

Special Documentation

Dosimag

Custody transfer

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1 Introduction

The Dosimag is suitable and certified for use as an optional component for volume measurement in legally regulated measuring systems in accordance with Appendix MI-005 of the European Measuring Instruments Directive 2014/32/EU (MID). The Dosimag is certified in accordance with OIML R117-1:2007/OIML R117-2:2014 and has an MID evaluation certificate confirming conformity with the basic requirements of the Measuring Instruments Directive.

It is used in conjunction with a Modbus output or double-pulse output, both of which are subject to legal metrology controls.

Generally a measuring device subject to legal metrological control is secured against tampering by seals on the transmitter or sensor. Usually, these seals may be broken only by an authorized representative of the responsible authority for legal metrology controls.

Once the measuring device has been sealed, write access is no longer possible.

Europe

Since the European Measuring Instruments Directive 2004/22/EC came into effect on 11.1.2006 and was replaced by 2014/32/EU on 4.20.2016, meters with the relevant marking can be placed on the market across the borders of all EU member states that have ratified the requirements of Appendix MI-005 of the European Measuring Instruments Directive and incorporated them into national law.

The associated declaration of conformity for the measuring device, as per the European Measuring Instruments Directive 2014/32/EU, was made in accordance with Module B. Module B: Type examination as per OIML R117: 2007 and OIML R117-2:2014

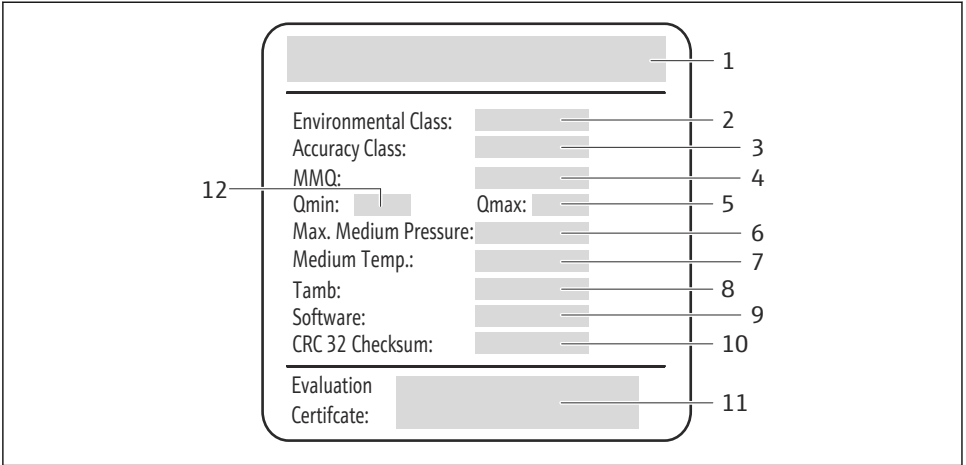
Outside Europe

Detailed ordering information for national approvals based on OIML R117 is available from your local Endress+Hauser sales center.

2 Product identification

Measuring devices for use subject to legal metrology controls are supplied with the relevant marking.

2.1 Europe

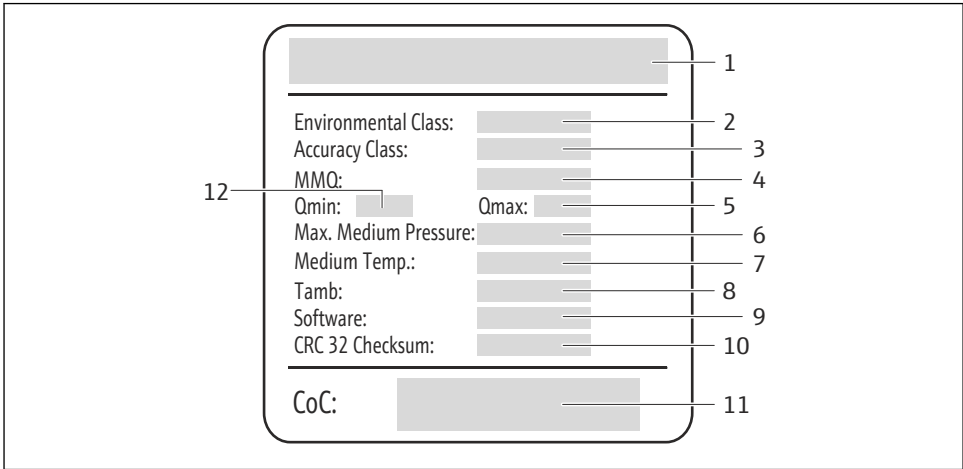


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1 Sensor nameplate, calibration required due to legal metrology controls, Europe

- 1 Name and nominal diameter of sensor
- 2 Permitted environmental classes
- 3 Accuracy class
- 4 Minimum quantity measured
- 5 Maximum permitted continuous flow rate Q_{max}
- 6 Maximum permitted medium pressure
- 7 Permitted medium temperature range
- 8 Permitted ambient temperature range
- 9 Double-pulse output only: software version
- 10 Double-pulse output only: CRC 32 checksum
- 11 Type approval number
- 12 Minimum permitted continuous flow rate Q_{min}

2.2 Outside Europe



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2 Sensor nameplate, calibration required due to legal metrology controls, outside Europe

- 1 Name and nominal diameter of sensor
- 2 Permitted environmental classes
- 3 Accuracy class
- 4 Minimum quantity measured
- 5 Maximum permitted continuous flow rate Q_{max}
- 6 Maximum permitted medium pressure
- 7 Permitted medium temperature range
- 8 Permitted ambient temperature range
- 9 Double-pulse output only: software version
- 10 Double-pulse output only: CRC 32 checksum
- 11 Marking of OIML R117 declaration of conformity
- 12 Minimum permitted continuous flow rate Q_{min}

i For a description of the standard transmitter and sensor nameplates, see the "Incoming acceptance and product identification" section of the Operating Instructions.

3 Operating conditions

The measuring device should be sized in such a way that, under normal operating conditions, it operates within the permitted ranges.

The measuring device is designed for:

Accuracy class	0.5
Temperature class	-40 to +60 °C (-40 to +140 °F)

Pressure range	1 to 600 kPa
Density range	800 to 1200 kg/m ³
Viscosity range	0.5 to 5.0 mPa × s
Orientation	Horizontal, vertical
Inlet run	From flange ≥ 10×DN
Outlet run	From flange ≥ 5×DN
Flow direction	Bidirectional
Test equipment	Measurement transducer, calculator, indicating device
Test equipment type	P

3.1 Flow characteristic values

The following flow characteristic values correspond to the metrology approval:

DN		Q min	Q max	MMQ
[mm]	[in]	[l/min]	[l/min]	[l]
8	$\frac{5}{16}$	2	10	2
15K ¹⁾	$\frac{1}{2}K^{1)}$	2	40	2
15	$\frac{1}{2}$	4	80	2
25	1	8	160	4

1) conical version corresponds to DN 12

4 Delivery status

The measuring devices are always supplied in an unlocked state. Within Europe, the EU type-examination certificate as per the Measuring Instrument Directive 2014/32/EU (MID), Annex MI-005, stipulates that the manufacturer of the measuring system is responsible for locking the measuring system correctly. The manufacturer of the measuring system is thus responsible for locking the measuring device as a component.

This applies also to measuring devices with a certificate of conformity as per OIML R117 that are supplied as a component of measuring systems as per OIML R117. Here also, the system manufacturer is responsible for locking the measuring device as a system component.

4.1 Modbus output

For measuring devices with a Modbus output, the "Assign status input" parameter used for locking at the software end is set to "Positive zero return" in the factory. Therefore, the custody transfer mode can be put into operation without further software settings. It is recommended that you do not change this parameter.

5 Custody transfer measurement

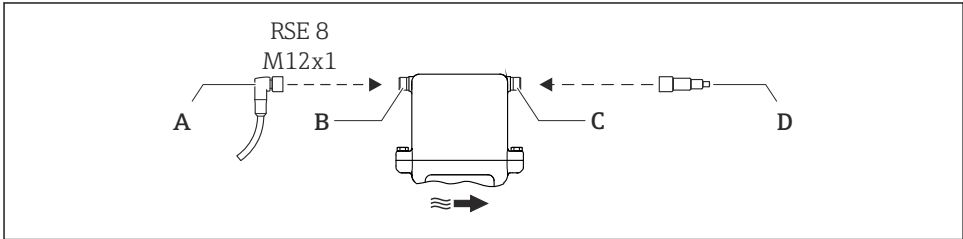
Depending on the output option ordered, the measuring device is supplied with a dongle with safety clip for the Modbus output or a cable converter with safety clip for the double-pulse output. The use of either of these prevents write access to the measuring device.

5.1 Locking/unlocking custody transfer mode

Each of the Dosimag's output options has its own locking concept.


5.1.1 Modbus output

The measuring device is locked for custody transfer mode by setting the "Assign status input" parameter to "Positive zero return". This setting has already been performed in the factory. To lock, screw on the dongle. To unlock, unscrew and remove the dongle.



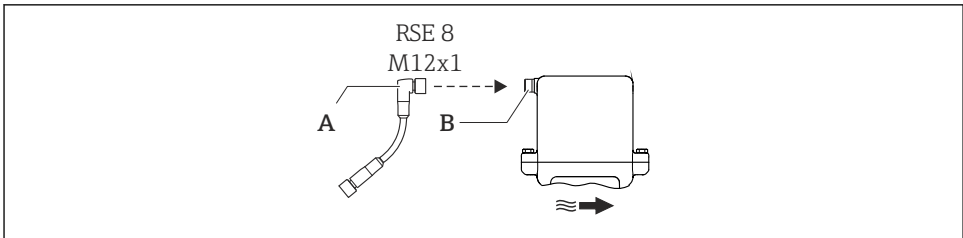
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- A Coupling: Supply voltage, Modbus RS485
- B Connector: Supply voltage, Modbus RS485
- C Coupling on measuring device
- D Connector: Dongle (hardware write protection for custody transfer mode)

 Write protection is enabled only if the "Assign status input" parameter is set to "Positive zero return" and the dongle is screwed on the coupling on the measuring device.

5.1.2 Double-pulse output only

For electronic locking and unlocking of the measuring device for custody transfer mode, a cable converter is used.



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- A Coupling: cable converter, supply voltage
- B Connector: Supply voltage, pulse/freq./switch output

The cable converter reduces the coupling wires so that only the double-pulse output is connected. This blocks write access via the service interface.

5.2 Obtaining a readout of the software version, CRC 32 checksum and locking status


5.2.1 Modbus output

The Modbus output is a bidirectional interface. Information on the software version and the CRC 32 checksum can be read out via special registers.

Parameter	Register	Data type	Access
Firmware version	7277	String	Read
CodeCRC	20386	String	Read
Locking status	4918	uint16	Read ¹⁾

1) The final bit provides information on the locking status. 1 = locked; 0 = unlocked

5.2.2 Double-pulse output only


The double-pulse output is a unidirectional interface. Therefore, communication with the measuring device is not possible. Information on the software version and the 32 checksum is provided on the nameplate. →  5

5.3 Enabling or disabling custody transfer mode

5.3.1 Enabling custody transfer mode

Prerequisite: The measuring device is operational and is not in a calibrated state.

Any modifications made on site to the measuring device must comply with the relevant national regulations. As a rule, modifications to the measuring device may be carried out only under the supervision of an authorized representative of the responsible authority for legal metrology controls!

1. For devices with a Modbus output, set the "Locking status" parameter to "On".
2. Attach the dongle or cable converter to the connector and screw tight.
3. Place the safety clip over the screw connection and click into place.
4. Secure the safety clip using a cable and a seal.
5. For devices with a Modbus output, query the "Locking status" parameter →  9.

5.3.2 Disabling custody transfer mode

Prerequisite: The measuring device is operational and is in a calibrated state.

Any modifications made on site to the measuring device must comply with the relevant national regulations. As a rule, modifications to the measuring device may be carried out only

under the supervision of an authorized representative of the responsible authority for legal metrology controls!

1. Break the seal on the safety clip.
2. Remove the safety clip.
3. Unscrew the dongle or cable converter and remove.
4. For devices with a Modbus output, set the "Locking status" parameter to "Off".

6 Repeated calibration due to legal metrology controls

The operator is obliged to obtain reapproval in accordance with the applicable national regulations. The reapproval deadline (year) may be recorded on a special seal on the measuring device.

For measuring devices placed on the market in accordance with EU type-examination certificate as per Measuring Instruments Directive 2014/32/EU (MID), Annex MI-005, the first reapproval deadline is based on the year indicated on the additional nameplate.

7 Sealing the Modbus and double-pulse version

For custody transfer mode, the dongle or cable converter is sealed with the housing. This prevents tampering. The use of a safety clip ensures that the dongle cannot be unscrewed. This safety clip is protected by a safety cable and a seal.



Europe

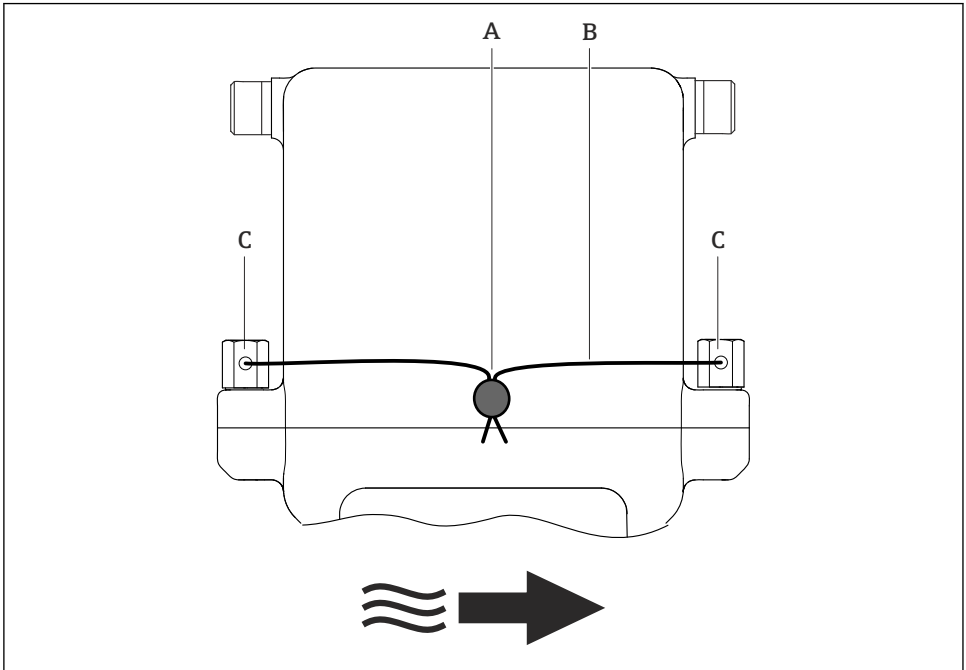
For measuring devices in accordance with EU type-examination certificate as per Measuring Instruments Directive 2014/32/EU, it is the responsibility of the system manufacturer to implement the system in accordance with the applicable requirements regarding lead sealing. Following successful installation and configuration, the dongle or cable converter must be connected and sealed.



Outside Europe

In the case of measuring devices with a declaration of conformity as per OIML R117, the customer is expected to place the measuring device on the market and to ensure that locally applicable requirements as regards the sealing of the measuring device are implemented correctly. This must be done in consultation with the competent national authority for legal metrology controls. This is normally performed under the supervision of an authorized representative of the competent national calibration authority.

7.1 Sealing the housing in the Modbus and double-pulse version



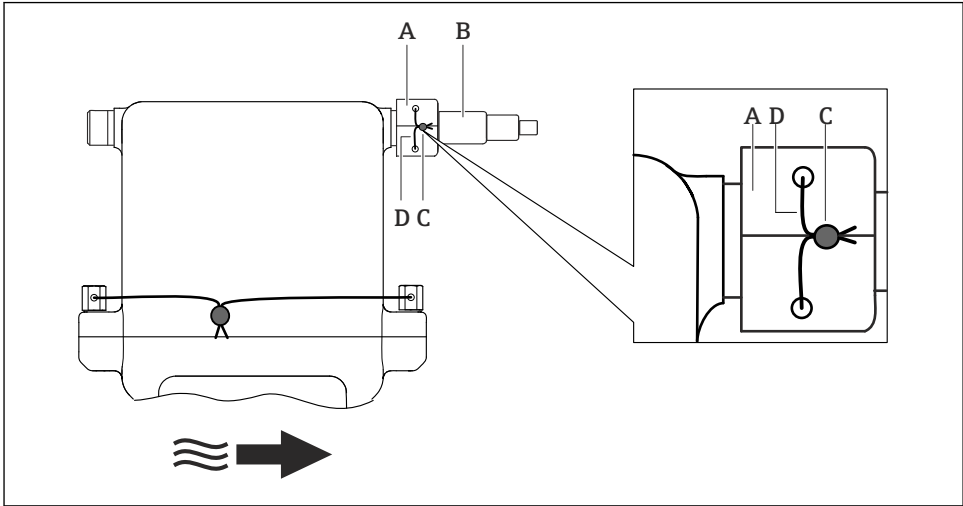
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3 Sealing the Dosimag housing

- A Seal
- B Safety cable
- C Sealing screws

1. Pull the safety cable through the sealing screws.
2. Guide the safety cable through the seal.
3. Press the seal shut.

7.2 Sealing the Modbus output



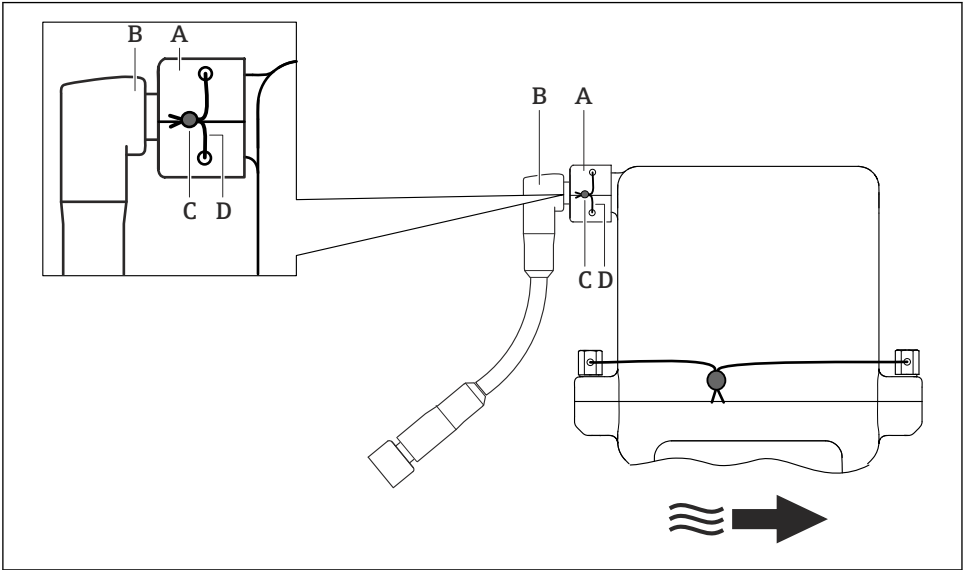
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4 Modbus output seal

- A Safety clip
- B Dongle (hardware write protection for custody transfer mode)
- C Seal
- D Safety cable

1. Place safety clip around the dongle.
2. Pull the safety cable through the safety clip.
3. Guide the safety cable through the seal.
4. Press the seal shut.

7.3 Sealing the double-pulse output



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5 Double-pulse output seal

- A Safety clip
- B Cable converter (hardware write protection for custody transfer mode)
- C Seal
- D Safety cable

1. Place safety clip around the cable converter.
2. Pull the safety cable through the safety clip.
3. Guide the safety cable through the seal.
4. Press the seal shut.

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