

RHM015

Ultimate Performance Coriolis Mass Flow Meter for Critical Ultra Low Flow Applications

Features

- Standard pressure ratings up to 752 bar (10907 psi)
- Temperature ratings from -196 to 350°C (-320 to 662°F)
- Mass flow uncertainty down to 0.10%
- Repeatability better than 0.05%
- Typical measuring ranges between 0.004 kg/min and 0.6 kg/min
- Accurately measure low flow rates down to 1.5 g/min
- Unique robust torsion driven oscillation system
- Process connection customization available
- Ultra compact design with minimal footprint
- Approved for use in hazardous areas
- Stainless steel case
- Removable connection manifold version available for easy and efficient maintenance
- Remote and compact transmitter versions available

Applications

Typical applications include:

- General Flow Control
- Additive Dosing
- Mixing and Batching
- Chemical Injection
- Package and Container Filling

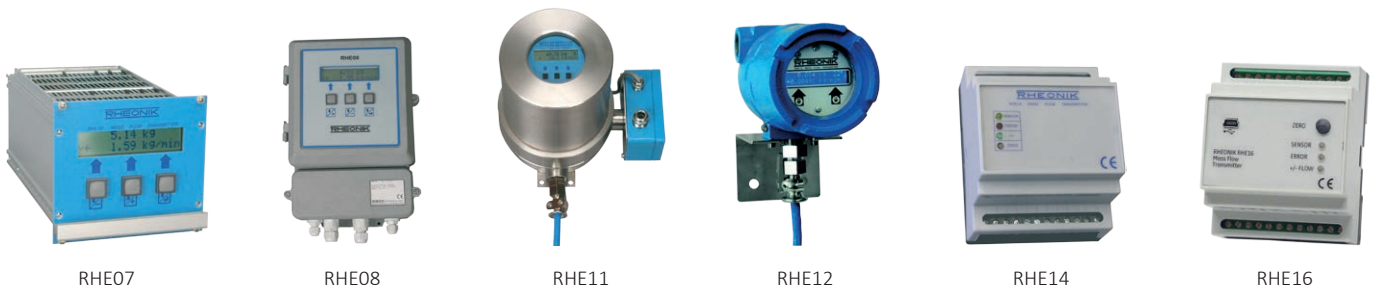
Benefits

- 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
- Long sensor life guaranteed due to low mechanical stresses in the meter mechanism
- No moving parts to wear or fail

RHM015 General Specifications

Nominal Max Flow Range:	Parallel/dual path measurement tube versions: 0.6 kg/min (1.323 lb/min) Serial/single path measurement tube versions: 0.3 kg/min (0.661 lb/min)
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 100m (330 ft)
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. IP 66 / NEMA 4X (optional)
Material of Wetted Parts:	Sensors are available in a variety of standard and custom materials to suit a wide range of pressure 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 Art.3 (3) Sound Engineering Practice (SEP)
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 housing for high temperature applications Mounting bracket

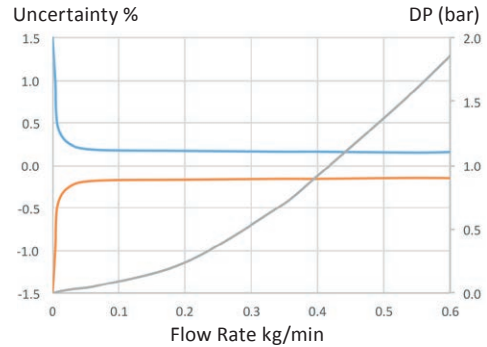
Transmitter Range



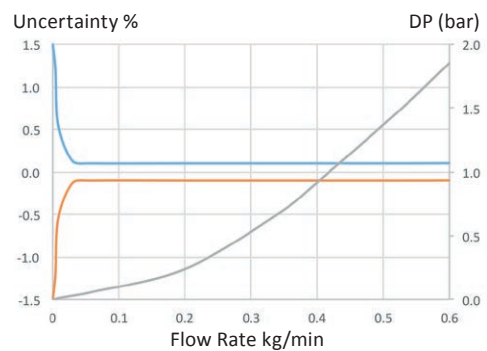
Any Rheonik Mass Flow Transmitter model can be combined with an RHM015 sensor to provide an overall mass flow measurement system to suit any requirement. Rheonik Coriolis transmitters are designed with versions for process, industrial and OEM applications. Together they offer a tremendous range of options for system designers and end users alike.

RHM015 Measurement Performance

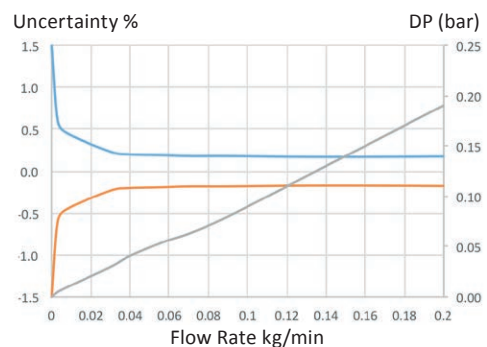
Standard Calibration		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
0.600	1.323	0.20
0.300	0.661	0.20
0.100	0.220	0.20
0.030	0.066	0.20
0.008	0.018	0.50



Goldline Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
0.600	1.323	0.10
0.300	0.661	0.10
0.100	0.220	0.10
0.060	0.132	0.10
0.030	0.066	0.12



Low Flow Calibration*		
Flow Rate		Uncertainty
kg/min	lb/min	in % of reading
0.160	0.353	0.20
0.100	0.220	0.20
0.050	0.110	0.20
0.008	0.018	0.20
0.003	0.007	0.60



*Goldline and Low Flow Calibration is not available with all configurations of the RHM015. Please check with factory.

Mass Flow Calibration Options	
A	75:1 Standard Calibration – 0.5% Uncertainty between 600 and 8 g/min
B	20:1 Standard Calibration – 0.2% Uncertainty between 600 and 30 g/min
C	1:20 Calibration – 0.2% Uncertainty between 8 and 160 g/min
G	20:1 Goldline Calibration – 0.12% Uncertainty between 600 and 30 g/min
P	10:1 Goldline Calibration – 0.10% Uncertainty between 600 and 60 g/min
1	Low Flow Calibration – 0.2% Uncertainty between 8 and 160 g/min, 0.6% between 3 and 8 g/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 PM0 (parallel measuring tubes with manifold block) construction*
- *Serial path versions offer the same accuracy performance at half the flow (Nominal max. flow range of serial versions = 300 g/min). Pressure drop will be greater*
- *For customized calibration range or uncertainty levels, please consult factory*

Flow Measurement Repeatability **Temperature**
 Standard ± 0.1% of rate Better than ± 1°C
 Goldline ± 0.05% of rate

RHM015 Pressure Ratings

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

RHM015 Measurement Tube Pressure Ratings

Pressure Code	Material Code	Material	P_{max}				
			bar	psi		°C	°F
P1 (std.)	M0 (std.)	1.4539 (904L) UNS N08904	362	5250	@	50	122
			300	4351	@	120	248
			250	3626	@	210	410
			200	2901	@	350	662
P1	M1*	1.4571 (316Ti) UNS S31635	332	4815	@	50	122
P1	M3	2.4602 (Alloy C22) UNS N06022	450	6527	@	50	122
			400	5802	@	120	248
			350	5076	@	210	410
			300	4351	@	350	662
P2	M0 (std.)	1.4539 (904L) UNS N08904	467	6773	@	50	122
			400	5802	@	120	248
			300	4351	@	210	410
			250	3626	@	350	662
P2	M4**	Tantalum UNS R05200	196	2843	@	50	122
			150	2176	@	120	248
			122	1769	@	210	410
P3	M0 (std.)	1.4539 (904L) UNS N08904	752	10907	@	50	122
			700	10153	@	120	248
			600	8702	@	210	410
			500	7252	@	350	662

*Only for T3 temperature rating.

**Only with T1, TA, T2 temperature rating, max. operating temp. 150°C, PFO, SFO construction types only, max. ANSI 600/PN100.

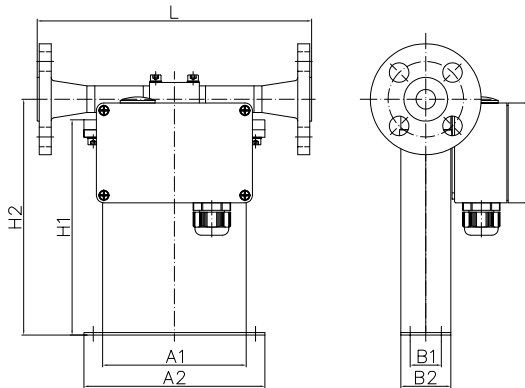
Other Materials

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.

RHM015 Mechanical Construction

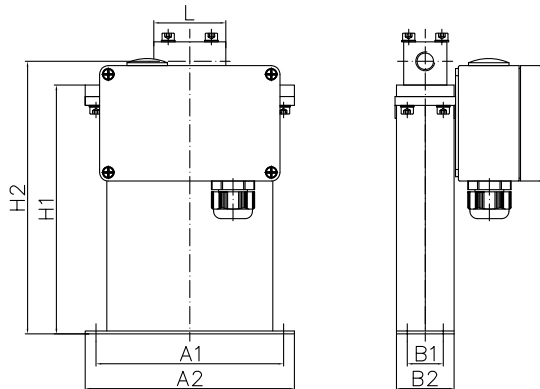
PM0/SM0: Serial or parallel measuring tubes with flange connection and removable manifold* with PTFE seals



H2 = 189 mm (7.44 in)

Process Connection	Face to face length (L)		Order Code
	mm	in	
ANSI ½" 150# RF	220	8.66	A1
ANSI ½" 300# RF	220	8.66	A2
ANSI ½" 600# RF	220	8.66	A3
ANSI ½" 1500# RF	300	11.81	A6
ANSI ½" 1500# RTJ	300	11.81	R1
DIN DN15/PN40	220	8.66	D1
DIN DN15/PN100	220	8.66	D2
DIN DN15/PN 160	220	8.66	D3
JIS RF 10k 15A (½")	220	8.66	J1
JIS RF 20k 15A (½")	220	8.66	J2

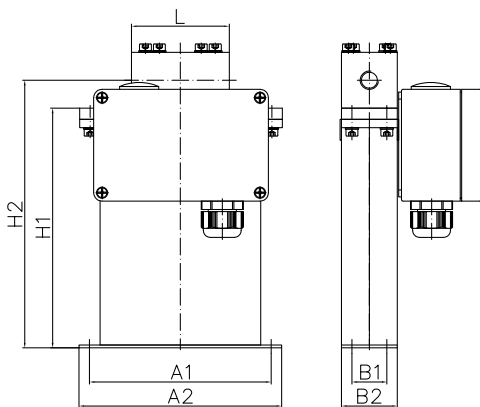
PM0/SM0: Serial or parallel measuring tubes with female thread connection and removable manifold* with PTFE seals



H2 = 189 mm (7.44 in)

Process Connection	Face to face length (L)		Order Code
	mm	in	
Female Thread G ¼"	50	1.97	G1
Female Thread ¼" NPT	50	1.97	N1

PH0/SH0: Serial or parallel measuring tubes with female thread connection and removable high pressure manifold* with PTFE seals



H2 = 204 mm (8.03 in)

Process Connection	Face to face length (L)		Order Code
	mm	in	
Female Thread G ¼"	70	2.76	G1
Female Thread ¼" NPT	70	2.76	N1
Autoclave ⅜" MP (⅜"-18 UNF female thread)	70	2.76	P2

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.*

Common Dimensions

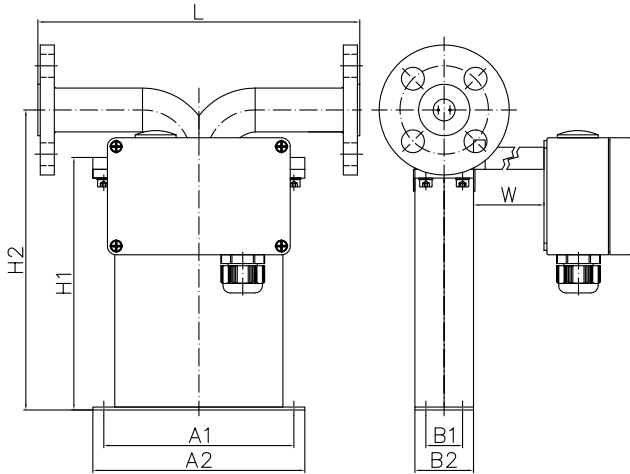
A1 = 130 mm (5.12 in) A2 = 145 mm (5.71 in) B1 = 25 mm (0.98 in) B2 = 40 mm (1.57 in) H1 = 173 mm (6.79 in)
 Electrical box**: std. = 125 x 80 x 58 mm (4.92 x 3.15 x 2.28 in), RHE16 compact = 120 x 120 x 80 mm (4.72 x 4.72 x 3.15 in)

*Manifold and process connection parts are manufactured from 1.4571 (316Ti) material – may differ from measuring tube material. Please check compatibility with process fluid.
 **No electrical box for temperature range T2. Meter is supplied with 2m PTFE integral cables. Accessory JB is available for connection of extension cables. RHE16 compact not available with temperature range T2.

For weights and packaging dimensions please see last page of the Mechanical Construction section.

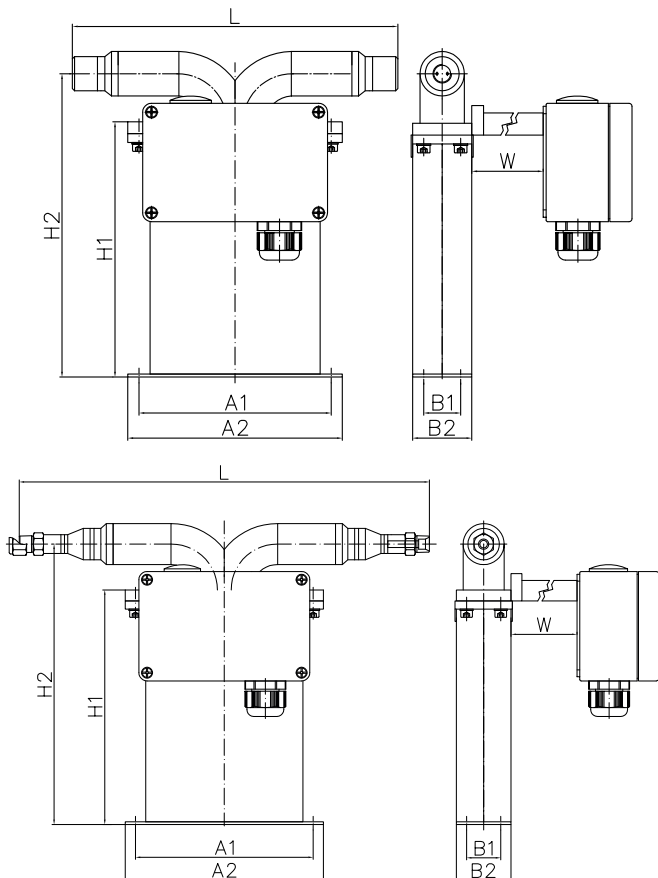
RHM015 Mechanical Construction

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



Process Connection	Face to face length (L)		Order Code
	mm	in	
ANSI ½" 150# RF	220	8.66	A1
ANSI ½" 300# RF	220	8.66	A2
ANSI ½" 600# RF	220	8.66	A3
ANSI ½" 1500# RF	300	11.81	A6
ANSI ½" 2500# RF	220	8.66	D3
ANSI ½" 1500# RTJ	300	11.81	R1
ANSI ½" 2500# RTJ	220	8.66	J1
DIN DN15/PN40	220	8.66	D1
DIN DN15/PN100	220	8.66	D2
DIN DN15/PN 160	300	11.81	A8
DIN DN25/PN 40	300	11.81	R2
JIS RF 10k 15A (½")	220	8.66	J2
JIS RF 20k 15A (½")	300	11.81	H3

PFT/SFT: Seal-less serial or parallel measuring tube construction with thread and compression fitting connections



Process Connection	Face to face length (L)		Order Code
	mm	in	
Female Thread G ¼"	220	8.66	G1
Female Thread ¼" NPT	220	8.66	N1
Swagelok ¼" tube compression fitting (SS-400-1-4W)	300	11.81	W1

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. 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.

Common Dimensions

A1 = 130 mm (5.12 in) A2 = 145 mm (5.71 in) B1 = 25 mm (0.98 in) B2 = 40 mm (1.57 in) H1 = 173 mm (6.79 in) H2 = 205 mm (8.07 in)

W: temp. range T1, TA = 0 mm (0 in), temp. range T4 = 100 mm (3.94 in)

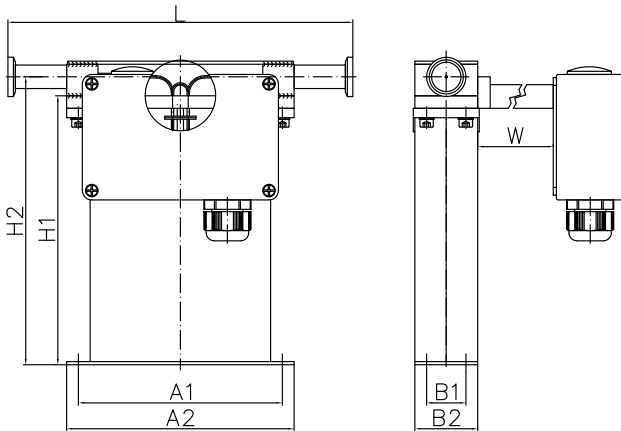
Electrical box*: std. = 125 x 80 x 58 mm (4.92 x 3.15 x 2.28 in), RHE16 compact = 120 x 120 x 80 mm (4.72 x 4.72 x 3.15 in)

* No electrical box for temperature range T2, T3. Meter is supplied with 2m PTFE integral cables. Accessory JB is available for connection of extension cables. RHE16 compact not available with temperature ranges T2 and T3.

For weights and packaging dimensions please see last page of the Mechanical Construction section.

RHM015 Mechanical Construction

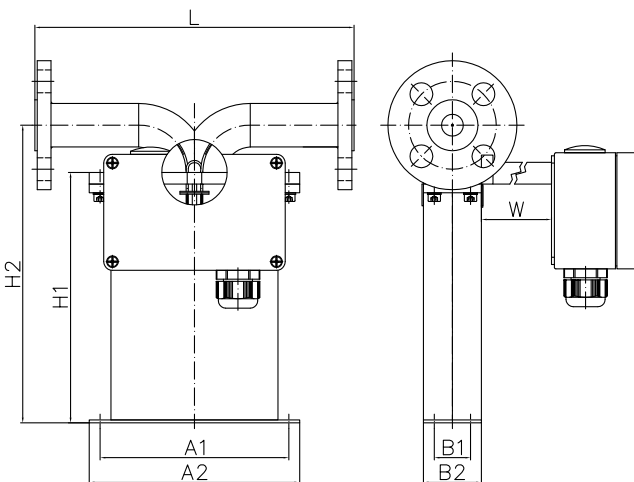
SFO: Seal-less serial measuring tube construction with sanitary connections



H2 = 184 mm (7.24 in)

Process Connection	Face to face length (L)		Order Code
	mm	in	
Sanitary ½" Triclamp, DIN 32676	220	8.66	S1*
Sanitary NW10, DIN 11851	220	8.66	S2*

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



H2 = 205 mm (8.07 in)

Process Connection	Face to face length (L)		Order Code
	mm	in	
ANSI ½" 150# RF	220	8.66	A1
ANSI ½" 300# RF	220	8.66	A2
ANSI ½" 600# RF	220	8.66	A3
ANSI ½" 1500# RF	300	11.81	A6
ANSI ½" 1500# RTJ	300	11.81	R1
DIN DN15/PN40	220	8.66	D1
DIN DN15/PN100	220	8.66	D2
DIN DN15/PN 160	220	8.66	D3
JIS RF 10k 15A (½")	220	8.66	J1
JIS RF 20k 15A (½")	220	8.66	J2

The sensor is manufactured with two internal measurement tubes arranged side by side. 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.

Common Dimensions

A1 = 130 mm (5.12 in) A2 = 145 mm (5.71 in) B1 = 25 mm (0.98 in) B2 = 40 mm (1.57 in) H1 = 173 mm (6.79 in)

W: temp. range T1, TA = 0 mm (0 in), temp. range T4 = 100 mm (3.94 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)

* No terminal box for temperature range T2, T3. Meter is supplied with 2m PTFE integral cables. Accessory JB is available for connection of extension cables. RHE16 compact not available with temperature ranges T2 and T3.

**P_{max} for sanitary fittings is 40 bar (580 psi) @120°C (248°F).

Weights and Shipping Dimensions

Typical weight for standard manifold construction (PM0/SM0) sensor with female threads: approx. 2.5 kg (5.5 lb).

Typical weight for standard seal-less construction (PF0/SFO) sensor with 150# flanges: approx. 3.5 kg (7.7 lb).

RHM015 sensors typically ship in a carton approx. 60 x 41 x 32 cm (24 x 16 x 13 in) complete with transmitter and cable.

Typical gross shipping weight example: RHM015 seal-less construction sensor with 150# flanges c/w RHE08 transmitter approx. 10 kg (22 lb).

RHM015 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
- P2 P_{max} depends upon material
- P3 700 bar (10153) @120°C (248°F) (M0 material)

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

- PM0 Parallel manifold, P_{max} = 400 bar (5800 psi) with thread, 214 bar (3104 psi) with flange
- SM0 Serial manifold, P_{max} = 400 bar (5800 psi) with thread, 214 bar (3104 psi) with flange
- PF0 Parallel path, seal-less
- SF0 Serial path, seal-less, P_{max} = 233 bar (3379 psi)
- PFT Parallel path, seal-less for thread connection, P_{max} = 530 bar (7687 psi)
- SFT Serial path, seal-less for thread connection, P_{max} = 233 bar (3379 psi)
- PH0 Serial path, HP manifold, P_{max} = 700 bar (10150 psi) with N1, P2 connections, 540 bar (7832 psi) with G1 connections
- SH0 Parallel path, HP manifold, P_{max} = 700 bar (10150 psi) with N1, P2 connections, 540 bar (7832 psi) with G1 connections

Material of Wetted Parts

- M0 Measuring tubes 1.4539 (904L), manifold/connection 1.4571 (316Ti) (std.)
- M1 1.4571 (316Ti)
- M3 2.4602 (Alloy C22), seal-less construction types only
- M4 Tantalum, PF0/SF0 construction types only, max. ANSI 600/PN100

Process Connection

See mechanical construction pages for available connections and codes

Options Codes

See options listing for specific codes

Terminal Box Selection

- 9 Remote transmitter cable termination box (std.)
- C Compact mount RHE16 transmitter enclosure

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
- SE PED (SEP) [Europe]
- CA CRN (Alberta Province) [Canada]
- CR CRN (All other Provinces) [Canada]

Mass Flow Calibration Selection

See performance page for code options

RHM015 N N

Options

H1	Hot oil/steam heating for housing, DN15 PN40
H2	Hot oil/steam heating for housing, ½" ANSI 150 RF
H3	Hot oil/steam heating for housing, ½" ANSI 300 RF
HF	Hot oil/steam trace heating for flange
M	Mounting bracket – PM0/SM0 construction types
MF	Mounting bracket – PF0/SF0 and PFT/SFT construction types
P2	Housing purge for dry gas – ¼" NPT (2 pcs)

SH	Housing in 316Ti stainless steel
WH	Fully welded/sealed housing
DY	Dye penetrant inspection
XR	X-ray test – PFT, PM0 (flange), SM0 (flange) types only
O	Oil/grease free cleaning
ARHE-IT-T	Epoxy coated aluminium interconnection terminal box for sensor with teflon cables