RHEONIK

RHE27

Rack/Panel Mount
Multifunction Coriolis
Flow Transmitter

Features

- Rack/Panel Mounting
- Operate with RHM sensor in hazardous area
- 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 with digital data interfaces: 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
- USB connection for PC running Rheonik *RHECom* software
- Built-in *Assurance View®* Advanced Diagnostic Set – clear 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
- Optional lockable front cover

Applications

- General and critical process flows
- Batching and mixing
- Feed stocks and transfers
- Custody transfer

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

RHE27 General Specifications

Housing:	IEC61554 Panel Mount Housing. Optional lockable front cover
Enclosure Rating:	IP20 (front). IP54 with lockable front cover
Ambient Temperature:	-20°C to +60°C (-4°F to +140°F)
Dimensions:	96mm x 144mm x 61/75mm
Display:	High contrast backlit LCD. Screen changes color to indicate warning or error
Weight:	0.55kg / 1.2lb
Operation:	3 x front panel operator buttons for all menu navigation and settings
Sensor Connection:	Pluggable screw terminal strip. Cable available in lengths up to 100m for connection to remote sensor
Analog Outputs:	2 x 4-20mA outputs compliant to NAMUR NE-43.
Digital Outputs:	2 x configurable status outputs (IEC60946)
Pulse/Frequency Output:	2 x configurable pulse/frequency outputs (IEC60946), max 10 kHz
Digital Inputs:	2 x configurable control inputs (to IEC60946)
Analog Input:	1 x 4 - 20mA analog input 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) Mini-USB for PC connection - Rheonik RHECom software HART over analog output
Hazardous Area Approvals:	ATEX/IEC: Ex II (1)G [Ex ia Ga] IIC - for Ex i RHM in zone 0,1 ATEX/IEC: Ex II (3)G [Ex ic Gc] IIC - for Ex i RHM in zone 2

Hazardous Area Installation Overview

	Zone 0 and 1	Zone 2	Ordinary Area
ATEX IECEx			

Sensor and Transmitter must have matching certification

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 for liquids is calculated by multiplying direct mass flow measurement by the density value calculated by the fixed density function.

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	Amber	Blue	Red
Normal Operation	Operation Not Optimal	Operation at Limit	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.

Concentration Measurement

The transmitter can be configured to generate a concentration measurement based upon density. Standard flow and density functions are still available even when concentration 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*.

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 is provided at <u>no extra cost</u> with every RHE2x transmitter.**

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.

RHE27 Dimensions

96

144

60.5

138(+1)

92(+0.8)

RHE27 CORIOLIS MASS FLOW TRANSMITTER
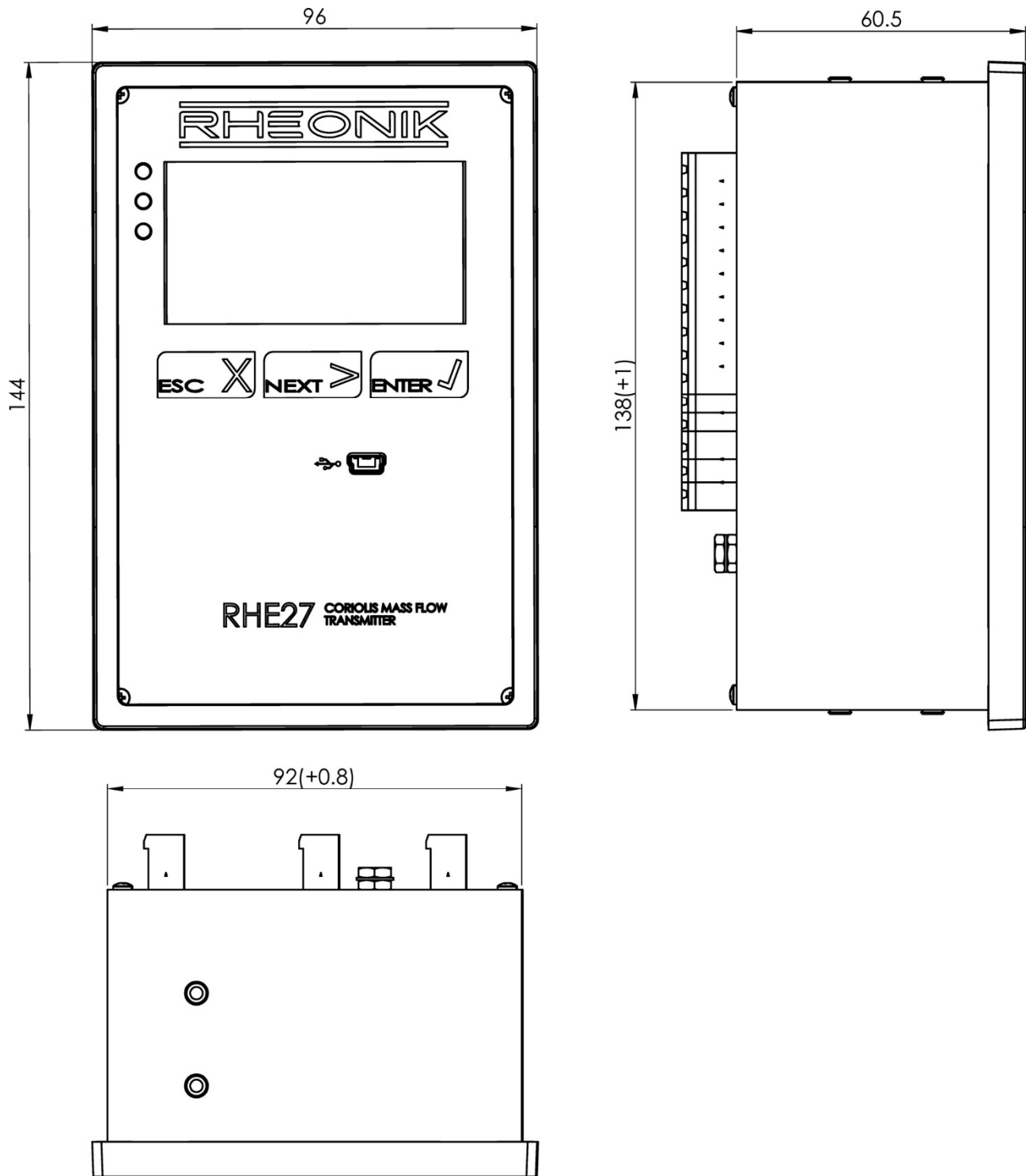
Dimensions in mm

RHE27 Part Number Code

Construction Type
E1 Standard panel mount version
E2 Panel mount version with lockable front cover

Supply Voltage
D1 12 to 24 VDC (+/- 10%)
A1 100 to 240 VAC (+/- 10%, 48 to 62 Hz)
U1 12 to 24 VDC (+/- 10%) 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 with Assurance Factor® diagnostics suite
GV Advanced package with Assurance Factor®/API standard volume/net oil/concentration

I/O Configuration
S1 RS485 (Modbus RTU), 1 x 4-20mA, 2 x DO (pulse/freq./status), 1 x DI
S2 RS485 (Modbus RTU), 2 x 4-20mA, 2 x pulse/freq., 2 x DO(status), 2 x DI
SH RS485 (Modbus RTU), 2 x 4-20mA, HART, 2 x pulse/freq., 2 x DO(status), 2 x DI
CH RS485 (Modbus RTU), 2 x 4-20mA, HART, 2 x pulse/freq., 2 x DO(status), 1 x AI, 2 x DI

Hazardous Area Approval
NN Without
A0 ATEX / IEC approval Ex II (1)G [Ex ia Ga] IIC - for Ex i RHM in zone 0,1
A2 ATEX / IEC approval Ex II 3G Ex nA IIC T4 Gc - for zone 2

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RHE27 Options and Accessories

Part Number	Description
ORHM-SI	Transmitter pre-configuration service to customer defined parameters and setup.
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).
ARHE2x-TN	Terminal adapter set for connection of Power I/O – required for new installation (for RHE without Ex approval)
ARHE2x-TA	Terminal adapter set for connection of Power I/O – required for new installation (for RHE with Ex approval)
ARHE2x-RS	PC Interconnection cable (Mini USB to PC USB)
ARHE2x-SO	Software RHECom (requires Mini USB to PC USB cable or direct RS485 connection)

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

RHE27 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.