— ENVIRO-CAP[®] —

INLET PRESSURE PORT
1/4" NPT
NOTE: INLET FILTER
IN THIS PORT



HEATING PORTS
1/4" NPT - 2 PLACES
NOTE: ORIENTATION IS
RANDOM BUT RADIAL
TO CENTERLINE



OUTLET PRESSURE PORT
1/4" NPT

WEIGHT - 3.5 LB. APPROX.

INSTALLATION DWG. ("P" NGV)

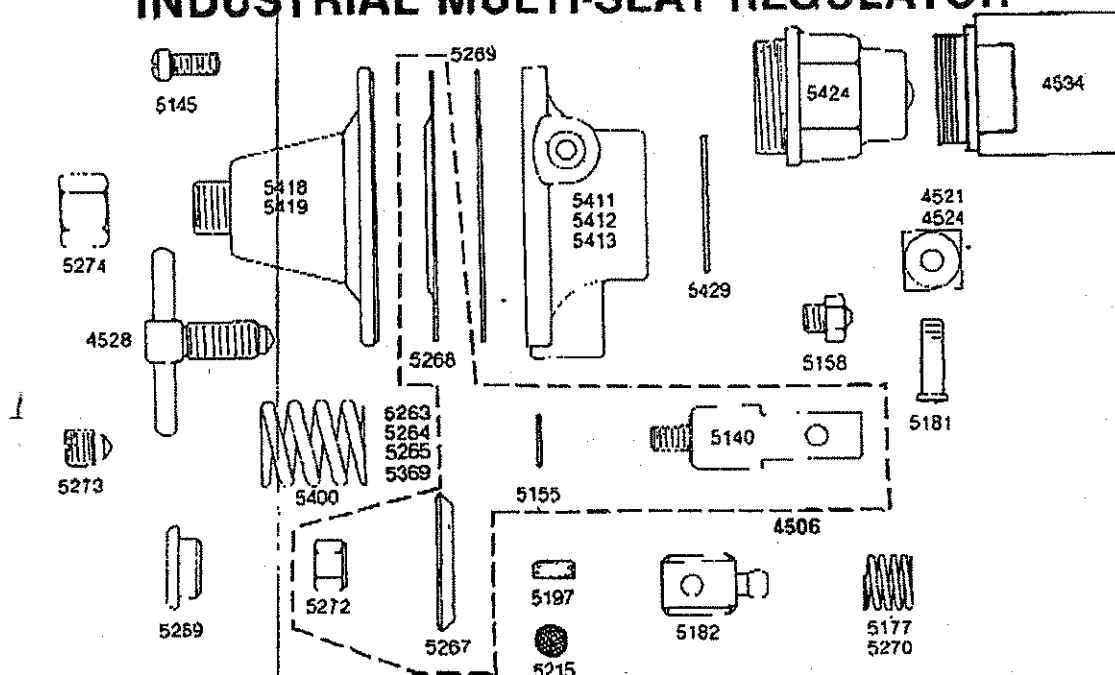
MODERN ENGINEERING COMPANY GALLIUM, MS • ST. LOUIS, MO U.S.A.	
SUBJECT TYPE "P" NGV REGULATOR	DATE 6-25-91
DRAWN WFF	CHECKED BY
SCALE FULL (APPROX.)	

ALL DIMENSIONS IN INCHES
TOLERANCE
1 PLACE DECIMAL AND FRACTIONAL DIMENSIONS ± 0.03
3 PLACE DECIMAL DIMENSIONS ± 0.001
UNLESS OTHERWISE SPECIFIED
UNLESS OTHERWISE SPECIFIED

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TYPE P-30, P-50, P-125, P-150, & P-225 INDUSTRIAL MULTI-SEAT REGULATOR

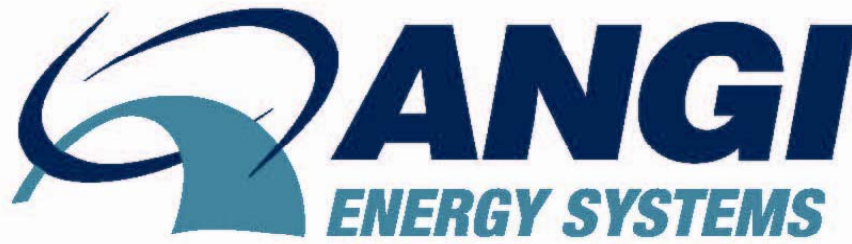


Stock No.

Description

4506	Diaphragm-Yoke Assembly
4521	Seat Block with White Nylon Seats
4524	Seat Block with Kel-F Seats for CO ₂
4528	Adjusting Screw Assembly
4534	ENVIRO-CAP, Water Heated Back Cap Assembly
5140	Yoke (Part of 4506)
5145	Bonnet Screw 6 required, Pkg. 12
5155	Yoke Gasket, Teflon, Pkg. 12 (Part of 4506)
5158	Nozzle with 5/84" Orifice, Pkg. 6
5177	Rear Spring, for over 500 PSI Inlet Pressure, Standard
5181	Yoke Clamping Screw, Pkg. 6
5182	Yoke Guide
5197	Filter Screen, pkg. 6
5215	Sintered Filter, pkg. 12, Standard
5259	Spring Button
5263	Compression Spring for 30 PSI Pressure (Red)
5264	Compression Spring for 125 PSI Pressure (Green)
5265	Compression Spring for 150 PSI pressure (Purple)
5267	Diaphragm Plate (Part of 4506)
5268	Stainless Steel Diaphragm (Part of 4506)
5269	Diaphragm Gasket, Pkg. 6
5272	Diaphragm Plate Nut (Part of 4506)
5273	Slot Type Adjusting Screw
5274	Protection Cap for Slot Adjusting Screw
5369	Compression Spring for 50 PSI pressure (Black)
5400	Compression Spring for 225 PSI pressure (Grey)
5411	Body, 1 Inlet, 2 outlets P-1-DA
5412	Body, 1 Inlet, 3 outlets P-1-DC
5413	Body, 2 inlets, 2 outlets P-1-DD
5418	Bonnet, for "T" Type Adjusting Screw
5419	Bonnet, for Slotted Type Adjusting Screw
5423	Allen Head Adj. Screw
5424	Back Cap
5429	Back Cap Gasket, Teflon, Pkg. 12

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PT 50

AMERICAN SENSOR TECHNOLOGIES (AST)
AST4400A06000P4E0437
0-6000 PSI PRESSURE TRANSDUCER, IS/UL
CL1 DIV2, GROUPEC&D, 4-20Ma, 1/4MNPT, SS

ANGI PART NUMBER 410-07282

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AST4400 *Stainless Steel Media Isolated Pressure Sensor*

CSA Approved For Hazardous Locations with Approved Barrier 



Overview

The AST4400 is a media isolated stainless steel pressure sensor with a wide variety of options. In addition to its rugged construction and best price-to-performance ratio in the industry, the AST4400 is the solution for pressure measurement in Intrinsically Safe areas.

Benefits

- **ANSI/ISA - 12.27.01.2003 Certified "Single Seal"**
(No need for expensive secondary seal)
- **CSA 157 Class 1** Groups C, D IS with approved Barrier (page 2)
- **CAN/CSA-C22.2 No. 157.92** - Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations
- High Strength Stainless Steel Construction
- No Oil, Welds or Internal O-rings
- Wide Operating Temperature Range
- Ranges up to 10,000 PSI
- Low Static and Thermal Errors
- Unparalleled Price and Performance
- Compatible with Wide Range of Liquids and Gases
- EMI/RFI Protection
- 500VAC Isolation

Applications

- Industrial OEM Equipment
- Water Management
- Pneumatics
- Hydrogen Storage (316L SS)
- HVAC/R Equipment
- Control Panels
- Hydraulic Systems
- Data Loggers

Performance @25°C (77°F)

Accuracy*	< ±0.25% BFSL
Stability (1 year)	±0.25%FS, typical
Over range Protection	2X Rated Pressure
Burst Pressure	5X or 20,000 PSI (whichever is less)
Pressure Cycles	> 100 Million

* Accuracy includes non-linearity, hysteresis & non-repeatability



Krystal Bond
Technology
by AST

Environmental Data

Temperature

Operating	-40 to 85°C (-40 to 185°F)
Storage	-40 to 100°C (-40 to 212°F)

Thermal Limits

Compensated Range	0 to 55°C (30 to 130°F)
TC Zero	<±1.5% of FS
TC Span	<±1.5% of FS

Other

Shock	100G, 11 msec, 1/2 sine
Vibration	10G peak, 20 to 2000 Hz.
EMI/RFI Protection	Yes
Rating	IP-66

Electrical Data

Output	4-20mA	1-5VDC, 1-6VDC	0-50mV (10mV/V)	0.5-4.5V Ratiometric
Excitation	10-28VDC	10-28VDC	5VDC, typical	5VDC, regulated
Output Impedance	>10k Ohms	<100 Ohms, Nominal	1100 Ohms, Nominal	<100 Ohms, Nominal
Current Consumption	20mA, typical	<10mA	<5mA	<10mA
Bandwidth	(-3dB): DC to 250 Hz	(-3dB): DC to 1kHz	(-3dB): DC to 5kHz, min	(-3dB): DC to 1kHz
Output Noise	-	<2mV RMS	-	<2mV RMS
Zero Offset:	<±1% of FS	<±1% of FS	< ±2% of FS	<±1% of FS
Span Tolerance	<±2% of FS	<±1.5% of FS	< ±2% of FS	<±1.5% of FS
Output Load	0-800 Ohms@10-28VDC	10k Ohms, Min.	>1M Ohms	10K Ohms, Min.
Reverse Polarity Protection	Yes	Yes	-	No

Ordering Information

AST4400 **A** **00500** **P** **4** **E** **0** **000** **-SS**

Series Type

Process Connection
A=1/4" NPT Male
B=1/8" NPT Male
C=1/4" BSPP Male
F=7/16" - 20 UNF Male
I= 1/4" NPT Female

Pressure Range
Insert pressure range from chart

Pressure Unit
B= Bar
K= kg/cm²
P= PSI

Outputs
1= 0.5-4.5V ratiometric 6= 1-6V
3= 1-5V A= 0-50mV (10mV/V)
4= 4-20mA (2 wire loop powered)

Electrical F= Packard Metripack 150 3-Pin Conn.
A= 2 ft. (0.6 m) I= DIN 43650A
B= 4 ft. (1.2 m) L= Conduit fitting, Cable 2 ft.
C= 6 ft. (1.8 m) M= Conduit fitting, Cable 4 ft.
D= 10 ft. (3.0 m) N= Conduit fitting, Cable 6 ft.
E= Mini DIN 43650 P= Conduit fitting, Cable 10 ft.

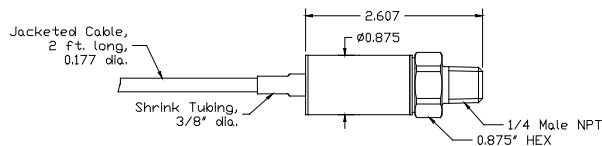
Wetted Material
0=17-4PH
1=316 L

Options
000 -No special options

Single Seal

Now With DIN43650A!

Dimensional Data

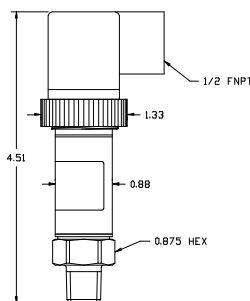


DIN43650A

Output	Pin 1	Pin 2	Pin 3	Wide Pin
4-20mA	+V Supply	Ground	Case GND	N/C
3W Voltage	+V Supply	Ground	+ Signal	Case GND

CABLE

Output	Red	Black	White	Green
4-20mA	+V Supply	Ground	N/C	Case GND
3W Voltage	+V Supply	Ground	+ Signal	Case GND



Warranty

Workmanship - AST, Inc. pressure transmitters have a limited one-year warranty to the original purchaser. AST, Inc. will replace or repair, free of charge, any defective transmitter. This warranty does not apply to any units that have been modified; misused, neglected or installed where the application exceeds published ratings. AST's sensors are made with pride in New Jersey, USA. If in the area please feel free to stop by for a visit!

Installation/Applications - The purchaser is responsible for media compatibility, functional adequacy, and correct installation of the transmitter.

Pressure Ranges*

PSIG Measurement Range	Pressure Range Code	BARG Measurement Range	Pressure Range Code
-14.7 to 25**	V0025**	-1 to 2**	V0002**
0-25	00025	0-2	00002
0-50	00050	0-5	00005
0-100	00100	0-10	00010
0-200	00200	0-20	00020
0-500	00500	0-50	00050
0-1,000	01000	0-100	00100
0-2,500	02500	0-250	00250
0-5,000	05000	0-350	00350
0-7,500	07500	0-500	00500
0-10,000	10000	0-700	00700

*Typical ranges. All ranges between 0-25 PSI and 0-10,000 PSI available.

**Compound ranges up to -14.7 to 2500 PSI available. Please consult factory.

Barrier Installation

Class I, Div. 1, Groups C, D
Hazardous Location
Nonhazardous Location
A08949

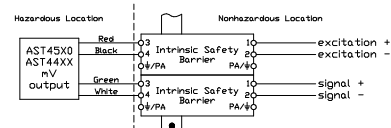


Figure 1: Wiring diagram for 4-wire, mV output

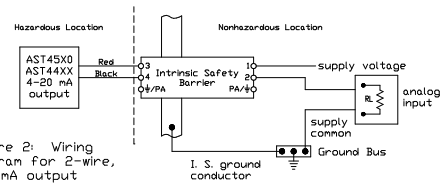


Figure 2: Wiring diagram for 2-wire, 4-20mA output

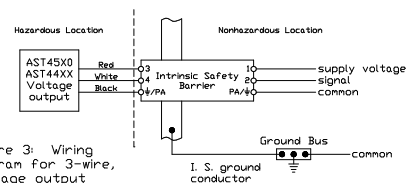


Figure 3: Wiring diagram for 3-wire, Voltage output

Entity Parameters

Models AST4400, AST4410 and AST44LP

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 0

Models AST4400, AST4410 and AST44P with integral cable

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 1.32 uH

Models AST4500, AST4510 and AST4520

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 16.5 uH

1. For installation in accordance with Fig. 2, barrier must be a CSA Certified, Single Channel grounded Shunt-Diode Zener Barrier or a Single Channel Isolating Barrier.

Barrier parameters must meet the following requirements:

$$V_{oc} \text{ or } U_o \leq V_{max} \quad C_a \text{ or } C_o \geq C_i + C_{cable}$$

$$I_{sc} \text{ or } I_o \leq I_{max} \quad L_a \text{ or } L_o \geq L_i + L_{cable}$$

$$P_o \leq P_i \text{ (if applicable)}$$

2. For installations in accordance with Figs. 1 and 3, one dual-channel or two single-channel barriers may be used, where in either case, both channels have been Certified for use together with combined entity parameters.

The following conditions must be satisfied:

$$V_{oc} \text{ or } U_o \leq V_{max} \quad C_a \text{ or } C_o \geq C_i + C_{cable}$$

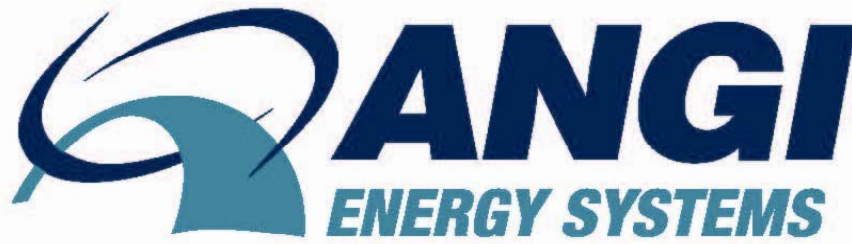
$$I_{sc} \text{ or } I_o \leq I_{max} \quad L_a \text{ or } L_o \geq L_i + L_{cable}$$

$$P_o \leq P_i \text{ (if applicable)}$$

3. Maximum non-hazardous area voltage must not exceed 250 V.

4. Installation should be in accordance with Canadian Electrical Code, Part I.

5. A grounding method is not provided by the manufacturer as part of the integral design of the Transducer. For units which are connected through a grounded shunt diode safety barrier, ensure that the transducer is mounted to a surface which is at the same potential as the barrier ground.



SRV 36

NUPRO
SS-4R3A5
1/4", 50-5000 PSI, SAFETY RELIEF VALVE

ANGI PART NUMBER 330-02483

REBUILD KIT – NUPRO – 761-01235

REBUILD KIT - HOKE 7100 SERIES SEAT – 761-01229

SPRINGS – R3A SERIES

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Technical Data

Pressure-Temperature Ratings

Series	R3A				R4				RL3 and RL4			
Working Pressure at 70°F (20°C)	6000 psig (413 bar)				6000 psig (413 bar)				300 psig (20.6 bar)			
Set Pressure ^①	50 to 6000 psig (3.4 to 413 bar)				50 to 1500 psig (3.4 to 103 bar)				10 to 225 psig (0.68 to 15.5 bar)			
Outlet Pressure	1500 psig (103 bar)				2500 psig (172 bar)				225 psig (15.5 bar)			
Seal Material	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene	Fluoro-carbon FKM	Buna N	Neo-prene	Ethylene pro-pylene
Temperature, °F (°C)	Working pressure, psig (bar)											
−40 (−40)	—	—	—	—	—	—	—	—	—	—	—	300 (20.6)
−30 (−34)												
−10 (−23)												
0 (−17)												
10 (−12)												
25 (−4)	6000 (413)	6000 (413)	6000 (413)	1500 (103)	1500 (103)	1500 (103)	300 (20.6)	300 (20.6)	300 (20.6)			
30 (−1)												
50 (10)												
150 (65)	5580 (384)	5580 (384)	5580 (384)							5580 (384)		
200 (93)	5160 (355)	5160 (355)	5160 (355)							5160 (355)		
250 (121)	4910 (338)	4910 (338)	4910 (338)	4910 (338)								
275 (135)	—	—	4660 (321)	—	—	—	—					
300 (148)												

① The pressure-temperature ratings are based upon laboratory testing to ensure that the cracking pressure does not deviate by more than 20 % from the initial room temperature set pressure.

Set Pressure and Resealing Pressure

- Set pressure is the upstream pressure at which the first indication of flow occurs. Set pressure of each valve is repeatable within $\pm 5\%$ at room temperature.
- Resealing pressure is the upstream pressure at which there is no indication of flow. Resealing pressure is always lower than set pressure.

Series	Set Pressure, psig (bar)	Minimum Resealing Pressure as a Percentage of Set Pressure, %
RL3, RL4	10 to 20 (0.68 to 1.3)	50
	175 to 225 (12.0 to 15.5)	91
R3A R4	100 to 200 (6.8 to 13.7)	50
	850 to 1000 (58.5 to 68.9)	84

Testing

Every R series proportional relief valve is tested for set and resealing performance.

Cleaning and Packaging

Every R series relief valve is cleaned and packaged in accordance with Swagelok Specification SC-10. Special cleaning and packaging in accordance with Specification SC-11 is available as an option.

Back Pressure

High-Pressure Valves (R3A and R4 Series)

The effect of system back pressure is minimized by the design of these high-pressure valves.

Low-Pressure Valves (RL3 and RL4 Series)

System back pressure increases the set pressure of the valve. To compensate, multiply the back pressure by 0.8 and subtract the result from the desired set pressure. Use the result to pre-set the valve while back pressure is equal to atmospheric pressure.

Example:

Desired set pressure is 120 psig. System back pressure is 40 psig.

Step 1. Multiply back pressure by 0.8.

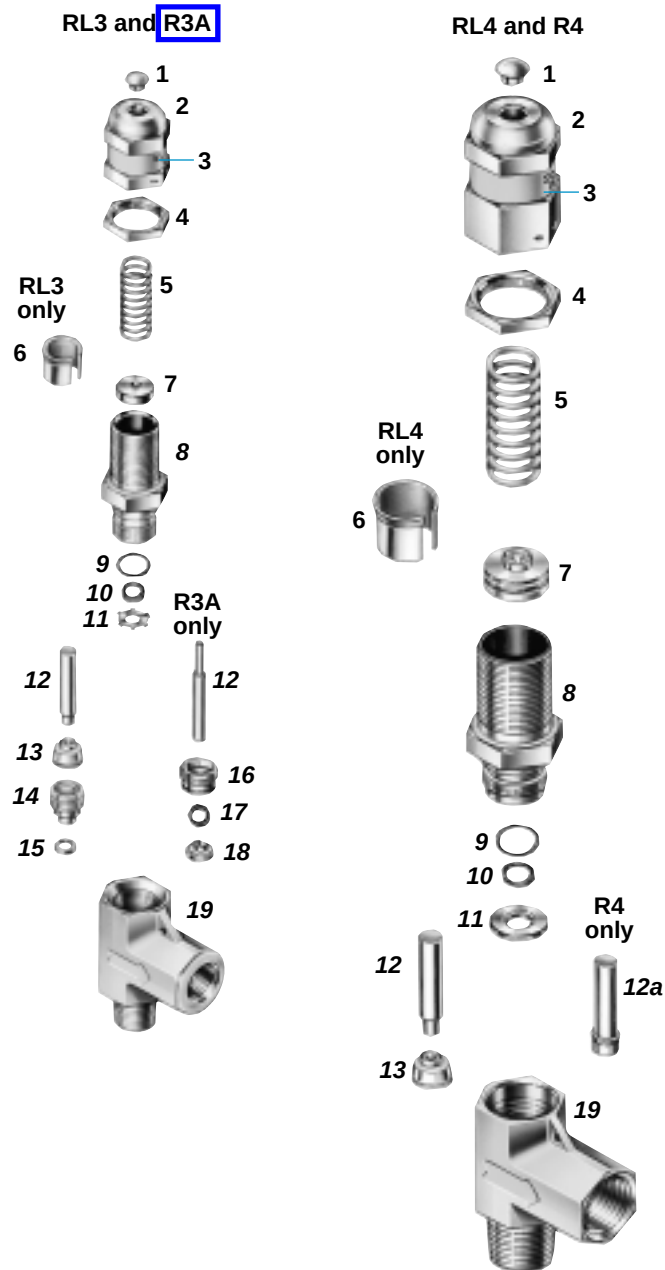
$$40 \text{ psig} \times 0.8 = 32 \text{ psig.}$$

Step 2. Subtract result from desired set pressure.

$$120 \text{ psig} - 32 \text{ psig} = 88 \text{ psig.}$$

Step 3. Pre-set proportional relief valve to 88 psig.

Materials of Construction



Component	Material Grade/ASTM Specification
1 Plug	Nickel-plated brass
2 Cap ^①	316 SS/A479
3 Label	Polyester
4 Lock nut	RL3, R3A—316 SS powdered metal; RL4, R4—316 SS/A276
5 Spring	17-7 PH® SS/ASM 5678B
6 Sleeve	304 SS/A240
7 Spring support	RL3, R3A—316 SS powdered metal; RL4, R4—316 SS/A276
8 Bonnet ^①	316 SS/A479
9 O-ring ^②	Fluorocarbon FKM
10 Quad seal ^②	PTFE-coated fluorocarbon FKM
11 Retainer	RL3, R3A—316 SS/A666 RL4, R4—316 SS/A479
12 Stem ^③	316 SS/A479
12a Bonded stem ^③	Fluorocarbon FKM-bonded 316 SS/A479
13 Bonded disc	
14 Seat	316 SS/A479
15 Gasket	PTFE-coated 316 SS/A240
16 Seat retainer ^①	316 SS/A479
17 O-ring ^②	Fluorocarbon FKM
18 Insert ^①	316 SS/A479
19 Body	316 SS/A182

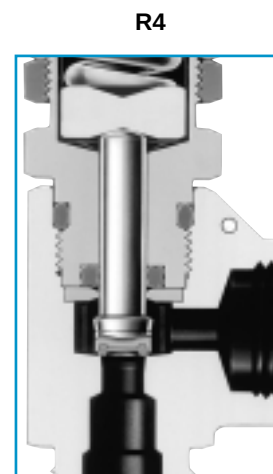
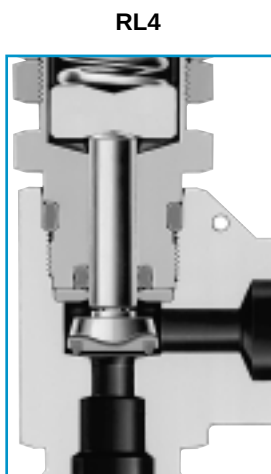
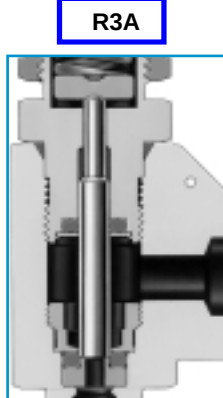
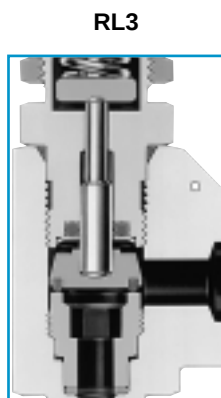
Wetted components listed in *italics*.

Lubricants:

① Molybdenum disulfide-based dry film.

② Silicone-based.

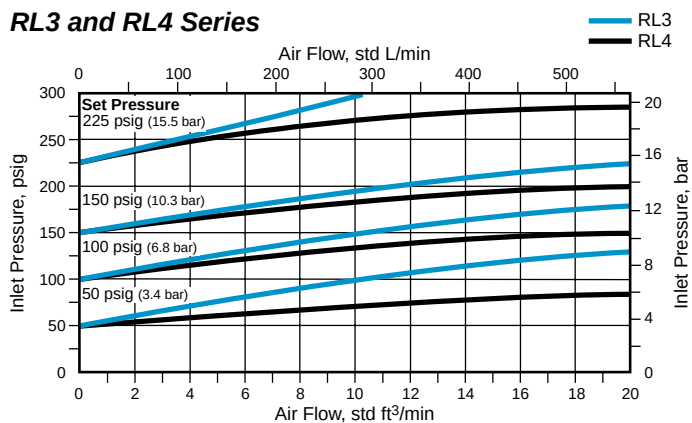
③ Molybdenum disulfide-based paste.



Flow Data at 70°F (20°C)

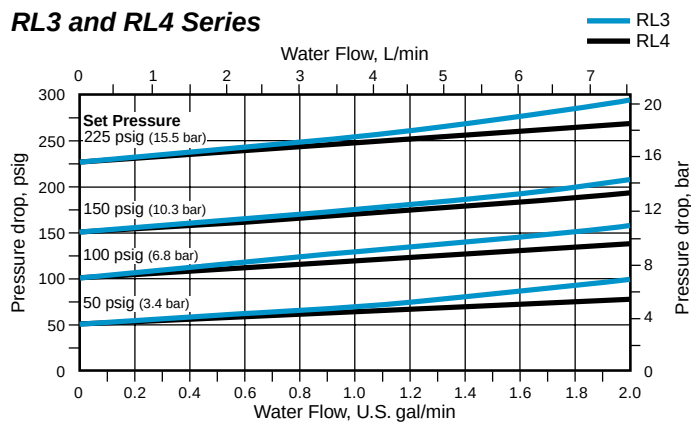
Air Flow

RL3 and RL4 Series

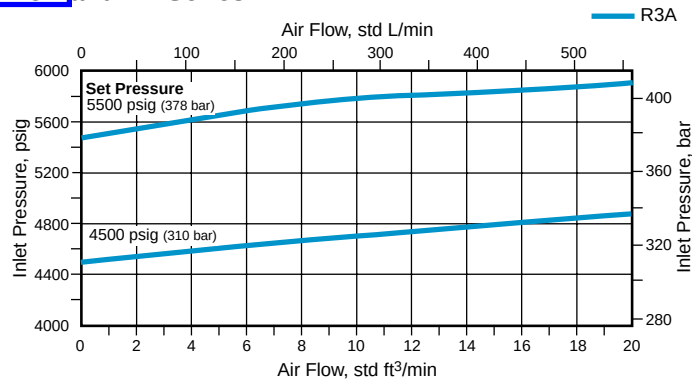


Water Flow

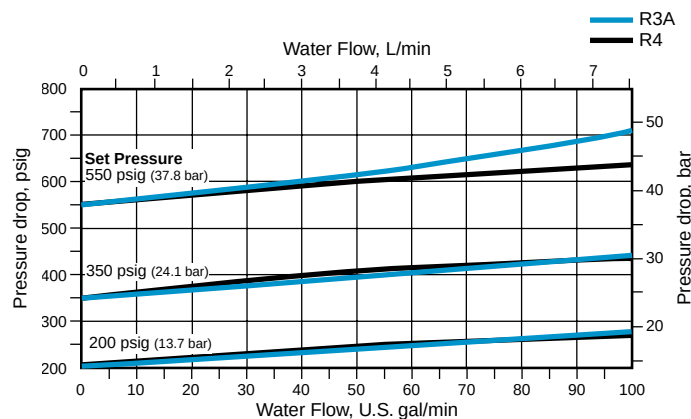
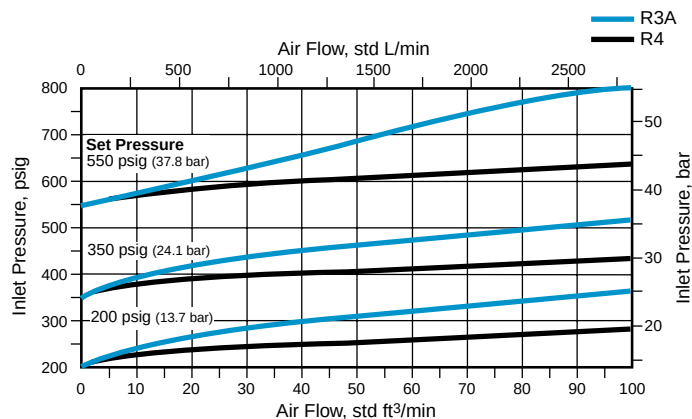
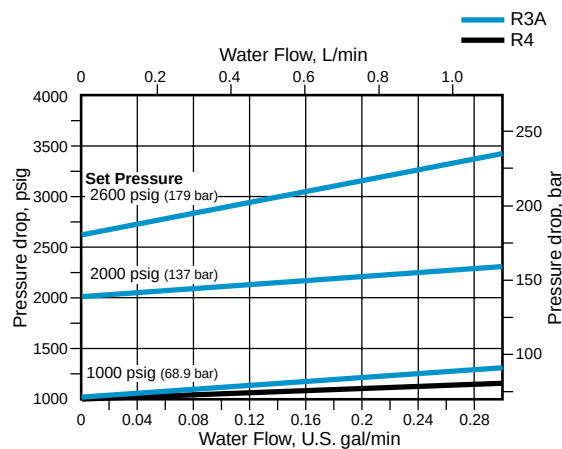
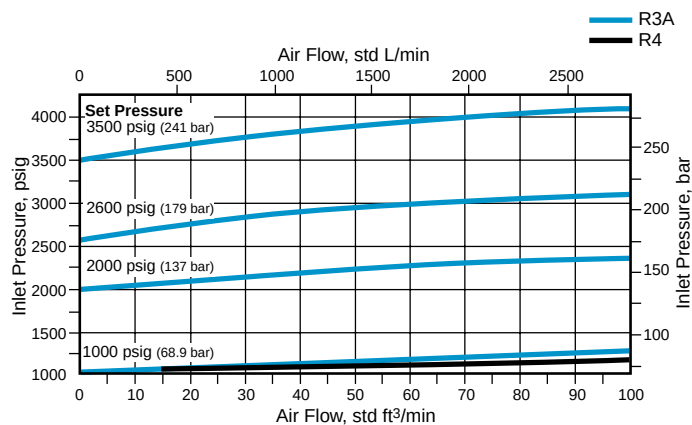
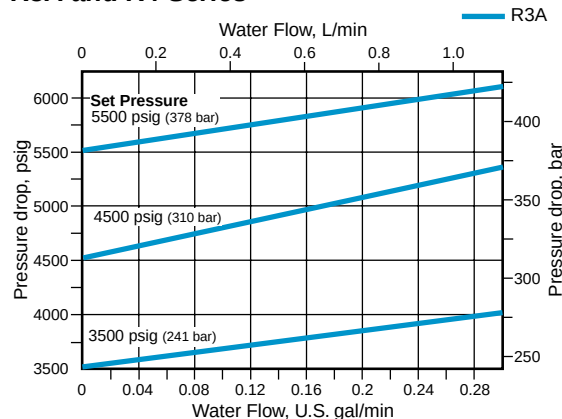
RL3 and RL4 Series



R3A and R4 Series

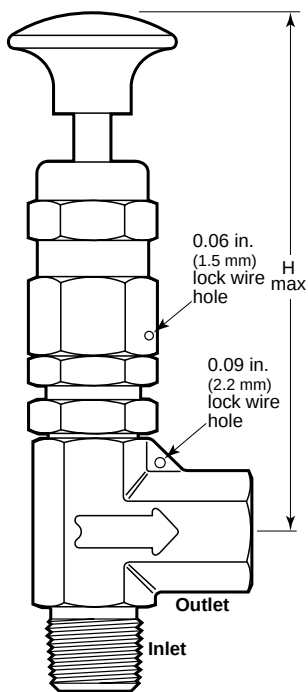
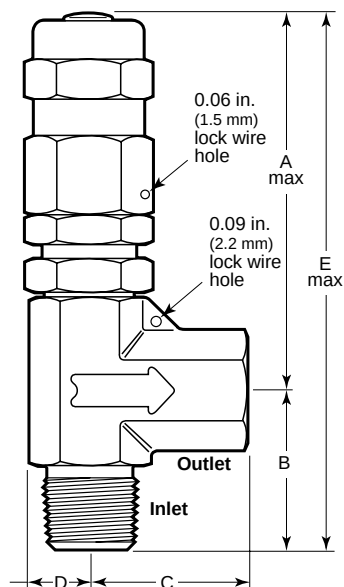


R3A and R4 Series



Dimensions

Dimensions in inches and (millimeters) are for reference only, subject to change.



**Valve with Manual
Override Handle**

Low-Pressure Valves (RL3 and RL4 Series)

End Connections		Ordering Number	Dimensions, in. (mm)						
Type	Size		A	B	C	D	E	H	
RL3 Series: 0.14 in. (3.6 mm) Fully Open Orifice									
Swagelok tube fittings	1/4 in.	SS-RL3S4	2.70 (68.6)	1.44 (36.6)	1.60 (40.6)	0.43 (10.9)	4.14 (105)	4.09 (104)	
	6 mm	SS-RL3S6MM							
	8 mm	SS-RL3S8MM							
Male NPT to Swagelok tube fitting	1/4 in.	SS-RL3M4-S4		1.19 (30.2)	1.17 (29.7)	3.89 (98.8)			
Male NPT to female NPT	1/4 in.	SS-RL3M4-F4							
Male ISO to female ISO ^①	1/4 in.	SS-RL3M4F4-RT							
RL4 Series: 0.25 in. (6.4 mm) Fully Open Orifice									
Swagelok tube fittings	1/2 in.	SS-RL4S8	4.09 (104)	1.72 (43.7)			5.81 (148)	5.37 (136)	
	12 mm	SS-RL4S12MM		1.83 (46.5)			5.92 (150)		
Male NPT to Swagelok tube fitting	1/2 in.	SS-RL4M8S8		1.43 (36.3)	1.72 (43.7)	0.50 (12.7)	5.52 (140)		
Male NPT to female NPT	1/2 in.	SS-RL4M8F8			1.43 (36.3)				

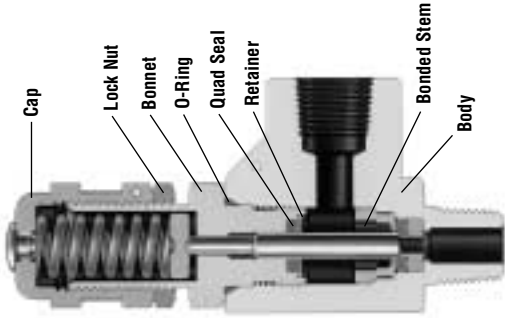
High-Pressure Valves (R3A and R4 Series)

End Connections		Ordering Number	Dimensions, in. (mm)					
Type	Size		A	B	C	D	E	H
R3A Series: 0.14 in. (3.6 mm) Fully Open Orifice								
Swagelok tube fittings	1/4 in.	SS-4R3A	2.70 (68.6)	1.44 (36.6)	1.60 (40.6)	0.43 (10.9)	4.14 (105)	4.09 (104)
	6 mm	SS-6R3A-MM						
	8 mm	SS-8R3A-MM						
Male NPT to Swagelok tube fitting	1/4 in.	SS-4R3A1		1.19 (30.2)	1.17 (29.7)	3.89 (98.8)		
Male NPT to female NPT	1/4 in.	SS-4R3A5						
Male ISO to female ISO ^①	1/4 in.	SS-4R3A5-RT						
R4 Series: 0.25 in. (6.4 mm) Fully Open Orifice								
Swagelok tube fittings	1/2 in.	SS-R4S8	4.09 (104)	1.72 (43.7)		0.50 (12.7)	5.81 (148)	5.37 (136)
	12 mm	SS-R4S12MM		1.83 (46.5)			5.92 (150)	
Male NPT to Swagelok tube fitting	1/2 in.	SS-R4M8S8		1.43 (36.3)	1.72 (43.7)		5.52 (140)	
Male NPT to female NPT	1/2 in.	SS-R4M8F8			1.43 (36.3)			

Dimensions shown with Swagelok nuts finger-tight.

^① Reference specifications: ISO 7/1, BS21, DIN-2999, JIS B0203.

R3A Series Seal and Stem Replacement Instructions



Seal and Stem Replacement Instructions

- Contents:
- 1 quad seal
 - 1 bonded stem
 - 1 O-ring
 - 1 Retainer

Quad Seal and O-Ring Replacement

1. Remove valve from system.
2. Loosen **cap** to relieve spring pressure.
3. Remove **bonnet** from **body**.
4. Remove **stem** and **retainer** from **bonnet**.
5. Remove **quad seal** from **bonnet**.
6. Make sure all parts are clean before reassembly.
7. Install new **quad seal** into **bonnet**. (Lubricate with system compatible lubricant.)
8. Place **retainer** in **bonnet**, then insert **stem** into **bonnet** through **retainer** and **quad seal**.
9. Remove and replace **bonnet O-ring**. (Lubricate with system compatible lubricant.)
10. Thread **bonnet** into **body** and torque to **400 in.-lb. (45 N-m)**.
11. Adjust desired set pressure as described in steps 7 through 10 in the Spring Installation section on reverse side.
12. Install valve in system. Grip valve on wrench pad during installation.



Stem and O-Ring Replacement

1. Remove valve from system.
2. Loosen **cap** to relieve spring pressure.
3. Remove **bonnet** from **body**.
4. Remove **stem** from **bonnet**.
5. Make sure all parts are clean before reassembly.
6. Place new **stem** into **bonnet**.
7. Remove and replace **bonnet O-ring**. (Lubricate with system compatible lubricant.)
8. Thread **bonnet** into **body** and torque to **400 in.-lb. (45 N-m)**.
9. Adjust desired set pressure as described in steps 7 through 10 in the Spring Installation section on reverse side.
10. Install valve in system. Grip valve on wrench pad during installation.

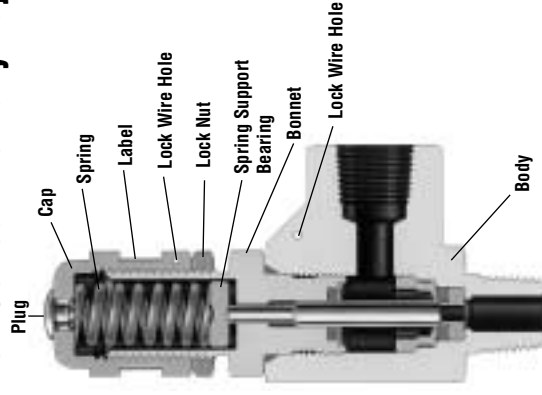


Spring Kit Identification

Spring Kit Ordering Number	Color Code	Nominal Cracking Pressure psig (bar)	Initial Cap Position, number of turns
177-13K-R4-A	Blue	50 to 350 (3.4 to 24.1)	9
177-13K-R4-B	Yellow	350 to 750 (24.1 to 51.7)	8.5
177-13K-R4-C	Purple	750 to 1500 (51.7 to 103)	9
177-R3A-K1-D	Orange	1500 to 2250 (103 to 155)	6
177-R3A-K1-E	Brown	2250 to 3000 (155 to 206)	6
177-R3A-K1-F	White	3000 to 4000 (206 to 275)	6
177-R3A-K1-G	Red	4000 to 5000 (275 to 344)	6
177-R3A-K1-H	Green	5000 to 6000 (344 to 413)	6



R3A Series Externally Adjustable Relief Valve



Spring Installation

! Warning: Relieve system pressure before installing spring.

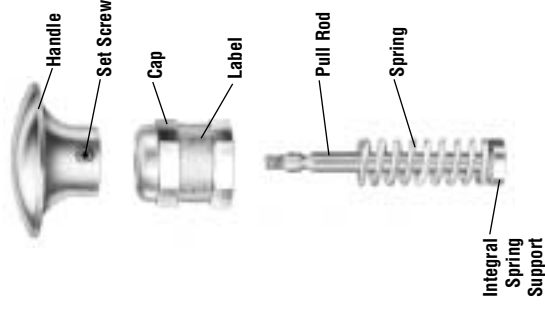
1. Loosen lock nut and remove the cap from bonnet.
2. Remove existing spring if necessary.
3. Make sure all components are clean.
4. Place spring support bearing in valve with bearing side UP.
5. Install proper spring for desired set pressure range.
6. Replace existing label with new label. Check this label against spring identification table for proper set pressure range.
7. Thread cap onto bonnet to initial position indicated in Spring Kit Identification Table. Tighten lock nut against cap and test for set pressure.
8. Relieve system pressure, unthread cap as needed, and retest. Repeat procedure as necessary to obtain desired set pressure.
9. Tighten lock nut against the cap to 100 in.-lb (11 N·m).
10. Lock wire the cap and body together to maintain relief setting.

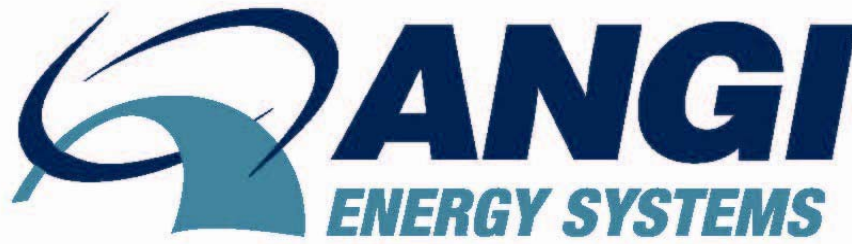
Manual Override Conversion

! Warning: Relieve system pressure before installing manual override handle.

1. Loosen lock nut and remove the cap from bonnet.
2. Remove the plug from the cap.
3. Remove existing spring and spring support.
4. Install pull rod into bonnet.
5. Place blue "A" spring over pull rod, resting it on the integral spring support.
6. Place the cap over pull rod, resting it on bonnet.
7. Thread handle onto pull rod. Tighten set screw on handle to 20 in.-lb. (2.2 N·m) with a 5/64 in. hex wrench.
8. Engage the cap threads with bonnet.

To adjust the set pressure, refer to steps 7 through 10 in the "Spring Installation" section.





SRV 37

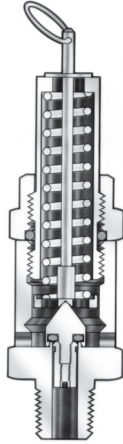
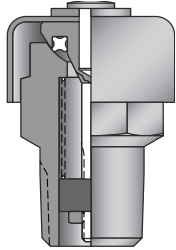
CIRCLE SEAL
D559N-2M-125 ASME

125 PSI 1/4" ASME, SAFETY RELIEF VALVE

ANGI PART NUMBER 991-07663

NO REBUILD KIT AVAILABLE

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CIRCLE SEAL CONTROLS, INC.

A division of CIRCOR International, Inc.

D500 Series 15 to 150 PSIG

M5100 Series 20 to 1200 PSIG

ASME Safety Relief Valves

Features

- D500 Features Cap Design
- M5100 Offered with Ring or Lift Handle
- MD500 Features Cup Design with Manual Override Ring.

Technical Data

ASME	• American Society of Mechanical Engineers
Body Construction Materials:	• D500 – Naval Brass or 316 Stainless Steel • M5100 – Naval Brass or 316 Stainless Steel
O-ring Materials:	• M5100 – Buna N, Neoprene, Teflon®, Viton®, and EPDM • D500 – Buna N, Neoprene, Teflon®, Viton®, EPDM, and silicone
Set Pressure:	• D500 – 15 to 150 PSIG 1/4" • M5100 – 20 to 1,200 PSIG 1/8", 3/4", 1" 50 to 1,200 PSIG 1/4", 3/8", 1/2"
Temperature Range:	• -100° F to +400° F (-73° C to 204° C) Based on o-ring material, see "How to Order"
Connection Sizes:	• D500 – 1/4" Male Pipe • M5100 – 1/8" to 1" Male Pipe

Terminology For ASME Safety Relief Valves

SAFETY RELIEF VALVES

An automatic pressure relieving device actuated by the static pressure upstream of the valve, which opens in proportion to the increase in pressure over the opening pressure.

START-TO-LEAK PRESSURE

The pressure at the valve inlet where the relieved fluid is first detected (on the down-stream side of the seat) before normal relieving action takes place.

OPENING PRESSURE (SET PRESSURE)

The valve inlet pop point pressure at which there is a measurable lift or discharge becomes continuous as determined by seeing, hearing or feeling. In the pop type of safety valve, it is the inlet pressure at which the valve opens, allowing a larger amount of fluid as compared with corresponding valve movements at higher or lower pressures.

NOTE: A safety relief valve is not considered to open when it is simmering at a pressure just below the popping point even though the simmering may be audible. This set pressure distinguishes our ASME relief valves from our standard relief valves whose cracking pressure indicates initial flow.

RELIEVING PRESSURE

(Opening Pressure plus Overpressure) The pressure measured at the valve inlet at which the relieving capacity is determined.

CLOSING PRESSURE

(Reset Pressure) The pressure measured at the valve inlet, at which the valve closes, flow is substantially shut off, and there is no measurable lift.

SEAL-OFF PRESSURE

The pressure (measured at the valve inlet) after closing at which no further gas is detected at the down-stream side of the seat.

OPERATING PRESSURE

The actual pressure at which a vessel is maintained in normal operation.

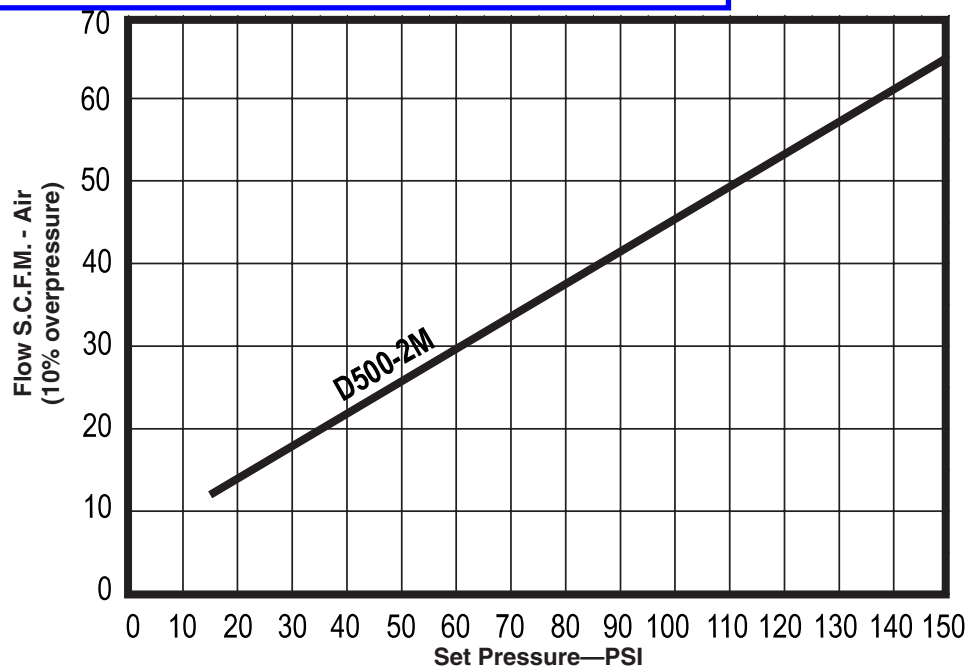
ACCUMULATION

Pressure build-up or overpressure beyond the set pressure of a safety relief valve, at which capacity flow is rated. Capacities are usually based on 10% accumulation.

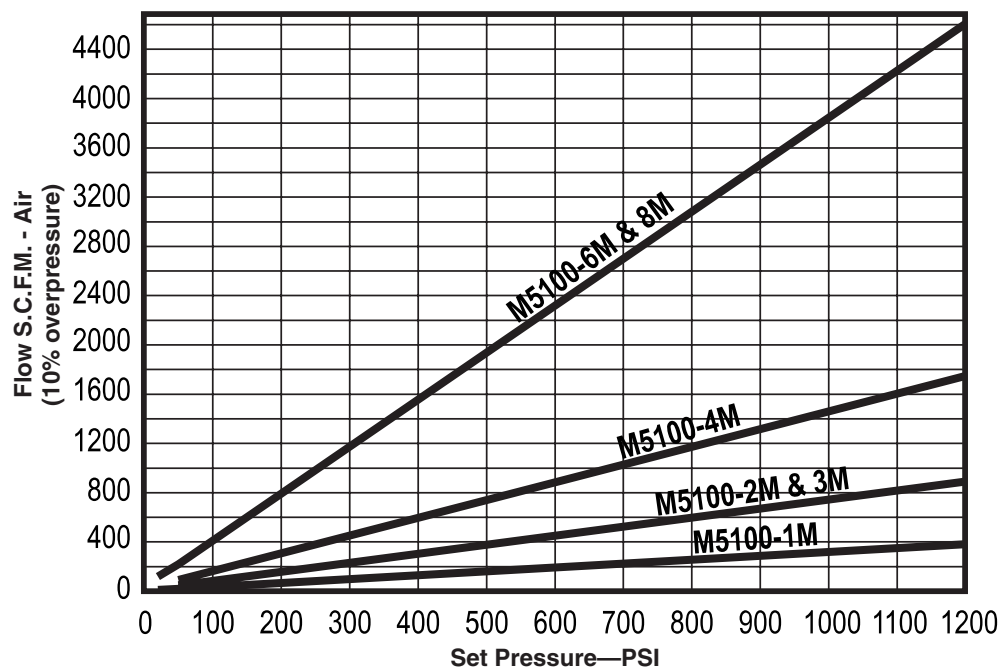
NOTE: Proper filtration is recommended to prevent damage to sealing surfaces.

D500 Series 15 to 150 PSIG
M5100 Series 20 to 1200 PSIG
ASME Safety Relief Valves

Flow Curve D500 Series ASME Safety Relief Valve



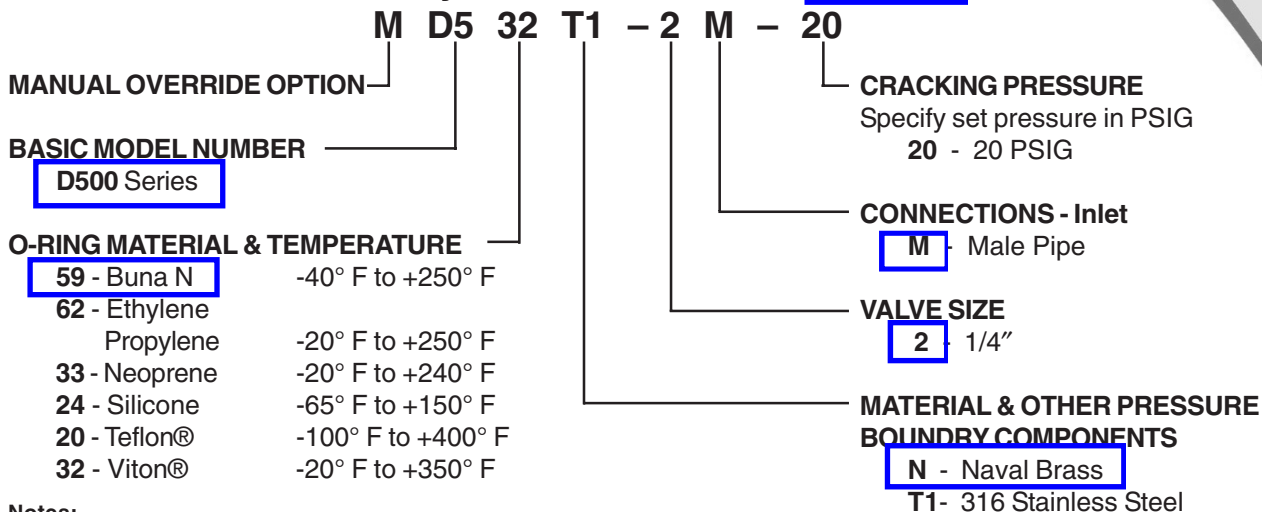
Flow Curve M5100 Series ASME Safety Relief Valve



D500 Series 15 to 150 PSIG M5100 Series 20 to 1200 PSIG ASME Safety Relief Valves

How to Order

D500 Series ASME Safety Relief Valve—15 to 150 PSI



Notes:

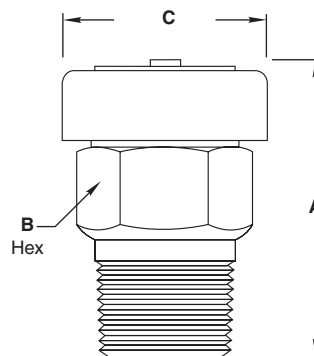
Teflon® is a registered trademark of DuPont.

Viton® is a registered trademark of DuPont Dow Elastomers.

Please consult your Circle Seal Controls Distributor or our factory for information on special connections, lubricants, operating pressures and temperature ranges.

Dimensions (Inches)

Dash No.	Size	A	B Hex	C Dia
2M	1/4"	1.375	.625	.90



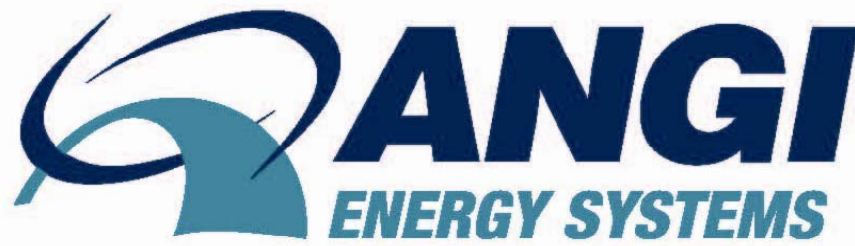
Recommended Installation

- 1 Before installing a new safety relief valve, we recommend that a pipe tap be used to assure clean-cut and uniform threads in the vessel opening and to allow for normal hand engagement followed by a half to one turn by wrench.
- 2 Avoid over-tightening as this can distort the valve seat.
- 3 Avoid excess "popping" of the valve. Safety relief valves should only be operated often enough to assure they are in good working order.
- 4 Apply only a moderate amount of pipe compound or tape to the threads, leaving the first thread clean parts.
- 5 Don't oversize the valve, as this may cause chatter resulting in rapid wear of the moving parts.
- 6 Avoid wire, cable or chain pulls for attachments to levers that do not allow a vertical pull. The weight of these devices should not be applied to the safety relief valve.
- 7 Avoid having the operation pressure too near the valve set pressure. A minimum differential of 10% is recommended.

For Your Safety

It is the sole responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Material compatibility product ratings and application details should be considered in the selection. Improper selection or use of products described here in can cause personal injury or property damage.

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SRV 47

NUPRO
177-R3A-K1-G
SPRING – RED 4000-5000#

ANGI PART NUMBER 652-01845

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Ordering Information

Low-Pressure Valves (RL3 and RL4 Series)

Valve contains spring; set pressure must be adjusted. Select a valve ordering number.

Spring Kits

Spring kits include spring and installation instructions. Select a spring kit ordering number.

Series	Spring Kit Ordering Number	Set Pressure Range, psig (bar)
RL3	177-13K-RL3	10 to 225 (0.68 to 15.5)
RL4	177-13K-RL4	

High-Pressure Valves (R3A and R4 Series)

Valve does not contain spring. Select a valve ordering number and a spring kit ordering number.

Spring Kits

Spring kits include spring, label, 302 SS lock wire with seal, spring support, and installation instructions.

Select a spring kit basic ordering number and add the spring designator for the desired set pressure range as a suffix.

Examples: **177-R3A-K1-F**; **177-13K-R4-C**.

Set Pressure Range psig (bar)	Spring Designator	Spring Color
R3A Series Spring Kit: Basic Ordering Number 177-R3A-K1-		
50 to 350 (3.5 to 25)	A	Blue
350 to 750 (25 to 50)	B	Yellow
750 to 1500 (50 to 100)	C	Purple
1500 to 2250 (100 to 155)	D	Orange
2250 to 3000 (155 to 205)	E	Brown
3000 to 4000 (205 to 275)	F	White
4000 to 5000 (275 to 340)	G	Red
5000 to 6000 (340 to 410)	H	Green
R4 Series Spring Kit: Basic Ordering Number 177-13K-R4-		
50 to 350 (3.5 to 25)	A	Blue
350 to 750 (25 to 50)	B	Yellow
750 to 1500 (50 to 100)	C	Purple

Options and Accessories

Seal Materials

Fluorocarbon FKM is the standard seal material. Optional seal materials are available. To order, add a seal material designator as a suffix to the valve ordering number.

Example: **SS-RL3S4-BU**.

Seal Material	Designator
Buna N	-BU
Ethylene propylene	-EP
Neoprene	-NE
Fluorocarbon FKM	-VI for seal kits; no designator for valves

Seal Kits

Fluorocarbon FKM, Buna N, ethylene propylene, and neoprene seal kits are available. To order, insert a seal material designator as a prefix (R3A series) or suffix (all others) to the seal kit basic ordering number.

Examples: **BU-R3A-K2**; **SS-3K-RL3-BU**.

RL3 Series	R3A Series	RL4 Series	R4 Series
Seal Kit Basic Ordering Number			
SS-3K-RL3-	-R3A-K2	SS-3K-RL4-	SS-3K-R4-
Seal Kit Contents			
O-ring, quad seal, bonded disc, retainer, instructions	O-rings (2), quad seal, retainer, instructions	O-ring, quad seal, bonded disc, retainer, instructions	O-ring, quad seal, bonded stem, instructions

Manual Override Handles

A manual override handle opens the valve without changing the set pressure.

For use with:

- RL3 and RL4 series—standard spring
- R3A series—A, B, and C springs only
- R4 series—A spring only.

Handle diameter is 1.50 in. (38.1 mm). Maximum overall height of valve with handle in closed position:

- 5.16 in. (131 mm) for R3A and RL3 series
- 6.78 in. (172 mm) for R4 and RL4 series.

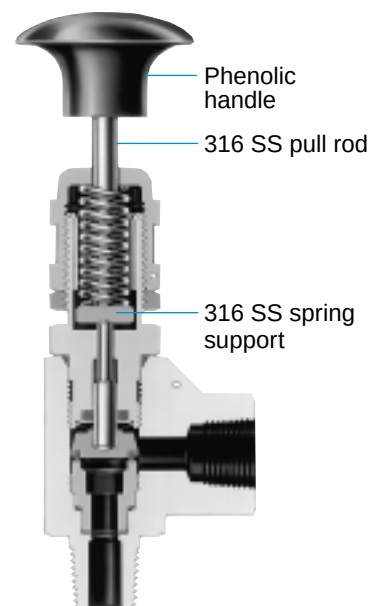
To order, add **-MO** as a suffix to the valve ordering number.

Example: **SS-RL3S4-MO**.

Manual Override Handle Kits

Kits contain handle, pull rod, spring support, and instructions.

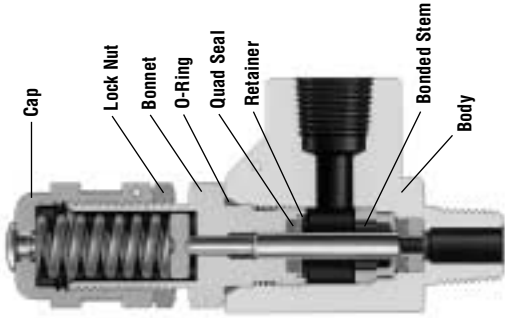
To order, select the desired kit ordering number.



Series	Manual Override Kit Ordering Number
RL3, R3A	SS-R3A-K5
RL4, R4	SS-R4-K5

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R3A Series Seal and Stem Replacement Instructions



Seal and Stem Replacement Instructions

- Contents:
- 1 quad seal
 - 1 bonded stem
 - 1 O-ring
 - 1 Retainer

Quad Seal and O-Ring Replacement

1. Remove valve from system.
2. Loosen **cap** to relieve spring pressure.
3. Remove **bonnet** from **body**.
4. Remove **stem** and **retainer** from **bonnet**.
5. Remove **quad seal** from **bonnet**.
6. Make sure all parts are clean before reassembly.
7. Install new **quad seal** into **bonnet**. (Lubricate with system compatible lubricant.)
8. Place **retainer** in **bonnet**, then insert **stem** into **bonnet** through **retainer** and **quad seal**.
9. Remove and replace **bonnet O-ring**. (Lubricate with system compatible lubricant.)
10. Thread **bonnet** into **body** and torque to **400 in.-lb. (45 N-m)**.
11. Adjust desired set pressure as described in steps 7 through 10 in the Spring Installation section on reverse side.
12. Install valve in system. Grip valve on wrench pad during installation.



Stem and O-Ring Replacement

1. Remove valve from system.
2. Loosen **cap** to relieve spring pressure.
3. Remove **bonnet** from **body**.
4. Remove **stem** from **bonnet**.
5. Make sure all parts are clean before reassembly.
6. Place new **stem** into **bonnet**.
7. Remove and replace **bonnet O-ring**. (Lubricate with system compatible lubricant.)
8. Thread **bonnet** into **body** and torque to **400 in.-lb. (45 N-m)**.
9. Adjust desired set pressure as described in steps 7 through 10 in the Spring Installation section on reverse side.
10. Install valve in system. Grip valve on wrench pad during installation.

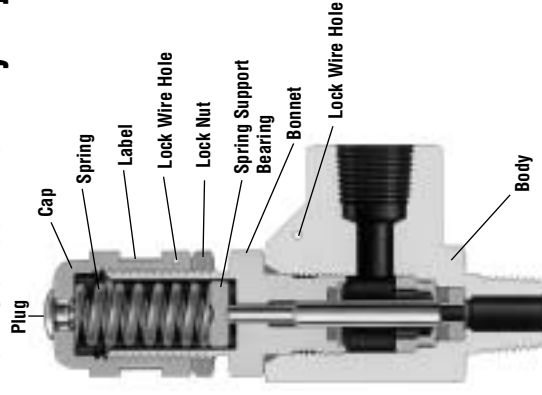


Spring Kit Identification

Spring Kit Ordering Number	Color Code	Nominal Cracking Pressure psig (bar)	Initial Cap Position, number of turns
177-13K-R4-A	Blue	50 to 350 (3.4 to 24.1)	9
177-13K-R4-B	Yellow	350 to 750 (24.1 to 51.7)	8.5
177-13K-R4-C	Purple	750 to 1500 (51.7 to 103)	9
177-R3A-K1-D	Orange	1500 to 2250 (103 to 155)	6
177-R3A-K1-E	Brown	2250 to 3000 (155 to 206)	6
177-R3A-K1-F	White	3000 to 4000 (206 to 275)	6
177-R3A-K1-G	Red	4000 to 5000 (275 to 344)	6
177-R3A-K1-H	Green	5000 to 6000 (344 to 413)	6



R3A Series Externally Adjustable Relief Valve



Spring Installation

! Warning: Relieve system pressure before installing spring.

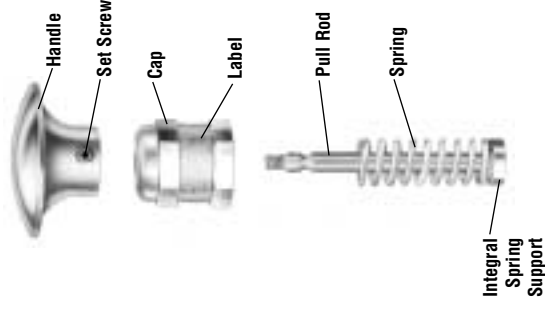
1. Loosen lock nut and remove the cap from bonnet.
2. Remove existing spring if necessary.
3. Make sure all components are clean.
4. Place spring support bearing in valve with bearing side UP.
5. Install proper spring for desired set pressure range.
6. Replace existing label with new label. Check this label against spring identification table for proper set pressure range.
7. Thread cap onto bonnet to initial position indicated in Spring Kit Identification Table. Tighten lock nut against cap and test for set pressure.
8. Relieve system pressure, unthread cap as needed, and retest. Repeat procedure as necessary to obtain desired set pressure.
9. Tighten lock nut against the cap to 100 in.-lb (11 N·m).
10. Lock wire the cap and body together to maintain relief setting.

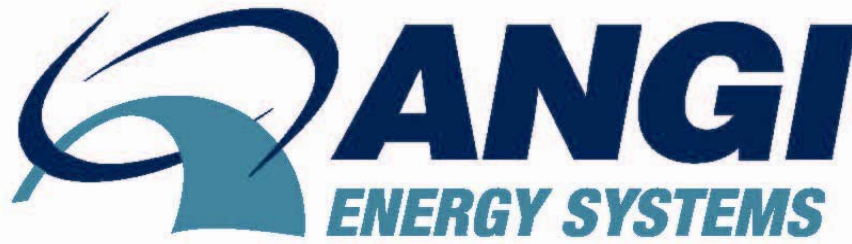
Manual Override Conversion

! Warning: Relieve system pressure before installing manual override handle.

1. Loosen lock nut and remove the cap from bonnet.
2. Remove the plug from the cap.
3. Remove existing spring and spring support.
4. Install pull rod into bonnet.
5. Place blue "A" spring over pull rod, resting it on the integral spring support.
6. Place the cap over pull rod, resting it on bonnet.
7. Thread handle onto pull rod. Tighten set screw on handle to 20 in.-lb. (2.2 N·m) with a 5/64 in. hex wrench.
8. Engage the cap threads with bonnet.

To adjust the set pressure, refer to steps 7 through 10 in the "Spring Installation" section.





SV 9

ASCO
EF8320G184-120/60

1/4" 3-WAY, 120V, 150 PSI SOLENOID VALVE

ANGI PART NUMBER 330-07243

REBUILD KIT- ASCO 3-WAY SOLENOID 120V 150 PSI – 761-07358

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Features

- All NPT connections are in the valve body to allow in-line piping.
- No Minimum Operating Pressure Differential required.
- Sturdy design for long years of reliable service.
- Broadest range of applications.
- Mountable in any position.

Construction

Valve Parts in Contact with Fluids		
Body	Brass	303 Stainless Steel
Seals and Discs	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

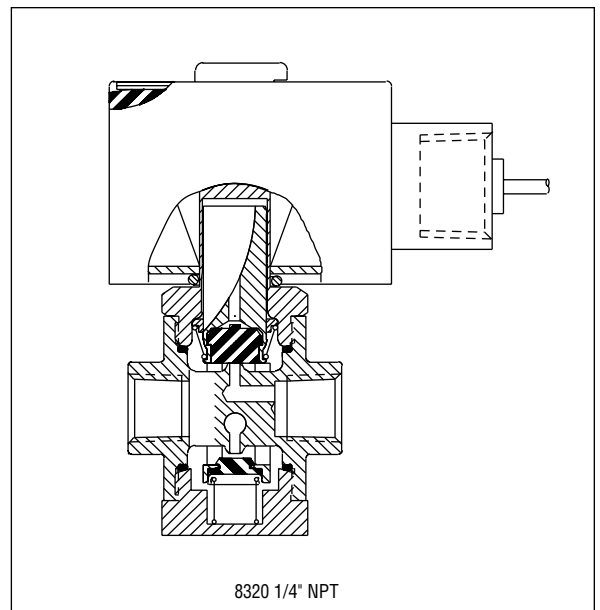
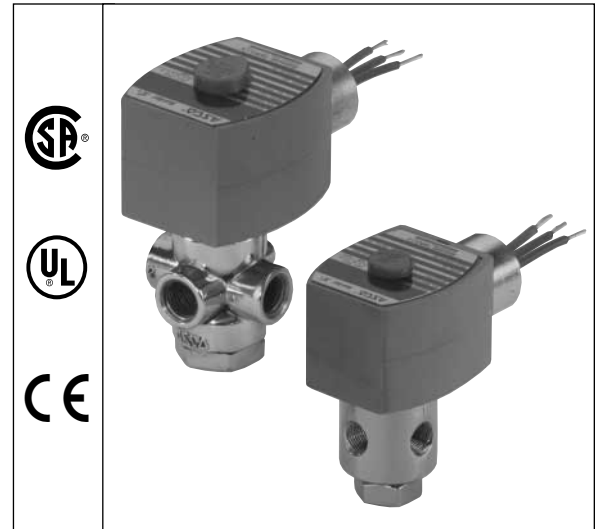
Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part No.			
	DC Watts	AC			General Purpose		Explosionproof	
		Watts	VA Holding	VA Inrush	AC	DC	AC	DC
F	10.6	6.1	16	30	238210	238310	238214	238314
F	-	9.1	25	40	238210	-	238214	-
F	11.6	10.1	25	50	238610	238710	238614	238714
F	-	17.1	40	70	238610	-	238614	-

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 Temperature Ranges:

AC: 32°F to 125°F (0°C to 52°C)

DC: 32°F to 104°F (0°C to 40°C)

Refer to Engineering Section for details.

Approvals:

CSA certified. UL listed General Purpose Valves.

Meets applicable CE directives.

Refer to Engineering Section for details.

Specifications (English units)

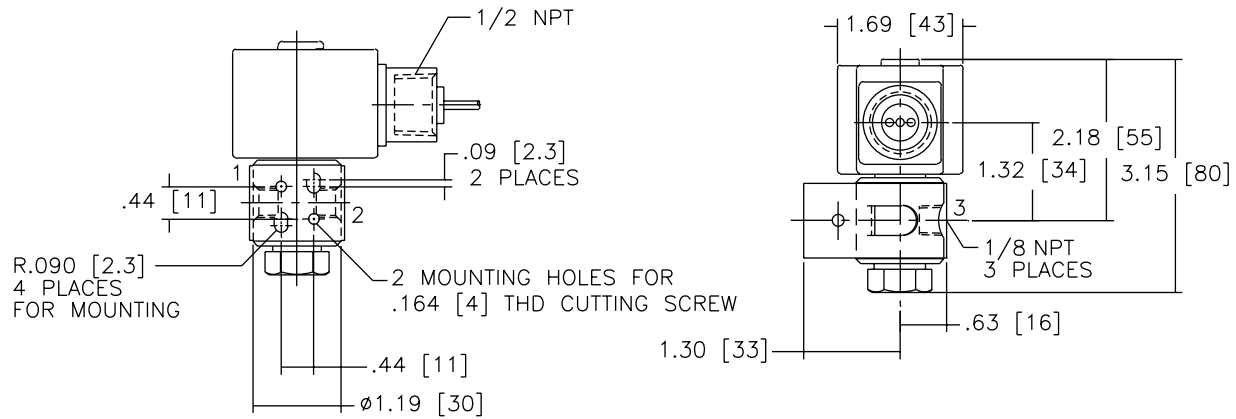
Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Operating Pressure Differential (psi)						Max. Fluid Temp. °F		Brass Body		Stainless Steel Body		Watt Rating/ Class of Coil Insulation ②	
			Max. AC			Max. DC										
			Air-Inert Gas	Water	Lt. Oil @ 300 SSU	Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC	DC	Catalog Number	Constr. Ref. No.	Catalog Number	Constr. Ref. No.	AC	DC
UNIVERSAL OPERATION (Pressure at any port)																
1/8	3/64	.06	175	175	175	125	125	125	140	120	8320G130 ①	1	8320G140 ①	1	9.1/F	10.6/F
1/8	1/16	.09	100	100	100	65	65	65	180	120	8320G1	1	8320G41	1	9.1/F	10.6/F
1/8	3/32	.12	50	50	50	50	50	50	180	120	8320G83	1	8320G87	1	6.1/F	10.6/F
1/8	1/8	.21	30	30	30	20	20	20	180	120	8320G3	1	8320G43	1	9.1/F	10.6/F
1/4	1/16	.09	125	130	130	75	75	75	200	150	8320G172	2	--	--	10.1/F	11.6/F
1/4	3/32	.12	100	100	100	60	60	60	200	150	8320G174	2	8320G200	3	17.1/F	11.6/F
1/4	1/8	.25	50	50	50	25	25	25	200	150	8320G176	2	8320G201	3	17.1/F	11.6/F
1/4	11/64	.35	20	20	20	12	12	12	200	150	8320G178	2	--	--	10.1/F	11.6/F
NORMALLY CLOSED (Closed when de-energized)																
1/8	3/64	.06	200	200	200	200	200	200	180	120	8320G132	1	8320G142	1	6.1/F	10.6/F
1/8	1/16	.09	150	125	125	125	125	125	180	120	8320G13	1	8320G45	1	6.1/F	10.6/F
1/8	3/32	.12	100	100	100	100	100	100	180	120	8320G15	1	8320G47	1	6.1/F	10.6/F
1/8	1/8	.21	40	40	40	40	40	40	180	120	8320G17	1	8320G49	1	6.1/F	10.6/F
1/4	1/16	.09	210	225	225	160	160	160	200	150	8320G182	2	--	--	17.1/F	11.6/F
1/4	3/32	.12	150	150	150	115	115	115	200	150	8320G184	2	8320G202	3	10.1/F	11.6/F
1/4	1/8	.25	85	85	85	60	60	60	200	150	8320G186	2	8320G203	3	10.1/F	11.6/F
1/4	11/64	.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	.06	200	200	200	200	200	200	180	120	8320G136	1	8320G146	1	6.1/F	10.6/F
1/8	1/16	.09	150	125	125	125	125	125	180	120	8320G27	1	8320G51	1	6.1/F	10.6/F
1/8	3/32	.12	100	100	100	100	100	100	180	120	8320G29	1	8320G53	1	6.1/F	10.6/F
1/8	1/8	.21	40	40	40	40	40	40	180	120	8320G31	1	8320G55	1	6.1/F	10.6/F
1/4	1/16	.09	250	250	250	160	160	160	200	150	8320G192	2	--	--	17.1/F	11.6/F
1/4	3/32	.12	150	140	140	100	100	100	200	150	8320G194	2	8320G204	3	10.1/F	11.6/F
1/4	1/8	.25	70	70	70	55	55	55	200	150	8320G196	2	8320G205	3	10.1/F	11.6/F
1/4	11/64	.35	40	40	40	30	30	30	200	150	8320G198	2	--	--	10.1/F	11.6/F
Notes: 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.																

Specifications (Metric units)

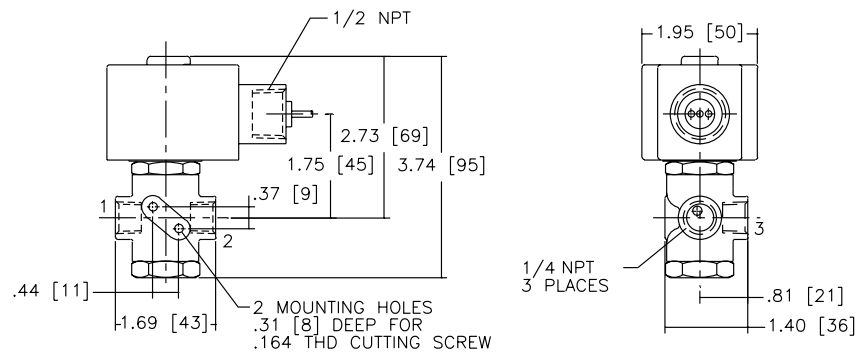
Pipe Size (ins.)	Orifice Size (mm)	Kv Flow Factor (m3/h)	Operating Pressure Differential (bar)						Max. Fluid Temp. °C		Brass Body		Stainless Steel Body		Watt Rating/ Class of Coil Insulation ②	
			Max. AC			Max. DC										
			Air-Inert Gas	Water	Lt. Oil @ 300 SSU	Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC	DC	Catalog Number	Constr. Ref. No.	Catalog Number	Constr. Ref. No.	AC	DC
UNIVERSAL OPERATION (Pressure at any port)																
1/8	1.2	.05	12	12	12	9	9	9	59	48.4	8320G130 ①	1	8320G140 ①	1	9.1/F	10.6/F
1/8	1.6	.08	7	7	7	4	4	4	81	48.4	8320G1	1	8320G41	1	9.1/F	10.6/F
1/8	2.4	.10	3	3	3	3	3	3	81	48.4	8320G83	1	8320G87	1	6.1/F	10.6/F
1/8	3.2	.18	2	2	2	1	1	1	81	48.4	8320G3	1	8320G43	1	9.1/F	10.6/F
1/4	1.6	.08	9	9	9	5	5	5	92	64.9	8320G172	2	--	--	10.1/F	11.6/F
1/4	2.4	.10	7	7	7	4	4	4	92	64.9	8320G174	2	8320G200	3	17.1/F	11.6/F
1/4	3.2	.21	3	3	3	2	2	2	92	64.9	8320G176	2	8320G201	3	17.1/F	11.6/F
1/4	4.4	.30	1	1	1	1	1	1	92	64.9	8320G178	2	--	--	10.1/F	11.6/F
NORMALLY CLOSED (Closed when de-energized)																
1/8	1.2	.05	14	14	14	14	14	14	81	48.4	8320G132	1	8320G142	1	6.1/F	10.6/F
1/8	1.6	.08	10	9	9	9	9	9	81	48.4	8320G13	1	8320G45	1	6.1/F	10.6/F
1/8	2.4	.10	7	7	7	7	7	7	81	48.4	8320G15	1	8320G47	1	6.1/F	10.6/F
1/8	3.2	.18	3	3	3	3	3	3	81	48.4	8320G17	1	8320G49	1	6.1/F	10.6/F
1/4	1.6	.08	14	16	16	11	11	11	92	64.9	8320G182	2	--	--	17.1/F	11.6/F
1/4	2.4	.10	10	10	10	8	8	8	92	64.9	8320G184	2	8320G202	3	10.1/F	11.6/F
1/4	3.2	.21	6	6	6	4	4	4	92	64.9	8320G186	2	8320G203	3	10.1/F	11.6/F
1/4	4.4	.30	3	3	3	2	2	2	92	64.9	8320G188	2	--	--	10.1/F	11.6/F
NORMALLY OPEN (Open when de-energized)																
1/8	1.2	.05	14	14	14	14	14	14	81	48	8320G136	1	8320G146	1	6.1/F	10.6/F
1/8	1.6	.08	10	9	9	9	9	9	81	48	8320G27	1	8320G51	1	6.1/F	10.6/F
1/8	2.4	.01	7	7	7	7	7	7	81	48	8320G29	1	8320G53	1	6.1/F	10.6/F
1/8	3.2	.18	3	3	3	3	3	3	81	48	8320G31	1	8320G55	1	6.1/F	10.6/F
1/4	1.6	.08	17	17	17	11	11	11	92	65	8320G192	2	--	--	17.1/F	11.6/F
1/4	2.4	.10	10	10	10	7	7	7	92	65	8320G194	2	8320G204	3	10.1/F	11.6/F
1/4	3.2	.21	5	5	5	4	4	4	92	65	8320G196	2	8320G205	3	10.1/F	11.6/F
1/4	4.4	.30	3	3	3	2	2	2	92	65	8320G198	2	--	--	10.1/F	11.6/F
Notes: 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.																

Dimensions: inches (mm)

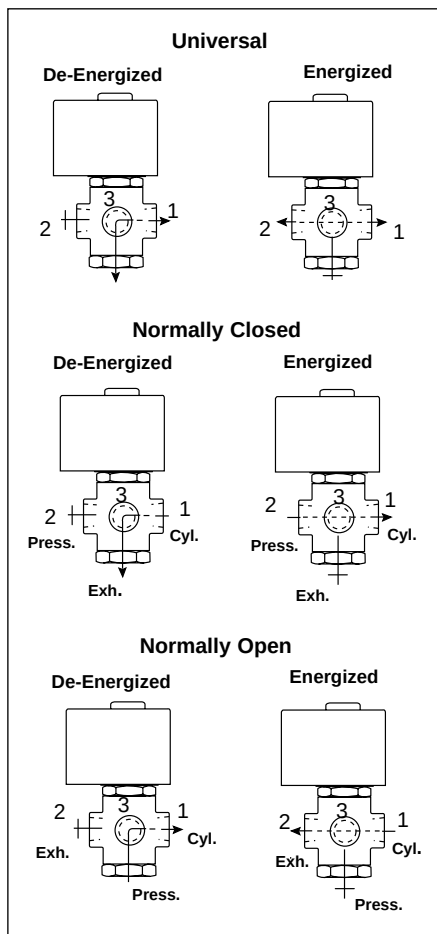
Constr. Ref. 1



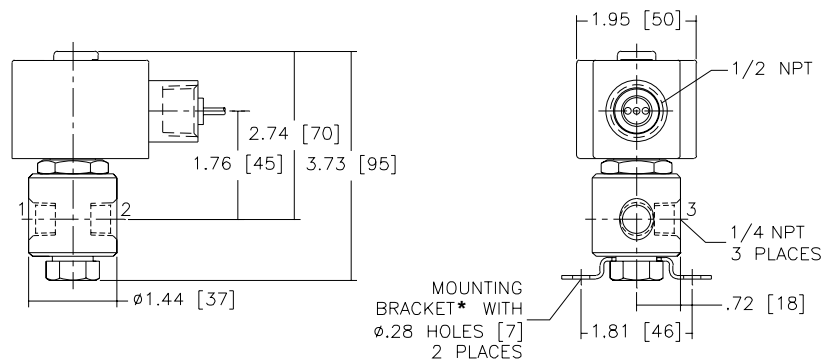
Constr. Ref. 2



FLOW DIAGRAMS



Constr. Ref. 3



*MOUNTING BRACKET IS STANDARD ON THIS CONSTRUCTION

NOTE:
Bulletin 8320 is for General Purpose Solenoid Enclosure
For Explosion Proof Solenoid Enclosure -
See Form No. V5380

Installation & Maintenance Instructions

GENERAL PURPOSE AND EXPLOSIONPROOF SOLENOIDS

SERIES

8003

Form No.V5380R9

IMPORTANT: See separate valve installation and maintenance instructions for information on: Operation, Positioning, Mounting, Cleaning, Preventive Maintenance, Causes of Improper Operation, Disassembly, and Reassembly of basic valve.

DESCRIPTION

Catalog numbers 80031 and 80032 solenoids have a Type 1, General Purpose Solenoid Enclosure. Catalog numbers EF80031, EF80032, 80033, and 80034 solenoids have an explosionproof solenoid enclosure designed to meet Enclosure Type 3—Raintight, Type 7 (C & D) Explosionproof Class I, Division 1, Groups C & D and Type 9 (E, F, & G) — Dust Ignitionproof Class II, Division 1, Groups E, F, & G, and have a temperature range code of TC3. Series 8003 solenoids (when installed as a solenoid and not as part of an ASCO valve), are supplied with a core which has a 0.250–28 UNF–2B tapped hole with 0.38 or 0.63 minimum full thread.

OPERATION

When the solenoid is energized, the core is drawn into the solenoid base sub—assembly.

IMPORTANT: When the solenoid is de—energized, the initial return force for the core, whether developed by spring, pressure, or weight must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force for AC construction is 1 lb, 5 oz, and 5 oz, for DC construction.

INSTALLATION

Check nameplate for correct catalog no., voltage, frequency, wattage, and service.

Enclosure Types 3, 4, 7, and 9

▲ CAUTION: To prevent fire or explosion, do not install solenoid enclosure where ignition temperature of hazardous atmosphere is less than 160° C. On valves used for steam service or when a class “H” solenoid is used, do not install in hazardous atmosphere where ignition temperature is less than 180° C. See nameplate for service. Open circuit before disassembling. Reassemble before operating.

When used in –40° C Ambient Temperature Applications

▲ WARNING: To prevent fire or explosion, use only conduit runs ½” in size with a sealing fitting connected within 5 feet of the solenoid enclosure.

IMPORTANT: To protect a solenoid operator or valve, install a strainer or filter, suitable for the service involved in the inlet side as close to the valve or operator as possible. Clean periodically depending on service conditions. See ASCO Series 8600, 8601 and 8602 for strainers.

Positioning

This solenoid is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub—assembly area.

Wiring

Wiring must comply with local codes and the National Electrical Code. The general purpose solenoid housing has a 7/8” diameter hole to accommodate 1/2” conduit. To facilitate wiring, the general purpose solenoid enclosure may be rotated 360° by removing the retaining cap or clip.

▲ CAUTION: When metal retaining clip disengages, it will spring upward.

Rotate solenoid enclosure to desired position. Then replace retaining cap or clip before operating. On some solenoids, a grounding wire which is green or green with yellow stripes is provided. Use rigid metallic conduit to ground all enclosures not provided with a green grounding wire. For the explosionproof solenoid enclosure, electrical fittings must be approved for use in hazardous locations. The explosionproof solenoid enclosure has a 1/2” conduit connection and may be rotated 360° to facilitate wiring.

▲ WARNING: To prevent the possibility of death, serious injury or property damage, from accidental disengagement of solenoid from valve body, hold housing securely by wrenching flats while removing or replacing housing cover.

To rotate enclosure, loosen housing cover using a 1” socket wrench. Two wrenching flats are provided on the housing to hold it securely in place while the cover is being loosened or tightened. Rotate housing to desired position and replace cover before operating. Torque housing cover to 135 ± 15 in—lbs [15,3 ± 1,7 Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid including the core and solenoid base sub—assembly, not just the coil. Consult ASCO.

Solenoid Enclosure Assembly

Catalog 80031 and 80032 solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid enclosure.

Catalog EF80031, EF80032, 80033, and 80034 solenoids may be assembled as a complete unit. Tightening is accomplished by means of two milled slots (wrenching flats) above the threaded area of the solenoid base sub—assembly. Use special ASCO wrench supplied (order No. K168146–1). An alternate type wrench adapter is also available which tightens the assembly by means of four (4) pin holes in the solenoid base sub—assembly. If this alternate wrench is used the solenoid must be completely disassembled, see *Coil Replacement* section.

Solenoid Temperature

Standard solenoids are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched by hand only for an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize solenoid operator or valve, and vent fluid to a safe area before servicing.

Cleaning

All solenoid operators and valves should be cleaned periodically. The time between cleaning will vary depending on medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise, or leakage will indicate that cleaning is required. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the solenoid operator or valve as free from dirt and foreign material as possible.
- While in service, the solenoid operator or valve should be operated at least once a month to ensure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* indicates loss of power supply. Check for loose or blown fuses, open—circuited or grounded coil, broken lead wires or splice connections.
- **Burned—Out Coil:** Check for open—circuited coil. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate and as marked on the coil.
- **Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of nameplate rating.

Coil Replacement

Solenoid Catalog Numbers 80031 and 80032

General Purpose Enclosure (Refer to Figure 1 below)

1. Disconnect coil lead wires and grounding wire if present.
2. Remove retaining cap or clip, nameplate (if present), and housing or housing with nameplate (alternate construction).

CAUTION: When metal retaining clip disengages, it will spring upward.

3. Slip spring washer, insulating washer, and coil off the solenoid base sub—assembly. Insulating washers are omitted when a molded coil is used.
4. Coil is now accessible for replacement
5. Torque housing cover to 135 ± 15 in—lbs [$15,3 \pm 1,7$ Nm].

Catalog Numbers EF80031, EF80032, 80033 and 80034

Explosionproof Solenoid Enclosure

NOTE: This solenoid has two constructions, refer to Figure 2 on page 3 for the first construction and Figure 3 on page 4 for the alternate construction.

1. Disconnect coil lead wires and grounding wire if present.

WARNING: To prevent the possibility of death, serious injury or property damage from accidental disengagement of solenoid from valve body, hold housing securely by wrenching flats while removing or replacing housing cover.

2. Unscrew housing cover using 1" socket wrench. Two wrenching flats are provided to hold the housing securely in place while the cover is being removed or replaced.
3. Remove take—up spring, flux washer, insulating washer, coil and insulating washer. For the alternate construction, slide retaining cup sideways to disengage it from the top of the solenoid base sub—assembly. Then remove yoke, spring washer, insulating washer, coil and insulating washer. Insulating washers are omitted when a molded coil is used.
4. Reassemble solenoid according to exploded view. Before reassembly, refer to NOTE following for cleaning and greasing requirements.
5. Torque housing cover to 135 ± 15 in—lbs [$15,3 \pm 1,7$ Nm].

CAUTION: Solenoid must be fully reassembled because the housing and internal parts complete the magnetic circuit. Be sure to replace an insulating washer at each end of non—molded coil.

NOTE: Solenoid Catalog Nos. EF80031, EF80032, 80033, and 80034, —Installation and maintenance of explosionproof equipment requires more than ordinary care to ensure safe performance. All finished surfaces of the solenoid are constructed to provide flame—proof seal. Be sure that the surfaces are wiped clean before reassembling. Grease the explosionproof solenoid enclosure with DOW CORNING® 111 Compound lubricant or an equivalent high—grade silicone grease. Grease all joints thoroughly including the underside of the solenoid base sub—assembly flange and internal threads of the housing cover.

Part Name	Torque Value in Inch—Pounds	Torque Value in Newton—Meters
Solenoid Base Sub—Assembly	175 ± 25	$19,8 \pm 2,8$

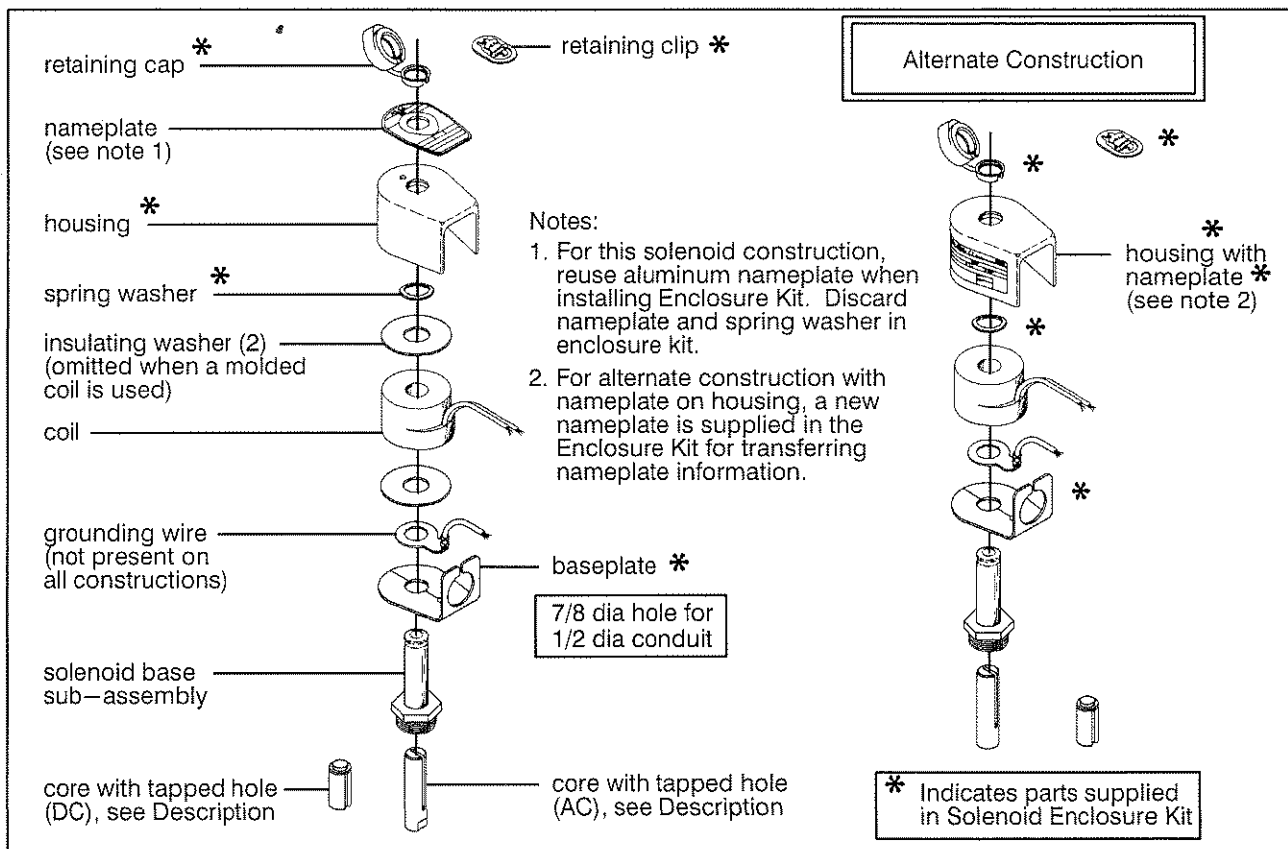


Figure 1, Catalog Nos. 80031 and 80032 General Purpose Solenoid Enclosure.

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
Solenoid Base Sub-Assembly	175 ± 25	19,8 ± 2,8
Housing Cover	135 ± 15	15,3 ± 1,7

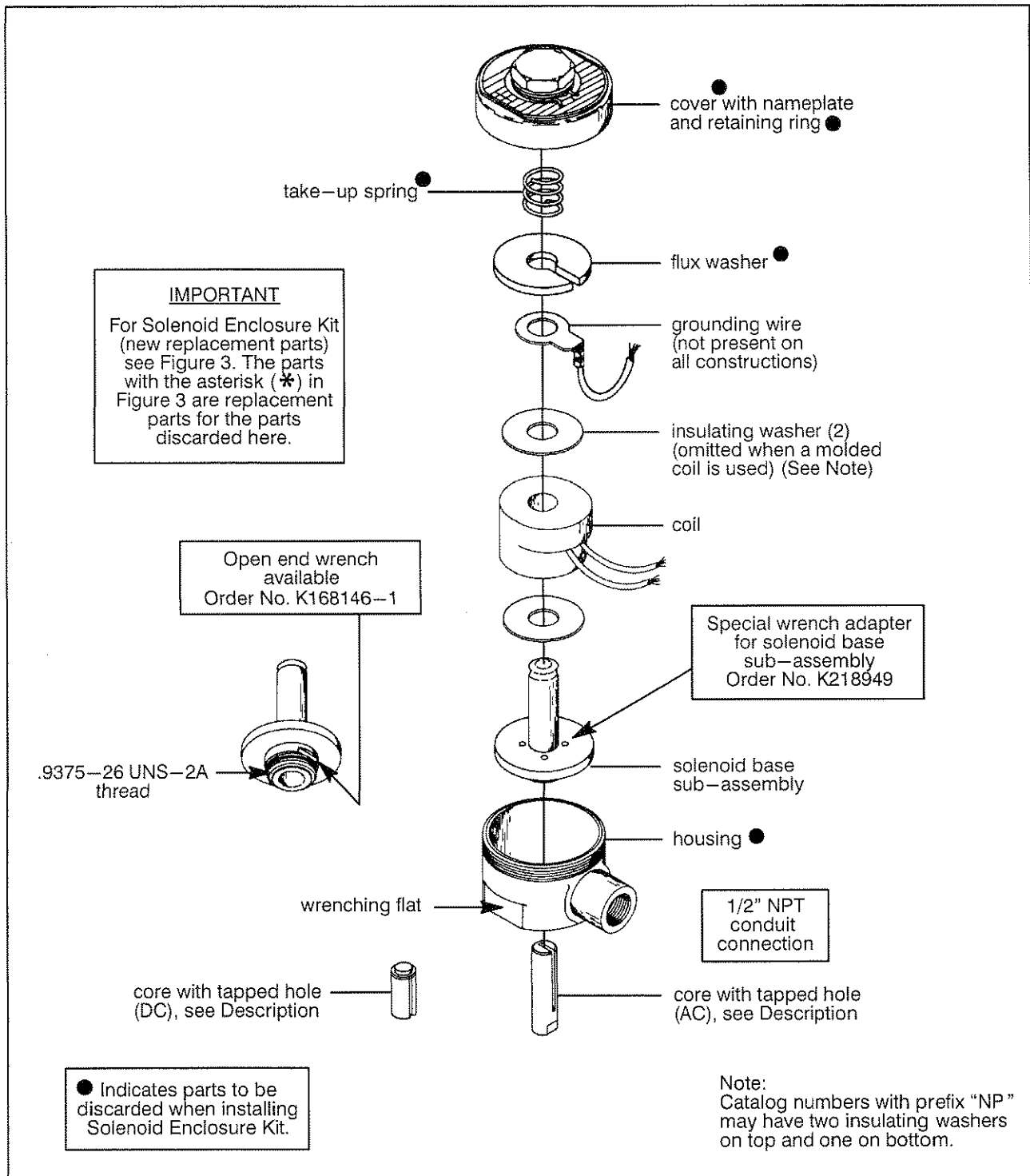


Figure 2. Catalog Nos. EF80031, EF80032 80033 and 80034 Explosionproof Solenoid Enclosure.

Torque Chart

Part Name	Torque Value in Inch—Pounds	Torque Value in Newton—Meters
Solenoid Base Sub—Assembly	175 ± 25	19,8 ± 2,8
Housing Cover	135 ± 15	15,3 ± 1,7

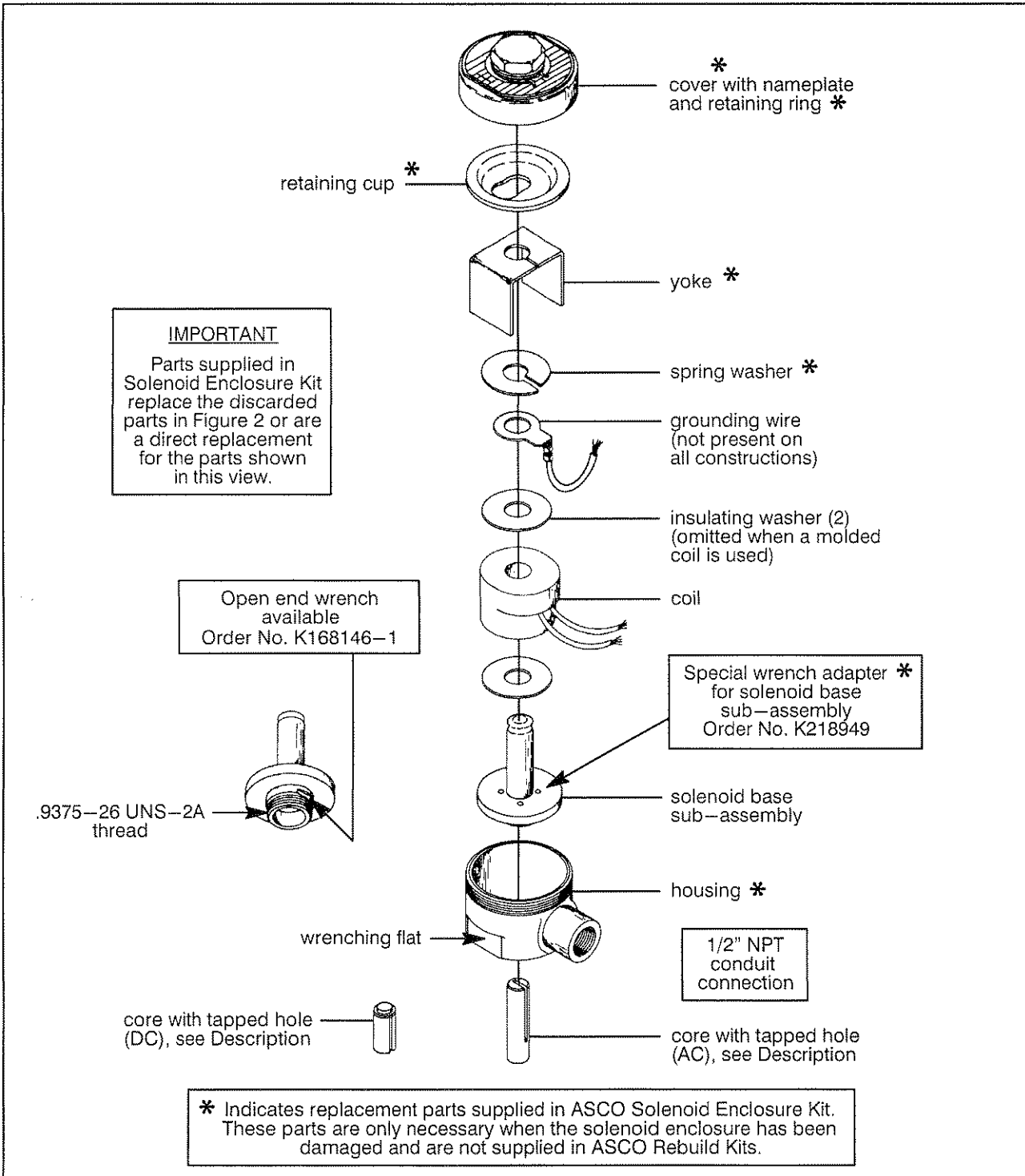


Figure 3. Catalog Nos. EF80031, EF80032, 80033 and 80034 Alternate Construction Explosionproof Solenoid Enclosure.

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HOSE

SYNFLEX
3770-2NG36

HOSE- $\frac{1}{4}$ " x $\frac{1}{4}$ " SYNFLEX BONDED 5000 PSI

ANGI PART NUMBER 137-05016

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HOSE

SYNFLEX / SAINT GOBAIN

3770-2XXX-008

HOSE – $\frac{3}{8}$ " x $\frac{1}{4}$ " BONDED 5000 PSI

ANGI PART NUMBER 137-05469

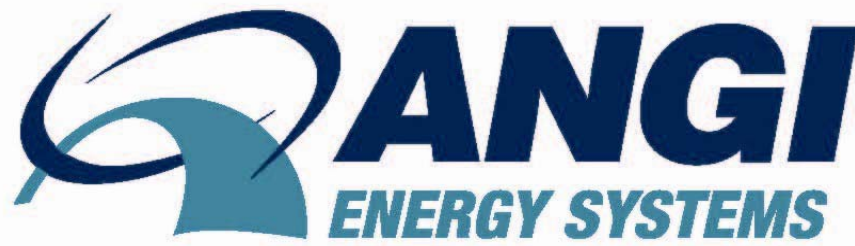


HOSE

SYNFLEX / SAINT GOBAIN
3770-25N5X-002
HOSE – 3/8"x3/8" BONDED, 5000 PSI

ANGI PART NUMBER 137-07230

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HOSE

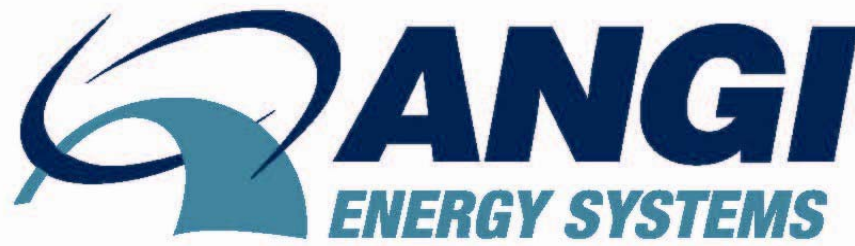
EATON

3770-25 NX6-001

HOSE-1/2 x 1/4 SYNIFLEX 5000#

ANGI PART NUMBER 137-07236

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HOSE

SYNFLEX
35NG-08003
HOSE-1/2 SYNFLEX CNG

ANGI PART NUMBER 137-06688

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Title: PRODUCT STANDARD
35NG COMPRESSED NATURAL GAS HOSE**Product: 35NG**
Revision: 5/21/01
Page No.: 1 of 13**PRODUCT STANDARD****35NG****COMPRESSED****NATURAL GAS HOSE**

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

Title: **PRODUCT STANDARD**
35NG COMPRESSED NATURAL GAS HOSE

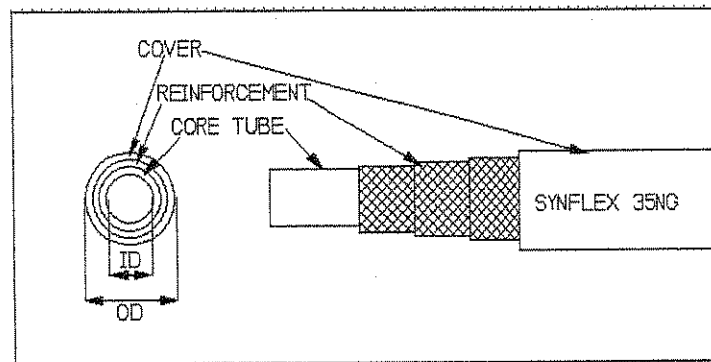
Product: **35NG**
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1.0 SCOPE

This standard covers Synflex thermoplastic compressed natural gas hose for use in compressed natural gas systems within a temperature range of -40°F to 150°F (-40°C to 66°C). Operating temperatures or pressures in excess of those recommended in this standard may materially reduce the life of the hose. The fluids which may be carried in the hose are those which are compatible with nylon. To dissipate static electricity which may be generated from the high velocity flow of gas, the hose must be connected and properly grounded. When used in vehicular fueling applications, electrical continuity must be maintained from the outlet vehicle connection port back through the shutoff valve to the hose end fitting. If electrical continuity through these components can not be demonstrated, the vehicle must be grounded via alternate means. Under no circumstances should the equipment remain in service if static sparks are observed.

2.0 CONSTRUCTION

- Tube:** The tube is a smooth, seamless dual wall tube. The inside layer of the tube is nylon and the outside layer is a semiconductive polymer.
- Reinforcement:** The reinforcement is a synthetic fiber applied to the core tube in two or three braided layers. The first layer of fiber is bonded to the core tube.
- Cover:** The hose cover is a perforated, seamless, polyether based polyurethane that is bonded to the reinforcement. The standard color is black, however other colors are available upon special request.



Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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3.0 PRODUCT IDENTIFICATION

The product is identified by marking that appears longitudinally on the cover of the product. The standard ink color is white. The text of the standard marking is shown in the following example; however private marking of the product is available upon special request.

SYNFLEX® 35NG-04 NGV HOSE 1/4" I.D. MAX PRESS 5000 PSI, MEETS "A.G.A. 1-93" FGA (m/yr) SAINT-GOBAIN

In addition to the marking text the product is lot numbered for manufacturing traceability.

4.0 DIMENSIONS AND PRESSURES

TABLE 1

Nom. I.D.	Hose Dash Size	Hose Dim. ID Nom.	Hose Dim. OD Max.	Min. Bend Radius	Max. Oper. Press	Min. Burst Press	Weight Per 100 Ft. (LB)
3/16	-03	.203	.510	1.50	5000	20,000	7.9
1/4	-04	.253	.630	2.00	5000	20,000	11.6
3/8	-06	.381	.766	4.00	5000	20,000	15.2
1/2	-08	.505	.885	5.50	5000	20,000	21.2

5.0 QUALIFICATION TESTS

To meet the qualification requirements for this hose standard, the hose and/or hose assemblies made using this hose and all applicable couplings shall conform to the following tests and requirements.

5.1 Dimensional Test and Visual Examination:

All hose shall conform to the dimensions detailed in Table 1 of this standard and all hose shall be visually examined per the latest issue of SAE J343.

5.2 Proof Test:

The hose or hose assembly shall show no indication of failure or leakage when pressurized to two times the working pressure listed in Table 1. This test shall be performed in accordance to the most current issue of SAE J343.

5.3 Change in Length Test:

The change in length shall not exceed +/- 2% when tested per the latest issue of SAE J343.

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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5.4 **Burst Test:**

The hose shall not leak or fail at a pressure less than four times the working pressure listed in Table 1. This test shall be conducted in accordance to the latest issue of SAE J343.

5.5 **Leakage Test:**

The hose or hose assembly shall show no signs of leakage or failure when pressurized to 2.8 times the working pressure listed in Table 1. This test shall be conducted in accordance to the latest issue of SAE J343.

5.6 **Cold Flex Test:**

The hose shall show no indication of cover cracks or leakage when tested at -40°F (-40°C) in accordance with the latest issue of SAE J343.

5.7 **Oil Resistance Test:**

A sample of hose tube and cover material shall be tested according to the latest issue of SAE J343. The change in volume of the test specimen shall be between -15% and +35% after 70 hours immersion at 212°F (100°C).

5.8 **Ozone Resistance Test:**

A sample of hose tube and cover material shall be tested according to the latest issue of SAE J343. After exposure to an air/ozone mixture for 70 hours with ozone at a partial pressure of 50 mPa there shall be no evidence of cracking or deterioration when viewed with a seven-power magnification while still in the stressed position.

5.9 **Impulse Test:**

Hose assemblies, when tested at 133% of working pressure, with 150°F (66°C) circulating Texaco Regal R&O 46 test fluid, shall withstand a minimum of 200,000 impulse cycles per SAE J343 Test Procedure without leakage or failure and shall not exceed the specified maximum assembly resistance shown in Table 6.

5.10 **Resistance Check:**

At 100 to 500 volts DC (sufficient voltage to eliminate the contact resistance) the resistance of all unused hose assemblies shall not exceed the resistance specified in Table 6.

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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6.0 INSPECTION TESTS

The following tests are to be performed on samples representing each production lot of hose. A production lot is defined as one shifts' production (8-12 hrs). Requirements shall be the same as the corresponding qualification tests:

1. Dimensional Test and Visual Examination per SAE J343.
2. Proof Test per SAE J343.
3. Change in Length Test per SAE J343.
4. Burst Test per SAE J343.

7.0 VOLUMETRIC EXPANSION

The volumetric expansion of Synflex 35NG series hose is shown in Chart 1. The curves are based on limited testing of each hose size according to the latest issue of SAE J343.

VOLUMETRIC EXPANSION OF SYNPLEX 35NG

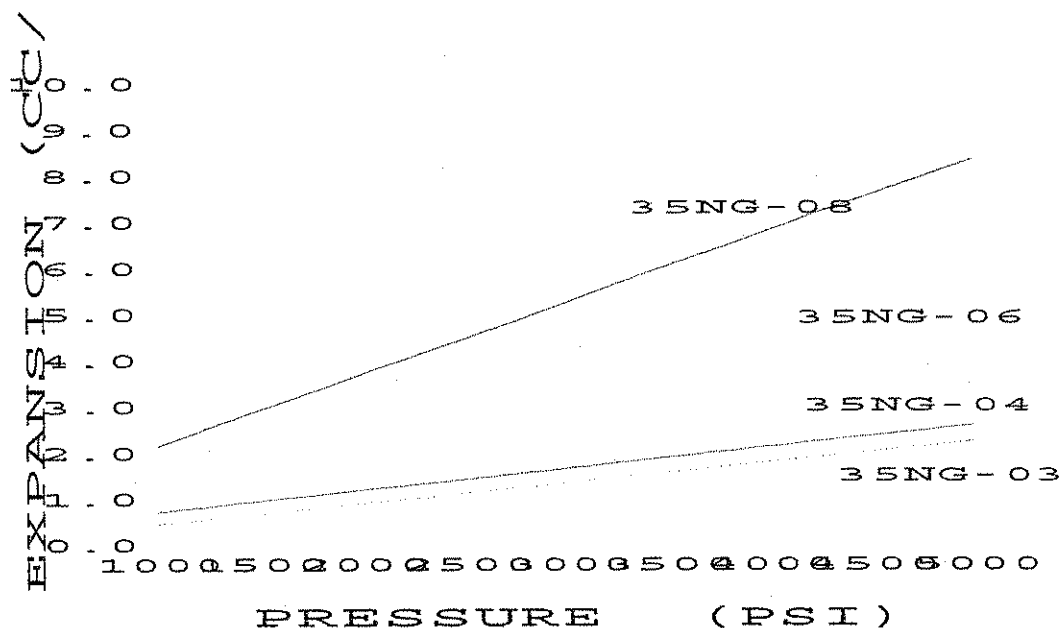


CHART 1

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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8.0 HOSE ASSEMBLY INFORMATION

Synflex 35NG series Hose assemblies **MUST** be made with only approved Synflex couplings and assembly equipment as listed in Tables 2 and 4.

8.1 Swaged Couplings:

TABLE 2 - Swaged Couplings

Nom. I.D.	Coupling Part Number ¹	Die Part Number ²	Insert Depth	Swage Dia.	Bell Length	Thru Hole Min.
3/16	390H-03XXX	4540-H0300	0.75	.532	.688	.080
1/4	390H-04XXX	4540-H0400	# 1.09	.679	.750	.120
3/8	390H-06XXX	4540-HP600	1.20	.766	.966	.240
1/2	390H-08XXX	4540-H0800	1.50	.905	.750	.330

1. The last three digits of the coupling part number describe the end style of the coupling and are found in the Synflex Sales Catalog. The 390H style coupling is a plated steel coupling, other materials are available and are listed in the Synflex Sales Catalog. For special coupling materials and configurations not listed in the catalog contact Synflex Engineering.
2. Refer to the Synflex Sales Catalog for the pusher that corresponds to the particular style of end connection.

8.1.1 Coupling Caution

MALE PIPE SWIVEL COUPLINGS ARE NOT RECOMMENDED for use in 35NG Compressed natural gas hose assemblies.

8.2 Required Assembly Components:

Table 4 - Swaged Couplings

Nom. I.D.	Conductive Media Part Number	Spring Guard Part Number	Spring Guard Retainer	Warning Tag Part Number
3/16	45J0-04208	4521-AF005	NOT USED	0112-23071
1/4	45J0-04209	4521-92005	NOT USED	0112-23089
3/8	45J0-04211	4521-AA005	45J0-00407	0112-23093
1/2	45J0-04215	4521-AB007	45J0-00408	0112-23097

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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8.3 Hose Assembly Procedure:

All hose assemblies are to be made according to the instructions described below.

- Step No 1 Measure and cut hose to required lengths, **never exceed 500 feet (150 meters) overall length.** An oil free, clean square cut is essential. Install the warning tag, (See Table No. 4) for 35NG.
- Step No 2 Place spring guards on **BOTH** ends of the hose. Install the end with the most closed coils towards the hose end. (Note: For 35NG-06 and 08, also place spring guard retainer shown in Table 5 over the ends of the spring guards with the smallest I.D. of the retainer toward the hose end). Mark the hose ends with the proper insertion depth. (See Table 2.)
- Step No 3 Slip the conductive media over the coupling insert, then assemble hose and coupling pushing the hose into the proper insertion depth.
- Step No 4 Swage the coupling on the hose using the specified die and pusher. First making sure that the hose is pushed securely into the coupling to the correct insertion depth to ensure proper contact. Check swage diameter and bell length. (See Table 2)

TABLE 5

Nom. I.D.	Spring Guard P/N	Spring Guard Retainer P/N	Retainer Crimp Dia. Per Section 8.4	Retainer Crimp Dia. With Commercial 8 Segment Crimper
3/16	4521-AF005	NOT USED		
1/4	4521-92005	NOT USED		
3/8	4521-AA005	45J0-00407	.990 +/- .005	
1/2	4521-AB007	45J0-00408	1.165 +/- .005	1.155 +/- .005*

* To crimp retainer smaller than 1.150" may damage hose in coupling

- Step No 5 Twist the spring guard on the couplings up to the bell. For 35NG-06 and -08 sizes, a crimped collar is required to secure the spring guard to the coupling. For either the -06 or -08 guard retainers, any standard eight (8) segment coupling crimp machine may be used to crimp the guard and retainer assembly to the diameters shown in Table 5. Or, See Section 8.4 for crimp tooling and procedure using any Synflex power swager. Drawing 2 shows correct positioning of spring guard and retainer prior to crimp.

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
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Step No 6 Check assembly electrical resistance as described in Qualification Test 5.10 and compare to the maximum allowable value calculated from Table 6. Example: the maximum resistance for a new 3/8 x 200 ft. assembly would be $2 \times 3.5 = 7.0$ Megohms. Never exceed 500 feet (150 meters) overall length. (See Table 6)

TABLE 6

Nom. I.D.	Max. Resistance Megohm/100'	Max. Resistance For New Assemblies 15 Ft. Long or Less (Megohms)
3/16	6	0.90
1/4	4	0.60
3/8	3.5	0.52
1/2	1.5	0.23

8.4 Spring Guard Retainer Crimping Procedure using SYNIFLEX Swager:

<u>Tooling</u>	<u>-06 Size</u>	<u>-08 Size</u>
Die Base	45JO-02012	45JO-02012
Pusher Plate	45JO-02022	45JO-02023
Crimp Fingers	45JO-02015 (T400-64)	45JO-02016 (T400-5)
Pusher Swager	4599-MP016 Any Syniflex Power Swager	4599-MP016

- Step No 1 When using Syniflex Mark IX 4540-009SX or Super V 4540-005S3 swagers, remove die holder brackets to avoid interference with die base. (See drawing no. 1)
- Step No 2 Lightly oil inside of die base 45JO-02012 using any good grade of lube oil.
- Step No 3 Place correct crimp fingers for the 06 or 08 size assembly in die base 45JO-02012, then place die base in swager die bowl.
- Step No 4 Place correct pusher plate for the 06 or 08 size assembly over crimp fingers in die base.
- Step No 5 Install 4599-MP016 pusher in swager.
- Step No 6 Positioning the spring guard retainer on the coupling as shown in Drawing 2, page 12, insert the assembly into the crimp fingers from the bottom, continue until coupling reaches the maximum depth within the pusher plate.

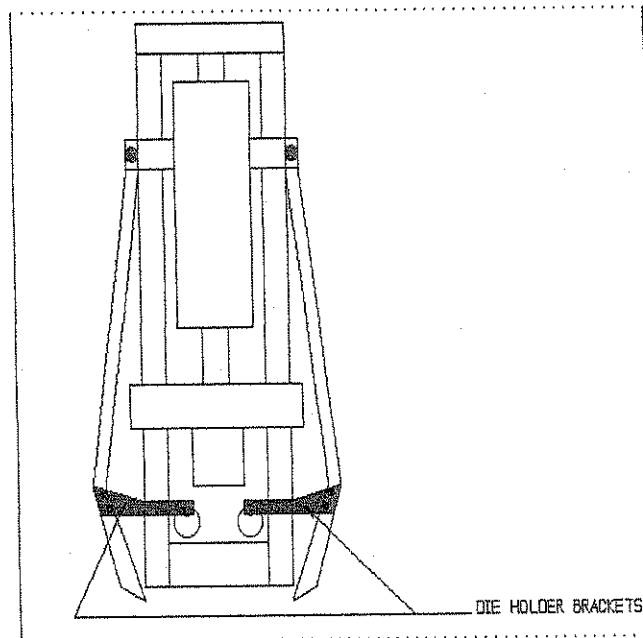
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(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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- Step No 7 When coupling makes contact with the pusher plate, activate swager to bottom pusher plate against die base.
- Step No 8 Reverse swager and remove hose/spring guard assembly.
- Step No 9 Verify that the retainer is crimped to proper dimensions given in Table 5. See Drawing No.2, page 12.

DRAWING 1 - SWAGER



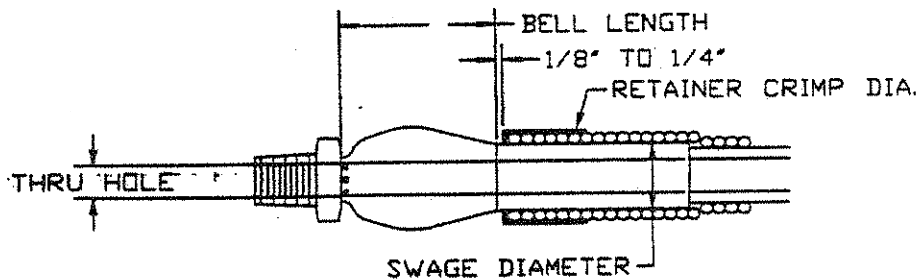
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(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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DRAWING 2 - SWAGED COUPLING CROSS SECTION
WITH SPRING GUARD & RETAINER RING

DRAWING 2- SWAGED
COUPLING CROSS SECTION



Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

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8.5 Inspection of Hose Assembly Before Use:

WARNING

SAFETY PRECAUTIONS FOR
SYNFLEX HOSE ASSEMBLIES

YOUR PERSONAL SAFETY MAY DIRECTLY OR INDIRECTLY BE AFFECTED IF THE HOSE ASSEMBLY HAS BEEN ABUSED.

The following **WARNINGS** pertain to the more common abuses of this hose and hose assemblies.

1. **INSPECT** the hose assembly before each use.
2. **REPLACE** the hose assembly immediately if:
 - A. The jacket of the hose appears abnormal.
 - B. You have reason to believe it maybe abnormal.
 - C. There is any fluid leakage.
 - D. The couplings are damaged.
 - E. The hose is damaged.
 - F. The reinforcement is visible through the jacket.
 - G. Gas leakage is detected using leak check solution.
3. **DO NOT EXCEED** the maximum recommended working pressure of the hose.
4. **DO NOT KINK** the hose assembly.
5. **DO NOT BEND** the hose assembly beyond its minimum recommended bend radius.
6. **DO NOT EXPOSE** to temperatures in excess of the maximum temperature rating of the hose or the fluid being conveyed.
7. **DO NOT USE AS A STRENGTH MEMBER** for pulling or lifting equipment.
8. **DO NOT EXPOSE HOSE TO FLUIDS** other than those outlined in the Synflex Chemical Resistance Chart or specifically approved by Synflex Engineering.
9. Use **ONLY Synflex COUPLINGS**.
10. Use **ONLY ASSEMBLY EQUIPMENT** and procedures approved by Synflex.

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)

Title: **PRODUCT STANDARD**
35NG COMPRESSED NATURAL GAS HOSE

Product: **35NG**
Revision: 5/21/01
Page No.: 12 of 13

8.6 **Maintenance Instructions:**

BEFORE INITIAL USE, AND ON AT LEAST A MONTHLY INTERVAL THEREAFTER, TEST AND EXAMINE THE HOSE ASSEMBLY:

1. **LEAKAGE** - Pressurize hose assembly to working pressure and check for leaks with leak check solution. **CAUTION:** Matches, candles, open flame or other sources of ignition shall not be used for this purpose. Leak check solution should be rinsed off after use.
2. **ELECTRICAL CONDUCTIVITY** - Test hose assembly using a megohmmeter at a test voltage of between 100 and 400 vdc. Connect the meter leads to the hose coupling. Overall resistance shall not exceed 5 megohms.
3. **VISUAL INSPECTION** - Examine hose assembly for soft spots, bulges, blisters, cuts, cracks, or abrasions which could expose the hose reinforcement. Examine couplings for any evidence of movement or slippage relative to the hose.
4. **REPLACEMENT** - Hose assembly replacement should be considered based on having a finite service life. If leakage, loss of conductivity, coupling separation and/or any signs of damage are detected, this hose assembly must be replaced immediately.

IGNORING THIS WARNING CAN RESULT IN DEATH OR SERIOUS INJURY

9.0 **REFERENCED TEST PROCEDURES**

This standard uses the following Test Procedures and Standards in whole or in part for evaluation of the product.

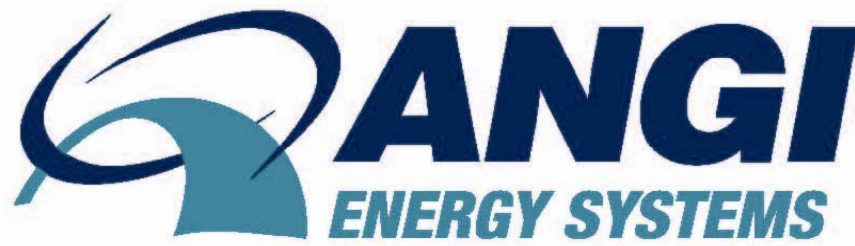
SAE J517 Hydraulic Hose

SAE J343 Tests and Procedures for 100R Series Hydraulic Hose and Hose Assemblies.

ASTM D-380 Standard Methods of Testing Rubber Hose.

ASTM D-622 Standard Methods of Testing Rubber Hose for Automotive Air and Vacuum Brake System

Changes: (C90-6786;9/18/90)(C91-9344;9/30/91)(C91-9445;1/3/92)(C92-9671;4/4/92)(C92-9925;11/3/92)(C93-0599;10/25/93)
(N93-0656;11/18/93)(C94-0824;2/21/94)(7/18/94)(C95-1390;2/15/95)(C95-1693;7/19/95)(C96-3338;04/30/96)(C96-3847;10/18/96)
(C97-4178;4/9/97)(C97-4540;8/1/97)(C00-6851;1/24/00)(C00-7235;9/18/00)(C00-7258;10/2/00)(C01-7561;5/21/01)



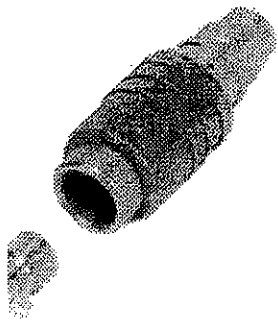
NOZZLE

STAUBLI
CMV08.1201/36
NOZZLE-3600 PSI NGV1 TYPE 2

ANGI PART NUMBER 700-06460

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NGV 1 TYPE 2-3 Nozzles



Double alignment guiding system

Great for fleets

Keying system

Automatic one-hand operation

Ball locking

Available from stock in 2
different service pressures

Color coded sleeve

Insulating coated

Check valve

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

Storage requirement to protect the
nozzle for water and dirt



NGV1 type 2-3 Nozzle	
Internal diameter	5/16" (7.5 mm)
Flow area	0.068 sq. in. (44 sq.mm)
Service pressures	3000 psi (205 bar) 3600 psi (250 bar)
Material	Stainless steel
Flow rate air (test value)	3000 scfm (5000 Nm3/h)
natural gas (calculated value)	3900 scfm (6500 Nm3/h)
Service temperature	-40° to 185 °F (-40°C to 85 °C)
Applications	• Designed for time fill (or fast fill), public or private use • Specially recommended for fleet applications (refueling of heavy or light duty vehicles) • High flow capability

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CMV 08

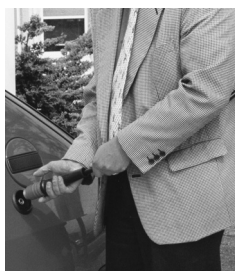
R V 110 01 00 E

Instructions d'assemblage et d'utilisation
Instructions for assembly and use
Bedienungs- und Montageanleitung

Raccords rapides CMV 08 pour véhicules au gaz naturel

NGV 1 refuelling CMV 08 nozzles for natural gas vehicles

Befüllkupplungen CMV 08 nozzles für erdgasbetriebene Fahrzeuge



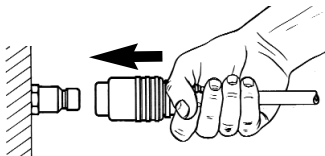
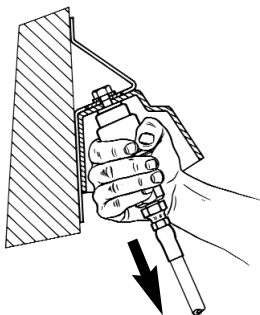
IMPORTANT ! Cette notice doit être conservée par l'utilisateur.
IMPORTANT ! This notice must be kept available by the user.
WICHTIG ! Diese Bedienungs- und Wartungsanweisung muss vom Benutzer sorgfältig aufbewahrt werden.

STÄUBLI

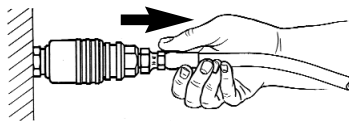
Instructions of use

Refuelling

- 1/ Remove the nozzle from the storage rack by pulling on the colored sleeve.
- 2/ Push the nozzle onto the receptacle as far as you can.
- 3/ Check the correct locking of nozzle by pulling the hose.

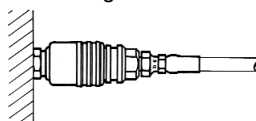


Hear the final
"clik".



- 4/ Operate the refuelling system.

- 5/ Refuelling.

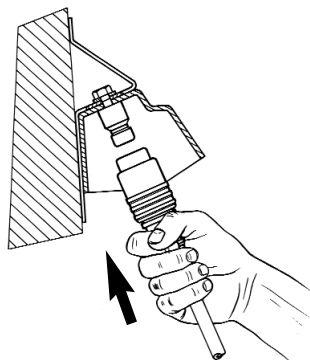
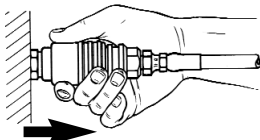


After refuelling is completed

- 1/ Pull the colored sleeve to disconnect.
- 2/ To store the nozzle simply connect it to the storage rack.

CAUTION!

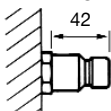
Maximum disconnecting
pressure: 10 bar (145 PSI).



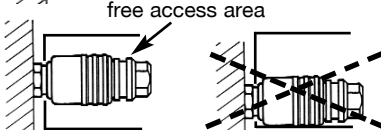
Operating and use instructions

To ensure easy operation of the nozzle locking sleeve:

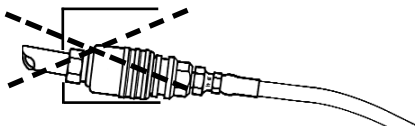
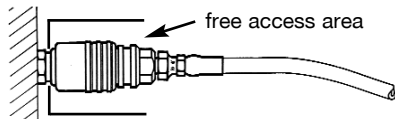
- Free access to the receptacle locking zone is essential.



- The area around the nozzle must be clear of all parts other than the receptacle itself.



- Make certain that any radial movements (caused by the hose for example) do not cause the nozzle to come into contact with other parts than the receptacle itself.



Fittings

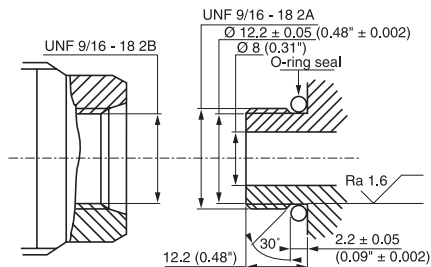
■ Right or left hand 9/16-18 UN female thread

Assembly instruction

Attach the hose to the UN 9/16-18 female thread of the nozzle. Use a thread locking compound.

Tightness

For best performance, we recommend the use of a low temperature Nitrile O-ring (- 40 °C / - 40 °F)
 $\varnothing 1.98 \times \varnothing 11.89 \text{ mm}$ ($\varnothing 0.078" \times \varnothing 0.468"$).



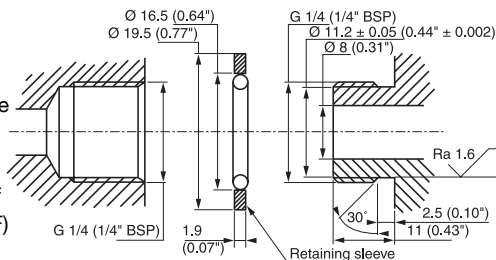
■ G 1/4 female thread

Assembly instruction

Attach the hose to the G 1/4 female thread of the nozzle. Use a thread locking compound.

Tightness

For best performance we recommend the use of a low temperature Nitrile O-ring (- 40 °C / - 40 °F)
 $\varnothing 2.62 \times \varnothing 10.77 \text{ mm}$ ($\varnothing 0.103" \times \varnothing 0.424"$).



Checking for leakage of connections

By means of leak detector fluid.

- Pressurize the device being leak checked.
- Apply fluid to all gas connections.
- Look for bubbles.

(Conform to the instructions of the leak detector fluid manufacturer for the interpretation of test results).

Gas used: nitrogen or natural gas, in exclusion of all other fluids.

Detected leakage rate: $10^{-3} \text{ Ncm}^3/\text{s}$.

Test pressure:

- low pressure: 43.5 PSI / 3 bar.
- high pressure: 3000 PSI / 207 bar or 3600 PSI / 250 bar.

Take all necessary precautions for high pressure testing.

Recommendations for proper operation and use

1/ CAUTION!

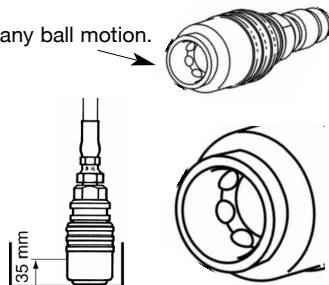
When installed, couplings must be correctly protected from dirt and moisture.

- 2/ These products are intended for use with NGV 1 compatible nozzles and receptacles.

Maintenance

- Frequency: every 3 months or when the level of dirt don't allow any ball motion.

- Dip the front part of the coupling into kerosine during 15 mn (max. height: 35 mm / 1.38 "). **Don't use any solvent.**
- Dry with a clean, dry and lint free rag.
- Rinse again into clean kerosine.
- Blow with clean and dry compressed air (free of oil). Use safety glasses.
- Lubricate the balls with a **lubricant spray compatible with elastomers.**



Construction standards

CAUTION!

In some countries, NGV applications are controlled by national regulations.

You must check the regulations applicable to your country and make your selection accordingly.



Nous nous réservons le droit d'apporter sans préavis toutes modifications à nos produits.

We reserve the right to modify product specifications without prior notice.

Die Firma STÄUBLI behält sich jederzeit das Recht vor, ohne vorherige Benachrichtigung Produkttypen und deren technische Daten, Ausführungen und Zubehör zu ändern.

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STÄUBLI INTERNATIONAL AG



NOZZLE

SHEREX / OPW
CT5000S

NOZZLE – CT5000 4000PSI CAPTIVE VENT HEAVY DUTY

ANGI PART NUMBER 700-03945

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SHEREX/OPW 5000 SERIES BUS/HEAVY-DUTY TRUCK NOZZLES

Bus/Heavy-Duty Truck Nozzles

Sherex/OPW 5000 Series nozzles are designed for extremely high flow public and private CNG fueling systems. Applications include quick-fill, self-service fueling of transit buses and large trucks. All Sherex/OPW NGV fueling nozzles are designed and built to exacting engineering specifications for fueling safety and efficiency.

Key Features Include:

- ◆ **User-Friendly Single-Action Operation-** Entire fueling operation is initiated by simply engaging nozzle and receptacle with a single 180 degree rotation of the handle. This automatically secures the nozzle jaws onto the receptacle and activates a system of three internal valves that regulate fueling. The nozzle will not dispense gas until securely engaged onto an appropriate receptacle. When fueling is completed, rotation of the handle to the disconnect position automatically stops the flow of gas into the nozzle, vents the trapped gas, and releases the nozzle from the receptacle. The 5000 Series nozzles connect directly to the hose, eliminating the need for a three-way valve. They are designed for public or private self-service applications, eliminating the need for a trained attendant.
- ◆ **High Flow/Fast-Fill Capability-** To provide quick fueling of large storage vehicles. Internal seals are specially designed to meet the demands of fast-fill NGV fueling.
- ◆ **Directed Vent (CT5000) -** Directs the gas vented at disconnect and directs it out of the nozzle via a 3/8" stainless-steel tubing connection which can be piped to a remote venting location or back to the upstream side of the compressor. Directing the vent gas is environmentally desirable and will provide an added measure of safety by minimizing the amount of gas present at the filling site. It also reduces vent noise and escaped gas smell.
- ◆ **Jaw-Lock Technology-** Designed specifically for the frequent coupling and uncoupling of the high pressure gas connections of NGV fueling. Forces at the contact point are distributed over the entire surface area of the receptacle, virtually eliminating receptacle "grooving" and significantly reducing nozzle wear.
- ◆ **Ergonomic Design-** One simple and convenient motion ensures connection and dispensing by all users. Insulated jacket provides thermal protection for operator's hand.
- ◆ **Durable Construction-** Heavy-duty brass and stainless-steel construction provides excellent corrosion resistance in the harsh automotive environment. Hardened brass body is non-sparking for added safety.
- ◆ **Tamper Resistant-** Specially designed cam system actuates the front and rear valve module. Any tampering with the valve will result in an immediate shut-off of the dispensing process.
- ◆ **Individually Leak Tested and Inspected with Traceable Serial Number.**
- ◆ **Agency Listings-** ASME Pressure Vessel Registered, Railroad Commission of Texas, Special Application of German Pressure Vessel available.

Materials:

Body: Brass
Internal Components: Stainless Steel
Seals: Kel-F/Low Temperature Elastomer/Blended PTFE

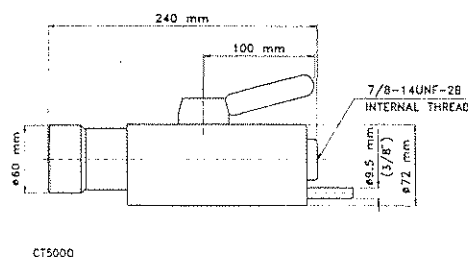
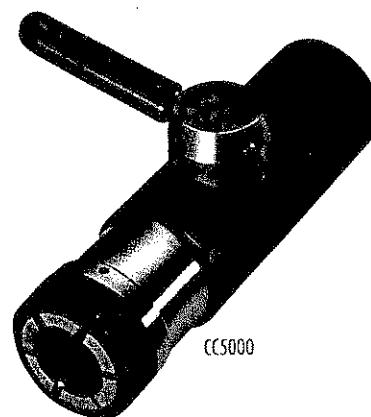
Specifications:

Flow Rate: 141 Nm³/min. Connected
(5000 SCFM)

Temperature Range: -40° to 85° C
(-40° to 185°F)

Ordering Information

Product Number	Inlet Thread Size	Design Pressure bar	Design Pressure psig
CC5000 (non-directed vent)	SAE 7/8"-14	282	4000
CT5000 (directed vent)	SAE 7/8"-14	282	4000



IMPORTANT: Sherex/OPW products should be used in compliance with applicable federal, state and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and materials to be handled. SHEREX/OPW MAKES NO WARRANTY OF FITNESS FOR A PARTICULAR USE. All illustrations and specifications in this literature are based on the latest product information available at the time of publication. Sherex/OPW reserves the right to make changes at any time in prices, materials, specifications and models and to discontinue models without notice or obligation.

INSTALLATION INSTRUCTIONS TO QUALIFIED TECHNICIANS

H13741M
OCTOBER 1997

for Self Service Fueling Nozzles

TABLE OF CONTENTS

FOR USE WITH TYPE 1—
CC1000, CT1000, CT1000S, CT1000L,
CT1000 P36, CC5000, CT5000 NOZZLES

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SHEREX/OPW

SECTION A: INTRODUCTION

USE THIS MANUAL

manua has been prepared as a step by step installation guide for the following SHEREX/OPW Self-Service series of fueling nzzles:

CT1000 P-36 CT1000 CT1000S CT1000L CC1000 CC5000 CT5000

This information is intended as general installation procedures and to familiarize the installer/end user with the techniques and procedures used.

GENERAL

The Self-Service series of natural gas fueling nozzles are designed to be used with the following receptacles for filling with compressed natural gas for vehicles (CNGV):

NGV1	CT1000 P36 nozzle CT1000 nozzle CT1000S nozzle CT1000L nozzle CC1000 nozzle	Any NGV1 P36 receptacle Any NGV1, P30, P36 or SR1 receptacle Any NGV1, P30, P36 or SR1 receptacle Any NGV1, P30, P36 or SR1 receptacle Any NGV1, P30, P36 or SR1 receptacle
Bus/Truck	CC5000 nozzle CT5000 nozzle	SR5, CR5, CL5, and CM5 series receptacles SR5, CR5, CL5, and CM5 series receptacles

The captive vent feature of the Self-Service series nozzles is designed to capture the small amount of high pressure gas that is contained between the nozzle inlet valve and the nozzle outlet valve prior to disconnecting. These nozzles are only intended for use as a Type 1 Class A fast fill unit, operating at the following service pressures:

		Maximum Service Pressure	NGV1 Rating
NGV1	CT1000 P36 nozzle CT1000 nozzle CT1000S nozzle CT1000L nozzle CC1000 nozzle	310 bar (4500 psi) 310 bar (4500 psi) 310 bar (4500 psi) 310 bar (4500 psi) 310 bar (4500 psi)	240 bar (3600 psi) 200 bar (3000 psi) 200 bar (3000 psi) 200 bar (3000 psi) 200 bar (3000 psi)
Bus/Truck	CC5000 nozzle CT5000 nozzle	310 bar (4500 psi) 310 bar (4500 psi)	N/A N/A

The Self-Service series nozzles have an operating temperature range of -40 C to 85 C (-40 F to 185 F).

NOTE: THE CT1000 P36 NOZZLE CANNOT FILL A P30 RECEPTACLE.

All SHEREX/OPW series nozzles require special installation precautions to ensure safe and reliable operation. The installation shall conform with the requirements of the Authorities having jurisdiction or, in the absence of requirements, with the Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems, NFPA 52 or the Natural Gas for Vehicles Installation Code, CAN/CGA B149.4, as applicable.

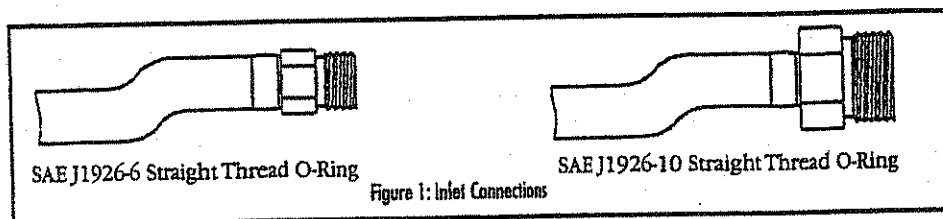
SECTION B: INSTALLATION

The inlet and seal for these Self-Service nozzles are as follows:

	Nozzle	Inlet	Seal
NGV1	CT1000 P36 nozzle CT1000 nozzle CT1000L nozzle CT1000S nozzle CC1000 nozzle	SAE J1926 - SAE 6 O-ring boss port with UNF $\frac{1}{16}$ " - 18 threads	Size #906 O-ring
Bus/Truck	CC5000 nozzle CT5000 nozzle	SAE J1926 - SAE 10 O-ring boss port with UNF $\frac{7}{16}$ " - 14 threads	Size #910 O-ring

All O-rings are manufactured of a compound that is suitable for use in compressed natural gas environments at the noted service temperatures (Figure 1).

IMPORTANT: THE VENT TUBE AND CHAMBER MUST NOT BE CONNECTED TO HIGH PRESSURE. A CHECK VALVE SHOULD BE INSTALLED IN THE VENT RECOVERY SYSTEM TO PROTECT THE VENT TUBE AND NOZZLE FROM HIGH PRESSURE INPUT OR BUILD UP. MAXIMUM VENT TUBE PRESSURE MUST BE KEPT BELOW 3.5 BAR (50 PSD) TO ALLOW EASY NOZZLE OPERATION.



CT1000, CT1000S, CT1000L, CT1000P36

A $\frac{1}{4}$ " tube is used to vent the gas. A double ferrule compression fitting should be used to connect to a $\frac{1}{4}$ " hose. The hose must be suitable for compressed natural gas with maximum service pressures up to 310 bar (4500 psi). It is of the utmost importance that there be no obstructions downstream of the vent line.

CT5000

A $\frac{3}{8}$ " tube is used to vent the gas. A double ferrule compression fitting should be used to connect to a $\frac{3}{8}$ " (minimum) flex hose. The hose must be suitable for compressed natural gas with maximum service pressures up to 310 bar (4500 psi). It is of the utmost importance that there be no obstructions downstream of the vent line.

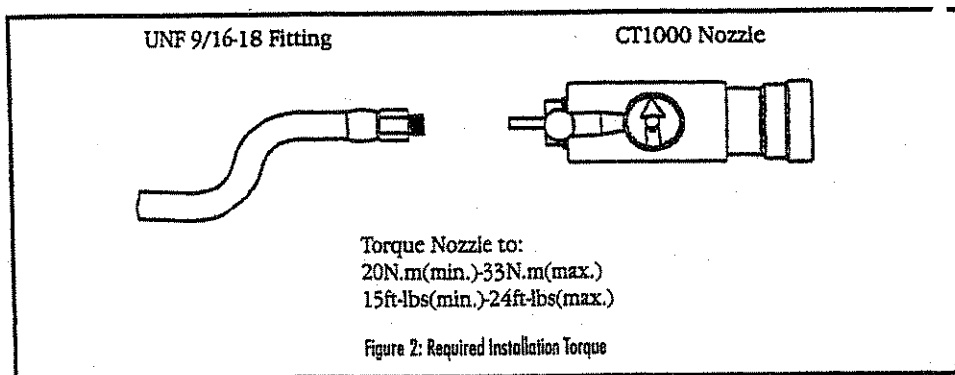
WARNING: UNDER NO CIRCUMSTANCES CAN NPT FITTINGS BE USED ON THESE NOZZLES! DO NOT USE THREAD SEALING TAPES OR COMPOUNDS.

Ensure that the correct size SAE sealing o-ring (#906 or #910) is installed on the male UNF fitting ($\frac{1}{16}$ "-18 or $\frac{7}{16}$ "-14) according to the fitting and O-ring manufacturer's instructions. We recommend using a Buna-N rubber compound specified for use with compressed natural gas and all compressor oils, including synthetic oils. An O-ring with durometer 90 is preferred and the MIL-P-25732 specification compounds perform very well under these conditions. SHEREX/OPW provides the proper O-ring with all new nozzles.

2. Be sure all sealing surfaces are clean, smooth and free of any oil, grease or other contaminants.

3. The nozzle should be tightened onto the fitting to a minimum torque of the following:

	Nozzle	Type of Wrench	Tighten To:
NGV1	CT1000 P36 nozzle CT1000 nozzle CT1000S nozzle CT1000L nozzle CC1000 nozzle	27 mm (1 1/8") wrench	Minimum 20 N.m, Maximum 33 N.m (15-24 ft-lbs) (Figure 2)
Bus/Truck	CC5000 nozzle CT5000 nozzle	36 mm wrench	Minimum 24 N.m, Maximum 41 N.m (18-30 ft-lbs) (Figure 2)



4. After installation, test the unit for leaks. The handle should be cycled a few times (see warning attached to nozzle). Pressurize and test the connection using a suitable leak detector (e.g., SNOOP®). Test pressures should include low pressures (under 7 bar /100 psi) and up to the following maximum service pressure of 310 bar (4500 psi).

WARNING: ENSURE THAT THE HOSE AND NOZZLE ARE DEPRESSURIZED BEFORE REMOVING NOZZLE OR DOING ANY MAINTENANCE.

SECTION C: OPERATION

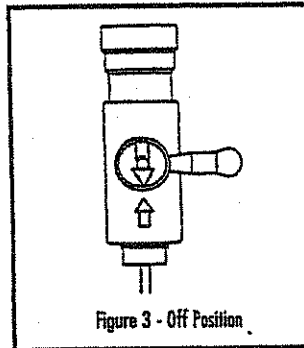
Connecting to a receptacle is easily accomplished by following these procedures.

1. Ensure the nozzle is intended to connect to the receptacle in accordance with the following table:

Nozzle	NGV1	Sherex Description
CC1000 CT1000 CT1000S CT1000L	P30 or P36 P30 or P36 P30 or P36 P30 or P36	NGVI-P30, SR1 type receptacles
CT1000 P36	P36	NGVI-P36
CC5000 CT5000	— —	SR50XX, CR50XX

2. Remove the nozzle from the rest position and verify the indicating arrows are opposing (OFF position) with the handle in the 3 o'clock position (Figure 3). This opens the jaws.

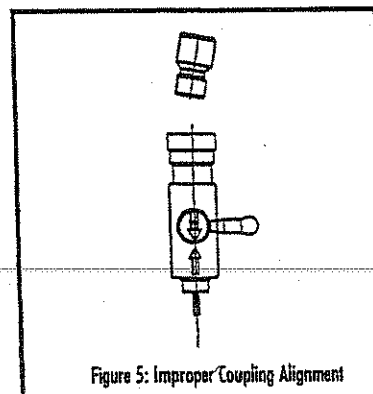
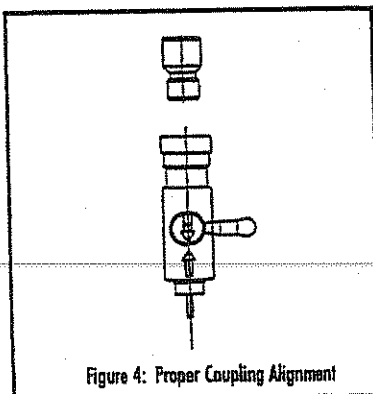
WARNING: DO NOT APPLY EXTREME FORCE TO THE NOZZLE HANDLE. INTERNAL COMPONENTS MAY BE DAMAGED BY HIGH TORQUE ON THE OPERATING HANDLE.



3. Connect by pushing the nozzle forward onto the receptacle first and rotating the handle clockwise until the indicating arrows are in line (ON position) with the handle in the 9 o'clock position. The "pushing on" is important and prevents handle from damage.

IMPORTANT: DO NOT ATTEMPT TO COUPLE THE NOZZLE AND RECEPTACLE WHEN THE RESPECTIVE AXIS OF THE NOZZLE AND RECEPTACLE ARE OFFSET OR AT AN ANGLE. (FIGURE 4 & 5)

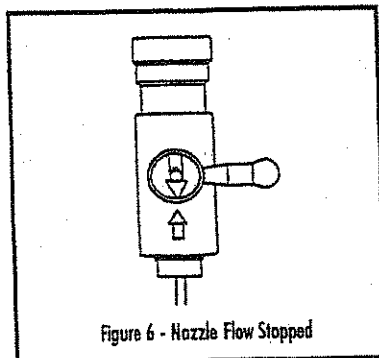
If the nozzle will not connect to the receptacle, ensure that the nozzle is fully vented and in the "OFF" or "NO FLOW" position.



SECTION C: OPERATION

REMOVAL IS EASILY ACCOMPLISHED:

- When fueling is complete, turn the station dispenser OFF.
- Turn the nozzle handle counter clockwise to the 6 o'clock position so that the arrows are perpendicular. This stops the flow of gas. Turn the handle through the vent position (about 5 o'clock) to relieve the internal pressure of the nozzle (Figure 6). The vented gas is from the nozzle. The hose remains pressurized.



WARNING: DO NOT APPLY EXTREME FORCE TO THE NOZZLE HANDLE. INTERNAL COMPONENTS MAY BE DAMAGED BY HIGH TORQUE ON THE OPERATING HANDLE.

NOTE: THERE IS A BRIEF SOUND OF GAS VENTING WHEN GOING THROUGH THE DISCONNECT MOTION. THIS IS NORMAL VENTING OF THE CAVITY IN THE NOZZLE.

In the event that a popping sound is heard during venting, this is an indication that there is an obstruction in the vent. If the nozzle is difficult to disconnect from the receptacle or venting does not stop after a few seconds, return the nozzle handle to the fill position, close the vehicle manual shut-off valve on the vehicle and repeat from Step D:2, above. If problems persist, the entire supply to the nozzle and vent lines must be depressurized and thoroughly inspected. If station inspection reveals nothing, return the nozzle to SHEREX/OPW immediately with a full description of the problem.

- Further rotate the nozzle handle counter-clockwise to the 3 o'clock position so that the arrows are lined up. This opens the jaws and releases the receptacle.
- Place the nozzle in a **CLEAN, PROTECTED AREA**.

SECTION D: SERVICE

These Self Serve nozzles must be stored in a clean protected area. The nozzle must not be exposed to debris, dirt, water or chemicals. Service life is dependent on handling and care of the nozzle. Contamination increases the potential for nozzle malfunction. Unusual operation must be reported to the service representative immediately! These captured vent nozzles (CT1000, CT1000S, CT1000L, CT1000-P36, CT5000) have an internal filter to prevent damage caused from gas-borne debris. A SHEREX/OPW in line filter is recommended at the inlet of non-protected nozzles, for maximum protection of your investment.

ROUTINE MAINTENANCE

1. Inspect the jaws and clean any dirt, grease, or oil from the stainless steel exhaust valve with a clean, lint free cloth. Do not use any solvents as this may result in seal degradation and create the likelihood of personal injury with subsequent use.
2. The entire nozzle should be cleaned periodically by wiping with a cloth or rag. This should occur on average twice per month, more frequently if the nozzle is constantly in use or is used under extremely dirty conditions.
3. Repeatedly depress the exhaust valve to ensure smooth operation. In the event that the valve remains depressed, do not attempt to dislodge it. Call the local service representative immediately!
4. Every four months, the inside diameter at the front opening of the CT1000-P36 nozzle (Figure 7) should be measured. If the inside diameter is greater than 24.7mm, then the nozzle should be returned to SHEREX/OPW for repair.

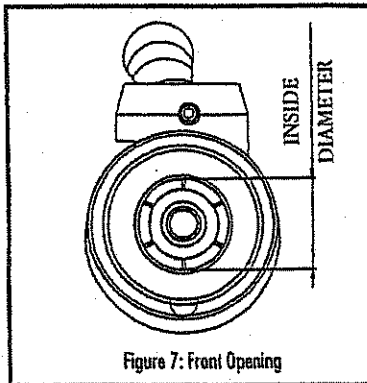


Figure 7: Front Opening

NOTE: A GO/NO GO GAUGE FOR THE JAWS CAN BE PURCHASED FROM SHEREX/OPW.

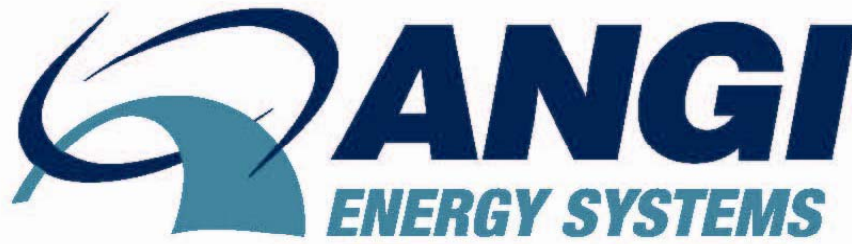
AFTER ONE YEAR OF SERVICE

The unit should be routinely checked for leaks while under service pressure. This should be carried out by the local service representative.

AFTER FOUR YEARS OF SERVICE

The unit should be returned to SHEREX/OPW for replacement of all seals. This period should be reduced to twenty-four (24) months if the potential exists for misuse, abuse, or the nozzle is used in extreme environmental surroundings.

Special tools and care are required to clean and remove the filter element from the filtered nozzles. In the interests of safety and performance, only specially trained and qualified technicians can remove and service the filter.



BREAKAWAY – INLINE (NR)

SNAPTITE
NGVBCN2-P50NR
BREAKAWAY-INLINE NON RELIEVING (NR) SUPPLY HOSE,
9/16-18FSAE

ANGI PART NUMBER 700-07259

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Natural Gas Fueling In-line Breakaway Coupling

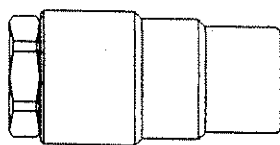
ISO-9001 Certified

Instructions to qualified personnel for installation of natural gas fueling in-line breakaway coupling.

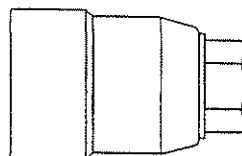
GENERAL

In-line breakaway units are designed for a maximum structural safety of 5000 PSIG. These units are not designed to be separated at greater than 3600 PSIG. Units may be used outdoors with temperatures ranging from -40°F to 150°F (-40°C to 66°C).

INSTALLATION INSTRUCTIONS



Coupler Assembly



Nipple Assembly

Attach the coupler assembly to the hose leading from the natural gas source. Torque coupler assembly to hose fitting to 20-25 lb./ft.

Attach the nipple assembly to a 18" long hose leading to the fueling nozzle. Torque nipple assembly to the hose fitting to 20-25 lb./ft.

To connect the nipple assembly to the coupler assembly you must ensure that the pin inside the nipple assembly bumper is lined up with the slot in the end of the coupler assembly. Holding the coupler assembly securely, by use of a vise or other means, push nipple assembly into coupler assembly until unit is fully connected. This will require a force of approximately 60 lb.. A clockwise rotating motion may be required while pushing the unit together to allow the pin in the nipple assembly to line up with the slot in the coupler assembly until fully connected. Test for leakage when fully connected.

ROUTINE MAINTENANCE

Keep the units clean and free of oil and dirt. Should any leaks or problems occur, discontinue use and return for repair. Installation and/or removal /replacement should only be performed by qualified personnel. **DO NOT** tamper with this device for any reason. Call your local service representative if there is any problem.

TRAINING

All user personnel must be trained by the service representative in the proper use of the in-line breakaway. There are no user serviceable parts, therefore, any problems should be addressed by the service representative.

WARNING

The use of high pressure gas fueling systems requires caution on the user's part. Any attempt to modify the equipment will void all claims against the manufacturer.

August 11, 1997 K:\OFFICE\WPWIN\ENGFILES\MEMOS\DOUG\NGVSTUFF\A002INST.WPD

Compressed Natural Gas (CNG) Inline Hose Breakaway



Snap-tite's inline breakaway is designed specifically for compressed natural gas fueling systems. When properly installed, this inline breakaway allows for the safe disconnection from the fueling system without damage to the dispenser in the event of an accidental disconnect (drive-off). The inline breakaway was designed to replace the traditional tripod leverage towers used in conjunction with the ISO B style coupling as the breakaway connection for the fueling hose from the dispenser.

Features

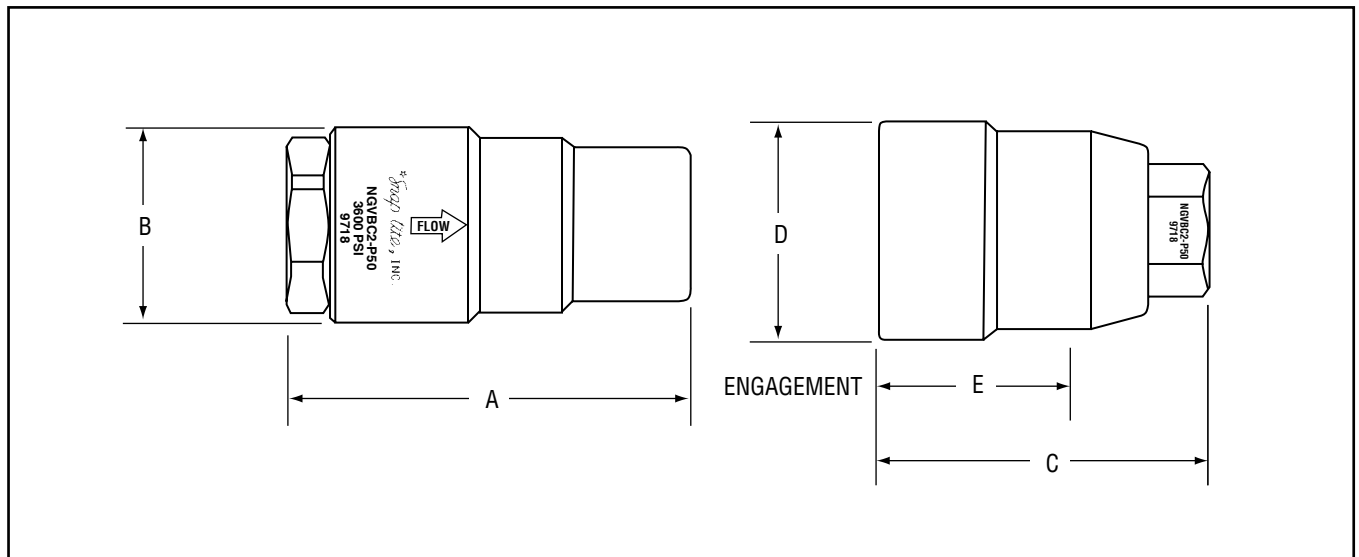
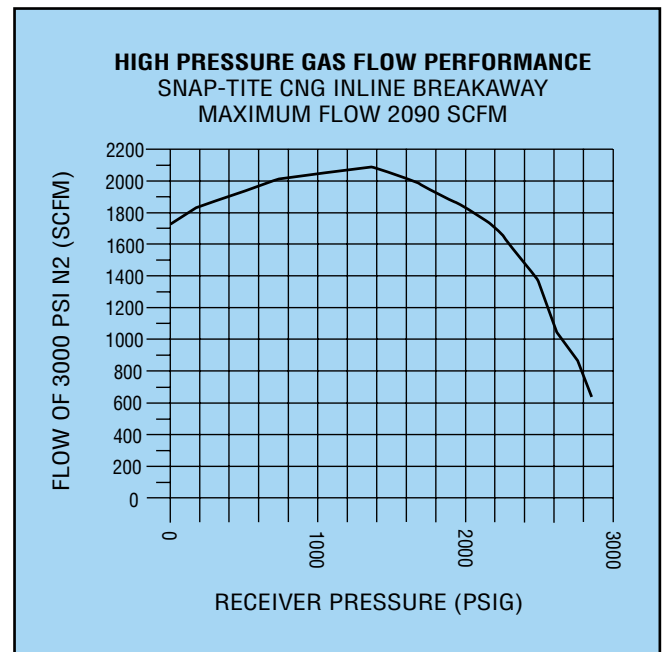
- ▶ Combination of corrosive resistant stainless steel (303 & 316) and brass construction
- ▶ Nipple is equipped with durable polyethylene bumper to protect the nipple form in the event of a breakaway
- ▶ Disconnect force: 60-140 lbs. (266.9 – 622.7 N) at any pressure up to operating
- ▶ Superior flow characteristics
- ▶ Compact envelope
- ▶ Balanced design assures positive connection until a breakaway cycle is required
- ▶ Lightweight design - .95 lbs. (.431 kgs)
- ▶ Easy installation
- ▶ Reusable following breakaway with minimal repair

Working Pressure: 3600 psi (248 bar)
Burst Pressure: 20,000 psi (1379 bar)
Temperature Range: -40°F (-40°C) to
 150°F (66°C)

Weight: .95 lbs (.431 kgs)

Flow Rate: 2090 SCFM (3551 Nm³/hr)

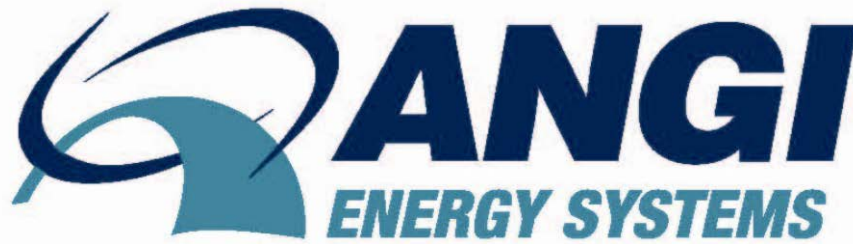
Material: 303 & 316 Stainless Steel and
 CA 360 Brass



PART NUMBER	A	B	C	D	E
*NGVBCN2-P50NR	2.79 (70.87)	1.38 (35.05)	2.28 (57.91)	1.53 (38.86)	1.34 (34.04)
*NGVBCN2-P50	2.79 (70.87)	1.38 (35.05)	2.28 (57.91)	1.53 (38.86)	1.34 (34.04)

Nipple type is determined by customer's system. If system has a separate vent line, use part number **NGVBCN2-P50NR** in (mm)
 (non-relieving). If system vents back through supply hose, use part number **NGVBCN2-P50**.
 Above part numbers will provide a complete unit consisting of one coupler and one nipple.

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BREAKAWAY INLINE

SNAPTITE
B887-2

BREAKAWAY-INLINE RELIEVING (R) VENT HOSE
9/16-18FSAE

ANGI PART NUMBER – 700-07260

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Natural Gas Fueling In-line Breakaway Coupling

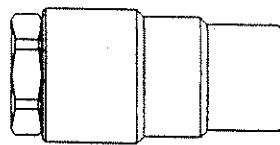
ISO-9001 Certified

Instructions to qualified personnel for installation of natural gas fueling in-line breakaway coupling.

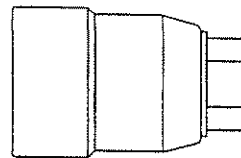
GENERAL

In-line breakaway units are designed for a maximum structural safety of 5000 PSIG. These units are not designed to be separated at greater than 3600 PSIG. Units may be used outdoors with temperatures ranging from -40°F to 150°F (-40°C to 66°C).

INSTALLATION INSTRUCTIONS



Coupler Assembly



Nipple Assembly

Attach the coupler assembly to the hose leading from the natural gas source. Torque coupler assembly to hose fitting to 20-25 lb./ft.

Attach the nipple assembly to a 18" long hose leading to the fueling nozzle. Torque nipple assembly to the hose fitting to 20-25 lb./ft.

To connect the nipple assembly to the coupler assembly you must ensure that the pin inside the nipple assembly bumper is lined up with the slot in the end of the coupler assembly. Holding the coupler assembly securely, by use of a vise or other means, push nipple assembly into coupler assembly until unit is fully connected. This will require a force of approximately 60 lb.. A clockwise rotating motion may be required while pushing the unit together to allow the pin in the nipple assembly to line up with the slot in the coupler assembly until fully connected. Test for leakage when fully connected.

ROUTINE MAINTENANCE

Keep the units clean and free of oil and dirt. Should any leaks or problems occur, discontinue use and return for repair. Installation and/or removal /replacement should only be performed by qualified personnel. **DO NOT** tamper with this device for any reason. Call your local service representative if there is any problem.

TRAINING

All user personnel must be trained by the service representative in the proper use of the in-line breakaway. There are no user serviceable parts, therefore, any problems should be addressed by the service representative.

WARNING

The use of high pressure gas fueling systems requires caution on the user's part. Any attempt to modify the equipment will void all claims against the manufacturer.

August 11, 1997 K:\OFFICE\WPWIN\ENGFILES\MEMOS\DOUG\NGVSTUFF\FA002\INST.WPD

Compressed Natural Gas (CNG) Inline Hose Breakaway



Snap-tite's inline breakaway is designed specifically for compressed natural gas fueling systems. When properly installed, this inline breakaway allows for the safe disconnection from the fueling system without damage to the dispenser in the event of an accidental disconnect (drive-off). The inline breakaway was designed to replace the traditional tripod leverage towers used in conjunction with the ISO B style coupling as the breakaway connection for the fueling hose from the dispenser.

Features

Combination of corrosive resistant stainless steel (303 & 316) and brass construction

Nipple is equipped with durable polyethylene bumper to protect the nipple form in the event of a breakaway

Disconnect force: 60-140 lbs. (266.9 – 622.7 N) at any pressure up to operating

Superior flow characteristics

Compact envelope

Balanced design assures positive connection until a breakaway cycle is required

Lightweight design - .95 lbs. (.431 kgs)

Easy installation

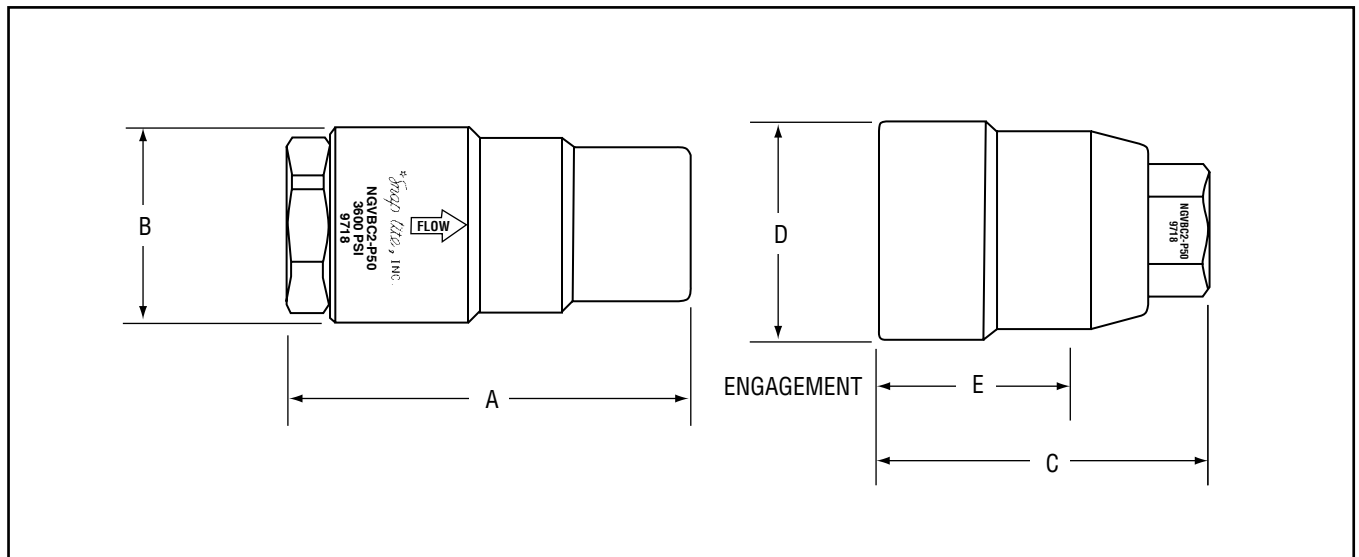
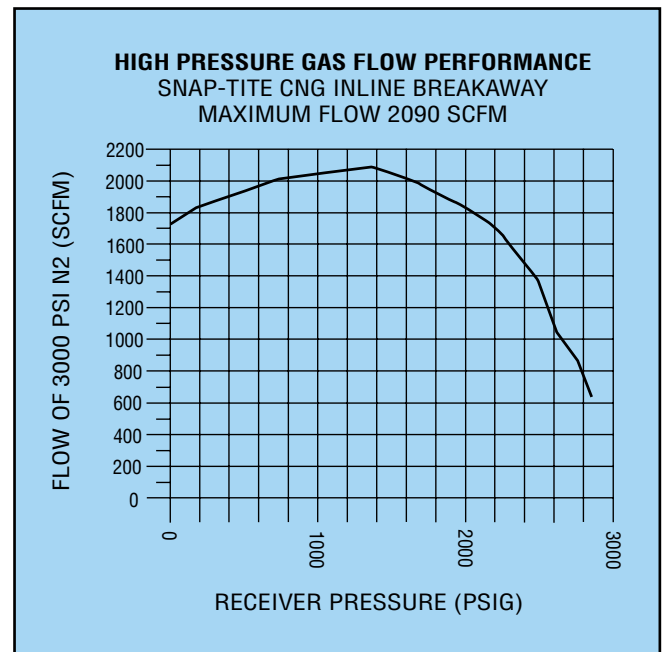
Reusable following breakaway with minimal repair

Working Pressure: 3600 psi (248 bar)
Burst Pressure: 20,000 psi (1379 bar)
Temperature Range: -40°F (-40°C) to
 150°F (66°C)

Weight: .95 lbs (.431 kgs)

Flow Rate: 2090 SCFM (3551 Nm³/hr)

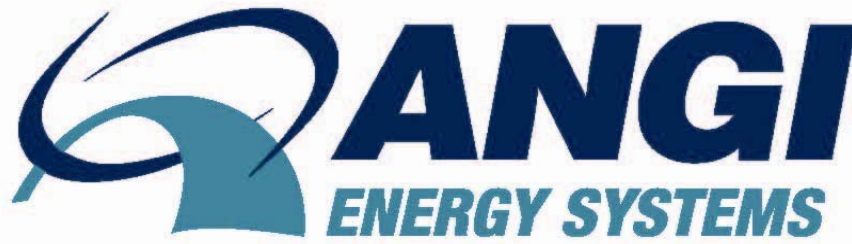
Material: 303 & 316 Stainless Steel and
 CA 360 Brass



PART NUMBER	A	B	C	D	E
*NGVBCN2-P50NR	2.79 (70.87)	1.38 (35.05)	2.28 (57.91)	1.53 (38.86)	1.34 (34.04)
*NGVBCN2-P50	2.79 (70.87)	1.38 (35.05)	2.28 (57.91)	1.53 (38.86)	1.34 (34.04)

Nipple type is determined by customer's system. If system has a separate vent line, use part number **NGVBCN2-P50NR** in (mm)
 (non-relieving). If system vents back through supply hose, use part number **NGVBCN2-P50**.
 Above part numbers will provide a complete unit consisting of one coupler and one nipple.

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BREAKAWAY - INLINE

SHEREX / OPW
ILB-5
BREAKAWAY – INLINE ILB5 HEAVY DUTY

ANGI PART NUMBER 700-07289

REBUILD KIT – ILB5 BREAKAWAY – 761-07345

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CNG/OPW IN-LINE BREAKAWAY

In-Line Breakaway (ILB-5) - Heavy-Duty Truck/Bus

CNG/OPW has developed an in-line breakaway that can be used in heavy-duty truck and bus NGV refueling applications. This unit will function consistently, independent of the inlet pressure. Depending on your needs and budget constraints, the CNG/OPW offers breakaway products that fit your application.

Key Features Include:

- ◆ **Durable, Corrosion-Resistant Construction** - Stainless steel and specially plated steel construction provide improved durability and corrosion resistance in harsh environments.
- ◆ **Reconnectable Design** - Allows the component to be reused, reducing maintenance costs.
- ◆ **Innovative Valve System** - The sealing system in this breakaway minimizes the amount of vent gas during a drive-away incident.
- ◆ **High Flow/Super Fast Fill Capacity** - This is CNG/OPW's fastest flowing breakaway. This breakaway will provide quick fueling of large storage vehicles. Internal seals are specifically designed to meet the demands of fast-fill NGV fueling.
- ◆ **Easy Installation** - The in-line breakaway has SAE - 10 O-ring fittings for easy installation in line between the dispenser and nozzle.
- ◆ **Individually Inspected, Leak and Breakaway Tested, with Traceable Serial Numbers.**
- ◆ **Disconnection Force** - 150-200 lbs. (668-890 N).

Materials:

Body: Stainless Steel

Internal Components: Stainless Steel

Seal: Specially formulated polymers and elastomers specific to high pressure NGV applications.

Specifications:

Min. Flow Rate: 5000 SCFM @ 3000 psid

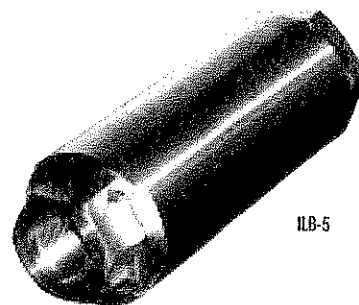
Temperature Range: -40° to 85° C
(-40° to 185° F)

Weight: 5 lbs.

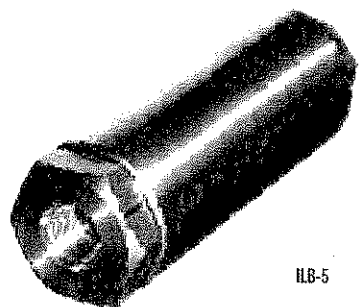
Cv: 3.6

Design Pressure: 5000 psig (345 Bar)

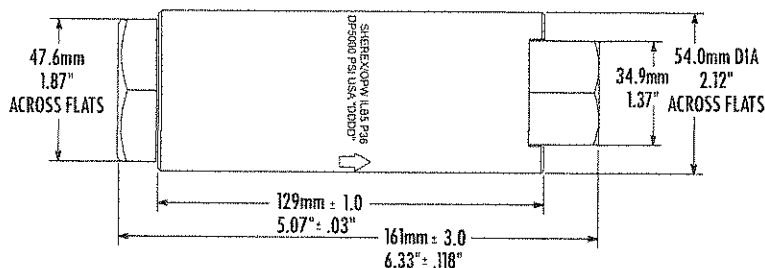
Agency Listings Pending



ILB-5



ILB-5



Ordering Information

Product Number	Inlet Thread Size	Outlet Thread Size	Max. Allowable Service Pressure
ILB-5	SAE - 10 7/8 - 14 UNF (female)	SAE - 10 7/8 - 14 UNF (female)	4500psig (310 Bar)

INSTALLATION INSTRUCTIONS TO QUALIFIED TECHNICIANS FOR INLINE BREAKAWAY DEVICES (ILB)

**FOR USE WITH ANY CERTIFIED ELECTRICALLY CONDUCTIVE HOSE INTENDED
FOR FILLING COMPRESSED NATURAL GAS OR COMPRESSED HYDROGEN
VEHICLES UP TO SERVICE PRESSURES OF 5000 PSI.**

SECTION A: INTRODUCTION

How to use this Manual

This manual has been prepared as a step by step users guide for the Sherex/OPW ILB series of Inline Safety Breakaway Valves.

This information is intended as a general outline to familiarize the installer/end user with the techniques and procedures used to install, reconnect and maintain the Breakaway Device.

General

The Inline Breakaway (ILB) series of valves are intended to protect the dispenser, vehicle and fueling nozzle from damage if a vehicle moves away from the refueling point while still coupled to the fuel line.

The ILB is designed to be used with any approved hose intended for filling compressed natural gas vehicles (CNGV) or Compressed Hydrogen Vehicles (CH2). The ILB operates at service pressures up to 5000 psi and has an operating temperature range of -40 C to 85 C (-40 F to 185 F). These units are designed to separate within range of 150 +/- 30 lbs (670 +/- 134 N) as specified by the ANSI NGV4.4 Breakaway Device Safety Standard.

SECTION B: INSTALLATION

The inlet and seal for these Inline Breakaways are as follows:

Breakaway	Inlet/Outlet	Seal
ILB-1 Or ILB-H	SAE J1926 - 6 o-ring Boss port with 9/16-18 UNF threads	Size #906 (P/N 1146) 70 durometer NBR Nitrile
ILB-2	¼ NPT Port	N/A
ILB-5	SAE J1926 - 10 o-ring Boss port with 7/8-14 UNF threads	Size #910 (P/N1127) 70 durometer NBR Nitrile
ILB-6	½ NPT Port	N/A

Please note: The NPT Port ILB breakaway valves (ILB-2 and ILB-6) are not intended for use in North American applications and do not carry approvals or certifications.

CAUTION: THE ILB MUST BE CONNECTED BETWEEN THE DISPENSER AND THE NOZZLE SO IT IS FREE TO ALIGN ITSELF IN A STRAIGHT MANNER BETWEEN ITS TWO HOSES. (FIGURE 1)

Installation Procedure

- Step 1. Inspect the unit and ensure that both halves are fully connected. If you can easily pull the two halves apart then please refer to Section D: Re-assembly before continuing with the installation.
- Step 2. Ensure that the threads on both the hose fitting as well as the inlet and outlet ports are clean and free of any debris, oil, grease or teflon tape.
- Step 3A. For ILB-1, ILB-H and ILB-5 Breakaways, ensure that the proper sealing o-rings are installed on the male hose fittings according to the fitting and o-ring manufacturer's instructions. These o-rings must be 70 Durometer Nitrile (NBR). Two of these o-rings are included with each assembly instruction sheet and must be installed. For additional o-rings contact Sherex/OPW customer service; order part number 1146 for the ILB-1 and ILB-H and part number 1127 for the ILB-5.



INSTALLATION INSTRUCTIONS TO QUALIFIED TECHNICIANS FOR INLINE BREAKAWAY DEVICES (ILB)

- Step 3B. For the ILB-2 and ILB-6 Breakaways, apply an appropriate amount of pipe sealant to the male fittings. **DO NOT USE TEFLON TAPE.**
- Step 4. Only use the wrench flats when tightening the hose to the ILB breakaways - do not grasp the housing.
- Step 5. Ensure that the flow direction arrow is pointing in the direction of gas flow. (the arrow points to nozzle)(FIGURE 2)

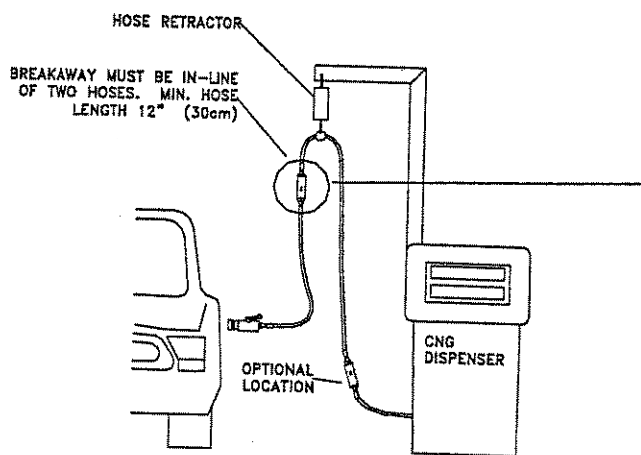


FIGURE 1. INSTALLATION DETAILS

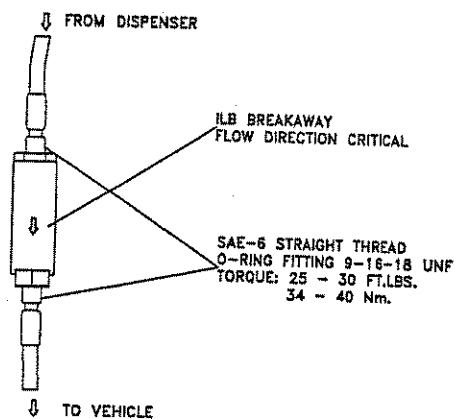


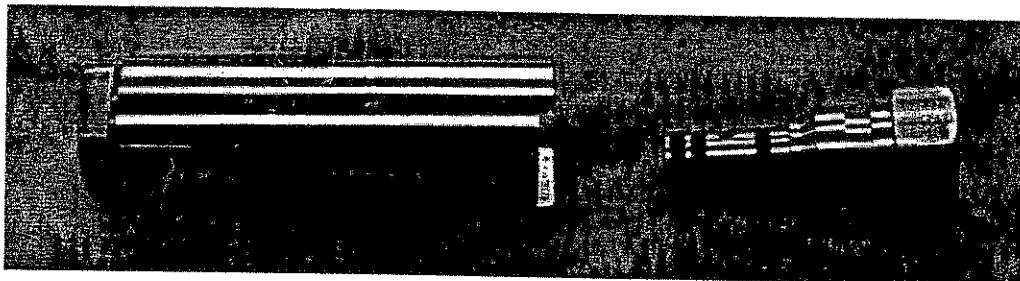
FIGURE 2. FLOW DIRECTION

- Step 6. Using a properly sized wrench, tighten the fitting to a torque of 25 ft.lbs. (34Nm) to 30 ft.lbs. (40 Nm).
Warning: Excessive over tightening will gall the threads and weaken the connection. **Do not wrench across coupling.**
- Step 7. After installation, test the unit for leaks. Pressurize and test the connection using a suitable leak detector (e.g. Snoop®). The test pressures should include both low (100 psi / 0.86 MPa) and high (3600 - 5000 psi / 25-35 MPa). For safety reasons, always pressurize at the low pressure first.

INSTALLATION INSTRUCTIONS TO QUALIFIED TECHNICIANS FOR INLINE BREAKAWAY DEVICES (ILB)

SECTION C: SEPARATION OF ILB

The ILB will split into two parts upon disconnection when a force within the range of 150 +/- 30 lbs (670 +/- 134 N) is applied axially to the breakaway coupling. (FIGURE 3.)



Stationary Module

Breakaway Module

FIG 3. Breakaway Modules

The Stationary Module is the portion that remains permanently attached to the hose on the dispenser. It shuts off the gas supply from the upstream dispenser, storage tanks and compressor. The Breakaway Module (vehicle side) will detach and slowly vent off the gas stored in the hose and nozzle that remain coupled to the vehicle. This is to ensure that the driver is not carrying a pressurized hose away from the station, eliminating a dangerous situation.

NOTE: UPON SEPARATION, A VERY LOUD NOISE SHOULD BE EXPECTED.

CAUTION: A HOSE BREAKAWAY EVENT IS INTENDED TO PROTECT THE FUELING DEVICE, DISPENSER, AND VEHICLE. HOSE STRETCH WILL CAUSE A WHIPPING ACTION FOR THE BREAKAWAY MODULE. AS A RESULT, PERSONAL INJURY MAY OCCUR IF SOMEONE IS IN THE WAY OF THE HOSE DURING A BREAKAWAY EPISODE.

SECTION D: RE-ASSEMBLY AFTER BREAKAWAY

Reconnection Procedure

- Step 1. Depressurize the dispenser system and hose before attempting re-connection.
- Step 2. Clean dirt or debris from both halves of the Breakaway unit before re-assembly is attempted.
- Step 3. Inspect both parts of the Breakaway. Make sure that the o-ring seals have not been damaged (Slits or rough spots) (Figure 4). If so, please contact Sherex/OPW customer service for replacement o-rings. For the ILB-1, ILB-H and ILB-2 order o-ring P/N 42020. For the ILB-5 and ILB-6 order o-ring P/N 42007. If the Breakaway Module is damaged or missing, a replacement kit is available as well. If the o-rings are dry lubricate them with light grease (e.g. Parker O-Lube ®) or mild soap before re-assembly.

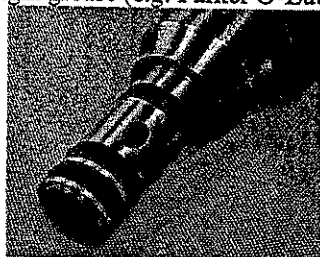


FIG 4. Breakaway Module O-Rings

- Step 4. Inspect the Stationary Module and ensure that the inner garter spring is present and properly situated in the groove (Figure 5). A replacement garter spring is available from Sherex/OPW customer Service. For the ILB-1, ILB-H and ILB-2 order spring P/N 42024. For the ILB-5 and ILB-6 order spring P/N 42007.

INSTALLATION INSTRUCTIONS TO QUALIFIED TECHNICIANS FOR INLINE BREAKAWAY DEVICES (ILB)

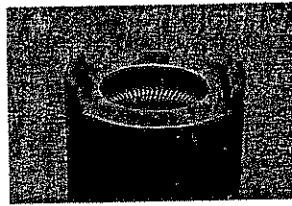


FIG 5. Garter Spring Location

- Step 5. Hold the Breakaway module so that the wrench flats will fit into the slot on the Stationary Module. (Figure 6)



FIG 6. Reconnection Alignment

- Step 6. Push the Breakaway Module into the Stationary Module until a definite click is felt and the wrench flats are in the groove on the Stationary Housing (Figure 7).



FIG 7. Fully Connected Position

- Step 7. After re-assembly, test the unit for leaks. Pressurize and test the connection using a suitable leak detector (e.g. Snoop®). The test pressures should include both low (100 psi / 0.86 MPa) first and high (3600 psi / 25 MPa). Always pressurize at the low pressure first to ensure that the reconnection has been made correctly.

CAUTION: DO NOT ATTEMPT ANY REPAIR IF LEAKAGE PERSISTS. DOING SO WILL VOID ALL WARRANTIES.

SECTION E: ROUTINE CHECKS

After One Year of Service:

- The unit should be routinely checked for leaks while under service pressure.
- This should be carried out by the local service representative.

After Four Years of Service:

- The unit should be returned to Sherex/OPW for rebuilding and replacement of all seals.
- This period should be reduced to twenty-four (24) months if the potential exists for misuse, abuse, if the ILB is used in extreme environmental surroundings, or if more than 20 breakaways have occurred on the unit.

PLEASE CONTACT Sherex/OPW Inc. FOR TRAINING, TOOLS AND REPLACEMENT PARTS.

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OPW SHEREX
ILB-1

BREAKAWAY-INLINE OPW ILB-1
SAE-6 (9/16 - 18 UNF)

ANGI PART NUMBER 700-07488

REBUILD KIT - 761-07317

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CNG/OPW IN-LINE BREAKAWAY

In-Line Breakaway (ILB-1)

CNG/OPW has developed an in-line breakaway that can be used in automotive NGV refueling applications. This unit will function consistently, independent of the inlet pressure. Depending on your needs and budget constraints, the CNG/OPW offers breakaway products that fit your application.

Key Features Include:

- ❖ **Durable, Corrosion-Resistant Construction** - Stainless steel and specially plated steel construction provide improved durability and corrosion resistance in harsh environments.
- ❖ **Reconnectable Design** - Allows the component to be reused, reducing maintenance costs.
- ❖ **Innovative Valve System** - The sealing system in this breakaway minimizes the amount of vent gas during a drive-away incident.
- ❖ **High Flow** - The flow path has been matched to provide ample flow for all NGV-1 Type 1 and Type 2 nozzles.
- ❖ **Reduced Size and Weight** - To allow for more applications where size may be a concern.
- ❖ **Easy Installation** - The in-line breakaway has SAE - 6 O-ring fittings for easy installation in line between the dispenser and nozzle.
- ❖ **Individually Inspected, Leak and Breakaway Tested, with Traceable Serial Numbers.**
- ❖ **Disconnection Force** - 150-200 lbs. (668-890 N).

Materials:

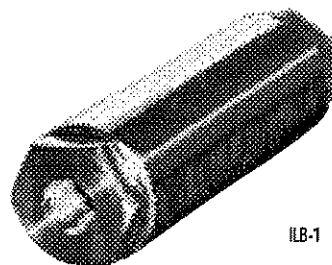
Body: Stainless Steel
Internal Components: Stainless Steel
Seal: Specially formulated polymers and elastomers specific to high pressure NGV applications.

Specifications:

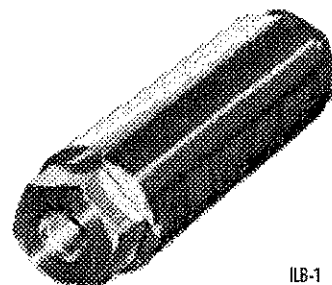
Min. Flow Rate: 2000 SCFM @ 3000 psid
Temperature Range: -40° to 85° C
(-40° to 185° F)

Weight: 2.3 lbs.
Cv: 1.17
Design Pressure: 5000 psig (345 Bar)

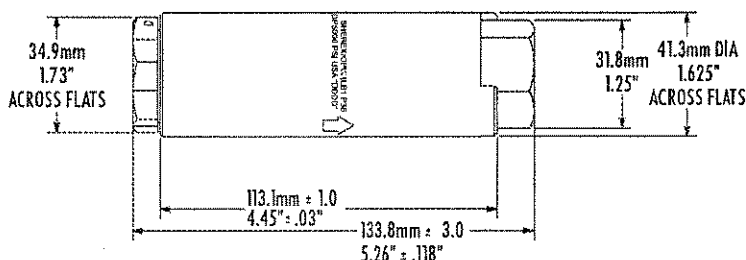
Agency Listings Pending



ILB-1



ILB-1



Ordering Information

Product Number	Inlet Thread Size	Outlet Thread Size	Max. Allowable Service Pressure
ILB-1	SAE - 6 9/16 - 18 UNF (female)	SAE - 6 9/16 - 18 UNF (female)	3600psig (P36) (248 Bar)

IMPORTANT: CNG/OPW products should be used in compliance with applicable federal, state and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and materials to be handled. CNG/OPW MAKES NO WARRANTY OF FITNESS FOR A PARTICULAR USE. All illustrations and specifications in this literature are based on the latest product information available at the time of publication. CNG/OPW reserves the right to make changes at any time in prices, materials, specifications and models and to discontinue models without notice or obligation.



INSTALLATION INSTRUCTIONS TO QUALIFIED TECHNICIANS FOR INLINE BREAKAWAY DEVICES (ILB)

**FOR USE WITH ANY CERTIFIED ELECTRICALLY CONDUCTIVE HOSE INTENDED
FOR FILLING COMPRESSED NATURAL GAS OR COMPRESSED HYDROGEN
VEHICLES UP TO SERVICE PRESSURES OF 5000 PSI.**

SECTION A: INTRODUCTION

How to use this Manual

This manual has been prepared as a step by step users guide for the Sherex/OPW ILB series of Inline Safety Breakaway Valves.

This information is intended as a general outline to familiarize the installer/end user with the techniques and procedures used to install, reconnect and maintain the Breakaway Device.

General

The Inline Breakaway (ILB) series of valves are intended to protect the dispenser, vehicle and fueling nozzle from damage if a vehicle moves away from the refueling point while still coupled to the fuel line.

The ILB is designed to be used with any approved hose intended for filling compressed natural gas vehicles (CNGV) or Compressed Hydrogen Vehicles (CH2). The ILB operates at service pressures up to 5000 psi and has an operating temperature range of -40 C to 85 C (-40 F to 185 F). These units are designed to separate within range of 150 +/- 30 lbs (670 +/- 134 N) as specified by the ANSI NGV4.4 Breakaway Device Safety Standard.

SECTION B: INSTALLATION

The inlet and seal for these Inline Breakaways are as follows:

<u>Breakaway</u>	<u>Inlet/Outlet</u>	<u>Seal</u>
ILB-1 Or ILB-H	SAE J1926 - 6 o-ring Boss port with 9/16-18 UNF threads	Size #906 (P/N 1146) 70 durometer NBR Nitrile
ILB-2	¼ NPT Port	N/A
ILB-5	SAE J1926 - 10 o-ring Boss port with 7/8-14 UNF threads	Size #910 (P/N1127) 70 durometer NBR Nitrile
ILB-6	½ NPT Port	N/A

Please note: The NPT Port ILB breakaway valves (ILB-2 and ILB-6) are not intended for use in North American applications and do not carry approvals or certifications.

CAUTION: THE ILB MUST BE CONNECTED BETWEEN THE DISPENSER AND THE NOZZLE SO IT IS FREE TO ALIGN ITSELF IN A STRAIGHT MANNER BETWEEN ITS TWO HOSES. (FIGURE 1)

Installation Procedure

- Step 1. Inspect the unit and ensure that both halves are fully connected. If you can easily pull the two halves apart then please refer to Section D: Re-assembly before continuing with the installation.
- Step 2. Ensure that the threads on both the hose fitting as well as the inlet and outlet ports are clean and free of any debris, oil, grease or teflon tape.
- Step 3A. For ILB-1, ILB-H and ILB-5 Breakaways, ensure that the proper sealing o-rings are installed on the male hose fittings according to the fitting and o-ring manufacturer's instructions. These o-rings must be 70 Durometer Nitrile (NBR). Two of these o-rings are included with each assembly instruction sheet and must be installed. For additional o-rings contact Sherex/OPW customer service; order part number 1146 for the ILB-1 and ILB-H and part number 1127 for the ILB-5.



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- Step 3B. For the ILB-2 and ILB-6 Breakaways, apply an appropriate amount of pipe sealant to the male fittings. **DO NOT USE TEFLON TAPE.**
- Step 4. Only use the wrench flats when tightening the hose to the ILB breakaways - do not grasp the housing.
- Step 5. Ensure that the flow direction arrow is pointing in the direction of gas flow. (the arrow points to nozzle)(FIGURE 2)

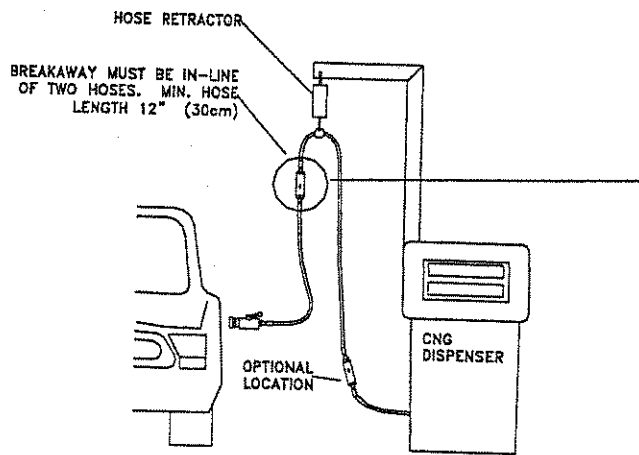


FIGURE 1. INSTALLATION DETAILS

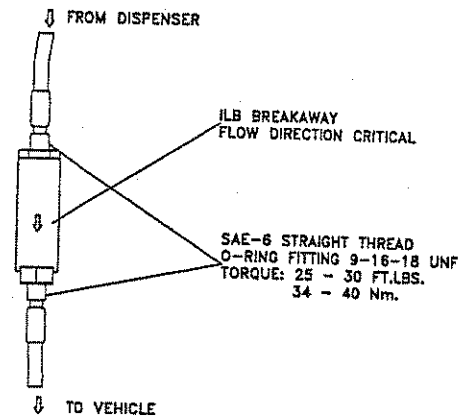


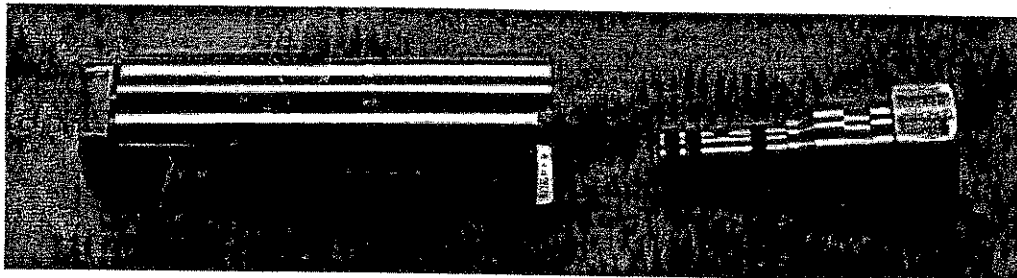
FIGURE 2. FLOW DIRECTION

- Step 6. Using a properly sized wrench, tighten the fitting to a torque of 25 ft.lbs. (34Nm) to 30 ft.lbs. (40 Nm). **Warning:** Excessive over tightening will gall the threads and weaken the connection. **Do not wrench across coupling.**
- Step 7. After installation, test the unit for leaks. Pressurize and test the connection using a suitable leak detector (e.g. Snoop®). The test pressures should include both low (100 psi / 0.86 MPa) and high (3600 - 5000 psi / 25-35 MPa). For safety reasons, always pressurize at the low pressure first.

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SECTION C: SEPARATION OF ILB

The ILB will split into two parts upon disconnection when a force within the range of 150 +/- 30 lbs (670 +/- 134 N) is applied axially to the breakaway coupling. (FIGURE 3.)



Stationary Module

Breakaway Module

FIG 3. Breakaway Modules

The Stationary Module is the portion that remains permanently attached to the hose on the dispenser. It shuts off the gas supply from the upstream dispenser, storage tanks and compressor. The Breakaway Module (vehicle side) will detach and slowly vent off the gas stored in the hose and nozzle that remain coupled to the vehicle. This is to ensure that the driver is not carrying a pressurized hose away from the station, eliminating a dangerous situation.

NOTE: UPON SEPARATION, A VERY LOUD NOISE SHOULD BE EXPECTED.

CAUTION: A HOSE BREAKAWAY EVENT IS INTENDED TO PROTECT THE FUELING DEVICE, DISPENSER, AND VEHICLE. HOSE STRETCH WILL CAUSE A WHIPPING ACTION FOR THE BREAKAWAY MODULE. AS A RESULT, PERSONAL INJURY MAY OCCUR IF SOMEONE IS IN THE WAY OF THE HOSE DURING A BREAKAWAY EPISODE.

SECTION D: RE-ASSEMBLY AFTER BREAKAWAY

Reconnection Procedure

- Step 1. Depressurize the dispenser system and hose before attempting re-connection.
- Step 2. Clean dirt or debris from both halves of the Breakaway unit before re-assembly is attempted.
- Step 3. Inspect both parts of the Breakaway. Make sure that the o-ring seals have not been damaged (Slits or rough spots) (Figure 4). If so, please contact Sherex/OPW customer service for replacement o-rings. For the ILB-1, ILB-H and ILB-2 order o-ring P/N 42020. For the ILB-5 and ILB-6 order o-ring P/N 42007. If the Breakaway Module is damaged or missing, a replacement kit is available as well. If the o-rings are dry lubricate them with light grease (e.g. Parker O-Lube ®) or mild soap before re-assembly.



FIG 4. Breakaway Module O-Rings

- Step 4. Inspect the Stationary Module and ensure that the inner garter spring is present and properly situated in the groove (Figure 5). A replacement garter spring is available from Sherex/OPW customer Service. For the ILB-1, ILB-H and ILB-2 order spring P/N 42024. For the ILB-5 and ILB-6 order spring P/N 42007.

INSTALLATION INSTRUCTIONS TO QUALIFIED TECHNICIANS FOR INLINE BREAKAWAY DEVICES (ILB)

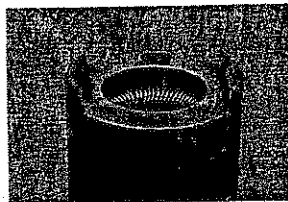


FIG 5. Garter Spring Location

- Step 5. Hold the Breakaway module so that the wrench flats will fit into the slot on the Stationary Module. (Figure 6)



FIG 6. Reconnection Alignment

- Step 6. Push the Breakaway Module into the Stationary Module until a definite click is felt and the wrench flats are in the groove on the Stationary Housing (Figure 7).

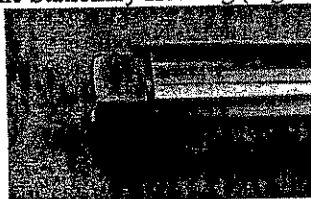


FIG 7. Fully Connected Position

- Step 7. After re-assembly, test the unit for leaks. Pressurize and test the connection using a suitable leak detector (e.g. Snoop®). The test pressures should include both low (100 psi / 0.86 MPa) first and high (3600 psi / 25 MPa). Always pressurize at the low pressure first to ensure that the reconnection has been made correctly.

CAUTION: DO NOT ATTEMPT ANY REPAIR IF LEAKAGE PERSISTS. DOING SO WILL VOID ALL WARRANTIES.

SECTION E: ROUTINE CHECKS

After One Year of Service:

- The unit should be routinely checked for leaks while under service pressure.
- This should be carried out by the local service representative.

After Four Years of Service:

- The unit should be returned to Sherex/OPW for rebuilding and replacement of all seals.
- This period should be reduced to twenty-four (24) months if the potential exists for misuse, abuse, if the ILB is used in extreme environmental surroundings, or if more than 20 breakaways have occurred on the unit.

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