



## RHM60

### Coriolis Mass Flow Meter with Uncompromising Performance

#### Features

- Standard pressure ratings up to 490 bar (7107 psi)
- Temperature ratings from -196 to 350°C (-320 to 662°F)
- Mass flow uncertainty down to 0.15%
- Density uncertainty down to 0.5%
- Repeatability better than 0.05%
- Typical measuring ranges between 60 and 3000 kg/min
- Accurately measure low flow rates down to 45 kg/min
- Unique robust torsion driven oscillation system
- Process connection customization available
- Approved for use in hazardous areas
- Stainless steel case
- Remote and compact transmitter versions available

#### Applications

Typical applications include:

- Plant Balance
- Terminal Transfer
- Asphalt/Bitumen and Other High Temperature Fluids
- Viscous Fluids
- Reactor Charging
- Batching
- Barge, Ship, Rail Car and Truck Filling

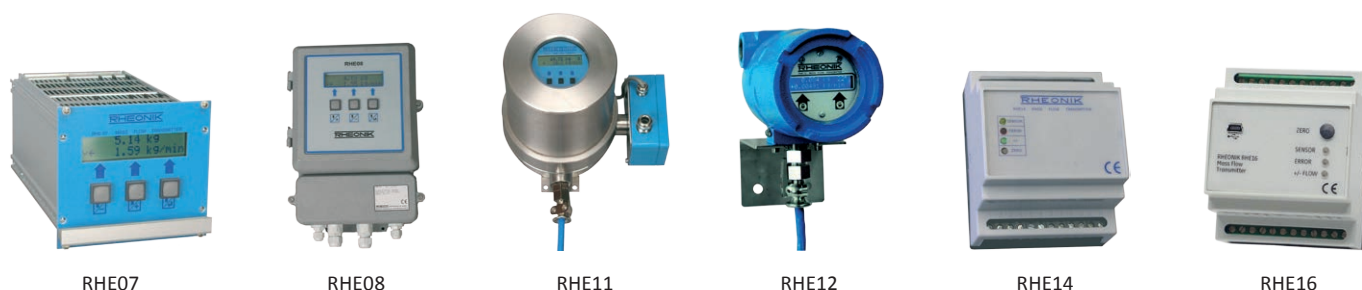
#### Benefits

- 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

## RHM60 General Specifications

<b>Nominal Max Flow Range:</b>	3000 kg/min (6613.9 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>	5 temperature range options cover temperatures from -196°C to 350°C (-320°F to 662°F)
<b>Pressure Ratings:</b>	Dependent upon material
<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 µin, 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 A1 or Module B + C1 (as required by application)
<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
<b>Options:</b>	Enclosure heating matrix for high temperature applications

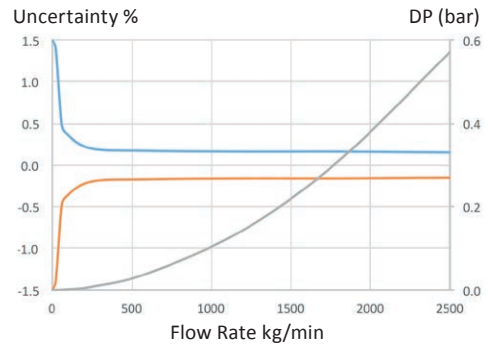
## Transmitter Range



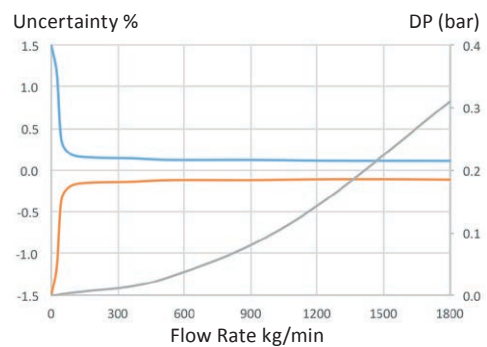
Any Rheonik Mass Flow Transmitter model can be combined with an RHM60 sensor to provide an overall mass flow measurement system to suit any requirement. Rheonik Coriolis transmitters are designed for process, industrial and OEM applications. Together they offer a tremendous range of options for system designers and end users alike.

## RHM60 Measurement Performance

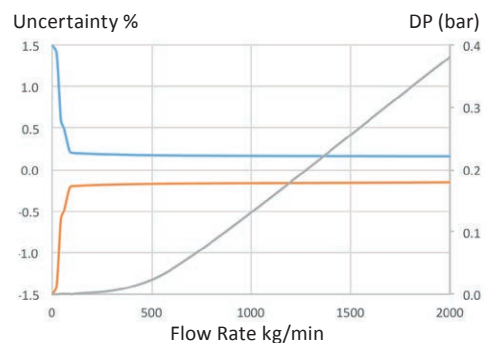
Standard Calibration		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
3000*	6614	0.20
1000	2205	0.20
300	661	0.20
100	220	0.20
60	132	0.50



Goldline Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
1800	3968	0.15
1000	2205	0.15
500	1102	0.15
300	661	0.15
180	397	0.15



Low Flow Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
2000	4409	0.20
1000	2205	0.20
100	220	0.20
60	132	0.50
45	99	0.60



\*Highest calibration point in factory is at 2000 kg/min (4409 lb/min).

Stated uncertainty is guaranteed up to 2500 kg/min (5512 lb/min).

\*\*Goldline and Low Flow Calibration is not available with all configurations of the RHM60. Please check with factory.

Mass Flow Calibration Options	
<b>A</b>	50:1 Standard Calibration – 0.5% Uncertainty between 2500 and 60 kg/min
<b>B</b>	20:1 Standard Calibration – 0.2% Uncertainty between 2500 and 100 kg/min
<b>G</b>	10:1 Goldline Calibration – 0.15% Uncertainty between 1800 and 180 kg/min
<b>Z</b>	Low Flow Calibration – 0.2% Uncertainty between 2000 and 100 kg/min, 0.5% between 100 and 60 kg/min, 0.6% between 60 and 45 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

## RHM60 Pressure Ratings

The maximum pressure ( $P_{max}$ ) of a sensor is determined by its lowest rated part. The lowest rated part is either the measuring tube ( $P_{max}$  indicated below) or the process connection (for  $P_{max}$  see published standards or manufacturer information).

## RHM60 Measurement Tube Pressure Ratings

Pressure Code	Material Code	Material	$P_{max}$				
			bar	psi	@	°C	°F
P1 (std.)	M1 (std.)	1.4571 (316Ti) UNS S31635	104	1508	@	50	122
			93	1349	@	120	248
			80	1160	@	210	410
			67	972	@	350	662
P1	M3	2.4602 (Alloy C22) UNS N06022	138	2002	@	50	122
			122	1769	@	120	248
			104	1508	@	210	410
			86	1247	@	350	662
P1	62*	1.4462 (Duplex) UNS S31803	188	2727	@	50	122
			165	2393	@	120	248
			144	2089	@	210	410
			206	2988	@	50	122
P2	M1 (std.)	1.4571 (316Ti) UNS S31635	184	2669	@	120	248
			159	2306	@	210	410
			134	1944	@	350	662
P1	10*	1.4410 (Super Duplex) UNS S32750	236	3423	@	50	122
			207	3002	@	120	248
			187	2712	@	210	410
P2	62*	1.4462 (Duplex) UNS S31803	270	3916	@	50	122
			237	3437	@	120	248
			207	3002	@	210	410
			283	4105	@	50	122
P3	M3*	2.4602 (Alloy C22) UNS N06022	250	3626	@	120	248
			214	3104	@	210	410
			178	2582	@	350	662
P2	10*	1.4410 (Super Duplex) UNS S32750	490	7107	@	50	122
			430	6237	@	120	248
			389	5642	@	210	410

\*Only with T1, TA, T2 temperature range (note min. temp. is -40°C)

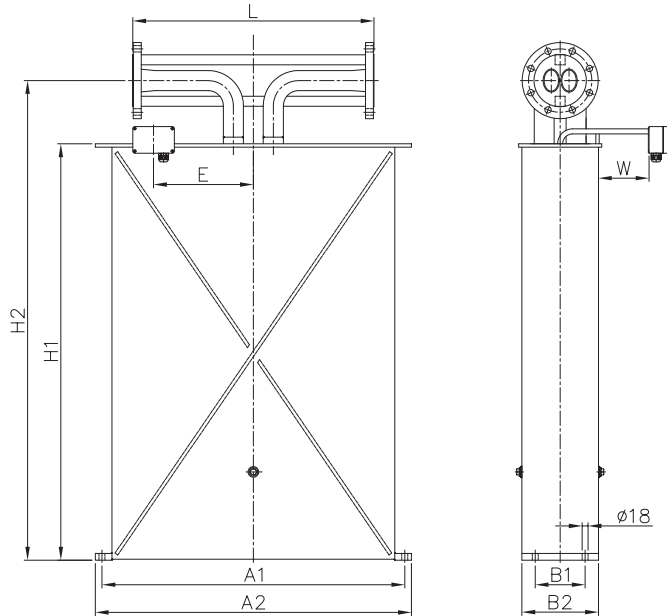
## Other Materials

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.

## RHM60 Mechanical Construction

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



Process Connection	Face to face length (L)		Order Code
	mm	in	
ANSI 4" 150# RF	725	28.54	F1
ANSI 4" 300# RF	725	28.54	F2
ANSI 4" 600# RF*	725	28.54	F3
ANSI 6" 1500# RF	900	35.43	AA
ANSI 4" 900# RTJ	900	35.43	R0
ANSI 4" 1500 RTJ	900	35.43	R2
ANSI 4" 2500 RTJ	900	35.43	R3
ANSI 6" 300# RTJ	900	35.43	R5
DIN DN100/PN16	725	28.54	D4
DIN DN100/PN40	725	28.54	C1
DIN DN100/PN100*	725	28.54	C2

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 = 910 mm (35.83 in)    A2 = 950 mm (37.40 in)    B1 = 150 mm (5.91 in)    B2 = 230 mm (9.06 in)    H1 = 1253 mm (49.33 in)    H2 = 1443 mm (56.81 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)

\*This flange selection will reduce maximum allowable measurement tube pressure rating by a factor of 0.73.

### Weights and Shipping Dimensions

Typical weight with 4" 150# flanges: approx. 140 kg (309 lb)

RHM60 meters ship in a wooden crate (to ISPM 15). Typical dimensions approx. 180 x 120 x 75 cm (71 x 48 x 30 in)

Typical gross shipping weight example: RHM60 with 4" 150# flanges c/w RHE08 transmitter approx. 310 kg (683 lb)

## RHM60 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)
- T2 -45°C to +210°C (-49 to +410°F)
- T3 -196°C to +50°C (-320 to +122°F)
- T4 0°C to +350°C (+32 to +662°F)

### P<sub>max</sub> of Measuring Loops (see pressure rating page)

- P1 P<sub>max</sub> depends upon material
- P2 P<sub>max</sub> depends upon material

### Material of Wetted Parts

- M1 1.4571 (316Ti)
- M3 2.4602 (Alloy C22)
- 62 1.4462 (Duplex)
- 10 1.4410 (Super Duplex)

### Process Connection

See mechanical construction 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
- A1 PED to module A1 [Europe]
- BC PED to module B+C1 [Europe]
- CA CRN (Alberta Province) [Canada]
- CR CRN (All other Provinces) [Canada]

### Mass Flow Calibration Selection

See performance page for code options

### Density Calibration Selection

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

RHM60 

			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