BROOKS® INSTRUMENT

Beyond Measure

GF40 Series

Elastomer Sealed, Digital, MultiFlo™ Gas Mass Flow Controllers & Meters

GF40 Series thermal mass flow controllers and meters offer exceptional performance, reliability, and flexibility for a wide range of gas flow measurement and control applications. At its core is our patented MultiFlo™ technology, which overcomes a key limitation of traditional thermal MFCs: when switching gas types, simple correction factors like heat capacity ratios can't fully account for viscosity and density differences. Instead, MultiFlo™ leverages a comprehensive database of gas runs to provide highly accurate, gas-specific correction functions, making the GF40 Series one of the most precise and adaptable MFC/MFM solutions available today.

The GF40 Series is ideal for customers who frequently change gas types or need to re-range without sacrificing accuracy. It simplifies inventory management by reducing the need for gas- and range-specific controllers, benefiting OEMs, large users in industries like solar, biotech, and nanotechnology, and researchers needing quick gas and range adjustments. The device's easy programming, fast setup (under 60 seconds), and corrosion-resistant construction ensure long-term durability and reliability.

Features	Benefits
MultiFlo™ Gas and Range Programmability	Select new gas calibrations and full-scale ranges without the trouble and cost of removing the mass flow controller from the gas line.
Variety of Elastomer Seals	Cost performance flexibility for a wide range of applications
Corrosion Resistant Hastelloy Sensor	Provides unmatched long-term sensor stability ensuring maximum yield and throughput.
Alarms and Diagnostics	Ensures device is operating within user specified limits for high process yield and uptime.
User Accessible Service Port	Simplified installation, start-up, troubleshooting and access to diagnostics provide maximum uptime

Product Specifications

	GF40
Performance	
Full-Scale Flow Range (N_2 Eq.)	3 sccm to 50 slm
Flow Accuracy	±1% S.P. 35-100%, ±0.35% F.S. 2-35%
Repeatibility & Reproducibility	<±0.2% S.P.
Linearity	±0.5% F.S. (included in accuracy)
Response Time (Settling Time)	Normally Closed Valve <1 sec (within 2% for steps 0-10 through 0-100%) Normally Open Valve <3 sec (within 2% for steps 0-10 through 0-100%)
Control Range	2 - 100%
MultiFlo™	Standard
Number of Bins	10 bins
Valve Shut Down	<1% of F.S.
Zero Stability	<±0.5% F.S. per year
Pressure Coefficient	0.03% per psi (0-50psi N_2)
Attitude Sensitivity	<0.25% span change @ 90° after rezeroing (N_2 @ 50 psi)
Auto Shut-off	The Auto Shut-off feature closes the GF0xx valve when the set point drops below 1.5% of full scale
Ratings	
Operating Temperature Range	5-50°C (41-122°F)
Maximum Operating Pressure	150 psig (10 bar)
Design Proof Pressure	4000 psig (275 bar)
Differential Pressure Range	3-860 sccm = 7-45 psid 861-7200 sccm = 15-45 psid 7201-50000 sccm = 25-45 psid Typical pressure drop, high density gases like Argon gas applications require an additional 10 psid differential pressure
Leak Integrity (External)	$1x10^{-9}$ atm. cc/sec He
Mechanical	
Valve Type	Normally Closed, Normally Open, No Valve (Meter)
Primary Wetted Materials	316 Stainless Steel, Hastelloy C-22, 17-7 PH, 430SS
External Seals	Viton, Buna, Kalrez, EPDM or Neoprene
Internal Seals/Valve Seat	Viton, Buna, Kalrez, EPDM or Neoprene
Surface Finish	32µ inch Ra
Compliance	
Environmental Compliance	CE: EN61326: 2006 (FCC Part 15 & Canada IC-subset of CE testing)
	Safe Area: Designed to EN61010-1
	RoHS
	General, Leak-Test Traceability, Oxygen Cleaning, Calibration Traceability, Material Certification

Product Specifications

	RS485	Profibus®	DeviceNet™	EtherCAT®
Communication Protocol				
Electrical Connection	1x15-pin Male Sub-D, (A)	1x15-pin Male Sub-D / 1x9-pin Female Sub-D	1xM12 with threaded coupling nut (B)	5-pin M8 with threaded coupling nut / 2xRJ45
Analog I/O	0-5 V, 0-10 V, 0-20 mA, 4-20 mA	0-5 V, 0-20 mA, 4-20 mA	0-5 V (Output Only)	0-5 V (Output Only)
GF40 Power Max./Purge	From +12 Vdc to +24 Vdc: 7 Watt/8 Watt	From +13.5 Vdc to +27 Vdc 7 Watt/8 Watt	From +11 Vdc to +25 Vdc: 7 Watt/8 Watt	From +13.5 Vdc to +27 Vdc 7 Watt/8 Watt
Voltage Set Point Input Specification				
Nominal Range	0-5 Vdc or 0-10 Vdc	0-5 Vdc	N/A	N/A
Full Range	0-11 Vdc	0-5.5 Vdc	N/A	N/A
Absolute Max.	25 V (without damage)		N/A	N/A
Input Impedence	192 kOhms		N/A	N/A
Required Max. Sink Current	0.002 mA		N/A	N/A
Current Set Point				
Nominal Range	4-20 mA or 0-20 mA		N/A	N/A
Full Range	0-22 mA		N/A	N/A
Absolute Max.	25 mA (without damage)		N/A	N/A
Input Impedence	250 Ohms	125 Ohms	N/A	N/A
Flow Output (Voltage) Specifications				
Nominal Range	0-5 Vdc or 0-10 Vdc	0-5 Vdc		
Full Range	(-0.5)-11 Vdc	0-5.5 Vdc	(-0.5)-5.5 Vdc	
Min Load Resistance	1 kOhms	1 kOhms	0.5 kOhms	
Flow Output (Current) Specifications				
Nominal Range	0-20 mA or 4-20 mA		N/A	N/A
Full Range	0-22 mA (@ 0-20 mA); 3.8-22 mA (@ 4-20 mA)		N/A	N/A
Max. Load	400 Ohms for supply voltage: 12-24 Vdc		N/A	N/A
Analog I/O Alarm Output[1]				
Type	Open Collector		N/A	N/A
Max. Closed (On) Current	25 mA		N/A	N/A
Max. Open (Off) Leakage	1µA		N/A	N/A
Max. Open (Off) Voltage	30 Vdc		N/A	N/A
Analog I/O Valve Override Signal Specifications[2]				
Floating/Unconnected	Instrument controls valve to command set point		N/A	N/A
VOR < 1.40 Vdc	Valve Closed		N/A	N/A
1.70 Vdc < VOR < 2.90 Vdc	Valve Normal		N/A	N/A
VOR > 3.20 Vdc	Valve Open		N/A	N/A
Input Impedence	800 kOhms		N/A	N/A
Absolute Max. Input	(-25 Vdc) < VOR < 25 Vdc (without damage)		N/A	N/A

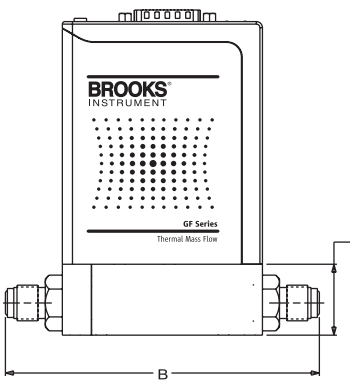
[1] The Alarm Output is an open collector or "contact type" that is CLOSED (on) whenever an alarm is active. The Alarm Output may be set to indicate any one of various alarm conditions.

[2] The Valve Override Signal (VOR) is implemented as an analog input which measures the voltage at the input and controls the valve based upon the measured reading as shown in this section.

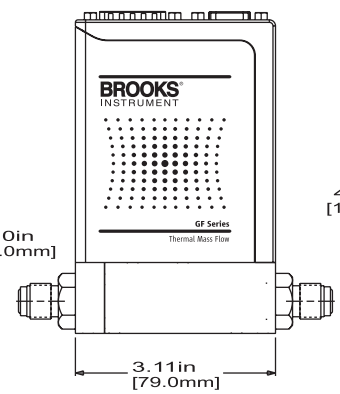
Product Dimensions

GF40 Analog, DeviceNet, EtherCAT, and Profibus Configurations

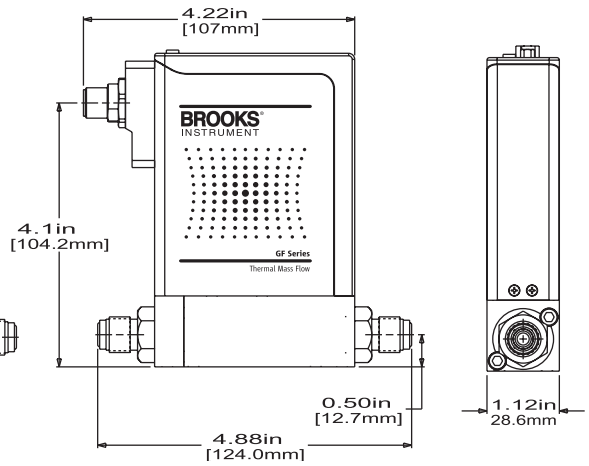
Analog / RS485



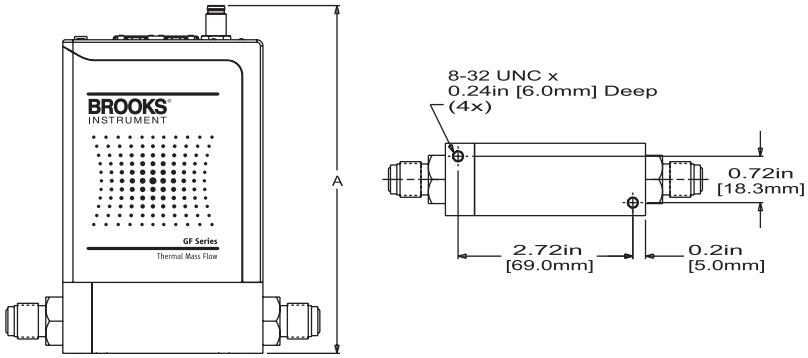
Profibus



DeviceNet



EtherCAT

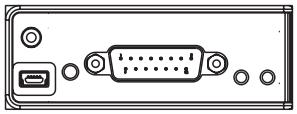


Configuration	Dim A
Analog/RS485	5.06in [128.5mm]
Profibus	5.00in [127mm]
DeviceNet	4.92in [125.1mm]
EtherCAT	5.41in [137.4mm]

Connection Type	Dim B
9/16 - 18 UNF	3.00in [76.2mm]
1/2 in TC	5.22in [133mm]
3/8 in TC	4.84in [131mm]
1/4 in TC	4.94in [125.5mm]
1/8 in TC	4.84in [123mm]
1/4 in VCR	4.88in [124mm]
1/4 in VCO	4.61in [117mm]
1/4 in NPT	4.58in [116.4mm]
1/4 in RC	4.58in [116.4mm]
6mm TC	5.02in [127.6mm]
10mm TC	5.16in [131mm]

Product Connections

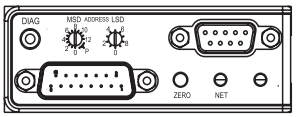
Base I/O Options



Description: Industry standard Analog / RS485

Analog/RS485 Option (S, L, and A Protocols)

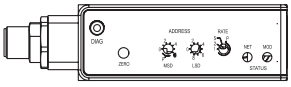
Pin	Description
1	Setpoint Common
2	Flow Output (0 - 5 V, 0 - 10 V)
3	Alarm Out
4	Flow Output (0 - 20mA, 4 - 20 mA)
5	Power Supply (+12 V to +24 Vdc)
6	NC
7	Setpoint Input (0 - 20mA, 4 - 20 mA)
8	Setpoint Input (0 - 5 V, 0 - 10 V)
9	Power Common
10	Flow Out Common
11	NC
12	Valve Override Input
13	Reserved
14	RS485B
15	RS485A



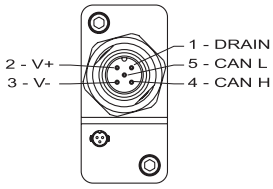
Description: Industry standard Profibus

Profibus Option

Pin	Description
1	Setpoint Common
2	Flowpoint Output (0 - 5 V)
3	Alarm Out
4	Flow Output (0 - 20mA, 4 - 20 mA)
5	Power Supply (13.5 - 27 V)
6	NC
7	Setpoint Input (0 - 20 mA, 4 - 20 mA
8	Setpoint Input (0 - 5 V)
9	Power Common
10	Flow Out Common
11	NC
12	Valve Override Input
13	Reserved
14	NC
15	NC

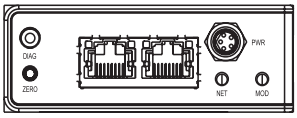


Description: Industry standard DeviceNet

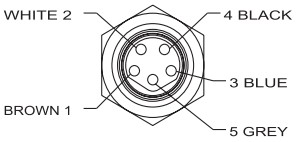


DeviceNet Option

Pin	Description
1	Drain
2	V+ (11 - 25 Vdc)
3	V-
4	CAN-H
5	CAN-L



Description: Industry standard EtherCAT



EtherCAT Option

Pin	Description
1	Power Supply (13.5 - 27 V)
2	Flow Out Common
3	Power Common
4	Flow Output (0 - 5 V)
5	Reserved

Model Code

Code Description	Code Option	Option Description
I. Base-Model Code	GF040	Elastomer / Range Flow (0-50 slpm)
II. Configurability	C	MultiFlo Capable. Standard Bins or specific gas range may be selected
	X	Not MultiFlo Capable. Specific gas/range required
III. Special Application	XX	Standard
IV. Valve Configuration	C	Normally Closed Valve
	O	Normally Open Valve
	M	Meter (No Valve)
V. MultiFlo Bin & Range or Gas & Range (Standard)	XXXX XXXX	Specific Gas Code & Range, example: "0004" = Argon and "010L" = 10 slpm
	SA40 010C	Standard Configuration #40, 3-10 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA41 030C	Standard Configuration #41, 11-30 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA42 092C	Standard Configuration #42, 31-92 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA43 280C	Standard Configuration #43,93-280 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA44 860C	Standard Configuration #44, 281-860 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA45 2.6L	Standard Configuration #45, 861-2600 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA46 7.2L	Standard Configuration #46, 2601-7200 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA47 015L	Standard Configuration #47, 7201-15000 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA48 030L	Standard Configuration #48, 15001-30000 sccm N_2 Eq. @ 0 deg C Ref Temp.
	SA50 050L	Standard Configuration #50, 30001-50000 sccm N_2 Eq. @ 0 deg C Ref Temp.
VI. Fitting	XX	9/16" - 18 UNF
	T1	1/8" tube compression
	T2	1/4" tube compression
	T3	3/8" tube compression
	T4	1/2" tube compression
	T6	6 mm tube compression
	T0	10 mm tube compression
	R2	14" RC (BSP)
	VX	1/4" VCR
	O2	1/4" VCO
	N2	1/4" NPT
VII. Downstream Condition	A	Atmosphere
	V	Vacuum
	P	Positive Pressure
VIII. External Seals, Valve Seat	B	Seal Buna / Seat Buna
	E	Seal EPDM / Seat EPDM
	K	Seal Kalrez / Seat Kalrez
	N	Seal Neoprene / Seat Neoprene
	V	Seal Viton / Seat Viton

Model Code

Code Description	Code Option	Option Description				
IX. Communications / Connector	P5	Profibus / Analog (Input 0-5 V; Output 0-5 V); 9-Pin Female D conn. / 15-Pin Male D conn.				
	P0	Profibus / Analog (Input 0-20 mA; Output 0-20 mA); 9-Pin Female D conn. / 15-Pin Male D conn.				
	P4	Profibus / Analog (Input 4-20 mA; Output 4-20 mA); 9-Pin Female D conn. / 15-Pin Male D conn.				
	E5	EtherCAT™ / (Output 0-5 V); 2xRJ45 signal 2-Pin power				
	S5[4]	RS485: (S-Protocol)/Analog (Input 0-5 V; Output 0-5 V)15-Pin Male D (Brooks Protocol)				
	S1[2]	RS485: (S-Protocol)/Analog (Input 0-10 V; Output 0-10 V); 15-Pin Male D (Brooks Protocol)				
	S0[1]	RS485 (S-Protocol)/Analog (Input 0-20 mA ; Output 0-20 mA); 15-Pin Male D (Brooks Protocol)				
	S4[3]	RS485 (S-Protocol)/Analog (Input 4-20 mA; Output 4-20 mA); 15-Pin Male D (Brooks Protocol)				
	L5	RS485 (L-Protocol)/Analog (Input 0-5 V; Output 0-5 V); 15-Pin Male D (Celerity/Legacy Protocol)				
	L1[2]	RS485 (L-Protocol)/Analog (Input 0-10 V; Output 0-10 V); 15-Pin Male D (Celerity/Legacy Protocol)				
	L0[1]	RS485 (L-Protocol)/Analog (Input 0-20 mA; Output 0-20 mA); 15-Pin Male D (Celerity/Legacy Protocol)				
	L4	RS485 (L-Protocol)/Analog (Input 4-20 mA; Output 4-20 mA); 15-Pin Male D (Celerity/Legacy Protocol)				
	A5	RS485 (A-Protocol)/Analog (Input 0-5 V; Output 0-5 V); 15-Pin Male D (Aera Protocol)				
	A1	RS485 (A-Protocol)/Analog (Input 0-10 V; Output 0-10 V); 15-Pin Male D (Aera Protocol)				
	A0	RS485 (A-Protocol)/Analog (Input 0-20 mA; Output 0-20 mA); 15-Pin Male D (Aera Protocol)				
	A4	RS485 (A-Protocol)/Analog (Input 4-20 mA; Output 4-20 mA); 15-Pin Male D (Aera Protocol)				
	DeviceNet Standard Configuration Parameters					
		Connector	Full Scale Setting	Full Scale Setting	Poll I/O Instance Consumer	External Baud Rate
	D1	5 Pin Micro	Count	6000h	7	500KB
	D3	5 Pin Micro	Count	6000h	7	500KB
	D5	5 Pin Micro	Count	6000h	8	500KB
	D7	5 Pin Micro	Count	7FFFh	8	500KB
	D9	5 Pin Micro	Count	6000h	7	500KB
	DB	5 Pin Micro	Count	6000h	8	500KB
	DD	5 Pin Micro	Count	7FFFh	8	500KB
	DX	5 Pin Micro	To be defined by CSR			
X. Customer Special Request	XXXX	Customer Special Request Number				
XI. Auto Shut Off	A	Auto Shut-Off (Included)				
	X	Auto Shut-Off (Not Included)				
XII. Fixed X Value	X	Fixed X Value				
XIII. Reference Temperature	00C	0°C Reference				
	15C	15°C Reference				
	20C	20°C Reference				
	70F	21.1°C Reference / 70°F Reference				

Sample Model Code

I	II	III	IV		V		VI	VII	VIII	IX		X	XI	XII		XIII
GF040	C	XX	C	-	0013300C	-	T2	A	V	P5	-	XXXX	A	X	-	20C

Service and Support

Brooks is committed to assuring all of our customers receive the ideal pressure controllers 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.

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.

Data-Sheet-GF40-EN/2024-11

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BROOKS® INSTRUMENT
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