

PRODUCT GUIDE

BROOKS[®]
INSTRUMENT

Application Experience
Beyond Measure

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Application Experience Beyond Measure



Every day, customers turn to Brooks Instrument for solutions to their flow, pressure, vacuum and level challenges. Brooks' award-winning meters and controllers consistently rank at the top of their category for accuracy, reliability and user preference, as judged by the audience that matters – users of instrumentation. Brooks provides the broadest array of flow, pressure and level products in the market for a diverse range of industries:

- Semiconductors
- Chemical/petrochemical
- Biopharmaceuticals
- Solar cell
- Fuel cell
- Fiber optic
- LED
- Oil and gas
- Analytical instrumentation
- Power
- Medical devices

But Brooks' products are only half the story. Our customers are backed by unsurpassed technical expertise around the planet. Local Brooks product and application specialists bring to each customer priceless application experience. They have been extensively trained to help you select the optimal solutions for your measurement and control needs, and offer years of experience solving application problems just like yours.

When technology matters: Brooks' revolutionary MultiFlo™ technology offers users of thermal mass flow products tremendous flexibility to satisfy a broad range of applications with one device.

When quality matters: A leading anesthesiology equipment supplier uses thousands of Brooks needle valves annually because of their precise, repeatable flow control and smooth 'feel.'

When precision matters: A Big 5 chemical company uses Brooks thermal mass and Quantim® Coriolis products exclusively for their critical catalyst and process research.

When repeatability matters: Many leading biotechnology companies use only Brooks thermal mass flow controllers as the standard for bench-top reactors and full production units to ensure smooth scale-up.

When consistent performance over a wide range of flows matters: Leading fuel cell companies worldwide specify Brooks thermal mass flow controllers for their exceptional accuracy, wide turn-down and response time.

When global reach matters: Leading engineering contractors select Brooks variable area meters for multi-national projects that require compliance with worldwide standards because of Brooks' local experience and global support.

When certifications matter: Many Brooks products are available with national laboratory calibration traceability and certification, recognized hazardous area approvals, pressure boundary certifications, material certifications, RoHS compliance and more.

So if you're serious about improving your process yield, throughput and product quality, choose Brooks.

Thermal Mass Flow Controllers and Meters



The most popular thermal mass flow product line on the planet!

Brooks offers a broad range of thermal mass flow controllers (MFCs) and meters, ensuring that we will have exactly the right device for your application. Our mass flow controllers are the acknowledged industry leader in quality and reliability, with many devices in operation for more than 20 years.







Brooks thermal mass flow devices provide significant advantages in long term stability, response time, accuracy, repeatability, turndown, self-diagnostics and application flexibility. The Brooks portfolio covers the widest range of options to meet your application needs, including:

- Pressure transient insensitive MFCs (an industry first)
- MultiFlo™ (i.e., multi-gas and multi-range) capability to satisfy a broad range of applications with one device without removing device from system (an industry first)
- FOUNDATION™ Fieldbus communications option (an industry first)
- NEMA 4X/IP66 MFCs for hose down/wash down applications (an industry first)
- Ultra-high purity devices for the vacuum, thin film, solar and semiconductor industry
- Class1 Div 2/Zone 2 approved devices for use in hazardous areas
- Downport MFCs for ease of maintenance and reduced gas panel footprint

Plus, we have the best trained and most responsive flow experts with application experience in virtually every industry, all over the world. They make sure your thermal mass flow controller is selected correctly and maintained properly.

Applications include:



Awards	Communications Options
 Reader's Choice Award for best products in the "Flowmeter, Thermal Mass" category.	  
 Golden gas Award winner in "Mass Flow Measurement & Control" for the GF Series.	

MultiFlo™ Capable Mass Flow Controllers and Meters



GF100 Series

GF40/80 Series

GF100 Series mass flow measurement and control

Designed for semiconductor, MOCVD and other gas flow control applications that require a high-purity, all-metal flow path, the Brooks GF Series mass flow controllers deliver outstanding performance, reliability and flexibility. The GF Series has been marathon-tested to over three times the semiconductor industry standard for reliability, ensuring repeatable low-drift performance over time.

- Ultra-fast 300-millisecond settling time
- Optional pressure transient insensitive (PTI), high accuracy and safe delivery system models available
- MultiFlo™ gas and range configurability
- Corrosion-resistant Hastelloy® sensor tube and valve orifice (jet)

GF40/80 mass flow measurement and control

Designed for solar thin film deposition, CVD, vacuum processes, bioreactors and other industrial gas flow control applications that require cost-efficient solutions.

- Elastomer or metal seal
- Fast sub 1 second settling time
- MultiFlo gas and range configurability
- Corrosion-resistant Hastelloy sensor tube

Type	Model	Full-Scale Capacity	Accuracy	Max. Pressure psig (bar)	Input/Output	Power Supply
UHP PTI Metal Seal Controller	GF125	3 sccm – 55 slpm N ₂ equivalent	+/-1% rate (35 – 100% FS)	85 (6)	0 – 5 Vdc/RS485/ DeviceNet	+/-15 Vdc, 11 – 25 Vdc
UHP Metal Seal Controller/Meter	GF120	3 sccm – 55 slpm N ₂ equivalent	+/-1% rate (35 – 100% FS)	485 (33)	0 – 5 Vdc/RS485/ DeviceNet	+/-15 Vdc, 11 – 25 Vdc
HP Metal Seal Controller/Meter	GF100	3 sccm – 55 slpm N ₂ equivalent	+/-1% rate (35 – 100% FS)	485 (33)	0 – 5 Vdc/RS485/ DeviceNet	+/-15 Vdc, 11 – 25 Vdc
UHP High-Accuracy Metal Seal Controller/Meter	GF125 (HA)	5 sccm – 10 slpm N ₂ equivalent	+/-1% rate (10 – 100% FS)	85 (6)	0 – 5 Vdc/RS485/ DeviceNet	+/-15 Vdc, 11 – 25 Vdc
UHP Safe Delivery Metal Seal Controller	GF120 (SDS) Safe Delivery System	4 sccm – 1 slpm	+/-1% rate (35 – 100% FS)	485 (33)	0 – 5 Vdc/RS485/ DeviceNet	+/-15 Vdc, 11 – 25 Vdc
Metal Seal Controller/Meter	GF80	3 sccm – 50 slpm	+/-1% rate (35 – 100% FS)	150 (10)	0 – 5 Vdc/4 – 20mA/ Profibus/ RS485/ DeviceNet/ EtherCAT	15 – 24 Vdc, 12 – 24 Vdc, 11 – 25 Vdc
Elastomer Seal Controller/Meter	GF40	3 sccm – 50 slpm	+/-1% rate (35 – 100% FS)	150 (10)	0 – 5 Vdc/4 – 20mA/ Profibus/ RS485/ DeviceNet/ EtherCAT	15 – 24 Vdc, 12 – 24 Vdc, 11 – 25 Vdc

General Purpose Mass Flow Controllers and Meters



SLA5800 Series

4800 Series

With the largest installed base of thermal mass flow controllers and meters around the world, Brooks offers products with faster response, better accuracy and improved control over analog devices.

- Industry-leading repeatability ensures a stable process even under changing conditions
- Self diagnostics and alarms eliminate downtime
- Multiple communication protocols allow easy integration into many control systems
- Analog I/O devices allow for quick and easy system integration
- Elastomer seal option provides exceptional leak integrity and maximizes control valve shutoff dependability
- Globally approved for a variety of service areas

The Smart Link Advantage (SLA) Series is Brooks' premier smart digital thermal mass flow series. SLA mass flow controllers and mass flow meters link to advanced service tools and offer the advantage of digital protocols. The SLA Series provides many advanced features such as enhanced temperature stability, zero-drift diagnostics, coplanar valve for improved turndown, and more.

The 4800 Series features a broad flow range, compact size and MEMS-based sensor that provides lightning-fast response times.

Type	Model	Full-Scale Capacity	Accuracy	Max. Pressure psig (bar)	Input/Output	Power Supply
Elastomer Seal Controller/Meter	SLA5800 Series	3 sccm – 2500 slpm	1% rate or 0.7% rate $\pm 0.2\%$ FS	4500 (300)	0 – 5 Vdc, 4 – 20 mA RS485, DeviceNet, FOUNDATION™ Fieldbus	13.5 – 27 Vdc, 11 – 25 Vdc, 14 – 27 Vdc
Elastomer Seal Controller/Meter	5800S Series	3 sccm – 2500 slpm	0.7% rate & $\pm 0.2\%$ FS	4500 (300)	Profibus	15 – 24 Vdc
Elastomer Seal Controller/Meter	4800 Series	50 sccm – 40 slpm	$\pm 1\%$ FS or $\pm 3\%$ FS	150 (10)	0 – 5 Vdc, 4 – 20 mA RS232/RS485, Profibus	15 – 24 Vdc
Elastomer Seal Controller/Meter	5800E Series	3 sccm – 1000 slpm	1% FS	1500 (100)	0 – 5 Vdc	± 15 Vdc
Elastomer Seal Controller/Meter	5800i Series	3 sccm – 1000 slpm	1% FS	1500 (100)	0 – 5 Vdc or 4 – 20 mA	15 – 24 Vdc
Metal Seal Controller/Meter	5800EM Series	3 sccm – 100 slpm (200 slpm H ₂)	1% FS	1500 (100)	0 – 5 Vdc or 4 – 20 mA	± 15 Vdc or 15 – 24 Vdc



NEMA 4X/IP66 Mass Flow Controllers and Meters



SLAMf™ Series

SLAMf™ 53

The Brooks Mf™ and SLAMf™ Series mass flow lines are designed specifically for use in harsh environments. Their unique NEMA 4X/IP66 enclosure provides protection from dust and water making them ideal for indoor and outdoor use and perfect for hose down/wash down applications. The integrated sensor, valve and PID make these devices a cost-effective solution for hazardous area installations.

This series is available with a variety of digital protocols including FOUNDATION™ Fieldbus communications – an all-digital, two-way communications technology that improves efficiency with advanced diagnostics, decreases installation costs, and operates with any control system.

Type	Model	Full-Scale Capacity	Accuracy	Max. Pressure psig (bar)	Input/Output	Power Supply
NEMA 4X/IP66 Elastomer Seal Controller/Meter	SLAMf Series	3 sccm – 2500 slpm	1% rate +/-0.2% FS	1500 (100)	0 – 5 Vdc, 4 – 20 mA RS485 DeviceNet FOUNDATION Fieldbus	13.5 – 27 Vdc, 11 – 25 Vdc, 14 – 27 Vdc
NEMA 4X/IP66 Elastomer Seal Meter	Mf S Series	3 sccm – 36000 slpm	0.7% rate +/-0.2% FS	1500 (100)	Profibus	15 – 24 Vdc
NEMA 4X/IP66 Elastomer Seal Controller		3 sccm – 2500 slpm				
NEMA 4X/IP66 Elastomer Seal Controller/Meter	Mfi Series	3 sccm – 1000 slpm	1% FS	1500 (100)	0 – 5 Vdc, 4 – 20 mA	15 – 24 Vdc



Variable Area Flow Meters



Over sixty years of variable area meter expertise

Brooks started designing and manufacturing variable area (VA) meters, also referred to as rotameters, in 1946. Now, with more than six decades of application experience, we help customers with VA solutions in just about every industry. Our solutions have come from our standard portfolio as well as custom-designed products incorporating special materials of construction, connections and pressure ratings.



The Brooks line of glass tube and metal tube VA meters ensures measurement repeatability, which provides dependable flow monitoring and consistency. External power is not required for operation; therefore, they provide a fail-safe flow indication under any circumstance. Brooks VA meters can be provided with a variety of wetted materials for high-pressure, high-temperature conditions and hazardous locations.

Armored VA Meters: The Brooks line of rugged metal tube VA flow meters is ideal for high-pressure, high-temperature, and other demanding flow applications where safety is a concern. HART, FOUNDATION™ Fieldbus and 4 – 20 mA outputs and limit switches provide for remote flow monitoring.

Glass Tube VA Meters: The Brooks line of reliable glass tube VA meters is ideal for gas and liquid flow measuring applications where viewing the process is desirable.

Purgemeters: The Brooks Sho-Rate™ brand of VA meters delivers industry-leading performance for gas or liquid flows. Robust engineering ensures reliable indication and unsurpassed service life.

Applications include:



Low-Flow Glass Tube Variable Area Meters



1350 Sho-Rate™

1358 Sho-Rate™

1250 Sho-Rate™

The name Sho-Rate™ has meant reliability and performance for decades now, and the 1350 and 1355 Sho-Rate variable area meters continue to deliver industry-leading performance for gas or liquid flows today. Their robust and proven engineering ensures reliable indication and unsurpassed service life. Sho-Rate flow meters pioneered the concept of field-replaceable tube and float kits; the tube and float can be replaced in-line, if necessary, in a matter of minutes. Now Brooks introduces the new 1250 and 1255 Sho-Rate. These glass tube flow meters offer an easy-to-read rotating magnifying glass, making it the ideal choice for display on panels and cabinets.

1350/1355 Sho-Rate

Rugged and durable

- Integral needle valves on inlet or outlet
- Integral flow controller that compensates for varying inlet or outlet pressures
- 316 stainless, brass, aluminum or Kynar™ construction
- Custom scales for any application

1250/1255 Sho-Rate

Ideal for panel display

- Integral needle valves on inlet or outlet
- Direct-read scales for common units and fluids
- Easy-change design allows quick interchangeability of tube assemblies
- Rotating lens allows 180° view with magnification

Model	Capacity – Water (lph) (gph)		Capacity – Air (m ₃ n/hr) (scfm)		Accuracy	Max. Pressure psig (bar)	Construction
1350/1355 Sho-Rate	0.035 – 120	0.009 – 32	0.003 – 3.9	0.001 – 2.2	10% (1350) FS 5% (1355) FS	200 (14)	Glass tube w/ brass, 316 SS or Kynar
1358 Sho-Rate	180 – 1000	49 – 280	5.7 – 22	3.4 – 15	10% FS	200 (14)	Glass tube w/ brass or 316 SS
1250/1255 Sho-Rate	1.3 – 120	0.34 – 32	0.003 – 3.9	0.001 – 2.33	10% (1250) FS 5% (1255) FS	200 (14)	Glass tube w/ aluminum or 316 SS

Armored Metal Tube Variable Area Meters



MT3809

3750 Ar-Mite™

The Brooks line of rugged metal tube variable area meters (rotameters) is ideal for high-pressure, high-temperature and other demanding flow applications where safety is a concern.

- Globally approved for use in hazardous environments
- Needle valves available for flow control
- Multiple connection options to match your existing system and provide easy installation
- Many corrosion-resistant material options for the metering of aggressive fluids
- Alarm and 4 – 20 mA with HART and FOUNDATION™ Fieldbus options provide for remote flow monitoring
- Excellent meter repeatability provides consistent batch and/or process production
- No power required, which reduces installation cost and provides flow measurement in hazardous areas
- Low-pressure drop

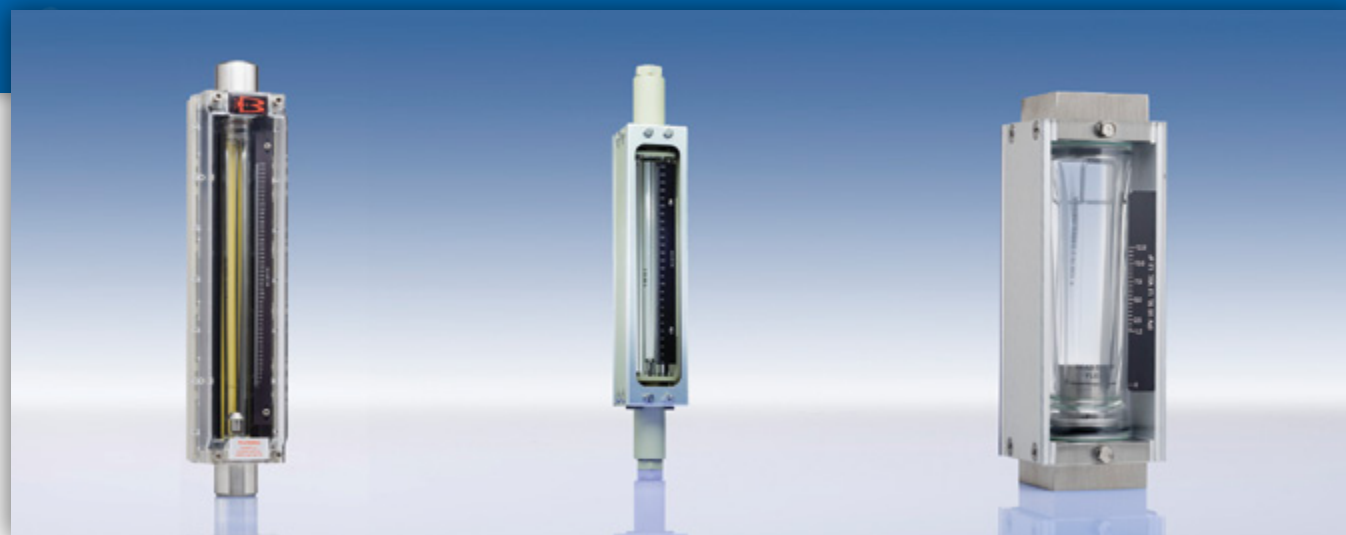
Model	Capacity – Water		Capacity – Air		Accuracy	Max. Pressure	Output
	(lph)	(gpm)	(m ₃ /hr)	(scfm)		psig (bar)	
MT3809	25 – 100,000 ¹	0.11 – 440 ¹	0.8 – 1200 ¹	0.49 – 750 ¹	2% FS	1500 (100) ²	Alarm and/or 4 – 20 mA, HART, FOUNDATION Fieldbus (IS or X-Proof)
MT3819	110 – 15,000	0.48 – 66	3.7 – 470	2 – 280	2% FS	275 (19)	Alarm and/or 4 – 20 mA, HART, FOUNDATION Fieldbus (IS or X-Proof)
MT3810	25 – 20,000	0.11 – 88	0.8 – 650	0.49 – 390	5% FS	1500 (100)	Alarm and/or 4 – 20 mA, HART (IS or X-Proof)
MT3750	0.8 – 100	0.003 – 0.44	0.04 – 3.1	0.02 – 1.9	5% FS	4000 (275)	Alarm and/or 4 – 20 mA, HART, FOUNDATION Fieldbus (IS or X-Proof)
3600 Series	19 – 11,000	0.08 – 49	0.65 – 43	0.38 – 28	10% FS	1500 (100)	Alarm (IS or X-Proof)



¹ Special designs for flow rates as low as 5 l/h of air and 0.08 l/h of water are available. Consult your local representative for more information.

² Special designs for up to 15,000 psi (1000 bar) are available. Consult your local representative for more information.

High-Flow Glass Tube Variable Area Meters



GT1000

GT1100

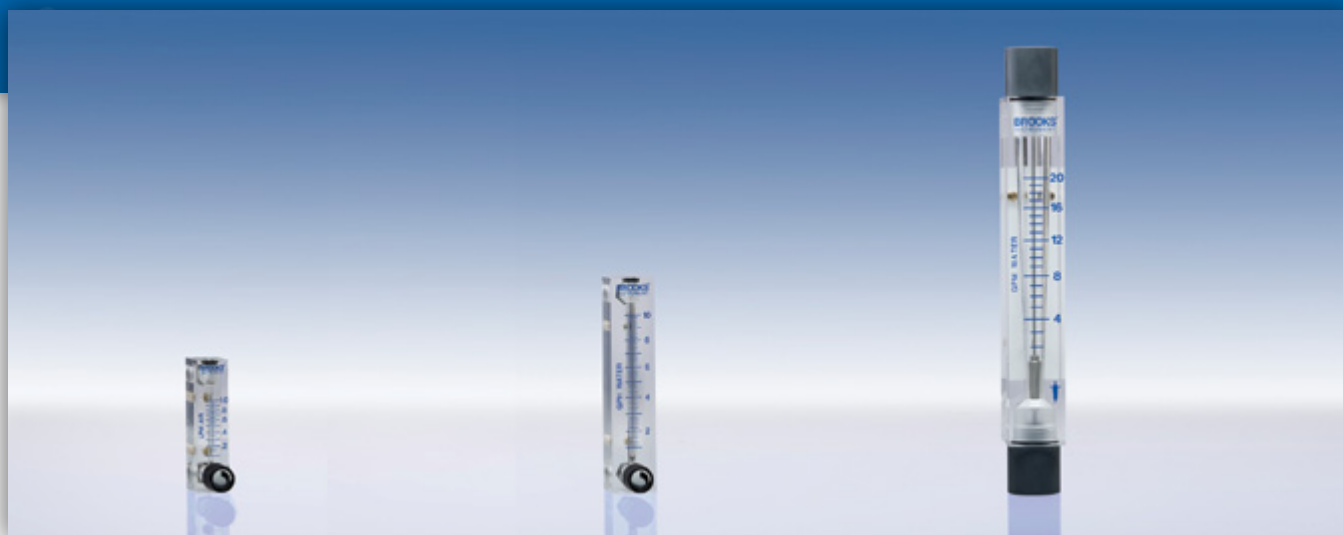
GT1305

The Brooks line of reliable glass tube variable area meters (rotameters) is ideal for many gas and liquid flow measuring applications where viewing the process is important.

- Tube and float can be re-ranged in-line, minimizing process downtime
- Rotatable connections for easy installation at any angle
- Packing gland or O-ring sealing to meet piping requirements or customer preference
- Globally approved for use in hazardous environments
- Reliable – only one moving part
- No power required, which reduces installation cost and provides flow measurement in hazardous areas
- Low-pressure drop allows for economical pump selection
- Flow alarms available on some models
- Rugged, vented polycarbonate enclosure available on most models

Model	Capacity – Water		Capacity – Air		Accuracy	Max. Pressure psig (bar)	Output
	(lph)	(gpm)	(m ₃ /hr)	(scfm)			
GT1000	0.032 – 22,000	0.0001 – 98	0.002 – 280	0.001 – 170	2% FS	500 (34)	Alarm (IS)
GT1100	0.032 – 22,000	0.0001 – 98	0.002 – 280	0.001 – 170	2% FS	500 (34)	Local indication
GT1307	35 – 22,000	0.15 – 98	1.5 – 280	0.9 – 170	2% FS	350 (24)	Local indication
GT1306	24 – 2200	0.1 – 9.8	1.2 – 63	0.8 – 39	3% FS	350 (24)	Local indication
GT1305	180 – 11,000	0.8 – 50	5.4 – 90	3 – 55	10% FS	200 (14)	Alarm (IS)

Plastic Tube Variable Area Meters



2510

2520

2540

Brooks Instrument's versatile, economic acrylic flow meters are ideal for a variety of air, water and gas flow instrumentation applications. The new Series 2500 is a standard precision-machined acrylic flow meter for liquids and gases. It has direct-read air or water scales and is available in either English or metric scales. Series 2500 devices can be configured with various control valve, fitting and O-ring options.

- Easy-to-read English or metric scales
- Water ranges from 4 ccm to 20 gpm
- Air ranges from 40 ccm to 4000 slpm
- Threaded brass inserts for quick installation
- Easy disassembly and assembly for maintenance
- Durable one-piece clear acrylic construction
- Stable, easy-to-read float

Model	Capacity – Water		Capacity – Air		Accuracy	Max. Pressure	Temperature	Construction
	(lph)	(gph)	(m ₃ /hr)	(scfm)		psig (bar)	°C (°F)	
2510	8 – 150	.2 – 40	.002 – 5.5	.002 – 3.3	5% FS	100 (6.8)	65 (150)	Plastic tube w/ brass or 316 SS
2520	4 – 220	1 – 60	.002 – 5.5	.002 – 3.3	3% FS	100 (6.8)	65 (150)	Plastic tube w/ brass or 316 SS
2530	45 – 1130	12 – 300	.76 – 30	.5 – 20	3% FS	100 (6.8)	65 (150)	Plastic tube w/ brass or 316 SS
2540-S/2540-V /2540-I	90 – 4500	24 – 1200	5.5 – 165	3 – 100	2% FS	100 (6.8)	65 (150)	Plastic tube w/ PVC or 316 SS

Need more options in plastic tube variable area meters? Brooks Instrument's sister company Key Instruments offers precision-machined acrylic flow meters, molded plastic flow meters, glass tube flow meters, and flow control valves for medical, industrial, chemical and laboratory applications. Key Instruments also maintains a large inventory of standard meters for immediate delivery to meet your requirements. Turn to the Key Instruments brochure or visit www.KeyInstruments.com for more information.



Precision Valves, Controllers, Switches and Indicators



FC8800 Series

with 1350 Sho-Rate™

8500 Series NRS™

1198

Manual Flow Controller

Brooks Model FC8800/8900 Series flow controllers are designed to maintain a constant differential pressure across an integral manual flow regulating valve.

- Series 8800 controllers are designed for all liquid and gas flows with variable upstream pressures.
- Series 8900 controllers are for all liquid and gas flows with variable downstream pressures.

Control Valve, Fine Control

Brooks Model 8500 Series NRS™ (non-rising stem) control valves are designed specifically for extremely low-flow gas and liquid applications. Straight and 90° angle models in brass or stainless steel are available. They feature a means of adjusting a sliding tapered needle, which prevents sticking. These valves are particularly suitable for precise control and possess a high turns-to-lift ratio. The flow is constant for any given stem position.

Flow Switch

The CCB311 flow switch is designed to detect low flows in horizontal or vertical pipes with an upward flow direction. Suitable for liquids or gases, the CCB311 flow switch is very robust with high repeatability and a very basic design. It is certified explosion proof/intrinsically safe.

Flow Indicator

Brooks Instrument Model 1198 flow indicators provide a quick, reliable and economical way to verify fluid flows through industrial process lines. Model 1198 is available with three styles of indicators including paddle wheel, flap style or drip tube/whistle shape. Many specials are also available upon request to meet various conditions of pressure, temperature, fluid types and mechanical dimensions.

Pressure and Vacuum Products



Measuring pressure and vacuum with superior designs and performance

Brooks now offers a very diverse line of pressure and vacuum products including pressure/vacuum controllers, pressure gauges, pressure transducers, pressure transmitters, pressure regulators, capacitance manometers, and more.

- Pressure/vacuum controllers that are flexible enough to manage the pressure of gas or liquid upstream or downstream of the device
- Pressure gauges that meet rigid cleanliness and safety guidelines
- Remote transducers that provide stability and reliability using proven sensing technologies
- All-PFA seal-free pressure transducers for measurement in corrosive fluids
- Compact and economical high-precision mechanical pressure regulators
- Heated and unheated capacitance manometers that meet the diverse requirements of vacuum-based processes

Pressure/Vacuum Controllers



SLA7810/20 Series

SLA5810/20 Elastomer Series

Model 5866M Series

Electronic pressure controllers are flexible devices to manage the pressure of gas upstream or downstream of the device. Brooks electronic pressure controllers utilize the core control technology present in our industry-leading thermal mass flow controllers.

Brooks replaces the thermal mass flow sensor with a pressure sensor, provides industry-leading control valve technology and software, then controls the pressure of a fluid based on a set-point signal to the device. Using a closed-loop control, Brooks pressure controllers do not have the droop or hysteresis associated with traditional mechanical spring diaphragm pressure regulators. Brooks pressure controllers are available with internal pressure sensors to control pressure in a range from vacuum to 4500 psig.

Brooks pressure controllers can be configured to use external pressure sensors for added flexibility. When using an external pressure sensor, the flow of the gas required to maintain pressure can be controlled and measured.

Type	Model	Full-Scale Capacity	Pressure Accuracy	Max. Pressure psig (bar)	Input/Output	Power Supply
Pressure Controllers						
Metal Seal, 1.125"	SLA7810/20	0 – 20 bar (0 – 290 psia)	0.5% FS	290 (20)	0 – 5 Vdc, DeviceNet	15 Vdc, 11 – 25 Vdc
Elastomer Seal	SLA5810/20	0 – 300 bar (0 – 4350 psia)	0.5% FS	4500 (300)	0 – 5 Vdc, 4 – 20 mA DeviceNet, FOUNDATION Fieldbus	15 – 24 Vdc, 11 – 25 Vdc, 14 – 27 Vdc
Elastomer Seal	5866E	0 – 300 bar (0 – 4350 psia)	0.5% FS	4500 (300)	0 – 5 Vdc, 4 – 20 mA	+/- 15 Vdc

Type	Model	Full-Scale Capacity	Flow Accuracy	Max. Pressure psig (bar)	Input/Output	Power Supply
Remote Transducers/Pressure Controlling Flow Meters						
Metal Seal, 1.125"	SLA7840	3 sccm – 30 slpm	1% Rate	1500 (100)	0 – 5 Vdc, DeviceNet	15 Vdc, 11 – 25 Vdc
Elastomer Seal	SLA5840	3 sccm – 30 slpm	1% Rate	1500 (100)	0 – 5 Vdc, DeviceNet	15 Vdc, 11 – 25 Vdc
Elastomer Seal	5866RT	3 sccm – 30 slpm	1% FS	1500 (100)	0 – 5 Vdc	+/- 15 Vdc

Vacuum Measurement



XacTorr™ CMX Series

Rugged, stable capacitance manometers for process vacuum measurement

Brooks capacitance manometers incorporate industry-leading features that combine to improve measurement reliability, minimize drift, resist diaphragm contamination, and minimize thermal effects. The result is an exceptionally reliable capacitance manometer family for all vacuum measurement applications.

An important benefit of a Brooks capacitance manometer is its advanced Mark-IV sensor. The sensor chamber contains surface areas that are not used in the pressure measurement; these surfaces provide locations for particles and condensable vapors to accumulate without affecting the sensor, dramatically reducing the need for re-zeroing and greatly extending sensor life. The sensor diaphragm is made from corrosion-resistant Inconel®.

Brooks offers truly digital capacitance manometers that operate over a wide dynamic range with extremely good accuracy.

XacTorr™ CMX Series (Heated Gauges)

The XacTorr CMX series gauges are premium heated gauges that use patented, dual-zone heating to ensure 0.1 °C temperature uniformity. The sensor very quickly recovers from thermal events and is virtually immune to ambient temperature changes. Three operating temperatures are offered, 45 °C, 100 °C and 160 °C, with full-scale measurement ranges from 100 milliTor to 1000 Torr.

The gauges include an RS485 dataport that enables *in situ* monitoring and troubleshooting without disturbing communication with the vacuum chamber control system. XacTorr CMX devices offer RS485, DeviceNet or analog 0 – 10 Vdc communication.

Model	Ranges FS (Torr)	Measurement Range	Operating Temp (°C)	Accuracy Sub 1/1-100/1000 Torr Ranges	Temp. Coefficient	Input/Output
CMX45	0.1, 0.5, 1, 2, 10, 20, 100, 1000	4 decades (from FS)	45	0.25% or 0.50% of reading/ 0.15% of reading/ 0.25% of reading	0.002% of FS/°C (zero)/ 0.02% of FX/°C (span)	RS485, DeviceNet, Analog (9-pin or 15-pin D-Sub)
CMX100	0.1, 0.5, 1, 2, 10, 20, 100, 1000	4 decades (from FS)	100	0.25% of reading/ 0.15% of reading/ 0.25% of reading	0.002% of FS/°C (zero)/ 0.02% of FX/°C (span)	RS485, DeviceNet, Analog (9-pin or 15-pin D-Sub)
CMX160	1, 2, 10, 20, 100, 1000	4 decades (from FS)	160	N/A/ 0.25 to 0.35% of reading/ 0.50% of reading	0.002% of FS/°C (zero)/ 0.02% of FX/°C (span)	RS485, DeviceNet, Analog (9-pin or 15-pin D-Sub)

Vacuum Measurement



CMC Series

CMC (Unheated Gauges)

CMC series gauges are compact, economical un-heated capacitance manometers that feature a robust all-welded construction and Inconel® sensing diaphragm. The device's electronics are temperature compensated to minimize drift due to ambient temperature changes.

The CMC series is available in full scale ranges from 10 Torr to 1000 Torr and offer 0-10 Vdc I/O.

Model	Range FS (Torr)	Measurement Range	Operating Temp. (°C)	Accuracy	Temp. Coefficient	Output Signal
CMC	10, 20, 50, 100, 200, 1000	3.5 decades (from FS)	Unheated	0.25% or 0.50% of reading	0.005% of FS/°C (zero) 0.027% of FX/°C (span)	0 – 10 Vdc

Brooks Instrument also offers factory service and recalibration on your existing capacitance manometers.

Pressure Transducers and Transmitters



SolidSense II™

SolidSense II™ ATEX

Seal-Free Pressure (SFP) Transmitter

Ultra-High Purity Pressure Transducers

The Brooks SolidSense II® ultra-high purity pressure transducers offer the lowest cost of ownership for high-purity gas distribution systems through virtually zero-maintenance operations. The ultra-stable, micro-machined silicon strain gauges are matched and glass-fused at high temperature to the metal diaphragm. This process reduces drift commonly associated with competitive products. These transducers will not need to be reset immediately after installation and will not temporarily indicate inaccurate pressure readings during purge cycle.

Model	Full-Scale Range	Pressure Reference	Output	Electrical Connection
SolidSense II	30 – 3000 psi	Absolute, gauge or compound	4 – 20 mA, 0 – 10 Vdc, 0.05 – 5.05 Vdc	Bendix, Pigtail, 15-pin D-sub

Industrial Pressure Transmitters

The Brooks SolidSense II® ATEX industrial pressure transmitters offer superior corrosion resistance with a 316L stainless steel, chromium-enriched wetted flow path, making them suitable for virtually all process fluids. Active temperature compensation enables improved process pressure measurement in plants exposed to wide temperature variations. High accuracy, combined with FM and ATEX compliance, makes the SolidSense II pressure transmitter the optimum choice for demanding applications.

Model	Full-Scale Range	Pressure Reference	Output	Electrical Connection
Solid Sense II ATEX	30 – 3000 psi	Absolute, gauge or compound	4 – 20 mA (others available upon request)	Pigtail

Polymer Pressure Transmitters

The Brooks SFP polymer pressure transmitters use a seal-free perfluoroalkoxy (PFA) sensor to eliminate the potential for process fluid contamination. A temperature-compensated output ensures repeatable pressure measurement and an integrated vapor leak indicator provides visual warning of potentially unsafe operation.

Model	Full-Scale Range	Pressure Reference	Output	Electrical Connection
SFP Single-Ended or Flow-Thru Transmitter	15 to 150 psig	Gauge, compound	4 – 20 mA (others available upon request)	Pigtail

Pressure Gauges, Regulators and Displays



S122/C122/F122 Series

8601 Pressure Regulator

Pressure Gauges

Brooks Instrument pressure gauges feature all-stainless wetted materials and are welded in an oxygen-free environment to meet rigid cleanliness and safety guidelines for all demanding requirements, including high-purity gases. An optional transmitting alarm or continuous transmitter enhances the versatility of Brooks' pressure gauges in applications where automation is required.

Model	Range	Accuracy	Process Connections
S122/C122/F122 2" Pressure Gauges	Vacuum to 4,000 psig	1% FS	Face seal male/female, NPT
IPS122 2" Indicating Pressure Switches	Vacuum to 4,000 psig	1% FS	Face seal male/female, NPT
IPT122 2" Indicating Pressure Transmitters	Vacuum to 4,000 psig	1% FS	Face seal male/female, NPT

Pressure Regulators

Brooks 8601 high-precision supply pressure regulators are direct-acting, non-relieving units that provide bubble-tight shut-off on helium at 100 psi. Compact and economical, these units are assembled in a cleanroom environment and are tested under simulated operating conditions.

Type	Model	Full-Scale Capacity	Max. Pressure	Temperature	Construction
Pressure Regulator	8601	3 – 1000 ccm Air	250 psig, 17 bar	1 – 177 °C 33 – 350 °F	Aluminum, 316 SS

Pressure Displays

Brooks offers a new generation of displays for our SolidSense II pressure transducers or other pressure devices that provide 4 – 20mA analog communication. Displayed pressure units and ranges are user-settable. The LR056 series also provides two user-programmable alarms for high or low pressure condition.

Direct Liquid Injection Vaporizers



Direct Liquid Injection Vaporizer

Integrated System

Break free from conventional vaporizing technology

Direct liquid injection (DLI) vaporization solutions are high-performing liquid vaporizers designed for customers who require reliable liquid vaporization. Direct liquid injection vaporizers overcome the many limitations of conventional vaporizing systems, such as bubblers and vapor draw systems, for more efficiency, control and precision.

The Brooks DLI vaporizers employ hot gas, rather than a hot metal surface, to accomplish liquid vaporization. With unique atomization and heat exchanger technology, the Brooks DLI vaporizers deliver chemically pure vapor and provide enhanced thermal, optical and hardness characteristics for various applications:

- Water vaporization for fuel cell stack humidification and many other water addition applications
- Liquid precursor vaporization for chemical vapor deposition (CVD), metal oxide chemical vapor deposition (MOCVD), and atomic layer deposition (ALD)
- Depositing thin films for enhanced thermal, optical or hardness characteristics such as diamond-like carbon coating and glass coating
- Vaporizing monomers for vacuum polymer film deposition
- Generating calibration vapor
- Vaporizing liquid hydrocarbons

Specifications:

- Allowable process pressure: vacuum to many atmospheres
- Vapor capacity: less than 5 g per hour to greater than 15 kg per hour. (In calibration vapor applications, the target analyte concentrations may be achieved proportioning the liquid and carrier gas flows.)
- Number of liquid feeds: multiple
- Sample wetted materials: 316L stainless steel with elastomer seals, all welded 316L, or electropolished 316L with nickel seals
- Vaporizer chamber heating: electric band heater
- Heater power: less than 100 W to greater than 5000 W, application dependent; 100 Vac, 115 Vac or 230 Vac
- Temperature sensors: two K-type thermocouples, one for chamber temperature and one for over-temperature alarm
- Process connections: 1/8" to 1" compression, face-seal or NPT typical
- Leak integrity: 1×10^{-9} cc/sec helium
- Dimensions: vary by application. A 400 W DLI vaporizer is approximately 7.5" H x 5" W x 5" D (200 mm x 125 mm x 125 mm)

Customized Systems and Solutions



MT3809 Special

MT3809 Special

Manifold Solution

Custom engineering for special applications

Can't find the exact instrument for your application? Let Brooks' application experts devise a custom solution for you. Our expertise in custom-engineered flow products for unique applications includes:

- Special ambient requirements
- High/low process temperature operation
- Exotic materials
- High process pressure capability
- Difficult process streams

If you have a unique application, contact Brooks or your local sales representative.

Comprehensive Solutions

Customers tight on resources and time often seek engineering partners to design the complete system for a new process or to keep their existing process up-to-date and running smoothly. Brooks' solutions-based approach to solving customer applications is ideal.

Brooks' Solutions Group can provide various plans including expert application advice and engineering, ready-to-assemble "kits" and complete, integrated, turnkey systems. We have also developed unique direct liquid injection vaporization systems, manifold systems, precise measurement solutions for dosing applications, and more.

Solutions for OEMs

Many Brooks Instrument products are ideal for OEM customers, providing high-performing, cost-effective solutions. Current Brooks OEM customers include medical device equipment manufacturers, analyzer manufacturers, suppliers of gas blending equipment, vacuum pump makers, and industrial processing equipment suppliers. Brooks can customize any standard product to meet OEM requirements.

- Compact thermal mass flow meters and controllers
- Needle valves for precise flow control
- Compact pressure regulators
- Flow controllers for variable upstream or downstream pressures
- Custom variable area glass tube assemblies available for your unique flow application
- Customized variable area, thermal mass and Coriolis flow controllers and pressure products
- Private labeling available

Coriolis Mass Flow Controllers and Meters



The first Coriolis device with built-in control

Quantim® is the first miniaturized Coriolis mass flow controller that measures and controls flow directly without any need to compensate for fluid properties or process conditions. Quantim's Coriolis technology, internal control valve and PID bring a new level of measurement accuracy and control all in one compact package.

The Coriolis principle is not new to process flow measurement. It is a proven technology that has been employed in a wide variety of markets and applications for over 30 years. Although Coriolis has been widely used in high-flow processes, Quantim brings precise flow measurement and control to lower-flow applications.

Quantim Coriolis controllers and meters provide unsurpassed performance, reliability, repeatability and control in demanding low-flow applications. The Brooks Coriolis portfolio covers virtually every need you may have, including:

- Metal seal devices for the vacuum thin film and semiconductor industry
- NEMA 4X/IP66 MFCs for wash down applications
- Downport MFCs for installation and service ease
- High-pressure capability for demanding research applications

Our products also have an array of certifications and approvals for ingress protection and use in hazardous areas. Plus, we have the best trained and most responsive flow experts with application experience in virtually every industry, all over the world. They make sure your Coriolis mass flow device is selected correctly and maintained properly.

Applications include:



Coriolis Mass Flow Controllers and Meters



QMBC IP40

QMBC IP66

Brooks Quantim Coriolis mass flow controllers and meters offer unsurpassed accuracy and flexibility in critical low-flow liquid and gas applications.

The heart of the device is a patented Coriolis sensor design that measures low flows independent of the fluid type or process variables. This provides you with unsurpassed performance, repeatable mass flow measurement and control even under changing conditions.

Brooks Quantim products are some of the smallest, lowest-flow Coriolis meters and controllers available on the market. With a footprint the size of a netbook, you can fit this instrument into any tight space.

Coriolis meters and controllers are available in NEMA 1/IP40, NEMA 4X/IP66, explosion proof and ANSI/ISA-76 downport configurations.

Type	Model	Tube Size	Nominal Flow* liquid (kg/hr)/gas (lpm)	Accuracy	Max. Pressure psig (bar)	Input/Output
Precision Mass Flow Controller Gas and Liquid	QMBC	2	0.15/1.05	+/-0.2%, 0.5% or 1% rate	500 (35), 1500 (100) or 4500 (300)	0 – 5 Vdc, 4 – 20 mA or HART
		3	0.78/2.96			
		4	7.97/24.8			
Precision Mass Flow Meter Gas and Liquid	QMBM	2	0.19/1.43	+/-0.2%, 0.5% or 1% rate	500 (35), 1500 (100) or 4500 (300)	0 – 5 Vdc, 4 – 20 mA or HART
		3	1.00/5.60			
		4	13.5/53.1			



* Higher flows may be possible depending on the fluid and process conditions.

Ultrasonic Liquid Flow Controllers

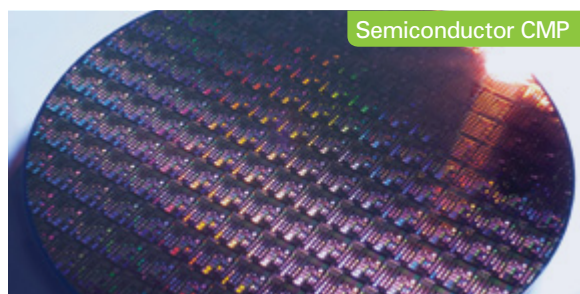


Advanced Ultrasonic Liquid Flow Controllers

Brooks' LF200 Series liquid flow controllers feature an all-PFA wetted flow path that is chemically inert and solvent-resistant to virtually all chemicals, making the LF200 ideal for controlling flows of high purity and ultra-high purity liquids, deionized (and other highly pure) water, acids, bases and similar fluids. In addition, the flow path is straight, permitting the LF200 liquid flow controller to measure complex dual-phase fluids like CMP slurries without imparting any shear force that could damage the fluid or cause agglomeration. The LF200 liquid flow controller employs a bi-directional, ultrasonic transit-time measurement technique and advanced signal processing algorithms to provide highly accurate flow measurement and control even in the presence of bubbles. Needle valve and pinch valve options are available.

- Chemically inert flow path
- Straight flow path with no bends or sharp turns
- Very compact size
- +/-1% rate accuracy available

Applications include:



Ultrasonic Liquid Flow Controllers



LF200 Series

The LF200 Series liquid flow controller ultrasonic measurement system features a proprietary sensor design that enables extremely high measurement precision. Even for a very low flow rate, such as 50 ml/min, the LF200 liquid flow controller can control flow to ± 0.5 ml/min. High-speed digital signal processing provides < 2 second response time; with field tuning, < 1 second response time is possible. The user interface features a high-visibility LCD that provides selectable local indication of flow, temperature, firmware revision or network address. A zero button provides a simple means to re-zero the liquid flow controller when flow is stopped. Several analog I/O options are available.

Type	Model	Valve Type	Full-Scale Capacity	Accuracy	Maximum Pressure (psig)	Input/Output	Power Supply
Liquid Flow Controller	LF200	Needle	50 – 500 ml/min	$\pm 1\%$ of SP, 50 – 500 ml/min	60	4 – 20 mA, 0 – 5 Vdc, 0 – 10 Vdc, RS485	24 Vdc, 0.5 A
Liquid Flow Controller	LF205	Pinch	50 – 1000 ml/min	$\pm 1\%$ of SP, 50 – 1000 ml/min	45	4 – 20 mA, 0 – 5 Vdc, 0 – 10 Vdc, RS485	24 Vdc, 0.5 A
Liquid Flow Controller	LF210	Needle	150 – 500 ml/min	$\pm 3\%$ of SP, 150 – 500 ml/min	60	4 – 20 mA, 0 – 5 Vdc, 0 – 10 Vdc, RS485	24 Vdc, 0.5 A
Liquid Flow Controller	LF215	Pinch	150 – 1000 ml/min	$\pm 3\%$ of SP, 150 – 1000 ml/min	45	4 – 20 mA, 0 – 5 Vdc, 0 – 10 Vdc, RS485	24 Vdc, 0.5 A

Secondary Electronics and Software Tools



Model 0254

Model 0260

Brooks Service Suite

Model 0254 four-channel power supply, readout and set-point controller

The Brooks 0254 is an innovative, reliable microcomputer-based controller that provides power for up to four Brooks mass flow meters and controllers, and/or pressure devices, all in a new compact design. Additionally, the 0254 can generate flow set-point commands, display flow rate, totalize flow, batch, blend multiple flow streams and more. This fully RoHS-compliant device has a very user-friendly operation and is offered with multiple mounting options such as rack mount, panel mount and table-top mount.

Brooks Smart Interface Model 0260 controls and monitors up to 30 devices

The Brooks Smart Interface Model 0260 is a Microsoft Windows®-based software application that provides expanded control and monitoring capabilities in laboratory and research environments for Brooks thermal mass flow meters and controllers with an RS485 Smart protocol digital interface. Together with the power supply and RS485 to USB hardware module, this product is a great solution for monitoring and controlling up to 30 mass flow meters/controllers.

Model	Channels	Additional Functions	Control I/O	Power Input	Power Output
0254	4	Totalize and blend RS-232 I/O for remote control	1 – 5 Vdc, 2 – 10 Vdc, 4 – 20 mA	100 – 240 Vac, 50/60 Hz	+/-15 Vdc, 24 Vdc
0260	Up to 30 devices	Display flow, adjust set point, display alarm status, display and change valve override (VOR) status, totalize, batch, blend, log data	RS485 Smart Protocol	85 – 250 Vac, 47 – 63 Hz	24 Vdc, 3.5 A

Brooks Service Suite

Brooks Instrument provides a variety of software and accessory options to simplify installations and start-up. Brooks software tools ensure mass flow controllers perform at their best. Calibration and control software, available for some models, allow customers to perform calibration checks to verify accuracy and repeatability.

Brooks Service Suite, Standard: Provides access to I/O tuning, alarm indication/configuration, diagnostics, selected response tuning, control and monitor.

Brooks Service Suite, Pro: Provides access to I/O tuning, alarm indication/configuration, diagnostics, selected response tuning, control and monitor, plus calibration and accuracy reporting capabilities.

Liquid Mass Flow Controllers and Oval Gear Meters



Flomega™

Oval Gear Meter

Flomega™ measures and controls very low flows

Flomega™ liquid flow meters and flow controllers use thermal mass flow technology to accurately measure and control liquids, especially very low flows of liquid from 1 to 1000 grams per hour. They are weatherproof and certified for use in hazardous areas.

Type	Model	Full-Scale Capacity	Accuracy	Max. Pressure psig (bar)	Input/Output	Power Supply
Liquid Mass Flow Controller/Meter	5881/91	30 – 100 g/hr	0.5% FS	5800 (400)	0 – 5 Vdc, 4 – 20 mA	15 – 24 Vdc
Liquid Mass Flow Controller/Meter	5882/92	200 – 1000 g/hr	0.5% FS	5800 (400)	0 – 5 Vdc, 4 – 20 mA	15 – 24 Vdc

Oval gear positive displacement meter for high-viscosity liquids

Brooks' oval gear positive displacement meters are ideal for highly viscous liquids in applications where accuracy and repeatability are critical.

Type	Model	Capacity – Water	Accuracy Rate	Max. Pressure psig (bar)	Temperature	Construction
Oval Gear Meter	BM01/02	2 – 500 lph/ 0.53 – 132 gph	1%	150 (10)	-29 – 66 °C -20 – 150 °F	316 SS, PPS
Oval Gear Meter	BM04/50	60 – 21,000 lph/ 15 – 5500 gph	0.5%	800 (55)	-29 – 120 °C -20 – 248 °F	Aluminum, 316 SS, PPS

Continuous Level Measurement



Robust magnetic level gauges from Brooks provide reliable and continuous liquid level measurement through the use of a proven magnetic float technology that does not require external power. As a result, plant engineers can continue to monitor material levels despite planned or unplanned power loss. Optional alarms and transmitters are available to permit remote monitoring as well.

Brooks magnetic level gauges feature sealed measurement chambers constructed from stainless steel, PVC, PPH, PVDF or PTFE that enable reliable level measurement of a wide assortment of liquids including those that are corrosive, toxic or otherwise hazardous. Because the only moving part in contact with the fluid is the float, these instruments are exceptionally rugged and durable. Many process connection options are available, further enhancing application flexibility.

Type 810 Mechanical Level Gauge

The type 810 magnetic level gauge allows you to measure liquid levels directly — even corrosive or dangerous liquids — in vessels or pressurized tanks. The design of the type 810 ensures good accuracy, excellent reliability, and safe use.

The type 810 mechanical level gauge measures liquid level (or liquid/liquid interface) over ranges from as short as 1 foot (0.3 m) to as long as 20 feet (6 m), and longer with multiple sections of instruments. Applications include product tank monitoring, feed water heaters, condensate and separator systems, cryogenic gases, effluent tanks, and more.

MC1000 Continuous Level Transmitter

This economical level instrument features a ball float on a stainless steel rod that can be insertion-mounted or mounted in a bypass chamber. The MC1000 comes with either flanged or threaded tank connections, providing flexible mounting options. Its 4 – 20 mA transmitter can be provided in standard, explosion proof or intrinsically safe configurations with or without HART. The maximum measurement range is 10 feet (3 m) and measurement resolution is 0.6" (15 mm).

Type	Type	Temperature	Pressure psig (bar)	Connection	Output	Construction
Continuous Level – Side Mount	810	420 °C / 790 °F	5800 (400)	Flanged/threaded/ welded	Alarm &/or 4 – 20 mA, HART (IS or XP)	304L SS, 316L SS, PVC, PVDF, PPH, PTFE
Continuous Level – Top Mount	811	200 °C / 390 °F	12 (180)	Flanged/threaded/ welded	Alarm &/or 4 – 20mA, HART (IS or XP)	304L SS, 316L SS, PVC, PVDF, PPH, PTFE
Continuous Level – Top Mount	MR1000	To 100 °C / 212 °F	N/A	Flanged/threaded	4 – 20mA, HART (IS or XP)	316 SS, PVC, PVDF

Point Level Measurement



ANV/ANH Point Level Switch

MR783 Multi-Point Level Switch

Point level switches are designed to detect level variations and activate alarms based on one or multiple level points. They can be used for normal, corrosive or hazardous liquids and are certified explosion proof or intrinsically safe. The ANV point level switches are certified and used in highly demanding nuclear power plant applications. Certified material, NACE and radiography options are available to meet customer specifications.

ANV/ANH Point Level Switch

The vertical Series ANV and horizontal Series ANH level switches are designed to detect level variations and activate alarms accordingly. They can be used for normal, corrosive or hazardous liquids and are certified explosion proof or intrinsically safe. Certified material, NACE and radiography options are available to meet customer specifications.

MR783 Multi-Point Level Switch

This multi-point level switch is compact, making it easy to mount in multiple locations on a tank. With versatile construction (316 SS, PVC or PVDF), the MR783 is certified explosion proof or intrinsically safe and is capable of indicating more than one level per tank and triggering alarms accordingly.

Type	Model	Temperature	Pressure psig (bar)	Connection	Output	Construction
Point Level – Vertical Mount	ANV	To 350 °C / 660 °F	1450 (100)	Flanged/threaded	Alarm (IS or XP), up to 2 switches	Carbon steel, 316 SS
Point Level – Horizontal Mount	ANH	To 350 °C / 660 °F	1450 (100)	Flanged/threaded	Alarm (IS or XP), up to 2 switches	Carbon steel, 316 SS
Point Level – Top Mount	MR783	To 100 °C / 212 °F	N/A	Flanged/threaded	Alarm (IS or XP), up to 2 switches	316 SS, PVC, PVDF

Technical Services



Application experts at your service

Backed by outstanding support, Brooks is committed to assuring that our customers receive the ideal solution for their application. We make it easy to locate a sales representative and get technical assistance, training services and more. Our instruments are top in the industry, but it's our application experience and support services that set us apart from the competition:

- Brooks factory-trained support
- 24/7 telephone support
- Worldwide coverage
- Primary standard calibration equipment at every Service Center
- NIST and NMI traceability to ensure accuracy and reliability

Start-Up Service: Need help getting your new flow products installed properly? Brooks' on-site start-up service will set up your flow products, then test them to make sure they are operating perfectly in your application.

Extended Warranties: For uninterrupted support and peace of mind, extended warranties may be purchased at any time within the original warranty period or after major repair in a Brooks Service Facility.

Preventive Maintenance Programs: For ongoing process accuracy and reliability, we offer a number of preventive maintenance programs. Brooks also offers annual calibration service for all devices and full rebuild/refurbishment.

Advanced Replacement Options: To minimize operational downtime, Brooks can provide advanced replacement devices for certain models in exchange for your existing device.

Training Services: Brooks encourages customers to take advantage of our excellent training programs such as "The Basics of Flow Measurement," "Calibration" and "Maintenance." We also offer customized, hands-on programs to fit your specific needs. Both factory and on-site training are available.



Application Experience
Beyond Measure

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