



## Operating Instructions

# Transmitter unit for meter reading ENCO08 and ENCO08-M

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**Manufacturer** Our customer service is available for technical queries

<b>Address</b>	RMG Messtechnik GmbH Otto-Hahn-Straße 5 D-35510 Butzbach
<b>Phone switchboard</b>	+49 6033 897 – 0
<b>Phone service</b>	+49 6033 897 – 0
<b>Phone spare parts</b>	+49 6033 897 – 173
<b>Fax</b>	+49 6033 897 – 130
<b>E-mail</b>	<a href="mailto:service@rmg.com">service@rmg.com</a>

**Original Document** The **ENCO08M\_manual\_07\_en** from 2020, September 25th for the transmitter unit ENCO08 u. ENCO08-M is the document translated first from the German original version. Anyhow, this document may serve as reference for translations into other languages. Please use in case of any uncertainties the German version as main reference.

**Note** Unfortunately, paper is not updated automatically, whereas technical development continuously advances. Therefore, we reserve the right to make technical changes in regard to the representations and specifications of these operating instructions. The latest version of this manual (and other devices) can be downloaded at your convenience from our Internet home-page

[www.rmg.com](http://www.rmg.com).

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# 1 Introduction

## 1.1 Structure of the manual

The introduction to this manual consists of three main parts. In the first part of the introduction, general guidelines are listed; here the symbols used, and the structure of notes are presented, but also a risk assessment is given. It also contains specifications for the transport and storage of the ENCO 08 encoder.

ENCO 08 may be operated in hazardous areas. The second part of the introduction deals with the conditions to be observed and describes this hazardous area.

The third part of the introduction describes mandatory, regular inspection and maintenance work.

The second chapter describes the function and intended use of ENCO 08. The third chapter describes the connection and commissioning.

The appendix contains the connection examples to a flow computer and a list of approvals.

## 1.2 Objective of the manual

This manual provides information necessary for trouble-free and safe operation. The ENCO 08 encoder was designed and manufactured in accordance with the state of the art and recognized safety standards and guidelines. Nevertheless, dangers can occur during its use which can be avoided by observing these instructions. You may only use the ENCO 08 encoder for its intended purpose and in a technically perfect condition.

### **Caution**

**If the encoder ENCO 08 is not used for its intended purpose, all warranty claims expire and the encoder may lose its approvals.**

## 1.2.1 Abbreviations

The following abbreviations are used:

ca.	circa, approximately
max.	maximum
min.	minimum
MID	Measurement Instruments Directive


## 1.2.2 Symbols


The following symbols are used:

1, 2, ...	Marks steps within a work operation
..	

## 1.2.3 Layout of instructions

The following instructions are used:

 <b>Danger</b>
<b>This warning instruction informs you of potentially hazardous situations that can occur as a result of incorrect operation or human error. If these situations are not avoided, they can lead to fatal or severest injuries</b>

 <b>Caution</b>
<b>This warning instruction informs you of possible hazardous situations that can occur as a result of incorrect operation or human error. If these situations are not avoided, they can lead to slight or minor injuries.</b>

**Notice**

**This warning instruction informs you of potentially hazardous situations that can occur as a result of incorrect operation or human error. If these situations are not avoided, they can result in material damage to the device or the vicinity.**

**This notice may also give to you tips on how to simplify your work. With this screen, you additionally receive further information on the device or the work process.**

**1.2.4 Using the encoder**

**1.2.4.1 Safety instructions**

The ENCO 08 encoder complies with current standards and regulations. Nevertheless, operating errors can cause hazards.

**⚠ Danger**

**Observe the following safety instructions!**

Non-observance of these safety instructions can lead to a risk of life and limb and health of the person as well as damage to the environment or property damage.

Note that the safety instructions in this operating instruction and on the device cannot cover all possible hazardous situations as the combination of different circumstances is impossible to predict. To simply follow the instructions specified may not normally be sufficient enough to ensure for correct operation. Always be observant and also consider the following:

- Before working with the device for the first time, read through this operating instruction and, in particular, follow the safety instructions carefully.
- The operating instruction warns against the residual risks for users, third parties, devices or other material assets. The safety instructions used refer to residual risks that cannot be avoided due to the design.
- Operate the device only in a sound state and when observing the operating instruction.

- Also observe the local legal accident prevention, installation and assembly guidelines.

### **Caution**

**All notes in the manual must be observed.**

**Always keep the operating instructions within reach for use at the place of installation.**

**For safe operation, the safety instructions must be observed and followed.**

**The manufacturer is not responsible for any damage that result as a consequence of not observing the operating instruction.**

### **Danger**

**Service and maintenance work or repairs that are not described in the operating instruction must not be carried out without previous consultation with the manufacturer.**

**Changes of the Encoder ENCO 08 are forbidden.**

#### 1.2.4.2 Hazards during commissioning

Initial start up

Initial start-up must only be carried out by especially trained personal (training by RMG) or by service personal from RMG.



**Notice**

In accordance with §15 BetrSichV "Betriebssicherheitsverordnung (industrial safety ordinance)", §5 DGUV Requirement 3 "Elektrische Anlagen und Betriebsmittel (electrical systems and equipment)" and the generally accepted rules of technology, especially VDE standards VDE 0100-100 "Errichten von Niederspannungsanlagen (building of low-voltage systems)" and VDE 0165 "Electrical explosion protection", the measuring system must be checked before commissioning the device.

Follow local or regional laws as appropriate.

An acceptance test certificate and corresponding test reports must be prepared for this commissioning. These, the operating instructions and the CE declaration of conformity must always be kept handy. All documentation, including declarations of conformity and certificates, must be checked for completeness.

**⚠ Danger**



This symbol in the manual warns you of the danger of explosion; follow the instructions next to the symbol.

Particular attention must be paid to the risk of explosion:

- Install the device TRZ03 in accordance with operating instructions. If the TRZ03 is not installed according to the manual, there is possibly an insufficient explosion protection.

**The explosion protection expires!**

- When staff carry out work without sufficient qualification, risks remain understated when working. Explosion or fire may happen. Perform the work only if you have the appropriate qualifications and you are an expert.
- If you do not use the appropriate tools and materials, components may be damaged. Use tools that are recommended to you for the job in the operating instructions.

Mechanical installation

Mechanical installation must only be carried out by the respectively qualified specialist personnel.

Electrical installation	Installation on components must only be carried out by qualified electricians.
Mechanical and/or electrical installation	The specialist personnel require a training especially for working in potentially explosive environment. Specialist personnel are persons that can verify a training / further education according to <b>DIN VDE 0105, IEC 364</b> or a <b>similar national standard</b> .

 **Danger**

**The installation of pressurized pipes must be carried out exclusively by trained specialist personnel.**

Since the operation of the ENCO 08 encoder does not have to do directly, but only indirectly, with pressurized pipelines, no further warnings in this respect are listed here. If necessary, contact the operator of the plant for further information.

Notice:

- The ENCO 08 encoder may only be connected in an explosion-free, depressured atmosphere. Observe the descriptions in the operating instructions during the installation process.
- In general, it is recommended that an ENCO 08 encoder should only be installed, connected or replaced by RMG Service.
- All the above points also apply to repair and maintenance work and generally when connecting or disconnecting the ENCO 08 encoder is required.

### 1.2.4.3 Danger when using, servicing and maintaining

Operating personnel	The operating personnel are to use and operate the device within the scope of the intended purpose.
Maintenance personnel	Work on the device must only be carried out by specialist personnel that can carry out the respective work assigned to them as a result of their training, knowledge and experience as well as the applicable regulations. These specialist personnel are familiar with the legal guidelines for accident prevention and can evaluate and avoid possible risks by themselves.

Maintaining and cleaning      Maintenance and cleaning must only be carried out by the respectively qualified specialist personnel.

<b>⚠ Danger</b>
<p>If staff carry out work without sufficient qualification, risks may be underestimated when working. Explosion or fire may happen. If work is carried out in hazardous areas on voltage supporting equipment, resulting sparks may cause an explosion.</p> <p>Only carry out the work if you have the appropriate qualifications and are a trained specialist.</p>

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<b>⚠ Caution</b>
<p>If the unit is not cleaned in accordance with the operating instructions, the device may be damaged. Clean the unit only in accordance with the operating instructions.</p> <p style="text-align: center;"><b>Clean with a damp cloth!</b></p>

<b>⚠ Danger</b>
<p>The Encoder ENCO 08 may only be used as intended! (chapter 2 Encoder ENCO 08 and ENCO 08-M).</p> <p><b>Avoid any use of the Encoder ENCO 08 as possible climbing aid or attachments of Encoder ENCO 08 as possible handholds!</b></p>

**1.2.4.4      Qualification of personnel**

Persons working with or on the device must have the following knowledge:

- Training / education for working in potentially explosive environments.
- The ability to correctly assess dangers and risks when using the ENCO 08 encoder and all connected devices. Possible hazards include components under pressure or the consequences of incorrect installation.

- Possible dangers are, e.g., components under pressure or the result of incorrect installation.
- Recognize dangers that could be caused by the used flow medium.
- Training / education by RMG for working with gas measuring instruments.
- Education / instruction in all country-specific standards and directives to be observed for work that is to be carried out on the device.

## 1.2.5 Risk assessment and mitigation

The TRZ03 subjects to risks in its use, which were judged by qualified staff of the company RMG. Risks can arise, for example, from work outside the permissible temperature range. Illegal current and voltage values can cause explosions in hazardous areas. Of course only work by trained personnel (*chapter 1.2.4.4 Qualification of personnel*) are permitted, which is also trained to know proper tools and use only this.

These risks have been considered during the development phase and action were taken to minimize these risks.



For work in hazardous areas (all zones):

- Only tools approved for Ex Zone 1 may be used for maintenance and repair work. Components can be damaged if you do not use the appropriate tool.

### The explosion protection expires

- Otherwise work may only be carried out if there is no potentially explosive atmosphere.
- A risk of ignition caused by impact or friction must be avoided.
- In hazardous areas, the wiring and installation of the ENCO 08 encoder may only be carried out by trained personnel in accordance with EN60079-14 and in compliance with national regulations.
- Qualified personnel are persons according to DIN VDE 0105 or IEC 364 or directly comparable standards

- Only use trained and instructed personnel. Work on the measuring system may only be carried out by qualified persons and must be checked by responsible specialists.
- Qualified persons have been authorized to carry out such work by the person responsible for the safety of man and plant on the basis of their training, experience or instruction and their knowledge of relevant standards, regulations, accident regulations and plant conditions. It is crucial that these persons are able to recognize and avoid possible dangers in good time.

### 1.2.6 Validity of the manual

This manual describes the transmitter unit ENCO08 u. ENCO08-M. This encoder is only a part of a complete on-site system. Observe also the instructions of other components of the site system. If you find contradicting instructions, please contact RMG.

<p><b>⚠ Caution</b></p>
<p><b>Make sure that the electrical data of the power connection correspond to the specifications on the type plate. Care of any other applicable national regulations in the country of use. Use cables suitable for the cable glands (see <i>chapter 3 Connection and commissioning</i>)</b></p>

#### 1.2.6.1 Hazards during Operation

Please take care of the information provided by the plant manufacturer and/or plant manager.

#### 1.2.6.2 Danger during operation in hazardous areas

<p><b>⚠ Danger</b></p>
<p><b>Use the encoder ENCO 08 only in the original condition.</b></p>

- Only operate the encoder ENCO 08 in perfect and complete condition. If you make technical changes to the device, safe operation can no longer be guaranteed.

- When connecting further measuring components or additional equipment in hazardous areas, make sure that the appropriate explosion protection is available for these components.
- If the devices are intrinsically safe, galvanic isolation must be provided when these devices are connected.

The encoder ENCO 08 may be operated in Ex-zone 1, but only within the permitted temperatures (chapter 1.3 *Explosion-proof design*)

### 1.2.6.3 Operator responsibility

Take care as plant manager that only sufficiently skilled personnel will work on the device. Ensure that all employees who handle the equipment have read and understood these instructions. Additionally, you are obliged to train staff on a regular basis and to inform them about any dangers. Ensure that any work carried out on the device is done by qualified personnel and checked by responsible specialists. You must establish clearly the responsibilities for installation, operation, troubleshooting, maintenance and cleaning. Point out to your staff any risks involved when using the device.

For all work on ENCO 08, suitable personal protective equipment must be used, which you as the operator must provide. This applies although all sharp edges have been removed from the device as far as possible.

### 1.2.7 Transportation

The device is packaged customized according to the transport requirements. For each subsequent transport, ensure safe packaging that absorbs shocks and vibrations. Nevertheless, advise the transporter to avoid possible shocks and vibrations during transport.

The following applies in particular during transport:

- Avoid shocks and vibrations
- Protect ENCO 08 from humidity
- In case of suspicion of improper transport or damage during transport, please contact RMG service immediately.

### 1.2.8 Delivery

Supplied number of parts may differ depending on the optional customer order. "Usually" the following is included in the scope of delivery:

Part	Quantity
Encoder ENCO 08	1
Manual	1

no CD is supplied with the integrated ENCO 08

or

Encoder ENCO 08-M	1
CD (with the operating software)	1
Programming module (optional)	1
...	

### 1.2.9 Dispose of packaging material

Dispose the packing material in an environmentally friendly way in accordance to the national standards.

### 1.2.10 Storage

Avoid long periods of storage. Check the Encoder ENCO 08 after any storage for damage and functionality. Ask for a check from the RMG service after a storage period for the device of over one year. In this case please send back the device to RMG.

Nevertheless, if storage is necessary, the following must be observed:

- A dry, frost-free environment is required for storage.
- Installation and commissioning must be carried out exclusively by qualified personnel

## 1.3 Explosion-proof design

### 1.3.1 General information

#### **Danger**

The encoder ENCO 08 may be installed in hazardous areas in zone 1, as long as only gases and vapors are present which are assigned to explosion group IIC and temperature class T6.

ATEX – Approval number: BVS 15 ATEX E 041 X

Indication:



II 2G Ex ib IIC T6

The device complies with the regulations of Directive 94/9/EC.

The applicable regulations must always be observed during installation and operation. The permitted electrical data can be found in chapter 3.3 *Electrical connections*.

#### **Danger**

Risk of destruction by body electricity, e.g. due to friction of clothing - appropriate protective clothing must be worn.

#### **Notice**

During installation, it must be ensured that the enclosure protection class is observed. Direct sunlight must be avoided.

The encoder housing complies with protection class IP20 due to EN 60529 and is installed in a totalizer housing (e.g. totalizer head G) or an aluminum housing (ENCO 08-M) with a protection class of IP66 + IP67.



## Temperature ranges

**MID:**

-25°C to +55°C (ambient Temperature, custody transfer)

**ATEX:**

-40°C to +57°C (T6)

**Notice**

In case of doubt, the limited range of the MID applies: -25°C to +55°C

### 1.3.2 Junction boxes with enhanced safety

**⚠ Danger**

When connecting the device electrically, make sure that the power supply is correct (see data on the type plate).

## 1.4 Inspection and maintenance work

### 1.4.1 General information

Explosion-proof electrical control units must be regularly maintained. The time intervals of this maintenance depend on the operating and environmental conditions.

**Notice**

We recommend at least one check per year (e.g. in connection with the annual calibration).

In principle, ENCO 08 is maintenance-free.

### **Danger**

**Work on live electrical equipment is generally prohibited in hazardous areas (except for intrinsically safe circuits).**

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In special cases, work can also be carried out on live electrical equipment in hazardous areas if it is ensured that no potentially explosive atmosphere is present. This may only be done with explosion-proof, approved measuring instruments.

### **Danger**

**If access to electrical modules is necessary, the following precautions must be taken:**

- **The entire device must be disconnected from the power supply.**
- **When working with electronic assemblies, a connection must be established between an earthed object and the body.**

If the device is repaired regarding a part which depends on explosion protection, it may only be put back into operation after it has been checked by a certified expert (*section 1.2.4.4 Qualification of personnel*).

If repairs are carried out by RMG service, no acceptance by an expert is required.

## 2 Encoder ENCO 08 and ENCO 08-M

### 2.1 Preface

In addition to the traditional transmission of volume information by electrical pulses, where the number of pulses is proportional to the volume at measuring conditions flowing through the meter, digital transmission of meter readings is getting more and more important.

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With the transmitter unit **ENCO 08** (integrated transmitter unit in totalizer F and G) and **ENCO 08-M** (external transmitter unit in totalizers with mechanical output drives), it is possible to transfer the meter reading digitally to a volume corrector.

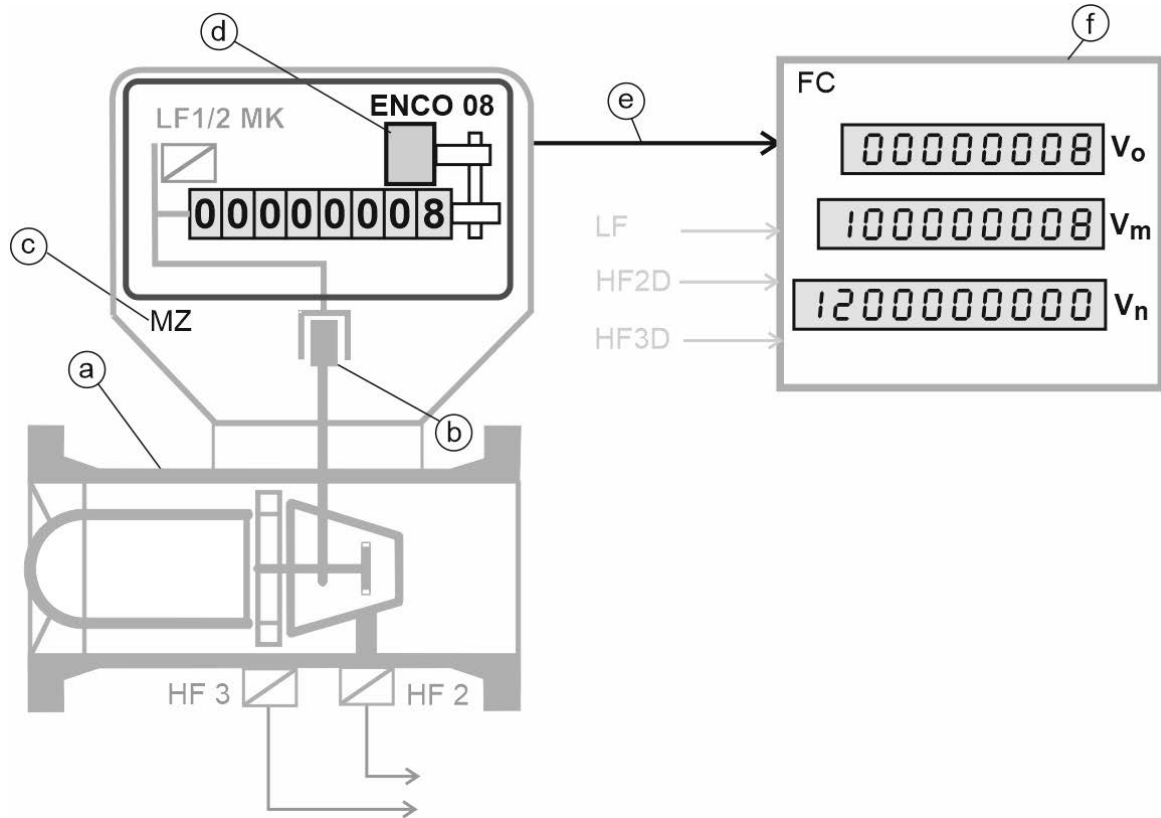
This is an energy self-sufficient encoder, which operates as a magnetic "absolute encoder" in continuous operation without any external power supply.

The encoder ENCO 08 is used for the custody transfer of mechanical totalizer readings (Vo) and for compliance with the legal metrological requirements with regard to the recording of measured values.

The counter reading and all other application-specific device values are stored in the microcontroller and cannot be lost. The meter reading is output via the NAMUR interface (EZD protocol).

ENCO 08 is parameterized by means of an operating software (e.g. "Set meter reading"). This is done by RMG Messtechnik upon delivery, so the customer does not have to carry out any further parameter adjustments on site during commissioning (exception: ENCO 08-M).

## 2.2 Operation



Remark: Usually the totalizer housing is significantly smaller than the turbine

- (a) gas meter (turbine)
- (b) magnetic coupling
- (c) MZ mechanical counter
- (d) encoder ENCO 08, transmitter unit for meter reading
- (e) connection for data transmission
- (f) flow computer

$V_o$  volume counter (original counter reading)

$V_m$  volume at measurement conditions

$V_n$  volume at standard conditions

2 x LF, HF2D, HF2D pulse generator, 1 channel [Namur, Reed]

LF Low frequency

HF High frequency

## 2.3 Function

The ENCO 08 is coupled to the totalizer via a gear wheel. When the mechanical counter rotates, the rotation is transferred to the encoder shaft in the ENCO 08. Voltage pulses are induced in the Wiegand sensor module under the impact of the now rotating magnetic field. These signals are evaluated in the electronic module and converted into an electronic meter reading.

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The energy required for displaying and permanent storing of the meter reading is generated by the internal Wiegand sensors. Therefore, no external power supply (battery) is required to record the meter reading. As soon as a converter is connected, it also provides the necessary power supply for digital transmission (EZD protocol) of the meter reading.

The hardware consists of Wiegand sensors with energy generation (Wiegand sensor module), counting logic (ASIC and Hall sensor) and counter reading archive (FRAM counter).

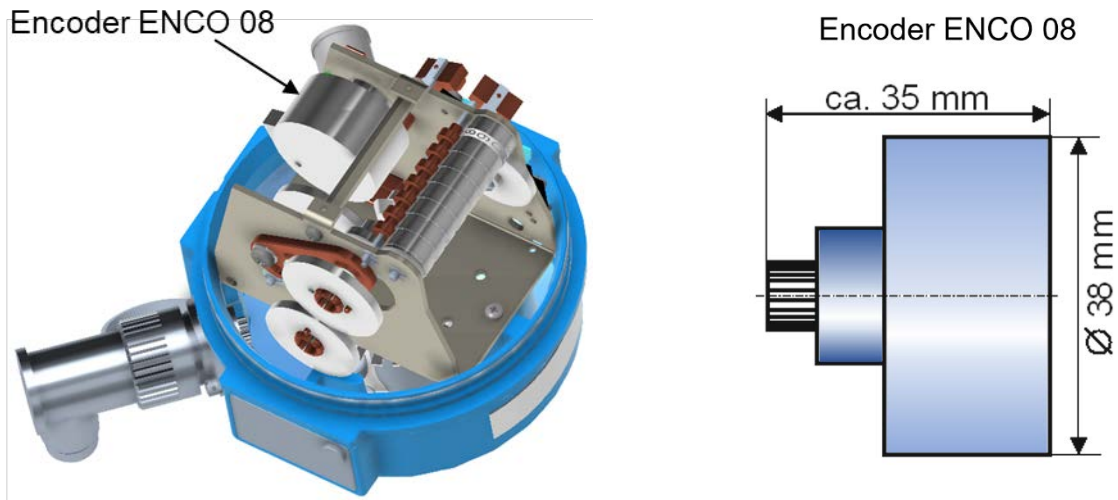
All application-specific parameters are stored in the EEPROM of the microcontroller and cannot be lost.

## 2.4 Variants

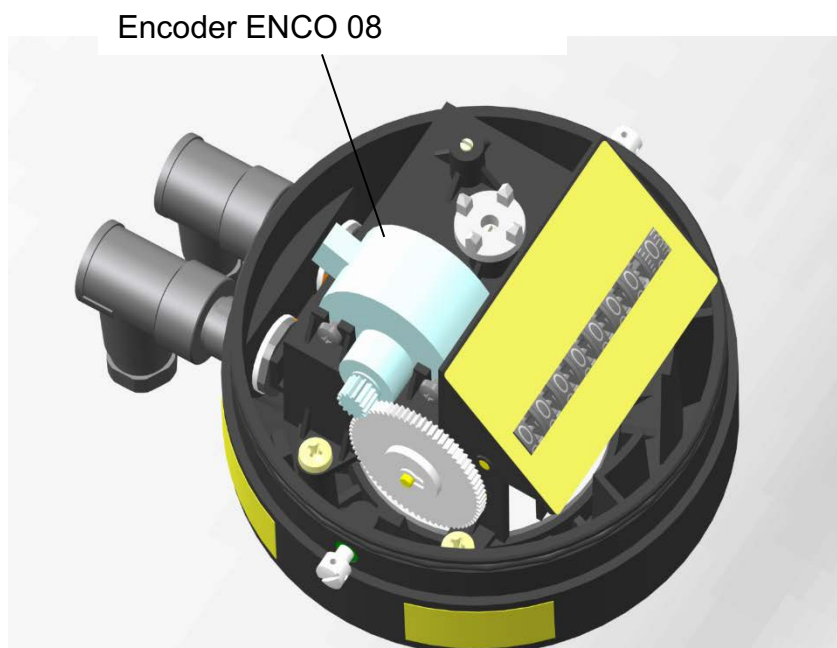
### 2.4.1 ENCO 08

Integrated in the totalizer head type F (for TRZ 03, TRZ 03-K)

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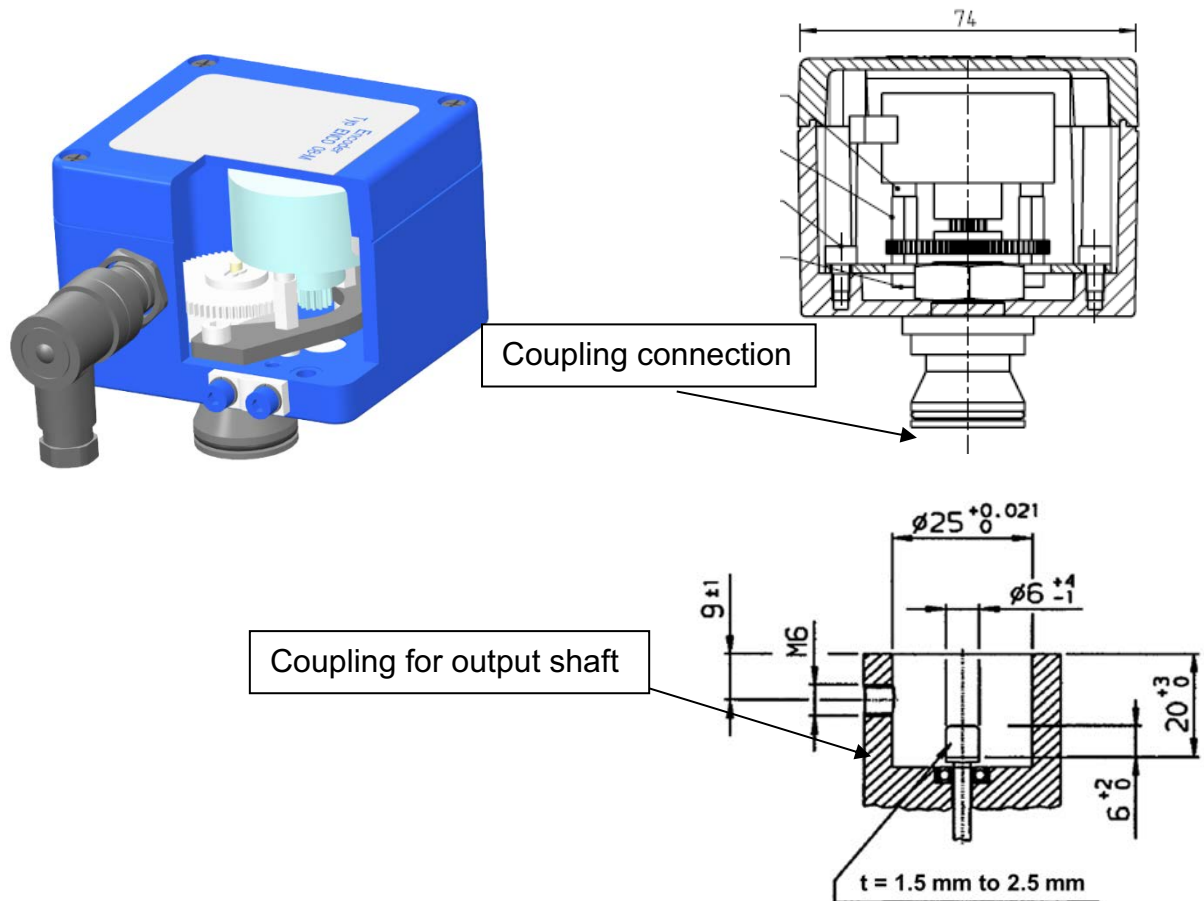


Integrated in the totalizer head type G (for TRZ 04, TRZ 04-K and DKZ 02)



2.4.2 ENCO 08-M

External encoder for mounting on mechanical counters with mechanical output according to EN12261.



This version requires on-site parameterization, unless the ENCO08-M is already mounted and sealed in a totalizer head with mechanical output.

The ENCO 08-M is parameterized with its specific data (such as meter reading, number of decimals and direction of rotation) by means of a PC operating program to the meter type to which it is attached.

With the ENCO 08 firmware (1.11 and 1.12), turbine and rotary displacement meters can be operated with the following combinations of output value (Ua) and number of decimals (NKS – Nachkommastellen, German):

	U <sub>a</sub> = ... m <sup>3</sup> , (Specification on mechanical output)				
NKS	0.01	0.1	1	10	100
3	1.12	-	-	-	-
2	1.12	1.11 1.12	-	-	-
1	-	1.12	1.11 1.12	-	-
0	-	-	1.12	1.11 1.12	-
x10	-	-	-	1.12	1.11 1.12

1.11: Standard for ENCO08 / ENCO08-M for **8-digit counters**

1.12: ENCO08-M for **9-digit counters**

1.12: ENCO08-M with special output ratio and **8-digit counters**

### Note

#### Important

The output values must be specified when ordering. If these values are not available, the ENCO08-M is set to the default values:

- U<sub>a</sub> = 0,1m<sup>3</sup>
- NKS = 1
- SW = 1.12
- Direction of rotation = clockwise



## 2.5 Use in custody transfer applications

This chapter contains information on how you can upgrade the ENCO08-M for custody transfer and ensure its use here. For this purpose, seals are attached at various points of the ENCO08-M and the housing is sealed to prevent opening.

### Caution

**The ENCO08-M is approved for custody transfer. It is sealed before delivery and certain settings are locked by the approval authority.**

**These seals must not be damaged, destroyed or removed!**

**In this case, the ENCO 08 loses the calibration certification!**

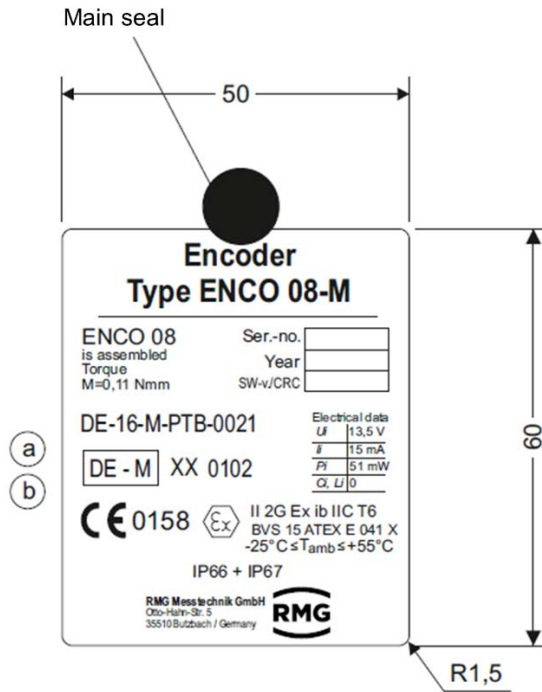
**The ENCO 08 can only be re-certified for the in custody transfer applications by an officially approved certification lab or an calibration official and an additional check of the settings. The calibration officer must reattach the seals after his verification and calibration.**

**The re-equipping for custody transfer is usually associated with costs**

2.5.1 Sealing plan

2.5.1.1 Type plate

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**Notice**

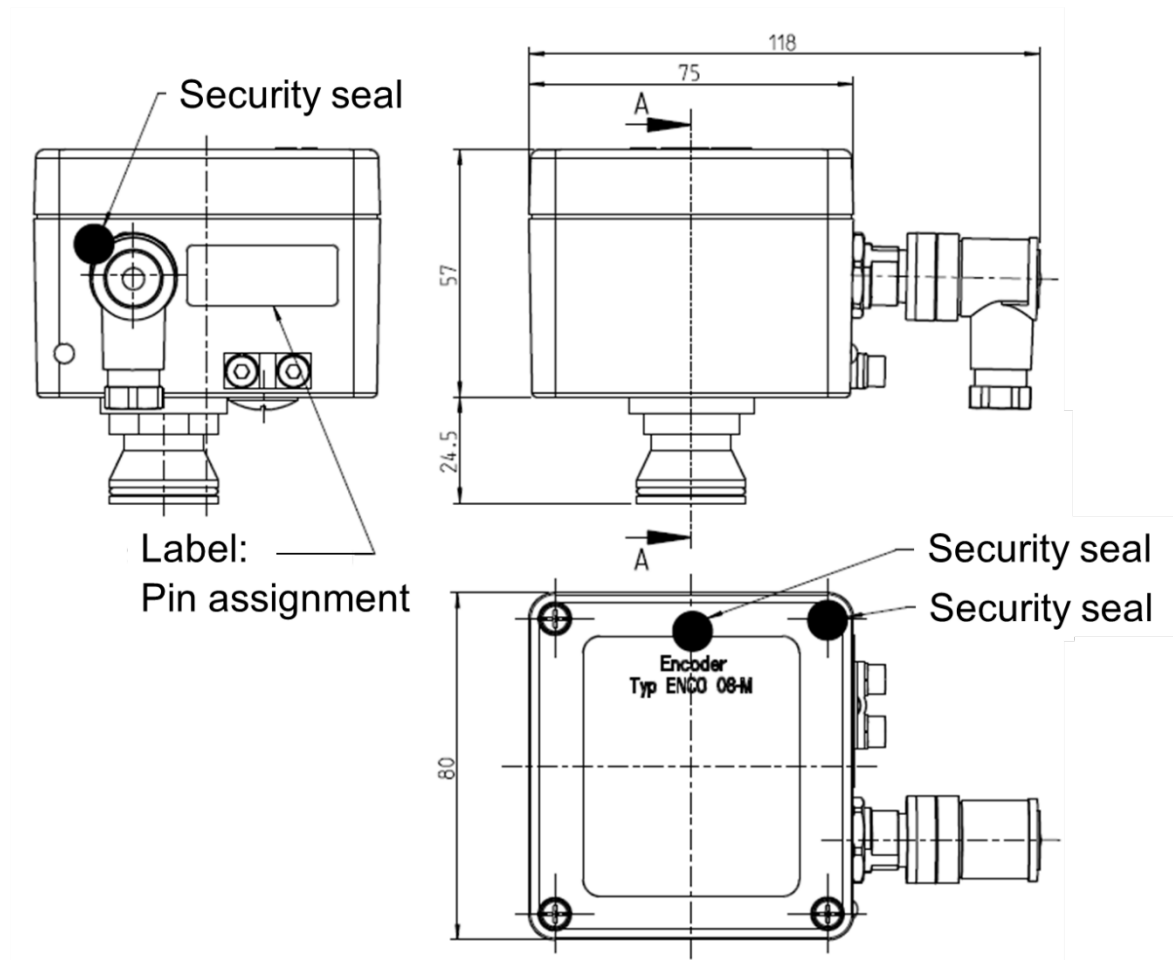
The modification of parameters or the software (of the internal firmware) is only possible after a seal break and by using a PC and a programming module.

**⚠ Caution**

If the software version is replaced, the type plate must be replaced, too.

2.5.1.2 Seals on the housing

In the following figures, the positions at the encoder ENCO 08 are marked that must be sealed to prevent opening.



The digital, custody transfer of the Vo to a transmitter device is in accordance to DIN 19234 respectively NAMUR. This is unidirectional and interaction-free.

**Notice**

**The cable between the ENCO08-M and the transmitter device must be sealed.**

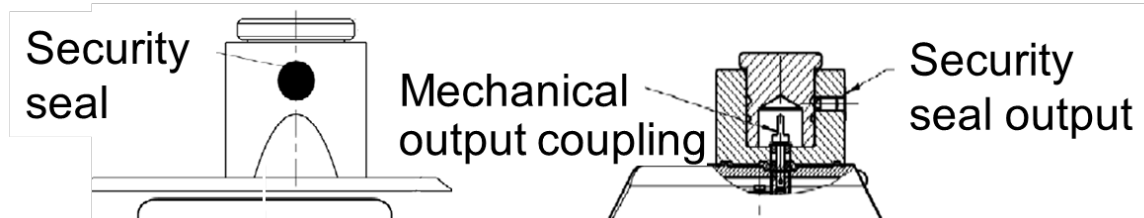
2.5.1.3 Coupling for the output shaft

**Notice**

The mechanical output of the ENCO08-M must be sealed, too.

**Front view**

**View rotated 90°  
sectional view**



## 3 Connection and commissioning

### 3.1 General

When selecting the cable, make sure that the permitted maximal values are taken into account according to the EC type examination certificate.

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The electrical Ex network must be realized with its own cable. Only a shielded cable may be used for the installation of the encoder; we recommend the cable LIYCY 2 x 0.75 mm<sup>2</sup>, sheath color blue.

The cable screen is connected on both sides. The shield is grounded on the non-hazardous supply side. At the other end of the cable, the shield is connected on the insulated metal housing of ENCO 08. The housing of ENCO 08 may also be earthed in potentially hazardous area, observing the regulations according to DIN EN 60079-14. The meter housings of turbine gas meters and rotary displacement meters as well as the aluminum housing of the ENCO 08-M must be earthed.

A stable installation of the intrinsically safe cables is absolutely necessary. The connection cables must be equipped with wire end ferrules.

### 3.2 Electrical Data

Label:	Type: ENCO 08
Voltage $U_i$ :	13,5 V
Current $I_i$ :	15 mA
Power $P_i$ :	51 mW
$C_i$ :	neglectable
$L_i$ :	neglectable

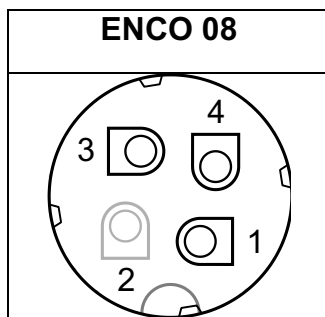
The device complies with the following regulations and standards:

- ATEX guideline: 2014/34/EU
- EN 60079-0
- EN 60079-11
- EN 60079-14
- EMV guideline: 2014/30/EU
- OIML R137-1&2

- OIML D11
- Digital interface for primary devices with transmission of the meter readings
- EN 60947-5-6

The applicable regulations and directives must always be observed during installation and operation.

### 3.3 Electrical connections



Contact	
1	Vo +
2	-
3	Vo -
4	PE

The connection of the digital signal  $V_o$  is realized via the sockets 1 and 3.

### 3.4 Data protocol

The electronically recorded totalizer reading is transmitted in a data protocol "Digital interface for primary devices with meter reading transmission" in specified time intervals.

A two-wire interface according to EN 60947-5-6 (NAMUR threshold level specification) serves as the hardware layer for power supply during the data transmission.

The additional bidirectional interfaces on the ENCO 08 are only available in the service mode and enable operation, parameterization and flashing of the firmware in the factory or during maintenance work on site.

**⚠ Danger**

**Intrinsic safe operation is not guaranteed during the use of these interfaces!**

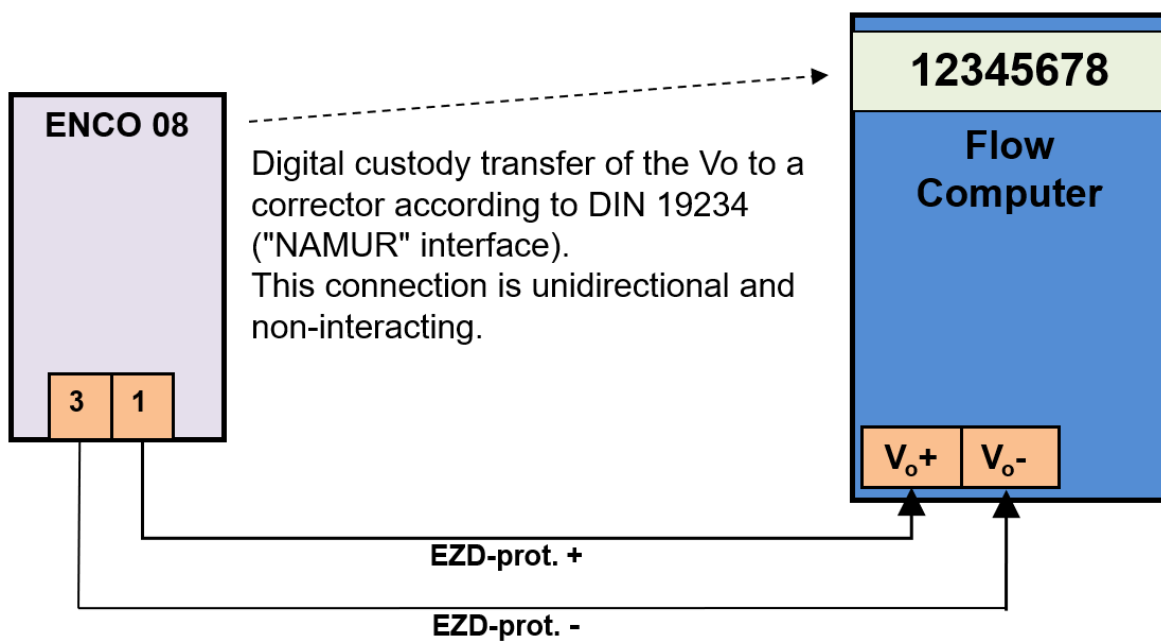


## 3.5 Putting into operation

### 3.5.1 ENCO 08

This version (integrated in totalizer heads F and G) **does not require a local parameterization**. The ENCO 08 is preset to the meter type with its specific data, tested and sealed at the RMG factory by the certified test lab using the user software.

During commissioning on site, only the connection (see connection examples) between ENCO 08 and the connected readout device must be established. The connection for the encoder is located on the back of the totalizer head (a plug from the company Binder of the series 713: 1 = Vo + // 3 = Vo -).



### 3.5.2 ENCO 08-M

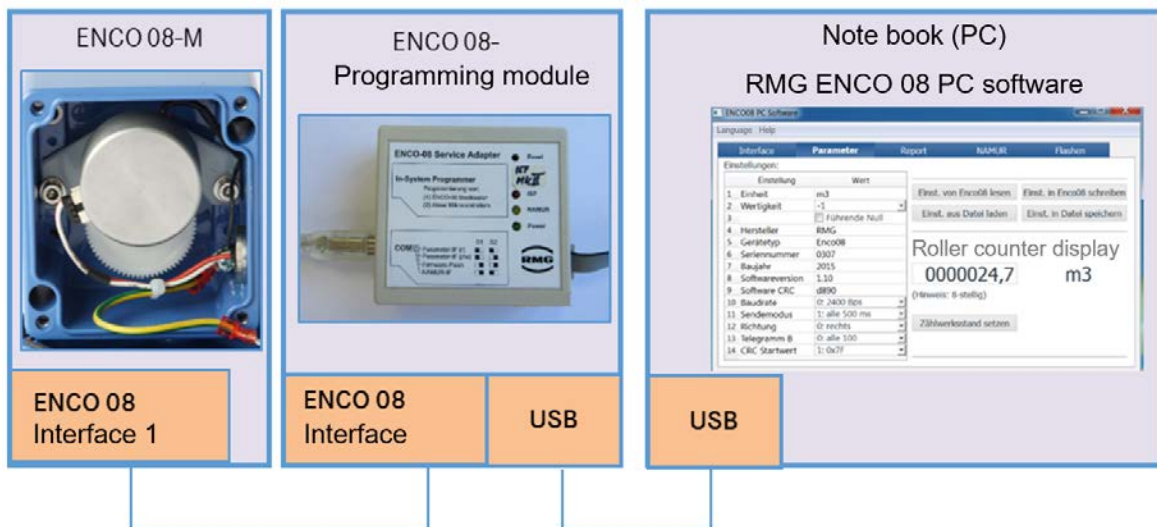
This version (external encoder) requires local parameterization. The ENCO 08-M must be parameterized to its specific data for the meter type to which it is attached (such as meter reading, decimal digits and direction of rotation) by means of the user software. This separate manual "ENCO 08 - Programming Manual" can be found in the help menu of the "ENCO08 PC Software". Here you will also find a short manual for this "ENCO08 PC Software".

The ENCO 08-M can be used without restriction on all RMG turbine meters and rotary displacement meters with mechanical output. The ENCO08-M can also be



mounted on all manufacturer-independent turbine and rotary displacement gas meters with mechanical output and a maximum of 9-digit roller counter, whereby for 8 rollers, the last scale division corresponds to the 9th digit.

The ENCO 08 programming module and the PC-ENCO user program (software) are required for parameter setting. This separate quick guide can be found in the help menu of the "ENCO08 PC Software".



When putting into operation on site, the connection (see connection examples) between ENCO 08-M and the connected readout device must still be established after the programming has been completed. On the housing side there is the connection for the encoder (plug from the company Binder of series 713).

#### 3.5.3 Connecting the gas flow

Please observe the operating instructions of the gas meter! The following applies to RMG turbine meters:

**⚠ Caution**

**Do not operate any downstream pipelines or system components through the turbine meter. Turbine rotation can occur that may lead to excessive stress or overload and cause damage.**

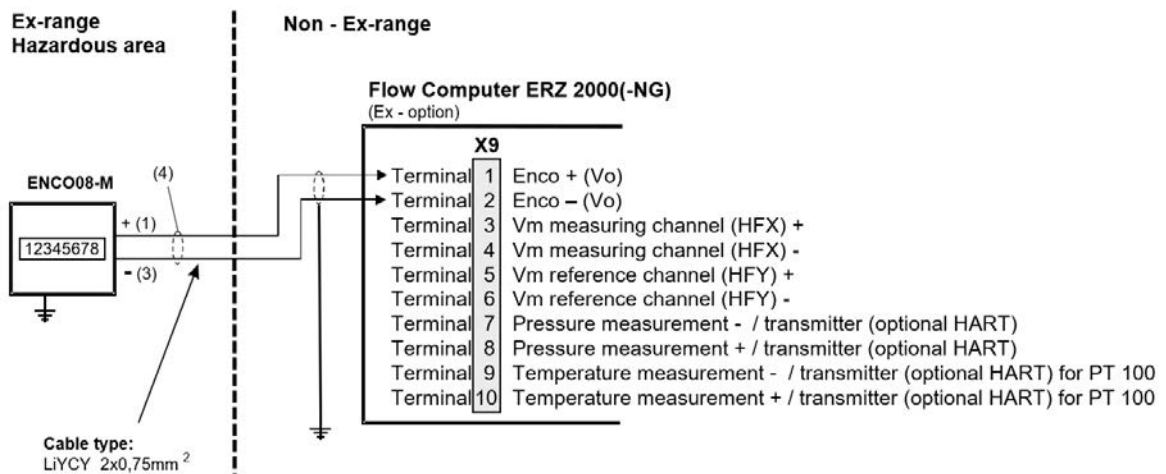
A short overload of 20% above the maximum flow rate  $Q_{\max}$  is permitted. In case of a smooth backflow, no damage occurs.

# Appendix

## Appendix A: connection example

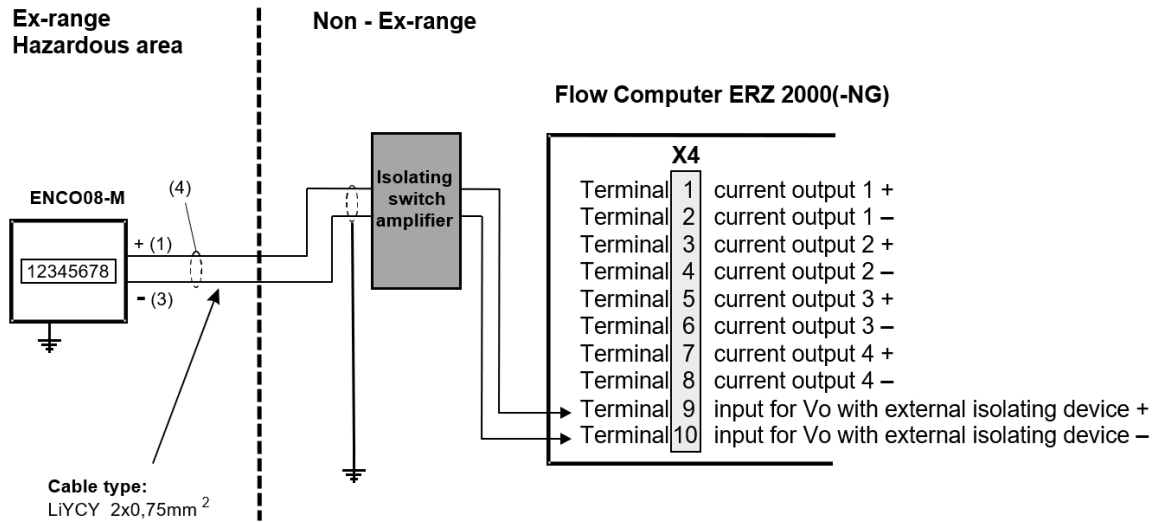
### Connection scheme to the flow computer ERZ 2000(-NG; -Di, ..)

When using the internal Ex separating stage, terminals X9 are assigned on the ERZ:

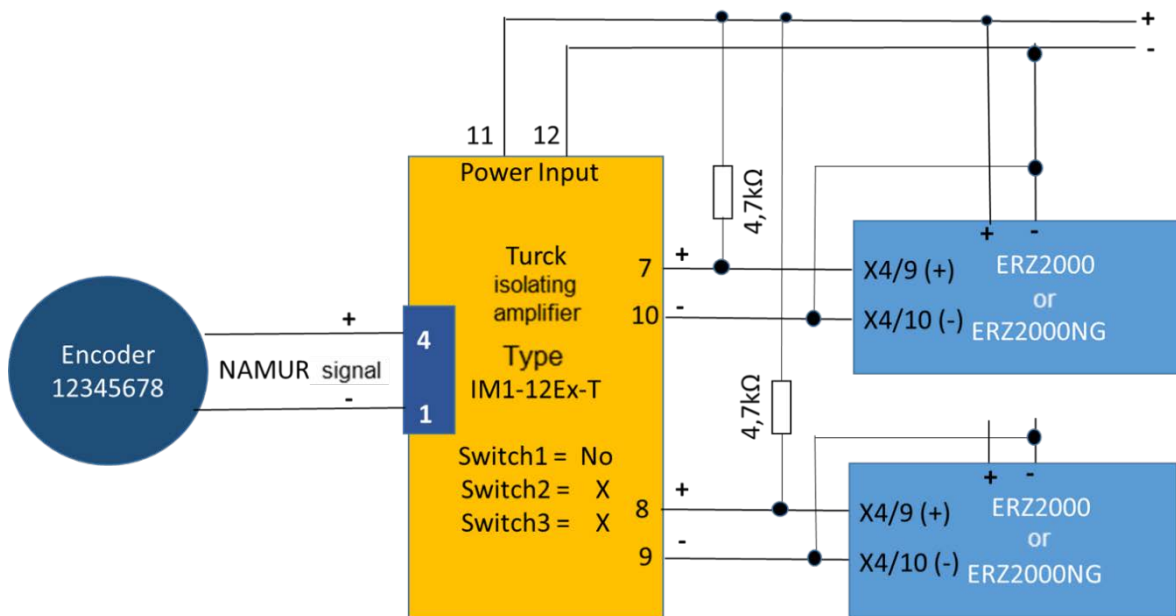


When used without internal Ex separating stage, terminals X4 are assigned on the ERZ:

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With recommendation of the Turck isolation switch amplifier type IM1-12Ex-T, the wiring of encoder to X4 connector on the ERZ2000-NG can be realized as follows:



## Appendix B: certificates / standards

**ENCO 08 (-M) has the following approvals, which are listed below:**

- Type examination certificate

33

### **Metrologic approval**

- Certificate of Conformity according OIML R137-1 (2012), EN12261: + A1, EN12480 + A1 (NMI: CoC-15200211-01)

### **Ex-approval**

- ATEX according EN60079-11, EN60079-0 + A11 (BVS 15 ATEX E 041 X)
- Labeling: II 2G Ex ib IIC T6

- **EU-Declaration of Conformity**

- **Declaration of Conformity due to MessEG**



Physikalisch-Technische Bundesanstalt  
Nationales Metrologieinstitut

KBS

Konformitätsbewertungsstelle



## Baumusterprüfbescheinigung

*Type-examination Certificate*

<b>Ausgestellt für:</b> <i>Issued to:</i>	RMG MESSTECHNIK GmbH Otto-Hahn-Str. 5 35510 Butzbach	
<b>gemäß:</b> <i>In accordance with:</i>	Anlage 4 Modul B der Mess- und Eichverordnung vom 11.12.2014 (BGBI. I S. 2010) <i>Annex 4 Modul B of the Measures and Verification Ordinance dated 11.12.2014 (Federal Law Gazette I, p. 2010)</i>	
<b>Geräteart:</b> <i>Type of instrument:</i>	Gebergerät für Zählwerkstände <i>Transmitter unit for meter reading</i>	
<b>Typbezeichnung:</b> <i>Type designation:</i>	ENCO 08-M	
<b>Nr. der Bescheinigung:</b> <i>Certificate No.:</i>	DE-16-M-PTB-0021, Revision 2	
<b>Gültig bis:</b> <i>Valid until:</i>	11.05.2026	
<b>Anzahl der Seiten:</b> <i>Number of pages:</i>	11	
<b>Geschäftszeichen:</b> <i>Reference No.:</i>	PTB-1.42-4089935	
<b>Nr. der Stelle:</b> <i>Body No.:</i>	0102	
<b>Zertifizierung:</b> <i>Certification:</i>	Braunschweig, 28.03.2018	<b>Bewertung:</b> <i>Evaluation:</i>
<b>Im Auftrag</b> <i>On behalf of PTB</i>	<b>Siegel</b> <i>Seal</i>	<b>Im Auftrag</b> <i>On behalf of PTB</i>

Dr. Rainer Kramer



Dr. Roland Schmidt

Baumusterprüfbescheinigungen ohne Unterschrift und Siegel haben keine Gültigkeit. Diese Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden. Auszüge bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.  
*Type-examination Certificates without signature and seal are not valid. This Type-examination Certificate may not be reproduced other than in full. Extracts may be taken only with the permission of the Physikalisch-Technische Bundesanstalt.*

R3-0012



Translation

**EC-Type Examination Certificate**

- (1) **EC-Type Examination Certificate**
- (2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC
- (3) No. of EC-Type Examination Certificate: **BVS 15 ATEX E 041 X**
- (4) Equipment: **Rotary Counter type ENCO-08**
- (5) Manufacturer: **RMG Messtechnik GmbH**
- (6) Address: **Otto-Hahn-Straße 5, 35510 Butzbach, Germany**
- (7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.
- (8) The certification body of DEKRA EXAM GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in the Test and Assessment Report BVS PP 15.2067 EG.
- (9) The Essential Health and Safety Requirements are assured by compliance with:
  - EN 60079-0:2012 + A11:2013 General requirements**
  - EN 60079-11:2012 Intrinsic Safety "i"**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.
- (11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment shall include the following:

 **II 2G Ex ib IIC T6**

DEKRA EXAM GmbH  
Bochum, dated 2015-04-02

Signed: Simanski

Signed: Dr. Wittler

Certification body

Special services unit



Page 1 of 2 of BVS 15 ATEX E 041 X  
This certificate may only be reproduced in its entirety and without any change.  
DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,  
telephone +49.234.3696-105, Fax +49.234.3696-110, zs-exam@dekra.com

(13) Appendix to

(14) **EC-Type Examination Certificate**  
**BVS 15 ATEX E 041 X**

(15) 15.1 Subject and type  
Rotary Counter type ENCO-08

15.2 Description  
The Rotary Counter type ENCO-08 is designed for installation inside mechanical totalizer turbine meters / totalizer rotary meters and comes with a metallic enclosure containing a printed circuit board and an electrical / mechanical pulse probe.  
The electrical / mechanical pulse probe is driven by means of an axle extruding from the enclosure, fitted with a gear wheel.  
The intrinsically safe supply and signal circuit (standardised 2-wire NAMUR switching level interface) is fitted with a connection facility.

15.3 Parameters

15.3.1 Intrinsically safe supply- and signal-circuit

Voltage	$U_i$	DC	13.5 V
Current	$I_i$		15 mA
Power	$P_i$		51 mW
Effective internal capacitance	$C_i$		negligible
Effective internal inductance	$L_i$		negligible

15.3.2 Ambient temperature range  $-40\text{ °C} \leq T_a \leq +57\text{ °C}$

15.3.3 Maximum revolution rate: 6000 U/min

(16) Test and Assessment Report  
BVS PP 15.2067 EG as of 2015-04-02

(17) Special conditions for safe use

17.1 The Rotary Counter type ENCO-08 shall be mounted inside a housing providing degree of protection IP20 according to EN 60529 as a minimum.

17.2 Wiring inside the housing shall comply with requirements of EN 60079-11:2012, clauses 6.3.12 and 7.6.e.

17.3 Terminals and connectors carrying the intrinsically safe supply- and signal-circuit shall be arranged according to EN 60079-11:2012, clause 6.2.1 or 6.2.2.

---

We confirm the correctness of the translation from the German original.  
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH  
44809 Bochum, 2015-04-02  
BVS-Scha/Ma A 20131071




\_\_\_\_\_  
 Certification body

\_\_\_\_\_  
 Special services unit

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telephone +49.234.3696-105, Fax +49.234.3696-110, zs-exam@dekra.com



**Translation**

**1 EU-Type Examination Certificate Supplement 1**  
Change to Directive 2014/34/EU

**2 Equipment intended for use in potentially explosive atmospheres**  
Directive 2014/34/EU

**3 EU-Type Examination Certificate Number: BVS 15 ATEX E 041 X**

**4 Product: Rotary Counter type ENCO-08**

**5 Manufacturer: RMG Messtechnik GmbH**

**6 Address: Otto-Hahn-Straße 5, 35510 Butzbach, Germany**


**7** This supplementary certificate extends EC-Type Examination Certificate No. BVS 15 ATEX E 041 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

**8** DEKRA EXAM GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.  
The examination and test results are recorded in the confidential Report No. BVS PP 15.2067 EU.

**9** The Essential Health and Safety Requirements are assured in consideration of:  
**EN IEC 60079-0:2018 General requirements**  
**EN 60079-11:2012 Intrinsic Safety "i"**  
Except in respect of those requirements listed under item 18 of the appendix.

**10** If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

**11** This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

**12** The marking of the product shall include the following:  
 **II 2G Ex Ib IIC T6/T4 Gb**  
  
DEKRA EXAM GmbH  
Bochum, 2018-12-10

Signed: Jörg Koch

---

Certifier

Signed: Dr Michael Wittler

---

Approver

Page 1 of 3 of BVS 15 ATEX E 041 X / N1  
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DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,  
telephone +49.234.3696-105, fax +49.234.3696-110, zs-exam@dekra.com





17 **Special Conditions for Use**

17.1 The Rotary Counter type ENCO-08 shall be mounted inside a housing providing degree of protection IP20 according to EN 60529 as a minimum.

17.2 Wiring inside the housing shall comply with requirements of EN 60079-11:2012, clauses 6.3.12 and 7.6.e.

17.3 Terminals and connectors carrying the intrinsically safe supply- and signal-circuit shall be arranged according to EN 60079-11:2012, clause 6.2.1 or 6.2.2.

18 **Essential Health and Safety Requirements**

The Essential Health and Safety Requirements are covered by the standards listed under item 9. For this product the standard EN IEC 60079-0:2018 is equivalent to the harmonized standard EN 60079-0:2012 + A11:2013 in terms of safety.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

---

We confirm the correctness of the translation from the German original.  
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH  
Bochum, dated 2018-12-10  
BVS-Scha/Mu A 20180965

  
 \_\_\_\_\_  
 Certifier

  
 \_\_\_\_\_  
 Approver

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DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,  
telephone +49.234.3696-105, fax +49.234.3696-110, zs-exam@dekra.com



## Certificate of Conformity

number: CoC-SO16204614-01  
Page 1 of 4

Applicant : RMG Messtechnik GmbH  
Otto-Hahn-Strasse 5  
D-35510, Butzbach  
Germany

Issued by : NMI Certin B.V.  
Hugo de Grootplein 1  
3314 EG DORDRECHT  
The Netherlands

Submitted : **Electronic encoder** for a rotary or turbine gas meter

Manufacturer : RMG Messtechnik GmbH  
Type : ENCO 08 and ENCO 08-M

Characteristics : See page 3.

In accordance with : **OIML R 137-1 (2012)** "Gas meters"  
**EN12261:2002 + A1:2006** "Gas meters – Turbine gas meters"  
**EN12480:2002 + A1:2006** "Gas meters – Rotary displacement gas meters"

The described product is tested according to the above mentioned product standards and meet the essential requirements, based on a non-recurrent examination. However, the requirements for radiated electromagnetic fields, as stated in the OIML R 137-1 (2012), are not fully covered as indicated by means of the remark on page 2.

The appertaining test data is presented in the (type evaluation) reports as given on page 2.

Dordrecht, 20 December 2016  
NMI Certin B.V.

  
C. Oosterman  
Head Certification Board

NMI Certin B.V.  
Hugo de Grootplein 1  
3314 EG Dordrecht  
The Netherlands  
T +31 78 6332332  
certin@nmi.nl  
www.nmi.nl

This document is issued under the provision that no liability is accepted and that the applicant shall indemnify third-party liability.

The designation of NMI Certin B.V. as Notified Body can be verified at <http://ec.europa.eu/enterprise/newapproach/ndb/>

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## Certificate of Conformity

number: CoC-SO16204614-01  
Page 2 of 4

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### 1. Test data

The conformity was established by the results of tests and examinations provided in the associated OIML R 137-1 (2012) type evaluation report granted by NMI:

- No. NMI-15200211-02 dated 2 April 2015 that includes 19 pages;

and WELMEC 7.2 test report granted by NMI:

- No. NMI-15200211-03 dated 2 April 2015 that includes 9 pages.

Furthermore the following (third party) reports are used for evaluating the compliance of the encoder to the (normative) documents:

- Nemko GmbH & Co. KG, EMC documents  
No. FS-1410-272135 dated 29 October 2014 that includes 40 pages [\*];  
No. FS-1410-271992 dated 27 October 2014 that includes 40 pages [\*].
- TÜV SÜD Product Service GmbH, sealing test of degree of protection  
No. 713052617Rev.1 dated 25 November 2014 that includes 8 pages.
- EN12261 Output shaft / magnetic drive units  
"Drehmomentmessung am ENCO08M\_20140902" dated 2 September 2014 that includes 1 page;  
"5.2.10 Ausgangswelle" dated 1 December 2004 that includes 23 pages.

A remark with respect to the reports, marked above with an asterisk [\*], has to be made regarding the "radiated electromagnetic fields disturbance tests". The following test levels were used:

- 80 MHz ... 2 GHz; 10 V/m.
- 2 GHz ... 2,7 GHz; 5 V/m.

According the OIML R137-1&2 (2012) the field strength should be 10 V/m from 80 MHz...3 GHz. This is not fully covered in the given test reports.



# Certificate of Conformity

number: CoC-SO16204614-01  
Page 3 of 4

## 2. Characteristics of the encoder

Table 1 gives the general characteristics of the encoder type. Table 2 specifies in detail the essential characteristics.

Table 1: general characteristics	
Destined for assembly on a mechanical output shaft according	EN12261:2002 + A1:2006, article 7.4 EN12480:2002 + A1:2006, article 7.3
Mechanical class	M2
Electromagnetic class	E2
Ambient temperature range	-25 °C / +55 °C
Designed for	Condensing humidity
Orientation	Horizontal / Vertical up / Vertical down All orientations

Table 2: essential characteristics	
Data transmission from encoder to EVHI	NAMUR interface (plug in connector)
Transmitted data (at least each 500 ms)	Unidirectional consisting of: Mechanical indicating device reading ( $V_0$ ), unit and status
Minimum needed torque	0,11 N.mm
Deviation compared to mechanical indicating device (due to rounding on the last digit a reasonable test time should be considered to determine the given accuracy)	<0,05%
Power supply	The encoder is powered by the movement of the turbine wheel and has no internal battery or external power supply
Software identification given on the name plate	Version number: 1.10    Checksum: d890 Version number: 1.11    Checksum: 7662

## 3. Installation conditions

The encoder can be installed on any turbine or rotary meter with an output shaft according the EN12261:2002+A1:2006 or EN12480:2002+A1:2006 which are suitable to drive ancillary devices with a minimum needed torque of 0,11 N.mm. The encoder has to be installed according the applicable user manual.

The connection between the (mechanical) indicating device of the meter and the encoder is sealed. The name plate stickers are tamper proof.



## Certificate of Conformity

number: CoC-SO16204614-01  
Page 4 of 4

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#### 4. Device description

The encoder, type ENCO 08 and ENCO 08-M, serves for the registration and digitalization of the indicating device reading for gas meters. The data exported by the encoder shall be displayed by a Volume Conversion Device or comparable device.

The encoder distinguishes two models:

- ENCO 08; the encoder is directly installed in the mechanical indicating device type "G" of the RMG turbine or rotary gas meter.
- ENCO 08-M; the encoder, placed in an external housing, is directly installed on a gas meter with standardized mechanical drive shaft (output coupling) in accordance with normative documents as mentioned in table 1.

Whether or not the measuring instrument intended for utility measurement purposes can be remotely read (via the encoder) it shall in any case be fitted with a metrologically controlled display (for instance a mechanical indicating device) accessible without tools to the consumer. The reading of this display is the measurement result that serves as the basis for the price to pay according the Directive 2014/32/EU, annex I, article 10.5.

The deviation between the output of the electronic encoder and the metrologically controlled display (mechanical indicating device) has been smaller than 0,05% during the conditions as listed in the harmonized standards or normative documents as given on the front-page. The electronic encoder output (which is a derivative of the cumulated volume given by the metrologically controlled display), can be used as the basis for the price to pay taking into account the given maximum deviation between both indications.

Reliable Measurement of Gas



**EU-Declaration of Conformity**  
**EU-Konformitätserklärung**



We **RMG Messtechnik GmbH**  
Wir Otto – Hahn – Straße 5  
35510 Butzbach  
Germany

Declare under our sole responsibility that the product is in conformity with the directives. Product is labeled according to the listed directives and standards and in accordance with the Type-Examination. Erklären in alleiniger Verantwortung, dass das Produkt konform ist mit den Anforderungen der Richtlinien. Das entsprechend gekennzeichnete Produkt ist nach den aufgeführten Richtlinien und Normen hergestellt und stimmt mit dem Baumuster überein.

Product **Rotary Counter Type ENCO 08 and ENCO 08-M**  
Produkt **Encoder-Drehgeber Typ ENCO 08 und ENCO 08-M**

Harmonisation Legislations <i>Harmonisierungsrechtsvorschriften</i>	EMV	ATEX
<b>EU- Directives</b> <i>EU-Richtlinie</i>	2014/30/EU	2014/34/EU
<b>Marking</b> <i>Kennzeichen</i>	---	II 2G Ex ib IIC T6/T4 Gb
<b>Normative Documents</b> <i>Normative Dokumente</i>	EN 61000-6-3:2007 +A1:2011 EN 61000-6-2:2005	EN 60079-0:2012 + A11:2013 EN 60079-11:2012
<b>EC Type-Examination issued by</b> <i>EG-Baumusterprüfung ausgestellt durch</i>	Prüfbericht / Test Report: FS-1410-271992 (ENCO 08) and FS-1410-272135 (ENCO 08-M) Nemko GmbH Germany	BVS 15 ATEX E 041 X  DEKRA EXAM Germany
<b>Approval of a Quality System by</b> <i>Anerkennung eines Qualitätssicherungs-systems durch</i>	---	Modul D BVS 17 ATEX ZQS/E139 Notified Body: 0158 DEKRA EXAM Germany



The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Der oben beschriebene Gegenstand der Erklärung erfüllt die Vorschriften der Richtlinie 2011/65/EU des Europäischen Parlaments und des Rates vom 8. Juni 2011 zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten.

**RMG Messtechnik GmbH**  
Butzbach, den 01.03.2019

Thorsten Dietz, Managing Director

Michael Schöch, Engineering Manager

Sitz der Gesellschaft Butzbach • Registergericht Friedberg HRB 2535  
Geschäftsführung Barbara Baumann, Thorsten Dietz  
Qualitätsmanagement DIN EN ISO 9001:2015

Seite 1 von 1



Reliable Measurement of Gas



### Konformitätserklärung

Wir, **RMG Messtechnik GmbH**,  
 Otto – Hahn – Straße 5,  
 35510 Butzbach,  
 Germany,

erklären als Hersteller in alleiniger Verantwortung, dass nachfolgende Produkte die Anforderungen des **Mess- und Eichgesetzes (MessEG)** und die der darauf gestützten Rechtsverordnungen einhalten:

Typenbezeichnung	Gerätebezeichnung	Zulassungsunterlage
EC 900	Höchstbelastungs-Anzeigergerät und Belastungs-Registriergerät	7.732 / 08.41 innerstaatl. Bauartzulassung
MRG 905	Höchstbelastungs-Anzeigergerät und Belastungs-Registriergerät	7.732 / 06.34 innerstaatl. Bauartzulassung
MRG 910	Höchstbelastungs-Anzeigergerät und Belastungs-Registriergerät	7.732 / 01.22 innerstaatl. Bauartzulassung
MRG 2203	Elektronisches Zusatzgerät für Brennwertmessgeräte, Messwertregistriergerät für Gasbeschaffungsdaten	7.690 / 04.52 innerstaatl. Bauartzulassung
ENCO	Gebergerät für Zählwerksstände	7.711 / 02.03 innerstaatl. Bauartzulassung
ENCO 08-M	Gebergerät für Zählwerksstände	DE-16-M-PTB-0021 Baumusterprüfung

Folgende Rechtsvorschriften, einschlägige harmonisierte Normen, normative Dokumente, Regeln oder technische Spezifikationen wurden im Sinne des § 46 des Mess- und Eichgesetzes typenbezogen zugrunde gelegt:

Rechtsvorschriften	EC 900	MRG 905	MRG 910	MRG 2203	ENCO	ENCO 08-M
§ 6 (2) MessEG (25.07.2013) (BGBl. I S. 2722)	-	-	-	-	-	X
§ 7 (1) MessEG (11.12.2014) (BGBl. I S. 2010)	-	-	-	-	-	X
EO (12.08.1988) (BGBl. I, S 1657), zuletzt geändert durch Artikel 287 der 8. Zuständigkeitsanpassungsverordnung (25.11.2003)	-	X	-	-	-	-
EO-AV (12.08.1988), zuletzt geändert durch Artikel 287 der 8. Zuständigkeitsanpassungsverordnung (25.11.2003) (BGBl. I S 2304)	-	-	-	X	-	-
EO-AV (18.08.2000) (BGBl I, S. 1307)	-	-	X	-	-	-
EO-AV (21.06.1994) (BGBl I, S. 1293)	-	-	-	-	X	-
EO, Anlage 7, Abschnitt 3 (24.09.1992) (BGBl I, S. 1653)	-	-	-	-	X	-
EO, Anlage 7 in der am 31.12.2014 geltenden Fassung	-	-	-	-	-	X

## Reliable Measurement of Gas



Rechtsvorschriften	EC 900	MRG 905	MRG 910	MRG 2203	ENCO	ENCO 08-M
EO, Anlage 7 (12.08.1988), zuletzt geändert durch die 4. VO zur Änderung der EO (08.02.2007) (BGBl. I, S. 70)	X	-	-	-	-	-
EO, Anlage 7, Abschnitt 3 (18.08.2000) (BGBl. I, S. 1307)	-	-	X	-	-	-
EO-AV (12.08.1988) (BGBl. I S 1657), zuletzt geändert durch die 4. VO zur Änderung der EO (08.02.2007) (BGBl. I S. 70)	X	-	-	X	-	-
EO, Anlage 6, zuletzt geändert durch die 3. VO zur Änderung der EO (18.08.2000) (BGBl. I S. 1307)	-	X	X	-	-	-
EO, Anlage 7, zuletzt geändert durch die 3. VO zur Änderung der EO (18.08.2000) (BGBl. I S. 1307)	-	X	-	-	-	-
<b>Normative Dokumente</b>						
GM-AR (01.06.2002) (BAnz Nr. 108a vom 15.06.2002)	X	-	-	X	-	-
PTB-A 7.3 (04/1988)	-	-	X	X	X	-
PTB-A 7.3 (03/1996)	X	X	-	-	-	-
PTB-A 7.3 (11/2010)	-	-	-	-	-	X
PTB-A 6.3 (12/1990)	-	-	X	-	-	-
PTB-A 50.1 (12/1990)	-	-	-	-	-	-
PTB-A 50.1 (12/1989)	-	-	X	X	-	-
PTB-A 50.7 (04/2002)	X	X	-	X	-	X
<b>Anerkannte Regeln der Technik</b>						
Welmec-Leiffaden 7.2 (5/2011)	-	-	-	-	-	X
DVGW-Arbeitsblatt G 485 (09/1997)	-	-	-	X	-	-

Die Bewertung des Qualitätssystems erfolgte nach Modul D der Mess- und Eichverordnung (MessEV) durch die Konformitätsbewertungsstelle 0102 der Physikalisch-Technischen Bundesanstalt (PTB).

Die Anerkennung des Qualitätssystems wird mit dem Zertifikat DE-M-PTB023 bescheinigt.

Außerdem ist das Qualitätssystem gemäß DIN EN ISO 9001:2015 anerkannt.

**RMG Messtechnik GmbH**

Butzbach, 15.03.2019

  
Thorsten Dietz  
– Geschäftsführer –

  
Michael Schöch  
– Leiter Entwicklung –

*Subject to technical modification*

**For further information**

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to learn more about the RMG products.

**RMG Messtechnik GmbH**

Otto-Hahn-Straße 5  
35510 Butzbach, Deutschland  
Tel: +49 (0) 6033 897 – 0  
Fax: +49 (0) 6033 897 – 130  
Email: [service@rmg.com](mailto:service@rmg.com)

