



## RHM160

### Coriolis Mass Flow Meter for High Flow Terminal and Pipeline Applications

#### Features

- Standard Pressure ratings up to 50bar (725 psi)
- Temperature ratings from -196 to 120°C (-320 to 248°F)
- Mass flow uncertainty down to 0.15%
- Density uncertainty down to 0.5%
- Repeatability better than 0.05%
- Typical measuring ranges between 750 and 30000 kg/min
- Accurately measure low flow rates down to 600 kg/min
- Unique robust torsion driven oscillation system
- Approved for use in hazardous areas
- Stainless steel case
- Remote and compact transmitter versions available

#### Applications

Typical applications include:

- Terminal Transfer
- Allocation Metering
- Viscous Fluids
- Barge, Ship, Rail Car and Truck Filling

#### Benefits

- Torsion oscillator design assures a stable and drift free measurement with excellent signal to noise ratios
- Resilient to external noise and vibration
- Insensitive to pipe pressure changes
- Robust tube wall thickness provides increased operational safety in abrasive applications
- Corrosion resistant
- Long sensor life guaranteed due to low mechanical stresses in the meter mechanism
- No moving parts to wear or fail

## RHM160 General Specifications

<b>Nominal Max Flow Range:</b>	30000 kg/min (66139 lb/min)
<b>Density Range:</b>	5 to 5000 kg/m <sup>3</sup> (0.31 to 312 lb/ft <sup>3</sup> )
<b>Temperature Range:</b>	3 temperature range options cover temperatures from -196°C to 120°C (-320°F to 248°F)
<b>Pressure Ratings:</b>	Dependent upon material and process connection
<b>Electrical Connection:</b>	Cable entry M25 x 1.5 (standard) M20 x 1.5, ½" NPT, ¾" NPT (optional) Max cable length to remote RHE transmitter 30m (98 ft). 100m (330ft) with optional high performance cable
<b>Sensor Housing Materials:</b>	1.4301 / 304 stainless steel (standard), 1.4571 / 316Ti stainless steel (optional) Epoxy coated aluminium electrical box (standard), 1.4571 / 316Ti stainless steel (optional)
<b>Enclosure Type:</b>	Protection Class IP 65. Optional IP 66 / NEMA 4X
<b>Material of Wetted Parts:</b>	Sensors are available in a variety of standard and custom materials to suit a wide range of pressure ratings and chemical compatibility requirements. See the pressure ratings listing in this document for further details
<b>Finishes:</b>	ANSI flange finish: AARH 125 to 250 µm, Ra 3.2 to 6.3 µm
<b>Certifications and Approvals:</b>	ATEX approval Zone 0: Ex II 1 G Ex ia IIC T1-T6 Ga ATEX rating Zone 2: Ex II 3 G Ex nA IIC T1-T6 Gc CSA USA-Canada, Class I, Div. 1, Groups A, B, C, D PED according to 97/23/EC Module B + C1
<b>Documentation:</b>	All sensors are supplied with a traceable calibration certificate. Optional documentation items available: - Traceable material certificates - Certificates of origin and conformity - Welding - NACE - Quality - Production and manufacturing procedures Other documentation to client requirements available
<b>Proof Testing:</b>	Hydrotest, dye penetrant, x-ray, PMI

## Transmitter Range



RHE07



RHE08



RHE11

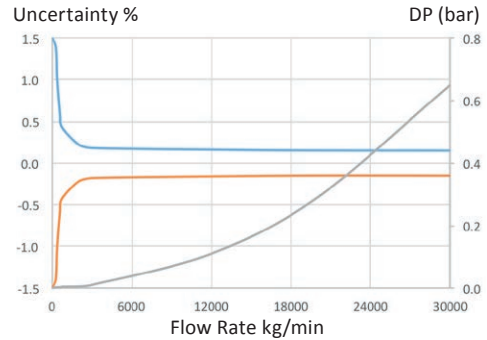


RHE12

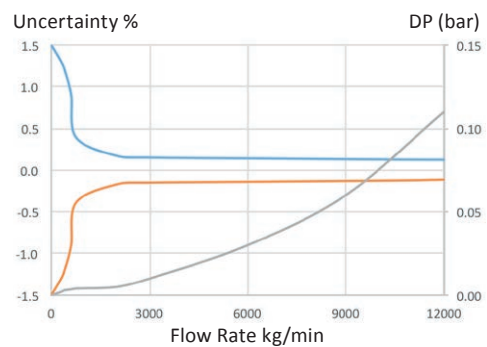
Any Rheonik Mass Flow Transmitter model can be combined with an RHM160 sensor to provide an overall mass flow measurement system to suit any requirement. Rheonik Coriolis transmitters are designed for process, industrial and OEM applications. Together they offer a tremendous range of options for system designers and end users alike.

## RHM160 Measurement Performance

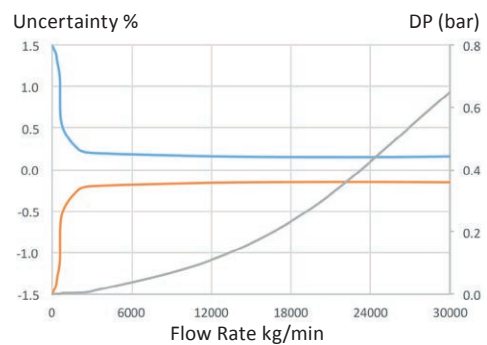
Standard Calibration		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
30000**	66139	0.20
15000	33069	0.20
7500	16535	0.20
2000	4409	0.20
750	1653	0.50



Goldline Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
12000**	26455	0.15
9000	19242	0.15
7500	16535	0.15
5000	11023	0.15
3000	6614	0.15



Low Flow Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
30000**	66139	0.20
6000	13228	0.20
2000	4409	0.20
750	1653	0.50
600	1323	0.75



\*Goldline and Low Flow Calibration is not available with all configurations of the RHM160. Please check with factory.

\*\*Calibration at factory only up to 11,000 kg/min.

Mass Flow Calibration Options	
<b>A</b>	40:1 Standard Calibration – 0.5% Uncertainty between 30000 and 750 kg/min
<b>B</b>	20:1 Standard Calibration – 0.2% Uncertainty between 30000 and 2000 kg/min
<b>G</b>	4:1 Goldline Calibration – 0.15% Uncertainty between 12000 and 3000 kg/min
<b>2</b>	Low Flow Calibration – 0.2% Uncertainty between 30000 and 2000 kg/min, 0.5% between 2000 and 750 kg/min, 0.75% between 750 and 600 kg/min

- Uncertainty of reading (incl. zero drift) stated at reference condition of: H<sub>2</sub>O, 18-24°C (66-76°F), 1-3 bar (15-45 psi) when installed according to field manual
- Pressure drop indications are based upon H<sub>2</sub>O flowing in a meter with P1 pressure rating
- For customized calibration range or uncertainty levels, please consult factory

### Flow Measurement Repeatability

Standard ± 0.1% of rate

Goldline ± 0.05% of rate

### Density Measurement Performance (liquids)

Standard 2 point calibration ±1% of value

Optional 3 point calibration ±0.5% of value

Gas density – depends upon pressure

### Temperature

Better than ± 1°C

## RHM160 Meter Pressure Ratings

Pressure Code	Material		Process Connection		$p_{max}$ @ 120°C (248°F)	
	Order Code	Material Type	Order Code	Flange Type	bar	psi
P1	M1	1.4571 (316Ti) UNS S31635	A4	ANSI 10" 300# RF	20	290
			A1	ANSI 12" 150# RF	16.4	238
			A2	ANSI 12" 300# RF	42.9	622
			A6	ANSI 12" 600# RF	42.9	622
			D1	DIN DN300/PN16	15.2	220
			D2	DIN DN300/PN40	30	435
P1	M3	2.4602 (Alloy C22) UNS N06022	A1	ANSI 12" 150# RF	16.9	245
			A2	ANSI 12" 300# RF	50	725
			A6	ANSI 12" 600# RF	50	725
			D1	DIN DN300/PN16	16	232
			D2	DIN DN300/PN40	40	580

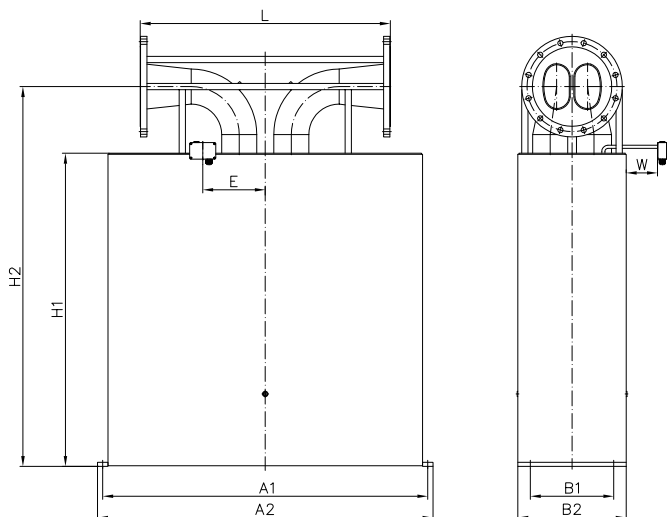
### Other Materials

Additional/custom wetted materials (Inconel, Monel, 304 stainless steel, others) may be possible for chemical compatibility, lower pressure drop, abrasion allowance, other application specific requirements.

Contact factory with specification for assessment and availability.

## RHM160 Mechanical Construction

**PFO:** Seal-less parallel measuring tube construction with flange connections



For customization of face to face length and/or special fittings other than the ones listed on this page, please consult factory.  
Note that larger diameter flange process connections are always possible.

A1 = 1560 mm (61.42 in) A2 = 1610 mm (63.39 in) B1 = 400 mm (15.75 in) B2 = 520 mm (20.47 in) H1 = 1500 mm (59.06 in) H2 = 1820 mm (71.65 in)  
E = 300 mm (11.81 in) W = 150 mm (5.91 in)  
Electrical box: std. = 125 x 80 x 58 mm (4.92 x 3.15 x 2.28 in), RHE16 compact = 120 x 120 x 80 mm (4.72 x 4.72 x 3.15 in)

## RHM160 Part Number Code

### Temperature Range

- T1 -20°C to +120°C (-4 to +248°F) (std.)
- TA -45°C to +120°C (-49 to +248°F)
- T3 -196°C to +50°C (-320 to +122°F)

### Material of Wetted Parts

- M1 1.4571 (316Ti) (std.)
- M3 2.4602 (Alloy C22)

### Process Connection

See pressure rating page for available connections and codes

### Options Codes

See options listing for specific codes

### Terminal Box Selection

- 9 Remote transmitter cable termination box (std.)
- C Enclosure for compact mount RHE16 transmitter

### Hazardous Area Certifications

- N Without Ex approval
- A ATEX approval Zone 0: Ex II 1 G Ex ia IIC T1-T6 Ga
- 2 ATEX rating Zone 2: Ex II 3 G Ex nA IIC T1-T6 Gc
- C CSA approvals USA-Canada Class I, Div. 1, Gr., A, B, C, D

### Pressure Design Compliance

- NN No design compliance selected
- BC PED to module B+C1 [Europe]
- CR CRN (All Provinces except AB) [Canada]

### Mass Flow Calibration Selection

See performance page for code options

### Density Calibration Selection

- D 1% Accuracy (std.)
- S 0.5% Accuracy

RHM160 

	P1	PFO							N		
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### Options

<b>H1</b>	Hot oil/steam heating matrix for housing, DN25 PN40
<b>H2</b>	Hot oil/steam heating matrix for housing, 1" ANSI 150 RF
<b>H3</b>	Hot oil/steam heating matrix for housing, 1" ANSI 300 RF
<b>P2</b>	Housing purge for dry gas – ½" NPT (2 pcs)

<b>SH</b>	Housing in 316Ti stainless steel
<b>DY</b>	Dye penetrant inspection
<b>XR</b>	X-ray test
<b>O</b>	Oil/grease free cleaning

### Weights and Shipping Dimensions

Typical weight with 12" 150# flanges: approx. 770 kg (1698 lb).

RHM160 meters ship in a wooden crate (to ISPM 15). Typical dimensions approx. 240 x 190 x 120 cm (95 x 75 x 47 in).

Typical gross shipping weight example: RHM160 with 4" 150# flanges c/w RHE08 transmitter approx. 1150 kg (2535 lb).