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Valid as of version
01.00.zz (Device firmware)

Operating Instructions
Master Meter System

High-precision measurement in custody transfer applications thanks to regular proving with the Master Meter System from Endress+Hauser

Endress+Hauser
People for Process Automation

- Make sure the document is stored in a safe place such that it is always available when working on or with the device.
- To avoid danger to individuals or the facility, read the "Basic safety instructions" section carefully, as well as all other safety instructions in the document that are specific to working procedures.
- The manufacturer reserves the right to modify technical data without prior notice. Your Endress+Hauser Sales Center will supply you with current information and updates to these instructions.

Table of contents

1 About this document

1.1 Document function

These Operating Instructions contain all the information required in the various life cycle phases of the device: from product identification, incoming acceptance and storage, to installation, connection, operation and commissioning, through to troubleshooting, maintenance and disposal.

1.2 Symbols

1.2.1 Safety symbols

⚠ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠ CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Electrical symbols

Symbol	Meaning
⎓	Direct current
~	Alternating current
⎓ ~	Direct current and alternating current
⏚	**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
⏚	**Potential equalization connection (PE: protective earth)** Ground terminals that must be connected to ground prior to establishing any other connections. The ground terminals are located on the interior and exterior of the device: ▪ Interior ground terminal: potential equalization is connected to the supply network. ▪ Exterior ground terminal: device is connected to the plant grounding system.

1.2.3 Communication-specific symbols

Symbol	Meaning
	Wireless Local Area Network (WLAN) Communication via a wireless, local network.
A0044513	**Cellular radio** Bidirectional data exchange via cellular network.

Symbol	Meaning
	**Bluetooth** Wireless data transmission between devices over a short distance.
	**LED** Light emitting diode is off.
	**LED** Light emitting diode is on.
	**LED** Light emitting diode is flashing.

1.2.4 Tool symbols

Symbol	Meaning
	Torx screwdriver
	Flat-blade screwdriver
	Phillips head screwdriver
	Allen key
	Open-ended wrench

1.2.5 Symbols for certain types of information

Symbol	Meaning
	**Permitted** Procedures, processes or actions that are permitted.
	**Preferred** Procedures, processes or actions that are preferred.
	**Forbidden** Procedures, processes or actions that are forbidden.
	**Tip** Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Notice or individual step to be observed
1., 2., 3...	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection

1.2.6 Symbols in graphics

Symbol	Meaning
1, 2, 3, ...	Item numbers
1., 2., 3., ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections
	Hazardous area
	Safe area (non-hazardous area)
	Flow direction

1.3 Highlighting of text

Emphasis	Meaning	Example
Bold	Keys, buttons, program icons, tabs, menus, commands	**Start** → **Programs** → **Endress+Hauser** In the **File** menu, select the **Print** option.

1.4 Acronyms used

Acronym	Meaning
CSV	Comma Separated Values
DUT	Device Under Test
HMI	Human-Machine Interface
MM	Master Meter
OPC	OLE (Object Linking and Embedding) for Process Control

1.5 Valid versions

Component	Version
HMI application, version	01.00.00
Flow computer app, version	0v4r20
Flow computer app, name	E+H MM application
Flow computer app, firmware version	4v7r8770-R

1.6 Documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the matrix code on the nameplate

Detailed list of the individual documents incl. documentation code → 55

1.6.1 Supplementary device-dependent documentation

Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.

1.7 Registered trademarks

Microsoft®, Internet Explorer and the Microsoft logo are registered trademarks of the Microsoft Corporation.

All other brand and product names are trademarks or registered trademarks of the companies and organizations in question.

2 Safety instructions

2.1 Requirements for the 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.

2.2 Intended use

This user manual is intended for **operators** working with the HMI of the Master Meter System. The functionality described in this manual applies to users with the **Operator** authorization level.

The HMI of the Master Meter System was designed for use with Proline Promass F/Q/X 300/500 Coriolis flowmeters as master meter. Any other use is regarded as improper use.

The manufacture is not responsible for any damage caused by improper use. In such cases, the user bears full responsibility.

Intended use includes compliance with the operating and maintenance requirements specified by the manufacturer.

Depending on the version ordered, the measuring device can also measure potentially explosive, flammable, poisonous and oxidizing media.

Measuring devices for use in hazardous areas, in hygienic applications or where there is an increased risk due to process pressure, are labeled accordingly on the nameplate.

To ensure that the measuring device remains in proper condition for the operation time:
- Observe the specified temperature range.
- Only use the system in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- Check the nameplate to verify if the system ordered is permitted for the intended use in the area for which it is approved (e.g. explosion protection).
- Ensure that the system is permanently protected against corrosion caused by environmental influences.

2.3 Workplace safety

When working on and with the system:
- Wear the required personal protective equipment as per national regulations.

When mounting the cabinet:
- Due to the increased risk of cuts, wear suitable gloves and protective goggles.

For welding work on the piping:
- Do not ground the welding unit via the system.

If working on and with the system with wet hands:
- Due to the increased risk of electric shock, wear suitable gloves.

2.4 Operational safety

Risk of injury!
- Operate the system only if it is in proper technical condition, free from errors and faults.
- The operator is responsible for ensuring trouble-free operation of the device.

2.5 Product safety

This system is designed in accordance with good engineering practice to meet state-of-the-art safety requirements and has been tested and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EU directives listed in the device-specific EU Declaration of Conformity. This is confirmed by the affixed CE-mark.

2.6 IT security

IT security measures, which provide additional protection for the system and its associated data transfer, must be implemented by the operators themselves in line with their security standards.

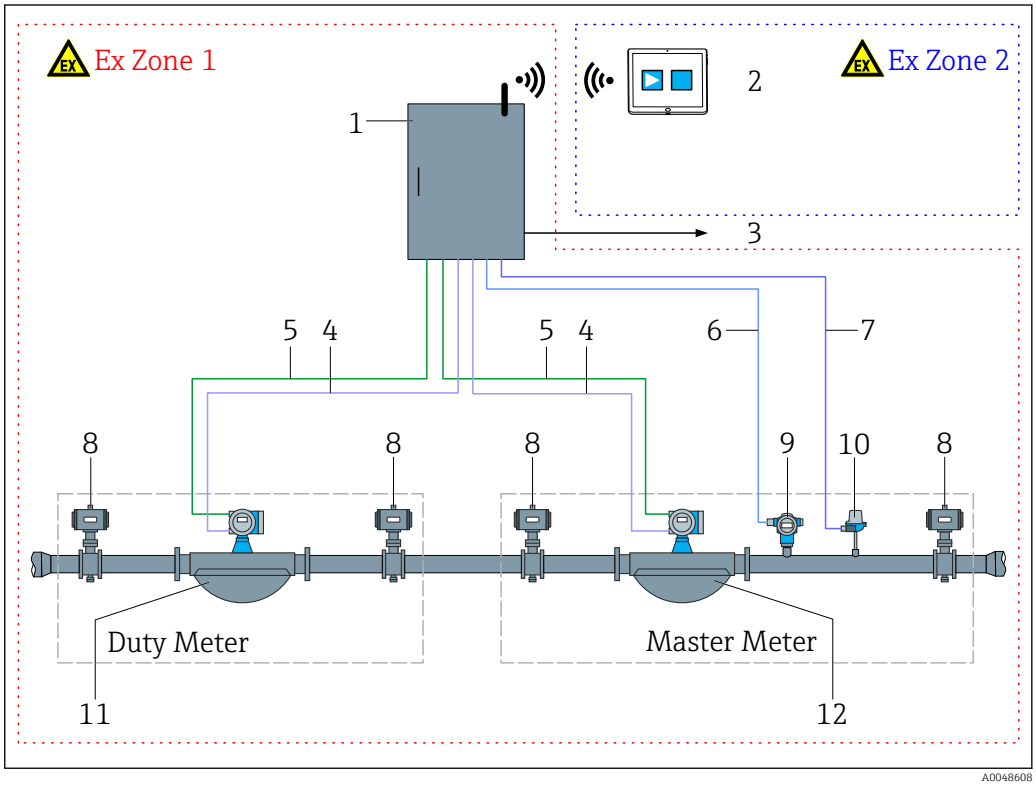
The operator is responsible for backing up data.

3 Product description

The main functions of the HMI of the MM System are to enable operation of the system, visualization of the test operation and also data management and troubleshooting. The HMI was designed to provide user-friendly, step-by-step procedures for safety operation.

3.1 System overview

The following is an overview of the entire MM measuring system. The relevant devices in the overall system architecture are described in detail.



1 *System overview*

1 *Ex d housing including MM flow computer*
2 *Tablet PC compliant with Ex Zone 2*
3 *Web browser via Ethernet (optional)*
4 *Modbus signal*
5 *Pulse signal*
6 *4-20 mA (pressure)*
7 *4-20 mA (temperature)*
8 *Shut-off valve*
9 *Pressure transmitter*
10 *Temperature transmitter*
11 *Duty Meter*
12 *Master Meter*

3.2 System design

The HMI is installed and loaded either on a robust tablet or on an integrated panel PC. The touch-sensitive HMI manages all integrated field devices and flow computer.

The MM flow computer is the heart of the system and is used to record various process data of the MM and DUT. Various signal types are transmitted between the flow computer and field instruments via an Ethernet switch with eight ports and a wireless router.

All real-time signals are synchronized via the wireless network on the tablet PC or panel PC and thus made available to the operator via the HMI. Reports with test results are also logged and can be retrieved, displayed and exported.

3.3 Interfaces

Various wireless communication channels and ports are available on the tablet PC:
- WWAN LTE + GPS Combo (US & EU) + Intel Wireless AC7260 802.11 a/b/g/n/ac + Bluetooth 4.0 Class 1
- 2x USB 3.0
- 1x port for headphones/microphone
- 1x docking connection
- 1x extension connection for add-on modules
- 2x RF pass-through connections for WWAN & GPS
- 1x Micro SD card slot to support SDHC/SDXC
- 1x SIM card slot for WWAN data communication

3.4 Using the system

The system may be used only if it has no technical defects. Furthermore, it may be used only as intended and in accordance with the instructions provided in this user manual.

It may be used only by safety-conscious and appropriately trained personnel who are fully aware of the possible risks.

3.5 Modifying the system

Only appropriately trained and qualified staff are permitted to modify the system. Modifications to the hardware or software may be performed only by Endress+Hauser Service prior to implementing updates or upgrades. If you require further support, contact your local Endress+Hauser Sales Center.

4 Incoming acceptance and product identification

4.1 Incoming acceptance

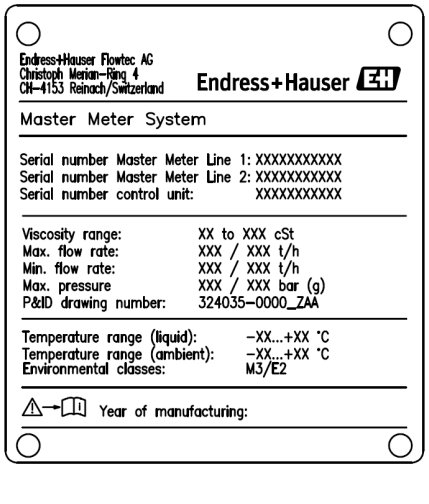
Upon receipt of goods, check the following:
- Check the packaging for visible damage arising from transportation.
- To avoid damage, remove the packaging with care.
- Check the delivery and ensure that it is complete and corresponds to the order.
- Retain all accompanying documents.

The system must not be put into operation if it has been established that the delivery is damaged. In this case, please contact your Endress+Hauser Sales Center. Return the system to Endress+Hauser in the original packaging where possible.

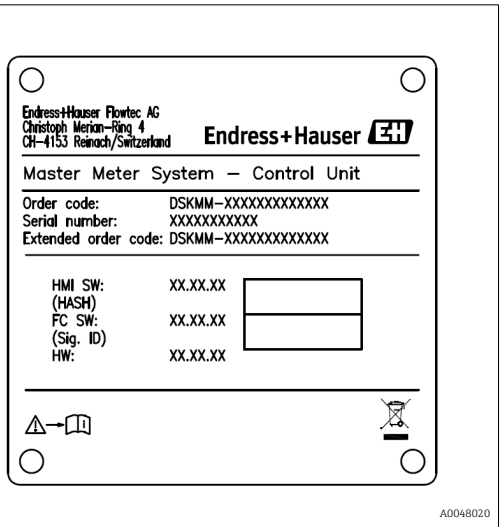
4.2 Product identification

4.2.1 Nameplates on cabinet of system

There are two nameplates on the cabinet, which serve to identify it clearly.



2 *Master Meter System nameplate*



3 *Control unit nameplate*

5 Storage and transport

5.1 Storage conditions

Observe the following notes for storage:
- ▶ Store in the original packaging to ensure protection from shock.
- ▶ Protect from direct sunlight to avoid unacceptably high surface temperatures.
- ▶ Store in a dry and dust-free place.
- ▶ Do not store outdoors.
- ▶ Storage temperature: −25 to +60 °C (−13 to +140 °F)

5.2 Transporting the product

Observe the following notes during transport:
- ▶ Store in the original packaging to protect against impact.
- ▶ Protect from direct sunlight to avoid unacceptably high surface temperatures.
- ▶ Transport in the transportation box to the place of operation.

5.3 Packaging disposal

All packaging materials are environmentally friendly and 100% recyclable:
- Outer packaging of device
  Polymer stretch wrap, complying with EU Directive 2002/95/EC (RoHS)
- Packaging
  - Wooden crate treated in accordance with ISPM 15 standard, confirmed by IPPC logo
  - Cardboard box in accordance with European packaging guideline 94/62EC, recyclability confirmed by Resy symbol
- Carrying and securing materials
  - Disposable plastic pallet
  - Plastic straps
  - Plastic adhesive strips
- Filler material
  Paper pads

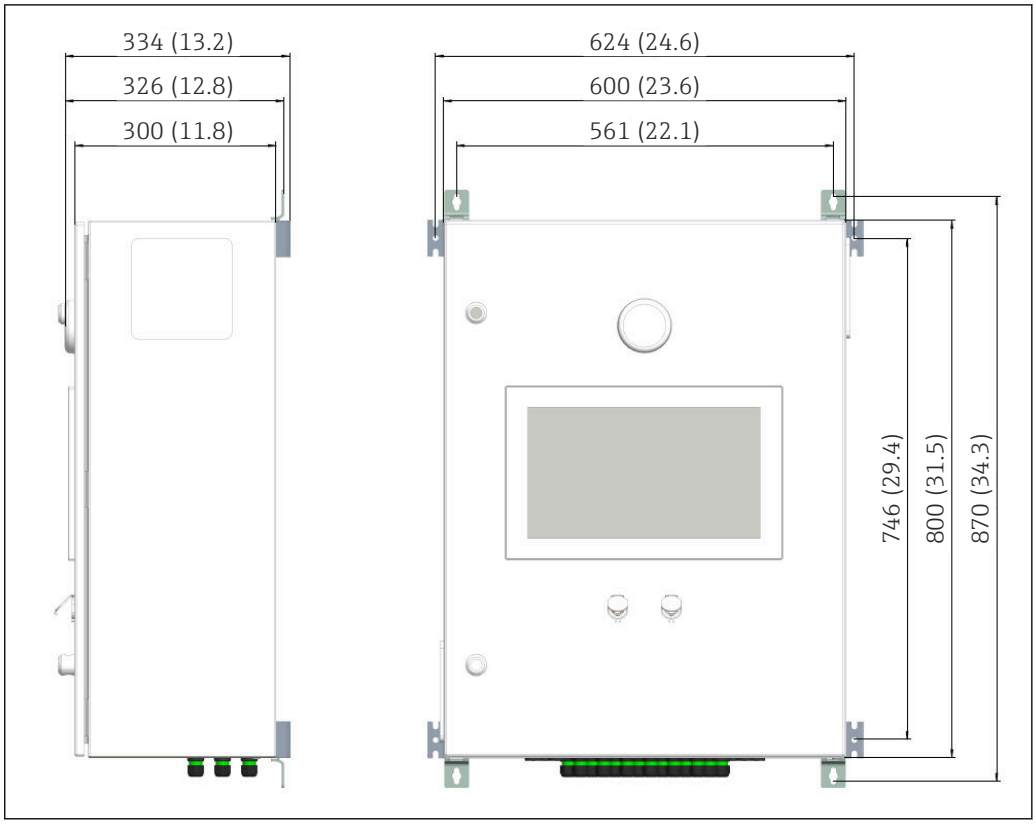
6 Installation

6.1 Mounting the system cabinet

The system cabinet is supplied with brackets for wall mounting and must be installed on a stable wall with suitable fastening fixtures.

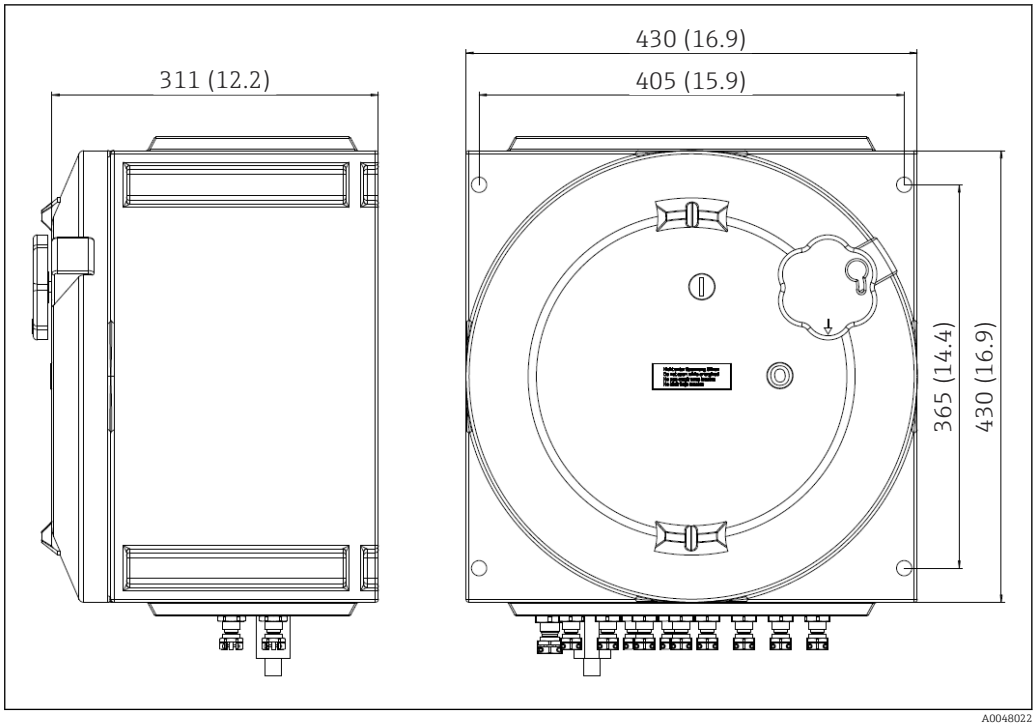
The different versions of the control system with attached mounting brackets are listed below.

6.1.1 Non-Ex version



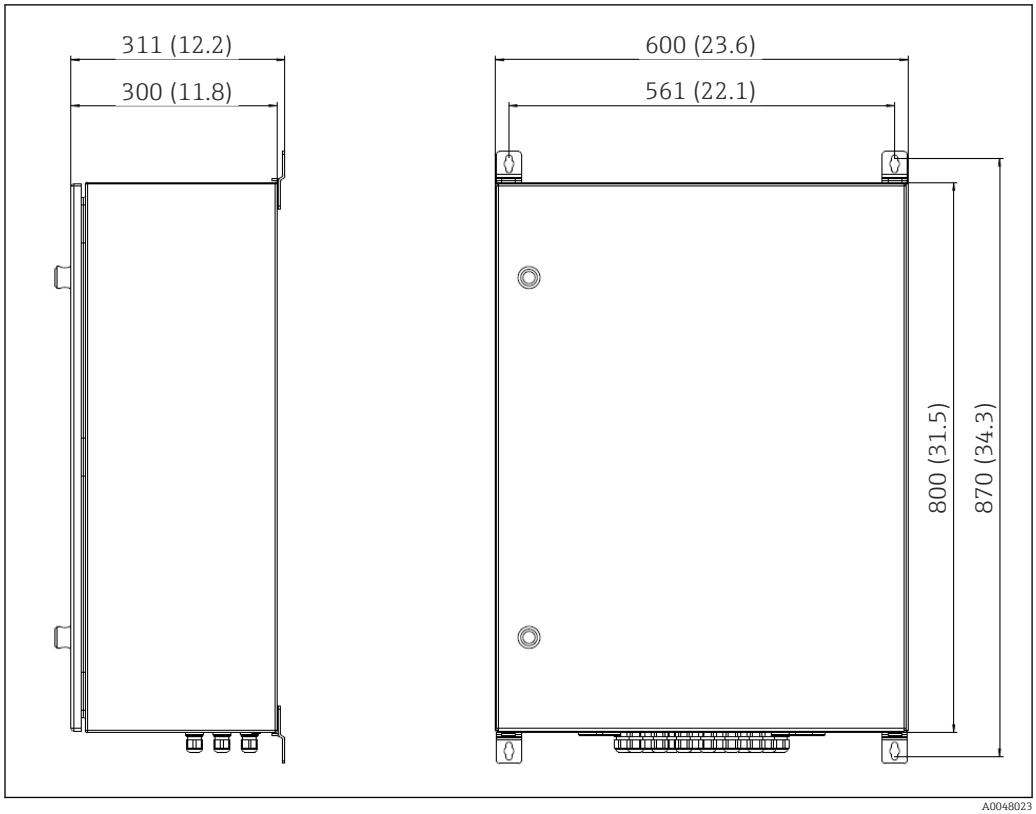
4 *Dimensions in mm (in)*

6.1.2 Ex Zone 1 version



5 *Dimensions in mm (in)*

6.1.3 Ex Zone 2 version



6 *Dimensions in mm (in)*

6.1.4 Weight

Version	Number of lines	Weight
Non-Ex	1	48 kg (106 lb)
	2	50 kg (110 lb)
Ex Zone 1	1	55 kg (121 lb)
	2	57 kg (126 lb)
Ex Zone 2	1	45 kg (99 lb)
	2	47 kg (104 lb)

6.2 Flow computer

The system is delivered with the flow computer already installed.

Detailed information on installation → 55

7 Commissioning

7.1 Software update

If an update is required for one of the following programs, this must be carried out first:
- HMI
- OPC
- Flow computer app

7.2 Wireless communication (can be used on a tablet PC)

All process values from the flow computer, MM and DUT are linked via an industrial switch and transmitted to the tablet PC via an industrial, wireless router.

Check the wireless connection on the tablet PC to ensure that communication is working correctly.

The **I/O Diagnostics** screen shows the process parameters that are transmitted via Modbus from the field device in question, once Modbus communication has been successfully established.

To ensure that communication is functioning correctly, verify that the values shown on the display are meaningful.

For further information → 33

7.3 HMI settings

7.3.1 Test settings

Prior to commissioning the system, a number of test-related settings must be correctly defined and entered. These include:
- Customer name, customer location
- Default settings for verification mode
- Default settings for verification method
- MM configuration (e.g. serial number, tag name, manufacturer, etc.)
- DUT configuration
- Units

For further information → 36

7.3.2 System settings

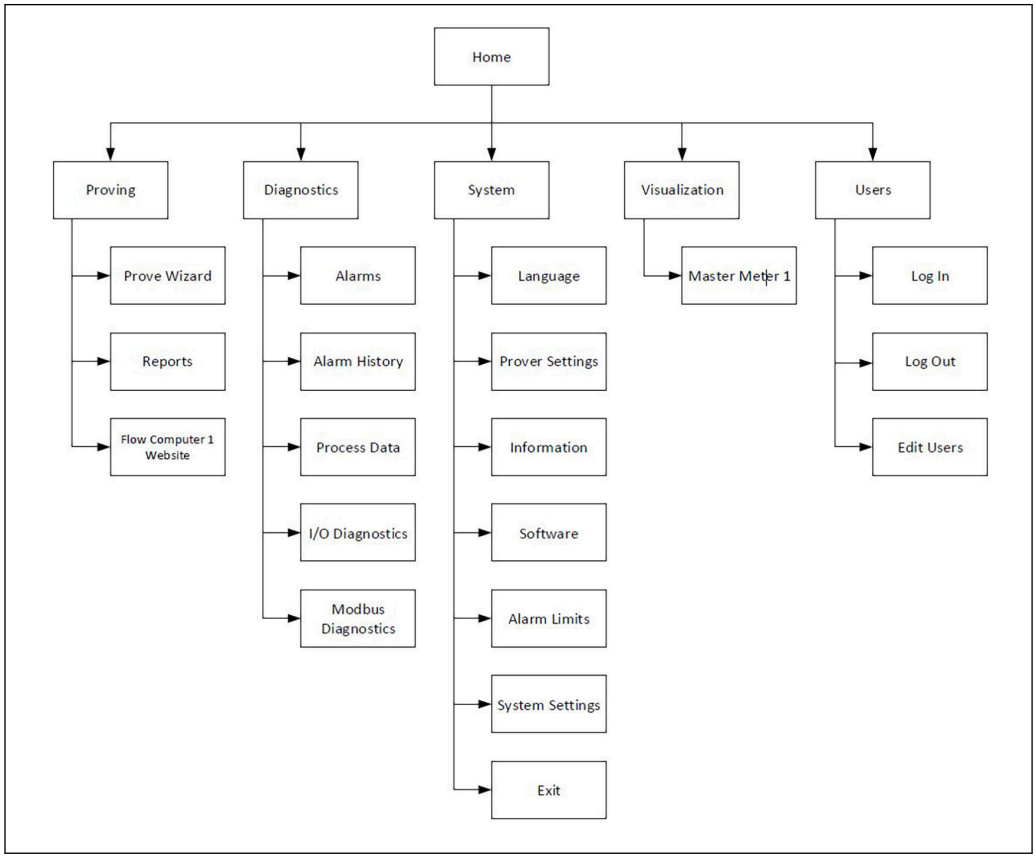
The system settings generally include user settings (e.g. date and time, file path), communication (e.g. IP address) and other configurations.

For further information → 42

8 Operation

8.1 HMI navigation

The following overview shows hows the user can navigate between the screens. Depending on the user group, certain screens may not be available and are therefore grayed out.



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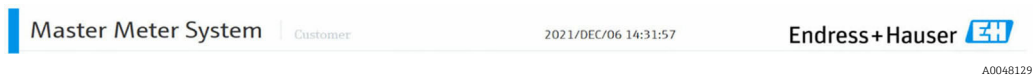
8.2 General information

8.2.1 Status bar

The status bar is located at the top of the screen and contains the following information:
- System name
- Customer name
- System date, system time
- Endress+Hauser logo (→ 7, 18) or system status (OK, warning, error; → 8, 18)



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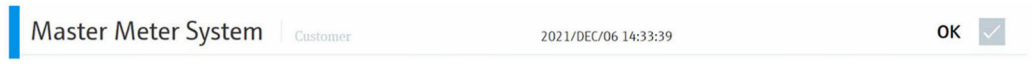
7 *Status bar (with Endress+Hauser logo)*



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8 *Status bar (with system status)*

8.2.2 Navigation bar

The navigation bar is located at the top of the screen, directly below the status bar, and enables navigation between the individual screens.

The current screen is displayed with a blue background.

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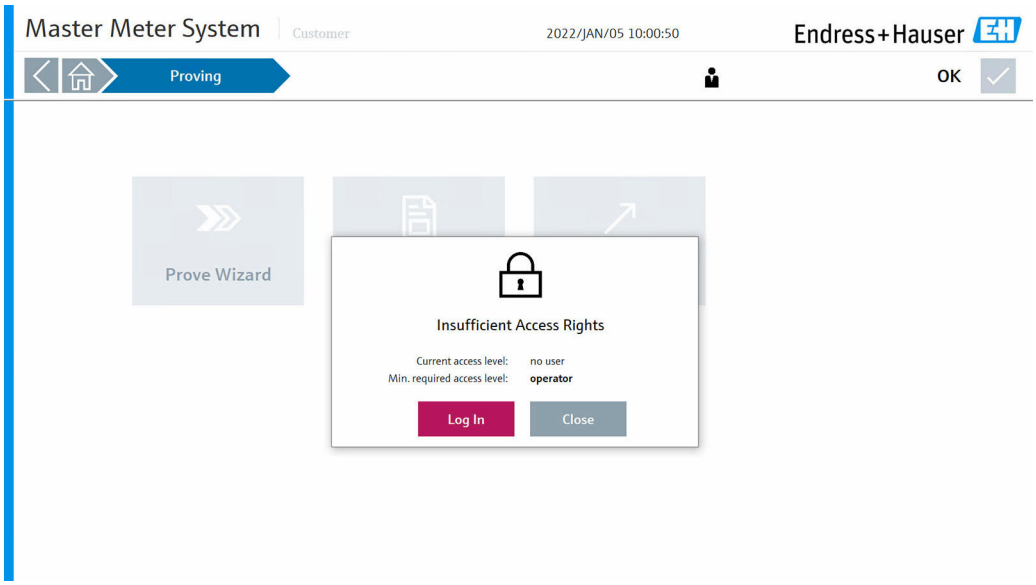
8.3 User management

User management is where the access rights for operation are organized.

Certain functions are only available to users with more wide-ranging access rights. If access is restricted, consideration should be given to acquiring login details in order to obtain increased access rights.

For more information → 46



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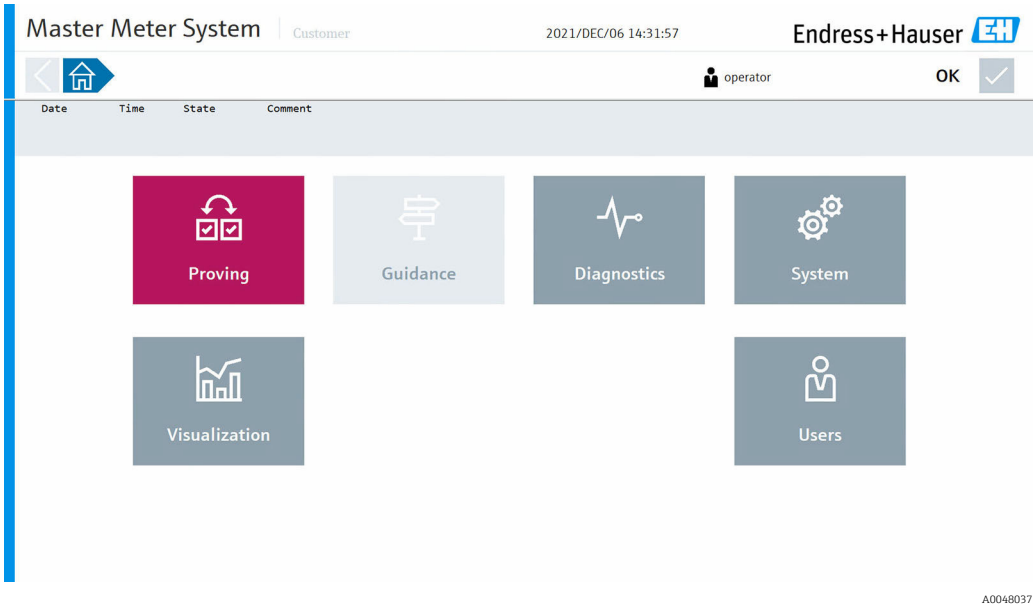
9 *No access rights*

8.4 "Home" screen

Each time the tablet PC or panel PC is switched on or restarted, the HMI program is automatically loaded and the home screen then appears.

The operator can navigate from here to the following main sections:
- **Proving**
- **Diagnostics**
- **System**
- **Visualization**
- **User**

The grayed-out **Guidance** section is temporarily blocked.



8.5 "Proving" screen

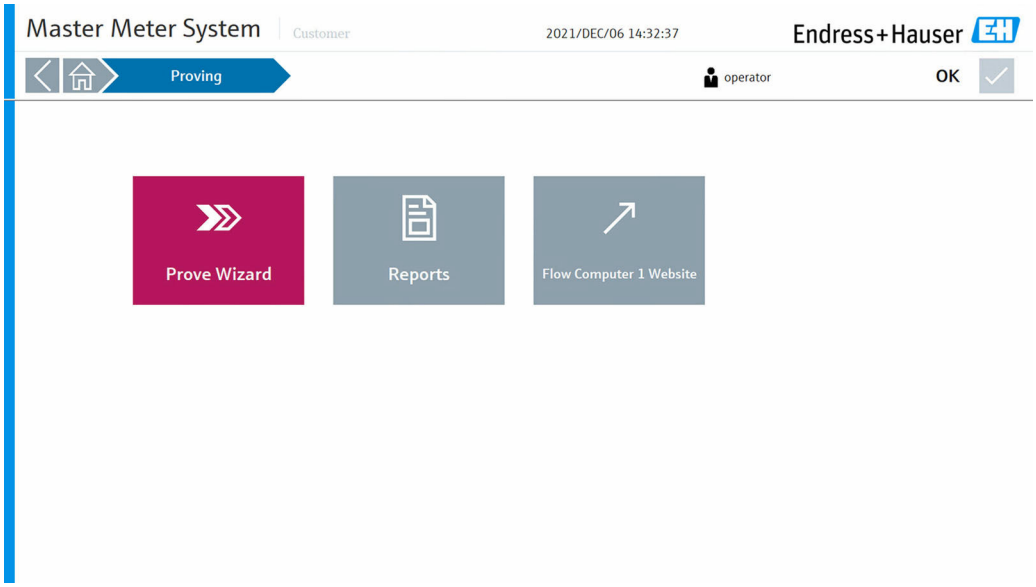
A proving operation is carried out on the "Proving" screen. The user should call up the "Proving" screen" once the physical connection has been prepared, system communication established and the HMI settings successfully configured.

The operator also can access the MM flow computer on this screen via the integrated web browser. Reports of past operations can also be retrieved, displayed and exported here.

Additional login data are required to access the MM flow computer.

On the "Home" screen, tap **Proving**. The "Proving" screen opens.

The operator can navigate from here to the following subsections:
- **Prove Wizard**
- **Reports**
- **Flow Computer 1 Website**



8.6 Prove Wizard

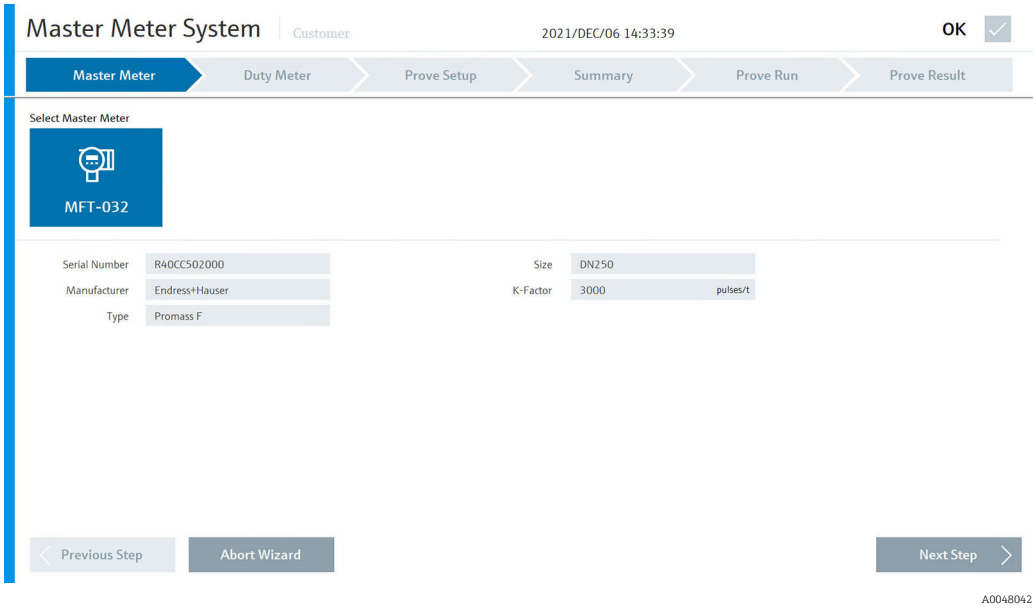
8.6.1 "Master Meter" screen

The Prove Wizard is the main interface in the software where the operator can manage and perform proving operations in an organized manner.

On the "Proving" screen, tap **Prove Wizard**. The "Master Meter" screen opens. A predefined MM device (→ 10, 21), highlighted in blue, is available to the operator for selection.

The current software version supports only one MM.

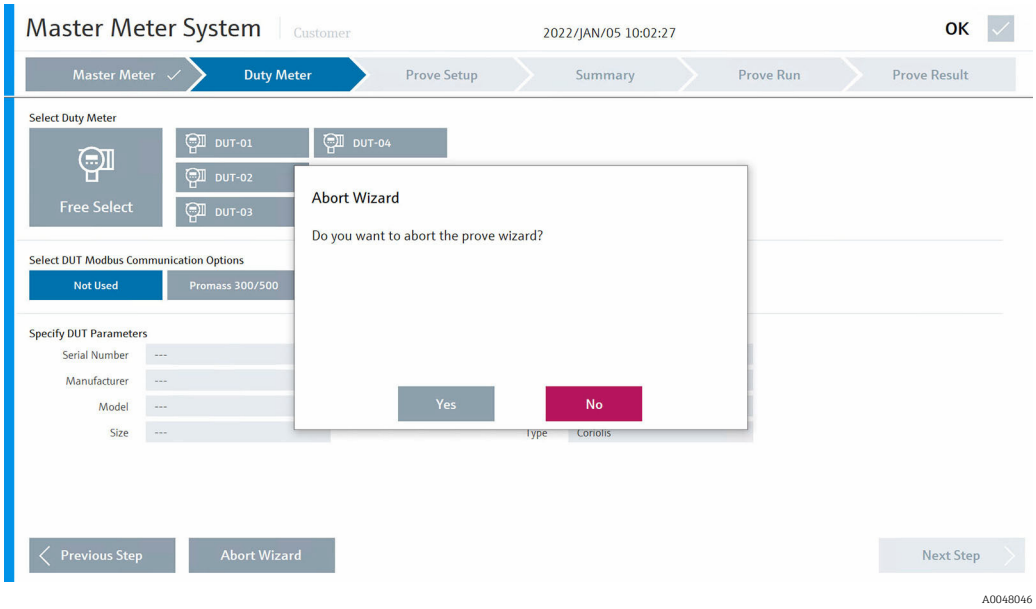
For more information on how to predefine an MM and configure the associated parameters → 17



10 *Master Meter (selected)*

At each stage of the Prove Wizard, the **Abort Wizard** button is visible at the bottom of the screen to allow the operator to cancel the current wizard (→ 11, 22).

If you tap this button, the system prompts the user to confirm the cancellation of the wizard. If the operation is confirmed with **Yes**, the current wizard is aborted, the system returns to the "Proving" screen and all of the options in the wizard are deleted. This does not affect predefined proving and system settings.

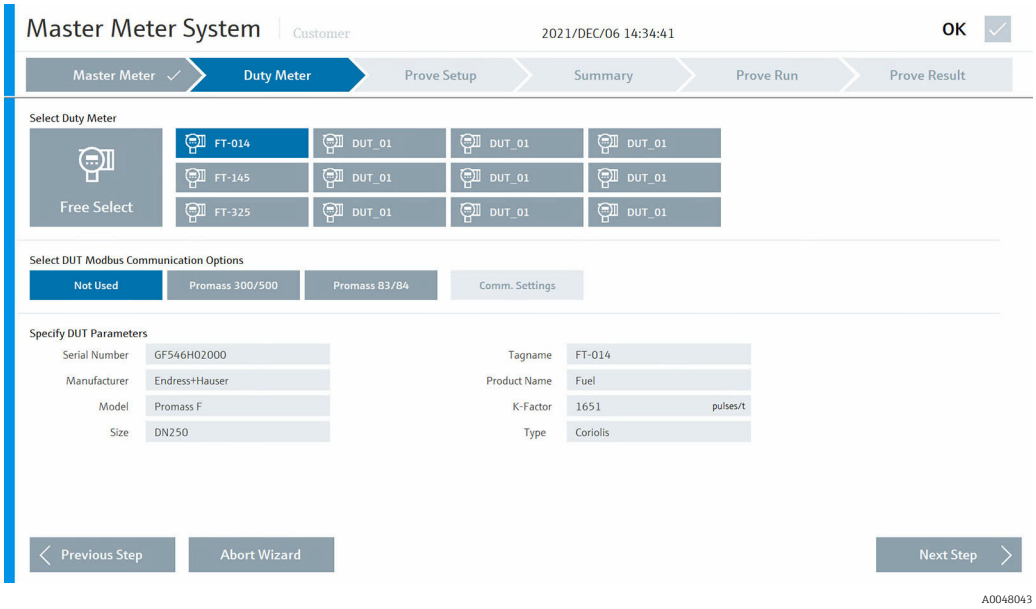


11 *Aborting the wizard*

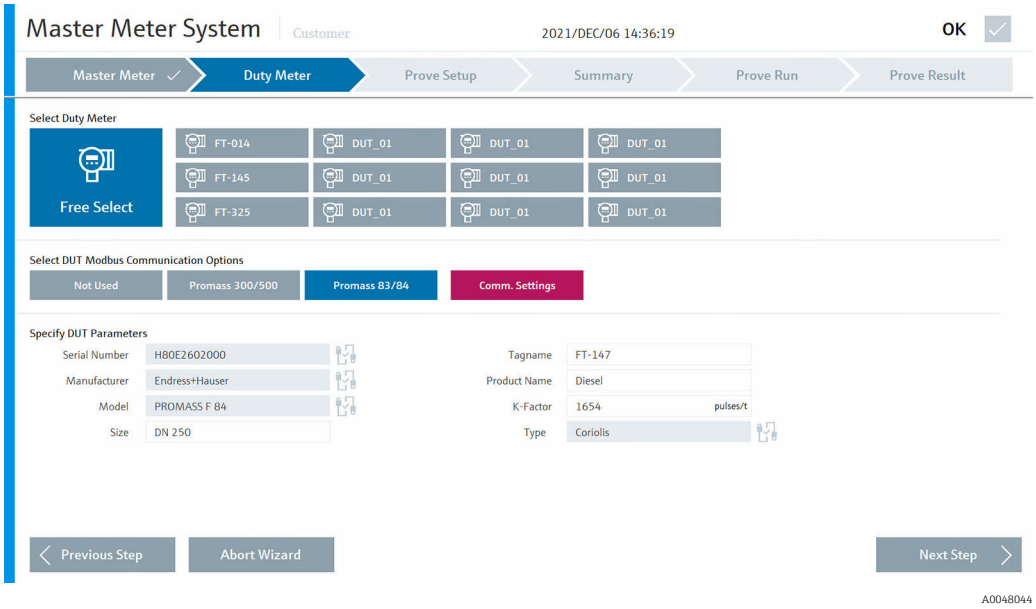
8.6.2 "Duty Meter" screen

Once the MM has been selected, tap **Next Step**. The "Duty Meter" screen opens. Up to 12 predefined Duty Meters (→ 12, 23) and the **Free Select** option (→ 13, 23, if enabled) are available to the operator. The selected Duty Meter is highlighted in blue.

For more information on how to predefine a Duty Meter, enable or disable the **Free Select** option and configure the associated parameters → 17



12 *Duty meter (selected)*



13 *Duty meter (Free Select)*

If the **Free Select** option is enabled and selected in the settings, the operator must manually enter the parameters for the "Free Select" Duty Meter, including the DUT type. The current software version only supports Coriolis.

Once the Duty Meter has been selected, the DUT Modbus communication options can be enabled and used as needed. The **Next Step** button remains grayed out and cannot be selected until all of the red fields have been completed.

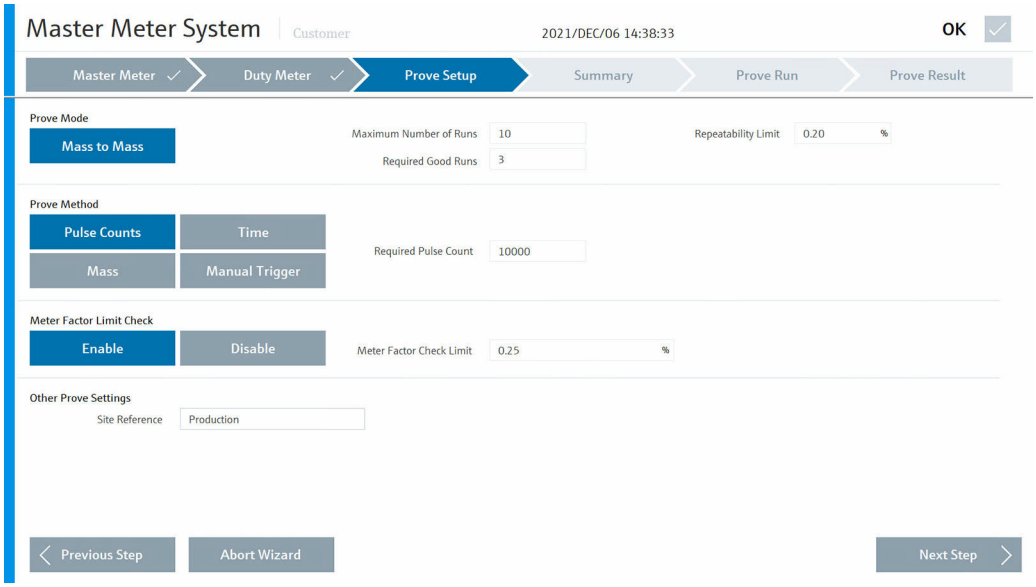
8.6.3 "Prove Setup" screen

Once the Duty Meter has been selected, tap **Next Step**. The "Prove Setup" screen opens. Here the operator can select the "prove mode" required for the application and check the predefined settings under "Prove Mode", "Prove Method", "Meter Factor Limit Check" and "Other Prove Settings" (→ 24).

The current software version supports only the "Mass to Mass" prove mode.

For more information on how to predefine the standard settings → 17

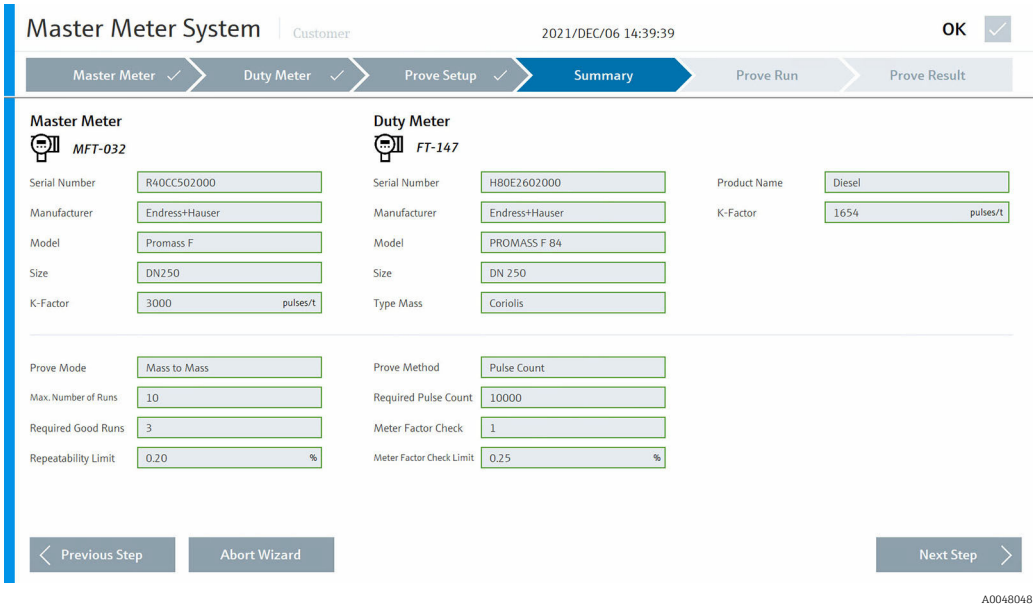
For the various "prove methods", the relevant requirements apply to **Pulse Count**, **Time** and **Mass**. There are no requirements for the **Manual Trigger** method.



8.6.4 "Summary" screen

Once the settings have been confirmed, tap **Next Step**. The "Summary" screen opens. The system now provides the operator with a summary of the previously selected settings (→ 25).

If there are red fields present, please wait a few seconds until the new selection has been synchronized with the MM flow computer and all fields are green.

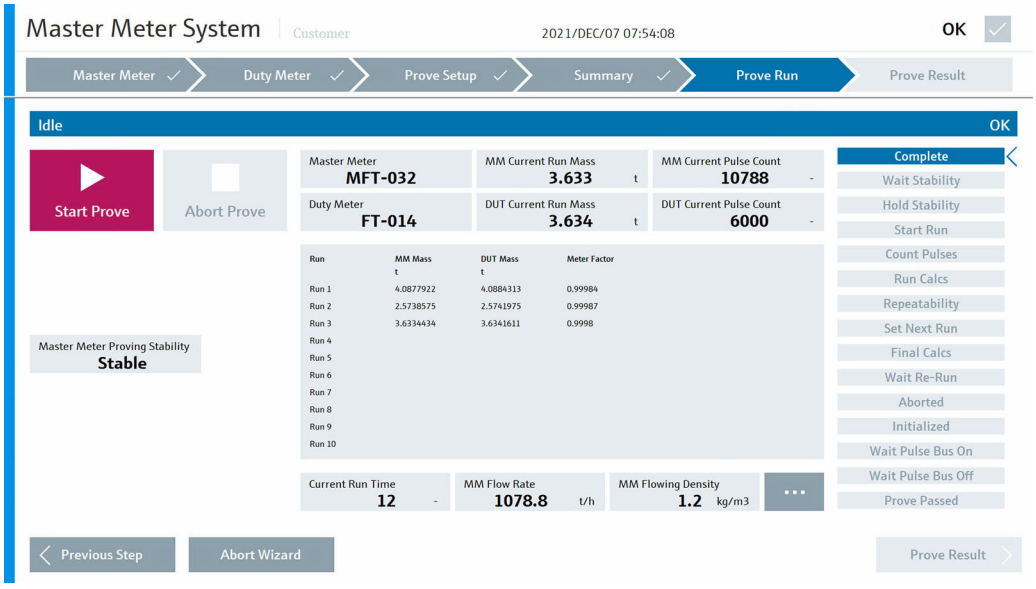


8.6.5 "Prove Run" screen

Once the summary has been confirmed, tap **Next Step**. This is the interface used by the operator to run the proving operation.

- If **Master Meter Proving Stability** is enabled, check and confirm that the stability status is "stable". If the stability is "unstable", the **Start Prove** is grayed out and operation is not permitted.
- Tap the **Start Prove** button on the top left of the screen (→ 26). The system starts in accordance with the program logic.
- While the process is running, the test phase is shown on the right-hand side of the screen. The **Prove Result** button in the bottom right corner of the screen is grayed out until the operation has been completed in accordance with the defined settings (→ 26).
- Expand and display additional information by tapping the **...** button in the bottom right corner of the screen.

While the process is running, the operator can tap the **Abort Prove** button at any time to cancel the operation. In this case, the system stops at the point it is currently at, and the system status changes to "Warning".



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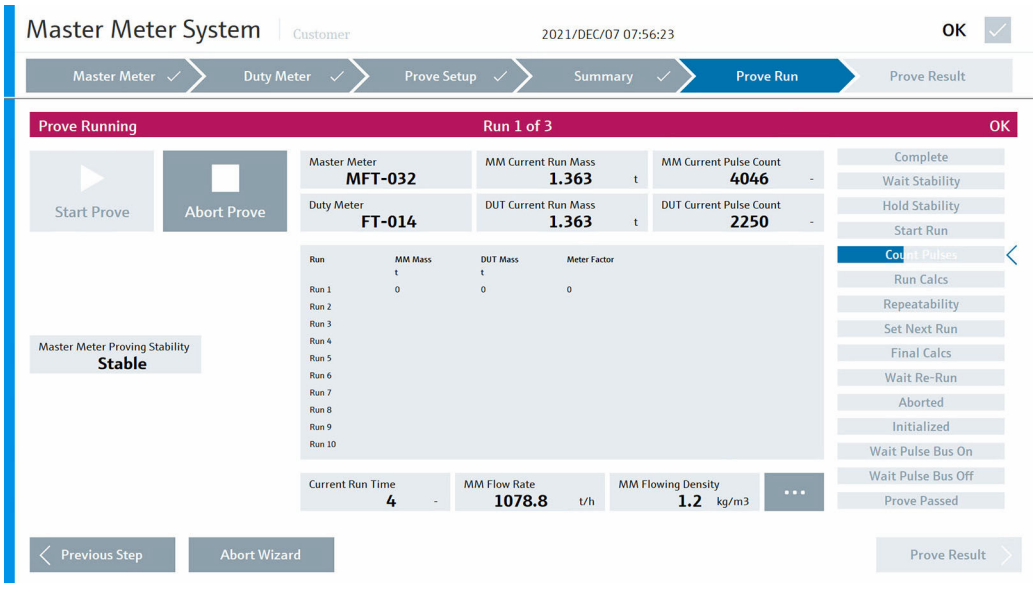

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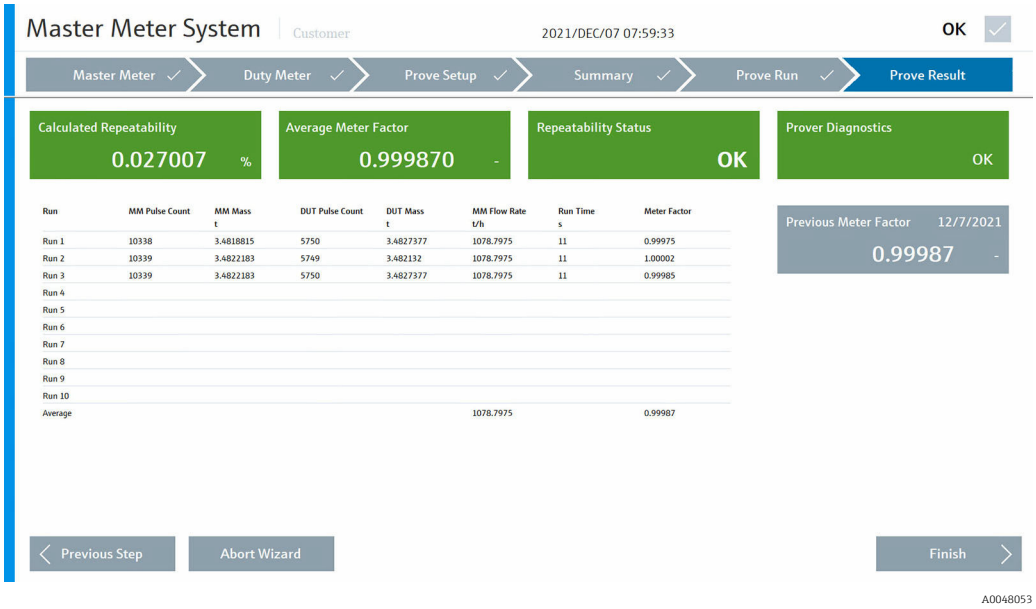
8.6.6 "Prove Result" screen

Once the operation has been completed, tap **Prove Result**. The "Prove Result" screen opens. This is the final screen of the Prove Wizard. Tap **Finish** and the system will return to the home screen of the wizard.

The calculated repeatability (as %) and the average meter factor are displayed together with the repeatability status and prover diagnostics (→ 27). The details for each prove, for which the number of runs is defined, are shown in the center of the screen.

The operation that was aborted by the operator is indicated by the system with "failed" in red.



8.7 "Flow Computer 1 Website" screen

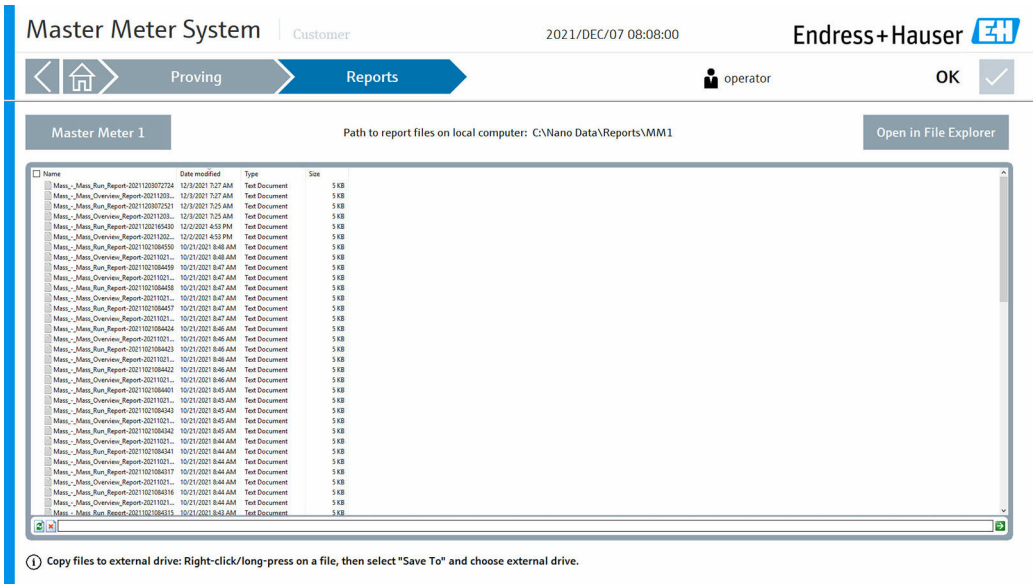
In the "Proving" screen", tap **Flow Computer 1 Website**. The "Flow Computer 1 Website" screen opens. The operator can access the MM flow computer settings and parameters on this screen via the integrated web browser.

Additional login data are required to access the MM flow computer.

8.8 "Reports" screen

In the "Proving" screen, tap **Reports**. The "Reports" screen opens. Here the operator can retrieve, display and export reports on previous operations.

The individual report files are saved in .txt format and can be opened in the File Explorer and exported to an external drive by following the instructions on the screen.



A0048054

8.8.1 Overview Report

The following is an example of an "Overview Report" in the current software version:

```
MASTER METER MASS OVERVIEW REPORT #2                                        App Version:    0v4r19

Generated: 2022/01/05 08:58:44

Owner/Operator:      Customer                          Location:          Location
Site Reference:      Lab                               MM Micro ID:       International Master Meter

MASTER METER DATA
Manufacturer:        Endress+Hauser                    Model #:           Promass F
Meter Type:          Coriolis                          Serial #:          R40CC502000
Meter Size:          DN250                             Meter NKF:         5200              pulses/tonne
Master Meter ID/Tag: MM-001
Pressure Compensation: No                              Temperature Compensation: No
Totalizer:           284595.44                         Pulse Mode:        MASS

DUTY METER DATA
Manufacturer:        Endress+Hauser                    Model #:           Promass 83
Meter Type:          Coriolis                          Serial #:          GFD35A02000
Meter Size:          DN 250                            Meter NKF:         2850              pulses/tonne
Duty Meter ID/Tag:   DUT-01
Pressure Compensation:       No                        Temperature Compensation:      No
Cubic Pressure Coefficient:  6e-06          /bar       Cubic Temperature Coefficient: 4.12e-05        /°C
                                                       Pulse Mode:        MASS

FLUID DATA
Product Name:              Fuel
LVC Tables:                2012 API Ch11.1 (Crude Oil)
Base Density:              750.000     kg/m3

PROVE CRITERIA
Report Method:       Average Meter Factor Method
Run Criteria:        Repeatability                     Requirement:  3 of 03 completed runs - (Max 10)
Repeatability Limit: 0.2        %                      Calculated Repeatability: 0.00903923 %

DATA FROM PROVE RUNS
Run  Run  Master Meter     Master Meter      Duty Meter       Duty Meter    Master Meter     Test          IMF
 #   Ack    Pulse Count       Indicated     Pulse Count        Indicated       Flow Rate     /Run
                                Mass                              Mass         tonnes/h     Time
                              tonnes                            tonnes                     secs
01   Yes         10339       2.008972           5750          2.017544          622.38       11      0.99575
02   Yes         10338       2.008778           5750          2.017544          622.38       11      0.99566
03   Yes         10338       2.008778           5750          2.017544          622.38       11      0.99566
04    No             0       0.000000              0          0.000000            0.00        0      0.00000
05    No             0       0.000000              0          0.000000            0.00        0      0.00000
06    No             0       0.000000              0          0.000000            0.00        0      0.00000
07    No             0       0.000000              0          0.000000            0.00        0      0.00000
08    No             0       0.000000              0          0.000000            0.00        0      0.00000
09    No             0       0.000000              0          0.000000            0.00        0      0.00000
10    No             0       0.000000              0          0.000000            0.00        0      0.00000

Aves        ------          ------       ------           ------               622.38   ------     0.99569

================================================================================================================

Previous Meter Factor:     903.2449                    Average Meter Factor:    0.9957

Prove Status: Prove Passed

Meter Factor Limit Status: OK                          Meter Factor Limit:        1.00 %
================================================================================================================

Remarks, Repairs, Adjustments, Etc.,_____________________________________________________________________

_____________________________________________________________________________________________________

         Signature                    Date                              Company Represented

_____________________________    _____________________    _____________________________________________

_____________________________    _____________________    _____________________________________________

END OF MASTER METER MASS OVERVIEW REPORT
```

A0048095

8.8.2 Run Report

The following is an example of a "Run Report" in the current software version:

MASTER METER MASS RUN REPORT # 2 App Version: 0v4r19

Report Date/Time: 2022/01/05 08:58:44

Owner/Operator: Customer Location: Location
Site Reference: Lab MM Micro ID: International Master Meter

Prove Status: Prove Passed

MASTER METER DATA
Master Meter NKF: 5200 pulses/tonne

Run #	Master Meter Pulse Count	Master Meter Reynolds Number	Master Meter Meter Factor (Reynolds)	Master Meter Temperature °C	Master Meter Pressure barg	Master Meter Flow Rate tonnes/h	Master Meter Indicated Mass tonnes
01	10339	66666.67	1.010413	-0.08	4.98	622.38	2.008972
02	10338	66666.67	1.010413	-0.08	4.98	622.38	2.008778
03	10338	66666.67	1.010413	-0.08	4.98	622.38	2.008778
04	0	0.00	0.000000	0.00	0.00	0.00	0.000000
05	0	0.00	0.000000	0.00	0.00	0.00	0.000000
06	0	0.00	0.000000	0.00	0.00	0.00	0.000000
07	0	0.00	0.000000	0.00	0.00	0.00	0.000000
08	0	0.00	0.000000	0.00	0.00	0.00	0.000000
09	0	0.00	0.000000	0.00	0.00	0.00	0.000000
10	0	0.00	0.000000	0.00	0.00	0.00	0.000000
Aves	------	------	------	-0.08	4.98	622.38	------

DUTY METER DATA
Duty Meter NKF: 2850 pulses/tonne

Run #	Duty Meter Pulse Count	Duty Meter Temperature °C	Duty Meter Pressure barg	Duty Meter Indicated Mass tonnes	Test /Run Time secs	IMF
01	5750	49.93	14.98	2.017544	11	0.99575
02	5750	49.93	14.98	2.017544	11	0.99566
03	5750	49.93	14.98	2.017544	11	0.99566
04	0	0.00	0.00	0.000000	0	0.00000
05	0	0.00	0.00	0.000000	0	0.00000
06	0	0.00	0.00	0.000000	0	0.00000
07	0	0.00	0.00	0.000000	0	0.00000
08	0	0.00	0.00	0.000000	0	0.00000
09	0	0.00	0.00	0.000000	0	0.00000
10	0	0.00	0.00	0.000000	0	0.00000
Aves	------	49.93	14.98	------	------	0.99569

Remarks, Repairs, Adjustments, Etc.,_____

_____

Signature Date Company Represented

_____ _____ _____

_____ _____ _____

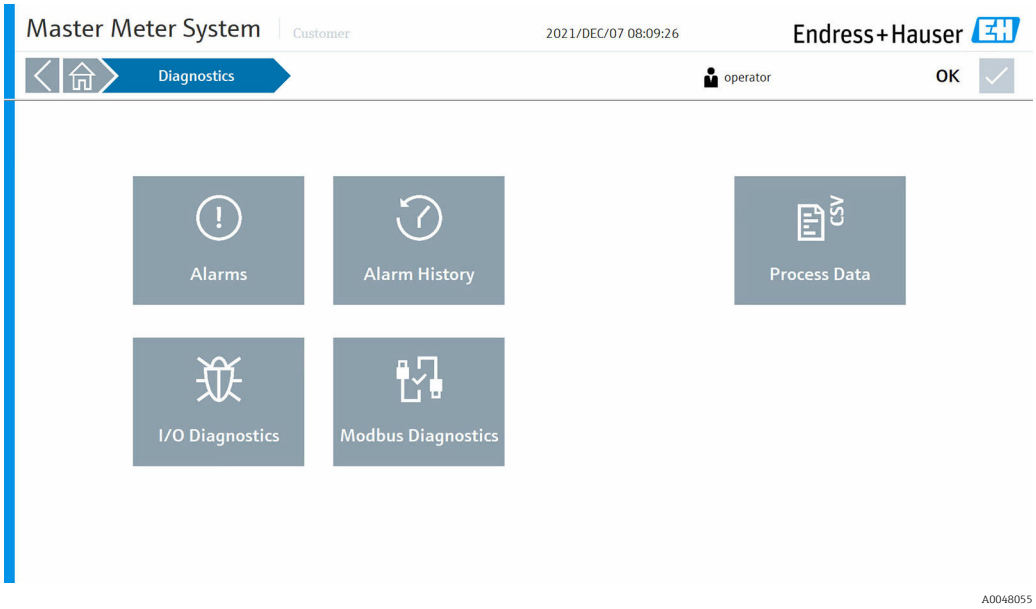
END OF MASTER METER MASS RUN REPORT

A0048096

8.9 "Diagnostics" screen

On the "Home" screen, tap **Diagnostics**. The "Diagnostics" screen opens.

From here, the operator can navigate to the following five subsections:
- Alarms
- Alarm History
- Process Data
- I/O Diagnostics
- Modbus Diagnostics

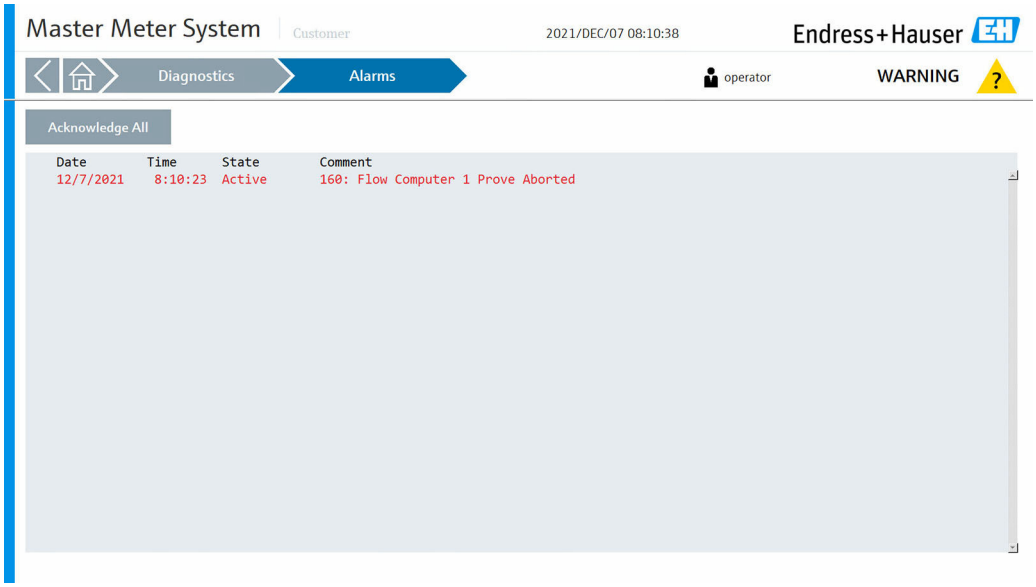


If an alarm occurs, a red exclamation mark appears in the "Diagnostics" section and in the "Alarms" subsection, and the system status changes to "Warning".

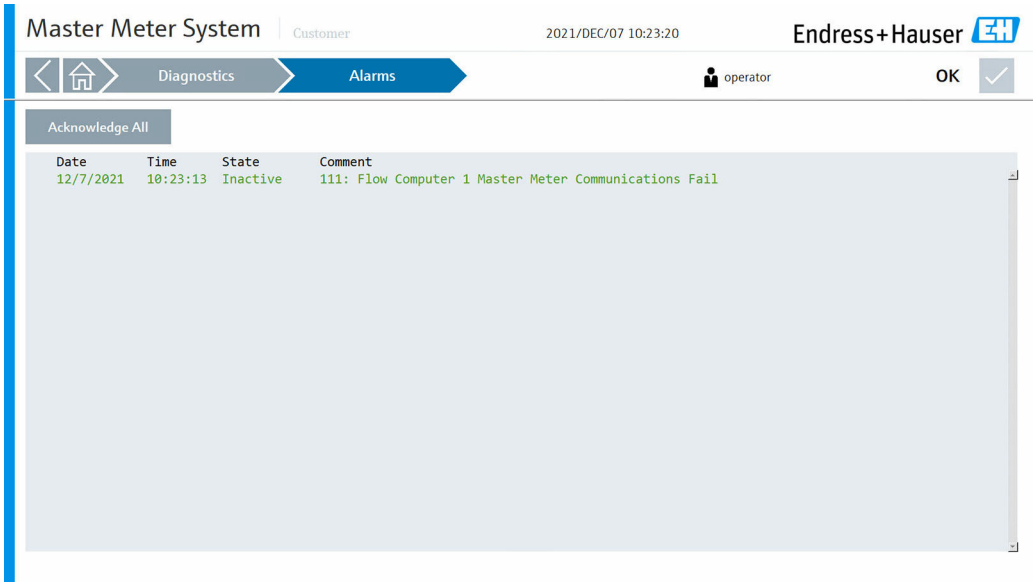
8.9.1 "Alarms" screen

On the "Diagnostics" screen, tap **Alarms**. The "Alarms" screen opens.

All active alarms are displayed in the form of a list (→ 32). Tap the **Acknowledge All** button to change the status of the alarms from "Active" to "Inactive" and to change the system status from "Warning" to "OK" once all alarms have been rendered inactive (→ 32).



A0048056

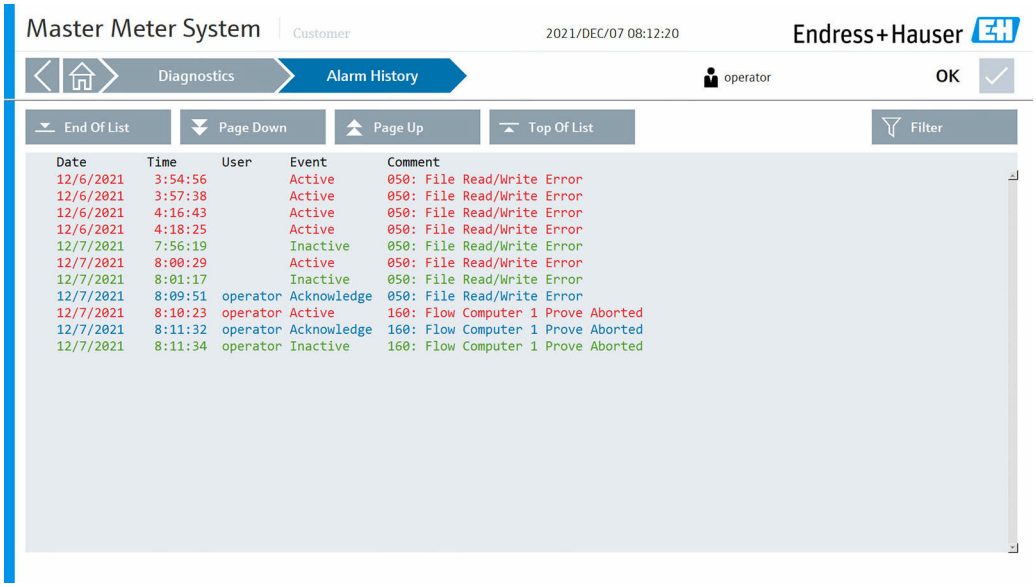


A0048059

8.9.2 "Alarm History" screen

On the "Diagnostics" screen, tap **Alarm History**. The "Alarm History" screen opens.

Previous alarms of any status are displayed in the form of a list and can be filtered according to the operator's requirements.

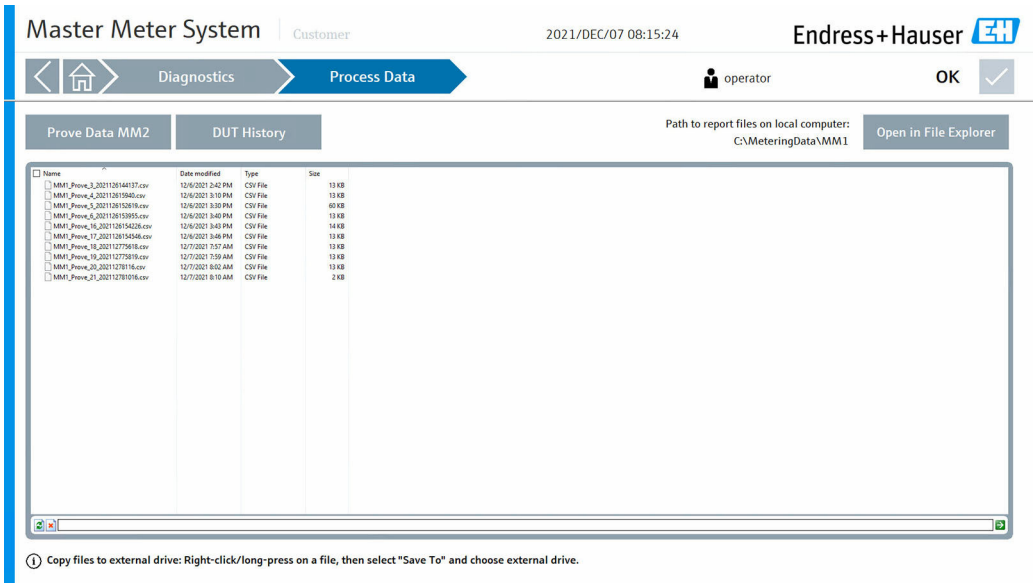


A0048060

8.9.3 "Process Data" screen

On the "Diagnostics" screen, tap **Process Data**. The "Process Data" screen opens.

The individual process data is saved in .csv format and can be opened in the File Explorer and exported to an external drive by following the instructions on the screen.

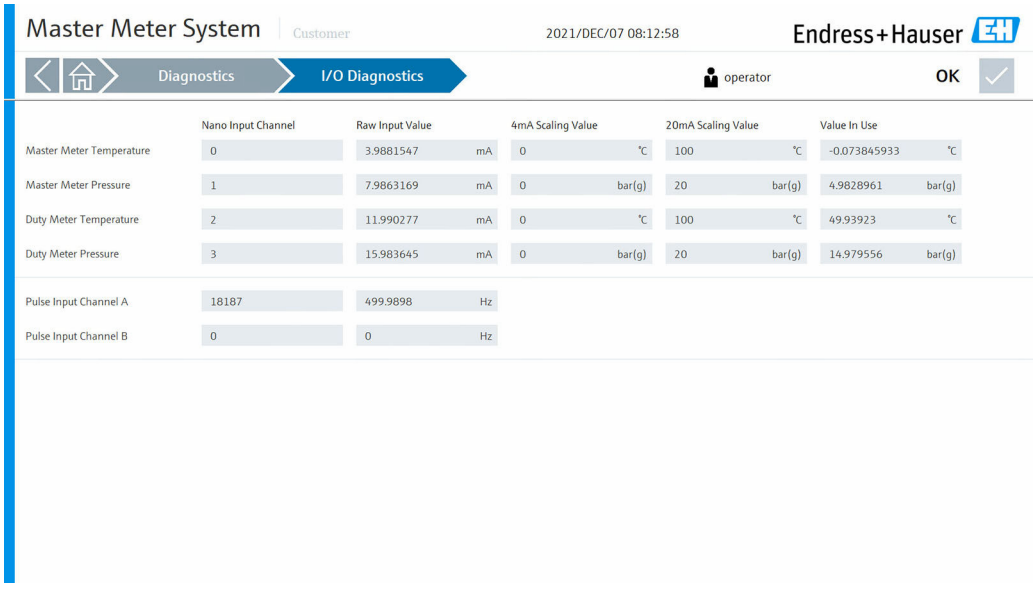


A0048061

8.9.4 "I/O Diagnostics" screen

On the "Diagnostics" screen, tap **I/O Diagnostics**. The "I/O Diagnostics" screen opens.

The "I/O Diagnostics" screen shows the process parameters transmitted by the relevant field instrument.

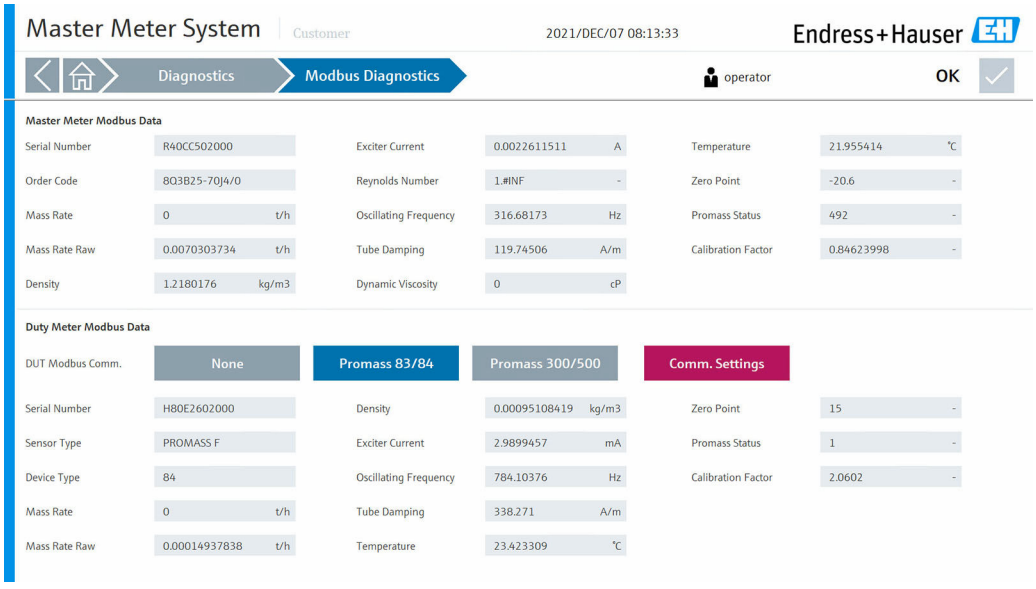


A0048062

8.9.5 "Modbus Diagnostics" screen

On the "Diagnostics" screen, tap **Modbus Diagnostics**. The "Modbus Diagnostics" screen opens.

The "Modbus Diagnostics" screen shows the process parameters transmitted by the relevant Master and Duty Meter via Modbus, once Modbus communication has been successfully established. These advanced diagnostic parameters enable a detailed assessment of the prevailing process conditions.

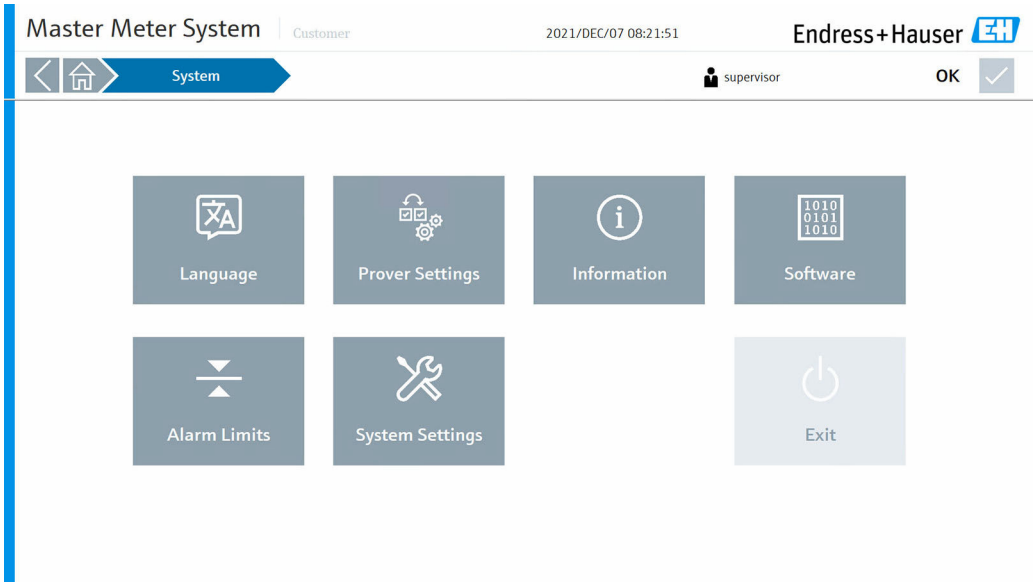


A0048063

8.10 "System" screen

On the "Home" screen, tap **System**. The "System" screen opens.

The operator can navigate from here to the following seven subsections:
- Language
- Settings
- Information
- Software
- Alarm limits
- System settings
- Exit

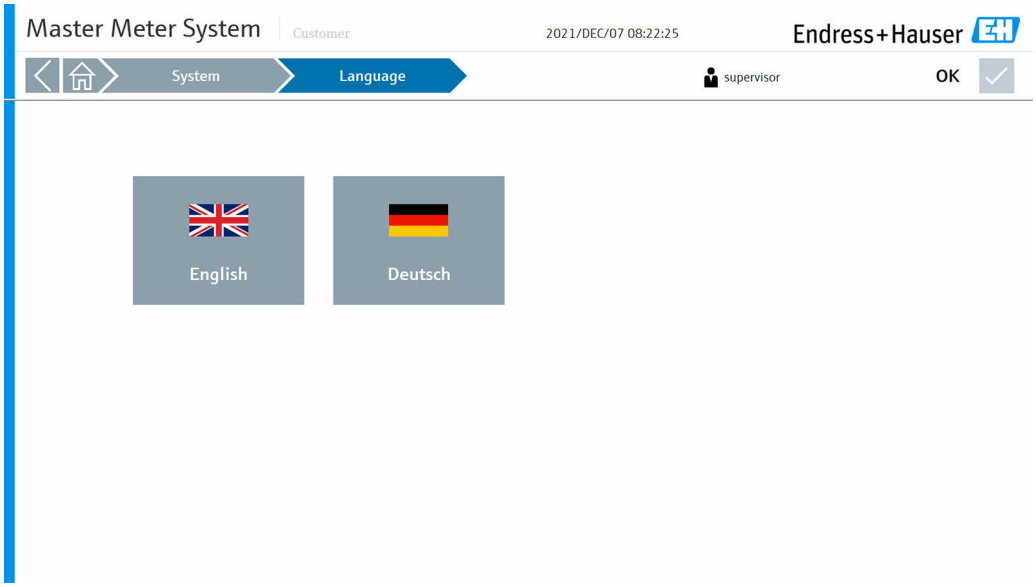


All HMI settings are configured in this section.

8.10.1 "Language" screen

On the "System" screen, tap **Language**. The "Language" screen opens.

The operator can switch freely between English and German as the menu language. The default system language at startup is English.



8.10.2 "Prover Settings" screen

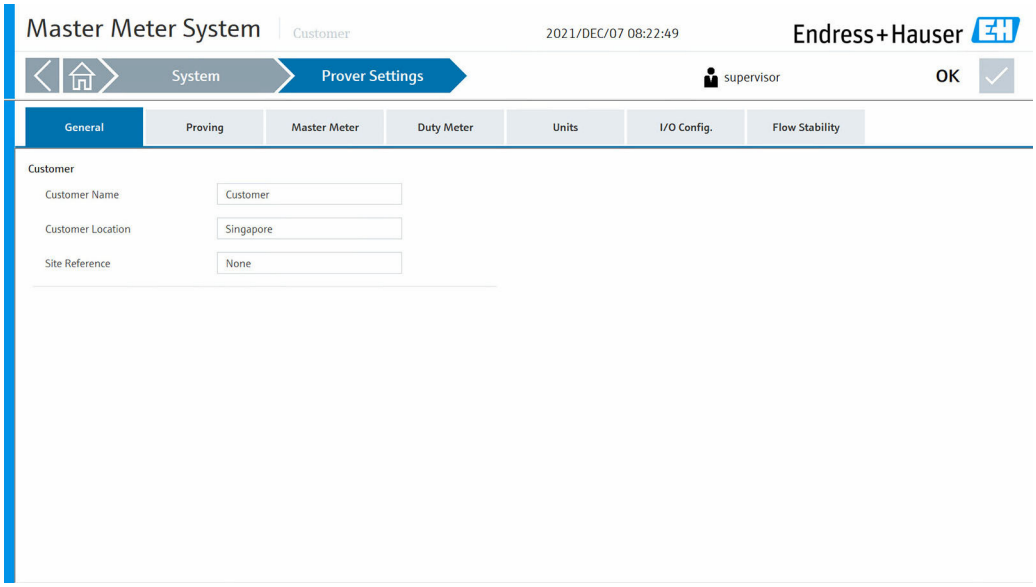
On the "System" screen, tap **Prover Settings**. The "Prover Settings" screen opens (→ 37).

The operator can navigate from here to the following seven tabs:
- General
- Proving
- Master Meter
- Duty Meter
- Units
- I/O Config.
- Flow Stability

During the commissioning phase, before the system can be put into operation, all settings must first be configured in accordance with the actual application in the field.

"General" tab

The operator can define the "Customer Name", which is displayed in the status bar on every page, as well as the "Customer Location" and "Site Reference".



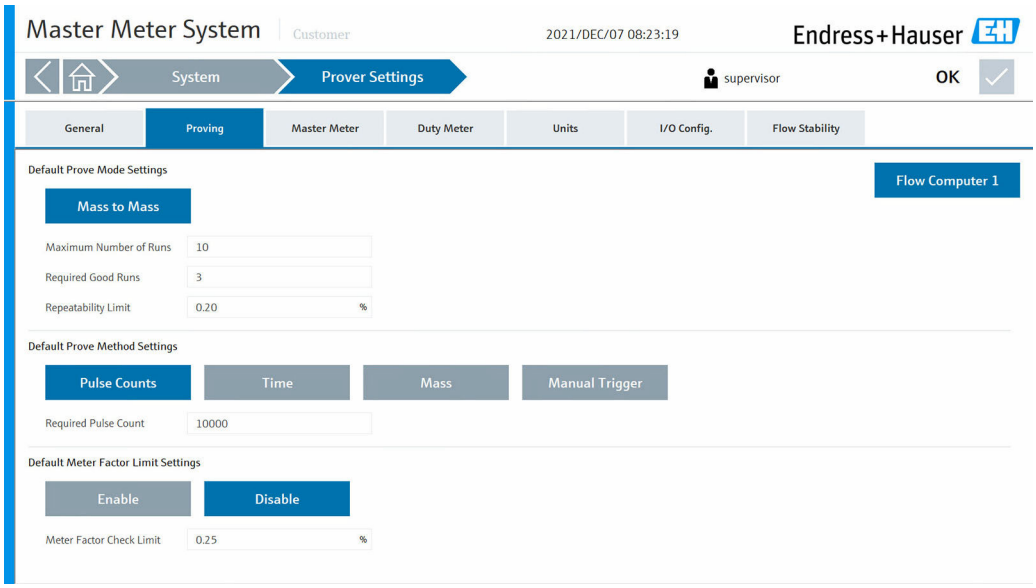
A0048067

"Proving" tab

The operator can define a range of proving settings:

- Default Prove Mode Settings:
  - Maximum Number of Runs
  - Required Good Runs
  - Repeatability Limit
- Default Prove Method settings:
  - Pulse Counts
  - Time
  - Mass
  - Manual Trigger
- Default Meter Factor Limit Settings:
  - On
  - Off

For the various "prove methods", the relevant requirements apply to "Required Pulse Count", "Time" and "Mass". There are no requirements for the "Manual Trigger" method.

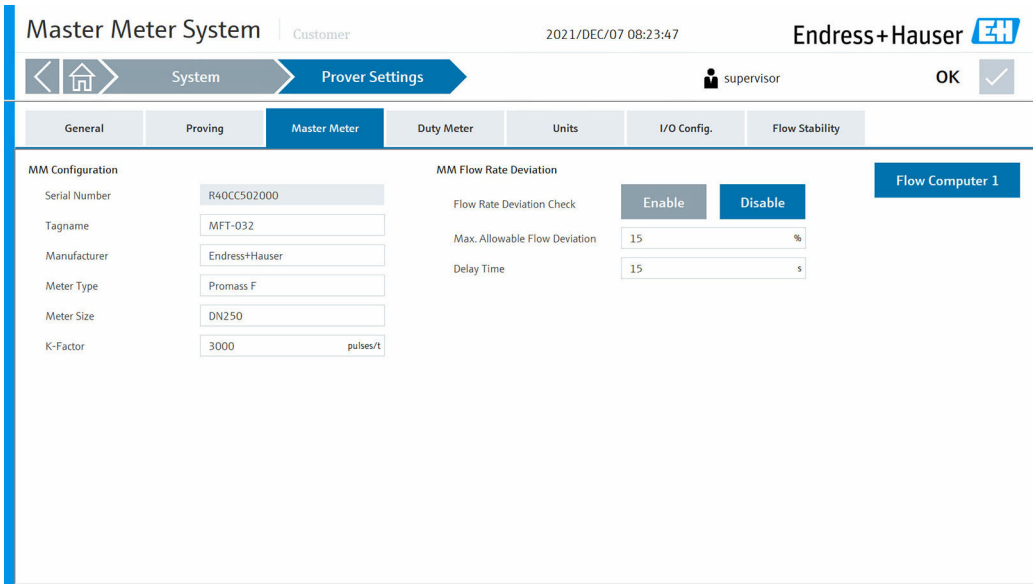


A0048068

"Master Meter" tab

The operator can configure the following parameters for the MM:
- Serial Number
- Tagname
- Manufacturer
- Meter Type
- Meter Size
- K-Factor (in pulses/t)

The operator can also enable or disable the "Flow Rate Deviation Check" and define the following settings:
- Max. Allowable Flow Deviation
- Delay Time



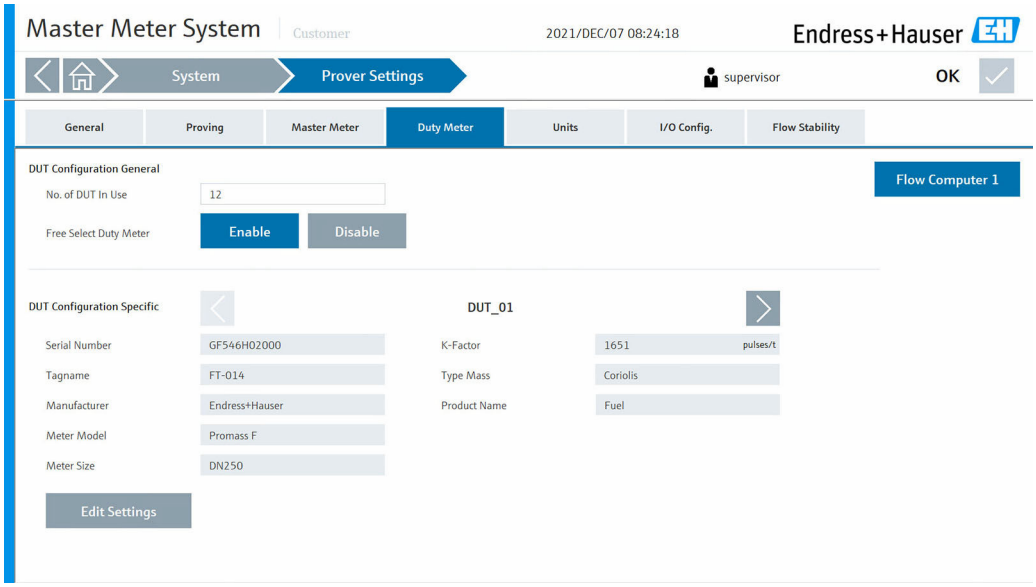
A0048069

"Duty Meter" tab

The operator can define the number of DUTs used (up to 12) and determine whether "Free Select Duty Meter" should be enabled or disabled.

The operator can configure the following parameters under the specific configuration for each DUT:
- Serial Number
- Tagname
- Manufacturer
- Meter Model
- Meter Size
- K-Factor (in pulses/t)
- Type Mass
- Product Name

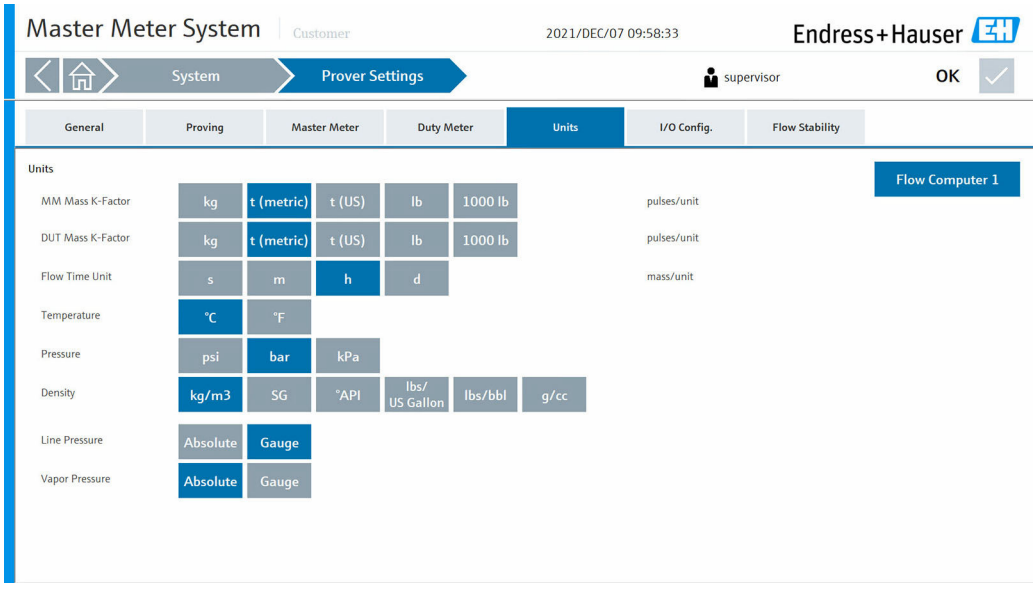
The current software version supports only "Coriolis" under "Type Mass".



A0048070

"Units" tab

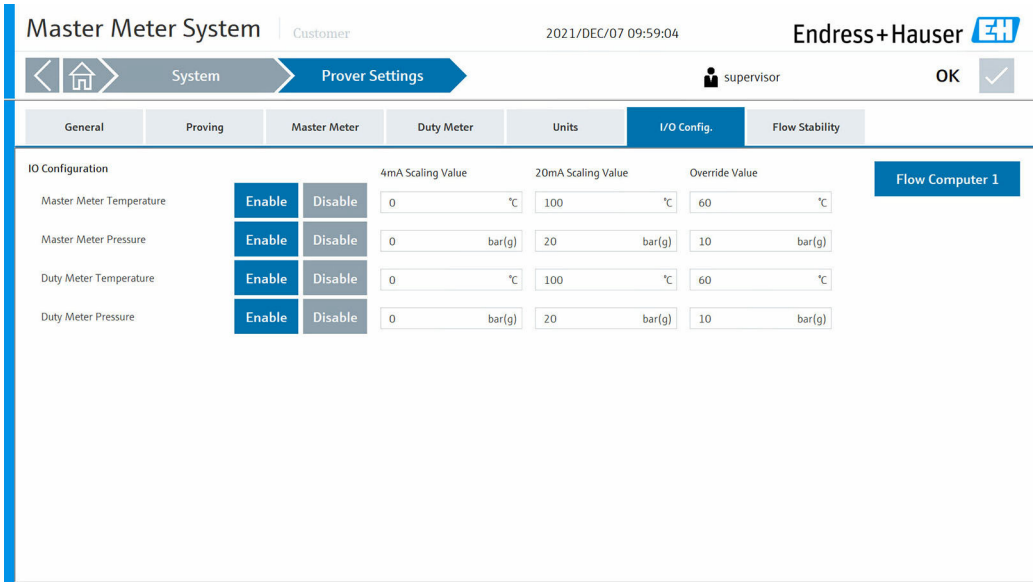
The operator can configure the units for the following terms:
- MM Mass K-Factor
- DUT Mass K-Factor
- Flow Time Unit
- Temperature
- Pressure
- Density
- Line Pressure
- Vapor Pressure



A0048072

"I/O Config." tab

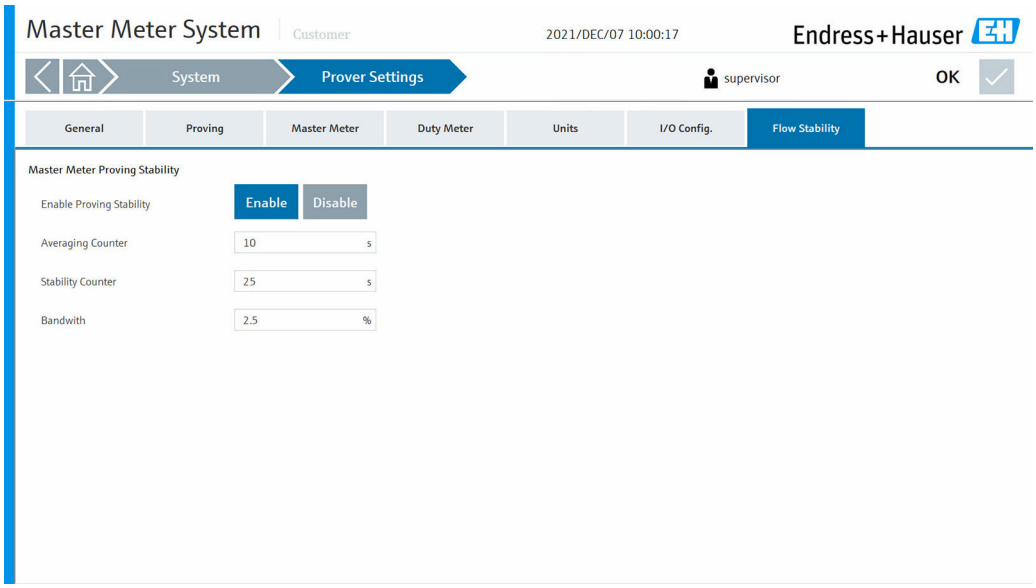
The operator can configure the following parameters for the field instrument:
- Master Meter Temperature
- Master Meter Pressure
- Duty Meter Temperature
- Duty Meter Pressure



A0048073

"Flow Stability" tab

The operator can enable or disable the "Proving Stability" and define the following settings:
- Averaging Counter
- Stability Counter
- Bandwidth

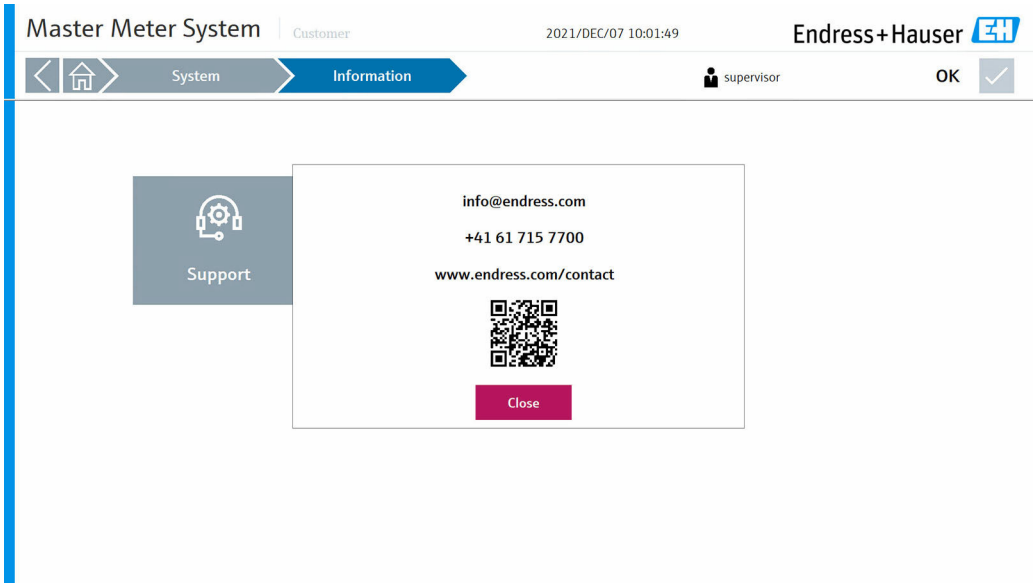


A0048074

8.10.3 "Information" screen

On the "System" screen, tap **Information**. The "Information" screen opens.

This is where the manufacturer's contact details are provided, which the operator can use if assistance is required.

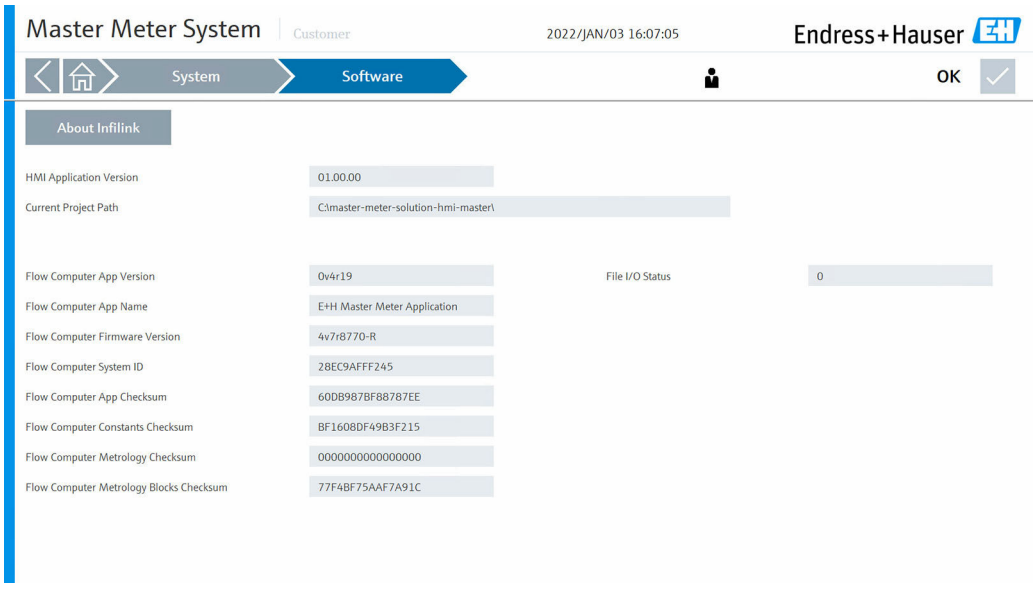


A0048076

8.10.4 "Software" screen

On the "System" screen, tap **Software**. The "Software" screen opens.

Important information, such as the HMI application version, the flow computer app and firmware version as well as various checksums, are displayed here.

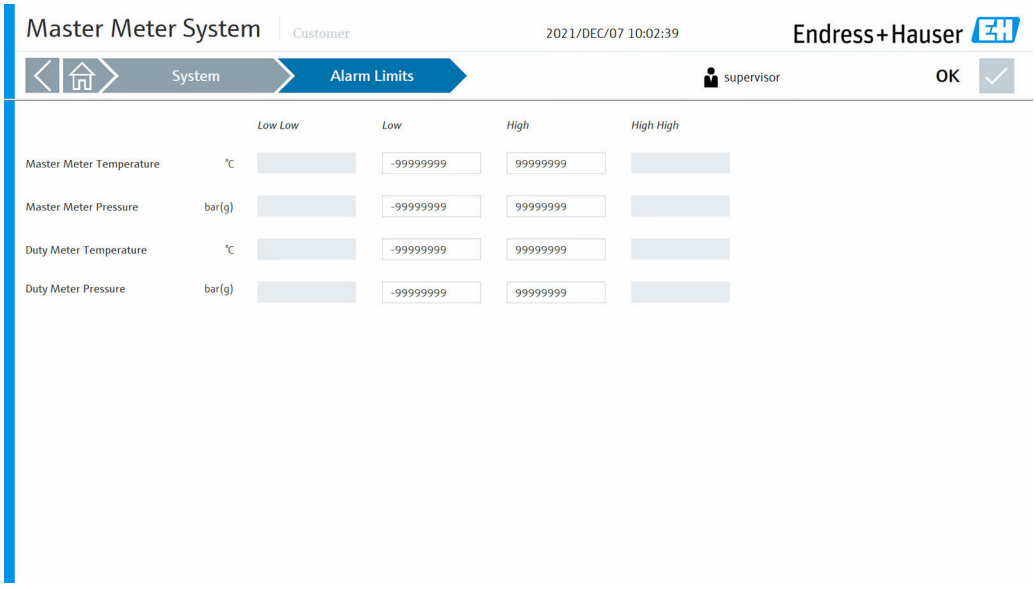


A0048077

8.10.5 "Alarm Limits" display

On the "System" screen, tap **Alarm Limits**. The "Alarm Limits" screen opens.

Here the operator can configure the required pressure and temperature limit values for the MM and DUT.



A0048078

8.10.6 "System Settings" screen

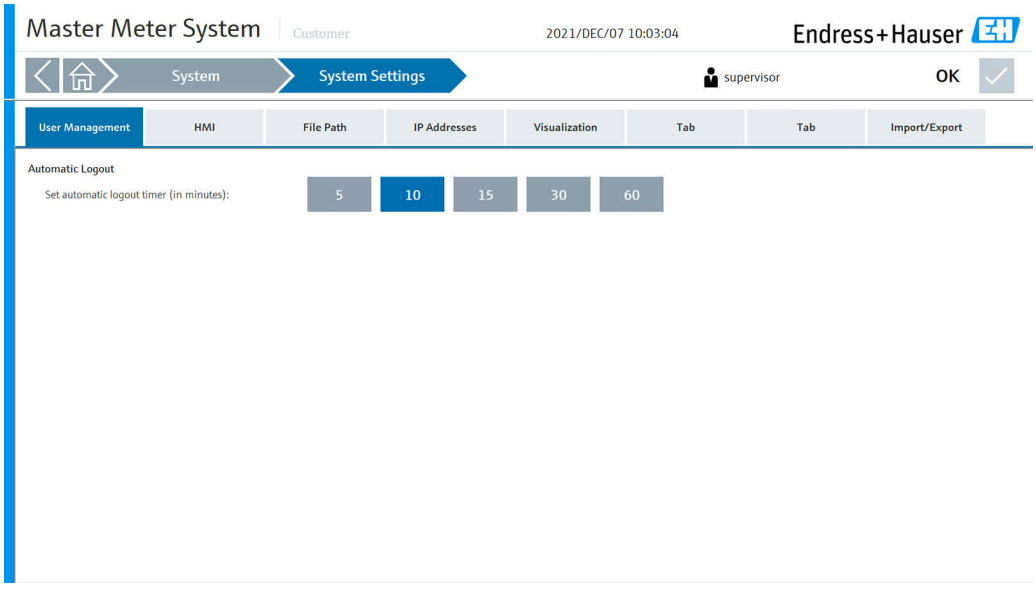
On the "System" screen, tap **System Settings**. The "System Settings" screen opens.

The operator can navigate from here to the six tabs:
- User Management
- HMI
- File Path
- IP Addresses
- Visualization
- Import / Export

During the commissioning phase, before the system can be put into operation, all settings must first be configured in accordance with the actual application in the field.

"User Management" tab

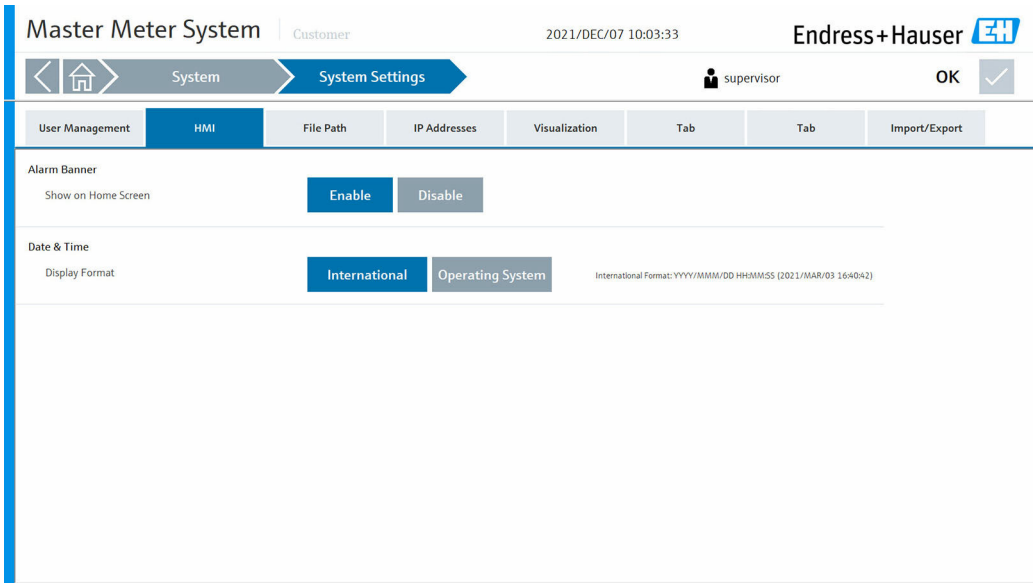
The operator can set the automatic logout timer (in minutes).



A0048079

"HMI" tab

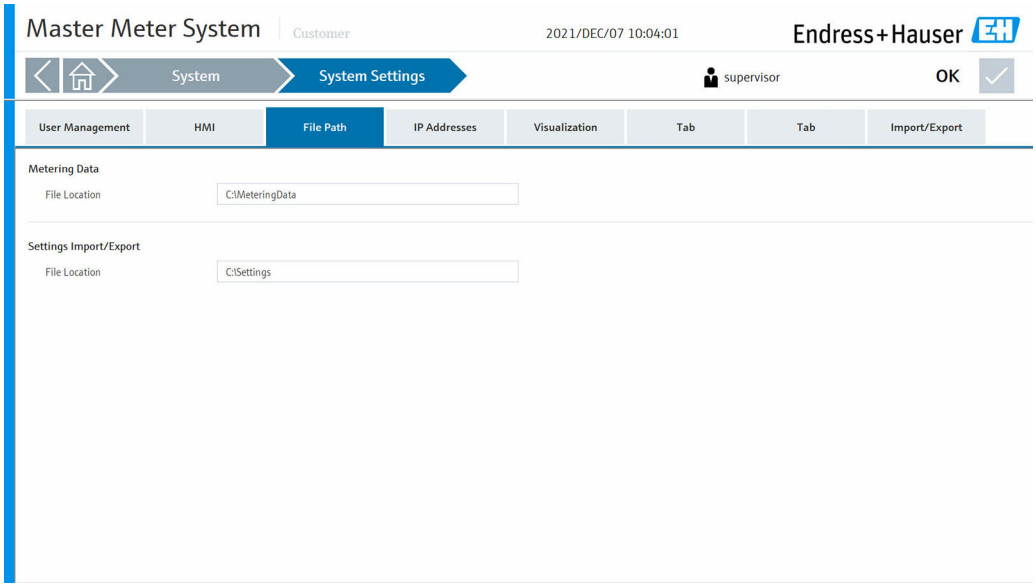
The operator can determine whether the alarm banner should be shown on the home screen and can select the display format for the system date and time.



A0048080

"File Path" tab

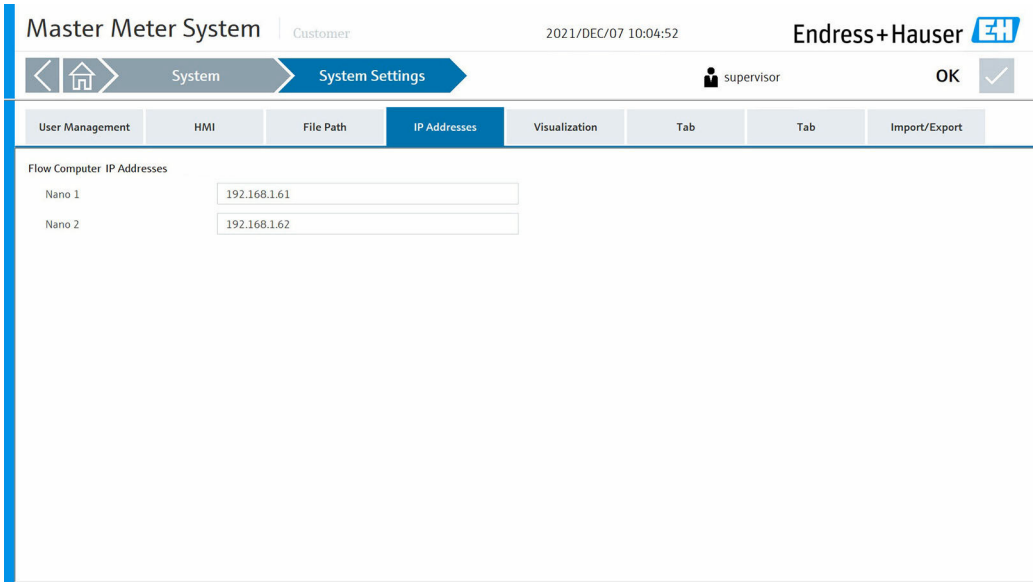
The operator can select the file path for "Metering Data" and "Settings Import/Export".



A0048081

"IP Addresses" tab

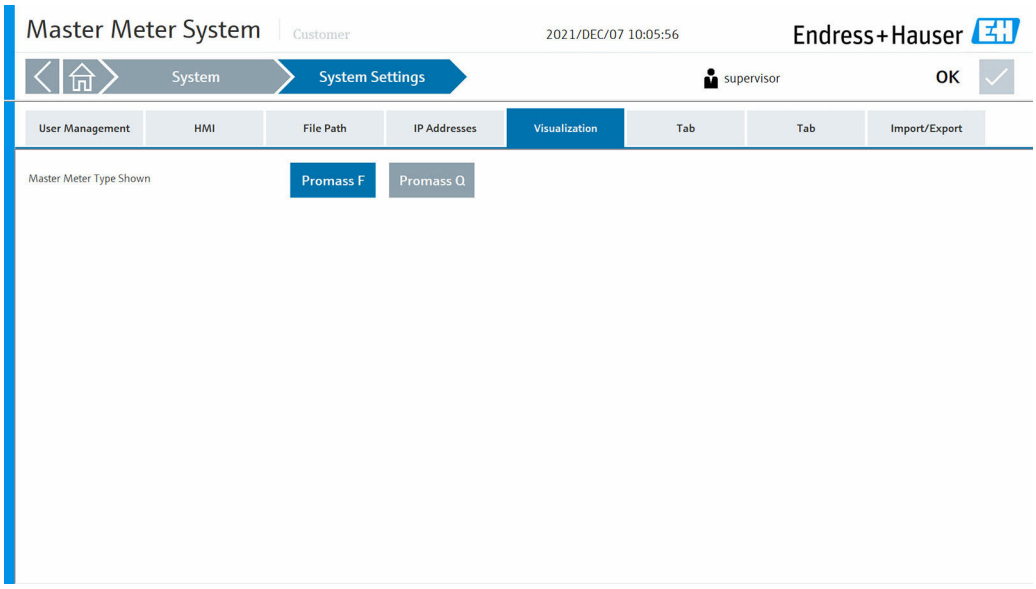
The operator can define or modify the IP address for the flow computer(s).



A0048082

"Visualization" tab

The operator can select the MM type to be shown on the visualization screen.

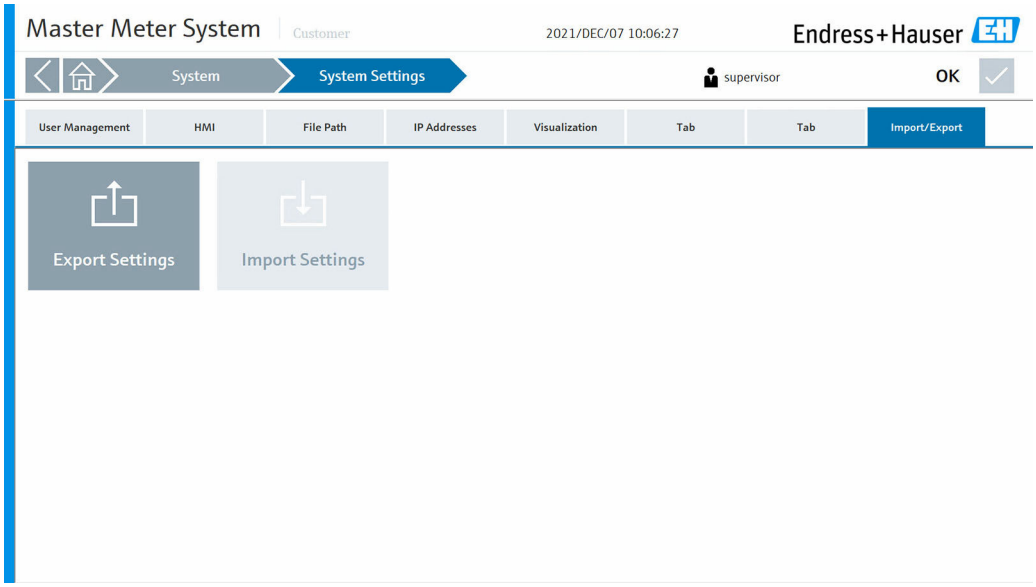


A0048083

"Import/Export" tab

The operator can import or export the configuration file.

Only users with the highest "EH" access authorization level are permitted to import configurations.

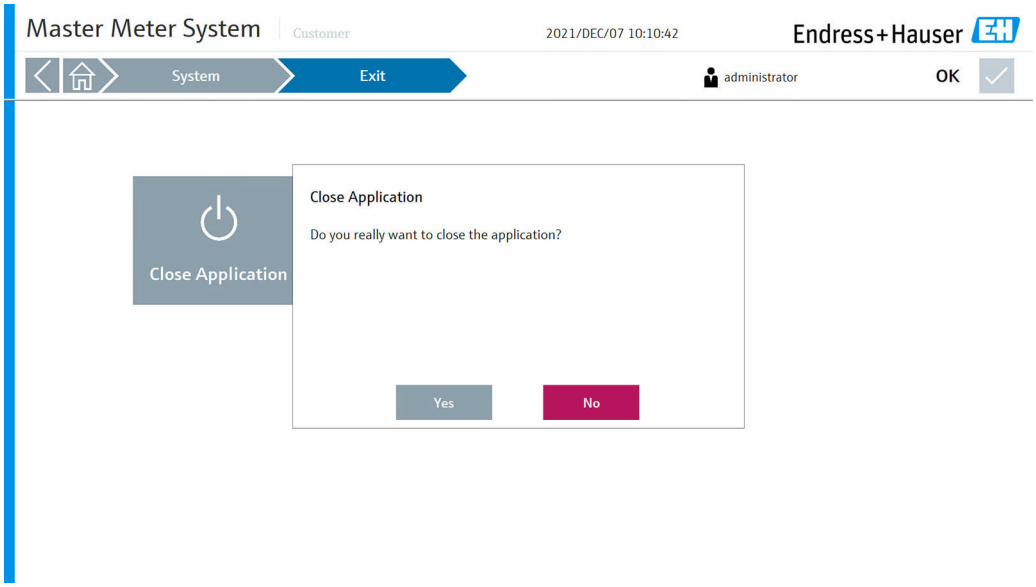


A0048085

8.10.7 "Exit" screen

On the "System" screen, tap **Exit**. The "Exit" screen opens.

Only users with "Administrator" access authorization or higher are permitted to close the application and return to the Windows desktop.



A0048088

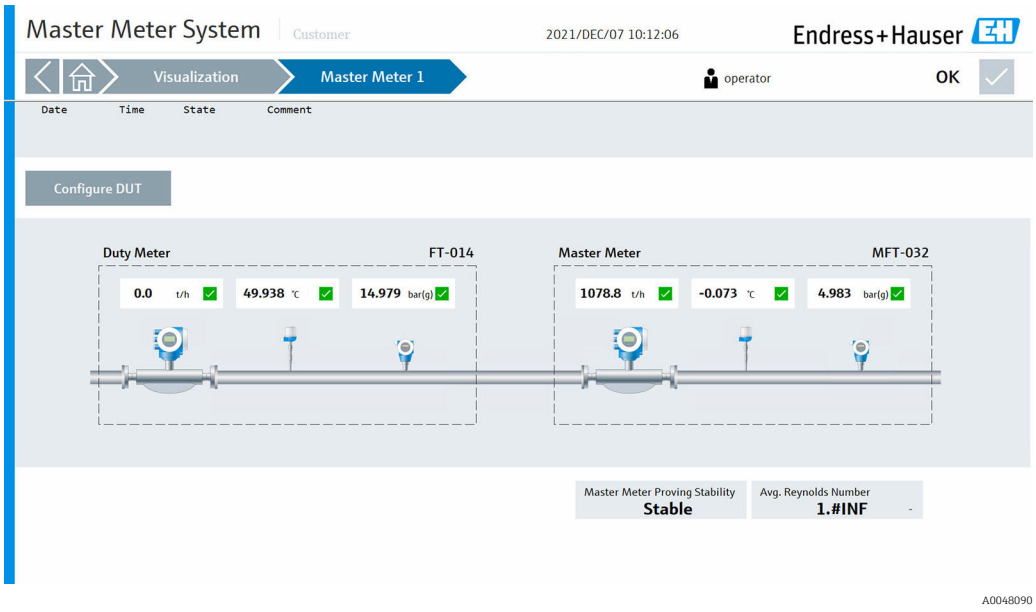
8.11 "Visualization" screen

On the "Home" screen, tap **Visualization**. The "Visualization" screen opens.

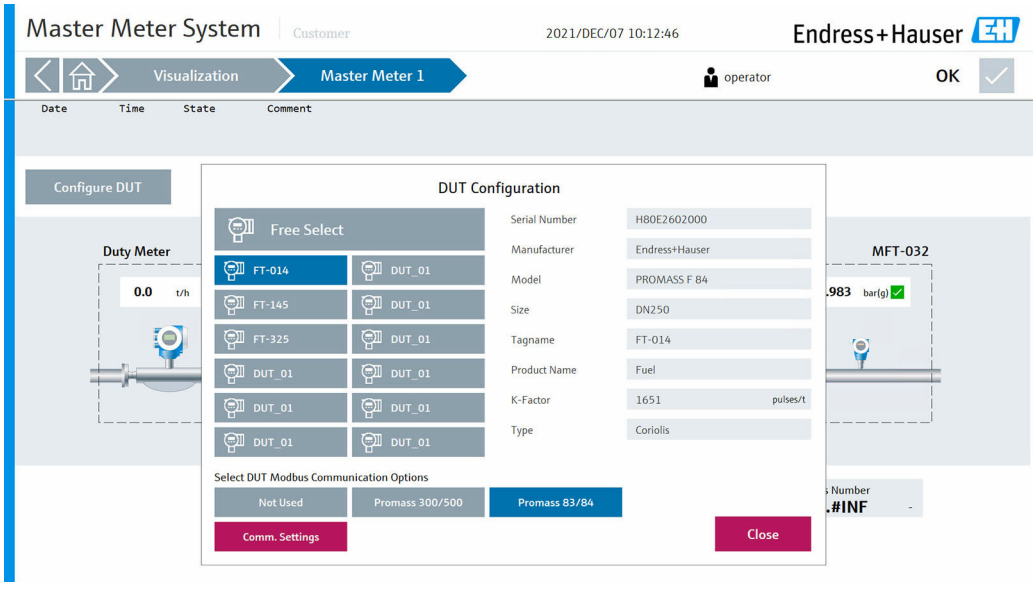
The operator can select the MM used to display the real-time measured values of various field devices on the line connected to the Duty Meter (→ 14, 46). The Duty Meter can be configured by tapping the **Configure DUT** button (→ 15, 46).

The type of the MM displayed can be selected.

For more information → 42



14 *Visualization of Master Meter 1*

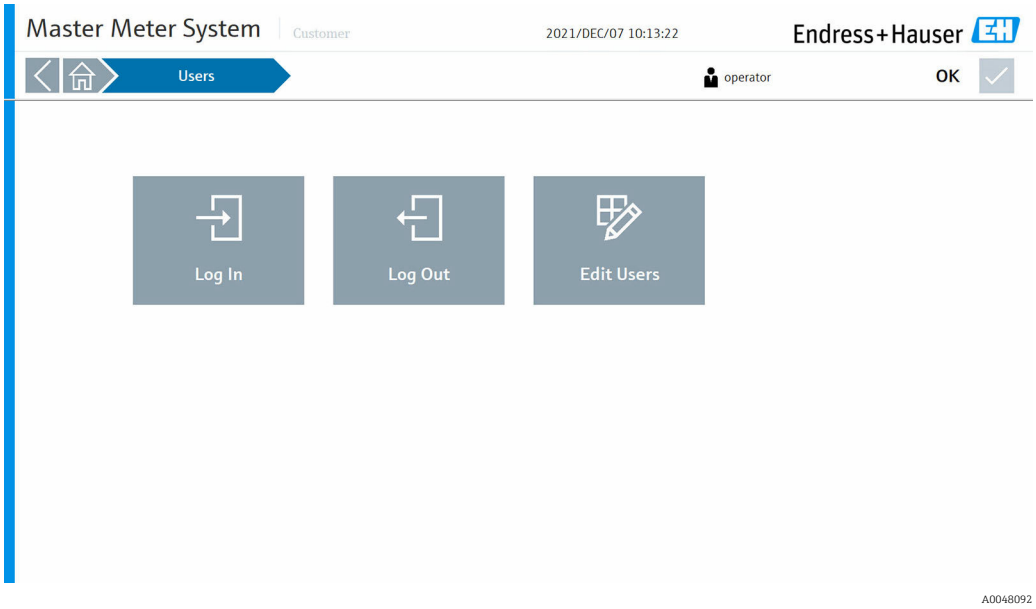


15 *DUT configuration*

8.12 "Users" screen

On the "Home" screen, tap **Users**. The "Users" screen opens.

Here the operator can log users in or out, or edit users.



16 *Users*

8.12.1 User Management

User management comprises three customer levels and an EH level:
- Operator (basic operation)
- Supervisor (plus advanced operation, customer settings, operator management)
- Administrator (plus supervisor management)
- EH (plus system parameter settings)

8.12.2 User access matrix

Authorization	Non-registered user	Operator	Supervisor	Administrator	EH
View screens	✓	✓	✓	✓	✓
Perform proving	✗	✓	✓	✓	✓
Access to reports and data logs	✗	✓	✓	✓	✓
Access to flow computer website	✗	✗	✓	✓	✓
Acknowledge alarms	✗	✓	✓	✓	✓
Scroll through and filter alarm history	✗	✓	✓	✓	✓
Access to diagnostic data	✓	✓	✓	✓	✓
System: Change language	✓	✓	✓	✓	✓
Display & modify settings	✗	✗	✓	✓	✓
Display & modify system settings	✗	✗	✗	✓	✓
System: Exit HMI application	✗	✗	✗	✓	✓
System: Display support information	✓	✓	✓	✓	✓
System: Change alarm limits	✗	✗	✓	✓	✓
System: Display software information	✓	✓	✓	✓	✓
System: Export settings	✗	✗	✗	✓	✓
System: Import settings	✗	✗	✗	✗	✓
Change user settings	✗	✗	✗	✓	✓

9 Diagnostics and troubleshooting

9.1 List of error messages

Diagnostic behavior:
- Error: ⊗
- Warning: ⚠

Diagnosis no.	Short text	Diagnostic behavior	Possible cause	Remedy
000	Flow Computer 1 Communication Error	⊗	Communication between HMI and flow computer is interrupted.	Ensure that flow computer is operational and that Ethernet cables are connected.
001	Flow Computer 2 Communication Error	⊗	Communication between HMI and flow computer is interrupted.	Ensure that flow computer is operational and that Ethernet cables are connected.
002	Cabinet door open	⊗	The cabinet door is open.	Close cabinet door.
003	Sealing Switch Unsealed Position	⊗	The sealing switch has been activated and is in the "unsealed" position.	Set sealing switch to "sealed" position.
050	File Read/write Error	⚠	The HMI could not read or write to the file.	Restart HMI computer.
051	Power Supply 1 Alarm	⚠	No 24 V signal available at Power Supply 1.	Ensure that Power Supply 1 is switched on. Replace power supply if necessary.
052	Power Supply 2 Alarm	⚠	No 24 V signal available at Power Supply 2.	Ensure that Power Supply 2 is switched on. Replace power supply if necessary.
100	Flow Computer 1 Calculation Error	⊗	A calculation error has occurred in the flow computer.	Restart flow computer. If error persists, contact Endress+Hauser.
101	Flow Computer 1 DUT Density Transmitter Fail	⊗	No signal received at analog input of DUT density sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
102	Flow Computer 1 DUT Pressure Transmitter Fail	⊗	No signal received at analog input of DUT pressure sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
103	Flow Computer 1 DUT Temperature Transmitter Fail	⊗	No signal received at analog input of DUT temperature sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
104	Flow Computer 1 FLASH Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
105	Flow Computer 1 FRAM Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
106	Flow Computer 1 I/O Comms Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
107	Flow Computer 1 MM Pressure Transmitter Fail	⊗	No signal received at analog input of MM pressure sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
108	Flow Computer 1 MM Temperature Transmitter Fail	⊗	No signal received at analog input of MM temperature sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
109	Flow Computer 1 Invalid Hardware Version	⊗	The MM application was installed on an incompatible flow computer.	Install application on a 3rd generation or newer flow computer.
110	Flow Computer 1 System Restart	⊗	The flow computer has been restarted.	This is normal behavior following an intended restart. In any other case, contact Endress+Hauser.
111	Flow Computer 1 MM Comms Fail	⊗	Modbus RTU communication between flow computer and Promass MM has failed.	Check wiring of Modbus RTU (RS-485) cables. Ensure that Promass is switched on. Check Modbus RTU communication settings.

Diagnosis no.	Short text	Diagnostic behavior	Possible cause	Remedy
112	Flow Computer 1 RAM Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
113	Flow Computer 1 RTC Error	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
114	Flow Computer 1 SD Card Error	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
115	Flow Computer 1 Task Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
116	Flow Computer 1 Units Mismatch Error	⊗	Settings selected for units are not plausible.	Check settings for units.
117	Flow Computer 1 Flow Rate/Total Discrepancy Error	⊗	The pulse input signal of the MM does not match the Modbus mass rate signal.	Check pulse input of MM and Modbus RTU communication. Check settings for flow discrepancy.
150	Flow Computer 1 DUT Density High	⚠	Upper DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
151	Flow Computer 1 DUT Density Low	⚠	Lower DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
152	Flow Computer 1 DUT Pressure High	⚠	Upper DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
153	Flow Computer 1 DUT Pressure Low	⚠	Lower DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
154	Flow Computer 1 DUT Temperature High	⚠	Upper DUT temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
155	Flow Computer 1 DUT Temperature Low	⚠	Lower DUT temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
156	Flow Computer 1 MM Pressure High	⚠	Upper MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
157	Flow Computer 1 MM Pressure Low	⚠	Lower MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
158	Flow Computer 1 MM Temperature High	⚠	Upper MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
159	Flow Computer 1 MM Temperature Low	⚠	Lower MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
160	Flow Computer 1 prove aborted	⚠	An ongoing prove was aborted (either manually or automatically).	Check detailed messages for prove. A message will appear as soon as a new prove is started.
161	Flow Computer 1 Printer 1 Error	⚠	An error has occurred in a connected printer.	Check printer connection and settings.
162	Flow Computer 1 Printer 2 Error	⚠	An error has occurred in a connected printer.	Check printer connection and settings.
163	Flow Computer 1 Printer 3 Error	⚠	An error has occurred in a connected printer.	Check printer connection and settings.
164	Flow Computer 1 Printer Spool Full	⚠	Flow computer printer spool is full.	Check connected printers.
165	Flow Computer 1 FTP Error	⚠	The flow computer could not save the data to the HMI computer.	Check FTP settings on flow computer and HMI. Contact Endress+Hauser.
166	Flow Computer 1 Duty Meter Communications Fail	⚠	Modbus RTU communication between the flow computer and Promass Duty Meter has failed.	Check wiring of Modbus RTU (RS-485) cables. Ensure that Promass is switched on. Check Modbus RTU communication settings. Ensure that a compatible Duty Meter is being used.
200	Flow Computer 2 Calculation Error	⊗	A calculation error has occurred in the flow computer.	Restart flow computer. If error persists, contact Endress+Hauser.

Diagnosis no.	Short text	Diagnostic behavior	Possible cause	Remedy
201	Flow Computer 2 DUT Density Transmitter Fail	⊗	No signal received at analog input of DUT density sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
202	Flow Computer 2 DUT Pressure Transmitter Fail	⊗	No signal received at analog input of DUT pressure sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
203	Flow Computer 2 DUT Temperature Transmitter Fail	⊗	No signal received at analog input of DUT temperature sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
204	Flow Computer 2 FLASH Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
205	Flow Computer 2 FRAM Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
206	Flow Computer 2 I/O Comms Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
207	Flow Computer 2 MM Pressure Transmitter Fail	⊗	No signal received at analog input of MM pressure sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
208	Flow Computer 2 MM Temperature Transmitter Fail	⊗	No signal received at analog input of MM temperature sensor.	Check wiring of 4 to 20-mA signal at analog input. Check sensor.
209	Flow Computer 2 Invalid Hardware Version	⊗	The MM application was installed on an incompatible flow computer.	Install application on a 3rd generation or newer flow computer.
210	Flow Computer 2 System Restart	⊗	The flow computer has been restarted.	This is normal behavior following an intended restart. In any other case, contact Endress+Hauser.
211	Flow Computer 2 MM Comms Fail	⊗	Modbus RTU communication between flow computer and Promass MM has failed.	Check wiring of Modbus RTU (RS-485) cables. Ensure that Promass is switched on. Check Modbus RTU communication settings.
212	Flow Computer 2 RAM Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
213	Flow Computer 2 RTC Error	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
214	Flow Computer 2 SD Card Error	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
215	Flow Computer 2 Task Fail	⊗	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
216	Flow Computer 2 Units Mismatch Error	⊗	Settings selected for units are not plausible.	Check settings for units.
217	Flow Computer 2 Flow Rate/Total Discrepancy Error	⊗	The pulse input signal of the MM does not match the Modbus mass rate signal.	Check pulse input of MM and Modbus RTU communication. Check settings for flow discrepancy.
250	Flow Computer 2 DUT Density High	⚠	Upper DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
251	Flow Computer 2 DUT Density Low	⚠	Lower DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
252	Flow Computer 2 DUT Pressure High	⚠	Upper DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
253	Flow Computer 2 DUT Pressure Low	⚠	Lower DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
254	Flow Computer 2 DUT Temperature High	⚠	Upper DUT temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.

Diagnosis no.	Short text	Diagnostic behavior	Possible cause	Remedy
255	Flow Computer 2 DUT Temperature Low	⚠	Lower DUT temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
256	Flow Computer 2 MM Pressure High	⚠	Upper MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
257	Flow Computer 2 MM Pressure Low	⚠	Lower MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
258	Flow Computer 2 MM Temperature High	⚠	Upper MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
259	Flow Computer 2 MM Temperature Low	⚠	Lower MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
260	Flow Computer 2 prove aborted	⚠	An ongoing prove was aborted (either manually or automatically).	Check detailed messages for prove. A message will appear as soon as a new prove is started.
261	Flow Computer 2 Printer 1 Error	⚠	An error has occurred in a connected printer.	Check printer connection and settings.
262	Flow Computer 2 Printer 2 Error	⚠	An error has occurred in a connected printer.	Check printer connection and settings.
263	Flow Computer 2 Printer 3 Error	⚠	An error has occurred in a connected printer.	Check printer connection and settings.
264	Flow Computer 2 Printer Spool Full	⚠	Flow computer printer spool is full.	Check connected printers.
265	Flow Computer 2 FTP Error	⚠	The flow computer could not save the data to the HMI computer.	Check FTP settings on flow computer and HMI. Contact Endress+Hauser.
266	Flow Computer 2 Duty Meter Communications Fail	⚠	Modbus RTU communication between the flow computer and Promass Duty Meter has failed.	Check wiring of Modbus RTU (RS-485) cables. Ensure that Promass is switched on. Check Modbus RTU communication settings. Ensure that a compatible Duty Meter is being used.

9.2 Troubleshooting

This section explains the actions the user should take to fix common computer problems caused by hardware or software errors.

Should a problem occur, the initial steps listed below should be followed before taking further action:

- On the tablet PC, try to identify and isolate the component that is causing the problem.
- Ensure that all peripheral devices are switched on before switching on the tablet PC.
- In the event of problems with an external device, ensure that the cable connections are correct and secure.
- Ensure that the correct configuration information is configured in the BIOS setup program.
- Ensure that all device drivers are correctly installed.
- Take note of the user's observations. Are there any message on the display? Are indicator lamps lit? Are there any beeping sounds? If the user wants to seek assistance, detailed descriptions are helpful for service staff.

If the problem persists after the user has followed the instructions in this section, contact your local Endress+Hauser Sales Center.

10 Maintenance and repair

10.1 General information

- Use only original spare parts.
- Compliance with all applicable standards, regional/national laws and certificates is mandatory.
- Repairs may be carried out only by Endress+Hauser service employees or by suitably trained customer staff.

10.2 Cabinet fan

The filter mat of the cabinet fan must be checked periodically. If necessary, clean the filter mat or replace it with a mat of the correct type.

10.3 Spare parts

Manufacturer	Description	Type	EH material no.
Newflow	Flow computer	NÅNO-311	71526319
Moxa	Ethernet switch	EDS-208	71526312
Teltonika	Industrial 4G LTE Wi-Fi router	RUT240	71534091
Teltonika	Antenna	Combo SISO Mobile	71534421
Advantech	15.6" Panel PC	PPC-3151W	71540988
B&R	15.6" Panel PC	PC 2200	71479866
B&R	Automation PC	PC 2200	71526321
ICOP	External display	PDX2-090T-8A	71473410

10.4 Spare parts and services

Regular servicing of the MM System by the system manufacturer is recommended.

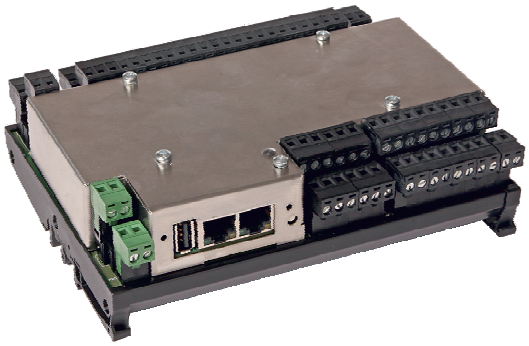
For more information please contact your Endress+Hauser Sales Center at www.address.endress.com.

10.5 Disposal

Incorrect disposal of the system components may damage the environment.
- Do not dispose of system components as household waste.
- Always dispose of system components in accordance with national regulations.
- Ensure proper separation and reuse of system components.

11 Technical data

11.1 System components

Flow computer (Newflow NÅNO-311)	 A0048150
Ethernet switch (Moxa EDS-208)	 A0048151
Industrial 4G LTE Wi-Fi router (Teltonika RUT240)	 A0048152
Antenna (Teltonika Combo SISO Mobile)	 A0048153

15.6" Panel PC (Advantech PPC-3151W)	 A0048154
15.6" Panel PC (B&R PC 2200)	 A0048794
Automation PC (B&R PC 2200)	 A0048795
External display (ICOP PDX2-090T-8A)	 A0048796

11.2 Power supply

MM cabinet	110 to 230 V AC at 50/60 Hz

11.3 Input/output

MM	24 V DC pulse, Modbus RTU
MM temperature	Current signal 4 to 20 mA
MM pressure	Current signal 4 to 20 mA
DUT	24 V DC pulse, Modbus RTU
DUT temperature	Current signal 4 to 20 mA
DUT pressure	Current signal 4 to 20 mA

11.4 Cables

Power cable	Standard installation cable is sufficient.
Signal cable, current signal 4 to 20 mA	Shielded cable required.
Modbus RS485 cable	The EIA/TIA-485 standard specifies two cable types (A and B) for the bus line, which can be used for all transmission rates. Cable type A is recommended.
Pulse/frequency output	Shielded cable required.

11.5 Environment

Ambient temperature range	−10 to +55 °C (+14 to +131 °F)
Relative humidity	25 to 75 %

11.6 Documentation

Device	Document type	Documentation code
Flow computer	Installation manual	TBC

Index

Symbols

C

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

W

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