

# Flow, Pressure & Vapor Instrumentation



**BROOKS**<sup>®</sup>  
INSTRUMENT

*Beyond Measure*

# Mass Flow & Pressure Controllers



**SLA Series General Purpose Thermal MFCs**

Proven MFC for widest range of mass flow needs and applications delivers superior results and lower total cost of ownership.



**GF40 Series MultiFlo™ Thermal MFCs**

Multiple gases and flows in one device maximizes process flexibility and productivity while preserving accuracy, all in a compact footprint.



**5850E & i Series Analog Thermal MFCs**

Extremely reliable, accurate and repeatable measurement and control for demanding industrial processes.



**SLAMf Series NEMA 4X/IP66 Thermal MFCs**

Precision mass flow control of the SLA platform with a specially engineered NEMA4X/IP66 enclosure for harsh environments.

## Key Features

- Superior long-term drift stability and the best MTBF in the industry
- Industry-leading device linearity, repeatability and reproducibility
- Widest flow and pressure ranges
- Programmable gas and range capabilities (optional)
- Independent and easily accessible service port simplifies installation, diagnostics and troubleshooting
- Broad array of available communication options now includes the EtherNet/IP™ protocol

- MultiFlo™ technology enables one MFC to support thousands of gas types and range combinations without removing it from the gas line or compromising on accuracy
- Excellent process gas accuracy
- Suitable for a full suite of gases

- Wide flow and pressure ranges
- Fast flow response to command changes with negligible overshoot/undershoot
- Analog only inputs/outputs enable easy installation and serviceability

- NEMA4X/IP66 rated hardened enclosure for hose-down/wash-down applications
- Hazardous area approvals: CE, UL (Recognized) Class I, Div 2, ATEX, IECEx
- Widest range of flow, temperature and pressure ranges
- Programmable gas and range capabilities (optional)

## Performance

- Fluid Type — gas
- Flow Range — 3 sccm - 2500 lpm
- Accuracy —  $\pm 0.9\%$  of SP (20-100% FS)
- Max Pressure —
  - o Standard 1500 psi (100 bar)
  - o Optional 4500 psi (310 bar)
- Temperature Range — -14-65°C (7-149°F)

- Fluid Type — gas
- Flow Range — 3 sccm-50 slpm
- Accuracy —  $\pm 1\%$  of SP (35-100% FS)
- Max Pressure — 150 psig (10 bar)
- Temperature Range — 5-50°C (41-122°F)

- Fluid Type — gas
- Flow Range — 3 sccm - 1000 lpm
- Accuracy —  $\pm 1\%$  FS
- Max Pressure — 1500 psig (100 bar)
- Temperature Range — 5-65°C (41-149°F)

- Fluid Type — gas
- Flow Range — 3 sccm-2500 lpm
- Accuracy —  $\pm 0.9\%$  of SP
- Max Pressure —
  - o Standard 1500 psi (100 bar)
  - o Optional 4500 psi (310 bar)
- Temperature Range — -14-65°C (7-149°F)

# Mass Flow & Pressure Controllers



**SLA Series**  
Elastomer Sealed  
Pressure Controllers

Eliminate droop and hysteresis through closed loop control utilizing the core technology in our thermal MFCs.



**Metal Sealed**  
Thermal MFCs

Ultra-fast response time and high-purity all-metal flow path minimizes contamination, enhances yield.



**Metal Sealed**  
Pressure Controllers

Maximize process results through stable pressure control and enhanced process gas purity.



**Quantim®**  
Coriolis MFCs

Most accurate measurement and control technology for very low flow applications.

## Key Features

- Use with SLA Series mass flow devices to maximize process consistency benefits
- Wide pressure measurement and control range
- Downstream or upstream control modes
- Durable, robust metal top lid prevents damage during installation
- Independent and easily accessible diagnostic/service port
- SLAMf Series available with NEMA4X/IP66 rated hardened enclosure for hose-down/wash-down applications

- For processes sensitive to moisture or oxygen
- Ultra-stable, highly accurate measurement sensors
- Fast precision control valves
- High-integrity (leak tight), ultra-high purity, all-metal wetted flow path
- Corrosion-resistant Hastelloy® sensor
- MultiFlo™ programmable gas and range capabilities
- Real-time flow error detection and pressure transient insensitive technology

- Integral pressure transducer
- All-metal seal flow paths — 5μ and 32μ inch Ra maximum surface finish
- PC125 with embedded flow meter includes a highly corrosion-resistant Hastelloy® C-22 flow sensor combined with high-speed ARM processor
- Fast-acting diaphragm-free valve assembly
- High-visibility LCD display
- Independent diagnostic/service port

- True mass flow measurement, not inferred
- Inherent fluid densitometer
- Selectable multi-variable outputs of mass flow or volume flow and density or temperature
- Insensitive to fluid type
- Variety of enclosure options — up to NEMA 4X/IP66
- High pressure capability for demanding research applications
- Optional hazardous area approvals for Zone 2 and Class 1 Division 2
- Internal and user settable alarms and diagnostics

## Performance

- Pressure Control Range —
  - o Standard: 20 to 1 up to 1500 psi (100 bar)
  - o Optional: Up to 4500 psi (310 bar)
- Flow Range — 3 sccm - 50 lpm
- Accuracies —
  - o ±0.25% of Transducer FS (FS >300 psia)
  - o ±0.12% of Transducer FS (FS <300 psia)
- Max Pressure — 4500 psia (310 bar)

- Fluid Type — gas
- Flow Range — 3 sccm–300 slm
- Accuracy — ±1% of SP
- Max Pressure — Up to 500 psia (34.4 bar)
- Temperature Range — 5–65°C (40–149°F)

- Pressure Control Range — >2 to 100%
- Flow Range — 20 sccm–10 slm (N2 or H2 only)
- Accuracies —
  - o Pressure Reading — ±1% of reading
  - o Pressure Control — ±1% of reading >10% FS
  - o Flow Reading — ±1% of reading >35% FS
- Max Pressure — Transducer Pressure Range — 1000 Torr FS, (1.3 bar) Transducer Over Pressure Limit: 2 x FS range

- Fluid Type — gas and liquids
- Flow Range — 1–27,000+ gm/hr
- Accuracy — 0.2–0.5% of rate
- Max Pressure —
  - o Standard 500 psi (34 bar)
  - o Optional 1500 (103 bar) or 4500 psi (310 bar)
- Temperature Range — 0–60°C (33–140°F)

**BROOKS**  
INSTRUMENT

*Beyond Measure*

# Variable Area Flow Meters



**Acrylic  
VA Flow Meters**

Most cost-effective variable area flow measurement solution for non-corrosive and low-pressure applications.

**QuickShip** →



**Sho-Rate™ Series  
Glass Tube  
VA Flow Meters**

Improved accuracy compared to plastic VA flow meters, supporting a wider range of flow rates, pressures and fluids. The industry standard glass tube VA flow meter for decades.

**QuickShip** →

**NEW**



**GT1600 Series Glass  
Tube VA Flow Meters**

Simple, rugged design for long-lasting performance with low and high-flow gas and liquid applications where viewing the process is important.



**MT3750 Series  
Metal Tube VA  
Flow Meters**

Reliable, durable, low flow measurement for long-lasting performance in harsh environments.

**QuickShip** →

## Key Features

- Machined acrylic and molded polycarbonate bodies
- Annealed, unibody construction eliminates leaks and panel detachment issues
- Easy-to-read scales available in both standard and custom scaling
- Multiple valve fitting, o-ring and float options

- Rugged, single piece frame construction
- Easy-change design allows quick interchangeability of tube assemblies
- Rotating lens provides 180° view with magnification ideal for panel mounting
- Optional needle valves and flow controllers mounted to inlet or outlet for precision flow control
- Standard direct read scales on tube for all fluids and fluid conditions
- Standard millimeter scales with flow curves for all fluids and fluid conditions

- Configurable to retro-fit GT1000, GT1300 and Full-View Series
- Premium materials of construction ensure safety, indoor and outdoor durability
- Process connections can be rotated 360°, 180° viewing window, panel mount option
- Transparent scale for easy readability; also acts as a shield for absolute safety
- Monitor critical flow conditions with alarm option (purchase at time of order or add it in the field)
- Optional integral inlet or outlet valve saves space, time & cost, eliminating potential leak points

- For use in low flow applications with high-pressure or hazardous fluids
- Compact design
- 4–20 mA output
- Good upgrade from glass tube flow meters
- Optional alarms, transmitters and limit switch controllers provide added levels of measurement and control

## Performance

- Fluid Types — gas and liquids
- Flow Range —
  - o Gas: 0.04–4,000 slpm
  - o Liquid: 0.01–75 lpm
- Accuracy — 2–10% FS
- Max Pressure — 100 psig (7 bar)
- Temperature Range — Up to 65°C (149°F)

- Fluid Types — clean liquids and gases
- Flow Range —
  - o Air: Up to 15 scfm / 425 slpm
  - o Water: Up to 5 gpm / 19 lpm
- Accuracy — ±3, ±5, ±10% FS
- Max Pressure — 200 psig (13.8 bar)
- Temperature Range — 1–121°C (33–250°F)

- Fluid Types — clean liquids and gases
- Flow Range —
  - o Air: Up to 150 scfm/270 m3n/hr
  - o Water: Up to 21 gpm/4,800 l/h
- Accuracy — ±2, ±5, ±10% FS Class 2.5 acc VDI/VDE (Optional ±1% FS, Class 1.6 acc VDI/VDE)
- Max Pressure — 500 psig (34.5 bar)
- Temperature Range — 1–121°C (33–250°F)

- Fluid Types — clean liquids, gases and steam
- Flow Range —
  - o Air: Up to 110 scfh / 3.1 m3n/hr
  - o Water: Up to 26 gpm / 100 l/h
- Accuracy — ±3, ±5% FS
  - o Class 2.5, 4.0 VDI
- Max Pressure —
  - o Standard 1500 psig (100 bar)
  - o Optional 4000 psig (276 bar)
- Temperature Range — -50–204°C (-58–400°F)



# Pressure Products



**MT3809 Series  
Metal Tube VA  
Flow Meters**



**8600 Series Mechanical  
Pressure Regulators**



**Mechanical Pressure Gauges,  
Switches & Transmitters**



**SolidSense II<sup>®</sup>  
Pressure Transducers**

Widest temperature, pressure and flow ranges for measuring fluids in hazardous, remote areas.



High precision supply pressure regulators are direct-acting, non-relieving units providing bubble-tight shut-off on helium at 100 psi, ideal for analytical systems.

Exceptional versatility and reliability combined with durable designs and materials to handle a wide range of industrial processes.

Smart, precise digital measurement through dependable pressure monitoring in ultra-high purity and specialty gas applications.

## Key Features

- Repeatable flow measurement even at low process temperatures down to -198°C (-325°F) and high process temperatures up to 420°C (788°F)
- Designed for high process pressures 1379 bar / 20,000 psig
- 4–20 mA output with HART
- Integrated FOUNDATION Fieldbus
- Optional local operator interface with LCD screen
- Alarm functions meet SIL 2 requirements
- Multiple corrosion-resistant wetted materials and indicator housings available
- Meets ASME B31.3 standard

- Compact design
- Suitable for line or panel mounting
- Pressure gauge connection
- Replaceable stainless steel inlet filter element
- UL listed

- 2-inch stainless steel solid-state switch and transmitter
- Adjustable pressure switch set point to operate lights or relays
- Multiple process connections and socket orientations
- 316L steel withstands harsh environments
- Welded in oxygen-free chambers to meet rigid cleanliness and safety guidelines of demanding high-purity applications

- Weld-free, corrosion-resistant materials
- Outstanding zero stability and accuracy within 0.25% FS
- Models available with integrated display or full-function programmable display
- Digital thermal compensation uses multi-point temperature-compensation method
- Proprietary micro-machined silicon strain gauges exhibit very low zero drift

## Performance

- Fluid Types — clean liquids, gases and steam
- Flow Range —
  - o Air: Up to 750 scfm / 1200 m<sup>3</sup>n/hr
  - o Water: Up to 440 gpm / 100,000 l/h
- Accuracy — ±1, ±2%, ±3%, ±5% FS
  - o Class 1.6, 2.5, 4.0 VDI
- Max Pressure —
  - o Standard 6000 psig (413.7 bar)
  - o Optional 20,000 psig (1379 bar)
- Temperature Range —
  - o -198–420°C (-325–788°F)

- Ideal for use up to 1,000 sccm air
- Max Inlet Supply Pressure —
  - o 250 psig (17 bar)
- Max Working Temperature —
  - o Standard 60°C
  - o Optional 177°C
- Total Pressure Drop —
  - o Min 10 psi (0.7 bar)
  - o Max 250 psi (17 bar)

- Pressure Range — Up to 4000 psi (276 bar)
- Accuracy — 1% FS
- Switches available with logic outputs:
  - o Off-on and Type 1 (0 to 9–30 Vdc)
  - o Type 2 (8 to 30 Vdc) and
  - o Type 3 (0 to 5 Vdc)
- Transmitters available with industry standard outputs — 4–20 mA; 0–5 Vdc; 1–5 Vdc

- Pressure Range —
  - o -15–3000 psi (205 bar)
- Accuracy — 1% FS
- Output Type — Analog voltage or current
- Certifications/Approvals —
  - o CE, FM and ATEX

# Secondary Electronics & Software



**0250 Series Four Channel Power Supply, Readout & Set Point Controller**



**0260 Power Supply, Smart Interface & Controller**



**BEST Software**



**MultiFlo™ Configurator Software**

Compact, innovative, reliable microcomputer-based controller provides power for up to four Brooks Instrument thermal mass flow, Quantim Coriolis mass flow and/or pressure devices.

Microsoft® Windows® based software application that provides expanded control and monitoring capabilities in laboratory and research environments. Together with the power supply and RS485 to USB hardware module this product provides a great turnkey solution for monitoring and controlling up to 30 RS485 S-Protocol mass flow and/or pressure control devices.

The Brooks Expert Support Tool™ (BEST) provides expanded control, diagnostics and servicing capabilities for all versions of the SLA mass flow, SLA pressure, GF40 mass flow and QMB Quantim™ coriolis mass flow products.

MultiFlo™ Configurator software provides users with a fast and simple method to reprogram the gas and range on MultiFlo™ enabled GF100 Series, GF40 Series, GF80 Series and Celerity/Unit brand mass flow controllers without removing them from the gas line or compromising on accuracy.

## Key Features

- Self-diagnostics on every power-up
- Batch control for single- or multi-channel recipes
- Blending supports master slave configuration and operation
- Gas factor scaling adapts to any non-calibrated fluid
- Valve Override Control — open, closed or normal
- Large, graphic eight-line backlit display
- Smart DDE Software simplifies data exchange with programs such as Excel, Test Point™ and LabVIEW™
- RS232 serial port allows remote control, data logging and remote alarms

- Control up to 30 RS485 S-Protocol mass flow and/or pressure control devices
- Batch control for single- or multi-channel batch recipes
- Save and reuse flow process and blending recipes for any network device
- Select gas page, change flow units and configure alarms
- Valve Override Control — open, closed or normal
- Diagnostic monitoring for alarms, valve drive and device temperature
- Data logging to track process results or troubleshooting

- Easy plug-and-play installation via computer's serial or USB port
- User-friendly interface running under Microsoft® Windows® simplifies operation and data capture.
- Able to switch control of the mass flow device between BEST and the external process controller for real-time on-line diagnostics and tuning.
- Able to capture device log data to text file.

- Provides the same performance as an MFC calibrated at the factory and tuned for a specific gas and range
- Easy plug-and-play installation via computer's serial or USB port
- Library with thousands of gas types provides widest process gas coverage
- Allows for considerable reduction of MFC inventory
- The MG-MR Configurator software runs on PCs with Windows 98SE/2000/NT4.0/or Windows 7

## Performance

- Power Input — Voltage: 12–24 Vdc required, -15 Vdc permitted
  - o Current: 400 mA max current draw per channel
  - o Instrument power draw: 0.8 Watts
- Optional power module: 100–240 Vac, 47–63 Hz
- Power Output — +15V/2.0A, -15V/1.0A or 12–24 Vdc/2.0A
- Signal Input / Output — 0(1)–5 Volts, 0(2)–10 Volts, 0(4)–20 mA
- Mounting Options — panel, table top or rack mount

- Power Input — 85–250 Vac, 47–63 Hz
- Power Output — Voltage: 24 Vdc (± 10%)
  - o Current: 3.5 Amp
  - o Will power up to 10 Brooks S-Series or SLA Smart II or 4800 Series mass flow/pressure devices
- Signal Input / Output — RS485 S-Protocol (HART Command Set)
- Mounting Options — table top

- BEST can be used for installation, start-up and servicing tasks that include device and diagnostic setup, configuration, troubleshooting and tuning
- BEST Professional version also provides access to the calibration parameters for SLA mass flow and pressure products (Requires license subscription)
- To connect the computer to the device an RS232 to RS485 or USB to RS485 converter and a 2.5-mm jack plug to 9-pin sub-D connector cable is required

- Ability to re-scale device with no impact on accuracy, turndown or leak-by specifications, for optimum process and inventory flexibility
- Mass flow controllers can be reconfigured in a few minutes giving the user maximum uptime for a production process or maximum flexibility for research applications
- Supports configuration of multiple gas pages on one device enabling dynamic gas page switching providing process flexibility and potential system cost reduction

	EtherNet/IP	EtherCAT	PROFI BUS	DeviceNet	Fieldbus Foundation	HART	RS-485
NODES	Unlimited	65,535	127	64	240	15	16
BAUD RATES	10 MBPS, 100 MBPS, 1 GBPS	100 MBS	250 K	250 K	31.25 K	1200	9.6 K, 19.2 K, 38.4 K, 57.6 K
MESSAGE SIZE	500 BYTES	1500 BYTES	8 BYTES	8 BYTES	240 BYTES	31 BYTES	24 BYTES
MAIN TOPOLOGY	MULTI DROP	MULTI DROP	MULTI DROP	MULTI DROP WITH BRANCHES	MULTI DROP WITH BRANCHES	STAR POINT-POINT	MULTI DROP
MESSAGE TYPES	PRODUCT-CONSUMER NETWORK	P2P PASS THROUGH	MASTER-SLAVE: POLL, EXPLICIT	MASTER-SLAVE: POLL, EXPLICIT, CYCLIC	PEER-PEER, CYCLIC	MASTER-SLAVE: EXPLICIT	MASTER-SLAVE: POLL, EXPLICIT
CABLING	STANDARD ETHERNET RJ45	STANDARD ETHERNET RJ45	PRE-DEFINED CORDSETS	PRE-DEFINED CORDSETS	PRE-DEFINED CORDSETS	2 - WIRE (4 - 20 mA)	PROPRIETARY CABLES

## KEY ADVANTAGES:



Exceptional performance, flexible topologies, full duplex, self-terminating, easy to deploy, uses standard, cost-effective Ethernet cabling



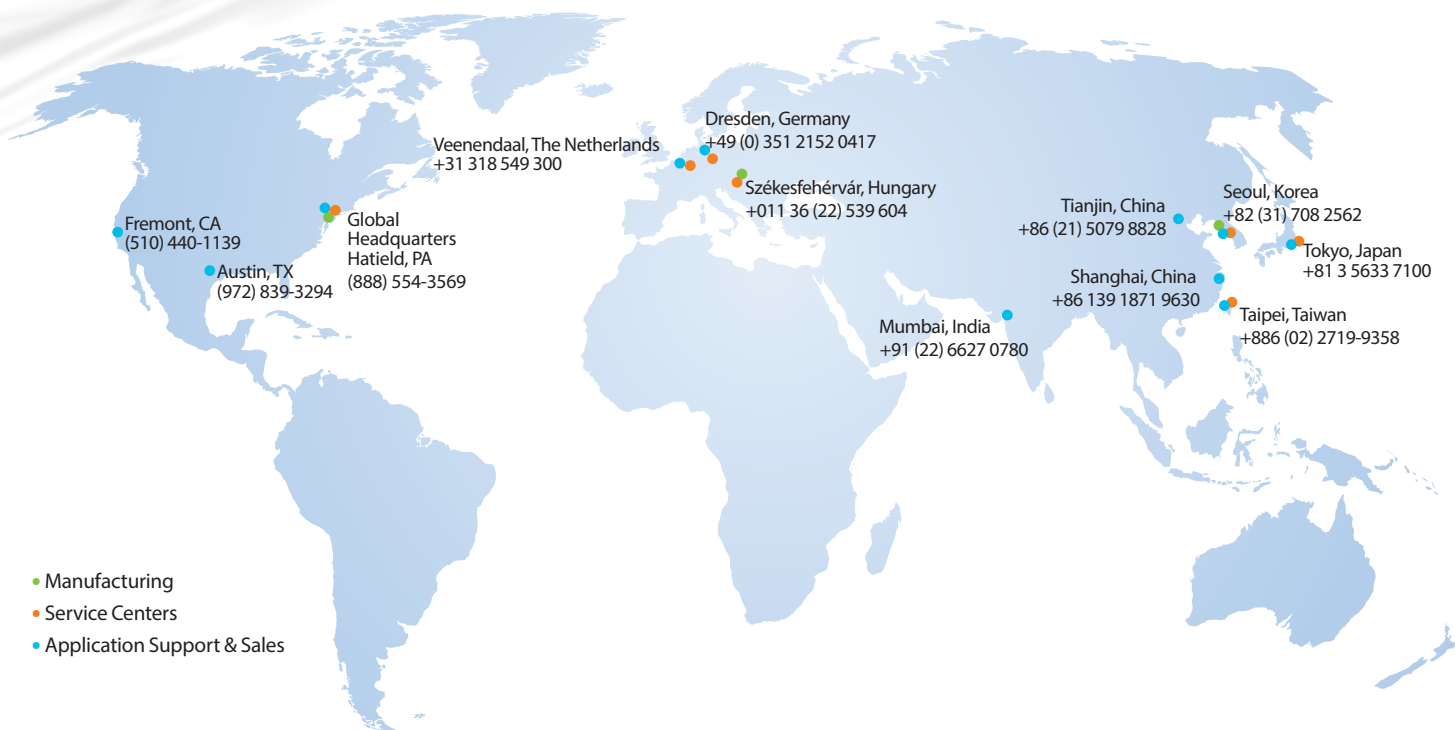
Widely used and field proven industry standards communication protocols, well suited for medium and large automation projects, cost-effective versus point-to-point solutions



Widely accepted, ideal for set-up, diagnostics and troubleshooting, easy implementation over 4-20 mA signal lines, easy to use with HART hand held communicator, can be used effectively over long distances and in electrically noisy environments



Good for small automation projects or systems, supports typical topologies used in small systems, custom tools and software (DDE, DLL, 0260 Smart Interface), simplifies installation



Visit [www.BrooksInstrument.com](http://www.BrooksInstrument.com) for more information on Service.

## Global Service & Support

Brooks Instrument products are recognized as the most stable and reliable in the world. To keep your products operating at the highest level of accuracy and extend their life, your best choice is to trust Brooks Instrument Factory Certified Service repair and recalibration offerings.



Only Brooks Instrument Factory Certified Service ensures that your Brooks Instrument flow, pressure, vapor and vacuum products are serviced utilizing the same metrology standards, work instructions, equipment and custom software as our manufacturing processes — by expert technicians trained exclusively on servicing Brooks products.

Our global service center network offers fast turnaround on repair and recalibration requests. Complete details are available at [BrooksInstrument.com/globalsupportcenters](http://BrooksInstrument.com/globalsupportcenters).

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