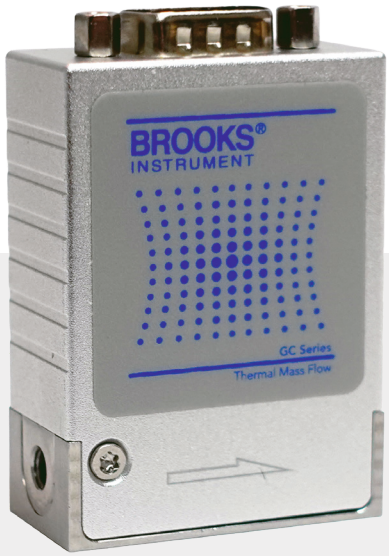
BROOKS® INSTRUMENT

Beyond Measure

GC Series

Elastomer Sealed, Supercompact, Gas Mass Flow Controllers



The GC Series mass flow controllers are MEMS-based devices designed with a supercompact, space-saving form factor and a highly stable sensor. Ideal for benchtop and laboratory use, where space is limited, these mass flow controllers offer a broad control range and integrate both analog I/O and Modbus RTU communication for versatile operation.

Features	Benefits
Supercompact Footprint	Maximizes gas panel density and reduces system size.
Extremely Low Valve Leak Rate	Eliminates the need for a separate shut-off valve in the gas delivery system.
Wide Turndown	Enables control across a wider flow range with fewer devices, simplifying panel design and reducing cost.
Straight Thread Mechanical Connection	Provides reliable, repeatable sealing with lower leak risk and potential for process contanimation (e.g. Teflon tape).
Modbus RTU (RS-485) + Analog I/O Options	Integrates easily into both digital and analog systems. Modbus provides additional information for process monitoring and control.
BCAT Software (Brooks Calibration Application Tool)	Provides documented performance verification for quality audits. Enables field calibration, verification, tuning, troubleshooting, and monitoring (including logging and charting) to support process optimization and minimize downtime.

Product Specifications

	GC50	GC51
Performance		
Full Scale Flow Range (air, eq.)	210 - 1500 sccm	210 - 5000 sccm
Flow Accuracy (at calibration conditions)[1]	1.5% of S.P. ±0.5% of F.S.	
Control Range (air, eq.)	100:1 for F.S.	
Repeatability & Reproducibility	±0.25% S.P	
Linearity	Included in accuracy	
Response Time (typical settling time at room temperature)	≤2 seconds for setpoints >10% F.S. ≤5 seconds for setpoints at ≤10% F.S.	
Zero Stability	≤0.2% F.S. per year	
Temperature Coefficient	Typical Offset: <0.05% of F.S. per °C Typical Span: <0.2% of RD per °C	
Attitude Sensitivity	Attitude Insensitive	
Ratings		
Operating Temperature Range	0 - 50°C (32 - 122°F)	
Maximum Rated Pressure	150 psig	
Proof/Burst Pressure	200 psig / 300 psig	
Minimum Pressure Differential	5 psi / 0.35 bar	
Maximum Pressure Differential	30 psi / 2.0 bar	
Inlet Pressure Range	5 psig - 55 psig	
Outlet Pressure Range	0 psig - 50 psig	
Leak Integrity (External)	$2x10^{-9}$ atm cc/sec He Valve Shut Down (Leak-by) <0.005 sccm	
Mechanical		
Valve Type	Normally Closed	
Primary Wetted Materials	316 Stainless Steel, AlO_x, 84-3J Epoxy, Copper, FKM, Silicon Nitride	
Dimensions / Connections		
L x W x H	20 mm x 40 mm x 60 mm	25 mm x 60 mm x 65 mm
Fittings	¼" tube compression, ¼" VCR, 6mm tube compression	¼" tube compression, ¼" VCR, 6mm tube compression
Compliance Standard		
Environmental Compliance	Safe Area use only — IEC 61010-1	
	CE Compliant — EN 61326-1:2021	
	RoHS — 2011/65/EU & 2015/863/EU	
	REACH — EC 1907/2006	

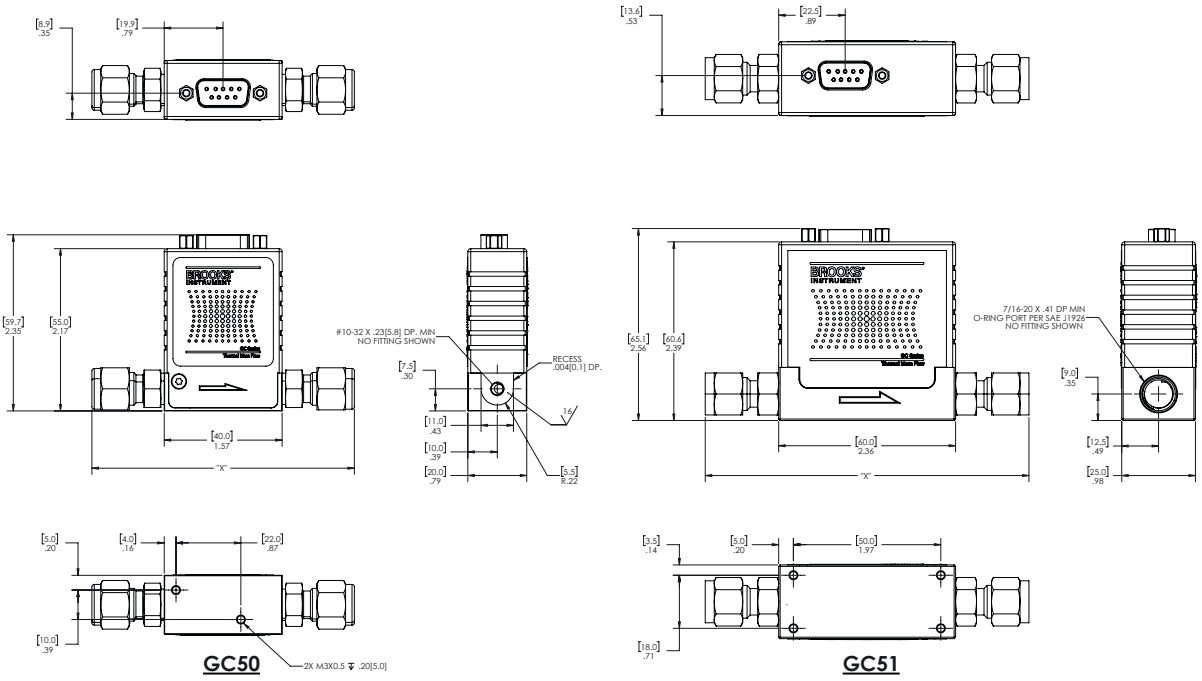
[1] Accuracy at calibration conditions; accuracy spec valid across the full control range

Product Specifications

	Analog + Modbus RTU via RS-485 (Included)
Communication Protocol	
Electrical Connection	DB9 Male
Analog I/O	0–5 VDC, 0–10 VDC, 4–20 mA, 0–20 mA (configurable)
Maximum Current Draw	300 mA
Voltage Set Point Input	
Full Range	0–5 VDC, 0–10 VDC
Absolute Max.	5.1 V (0-5 VDC), 10.2 V (0-10 VDC)
Input Impedance	4.9 kΩ (0-5 VDC), 10.1 kΩ (0-10 VDC)
Current Set Point	
Full Range	4–20 mA, 0–20 mA
Absolute Max.	20.4 mA
Input Impedance	51 Ω
Flow Output (Voltage) Specifications	
Full Range	0–6 V (0–5 VDC), 0–12 V (0–10 VDC)
Absolute Max.	6 V (0-5 VDC), 12V (0-10 VDC)
Maximum Current	10 mA
Flow Output (Voltage) Specifications	
Full Range	4–23.2 mA (4-20 mA), 0–24 mA (0-20 mA)
Absolute Max.	23.2 mA (4-20 mA), 24 mA (0-20 mA)
Maximum Load	400 Ω

Product Dimensions

GC50/1 Dimensions

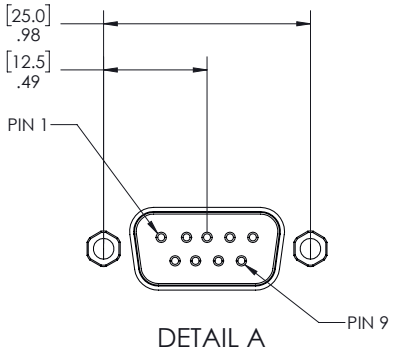


Dimension "X" Table

Connection	GC50	GC51
1/4" Tube Compression	3.50 [89.0]*	4.32 [109.8]*
	2.30 [58.6]**	3.12 [79.3]**
1/4" VCR	3.53 [89.6]	4.18 [106.1]
6mm Compression	3.53 [89.7]*	4.33 [110.0]*
	2.30 [58.6]**	3.13 [79.4]**

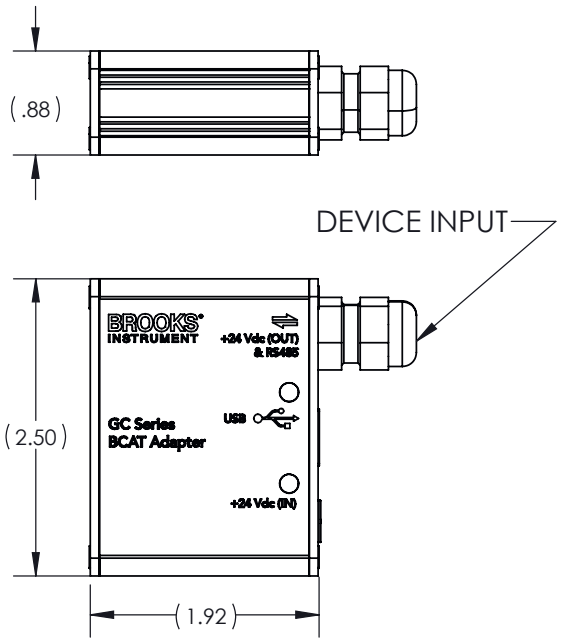
*With nut finger tight
**Length from tube locating shoulder of fitting

GC50/1 Electrical Connector



DETAIL A
ELECTRICAL CONNECTOR DETAIL
SCALE 2 : 1

Pin	Connection
1	N/C
2	N/C
3	RS-485 (-)
4	0-5 Vdc, Setpoint
5	RS-485 (+)
6	0-5 Vdc, Output
7	V+
8	GND
9	GND



BCAT Adapter

The BCAT (Brooks Calibration Application Tool) adapter provides **power** and **RS-485 communication** between the GC Series mass flow controller and the BCAT software on a PC. It performs three functions:

1. Supplies 24 VDC power to the GC
2. Converts USB from the PC into RS-485 (Modbus RTU)
3. Provides the correct 9-pin D-sub pinout to the GC device

BCAT software, downloadable via the Brooks Instrument website, allows the user to take advantage of servicing tasks that include setup, data logging, gas factor selection, response tuning and with a license, verification and calibration.

BCAT Adapter – 778Z024AAA	Description
Compatibility	GC Series Mass Flow Controllers
Included Items	110 VAC → 24 VDC power supply USB cable
Connector to Device	9-pin D-connector (assembled to adapter)
Dimensions	2.50" x 1.92" x .88"
Input Power Plug	Type A (NEMA 1-15): American 2-prong ungrounded plug.

Model Code

Code Description	Code Option	Option Description
I. Base Model Number	GC	Brooks MEMS MFC
II. Device Type	5	Mass Flow Controller
III. Device Size (Select based on Flow Range)	0	210 sccm - 1500 sccm
	1	210 sccm - 5000 sccm
IV. Flow Rate (Mantissa)	XX	Mantissa of flow rate
V. Flow Rate (Exponent)	X	Exponent of flow rate
VI. Configured Gas	X004	Ar (Argon)
	X008	Air
	X009	CO (Carbon Monoxide)
	X013	N_2 (Nitrogen)
	X015	O_2 (Oxygen)
	X025	CO_2 (Carbon Dioxide)
	X027	N_2O (Nitrous Oxide)
	X028	CH_4 (Methane)
	X089	C_3H_8 (Propane)
VII. Analog Communication	1	0 - 5 Vdc
	2	0 - 10 Vdc
	3	4 - 20 mA
	4	0 - 20 mA
VIII. Digital Communications	1	Modbus RTU (RS-485)
IX. Mechanical Connection	1A	No Fitting
	1B	1/4" Tube Compression
	1E	1/4" VCR
	1H	6mm Tube Compression
X. O-ring Material	A	FKM
XI. Valve Seat	B	FKM
XII. Valve Type	1	Normally Closed
XIII. Inlet Pressure	XX	5 psig - 55 psig
XIV. Outlet Pressure	XX	0 psig - 50 psig
XV. Certification	1	Safe Area

Sample Model Code

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
GC	5	0	XX	X	X013	1	1	1A	A	B	1	XX	XX	1

Service and Support

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

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

CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users, and maintenance persons. Please contact your nearest sales representative for more details. Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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