RHE16 Coriolis Transmitter
Quick Start Guide

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1 Introduction

Thank you for purchasing Rheonik products. Rheonik has more than 20 years of experience in the field of Coriolis mass flow meter design and development. The patented Omega tube meter with torsion rod and mass bar drive is a product of that exhaustive development program. Compared to other Coriolis meter designs, the unique Rheonik Omega tube design offers outstanding performance and mechanical reliability.

This guide is intended as a quick reference instruction to aid the installation and startup of an RHE16 Coriolis mass flow transmitter with an RHM flow sensor and is an abridged version of the complete documentation found in the RHE16 Operating Manual. The full RHE16 Operating Manual is available for download from the Rheonik website:

http://www.rheonik.com

This quick start guide includes basic details about:

- Zeroing
- Wiring of the RHM sensor and the RHE16 transmitter
- MODBUS communication
- RHE16Com software

It is highly recommended to completely read through this guide before commencing with installation and commissioning of an RHE16/RHM mass flow meter.
2 Safe Operation and Liability

! Important safety instructions

The operating conditions for each flow sensor is stated on its serial number plate. These conditions must not be exceeded.

The maximum operating pressure for each flow sensor is listed on its serial number plate. When using piston pumps, ensure that pressure peaks caused through pump operation do not exceed the maximum operating pressure listed.

Where a flow sensor is operated at high temperature, it must be installed with sufficient thermal insulation to ensure that a stable temperature at the process line temperature is maintained.

Avoid thermal shocks to the flow sensor caused by rapid process temperature changes.

Use in applications with abrasive fluids may cause wear over time of the flow sensor’s internal tubes, reducing wall thickness and therefore lowering the maximum operating pressure. In applications where abrasive fluid is present, erosion allowances should be assessed by the system designer.

The flow sensor wetted material is listed on the serial number plate. In applications where corrosion is a possibility, we recommend that the wall thickness of the flow tubes be measured from time to time to ensure continued safe operation. The manufacturer assumes no responsibility for the corrosion resistance of the flow sensor with regard to the fluid to be measured.

For flow sensors used in food, beverage or pharmaceutical applications, it is the responsibility of the end user to ensure cleanliness of any flow sensor before use.

These measuring instruments may not be utilized in life-preserving systems used in medical applications, motor vehicles, aircraft, watercraft or the mining industry.

! Liability

The manufacturer accepts no liability for damage resulting from improper usage or installation of the flow sensor or transmitter.

The manufacturer accepts no liability for consequential damages or loss of production caused by the use of its products unless expressly and specifically agreed by contract.
3 Installation

Rheonik RHE16 Quick Installation Guide

Start:
Please remove the transportation locking bolt (only sensor sizes > RHM30) and reseal the housing.

Sensor installation:
For liquid applications (1), the meter body should be mounted with process connections at the top and the sensor case hanging downwards.
For gas applications (2) the meter body is mounted upright with the process pipe connections at the bottom.

Notes:
- Firm/rigid support is required on both sides of the sensor.
- At least one isolation valve is recommended for zeroing. Installing two valves is highly recommended.
- Avoid installation in locations with high vibration or electrical noise.

Wiring instructions:
See Appendix B in this manual for the complete wiring diagram.

Notes:
- Digital outputs must be fitted with current limiting resistors.
- Do not connect external power directly to terminals 16 to 19 without resistor.
- Power up the RHE16.

Filling the sensor:
- Fill the sensor completely with the process fluid. For liquids, it should be bubble free. Gases should be dry. Flow through the sensor for at least 15 minutes at high flow rate.
- Attention: Avoid temperature shocks.
- Check that the red LED is not lit at the front of the RHE16.

Zeroing Procedure:
- Shut off the flow through the meter with isolation valves.
- Press the “ZERO” button on the RHE16 for two seconds and wait until the red and orange LEDs start to blink. Zeroing is concluded when the blinking stops.

Check that a zero flow is indicated (orange LED blinks) and no error condition is present (red LED off).

Put meter into service: open valves, start pump etc. meter will now measure flow.
4 Zeroing Procedure Details

Like all Coriolis instruments, the meter may require zeroing from time to time to remove any offset in the measured flow rate.

Zeroing of the meter should be carried out:

- When an RHM flow sensor and/or RHE16 transmitter has been newly installed.
- Before field or laboratory calibration of the meter.
- During routine maintenance of the meter.

In order for the zero to be correctly set in the meter, it is important to ensure that the following conditions are met:

1. The pipes of the RHM flow sensor are completely filled with process fluid.
2. The RHM flow sensor is at or near normal operating temperature.
3. The meter is in a no flow condition. Valves mounted upstream and downstream of the RHM flow sensor must be tightly closed.
4. The RHE16 is not in an error condition, i.e. the red LED on the transmitter is not illuminated.
5. The RHM flow sensor must stay in the same condition throughout the zeroing procedure.

![Zeroing Button](image)
The Zeroing Procedure is initiated in one of three ways:

1) By pressing the button labeled “ZERO” on the front cover of the RHE16. The button should be kept pressed for about two seconds until the process starts. The position of the ZERO button is shown in Figure 1.

2) Through the RHE16Com software (as described in the “RHE16 Operating Manual”, see section 4) via the USB port on the front cover of the transmitter. The Dashboard window of the RHE16Com software features a virtual button labeled “Zero Sensor” which starts the Zeroing Procedure when clicked.

3) Through the RS-485 port using Modbus commands. A supervisory control system can be programmed to zero the meter (along with other functions) as part of an overall control scheme. A full description of the RHE16 Modbus register set can be found in the full “RHE16 Operating Manual”.

When the Zeroing Procedure is active, the orange “+/- FLOW” and the red “ERROR” LEDs on the RHE16 front panel both blink. In the Dashboard of the RHE16Com software, a countdown to completion is started in the field labeled “Cnt”. When this counter reaches 0, the Zeroing Procedure is completed. The end of the Zeroing Procedure is indicated on the transmitter front panel; upon completion of a successful zero procedure, the red “ERROR” LED will be off, the green “SENSOR” light will be on and the orange LED should be blinking to indicate zero flow.

The time taken for the Zeroing Procedure depends upon the model and size of the RHM flow sensor. In general, zeroing a meter should take approximately 60 seconds.

The result (offset value) of the Zeroing Procedure is displayed in the field labeled “Zero” on the Dashboard of the RHE16Com software and should be a small number. Note that this number is dimensionless and does not relate to flow range or flow units. A number larger than 500 may be a sign of an installation problem or some other issue. The zeroing may be repeated in order to obtain an indication regarding the stability of the installation. Consecutive zeroing values should not vary by more than +/- 2 units.

No other configuration activity should be carried out while the zeroing procedure is active as this may reset the RHE16 transmitter and prematurely terminate the process.

Zeroing of the meter is independent of any meter setup parameters and remains valid even if setup parameters are subsequently modified in the transmitter.

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<th>Once zeroing is complete, the valves upstream and downstream of the RHM flow sensor should be opened.</th>
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Once zeroing is complete, the valves upstream and downstream of the RHM flow sensor should be opened. *Safety first! Ensure this can be done in a safe manner.*
Appendix A CE Certificate

DECLARATION OF CONFORMITY

Equipment: RHM mass flow sensors & RHE 16 flow transmitter
Manufacturer: Rheonik Messtechnik GmbH
Address: Rudolf - Diesel - Str. 5
D-85235 Odelzhausen, Germany

We declare in sole responsibility that the equipment to which this declaration applies is in conformity with the following directives and standards:

EMC Directive: 2014/30/EC
EN 61326-1: 2013
EN 55011:2009 +A1:2010

PED Directive: 97/23/EC
See separate declaration of conformity if applicable.

Environmental and Use Conditions: RHM & RHE16: EN 61326-1:2013, Class A, Group 1, equipment

Certification type and Marking: \( \text{CE} \)

RHM mass flow sensors

EN 55011, Group 1, Class A, equipment
EMC test report #BC14-102
from Boston Center EMC Lab, 1100 Technology Park Drive, Billerica, MA 01821, U.S.A.

Issue Date: January, 19th, 2015

Signatory:

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Appendix B Complete Wiring Diagram

Mass Flow Meter Sensor RHM xx

Drive coils
Temperature sensor PT100 T1 (tube)
Pickup coil 1
Pickup coil 2
Temperature sensor PT100 T2 (net)

NOTES:
1. Digital output current: 10mA (NOMINAL), 30mA (MAXIMUM).
2. External Pull-Up Resistor(s) required on digital output(s).
   Calculate resistance for 10mA NOMINAL current.
   Example: R Pull-up = 2.4 kΩ at 24 VDC/10mA
3. Torsion rod temperature sensor and terminal pins 10/11/12 not available on all sensors.
   If you have such a sensor, please connect pins 1 through 9 only.

Wiring diagram RHE 16

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