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BA02244D/06/EN/01.22-00

Operating Instructions Master Meter System

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





- 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.

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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.

A 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	
\sim	Alternating current	
\sim	Direct current and alternating current	
<u> </u>	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 a 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.
((۲۰۱۰)) ۵0044513	Cellular radio Bidirectional data exchange via cellular network.

Symbol	Meaning
8	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
0	Torx screwdriver
•	Flat-blade screwdriver
•	Phillips head screwdriver
$\bigcirc \not \sqsubseteq$	Allen key
Ń	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.	
i	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	
L.	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
EX	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 \rightarrow Programs \rightarrow 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



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-ofthe-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.



I 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.

Christoph Manian-Filing 4 Christoph Manian-Filing 4 CH-1153 Reinoch/Switzerland Moster Neter System	-	Endress Huser Porte: AG Christoph Weinen-Ring 4
Serial number Master Meter Line 1: XXXXXXXXXXX Serial number Master Meter Line 2: XXXXXXXXXXX Serial number control unit: XXXXXXXXXXX	-	Master Meter System – Control Unit Order code: DSKMM-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Viscosity range: XX to XXX cSt Max. flow rate: XXX / XXX t/h Min. flow rate: XXX / XXX t/h Max. pressure XXX / XXX bar (g) P&D drawing number: 324035-0000_ZAA	-	Extended order code: DSKMM-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Temperature range (liquid): -XX+XX °C Temperature range (ambient): -XX+XX °C Environmental classes: M3/E2	-	
A→C Year of manufacturing:	5	
2 Master Meter System namenlate	A0048019	ADD

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



6.1.4 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 $\rightarrow \textcircled{}{55}$

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 $\rightarrow \implies 33$

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 $\rightarrow \cong 36$

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.

Fi Fo

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.



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 ($\rightarrow \square 7$, $\square 18$) or system status (OK, warning, error; $\rightarrow \square 8$, $\square 18$)



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.

Master Meter 🗸 🗸	Duty Meter 🗸 🗸	Prove Setup 🗸 🗸	Summary 🗸 🗸	Prove Run	Prove Result	
					A00481	"II 131

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 $\rightarrow \triangleq 46$

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.

Master Meter System Custon	ner	2021/DEC/06 14:31:57	Endress++	lauser 🖽
		ů	operator	ок 🗸
Date Time State Comment				
Proving	Guidance	- \/_ o Diagnostics	System	
Visualization			Users	

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



Prove Wizard 8.6

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 ($\rightarrow \blacksquare$ 10, \blacksquare 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 $\rightarrow \square 17$

	laster Meter System Customer 2021/DEC/06 14:33:39			ОК							
Master M	eter	Duty Meter	>	Prove Setup		Summary		Prove Run		Prove Result	
Select Master Meter											
Serial Number	R40CC502000				Size	DN250					
Manufacturer	Endress+Hauser				K-Factor	3000	pulse	es/t			
Type	Promass F										

E 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 ($\rightarrow \blacksquare 11, \boxminus 22$).

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.

Master Me					
	ter 🗸 🔪 Duty Me	eter Prove Setup	Summary	Prove Run	Prove Result
Select Duty Meter	DUT-02 DUT-02 DUT-03 DUT-03 Promass 300/500	Abort Wizard Do you want to abort the prove	wizard?		
Model		Yes	No		
Size	 Abort Wiza	rd	Type Conolis		Next Step

■ 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 ($\rightarrow \blacksquare$ 12, \boxdot 23) and the **Free Select** option ($\rightarrow \blacksquare$ 13, \boxdot 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 $\rightarrow \triangleq 17$

Master Me	eter System	omer	202	1/DEC/06 14:34:41		ОК 🗸
Master Met	er 🗸 🔪 Duty Meter	Prove S	Setup	Summary	Prove Run	Prove Result
Select Duty Meter						
Ē	FT-014	@II DUT_01	@I DUT_01	☐ DUT_01		
"The second seco	💬 FT-145	@I DUT_01	@I DUT_01	@I DUT_01		
Free Select	FT-325	@II DUT_01	@I DUT_01	@I DUT_01		
Colort DUT Madhus Cou	university of the second se					
Not Used	Promass 300/500	Promass 83/84	Comm. Settings			
Specify DUT Parameter	s					
Serial Number	GF546H02000		Tagname	FT-014		
Manufacturer	Endress+Hauser		Product Name	Fuel		
Model	Promass F		K-Factor	1651	pulses/t	
Size	DN250		Туре	Coriolis		
Previous Step	Abort Wizard					Next Step

■ 12 Duty meter (selected)

Aaster Me	eter System 🛛 🗅	istomer	202	1/DEC/06 14:36:19		ОК
Master Me	ter 🗸 🔪 Duty Mete	r Prove	e Setup	Summary	Prove Run	Prove Result
elect Duty Meter						
	FT-014	@I DUT_01	☐ DUT_01	@I DUT_01		
	FT-145	@I DUT_01	@I DUT_01	@II DUT_01		
Free Select	🗐 FT-325	DUT_01	☐ DUT_01	©I DUT_01		
		-			_	
elect DUT Modbus Co	mmunication Options			_		
Not Used	Promass 300/500	Promass 83/84	Comm. Settings			
pecify DUT Paramete	rs					
Serial Number	H80E2602000	6	Tagname	FT-147		
Manufacturor	Endress+Hauser	0.51	Product Name	Direct.		
Manufacturer		Lit		Diesel		
Manufacturer	PROMASS F 84		K-Factor	1654	pulses/t	

■ 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" ($\rightarrow \square 24$).

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

For more information on how to predefine the standard settings \rightarrow 🗎 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.

Master Meter	System Custo	mer	202	1/DEC/06 14:3	8:33			Ok	(🗸
Master Meter 🗸	Duty Meter	Prove Setup		Summary		Prove Ru	n	Prove Result	t
Prove Mode Mass to Mass		Maximum Number of Runs Required Good Runs	10 3			Repeatability Limit	0.20	%	
Prove Method									
Pulse Counts	Time	Required Bulco Count	10000						
Mass	Manual Trigger	Required Pulse Count	10000						
Meter Factor Limit Check									
Enable	Disable	Meter Factor Check Limit	0.25		%				
Other Prove Settings Site Reference	Production								
Previous Step	Abort Wizard	I						Next St	ep >

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 ($\Rightarrow \square 25$).

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.

Master Meter System	er 2021/DE	C/06 14:39:39	ок 🗸
Master Meter \checkmark Duty Meter \checkmark	🗸 🔪 Prove Setup 🧹 🔪 Sur	mmary Prove Run	Prove Result
Master Meter Image: market of the second	Duty Meter FT-147 Serial Number HB0E2602000 Manufacturer Endress+Hauser Model PR0MASS F 84 Size DN 250	Product Name K-Factor	Diesel 1654 pulses/t
K-Factor 3000 pulses/t	Type Mass Coriolis		
Prove Mode Mass to Mass Max. Number of Runs 10 Required Good Runs 3 Repeatability Limit 0.20 %	Prove Method Pulse Count Required Pulse Count 10000 Meter Factor Check 1 Meter Factor Check Limit 0.25	96	
Previous Step Abort Wizard			Next Step

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.
- 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".

Master Meter System	Customer	2021/DEC/07 07:	54:08	ОК 🗸
Master Meter 🗸 🔪 Duty M	eter 🗸 🔪 Prove Se	tup 🗸 🔪 Summary	Prove Run	Prove Result
Idle				ОК
	Master Meter MFT-032	MM Current Run Mass 3.633 t	MM Current Pulse Count 10788 -	Complete 🗸 Wait Stability
Start Prove Abort Prove	Duty Meter FT-014	DUT Current Run Mass 3.634 t	DUT Current Pulse Count 6000 -	Hold Stability Start Run
Master Meter Proving Stability Stable	Run MM Mass t Run 1 4.0877922 Run 2 2.5738575 Run 3 3.0334434 Run 5 3.04344 Run 6 3.04344 Run 6 3.0414 Run 7 3.0414 Run 8 3.0414 Run 9 3.0414	DUT Mass Meter Factor t 0.399984 4.0804313 0.399984 2.5741975 0.99987 3.6341611 0.5998		Count Pulses Run Calcs Repeatability Set Next Run Final Calcs Wait Re-Run Aborted Initialized Wait Pulse Bus On
	Current Run Time 12 -	MM Flow Rate MM 1078.8 t/h	Flowing Density 1.2 kg/m3	Wait Pulse Bus Off Prove Passed
Previous Step Abort Wiza	rd			Prove Result

Master Meter System	Customer	2021/DEC/0	07 07:56:23	ОК 🗸
Master Meter 🗸 🔪 Duty Me	eter 🗸 🔪 Prove Se	etup 🗸 🔪 Sumn	nary 🗸 🗡 Prove	Run Prove Result
Prove Running		Run 1 of 3		ОК
	Master Meter MFT-032	MM Current Run Mass 1.363	t MM Current Pulse Cou	nt Complete - Wait Stability
Start Prove Abort Prove	FT-014	1.363	t 2250	- Start Run
Master Meter Proving Stability Stable	Ram KMM Mass t t Run 1 0 Run 3 Run 3 Run 5 Run 6 Run 6 Run 8 Run 8 Run 9 Run 10	DUT Mass Meter Fact t 0 0	и	Cou at Polaces Run Cales Repeatability Set Next Run Final Cales Wait Re-Run Aborted Initialized Wait Pulse Bus On
	Current Run Time 4 -	MM Flow Rate 1078.8 t/h	MM Flowing Density 1.2 kg/m3	Prove Passed
< Previous Step Abort Wizar	rd			Prove Result

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 ($\rightarrow \textcircled{27}$). 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.

laster	r Meter Sy	stem	Customer			2021/DEC/07	07:59:33				ок
Mas	ter Meter $\checkmark ightarrow$	Duty	Meter 🗸 🔪	Prove Set	up \checkmark	Summa	ary 🗸 🔪	Prove	Run 🗸 🔪	Prove Re	sult
Calculated	Repeatability		Average Meter	Factor		Repeatability S	Status		Prover Diagnost	ics	
	0.027007	%	0.	.999870	-			ок			ОК
Run	MM Pulse Count	MM Mass t	DUT Pulse Count	DUT Mass t	MM Flow Rate	Run Time s	Meter Factor		Previous Meter	Factor 1	2/7/202
Run 1	10338	3.4818815	5750	3.4827377	1078.7975	11	0.99975				
Run 2	10339	3.4822183	5749	3.482132	1078.7975	11	1.00002).9998	
Run 3	10339	3.4822183	5750	3.4827377	1078.7975	11	0.99985				
Run 4											
Run 5											
Run 6											
Run 7											
Run 8											
Run 9											
Run 10											
Average					1078.7975		0.99987				
Previo	us Step	Abort W	izard							Fi	nish

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.

Aaster Meter System	n Cus	omer	2021/DEC/07 08:08:00		Endress+Hauser 🖪
<口 Proving	\geq	Reports		operator	ок 🗸
Master Meter 1		Path to report files on local compute	r: C:\Nano Data\Reports\MM1		Open in File Explorer
Name Date modified Tw	ne Si				^
Marr - Marr Run Report 20211202072724 12/2/2021 7:27 AM	d Dacument	540			1
Mann - Mann Overview Report 20211203 12/3/2021 7-27 AM	d Document	SKR			
Mass - Mass Run Report-20211208072521 12/3/2021 7:25 AM Teo	t Document	5 KB			
Mass - Mass Overview Report-20211203. 12/3/2021 7:25 AM Tex	t Document	5 KB			
Mass - Mass Run Report-20211202165430 12/2/2021 4:53 PM Tex	t Document	5 KB			
Mass - Mass Overview Report-20211202 12/2/2021 4:53 PM Tex	t Document	5 KB			
Mass - Mass Run Report-20211021084550 10/21/2021 8-48 AM Tex	d Document	5 KB			
MassMass_Overview_Report-20211021 10/21/2021 8:48 AM Tex	t Document	5 KB			
MassMass_Run_Report-20211021084459 10/21/2021 8:47 AM Tex	t Document	5 KB			
MassMass_Overview_Report-20211021 10/21/2021 8:47 AM Tex	t Document	5 KB			
MassMass_Run_Report-20211021084458 10/21/2021 8:47 AM Tex	d Document	5 KB			
MassMass_Overview_Report-20211021 10/21/2021 8:47 AM Tex	d Document	5 KB			
MassMass_Run_Report-20211021084457 10/21/2021 8:47 AM Tex	d Document	5 KB			
Mass_*_Mass_Overview_Report-20211021 10/21/2021 8:47 AM Tex	d Document	5 KB			
MassMass_Run_Report-20211021084424 10/21/2021 8:46 AM Tex	d Document	5 KB			
MassMass_Overview_Report-20211021 10/21/2021 8:46 AM Tex	d Document	5 KB			
MassMass_Run_Report-20211021084423 10/21/2021 8:46 AM Tex	d Document	5 KB			
MassMass_Overview_Report-20211021 10/21/2021 8:46 AM Tex	d Document	5 KB			
MassMass_Run_Report-20211021084422 10/21/2021 8:46 AM Tex	d Document	5 KB			
MassMass_Overview_Report-20211021 10/21/2021 8:46 AM Tex	d Document	5 KB			
MassMass_Run_Report-20211021084401 10/21/2021 8:45 AM Tex	d Document	5 KB			
Massmass_overview_keport-20211021 10/21/2021 845 AM Tex	d Document	3 KB			
MassMass_kun_keport-20211021084343 10/21/2021 8:45 AM Tex	d Document	3 KB			
Massmass_overview_neport-20211021 10/21/2021 845 AM 16	a Document	3 ND			
Marr - Marr Outpoint Report 2021004942 10/21/2021 0:45 AM 16	d Document	SVD			
Marr - Marr Dun Percet 20211021004341 10/21/2021 0.44 844 Te	d Document	SVD			
Mass - Mass Overview Renort-20211021 10/21/2021 844 AM Ten	d Document	SKR			
Mass - Mass Run Report-20211021084317 10/21/2021 8-44 AM Te-	t Document	5 KB			
Mass - Mass Overview Report-20211021 10/21/2021 8:44 AM Tex	d Document	5 KB			
Mass - Mass Run Report-20211021084316 10/21/2021 8:44 AM Tex	t Document	5 KB			
Mass - Mass Overview Report-20211021 10/21/2021 8:44 AM Tex	t Document	5 KB			
Mass - Mass Run Report-20211021084315 10/21/2021 8-43 AM Tex	t Document	5 KB			v
a) 👌					lei l

8.8.1 Overview Report

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

MAST	ER ME	TER MASS	OVERVIEW	REPORT #2	2				Арр	Version:	0v4r19
Gene	rated	: 2022/03	1/05 08:58	8:44							
Owne	r/Ope	rator:	Custom	ner				Location:	Location		
Site	Refe	rence:	Lab					MM Micro ID:	International	l Master M	leter
MAST	ER ME	TER DATA									
Manu	factu	irer:	Endres	s+Hauser				Model #:	Promass F		
Mete	r Typ	e:	Coriol	is				Serial #:	R40CC502000		
Mete	r Siz	e:	DN250					Meter NKF:	5200	pu	lses/tonne
Pres	er me	Compensat	ion: No					Temperature Comp	ansation: No		
Tota	lizer	:	284595	.44				Pulse Mode:	MASS		
DUTY	METE	R DATA									
Manu	factu	irer:	Endres	s+Hauser				Model #:	Promass 83		
Mete	r Typ	e:	Coriol	is				Serial #:	GFD35A02000	100	
Mete	r Siz	e: n TD/Tag	DN 250	,				Meter NKF:	2850	pu	lises/tonne
Pres	sure	Compensat	tion:	No				Temperature Comp	ensation:	No	
Cubi	c Pre	ssure Coe	efficient:	6e-06		/bar		Cubic Temperature Pulse Mode:	e Coefficient: MASS	4.12e-05	/°C
FLUI	D DAT	A									
Prod	uct N	lame:		Fuel							
LVC	Table	s:		2012 API	Ch11.1	(Crude	Oil)				
Base	Dens	ity:		750.000	kg/	m3					
PROV	E CPT	TERTA									
Reno	rt Me	thod:	Averag	e Meter F	actor	Method					
Run	Crite	ria:	Repeat	ability	uccor	inc chied		Requirement: 3 d	of 03 completed	runs - (M	4ax 10)
Repe	atabi	lity Limi	it: 0.2	%				Calculated Repeat	tability: 0.009	03923 %	
DATA	ERON		INC								
Run	Run	Master M	Meter	Master Me	ter	Duty	Meter	Duty Meter	Master Meter	Test	TME
#	Ack	Pulse (Count	Indica	ated	Pulse	Count	Indicated	Flow Rate	/Run	2.1.1
				N	lass			Mass	tonnes/h	Time	
				tor	nnes			tonnes		secs	
01	Yes	1	10339	2.008	3972		5750	2.017544	622.38	11	0.99575
02	Yes	-	10338	2.008	3778		5750	2.017544	622.38	11	0.99566
03	Yes		10338	2.000	8//8		5/50	2.01/544	622.38	11	0.99566
04	No		0	0.000	0000		9	0.000000	0.00	0	0.00000
06	No		0	0.000	0000		0	0.000000	0.00	0	0.00000
07	No		0	0.000	9999		0	0.000000	0.00	0	0.00000
08	No		0	0.000	9999		0	0.00000	0.00	0	0.00000
09	No		0	0.000	9999		0	0.00000	0.00	0	0.00000
10	No		0	0.000	9999		0	0.00000	0.00	0	0.00000
Aves			-						622.38		0.99569
Prev	ious	Meter Fac	ctor:	903.2449				Average Meter	r Factor: 0.	9957	
Prov	e Sta	tus: Prov	ve Passed								
Mete	r Fac	tor Limit	t Status:	ОК				Meter Factor	Limit: 1	.00 %	
Rema	rks,	Repairs,	Adjustmen	nts, Etc.,							
		Signatur	re			Date			Company	Represente	≥d
·											

END OF MASTER METER MASS OVERVIEW REPORT

8.8.2 Run Report

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

MASTE	R METER MASS RUN	REPORT # 2				App Versie	on: 0v4r19
Report	t Date/Time: 20	22/01/05 08:58:	:44				
Owner Site	/Operator: Cust Reference: Lab	omer		Loc MM	ation: Loc Micro ID: Int	ation ernational Maste	er Meter
Prove	Status: Prov	e Passed					
MASTE Maste	R METER DATA r Meter NKF:	5200 pulses/	/tonne				
Run	Master Meter	Master Meter	Master Meter	Master Meter	Master Meter	Master Meter	Master Meter
#	Pulse Count	Reynolds	Meter Factor	Temperature	Pressure	Flow Rate	Indicated
		Number	(Reynolds)	°C	barg	tonnes/h	Mass
-	10000		1 010110	0.00	1 00	c22 22	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	0.00000
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	0.00000	0.00	0.00	0.00	0.000000
Aves				-0.08	4.98	622.38	
DUTY I Duty I	METER DATA Meter NKF:	2850 pulses/to	onne				
Run	Duty Mete	r Duty M	leter Dut	v Meter	Duty Meter	Test	IMF
#	Pulse Coun	t Tempera	ature F	ressure	Indicated	/Run	
	ruibe coun	e rempere	°C	harg	Mass	Time	
			C	bars	tonnos	Soce	
01	575	9	10 03	14 08	2 017544	11	0 00575
01	575	0	10 02	14.98	2.017544	11	0.99575
02	5/5	0	+9.95	14.90	2.017544	11	0.99566
05	5/5	0	+9.95	14.98	2.01/544	11	0.99500
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		- 2	19.93	14.98			0.99569
Remar	ks, Repairs, Adj	ustments, Etc.,					
	Cimatura		Data			Company Donno	
	Signature		Date			company kepres	enceu
END O	F MASTER METER M	ASS RUN REPORT					

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

Master M	leter System	istomer	2021/DEC/07 08:09:26	Endress+Ha	user 🖽
く合>	Diagnostics		i i	operator	ок 🗸
	Image: Construction of the second	Alarm History		Process Data	
					A0048055

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 ($\rightarrow \square$ 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 ($\rightarrow \square$ 32).

Master Meter	System	Customer		2021/	DEC/07 08:10:38		Endress+Hause	r 🖽
く 命〉 Dia	agnostics) А	larms			operator	WARNING	?
Acknowledge All								
Date Time 12/7/2021 8:1	e State .0:23 Active	Commer 160: I	nt Flow Computer 1	Prove Aborted				×
								<u> </u>
								A004805
Master Meter	System			2021/	DEC/07 10-23-20		Endross+Hauso	· (<u>7</u> 1)
Master Meter	System	Customer	larms	2021/	DEC/07 10:23:20	operator	Endress+Hause	r 🖽
Master Meter	System	Customer	larms	2021/	DEC/07 10:23:20	e operator	Endress+Hauser ок	r 🖽
Master Meter	agnostics	Customer	larms	2021/ Master Meter (DEC/07 10:23:20	operator	Endress+Hausei ок	r 🖽
Master Meter	agnostics state 33:13 Inactiv	Customer A Commer re 111: I	larms nt Flow Computer 1	2021/ Master Meter C	DEC/07 10:23:20	operator Fail	Endress+Hausei ок	r 🖽
Master Meter	agnostics	Customer A Commer re 111: 1	larms nt Flow Computer 1	2021/ Master Meter (DEC/07 10:23:20	e operator	Endress+Hausei ок	r 🔣
Master Meter	agnostics	Customer A Commen ze 111: I	larms nt Flow Computer 1	2021/ Master Meter (DEC/07 10:23:20	e operator	Endress+Hauser ок	r 🛃
Master Meter	agnostics	Customer A Commen Ze 111: I	larms nt Flow Computer 1	2021/ Master Meter C	DEC/07 10:23:20	e operator	Endress+Hauser ок	r 🖽
Master Meter	agnostics	Customer A Commen ve 111: I	larms nt Flow Computer 1	2021/ Master Meter C	DEC/07 10:23:20	i operator	Endress+Hausei ок	r 🛃
Master Meter	agnostics	Customer A Commen ye 111: I	larms nt Flow Computer 1	2021/ Master Meter C	DEC/07 10:23:20	i operator	Endress+Hauser	r 🛃
Master Meter	agnostics	Customer A Commen re 111: 1	<mark>larms</mark> nt Flow Computer 1	2021/ Master Meter (DEC/07 10:23:20	€ operator	Endress+Hauser ок	r 🚮
Master Meter	agnostics	Customer A Commen re 111: I	larms nt Flow Computer 1	2021/ Master Meter (Communications	Fail	Endress+Hauser ок	r 🖽

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.

Master Me	eter Sys	stem	Customer		2021/DEC/07 0	8:12:20	Endress+Hauser	E
く合く	Diagnos	tics	Alarm	History		🏜 operator	ОК	\checkmark
💻 End Of List	¥	Page Dowr	*	Page Up	Top Of List		₩ Filter	
Date 12/6/2021 12/6/2021 12/7/2021 12/7/2021 12/7/2021 12/7/2021 12/7/2021 12/7/2021	Time 3:54:56 3:57:38 4:16:43 4:18:25 7:56:19 8:00:29 8:00:17 8:09:51 8:10:23 8:11:34	operator operator operator	Event Active Active Active Inactive Acknowledge Acknowledge Inactive	Comment 050: Fill 050: Fill 050: Fill 050: Fill 050: Fill 050: Fill 050: Fill 050: Fill 050: Fill 160: Filo 160: Flow	e Read/Write Error E Read/Write Error Read/Write Error Read/Write Error Read/Write Error Read/Write Error Read/Write Error Read/Write Error Computer 1 Prove Aborte Computer 1 Prove Aborte	d d d		-
								10049060

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.

Master Meter System	stomer	2021/DEC/07 08:15:24	Endress+Hauser 🖾
く ☆ 🔪 Diagnostics 🔪	Process Data	🏚 operator	ок 🗸
Prove Data MM2 DUT History	l	Path to report files on I C:\Meter	ocal computer: IngData\MM1 Open in File Explorer
Disc Date method Type MMD_Proce_23211315184 Disc Disc Disc MMD_Proce_23211315184 Disc Disc Disc Disc MMD_Proce_23211315184 Disc Disc Disc Disc Disc MMD_Proce_23211315184 Disc Dis Disc Disc Dis	68 100 100 100 100 100 100 100 100 100 10		
			B

(i) Copy files to external drive: Right-click/long-press on a file, then select "Save To" and choose external drive.

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.

Master Me	ter System	stomer		2021/DEC/	/07 08:1	2:58	E	ndress+Ha	auser	E
く命〉	Diagnostics	I/O Diagnostics	•			operator			ок	\checkmark
	Nano Input Channel	Raw Input Value		4mA Scaling Value		20mA Scaling Value		Value In Use		
Master Meter Temperature	0	3.9881547	mA	0	°C	100	°C	-0.073845933	°C	
Master Meter Pressure	1	7.9863169	mA	0	bar(g)	20	bar(g)	4.9828961	bar(g)	
Duty Meter Temperature	2	11.990277	mA	0	°C	100	°C	49.93923	°C	
Duty Meter Pressure	3	15.983645	mA	0	bar(g)	20	bar(g)	14.979556	bar(g)	
Pulse Input Channel A	18187	499.9898	Hz							
Pulse Input Channel B	0	0	Hz							
										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.

Master Me	ter Syster	er System Customer		2021/	DEC/07 (08:13:33	Endress+Ha	user 🖽
< (合)	Diagnostics	>	Modbus Diagnostics			operator		ок 🗸
Master Meter Modbus Da	ata							
Serial Number	R40CC502000		Exciter Current	0.0022611511	А	Temperature	21.955414	°С
Order Code	803B25-70J4/0		Reynolds Number	1.#INF	-	Zero Point	-20.6	-
Mass Rate	0	t/h	Oscillating Frequency	316.68173	Hz	Promass Status	492	-
Mass Rate Raw	0.0070303734	t/h	Tube Damping	119.74506	A/m	Calibration Factor	0.84623998	-
Density	1.2180176	kg/m3	Dynamic Viscosity	0	сP			
Duty Meter Modbus Data	ī.							
DUT Modbus Comm.	None		Promass 83/84	Promass 300/5	00	Comm. Settings		
Serial Number	H80E2602000		Density	0.00095108419	kg/m3	Zero Point	15	-
Sensor Type	PROMASS F		Exciter Current	2.9899457	mA	Promass Status	1	-
Device Type	84		Oscillating Frequency	784.10376	Hz	Calibration Factor	2.0602	-
Mass Rate	0	t/h	Tube Damping	338.271	A/m			
Mass Rate Raw	0.00014937838	t/h	Temperature	23.423309	°C			

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.

Master Me	ter System	Custo	mer	2021/DEC/07 08:22:25		Endress+Hause	r 🖽
く命〉	System	\rangle	Language		supervisor	OF	< 🗸
			_				
	Enalish		Deutsch				

8.10.2 "Prover Settings" screen

On the "System" screen, tap **Prover Settings**. The "Prover Settings" screen opens ($\rightarrow \cong 37$).

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".

Master Met	ter System	Customer		2021/DEC/07	08:22:49	Endress	+Hauser 🖽
く合く	System	Prover Se	ttings		supervisor		ок 🗸
General	Proving	Master Meter	Duty Meter	Units	I/O Config.	Flow Stability	
Customer							
Customer Name	Custom	er					
Customer Location	Singapo	re					
Site Reference	None						
							A004806

"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.

Master Mete	er System	Customer		2021/DEC/07 0	08:23:19	Endres	Endress+Hauser 🖾		
< 合>	System	System Prover Se			supervisor		ок 🗸		
General	Proving	Master Meter	Duty Meter	Units	I/O Config.	Flow Stability			
Default Prove Mode Setting	ļs						Elow Computer 1		
Mass to Mass							Flow Computer 1		
Maximum Number of Ru	ns 10								
Required Good Runs	3								
Repeatability Limit	0.20	%							
Default Prove Method Settin	ngs								
Pulse Counts		Time	Mass	Manual Trigge	er				
Required Pulse Count	10000								
Default Meter Factor Limit	Settings								
Enable		Disable							
Meter Factor Check Limit	0.25	96							

"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

Master Me	ter System	Customer		2021/DEC/	07 08:23:47	Endres	s+Hauser 💷
< (合)	System	Prover Set	tings	supervisor		upervisor	ок 🗸
General	Proving	Master Meter	Duty Meter	Units	I/O Config.	Flow Stability	
MM Configuration Serial Number Tagnamie Manufacturer Meter Type Meter Size K-Factor	R40CC5020 MFT-032 Endress+Hai Promass F DN250 3000	00 Jser pubes/t	MM Flow Rate Flow Rate Max. Allor Delay Tim	e Deviation Deviation Check wable Flow Deviation e	Enable 15 15	Disable %	Flow Computer 1
							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".

Master Met	er System	Customer		2021/DE	C/07 08:24:1	18	Endress	s+Hauser 🖽
く命〉	System	em Prover Settings				supervisor		ок 🗸
General	Proving	Master Meter	Duty Meter	Units	17	O Config. F	low Stability	
DUT Configuration Genera No. of DUT in Use Free Select Duty Meter	12 Enabl	e Disable						Flow Computer 1
DUT Configuration Specifi	c <		DUT_01			>		
Serial Number	GF546H02	000	K-Factor		1651	pulses/t		
Tagname	FT-014		Type Mass		Coriolis			
Manufacturer	Endress+Ha	user	Product Name		Fuel			
Meter Model	Promass F							
Meter Size	DN250							
Edit Settings								
-								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

Master Mete	Master Meter System					2021/DE	C/07 09:58:33	End	lress+Hauser 🖽
< (合)	System	System Prover Settings				supervisor			ок 🗸
General	Proving	Mast	er Meter	Duty N	Neter	Units	I/O Conf	ig. Flow Stabil	ity
Units									Flow Computer 1
MM Mass K-Factor	kg	t (metric)		lb	1000 lb		pulses/unit		
DUT Mass K-Factor	kg	t (metric)	t (US)	lb	1000 lb		pulses/unit		
Flow Time Unit	s	m	h	d			mass/unit		
Temperature	°C	°F							
Pressure	psi	bar	kPa						
Density	kg/m3	SG	°API	lbs/ US Gallon	lbs/bbl	g/cc			
Line Pressure	Absolute	Gauge							
Vapor Pressure	Absolute	Gauge							

"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

Master Met	er Syste	em	ustomer		2021/DEC/07	09:59:04		Endres	s+Hauser 💷
く命〉	System	\rightarrow	Prover	Settings			🔓 super	visor	ок 🗸
General	Proving	N	aster Meter	Duty Meter	Units	1/0 (Config.	Flow Stability	
IO Configuration				4mA Scaling Value	20mA Scaling Value		Override Valu	2	Flow Computer 1
Master Meter Temperatu	ire	Enable	Disable	0 °C	100	°C	60	°C	
Master Meter Pressure		Enable	Disable	0 bar(g)	20	bar(g)	10	bar(g)	
Duty Meter Temperature		Enable	Disable	0 °C	100	' C	60	°C	
Duty Meter Pressure		Enable	Disable	0 bar(g)	20	bar(g)	10	bar(g)	
									A0048073

"Flow Stability" tab

The operator can enable or disable the "Proving Stability" and define the following settings:

- Averaging Counter
- Stability Counter
- Bandwidth

Master Meter System				2021/DEC/07	10:00:17	Endress	+Hauser 🖽
く命〉	System	Prover Se	ettings		🗳 sup	ervisor	ок 🗸
General	Proving	Master Meter	Duty Meter	Units	I/O Config.	Flow Stability	
Master Meter Proving S	tability						
Enable Proving Stabilit	y E	nable Disable					
Averaging Counter	1	D s					
Stability Counter	2	5 s					
Bandwith	2	5 %					

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.



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.

Master Meter System	Customer	2022/JAN/03 16:07:05	Endress+Hauser 🖽
く 🟠 🤇 System	Software	ú	ок 🗸
About Infilink			
HMI Application Version	01.00.00		
Current Project Path	C:\master-meter-solution-hmi-master	1	
Flow Computer App Version	0v4r19	File I/O Status	0
Flow Computer App Name	E+H Master Meter Application		
Flow Computer Firmware Version	4v7r8770-R		
Flow Computer System ID	28EC9AFFF245		
Flow Computer App Checksum	60DB987BF88787EE		
Flow Computer Constants Checksum	BF1608DF49B3F215		
Flow Computer Metrology Checksum	000000000000000		
Flow Computer Metrology Blocks Checksum	77F4BF75AAF7A91C		
			40049077

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.

Master Meter System		omer	2021/DE	C/07 10:02:39	Endress+Hauser 🖽	
〈命〉	System	\rightarrow	Alarm Limits		superviso	ок 🗸
		Low Low	Low	High	High High	
Master Meter Temperature	°C		-99999999	99999999		
Master Meter Pressure	bar(g)		-99999999	99999999		
Duty Meter Temperature	°C		-99999999	99999999		
Duty Meter Pressure	bar(g)		-99999999	99999999		
						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).

Master Meter System	Customer		2021/DEC/07	10:03:04	Endres	s+Hauser 🖽
< G System	System Se	ettings		🗳 sup	ervisor	ок 🗸
User Management HMI	File Path	IP Addresses	Visualization	Tab	Tab	Import/Export
Automatic Logout Set automatic logout timer (in minutes):	5	10 15	30	60		

"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.

Master Meter System		Customer		2021/DEC/07	10:03:33	Endress	+Hauser	31
く命〉	System	System Se	System Settings		supervise		ОК	\checkmark
User Management	нмі	File Path	IP Addresses	Visualization	Tab	Tab	Import/Export	
Alarm Banner Show on Home Screen		Enable	Disable					
Date & Time Display Format		Internati	onal Operating	System Interna	tional Format: YYYY/MMM/DD H	H:MM:SS (2021/MAR/03 16:40:42)		

"File Path" tab

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

System System Settings User Management HMI File Path IP Addresses Visualization Tab Tab Import/Export Metering Data File Location CtMeteringData File Location CtSettings	Master Meter System Gustomer			2021/DEC/07	10:04:01	Endre	ss+Hauser	E	
User ManagementHMIFile PathIP AddressesVisualizationTabTabImport/ExportMetering DataFile LocationCtMeteringDataSettings Import/ExportFile LocationCtSettings	く合く	System	System Se	ettings		🔓 sup	ervisor	ок	\checkmark
Metering Data CiMeteringData Settings Import/Export CiSettings File Location CiSettings	User Management	нмі	File Path	IP Addresses	Visualization	Tab	Tab	Import/Export	
Settings Import/Export File Location CISettings	Metering Data File Location	C:1Mete	ringData						
	Settings Import/Export File Location	CiSettir	195						

"IP Addresses" tab

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

Master Me	ter System	Customer		2021/DEC/07	/ 10:04:52	Endre	ss+Hauser	31
く命〉	System	System S	ettings		🔓 sup	ervisor	ок	\checkmark
User Management	нмі	File Path	IP Addresses	Visualization	Tab	Tab	Import/Export	
Flow Computer IP Addres	sses							
Nano 1	192.10	58.1.61						
Nano 2	192.10	58.1.62						
								A004808

"Visualization" tab

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

Master Met	ter System	Customer		2021/DEC/07	10:05:56	Endre	ss+Hauser	ΞĐ
〈命〉	System	System Se	ettings		🔓 sup	ervisor	ок	\checkmark
User Management	нмі	File Path	IP Addresses	Visualization	Tab	Tab	Import/Export	
Master Meter Type Shown		Promass F	Promass Q					
								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.

Master Met	er System	Customer		2021/DEC/07	10:06:27	Endres	s+Hauser	31
〈合〉	System	System Se	ettings		🔓 sup	ervisor	ок	\checkmark
User Management	нмі	File Path	IP Addresses	Visualization	Tab	Tab	Import/Export	
Export Settin	ıgs İn	nport Settings						

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.

Master Me	eter System	Customer	2021/DEC/07 10:10:42	End	ress+Hauser 🖽
く命〉	System	Exit		administrator	ок 🗸
	Close Application	Close Application Do you really want to close the ap	pplication?		
					A004808

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 ($\rightarrow \blacksquare 14$, $\boxdot 46$). The Duty Meter can be configured by tapping the **Configure DUT** button ($\rightarrow \blacksquare 15$, $\boxdot 46$).



For more information $\rightarrow \triangleq 42$

Master Meter System	ner	2021/DEC/07 10:12:06	Endress+Hauser 🖽
く 🟠 Visualization 🔰 N	laster Meter 1	🛔 оре	rator OK 🗸
Date Time State Comment			
Configure DUT			
Duty Meter	FT-014	Master Meter	MFT-032
0.0 t/h 🗹 49.938 °C 🗹	14.979 bar(g) 🗹	1078.8 t/h 🗹 -0.073	°C 🗹 4.983 bar(g) 🗹
Q 7	9	.	9
		Master Meter Proving Stability Stable	Avg. Reynolds Number 1.#INF -
			A0048090



Master Meter Sy	/stem Custom	2021/DEC/0	07 10:12:46	Endres	s+Hauser	E	
く 🟠 Visuali	zation Ma	aster Meter 1		operat	or	ок	\checkmark
Date Time Sta	te Comment						
Configure DUT		DUT Co	onfiguration				
	Free Selec	t	Serial Number	H80E2602000			
Duty Meter			Manufacturer	Endress+Hauser		MFT-032	
0.0 t/h			Model	PROMASS F 84	.983	bar(g) 🖌	
	日本 FT-145	UT_01	Size	DN250			
	FT-325	DUT_01	Tagname	FT-014	(e		
	@II DUT_01	DUT_01	Product Name	Fuel			
	@II DUT_01	QI DUT_01	K-Factor	1651	pulses/t		
L	@I DUT_01	DUT_01	Туре	Coriolis		'	
	Select DUT Modbus Comr	nunication Options					
	Not Used	Promass 300/500	Promass 83/84		.#INF	er F -	
	Comm. Settings			CI	ose		
							40049001

■ 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.



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		\checkmark		\checkmark	
Perform proving	×			\checkmark	
Access to reports and data logs	×			\checkmark	\checkmark
Access to flow computer website	×	×		\checkmark	\checkmark
Acknowledge alarms				\checkmark	
Scroll through and filter alarm history				\checkmark	\checkmark
Access to diagnostic data				\checkmark	\checkmark
System: Change language				\checkmark	\checkmark
Display & modify settings	×	×		\checkmark	\checkmark
Display & modify system settings	×	×	×	\checkmark	\checkmark
System: Exit HMI application	×	×	×	\checkmark	\checkmark
System: Display support information		\checkmark	\checkmark	\checkmark	\checkmark
System: Change alarm limits	×	×		\checkmark	
System: Display software information				\checkmark	\checkmark
System: Export settings	×	×	×	\checkmark	\checkmark
System: Import settings	×	×	×	×	
Change user settings	×	×	×		

9 Diagnostics and troubleshooting

9.1 List of error messages

Diagnostic behavior:

- Error: 😵
- Warning: 🖄

Diagnosis no.	Short text	Diagnosti c behavior	Possible cause	Remedy
000	Flow Computer 1 Communication Error	8	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	8	Communication between HMI and flow computer is interrupted.	Ensure that flow computer is operational and that Ethernet cables are connected.
002	Cabinet door open	8	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	A	The HMI could not read or write to the file.	Restart HMI computer.
051	Power Supply 1 Alarm	A	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	Δ	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	8	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	8	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	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
105	Flow Computer 1 FRAM Fail	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
106	Flow Computer 1 I/O Comms Fail	8	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	8	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	8	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	8	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	Short text	Diagnosti	Possible cause	Remedy
no.		c behavior		
112	Flow Computer 1 RAM Fail	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
113	Flow Computer 1 RTC Error	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
114	Flow Computer 1 SD Card Error	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
115	Flow Computer 1 Task Fail	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
116	Flow Computer 1 Units Mismatch Error	8	Settings selected for units are not plausible.	Check settings for units.
117	Flow Computer 1 Flow Rate/Total Discrepancy Error	8	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	Δ	Upper DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
151	Flow Computer 1 DUT Density Low	Δ	Lower DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
152	Flow Computer 1 DUT Pressure High	Δ	Upper DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
153	Flow Computer 1 DUT Pressure Low	Δ	Lower DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
154	Flow Computer 1 DUT Temperature High	Δ	Upper DUT temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
155	Flow Computer 1 DUT Temperature Low	Δ	Lower DUT temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
156	Flow Computer 1 MM Pressure High	Δ	Upper MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
157	Flow Computer 1 MM Pressure Low	Δ	Lower MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
158	Flow Computer 1 MM Temperature High	Δ	Upper MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
159	Flow Computer 1 MM Temperature Low	Δ	Lower MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
160	Flow Computer 1 prove aborted	Δ	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	Δ	An error has occurred in a connected printer.	Check printer connection and settings.
162	Flow Computer 1 Printer 2 Error	Δ	An error has occurred in a connected printer.	Check printer connection and settings.
163	Flow Computer 1 Printer 3 Error	Δ	An error has occurred in a connected printer.	Check printer connection and settings.
164	Flow Computer 1 Printer Spool Full	Δ	Flow computer printer spool is full.	Check connected printers.
165	Flow Computer 1 FTP Error	Δ	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	Δ	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	\otimes	A calculation error has occurred in the flow computer.	Restart flow computer. If error persists, contact Endress+Hauser.

Diagnosis no.	Short text	Diagnosti c	Possible cause	Remedy
		behavior		
201	Flow Computer 2 DUT Density Transmitter Fail	8	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	8	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	8	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	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
205	Flow Computer 2 FRAM Fail	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
206	Flow Computer 2 I/O Comms Fail	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
207	Flow Computer 2 MM Pressure Transmitter Fail	8	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	8	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	۲	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	8	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	8	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	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
213	Flow Computer 2 RTC Error	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
214	Flow Computer 2 SD Card Error	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
215	Flow Computer 2 Task Fail	8	An internal flow computer error has occurred.	Restart flow computer. If error persists, contact Endress+Hauser.
216	Flow Computer 2 Units Mismatch Error	8	Settings selected for units are not plausible.	Check settings for units.
217	Flow Computer 2 Flow Rate/Total Discrepancy Error	8	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	Δ	Upper DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
251	Flow Computer 2 DUT Density Low	Δ	Lower DUT density limit has been exceeded.	Check process conditions. Check settings for alarm limits.
252	Flow Computer 2 DUT Pressure High	Δ	Upper DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
253	Flow Computer 2 DUT Pressure Low	Δ	Lower DUT pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
254	Flow Computer 2 DUT Temperature High	Δ	Upper DUT temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.

Diagnosis no.	Short text	Diagnosti C 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	Δ	Upper MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
257	Flow Computer 2 MM Pressure Low	Δ	Lower MM pressure limit has been exceeded.	Check process conditions. Check settings for alarm limits.
258	Flow Computer 2 MM Temperature High	Δ	Upper MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
259	Flow Computer 2 MM Temperature Low	Δ	Lower MM temperature limit has been exceeded.	Check process conditions. Check settings for alarm limits.
260	Flow Computer 2 prove aborted	Δ	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	Δ	An error has occurred in a connected printer.	Check printer connection and settings.
262	Flow Computer 2 Printer 2 Error	Δ	An error has occurred in a connected printer.	Check printer connection and settings.
263	Flow Computer 2 Printer 3 Error	Δ	An error has occurred in a connected printer.	Check printer connection and settings.
264	Flow Computer 2 Printer Spool Full	Δ	Flow computer printer spool is full.	Check connected printers.
265	Flow Computer 2 FTP Error	Δ	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	Δ	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	Туре	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





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

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