RHEONIK

RHE45

Compact Mount Fully Digital
High Performance Flow
Transmitter

Features

- Extremely compact *Fully Digital* Coriolis Transmitter
- Excellent signal to noise ratio for ultimate performance
- Selectable outputs for mass flow, volumetric flow, density and temperature
  Positive, negative and net totalizers for both volumetric and mass flow
- Discrete I/O includes 4-20mA, pulse, frequency, status plus analog and digital inputs for remote control and measurement packages
- The *Rheonik AnyInterface Commitment* – a wide variety of communication options for seamless connection to your control or SCADA system. Options include Ethernet, Modbus, ProfiNet, EtherCat, PowerLink, Profibus, CAN, and others!
- Fast and easy electrical installation with plug in connectors
- Optional *color back-lit display* including 3 button keypad for local configuration and operation through an intuitive user menu
- Zone 2 / Class 1, Div. 2 hazardous areas certification in preparation

Applications

- High pressure, low flow chemical injection measurements – sensors up to 1400 bar / 20000 psi available
- Filling and batching
- Robot mounted flow measurement
- Mixing and blending of chemicals
- PU and Paint
- Compact flow measurement for OEM's and skid manufacturers

Benefits

- Very compact highly accurate multifunctional flow measurement
- iOT / Industry 4.0 ready
- Compatible with various Ethernet standards
- Fast and easy setup using *RHECom software* incl. data logging
- Highly reliable thanks to self-diagnostic and *Assurance Factor®*

RHE45 General Specification

Enclosure Material	Epoxy coated aluminum enclosure
Enclosure Rating	IP66 / NEMA 4
Ambient Temperature	-40 to +60°C (-40 to +140°F) *Reduced display visibility at temperatures below -10°C (14°F)*
Dimensions	Aluminum enclosure: 125 x 80 x 57 mm / 4.92 x 3.15 x 2.24 in
Display	Optional high contrast backlit LCD color display available
Operation	Via RHECom configuration software 3 x front panel operator buttons with optional LCD display
Electrical Connection	Via 12 pin and 8 pin A-coded plug in connectors USB for PC connection
Totalizers	Forward, reverse and net flow totalizers for both mass and volume
Analog Outputs	Up to 2 x 4-20 mA (active/passive) for flow, density or temperature
Pulse/Freq/Status Outputs	Up to 2 x configurable pulse/frequency/status outputs (IEC60946). Max. frequency 10kHz
Digital Inputs	Up to 2 x configurable control inputs (to IEC60946)
Digital Data Communications	Modbus RTU/TCP, Ethernet IP, Profinet, EtherCAT, PowerLink, Profibus DP, DeviceNet, CAN. Others on request
Power Supply	12-24 VDC +/- 10%, 4W
Hazardous Area Approvals	ATEX/IECEx: Zone 2 – *scheduled for Q1 2020* CSA: Class 1, Div. 2 – *scheduled for Q1 2020*

Hazardous Area Installation Overview

Zone 2 / Class I, Div. 2	Ordinary Locations
Certification scheduled for Q1 2020	

RHE45 Dimensions

RHE45 enclosure size = 125 x 80 x 57 mm (4.92 x 3.15 x 2.24 in)

Close Coupled
RHE45

Set-off
RHE45

W

RHE 45 CORIOLIS MASS FLOW TRANSMITTER
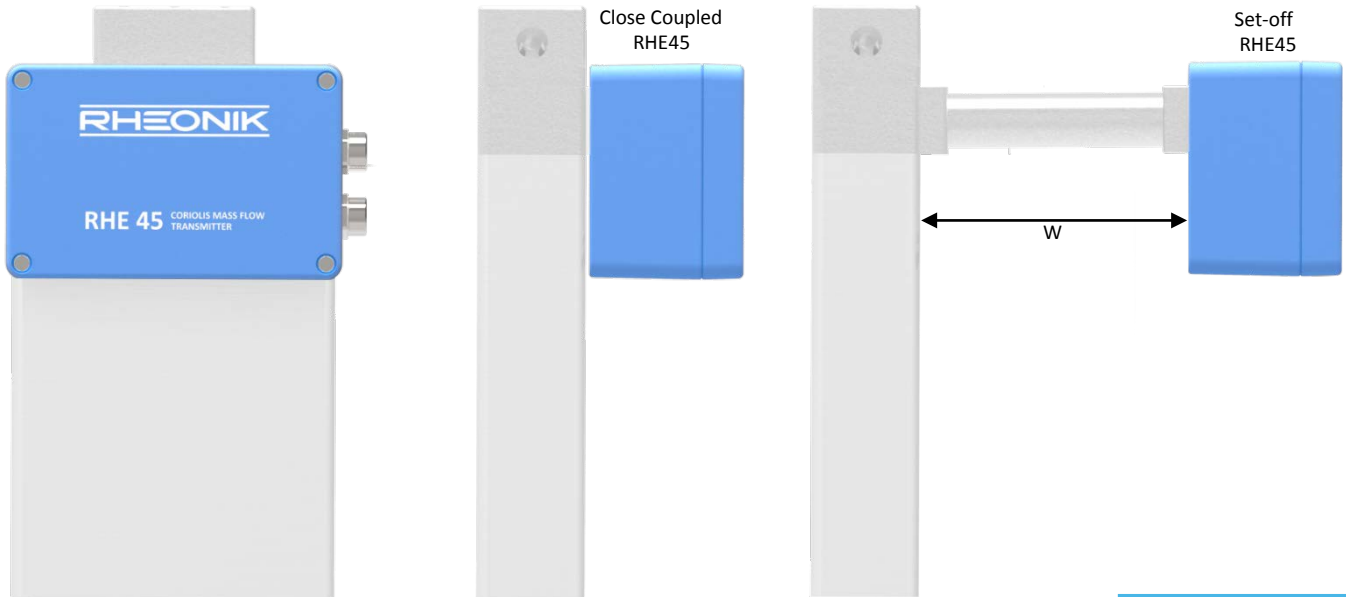
For RHM015L to RHM20L sensors, RHE45 transmitters are mounted either close coupled to or set-off from the sensor body depending upon temperature range selected.

For RHM30L to RHM160 sensors, RHE45 is always installed set-off from the sensor body.

|	W mm	W in
RHM015L to RHM04L Temperature Range N1, NA	2	0.08
RHM015L to RHM04L all other Temperature Ranges	100	3.94
RHM06L to RHM20L Temperature Range N1, NA	0	0
RHM06L to RHM20L all other Temperature Ranges	150	5.91
RHM30L to RHM160 all Temperature Ranges	150	5.91

Complete meter/transmitter assembly size depends upon sensor size – please see sensor data sheet for sensor size information.

RHE45 Temperature Specification

Operating temperature range for close coupled RHE45
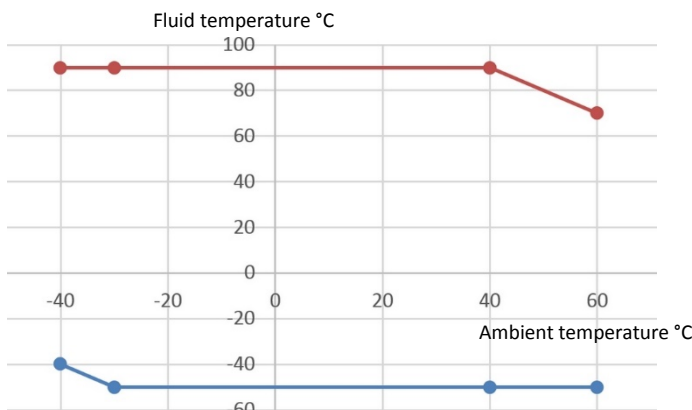
Operating temperature range for set-off RHE45

Fluid temperature °C

Ambient temperature °C

Fluid temperature °C
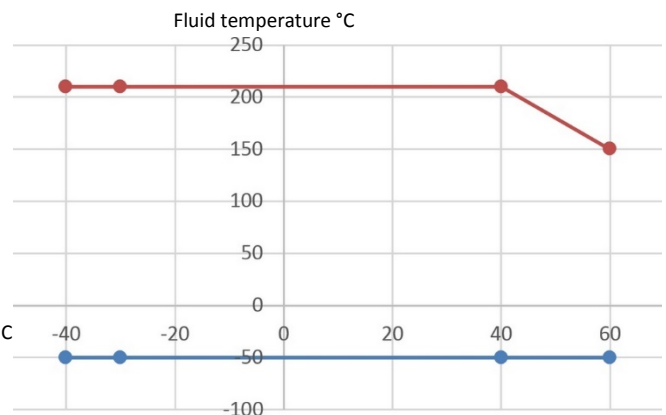
RHE45 maximum

RHE45 minimum

Program Packages and Features

Standard Package (Part Number Code SO)

The RHE4x 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 RHE4x 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 RHE4x 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 when the optional display is fitted to the RHE45 (White – Amber – Blue – Red), providing highly visible wide area condition indication.

| 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*

RHECom Software

The RHE45 transmitter is a fully featured device with many sophisticated functions and configuration is necessary for proper performance of these functions. *RHECom* software is available in three versions – *Free*, *Pro* and *Pro+*.

RHEComFree is available for download at **no extra cost** or on USB flash drive. *RHEComFree* allows full setup of transmitter parameters and includes a useful datalogging function for monitoring performance of the meter.
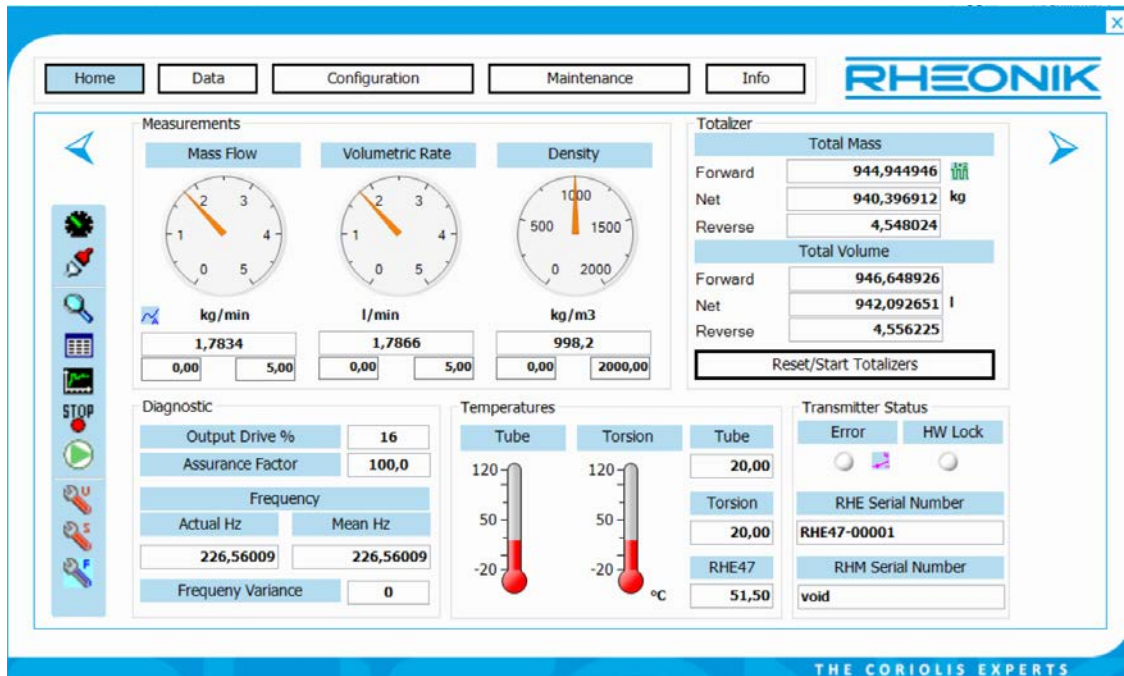
For a small one-time license fee, *RHEComPro* and *RHEComPro+* offer additional insight and setup convenience menus. *RHEComPro* includes data logging, trending and broad diagnostic capabilities.

RHEComPro+ takes flow meter management one step further with a revolutionary fully functioning simulator application. With the simulator, you can trial run your application from the convenience of your office, adjusting transmitter settings, setting alarms and filters, and creating transmitter configuration files for upload into the actual unit. The simulator is also ideal for training - it exactly mimics the front panel of the instrument display and buttons when clicked and includes controls for adjusting flow, density and temperature readings just like the unit was in line!
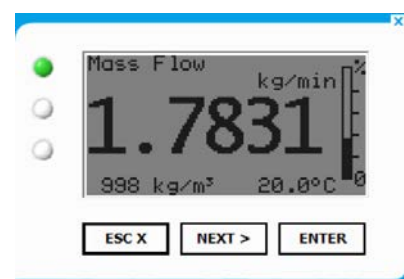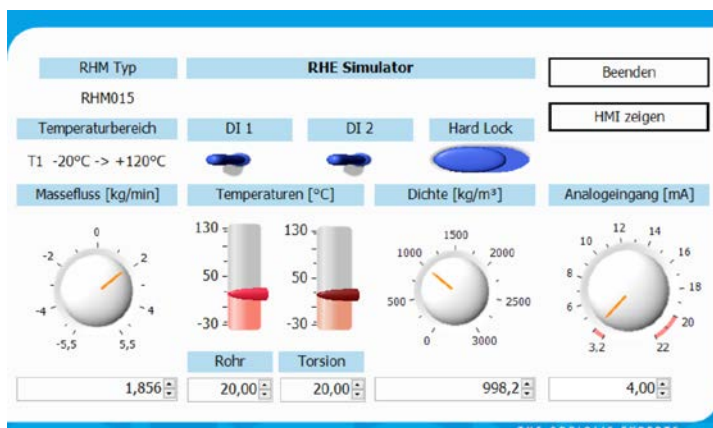
RHECom software is designed to ensure simple and expedient setup of Rheonik transmitter features and functions – a real time saver and a valuable tool.

RHE45 Part Number Code

Construction Type
C1   Compact mount at sensor IP66 with M12 socket(s), plug(s) and cable(s) - requires J5 option at RHM
CD   Compact mount at sensor IP66 with display, M12 socket(s), plug(s) and cable(s) - requires J5 option at RHM

Supply Voltage
D1   12 to 24 VDC (±10%)

Software Function Package
SO   Standard OP system - mass flow, normalized density / volume
DO   Enhanced OP system - mass flow, measured density / volume - requires RHM density calibration
AF   Enhanced OP system plus Assurance Factor®, data logging, partly filled pipe manager etc.

I/O Configuration
B1   RS485 (Modbus RTU), 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin
P1   RS485 (Modbus RTU), 1 x 4-20mA (passive), 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin
P2   RS485 (Modbus RTU), 2 x 4-20mA (passive), 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin
S1   RS485 (Modbus RTU), 1 x 4-20mA (active), 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin
S2   RS485 (Modbus RTU), 2 x 4-20mA (active), 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin
EB   Modbus TCP, 2 x DO (pulse/freq./status), 2 x DI - 1x M12-12 pin, 1x M12-8 pin
EA   Modbus TCP, 2 x 4-20mA (active), 2 x DO (pulse/freq./status), 2 x DI - 1x M12-12 pin, 1x M12-8 pin
EN   Ethernet IP, Modbus IP, 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin, 1x M12-8 pin
EP   Profinet, 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin, 1x M12-8 pin
EC   EtherCAT, 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin, 1x M12-8 pin
EL   PowerLink, 2 x DO (pulse/freq./status), 1 x DI - 1x M12-12 pin, 1x M12-8 pin
DP   Profibus DP, 2 x DO (pulse/freq./status), 2 x DI - 1x M12-12 pin, 1x M12-8 pin
DN   DeviceNet, 2 x DO (pulse/freq./status), 2 x DI - 1x M12-12 pin, 1x M12-8 pin
DC   CAN, 2 x DO (pulse/freq./status), 2 x DI - 1x M12-12 pin, 1x M12-8 pin
DO   CAN Open, 2 x DO (pulse/freq./status), 2 x DI - 1x M12-12 pin, 1x M12-8 pin
XX   Customized configuration of I/O Interface

Hazardous Area Approval
NN   For installation in ordinary area
A2   For installation in zone 2 - scheduled for Q1 2020

RHE45 [   ] [D1] - [   ] [   ] - [   ] [NN] - [NNN]

RHE45 Options and Accessories

Part Number	Description
ARHE-SO	RHEComFree PC software on USB flash drive. Includes all sensor/transmitter documentation
ARHE-RS	PC interconnection cable (Mini USB at RHE45 to PC USB), 5m length
ARHE-MO	Modbus RS485 terminals to PC USB Converter (additional ARHE45-MS recommended)
ARHE45-M1	Spare / replacement 3m connection cable, 12 pin M12 plug to free ends
ARHE45-M2	Spare / replacement 2m connection cable, 8 pin M12 plug to free ends
ARHE45-M3	M12 plug with 12 pins in A config. for self wiring to individual cable length
ARHE45-M4	M12 plug with 8 pins in A config. for self wiring to individual cable length
ARHE45-MS	3m connection cable, 12 pin M12 plug to 13-terminal test interface
ARHE45-MY	2m CAT5 connection cable, 8 pin M12 plug to two RJ45 sockets for Ethernet 100Base TX
ARHE45-PR	PC software RHEComPro license key
ARHE45-PP	PC software RHEComPro+ license key
ARHE45-SI	Configuration service - factory presetting of transmitter to customer supplied specifications

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

RHE45 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 our valued business partner.

Need a specific configuration for your plant - don't compromise with a "standard" product from elsewhere that will add extra cost to your installation. If we can't configure it from our extensive product range, our exclusive *AnyPipeFit Commitment* can have your flow sensor customized with any size or type process connection you need.

No matter what control system you use as the backbone in your enterprise, with our *AnyInterface Commitment*, you can be sure that connection and communication will not be a problem. Alongside a wide variety of discrete analog or digital signal connections, we can also provide just about any network/bus interface available (for example: HART, ProfibusDP, ProfiNet, EtherCAT, PowerLink, EtherNet/IP, CAN, ….) with our RHE4x family of transmitters. Rheonik RHE4X transmitters can connect to your system – no headache and no conversion needed.