

# Brooks® “ Next generation” QUANTIM®

## Ultra Low Flow Coriolis Precision Mass Flow QmBS Sensor / QTA Transmitter With MVD™ Technology



*QmBS Sensor*



*QTA7 Transmitter  
Field Mount*



*QTA5 Transmitter  
DIN Rail*

## QmBS Sensor / QTA Transmitter

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Brooks's QUANTIM Sensors are the smallest Coriolis Flow Sensors available on the market. With a footprint the size of a handheld organizer, you can use this sensor in many spaces to meet your low-flow needs.

Small size means low flow with a range of 0.022 to 61.7 lb/hr (0.001 to 28 kg/hr), you can measure mass or volume flow for drops of liquid, slurries, or gas.

Like other Brooks Coriolis devices, QUANTIM Sensors offer all the benefits of Coriolis:

- High accuracy, for a quicker ROI
- No moving parts, for reduced maintenance costs and downtime
- Direct measurement of mass, volume, temperature and density, for reduced instrumentation requirements
- Measurements unaffected by changing fluid properties, allowing for no special installation requirements or manual calculations

### Applications

Whatever your low-flow application – flavoring, fragrances, or catalysts; whatever your industry – chemical, life sciences, food and beverage, oil and gas; Brooks' QUANTIM Sensor can measure it. And install it wherever you want: pilot plant, research, or processing.

### QTA-Series transmitters with MVD™

QTA-Series transmitters are specially designed to work with Brooks sensors on your low-flow applications. QTA-Series transmitters incorporate MVD technology – an innovative, multivariable, digital signal processing capability. MVD technology:

- Improves ease of use with an easy-to-use display
- Reduces downtime with enhanced diagnostics
- Lowers your flowmetering costs with a 4-wire connection.

Transmitter features include:

- Milliampere and frequency/pulse outputs
- Transmitter and process control functions in a single device
- Field-mount or DIN rail mount transmitter
- Optional NEMA enclosures (field-mount transmitters only)

### Make your process more profitable

Brooks QUANTIM sensors and transmitters can be installed as part of a HART® Bell 202 multidrop network, a Modbus® RS-485 digital communications network, or a Profibus-PA or FOUNDATION™ fieldbus system.

All transmitters support Emerson Process Management's PlantWeb® field-based architecture, which uses the power of intelligent, interoperable field devices to improve plant performance.

Brooks is known worldwide for increasing plant efficiency, production, and profitability.



# Data Sheet

DS-CM-QmBS-eng

June, 2008

## QmBS Sensor / QTA Transmitter

### Sensor - Liquid flow rates

		Mass		Volume <sup>(1)</sup>	
		lb/hr	kg/hr	gal/hr	l/hr
<b>Nominal flow range<sup>(2)</sup></b>	QmBS2	0.42	0.19	0.05	0.19
	QmBS3	2.21	1.00	0.26	1.00
	QmBS4	29.77	13.50	3.57	13.50
<b>Maximum flow range</b>	QmBS2	0.84	0.38	0.10	0.38
	QmBS3	2.21	1.00	0.26	1.00
	QmBS4	59.54	27.00	7.13	27.00

- (1) Volume measurement is based on a process-fluid density of 1 g/cm<sup>3</sup> (1000 kg/m<sup>3</sup>). For fluids with density other than 1 g/cm<sup>3</sup>, the volumetric flow rate equals the maximum mass flow rate divided by the fluid's density.
- (2) The nominal flow rate is the flow rate at which water at reference conditions causes approximately 14.5 psid (1 bar) of pressure drop or the laminar to turbulent transition flow which ever is lower. Maximum flow rate is twice the nominal flow rate or the laminar to turbulent transition flow which ever is lower.

### Sensor - Gas Flow Rates

Flow rates that produce approximately 14.5 psid (1.0 bar) pressure drop on air at 70 °F (21.1 °C) and 500 psia (35 bar)

		Mass		Volume <sup>(1)</sup>	
		lb/hr	kg/hr	SCFH	SCCM
<b>Typical flow range</b>	QmBS2	0.227	0.103	3.034	1,432
	QmBS3	0.893	0.405	11.86	5,595
	QmBS4	8.026	3.640	106.7	50,350

- (1) Reference conditions are 14.696 psia and 70° F.

### Sensor - Liquid and Gas Performance

**Mass flow accuracy<sup>(1)</sup>** Measurement accuracy% of rate or  $\pm \left[ \left( \frac{\text{zero stability}}{\text{flow rate}} \right) \times 100 \right]$  % of rate, whichever is greater

- (1) Stated flow accuracy includes the combined effects of repeatability, linearity, and hysteresis. All specifications for liquids are based on reference conditions of water at 70 °F (21.1 °C).

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%
Stainless Steel	Gas	0.5%	1.0%
Hastelloy	Liquid	0.5%	1.0%
Hastelloy	Gas	0.5%	1.0%

## QmBS Sensor / QTA Transmitter

**Mass Flow Repeatability**  $\pm 0.05\%$  of rate or  $\pm \frac{1}{2} \left[ \left( \frac{\text{zero stability}}{\text{flow rate}} \right) \times 100 \right]$  % of rate, whichever is greater

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

**Density** Range 0 to 0.3 and 0.5 to 2.0 gr/cm<sup>3</sup>(3)  
\* For fluid density in the range of 0.3 to 0.5 grams/cc contact factory.

Accuracy  $\pm 0.005$  g/cm<sup>3</sup>  
Repeatability  $\pm 0.002$  g/cm<sup>3</sup>

**Temperature** Ambient and process 0 to 65 °C (32 to 149 °F)  
Accuracy  $\pm 0.5$  °C ( $\pm 1.0$  °F)

**Maximum Operating Pressure** Standard 35 bar (500 psi)  
Optional 100 bar (1500 psi)  
Optional 300 bar (4500 psi)

**Pressure Equipment Directive (PED) Sound Engineering Practice (SEP)**

### Sensor - Hazardous Area Classifications


*Non Incendive/ Non Sparking*  
United States and Canada - UL  
Recognized E73889 Vol. 3 Sect. 3<sup>(1)</sup>

Non Incendive, Class I Division 2, Groups A, B, C and D  
Class II, Groups F and G  
Suitable for Class III ; T4  
*Per UL 1604 and CSA 213*  
  
Ex nA IIC T4  
Per CSA E79-15

Class 1, Zone 2, AEx nA IIC T4  
*Per ANSI/ISA 12.12.02-2003 and ANSI/UL 60079-15*  
Ambient Temperature: 0° C to 65° C  
Enclosure: Type 4X/IP65

Europe - KEMA 04ATEX1259 X

ATEX<sup>(2)</sup>

 II 3 G EEx nA II T4  
II 2 D T135°C  
*Per EN 50021 and EN 50284-1-1*  
Ambient Temperature: 0o C to 65o C  
Enclosure: IP65

(1) *UL, Under Writers labs is an American approvals agency that provides approvals accepted both in the U.S.A. and in Canada.*

(2) *ATEX is a European directive.*

(3) *Contact Brooks for applications with fluid density in the range from 0.3 to 0.5 grams/cc. Density accuracy at temperatures other than 21.1 degree C you can expect an additional error of approximately 0.0005 grams/cc per degree C.*

### Sensor - Materials of Construction

**Wetted Parts** 316/316L Stainless Steel, Optional: Hastelloy Sensor Tube

**Optional Filter Components (Wetted)** 302 and 316 Stainless Steel

**Process Seals** Viton® fluoroelastomers, Buna, Kalrez®, or EPDM

**Housing** Type 4X/IP65; Polyurethane-Painted Aluminum and Stainless Steel

# Data Sheet

DS-CM-QmBS-eng

June, 2008

# QmBS Sensor / QTA Transmitter

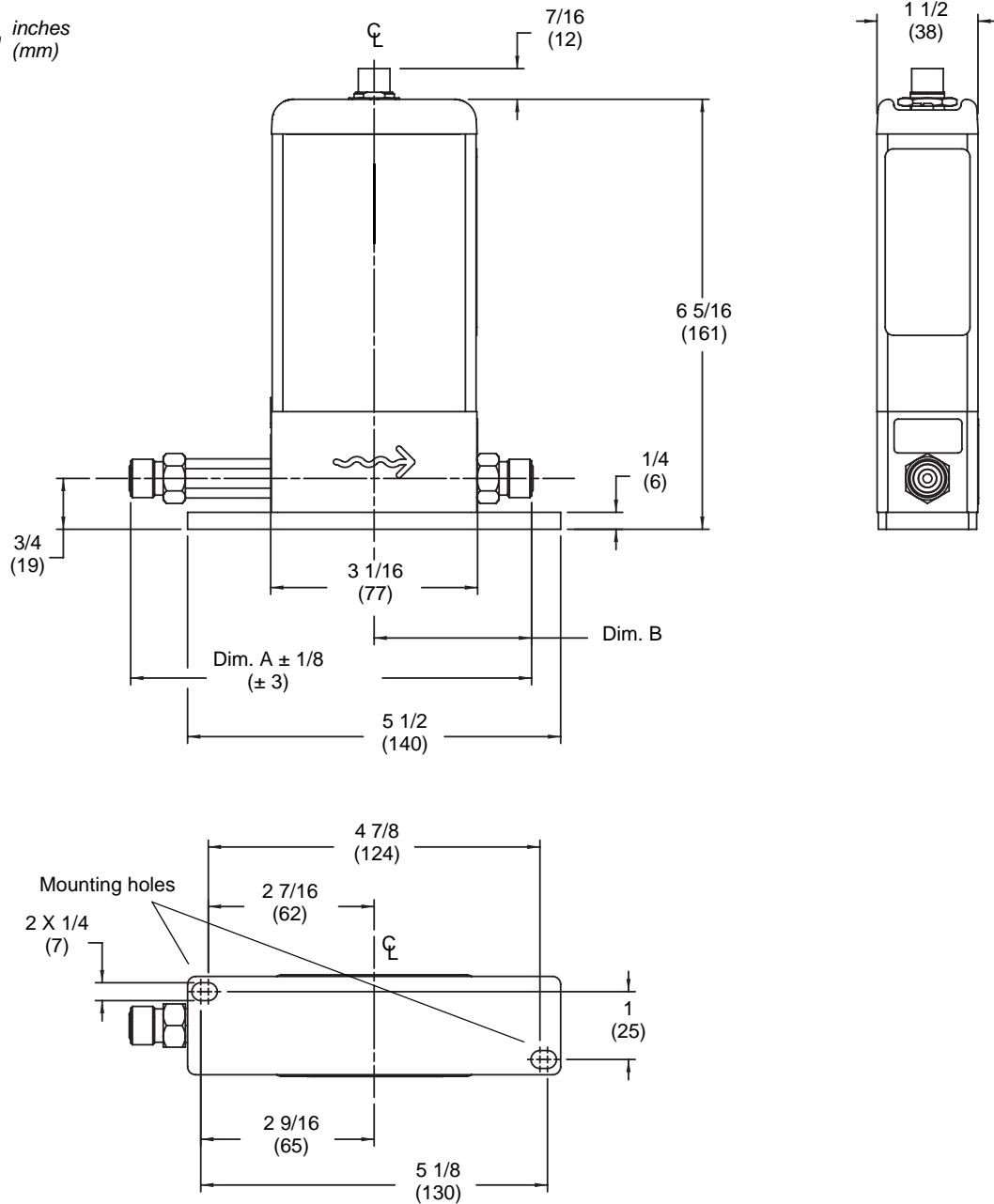
## Sensor - Physical Specifications

**Weight** 4 lbs (2 kg)

**Shipping weight** 5 lbs (2 kg)

## Dimensions

Dimensions in inches (mm)



## QmBS Sensor / QTA Transmitter

### Sensor - Physical Specifications *continued*

Model	Fitting options	Dim. A with filter inches (mm)	Dim. A without filter inches (mm)	Dim. B inches (mm)
All	1/4" tube compression fittings	6 1/4 (158)	5 (126)	2 1/2 (63)
	1/8" tube compression fittings	5 15/16 (151)	4 11/16 (119)	2 5/16 (59)
	1/8" VCR	5 11/16 (144)	4 3/8 (112)	2 3/16 (56)
	1/4" VCR	6 3/8 (162)	5 1/8 (129)	2 9/16 (65)
	1/4" VCO	5 7/8 (149)	4 5/8 (117)	2 5/16 (59)
	6 mm tube compression fittings	6 1/4 (158)	5 (126)	2 1/2 (63)

### Transmitter Outputs

	Field mount	DIN rail mount
<b>1 mA output, 1 frequency/pulse output</b>	Mounting and outputs codes 1 and 3 (FM AN)	Mounting and outputs code 2 (DIN AN)
<b>2 mA outputs, 1 frequency/pulse output (configurable)</b>	Mounting and outputs code 4 (FM CIO)	Mounting and outputs code 5 (DIN CIO)
<b>FOUNDATION fieldbus</b>	Mounting and outputs code 6 (FM FB)	(Not available)
<b>Profibus-PA</b>	Mounting and outputs code 7 (FM PB)	(Not available)

### Transmitters with Configurable I/O

The FM CIO and DIN CIO transmitters (mounting and outputs codes 4 and 5, with configurable I/O), are designed to increase transmitter flexibility and reduce the number of transmitter variations required in inventory.

The table below shows the various configuration options that can be produced with the configurable I/O output option. All transmitters ship with the default, but can be configured in the field.

Channel	Terminals		Configuration option	Default process variable assignment	Power
	Field mount	DIN rail			
A	1 & 2	21 & 22	mA output 1 (with Bell 202 HART)	Mass flow	Internal (active)
B	3 & 4	23 & 24	mA output 2 (default)	Density	Internal (active)
			Frequency output (FO) <sup>(1)</sup>	Mass flow	Internal (active) or external (passive)
			Discrete output 1 (DO1)	Fwd/Rev	
C	5 & 6	31 & 32	FO (default) <sup>(1)</sup>	Mass flow	Internal (active) or external (passive)
			Discrete output 2 (DO2)	Flow switch	
			Discrete input (DI)	None	

(1) When configured for two FOs (dual pulse), FO2 is generated from the same FO signal sent to the first FO. FO2 is electrically isolated but not independent.

**Definition of Transmitter Codes**

<b>Transmitter type</b>	<b>Code</b>
QmBS field-mount transmitter with the 1 mA/1 FO outputs option board (flow-only or multivariable)	FM AN
QmBS field-mount transmitter with the 2 mA/1 FO outputs option board (multivariable, configurable)	FM CIO
QmBS field-mount transmitter with the FOUNDATION fieldbus outputs option board	FM FB
QmBS field-mount transmitter with the Profibus-PA outputs option board	FM PA
QmBS DIN rail mount transmitter with the 1 mA/1 FO outputs option board (flow-only)	DIN AN
QmBS DIN rail mount transmitter with the 2 mA/1 FO outputs option board (multivariable, configurable)	DIN CIO

**Transmitters with FOUNDATION® Fieldbus**

FOUNDATION fieldbus software is designed to permit remote testing and configuration of the transmitter using DeltaV Fieldbus Configuration Tool, or other Foundation fieldbus compliant hosts. The Coriolis sensor signal is channeled through the sensor to the control room and the FOUNDATION fieldbus configuration device.

- The transducer block holds the data from the Coriolis sensor. It includes information about the sensor type, sensor configuration, engineering units, calibration, damping and diagnostics.
- The resource block contains physical device information, including available memory, manufacturer identification, type of device and features.
- The Analog Input (AI) function block processes the measurement from the Coriolis sensor and makes it available to other function blocks. It also allows filtering, alarm handling, and engineering unit changes. Each of the four Brooks QTA Transmitter function blocks can be assigned to one variable from the five available; mass flow, volume flow, density, temperature and drive gain.

- The Analog Output (AO) function block assigns an output value to a field device through a specified channel. The block supports mode control, signal status calculation and simulation.
- The Proportional Integral Derivative (PID) function block combines all the necessary logic to perform proportional/integral/derivative control. The block supports mode control, signal scaling and limiting, feed forward control, override tracking, alarm limit detection and signal status propagation.

**Transmitter Diagnostics and Service**

QTA-Series Transmitters automatically perform continuous self-diagnostics. Using the transducer block, the user can perform on-line testing of the transmitter and sensor.

Diagnostics are event-driven and do not require polling for access.

The new meter fingerprinting feature allows you to capture device-level snapshots of your meter performance.

## QmBS Sensor / QTA Transmitter

### Transmitter - Field Mount

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<b>Physical specifications</b>	Housing	Polyurethane-painted cast aluminum, NEMA 4X (IP 67)
	Weight	With display: 3.6 kg (8 lb) Without display: 3.2 kg (7 lb)
	Mounting and cabling	Transmitters include a mounting bracket. Hardware for installing the transmitter on the mounting bracket is included. The transmitter can be rotated on the mounting bracket 360° in 90° increments. Cable with a pre-installed Eurofast connector can be purchased in lengths up to 1000 ft (300 m).
	Interface/display (optional)	<p>Segmented 2-line LCD display with optical controls and flowmeter-status LED is standard.</p> <ul style="list-style-type: none"> <li>• LCD line 1 lists the process variable.</li> <li>• LCD line 2 lists engineering unit of measure.</li> </ul> <p>Non-glare tempered glass lens. Available in both backlit and non-backlit versions. Display is suitable for hazardous area installation. To facilitate various mounting orientations, the display can be rotated on the transmitter 360° in 90° increments. Display controls feature optical switches that are operated through the glass with a red LED for visual feedback to confirm when a “button” is pressed.</p> <p>Display functions:</p> <ul style="list-style-type: none"> <li>• View process variables</li> <li>• Start, stop, and reset totalizers</li> <li>• View and acknowledge alarms</li> <li>• Off-line (where applicable):             <ul style="list-style-type: none"> <li>- Zero flowmeter</li> <li>- Simulate outputs</li> <li>- Change measurement units</li> <li>- Configure outputs</li> <li>- Set RS-485 communications options</li> </ul> </li> </ul>
	Status light	Three-color LED status light on display panel indicates flowmeter condition at a glance.

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**Transmitter - Field Mount Continued**

<b>Electrical connections</b>	Input and output connections	One (mounting and outputs codes 6 and 7), two (mounting and outputs codes 1 and 3), or three (mounting and outputs code 4) pairs of wiring terminals for transmitter outputs Screw terminals accept one or two solid conductors, 14 to 12 AWG (2.0 to 3.5 mm <sup>2</sup> ); or one or two stranded conductors, 22 to 14 AWG (0.34 to 2.5 mm <sup>2</sup> )
	Power connections	One pair of wiring terminals accepts AC or DC power One internal ground lug for power-supply ground wiring Screw terminals accept one or two solid conductors, 14 to 12 AWG (2.0 to 3.5 mm <sup>2</sup> ); or one or two stranded conductors, 22 to 14 AWG (0.34 to 2.5 mm <sup>2</sup> )
	Service port connection	Two clips for temporary connection to the service port
	Sensor connection	Two pairs of terminals for the 4-wire connection to the sensor <ul style="list-style-type: none"><li>• One pair is used for the RS-485 connection to the sensor</li><li>• One pair is used to supply power to the sensor</li></ul> Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0.2 to 2.5 mm <sup>2</sup> )

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<b>Input/output signals</b>	All transmitters	One 4-wire sensor signal input connection with ground
	Mounting and outputs code 1 or 3 (1 mA, 1 FO)	One active 4–20mA output <ul style="list-style-type: none"><li>• Not intrinsically safe</li><li>• Isolated to ±50 Vdc from all other outputs and earth ground</li><li>• Maximum load limit: 600 ohms</li><li>• Flow-only transmitter can report mass flow or volume flow</li><li>• Multivariable transmitter can report mass flow, volume flow, density, temperature, or drive gain</li><li>• Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)</li></ul>

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## QmBS Sensor / QTA Transmitter

## Transmitter - Field Mount Continued

Mounting and outputs code 4  
(2 mA, 1 FO configurable,  
multivariable transmitter only)

One active or passive frequency/pulse output

- Not intrinsically safe
- Can report mass flow or volume flow, which can be used to indicate flow rate or total
- Flow-only transmitter: frequency output reports the same flow variable as the mA output
- Multivariable transmitter: frequency output is independent of the mA output
- Scalable to 10,000 Hz
- Maximum output of +24 Vdc  $\pm$ 3% with a 2.2 Kohm internal pull-up resistor
- Output is linear with flow rate to 12,500 Hz

One or two active 4–20 mA outputs

- Not intrinsically safe
- Isolated to  $\pm$ 50 Vdc from all other outputs and earth ground
- Maximum load limit:
  - mA1: 820 ohms
  - mA2: 420 ohms
- Can report mass flow, volume flow, density, temperature, or drive gain
- Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)

One active or passive frequency/pulse output

- Not intrinsically safe
- Can report mass flow or volume flow, which can be used to indicate flow rate or total
- Scalable to 10,000 Hz
- Power:
  - Internal (active): +15 Vdc  $\pm$ 3% with a 2.2 Kohm internal pull-up resistor
  - External (passive): +30 Vdc maximum, +24 Vdc typical
- Output is linear with flow rate to 12,500 Hz

One or two active or passive discrete outputs

- Not intrinsically safe
- Can report event 1, event 2, event 1 and event 2, flow switch, forward/reverse flow, calibration in progress, or fault
- Power:
  - Internal (active): +15 Vdc  $\pm$ 3% with a 2.2 Kohm internal pull-up resistor
  - External (passive): +30 Vdc maximum, +24 Vdc typical
- Maximum sink capability: 500 mA

**Transmitter - Field Mount Continued**

		<p>One discrete input</p> <ul style="list-style-type: none"><li>• Can be configured for internal or external power</li><li>• Not intrinsically safe</li><li>• Power<ul style="list-style-type: none"><li>- Internal (active): +15 Vdc, 7 mA maximum source current</li><li>- External (passive): +3 to 30 Vdc maximum</li></ul></li><li>• Can report reset all totals, reset mass total, reset volume total, or start sensor zero</li></ul>
	Mounting and outputs code 6 (FOUNDATION fieldbus)	One FOUNDATION fieldbus H1 output Manchester-encoded digital signal conforms to IEC 1158-2
	Mounting and outputs code 7 (Profibus-PA)	One Profibus-PA output Manchester-encoded digital signal conforms to IEC 1158-2
<b>Digital communications</b>	All transmitters	One service port can be used for temporary connection only Uses RS-485 Modbus signal, 38.4 kilobaud, one stop bit, no parity
	Mounting and outputs code 1, 3, or 4	HART Bell 202 signal is superimposed on the primary milliamp output, and is available for host system interface: <ul style="list-style-type: none"><li>• Frequency: 1.2 and 2.2 kHz</li><li>• Amplitude: to 0.8 V peak-to-peak</li><li>• 1200 baud</li><li>• Requires 250 to 600 ohms resistance</li></ul>
	Mounting and outputs code 1 or 3	One RS-485 output can be used for direct connection to a HART or Modbus host system. Modbus communications supports 7-bit or 8-bit protocol (default: 8-bit), 1200 to 38,400 baud (default: 9600), one or two stop bits (default: one), and odd, even, or no parity (default: odd). Configuration can be changed using ProLink II software.
	Mounting and outputs code 6 (FOUNDATION fieldbus)	Transmitters are registered with the Fieldbus Foundation, and conform to the FOUNDATION fieldbus H1 protocol specification. Input frequency from sensor: <ul style="list-style-type: none"><li>• Mass flow: 20 Hz</li><li>• Volume flow: 20 Hz</li><li>• Density: 20 Hz</li><li>• Temperature: 1Hz</li></ul> Analog input function blocks: <ul style="list-style-type: none"><li>• Cycle time: Host dependent</li><li>• Update rate: 50 milliseconds</li><li>• Refresh rate: Host dependent</li></ul>

## QmBS Sensor / QTA Transmitter

### Transmitter - Field Mount Continued

Mounting and outputs code 7 (Profibus-PA)	Transmitters are registered with the Profibus Organization, and fulfill the requirements of the Profibus-PA Profile for Process Control Devices. Input frequency from sensor: <ul style="list-style-type: none"> <li>• Mass flow: 20 Hz</li> <li>• Volume flow: 20 Hz</li> <li>• Density: 20 Hz</li> <li>• Temperature: 1Hz</li> </ul> Analog input function blocks: <ul style="list-style-type: none"> <li>• Cycle time: Host dependent</li> <li>• Update rate: 50 milliseconds</li> <li>• Refresh rate: Host dependent</li> </ul> Siemens Simatic PDM required for configuration.
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### Power supply

Self-switching AC/DC input, automatically recognizes supply voltage.  
Complies with low voltage directive 73/23/EEC per IEC 1010-1.  
Installation (Overvoltage) Category II, Pollution Degree 2.  
The transmitter fieldbus circuit is passive, and draws its power from the fieldbus segment.  
Current draw from the fieldbus segment is 11.5 mA.

AC power	85 to 265 VAC, 50/60 Hz, 6 watts typical, 11 watts maximum
DC power	18 to 100 Vdc, 6 watts typical, 11 watts maximum At startup, transmitter power source must provide a minimum of 1.5 amperes of short-term current at a minimum of 18 volts at the transmitter's power input terminals. Minimum 22 Vdc with 1000 feet of 18 AWG (300 meters of 0.8 mm <sup>2</sup> ) power supply cable
Fuse	IEC 127-1.25 fuse, slowblow

### Environmental limits

Ambient temperature limits	Operating and storage: -40 to +140 °F (-40 to +60 °C) Display responsiveness decreases and display June become difficult to read below -4 °F (-20 °C). Above 131 °F (55 °C), some darkening of the display might occur. ATEX requires limiting ambient temperature to below 131 °F (55 °C).
Humidity limits	5 to 95% relative humidity, non-condensing at 140 °F (60 °C)
Vibration limits	Meets IEC68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0g.

### Environmental effects

EMI effects	Meets EMC directive 89/336/EEC per EN 50081-2 (August 1993) and EN50082-2 (March 1995) and EN 61326.
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# Data Sheet

DS-CM-QmBS-eng

June, 2008

## QmBS Sensor / QTA Transmitter

### Transmitter - Field Mount Continued

Ambient temperature effect

On analog outputs  $\pm 0.005\%$  of span per  $^{\circ}\text{C}$

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#### Hazardous area classifications



CSA<sup>(1)</sup>

Class I Division 2 Groups A, B, C, D  
Class II Division 2 Groups F and G  
Class III Division 2



ATEX<sup>(2)</sup>

Output option codes 1, 3, or 4:

With display:



  II 3 G EEx nC IIB+H2 T6  
II 3 D IP66/IP67 T65 $^{\circ}\text{C}$

Without display or with optional display cover:



  II 3 G EEx nC IIC T6  
II 3 D IP66/IP67 T65 $^{\circ}\text{C}$

Output option codes 6 and 7:

With display:

  II 3 G EEx nC [L] IIB+H2 T6  
II 3 D IP66/IP67 T65 $^{\circ}\text{C}$

Without display or with optional display cover:

  II 3 G EEx nC [L] IIC T6  
II 3 D IP66/IP67 T65 $^{\circ}\text{C}$

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(1) CSA is a Canadian approvals agency that provides approvals accepted both in the U.S.A. and in Canada.

(2) ATEX is a European directive.

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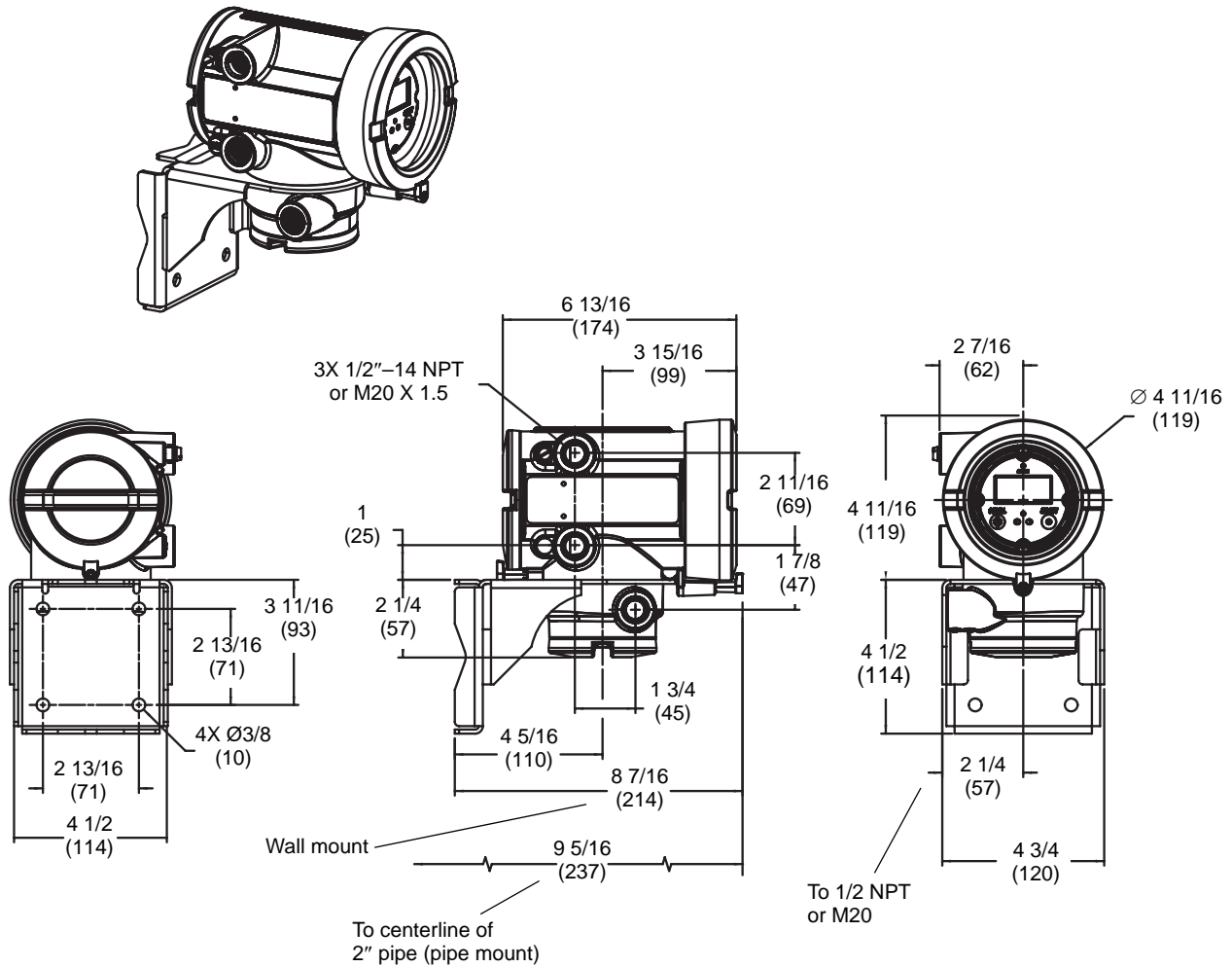
# QmBS Sensor / QTA Transmitter

## Transmitter - Field Mount Continued

### Dimensions

With display

Dimensions in inches  
(mm)



# Data Sheet

DS-CM-QmBS-eng

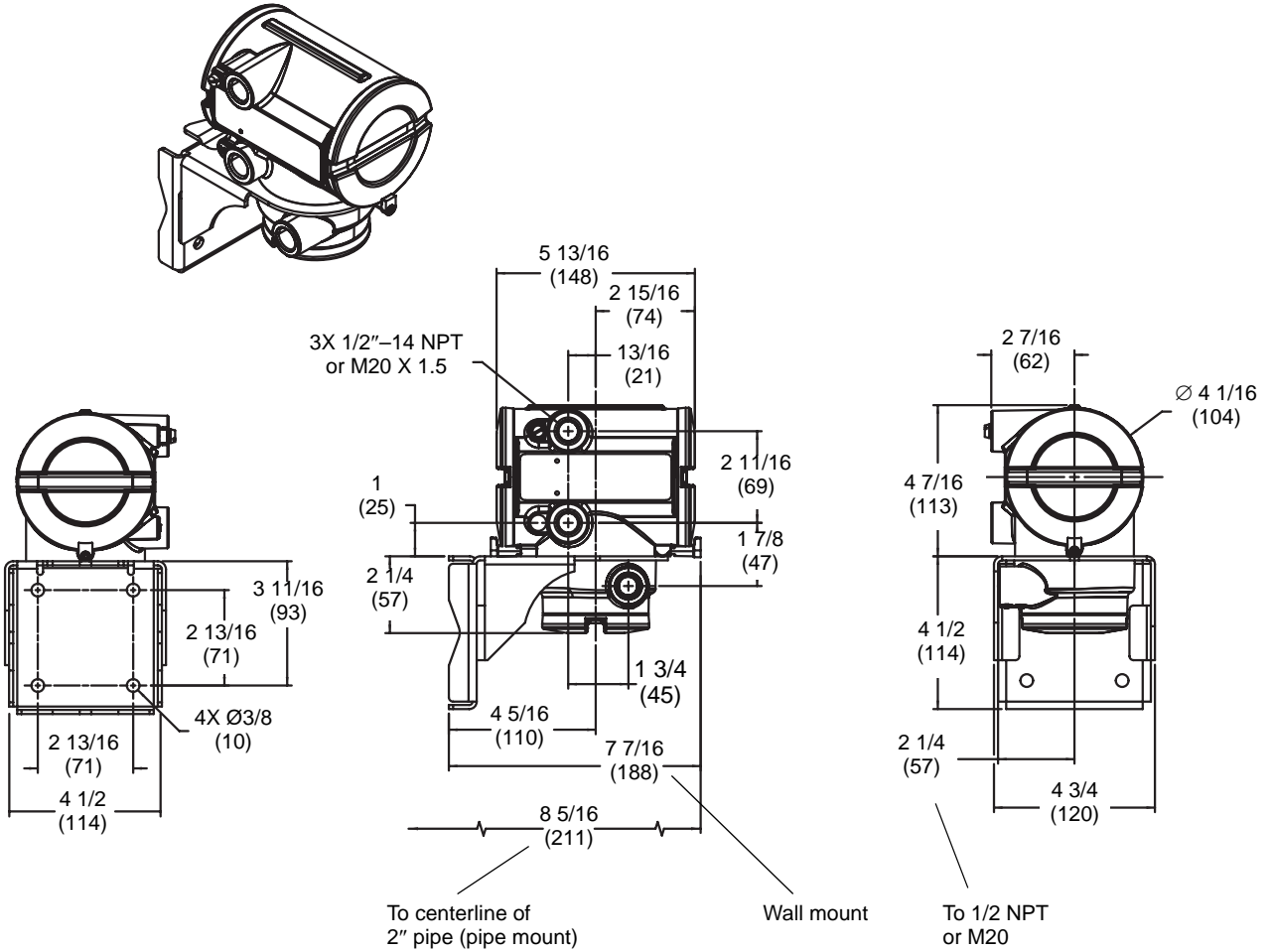
June, 2008

# QmBS Sensor / QTA Transmitter

## Transmitter - Field Mount Continued

Without display

Dimensions in inches  
(mm)



## QmBS Sensor / QTA Transmitter

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### Transmitter - DIN Rail Mount

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<b>Physical specifications</b>	Housing	Polyamide PA 6.6
	Weight	0.52 lbs (0.24 kg)
	Mounting and cabling	DIN rail transmitters are mounted on a 35 mm rail. The rail must be grounded. Cable with a pre-installed Eurofast connector can be purchased in lengths up to 1000 ft (300 m).
	Status LED	Three-color LED status light on face of transmitter indicates flowmeter condition at a glance, using a solid green, yellow or red light. Zero in progress is indicated by a flashing yellow light.
	Zero button	A zero button on the face of the transmitter can be used to start the transmitter zero process.

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<b>Electrical connections</b>	Input and output connections	Three pairs of wiring terminals for transmitter outputs One pair of terminals for digital communications (Modbus/RS-485) Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0.2 to 3.5 mm <sup>2</sup> )
	Power connections	Two pairs of terminals <ul style="list-style-type: none"> <li>• Either pair accepts DC power</li> <li>• The remaining pair is used for making a jumper connection to a second transmitter</li> </ul> Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0.2 to 3.5 mm <sup>2</sup> )
	Sensor connection	The transmitter has two pairs for the 4-wire connection to the sensor <ul style="list-style-type: none"> <li>• One pair is used for the RS-485 connection to the sensor</li> <li>• One pair is used to supply power to the sensor</li> </ul> Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0.2 to 3.5 mm <sup>2</sup> )

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<b>Input/output signals</b>	All transmitters	One 4-wire sensor signal input connection with ground
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**Transmitter - DIN Rail Mount** *continued*

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Mounting and outputs code 2  
(1 mA, 1 FO)

- One active 4–20mA output
- Not intrinsically safe
- Isolated to  $\pm 50$  Vdc from all other outputs and earth ground
- Maximum load limit: 600 ohms
- Can report mass flow or volume flow
- Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)

- One active or passive frequency/pulse output
- Not intrinsically safe
- Can report mass flow or volume flow, which can be used to indicate flow rate or total
- Frequency output reports the same flow variable as the mA output
- Scalable to 10,000 Hz
- Maximum output of +24 Vdc  $\pm 3\%$  with 2.2 Kohm internal pull-up resistor
- Output is linear with flow rate to 12,500 Hz

Mounting and outputs code 5  
(2 mA, 1 FO configurable,  
multivariable transmitter only)

- One or two active 4–20 mA outputs
- Not intrinsically safe
- Isolated to  $\pm 50$  Vdc from all other outputs and earth ground
- Maximum load limit:
  - mA1: 820 ohms
  - mA2: 420 ohms
- Can report mass flow, volume flow, density, temperature, or drive gain
- Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)

- One active or passive frequency/pulse output
  - Not intrinsically safe
  - Can report mass flow or volume flow, which can be used to indicate flow rate or total
  - Scalable to 10,000 Hz
  - Power:
    - Internal (active): +15 Vdc  $\pm 3\%$  with 2.2 Kohm internal pull-up resistor
    - External (passive): +30 Vdc maximum, 24 Vdc typical, sinking up to 500 mA at 30 Vdc
  - Output is linear with flow rate to 12,500 Hz
-

**QmBS Sensor / QTA Transmitter**

**Transmitter - DIN Rail Mount** *continued*

One or two active or passive discrete outputs

- Not intrinsically safe
- Can report event 1, event 2, event 1 and event 2, flow switch, forward/reverse flow, calibration in progress, or fault
- Power:
  - Internal (active): +15 Vdc  $\pm$ 3% with 2.2 Kohm internal pull-up resistor
  - External (passive): +30 Vdc maximum, +24 Vdc typical, sinking up to 500 mA at 30 Vdc
- Maximum sink capability: 500 mA

One discrete input

- Can be configured for internal or external power
- Not intrinsically safe
- Power:
  - Internal: +15 Vdc, 7 mA maximum source current
  - External: +3 to 30 Vdc maximum
- Can reset all totals, reset mass total, reset volume total, or start sensor zero

**Digital communications**

All transmitters

One pair of terminals supports Modbus/RS485 signal or SP (service port) mode.

HART/Bell 202 signal is superimposed on the primary mA output, and is available for host system interface

- Frequency: 1.2 and 2.2 kHz
- Amplitude: 0.8 V peak-to-peak
- 1200 baud
- Requires 250 to 600 ohms load resistance

**Power supply**

Transmitter's power supply:

- Requires DC power
- Meets Installation (Overvoltage) Category II, Pollution Degree 2 requirements
- Contains an IEC 1.6A slowblow fuse

Power requirements

19.2 to 28.8 Vdc, 6.3 watts maximum

At startup, transmitter power source must provide a minimum of 1.0 amperes of short-term current per transmitter

Length and conductor diameter of the power cable must be sized to provide 19.2 Vdc minimum at the power terminals, at a load current of 330 mA

## Data Sheet

DS-CM-QmBS-eng

June, 2008

## QmBS Sensor / QTA Transmitter

### Transmitter - DIN Rail Mount *continued*

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<b>Environmental limits</b>	Ambient temperature limits	Operating: -40 to +131 °F (-40 to +55 °C) Storage: -40 to +185 °F (-40 to +85 °C) If temperature is above 113 °F (45 °C) and you are mounting multiple transmitters, they must be mounted at least 8.5 mm apart.
	Humidity limits	5 to 95% relative humidity, non-condensing at 140 °F (60 °C)
	Vibration limits	Meets IEC68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0g.

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<b>Environmental effects</b>	EMI effects	Meets EMC directive 89/336/EEC per EN 61326 Industrial.
	Ambient temperature effect	On analog outputs $\pm 0.005\%$ of span per °C

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<b>Hazardous area classifications</b>	CSA <sup>(1)</sup>	Class I Division 2 Groups A, B, C, D Class II Division 2 Groups F and G Class III Division 2
	ATEX <sup>(2)</sup>	Transmitter has no ATEX classification, and should be installed only in safe areas. Transmitter outputs are acceptable for connecting to a sensor in a hazardous area.

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(1) CSA is a Canadian approvals agency that provides approvals accepted both in the U.S.A. and in Canada.

(2) ATEX is a European directive.

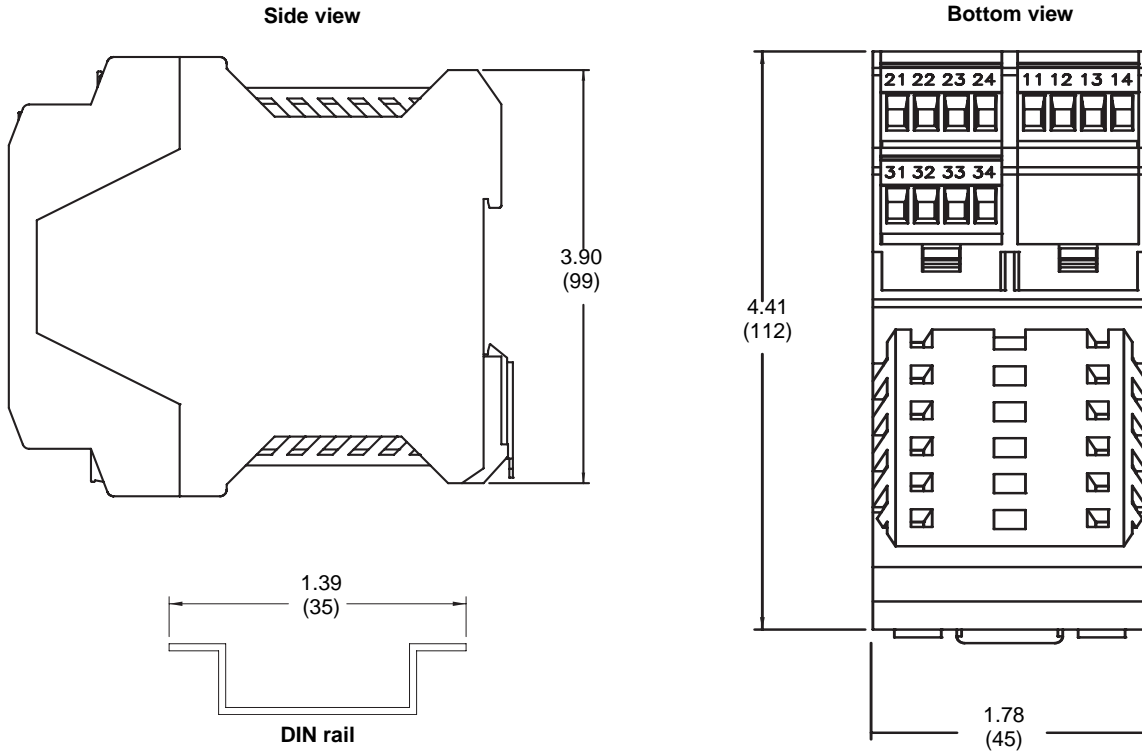
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# QmBS Sensor / QTA Transmitter

## Transmitter - DIN Rail Mount *continued*

### Dimensions

Dimensions in *inches*  
(*mm*)



QmBS Sensor Model Code

<b>Model: QM Series</b>					
<b>MULTIVARIABLE PRECISION MASS FLOW MEASUREMENT AND CONTROL</b>					
<b>BASE MODEL NUMBER, REVISION AND PRIMARY DEVICE DESCRIPTION</b>					
<b>QMBS</b>	FLOW SENSOR (MODBUS 485 OUTPUT)				
<b>TUBE SIZE</b>		<b>SENSOR NOMINAL FLOW RATE</b>			
		<b>LIQUID</b>	<b>GAS</b>		
<b>2</b>	SMALL	190 grams/hour	1432 sccm		
<b>3</b>	MEDIUM	1.00 Kg/hour	5.595 SLPM		
<b>4</b>	LARGE	13.5 Kg/hour	50.35 SLPM		
<b>FLUID TYPE</b>					
<b>L</b>	LIQUID	<b>NOTE: SELECT PRIMARY FLUID TYPE. USER CAN SWITCH FROM LIQUID TO GAS AND</b>			
<b>G</b>	GAS	<b>VISA-VERSA. REZEROING IS REQUIRED.</b>			
<b>PRESSURE TRANSDUCER</b>					
<b>1</b>	NO TRANSDUCER				
<b>VALVE TYPE</b>					
<b>A</b>	NO VALVE				
<b>ACCURACY LIQUID AND STAINLESS STEEL</b>		<b>ACCURACY GAS OR HASTELLOY</b>			
<b>2</b>	STANDARD	0.2% OF RATE	<b>3</b>	STANDARD	0.5% OF RATE
<b>3</b>	OPTIONAL	0.5% OF RATE	<b>4</b>	OPTIONAL	1.0% OF RATE
<b>ENCLOSURE TYPE AND AREA CLASSIFICATION</b>					
<b>D</b>	NEMA 4X / IP 65		CLASS 1 DIV 2 / ZONE 2		
<b>SURFACE FINISH</b>					
<b>1</b>	STANDARD SURFACE FINISH (32 Ra)				
<b>SENSOR TUBE MATERIAL</b>					
<b>A</b>	STAINLESS STEEL, 316L MAXIMUM BODY PRESSURE <= 100 BAR OR 1500 PSI				
<b>B</b>	HASTELLOY, C22 (TUBES ONLY)				
<b>MAXIMUM BODY PRESSURE RATING</b>					
<b>1</b>	35 BAR OR 500 PSI				
<b>2</b>	100 BAR OR 1500 PSI				
<b>3</b>	300 BAR OR 4500 PSI MUST SELECT HASTELLOY SENSOR TUBE MATERIAL				
<b>MAXIMUM TEMPERATURE RATING</b>					
<b>A</b>	65 DEG C				
<b>PROCESS CONNECTIONS</b>					
<b>1A</b>	STANDARD BODY CONNECTIONS - 5/16"-24 UNF				
<b>1B</b>	1/16" - TUBE COMPRESSION FITTINGS				
<b>1C</b>	1/4" TUBE COMPRESSION FITTINGS				
<b>1D</b>	1/8" TUBE COMPRESSION FITTINGS				
<b>1G</b>	6mm TUBE COMPRESSION FITTINGS				
<b>1J</b>	1/8" NPT(F)				
<b>1K</b>	1/4" NPT(F)				
<b>1L</b>	1/8" VCR				
<b>1M</b>	1/4" VCR				
<b>1P</b>	1/4" VCO				
<b>1Y</b>	DOWN PORT ANSI/ISA-76.00.02				
<b>ELECTRICAL I/O - COMMUNICATIONS</b>					
<b>M</b>	MODBUS				
<b>ELECTRICAL CONNECTION</b>					
<b>2</b>	4 PIN CIRCULAR CONNECTOR				

**QmBS Sensor Model Code (Continued)**

<b>SEALS</b>		<b>SENSOR</b>	<b>FITTING</b>	
<b>A</b>		VITON	VITON	
<b>B</b>		BUNA	BUNA	NOTE:
<b>C</b>		KALREZ	KALREZ	DOWNPORT PROCESS
<b>E</b>		EPDM	EPDM	CONNECTION OPTION
<b>F</b>		NICKEL	VITON	CODE 1Y HAS NO
<b>G</b>		NICKEL	BUNA	FITTING O'RING IN THE
<b>H</b>		NICKEL	KALREZ	ASSEMBLY.
<b>J</b>		NICKEL	EPDM	
<b>VALVE SEAT MATERIAL</b>				
<b>1</b>		NONE		(METER)
<b>SPECIAL PROCESSING</b>				
<b>A</b>		NONE		
<b>B</b>		CERTIFIED MATERIALS 2.2 EN 10204		
<b>C</b>		CERTIFIED MATERIALS 3.1B EN 10204		
<b>D</b>		CLEANING FOR OXYGEN SERVICE		
<b>E</b>		CLEANING FOR OXYGEN SERVICE AND CERTIFIED MATERIALS 2.2 EN 10204		
<b>F</b>		CLEANING FOR OXYGEN SERVICE AND CERTIFIED MATERIALS 3.1B EN 10204		
<b>QUALITY CERTIFICATIONS</b>				
<b>1</b>		NONE		
<b>2</b>		CALIBRATION CERTIFICATION - TRACEABLE TO NIST		
<b>4</b>		CERTIFICATE OF CONFORMANCE		
<b>5</b>		CALIBRATION CERTIFICATION - TRACEABLE TO NIST AND CERTIFICATE OF CONFORMANCE		
<b>IN LINE FILTER</b>				
<b>A</b>		NONE		
<b>B</b>		IN LINE CARTRIDGE FILTER, 10 MICRON	B OR F REQUIRED FOR SIZE 2 CONTROLLER	
<b>C</b>		IN LINE CARTRIDGE FILTER, 20 MICRON		
<b>D</b>		IN LINE CARTRIDGE FILTER, 30 MICRON		
<b>E</b>		IN LINE CARTRIDGE FILTER, 40 MICRON		
<b>F</b>		IN LINE CARTRIDGE FILTER, 1 MICRON	B OR F REQUIRED FOR SIZE 2 CONTROLLER	
<b>OEM CODE</b>				
<b>A</b>		BROOKS		

QTA Transmitter Model Code

<b>Model: QT Series</b>	
<b>Quantim Transmitter</b>	
<b>Product Description</b> <span style="float: right;">World area &gt;&gt;&gt;</span>	
<b>QTA</b>	TRANSMITTER FOR USE WITH QUANTIM QMBS SENSORS
<b>MOUNTING AND OUTPUTS</b>	
1	1 ma/1FO FLOW ONLY 4-WIRE FIELD MOUNT TRANSMITTER
2	1 ma/1FO FLOW ONLY 4-WIRE DIN RAIL MOUNT TRANSMITTER
3	1ma/1FO MULTIVARIABLE 4-WIRE FIELD MOUNT TRANSMITTER
4	2ma/1FO CONFIGURABLE MULTI VARIABLE 4-WIRE FIELD MOUNT TRANSMITTER
5	2ma/1FO CONFIGURABLE MULTI VARIABLE 4-WIRE DIN RAIL MOUNT TRANSMITTER
6	FOUNDATION FIELDBUS 4-WIRE FIELD MOUNT TRANSMITTER W/STD FIELDBUS FUNCTION BLOCKS
7	PROFIBUS PA 4-WIRE FIELD MOUNT TRANSMITTER
<b>DISPLAY</b>	
1	DUAL LINE DISPLAY FOR PV AND TOTAL RESET (NOT AVAIL WITH MOUNTING CODES 2 AND 5)
2	BACKLIT DUAL LINE DISPLAY FOR PV AND TOTAL RESET (NOT AVAIL WITH MOUNT CODES 2 AND 5)
3	NO DISPLAY
<b>CONDUIT CONNECTIONS</b>	
A	NONE
B	1/2" NO GLAND
C	1/2" BRASS NICKEL
D	1/2" STAINLESS STEEL
E	M20 NO GLAND
F	M20 BRASS NICKEL
G	M20 STAINLESS STEEL
<b>APPROVALS</b>	
M	GENERAL PURPOSE STANDARD (NO APPROVAL)
A	CSA (US AND CANADA) CLASS 1 DIVISION 2
L	ATEX - EQUIPMENT CATEGORY 3 (Zone 2) - nL PROTECTION
<b>LANGUAGE</b>	
E	ENGLISH QUICK REFERENCE GUIDE AND ENGLISH MANUAL
<b>SOFTWARE OPTIONS</b>	
Z	RESERVED FOR FUTURE USE
<b>SOFTWARE OPTIONS 2</b>	
A	REGULATORY CONTROL SUITE: STANDARD FIELDBUS FUNCTION BLOCKS PLUS 1 PID BLOCK (ONLY AVAILABLE WITH MOUNTING CODE 6)
Z	NO SOFTWARE OPTIONS 2
<b>FACTORY OPTIONS</b>	
A	STANDARD PRODUCT
Z	SPECIAL PRODUCT - CONTACT FACTORY
<b>SELECTED MODEL CODE: QTA13BMEAZ</b>	

## QmBS Sensor / QTA Transmitter

### **BROOKS LOCAL AND WORLDWIDE SUPPORT**

Brooks Instrument provides sales and service facilities around the world, ensuring quick delivery from local stock, timely repairs and local based sales and service facilities.

Our dedicated flow experts provide consultation and support, assuring successful applications of the Brooks flow measurement and control products.

Calibration facilities are available in local sales and service offices. The primary standard calibration equipment to calibrate the mass flow products is certified by 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.

For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the mass flow products periodically.

### **CUSTOMER SEMINARS AND TRAINING**

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users and maintenance professionals. Please contact your nearest sales representative for more details.

### **HELP DESK**

In case you need technical assistance:

Americas ☎ 1-888-554-FLOW  
Europe ☎ +(31) 318 549 290 Within Netherlands ☎ 0318 549 290  
Asia ☎ +011-81-3-5633-7100

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

For the latest QUANTIM product specifications view our Web Site at:  
[WWW.BrooksInstrument.com](http://WWW.BrooksInstrument.com)



### **TRADEMARKS**

Brooks ..... Brooks Instrument Division, Emerson Electric Co.  
DeltaV ..... Emerson Electric Co.  
FOUNDATION ..... Fieldbus Foundation  
HART ..... HART Communications Foundation  
Kalrez ..... DuPont Dow Elastomers L.L.C.  
Modbus ..... Scheinder Automation Inc.  
MVD ..... Micro Motion  
PlantWeb ..... Emerson Electric Co.  
QUANTIM ..... Brooks Instrument Division, Emerson Electric Co.  
Viton ..... DuPont Dow Elastomers L.L.C.

### **QUANTIM Patent Numbers as follows:**

US ..... D 436,876  
US ..... 6513392  
US ..... 6526839  
Germany ..... 40004270.3  
UK ..... 2092458  
China ..... 171140

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