RHEONIK

RHE28

Field and Wall Mount
Multifunction Coriolis
Flow Transmitter

Features

- Wall or pipe/ hook mount
- Epoxy Coated Aluminum, IP65 / IP66
- Operates RHM sensors in hazardous areas, RHE28 fits in Zone 2 / Div. 2 areas
- Selectable Units for Mass, Volume, Density and Temperature
- Positive, negative and net totalizers for both volume and mass flow
- Two configurable pulse/frequency outputs – double pulse available
- Two configurable analog outputs
- Two configurable digital status outputs
- Two configurable digital inputs
- Analog input for pressure or density
- Advanced functions: Net Oil, Baume/Brix, % Solids, Concentration, Standard Density and Standard Volume (API MPMS Ch. 11)
- Connectivity to control systems through Modbus RTU and HART
- Custody transfer version with lockout switch and seal point
- Simple user interface – Back Lit Color LCD display and 3 operator buttons with intuitive menu design
- Quick service & settings via USB / PC

- Built-in *Assurance View®* Advanced Diagnostic Set – simple publication of measurement status with *Assurance Factor®* and/or color changing display
- Password Protected Setup
- Upload and download of configuration files
- Power consumption less than 5 W

Applications

- General process flow measurement
- Batching and mixing
- Feed stocks and transfers
- Custody transfer
- Allocation metering

Benefits

- More insight into process and measurement conditions with *Assurance View®*
- *Assurance Factor®* for proactive maintenance
- Works with all Rheonik RHM flow sensors
- Fast and easy setup using *RHECom* software
- Remote electronics provides installation flexibility

RHE28 General Specifications

Housing:	Epoxy coated cast aluminum universal field mount enclosure
Enclosure Rating:	IP65 / NEMA 4. Optionally IP66 / NEMA 4
Ambient Temperature:	-20°C (optionally -40°C) to +60°C / -4°F (-40°F) to +140°F (reduced visibility below -20°C)
Dimensions:	170 x 272 x 93 mm / 6.7 x 10.7 x 3.7 in
Display:	Large high contrast backlit LCD 128 x 24. Screen changes color to indicate warning or error
Weight:	2.4 kg / 5.3 lb
Operation:	3 x behind-window capacitive sensors for menu navigation / settings
Sensor Connection:	Cage clamp terminals. Cable available in lengths up to 100m for connection to remote sensor
Analog Outputs:	Up to 2 x 4-20mA outputs, active or passive, compl. to NAMUR NE-43
Digital Outputs:	Up to 2 x configurable status outputs (IEC60946)
Pulse/Frequency Output:	Up to 2 x configurable pulse/frequ. outputs (IEC60946), max 10 kHz
Digital Inputs:	Up to 2 x configurable control inputs (to IEC60946)
Analog Input (optional):	1 x 4-20mA analog input (active) for two-wire pressure or density sensor
Power Supply:	100-240 VAC +/- 10% (48 to 62 Hz), 5W or 12-24 VDC +/- 10%, 4W
Digital Data Communications:	Modbus RTU (RS485) Connection to PC (USB) with Rheonik RHECom software HART over analog output
Hazardous Area Approvals:	ATEX/IECEx for RHE in ordinary locations (code AS), RHM in all zones ATEX/IECEx for RHE in zone 2 (code AB, A2), RHM in all zones cCSAus for RHE in ordinary locations (code CS), RHM in all divisions cCSAus for RHE in Div. 2 (code CB, C2), RHM in all divisions
Cable Entries:	2 x M16, 2 x M25 as standard. Optional metric and NPT available

Hazardous Area Installation Overview

Zone 0,1 / Class I, Div. 1	Zone 2 / Class I, Div. 2	Ordinary Locations

Sensor and Transmitter must have matching certification

THE CORIOLIS EXPERTS
Contact us: www.rheonik.com

Program Packages and Features

Standard Package (Part Number Code SO)

The RHE2x Standard programming package provides the following measurement and function features:

Direct Mass Flow Measurement

Mass flow is calculated using the Coriolis principle to provide a high accuracy Mass Flow measurement of the fluid flowing through an Omega Tube Coriolis meter.

Temperature Measurement

Each Omega Tube Coriolis Sensor provides a temperature measurement from built in sensors.

Fixed Density Function

The Fixed Density function allows density to be generated based upon process temperature. A base/reference density at a known temperature is entered for the fluid being measured along with a coefficient describing the change in density per temperature unit. The firmware in the transmitter calculates flowing density based upon this information to use for volumetric flow calculations.

Calculated Actual Volume Measurement for Liquids and Gas

Volume measurement is calculated by dividing direct mass flow measurement by the Fixed Density.

Standardized/Normalized Volume Measurement for Gas

This function calculates the volume of gas passing through the meter at standard conditions. The density of the gas at standard conditions is entered into the transmitter and the volume is calculated using this in conjunction with the flowing mass.

Password Protection

All setup and calibration parameters within the meter are protected with passwords to prevent unintentional or unauthorized change once installed.

Batch Controller

The transmitter is equipped with an onboard batch controller that, in conjunction with external pumps and/or valves allows the precise delivery of a preset mass or volume of process fluid on demand. Operated from the instrument front panel or remotely via operator switches, the controller is configured to utilize either a one stage or a two stage delivery strategy in ensuring the right amount of fluid is batched through the meter. The electronics self-learns, adjusting shut off times as more and more batches are delivered to further refine the amount of delivery, saving material costs and improving quality.

Program Packages and Features

Multifunction Package (Part Number Code DO)

The RHE2x Multifunction programming package includes all features from the Standard programming package plus the following measurement and function features:

Direct Density and Volume Measurement
The flowing density of the fluid in an Omega Tube Coriolis Sensor is determined from the measured resonant frequency of the sensor and used to calculate instantaneous volumetric flowrate.

Brix/Baume Units
The unit can be configured to read out in °Brix or Baume. °Brix or Baume are used extensively in the sugar and beverage industries.

Multifunction Package with Assurance Diagnostics Suite (Part Number Code AF)

The RHE2x Multifunction Package with Assurance Diagnostics Suite includes everything from the Multifunction package plus the following advanced diagnostic functions:

Assurance View® Diagnostics
Inbuilt self-monitoring functions are available that can be used to determine the reliability of the flow meter readings at all times. Diagnostics are quickly accessed through dedicated menu displays, RHECom software and the MODBUS interface.

Assurance Factor®
Assurance Factor® is a numeric value generated by an internal algorithm that in indicates the overall health of the flow meter and measurement. **Assurance Factor®** value can be used to trigger changes in screen color (White – Amber – Blue – Red), providing highly visible wide area condition indication.

ASSURANCE FACTOR®

WHITE Normal Operation	AMBER Operation Not Optimal	BLUE Operation at Limit	RED Measurement Failure
No faults present. All parameters within expected limits. Meter fully operational	*Sensor subject to noise / changing conditions in pipe. Measurement quality may be compromised*	*Sensor experiencing disturbance. Measurement quality compromised*	*Sensor experiencing extreme disturbance / meter in fault. Measurement offline*

Program Packages and Features

Advanced Package (Part Number Code GV)

In addition to all Multifunction functions and the complete Assurance Diagnostics suite, the RHE2x Advanced package includes the following functions:

Standard Volume Calculations to API Standards for Liquid

This function calculates the volume of fluid passing through the meter at prescribed standard conditions according to API MPMS Chapter 11.

%Solids Measurement

The transmitter can be configured to generate a %Solids measurement based upon density. Standard flow and density functions are still available while %solids measurement is implemented.

Net Oil Function

The Net Oil Function Set provides full-stream real-time measurements of water cut, net oil volume flow and net water volume flow. Depending upon meter size, the flow meter can measure well production at rates from a few barrels per day to over 200,000 barrels per day. The net oil calculations are based upon Chapter 11 of the *American Petroleum Institute (API) Manual of Petroleum Measurement Standards*.

Power Supply Options

The RHE21 can be configured with one of three power supply options:

- **Universal AC Power - 100-240 VAC ±10% (48 to 62 Hz) (Part Number Code A1)**

- **Wide Tolerance DC Power - 12-24 VDC ±10%, 4W (Part Number Code D1)**

- **Dual Supply - 100-240 VAC ±10% (48 to 62 Hz) / 12-24 VDC ±10%, 4W (Part Number Code U1)**
  This unique option provides inputs for simultaneous connection of both a universal AC and separate DC supply. The transmitter utilizes AC power when available but will switch to the DC supply in the event of AC power outage. The DC supply can be a battery source. As an example, an RHE27 transmitter and connected sensor will operate for 10 days or more on a typical automobile battery.
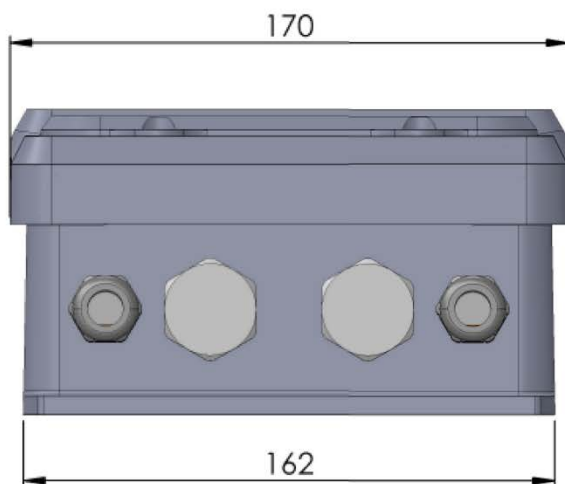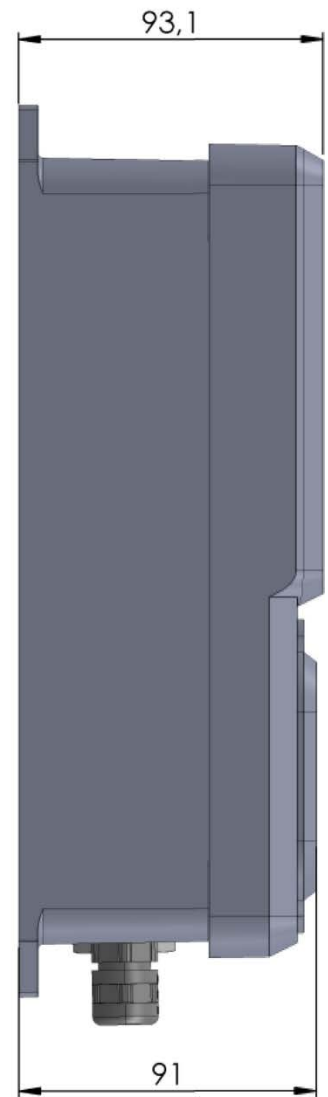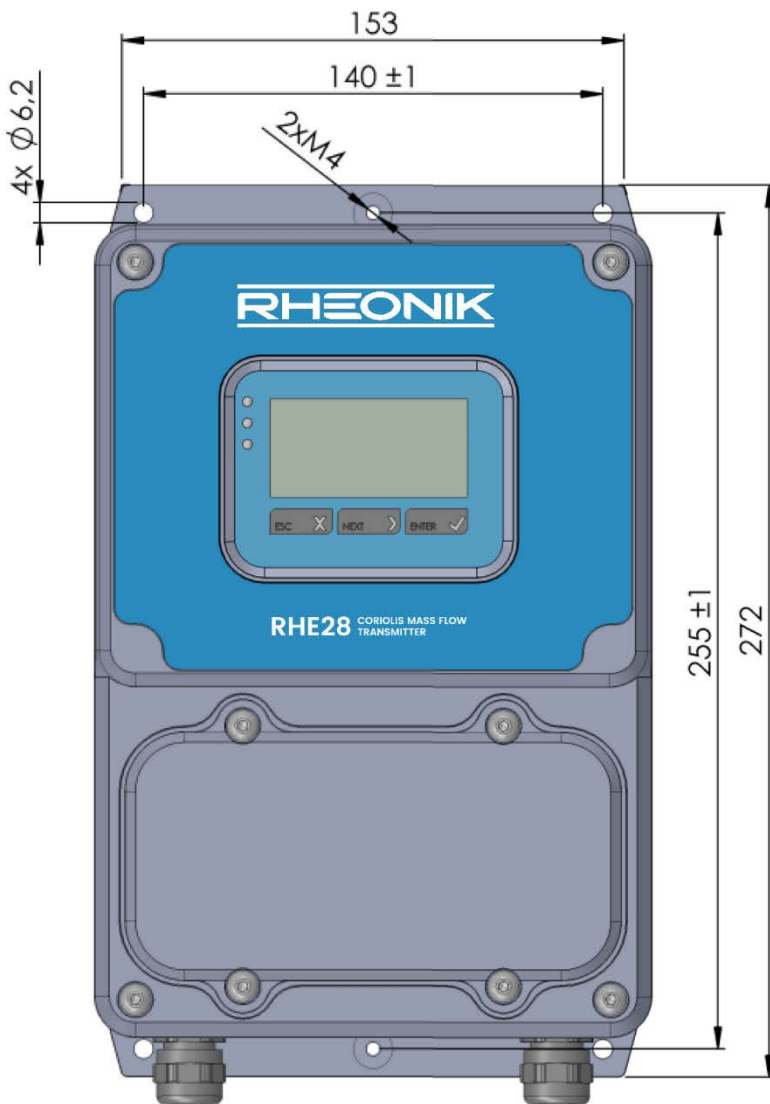
RHECom Software

The transmitter is a fully featured device with many sophisticated functions. Careful configuration is necessary if these functions are to perform as desired. **RHECom can be provided at <u>no extra cost.</u>**

RHECom software is designed to ensure simple and expedient setup of the transmitter features and functions. The program operates on Windows^{TM} based computers and has an intuitive user interface. Connection is via a standard USB port or the native RS485 connection of the transmitter. Communication between RHECom software and the transmitter uses MODBUS protocol.

MODBUS protocol may also be used by other systems to configure the transmitter and/or read measurement results through the native RS485 port. A full and detailed MODBUS register listing is available for designers when connecting the transmitter to supervisory control systems.

RHE28 Dimensions

153

140 ±1

4x ⌀ 6,2

2xM4

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RHE28 CORIOLIS MASS FLOW
TRANSMITTER

255 ±1

272

93,1

91

170

162

Dimensions in mm

RHE28 Part Number Code

Construction Type

E1 Standard version IP65 / NEMA 4 (-20 to +60 C), two M16 glands, two M25 blind covers

E2 Endurance version IP66 / NEMA 4 (-40 to +60 C), two M16 glands, two M25 blind covers

Supply Voltage

D1 12 to 24 VDC (±10%)

A1 100 to 240 VAC (±10%, 48 to 62 Hz)

U1 12 to 24 VDC (+/- 10%) and/or 100 to 240 VAC (+/- 10%, 48 to 62 Hz)

Software Function Package

SO Standard package: mass with calculated density/volume measurement

DO Multifunction package: mass and live density/volume measurement

AF Multifunction package as DO plus Assurance Factor® diagnostics suite

GV Advanced package as AF plus API standard volume/net oil/concentration

CT Advanced package as GV plus sealable/tamperproof hardware lock function

I/O Configuration

S1 RS485 (Modbus RTU), 1 x 4-20mA (a/p), 2 x DO (pulse/freq./status), 1 x DI

S2 RS485 (Modbus RTU), 2 x 4-20mA (a/p), 2 x pulse/freq., 2 x DO(status), 2 x DI

SH As S2 plus HART

CH As S2 plus HART and analogue input (active)

Hazardous Area Approval

NN Without - RHM and RHE in ordinary locations

AS ATEX / IEC Ex II (1)G [Ex ia Ga] IIC - RHE in ordinary locations

AB ATEX / IEC Ex II 3(1)G Ex nA [ia Ga] IIB T4 Gc - RHE in zone 2 excl. hydrogen, acetylene

A2 ATEX / IEC Ex II 3(1)G Ex nA [ia Ga] IIC T4 Gc - RHE in zone 2 incl. hydrogen, acetylene

CS cCSAus Class I, [Ex ia Ga], associated equipment - RHE in ordinary locations

CB cCSAus Class I, Div. 2, Groups C, D - RHE in division 2 excl. hydrogen, acetylene

C2 cCSAus Class I, Div. 2, Groups A, B, C, D - RHE in division 2 incl. hydrogen, acetylene

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RHE28 Options and Accessories

Part Number	Description
ORHE-SI	Factory configuration service with customer defined data set
ARHE-C4	Transmitter-sensor interconnecting cable with blue outer covering, fire retardant and halogen-free. Max. cable length 100 meters (30 meters max for RHM 30 and bigger sensors)
ORHE-E1	Two ½" NPT cable entries (instead of M25), two sealing plugs for M16 glands
ORHE-E2	Two M20 x 1.5 cable entries (instead of M25), two sealing plugs for M16 glands
ORHE-E3	Two ¾" NPT cable entries (instead of M25), two sealing plugs for M16 glands
ARHE-H-316	316 Stainless Steel 2" pipe rack mounting kit
ARHE-SO	USB drive with RHECom software, manuals, configuration data of paired RHM
ARHE-MO	Modbus to USB converter (RS485 terminals of RHE to USB port of PC)

Flow Sensor Range

Some of the many RHM mass flow sensors available

The RHM range of mass flow sensors features:

Line Sizes	From DN1 to DN300 / 1/24" to 12"
Pressure Ratings	Up to 1379 bar / 20000 psi
Temperature Ratings	From -200°C to 400°C / -328°C to 752°F
Wetted materials	Stainless Steel, Alloy C22, Duplex, Super Duplex, Tantalum, Others

RHE28 transmitters can be connected to all RHM Flow Sensors in the Rheonik Omega Tube range. Together they make a high performance measurement package suitable for many applications.
For specific details on any sensor size, please see the relevant specification sheet.

About Rheonik

Rheonik has a single purpose: to design and manufacture the very best Coriolis meters available. Our research and engineering resources are dedicated to finding new and better ways to provide cost effective accurate mass flow solutions. Our manufacturing group care for each and every meter we produce from raw materials all the way to shipping and our service and support group are available to help you specify, integrate, start-up and maintain each and every Rheonik meter you have in service. Whether you own just one meter or have hundreds, you will never be just another customer to us, you are a valued business partner. Need a special configuration for your plant - don't compromise with a "standard" product from elsewhere. If we can't configure it from our extensive product range, we can build you what you need as a custom meter.

Rheonik only make Coriolis meters - we are **The Coriolis Experts** - contact us for all of your Coriolis meter requirements.