

Special Documentation

LNGmass D8LB

Custody transfer

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1 Document information

1.1 Document function

This manual is Special Documentation that describes the use of the device in custody transfer measurement.

NOTICE

When installing:

- ▶ Follow the Operating Instructions for the device.

1.2 Using this document

1.2.1 Information on the document structure










For the arrangement of the parameters as per the **Operation** menu, **Setup** menu, **Diagnostics** menu, along with a short description, see the Operating Instructions for the device




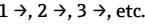
For information about the operating philosophy, see the "Operating philosophy" chapter in the device's Operating Instructions

1.3 Symbols used

1.3.1 Symbols for certain types of information

Symbol	Meaning
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Notice or individual step to be observed
	Series of steps
	Result of a step

1.3.2 Symbols in graphics

Symbol	Meaning
	Item numbers
	Series of steps of individual, consecutive images

Symbol	Meaning
1, 2, 3, ...	Series of steps within an image
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections

1.4 Documentation

This manual is Special Documentation. It is not a substitute for the Operating Instructions supplied with the device.

For detailed information, refer to the Operating Instructions and other documentation on the CD-ROM provided or visit "www.endress.com/deviceviewer".

The Special Documentation is an integral part of the following Operating Instructions:

2 Basic safety instructions

2.1 Requirements for personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

3 Product description

The measuring device is tested according to the internationally recognized OIML Recommendations and has national or EC type-examination certification for the use subject to legal metrological control.

The measuring device does not have an onsite display, and is used exclusively with a legally controlled Modbus Interface.

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.

After putting the device into circulation or after sealing the device, operation is only possible to a limited extent.

Europe

Since the European Measuring Instruments Directive 2004/22/EC came into effect on November 1, 2006 and was replaced by 2014/32/EU on April 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 Annex VII (MI-005) of the European Measuring Instruments Directive and incorporated them into national law.

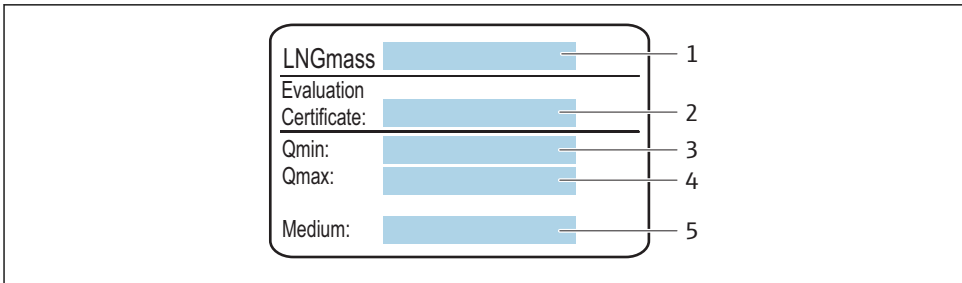
The associated declaration of conformity for the measuring device, as per the European Measuring Instruments Directive 2014/32/EU, was made in accordance with Module B: Module B: Type examination according to OIML R81:1998, OIML R117-1:2007 and OIML R117-2:2014

Outside Europe

Detailed ordering information for national approvals based on OIML R81 or OIML R117 is available from your local Endress+Hauser sales center.

4 Product identification

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



A0031761

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

- 1 Name and nominal diameter of sensor
- 2 Number of the evaluation certificate.
- 3 Minimum permanent flowrate Q_{min}
- 4 Maximum permanent flowrate Q_{max}
- 5 Permitted medium

5 Operation and commissioning

5.1 Operating conditions

Refer to the national or EC type-examination certificates for the operating conditions.

The measuring device is a flowmeter suitable for custody transfer measurement for:

Measuring device	Medium
LNGmass	Cryogenic liquids

5.2 Delivery status



Europe

The measuring device is not locked when delivered. In accordance with Measuring Instruments Directive 2014/32/EU, Annex I ("Essential requirements") the system manufacturer is responsible for the correct implementation of the requirements with regard to the locking and sealing of the measuring device as part of the manufacturer's approved measuring system according to Measuring Instruments Directive 2014/32/EU, Annex VII (MI-005).



Outside Europe

The measuring device is not locked when delivered. The customer is expected to place the measuring device on the market with the involvement of the competent national calibration authority and correctly implement the locally applicable requirements as regards the locking and sealing of the measuring device. The authorized representative of the national authority for legal metrology controls is responsible for any information required in this regard.

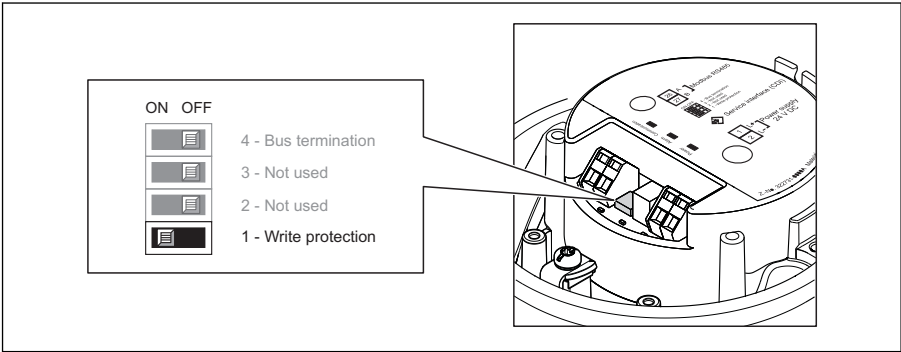
5.3 Custody transfer mode

i National rules or regulations must be observed when performing custody transfer.

5.3.1 Enabling custody transfer mode

The measuring device must be locked with write protection for custody transfer measurement. No parameters can be changed when the device is locked. Application-specific settings must be made before locking. When the device is locked, totalizer 3 can still be reset and can also be reset in the custody transfer mode.

1. Release the securing clamp and the sealing screw on the housing cover.
2. Unscrew the housing cover.
- 3.



A0017954

Setting the write protection switch on the main electronics module to the **ON** position enables the hardware write protection. Setting the write protection switch on the main electronics module to the **OFF** position disables hardware write protection.

4. Reverse the removal procedure to reassemble the transmitter.
5. Fit the securing clamp and the sealing screw.
6. Have the measuring device sealed by an authorized person or the responsible authority for legal metrology controls.

i As soon as the measuring device has been locked via write protection, this is entered in the logbook.

5.3.2 Disabling custody transfer mode

The measuring device can be reset from the custody transfer mode at all times. Break open the seal and set the write protection switch to the **OFF** position as described under "Enabling custody transfer mode".

i Once the seal has been broken, the measuring device may no longer be used in custody transfer. If the measuring device is to be used again in custody transfer, the measuring device must be put into circulation again.

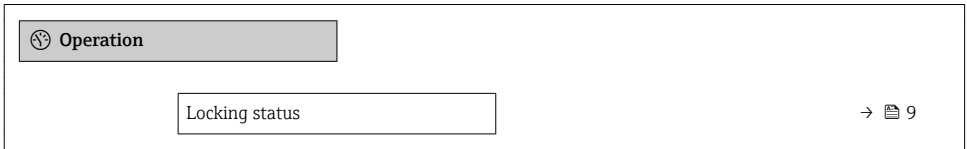
5.3.3 Reading custody transfer-related parameters

Reading the locking status

The locking status can also be read in the Locking Status parameter via Modbus RS485 registers.

Navigation

"Operation" menu → Locking status



Parameter overview with brief description

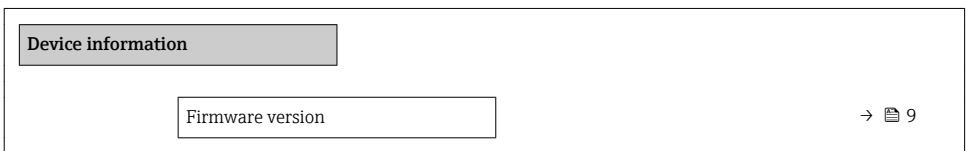
Parameter	Description	User interface
Locking status	Indicates the write protection with the highest priority that is currently active.	<ul style="list-style-type: none"> ▪ Hardware locked ▪ Temporarily locked

Reading the firmware version

The firmware version can also be read in the Firmware Version parameter via Modbus RS485 registers.

Navigation

"Diagnostics" menu → Device information → Firmware version



Parameter overview with brief description

Parameter	Description	User interface	Factory setting
Firmware version	Displays the device firmware version installed.	Character string with the following format: xx.yy.zz	01.03

Reading the CRC checksum

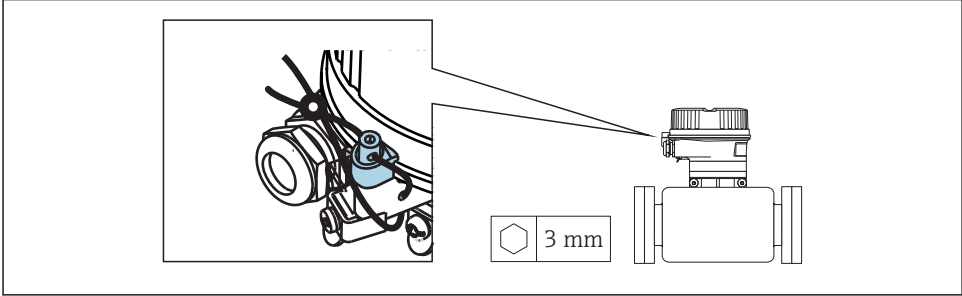
The CRC checksum can only be read via Modbus RS485 registers.

5.4 Repeated calibration due to legal metrology controls

The operator is obliged to obtain reapproval in accordance with the applicable national regulations.

5.5 Seal

The device can be sealed. It is expected that the device is sealed before it is put into circulation. The customer or the competent authority for legal metrology controls is responsible for sealing the device.



A0030203

2 Example of sealing with a sealing screw



6 Modbus RS485 Register Information

6.1 Notes

6.1.1 Structure of the register information

The individual parts of a parameter description are described in the following section:

Navigation:	Navigation path to the parameter
Parameter	Name of parameter
Register	Indicated in decimal numerical format
Data type	<ul style="list-style-type: none"> ▪ Float length = 4 byte ▪ Integer length = 2 byte ▪ String length, depending on parameter
Access type	Possible type of access to parameter: <ul style="list-style-type: none"> ▪ Read access via function codes 03, 04 or 23 ▪ Write access via function codes 06, 16 or 23

Selection/input	<p>Selection List of the individual options for the parameter</p> <ul style="list-style-type: none"> ▪ Option 1 ▪ Option 2 ▪ Option 3 ⁽⁺⁾ <p> ▪ Factory setting highlighted in bold</p> <p>▪ ⁽⁺⁾ = Factory setting depends on country, order options or device settings</p> <p>User entry Input range for the parameter</p>
→ 	Page number information and cross-reference to the standard parameter description

NOTICE

If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device.

The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

- ▶ Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- ▶ Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

6.1.2 Address model

The Modbus RS485 register addresses of the measuring device are implemented in accordance with the "Modbus Applications Protocol Specification V1.1".

In addition, systems are used that work with the register address model "Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev. J)".

Depending on the function code used, a number is added at the start of the register address with this specification:

- "3" → "Read" access
- "4" → "Write" access

Function code	Access type	Register in accordance with "Modbus Applications Protocol Specification"	Register in accordance with "Modicon Modbus Protocol Reference Guide"
03 04 23	Read	XXXX Example: mass flow = 2007	3XXXX Example: mass flow = 32007
06 16 23	Write	XXXX Example: reset totalizer = 6401	4XXXX Example: reset totalizer = 46401








6.2 Overview of the operating menu

The following table shows the Modbus RS485 register information. The page reference indicates where the associated description of the submenu or parameter can be found.

6.3 Overview of the operating menus


Navigation

Operating tool

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">  Operation </div>	→  12
<div style="border: 1px solid black; padding: 5px; width: 200px;">Locking status</div>	→  12
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">  Diagnostics </div>	→  12
<div style="border: 1px solid black; padding: 5px; width: 200px;">▶ Device information</div>	→  12
<div style="border: 1px solid black; padding: 5px; width: 200px;">Firmware version</div>	→  12


6.4 Register information

6.4.1 "Operation" menu

Navigation: Operating tool → Operation					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Locking status	4918	Integer	Read	256 = Hardware locked 512 = Temporarily locked	9

6.4.2 "Diagnostics" menu

"Device information" submenu

Navigation: Operating tool → Diagnostics → Device information					
Parameter	Register	Data type	Access	Selection / User entry / User interface	→ 
Firmware version	7277	String	Read	Character string with the following format: xx.yy.zz	9

6.5 CRC checksum

Parameters	Register	Data type	Access	Display / selection / entry
CRC 32 checksum	20386	String	Read	Character string

www.addresses.endress.com
