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In accordance with	– “Metrologiewet” (Stb. 2006, 137) – “Regeling nationaal autonoom geregelde meetinstrumenten” (Stc. 2019, 28009)
Producer	Rheonik Messtechnik GmbH Rudolf Diesel Strasse 5 D-85235 Odelzhausen Germany
Part	A measuring device (Coriolis sensor) intended to be used as a part of a CG dispenser. Producer’s mark or name : Rheonik Type designation : RHMxx+RHE2x Accuracy class : 2,0 or 4,0 Destined for the measurement of : Hydrogen (H2) Further properties and test results are described in the annexes: – Description TC11811 revision 0; – Documentation folder TC11811-1.
Remark	All relevant tests have been performed in line with OIML R139 edition 2019 “Compressed gaseous fuel measuring systems for vehicles.”

Issuing Authority

The Designated Body, NMI Certin B.V.
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Certification Board

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1 General information about the measuring device

Properties of this measuring device, whether mentioned or not, shall not conflict with the legislation.

This Test Certificate is the positive result of the applied voluntary, modular approach, for a component of a measuring instrument, as described in WELMEC 8.8, 2017.

The complete CG measuring system must be covered by a type approval certificate.



Example of the RHMxx sensor



Example of the RHE2x transmitter

The measuring principle is based on the Coriolis effect. The sensor consists of two parallel tubes. The transmitter powers an electromagnetic drive system installed in the sensor causing the tubes to vibrate at their natural frequency. The inertia of product flowing through the sensor caused the tubes to deflection of the frequency. This is detected by two sensors installed on the tubes. The transmitter processes the signals and converts it into to physical properties and measurement data.

1.1 Essential parts

The measuring device can be composed of the following parts:

Description	Documentation	Remarks
Sensor construction	11811/0-01	
Transmitter construction	11811/0-02	
Transmitter PCB's	11811/0-03	

1.2 Essential characteristics

1.2.1 Measuring range

The measuring device has the following characteristics:

Sensor type	Q_{min} [kg/min]	Q_{max} [kg/min]	Minimum Measured Quantity [kg]
RHM04	0,17	4,17	1
RHM06	0,33	8,33	1
RHM08	0,67	16,67	2
RHM10	1,00	25,00	2
RHM12	1,17	29,17	2
RHM15	1,33	33,33	5

1.2.2 Bi-directional flow

All sensors can be used to measure flow in forward and reverse directions. See also the conditions as stated in chapter 3.

1.2.3 Maximum operating pressure

- 1070 bar(g)

1.2.4 Temperature range product

- -40°C / +55 °C

1.2.5 Temperature range ambient

- -40°C / +70 °C

1.2.6 Environment classes

- M2 / E2

1.2.7 Power supply

The measuring device can be powered by AC or DC power supply in the range:

- 100 - 240V AC nominal 50/60Hz
- 10,8 – 26,4 V DC

1.2.8 Software specification (refer to WELMEC 7.2)

- Software type P;
- Risk Class C;
- Extension T while extension S, L and D are not applicable.

Software versions	CRC Checksum	Remarks
2.06	87DB	Similar for all types of transmitter

The validity of the program and the parameters are continuously checked. If these checks fail, an alarm is generated. The metrological software is identified by the software version and/or checksum, which can be checked in the custody transfer menu:

Main screen → Assurance View → Status info → Custody transfer 1 → Custody transfer 2

1.2.9 Temperature correction

In the flow transmitter a temperature correction is applied depending on the connected sensor type.

Temperature correction for the sensor behaviour due to process temperature variations takes automatically place by default, based on the integral temperature sensor and the configured temperature coefficients in the electronics.

1.2.10 Data communication

The measuring device is capable of indicating several quantities. Use for Weights and Measures related purposes is allowed for the following quantities:

- Mass.

The following output(s) can be used for legally relevant data:

- Display;
- Dual frequency output (maximum frequency is 10 kHz);
- 4...20 mA analog output
- Serial communication RS485 with Modbus protocol.

1.3 Essential shapes

1.3.1 Inscriptions

On the measuring device, clearly visible, at least the following is inscribed:

- Test Certificate number TC11811;
- Name or trade mark of the producer;
- Type designation;
- Serial number and year of manufacture.

See documentation no. 11811/0-04 for an example of the markings.

1.3.2 Indication

The measuring device is equipped with an electronic display and can be operated using the capacitive keys on the display module.

The indicating device is mounted separate of the flow sensor by cable (remote version).

1.4 Conditional parts

1.4.1 Housing

The housing of the flow transmitter is available in various configurations:

- RHE21 EX-zone 1 housing, wall mount
- RHE26/27 Panel Mount
- RHE28 EX-zone 2 housing, wall mount

The housing of the flow transmitter is made of plastic or aluminium with sufficient tensile strength.

1.5 Conditional characteristics

1.5.1 Programming

Next to the display of the transmitter the Lock Switch is located. The Lock Switch is in the "active" position in normal use. This is indicated by the Lock LED positioned above the Lock Switch. When activated no configurations, parameters or data can be altered.

It is not possible to change the position of the Lock Switch without breaking a seal.

1.5.2 Parameter settings

The legally relevant settings, which cannot be altered anymore after putting the device into Custody Transfer Mode contains at least the following:

Parameter	Setting	Remarks
Device information		
Sensor Type	LOCKED	
System Serial Number	LOCKED	
System Part Number + Revision	LOCKED	
Assembly Sensor Serial	LOCKED	
Assembly Sensor Part Number	LOCKED	
Product Code	LOCKED	
Electronic Serial Number	LOCKED	
Electronic Part Number + Revision	LOCKED	
Cut-offs parameters		
Mass flow cut off limit	LOCKED	
Installation direction	LOCKED	
Calibration parameters		
MassFlowKfactor	LOCKED	
TempCor STD	LOCKED	
OutputCalVal	LOCKED	

Parameter	Setting	Remarks
Pressure Cal config	LOCKED	
MassFlow press Cor	LOCKED	
Low Density Cal point	LOCKED	
High Density Cal point	LOCKED	
Dens Cal Mode	LOCKED	

Remark: See documentation no. 11811/0-06 for complete list of locked parameters.

- All parameter settings may be read out and displayed:
 - by the electronic calculating/indicating device connected to the measuring device, or
 - for example via a computer temporarily connected to the measuring device.
- The software version and belonging checksum of the measuring device shall be displayed on the electronic calculating/indicating device by manual command.

1.5.3 Alarm handling

Under the following conditions the measuring device generates an accountable alarm:

- if the flow rate, density or temperature are outside certain pre-programmed limits;
- if the fatal/ hardware error is detected.

In case of an alarm, the display of the flow transmitter changes the colour of the display making it visible to an operator. In addition, an alarm output is present to transfer an error to a connected calculating and indicating device or flow computer.

2 Seals

The following seals are applied:

- The inscriptions are fixed to the measuring device and secured against removal by seal or it will be destroyed when removed.
- The measuring device shall be set into Custody Transfer Mode and sealed against opening.

See documentation no. 11811/0-05 for an example of the sealing positions.

3 Conditions for conformity assessment

- Other parties may use this Test Certificate only with the written permission of the producer.
- Before taken into use, the complete dispenser including measuring device shall be calibrated on the product it is going to measure on site or at a test laboratory. In the latter case the relevant parameter settings have to be registered and checked at the initial verification on site.