**Data Sheet**
DS-CM-QmB-eng
May, 2008

# Brooks® QUANTIM® Low Flow Coriolis Precision Mass Flow Measurement and Control


NEMA 1 / IP40
1/4" VCR Configuration


NEMA 4X / IP65
Weather Proof
Configuration


IP65XP
Explosion Proof
Configuration

HART
FIELD COMMUNICATIONS PROTOCOL

*"QUANTIM Coriolis mass flow controllers enable precision measurement and control with maximum flexibility and lowest overall cost of ownership."*

**Brooks® QUANTIM®**
**Low Flow Coriolis**
**Precision Mass Flow Measurement and Control**

Brooks QUANTIM family of products are the smallest lowest flow Coriolis meters and controllers available on the market. With a footprint the size of a handheld organizer, you can fit this instrument into any tight space. With a range of 0.001 to more than 40 kg/hr, you can measure mass or volume flow and density or temperature for drops of liquid, slurries, or gas. QUANTIM offers unsurpassed accuracy and unmatched zero stability in demanding low flow applications.

QUANTIM provides precision mass flow measurement, integral control, on line density and temperature measurement all in one compact package. The heart of the device is a patented Coriolis sensor design which measures low flows independent of the fluid type or process variables. This provides you with unsurpassed performance in even the most challenging low flow applications.

Most critical processes require control as well as measurement, therefore QUANTIM offers an optional integrally mounted, in-line control valve. No remote electronics are required as all the transmitting and control electronics are contained within the product housing.

Available with a variety of options and global approvals the Brooks QUANTIM meters and controllers provide unsurpassed performance, solving specific challenges in demanding low-flow applications.

**APPLICATIONS**
Available for general purpose, hose down or hazardous area requirements, the Brooks QUANTIM family of products have been designed to accurately measure and control low flow rates for virtually any process fluid, independent of it's characteristics without the need for conversion factors. It has been designed for low flow applications in the demanding specialty chemical, petrochemical, pharmaceutical, semiconductor, analytical, laboratory and OEM markets. Brooks QUANTIM precisely measures and controls process fluids like catalysts, food additives, chemical vapor deposition precursors, hydrocarbons, inhibitors, nutrients, and other critical process fluids.

**Brooks Instrument**
Brooks Instrument provides products, custom solutions and services tailored to your specific needs.

The Brooks Instrument Labratory Certification confirms the Brooks QUANTIM measurement accuracy to the industries highest levels for low flow rates. This translates to better process control allowing tighter process tolerances and improved yields ultimately reducing waste and rework.

The Quality System at Brooks Instrument conforms to the quality standards set forth in ISO 9001: 2000. Brooks is known worldwide as offering the best low flow measurement and control solutions for your process needs.

| FEATURES | BENEFITS |
|---|---|
| Lowest flow Coriolis meter or controller available. | Brooks QUANTIM meets the demands of ultra low flow direct mass measurement and control, where Coriolis flow measurement has never been available before. |
| Multiple functions including, Coriolis mass flow sensor, transmitter, in-line valve and PID control electronics in a single compact package. | One stop shopping and simplified installation. |
| Industry leading mass flow measurement precision. | Provides accurate mass measurement of your fluids in demanding low flow processes, research and pilot plant applications. |
| Direct (not inferred) mass flow measurement. | 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. |
| Diagnostic alarms and warnings | Provides early indication of potential process issues so preventitve actions can be taken. |
| No internal moving parts. | Minimizes maintenance requirements and over all cost of ownership. |
| Small physical size. | Easily integrated into the most intricate process systems. |
| Multivariable output including: Mass Flow or Volumetric Flow and Density or Temperature. | Multiple outputs from a single device improves and simplifies process monitoring and diagnostics, further reducing cost of ownership. |
| Gas, liquid and slurry measurement and control capability in one package. | The ultimate in process flexibility. |
| Variety of options, enclosure types and area classifications available. | The right product for your application. |

## SPECIFICATIONS

**Performance Specifications:**

**Flow**

**Liquid Flow Specifications, Metric Units**[8]

| Product Type | QUANTIM Model[1] | QUANTIM Tube Size | Maximum Flow Rate[2] | Nominal Flow Rate[2] | Minimum Full Scale | Minimum Measurable Flow |
|---|---|---|---|---|---|---|
| | | | Kg/hr or l/hr | Kg/hr or l/hr | Kg/hr or l/hr | Kg/hr or l/hr |
| Controller | QMBC | 2 | 0.30 | 0.15 | 0.01 | 0.001 |
| | | 3 | 1.00 | 0.78 | 0.10 | 0.010 |
| | | 4 | 15.94 | 7.97 | 1.00 | 0.100 |
| Meter | QMBM | 2 | 0.38 | 0.19 | 0.01 | 0.001 |
| | | 3 | 1.00 | 1.00 | 0.10 | 0.010 |
| | | 4 | 27.00 | 13.50 | 1.00 | 0.100 |

**Liquid Flow Specifications, English Units**[8]

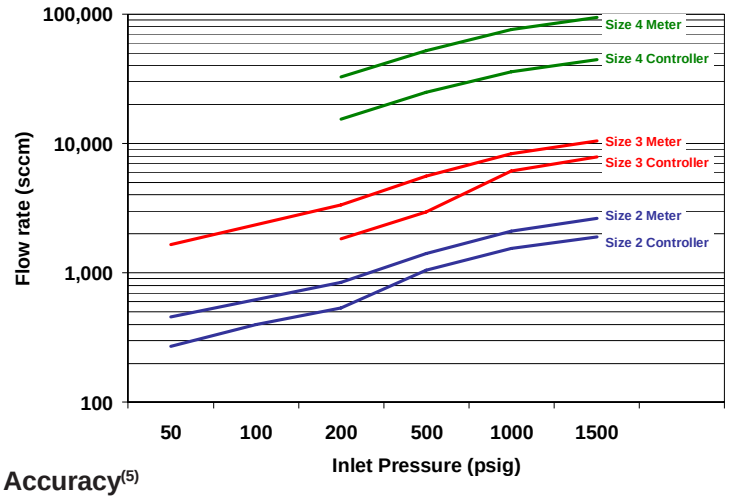
| Product Type | QUANTIM Model[1] | QUANTIM Tube Size | Maximum Flow Rate[2] | | Nominal Flow rate[2] | | Minimum Measurable Flow |
|---|---|---|---|---|---|---|---|
| | | | lb/hr | gal/hr | lb/hr | gal/hr | lb/hr |
| Controller | QMBC | 2 | 0.66 | 0.08 | 0.33 | 0.04 | 0.002 |
| | | 3 | 2.21 | 0.26 | 1.72 | 0.21 | 0.022 |
| | | 4 | 35.15 | 4.21 | 17.57 | 2.11 | 0.221 |
| Meter | QMBM | 2 | 0.84 | 0.10 | 0.42 | 0.05 | 0.002 |
| | | 3 | 2.21 | 0.26 | 2.21 | 0.26 | 0.022 |
| | | 4 | 59.54 | 7.13 | 29.77 | 3.57 | 0.221 |

**Gas Flow Specifications**

| Product Type | QUANTIM Model[1] | QUANTIM Tube Size | Nominal Mass Flow Rate | | Nominal Volume Flow Rate | | |
|---|---|---|---|---|---|---|---|
| | | | lb/hr | Kg/hr | scfh[3] | sccm[3] | ml/min[4] |
| Controller | QMBC | 2 | 0.168 | 0.076 | 2.227 | 1051 | 975.2 |
| | | 3 | 0.472 | 0.214 | 6.261 | 2955 | 2743 |
| | | 4 | 3.960 | 1.796 | 52.52 | 24787 | 23009 |
| Meter | QMBM | 2 | 0.227 | 0.103 | 3.034 | 1432 | 1329 |
| | | 3 | 0.893 | 0.405 | 11.86 | 5595 | 5193 |
| | | 4 | 8.467 | 3.840 | 112.6 | 53116 | 49319 |

### Gas Flow Limits

Air, 70°F (21°C), 14.5 psi (1 bar) pressure drop




### Accuracy[5]

± measurement accuracy % of rate or [(zero stability/flowrate) x 100] % of rate, which ever is greater

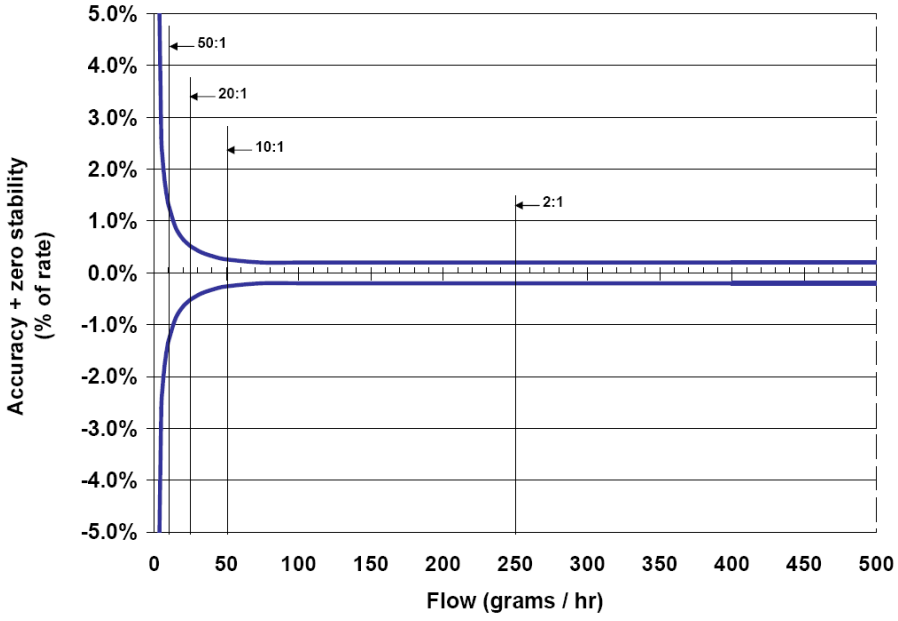
***Measurement Accuracy***

| Sensor Tube Material | Fluid Type | Standard Flow Measurement Accuracy (% of rate) | Optional Flow Measurement Accuracy (% of rate) |
|---|---|---|---|
| Stainless Steel | Liquid | 0.2% | 0.5% |
| | Gas | 0.5% | 1.0% |
| Hastelloy | Liquid | 0.5% | 1.0% |
| | Gas | 0.5% | 1.0% |

### Zero Stabilities

| Sensor Tube Material | Tube Size | Zero Stability (Kg/hr) | Zero Stability (Lb/hr) |
|---|---|---|---|
| Stainless Steel | 2 | 0.00013 | 0.0003 |
| | 3 | 0.0010 | 0.0022 |
| | 4 | 0.0040 | 0.0088 |
| Hastelloy | 2 | 0.0002 | 0.0004 |
| | 3 | 0.0015 | 0.0033 |
| | 4 | 0.0120 | 0.0265 |

### Standard Measurement Accuracy vs Flow Rate Chart, Tube Size 2



Repeatability[6]:

± 0.05% or ± [0.5 x (zero stability/flowrate) x 100]% of rate whichever is greater

Device Leak Integrity:

Elastomer Sealed Device:Outboard 1 x $10^{-9}$ atm. cc/sec., helium (maximum)
Metal Sealed Device:1 x $10^{-10}$ atm. cc/sec., helium (maximum)

Turn Down:

Controller: 100:1 or down to the minimum measurable flow, whichever flow rate is greater
Meter: to minimum measurable flow

Settling Time:

Controller(Stainless Steel sensor tube): Less than 2 seconds within 2 % full scale of final value, ± [(zero stability/flowrate) x 100]% of rate per SEMI Guideline E17-91
Controller(Hasteloy sensor tube): Less than 12 seconds within 2 % full scale of final value per SEMI Guideline E17-91
Meter: Less than 0.5 seconds within 2 % full scale of final value, ± [(zero stability/flowrate) x 100]% of rate per SEMI Guideline E17-91

Maximum Operating Pressure:

Standard: 3.5 MPa, 35 bar or 500 psi
Optional: 10 MPa, 100 bar or 1500 psi
Optional: 30 MPa, 300 bar or 4500 psi (Hastelloy sensor tube only)

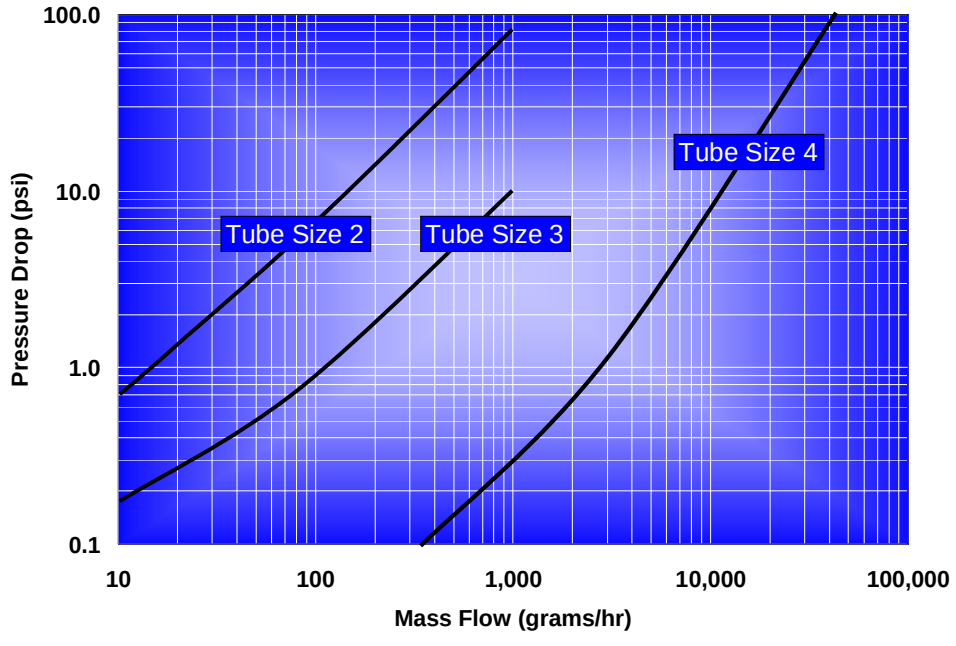
**Differential Pressure Requirements, Controller [7]**

| | | Liquid | | | | | | Gas | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **QUANTIM** | **QUANTIM** | **KpA** | | **bar** | | **psi** | | **KpA** | | **bar** | | **psi** | |
| **Model[1]** | **Tube Size** | **min** | **max*** | **min** | **max*** | **min** | **max*** | **min** | **max*** | **min** | **max*** | **min** | **max*** |
| QMBC | **2** | 69 | 1034 | 0.7 | 10.3 | 10 | 150 | 69 | 1724 | 0.7 | 17.2 | 10 | 250 |
| | **3** | 69 | 1379 | 0.7 | 13.8 | 10 | 200 | 69 | 1034 | 0.7 | 10.3 | 10 | 150 |
| | **4** | 69 | 1379 | 0.7 | 13.8 | 10 | 200 | 69 | 1034 | 0.7 | 10.3 | 10 | 150 |

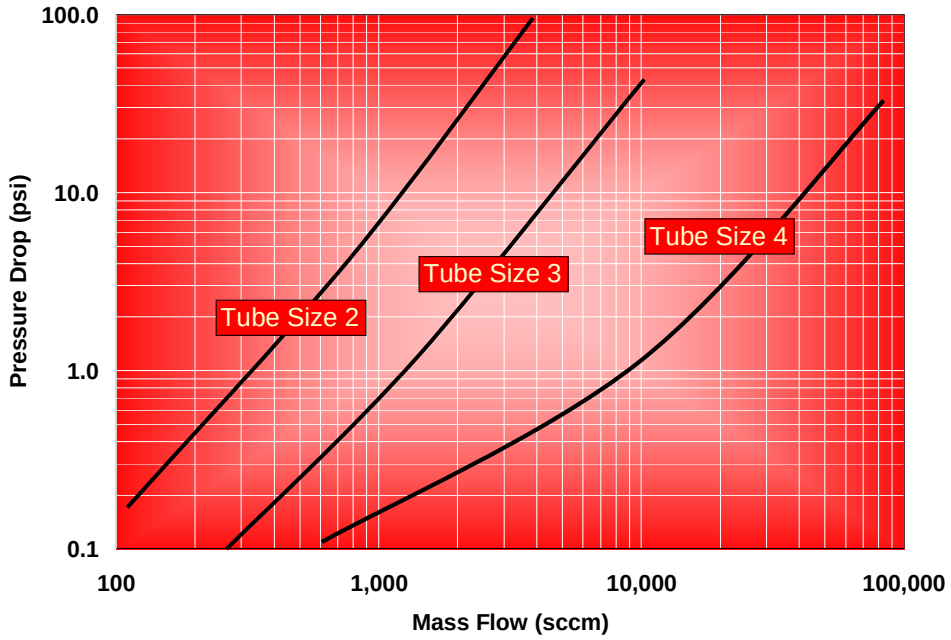
* Actual maximum pressure drop will depend on process conditions and orifice selection.

**Differential Pressures , Meter[7]**

Pressure Drop Liquid - ($H_20$)



Pressure Drop Air @ 500 psi Inlet Pressure




Density[8]:

| | |
|---|---|
| Range: | 0 to 2.0 grams/cc |
| Accuracy: | ±0.005 grams/cc |
| Repeatability: | ±0.002 grams/cc |

Temperature[9]

| | |
|---|---|
| Device Temperature Range: | 0 to 65°C or 32 to 149°F |
| Accuracy: | ± 0.5°C or ± 1.0°F |

**Notes**

(1) QMBC - Brooks QUANTIM controller with integral control valve. QMBM - Brooks QUANTIM meter (no valve).

(2) 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 twice nominal flow rate or the laminar to turbulent transition flow whichever is lower.

(3) Standard volumetric conditions are 14.696 psia and 70°F.

(4) $ml_n$/min Reference Conditions 0°C at 1013.25 mbar.

(5) Accuracy includes combined repeatability, linearity, and hysteresis. 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).

(6) Repeatability- The maximum difference between output readings when the same input is applied consecutively; the closeness of agreement among consecutive measurements of an output for the same value of input under the same operating conditions, approaching from the same direction.

(7) Differential pressures are based on reference conditions of water and air at 68 to 77°F (20 to 25°C).

(8) For applications with fluid density in the range from 0.3 to 0.5 grams/cc the device may be sensitive to 50Hz or 60Hz vibration. The density measurement at temperatures other than 21° C (70° F) has an additional error of approximately 0.0005 grams/cc per deg C.

(9) A temperature rise of up to 20°C (68°F) from internal heating can occur in an open environment where ambient temperature is 23°C (73°F).

**Physical Specifications**

Materials of construction:

Process Wetted: 316L, 316L VAR, High Alloy Ferritic Stainless and 17-7PH
Optional: Hastelloy sensor tube.
Process Seals:
Elastomer Seal: Viton® fluoroelastomers, Buna, Kalrez® or EPDM
Metal Seal: Stainless Steel and Nickel

Housing:
IP40: Polyurethane painted Aluminum
IP65: Polyurethane painted Aluminum
IP65XP: Aluminum

Inlet Filter:

Tube Size 2 Controller: 1 micron or 10 micron inlet filter recommended
Tube Size 3 or 4: 10, 20, 30 & 40 micron filters available

Weight:

Housing: IP40: 1.6 kg or 3.5 Lbs.
Housing IP65: 1.9 kg or 4.2 Lbs.
Housing IP65XP: 24 kg or 52 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:

1/16", 1/8", 1/4" or 6mm tube compression, VCR, VCO or NPT(F), 3.2 mm UPG, Down Port ANSI/ISA 76.00.02 (See Model Code).

Electrical connections:

IP40: 15 pin D-Type connector. (See Figure 3).
IP65: Unpluggable Terminal Block 28-16 Awg.
IP65XP: ¾" NPT wiring access to IP40 Device with 15 pin D-Type connector.

Dimensions:

See Figures 1&2 and Figures 4 thru 7

**Functional Specifications**

Output signals(10):

- 4-20 mA or 0-5 Vdc active outputs represent mass flow or volume flow.
- And simultaneously available 4-20 mA or 0-5 Vdc active output, represents on-line density or temperature information.
- Alarm output, max. voltage 30 Vdc, max. current 100 mA.

Input signals(10):

- Command (setpoint) that drives the control valve, either 4-20 mA or 0-5 Vdc input signals.

- Valve Override 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 forced closed

Power Requirements:
Voltage:

+14 to 27 Vdc.

Nominal Current:

Controller: 300 mA to 400 mA
Meter: 100 mA to 150 mA

Maximum Current:

Controller: 715 mA @ 14 Vdc
Meter: 470 mA @ 14 Vdc

Maximum Power:

Controller: 10.0 W

| | |
|---|---|
| | Meter: 6.6 W |

**Additional Functions and Outputs**

| | |
|---|---|
| Damping: | Factory set time constant from 0 to 10 seconds. |
| Alarms and Warnings: | Alarms accessed via HART or the Brooks Service Tool can be configured to monitor the following variables:<br>• Mass Flow<br>• Density<br>• Volumetric Flow<br>• Temperature<br>• Slug Flow<br>• Diagnostic Failure<br>• Setpoint Deviation<br>• Valve Drive |
| LED's: (11) | 'STAT'<br>solid green: system operative.<br>solid red: system fault.<br>'AL'<br>flashing green: warning<br>flashing red: alarm |
| Pushbutton: (12) | 'ZERO' setting pushbutton. |

**Notes (continued)**

(10) If QUANTIM is configured for HART® communication protocol, only 4-20 mA I/O option is available.

(11) IP65 and IP65XP Series external housing cover must be removed to gain access to status LED's.

(12) IP65XP series external housing cover must be removed to gain access to zero push button.

## Certifications and Approvals

### IP40 Series

Non Incendive/ Non Sparking
United States and Canada- UL Recognized E73889, Vol. 3, Sect. 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; C22.2 No. 14-M91

Ex nC IIC T4
Per CSA E79-15

Class I, Zone 2, AEx nC IIC T4
Per ANSI/UL 60079-15

Ambient Temperature: 0º C to 65º C

Enclosure: Type 1/ IP40

Europe - KEMA 04ATEX1241 X

II 3 G EEx nA II T4
Per EN 600Y9-15: 2003

Ambient Temperature: 0ºC to 65ºC

Enclosure: IP40

### IP65 Series

Non Incendive/ Non Sparking
United States and Canada- UL Recognized E73889, Vol. 1, Sect. 26. (conduit entry)
United States and Canada Recognized, UL E73889, Vol. 3, Sect. 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 N0. 213 1987; C22.2 No. 14-M91

Ex nC IIC T4
Per CSA E79-15

Class I, Zone 2, AEx nC IIC T4
Per ANSI/UL 60079-15

Ambient Temperature: 0º C to 65º C

Enclosure: Type 4X/ IP65

Europe - KEMA 05ATEX1068 X

II 3 G EEx nA II T4
II 3 D T 135 C
Per EN 600Y9-15: 2003 and EN 50281-1-1: 1998 + A1

Ambient Temperature: 0º C to 65º C

Enclosure: IP65

## Certifications and Approvals

**IP65XP Series Explosion-proof/ Flame-proof**

United States and Canada- UL Recognized E73889, Vol. 1, Sect. 21.

Explosion-proof , Class I, Division 1, Groups C and D;
Dust Ignition-proof, Class II, Division 1 Groups E, F, and G;
Suitable for Class III, Division 1; T4
Per ANSI/UL 1203 and CSA 22.2 No. 30

Ex nC IIC T4
Per CSA E79-1

Class I, Zone 2, AEx nC IIC T4
Per UL 60079-1

Ambient Temperature: 0° C to 65° C

Enclosure: Type 4/ IP65

Europe - KEMA 05ATEX2052

II 2 G EEx d IIB T6
II 2 D T 85° C
Per EN 50014, EN 50018 and EN 50281-1-1

Ambient Temperature: 0° C to 65° C

Enclosure: IP65

***Environmental effects***

EMC effects: The Brooks QUANTIM series meets the requirements of the EMC directive 89/336EEC per EN 50081-2 and EN 61326-1. To meet these specifications, the Brooks QUANTIM device must be directly connected to a low impedance (less than 1 Ohm) earth ground. Signals must use a standard twisted-pair, shielded instrument wire.

Pressure effects: The Brooks QUANTIM series meets the requirements of the Pressure Equipment Directive 97/23/EC. The unit falls into the category "Sound Equipment Practice".

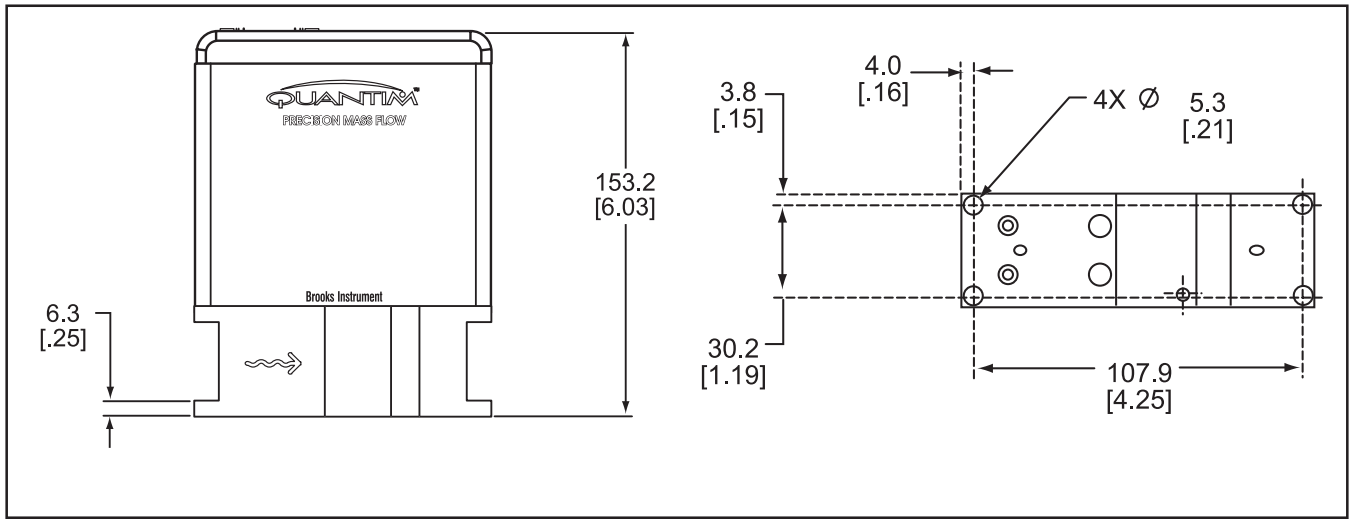



*Figure 1 Dimensional Drawing QmB IP40 Downported*

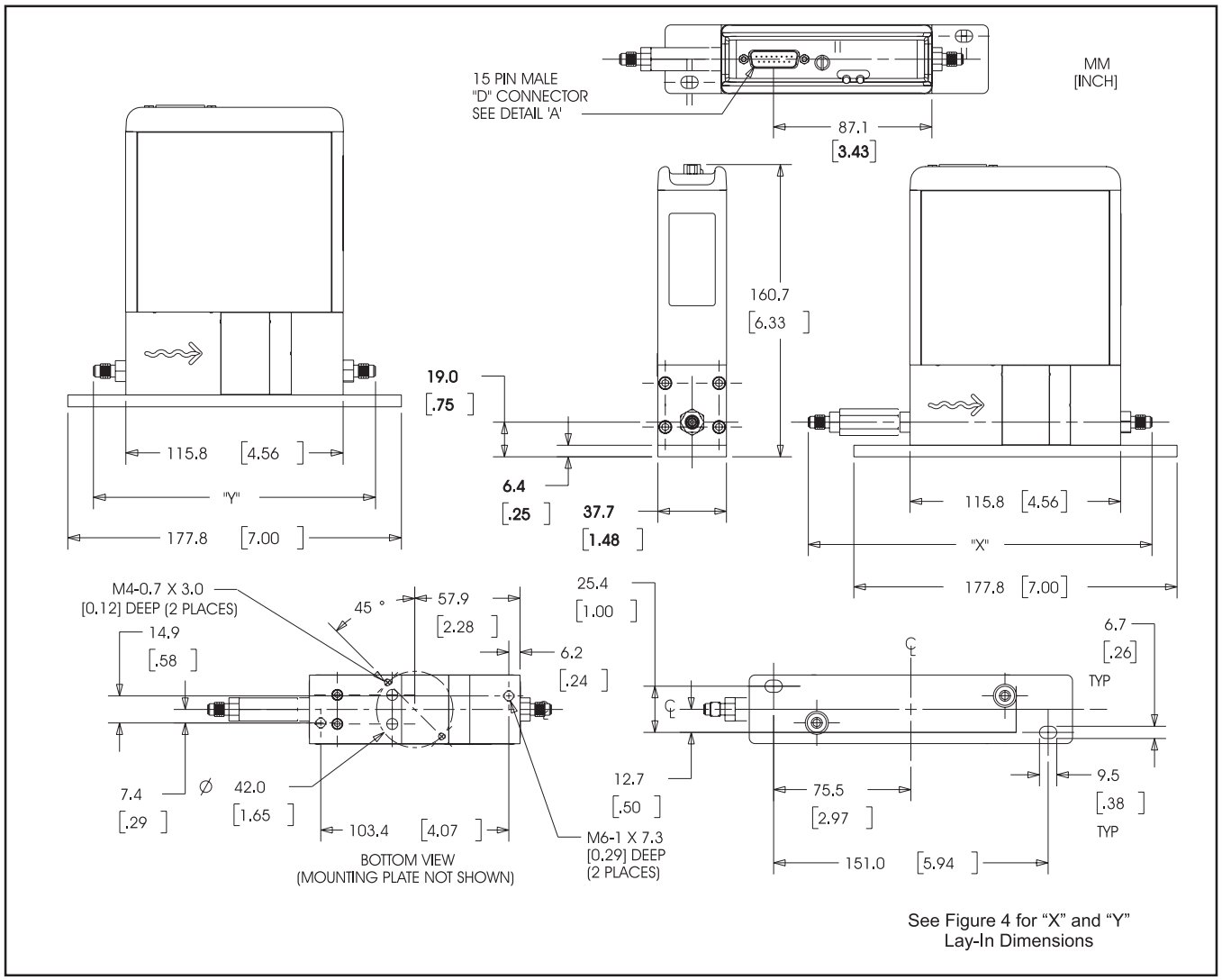
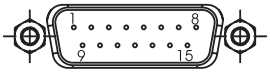



*Figure 2 Dimensional Drawing QmB IP40*




D-CONNECTOR CONNECTIONS

| PIN # | FUNCTION |
|---|---|
| 1 | SETPOINT COMMON |
| 2 | 0-5 VDC FLOW SIGNAL OUTPUT |
| 3 | (TTL) OPEN COLLECTOR ALARM OUTPUT |
| 4 | *4-20 MA FLOW SIGNAL OUTPUT |
| 5 | +14.0 VDC TO +27 VDC POWER SUPPLY |
| 6 | NOT USED |
| 7 | *4-20 MA SETPOINT INPUT (+) |
| 8 | 0-5 VDC SETPOINT INPUT (+) |
| 9 | POWER SUPPLY COMMON |
| 10 | SIGNAL OUTPUT COMMON |
| 11 | +5 VOLT REFERENCE OUTPUT |
| 12 | VALVE OVERRIDE INPUT |
| 13 | *4-20 MA OR 0-5 VDC DENSITY OR TEMPERATURE |
| 14 | NOT USED |
| 15 | NOT USED |

*DO NOT APPLY POWER TO THESE PINS.

*Figure 3 D-Connector Electrical Pin Connections*

LAY-IN DIMENSIONS

| | INTEGRAL VALVE | | REMOTE VALVE | |
|---|---|---|---|---|
| FITTING | "X" Dimension | "Y" Dimension | "X" Dimension | "Y" Dimension |
| 1/16" Tube Compression | 184.1 [7.25]*<br>167.3 [6.59]** | 151.9 [5.98]*<br>135.1 [5.32]** | 340.1 [13.39]<br>323.3 [12.73] | 307.9 [12.12]<br>291.1 [11.46] |
| 1/8" Tube Compression | 192.7 [7.59]*<br>167.3 [6.59]** | 160.5 [6.32]*<br>135.1 [5.32]** | 348.7 [13.73]<br>323.3 [12.73] | 316.5 [12.46]<br>291.1 [11.46] |
| 1/4" Tube Compression | 197.3 [7.77]*<br>166.8 [6.57]** | 165.1 [6.50]*<br>134.6 [5.30]** | 353.6 [13.92]<br>323.1 [12.72] | 321.4 [12.65]<br>290.9 [11.45] |
| 6 mm Tube Compression | 197.6 [7.78]*<br>167.0 [6.78]** | 165.4 [6.51]*<br>134.8 [5.31]** | 353.9 [13.93]<br>323.2 [12.72] | 321.7 [12.67]<br>291.0 [11.46] |
| 1/8" NPT (F) | 179.9 [7.08] | 147.7 [5.81] | 335.9 [13.22] | 303.7 [11.96] |
| 1/4" NPT (F) | 189.3 [7.45] | 157.1 [6.19] | 345.3 [13.59] | 313.1 [12.33] |
| 1/8" VCR | 182.6 [7.19] | 150.4 [5.92] | 338.6 [13.33] | 306.4 [12.06] |
| 1/4" VCR | 200.9 [7.91] | 168.7 [6.64] | 356.2 [14.02] | 324.0 [12.76] |
| 1/4" VCO | 188.2 [7.41] | 156.0 [6.14] | 344.2 [13.55] | 312.0 [12.28] |
| 3.2MM UPG | N/A | 150.3 [5.92] | N/A | N/A |
| ANSI/ISA 76.00.02 | N/A | Contact Factory | Not Available | |

* OVERALL LENGTH FINGER TIGHT
** OVERALL LENGTH DIMENSION IS TO THE INTERNAL TUBE LOCATING SHOULDER

MM
[INCH]

*Figure 4 Lay-In Dimensions Integral and Remote Valves*

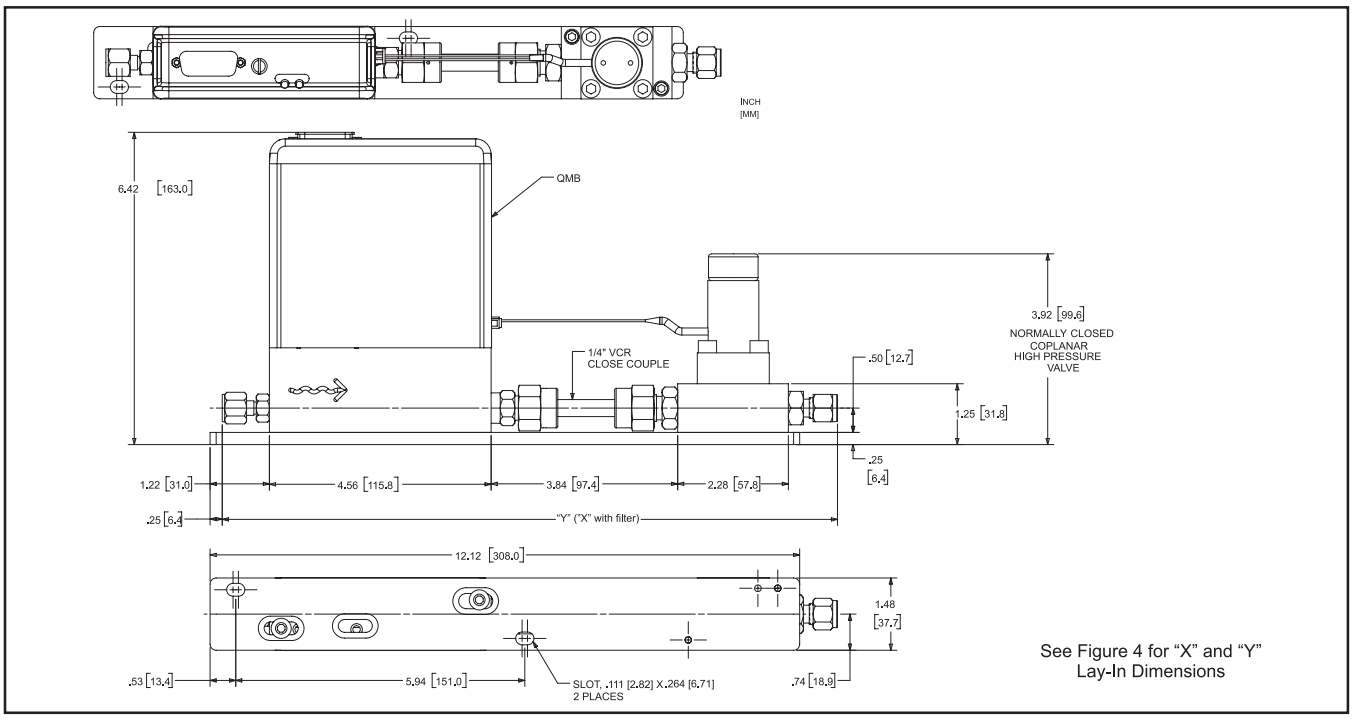



*Figure 5 Dimensional Drawing QmB IP40 with Remote Valve*

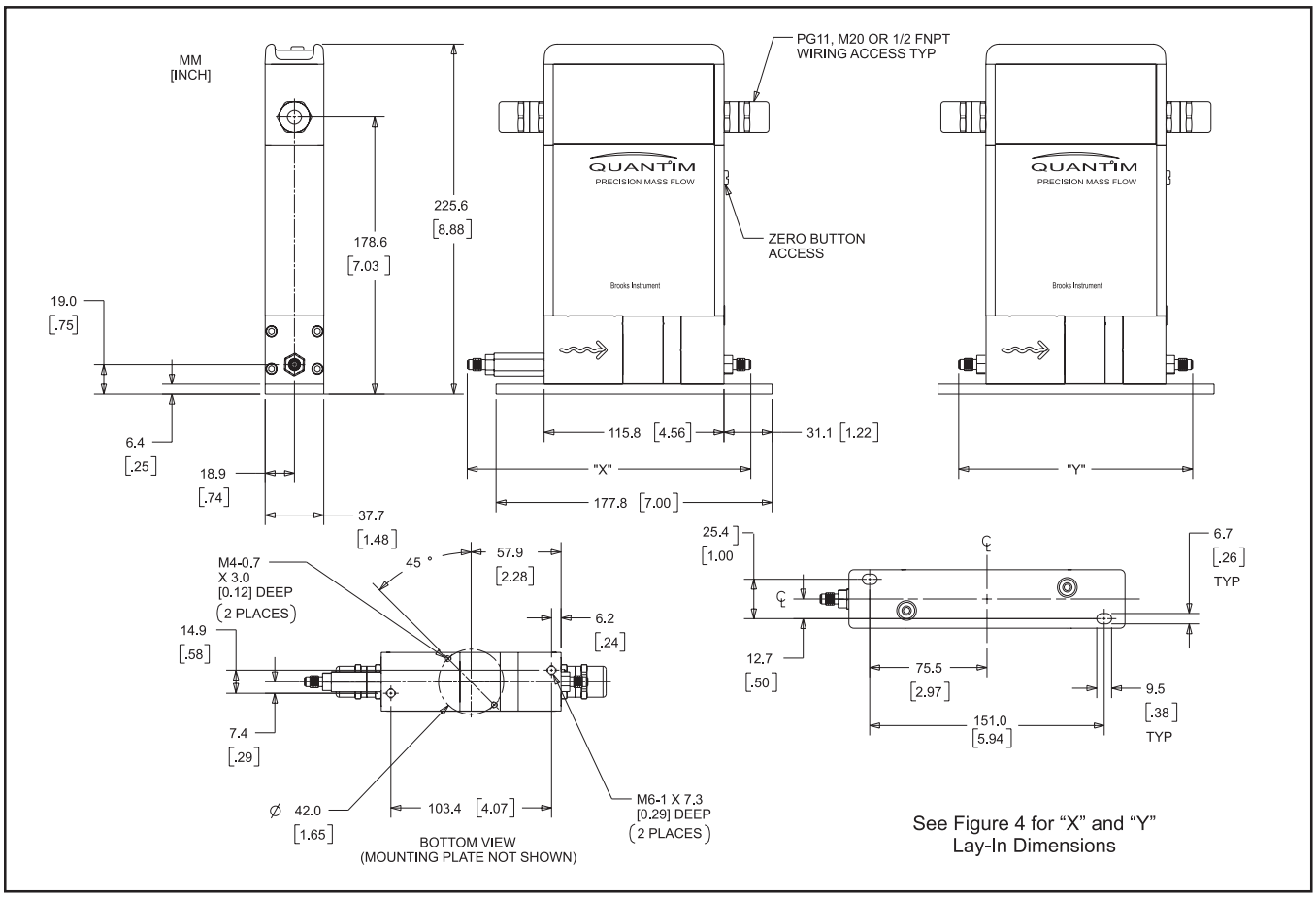
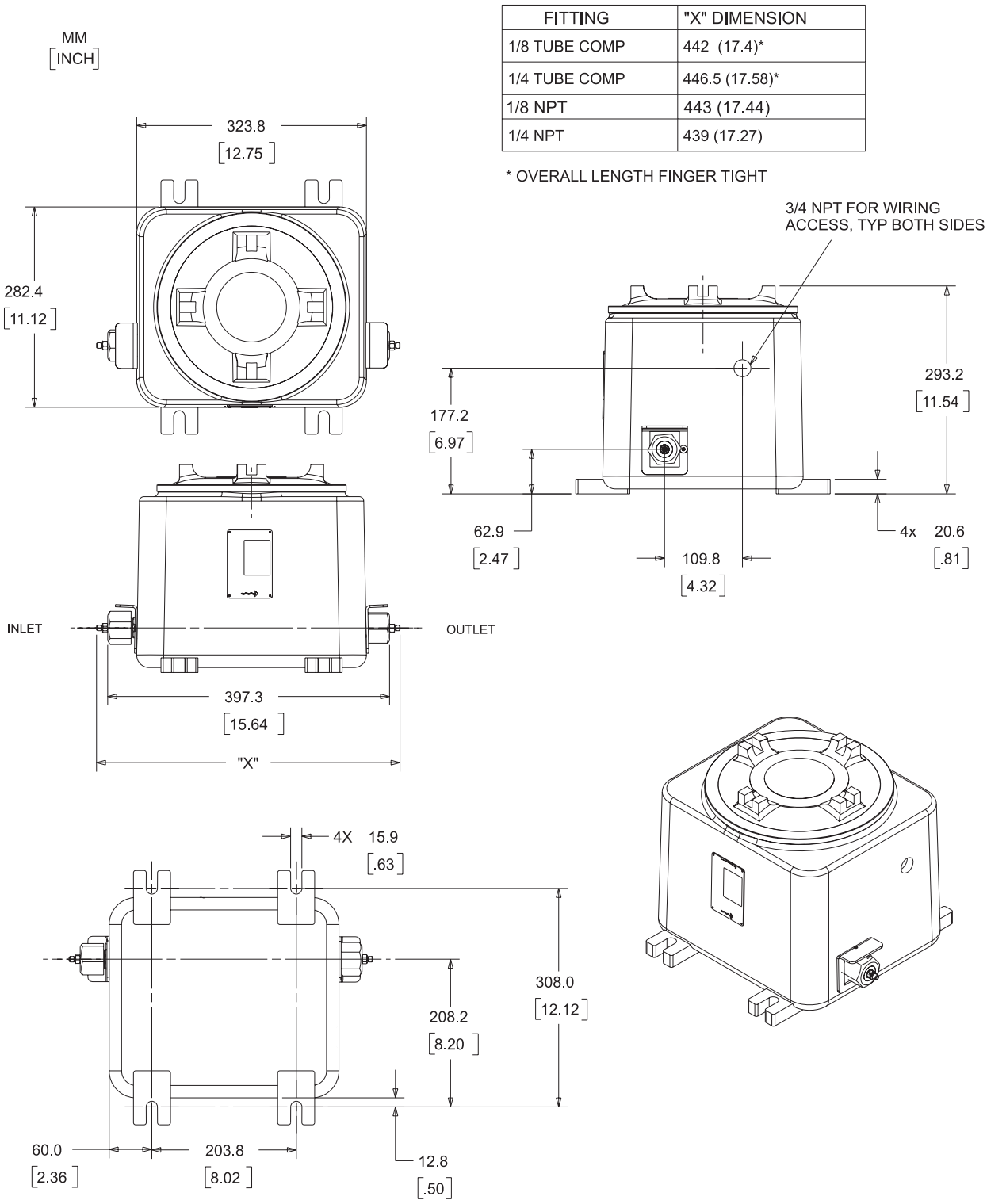



*Figure 6 Dimensional Drawing QmB IP65*




| FITTING | "X" DIMENSION |
|---|---|
| 1/8 TUBE COMP | 442 (17.4)* |
| 1/4 TUBE COMP | 446.5 (17.58)* |
| 1/8 NPT | 443 (17.44) |
| 1/4 NPT | 439 (17.27) |

* OVERALL LENGTH FINGER TIGHT

*Figure 7 Dimensional Drawing QmB IP65XP*

Model Code for QM Series, Multivariable Precision Mass Flow Measurement and Control

| OPTION | | | | | | SELECTION |
|---|---|---|---|---|---|---|
| QMBC | FLOW CONTROLLER | | | | | |
| QMBM | FLOW METER | | | | | |
| QMBS | FLOW SENSOR (REQUIRES SELECTION OF NEMA 4X/IP65 OPTION) | | | | | |
| | | SENSOR/METER NOM. FLOW | | CONTROLLER NOMINAL FLOW | | |
| OPTION | TUBE SIZE | LIQUID | GAS | LIQUID | GAS | SELECTION |
| 2 | 2 | 190 GRAMS/HOUR | 1432 SCCM | 150 GRAMS/HOUR | 1051 sccm | |
| 3 | 3 | 1.00 KG/HOUR | 5.595 SLPM | 780 GRAMS/HOUR | 2.96 SLPM | |
| 4 | 4 | 13.5 KG/HOUR | 53.12 SLPM | 7.97 KG/HOUR | 24.79 SLPM | |
| OPTION | FLUID TYPE | | | | | SELECTION |
| G | GAS | **NOTE:** SELECT PRIMARY FLUID TYPE. USER CAN SWITCH FROM | | | | |
| L | LIQUID | LIQUID TO GAS AND VISA-VERSA. REZEROING IS REQUIRED. | | | | |
| OPTION | PRESSURE TRANSDUCER | | | | | SELECTION |
| 1 | NO TRANSDUCER | | | | | |
| OPTION | VALVE TYPE | | | | | SELECTION |
| A | NO VALVE | | (PRODUCT TYPE = FLOW METER / SENSOR) | | | |
| B | NORMALLY CLOSED INTERNAL VALVE | | | | | |
| OPTION | ACCURACY | | | | | SELECTION |
| 2 | STANDARD 0.2% OF RATE | | LIQUID & STAINLESS STEEL | | | |
| 3 | OPTIONAL 0.5% OF RATE | | LIQUID & STAINLESS STEEL | | | |
| 3 | STANDARD 0.5% OF RATE | | GAS OR HASTELLOY | | | |
| 4 | OPTIONAL 1.0% OF RATE | | GAS OR HASTELLOY | | | |
| OPTION | ENCLOSURE TYPE | AREA CLASSIFICATION | | | | SELECTION |
| A | NEMA 1 / IP 40 | | | (METER OR CONTROLLER) | | |
| B | NEMA 1 / IP 40 | CLASS 1 DIV 2 ZONE 2 | | (METER OR CONTROLLER) | | |
| C | NEMA 4X / IP 65 | | | (SENSOR, METER, CONTROLLER) | | |
| D | NEMA 4X / IP 65 | CLASS 1 DIV 2 ZONE 2 | | (SENSOR, METER, CONTROLLER) | | |
| E | EXPLOSION PROOF | DIV 1 / ZONE 1 | | (METER OR CONTROLLER) | | |
| OPTION | SURFACE FINISH | | | | | SELECTION |
| 1 | STANDARD SURFACE FINISH (32 Ra) | | | | | |
| OPTION | SENSOR TUBE MATERIAL | | | | | SELECTION |
| A | STAINLESS STEEL, 316L | | MAXIMUM PRESSURE <= 100 BAR/1500 PSI | | | |
| B | HASTELLOY, C22 (TUBES ONLY) | | MAXIMUM PRESSURE <= 300 BAR/4500 PSI | | | |
| OPTION | MAXIMUM PRESSURE RATING | | | | | SELECTION |
| 1 | 35 BAR OR 500 PSI | | | | | |
| 2 | 100 BAR OR 1500 PSI | | | | | |
| 3 | 300 BAR OR 4500 PSI | | TUBE MATERIAL = HASTELLOY (METER OR SENSOR) | | | |
| OPTION | MAXIMUM TEMPERATURE RATING | | | | | SELECTION |
| A | 65 DEG C | | | | | |
| OPTION | PROCESS CONNECTIONS | | | | | SELECTION |
| 1A | STANDARD BODY CONNECTIONS 5/16"-24 UNF | | | (SEAL CODE A-J) | | |
| 1B | 1/16" TUBE COMPRESSION FITTINGS | | | (SEAL CODE A-J) | | |
| 1C | 1/4" TUBE COMPRESSION FITTINGS | | | (SEAL CODE A-**K**) | | |
| 1D | 1/8" TUBE COMPRESSION FITTINGS | | | (SEAL CODE A-J) | | |
| 1G | 6MM TUBE COMPRESSION FITTINGS | | | (SEAL CODE A-**K**) | | |
| 1J | 1/8" NPT (F) | | | (SEAL CODE A-J) | | |
| 1K | 1/4" NPT (F) | | | (SEAL CODE A-J) | | |
| 1L | 1/8" VCR | | | (SEAL CODE A-**K**) | | |
| 1M | 1/4" VCR | | | (SEAL CODE A-**K**) | | |
| 1P | 1/4" VCO | | | (SEAL CODE A-J) | | |
| 1Y | DOWN PORT ANSI/ISA-76.00.02 | | | (SEAL CODE A-E) | | |
| 2A | 3.2MM UPG | | | (SEAL CODE **K**) | | |
| | ELECTRICAL I/O - COMMUNICATIONS | | | | | |
| OPTION | PRIMARY OUTPUT | SECONDARY OUTPUT | | | | SELECTION |
| A | 0-5 VDC | 4-20 MA | | (METER OR CONTROLLER) | | |
| B | 4-20 MA | 4-20 MA | | (METER OR CONTROLLER) | | |
| C | 0-5 VDC | 0-5 VDC | | (METER OR CONTROLLER) | | |
| H | HART / 4-20 MA | HART / 4-20 MA | | (METER OR CONTROLLER) | | |
| M | MODBUS | MODBUS | | (SENSOR) | | |
| OPTION | ELECTRICAL CONNECTION | | | | | SELECTION |
| 1 | 15 PIN D TYPE | ENCLOSURE = NEAMA 1 / IP40 | | (METER OR CONTROLLER) | | |
| 2 | 4 PIN CIRCULAR | ENCLOSURE = NEAMA 1 / IP65 | | (SENSOR) | | |
| 3 | PG11 CABLE GLAND | ENCLOSURE = NEAMA 1 / IP65 | | (METER OR CONTROLLER) | | |
| 4 | 1/2" FNPT CONDUIT | ENCLOSURE = NEAMA 1 / IP65 | | (METER OR CONTROLLER) | | |
| 6 | M20 FNPT CONDUIT | ENCLOSURE = NEAMA 1 / IP65 | | (METER OR CONTROLLER) | | |
| 8 | 3/4" FNPT CONDUIT | ENCLOSURE = EX PROOF | | (METER OR CONTROLLER) | | |

Model Code for QmB (continued)

| OPTION | SEALS | | | | | SELECTION |
|---|---|---|---|---|---|---|
| | SENSOR | VALVE STEM | FITTING | ORIFICE SEAL | | |
| A | VITON | VITON | VITON | STAINLESS STEEL | **NOTE:** | |
| B | BUNA | BUNA | BUNA | STAINLESS STEEL | **Process** | |
| C | KALREZ | KALREZ | KALREZ | STAINLESS STEEL | **connection** | |
| E | EPDM | EPDM | EPDM | STAINLESS STEEL | **code 1A** | |
| F | NICKEL | NICKEL | VITON | STAINLESS STEEL | **and 1Y** | |
| G | NICKEL | NICKEL | BUNA | STAINLESS STEEL | **have no** | |
| H | NICKEL | NICKEL | KALREZ | STAINLESS STEEL | **fitting** | |
| J | NICKEL | NICKEL | EPDM | STAINLESS STEEL | **seals** | |
| K | NICKEL | NICKEL | NICKEL | STAINLESS STEEL | (CONTRLR) | |

| OPTION | VALVE SEAT MATERIAL | | SELECTION |
|---|---|---|---|
| 1 | NONE | (METER OR SENSOR) | |
| 7 | MATERIAL 17-7PH STAINLESS STEEL | (CONTROLLER) | |

| OPTION | SPECIAL PROCESSING | SELECTION |
|---|---|---|
| A | NONE | |
| B | CERTIFIED MATERIAL 2.2 EN 10204 | |
| C | CERTIFIED MATERIAL 3.1 EN 10204 | |
| D | CLEANING FOR OXYGEN SERVICE | |
| E | CLEAN FOR O2 + CERT MATERIAL 2.2EN10204 | |
| F | CLEANING FOR O2 + CERT MATATERIAL 3.1EN10204 | |

| OPTION | QUALITY CERTIFICATIONS | SELECTION |
|---|---|---|
| 1 | NONE | |
| 2 | CALIBRATION CERTIFICATION TRACEABLE TO NIST | |
| 3 | CALIB. MEASUREMENT CAPABILITY CERT (NMI) | |
| 4 | CERTIFICATE OF CONFORMANCE | |
| 5 | CALIB. CERT TRACEABLE TO NIST + C OF C | |
| 6 | CALIB. MEASUREMENT CAPABILITY CERT + C OF C | |

| OPTION | INLINE FILTER | | SELECTION |
|---|---|---|---|
| A | NONE | (METAL SEAL OR DOWNPORT) | |
| B | INLINE FILTER CARTRIDGE FILTER, 10 MICRON | B or F RECOMMENDED FOR QMBC2 | |
| C | INLINE FILTER CARTRIDGE FILTER, 20 MICRON | | |
| D | INLINE FILTER CARTRIDGE FILTER, 30 MICRON | | |
| E | INLINE FILTER CARTRIDGE FILTER, 40 MICRON | | |
| F | INLINE FILTER CARTRIDGE FILTER, 1 MICRON | B or F RECOMMENDED FOR QMBC2 | |

| OPTION | OEM CODE | SELECTION |
|---|---|---|
| A | BROOKS | |
| N | NO LOGO | |

## BROOKS LOCAL AND WORLDWIDE SUPPORT

- Brooks Instrument provides sales and service facilities around the world.
- Calibration facilities are available in local sales and service offices. Certified by our local Weights and Measures Authorities and traceable to the relevant international standards.

## START-UP SERVICE AND IN-SITU CALIBRATION

- Brooks Instrument can provide start-up service prior to operation when required, if necessary under in-situ conditions, and the results will be traceable to the relevant international quality standards.

## CUSTOMER SEMINARS AND TRAINING

- Brooks® can provide customer seminars and dedicated training to engineers, end users and maintenance persons.

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Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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