

## Installation and Operation Manual

X-VA-2001-eng

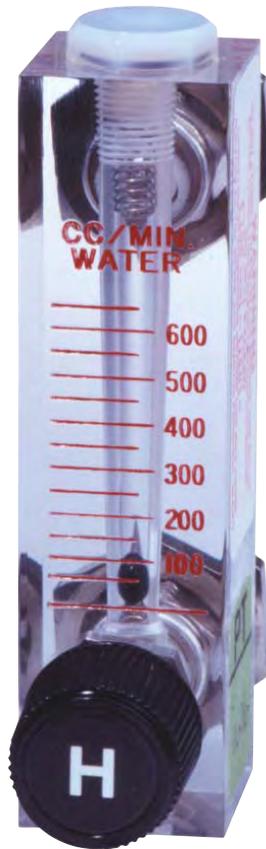
Part Number: 541B039AHG

March, 2008

# Brooks-Mite<sup>®</sup> Flow Indicators, Sizes 2-8



Model 2001  
Size 8



Model 2001 with Valve  
Sizes 2-6

# Essential Instructions

## Read this page before proceeding!

Brooks Instrument designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using and maintaining Brooks Products.

- Read all instructions prior to installing, operating and servicing the product. If this instruction manual is not the correct manual, please see back cover for local sales office contact information. Save this instruction manual for future reference.
- If you do not understand any of the instructions, contact your Brooks Instrument representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation and maintenance of the product.
- Install your equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Brooks Instrument. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look-alike substitutions may result in fire, electrical hazards or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

## Pressure Equipment Directive (PED)

All pressure equipment with an internal pressure greater than 0.5 bar (g) and a size larger than 25mm or 1" (inch) falls under the Pressure Equipment Directive (PED). The Directive is applicable within the European Economic Area (EU plus Norway, Iceland and Liechtenstein). Pressure equipment can be traded freely within this area once the PED has been complied with.

- Section 1 of this manual contains important safety and operating instructions related to the PED directive.
- Meters described in this manual are in compliance with EN directive 97/23/EC module H *Conformity Assessment*.
- All Brooks Instrument Flowmeters fall under fluid group 1.
- Meters larger than 25mm or 1" (inch) are in compliance with category I, II, III of PED.
- Meters of 25mm or 1" (inch) or smaller are Sound Engineering Practice (SEP).

## Installation and Operation Manual

X-VA-2001-eng

Part Number: 541B039AHG

March, 2008

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Dear Customer,

We appreciate this opportunity to service your flow measurement and control requirements with a Brooks Instrument device. Every day, flow customers all over the world turn to Brooks Instrument for solutions to their gas and liquid low-flow applications. Brooks provides an array of flow measurement and control products for various industries from biopharmaceuticals, oil and gas, fuel cell research and chemicals, to medical devices, analytical instrumentation, semiconductor manufacturing, and more.

The Brooks product you have just received is of the highest quality available, offering superior performance, reliability and value to the user. It is designed with the ever changing process conditions, accuracy requirements and hostile process environments in mind to provide you with a lifetime of dependable service.

We recommend that you read this manual in its entirety. Should you require any additional information concerning Brooks products and services, please contact your local Brooks Sales and Service Office listed on the back cover of this manual or visit [www.BrooksInstrument.com](http://www.BrooksInstrument.com)

Yours sincerely,

Brooks Instrument

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## 1-1 Description

The Brooks-Mite® flow indicator provides a means of indication at lowest cost for non-corrosive flow applications. The tapered metering tube is integrally machined in the acrylic plastic body. A standard direct reading scale engraved on the body affords maximum simplicity of installation and operation. Available options include integral needle control valves, as well as flow controllers on the inlet or outlet.

## 1-2 Specifications

### **⚠ WARNING**

**Do not operate this instrument in excess of the specifications listed below. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.**

#### **Capacities**

Refer to Table 1-1

#### **Pressure Equipment Directive (PED) 97/23/EC**

Flowmeters mentioned in this instruction manual are Sound Engineering Practice (SEP).

- Flowmeters are hydrostatic pressure tested according to ASME B31.3.
- Admissible maximum temperatures and pressure are stated below.

#### **Pressure & Temperature**

100 psig max. at temperatures from 35° to 160°F (1.67° to 72°C)

#### **Accuracy**

Meter specified to have an accuracy of  $\pm 10\%$  of full scale

#### **Repeatability**

1% Full Scale

#### **Rangeability**

10 to 1

#### **Scales**

Length - 37mm, nominal (Sizes 2-7), 65mm nominal (Size 8)

Type - Direct read scale engraved on meter body for air or water service (see capacity table for available ranges) millimeter scale with table for air or water service.

Optional: Special direct read scale engraved on meter body.

Model 2001 Brooks-Mite®

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**Materials of Construction**

Meter Body - Clear acrylic plastic  
Floats - Glass, 316 Stainless Steel  
End Fittings - Brass, 316 Stainless Steel  
Clean Out Plugs - Nylon  
Float Stops - 316 Stainless Steel (Sizes 2 - 7)  
O-rings - Buna-N, Viton® fluoroelastomers  
Guide Rod (Sizes 2 - 8), 316 Stainless Steel

**Connections**

Sizes 2-6 - 1/8" NPT female threaded stainless, horizontal  
Size 7-1/8"-1/4" NPT female threaded, stainless, horizontal  
Size 8 - 3/8" NPT female adapters, stainless, vertical; 3/4" NPT female machined in body, vertical

**Dimensions**

Refer to Figures 1-1, 1-2, 1-3, 1-4 and 1-5  
(For certified prints, contact the factory)

**Compatible Brooks Equipment**

Brooks-Line® IV (Sizes 2-6, see DS-VA-BLIV-eng), or standard needle (Size 7) integral flow control valve on inlet or outlet. Cannot be installed on manifolded fittings.  
Flush mountings bezels in aluminum (Sizes 2-7) or steel (Size 8).  
Threaded adaptors and locknuts for front of panel mounting (Sizes 2-7).  
Integral flow controllers and needle valves (See DS-VA-FC-eng).

Table 1-1 Model 2001 Capacities

Meter Size Tube & Float	Maximum Flow Rate	
	Air	Water
2-38 A Glass	2 scfh	
2-38 B Stn. Stl.	4.5 scfh	
2-38 C Glass		.25 gph
2-38 D Stn. Stl.		.8 gph
2-38 E Glass		16 cc/min
2-38 F Stn. Stl.		50 cc/min
4-38 A Glass	10 scfh	
4-38 B Stn. Stl.	18 scfh	
4-38 C Glass		1.4 gph
4-38 D Stn. Stl.		4 gph
4-38 E Glass		90 cc/min
4-38 F Stn. Stl.		250 cc/min
6-38 A Glass	50 scfh	
6-38 B Stn. Stl.	90 scfh	
6-38 B Stn. Stl.	1.5 scfm	
6-38 C Glass		10 gph
6-38 D Stn. Stl.		20 gph
6-38 E Glass		650 cc/min
6-38 F Stn. Stl.		1200 cc/min
7-38 A Stn. Stl.	225 scfh	
7-38 B Stn. Stl.		
8-75 A Stn. Stl.	6.5 scfm	
8-75 B Stn. Stl.	10 scfm	
8-75 C Stn. Stl.	15 scfm	
8-75 D Stn. Stl.		2.0 gpm
8-75 E Stn. Stl.		3.0 gpm
8-75 F Stn. Stl.		4.5 gpm

Model 2001 Brooks-Mite®

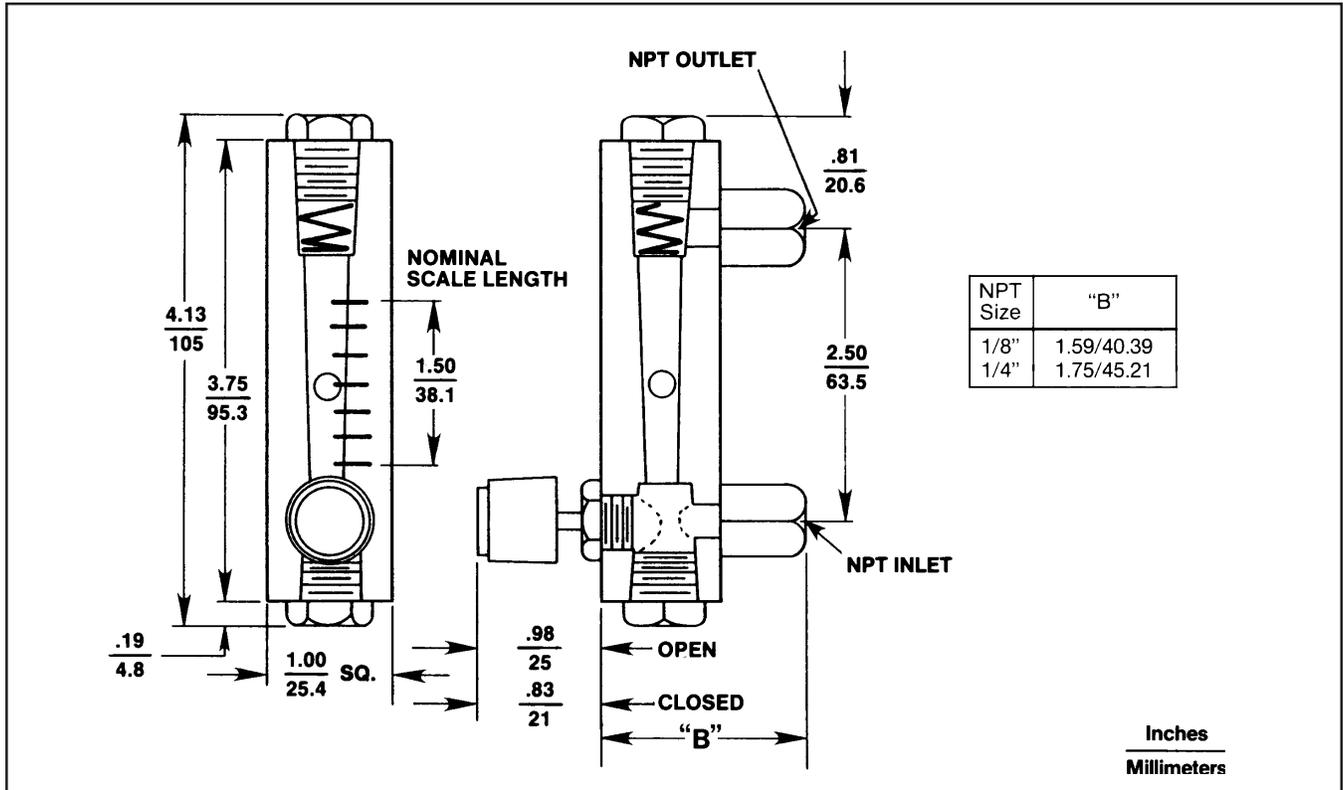


Figure 1-1 Model 2001 Dimensions, Sizes 2-6

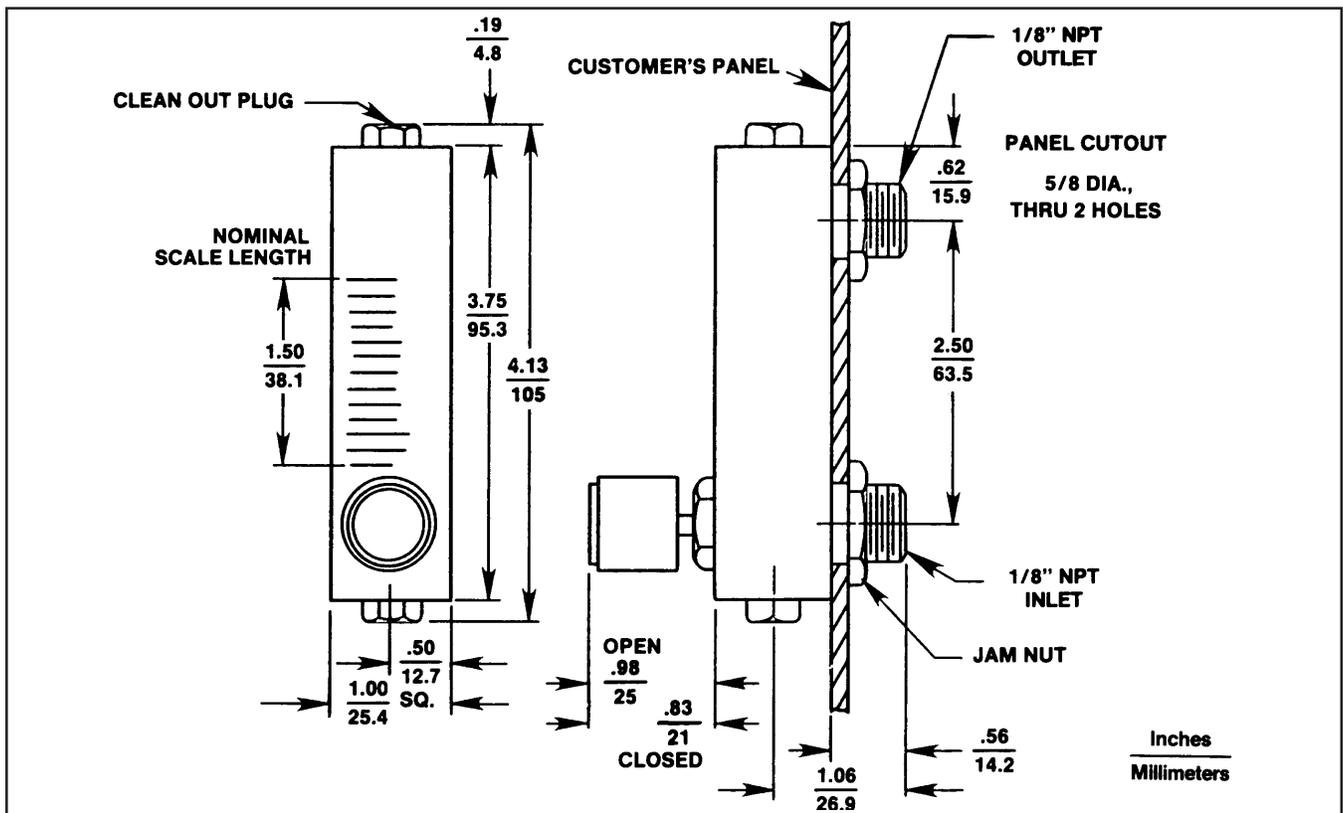


Figure 1-2 Model 2001 Dimensions, Sizes 2-6 (Front Panel Mounting)

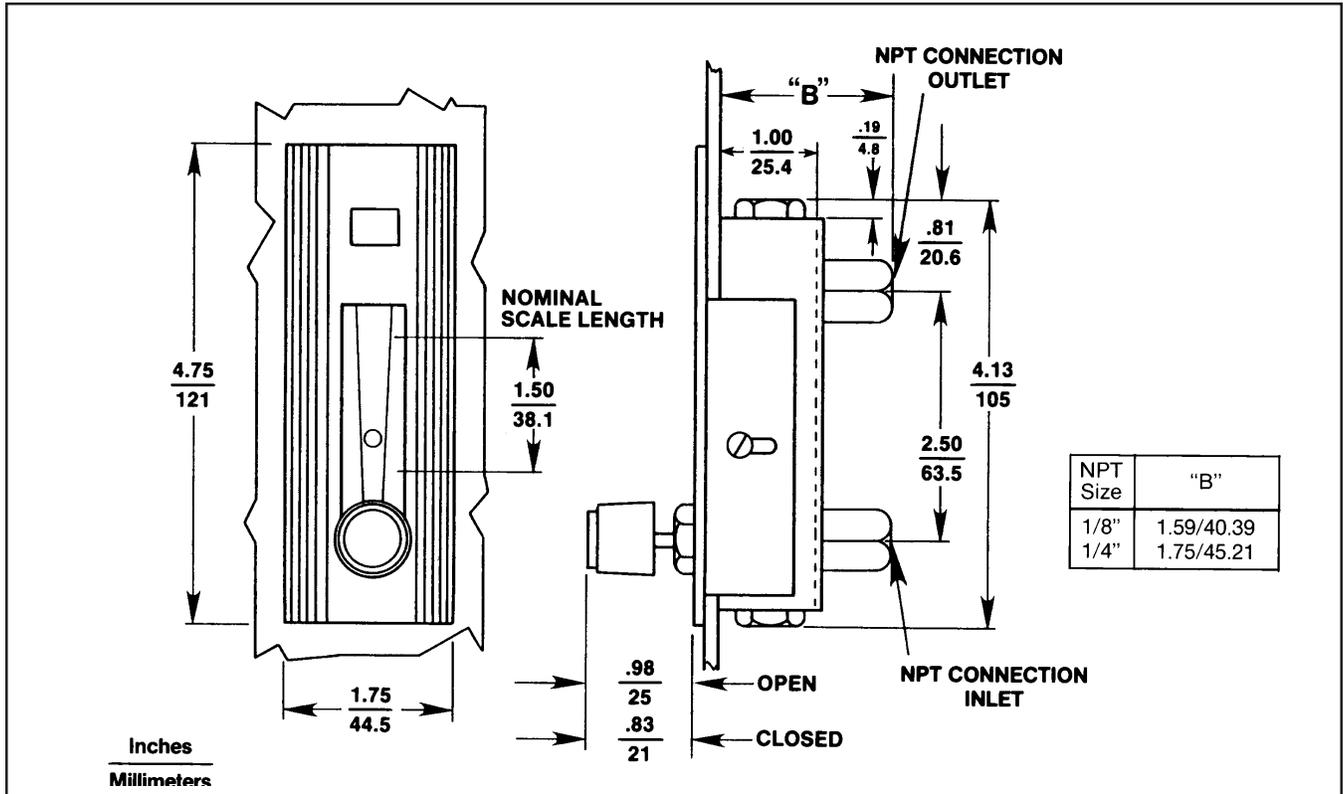


Figure 1-3 Model 2001 Dimensions, Sizes 2-6 (Bezel Mounting)

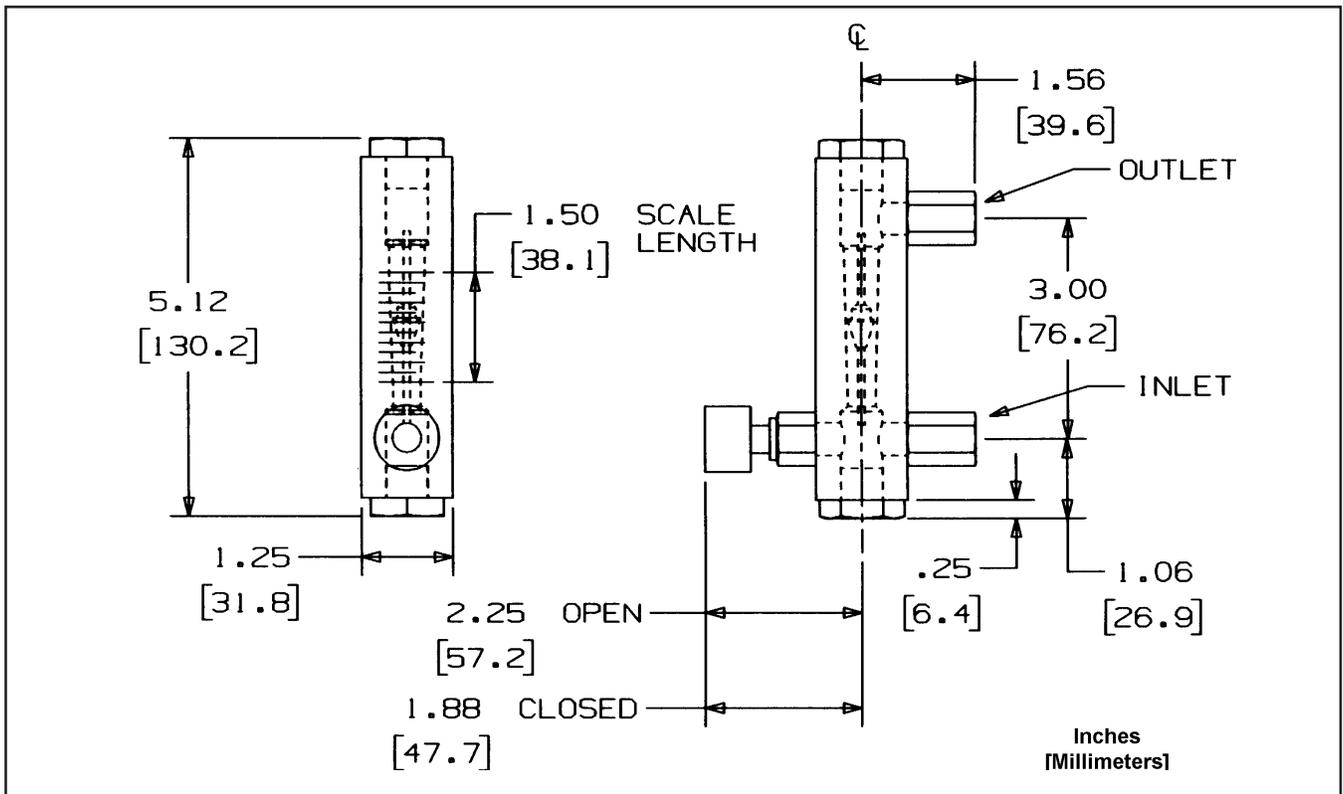


Figure 1-4 Model 2001 Dimensions, Size 7

Model 2001 Brooks-Mite®

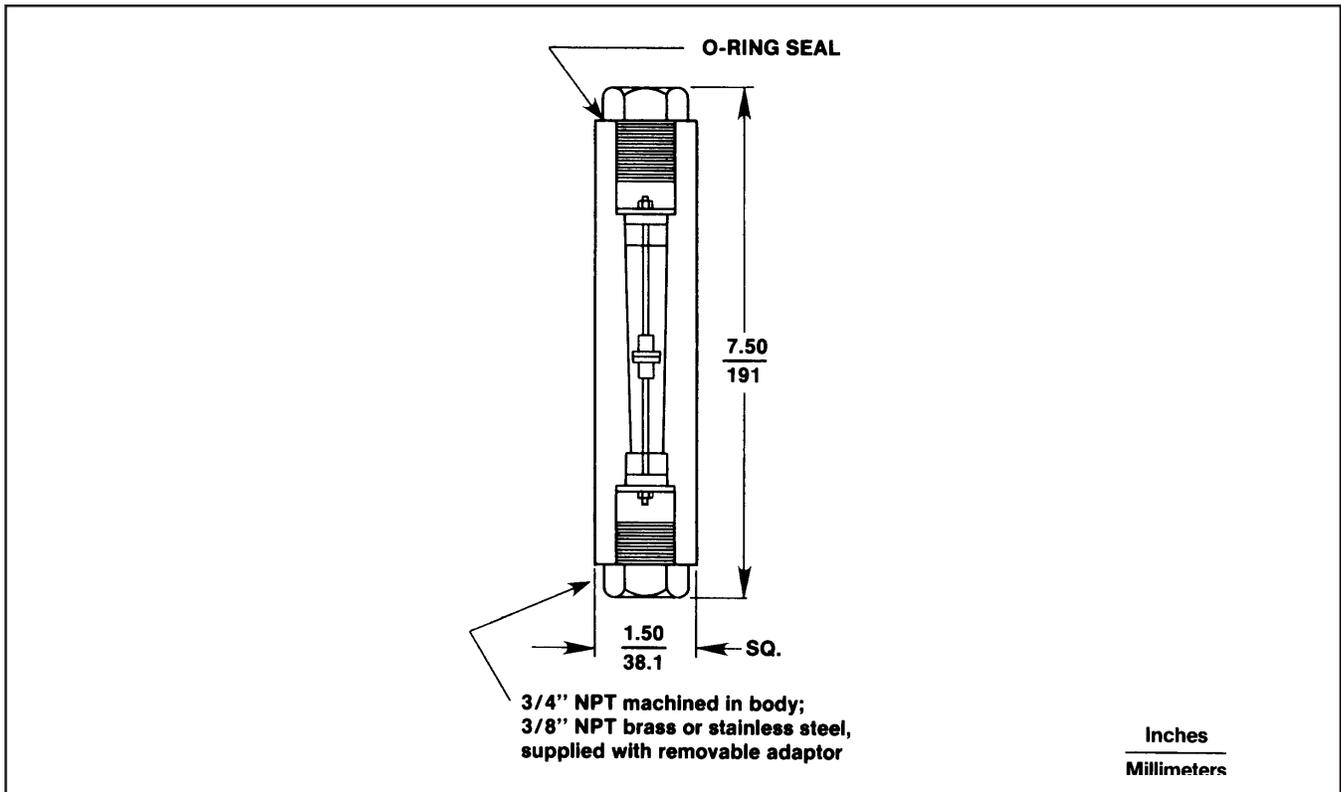


Figure 1-5 Model 2001 Dimensions, Size 8

**2-1 General**

This section contains the procedures for the receipt and installation of the instrument. Do not attempt to start the system until the instrument has been permanently installed. It is extremely important that the start-up procedures be followed in the exact sequence presented.

**2-2 Receipt of Equipment**

When the instrument is received, the outside packing case should be checked for damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to your nearest Product Service Department.

**Brooks Instrument**

407 W. Vine Street  
P.O. Box 903  
Hatfield, PA 19440 USA  
Toll Free (888) 554-FLOW (3569)  
Tel (215) 362-3700  
Fax (215) 362-3745  
E-mail: BrooksAm@EmersonProcess.com  
www.BrooksInstrument.com

**Brooks Instrument**

Neonstraat 3  
6718 WX Ede, Netherlands  
P.O. Box 428  
6710 BK Ede, Netherlands  
Tel 31-318-549-300  
Fax 31-318-549-309  
E-mail: BrooksEu@EmersonProcess.com

**Brooks Instrument**

1-4-4 Kitasuna Koto-Ku  
Tokyo, 136-0073 Japan  
Tel 011-81-3-5633-7100  
Fax 011-81-3-5633-7101  
Email: BrooksAs@EmersonProcess.com

Remove the envelope containing the packing list. Carefully remove the instrument from the packing case. Make sure spare parts are not discarded with the packing materials. Inspect for damaged or missing parts.

**2-3 Recommended Storage Practice**

If intermediate or long-term storage of equipment is required, it is recommended that the equipment be stored in accordance with the following:

- a. Within the original shipping container.
- b. Stored in a sheltered area, preferably a warm, dry, heated warehouse.
- c. Ambient temperature of 70° F (21° C) nominal, 109° F (43° C) maximum, 45° F (7° C) minimum.
- d. Relative humidity 45% nominal, 60% maximum, 25% minimum.  
Upon removal from storage a visual inspection should be conducted to verify the condition of equipment is "as received".

## Model 2001 Brooks-Mite®

**2-4 Return Shipment**

Prior to returning any instrument to the factory, contact your nearest Brooks location for a Return Materials Authorization Number (RMA#). This can be obtained from one of the following locations:

**Brooks Instrument**

407 W. Vine Street  
P.O. Box 903  
Hatfield, PA 19440 USA  
Toll Free (888) 554-FLOW (3569)  
Tel (215) 362-3700  
Fax (215) 362-3745  
E-mail: BrooksAm@EmersonProcess.com  
www.BrooksInstrument.com

**Brooks Instrument**

Neonstraat 3  
6718 WX Ede, Netherlands  
P.O. Box 428  
6710 BK Ede, Netherlands  
Tel 31-318-549-300  
Fax 31-318-549-309  
E-mail: BrooksEu@EmersonProcess.com

**Brooks Instrument**

1-4-4 Kitasuna Koto-Ku  
Tokyo, 136-0073 Japan  
Tel 011-81-3-5633-7100  
Fax 011-81-3-5633-7101  
Email: BrooksAs@EmersonProcess.com

Instrument must have been purged in accordance with the following:

**⚠ WARNING**

**Before returning the device purge thoroughly with a dry inert gas such as Nitrogen before disconnecting gas connections. Failure to correctly purge the instrument could result in fire, explosion or death. Corrosion or contamination may occur upon exposure to air.**

All flow instruments returned to Brooks requires completion of Form RPR003-1, Brooks Instrument Decontamination Statement, along with a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument. Failure to provide this information will delay processing by Brooks personnel. Copies of these forms can be downloaded from the Brooks website [www.BrooksInstrument.com](http://www.BrooksInstrument.com) or are available from any Brooks Instrument location listed above.

**2-5 Transit Precautions**

To safeguard against damage during transit, transport the instrument to the installation site in the same container used for transportation from the factory if circumstances permit.

**2-6 Removal from Storage**

Upon removal of the instrument from storage, a visual inspection should be conducted to verify its "as-received" condition. If the instrument has been subject to storage conditions in excess of those recommended (See Section 2-3), it should be subjected to a pneumatic pressure test in accordance with applicable vessel codes.

2-7 Installation

Mount the meter in a vertical position with the inlet (upstream flow line) connected to the bottom connection, and the outlet (downstream line) connected to the top connection. Standard connection adaptors are horizontal (Sizes 2-7), vertical (Size 8) screwed hand tight into the body and lightly tightened with wrench to seal adequately. The connections are provided with wrench flats so the fittings may be held firmly in place with an open end wrench, while the pipe or tubing fittings are threaded into the adaptor. Flexible pipe is recommended to avoid stressing the meter body.

**⚠ WARNING**

If the inlet and outlet valves adjacent to the flowmeter are to be closed for any reason, the flowmeter must be completely drained. Failure to do so may result in thermal expansion of the liquid which can cause rupture of the meter and possible personal injury.

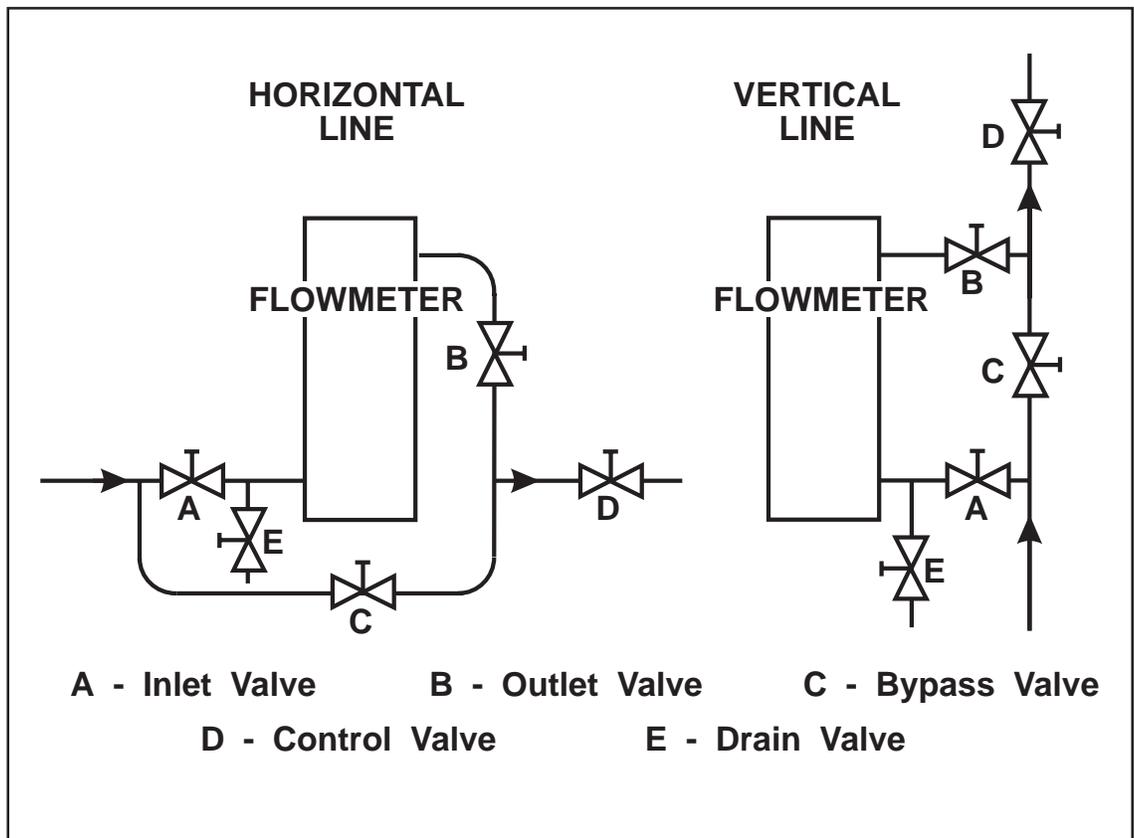


Figure 2-1 Typical Flowmeter Installation

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### 3-1 Operation

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#### **WARNING**

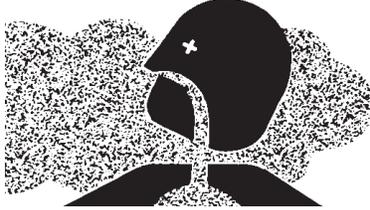
**Do not operate this instrument in excess of temperature and pressure ratings. Failure to heed this warning may result in serious personal injury and/or damage to the equipment.**

After the Brooks-Mite has been installed in the flow line it is ready for operation. A built-in needle control valve may be provided to control flow through the flowmeter. These control valves are designed for fine control. Excessive tightening of the valve may damage the valve seat and limit its effectiveness as a control valve.

Glass or Stainless Steel ball floats (Sizes 2-6), and Stainless Steel floats (Sizes 7 & 8) are available. Ball floats are read by observing the location of the center of the float against the scale inscribed on the meter body. Rod guided floats are read at the very top edge of the metering head.

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#### 4-1 Overview

	<b>⚠ WARNING</b>
<b>METER/CONTROLLER SEAL COMPATIBILITY</b>	
<p>Products in this manual may contain metal or elastomeric seals, gaskets, O-rings or valve seats. It is the "user's" responsibility to select materials that are compatible with their process and process conditions. Using materials that are not compatible with the process or process conditions could result in the Meter or Controller leaking process fluid outside the pressure boundary of the device, resulting in personnel injury or death.</p> <p>It is recommended that the user check the Meter or Controller on a regular schedule to ensure that it is leak free as both metal and elastomeric seals, gaskets, O-rings and valve seats may change with age, exposure to process fluid, temperature, and /or pressure.</p>	

#### 4-2 Cleaning Procedure Sizes 2-6

Brooks-Mite flow indicators require little maintenance except routine cleaning. To clean the Brooks-Mite Sizes 2-6, remove the top and bottom clean-out plugs, float stops and metering float. The metering tube may be cleaned with a pipe cleaner or similar soft material. Never use a hard material, as the tube can easily be scored, and this will affect the accuracy of the meter. The metering float may be wiped clean with soft gauze. Never use a cleaning fluid or solvent to clean a Brooks-Mite flow indicator. For control valve maintenance procedures, refer to the applicable Installation & Operating Instructions.

#### 4-3 Cleaning Procedure Sizes 7 & 8

To clean the Brooks-Mite Sizes 7 and 8, loosen guide rod nut and remove cartridges, guide rod and float. Before removing the float, note its position so it will be reassembled in the same manner. The metering tube may be cleaned with a pipe cleaner or similar soft material. Never use a hard material, as the tube can easily be scored, and this will affect the accuracy of the meter. The metering float may be wiped clean with soft gauze. Reassemble the meter, tighten the guide rod nuts hand tight, and use a 1/4" wrench to tighten the nuts approximately one turn.

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**5-1 General**

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When ordering parts please specify:  
Brooks Serial Number,  
Model Number,  
Part Number,  
Description and Quantity.  
Refer to Figure 5-1 and  
Table 5-1.

Model 2001 Brooks-Mite®

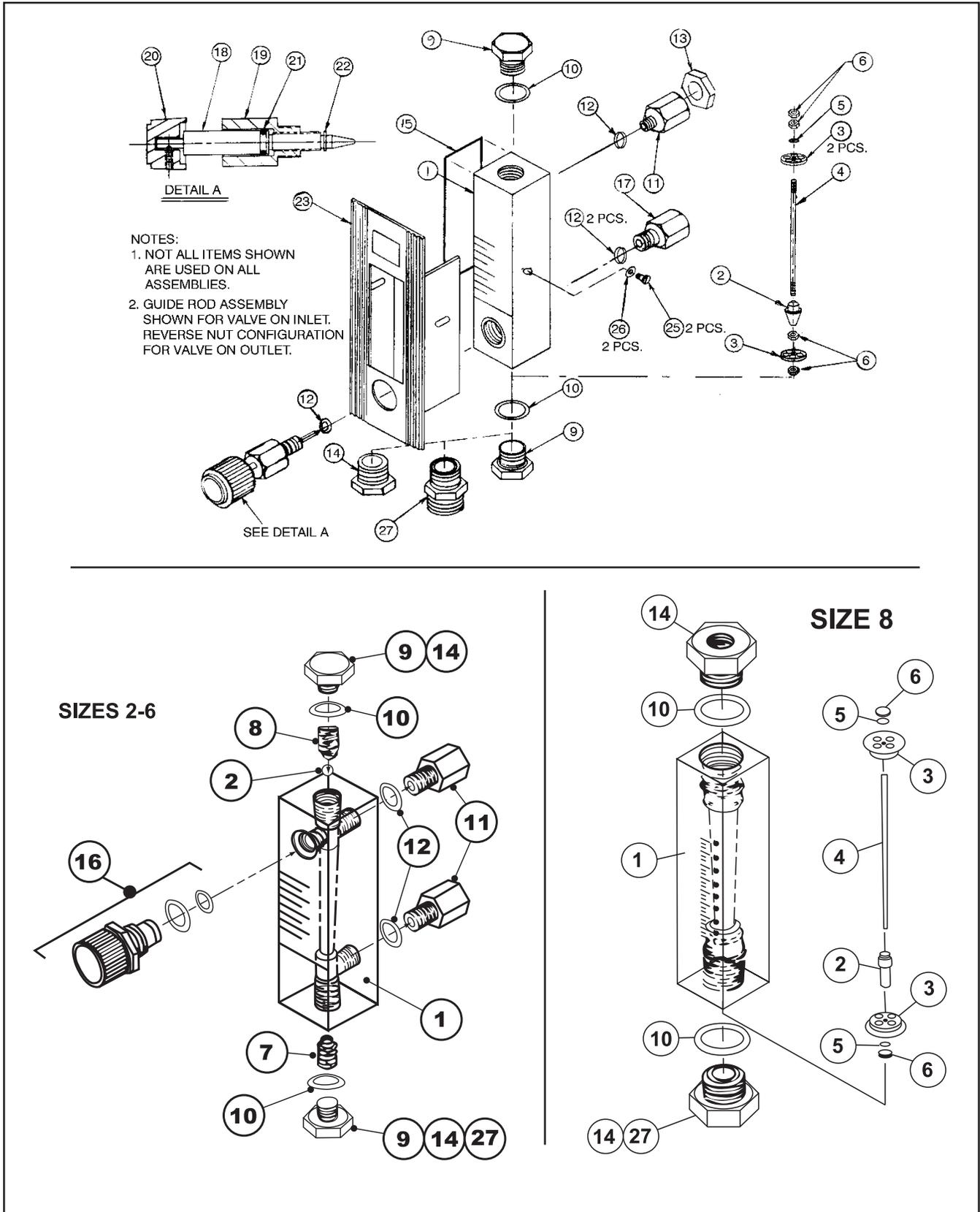


Figure 5-1 Exploded View, Size 7, Sizes 2-6 and Size 8 model 2001 Brooks-Mite® Flow Indicators

Table 5-1 Parts List

Ref. No.	Qty.	Description
1	1	Body
2	1	Float
3	2	Guide Cartridge
4	1	Guide Rod
6	2	Hexnut
9	2	Pipe Plug
10	2	O-ring: Pipe Plug or Vert Adapter
		Buna Viton EPR
11	2 (1)	Adapters - Horizontal 1/8" NPT Brass 316 SS Thd 1/8" NPT Brass 316 SS 1/4" NPT Brass 316 SS Thd 1/4" NPT Brass 316 SS
12	2(3)	O-ring for Adapters Buna Viton EPR
13	2	Locknuts for Thd Adapters
14	2 (1)	Adapters - Vertical 1/4" NPTBrass 316 SS
15	1	Warning Label
17	1	Needle Valve Seat (Adapter) 1/8" NPT Brass 316 SS Thd 1/8" NPT Brass 316 SS 1/4" NPT Brass 316 SS Thd 1/4" NPT Brass 316 SS
18	1	Valve Stem Brass 316 SS
19	1	Valve Bonnet Brass 316 SS
20	1	Valve Knob
21	1	O-ring: ValveStem Buna Viton EPR
22	1	Retaining Ring for Valve
23	1	Bezel: No Valve With Valve With Flow Controller
25	2	Screws - Bezel Mtg.
27	1	Adapter to Flow Controller Brass 316 SS

Model 2001 Brooks-Mite®

LIMITED WARRANTY

Seller warrants that the Goods manufactured by Seller will be free from defects in materials or workmanship under normal use and service and that the Software will execute the programming instructions provided by Seller until the expiration of the earlier of twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller. Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer.

All replacements or repairs necessitated by inadequate preventive maintenance, or by normal wear and usage, or by fault of Buyer, or by unsuitable power sources or by attack or deterioration under unsuitable environmental conditions, or by abuse, accident, alteration, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at Buyer's expense.

Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller.

BROOKS LOCAL AND WORLDWIDE SUPPORT

Brooks Instrument provides sales and service facilities around the world, ensuring quick delivery from local stock, timely repairs and local based sales and service facilities.

Our dedicated flow experts provide consultation and support, assuring successful applications of the Brooks flow measurement and control products.

Calibration facilities are available in local sales and service offices. The primary standard calibration equipment to calibrate our flow products is certified by our local Weights and Measures Authorities and traceable to the relevant international standards.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required.

For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users and maintenance persons. Please contact your nearest sales representative for more details.

HELP DESK

In case you need technical assistance:

- Americas 1-888-554-FLOW
Europe +(31) 318 549 290 Within Netherlands 0318 549 290
Asia +011-81-3-5633-7100

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

TRADEMARKS

- Brooks Brooks Instrument, LLC
Brooks-Line IV Brooks Instrument, LLC
Brooks-Mite Brooks Instrument, LLC
Viton DuPont Performance Elastomers



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