



RHM40

Coriolis Mass Flow Meter for Demanding Applications

Features

- Standard pressure ratings up to 433 bar (6280 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 1500 and 15 kg/min
- Accurately measure low flow rates down to 12.5 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:

- General Flow Control
- Plant Balance
- Terminal Transfer
- High Temperature Fluids
- Viscous Fluids
- Mixing, Blending, Batching
- Barge, Ship, Rail Car and Truck Filling

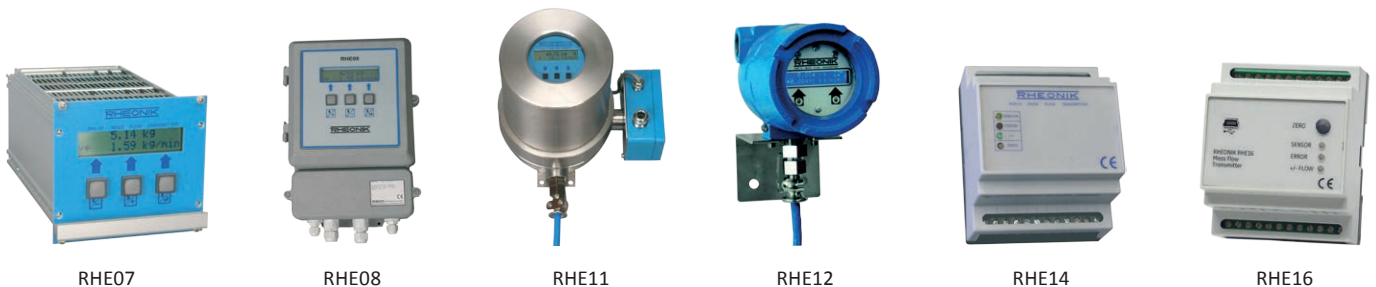
Benefits

- 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

RHM40 General Specifications

Nominal Max Flow Range:	Parallel/dual path measurement tube versions: 1500 kg/min (3306.9 lb/min) Serial/single path measurement tube versions: 750 kg/min (1653.5 lb/min)
Density Range:	5 to 5000 kg/m ³ (0.31 to 312 lb/ft ³)
Temperature Range:	5 temperature range options cover temperatures from -196°C to 350°C (-320°F to 662°F)
Pressure Ratings:	Dependent upon material
Electrical Connection:	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
Sensor Housing Materials:	1.4301 / 304 stainless steel (standard), 1.4571 / 316Ti stainless steel (optional) Epoxy coated aluminium electrical box (standard), 1.4571 / 316Ti stainless steel (optional)
Enclosure Type:	Protection Class IP 65. Optional IP 66 / NEMA 4X
Material of Wetted Parts:	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
Finishes:	ANSI flange finish: AARH 125 to 250 µin, Ra 3.2 to 6.3 µm
Certifications and Approvals:	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)
Documentation:	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
Proof Testing:	Hydrotest, dye penetrant, x-ray, PMI
Options:	Enclosure heating matrix for high temperature applications

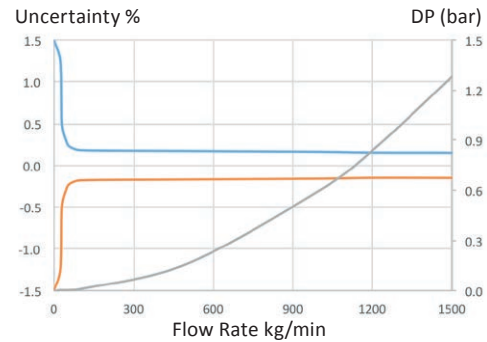
Transmitter Range



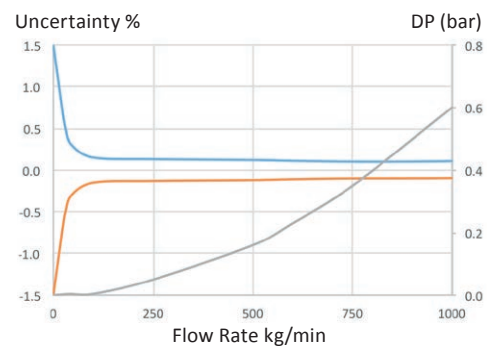
Any Rheonik Mass Flow Transmitter model can be combined with an RHM40 sensor to provide an overall mass flow measurement system to suit any requirement. Rheonik Coriolis transmitters are designed for process, industrial and OEM applications. Together they offer a tremendous range of options for system designers and end users alike.

RHM40 Measurement Performance

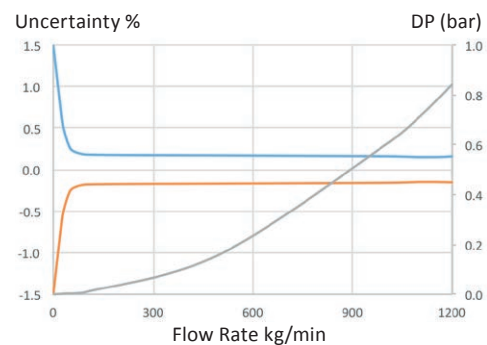
Standard Calibration		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
1500	3307	0.20
1200	2646	0.20
600	1323	0.20
60	132	0.20
30	66	0.50



Goldline Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
1000	2205	0.15
600	1323	0.15
400	882	0.15
200	441	0.15
100	220	0.15



Low Flow Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
1200	2646	0.20
600	1323	0.20
60	132	0.20
30	66	0.50
25	55	0.60



*Goldline and Low Flow Calibration is not available with all configurations of the RHM40. Please check with factory.

Mass Flow Calibration Options	
A	50:1 Standard Calibration – 0.5% Uncertainty between 1500 and 30 kg/min
B	20:1 Standard Calibration – 0.2% Uncertainty between 1200 and 60 kg/min
G	10:1 Goldline Calibration – 0.15% Uncertainty between 1000 and 100 kg/min
Z	Low Flow Calibration – 0.2% Uncertainty between 1200 and 60 kg/min, 0.5% between 60 and 30 kg/min, 0.6% between 30 and 25 kg/min

- *Uncertainty of reading (incl. zero drift) stated at reference condition of: H₂O, 18-24°C (66-76°F), 1-3 bar (15-45 psi) when installed according to field manual*
- *Pressure drop indications are based upon H₂O flowing in a meter with P1 pressure rating and parallel measuring tubes*
- *Serial path versions offer the same accuracy performance at half the flow (Nominal max. flow range of serial versions = 750 kg/min). Pressure drop will be greater*
- *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

RHM40 Pressure Ratings

The maximum pressure (P_{max}) of a sensor is determined by its lowest rated part. The lowest rated part can be either the measuring tube (P_{max} indicated below), the construction type (P_{max} indicated in the Part Number Code section, last page) or the process connection (for P_{max} see published standards or manufacturer information).

RHM40 Measurement Tube Pressure Ratings

Pressure Code	Material Code	Material	P_{max}				
			bar	psi		°C	°F
P1 (std.)	M1 (std.)	1.4571 (316Ti) UNS S31635	164	2379	@	50	122
			147	2132	@	120	248
			127	1842	@	210	410
			107	1552	@	350	662
P1	M3	2.4602 (Alloy C22) UNS N06022	253	3669	@	50	122
			224	3249	@	120	248
			191	2770	@	210	410
			159	2306	@	350	662
P1	M4*	Tantalum UNS R05200	53	769	@	50	122
			41	595	@	120	248
			33	479	@	210	410
P1	10**	1.4410 (Super Duplex) UNS S32750	332	4815	@	50	122
			291	4221	@	120	248
			263	3814	@	210	410
P1	62**	1.4462 (Duplex) UNS S31803	265	3844	@	50	122
			232	3365	@	120	248
			203	2944	@	210	410
P2	M1 (std.)	1.4571 (316Ti) UNS S31635	257	3727	@	50	122
			230	3336	@	120	248
			199	2886	@	210	410
			167	2422	@	350	662
P2	10**	1.4410 (Super Duplex) UNS S32750	433	6280	@	50	122
			380	5511	@	120	248
			343	4975	@	210	410
P2	62**	1.4462 (Duplex) UNS S31803	346	5018	@	50	122
			303	4395	@	120	248
			265	3844	@	210	410

*Only with T1, TA, T2 temperature range (note max. operating temp. is 150°C) and PF0 construction type (max. ANSI 300/PN40).

**Only with T1, TA, T2 temperature range (note min. temp. is -40°C) and PF0 construction type.

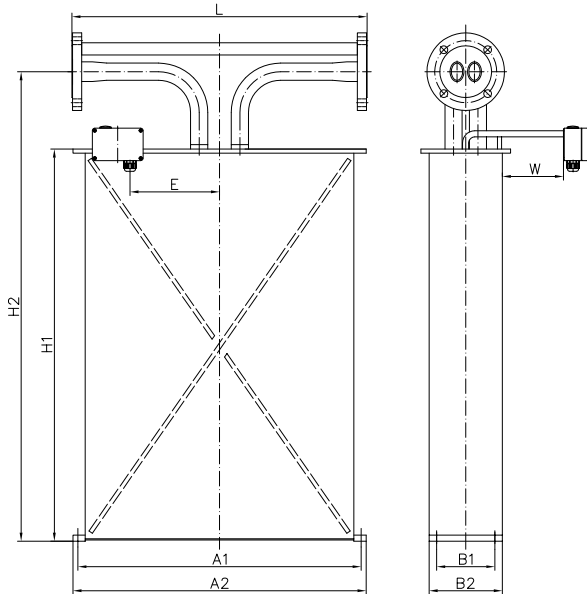
Other Materials

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.

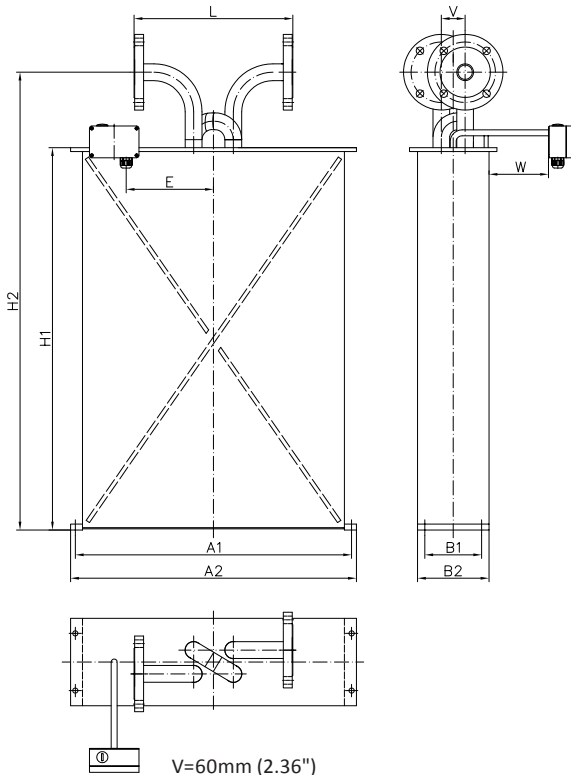
RHM40 Mechanical Construction

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



Process Connection	Face to face length (L)		Order Code
	mm	in	
ANSI 3" 150# RF	725	28.54	A1
ANSI 3" 300# RF	725	28.54	A2
ANSI 3" 600# RF	725	28.54	A3
ANSI 4" 150# RF	725	28.54	A8
ANSI 3" 900# RTJ	725	28.54	A6
ANSI 3" 1500# RTJ	725	28.54	A5
ANSI 3" 2500# RTJ	725	28.54	R3
ANSI 4" 900# RTJ	725	28.54	R4
ANSI 4" 1500# RTJ	725	28.54	R5
DIN DN80/PN16	725	28.54	D3
DIN DN80/PN40	725	28.54	D1
DIN DN80/PN100	725	28.54	D2
DIN DN100/PN160	725	28.54	D6
DIN DN100/PN320	725	28.54	D9
JIS RF 10k 80A (3")	725	28.54	J1
JIS RF 20k 80A (3")	725	28.54	J2
Grayloc 4" GR34 Hub	725	28.54	H4

SFO: Seal-less serial measuring tube construction with flange connections*



Process Connection	Face to face length (L)		Order Code
	mm	in	
ANSI 2" 150# RF	400	15.75	A7
ANSI 2" 300# RF	400	15.75	A9
ANSI 3" 150# RF	400	15.75	A1
ANSI 3" 300# RF	400	15.75	A2
DIN DN50/PN40	400	15.75	D7
DIN DN80/PN16	400	15.75	D3
DIN DN80/PN40	400	15.75	D1
DIN DN80/PN100	400	15.75	D2
DIN DN80/PN160	400	15.75	D4
JIS RF 10k 80A (3")	400	15.75	J1
JIS RF 20k 80A (3")	400	15.75	J2
Sanitary 2" Triclamp, DIN 32676 (P _{max} = 17.2 bar (249.5 psi) @ 120°C (248°F))	400	15.75	S1
Sanitary NW50, DIN 11851 (P _{max} = 25 bar (363 psi) @ 120°C (248°F))	400	15.75	S2

The sensor is manufactured with two internal measurement tubes arranged side by side. In parallel or dual path sensors, these tubes are connected in parallel and the flowing fluid is split equally between them. In serial or single path sensors, the tubes are connected end to end creating a single path through which all fluid flows. 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.*

Weights and Shipping Dimensions

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

RHM40 meters ship in a wooden crate (to ISPM 15). Typical dimensions approx. 145 x 95 x 70 cm (57 x 37 x 28 in)

Typical gross shipping weight example: RHM40 with 150# flanges c/w RHE08 transmitter approx. 180 kg (397 lb)

Common Dimensions

A1 = 696 mm (27.40 in) A2 = 720 mm (28.35 in) B1 = 143 mm (5.63 in) B2 = 180 mm (7.09 in) H1 = 963 mm (37.91 in) H2 = 1153 mm (45.39 in)
E = 250 mm (9.84 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)

* SFO meters are constructed with offset inlet/outlet ports. Consideration should be given to the offset (dimension V) when planning installation.

RHM40 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_{max} of Measuring Loops (see pressure rating page)

- P1 P_{max} depends upon material (max flange rating Cl. 600 / PN100)
- P2 P_{max} depends upon material

Construction Type (P_{max} @ 120°C (248°F))

- PF0 Parallel path, seal-less
- SF0 Serial path, seal-less, pmax = 149 bar (2161 psi)

Material of Wetted Parts

- M1 1.4571 (316Ti) (std.)
- M3 2.4602 (Alloy C22), seal-less construction types only
- M4 Tantalum, PF0 construction type only, max. ANSI 300/PN40
- 62 1.4462 (Duplex), PF0 construction type only
- 10 1.4410 (Super Duplex), PF0 construction type only

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 specific design compliance required
- 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

RHM40 N

Options

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

SH	Housing in 316Ti stainless steel
DY	Dye penetrant inspection
XR	X-ray test (not available for M4 tantalum material)
O	Oil/grease free cleaning