

Quantim[®] QMC Series

Low Flow Coriolis Mass Flow
Controllers & Meters for Liquids & Gases

Brooks Instrument has developed the third generation of its small, low-flow Coriolis mass flow meter and controller – the new Quantim[®] QMC Series. Compatible in fit, form and function with second generation QMB models, the new QMC model features a modern digital architecture enabling fast response, expanded simultaneous multi-variable outputs and enhanced diagnostics to handle a wide range of challenging applications. The easy-to-access service port via a 2.5mm jack plug and status LEDs simplifies installation, setup and troubleshooting using our free BEST (Brooks Expert Support Tool) software.



The heart of the device is a unique high-performance Coriolis sensor which directly measures mass flow independent of fluid type and process variables. With a range of 0.001 to more than 27 kg/hr, this multi-variable device simultaneously measures and reports mass flow, volume flow, density and temperature along with other valuable diagnostic variables for optimized process control and predictive maintenance. Quantim[®] offers unsurpassed accuracy and zero stability for demanding low flow gas or liquid measurement applications.

Features

Benefits

Integrated sensor, valve and PID control all in one small package	Simplifies purchase, installation, and start up by having everything available from one supplier in a single compact unit
Low mass tube drive and optical sensing	Enables accuracy and zero stability at extreme low flow
Multivariable outputs and true mass measurement	Improves and simplifies process monitoring and diagnostics, further reducing cost of ownership
Diagnostic alarms and warnings	Provides early indication of potential process issues so preventative actions can be taken
Direct mass flow measurement with industry leading precision	Process chemistry and/or process conditions can be altered without the need to change or recalibrate the measurement system, providing the user with maximum flexibility
Easy-to-access service port and BEST software	Facilitates enhanced process monitoring and predictive maintenance, simplifies installation, and supports troubleshooting
Variety of material options, enclosure types and area classifications available	Available with IP40 or IP66 enclosure for hosedown washdown installations and optional Class 1 Division 2 and Zone 2 hazardous area approvals.
Coplanar valve	Super-fast response times (<400 msec typical); Minimum valve leak-by (<0.2% F.S.); High turndown ratio

Product Specifications

	QMCC (Controller)			QMCM (Meter)		
Performance						
Tube Size:	2	3	4	2	3	4
Nominal Flow Range ¹ :						
Liquid (kg/hr):	0.15	0.78	7.97	0.19	1.30	13.50
Gas (kg/hr):	0.076	0.214	1.796	0.103	0.53	3.840
Gas (scm) ² :	1051	2955	24787	1432	7207	53116
Maximum Flow Liquid (kg/hr) ¹ :	0.3	1.4	16.0	0.38	1.4	27.0
Minimum Flow Liquid (kg/hr):	0.001	0.010	0.100	0.001	0.010	0.100
Flow Accuracy ^{3,4} :	Standard Flow Accuracy or [(zero stability/flow rate) x 100]% of rate, whichever is greater					
Standard Flow Accuracy:	Liquid: 0.2% Gas: 0.5% of rate					
Zero Stability Stainless Steel Sensor (kg/hr):	0.00013	0.0010	0.0040	0.00013	0.0010	0.0040
Repeatability & Reproducibility:	+0.05% or +[0.5 x (zero stability/flowrate) x 100]% of rate whichever is greater					
Response Time (Settling Time): 2% F.S. of final value, (per SEMI Guideline E17-91)	<2 seconds			<0.5 seconds		
Temperature Coefficient	Zero: 0.05% F.S./°C Span: 0.035% F.S./°C					
Control Range / Turndown ⁵	100:1 or down to minimum flow					
Ratings						
Operating Temperature Range ⁶ :	0 to 60°C					
Temperature Accuracy (Device):	±0.5°C					
Differential Pressure Range:	Liquid: 10 to 200 psi (0.69 to 13.8 bar) Gas: 10 to 150 psi (0.69 to 10.3 bar)					
Maximum Operating Pressure:	Standard: 500 psi (34.5 bar) Optional: 1500 psi (103 bar)					
Density Range:	0 to 2.0 g/cc					
Density Accuracy ⁷ :	±0.005 g/cc					
Leak Integrity (External):	Elastomer: Outboard 1 x 10 ⁻⁹ atm. cc/sec., helium (max) Metal Seal: 1 x 10 ⁻¹⁰ atm. cc/sec., helium (max)					
Mechanical						
Materials of Construction (Process Wetted):	316L, 316L VAR, High alloy ferritic stainless and 17-7PH					
Materials of Construction (Process Seals):	Elastomer Seal: Viton® fluoroelastomers, Buna, Kalrez® or EPDM Metal Seal: stainless steel and nickel					
Housing:	IP40: polyurethane painted aluminum IP66: polyurethane painted aluminum					
In-Line Filter ⁸ :	Tube size 2 controller: 1 micron or 10 micron filter recommended Tube size 3 or 4: 10, 20, 30 & 40 micron filters available					
Weight:	IP40: 2.4 kg (5.4 lbs.) IP66: 2.5 kg (5.6 lbs.)					
Moisture Content:	Purged to exhaust dew point less than -40°C (-40°F) prior to shipment to remove calibration liquid, to prevent process contamination. Then vacuum bagged at ambient room conditions.					
Process Fitting Options:	Elastomer Seal: 1/16", 1/8", 1/4" or 6mm tube compression, 1/8" or 1/4" NPT(F), 1/8" or 1/4" VCR, 1/4" VCO Metal Seal: 1/8" VCR, 1/4" VCR, 3.2 mm UPG					
Electrical Connections:	IP40: 15 pin D-Type connector (See Figure 5) IP66: 15 conductor terminal block (26-20 Awg) (See Figure 6)					
Dimensions:	(See Figures 1 through 4)					
Vibration:	Tested per: IEC 60068-2-64 Ed 2.1, Table A.3, Category 1, per ETSI EN 300 019-2-3, T 3.2., 30 min / axis, 1.1m/s ² (0.1g), 5 to 100Hz IEC 60068-2-6, Table A.1, 75min / axis, Peak Acceleration of 9.8m/s ² (1g), 5 to 2,000Hz, 5 Sweeps					
Diagnostics						
Status Lights:	Status and Alarm LEDs					
Alarms:	Mass Flow, Density, Volumetric Flow, Temperature, Slug Flow, Diagnostic Failure, Setpoint Deviation, Valve Drive					

Product Specifications

	QMCC (Controller)	QMCM (Meter)
Electrical		
Output Signal:	Digital: RS485 S-Protocol (See RS485 Supplemental Manual – QMC for additional details) Analog: Primary: 0-20 mA, 4-20 mA, 0-5 Vdc, or 0-10 Vdc active output represents mass flow or volume flow(3) Secondary: 0-20 mA, 4-20 mA 0-5 Vdc or 0-10 Vdc active output represents density or temperature. Alarm output, max. voltage 30 Vdc, max. current 100 mA	
Input Signal:	Digital: RS485 S-Protocol (See RS485 Supplemental Manual – QMC for additional details) Analog: Command (setpoint): 0-20 mA, 4-20 mA, 0-5 Vdc or 0-10 Vdc Valve Override (VOR) Function: Left floating/unconnected - instrument controls flow at setpoint Connected to signal at or above 5.0 volts - valve is forced open Connected to signal at or below 0.0 volts - valve is closed	
Power Requirements:	Voltage: +14 to 27 Vdc	
Nominal Current:	Controller: 165mA @ 27V and 340mA @ 14V Meter: 80mA @ 27V and 150mA @ 14V	
Max Current:	Controller: 760mA @ 14 Vdc Meter: 260mA @ 14 Vdc	
Max Power	Controller: 10.6 W @ 14 Vdc Meter: 3.7 W @ 14 Vdc	

Additional Functions & Outputs

Damping:	Factory set time constant from 0 to 10 seconds
LED's:	'STAT' solid green: system operative 'AL' solid red: system fault
Pushbuttons:	'ZERO' setting pushbutton

Approvals, Certifications & Compliance

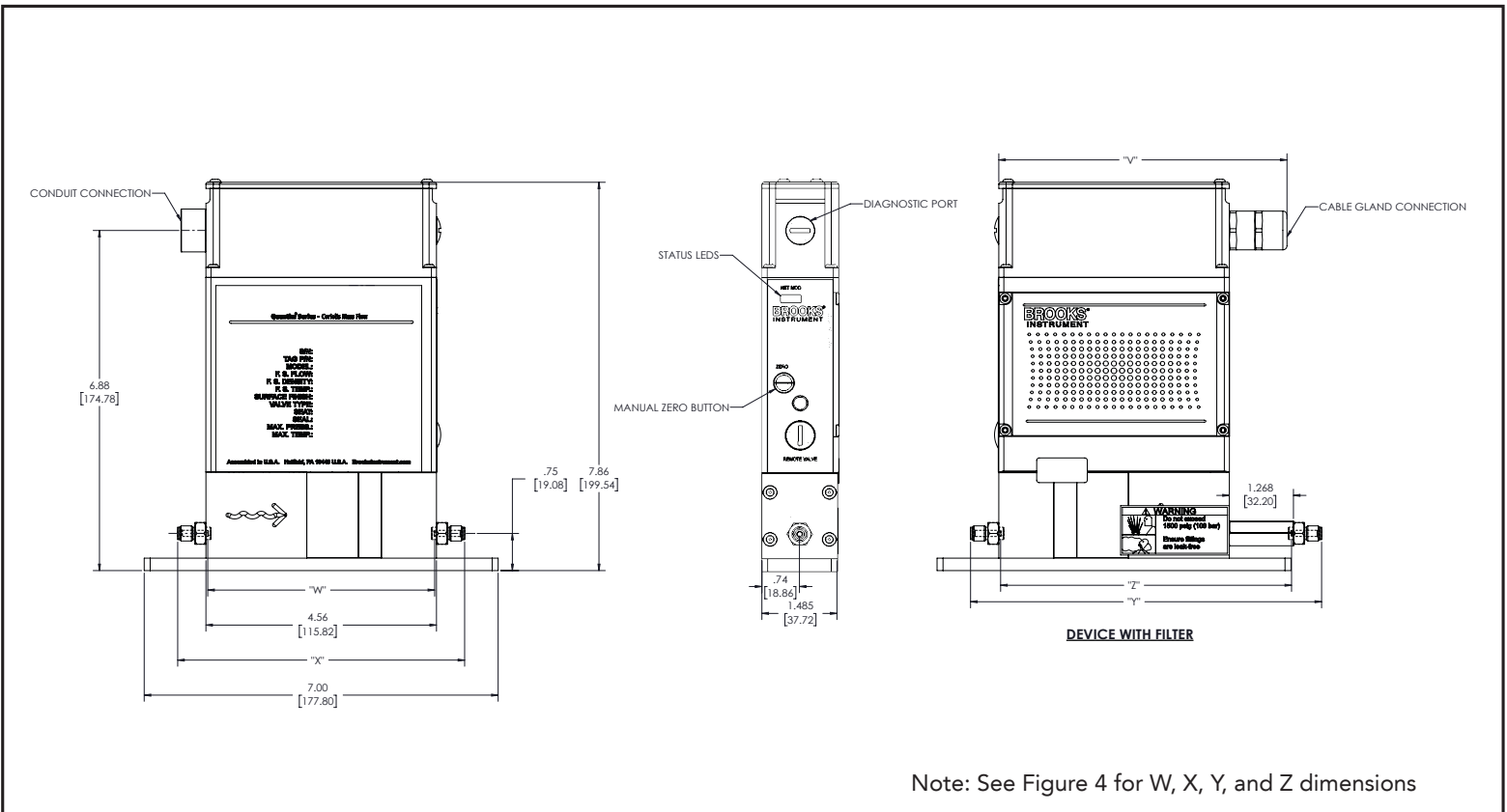
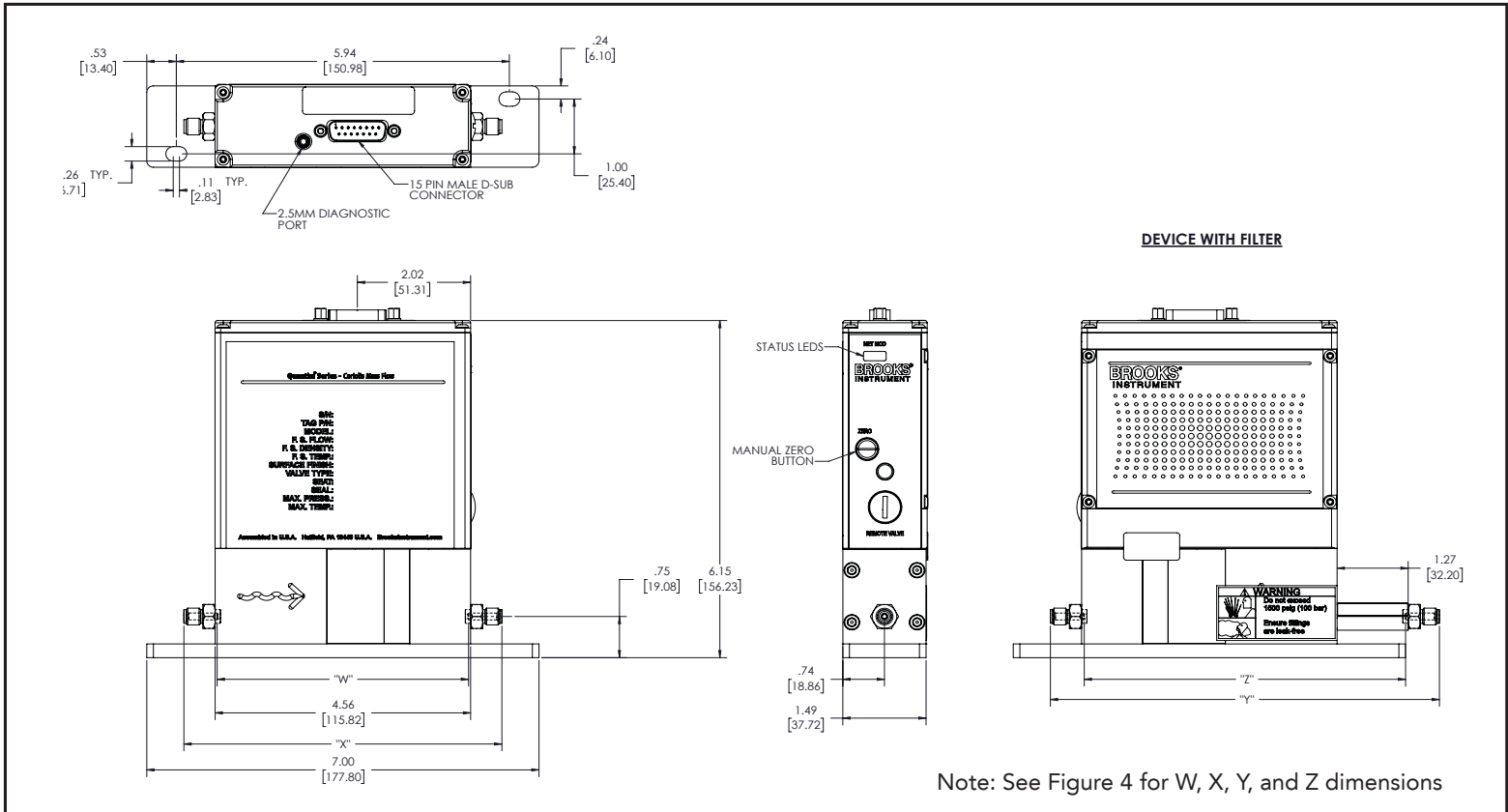
Environmental Compliance:	EMC Directive 2014/30/EU per EN 61326-1: 2013 ROHS Directive 2011/65/EU and 2015/863
Pressure Effects Compliance:	Pressure Equipment Directive 2014/34/EU "Sound Engineering Practice"
Additional Certifications (Optional):	Material 2.1 EN10204, Material 3.1B EN10204, Calibration Traceability, Oxygen Clean, Certificate of Conformance

Hazardous Area Approvals:	<p>IP4x Series: UL Recognized E73889, Vol 3, Section 3. Non Incendive, Class I Division 2 Groups A, B, C and D; T4 per UL 1604, UL 508, and CSA 22.2 No. 213 1987; C-22.2 No. 14-M91, Ex nC IIC T4 per CSA E79-1 KEMA 04ATEX1241 X II3G Ex nA II T4 per EN 60070-15: 2003</p> <p>IP6x Series: UL Recognized E73889, Vol 1, Section 26 (conduit entry) UL E73889, Vol. 3, Section 3 (cable gland entry) Non Incendive, Class I Division 2 Groups A, B, C and D; Dust Ignition-Proof, Class II, Division 2, Groups F and G; Suitable for Class III, Division 2, T4 per UL 1604, UL 508, and CSA 22.2 No. 213 1987; C-22.2 No. 14-M91, Ex nC IIC T4 per CSA E79-15, Class 1, Zone 2, AEx nC IIC T4 per ANSI/UL 60079-15 ATEX 4 IECEx II 3 G Ex nA II T4 and II 3D T 135°C per EN 60079-0: 2006, EN 60079-15: 2005, EN 61241-0: 2006, EN 61241-1: 2004, EC 60079-0: 2004, IEC 60079-15: 2005, IEC 61241-0: 2004, IEC 61241-1: 2004</p>
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Notes

- The nominal flow rate is the flow rate at which water at reference conditions causes approximately 1 bar of pressure drop or the laminar to turbulent transition flow whichever is lower. Maximum flow rate is higher than the nominal flow rate and is dependent upon process fluid and process conditions.
- Standard volumetric conditions are 14.696 psia and 70°F.
- Actual volumetric flow is a function of the mass flow and the density measurements; therefore the accuracy of actual volumetric flow is a function of the mass flow and density accuracy.
- Accuracy includes combined repeatability, linearity, hysteresis and calibration system uncertainty. Specifications are based on reference test conditions of water/nitrogen at 68 to 77°F (20 to 25°C) and 15 to 30 psig (1 to 2 bar).
- Control range for QMCC controller is 100:1 due to control valve leaky. Turndown for QMCM meter is only limited by acceptable accuracy at low end of flow range and may be greater than 100:1
- A temperature rise of up to 10°C (68°F) from internal heating can occur in an open environment where ambient temperature is 23°C (73°F). The device temperature is affected by the ambient and process temperature as well as warming when the device is powered. The device should be maintained in the specified temperature range at all times.
- The density measurement at temperatures other than 25°C (77°F) has an additional error of approximately 0.000125 grams/cc per °C.
- Additional upstream filtration is always recommended to remove any particulate from the process fluid before it flows through these devices. In most applications, Brooks in-line filters are recommended as a secondary filter in addition to other upstream filtering methods. The use of Brooks in-line filters are not recommended in moisture sensitive applications.

Product Dimensions



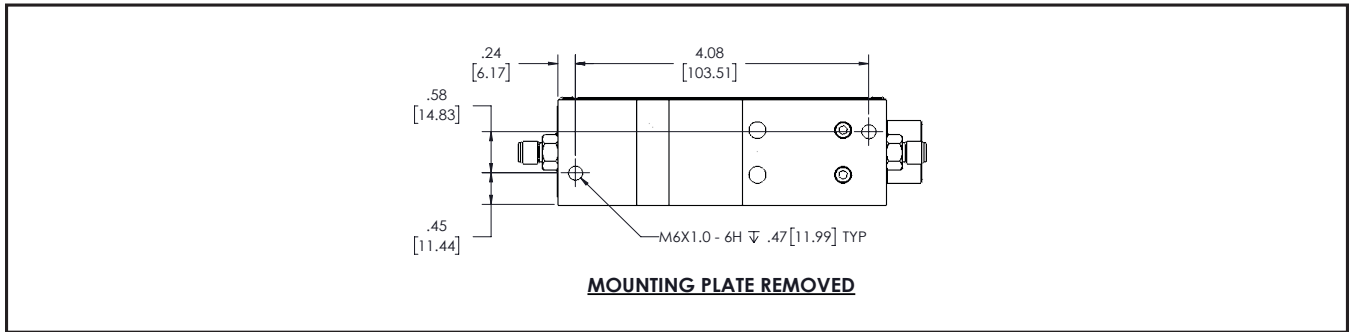


Figure 3 Dimensional Drawing QMC Bottom View

FITTING	"W" DIMENSION (NO FILTER)	"X" DIMENSION (NO FILTER)	"Y" DIMENSION (FILTER)	"Z" DIMENSION (FILTER)
1/8" VCR	N/A	5.92 [150.37]	7.19 [182.57]	N/A
1/4" VCR	N/A	6.64 [168.66]	7.91 [200.86]	N/A
1/16" TUBE COMPRESSION	5.30 [134.62]	5.68 [144.27]	6.95 [176.47]	6.57 [166.88]
1/8" TUBE COMPRESSION	4.49 [114.05]	5.68 [144.27]	6.95 [176.47]	5.76 [146.30]
1/4" TUBE COMPRESSION	5.30 [134.62]	5.92 [150.37]	7.19 [182.57]	6.57 [166.88]
6mm TUBE COMPRESSION	5.31 [134.87]	5.93 [150.62]	7.2 [182.82]	6.58 [167.13]
1/8" NPT	N/A	5.81 [147.57]	7.08 [179.77]	N/A
1/4" NPT	N/A	6.19 [157.23]	7.46 [189.43]	N/A
1/4" VCO	N/A	6.14 [155.96]	7.41 [188.16]	N/A
3.2mm UPG	N/A	5.92 [150.3]	N/A	N/A

NOTE: "W" & "Z" dimension reflects length of internal tube locating shoulder of each fitting.

Figure 4 Lay-In Dimensions

Pin	Function	Controller	Meter
1	Setpoint Common	*	N/A
2	0-5(10) Volt Flow Output	*	*
3	(TTL) Open Collector Alarm Output	*	*
4	(0)4-20 mA Flow Output	*	*
5	Power Supply (14-27 V)	*	*
6	Not Connected	N/A	N/A
7	(0)4-20 mA Setpoint Input	*	N/A
8	0-5(10) Volt Setpoint Input	*	N/A
9	Power Common	*	*
10	Signal Out Common	*	*
11	Not Connected	N/A	N/A
12	Valve Override Input	*	N/A
13	Density or Temperature output, Current or Voltage	*	*
14	RS-485, B(-) Input/Output	*	*
15	RS-485, A(+) Input/Output	*	*

Figure 5 D-Connector Electrical Pin Connections

Connector	Pin	Signal
J2	1	Power Supply (14-27 V)
	2	Power Common
	3	Earth GND
	4	RS-485, B(-) Input / Output
	5	RS-485, A(+) Input / Output
	6	N/C
J3	1	Setpoint Common
	2	Valve Override Input
	3	Setpoint Input, Current
	4	Setpoint Input, Voltage
J4	1	Signal Out Common
	2	N/C
	3	Density or Temperature Output (Current or Voltage)
	4	Flow Output, Current
	5	(TTL) Open Collector Alarm Output
	6	Flow Output, Voltage

Figure 6 Terminal Block Pinout Connections for IP66 or Class 1 Division 2 / Zone 2

Model Code

Code Position	Code Description	Code Option	Option Description		
1-4	Base Model	QMCC	Flow Controller		
		QMCM	Flow Meter		
5	Tube Size		Meter Nominal Flow		
			Liquid		
			Gas		
			Controller Nominal Flow		
		Liquid	Gas		
	2	190 grams/hr	1430 sccm	150 grams/hr	1051 sccm
	3	1300 grams/hr	7.21 slpm	780 grams/hr	2.96 slpm
	4	13.5 kg/hr	53.1 slpm	7.97 kg/hr	24.8 slpm
6	Fluid Type	L	Liquid		
		G	Gas		
7	Reserved	1	Standard		
8	Valve Type	A	No Valve (Flow Meter)		
		B	Normally Closed Valve		
9	Accuracy	2	0.2% of rate	Standard for Liquid	
		3	0.5% of rate	Standard for Gas, Optional for Liquid	
		4	1.0% of rate	Optional for Gas	
10	Enclosure Type and Safety Certification	A	IP40	No Area Classification	
		B	IP40	UL Recognized C1D2	
		C	IP66	No Area Classification	
		D	IP64	UL Listed C1D2	
		G	IP40	ATEX Zone 2	
		H	IP40	IECEx Zone 2	
		I	IP64	ATEX Zone 2	
J	IP64	IECEx Zone 2			
11	Surface Finish	1	Standard Surface Finish (32 Ra)		
12	Sensor Tube Material	A	316L Stainless Steel		
13	Maximum Pressure	1	500 psi (35 bar)		
		2	1500 psi (100 bar)		
14	Reserved	A	Standard		
15-16	Process Connections	1A	Standard Body Connection - 5/6" - 24 UNF		
		1B	1/16" Tube Compression		
		1C	1/4" Tube Compression		
		1D	1/8" Tube Compression		
		1G	6mm Tube Compression		
		1J	1/8" NPT(F)		
		1K	1/4" NPT(F)		
		1L	1/8" VCR	Available with Metal Seals	
		1M	1/4" VCR	Available with Metal Seals	
		1P	1/4" VCO		
		2A	3.2mm UPG	Available with Metal Seals	

Code Position	Code Description	Code Option	Option Description		
17	Input Output Signals / Communications		Primary I/O		
		A	0-5 VDC		
		B	4-20 mA		
		C	0-5 VDC		
		S	RS485		
		T	0-10 Volt		
		U	0-10 Volt		
		V	0-10 Volt		
		W	0-10 Volt		
		1	0-20 mA		
		2	0-20 mA		
18	Electrical Connection		Secondary Output		
		A	4-20 mA		
		B	4-20 mA		
		C	0-5 VDC		
19	Seals		Sensor, Valve Stem and End Fitting		
		A	Viton		
		B	Buna		
		C	Kalrez 4079		
		D	Kalrez 6375		
		E	EPDM		
		K	Nickel		
		20	Valve Seat Material	1	None (Meter)
				7	Metal 17-7pH Stainless Steel
		21	Special Processing	A	None
				B	2.1 EN 10204 Material Certificate
C	3.1B EN 10204 Material Certificate				
D	Certified Clean for Oxygen Service				
E	Certified Clean for Oxygen Service & 2.1 EN 10204 Material Certificate				
F	Certified Clean for Oxygen Service & 3.1B EN 10204 Material Certificate				
22	Quality Certifications	1	None		
		2	Calibration Certification Traceable to NIST		
		4	Certificate of Conformance		
		5	Calibration Certification Traceable to NIST and Certificate of Conformance		
23	In-Line Filter*	A	None		
		B	In-Line Cartridge Filter, 10 Micron		
		C	In-Line Cartridge Filter, 20 Micron		
		D	In-Line Cartridge Filter, 30 Micron		
		E	In-Line Cartridge Filter, 40 Micron		
		F	In-Line Cartridge Filter, 1 Micron		
		Z	Filter Housing Only / No Filter Element		
24	OEM Code	A	Brooks		
		N	No Logo		

Sample Model Code

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
QMCC	2	G	1	A	2	A	1	A	1	A	1A	A	1	A	1	A	1	A	A

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.

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.

TRADEMARKS

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Data-Sheet-Quantim-QMC-EN/2025-02



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INSTRUMENT

Beyond Measure