

Process Gas: CO2 25.00 L/min

Flow, Pressure & Vapor Instrumentation



BROOKS[®]
INSTRUMENT

Beyond Measure

Mass Flow & Pressure Controllers



SLA Series Elastomer Sealed Pressure Controllers

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



GF100 Series Metal Sealed Thermal MFCs

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



GP200 Series Metal Sealed P-MFCs

Our most advanced MFC, GP200 is the first fully pressure insensitive P-MFC with a unique design approach enabling the ultimate precision process gas delivery over the widest range of operating conditions.



Quantim® Coriolis MFCs

Most accurate measurement and control for very low flow rates of liquid or gas.



Key Features

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| <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • One true differential pressure sensor delivers superior flow measurement accuracy and repeatability reducing measurement uncertainty • Laminar flow element designed for low pressure drop making GP200 a universal P-MFC solution suitable for all pressures, all gases and all processes. • Embedded MultiFlo™ gas model enables on-the-fly gas & range reconfiguration for maximum process flexibility • Zero leak-by control valve delivers 100x improvement in valve shut-down (optional) • Communication protocols: DeviceNet™, EtherCAT® and RS485 | <ul style="list-style-type: none"> • True mass flow measurement, independent of fluid properties • Multi-variable outputs of mass flow, volume flow, density and temperature • High pressure capability for demanding research applications • Optional hazardous area approvals for Zone 2 and Class 1 Division 2 • Easily accessible service port simplifies installation, alarms setup, diagnostics and troubleshooting • I/O Signal Options: RS485, 0-20 mA, 4-20 mA, 0-5 Vdc, or 0-10 Vdc • Optional IP66 ingress protection rating for outdoor or hose down washdown installation • Third generation platform with latest digital architecture enables faster data speeds, improved zero stability and enhanced alarms & diagnostics to support Industry 4.0 trends |
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Performance

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| <ul style="list-style-type: none"> • Pressure Control Range — <ul style="list-style-type: none"> ◦ Standard: 20 to 1 up to 1500 psi (100 bar) ◦ Optional: Up to 4500 psi (310 bar) • Flow Range — 3 sccm – 50 lpm • Accuracies — <ul style="list-style-type: none"> ◦ ±0.25% of Transducer FS (FS >300 psia) ◦ ±0.12% of Transducer FS (FS <300 psia) • Max Pressure — 4500 psia (310 bar) | <ul style="list-style-type: none"> • 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) | <ul style="list-style-type: none"> • Fluid Type — gas • Flow Range — 3 sccm – 50,000 sccm • Accuracy — ±1% of SP (5-100% FS) • Max Pressure — Up to 60 psia (4 bar) • Temperature Range — 10-60° C (50-140° F) | <ul style="list-style-type: none"> • Fluid Type — gas or liquid • Flow Range — 1–27,000+ g/hr • Accuracy — <ul style="list-style-type: none"> ◦ 0.2% of rate, liquid ◦ 0.5% of rate, gas • Max Pressure — <ul style="list-style-type: none"> ◦ Standard 500 psi (34 bar) ◦ Optional 1500 psi (103 bar) • Temperature Range — 0–60°C (32-140°F) |
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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 Series Analog Thermal MFCs

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



SLAMF Series IP66 Thermal MFCs

Delivers the precise accuracy and long-term stability of our proven SLA5800 but with a specially engineered IP66 hardened enclosure for the harshest environments.



Key Features

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| <ul style="list-style-type: none"> • Superior long-term drift stability and the best MTBF in the industry • Industry-leading device linearity, repeatability and reproducibility • Wide flow and pressure ranges • Programmable gas and range capabilities • Independent and easily accessible service port simplifies installation, diagnostics and troubleshooting • Use with SLA Series pressure controllers to eliminate droop, boost and hysteresis • New options packages designed for biotech applications • Broad array of communication protocols available including EtherNet/IP™ and PROFINET® | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Wide flow and pressure ranges • Fast flow response to command changes with negligible overshoot/undershoot • Analog (0-5 Vdc) only inputs/outputs enable easy installation and serviceability | <ul style="list-style-type: none"> • IP66 hardened enclosure for hose-down/wash-down applications • Hazardous area approvals: ATEX, CE, IECEx, KOSHA, UL (listed) Class 1 Division 2 & Zone 2 • Wide range of flows, temperatures and pressures • Programmable gas and range capabilities • Independent and easily accessible service port simplifies installation, diagnostics and troubleshooting • Use with SLA Series pressure controllers to eliminate droop, boost and hysteresis • New options packages designed for biotech applications • Broad array of communication protocols available including EtherNet/IP™ and PROFINET® |
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Performance

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| <ul style="list-style-type: none"> • Fluid Type — gas • Flow Range — 3 sccm – 2500 lpm • Accuracy — ±0.6% of SP (20-100% FS) available with 17025 certified devices • Max Pressure — <ul style="list-style-type: none"> o Standard 1500 psi (100 bar) o Optional 4500 psi (310 bar) • Temperature Range — -14-65°C (7-149°F) | <ul style="list-style-type: none"> • Fluid Type — gas • Flow Range — 3 sccm – 50 slpm • Accuracy — ±1% of SP (35-100% FS) • Max Pressure — 150 psig (10 bar) • Temperature Range — 5–50°C (41-122°F) | <ul style="list-style-type: none"> • Fluid Type — gas • Flow Range — 3 sccm – 1000 lpm • Accuracy — ±1% FS • Max Pressure — 1500 psig (100 bar) • Temperature Range — 5–65°C (41-149°F) | <ul style="list-style-type: none"> • Fluid Type — gas • Flow Range — 3 sccm – 2500 lpm • Accuracy — ±0.6% of SP (20-100% FS) available with 17025 certified devices • Max Pressure — <ul style="list-style-type: none"> o Standard 1500 psi (100 bar) o Optional 4500 psi (310 bar) • Temperature Range — -14-65°C (7-149°F) |
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Variable Area Flow Meters



Sho-Rate™ 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.



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.



MT3809 Series Metal Tube VA Flow Meters

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



Key Features

- 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

- 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

Performance

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

- Fluid Types — clean liquids and gases
- Flow Range —
 - Air: Up to 150 scfm/270 m3n/hr
 - Water: Up to 21 gpm/4,800 l/h
- Accuracy — ± 2 , ± 5 , $\pm 10\%$ FS Class 2.5 acc VDI/VDE (Optional $\pm 1\%$ 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 —
 - Air: Up to 110 scfh / 3.1 m3n/hr
 - Water: Up to 26 gpm / 100 l/h
- Accuracy — ± 3 , $\pm 5\%$ FS
 - Class 2.5, 4.0 VDI
- Max Pressure —
 - Standard 1500 psig (100 bar)
 - Optional 4000 psig (276 bar)
- Temperature Range — -50–204°C (-58–400°F)

- Fluid Types — clean liquids, gases and steam
- Flow Range —
 - Air: Up to 750 scfm / 1200 m3n/hr
 - Water: Up to 440 gpm / 100,000 l/h
- Accuracy — ± 1 , $\pm 2\%$, $\pm 3\%$, $\pm 5\%$ FS
 - Class 1.6, 2.5, 4.0 VDI
- Max Pressure —
 - Standard 6000 psig (413.7 bar)
 - Optional 20,000 psig (1379 bar)
- Temperature Range — -198–420°C (-325–788°F)

Pressure Products



XacTorr Series Capacitance Manometers

Advanced vacuum measurement technology virtually eliminates drift and provides longer operational life.



VersaTorr Series Vacuum Gauges

All-in-one ultra-wide range gas measurement solution for many vacuum applications.



Pressure Gauges, Switches & Transmitters

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



SolidSense II® Pressure Transducers

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



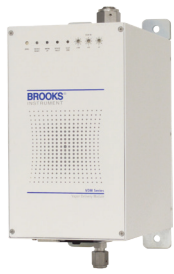
Key Features

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| <ul style="list-style-type: none"> Shielded sensor resists particle accumulation Dual-zone temperature control improves measurement stability and repeatability Multi-decade digital calibration provides superior window of known accuracy Independent diagnostic service port Heated or unheated models available | <ul style="list-style-type: none"> Ultra-wide measuring range of 9 decades Programmable settings and parameters Heat-loss MEMS Pirani to measure most accurately in the low and medium vacuum ranges Tri-Sensor Transducer model uses precision capacitance diaphragm gauge sensor to eliminate gas dependencies | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 |
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Performance

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| <ul style="list-style-type: none"> Pressure Range — 0.1 to 1000 Torr Accuracy — $\pm 0.15\%$ to 0.25% of reading Temperature Range — Ambient to 160°C Measurement Range — 4 Decades | <ul style="list-style-type: none"> Pressure Ranges — 7.5×10^{-7} to 1000 Torr Accuracy — $\pm 5\%$ to $\pm 0.5\%$ of reading Temperature Range — Ambient to 50°C Measurement Range — 9 Decades | <ul style="list-style-type: none"> Pressure Range — -15–3000 psi (205 bar) Accuracy — 1% FS Output Type — Analog voltage or current Certifications/Approvals — CE, FM and ATEX | <ul style="list-style-type: none"> Pressure Range — Up to 4000 psi (276 bar) Accuracy — 1% FS Switches available with logic outputs: <ul style="list-style-type: none"> Off-on and Type 1 (0 to 9–30 Vdc) Type 2 (8 to 30 Vdc) Type 3 (0 to 5 Vdc) Transmitters available with industry standard outputs — 4–20 mA; 0–5 Vdc; 1–5 Vdc |
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Vapor Delivery, Secondary Electronics & Software



Vapor Delivery Modules

Self-contained sub-system for the delivery of ultra-high purity water vapor.



0250 Series Power Supply, Readout & Set Point Controller

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



0260 Power Supply, Smart Interface & Controller

Provides a great turnkey solution for monitoring and controlling up to 30 RS485 S-Protocol mass flow and/or pressure control devices. Ideal in lab and research environments.



BEST Software

The Brooks Expert Support Tool (BEST) provides expanded control, diagnostics and servicing capabilities for GF40, GF1XX, GP200, PC1xx, Quantim®, VDM300 and all versions of SLA mass flow and pressure products.



Key Features

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| <ul style="list-style-type: none"> • Direct water vapor measurement with superior flow accuracy • Connects directly to the house deionized water supply • Operates at lower temperatures (non-superheated state) • Independent diagnostic service port | <ul style="list-style-type: none"> • 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™ | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Easy plug-and-play installation via computer's serial or USB port • MultiFlo™ configuration capability is accessible, providing users with a fast and simple method to reprogram the gas and range on MultiFlo™ enabled GF100, GF80, GF40 and Celerity/Unit brand mass flow controllers without removing them from the gas line or compromising on accuracy. • 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. |
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Performance

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| <ul style="list-style-type: none"> • Flow Range — 3000 sccm (H₂O vapor) • Accuracy — 1% of SP • Repeatability — <±0.2% FS • Response Time — <2 secs | <ul style="list-style-type: none"> • Power Input — Voltage: 12–24 Vdc required, -15 Vdc permitted <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> • Power Input — 85–250 Vac, 47–63 Hz • Power Output — Voltage: 24 Vdc (± 10%) <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> • 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 |
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Communication Protocols

Comparing Key Performance Criteria of Industrial Digital Protocols

	EtherNet/IP	EtherCAT	PROFINET	PROFIBUS	DeviceNet	Fieldbus Foundation	HART	RS-485
NODES	Unlimited	65,535	Unlimited	127	64	240	15	16
BAUD RATES	10 100 1 Mbps, MBPS, GBPS	100 Mbps	100 1 Mbps, GBPS	1200-12 Mbps	125 250 500	31.25 K	1200	1200-115 K
MESSAGE SIZE	511 BYTES	1500 BYTES	1440 BYTES	244 BYTES	8 BYTES	240 BYTES	31 BYTES	24 BYTES
MAIN TOPOLOGY	RING MULTI DROP	RING	MULTI DROP STAR, TREE	MULTI DROP	MULTI DROP WITH BRANCHES	MULTI DROP WITH BRANCHES	STAR POINT-POINT	MULTI DROP DAISY CHAIN
MESSAGE TYPES	PRODUCER-CONSUMER NETWORK	P2P PASS THROUGH	PRODUCER-CONSUMER NETWORK	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	STANDARD ETHERNET RJ45	PRE-DEFINED CORDSETS	PRE-DEFINED CORDSETS	PRE-DEFINED CORDSETS	2 - WIRE (4 - 20 mA)	PROPRIETARY CABLES

KEY ADVANTAGES:

EtherNet/IP EtherCAT PROFIBUS

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

PROFIBUS DeviceNet Fieldbus Foundation

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

HART COMMUNICATION PROTOCOL

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

RS-485

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

* PROFINET does not support ring topologies

Service and Support



Global Service and 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.



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