Installation and Operation Manual
X-VA-1307-eng
Part Number: 541B079AHG
March, 2008

Model 1307 O-ring Seal Flowmeter

Model 1307

BROOKS® INSTRUMENT

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).

⚠ WARNING

GLASS TUBE EXPLOSION HAZARD

Plastic protective sleeve must remain over glass tube.
Fasten meter windows securely.
Do not operate above pressure and temperature limits.
Avoid pressure and flow surges.
Do not service or repair while pressurized.
Read and understand instruction manual.
Failure to comply could result in serious personal injury or property damage.

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GLASS TUBE EXPLOSION HAZARD

Protective sleeve must remain over glass tube.
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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

Yours sincerely,

Brooks Instrument

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1-1 Description

Model 1307 O-ring seal flowmeters are economical, accurate indicating flowmeters. They are designed for applications where the industrial features or special materials of construction of Brooks® standard Full-View® or GT 1000 flowmeters are not required.

1-2 Design Features

- Side-plate construction
- Ten-to-one rangeability
- O-ring seal - inlet and outlet same size
- Choice of float types and capacity ranges
- Standard NPT connections

1-3 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.

⚠ WARNING

Glass metering tubes are designed for operation up to the maximum operating pressures and temperatures as specified herein. Due to the inherent brittle characteristics of glass and conditions beyond our control, tube breakage could result even within specified operating conditions. Do not use glass tube meters with fluids that are toxic, or chemically react with glass such as water above 140°F, steam, alkalis, flourine, hydrofluoric acid, or molten metal. Failure to heed warning can result in serious personal injury and/or damage to the equipment.

Capacities
Refer to Table 1-1

Flow Accuracy
Standard: ±2% full scale from 100% down to 10% of scale reading.
Optional: ±1% of full scale from 100% down to 10% of scale reading.

Repeatability
0.5% full scale

Pressure Ratings
Refer to Table 1-2

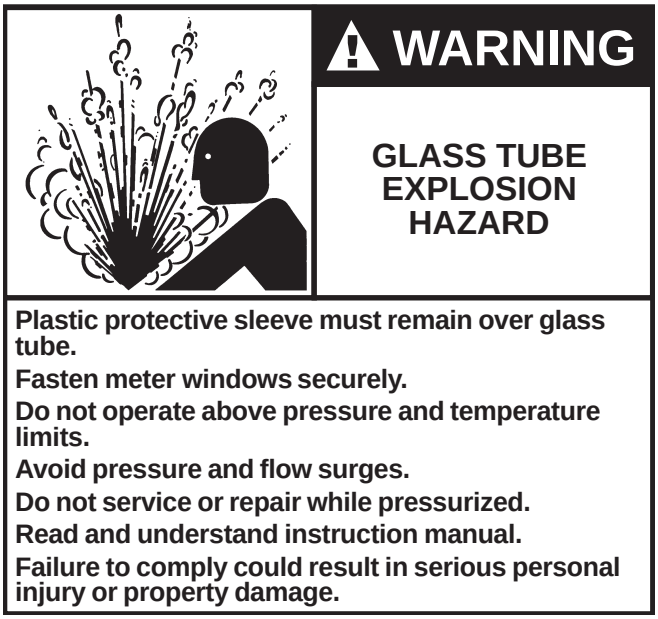
Scales
Length: 250 mm
Standard: Fused on metering tube, choice of arbitrary millimeter or calibration data sheet; percentage of maximum flow with factor tag.
Optional: Direct reading, engraved detachable metal plate.

Ambient Temperature Limits
33°F to 125°F (1°C to 52°C)

Operating Fluid Temperature Limits
33°F to 250°F (1°C to 121°C)

Materials of Construction:
Metering Tube
Borosilicate Glass

Protective Tube Sleeve
UV stabilized polycarbonate



Floats
Size 7 (1/2") (ball floats) glass, 316 stainless steel, Monel®
Size 8 (1/2") - 13 (1/2") 316 stainless steel

Float Stops
316 stainless steel

Float Types
Spherical: Size 7 meter only
Types RV, LJ and RS: Sizes 8 to 13, refer to Figure 1-1

Housing
Side-plates: Aluminum, stainless steel

End Fittings
Brass or 316 stainless steel

O-rings
Standard: Buna-N
Optional: Viton-A® fluoroelastomers

Window
Scratch resistant, UV stabilized polycarbonate

⚠ WARNING

GLASS TUBE EXPLOSION HAZARD

Protective sleeve must remain over glass tube.
Fasten meter windows securely.
Failure to comply could result in serious personal injury or property damage.

Connections
NPT female

Dimensions
Refer to Figure 1-2

1-4 Optional Equipment

Mounting - front of panel screws

Table 1-1. Capacities.

METER SIZE	TUBE	FLOAT	WATER				AIR @ 14.7 PSIA AND 70°F (21°C)			
			GPM	LPM	PRESSURE DROP INCHES W.C.	VISCOSITY IMMUNITY CEILING, CS (**)	SCFM	SLPM	PRESSURE DROP INCHES W.C.	PSI CRITICAL (*)
7	R-7M-25-1F	GLASS	0.17	0.64	1.0	1.0	0.93	26.3	2.0	0
		STN. STL.	0.37	1.40	3.0	1.0	1.64	46.4	4.0	0
		MONEL	0.39	1.48	4.0	1.0	1.72	48.7	4.0	0
8	R-8M-25-4F	8-RV-3	0.78	2.95	4.0	2.0	3.17	89.8	4.0	0
		8-RV-8	1.09	4.13	7.0	3.7	4.45	126.0	8.0	0
		8-RS-8	1.40	5.30	10.0	1.8	5.86	166.0	11.0	0
		8-RV-14	1.45	5.49	12.0	5.4	5.88	166.5	14.0	0
		8-RS-14	1.83	6.93	17.0	1.9	7.56	214.1	19.0	0
		8-RV-31	2.06	7.80	23.0	7.0	8.32	235.6	28.0	30
		8-RS-31	2.59	9.80	33.0	3.1	10.66	301.9	37.0	30
9	R-9M-25-3F	9-RV-33	2.53	9.58	6.0	11.0	10.45	295.9	7.0	0
		9-RS-33	3.24	12.26	7.0	2.4	13.45	380.9	8.0	0
		9-RV-87	3.92	14.84	14.0	17.0	16.25	460.2	16.0	30
		9-RS-87	5.12	19.38	17.0	3.5	21.20	600.4	20.0	30
10	R-10M-25-3F	10-RV-64	6.28	23.77	11.0	15.0	25.76	729.5	13.0	0
		10-RS-64	7.84	29.67	15.0	3.7	32.15	910.5	17.0	0
		10-RV-138	8.84	33.46	23.0	23.0	36.10	1022.4	26.0	30
		10-RS-138	10.93	41.37	29.0	5.5	45.90	1299.9	33.0	30
12	R-12M-25-5F	12-RV-221	17.21	65.14	10.0	29.0	70.80	2005.1	11.0	0
		12-RV-343	20.95	79.30	15.0	36.0	86.45	2448.3	17.0	30
		12-RS-221	22.40	84.78	12.0	4.2	91.85	2601.2	14.0	0
		12-RS-343	26.90	101.82	18.0	4.5	112.00	3171.8	20.0	30
		12-LJ-740	67.60	255.87	65.0	1.0	299.50	8481.8	75.0	30
13	R-13M-25-3F	13-RV-510	31.78	120.29	17.0	42.0	130.90	3707.1	19.0	0
		13-RV-760	37.60	142.32	24.0	52.0	155.20	4395.3	27.0	30
		13-RS-510	42.52	160.94	23.0	7.6	176.60	5001.3	26.0	0
		13-RS-760	49.55	187.55	32.0	9.3	217.70	6165.3	36.0	30
		13-LJ-1394	92.00	348.22	92.0	1.0				

(*) MINIMUM OPERATING DOWNSTREAM PRESSURE FOR GAS SERVICE (PSIG)
(**) VISCOSITY IMMUNITY CEILING LISTED IS FOR STAINLESS STEEL FLOAT AND FLUID SP.GR. 1.0.

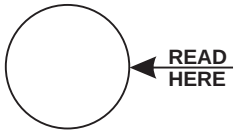
Table 1-2. Pressure Ratings.

Meter Size	Maximum Working Pressure (psig)	Max. Temp. Gas Service
7	350	
8	300	
9	175	250°F (121°C)
10	100	
12	75	
13	100	

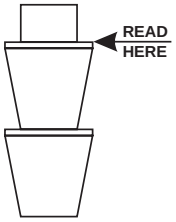
1. **Pressure ratings are based on static pressure applicable at 250°F.**
2. **Glass tubes are not usable for caustic service.**
3. **Fluid temperatures below 32°F will cause frosting of the glass metering tube. Please consult factory for applications below this temperature.**

Figure 1-1. Float Types.

Spherical - Lowest meter capacity and no viscous fluids with medium capacity.



Spherical

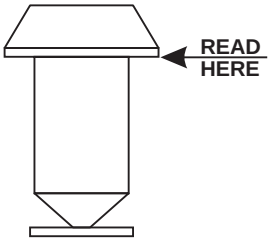


Type LJ

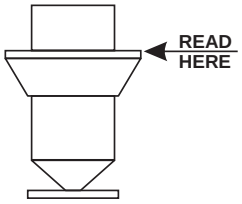
Type LJ - Maximum flowmeter capacity with limited viscosity immunity.

Type RV (rib guided) - Highest immunity to viscous fluids with medium meter capacity. (Most stable)

Type GV (rod guided) - Analogous in design to a sharp edge orifice. Gives most immunity to viscosity variations of the fluid being metered.



Type RV (Rib guided)

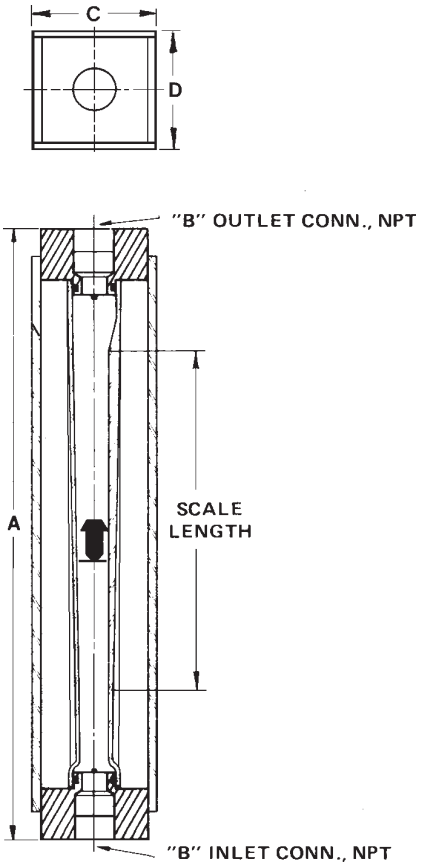


Type RS (Rib guided)

Type RS (rib guided) - High flow capacity with some immunity to viscous fluids.

Type GS (rod guided) - Analogous in design to a flow nozzle or venturi. Offers the maximum flow capacity in any given size flowmeter.

Figure 1-2. Dimensions.



Meter Size	Dimensions			
	A	B	C	D
7 & 8	16-15/16"	1/2"	2-3/8"	2-1/2"
9	16-15/16"	3/4"	2-3/8"	2-1/2"
10	17"	1"	2-3/8"	2-9/16"
12	19-1/16"	1-1/2"	3-3/8"	2-1/2"
13	21-7/16"	1-1/2"	4-1/2"	4-1/2"

2-1 Receipt of Equipment

When the equipment is received, the outside of the packing case should be checked for any damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. Remove the envelope containing the shipping list. Carefully remove the equipment from the packing case and inspect for any damaged or missing parts.

In the event that the meter is damaged during shipment, the Product Service Department, Brooks Instrument, LLC, Hatfield, PA 19440 should be contacted to obtain a return shipment form.

2-2 Recommended Storage Practice

If intermediate or long term storage is required for equipment, as supplied by Brooks Instrument, it is recommended that said 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 70°F (21.0°C) nominal 110°F maximum/45°F minimum (43°C maximum/7.1°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".

2-3 Installation

⚠ NOTICE

Prior to meter installation remove the plastic shipping tube preventing float movement during shipping.

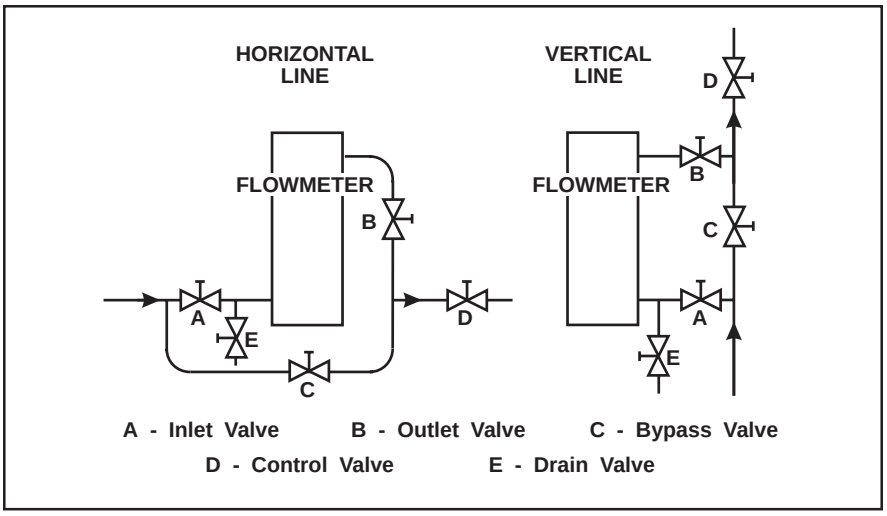
A. Location

For proper operation the Model 1307 must be mounted within 6 degrees of true vertical, with the inlet connection at the bottom and the outlet at the top. The use of a level is recommended to assure vertical positioning. Piping must be adequately supported to prevent undue strain on the flowmeter.

B. Piping Arrangement

It is recommended that bypass piping be installed around the flowmeter so it may be isolated from the process line for servicing and cleaning. Refer to Figure 2-1 for a typical installation.

Figure 2-1. Typical Bypass Installation.



⚠ CAUTION

Do not allow the float to fall out of the metering tube. A damaged float will affect the accuracy of the meter. Be careful not to break the tube by pulling on it at an extreme angle or applying excessive force.

⚠ CAUTION

Failure to drain the flowmeter when isolated in a bypass loop may result in tube breakage caused by thermal expansion of the process liquid.

Horizontal outlet connection is provided on Model 1307 flowmeters supplied with an alarm. For those flowmeters supplied with an alarm, the outlet end fitting may be rotated in 90° increments.

3-1 Operating Instructions

After the flowmeter has been properly installed in the system, it is ready for operation.

⚠ WARNING

GLASS TUBE EXPLOSION HAZARD

Plastic protective sleeve must remain over glass tube.
Fasten meter windows securely.
Do not operate above pressure and temperature limits.
Avoid pressure and flow surges.
Do not service or repair while pressurized.
Read and understand instruction manual.
Failure to comply could result in serious personal injury or property damage.

⚠ WARNING

GLASS TUBE EXPLOSION HAZARD

Protective sleeve must remain over glass tube.
Fasten meter windows securely.
Failure to comply could result in serious personal injury or property damage.

To initiate flow through a flowmeter using bypass piping, refer to Figure 3-1.

1. Close flowmeter isolation valves (A) and (B).
2. Fully open bypass valve (C) and slightly open control valve (D).
3. Initiate process flow. When flow has stabilized, fully open isolation valve (B), then slowly open isolation valve (A) fully.
4. Close bypass valve (C).
5. Regulate process flow using control valve (D).
6. If meter is left in by pass configuration, open drain valve (E) to prevent tube damage caused by thermal expansion of the process liquid.

⚠ CAUTION

Failure to drain the flowmeter when isolated in a bypass loop may result in tube breakage caused by thermal expansion of the process liquid.

Rate of flow is indicated by reading the increments inscribed on the metering tube or direct etched scale parallel with the metering edge of the float. For the correct reading edge of the float, refer to Figure 3-2.

Figure 3-1. Typical Bypass Installation.

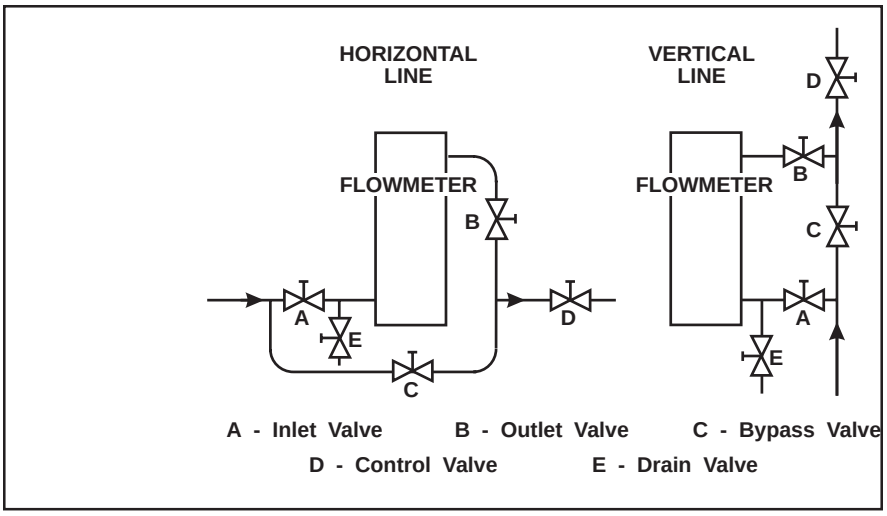
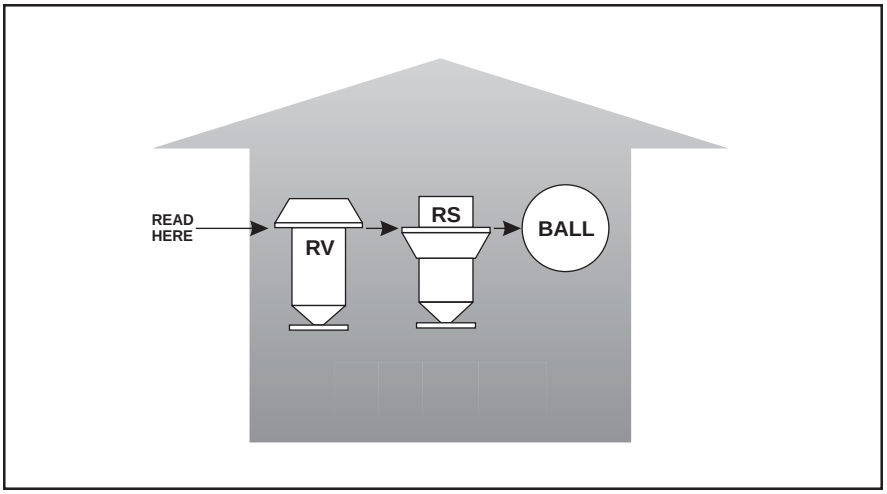


Figure 3-2. Reading edge of floats.



4-1 General

Model 1307 flowmeters require little maintenance except routine cleaning. It is necessary to remove the flowmeter from the line for tube and float cleaning. The tube and float may be cleaned with a soft absorbent swab. To disassemble the flowmeter proceed as follows:

a. Remove the front and rear window shields.
b. Remove four (4) screws connecting the bottom end fitting to the side plate.
c. Carefully pull the end fitting and tube away from the side plates and top fitting. DO NOT cock the tube when removing it from the top fitting.
d. Remove the polycarbonate sleeve surrounding the flow tube.
e. Remove the float from the tube.

⚠ CAUTION

Do not allow the float to fall out of the metering tube. A damaged float will affect the accuracy of the meter. Be careful not to break the tube by pulling on it at an extreme angle or applying excessive force.

f. Using a suitable solvent, carefully swab and flush the inside of the metering tube. Clean the float and blow dry all parts thoroughly.

⚠ NOTICE

Anytime the meter is removed for service, new O-rings should be installed in both the inlet and outlet end fittings.

Reassemble the flowmeter as follows:
a. Carefully install the float in the tube with the metering edge up. Refer to Figure 3-1 to determine the metering edge location.
b. Carefully hold the tube, (with float installed), sleeve, and end fitting, and push the tube on the top fitting.
c. Tighten the four (4) side plate screws in place.
d. Install the front and rear windows.

⚠ WARNING

Pressure test the meter before returning it to service. Hydrostatic pressure testing should be performed by qualified personnel or serious injury and/or damage to the equipment can result.

Model 1307

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)-0318-549-290	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

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Monel ..... Inco Alloys International Inc.
Viton ..... DuPont Performance Elastomers

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