

RHEONIK



THE WORLD'S MOST VERSATILE RANGE OF

CORIOLIS FLOWMETERS



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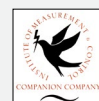
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1. ADHESIVES

No moving parts to be plugged or fouled

2. BITUMEN

Rheonik meters operate at continuous high temperature while providing high accuracy measurement

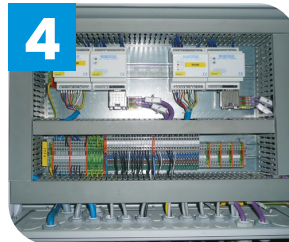


3. CUSTODY TRANSFER

Inherent high accuracy is a key requirement for CT

4. EMBEDDED SYSTEMS

The small footprint of Rheonik embedded rail mount transmitters and in line sensors are a favourite solution for OEM's



5. ELECTROLYTE FILLING

Rheonik meters are used in precision manufacturing of e-car batteries

6. PROCESS FEED

Rheonik Mass flow meters are perfect for batching and continuous feed processes

7. HYDROGEN FUELING

Rheonik are the world leader in high pressure meters for Hydrogen dispensing



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8. LEAK DETECTION

Mission critical systems like LD count upon the reliability of Rheonik Coriolis meters

9. TERMINALING

The dependable flow measurement from Rheonik flow meters leads to successful and reliable product movements in terminal complexes

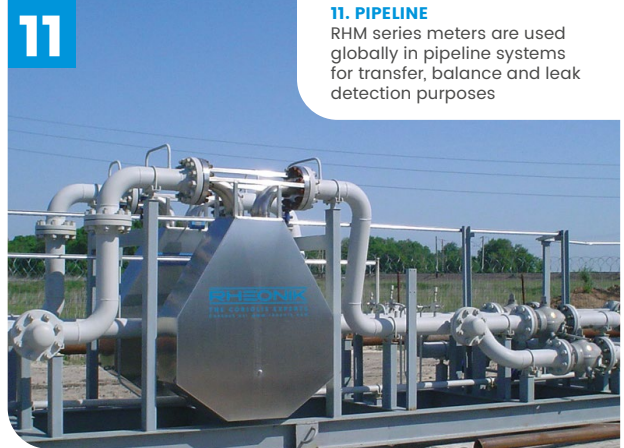


10. OFFSHORE

Rheonik meters are rugged and built with materials necessary for offshore use

12. ONSHORE OIL PRODUCTION

Coriolis meters are ideal for measuring well production flows and oil and water streams from test separators in the field



11. PIPELINE

RHM series meters are used globally in pipeline systems for transfer, balance and leak detection purposes

13. OILFIELD SERVICES

Rheonik high pressure meters provide close-to-the-well flow measurement with high turndown capability and fluid independence for the utmost in deployment flexibility



RHEONIK IN GLOBAL INDUSTRY

On this page are just a few examples of Rheonik meter installations from around the world. Rheonik meters are used every day in just about every industry globally, providing real time input into process and measurement systems.

Reliability is key – Rheonik Coriolis meters have no moving parts to wear or plug and are suited to both gas and liquid streams. The ability to work across a wide range of flow rates and process conditions dramatically lowers installation and operation costs.

Safety is built in to all systems. Low power usage makes all Rheonik meters intrinsically safe and all meters are proof tested to 1.5x their maximum operating pressure before shipment.

With highly accurate measurement performance and high pressure capabilities, Rheonik meters are a natural choice for so many applications and quickly provide payback through improved product quality and greatly reduced maintenance.

Whether used for transfer, batching, process feed or control, Rheonik meters can provide online flow and density measurement. Like all of our customers, you can be assured of a value-for-money flow measurement solution from Rheonik for every application.



14. FUEL FEED

Rheonik meters are found in ships, turbine sets, jet engine test stands, internal combustion engine test cells and dynamometers worldwide

15. POLYURETHANE PRODUCTION

Accurate measurement performance and high pressure capability of Rheonik meters make them a natural choice for any polyurethane production application



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RHEONIK OMEGA

MEASUREMENT TUBES

The part of the meter where the actual measurement with the pick-up coils is done. The measurement section is half round to cope with highest pressures – without tendency for deformation. It is also far away from the process connection where disturbances may come from.

- > **Semi-circle for pressure independence**
- > **Decoupled from potentially noisy process**

MEASUREMENT TUBES

MASS BAR

Provides great stability and support to the measurement tube oscillation just like the pendulum of a clock. For applications where Coriolis meters are to be installed in close proximity, the mass weight is adjusted on each one to suppress any localized cross-talk interference issues.

- > **Assurance of best possible oscillation**
- > **Easy variation to address cross talk issues**

MASS BAR

TORSION RODS

Help energize and guide the oscillation – the heart of the Rheonik meter mechanism. As the mass bars are driven and rotate, energy is loaded to and unloaded from the torsion rods to provide smooth and bump-free motion on the meter tubes. The torsion rods dramatically reduce energy loss and assure good operation even at harsh flow conditions.

- > **Ensures most stable oscillation / best signal to noise ratio**
- > **Works in concert with mass bar for a bump-free oscillation**

IN & OUTLET PIPING

IN & OUTLET PIPING

Decouples measurement tubes from process line stress and misalignment. While not a substitute for proper installation technique, this helps when meters are occasionally faced with real-world installation conditions.

- > **Decouples measurement from process piping**
- > **Dampens noise from process**

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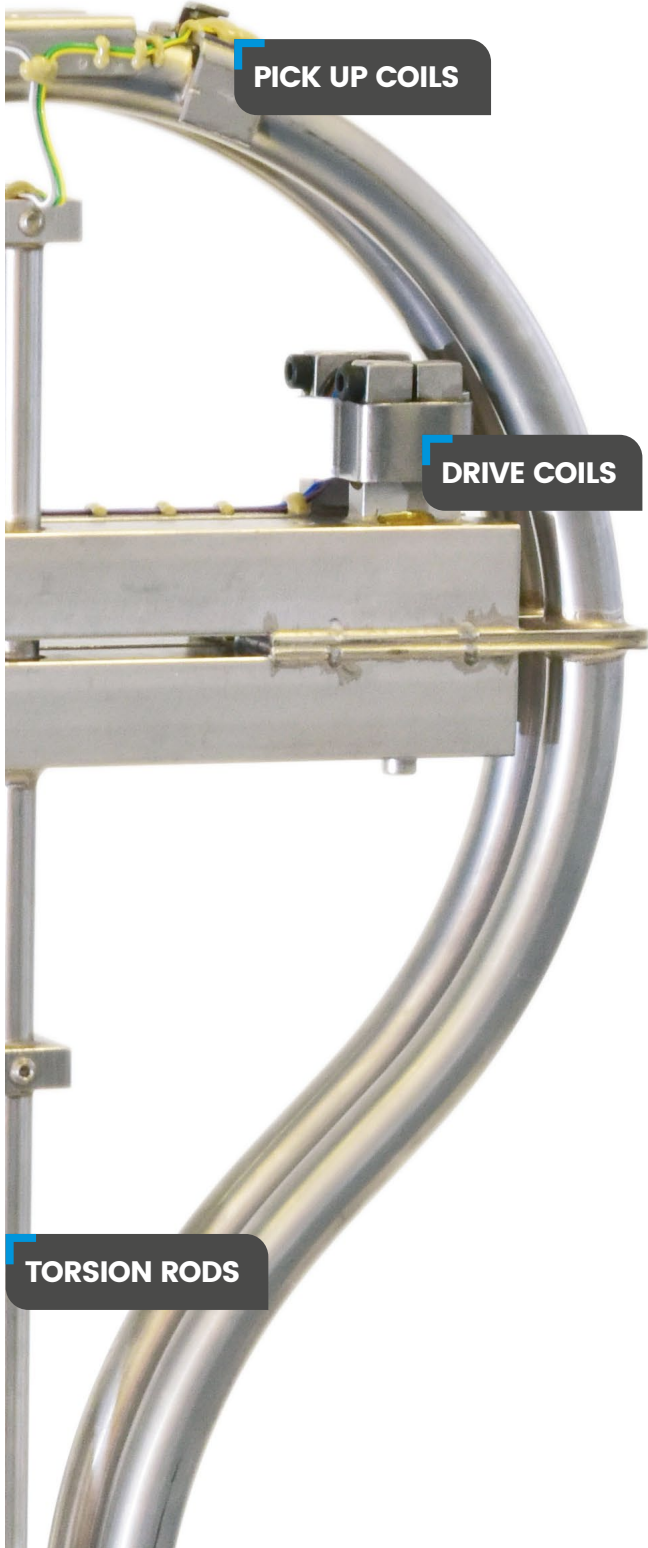
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TECHNOLOGY



PICK UP COILS

DRIVE COILS

TORSION RODS

TWO DRIVE COILS

Start and maintain a strong and uniform oscillation. Two drive coils, PID controlled, keep the oscillation going even at harsh dampening conditions such as air bubbles in liquid or very viscous materials.

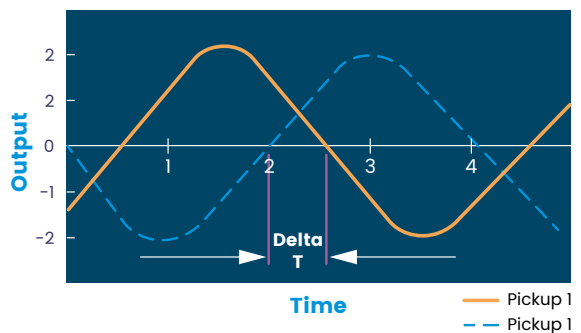
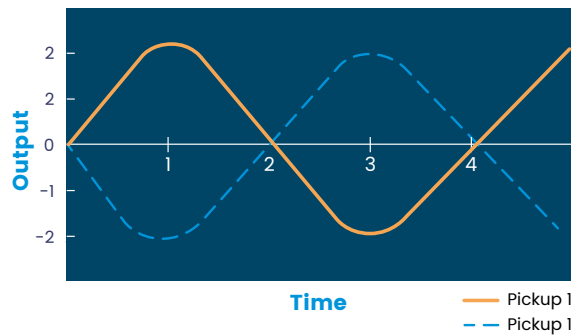
- > Symmetrical drive even at harsh conditions
- > Two coils instead of one for more power

TWO PICK UP COILS

Provide a sinusoidal feedback. When there is no flow, the waveforms are 180 degrees out of phase. When there is flow, Coriolis forces bend and deflects the tubes and the wave forms change their relative position to each other (a time difference) – the more flow the more time difference.

- > Precisely positioned around the center of oscillation
- > 180 degree out of phase for best electronic detection

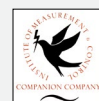
WAVEFORMS AT ZERO FLOW:



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METER RANGE OVERVIEW

Full scale meters up to 30000 kg/min (66140 lbs/min)

RHM60 TO RHM160

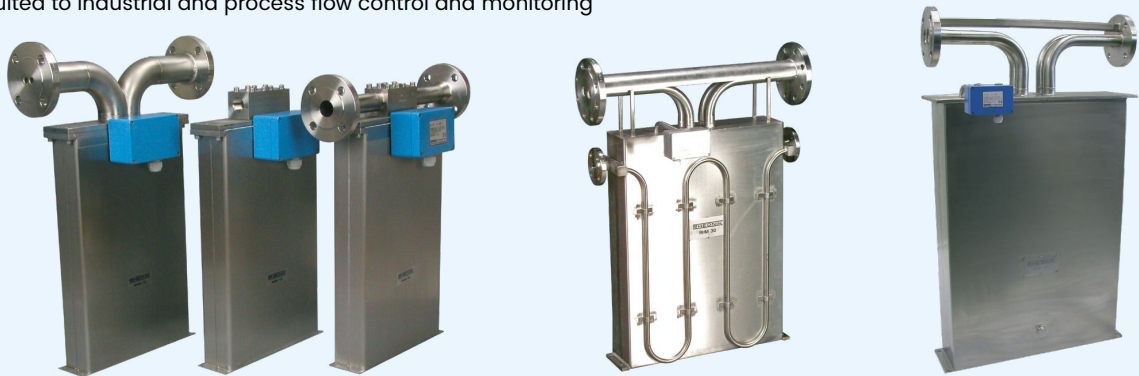
- 4" to 12" line sizes
- Perfect for material movements in small and wide scale operations



Mid range meters up to 1500 kg/min (3400 lbs/min)

RHM12 TO RHM40

- 1" to 3" line sizes
- Suited to industrial and process flow control and monitoring



Small sizes up to 50 kg/min (110 lbs/min)

RHM015 TO RHM08

- ¼" to 1" line sizes
- Small footprint - ideal for embedded systems and precise small flow applications



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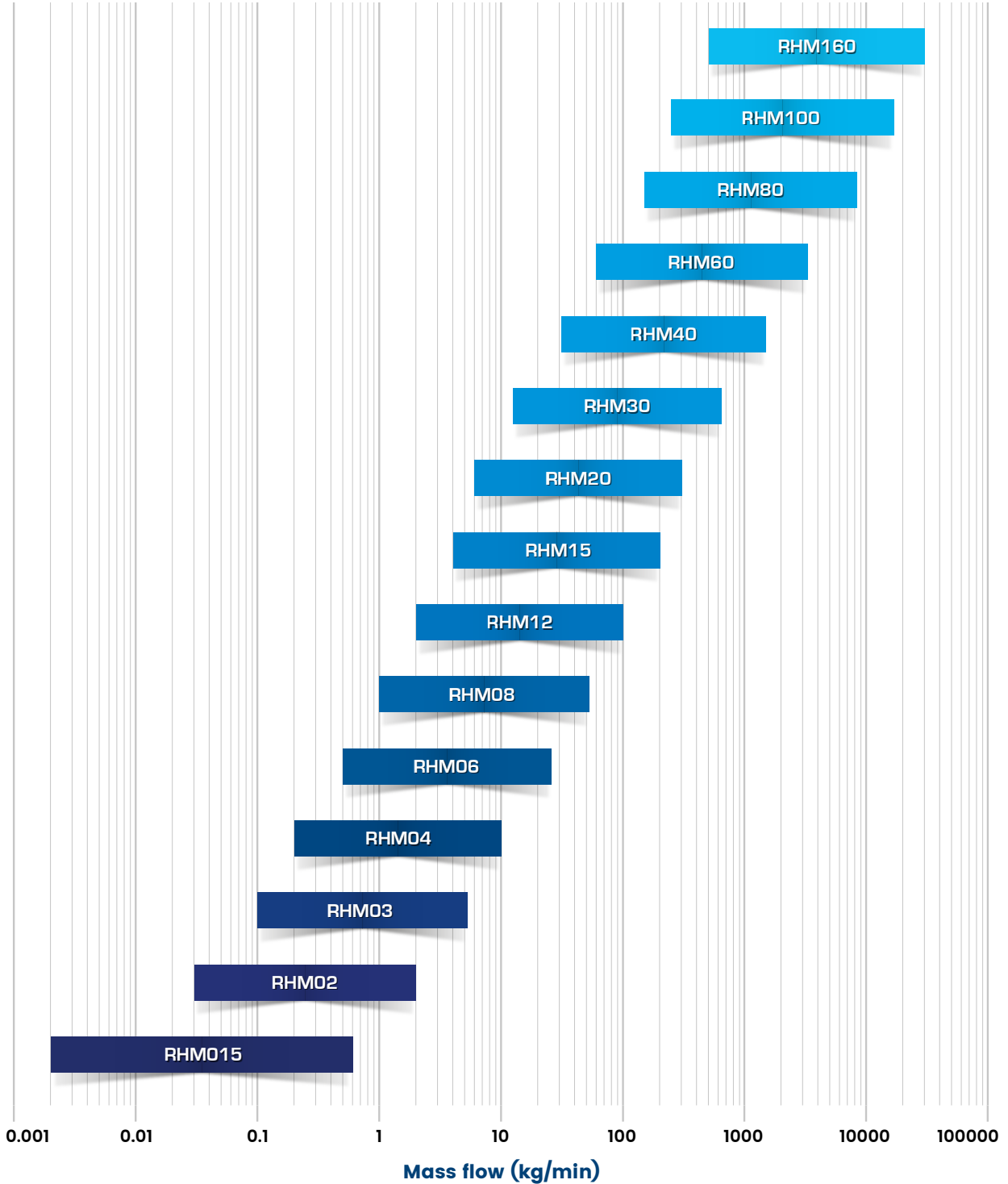
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FLOW RANGE

The Rheonik Omega tube Coriolis sensor range is carefully designed to provide complete coverage of mass flow rates from a few grams up to 30 tonnes per minute. Whatever the required flow range, Rheonik can cover it.



Flow rate chart depicts flow ranges for liquid applications at typical/common process pressure ratings. Flow ranges for meters with higher pressure ratings may vary. Gas flow ranges will depend upon pressure.

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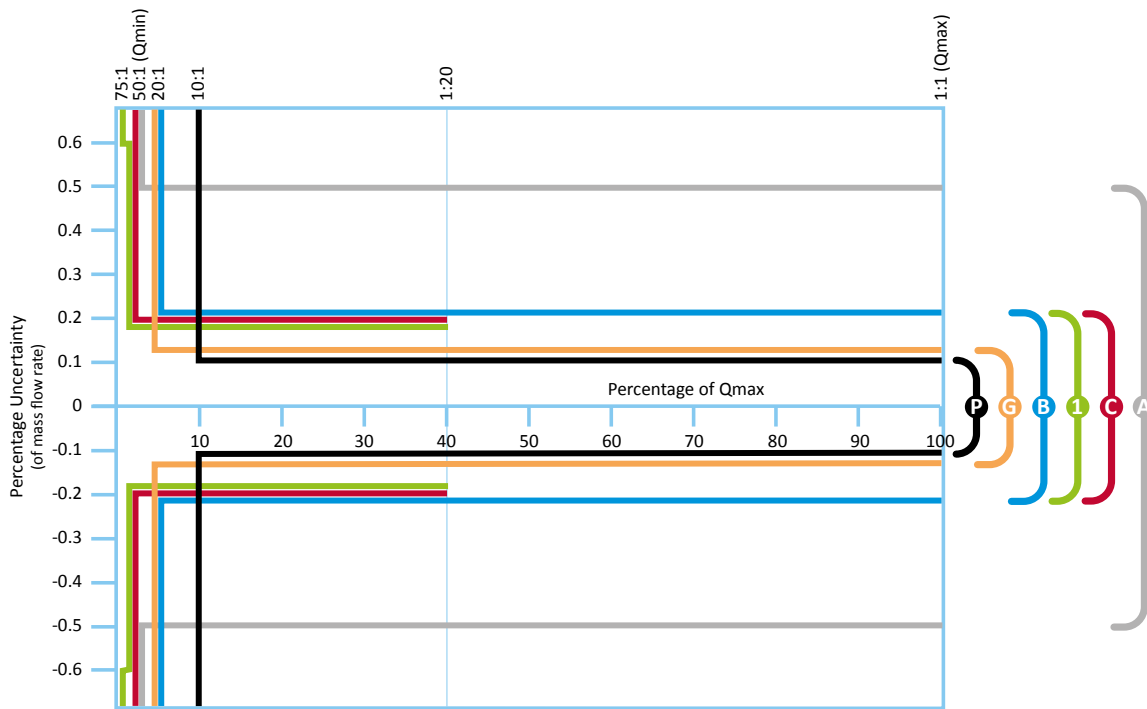
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UNCERTAINTY CHART



Only Rheonik offers a selection of calibration options to match application range for the best possible flow measurement performance. Select for wide turndown, higher accuracy or low flow optimized performance from the Rheonik calibration portfolio to maximize the value of your Rheonik Coriolis flow meter.

Mass Flow Calibration Options

A	Calibration optimized for wide flow range use – 0.5% uncertainty across a flow range of 50:1 from Qmax
B	Calibration optimized for higher flow rate use – 0.2% uncertainty across a flow range of 20:1 from Qmax
C	Low flow calibration – 0.2% uncertainty across a flow range of 1:20 from Qmin
G	Goldline higher accuracy calibration – 0.12% (0.15%)* uncertainty across a flow range of 20:1 from Qmax
P	Goldline high accuracy calibration – 0.10% (0.12%)* uncertainty across a flow range of 10:1 from Qmax
I	Low flow optimized calibration – 0.2% uncertainty across a flow range of 1:20 plus 0.6% uncertainty across a flow range of 2.5:1 around Qmin

Uncertainties stated are percentage of reading.

Some meter models will have slightly different turndown ranges – see specific model literature for details.

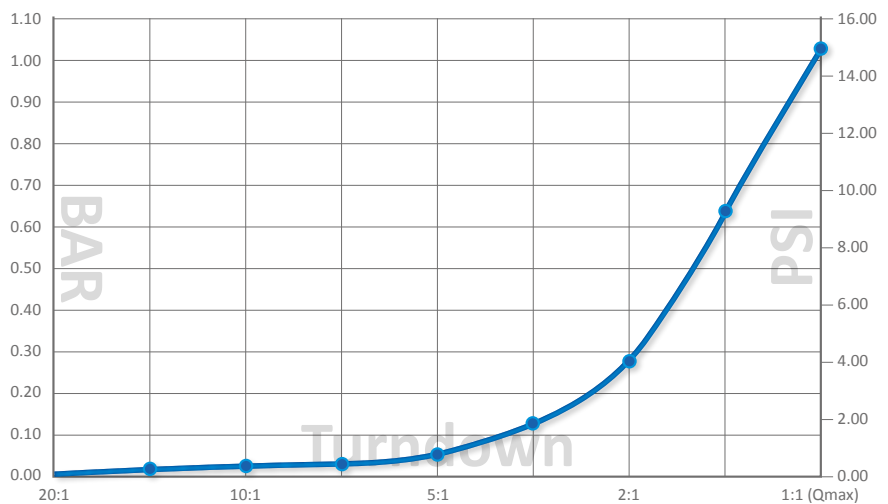
Uncertainty chart is applicable to liquid applications only.

Uncertainties are worst case and stated as % of reading.

*Depending upon meter size.

PRESSURE DROP

This chart gives a general indication of expected pressure drop when measuring water flow across the full range of a meter with standard pressure rating stainless steel measuring tubes. Actual pressure drop in operation is determined by construction type, pressure rating of the sensor tubes and the application fluid characteristics. Contact Rheonik or your local agent for pressure drop information for your specific application conditions.



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FEATURES AND ADVANTAGES



High Pressure Capabilities

Only Rheonik can provide Coriolis meters for extreme applications

- Coriolis meter solutions with pressure ratings up to 1400 bar / 20000 psi
- Proof pressure testing up to 2100 bar / 30000 psi

No secondary pressure containment required



Understandable Calibration Statements

Meter performance at a glance – know what measurement accuracy will be across the working range straight away

- Range of calibration and precision options to suit actual range required
- Accuracy across calibrated range – no complicated calculations needed to understand uncertainty



Customized Solutions

One size does not fit all. While Rheonik's fully featured range of standard Coriolis flow sensors are suitable for a great many applications, specific site and process conditions can mean a special build is needed. All Rheonik meters can be custom engineered to suit individual application requirements for:

- Process connections
- Exotic materials
- Face to face dimensions
- Specialty adaptations



An Industry Workhorse

The torsional drive method of the Omega Tube Coriolis meter provides the most mechanically stable Coriolis flow meter platform on the market. Rheonik designs have been proven reliable for applications in difficult environments for over 30 years

- Resilient to external vibration
- Resistant to process borne noise
- Tolerant to aeration



Externally Sealable Hardware Lock

Prevent unauthorized changes and tampering of the meter setup quickly and easily with the hardware lock and a tamper proof seal.

- Front cover can only be opened if tamper proof seal is broken
- LED indication when hardware lock switch is on – no board level manipulation required
- Hardware lock prevents changes manually and through digital communications.



Advanced Diagnostics Capabilities Through Assurance Factor / View®

Know at a glance if the meter is working at optimum performance or not. Easily review plain language messages that give error and warning information

- Simple 0 – 100% performance factor uses multiple internal diagnostic measurements to give a single operational status value related to the actual application. Track and trend this value to validate performance over time
- “Traffic light” status – complete display changes colour when performance conditions change
- On screen messages give unique insight to measurement challenges as they occur



Wetted Materials

A key advantage of the Rheonik Omega Tube design is the ability to use one of a wide range of materials in the construction of each meter. Rheonik maintains a range of materials (see chart on next page) but can always include custom requirements in any meter

- Meets specific application requirements
- Corrosive and aggressive fluids
- Customizable solutions



Global and Local Certifications

RHM sensors and RHE transmitters meet a great many global and local regulatory requirements by design. A full range of third party certifications are maintained to show compliance and conformance

- Quality
- Hazardous Area
- Custody Transfer

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PROCESS CONNECTION

	ANSI FLANGE	DIN FLANGE	JIS FLANGE	GRAYLOC® HUB	FEMALE THREAD	SWAGelok® FITTING	SWAGelok® VCO THREAD	TRICLAMP	DIN 11851 SANITARY	MP AUTOCLAVE
RHM015	0.5"	DN15	15A	1" GR4	0.25"	0.25"	0.25"	0.5"	NW10	3/8"
RHM02	0.5"	DN15	15A	1" GR4	0.25"	0.25"	0.25"	0.5"	NW10	3/8"
RHM03	0.5"	DN15	15A	1" GR4	0.25"	0.25"	0.25"	0.5"	NW10	3/8"
RHM04	0.5"	DN15	15A	1" GR4	0.25"	0.25"	0.25"	0.5"	NW10	3/8"
RHM06	1"	DN25	15A	1" GR5	0.5"	0.5"	0.5"	0.5"	NW10	—
RHM08	1"	DN25	15A	1" GR5	0.5"	0.5"	0.5"	0.5"	NW10	9/16"
RHM12	1"	DN25	15A	1.5" GR11	0.75"	0.75"	—	0.75"	NW20	—
RHM15	1" / 1.5"	DN25 / 40	25 / 40A	2" GR14	0.75"	0.75"	—	0.75"	NW20	—
RHM20	1.5" / 2"	DN40 / 50	40 / 50A	2.5" GR20	1"	1"	—	1"	NW20	—
RHM30	2" / 3"	DN50 / 80	50 / 80A	4" GR31	—	—	—	1.5"	NW32	—
RHM40	3"	DN80	80A	—	—	—	—	2"	NW50	—
RHM60	4"	DN100	100A	—	—	—	—	—	—	—
RHM80	6"	DN150	150A	—	—	—	—	—	—	—
RHM100	8"	DN200	200A	—	—	—	—	—	—	—
RHM160	12"	DN300	300A	—	—	—	—	—	—	—

Table shows standard size/offering.
Customer specific process connections available on request.

MATERIAL AVAILABILITY

	1.4571 (316Ti) UNS S31635	1.4539 (904L) UNS N08904	Sandvik HPI60	2.4602 (Alloy C22) UNS N06022	1.4462 (Duplex) UNS S31803	1.4410 (Super Duplex) UNS S32750	Tantalum UNS R05200	2.4360 (Monel) UNS N04400	Custom Materials to Customer Specification
RHM015		●		●		●	●	●	●
RHM02		●		●		●	●	●	●
RHM03	●		●	●		●	●	●	●
RHM04	●	●	●	●		●	●	●	●
RHM06	●	●		●		●	●	●	●
RHM08	●	●	●	●		●	●	●	●
RHM12	●	●		●	●	●	●	●	●
RHM15	●	●		●	●	●	●	●	●
RHM20	●	●		●	●	●	●	●	●
RHM30	●	●		●	●	●	●	●	●
RHM40	●	●		●	●	●	●	●	●
RHM60	●			●	●	●	●	●	●
RHM80	●			●	●	●	●	●	●
RHM100	●	●		●	●	●	●	●	●
RHM160	●			●					●

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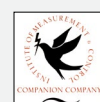
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TRANSMITTER RANGE



TRANSMITTER MODEL	RHE12	RHE14	RHE16	RHE21	RHE26	RHE27	RHE28
Mounting	Field	DIN rail	DIN rail	Field	Panel	Panel	Field
Housing material	Aluminium	Polymer	Polymer	Stainless Steel	Polymer	Polymer	Aluminium
Housing Rating	IP 66	IP 20	IP 20	IP66	IP20	IP20	IP65
LCD display, 2 lines, 16 characters	s						
LCD display, color, backlit, 8200 pixel				s	s	s	s
PARAMETER AVAILABILITY	RHE12	RHE14	RHE16	RHE21	RHE26	RHE27	RHE28
Mass Flow	s	s	s	s	s	s	s
Volumetric Flow			o	o	o	o	o
Density			o	o	o	o	o
Temperature	s	s	s	s	s	s	s
Dual Temperature Measurement			s	s	s	s	s
Assurance Factor				o	o	o	o
API Standard Volume, Net Oil				o		o	o
Hardware Lock Switch				o		o	o
SUPPLY VOLTAGE	RHE12	RHE14	RHE16	RHE21	RHE26	RHE27	RHE28
24 VDC	s	s	s	o	s	o	o
115 / 230 VAC				o		o	o
115 / 230 VAC with external battery backup				o		o	o
INPUTS/OUTPUTS	RHE12	RHE14	RHE16	RHE21	RHE26	RHE27	RHE28
4-20 mA	1	1	0/1	1-2	1	1-2	1-2
Pulse/frequency	1	2	0/2	1-2	1-2	1-2	1-2
Digital/status out		1	0/2	1-2	1-2	1-2	1-2
Digital/control in		1	0/2	1	1	1	1
Analog signal in				0/1		0/1	0/1
DIGITAL INTERFACES	RHE12	RHE14	RHE16	RHE21	RHE26	RHE27	RHE28
RS 485 Modbus			s	s	s	s	s
RS 232 ASCII		o					
HART	s	o		o		o	o
Profibus DP		o					
EX APPROVALS	RHE12	RHE14	RHE16	RHE21	RHE26	RHE27	RHE28
ATEX - RHM zone 0, RHE ordinary location		o					
ATEX - RHM zone 0, RHE zone 1	o						
ATEX/IEC - RHM zone 0, RHE ordinary location				o	o	o	o
ATEX/IEC - RHM zone 0, RHE zone 2				o			o
ATEX/IEC - RHM zone 0, RHE zone 1				o			
CSA - RHM Div. 1, RHE Div. 1	o			o			
CSA - RHM Div. 1, RHE Div. 2				o			o
CSA - RHM Div. 1, RHE ordinary location				o		o	o

s = standard o = selectable

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