RMG

Flow Computer System ERZ 2000-DI

Name	Value	Unit	Description
Pa	0.55000	MPa	Absolute pressure, measured value
T	350.00	K	Temperature, measured value
Qmc	0.000	m3/h	Corrected volumetric flow rate at measureme
Qb	0.00	m3/h	Volumetric flow rate at base conditions

Operating Manual

Flow Computer Series ERZ2000-DI

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Note The latest version of this manual (and other devices) can be downloaded at your convenience from our internet page:

www.rmg.com.

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1   About this manual

1.1   Structure of the manual

The first chapter of this manual essentially comprises four parts. Safety-relevant general specifications are provided in the first part. They must be observed for safe operation. The symbols used in the manual and the structure of notices are presented, and a risk assessment are also provided. The second part describes the function before the basic overview of the configuration is presented in the third part. The fourth part describes different device types that are used for various applications. In general, the device comes pre-configured and sealed for the previously intended application. For this reason, the fourth part also includes the complete seal diagram. This fourth area also includes signed data that the ERZ2000-DI can be sent as a final sub-section.

The second chapter covers the operation of the ERZ2000-DI. Complete operation is possible via the touchscreen of the device; the various screens and their functions are presented. Operation of the ERZ2000-DI via a browser is convenient after connection to a PC.

The electrical connections and their configuration are presented in the third chapter. The chapter also outlines how inspections and corrections can be carried out, when applicable.

There is additional information in the fourth chapter about turbines and ultrasonic gas flow meters for the transmitters.

The ERZ2000-DI stores a wide range of information, such as supporting documentation for data and registries and the collective parameterization. It is provided in the fifth chapter.

The sixth chapter provides a list of errors and error annotations.

The appendix contains the description of a software update. It also provides further details about the archives. Connection and operation of the optional Ex input card are defined here.

The manual is concluded with a summary of the current approvals.

1.2 Purpose of the manual

This manual provides information that is necessary for fault-free and safe operation.

The ERZ2000-DI was designed and produced according to the state of the art and generally recognized safety standards and directives. However, its use can entail dangers that are avoidable by complying with this manual. The device must only be used as intended and in technically sound condition.

> ⚠️ **Caution**
>
> **Unintended use voids all warranty claims and the flow computer ERZ2000-DI can also lose its approvals.**

1.2.1 Abbreviations

The following abbreviations are used:

MessEG	Measurement and Calibration Act Law on the marketing and provision of measuring devices in the market, their use and calibration, valid since 1/1/2015
MessEV	Measurement and Calibration Regulation Regulation on the marketing and provision of measuring devices in the market and on their use and calibration; 12/11/2014
MID	Measurement Instruments Directive
PTB	Physikalisch-Technische Bundesanstalt [German National Test Authority]
DSfG	Digitale Schnittstelle für Gasmessgeräte [digital interface for gas measuring devices]
TCP/IP	Transmission Control Protocol/Internet Protocol Family of network protocols (internet protocol family)
IP (address)	Devices are assigned an address based on the internet protocol (IP). This makes these devices addressable and reachable in the internet.
LAN	LAN (Local Area Network) is a local network, a computer network.

ETH1 / ETH 2	Ethernet interface 2 /2 Ethernet technology enables a data exchange between the connected devices in the local network.
SNTP	(Simple) Standard (NTP = Network Time Protocol) for synchronization of clocks in computer systems
SNR	Signal to Noise Ratio
SoS (VoS)	Speed (Velocity) of Sound
TD	Transducer (ultrasonic transmitter and receiver)
USM (USZ)	Ultrasonic gas meter
Vo	Digital interface, original meter of an encoder (ENCO)
HART	Highway Addressable Remote Transducer Protocol Standardized digital communication superimposes on the 4..20 mA analogue signal for data exchange with transmitting devices

The following registered trademarks are used in the text:

Windows, Windows®, Windows CE, Explorer ( ), Firefox ( ),

1.2.2   Structure of notices

The following notices are used:

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⚠ **Danger**
This warning notice informs you of imminently threatening dangers that can arise due to misuse/operator error. If these situations are not avoided, death or severe injuries can occur.

⚠ **warning**
This warning notice informs you of potentially dangerous situations that can arise due to misuse/operator error. If these situations are not avoided, minor injuries can occur.

⚠ **Caution**
This notice informs you of potentially dangerous situations that can arise due to misuse/operator error. If these situations are not avoided, damage to the device or nearby property can occur.

Note
This notice provides you with helpful tips to make your work easier. This notice also provides you with further information about the device or the work process in order to prevent operator error.

1.2.3 Working with the device

1.2.3.1 Safety instructions

⚠ **Danger**
All of the following safety notices must be observed!

Disregard of the safety notices can result in danger to the life and limb or environmental and property damage.

Bear in mind that the safety warnings in this manual and on the device cannot cover all potential dangerous situations, because the interaction of various conditions can be impossible to foresee. Merely following the instructions may not suffice for correct operation. Always remain attentive and consider potential consequences.

- Read this operating manual and especially the following safety notices carefully before working with the device for the first time.
- The operating manual provides a warning of residual risks for users and third parties working in the area of influence of the device, as well as for damage to devices or possible costs due to the damage of other property. The safety instructions used in this manual do not refer to unavoidable residual risks.
- Only operate the device in fault-free condition and in observance of the operating manual.
- Compliance with local statutory accident prevention, installation and assembly regulations is also mandatory.

⚠ **Caution**
All notices in the manual must be observed.
Use of the flow computer ERZ2000-DI is only permitted in accordance with the specifications in the operating manual.
RMG assumes no liability for damages arising due to disregard of the operating manual.

⚠ **Danger**
Service and maintenance tasks or repairs that are not described in the operating manual must not be carried out without prior consultation with the manufacturer.

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<div style="border:2px solid black">

Note

The flow computer ERZ2000-DI is approved for officially certified operation. For this purpose, it is sealed before deliver and settings specified by the approval authority are locked.

These seals, software or hardware locks must not be damaged, destroyed or removed!

In this case, the ERZ2000-DI loses its official certification!

The ERZ2000-DI can only be approved for officially certified operation after a renewed inspection by an officially recognized inspection authority or calibration officials and an additional inspection of additional settings in the factory.

The calibration official must re-apply the seals after the renewed locking.

</div>

Observe the following, in particular:

- changes to the flow computer ERZ2000-DI, e.g. from ERZ2004-DI to ERZ2104-DI (see *chapter 1.5 Areas of application*) are not permitted.

- The technical specifications must be observed and followed for safe operation. Performance limits must not be exceeded (*chapter 3 Electrical connections*).

- For safe operation, the flow computer ERZ2000-DI must only be used in the scope of the intended use (*chapter1.5 Areas of application*)

- The flow computer ERZ2000-DI complies with current standards and regulations. However, danger can arise with misuse.

1.2.3.2   Dangers during commissioning

Initial commissioning   The initial commissioning must only be carried out by qualified personnel or RMG service personnel.

> **Note**
>
> **In accordance with Article 15 of the German Ordinance on Industrial Safety and Health (BetrSichV), Article 5 of German Social Accident Insurance (DGUV) REGULATION 3 "Electrical systems and equipment" and generally recognized good engineering practices, particularly the VDE standards VDE 0100-100 "Construction of low-voltage systems" and VDE 0165 "Electrical explosion protection", an inspection of the measuring system must be carried out before the device is commissioned. Maybe that similar local laws and rules have to followed instead of the German ones.**
>
> **An acceptance test certificate must be created during the commissioning. This, the operating manual and the CE Declaration of Conformity must be stored so that they are always readily available. In the process, the entire documentation, including the conformity declarations and certificates must be checked for completeness.**
>
> **All sharp edges on the device were removed, insofar as possible. However, suitable personal protective equipment provided by the operator must be worn during all work.**

The flow computer ERZ2000-DI is **not** approved or designed for use in explosion-prone areas. Installation must only take place in safe rooms. The ERZ2000-DI is intended for installation in a control cabinet in an electronics room.

If the device as specified in the operating manual, adequate explosion protection for other connected devices may not be provided.

Inadequately qualified persons working on the equipment are unable to correctly estimate dangers. Explosions can be triggered. Only work on the equipment if you have the appropriate qualifications.

Components can be damaged if you do not use suitable tools and materials. Only use tools that are recommended for the respective work in the operating manual.

Mechanical installation	Mechanical installation must only be performed by appropriately qualified technicians.
Electrical installation	Installation on electrical components must only be carried out by qualified electricians.
Mechanical and/or electrical installation	These qualified personnel require training specifically for work in explosion-prone areas. Qualified personnel are persons who have training / education in accordance with **DIN VDE 0105**, **IEC 364** or **comparable standards**.

> ⚠ **Caution**
>
> **In general, the replacement of a flow computer ERZ2000-DI must only be carried out by RMG Service.**

1.2.3.3   Dangers during maintenance and repair

Operating personnel	The operating personnel use and operate the device in the scope of the intended use.
Maintenance personnel	Work on the device must only be carried out by qualified personnel who can carry out the respective tasks on the basis of their technical training, experience and familiarity with the applicable standards and requirements. These qualified personnel are familiar with the applicable statutory regulations for accident prevention and can independently recognize and avoid potential dangers.
Maintenance and cleaning	Maintenance and cleaning must only be performed by appropriately qualified technicians.

> ⚠ **Danger**
>
> **Inadequately qualified persons working on the equipment are unable to correctly estimate dangers. Explosions can be triggered if impermissible current or voltage values are transferred in the explosion-protected area.**

> ⚠ **Caution**
>
> **The device can be damaged if it is not cleaned as specified in the operating manual. Clean the device with a lightly moistened cloth only.**

> ⚠ **Danger**
>
> **The flow computer ERZ2000-DI must only be used as intended! (*chapter 1.5 Areas of application*).**

1.2.3.4   Qualification of personnel

Note
In general, the following is recommended for all persons working with or on the flow computer ERZ2000-DI:
• **Training / education for work in explosion-prone areas.**
• **The capacity to be able to correctly estimate dangers and risks when working with the flow computer ERZ2000-DI and all connected devices.**
• **Training / education by RMG for work with gas measuring devices.**
• **Education / instruction in all national standards and directives to be complied with for the work to be carried out on the flow computer ERZ2000-DI.**

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1.2.4   Risk assessment and minimization

According to assessment by qualified employees of RMG, the flow computer ERZ2000-DI is subject to risks during its use. Risks can arise, for instance, during use outside of the permissible temperature range. Impermissible current and voltage values can trigger explosions in explosion-prone areas. Naturally, work must only be carried out by trained personnel (see *chapter 1.2.3.4 Qualification of personnel*), who are also trained to recognize suitable tools and use them exclusively. These risks were summarized alongside development and measures were taken to minimize these risks.

Measures for risk minimization:

- The maximum permissible temperature range is specified on the type plate of the flow computer ERZ2000-DI. Operation of the device is only permitted within these specified ranges.

⚠ Danger

- **The wiring from and installation of the flow computer ERZ2000-DI in explosion-prone areas must only be carried out by trained personnel in accordance with EN60079-14 and in observance of national regulations.**
- **Qualified persons must satisfy the definitions in accordance with DIN EN 0105 or IEC 364 or directly comparable standards.**
- **Only trained and instructed personnel are permitted. Work on the measuring system must only be carried out from qualified persons and inspected by responsible qualified supervisors.**
- **Qualified persons have been authorized by the person responsible for safety of personnel to carrying out such work on the basis of their training, experience or instruction and familiarity with applicable standards, provisions, accident prevention regulations and system conditions. It is essential that these persons are able to recognize and avoid potential dangers in good time.**

1.2.5 Applicability of the manual

This manual describes the flow computer ERZ2000-DI. The ERZ2000-DI is only part of a complete system. The manuals of the other components of the system must be observed. If you find contradictory instructions, contact RMG and/or the manufacturers of the other components.

⚠ Caution

Ensure that the power data of the current connection matches the specifications on the type plate. Observe any applicable national regulations in the country of use. Use cable that is appropriate for the cable fittings.

1.2.5.1 Danger during operation

Observe the specifications of the system manufacturer and/or system operator.

1.2.5.2 Dangers of operation in Ex areas

> ⚠ **Danger**
>
> - **The flow computer ERZ2000-DI must be used exclusively in fault-free and complete, original condition. If you make technical changes to the device, safe operation can no longer be guaranteed.**
> - **Ensure that the appropriate explosion protection is provided for the connection of all sensors or other devices that are used in explosion-prone areas!**
> - **If they are intrinsically safe devices, galvanic isolation must be provided with connection of these devices!**

1.2.5.3 Responsibility of the operator

As the operator, you must ensure that only adequately qualified personnel work on the device. Ensure that all employees who work with the device have read and understood this manual. You are also obligated to train personnel regularly and inform them of the dangers. Ensure that all work on the device is carried out exclusively by qualified persons and inspected by responsible qualified supervisors. The responsibilities for installation, operation, fault rectification, maintenance and cleaning must be clearly regulated. Instruct your personnel with regard to the risks involved with working with the device.

1.2.6 Transport

The device is packaged specific to the transport requirements for each customer. Ensure safe packaging that absorbs light impact and vibrations is used for any further transport. Nevertheless, inform the transport company that all types of impact and vibrations should be avoided during transport.

1.2.7 Scope of delivery

The scope of delivery can differ depending on the optional orders. The following is "normally" included in the scope of delivery:

Part	Quantity
ERZ2000-DI	1
Socket set 98800-15700	1
Manual	1

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1.2.8 Disposal of packaging material

Dispose of the material in an environmentally friendly manner in accordance with national standards and directives.

1.2.9 Storage

Avoid extended periods of storage. After storage, inspect the device for damage and test for correct function. Contact the RMG service department to arrange for inspection of the device after a storage period of longer than one year. For this purpose, send the device to RMG.

Note
Even if the ERZ2000-NG is stored for a short time only, it is important to ensure a clean and dry environment!

⚠ Caution
Hazard due to damage during storage.   **If the device is stored for a period of more than one year, deficient repacking or securing of the device can result in damage to the device from dirt or moisture.**

1.3 Function

The flow computer ERZ2000-DI is designed to operate various sensors, particularly flow rate and gas analysis sensors, evaluate their signals or adopt and determine resulting operating and nominal volume flows. The resulting calculation variables can be represented in a graph and checked via alarm output, etc. The ERZ2000-DI corresponds to the standards, directives and specifications listed in *chapter 1.5 Areas of application. Figure* 1 explains the functional principle.
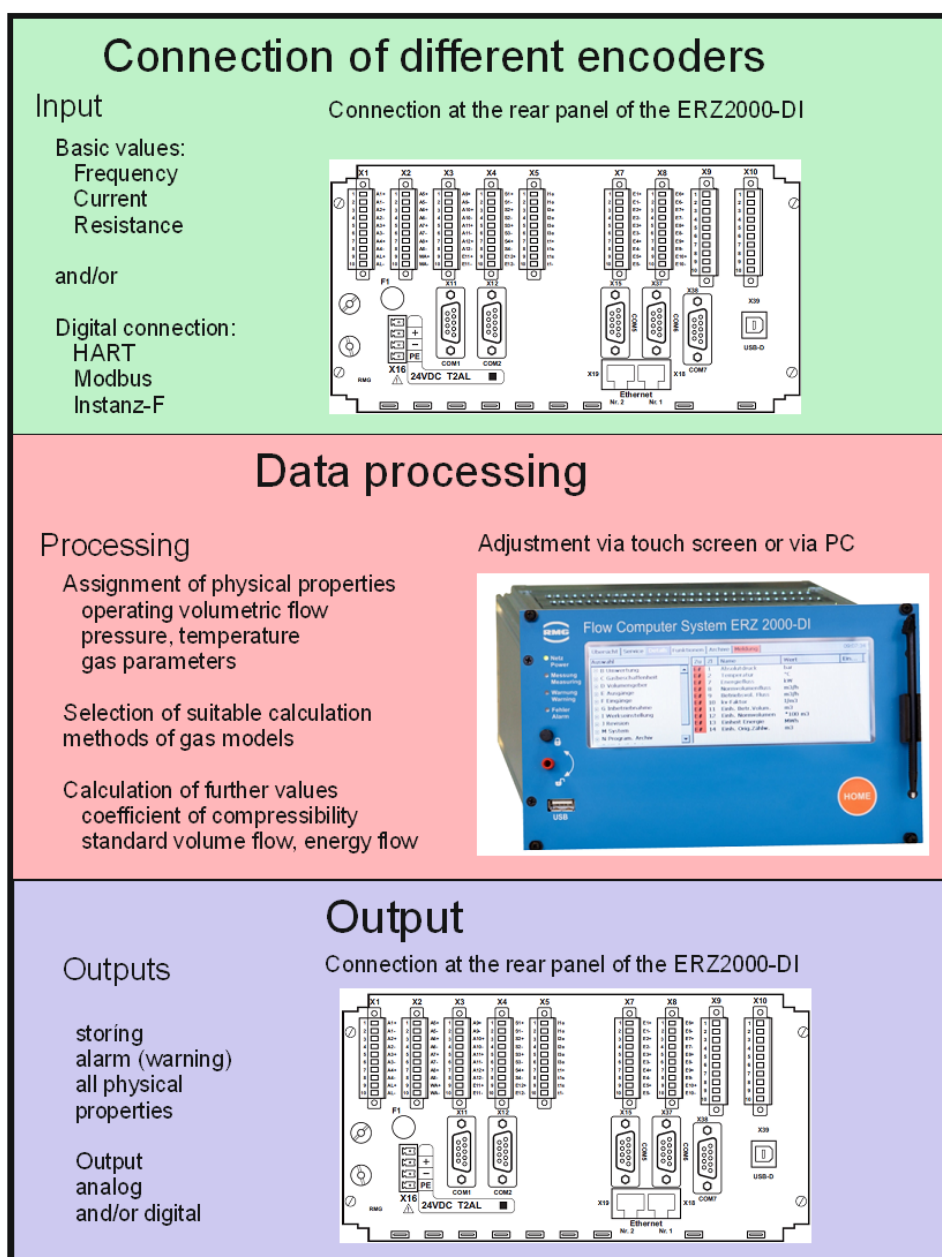
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Figure 1: Functional principle

The ERZ2000-DI records analogue and digital values, such as frequencies, resistances, etc. Then these are assigned to physical variables, such as operating volume flow or temperature. Further processing of these values takes place in the ERZ2000-DI, where, for example, gas characteristics and standard volume flow are calculated from these basic values. At the same time, a continuous check guarantees that all necessary values are constantly available. An alarm or warning message is triggered of adjustable limit values are exceeded or undercut.

The third task of the ERZ2000-DI is data storage and output, which can take place in analogue and digital form. An alarm or a warning is also triggered if there is a fault in the data recording.

1.4 Overview

The ERZ2000-DI, therefore, is an advancement of the ERZ2000 as a half 19" slide-in module (half 19" width). Enhancements include a live browser (*chapter 2.3 Browser home page and coordinate system*) which enables permanent control of the measurement data recording and reimbursement. A further enhancement is the adjustment of the flow computer ERZ2000-DI and the parameterization of the connected transmitters via a wizard on a PC. This wizard is not a separate PC program, and is executed directly in the browser.

The ERZ2000-DI system has a configuration consisting of 2 function groups. The first function group provides the quick measurement recording, all inputs and outputs, all interfaces and manual operation via the front panel or via the wizard. The internal calculations and converter functions are processed by the second assembly, the computing unit.

The working memory contains the variables, fields, buffers, etc. necessary for the processing of the system software, as well as the (variable) device parameters of all function assemblies. The device parameters are saved with a checksum that is checked automatically each time the device is restarted.

The program memory contains the operating program of the device. A CRC checksum is calculated via the source and stored as a reference value. The correctness of the checksum can be checked for the software ID in the coordinates of the menu **IE Software ID** with the specifications on the type plate (chapter "*2.7.3 Details*" and chapter "*2.7.4 Functions*" – type plate).

1.5   Areas of application

The **essential area of application** is the **recording and metering of flow rates for custody transfer in natural gas flow measurement technology**.

The device can be delivered in two different versions of the software, each with a separate approval as:

- Status flow computer for natural gas (**ERZ2004-DI**)

- Calorific value flow computer for natural gas (**ERZ2104-DI**)

Both variants can access the following for the K coefficient calculation:
k = constant, ideal gas, GERG88 S set A, GERG 88 S set B,
GERG 88 S set C, AGA NX 19 L, AGA NX 19 H, AGA 8 Gross Meth. 1,
AGA 8 Gross Meth. 2, GOST 30319.2, AGA 8 (1985),
AGA 8 92DC + AGA 10, AGA 8 (2017), GERG 2004, GERG 2008,
AGA 8 92DC + ISO20765-1, GOST 8.662-2009, GOST 30319.3

The ERZ2000-DI diction is superordinate and applies for both variables in the following text.

The special factory setting and sealing (*see chapter 1.5.2 Seal diagram for devices with MID approval*) is used for operation in custody transfer. In the process, the function of the device must conform to the approval identified on the type plate. Therefore, a subsequent modification of the device type is blocked.

Note
Modification of the device type is only possible under the supervision and control of an officially recognized inspection authority or calibration official. Then the necessary seals are also applied after the modification.

1.5.1   Use in gas measurement technology

The ERZ2000-DI is <u>not</u> intended for use in explosion-prone areas. However, it can operate sensors and other devices in explosion-prone areas.

Only operate the ERZ2000-DI in fault-free and complete condition.

If you make technical changes to the device, safe operation can no longer be guaranteed.

⚠ Danger

- **Only use the ERZ2000-DI in its original condition.**

- **When connecting sensors and other devices in explosion-prone areas, ensure that the appropriate explosion protection is provided for these components. The specified maximum values in the certificates issued for these components must be observed.**

- **They are intrinsically safe devices for which galvanic isolation must be provided with connection of these devices.**

- **Life-threatening danger due to incorrect earthing. If the device is not earthed correctly, so that electrostatic charges can trigger the formation of sparks, there is a risk of explosion.**

Note

The ERZ2000-DI system is approved in different variants for custody-transfer application for gas measurement technology in Germany and other countries.

The following EU type examination certificates are available for Germany (see *Appendix Approvals*:

ERZ2004-DI MID Approval / Status flow computer

ERZ2104-DI MessEV / Calorific value flow computer

ERZ2000-DI MessEV / Maximum load display and registering device

The respective applicable approval (approval symbol) is specified on the type plate (*chapter "2.7.4 Functions" – "Type plate"*). The corresponding seal diagrams can be found in this manual or the approval (*chapter 1.5.2 Seal diagram*).

If a pressure or temperature transmitter for the ERZ2004-DI or ERZ2104-DI types approved in accordance with MID, it must be secured as follows:

− The main plate is provided with a sealing label.

− Access to the calibration switch, which is set to "write protect" during normal operation, is secured by connecting the removable cover of the electronic housing with sealing marks with the stationary parts of the housing.

1.5.2   Seal diagram for devices with MID approval

The ERZ2000-DI leaves the company with a setting agreed upon with the customer, which is protected from "significant" modifications by seals and metrological sealing, or it leaves the factory without seals. In the latter case, a calibration official must provide the device with seals according to the desired settings in accordance with the seal diagram. The metrological seals must also be applied, as specified in the seal diagram. *Figure 2: Seal diagram - front* and *Figure 4: Seal diagram - rear* show the specified positions of the seals.

> ⚠ **Caution**
>
> **The ERZ2000-DI must only be used for custody transfer with unbroken seal. Removal or damage to seals normally entails considerable expenses!**
>
> **Re-application of seals must only be carried out by an officially recognized inspection authority or calibration officials!**

Frontal view

Figure 2: Seal diagram - front

View A   View B   View D   View C

Metrological seal   Metrological seal

Figure 3: Seal diagram - sides A, B, C, D

Connector housing with seals: : Non Ex: X5 and X8
                                 Exi   : X9 and X10

Figure 4: Seal diagram - rear
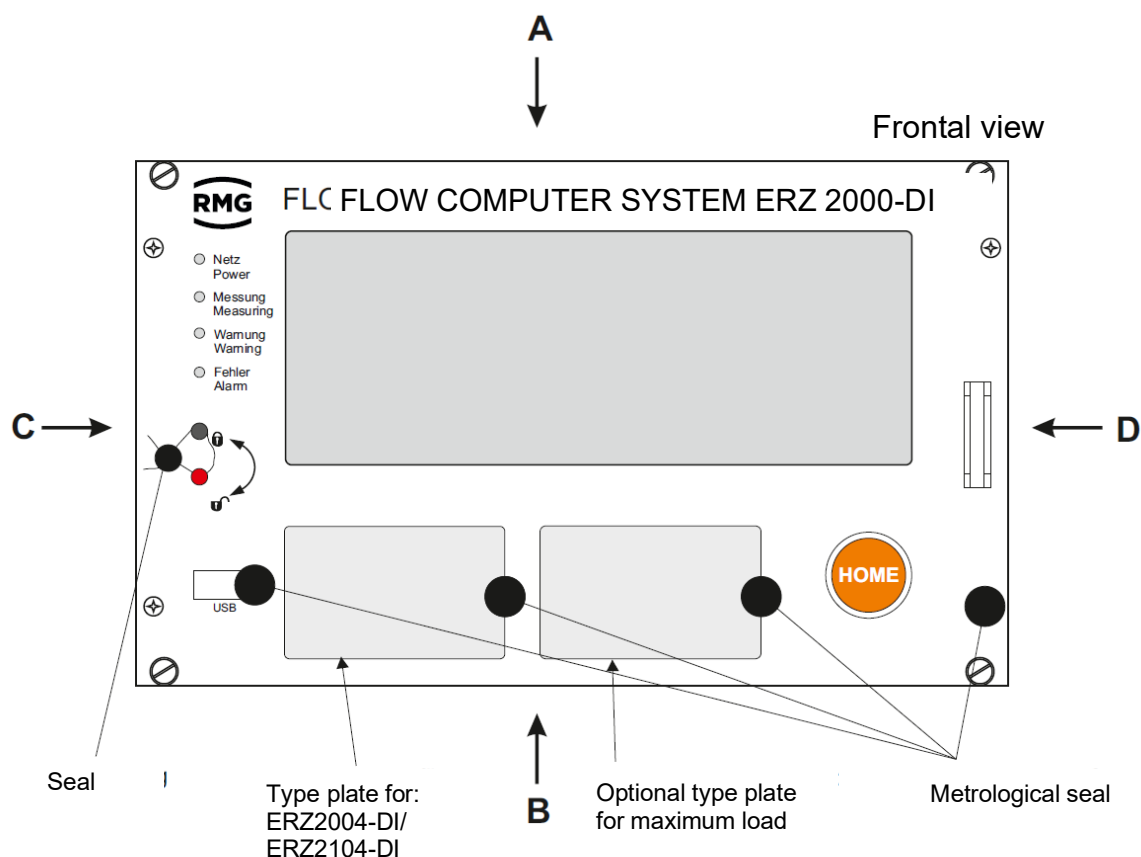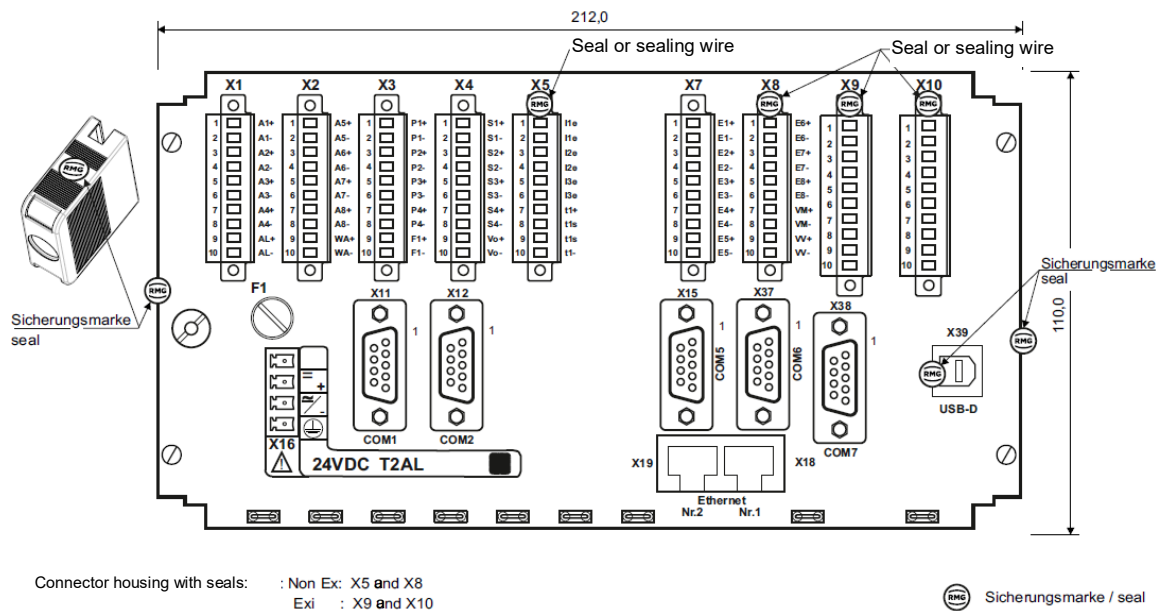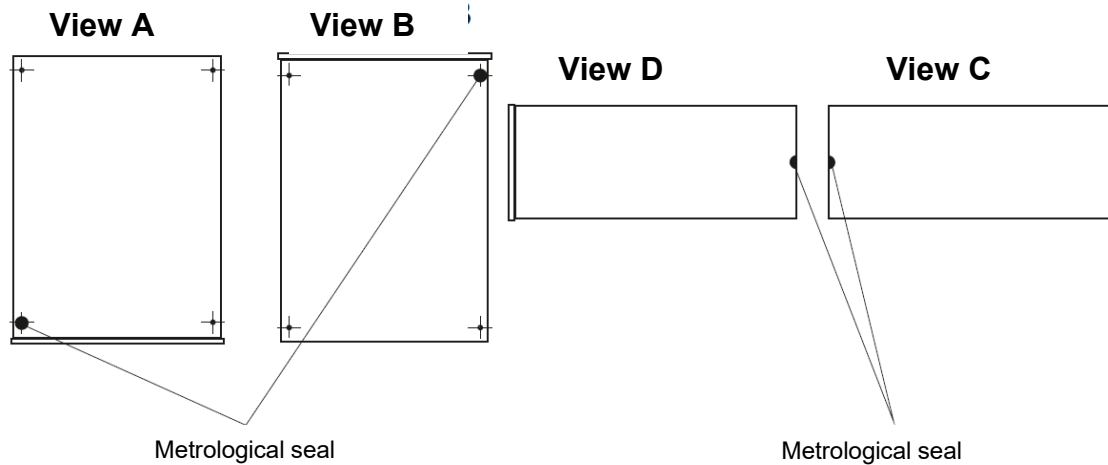
Note
The ERZ2000-DI is also supplied with a connector set (see above *chapter 1.2.7 Scope of delivery*).
In particular, terminals X5 and X8 (if necessary also X9 and X10) must be used to fasten the enclosed socket shells, which must be sealed by the calibration officer after adjustment and commissioning.

1.5.3 Signature, software and hardware data

The ERZ2000-DI offers the option of marking recorded data with an accompanying signature. In doing so, the recipient receives the message and signature. They can verify from the message and signature that the data is unchanged and originates from a "secure" source, i.e. from a trustworthy sender or whether this is not the case.

The signature is described in detail in the wizard (*chapter 2.2 Adjustment of the ERZ2000-DI via* wizard).

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2 Introduction

2.1 Operation

2.1.1 Front panel
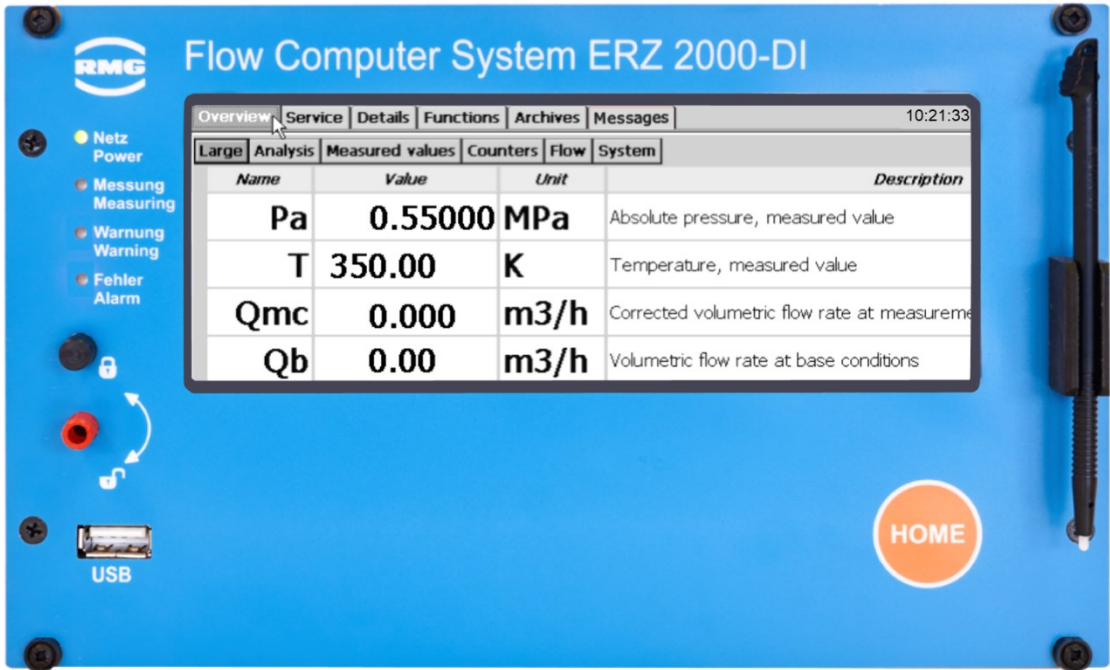
Figure 5: Front panel

The following display and operating elements are located on the front panel:

Green LED (Network)		**Continuously illuminated**:	Voltage indicator.
		Blinking light:	User or calibration lock opened
Orange LED (measure-ment)		**Continuously illuminated**:	Meter connected, delivers measurements.
		Blinking light:	Flow rate outside of permissible limits.
		Off:	No flow.
Yellow LED (warning)		**Blinking light**:	There is currently a fault (warning) in non-custody-transfer functions.
		Continuously illuminated:	A warning is pending
Red LED (error)		**Blinking light**:	There is currently a fault (alarm) in custody-transfer functions
		Continuously illuminated:	An alarm is pending
Custody transfer switch		**Sealable rotary switch**	at limit stop in the clockwise direction the custody transfer lock is open, at limit stop in the counterclockwise direction the custody transfer lock is closed

USB interface	For connection of USB components (e.g. a mouse), this interface is sealed in custody transfer mode and cannot be used.
Home button	To jump to the startup/message screen (alternating)
Touch screen	Display and control panel.

2.1.2 Operation on the touch screen

The touch screen enables operation via a graphic and largely self-explanatory user interface. You jump back to the home screen from any place in the menu with the "home" button. Pressing the button again jumps to the "Message" screen/menu.

> ### ⚠ Caution
>
> **Operate the touch screen directly with your finger or use the supplied plastic stylus.**
>
> **Never use hard or sharp objects such as screwdrivers or pens (otherwise, there is a risk that the foil of the touch screen is scratched or torn).**

2.1.3 Remote control / parameterization

In addition to operation via the front panel, the touchscreen provides an additional convenient option to operate or parameterize the device either **locally** or **remotely** with a PC or notebook.

Figure 6: Operation of the ERZ2000-DI

Very simple adjustment takes place with the browser available on the PC (e.g. Internet Explorer, Firefox, etc.), which essentially corresponds to operation of the touchscreen. In addition, display on the PC enables the startup of a wizard directly in the browser for convenient commissioning. The local connection is established via a standard network cable (LAN cable).

Operation of the ERZ2000-DI via the browser is the recommended adjustment and operation possibility and, therefore, is given priority below. Operation with the browser generally offers expanded display options. Furthermore, display on the touchscreen is identical to display on the browser; small differences are purely visual in nature and do not limit the adjustment options for the ERZ2000-DI via the web browser.

The LAN cable connects one of the 2 connection ports (Ethernet 1 or 2) on the rear side of the ERZ2000-DI (*see Figure 7: Rear side of the ERZ2000-DI and Ethernet interfaces*) with the local network of the PC.
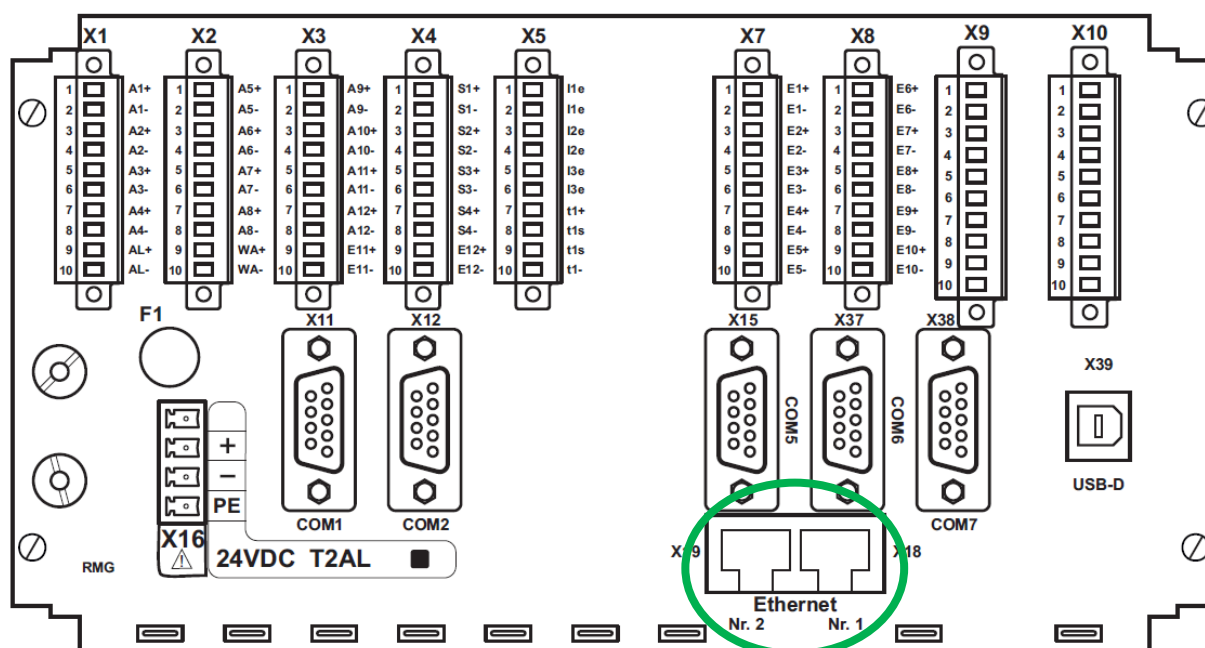
Figure 7: Rear side of the ERZ2000-DI and Ethernet interfaces

⚠	**Caution**

Then the ERZ2000-DI can only be integrated into an existing network if the network permits integration of third-party devices.

Protected company networks may prohibit this access.

Contact your IT department to discuss how you can integrate the ERZ2000-DI into your company network.

Note

The ERZ2000-D has – as shown in *Figure 7: Rear side of the ERZ2000-DI and Ethernet interfaces* – two Ethernet interfaces. Two separate accesses are also possible via these interfaces. With simultaneous use of the ERZ2000-DI by two users, <u>no</u> connection (bridge) is established between the (normally) two different networks.

In order to ensure that the network connections functions correctly, the correct TCP/IP address of the ERZ2000-DI must be entered in the browser. This TCP/IP address can be read on the ERZ2000-DI. For this purpose, proceed as follows after starting up the device:

Select the following with the stylus:

1. The ERZ2000-DI logs in after start-up with the following screen. Select the **"Functions"** tab in the upper part of the display.

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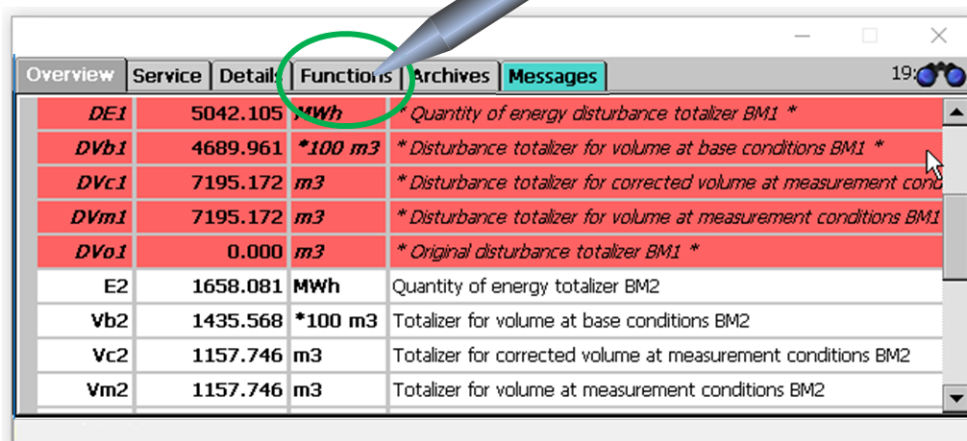
Figure 8: ERZ2000-DI Start page

2. Then select the TCP/IP tab.
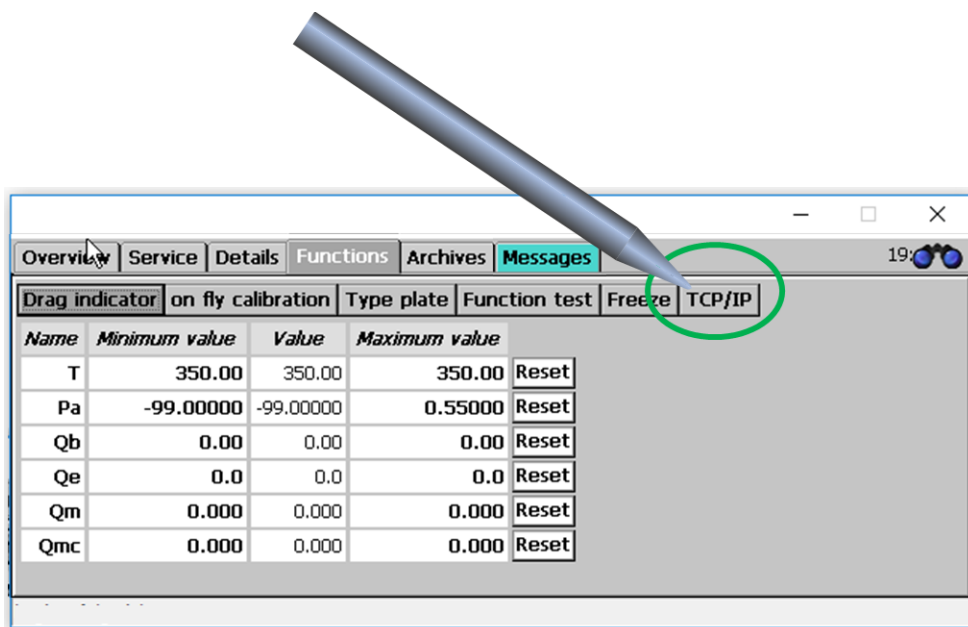
Figure 9: Functions menu

3. After activation, the screen below appears.
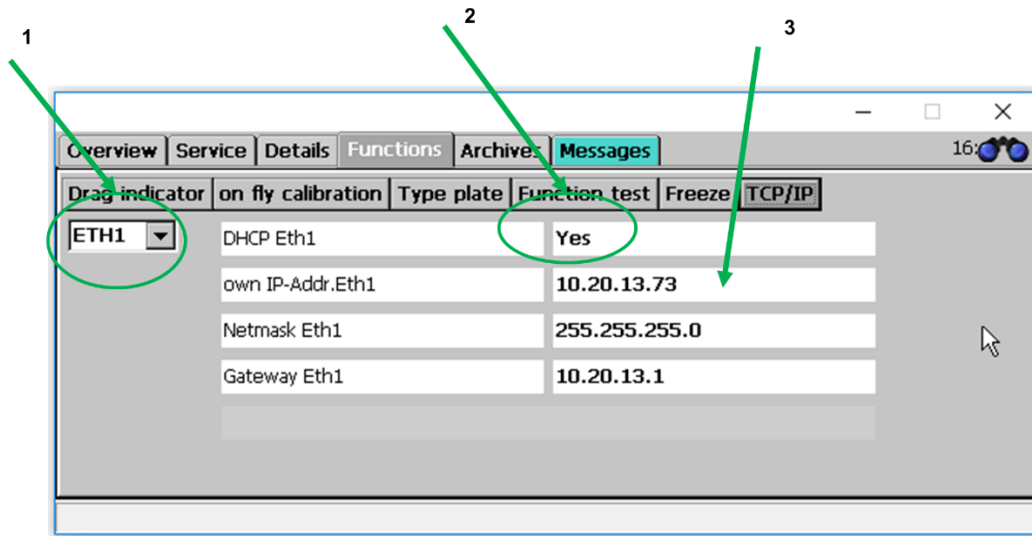
Figure 10: TCP/IP menu

1   Check whether you are working with interface 1 (ETH1) or 2 (ETH2) and adjust this setting in the selection menu (please activate) accordingly.

2   Check the DHCP setting of the interface.

   If a DHCP server is available in the network, the IP address is assigned automatically when "yes" is activated. When the setting is "no", the IP address must be entered manually.

3   Normally, you should be able to see the IP address now.

If the TCP/IP address in the browser is entered, the following home page of the ERZ2000-DI appears.
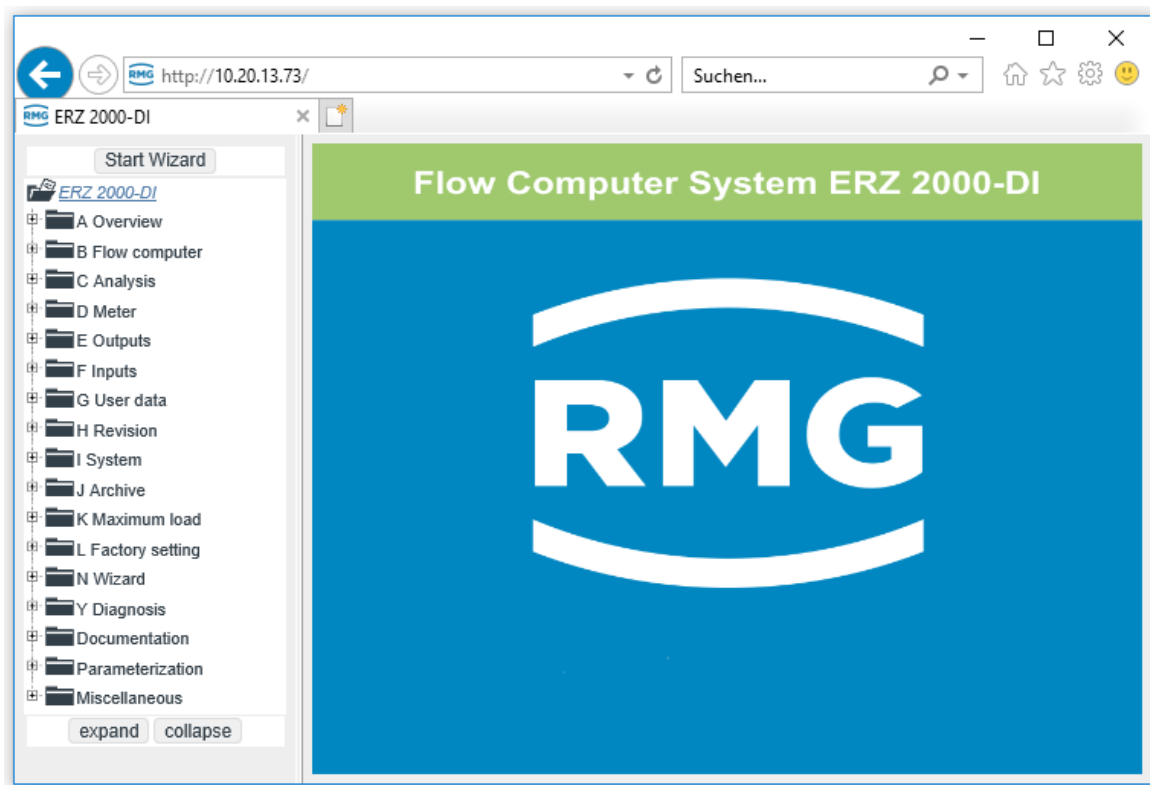
Figure 11: Home page after entry of the TCP/IP address

Note
If you work with Microsoft Internet Explorer – before the wizard can be started for simplified operation – the compatibility status of the web browser must be checked and adjusted as necessary.

If you are using Microsoft Internet Explorer, the compatibility view can be adjusted under "Extras" in the web browser. In this menu you may find the submenu "Adjustment of the compatibility view". The field "Show intranet sites in compatibility view" must be activated in this menu.

Note
In exceptions, it may be necessary to adjust the maximum packet size of the transmission protocol (MTU). This is possible for both Ethernet interfaces. Please make these settings only after consulting your IT department if there are connection problems (firewall, mobile radio, ...). **A short description can be found in *Appendix G) Adjustment of the MTU size*.**

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2.1.4   Operation on the home page

The home page can be operated with a mouse and keyboard in the accustomed manner. Operations are equivalent to those on the touchscreen of the ERZ2000-DI and are adopted accordingly. For instance, the TCP/IP addresses can be queried here. The IP address is displayed in the "Details" menus in *Figure 14: IF TCP/IP network menu*.
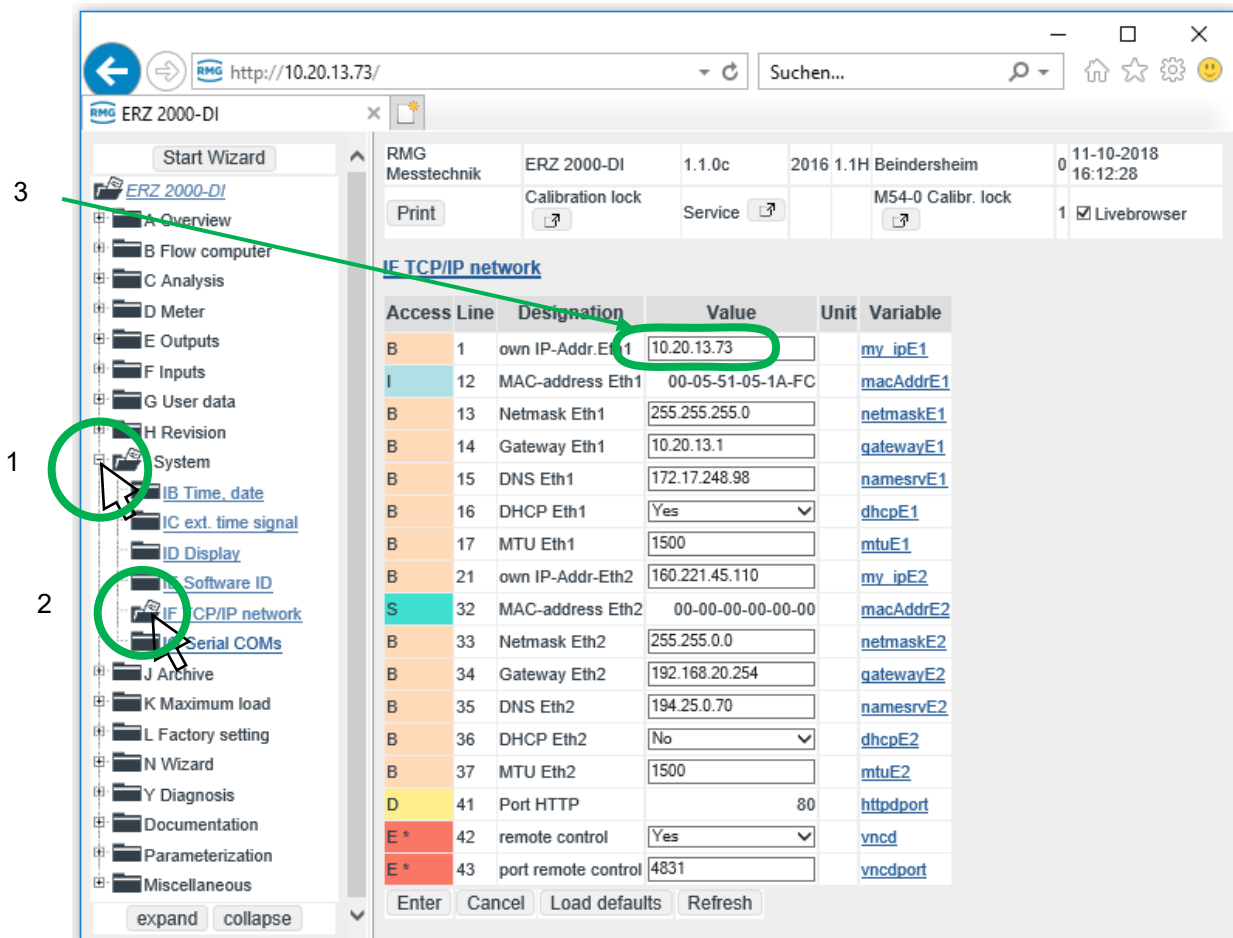
Figure 14: IF TCP/IP network menu

1. Activate the menu **I System** on the home page with the mouse
2. Activate the menu **IF TCP/IP network** with the mouse
3. The TCP/IP address can be read in the field with the green frame

2.2   Adjustment of the ERZ2000-DI via wizard

Adjustment of the ERZ2000-DI preferably takes place using a wizard. For this purpose, it must be activated on the home page:
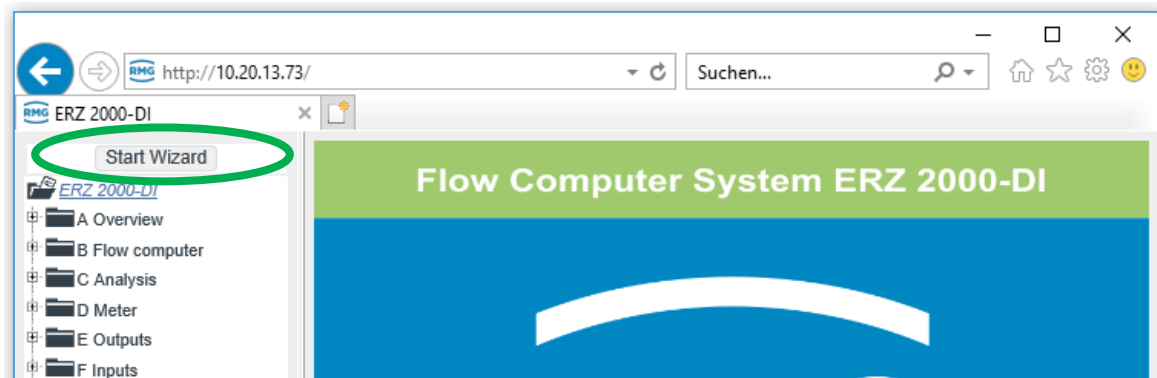
Figure 15: Starting the wizard

After activation of the "Start wizard" field circled in green, the settings tool of the ERZ2000-DI appears.
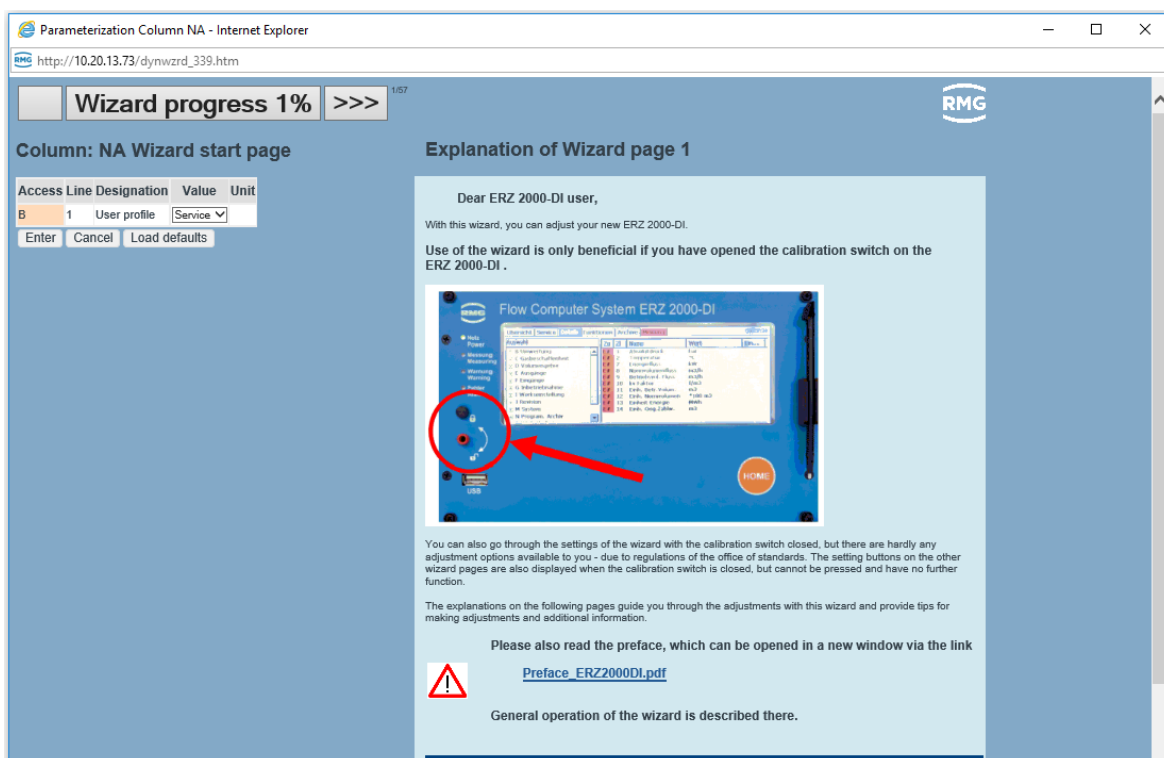
Figure 16: Wizard home page

The wizard is a component of the ERZ2000-DI and stored internally. This also applies for all documents and images integrated in the wizard. They are not listed here again. The wizard and all integrated documents and images, therefore, are an essential part of the documentation.

The document: Preface_ERZ2000DI.pdf is integrated on the first wizard screen and can be opened by clicking on the left part of this home page.
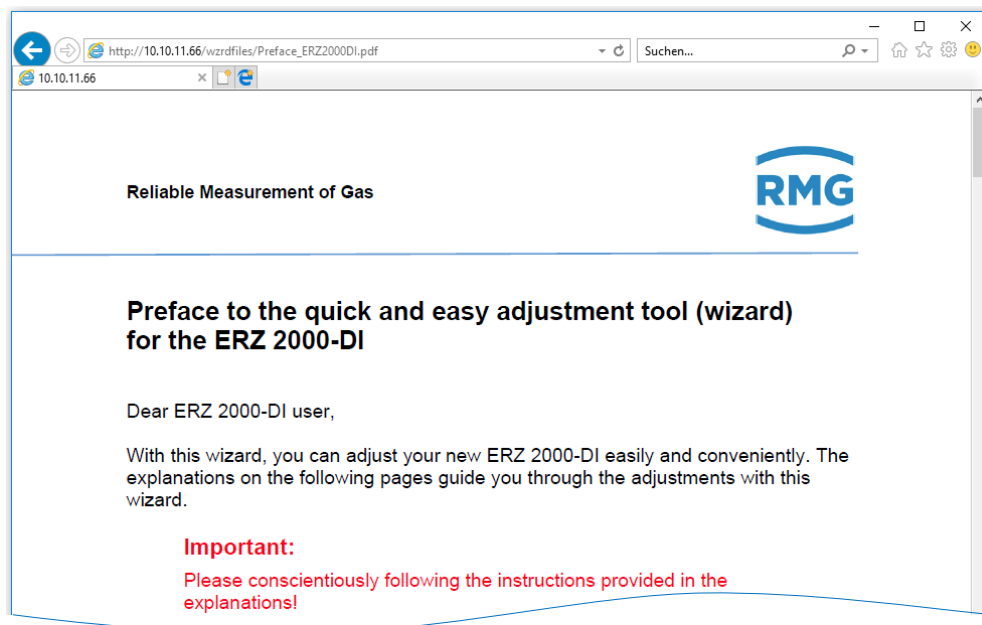
Figure 17: Preface to the wizard

This preface provides general information for use of the wizard and should absolutely be read prior to making any further settings in the wizard, which is why it is marked with an Attention symbol. This information is also helpful for a better understanding and use of the remainder of the manual.

The home page requires 2 essential settings. Firstly, access authorization must be specified (see *chapter 2.4 Access protection for data and* settings).

⚠ **Caution**
Simplified adjustment with the wizard is basically only possible with an open calibration switch of the ERZ2000-DI.
However, the notice on removal of seals (*chapter 1.5.2 Seal diagram for devices with MID approval*) must be observed!

If the calibration switch is closed - for legal custody-transfer purposes - almost no settings are possible on the wizard screens.

Secondly, the user profile must be specified. **"User"** should be selected for as an "ordinary" user of the flow computer; **"Service"** can also be selected for internal settings.

All settings options that are necessary for parameterization are available to a **"User"**. Then the simplified adjustment of the ERZ2000-DI with the help of the wizard is also enabled.

<table>
<tr><td>

Note

</td></tr>
<tr><td>

Recommendation:

Please choose User as a user profile!

The wizard (and the ERZ2000-DI) displays only the parameters that are relevant according to the intended use for the selected device type. Complete settings menus and/or individual parameters are hidden (in the wizard and coordinate system of the ERZ2000-DI).

The wizard should be used in the specified sequence. In this case, unnecessary additional settings options are hidden on the subsequent pages after settings have been changed. If, for instance, the GERG 88 S is selected for state equation of the gas composition, only the relevant input values for this calculation are required as entries. Portions of gas components such as methane or other types are no longer displayed or queried.

Scrolling past, forwards or backwards can result in unnecessary entries or corrections if these settings have not been carried out (yet).

The settings that are initiated with the recommendation button are also made on the basis of entries which were already made – then they are only permitted/logical if the sequence has been observed.

</td></tr>
</table>

The **"Service"** setting always shows **all** settings menus and settings possibilities, regardless of settings already made by the user. These settings options can be edited on the following wizard screens in the **"Service"** setting, although they are entirely unnecessary for the overall settings of the ERZ2000-DI.

Refer to the wizard for all additional settings here. The selection of all permissible transmitters that can normally be integrated easily with a pre-assignment of all relevant parameters by clicking the mouse.

2.3 Browser home page and coordinate system

Links in the home page there is a tree structure that is comparable to Windows Explorer. The relevant menu is opened by clicking on one of the ⊞: measurements, components, ... In the process, a symbol change from ⊞ to ⊟ or ⊟ (bottom menu item) takes place and various sub-menus can be selected by clicking on 📁, such as overviews, reassessment, gas properties, etc. A symbol change from 📁 to 📂 also takes place here. Then you see the content of the selected menu, see *Figure 18: "Overviews* .

Click on the first, top ⊞, then the menu "A Overview" in which various sub-items are listed in the menu tree appears.

2.3.1 Large representation in the display

The first sub-item "AB Large" ("Click" on the top 📁) permits the selection of 4 parameters, which are displayed in a large font on the display of the ERZ2000-DI for better reading at some distance (see *Figure 19: Display view*)

Figure 18: "Overviews " menu

Figure 19: Display view

This representation can be activated in the display of the ERZ2000-DI on the touchscreen:

1. Activation of the "Overview" tab

2. Activation of the "Large" tab

The displayed parameters can be changed by activating edit after the relevant selection. Then you have an additional selection with which the value can be changed if you click on the ∨ arrow.
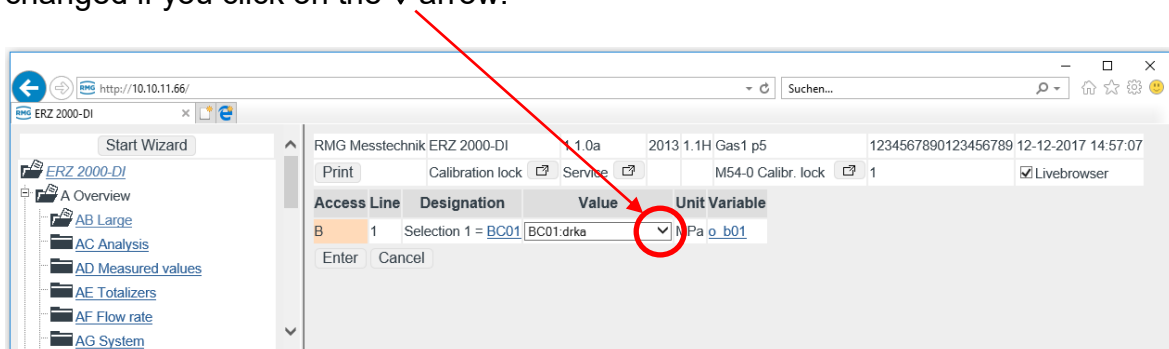
Figure 20: Selection of the large representation of parameters

Then a selection appears as shown in *Figure 21: Selection of parameters*.

Figure 21: Selection of parameters

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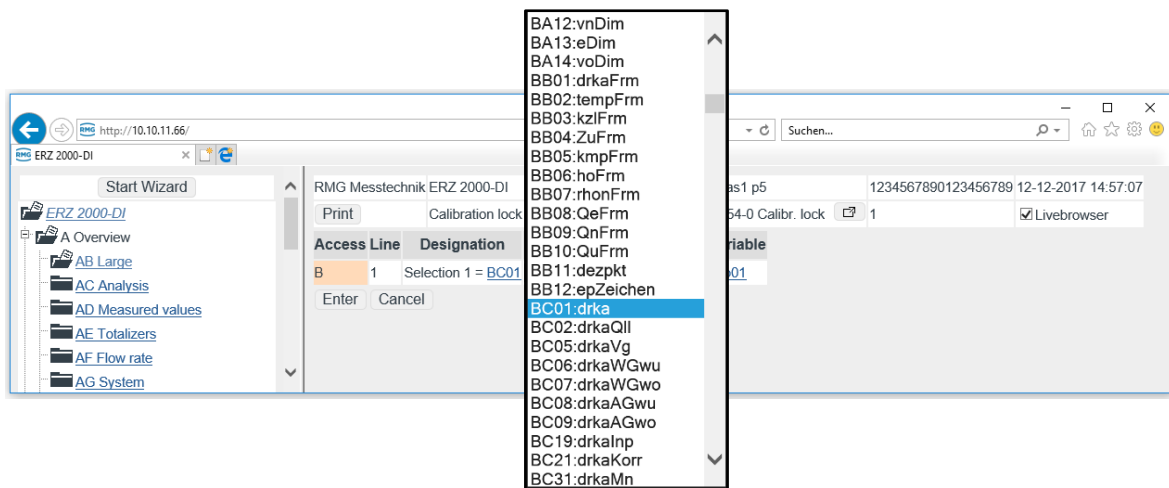
Any other parameters can be selected here, "entered" and then confirmed with "continue".

For assignment of the parameter to the selected value can be accessed by clicking on the term after the selection (BC01 in this case). The coordinate BC01 Absolute pressure is recognizable. This menu can also be reached with selection of the menu **B Reassessment** and then **BC Absolute pressure** is activated on the start screen. The coordinate BC01 Absolute pressure is in the 1st line.

2.3.2   Further specifications in the home page

In the right-hand window, the following can also be seen in the upper lines (*Figure 22: Top lines in the menu*):

RMG Messtechnik	ERZ 2000-DI	1.1.0	2017	1.1H	Gas1 p5	1234567890123456789	12-12-2017 15:08:20
Print	Calibration lock ⬀	Service ⬀			M54-0 Calibr. lock ⬀ 1		☑ Livebrowser

Figure 22: Top lines in the menu

Top line:

1. RMG Messtechnik
2. ERZ2000-DI
3. 1.1.0   Firmware version
4. 2017   Year of manufacture of the ERZ2000-DI
5. 1.1H   Rail name EL 2
6. Gas1 p5   Measurement point EL 3
7. 1234567890123456789
8. 12-12-2017   Current date
9. 15:08:20   Current time

> **Note**
>
> **If the live browser is activated (see below);**
>
> **For field 9: Time**
>
> **The time must change in the seconds!**
>
> **A live connection is only provided thereafter.**
>
> **<u>All</u> values, not only the values shown in *Figure 18: "Overviews " menu* are updated "online" (continuously - live).**
>
> **If the time does not change in seconds, there is no or only a poor connection between the ERZ2000-DI and the PC. It may also be due to an "old" browser or the settings above have not been carried out.**
>
> **A poor connection can impede or completely block data transmission (e.g. the reading of archives).**

Second line:

1.	Print	The framed area shows an operable field; the displayed page is printed.
2.	Calibration lock / locked	Shows the current access here: "Calibration lock open"
		The menu GA Access rights can be opened by clicking in the adjacent field ☐↗. The code values are visible and can be changed with the calibration switch open

GA Parameter access

Access	Line	Designation	Value	Unit	Variable
C	2	Codeword 1	9999		code1
C	3	Codeword 2	9999		code2
A *	4	Current access	Calibration lock		actAccess

Enter Cancel Load defaults Refresh

Figure 23: Access to the device

(For more information, see *Chapter 2.4 Access protection for data and* settings)

3. Service

Shows the user profile. The menu NA Wizard home page can be opened by clicking in the adjacent field ⬀.

NA Wizard start page

Access	Line	Designation	Value	Unit	Variable
B	1	User profile	Service ⌄		profil

Enter Cancel Load defaults Refresh

Figure 24: User profile

(For more information, see wizard)

4. " "

5. " "

6. Error display

Pending errors are continuously displayed here.

Here: "M54 Calibration lock"
(= Calibration lock is open)

All available messages can be displayed by clicking in the adjacent field ⬀.

Figure 25: Error messages

7. 1   Debug value (internal use)

8. "   "

9. ☑   Live browser   The live browser is activated and all data (such
                                        as time) is updated continuously.
                                        Clicking on ☑ deactivates the live browser (☐).

Furthermore, a heading **AB GUI/Overview/Large** is shown in *Figure 18: "Overviews " menu*:
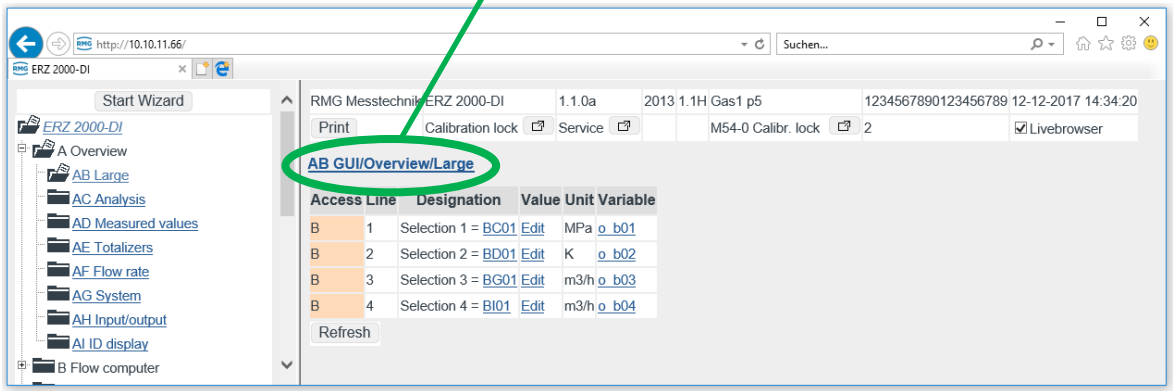
The selected measurements or parameters are displayed there. Click on this **Heading**, then a menu with further explanations for the values on the previous screen appears. Windows in which additional, in-depth information of the selected parameter is shown are opened by clicking on the underlined text. Clicking on the **Heading** again will bring you back to the initial menu (*Figure 18: "Overviews*).

The representation of measurements and parameters is shown in other menus.
For example, various analytical values are specified in the next menu
AC Analysis Overview.

AC Analysis Overview

Designation	Value	Unit	Description	Jump target
	GERG 88 S		Calculation method for K coefficient	K coefficient
C	4.2493		Current conversion factor	
K	0.99693		K coefficient	
Z	0.994348		Compressibility factor at measurement conditions	
Zb	0.997407		Compressibility factor at base conditions	
sd	0.75651	kg/m3	Standard density, measured value	Current gas quality
Hs	11.250	kWh/m3	Superior calorific value, measured value	
CO2	0.9960	mole%	Carbon dioxide, normalized molar fraction	
H2	0.0000	mole%	Hydrogen, normalized molar fraction	
Refresh				

Figure 26: "AC Analysis Overview " menu

The parameters contain the corresponding live values with a unit (if available) and
the jump target that describes the determination and specification of the respective
value in a menu. By clicking on the parameter under the jump target, the corre-
sponding menu appears; e.g. clicking on the K coefficient opens the sub-menu
"BH Calculation of K (compressibility) coefficient".

BH Calculation of K coefficient

Access	Line	Designation	Value	Unit	Variable
A *	1	Conversion factor	4.2493		Zu
A *	2	K coefficient	0.99693		kzl
A *	3	Compr.factor(M)	0.994348		ZBetr
A *	4	Compr.factor(B)	0.997407		ZNorm
E *	5	Calc. method	GERG 88 S		kMod
E *	6	Default	1		kVg
E *	30	Pbase selection	1.01325 bars		PnWahl
E *	31	Tb selection	0 °C		t_norm
E *	32	Tm selection	25 °C		tb
E *	51	Limit mode	Default if LV		gergErrMod
E *	52	Limits	Sensor limits		gergRange
F	61	Frz. Conversion factor	0.0000		fZu
F	62	Frz. K coefficient	0.00000		fkzl
F	63	Frz. Compr.factor(M)	0.000000		fZBetr
F	64	Frz. Compr.factor(B)	0.000000		fZNorm

Enter | Cancel | Load defaults | Refresh

Figure 27: "BH Calculation of K coefficient"

The parameters on the right side belong to different categories, which is indicated with different colors, identification letters and other symbols in the left part on the right screen in the relevant line. The most important include:

A	Dark yellow	Display values, change not possible
E	Red	Custody transfer parameter, can be changed with open calibration switch
F	Blue	Freeze parameter

This identification and the color assignment are shown in detail in *Chapter 2.3.3 Display*.

All measurements, calculation values, parameters and functions are arranged in a coordinate system. There are several tables with columns and lines in this coordinate system. Each table as a (umbrella) term, or a heading, under which all various

points which have a logical connection with the term are summarized line by line; for example, points such as **BH05 Calc. method**, **BH06 Default**, etc. are summarized under the term **BH Calculation of K coefficient**. These "points" are referred to as "coordinates" below. These individual coordinates are assigned additional meanings column-by-column:

Column	1.	2.	3.	4.	5.	6.
	Access column	Line number				Identification
	Alpha-num. Identification	Numerical identification	Coordinate name	Value	Corresponding unit	Variable

Figure 28: Coordinate system

With **BH01 Conversion factor**, the coordinate is uniquely identified in the green frame. The "Variable" column is only visible in Developer mode (see *Chapter 2.4 Access protection for data and settings*), for which the highest access level is required. The variable identification Zu establishes a unique identification for the physical variable; this physical identification is assigned to the coordinate **BH01 Conversion factor**.

If applicable, a coordinate can also be a function, then these designations can also appear simultaneously.

The coordinates are arranged in a table, a coordinate system in the form of a matrix, in which each column (also identified with menu) is identified with two letters and each line is identified with a number. Furthermore, columns that belong together are summarized in groups and each group has the same first letters, e.g. "A" for the measurement columns. Each table as a (umbrella) term, or a heading, under which all various points which have a logical connection with the term are summarized line by line; for example, points such as "status coefficient", "calculation type", etc. are summarized under the term "calculation of the compressibility number". Chapters belonging together are summarized under the first letters: AA, AB, AC, AD... / BA, BB, BC, ... / CA, CB, CC, CD.....

Note
The method of counting takes place with letter / number combinations beginning with

AA = first column
01 = first line

Chapters belonging together are summarized under the first letters: AA, AB, AC, AD... / BA, BB, BC, ... / CA, CB, CC, CD ...
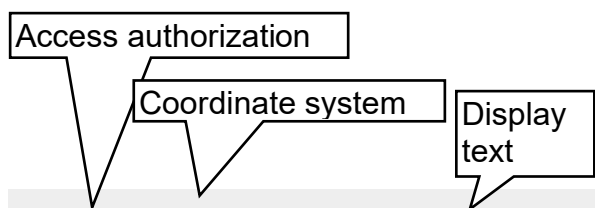
Only the values that are relevant for the selected device type are displayed. Therefore, complete columns and/or individual coordinates are hidden in the coordinate system – depending on the device type and operating mode setting.

In addition, there are coordinates (functions) that are intended for service purposes and for review, only. Depending on the user profile and the device type, therefore, all parameters and data are not always visible.

The columns displayed to the left and the parameters and measurements displayed to the right depend on the selected user profile. All data is displayed in "Service" mode only; the device is delivered in "User" mode.

2.3.3 Display

The visibility of coordinates and columns depends on the user profile setting. All coordinates are only visible in the service setting. Example display:

Access authorization

Coordinate system

Display text

Access	Line	Designation	Value	Unit	Variable
A *	1	Conversion factor	4.2493		Zu
A *	2	K coefficient	0.99693		kzl

Figure 29: Parameter display

Explanation of symbols in the Access column:

A	Display values, custody transfer, change not possible
B	Parameter under single code word protection
C	Special case: Code word entry/check
D	General displays, display values, non-custody-transfer
E	Parameters protected by official calibration
F	Freeze value, not editable
I	Interface variable – measurement, not editable
J	Interface variable – imported type plate (e.g. hard), not editable
K	Constant, not editable
M	Imported measurement via Modbus, not editable
N	Non-custody-transfer meters, CO_2, all disturbance meters, meters with an undefined billing mode, customer meters
P	Automatically changing input value with simple code word protection
Q	Automatically changing input value without protection
S	Parameter under super user protection
T	Parameter under double code word protection
W	Factory parameter, can only be changed in the factory
X	Automatically changing input value under calibration switch
Y	Automatically changing input value under super user protection
Z	Custody transfer meters Vo, Vm, Vb, E, M

The coordinate system runs horizontally from AA to QX (columns) and vertically from 1 to 99 (lines) (*Table 1: Coordinate system*)

43

AA	AB	AC	...	BA	BC	...	...	...	QW	QX
01										
02										
..										
98										
99										

Table 1: Coordinate system

Displayed parameters

Parameters
These behave like constants. Editing changes the value of this constant.

Automatically changing values that can be edited
These values behave like changing values. Editing will change the initial value of these changing values, e.g. an offset. Example: Remaining time / trigger (**IC06**) for viewing the PTB telephone time service. **IC06** contains the number of seconds until the next call of the telephone time service of the PTB. This call normally takes place once per day. The time can be shortened for testing and the call-up can be triggered prematurely.

IC External time signal

Access	Line	Designation	Value	Unit	Variable
T	1	Sync.mode input	OFF		zeitSyncMode
T	2	timesync.tolerance	2	s	syncZul
T	3	Time sync. rule	Always		tsetMode
B	4	Retrigger success	90000	s	ptbOk
B	5	Retrigger fault	300	s	ptbNok
Q	6	PTB trigger	0	s	ptbCall
B	10	Phone: PTB	0531512038		ptbNumber
B	21	Source time contact	OFF		kzoSyncClk
B	40	Server Port 37/123	ptbtime2.ptb.de		timeSrv
B	41	port 37 protocol	UDP		tsrvtyp
B	42	Network interface	ETH2		timeBind

Enter   Cancel   Load defaults   Refresh

Figure 30: Automatically changing value "IC06 PTB trigger"

Trigger
These values basically have no function in the basic state. A task is assigned and initiated with the editing. After completion of the task, the initiator returns to its basic state.

Click on the white field to change the value and then write the desired value.

Note
Please observe the unit after these fields (e.g. IC06: unit = s [seconds]) and choose suitable entries.

Parameter change:
There are different ways to change parameters:

1. Fields with an arrow (e.g. specification of the parameter shown in "large")

Access	Line	Designation	Value	Unit	Variable
B	1	Selection 1 = BC01	BC01:drka ⌄	MPa	o b01
Enter	Cancel				

Figure 31: "AB Large"

Clicking on the arrow (in the red circle) opens a selection menu (see above). The desired value can be selected from these specification parameters.

Entries can be made directly in other fields, e.g. **IC04 Retrigger success** (see *Figure 30: Automatically changing value "IC06 PTB trigger"*):

B	4	Retrigger success	90000	s	ptbOk

Figure 32: Entry in fields (numbers)

The desired time after which a re-login takes place is entered directly in the field (with the example 90000 s ≈ 1 day), the assigned unit ([s]) was already assigned. Other fields contain additional information that can also be entered directly (in *Figure 33: Entry in fields (text)* the manufacturer "Rosemount" is entered).

| E * | 50 | Manufacturer | ROSEMOUNT | | drkaManuf |

Figure 33: Entry in fields (text)

A final possibility is fields that can be activated (*Figure 34: Activation of value fields*).

Access	Line	Designation	Value	Unit	Variable
B	1	Selection 1 = BC01	Edit	MPa	o_b01

Figure 34: Activation of value fields

By clicking on the value: "edit", a sub-menu appears in which the variable **BC01 Absolute pressure** can be changed.

With the back arrow of Explorer
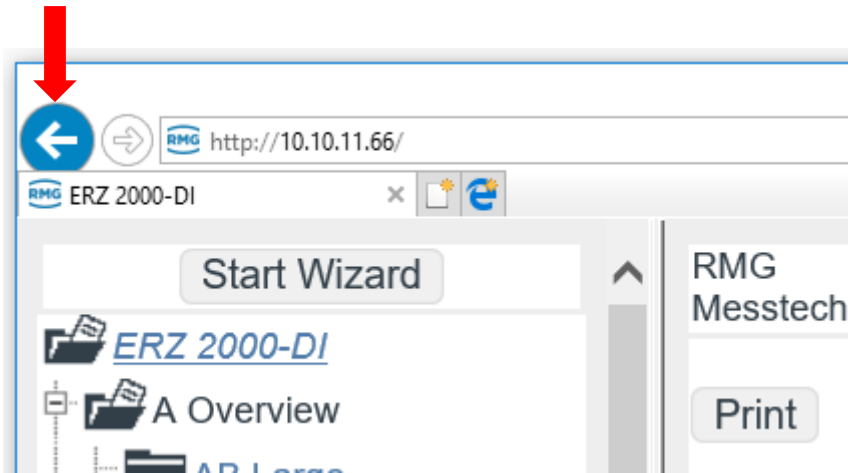
Figure 35: Back to the main menu

you return to the previous menu.

In order to familiarize yourself with the settings options and the type of setting, we recommend testing the settings options in the various "menus" in this display with the mouse. In order to avoid unnecessary "resetting", only save new settings if you actually need them.

2.4 Access protection for data and settings

The ERZ2000-DI permits the entry and adjustment of all editable values. A description is provided in *chapter 2.3.3 Display.* All editable values are access-protected, which prevents arbitrary changes. This access protection has different hierarchies that are illustrated in the following figure:
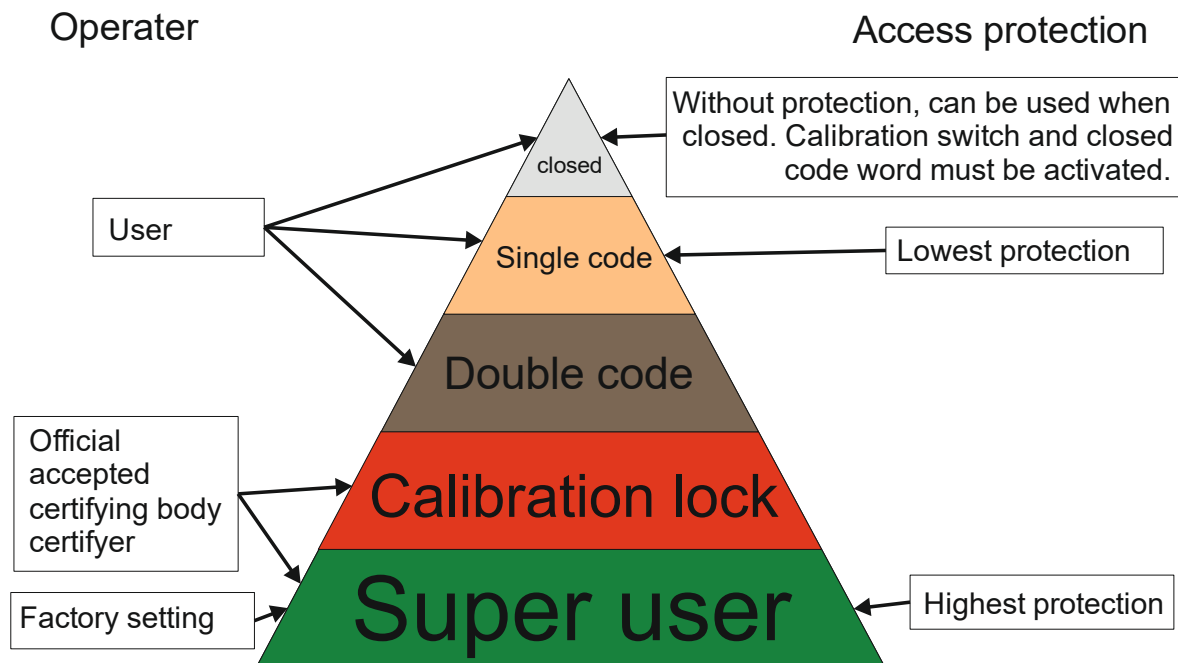
Figure 36: Hierarchy of access protection

The lowest protection level applies with a closed calibration switch and without entry of a protection code. With entry of the first protection code, you reach the next protection level and entry of the second protection enables access to the third protection level.

These levels must be activated or deactivated by the user in order to make changes.

The next protection level is subject to calibration protection and must only be opened by authorized persons. The factory settings are also made in this level. There is also a super user protection for the highest level. With higher protection level, all lower protection levels are open. The following *Table 2: Access rights* explains the access rights for the different protection levels.

Closed	Without influence on measurement and measurement accuracy, e.g. operating point testing resolution
Single code	Without influence on measurement and measurement accuracy, e.g. specification values, warning limits, plausibility, comparisons, user protocols
Double code	Adaptation of gas property tables, has influence on measurement, but is then permitted and desired. Permission takes place with enabling of an operating mode protected by calibration lock.
Calibration lock	With influence on measurement and measurement accuracy. e.g. alarm limits, coefficients, operating modes (especially also operating modes allowing permission),
Super user	With considerable influence on measurement and measurement accuracy. e.g. calibration values, equipment, enabling of functions, ..

Table 2: Access rights

Access rights can be changed in the menu "**GA Access**" (*Figure 23: Access to the device*).

You can click on the fields after Codeword 1 and Codeword 2 and change the value of the code words with keyboard entry. If the rotating calibration lock is already open, the currently set code word can be read under the code words. The factory setting for both is "9999". This value must be entered (with calibration turned back and closed) and activated with "enter". The field **GA04 Current access** displays "single code". If Code word 2 is activated with the same code = "9999" with the same procedure, then **GA04 Current access** displays "double code". Separation between supplier and purchaser is possible with 2 different code words.

The calibration lock on the front panel is opened by turning it clockwise and **GA04 Current access** displays "super user".

Without prior activation of Code words 1 and 2, **GA04 Current access** is "calibration lock".

Change of the code word
In "super user" access protection, the code word can also be changed. In the menu "GA Access", the code words are read as encrypted numbers. If a new word is entered for the code word (series of numbers), it is activated with "enter" (adopt) for further activation of the access protection.

Deactivation of the access protection
The access protection can be deactivated with the touchscreen of the ERZ2000-DI (see *Figure 37: Deactivation of the access protection*) and with the browser (see *Figure 25: Error messages*). The button "Forget code word" becomes visible in the touchscreen display after clicking on the "Message" tab to the right (*Figure 37: Deactivation of the access protection*). By clicking on the button, "single code" and "double code" are closed. The text on *Figure 25: Error messages* describes how to activate the error message. The "single code" and "double code" access are also closed here by clicking on the "Acknowledge faults" button. The calibration lock is closed by turning it counterclockwise.

Status	No	Time	Text	
active	M54-0	12.12.2017 18:10:43	Calibration lock is open	Delete
active	M54-1	12.12.2017 18:10:15	User lock is open	
active	A03-0	12.12.2017 17:57:53	Loss of absolute pressure	
active	R71-6	12.12.2017 13:15:38	Namur module A open circuit PT100	
active	R92-2	12.12.2017 10:49:12	HART 1 input failed	forget codeword
active	A98-8	12.12.2017 10:48:38	Invalid activation key	

Figure 37: Deactivation of the access protection

Note
Normally, the calibration is now sealed by a calibration official.

In order to finish the adjustment of the access authorization and the user profile, the user profile must be entered in the menu **NA Wizard**. This is carried out most easily by opening the wizard (see above).

2.5   Language setting

The ERZ2000-DI is normally pre-configured, and the ordered language is set. The wizard also starts automatically in the pre-configured language.

However, it may be necessary to change the language. This takes place in the menu **ID Display**, see *Figure 38: ID Display menu*.

ID Display

Access	Line	Designation	Value	Unit	Variable
B	1	Language	English ▾		sprache
B	3	Screen saver	0	min	schonZeit
B	5	Contrast Touchsrc.	2500		dspKontrast

Enter   Cancel   Load defaults   Refresh

Figure 38: ID Display menu

First, select the language in the coordinate **ID01 Language**; "German" and "English" are available selections. After a change of the language and an update, all texts and instructions of the ERZ2000-DI and the wizard language are changed.

2.6   Screen saver

The time after which the screen switches off following a period of inactivity is entered in the coordinate **ID03 Screen saver**. The coordinate **ID05 EE05 Contrast Touchscr.** control the resolution of the display; the brightness of the screen can be adjusted from 1000 to 4000 with a presetting of 2500.

2.7   Display screen

Representations of the touch screen of the ERZ2000-DI are shown below. For this purpose, supplementary explanations of the figures on the browser are provided, if applicable. After the power is connected to the ERZ2000-DI, it displays the home screen, which is visible in *Figure 39: Start screen*.

Figure 39: Start screen

The home screen appears after each restart of the device or after pressing the "HOME" key. This home screen shows the active meters, which are framed in italics with " * " according to calibration authority specifications. The other meters become visible with vertical scrolling (right).

Pressing the right tab in the upper area of the screen takes you to further display screens. The display screens are arranged like tabs. They represent the top level of the operating menu and are accessible via the buttons on the upper bar. The following display pages, "menus" are available, where the following sections are displayed.

Overview	Home screen with the meters (and important measurements)
Service	Service functions
Details	List of all measurements and parameters of the ERZ2000-DI
Functions	Displays and functions for test and calibration
Archives	Archive entries
Messages	Color event and error messages (alarms, warnings and notices)

Changes/settings can be made in some of the display screens. To change this parameter, go to the appropriate field or the appropriate line and the input fields appear, as shown in the example in *Figure 40: Input field*:
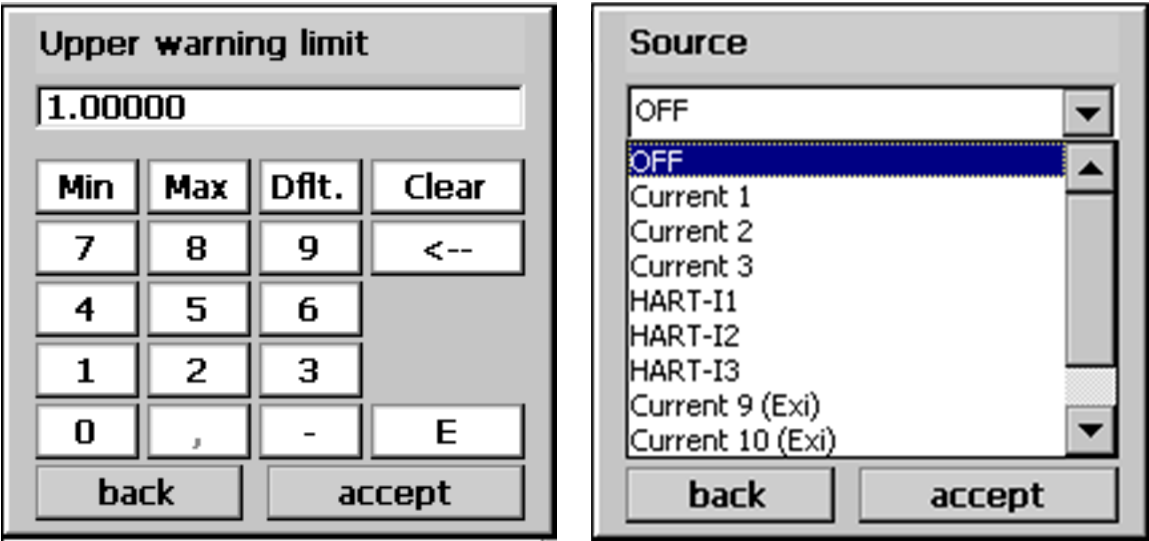
Figure 40: Input field

The left field is provided for entry of the numerical values; the right field is provided to select a mode. The new numerical value and/or the new mode is adopted with "accept".
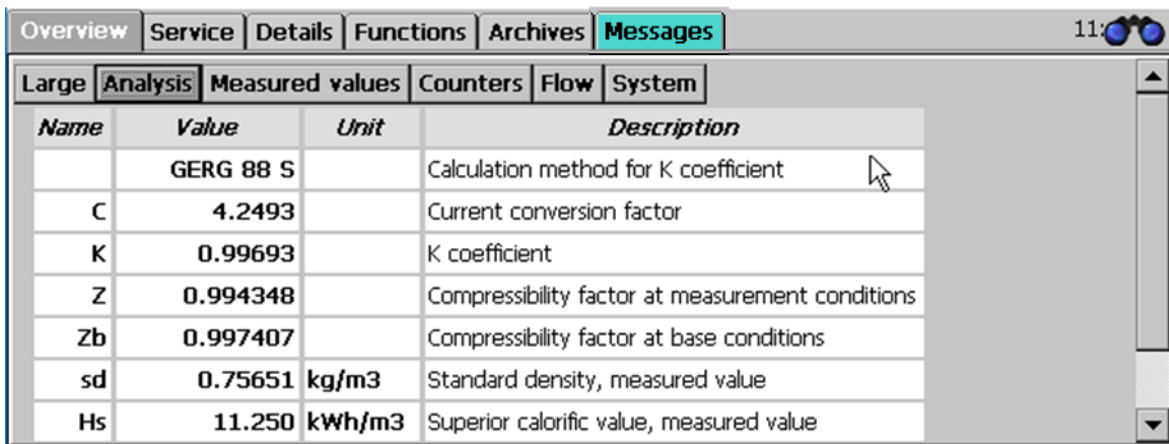
2.7.1   Overview

Scroll to the top in the overview or tap on the "Overview" menu item again; six selection fields which can be used to switch to other tables, e.g. display screens, appear in the upper line.

2.7.1.1   Large

The "Large" display was already described above. This can be used to display 4 specific parameters in an extra-large font in order to enable a reading from a greater distance.

2.7.1.2 Analysis

Name	Value	Unit	Description
	GERG 88 S		Calculation method for K coefficient
C	4.2493		Current conversion factor
K	0.99693		K coefficient
Z	0.994348		Compressibility factor at measurement conditions
Zb	0.997407		Compressibility factor at base conditions
sd	0.75651	kg/m3	Standard density, measured value
Hs	11.250	kWh/m3	Superior calorific value, measured value
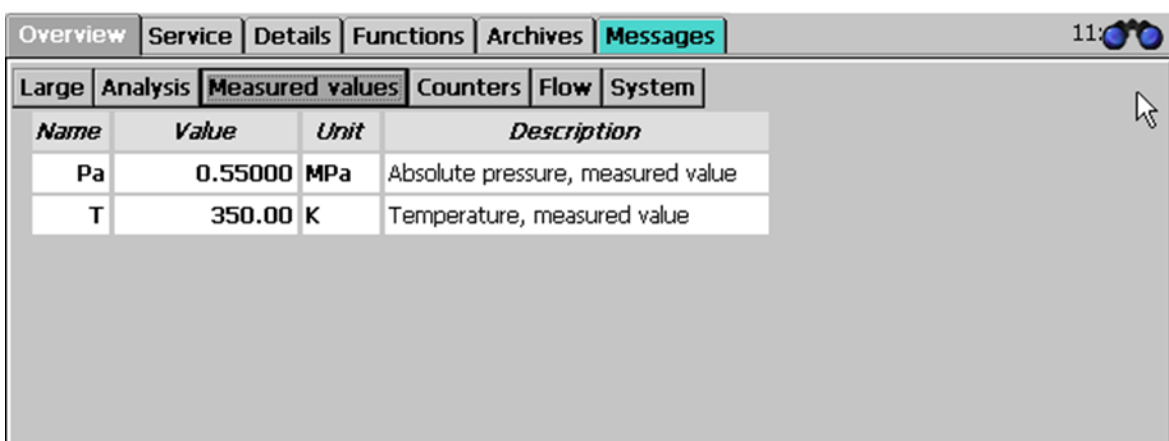
Figure 41: Overview -> Analysis sub-menu

The calculation process and corresponding input and result values are displayed in this menu. The calculation process of the compressibility number is specified in the first line – GERG 88S in this case.

In addition to further gas-specific parameters, the data for the gas composition that varies depending on the selected calculation process is provided here.

The calculation process can be changed on the **BH Calculation of K coefficient** wizard screen. This is equally possible in the corresponding menu.

2.7.1.3 Measurements
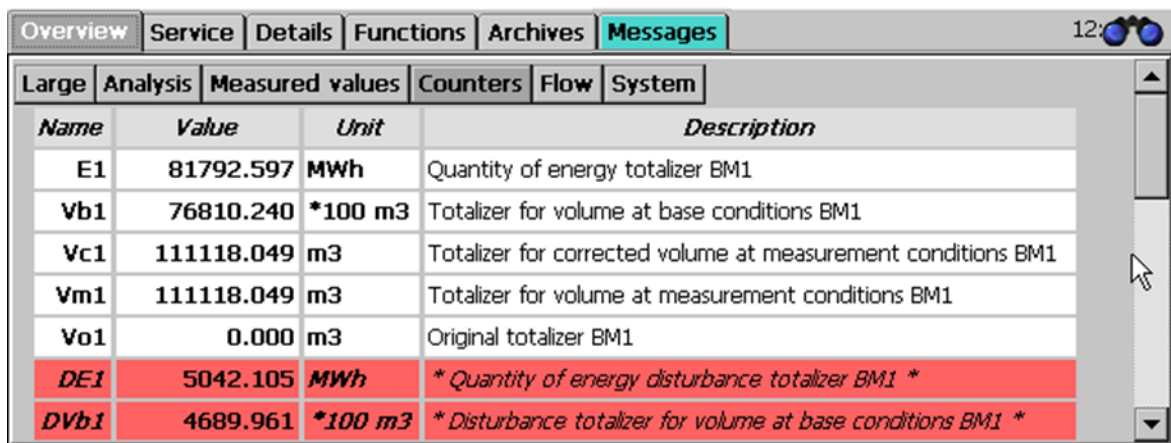
Name	Value	Unit	Description
Pa	0.55000	MPa	Absolute pressure, measured value
T	350.00	K	Temperature, measured value

Figure 42: Overview -> Measurements sub-menu

The pressure and temperature measurements are shown in this display.

2.7.1.4   Counters
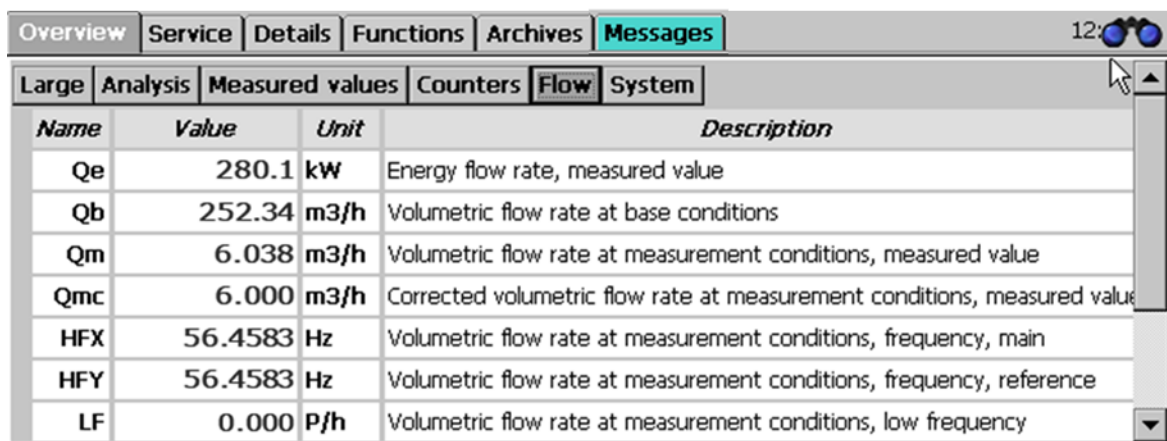
Name	Value	Unit	Description
E1	81792.597	MWh	Quantity of energy totalizer BM1
Vb1	76810.240	*100 m3	Totalizer for volume at base conditions BM1
Vc1	111118.049	m3	Totalizer for corrected volume at measurement conditions BM1
Vm1	111118.049	m3	Totalizer for volume at measurement conditions BM1
Vo1	0.000	m3	Original totalizer BM1
DE1	*5042.105*	*MWh*	** Quantity of energy disturbance totalizer BM1 **
DVb1	*4689.961*	**100 m3*	** Disturbance totalizer for volume at base conditions BM1 **

Figure 43: Overview -> Meters sub-menu

This menu shows the various meters for the two calculation modes, a color under-line assigns different times or other classifications to the meters.

The *appendix B) Totalizer in the browser view* shows how the meters are handled in the browser display.

2.7.1.5   Flow rate
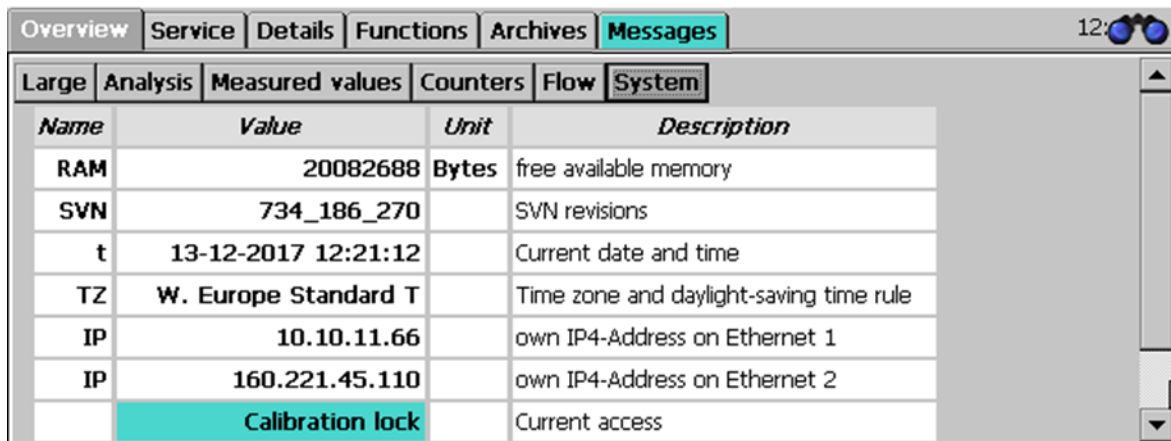
Name	Value	Unit	Description
Qe	280.1	kW	Energy flow rate, measured value
Qb	252.34	m3/h	Volumetric flow rate at base conditions
Qm	6.038	m3/h	Volumetric flow rate at measurement conditions, measured value
Qmc	6.000	m3/h	Corrected volumetric flow rate at measurement conditions, measured value
HFX	56.4583	Hz	Volumetric flow rate at measurement conditions, frequency, main
HFY	56.4583	Hz	Volumetric flow rate at measurement conditions, frequency, reference
LF	0.000	P/h	Volumetric flow rate at measurement conditions, low frequency

Figure 44: Overview -> Flow rate sub-menu

This menu shows different flow rates, such as energy flow, nominal volume flow and operating volume flow or the measurement current.

2.7.1.6 System
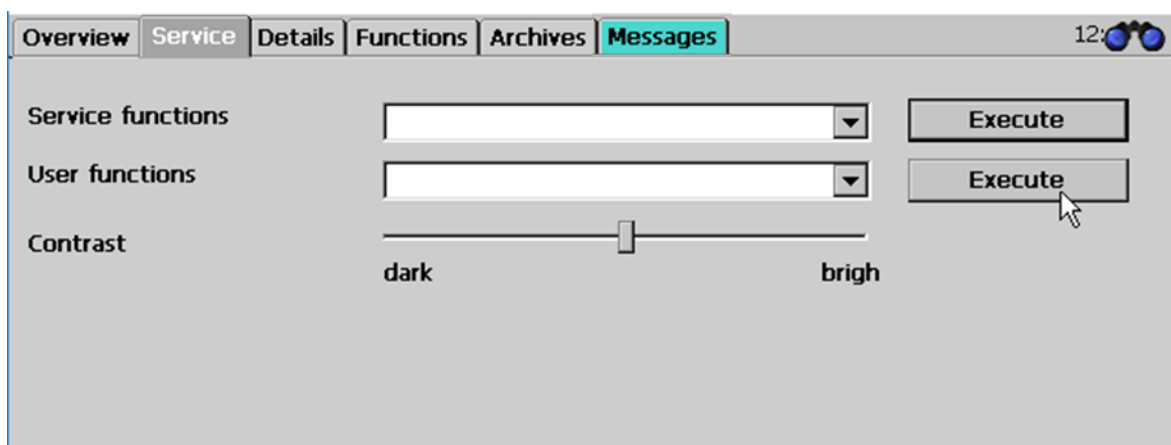
Figure 45: Overview -> System sub-menu

Various general values are displayed here, including the IP addresses with which you can actuate the device if it is connected to the PC, a PLC, etc. via Ethernet.

2.7.2 Service

Figure 46: Service menu

The available settings in "Service functions" are reserved for the service department and a calibration official and/or an officially recognized inspection authority. These functions are described in the *appendix F) Service functions*.

If a blur occurs on contact of the stylus with the touchscreen, calibration can take place in the "Calibrate stylus" menu item under "User functions". Then this is initiated after selection of "Execute".
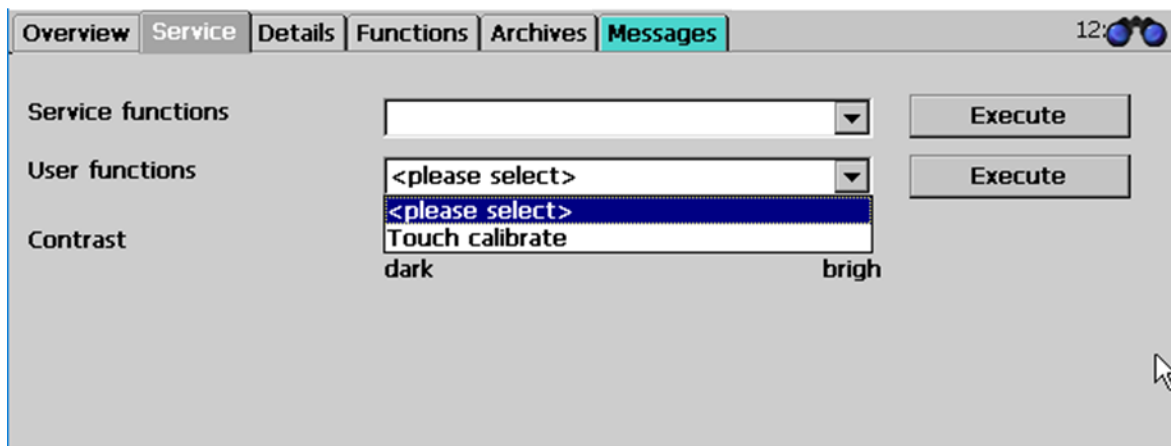
Figure 47: "Calibrate stylus" service menu / sub-program

After the function starts a series of crosses that must be touched in the center is displayed. After this takes place touching the touchscreen again returns to the previous screen.

This calibration can take place at any time. The **contrast** can also be changed in the service menu at any time. The stylus calibration can also be activated by pressing the home button on the overview page and drawing a line covering about 1/3 of the screen width. Then the stylus calibration opens automatically.

2.7.3 Details

A list of all measurements, computed values, calculated variables, parameters, functions and operating modes is provided here. The data is shown in a structure like in the display with an internet browser; as viewed from the left, you see the superordinate menu **tree**, which can be opened by "clicking" with the stylus on the touchscreen or by clicking with the right mouse pointer in the PC display for the sub-menus. *Figure 48: Details menu* shows the screen.

Figure 48: Details menu

Chapter 2.1.3 Remote control / parameterization explains how parameters can be changed.

2.7.4 Functions
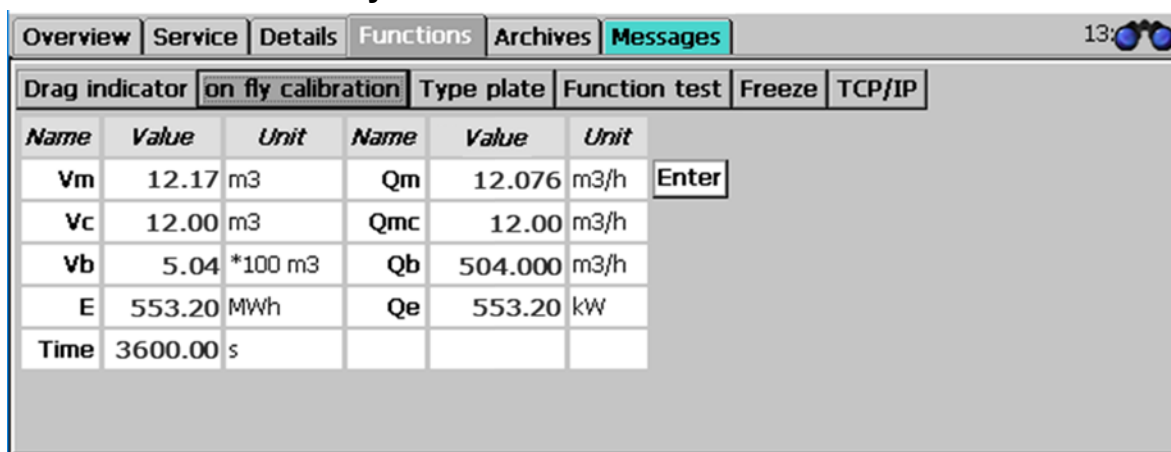
Figure 49: "Drag pointer" sub-menu under "Functions"

The "Functions" menu opens 6 additional display views, which are presented below. The drag pointer function is displayed first.

2.7.4.1 Drag pointer

The absolute minimum and maximum values for the measurements since the last restart or since the last resetting of the drag pointer are shown here. The function can be used for different measurement variables and is specified, for example, with the **BC Absolute pressure** in the coordinates **BC31 Min. drag pointer.** and **BC32 Max. drag pointer.** With other measurement variables, where this function can also be used, the settings are also in lines 31 and 32. These values specified for the "*drag pointer*" are deleted with "Reset" and then the set to the current measurement. The display is shown in *Figure 49: "Drag pointer" sub-menu under "Functions"*. The drag pointers can also be reset globally in the **LE Erasing procedure** menu.

2.7.4.2 On-the-fly calibration

Name	Value	Unit	Name	Value	Unit	
Vm	12.17	m3	Qm	12.076	m3/h	Enter
Vc	12.00	m3	Qmc	12.00	m3/h	
Vb	5.04	*100 m3	Qb	504.000	m3/h	
E	553.20	MWh	Qe	553.20	kW	
Time	3600.00	s				

Figure 50: "On-the-fly calibration" sub-menu under "Functions"

Meters that can be started like a stopwatch at 0 are shown in this screen. **It is started with "Enter" – to the right of the values**. The meters then run until "Enter" is pressed again. Pressing "Enter" again resets the meters to 0 and initiates a restart.

Note
Tip:
When the time marks: 36 s, 360 s and 3600 s are reached, the meter values of meter and flow can be compares most easily [1].

[1] Frequency conversion (unit Hz = 1/s) to volume flow (unit V = m³/h) the factor is set to 3600; rounding, which occurs with other time marks is omitted here.

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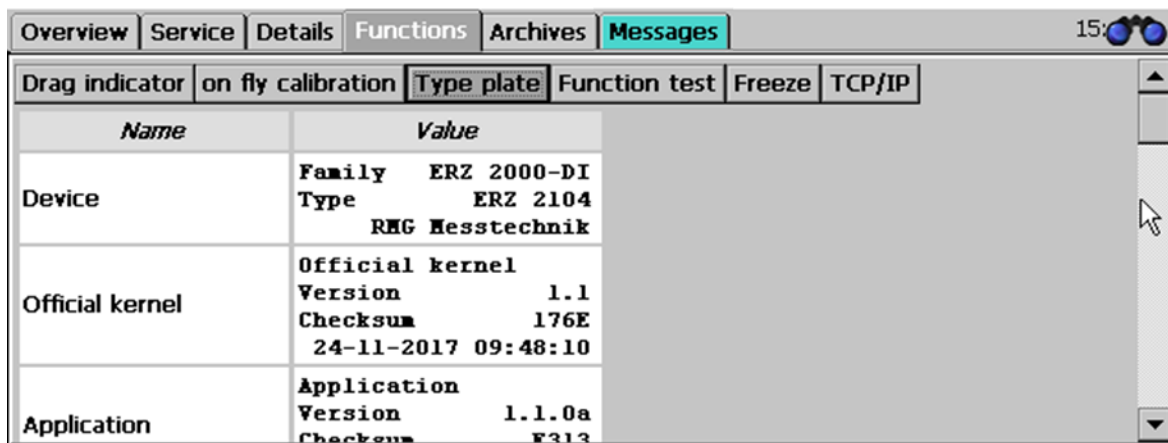
Figure 51: "Type plate" sub-menu under "Functions"

The type plate of the device is displayed in the "Type plate" submenu. This included further data, e.g. about the electronics (calibration kernel, Bios, WinCE kernel), about the meters and their settings (dimensions, pulse value), about the type of gas (composition, velocity of sound) and the environmental and standard conditions (pressure, temperature).

Only the type plate data is displayed here; there is no input possibility in the type plate display. Entry of the values takes place by entering the parameters of the relevant transmitter devices (*chapter "4 Transmitters"*)

The type plate can also be viewed in the browser under the menu **AI ID display**.

A *	33	TCP/IP Eth1	TCP/IP Eth1 IP 10.10.11.66 NM 255.255.255.0 GW 10.10.11.1	tcpTypsEth1
A *	34	TCP/IP Eth2	TCP/IP Eth2 IP 160.221.45.110 NM 255.255.0.0 GW 192.168.20.254	tcpTypsEth2
A *	35	DSfG	DSfG Entity U2 Address OFF CRC12 123	dsfgTyps
A *	36	Location	Location Gas1 p5 1.1H Main measurement	ortTyps

Refresh

Figure 52: AI Type plate menu

2.7.4.4 Functional test

Overview	Service	Details	**Functions**	Archives	**Messages**		15:

Drag indicator	on fly calibration	Type plate	**Function test**	Freeze	TCP/IP

				Name	*Value*		*Unit*	*Trend*
Time 1	15:48:32		Change	Time	0,000000		s	
Time 2	15:49:32		Exam.	Vo1	0,000000		m3	
Time 3	16:09:56			Vm1	0,000000		m3	
Time 4	16:10:56		Start Now	Vc1	0,000000		m3	
Revision run	1224	s	Start Time1	Vb1	0,000000		*100 m3	
Pre/post run	60	s	Cancel	E1	0,000000		MWh	
Delay	1	s	At rest	Vo2	0,000000		m3	

Figure 53: "Functional test" sub-menu under "Functions"

The quantities and measurements are recorded and displayed for a defined length of time in the functional test. The functional test is divided into a run-up, the actual test and an after-run.

Functional test process:

1. Enter four times for the three sections of the functional test.

2. Click on the "Start Time1" button. Then the functional test is run according to the four times. Times that have already elapsed are highlighted green. Blinking green times indicate the functional test progress.

3. Alternatively, you can press the "Start now" button. Time 1 is set to the current time and the test starts immediately with the run-up time. Run-up, after-run and test times proceed according to the specifications. The time progress is also displayed here in green and blinking green.

4. If the testing is finished, the 4 time fields are highlighted yellow.

5. The result can be read in the green highlighted table to the right. You can switch back and forth between the tables for run-up, test and after-run with "Change".

Alternatively, the times for test time, run-up and after-run, as well as a delay time can be entered. The results of the functional test are also saved in archive groups 17 to 20.

HC Function test under running conditions

Access	Line	Designation	Value	Unit	Variable
D	1	Revision status	At rest		revStat
Q	2	Time stamp 1	01-01-1970 01:00:00		revStamp1
Q	3	Time stamp 2	01-01-1970 01:00:00		revStamp2
Q	4	Time stamp 3	01-01-1970 01:00:00		revStamp3
Q	5	Time stamp 4	01-01-1970 01:00:00		revStamp4
Q	6	Revision run	1200	s	revPrf
Q	7	Pre/post run	60	s	revVorNach
Q	8	Delay	1	s	revDelay

Enter   Cancel   schedule   Refresh

Result of function test

Figure 54: HC Function test menu

In order to receive logical values with appropriate resolution, an adequate test time must be provided. A few minutes are sufficient for the volume detection via the HF inputs, because synchronization of the test function with the recording of the volume frequency takes place. For "slow" inputs, such as interfaces with ENCO or ultrasonic gas meters, the test time must be sufficiently long to minimize resolution

error (e.g. 1200 seconds = 20 minutes). This also applies for the "On-the-fly calibration" function.

The coordinates of the menu in detail:

HC01 Revision Status	Shows the current status of the function (stationary / running)
HC02 Time stamp 1	Parameter for starting the test process (run-up start)
HC03 Time stamp 2	Parameter for stopping the run-up and starting the actual test
HC04 Time stamp 3	Parameter for stopping the test and starting the after-run
HC05 Time stamp 4	Parameter for stopping the after-run and the function
HC06 Revision run	Parameter for a relative specification of the test time, corresponding to the time between Time stamp 3 and 4
HC07 Pre/post run	Parameter for a relative specification of the run-up and after-run time, corresponding to the time between Time stamp 1 and 2 or 3 and 4
HC08 Delay	Parameter for a wait time before the start with Time stamp 1

There are multiple processes for using the Functional testing function.

Use of the time stamp with manual entry.
If the 4 time stamps are entered, activate the "Start Time1" button. Then the function starts automatically when the times are reached and stops after the 4th time stamp has elapsed. The test time, the time for run-up/after-run and the delay are calculated and adopted from these times.
There is also a very simple option for activating a functional test directly by clicking on the "Start now" button. For this purpose, the test time and run-up/after-run must be specified beforehand.

Parameterization of the time stamp with entry by means of remote operation via the browser.
For this purpose, click on the "**schedule**" button under the table. The 4 time stamps are calculated from the PC time (not the flow computer time!) and the values for test time, run-up/after-run and delay. The function starts automatically when the times are reached and stops after the 4th time stamp has elapsed.

The result of an elapsed function test can be viewed in the browser. For this purpose, click on the "Result of function test" button under the table in the menu **HC Functional test under running conditions** (*Figure 54: HC Function test menu*)

Functional test under running conditions

	Time stamp 1		Time stamp 2		Time stamp 3		Time stamp 4		
	Pre run		**Examination**		**Post run**				
Desig-nation	13-12-2017 15:57:41	-	13-12-2017 15:58:41	-	13-12-2017 15:59:57	-	13-12-2017 16:00:57	Unit	Trend
Time	22459.647093	59.996115	22519.643209	75.995960	22595.639168	59.996881	22655.636049	s	
Vo1	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	m3	
Vm1	111118.048975	0.326637	43045.224940	1.959824	111118.048975	0.326637	111118.048975	m3	
Vc1	111118.048975	0.326637	43045.224940	1.959824	111118.048975	0.326637	111118.048975	m3	
Vb1	76810.239998	12.228196	1354422.625786	73.369174	76810.239998	12.228196	76810.239998	*100 m3	
E1	81792.596735	0.122184	24540.661667	0.733105	81792.596735	0.122184	81792.596735	MWh	
Vo2	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	m3	
Vm2	1157.746350	0.000000	1157.746350	0.000000	1157.746350	0.000000	1157.746350	m3	
Vc2	1157.746350	0.000000	1157.746350	0.000000	1157.746350	0.000000	1157.746350	m3	
Vb2	1435.567757	0.000000	1435.567757	0.000000	1435.567757	0.000000	1435.567757	*100 m3	
E2	1658.080787	0.000000	1658.080787	0.000000	1658.080787	0.000000	1658.080787	MWh	
Qm		117.589		117.589		117.589		m3/h	↑
Qmc		117.589		117.589		117.589		m3/h	↑
Qb		4402.15		4402.15		4402.15		m3/h	↑
Qe		43986.2		43986.3		43986.3		kW	↑
Pa		0.55000		0.55000		0.55000		MPa	
T		293.15		293.15		293.15		K	↓
Hs		11.250		11.250		11.250		kWh/m3	
sd		0.75651		0.75651		0.75651		kg/m3	↑
C		5.0577		5.0577		5.0577			↑
K		1.00000		1.00000		1.00000			↓
CO2		0.0000		0.0000		0.0000		mole%	
H2		0.0000		0.0000		0.0000		mole%	
N2		0.0000		0.0000		0.0000		mole%	
CH4		100.0000		100.0000		100.0000		mole%	
C2H6		0.0000		0.0000		0.0000		mole%	
C3H8		0.0000		0.0000		0.0000		mole%	
N-C4		0.0000		0.0000		0.0000		mole%	
I-C4		0.0000		0.0000		0.0000		mole%	
N-C5		0.0000		0.0000		0.0000		mole%	
I-C5		0.0000		0.0000		0.0000		mole%	
NeoC5		0.0000		0.0000		0.0000		mole%	
C6		0.0000		0.0000		0.0000		mole%	
C7		0.0000		0.0000		0.0000		mole%	
C8		0.0000		0.0000		0.0000		mole%	
C9		0.0000		0.0000		0.0000		mole%	
C10		0.0000		0.0000		0.0000		mole%	
H2S		0.0000		0.0000		0.0000		mole%	
H2O		0.0000		0.0000		0.0000		mole%	
He		0.0000		0.0000		0.0000		mole%	
O2		0.0000		0.0000		0.0000		mole%	
CO		0.0000		0.0000		0.0000		mole%	
Ar		0.0000		0.0000		0.0000		mole%	

Table 3: Explanation of terms Transfer of the volume transmitter

The center row with 3 columns and the test heading (bold) is the result of the function test. The first column displays the initial values, the center column the differences and averages and the third column the stop values. Run-up and after-run are relevant data depending on the logical test times.

The function test then delivers usable data if the flow computer runs error-free and does not change during the test of the totalizer status (running / stopped). If this is not the case, the starting and stopping values are not displayed and the lines with the totalizer statuses are hidden. If, for instance, only the disturbance totalizer are running, the stationary main totalizer are stored with the difference = 0. For interface protocols that only send the data in second-long intervals, the test time must be given more attention (ENCO, DZU). The same also applies for LF inputs.

2.7.4.5 Freeze

The ERZ2000-DI offers the option of temporarily storing current data for later use. This is referred to as a freeze. The last quantities and measurements are "frozen" with the freeze function. First, the ERZ2000-DI reports the recording of all data and the configuration of the table. This can take several seconds, then the data that was recorded on the specified date and time.

A freeze is most easily activated by pressing the "Freeze now" button.
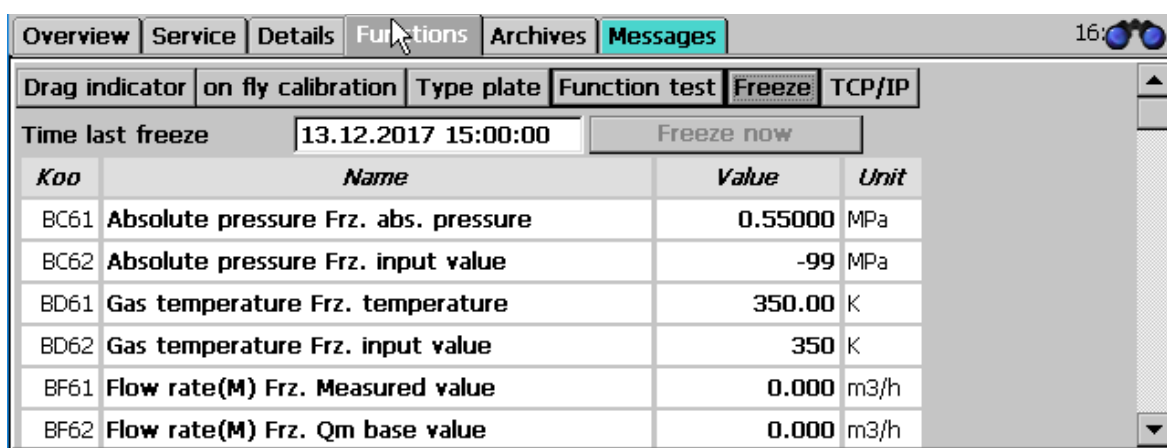
Figure 55: "Freeze" sub-menu under "Functions"

Figure 56: HA Freeze menu shows the menu **HA Freeze** under "**H Revision**".
HA01 shows the time of the last archiving, coordinates **HA03** to **HA05** can be
used to adjust when and how the freeze function is activated. **HA04** defines the
time interval over which the data is recorded and archived. In coordinate **HA05
Source** f**reeze cont.** the corresponding contact input 1 to 8 must be set if a
"Freeze" should be initiated by a contact pulse.

HA Freeze

Access	Line	Designation	Value	Unit	Variable
D	1	Time last freeze	13-12-2017 15:00:00		frzTime
D	2	Freeze contact	Freeze		ktkFreeze
B	3	Freeze mode	Gas day		frzMode
B	4	Freeze interval	30	s	frzInterval
B	5	Source freeze cont.	Contact input 2		kzoFreeze

Enter   Cancel   Load defaults   Refresh

Frozen values
Freeze now, then show results

Figure 56: HA Freeze menu

The selection of how frequently the freeze process is initiated (**HA03 Freeze
mode**) is:

Off	No freeze processes are initiated and the freeze dialog is de-activated.
Every second	Freeze in second intervals
Every minute	Freeze in minute intervals at the start of a minute
Every hour	Hourly freezing at the start of an hour
Every day	Daily freeze at the start of the day
Gas day	Freeze is initiated on the specified gas day ("YA27 Gas day") at the beginning of the specified billing hour. The billing hour must be specified; day, month and year are specified automatically.

Cyclical	Cyclical freeze in the specified interval (coordinate "HA04 Freeze interval")
Contact	Initiate freeze via a selectable contact input; e.g. if freeze is initiated with buttons via Contact input 2
Manual	The "Freeze now" button is activated in the freeze dialog.
Every month	Monthly freeze on the 1st day of every month
Gas month	The freeze is initiated in the specified month (coordinate "YA28 Gas month") at the beginning of the specified billing hour and specified day (coordinate "YA27 Gas day").
	The billing hour and day must be specified; month and year are specified automatically.

The freeze results can be displayed in the browser (function under the menu **HZ Freeze**). They are stored in the blue fields.

Frozen values

Date and time of last freeze : 13-12-2017 15:00:00

BC Absolute pressure

61 Freeze measured value for absolute pressure 0.55000   MPa
62 Freeze input value for absolute pressure   -99   MPa

BD Gas temperature

61 Freeze measured value for temperature   350.00   K
62 Freeze input value for temperature   350   K

BF Uncorrected volumetric flow rate at measurement conditions

61 Freeze volumetric flow rate at measurement conditions   0.000   m3/h
62 Freeze Qm base value   0.000   m3/h
63 Freeze volumetric flow rate at measurement conditions frequency main   0.0000   Hz
64 Freeze volumetric flow rate at measurement conditions frequency reference 0.0000   Hz

BG Corrected volumetric flow rate at measurement conditions

61 Freeze Qc   0.000   m3/h

BH Calculation of K coefficient

61 Freeze current conversion factor   4.2493
62 Freeze K coefficient   0.99693
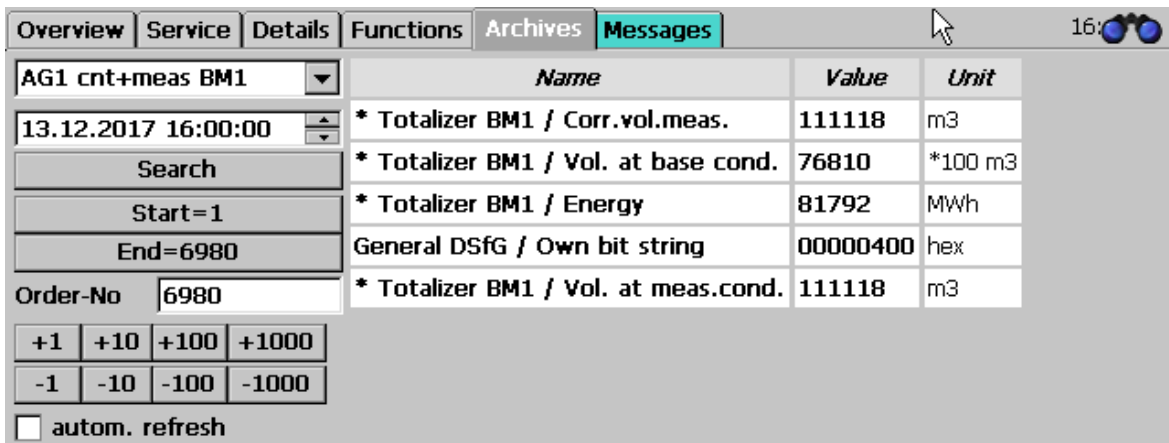
Figure 57: Display of the last freeze values

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2.7.5   Archive

The archive entries of all archive groups can be viewed in this screen. The entries are numbered from "Start" to "End", where the initial value is set to 1. If the index has reached the maximum buffer depth, the oldest entry is overwritten when a new data record is generated starting at this point. Then the start index increases by 1 each time.

> **Note**
>
> **Only display is possible on the device; the archive content can also be exported in the Excel-compatible tsv format with the internet browser.**

	Name	Value	Unit
	* Totalizer BM1 / Corr.vol.meas.	111118	m3
	* Totalizer BM1 / Vol. at base cond.	76810	*100 m3
	* Totalizer BM1 / Energy	81792	MWh
	General DSfG / Own bit string	00000400	hex
	* Totalizer BM1 / Vol. at meas.cond.	111118	m3

Figure 58: "Archive"

Call-up of archive data

The desired archive group (AG) is selected at the top left. A search time can be entered in the field below it. After pressing "Search", the entry is displayed to the right with this date and time.

> **Note**
>
> **If no entry exists with this time, the next newest data record is displayed.**

Two fields for jumping to the oldest or newest entry are included. The indenture number indicates the current position, i.e. the index of the displayed entry. Jumps of ±1, ±10, ±100 and ±1000 positions can be made with the fields below.

The display can be automated so that the last stored value is always displayed. For this purpose, the last data record (end) must be selected first, then the function "Autom. refresh" must be activated. If the newest data record is not displayed, the check box is deactivated and meaningless. "End" must be actuated before the automation is reactivated. The actualization process is displayed with a blinking of the background color of the check box. In the process, color-coding differentiates between updating and updating and display of a new data record.

The values in the table can have different background colors:

White		Error-free measurement
Gray		Meter/measurement has stopped
Blue		Substitute value
Green		Fixed value

It is possible to freely define a special archive. The content and recording cycle can be selected arbitrarily by the user. The complete scope of all measurements and values are available via a selection menu for the storage of data, comparable to the selection for the current outputs (*Figure 59: Free programmable archive menu*).

Parameterization of the archive content takes place under **JN Free programmable archive**. For selection of content, the appropriate coordinate to be archived must be selected under "Name" under **JN10 Assign. Channel 1**. Any other arbitrary value can be assigned via a selection menu. Up to 20 coordinates can be assigned in this manner. Entry for the user code is suitable for access.

The ERZ2000-DI writes the result-controlled (e.g. with incoming and outgoing errors or with full hours or ..) meter statuses, measurements and messages in its archive. For this purpose, there are different archives, e.g. for main meters, disturbance meters or special measurements. It also determines the highest values from the measurements, which are displayed and written to the appropriate archive groups.

The time grids are adjustable with the coordinate "JN01 Record cycle":
Off, every minute, every 2nd minute, every 3rd minute, every 4th minute, every 5th minute, every 6th minute, every 10th minute, every 12th minute, every 15th minute, every 20th minute, on minute 30, every hour, every day, gas day, every month, gas month, on ever freeze cycle and on every change of the gas composition.

The archive depth is 8192 entries.

Figure 59: Free programmable archive menu

Deletion of archives, log books, change buffer, etc.

In the menu **L Factory setting**, sub-menu **LE Erasing procedures** (*Figure 60: Menu LE Erasing procedure*s), archives, log books, etc. can be deleted. As a **Super user** (*see chapter 2.4 Access protection for data and settings*) the coordinates **LE10 Clear log**, **LE11 Clear changes**, **LE12 Clear archive** (DSfG archive of the flow computer and registry entry, as well as the DSfG log book), **LE13 Hour/day reset** (DSfG Archive for the highest load), **LE14 Drag indic. reset** (max and min values of all drag pointers, values are set to the current values) and **LE16 Clear exceptions** are activated.

LE Erasing procedures

Access	Line	Designation	Value	Unit	Variable
Y	10	Clear log	No		logbClr
Y	11	Clear changes	No		pchgClr
Y	12	Clear archive	No		arvClr
Y	13	Hour/day reset	No		STReset
Q	14	Drag indic. reset	No ▾		MnMxClr
Y	16	Clear exceptions	No		excClr

Enter | Cancel | Load defaults | Refresh

Figure 60: Menu LE Erasing procedures

Further details about the archive are provided in the *appendix C) Archive assignment, depth and identification*.

2.7.6 Alarm, warning message

Overview	Service	Details	Functions	Archives	Messages		17:

Status	No	Time	Text	Delete
inactive	H93-3	13.12.2017 15:57:41	A function test is running at the moment	
active	M54-0	13.12.2017 09:43:48	Calibration lock is open	

Figure 61: "Messages"

All messages that have taken place since the last deletion are displayed in different colors in this field:

Red	🟥	Pending alarms, i.e. faults of the custody transfer functions that result in counting in the disturbance meters. General alarms are identified with **"A"**; internal computer errors are identified with **"R"**.
Yellow	🟧	Current warnings, identified with **"W"**, that refer to an error of a non-custody-transfer function. The main meters continue to run.
Light blue	🟦	Notices (**"H"**) of implausible parameterization or potentially faulty operating statuses.
Turquoise	🟩	Messages (**"M"**) normal operating statuses, e.g. "User lock is open".
Gray	⬜	Alarms or warnings that are temporary, have not been acknowledged, but are no longer present.

LED status: blinking / continuously illuminated   Warning and alarm messages are displayed by a yellow (warning) and a red (alarm) LED on the front side of the device. The blinking LED indicates an active message. If a continuous light is present, the warning (alarm) is no longer present, but the message has not been deleted yet. **If multiple messages are pending simultaneously, the blinking status has priority.**

Relay closes   The warning relay and/or alarm relay closes in parallel.

If single-value and double-value messages are differentiated between; a single-value message appears and then is pending permanently, the two-value message is always present, but with interruptions. There is only one status for single-value messages: "Message is active"; the active status for these messages remains in effect until acknowledgment. The warning or alarm relay is energized if a (or multiple) message(s) occurs (occur) and reset if no messages are present. The relays remain active for single-value messages until acknowledgment.

All messages that have not been acknowledged are shown in the display. With "Delete", the no longer pending alarms and warnings and all other messages are deleted from this display. With "Delete", the relevant LEDs are also deactivated, if no alarm or warning is pending. However, the deleted messages are stored in the log book (archive group 21). If no events are pending, the following text appears: "*no errors*".

The "Message" tab is displayed in the color of the message having the highest value if you are in other menus / screens.

Warning and alarm messages can be acknowledged in the Miscellaneous menu, Error display sub-menu with the button under the error list.

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2.7.7   Highest load display

The highest load displays and archives have a dedicated approval and are described in a separate manual.

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2.8   Time system

General displays and parameters and all displays and parameters that are required for receiving the time signal are located in the menus **IB Time, date** and **IC External time signal**. The time system consists of a battery-buffered, quartz-controlled real-time clock module (RTC). This provides the basic time for the ERZ2000-DI.

2.8.1   IB Time, date

The settings for the time and date specifications are made in the wizard and are described there.

2.8.2   IC External time signal

The settings for the time synchronization are made in the wizard and are described there.

2.8.3   IF TCP/IP network

IF TCP/IP network

Access	Line	Designation	Value	Unit	Variable
B	1	own IP-Addr.Eth1	10.20.13.73		my_ipE1
I	12	MAC-address Eth1	00-05-51-05-1A-FC		macAddrE1
B	13	Netmask Eth1	255.255.255.0		netmaskE1
B	14	Gateway Eth1	10.20.13.1		gatewayE1
B	15	DNS Eth1	172.17.248.98		namesrvE1
B	16	DHCP Eth1	Yes		dhcpE1
B	17	MTU Eth1	1500		mtuE1
B	21	own IP-Addr-Eth2	160.221.45.110		my_ipE2
S	32	MAC-address Eth2	00-00-00-00-00-00		macAddrE2
B	33	Netmask Eth2	255.255.0.0		netmaskE2
B	34	Gateway Eth2	192.168.20.254		gatewayE2
B	35	DNS Eth2	194.25.0.70		namesrvE2
B	36	DHCP Eth2	No		dhcpE2
B	37	MTU Eth2	1500		mtuE2
D	41	Port HTTP	80		httpdport
E *	42	remote control	Yes		vncd
E *	43	port remote control	4831		vncdport

Enter   Cancel   Load defaults   Refresh

Figure 62: Menu: IF TCP/IP network

Usually the basic settings in the **IF TCP/IP Network** menu work, but it is still possible that the ERZ2000-DI cannot be reached via TCP/IP. A message appears that DHCP (communication protocol; enables the assignment of the network configuration to the client / ERZ2000-DI via server) has been changed at runtime (not at startup) and that no DHCP server is available. In this case, the settings should be checked and adjusted if necessary.

If "yes" is activated in coordinate **IF16 DHCP Eth1**, the network configuration is assigned automatically; if "no" is activated, this has to be done manually, which should be tried if the ERZ2000-DI cannot be reached via TCP/IP.

For example, the IP4 address for the ERZ2000-DI must be entered manually in coordinate **IF01 own IP-Addr. Eth1** for network 1, e.g. "10.20.13.73". Under this address (or the automatically assigned address), the ERZ2000-DI operates as an

HTTP server and can be activated with a standard browser (Internet Explorer, Firefox) (see also *chapter 2.1.3 Remote control / parameterization*). In **IF32 MAC-address Eth2**, the MAC address Ethernet 2 can be entered by a super user.

Coordinate **IF15 DNS Eth1** (DNS = Domain Name Service) contains the IP address of the service for the name resolution. The setting is connected to the time service via network function.

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The analog assignments for the Ethernet interface 2 are made with coordinates **IF21, IF33, IF34, IF35 and IF36**.

The value of coordinate **IA41 Port HTTP** is typically Port 80. It cannot be changed.

3 Electrical connections

3.1.1 Equipment variants

The assignment of the connection terminals of the ERZ2000-DI is essentially specified by the compact configuration. However, there are reserves, because a different definition of the terminal assignment is necessary depending on additionally installed extension modules. The positions of the extension cards and assignments for the plug strips are specified in the additional data sheet for the device. The unoccupied slots can be optionally equipped with the following extension cards:

1. Ex isolation card for volume (measurement and comparison), Vo, p and T with 4-20mA or HART

2. HART card for 3 transmitters

The modules that are used are recognized automatically by the ERZ2000-DI. The menu **LB Module assembly** shows the modules recognized by the system and inserted. Therefore, the menu is provided as information for automatic recognition or troubleshooting. This information is important for the assembly of device combinations in the factory or for equipping modules at a later time. *Figure 63: Menu LB Module assembly* shows the equipment for the ERZ2000-DI that is in use. (This includes a COM 6 / COM 7 card for additional interfaces and a Hard card for digital communication with pressure and temperature sensors.)

LB Module assembly

Access	Line	Designation	Value	Unit	Variable
S	1	Mod. 1A should be	COM6+7-card		m1ASoll
I	2	Mod. 1A assembly	Passive		m1ASteck
I	3	Mod. 1A Id	0		m1AKenn
I	4	Mod. 1A version	0.00		m1AVer
S	11	Mod. 1B should be	Unknown		m1BSoll
I	12	Mod. 1B assembly	Unknown		m1BSteck
I	13	Mod. 1B Id	0		m1BKenn
I	14	Mod. 1B version	0.00		m1BVer
S	21	Mod. 2A should be	Unknown		m2ASoll
I	22	Mod. 2A assembly	Unknown		m2ASteck
I	23	Mod. 2A Id	0		m2AKenn
I	24	Mod. 2A version	0.00		m2AVer
S	31	Mod. 2B should be	Unknown		m2BSoll
I	32	Mod. 2B assembly	Unknown		m2BSteck
I	33	Mod. 2B Id	0		m2BKenn
I	34	Mod. 2B version	0.00		m2BVer
S	41	Mod. 3A should be	Exi-card		m3ASoll
I	42	Mod. 3A assembly	Active		m3ASteck
I	43	Mod. 3A Id	300		m3AKenn
I	44	Mod. 3A version	1.10		m3AVer
I	49	Namur status M3A	0004	hex	namst1
S	51	Mod. 3B should be	Unknown		m3BSoll
I	52	Mod. 3B assembly	Unknown		m3BSteck
I	53	Mod. 3B Id	0		m3BKenn
I	54	Mod. 3B version	0.00		m3BVer
I	59	Namur-status M3B	0000	hex	namst2

Refresh

Figure 63: Menu LB Module assembly

Device rear wall

Since the ERZ2000-DI has a universal configuration, there are more connection terminals that required by the typical device (e.g. a status flow computer). There is a standard assignment of terminals that always use the first pins in consideration of numbering. Additional pins are reserves and/or can be assigned by means of software. Therefore, it is also possible to connect the pressure transducer to one of the free reserve inputs and select it by means of software.
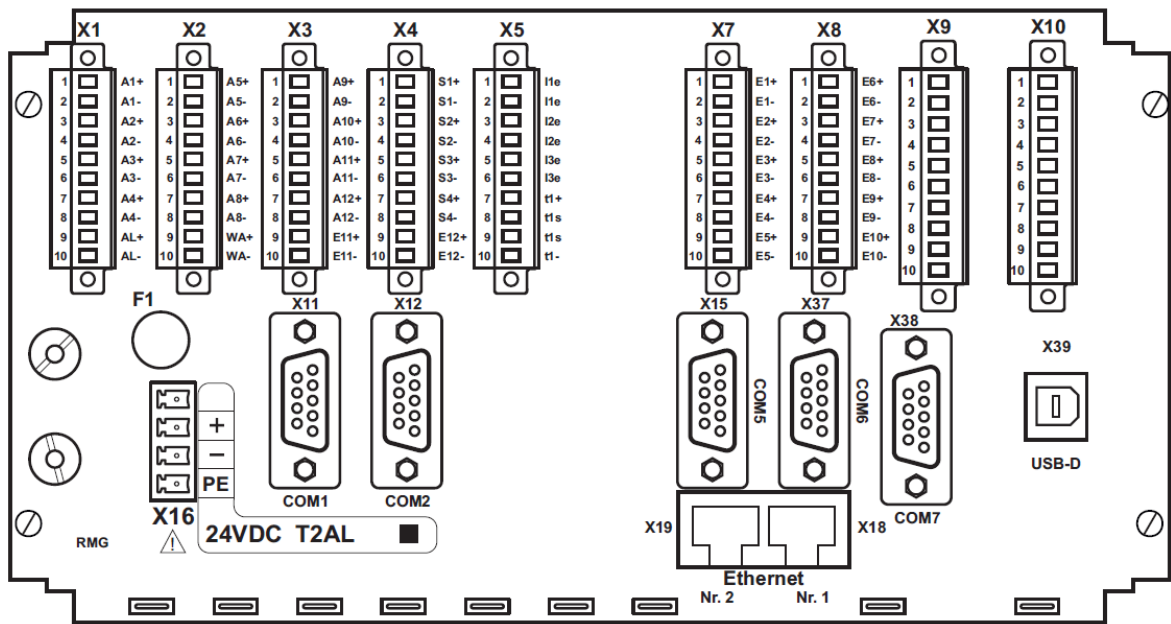
Figure 64: Rear wall of the ERZ2000-DI

3.1.2   Terminal assignment

Connection of supply voltage:
Figure 64: Rear wall of the ERZ2000-DI (bottom left)

X 16	24 V DC −10% / +15%	Fuse F1 = 2 A	1.0 A Typical power con- sumption (depending on equip- ment)	24 W Max. output

ERZ2000-DI without external Ex- separator stage Ex1-NAMUR-2 / V1 or V2

X 1   Terminal   1   Transistor output 1 +
Terminal   2   Transistor output 1 -
Terminal   3   Transistor output 2 +
Terminal   4   Transistor output 2 -
Terminal   5   Transistor output 3 +
Terminal   6   Transistor output 3 -
Terminal   7   Transistor output 4 +
Terminal   8   Transistor output 4 -
Terminal   9   Alarm contact + semiconductor rel. poled, NC
Terminal 10 Alarm contact – semiconductor rel. poled, NC

X 2   Terminal   1   Transistor output 5 +
Terminal   2   Transistor output 5 -
Terminal   3   Transistor output 6 +
Terminal   4   Transistor output 6 -
Terminal   5   Transistor output 7 +
Terminal   6   Transistor output 7 -
Terminal   7   Frequency output + (higher prio) or transistor output 8 +
Terminal   8   Frequency output - (higher prio) or transistor output 8 -
Terminal   9   Transistor output Warning message +
Terminal 10 Transistor output Warning message -

X 3   Terminal   1   Pulse output 1 + Dispatcher or meter pulse
Terminal   2   Pulse output 1 - Dispatcher or meter pulse
Terminal   3   Pulse output 2 +   Dispatcher or meter pulse
Terminal   4   Pulse output 2 - Dispatcher or meter pulse
Terminal   5   Pulse output 3 +   Dispatcher or meter pulse
Terminal   6   Pulse output 3 - Dispatcher or meter pulse
Terminal   7   Pulse output 4 +   Dispatcher or meter pulse
Terminal   8   Pulse output 4 -   Dispatcher or meter pulse
Terminal   9   **Reserve** 2nd input for Vo with external separator stage +
Terminal 10 **Reserve** 2nd input for Vo with external separator stage -

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X 4   Terminal | 1 | Current output 1 +
Terminal | 2 | Current output 1 -
Terminal | 3 | Current output 2 +
Terminal | 4 | Current output 2 -
Terminal | 5 | Current output 3 +
Terminal | 6 | Current output 3 -
Terminal | 7 | Current output 4 +
Terminal | 8 | Current output 4 -
Terminal | 9 | Input for Vo with external separator stage +
Terminal | 10 | Input for Vo with external separator stage -

X 5   Terminal | 1 | Current input 1 active or passive
Terminal | 2 | Current input 1, active or passive
Terminal | 3 | Current input 2, active or passive
Terminal | 4 | Current input 2, active or passive
Terminal | 5 | Current input 3, active or passive
Terminal | 6 | Current input 3, active or passive
Terminal | 7 | PT 100 # 1 supply ++ standard connection
Terminal | 8 | PT 100 # 1 sense   + standard connection
Terminal | 9 | PT 100 # 1 sense   - standard connection
Terminal | 10 | PT 100 # 1 supply - - standard connection

X 7   Terminal | 1 | Signal input 1 + , assignment takes place with software
Terminal | 2 | Signal input 1 - , assignment takes place with software
Terminal | 3 | Signal input 2 + , assignment takes place with software
Terminal | 4 | Signal input 2 - , assignment takes place with software
Terminal | 5 | Signal input 3 + , assignment takes place with software
Terminal | 6 | Signal input 3 - , assignment takes place with software
Terminal | 7 | Signal input 4 + , assignment takes place with software
Terminal | 8 | Signal input 4 - , assignment takes place with software
Terminal | 9 | Signal input 5 + , assignment takes place with software
Terminal | 10 | Signal input 5 - , assignment takes place with software

X 8   Terminal | 1 | Signal input 6 + , assignment takes place with software
Terminal | 2 | Signal input 6 -   assignment takes place with software
Terminal | 3 | Signal input. 7 + reserve for 2nd vol. input measuring channel
Terminal | 4 | Signal input 7 -   reserve for 2nd vol. input measuring channel
Terminal | 5 | Signal input 8 + reserve for 2nd vol. input comparison channel
Terminal | 6 | Signal input 8 -   reserve for 2nd vol. input comparison channel
Terminal | 7 | Volume input   measuring channel (HFX) + (external isolation)
Terminal | 8 | Volume input   measuring channel (HFX) - (external isolation)
Terminal | 9 | Volume input   comparison channel (HFY) + (ext. isolation)
Terminal | 10 | Volume input   comparison channel (HFY) - (ext. isolation)

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ERZ2004/2104-DI; X 9 and X 10 are optionally assigned

X 9 Terminal | 1 | Ex-option enco + (Vo)
Terminal | 2 | Ex-option enco - (Vo)
Terminal | 3 | Ex-option Vm measuring channel (HFX) +
Terminal | 4 | Ex-option Vm measuring channel (HFX) -
Terminal | 5 | Ex-option Vm comparison channel (HFY) +
Terminal | 6 | Ex-option Vm comparison channel (HFX) -
Terminal | 7 | Ex-option pressure measurement - transmitter (opt. HART)
Terminal | 8 | Ex-option pressure measurement + transmitter (opt. HART)
Terminal | 9 | Ex-option temp. - transmitter (opt. HART) for PT 100 s. X 10
Terminal | 10 | Ex-option temp. + transmitter (opt. HART) for PT 100 s. X 10

X 10 Terminal | 1 | reserve / free
Terminal | 2 | reserve / free
Terminal | 3 | reserve / free
Terminal | 4 | reserve / free
Terminal | 5 | reserve / free
Terminal | 6 | reserve / free
Terminal | 7 | Ex-option PT 100 supply ++
Terminal | 8 | Ex-option PT 100 sense +
Terminal | 9 | Ex-option PT 100 sense -
Terminal | 10 | Ex-option PT 100 supply - -

Note

With use of the internal Ex isolation stage:

A mixture of inputs is possible with respect to Ex protection, which means an individual signal can also be used with an external isolation stage or with a <u>pressure-proof encapsulated</u> ignition protection type, in combination with <u>Ex intrinsically safe</u> protection type.

Example:
The volume inputs for measuring and comparison channels and the original ENCO meter are operated on **X 9** via the internal Ex card, the pressure transducer is operated as a 4-20 mA transmitter and the temperature probe is operated as PT 100 4-wire connection with pressure-proof encapsulation ignition pressure type and connected to **X 5**.

Other possible mixtures are feasible.

The number of connection possibilities increases if the optional Ex input card is used. This input card enables galvanic isolation of MSR signals, such as 20 mA

current loops or the adjustment and/or standardization of signals. Intrinsically safe field devices can be operated within explosion-prone areas with the isolation.

For further information, refer to *appendix E) Optional Ex input card*.

3.1.3   Data interfaces

The **digital data interfaces** are also provided on the basic assembly. These interfaces can be used as:

- Service interface
- Modbus for external data transmission
- Ethernet TCP/IP network connections
- Connection for an external modem (DSfG-B)
- Serial data interfaces

Interface characteristics

			Recommendation / possible use
X 11	COM 1	Interface	Modbus RTU / ASCII
X 12	COM 2	Interface	
X 15	COM 5	Interface	External modem, PTB time call-up
X 37	COM 6	Interface	Modbus master for reading the gas composition and volume (F-instance)
X 38	COM 7	Interface	
X 18	Ethernet 1	Network connection	Multi-session capability: Modbus IP, http Single-Session (selectable interface): Remote operation, DSfG-B-IP, SNTP, TIME
X 19	Ethernet 2	Network connection	

3.1.4 Pin assignment and usage recommendation of the interfaces

COM 1: Pin assignment

Pin	Mode: RS 232	Mode: RS 422	Mode: RS 485
1	+U (+5V DC)	+U (+5V DC)	+U (+5V DC)
2	RxD	TxD-A	
3	TxD		R/TA A Data
4		RxD-A	
5	GND	GND	SGND Signal Ground
6		TxD-B	
7			
8		RxD-B	R/TN B Data
9			

Use

Switchable from **RS 232** to **RS 422** or **RS 485**, can be optionally assigned with **different protocols**, **MODBUS protocol** and **IGM** (for ultrasonic meters) available. Optionally, **MODBUS ASCII / RTU** can be offered as **Modbus standard** driver for RS 232 or RS 485 interfaces.

The operating mode for the COM 1 interface is adjusted in the wizard in the menu **IG Serial interfaces** with the coordinate **IG03 COM 1 operating mode**.

COM 2: Pin assignment

Pin	Mode RS 232
1	
2	RxD
3	TxD
4	
5	GND
6	
7	
8	
9	

The operating mode for the COM 2 interface is adjusted in the wizard.

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COM 5 (modem): Pin assignment

Pin	Mode: RS 232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Use

RS 232 with handshake plus DCD (data carrier detect) plus RI (ring indicator). Usable for MODEM (DFÜ).
With connection of a modem, the COM 5 operating mode "Modem" must be selected in the wizard.

3.1.5   External modem connection

The COM 5 interface is used for connection.

Example for a setting

The following setup must be made in the menu **GD DSFG instance remote data transmission**:

GD13 Modem init. string   ate0s0=1
GD14 Dial prefix   atx3dt

RMG

Figure 65: DSfG setting

Meaning:

at   Prefix of a command line

e0   Echo function deactivated

s0=1 Set register 0 to 1, which means the number of alert characters after which the modem answers and establishes the connection, should be 1.

x3   Response setting:
      Hayes Smartmode 300 compatible answers / blind dialing (extension)
      plus all CONNECT answers
      plus recognition of busy symbols

dt   sound selection process (dp = pulse selection process)

Depending on the modem, there may be other commands, which are covered in the manufacturer's manual.

Additional settings in the menu **IG Serial interfaces**:

IG Serial interfaces

Access	Line	Designation	Value	Unit	Variable
B	1	Baud rate COM1	38400		baudC0
B	2	B/P/S COM1	8N1		bpsC0
B	3	COM1 operating mode	OFF		modeC0
B	4	Modbusaddr. COM1	1		mbAdrC0
B	11	Baud rate COM2	115200		baudC1
B	12	B/P/S COM2	7E1		bpsC1
B	13	COM2 operating mode	Test		modeC1
B	14	Modbusaddr. COM2	2		mbAdrC1
B	21	Baud rate Vo	2400		baudVO
B	22	B/P/S Vo	7E1		bpsVO
B	23	Vo operating mode	Vo		modeVO
B	31	Baud rate COM5	38400		baudC5
B	32	B/P/S COM5	8N1		bpsC5
B	33	COM5 operating mode	Modem		modeC5
B	41	Baud rate COM6	38400		baudC6
B	42	B/P/S COM6	8N1		bpsC6
B	43	COM6 operating mode	Univ.Modbus.Master		modeC6
B	51	Baud rate COM7	38400		baudC7
B	52	B/P/S COM7	8N1		bpsC7
B	53	COM7 operating mode	Univ.Modbus.Master		modeC7
B	60	Register offset	0		regOffs

Enter   Cancel   Load defaults   Refresh

Figure 66: Menu: IG Serial interfaces

The parameters for operation of the serial interfaces (also DSfG-B and Modbus) are adjusted in this menu **IG Serial interfaces**.

The coordinate **IG23** is an internal interface that can be used for the original Vo totalizer of an encoder (ENCO).

The register offset for the Modbus register is adjusted in **IG60**. The Modbus address for COM 1 can be entered with **IG04** (**IG14** for COM 2).

With **IG33**, COM 5 can be configured for modem connection for "Modem" or "Dedicated line" (with external modem), e.g. DFÜ for DSfG-B.

3.1.6   Connections

3.1.6.1   Input characteristics

2-channel HF volume flow input with pulse metering and frequency measurement

The appropriate frequency input must be selected in this menu; Inputs 5, 6, 7 and 8 offer higher resolution.

Channel 1: Volume measuring channel HF input

Measuring range	0.10 Hz to 6.0 kHz
Accuracy	0.01 Hz
U hys	1.0 V
U trg	3.0 V
Overvoltage protection	6.8 V with external module
	18.0 V with internal module (galvanically isolated)

Channel 2: Volume comparison channel HF input
Same data as for Channel 1

2-channel LF volume flow input with pulse metering and frequency measurement

Channel 1: Volume measuring channel LF input

Measuring range	0.00 Hz to 6.0 kHz
Accuracy	0.01 Hz
U hys	1.0 V
U trg	3.0 V
Overvoltage protection	6.8 V with external module
	18.0 V with internal module (galvanically isolated)

Channel 2: Volume comparison channel LF input
Same data as for Channel 1

Volume input for digitally operating Vo totalizer

Data transmission between the gas volume meter and flow computer take place unidirectionally and reactionless via a shielded, twisted pair of wires from the meter to the flow computer. The electrical characteristic data conforms to DIN 19234 (NAMUR).

Up to 5 analogue inputs, including a pressure measurement input for analog signals and for HARD protocol

Current measurement

Range	0/4 to 25 mA
Resolution	20 bit
U max	2.5 V
Ri	250 Ω
Tk	< 15 ppm
Measuring time	50 ms
Overvoltage protection	6.8 V

Calibration of current inputs takes place at the factory, but correction can take place with the adjustment of the input variables pressure, temperature, etc.

HART protocol connection SMART transmitter (optional)

	Two-wire system
Communication	Simultaneously analog and digital
Protocol	HART master
Inputs	3 (optionally 6)
With EX isolation card (optional)	+ 2 inputs
Distribution of inputs	1 x pressure (reserved) 1 x temperature (reserved) Remainder -> Free availability

Up to 2 resistor inputs, a temperature measuring input for resistance measurement

Resistance measurement

Type	PT 100 four-wire
Range	-20°C to +60°C
Resolution	0.01°C
Accuracy	0.05°C
Measuring time	50 ms

8 signal inputs for H/L gas switching, travel direction reversal and external freeze

Digital status inputs
All inputs are galvanically isolated from the computer, but not from each other. The following can be used as signal transmitters: contact, open collector / drain, active push / pull

-U max	5 V
-I max	13 mA
f max	10 Hz
Overvoltage protection	6.8 V

3.1.6.2   Output characteristics
Current outputs

Quantity	4
Range	0-20 mA or 4-20 mA
Resolution	12 bit
Ohmic resistance	700 Ω
Overvoltage protection	from 33 V, galvanically isolated

Signal outputs

Quantity	8
U max	24 V DC
P max	150 mW
Ic max	100 mA
U_{CE}sat	1.2V or Ron = 50 Ohm
F max	400 Hz
Overvoltage protection	33 V, galvanically isolated

Pulse outputs

Quantity	4
tmin off	16 ms
tmax off	230 ms
tmin on	16 ms
tmax on	230 ms
Ic	100 mA
U_{CE}sat	1.2V
F max	400 Hz
Overvoltage protection	33 V, galvanically isolated

Alarm and warning status outputs

U max	24 V DC
I max	100 mA
P max	100 mW
R_{DS}on	<= 50 Ohm
Photomos relay	
Ic	100 mA
Ron	50 Ohm
Overvoltage protection	33 V, galvanically isolated

3.1.7   Assignment of "physical values"

The assignment of inputs and outputs to "physical values" takes place in the wizard.

3.1.8 Software and hardware identification

IE Identification of software

Access	Line	Designation	Value	Unit	Variable
A *	1	Vers.offic.kernel	1.1		versionEK
A *	2	Checks.offic.kernel	176E	hex	chksEK
A *	3	Time offic.kernel	24-11-2017 09:48:10		lchgEK
D	4	Version application	1.1.0a		versionAP
D	5	Checks. application	E313	hex	chksAP
D	6	Time stamp appl.	24-11-2017 09:48:10		lchgAP
J	7	Version FC BIOS	2.008		versionFCB
J	8	Checks. FC BIOS	5AB5	hex	chksFCB
J	9	Time stamp FC BIOS	21-10-2014 15:03:38		lchgFCB
E *	10	Activation key	348669738		schluessel
D	16	SVN revisions	734_186_270		svnRevisions
J	18	FC-BIOS bootloader	1.05		versionBTL
J	19	kernel	PicoMOD6 V1.11		versWinKern
J	20	kernel Built	Jun 18 2012		dateWinKern
J	21	kernel CRC	81455247	hex	chksWinKern
E *	22	approval kernel	81455247	hex	inputWinKern
J	23	kernel bootloader	1.10		versWinBL
J	24	version FPGA	3.000		versionFPGA
J	25	date FPGA	21-10-14		lchgFPGA
J	26	checksum FPGA	6FC2	hex	chksFPGA

| Enter | Cancel | Load defaults | Refresh |

Figure 67: Menu IE Software identification

There is an additional microcontroller on the base circuit board for control of the FPGA and basic measuring functions whose program is monitored with a check number.

Note

This check number is a component of the custody transfer approval.

The check number must be entered in coordinate **IE10 Activation key**. The Activation key can be found in the approval documents under "Identification".

The kernel has a **Target check**, which can also be found in the approval documentation and must be entered. This appropriate actual check number is calculated by the ERZ2000-DI with the WinCE operating system and displayed in **IE 21**. These check numbers are compared with each other continuously. If there is a deviation, the ERZ2000-DI issues an alarm with the message "*A57-7 WinCE kernel CRC false*".

LD Identification of hardware

Access	Line	Designation	Value	Unit	Variable
S	2	Year of construct.	2013		baujahr
S	3	Factory number	12345678901234567890		fabrikNr
S	4	Hardware ID	10		rfnummer
S	5	Comment	keine		bemerk
D	14	OBIS Id.	7061 1301 2345 6789		obisId

Refresh

Figure 68: Menu LD Identification of hardware

Manufacturer-independent identification numbers for measuring devices (Object Identification System) are provided in coordinate **LD14 OBIS-ID**. The OBIS-ID consists of 4 groups of 4 numbers each. The groups are separated by a blank space for easier legibility.

SHHH BBFF FFFF FFFF

S:	Column (7 = gas)
HHH:	Manufacturer (061 = RMG)
BB:	Year of manufacture (2-digit, e.g. 13=2013)
FF FFFF FFFF:	Serial number (10-digit, only numbers)

The OBIS-ID cannot be edited directly and is generated automatically from the existing coordinates **LD02 Year of construct.** and **LD03 Factory number**. Since the serial number in the ERZ2000-DI is a 20-character-long text field that is already used, there is generally a combination of numbers and letters in the field. The number may also be structured, e.g. "RMG-123/456/789". The software ignores all non-numerical characters when generating the number and the numbers are left in order. If the remainder number has less than 10 digits, leading zeros are shown. If the number has more than 10 digits, the highest order are truncated.

4 Transmitters

Various transmitters with various connections and communications can be connected to the ERZ2000-DI and bus connections. This normally takes place via the wizard and supports pre-settings that often only have to be acknowledged.

4.1 Flow meters

Basically, the ERZ2000-DI can work with all flow measuring devices that are used in the flow measurement of gas.

4.1.1 Turbine wheel gas meters

The operating method of turbine wheel gas meters is based on the measurement of gas speed with a turbine wheel. In the process, the speed of the turbine (approximately) within the measuring range (Q_{min} - Q_{max}) is proportional to the mean gas speed and thus the flow rate. The number of rotations, therefore, is a measurement for the gas volume flowing through.

Figure 69: RMG turbine wheel gas meter TERZ94
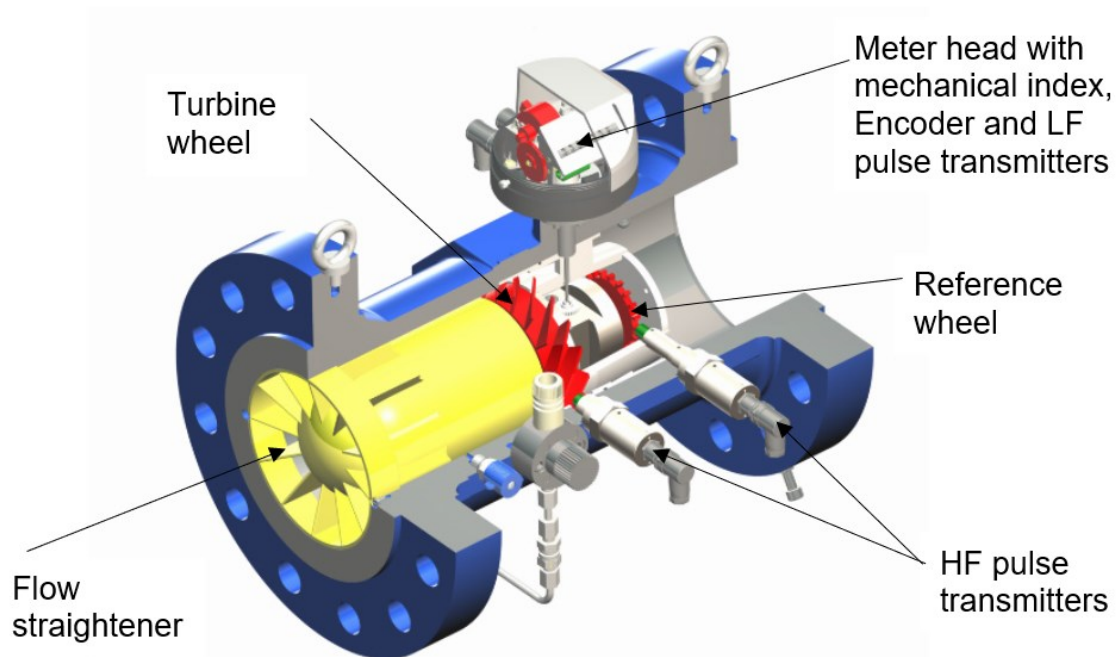
Figure 70: RMG turbine gas wheel meter sectional drawing

The rotational movement of the turbine wheel is transferred after reduction to the meter head in which the frequency is normally scanned redundantly with two sensors and transmitted as a LF signal. The meter can be optionally equipped with an encoder that can also transmit flow information.

In principle, the further processing of low-frequency pulses independently of the measuring principle, can also be handled in a comparable manner by rotary piston gas meters, vortex meters or other flow measuring devices with a frequency output.

4.1.2　Ultrasonic gas meters

Ultrasonic gas meters use the physical principle for volume flow detection that an ultrasonic pulse in the flow direction (with the flow) spreads faster than the opposite. With run-time measurement of ultrasonic pulses between appropriately arranged ultrasonic transducers, a flow speed and thus the flow rate can be determined. To achieve greater accuracy, multiple ultrasonic transducer pairs are normally used over multiple measuring paths. *Figure 71: RMG ultrasonic gas meter USM-GT400* shows an ultrasonic gas meter from RMG and *Figure 72: Measuring path arrangement USM-GT400* shows the basic arrangement of ultrasonic transducers with the measuring path.

Figure 71: RMG ultrasonic gas meter USM-GT400
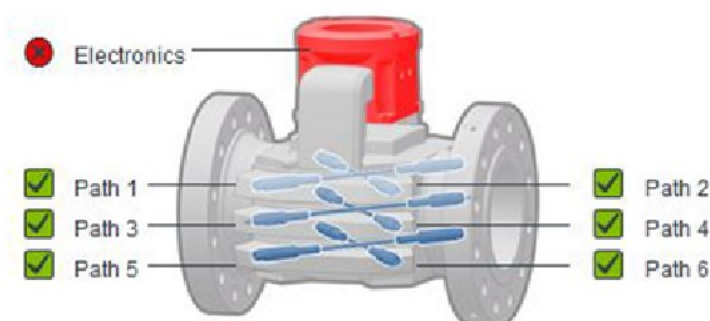
Figure 72: Measuring path arrangement USM-GT400

5 Special coordinates

Interim results of the highest load determination are shown in the hourly and daily amount menus. In case of faults, they behave as defined by the approval authorities. For a user who intends to base billing on these figures, the values cannot be used in case of a malfunction or are at least misleading.

Additional menus shown here include Documentation, Parameterization, Parameter aids, and Miscellaneous.

5.1.1 KI Hourly quantities

KI Hourly quantities

Access	Line	Designation	Value	Unit	Variable
D	2	Last hour Vm	0	m3	IzStd_vu
A *	3	Last hour Vb	0	*100 m3	IzStd_vn
A *	4	Last hour E	0	MWh	IzStd_e
D	6	Last hour Vc	0	m3	IzStd_vk
D	12	Last hour Vm frac.	.000000	m3	IrStd_vu
A *	13	Last hour Vb frac.	.000000	*100 m3	IrStd_vn
A *	14	Last hour E frac.	.000000	MWh	IrStd_e
D	16	Last hour Vc frac.	.000000	m3	IrStd_vk
D	22	Hour Vm	0	m3	czStd_vu
A *	23	Hour Vb	0	*100 m3	czStd_vn
A *	24	Hour E	0	MWh	czStd_e
D	26	Hour Vc	0	m3	czStd_vk
D	32	Hour Vm fraction	.000000	m3	crStd_vu
A *	33	Hour Vb fraction	.000000	*100 m3	crStd_vn
A *	34	Hour E fraction	.000000	MWh	crStd_e
D	36	Hour Vc fraction	.000000	m3	crStd_vk

Refresh

Figure 73: Menu KI Hourly amounts

Menus **KI Hourly quantities** and **KJ Daily quantities** are purely visualization menus. The amounts of the last hour KI02...KI16 are represented in the **Documentation / Documentation / Modbus Register 1400...1428**.

1400	4	unsigned integer 32-bit	R	KI	2	Hourly quantities	Last hour Vm	222 m3
1402	4	unsigned integer 32-bit	R	KI	3	Hourly quantities	Last hour Vb	2864 m3
1404	4	unsigned integer 32-bit	R	KI	4	Hourly quantities	Last hour E	34 MWh
1408	4	unsigned integer 32-bit	R	KI	6	Hourly quantities	Last hour Vc	222 m3
1420	4	float IEEE 754	R	KI	12	Hourly quantities	Last hour Vm frac.	.345000 m3
1422	4	float IEEE 754	R	KI	13	Hourly quantities	Last hour Vb frac.	.842821 m3
1424	4	float IEEE 754	R	KI	14	Hourly quantities	Last hour E frac.	.378114 MWh
1428	4	float IEEE 754	R	KI	16	Hourly quantities	Last hour Vc frac.	.345000 m3

Figure 74: Modbus register for hourly amounts

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5.2   Documentation

The documentation comprises 4 sub-chapters. Additional explanatory information is also provided here along with additional documents that can be opened by double-clicking on the <u>underlined</u> links.

5.2.1   Check numbers

Check numbers

	Version number	Check number	Date	Activation key
Flow computer BIOS	2.008	5AB5	21-10-2014 15:03:38	
Official kernel	1.1	D102	28-09-2018 12:02:07	
Application	1.1.0c	6D8F	11-10-2018 14:56:50	1500682782
WinCE kernel	PicoMOD6 V1.11		Jun 18 2012	81455247

Figure 75: Documentation / Check numbers

The check numbers shown here are used by the calibration authority for identification purposes.

5.2.2   Matrix

	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	
1		o_b01	o_y01	o_m01	o_z01	o_f01	o_s01	o_e01	gerTyps				1
2		o_b02	o_y02	o_m02	o_z02	o_f02	o_s02	o_e02	ekTyps				2
3		o_b03	o_y03	o_m03	o_z03	o_f03	o_s03	o_e03	apTyps				3
4		o_b04	o_y04	o_m04	o_z04	o_f04	o_s04	o_e04	fcbTyps				4
5			o_y05	o_m05	o_z05	o_f05	o_s05	o_e05	kernelTyps				5
6			o_y06	o_m06	o_z06	o_f06	o_s06	o_e06	inleTyps				6
7			o_y07	o_m07	o_z07	o_f07	o_s07	o_e07	refTyps				7
8			o_y08	o_m08	o_z08	o_f08	o_s08	o_e08	zwkTyps				8
9			o_y09	o_m09	o_z09	o_f09	o_s09	o_e09	applTyps				9
10			o_y10	o_m10	o_z10	o_f10		o_e10	zmTyps				10
11			o_y11	o_m11	o_z11	o_f11		o_e11	kvTyps				11
12			o_y12	o_m12	o_z12	o_f12		o_e12	voTyps				12
13			o_y13	o_m13	o_z13	o_f13		o_e13					13
14			o_y14	o_m14	o_z14	o_f14		o_e14					14
15			o_y15	o_m15	o_z15	o_f15		o_e15					15
16			o_y16	o_m16	o_z16	o_f16		o_e16	drkaTyps				16
17			o_y17	o_m17	o_z17			o_e17	tempTyps				17
18			o_y18	o_m18	o_z18			o_e18					18
19			o_y19	o_m19	o_z19			o_e19					19
20			o_y20	o_m20	o_z20			o_e20	kmpTyps				20
21			o_y21	o_m21	o_z21			o_e21					21
22			o_y22	o_m22	o_z22			o_e22					22
23			o_y23	o_m23	o_z23			o_e23					23
24			o_y24	o_m24	o_z24			o_e24					24
25			o_y25	o_m25	o_z25			o_e25					25
26			o_y26	o_m26	o_z26			o_e26					26
27			o_y27	o_m27	o_z27			o_e27					27
28			o_y28	o_m28	o_z28			o_e28					28
29			o_y29	o_m29	o_z29			o_e29					29
30			o_y30	o_m30	o_z30			o_e30					30
31			o_y31	o_m31	o_z31			o_e31					31
32			o_y32	o_m32	o_z32			o_e32					32
33			o_y33	o_m33	o_z33			o_e33	tcpTypsEth1				33
34			o_y34	o_m34	o_z34			o_e34	tcpTypsEth2				34
35			o_y35	o_m35	o_z35			o_e35	dsfgTyps				35
36			o_y36		o_z36			o_e36	ortTyps				36
37			o_y37		o_z37			o_e37					37
38			o_y38		o_z38			o_e38					38
39			o_y39		o_z39			o_e39					39
40			o_y40		o_z40								40
41			o_y41		o_z41								41
42			o_y42		o_z42								42
43			o_y43		o_z43								43
44			o_y44		o_z44								44
45					o_z45								45
46					o_z46								46

… (up to 99)

Figure 77: Menu Documentation / Matrix

An assignment of variables to the menus and the corresponding lines of the coordinate system is shown in this matrix.

5.2.3   Document creation

GUI/Overview/Large

Access	Column	Line	Designation	Minimum	Maximum	Unit	Remark(s)
B	AB	1	Selection 1	Visible types		var.	
B	AB	2	Selection 2	Visible types		var.	
B	AB	3	Selection 3	Visible types		var.	
B	AB	4	Selection 4	Visible types		var.	

GUI/Overview/System

Access	Column	Line	Designation	Minimum	Maximum	Unit	Remark(s)
D	AG	1	Anchor 1	Visible types		var.	
D	AG	2	Anchor 2	Visible types		var.	
D	AG	3	Anchor 3	Visible types		var.	
D	AG	4	Anchor 4	Visible types		var.	
D	AG	5	Anchor 5	Visible types		var.	
D	AG	6	Anchor 6	Visible types		var.	
D	AG	7	Anchor 7	Visible types		var.	
D	AG	8	Anchor 8	Visible types		var.	
D	AG	9	Anchor 9	Visible types		var.	

ID display

Access	Column	Line	Designation	Minimum	Maximum	Unit	Remark(s)
A	AI	1	Device			none	
A	AI	2	Official kernel			none	
A	AI	3	Application			none	
A	AI	4	Flow computer BIOS			none	
A	AI	5	WinCE kernel			none	
A	AI	6	Points of time			none	
A	AI	7	Reference cond.			none	
A	AI	8	Meter			none	
A	AI	9	Application			none	
A	AI	10	Meter dimensions			none	
A	AI	11	Pulse factor			none	
A	AI	12	Encoder			none	
A	AI	16	Absolute pressure			none	
A	AI	17	Temperature			none	
A	AI	20	Sup.calor.value			none	
A	AI	33	TCP/IP Eth1			none	
A	AI	34	TCP/IP Eth2			none	
A	AI	35	DSfG			none	
A	AI	36	Location			none	

Units

Access	Column	Line	Designation	Minimum	Maximum	Unit	Remark(s)
E	BA	1	Absolute pressure	Menu		none	bar; kgf/cm2; psi; MPa; atm; kPa; torr; bara; Pa; hPa;
E	BA	2	Temperature	Menu		none	°C; °F; K; °Ra;
E	BA	3	Unit components	Menu		none	mole%;
E	BA	4	Sup.calorific.val.	Menu		none	kWh/m3; Mcal/m3; MJ/m3; Btu/ft3; kcal/m3;
E	BA	5	Standard density	Menu		none	kg/m3; lb/ft3;

…

Figure 78: Menu Documentation / Document creation

All menus (columns), including the content are listed again here. Automatic adoption of this data to the documentation took place earlier, wherein the user saved or printed and stapled the pages. Now the user can decide which parts are added to the documentation.

Normally, this data is used for internal purposes.

5.2.4   Documentation

Documentation

I. DSfG
  1. Data Elements
       a. Flow computer
       b. Registration
       c. Remote data transmission
       d. Flow meter
  2. Events
II. MODBUS
  1. Registers
  2. Coils
III. Error table

Please have patience with longer loading times.

Figure 79: Menu Documentation / Documentation

Documents that offer additional explanations for the specified points beyond the manual.

For instance, DSfG parameter lists and Modbus register lists required for the programming if these buses are used are provided here. Examples are provided in the wizard.

5.3   Parameterization

5.3.1   Parameterizing data

List of parameters

Identification

Vers.offic.kernel	1.1
Checks.offic.kernel	176E
Version application	1.1.0a
Checks. application	E313
Version FC BIOS	2.008
Checks. FC BIOS	5AB5
FC-BIOS bootloader	1.05
kernel	PicoMOD6 V1.11
kernel CRC	81455247
kernel bootloader	1.10
SVN revisions	734_186_270
checksum parameter	50790
Year of construct.	2013
Factory number	1234567890123456789
Hardware ID	10
MAC-address Eth1	00-05-51-05-1A-FC
MAC-address Eth2	00-00-00-00-00-00
Measuring site	Gas1 p5
Owner	Besitzer
Start-up	01-01-1970 01:00:00

AB GUI/Overview/Large

1	Selection 1	BC01 (drka)	MPa
2	Selection 2	BD01 (temp)	K
3	Selection 3	BG01 (Qk)	m3/h
4	Selection 4	BI01 (Qn)	m3/h

BA Units

1	Absolute pressure, selection of unit	MPa	*
2	Temperature, selection of unit	K	*
3	Components, selection of unit	mole%	*
4	Superior calorific value, selection of unit	kWh/m3	*
5	Standard density, selection of unit	kg/m3	*
7	Energy flow rate, selection of unit	kW	*
8	Volumetric flow rate at base conditions, selection of unit	m3/h	*

…

Figure 80: Menu Parameterization / Parameterizing data

A list of the relevant parameterizations is provided here.

5.3.2   Official parameters

BA Units

1	Absolute pressure, selection of unit	MPa	*
2	Temperature, selection of unit	K	*
3	Components, selection of unit	mole%	*
4	Superior calorific value, selection of unit	kWh/m3	*
5	Standard density, selection of unit	kg/m3	*
7	Energy flow rate, selection of unit	kW	*
8	Volumetric flow rate at base conditions, selection of unit	m3/h	*
9	Volumetric flow rate at measurement conditions, selection of unit	m3/h	*
10	kv factor, selection of unit	P/m3	*
11	Totalizer for volume at measurement conditions, selection of unit	m3	*
12	Totalizer for volume at base conditions, selection of unit	*100 m3	*
13	Quantity of energy, selection of unit	MWh	*
14	Original totalizer for volume at measurement conditions, selection of unit m3		*

BB Formats

1	Absolute pressure, selection of format	%.5f	*
2	Temperature, selection of format	%.2f	*
3	K coefficient, selection of format	%.5f	*
4	Conversion factor, selection of format	%.4f	*
5	Components, selection of format	%.4f	*
6	Superior calorific value, selection of format	%.3f	*
7	Standard density, selection of format	%.5f	*
8	Energy flow rate, selection of format	%.1f	*
9	Volumetric flow rate at base conditions, selection of format	%.2f	*
10	Volumetric flow rate at measurement conditions, selection of format %.3f		*
11	Decimal delimiter	Point	*
12	Custody transfer identification mark	Asterisk	*

BC Absolute pressure

8	Absolute pressure, lower alarm limit	0.10000	MPa	*
9	Absolute pressure, upper alarm limit	1.00000	MPa	*
19	Absolute pressure, selection of input value	OFF		*
21	Absolute pressure, correction value	0.00000	MPa	*
50	Manufacturer of absolute pressure transmitter	ROSEMOUNT		*
51	Device type, absolute pressure transmitter	3051S1CA2		*
52	Serial number of absolute pressure transmitter 0			*

BD Gas temperature

8	Temperature, lower alarm limit	253.15	K	*
9	Temperature, upper alarm limit	333.15	K	*

…

Figure 81: Menu Parameterization / Official parameters

The custody transfer parameters from all parameters are displayed here.

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5.3.3 Changes

```
Go to end

Changes

13.12.17 15:47:30

(Browser) B ID01 Spracheinstellung

Menu: deutsch -> englisch

14.12.17 12:49:57

(Browser) B ID01 Language setting

Menu: English -> German

14.12.17 12:51:08

(Browser) B ID01 Spracheinstellung

Menu: deutsch -> russisch

14.12.17 12:51:36

(������� ) B ID01 ��������� �����

Menu: ������� -> ��������

14.12.17 12:53:10

(Browser) B ID01 Spracheinstellung

Menu: deutsch -> englisch

Go to top
```
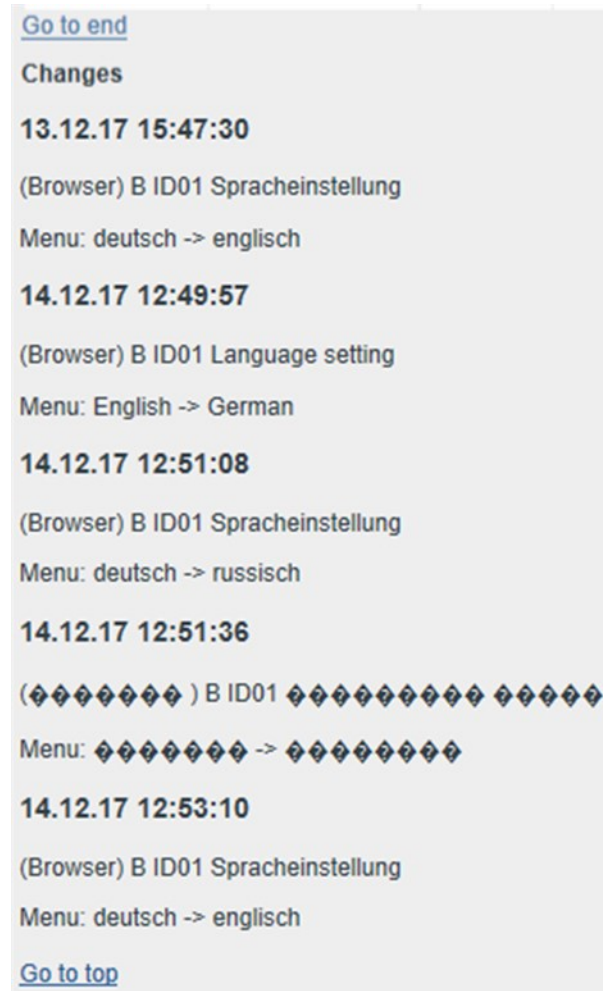
Figure 82: Menu Parameterization / Changes

This menu lists all parameter changes that have been made, sorted by time.

5.3.4 Save and load

Saving

The saving of all ERZ 2000 parameters on your PC can take place by reading back the [here] lodged file and save it under a significant name.

Loading

Downloading of all parameters from your PC into the ERZ2000 can take place by filling out the complete path of the saved file (ERZ2000 has to be in Superuser-Mode)

| | Durchsuchen... |

here and than send off

[hereby]

Uploading takes a few seconds (download-speed is faster). After uploading appears a table with all changed parameters. Please notice the marked lines and carry out the instructions.

Warning

Avoid to alter the saved file, changig data can cause damage of the system. If necessary use an editor with terminal-font and follow exactly the given syntax. Always use as an example an original saved file. Do not change the order of parameters. Do not change the notation of parameter names. Parameters in menus must have the exact value.

Do not send any files to engage ERZ2000 useless. The device will not accept these data. The device will not accept files with more than 50000 characters and will stop uploading immediately. In such a case the ERZ 2000 does not take any care of your browser or your PC.

Figure 83: Menu Parameterization / Save and load

This menu is provided for saving, reading and adjusting the settings of the ERZ2000-DI.

Note
In particular, backup copies of parameter settings of the ERZ2000-DI can and should be made with this menu, if the device is tested, updated or changed for other reasons.

5.4   Miscellaneous

5.4.1   Fault display

Active	Fault number	Short text	Long text
-	R40-7	Rebooted	Restart performed
+	M54-0	Calibr. lock	Calibration lock is open
-	M54-1	User lock	User lock is open
-	R56-7	Power OFF	Supply voltage failure

Acknowledge faults

Designation	Number	Contact	LED
Alarm	0	-	ON
Warning	0	-	OFF

Figure 84: Menu Miscellaneous / Fault display

Pending faults with fault numbers are listed in this menu. Acknowledgment corresponding to that of the touch screen is possible.

5.4.2   Freeze values

Frozen values

Date and time of last freeze : DD-MM-YYYY hh:mm:ss

BC Absolute pressure

61 Freeze measured value for absolute pressure 0.00000   MPa
62 Freeze input value for absolute pressure   0   MPa

BD Gas temperature

61 Freeze measured value for temperature   0.00   K
62 Freeze input value for temperature   0   K

BF Uncorrected volumetric flow rate at measurement conditions

61 Freeze volumetric flow rate at measurement conditions   0.000   m3/h
62 Freeze Qm base value   0.000   m3/h
63 Freeze volumetric flow rate at measurement conditions frequency main   0.0000   Hz
64 Freeze volumetric flow rate at measurement conditions frequency reference 0.0000   Hz

BG Corrected volumetric flow rate at measurement conditions

61 Freeze Qc   0.000   m3/h

BH Calculation of K coefficient

61 Freeze current conversion factor   0.0000
62 Freeze K coefficient   0.00000
63 Freeze compressibility factor at measurement conditions 0.000000
64 Freeze compressibility factor at base conditions   0.000000

BI Volumetric flow rate at base conditions

61 Freeze volumetric flow rate at base conditions 0.00   m3/h

BJ Energy flow rate

61 Freeze energy flow rate   0.0   kW

BL Totalizer, billing mode 1

61 Freeze totalizer for volume at base conditions BM1   0   *100 m3
62 Freeze fraction of volume at base conditions BM1   .000000   *100 m3
63 Freeze quantity of energy totalizer BM1   0   MWh
64 Freeze quantity of energy fraction BM1   .000000   MWh
65 Freeze totalizer for corrected volume at measurement conditions BM1 0   m3

Figure 85: Menu Miscellaneous / Freeze values

Values of the last freeze process are listed here.

5.4.3   Interface variables

interface variables from/to outside device

CH Modbus Slave

1	Superior calorific value Modbus Slave	11.250	kWh/m3
2	Standard density Modbus Slave	0.75651	kg/m3
3	Carbon dioxide Modbus Slave	0.9960	mole%
4	Hydrogen Modbus Slave	0.0000	mole%
5	Nitrogen Modbus Slave	0.2988	mole%
6	Methane Modbus Slave	96.1155	mole%
7	Ethane Modbus Slave	1.7928	mole%
8	Propane Modbus Slave	0.4482	mole%
9	N-butane Modbus Slave	0.0996	mole%
10	I-butane Modbus Slave	0.0996	mole%
11	N-pentane Modbus Slave	0.0299	mole%
12	I-pentane Modbus Slave	0.0498	mole%
13	Neo-pentane Modbus Slave	0.0000	mole%
14	Hexane Modbus Slave	0.0697	mole%
15	Heptan Modbus Slave	0.0000	mole%
16	Octane Modbus Slave	0.0000	mole%
17	Nonan Modbus Slave	0.0000	mole%
18	Decane Modbus Slave	0.0000	mole%
19	Hydrogen sulphide Modbus Slave	0.0000	mole%
20	Water Modbus Slave	0.0000	mole%
21	Helium Modbus Slave	0.0000	mole%
22	Oxygen Modbus Slave	0.0000	mole%
23	Carbon monoxide Modbus Slave	0.0000	mole%
24	Argon Modbus Slave	0.0000	mole%

DA Current velocity of gas

11	Rate of gas feed, path 1	0.000	m/s
12	Rate of gas feed, path 2	0.000	m/s

Figure 86: Menu Miscellaneous / Interface variables

Interface variables are variables that transmit custody transfer information or effect the representation of custody transfer information but are not (permanently) subject to custody transfer requirements.

Example

ERZ2000-DI is connected to Stream 1. If the measurements of Stream 2, 3, 4 or the test gas are available these data are irrelevant. These values only transport custody transfer data if Stream 1 is displayed and the status = "okay".

5.4.4 Log book

Figure 87: Menu Miscellaneous / Log book

Entries that are helpful for documentation can be made in the log book.

5.4.5 Binary code check

This menu is reserved exclusively for internal service purposes.

Figure 88: Menu Miscellaneous / Binary code check

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5.4.6 TSV export

TSV export

Archive group 1: counters and measured values billing mode 1

Ordinal No.	Number	state	from	to
6501 ... 6987	487	grows	03-06-2017 20:00:00	14-12-2017 14:00:00
6001 ... 6500	500	complete	12-05-2017 12:00:00	03-06-2017 19:00:00
5501 ... 6000	500	complete	22-04-2017 14:00:00	12-05-2017 11:00:00
5001 ... 5500	500	complete	01-04-2017 23:00:00	22-04-2017 13:00:00
4501 ... 5000	500	complete	12-03-2017 02:00:00	01-04-2017 22:00:00
4001 ... 4500	500	complete	19-02-2017 09:00:00	12-03-2017 01:00:00
3501 ... 4000	500	complete	31-03-2016 12:00:00	19-02-2017 08:25:44
3001 ... 3500	500	complete	17-02-2015 12:00:00	31-03-2016 11:00:00
2501 ... 3000	500	complete	30-09-2014 10:17:58	17-02-2015 11:00:00
2001 ... 2500	500	complete	17-06-2014 07:19:38	30-09-2014 09:50:14
1501 ... 2000	500	complete	21-03-2014 16:00:00	16-06-2014 15:53:18
1001 ... 1500	500	complete	16-12-2013 14:15:46	21-03-2014 15:00:00
501 ... 1000	500	complete	20-09-2013 13:00:00	16-12-2013 14:15:43
1 ... 500	500	complete	18-01-2023 16:04:49	20-09-2013 12:00:00

Archive group 2: disturbance counters billing mode 1

Ordinal No.	Number	state	from	to
5001 ... 5291	291	grows	11-06-2017 18:00:00	14-12-2017 10:53:26
4501 ... 5000	500	complete	20-05-2017 03:00:00	11-06-2017 17:00:00
4001 ... 4500	500	complete	10-04-2017 20:00:00	20-05-2017 02:00:00
3501 ... 4000	500	complete	21-03-2017 04:00:00	10-04-2017 19:00:00
3001 ... 3500	500	complete	28-02-2017 08:00:00	21-03-2017 03:00:00
2501 ... 3000	500	complete	25-01-2017 15:00:00	28-02-2017 07:00:00
2001 ... 2500	500	complete	26-02-2016 12:18:04	25-01-2017 14:00:00
1501 ... 2000	500	complete	24-10-2014 11:00:00	26-02-2016 12:17:06
1001 ... 1500	500	complete	16-05-2014 13:00:00	24-10-2014 10:00:00
501 ... 1000	500	complete	08-01-2014 10:46:37	16-05-2014 12:00:00
1 ... 500	500	complete	18-01-2023 16:04:49	08-01-2014 10:46:32

Archive group 3: counters and measured values billing mode 2

Ordinal No.	Number	state	from	to
6501 ... 6987	487	grows	03-06-2017 20:00:00	14-12-2017 14:00:00

…

Figure 89: Menu Miscellaneous / TSV export

All saved archive groups are listed here. They can be opened or saved by double-clicking on the indenture numbers. The "**complete**" groups no longer change and can be saved. The other groups ("growing") are still growing and thus not complete.

5.4.7 Exceptions

Figure 90: Menu Miscellaneous / Exceptions

This menu is reserved for internal service purposes. This data can provide information about the cause of error.

6 Errors

6.1 Error settings

6.1.1 YL error messages

YL Fault messages

Access	Line	Designation	Value	Unit	Variable
D	1	Current messages	M54-0 Calibr. lock		actErr
D	2	Accumulated msgs	M54-1 User lock		cumErr
D	3	No. of alarms	0		alarmAnz
D	4	No. of warnings	0		warnAnz
D	5	No. of notes	1		hinweisAnz
Q	8	Fault ackn. flag	0		errorQuit
D	14	AG21 clear text	M54-1 User lock		errKlar
D	15	Message counter	9		errChgCnt
A *	29	Vm-Alarm	0		midVBErr
D	31	Last event	-801		lEvt
D	32	Time of last event	14-12-2017 13:17:36		TlEvt
D	33	Msgs. at issue	1		actErrors
D	34	cummulated Msgs.	4		cumErrors

Enter   Cancel   Load defaults   Refresh

Figure 91: Menu YL error messages

The coordinate **YL01 Current messages** shows all pending (active) messages in 2-second intervals. **YL02 Accumulated msgse** shows all messages since the last acknowledgment.

This menu is normally intended for service purposes.

RMG

6.2 Error list

Running No.	Fault category	Fault number	Short text	Long text	Valence	Input enabled	No fault reported for Q=0
0	A	00-0	T loss	Loss of temperature	2	Yes	No
1	A	00-1	T<l.alarm lim.	Temperature below lower alarm limit	2	Yes	Yes
2	A	00-2	T>up.alarm lim.	Temperature exceeds upper alarm limit	2	Yes	Yes
3	W	00-4	T<l.warn.lim.	Temperature below lower warning limit	2	Yes	Yes
4	W	00-5	T>up.warn.lim.	Temperature exceeds upper warning limit	2	Yes	Yes
5	H	00-9	T param.error	Inconsistent parameterization, temperature	1	No	No
6	A	03-0	Pa loss	Loss of absolute pressure	2	Yes	No
7	A	03-1	Pa<l.alarm lim.	Absolute pressure below lower alarm limit	2	Yes	Yes
8	A	03-2	Pa>up.alarm lim.	Absolute pressure exceeds upper alarm limit	2	Yes	Yes
9	W	03-4	Pa<l.warn.lim.	Absolute pressure below lower warning limit	2	Yes	Yes
10	W	03-5	Pa>up.warn.lim.	Absolute pressure exceeds upper warning limit	2	Yes	Yes
11	H	03-9	Pa param.error	Inconsistent parameterization, absolute pressure	1	No	No
12	A	04-0	sd loss	Loss of standard density	2	Yes	No
13	A	04-1	sd<l.alarm lim.	Standard density below lower alarm limit	2	Yes	Yes
14	A	04-2	sd>up.alarm lim.	Standard density exceeds upper alarm limit	2	Yes	Yes
15	W	04-4	sd<l.warn.limit	Standard density below lower warning limit	2	Yes	Yes
16	W	04-5	sd>up.warn.lim.	Standard density exceeds upper warning limit	2	Yes	Yes
17	W	04-6	Vo warning	Vo failure, effect of fault: warning	2	Yes	No
18	H	04-7	HW pulse comp.	Hardware pulse comparison has taken effect	1	Yes	Yes
19	W	04-8	Run deviation	Quantitative comparison for synchronous run has taken effect	1	Yes	No
20	H	04-9	sd param.error	Inconsistent parameterization, standard density	1	No	No
21	W	05-7	Acc.puls.>max.	Too many temporarily stored pulses with open calibration lock	2	No	No
22	A	05-8	Vo alarm	Vo failure, effect of fault: alarm	2	Yes	No
23	A	06-0	Hs loss	Loss of superior calorific value	2	Yes	No
24	A	06-1	Hs<l.alarm lim.	Superior calorific value below lower alarm limit	2	Yes	Yes
25	A	06-2	Hs>up.alarm lim.	Superior calorific value exceeds upper alarm limit	2	Yes	Yes
26	W	06-4	Hs<l.warn.lim.	Superior calorific value below lower warning limit	2	Yes	Yes
27	W	06-5	Hs>up.warn.lim.	Superior calorific value exceeds upper warning limit	2	Yes	Yes
28	H	06-9	Hs param.error	Inconsistent parameterization, superior calorific value	1	No	No
29	A	07-0	CO2 loss	Loss of carbon dioxide	2	Yes	No
30	A	07-1	CO2<l.alarm lim.	Carbon dioxide below lower alarm limit	2	Yes	Yes
31	A	07-2	CO2>up.alarm lim.	Carbon dioxide exceeds upper alarm limit	2	Yes	Yes
32	W	07-4	CO2<l.warn.lim.	Carbon dioxide below lower warning limit	2	Yes	Yes
33	W	07-5	CO2>up.warn.lim.	Carbon dioxide exceeds upper warning limit	2	Yes	Yes

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34	H	07-9	CO2 param.error	Inconsistent parameterization, carbon dioxide	1	No	No
35	W	09-4	H2<l.warn.lim.	Hydrogen below lower warning limit	2	Yes	Yes
36	W	09-5	H2>up.warn.lim.	Hydrogen exceeds upper warning limit	2	Yes	Yes
37	W	10-8	Def. channel 1	Channel 1 failed	1	No	No
38	W	10-9	Def. channel 2	Channel 2 failed	1	No	No
39	W	11-0	Start-up>max.	Meter start-up time too long	2	Yes	No
40	W	11-1	Slow-down>max.	Meter slow-down time too long	2	Yes	No
41	W	19-4	N2<l.warn.lim.	Nitrogen below lower warning limit	2	Yes	Yes
42	W	19-5	N2>up.warn.lim.	Nitrogen exceeds upper warning limit	2	Yes	Yes
43	H	30-0	Malloc error	Dynamic memory allocation error	1	No	No
44	H	31-9	CAN fault	CAN bus malfunction	2	No	No
45	A	32-1	BM failure	Failure of the billing-mode signal	2	Yes	Yes
46	M	33-0	Bill.Mod undef.	Undefined billing mode	1	No	No
47	M	33-1	Billing mode 1	Billing mode 1	1	No	No
48	M	33-2	Billing mode 2	Billing mode 2	1	No	No
49	M	33-5	DSfG-freeze	archive entry because attention f (freeze) on DSfG	1	No	No
50	H	40-1	old totalizer	Totalizer directly before setting of new value	1	No	No
51	H	40-2	new totalizer	Totalizer directly after setting of new value	1	No	No
52	R	40-7	Rebooted	Restart performed	1	No	No
53	H	42-1	RTC defective	Real time clock is defective	2	No	No
54	A	43-2	Def.tot.	Totalizer is defective	1	No	No
55	H	45-0	I1 inp.param.	Current input 1 parameterization error	2	No	No
56	H	45-1	I2 inp.param.	Current input 2 parameterization error	2	No	No
57	H	45-2	I3 inp.param.	Current input 3 parameterization error	2	No	No
58	H	45-8	PT1 inp.param.	Resistance input 1 parameterization error	2	No	No
59	H	46-0	Cont.param.error	Parameterization of contact input, double seizing	1	No	No
60	H	46-1	Vo defective	Vo transmitter shows unexpected behavior	2	No	No
61	H	46-2	Vo timeout	No more signal from Vo transmitter	2	No	No
62	H	46-3	Vo protocol	Vo protocol error	2	No	No
63	H	46-4	Deleted pulses	Stored pulses were deleted	1	No	No
64	H	46-5	I9 inp.param.	Current input 9 parameterization error	2	No	No
65	H	46-6	I10 inp.param.	Current input 10 parameterization error	2	No	No
66	W	47-0	Qm<l.warn.lim.	Flow rate at base conditions below lower warning limit	2	Yes	No
67	W	47-1	Qm>up.warn.lim.	Flow rate at measurement conditions exceeds upper warning limit	2	Yes	No
68	W	47-2	Qmc<l.warn.lim.	Corrected flow rate at measurement conditions below lower warning limit	2	Yes	No
69	W	47-3	Qmc>up.warn.lim.	Corrected flow rate at measurement conditions exceeds upper warning limit	2	Yes	No
70	W	47-4	Qb<l.warn.lim.	Volumetric flow rate at base conditions below lower warning limit	2	Yes	No
71	W	47-5	Qb>up.warn.lim.	Volumetric flow rate at base conditions exceeds upper warning limit	2	Yes	No
72	W	47-6	Qe<l.warn.lim.	Energy flow rate below lower warning limit	2	Yes	No
73	W	47-7	Qe>up.warn.lim.	Energy flow rate exceeds upper warning limit	2	Yes	No

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74	A	48-0	CAN timeout	CAN bus timeout	2	No	No
75	H	48-1	Def.modem	Modem is defective or switched off	1	No	No
76	M	48-2	Factory state	I am a device which has not been tested.	1	No	No
77	H	48-3	PT1 open circ.	Resistance measurement 1 shows open circuit	2	No	No
78	H	48-6	PT3 inp.param.	Resistance input 3 parameterization error	2	No	No
79	A	50-0	T<>GERG lim.	Temperature exceeds GERG limits	2	Yes	Yes
80	A	50-1	P<>GERG lim.	Pressure exceeds GERG limits	2	Yes	Yes
81	A	50-2	rd<>GERG lim.	Relative density exceeds GERG limits	2	Yes	Yes
82	A	50-3	CO2<>GERG lim.	Carbon dioxide exceeds GERG limits	2	Yes	Yes
83	A	50-4	N2<>GERG lim.	Nitrogen exceeds GERG limits	2	Yes	Yes
84	A	50-5	Hs<>GERG lim.	Superior calorific value exceeds GERG limits	2	Yes	Yes
85	A	50-6	H2<>GERG lim.	Hydrogen exceeds GERG limits	2	Yes	Yes
86	A	50-8	GERG iter.max	Maximum permissible GERG iterations exceeded	2	Yes	Yes
87	A	51-0	T<>AGA limit	Temperature exceeds AGA limits	2	Yes	Yes
88	A	51-1	P<>AGA limit	Pressure exceeds AGA limits	2	Yes	Yes
89	A	51-2	rd<>AGA limit	Relative density exceeds AGA limits	2	Yes	Yes
90	A	51-3	CO2<>AGA limit	Carbon dioxide exceeds AGA limits	2	Yes	Yes
91	A	51-4	N2<>AGA limit	Nitrogen exceeds AGA limits	2	Yes	Yes
92	A	51-5	Hs<>AGA limit	Superior calorific value exceeds AGA limits	2	Yes	Yes
93	A	51-7	AGA oth.errors	Other AGA errors	2	Yes	Yes
94	A	51-8	AGA-pi,tau	AGA interim result, pi,tau exceed limits	2	Yes	Yes
95	A	51-9	Interp.pt.probl.	Error during calculation of interpolation point	2	Yes	Yes
96	A	52-0	Q<Qmin	Flow rate at measurement conditions below minimum	2	Yes	No
97	A	52-1	Q>Qmax	Flow rate at measurement conditions exceeds maximum	2	Yes	No
98	W	52-4	Bus-ID<>12	Bus identification for remote data transmission has not exactly 12 characters	1	No	No
99	W	52-5	RDT ID<>16	Remote data transmission identification has not exactly 16 characters	1	No	No
100	M	54-0	Calibr. lock	Calibration lock is open	2	No	No
101	M	54-1	User lock	User lock is open	2	No	No
102	M	54-2	Revision	Revision switch is open	2	No	No
103	R	56-0	Chan. 1 fault	Pulse counting channel 1 implausible	1	No	No
104	R	56-1	Chan. 2 fault	Pulse counting channel 2 implausible	1	No	No
105	A	56-2	Tc/Tb comb.	Tc/Tb combination not permitted	1	No	No
106	H	56-3	CAN check	CAN bus plausibilization	1	No	No
107	H	56-5	Old time	Time immediately before time adjustment	1	No	No
108	H	56-6	New time	Time immediately after time adjustment	1	No	No
109	R	56-7	Power OFF	Supply voltage failure	1	No	No
110	W	60-0	Ethane<l.warn.lim.	Ethane below lower warning limit	2	Yes	Yes
111	W	60-1	Ethane>up.warn.lim.	Ethane exceeds upper warning limit	2	Yes	Yes
112	W	60-2	C3H8<l.warn.lim.	Propane below lower warning limit	2	Yes	Yes
113	W	60-3	C3H8>up.war.lim.	Propane exceeds upper warning limit	2	Yes	Yes
114	W	60-4	N-C4<l.warn.lim.	N-butane below lower warning limit	2	Yes	Yes
115	W	60-5	N-C4>up.warn.lim.	N-butane exceeds upper warning limit	2	Yes	Yes
116	W	60-6	I-C4<l.warn.lim.	I-butane below lower warning limit	2	Yes	Yes

117	W	60-7	I-C4>up.warn.lim.	I-butane exceeds upper warning limit	2	Yes	Yes
118	W	60-8	N-C5<l.warn.lim.	N-pentane below lower warning limit	2	Yes	Yes
119	W	60-9	N-C5>up.warn.lim.	N-pentane exceeds upper warning limit	2	Yes	Yes
120	W	61-0	I-C5<l.warn.lim.	I-pentane below lower warning limit	2	Yes	Yes
121	W	61-1	I-C5>up.warn.lim.	I-pentane exceeds upper warning limit	2	Yes	Yes
122	W	61-2	NeoC5<l.warn.lim.	Neo-pentane below lower warning limit	2	Yes	Yes
123	W	61-3	NeoC5>up.warn.lim.	Neo-pentane exceeds upper warning limit	2	Yes	Yes
124	W	61-4	Hexane<l.warn.lim.	Hexane below lower warning limit	2	Yes	Yes
125	W	61-5	Hexane>up.warn.lim.	Hexane exceeds upper warning limit	2	Yes	Yes
126	W	61-6	Heptane<l.warn.lim.	Heptane below lower warning limit	2	Yes	Yes
127	W	61-7	Heptane>up.war.lim.	Heptane exceeds upper warning limit	2	Yes	Yes
128	W	61-8	Octane<l.warn.lim.	Octane below lower warning limit	2	Yes	Yes
129	W	61-9	Octane>up.warn.lim.	Octane exceeds upper warning limit	2	Yes	Yes
130	W	62-0	Nonane<l.warn.lim.	Nonane below lower warning limit	2	Yes	Yes
131	W	62-1	Nonane>up.warn.lim.	Nonane exceeds upper warning limit	2	Yes	Yes
132	W	62-2	Decane<l.warn.lim.	Decane below lower warning limit	2	Yes	Yes
133	W	62-3	Decane>up.warn.lim.	Decane exceeds upper warning limit	2	Yes	Yes
134	W	62-4	H2S<l.warn.lim.	Hydrogen sulphide below lower warning limit	2	Yes	Yes
135	W	62-5	H2S>up.warn.lim.	Hydrogen sulphide exceeds upper warning limit	2	Yes	Yes
136	W	62-6	H2O<l.warn.lim.	Water below lower warning limit	2	Yes	Yes
137	W	62-7	H2O>up.warn.lim.	Water exceeds upper warning limit	2	Yes	Yes
138	W	62-8	He<l.warn.lim.	Helium below lower warning limit	2	Yes	Yes
139	W	62-9	He>up.warn.lim.	Helium exceeds upper warning limit	2	Yes	Yes
140	W	63-0	O2<l.warn.lim.	Oxygen below lower warning limit	2	Yes	Yes
141	W	63-1	O2>up.warn.lim.	Oxygen exceeds upper warning limit	2	Yes	Yes
142	W	63-2	CO<l.warn.lim.	Carbon monoxide below lower warning limit	2	Yes	Yes
143	W	63-3	CO>up.warn.lim.	Carbon monoxide exceeds upper warning limit	2	Yes	Yes
144	W	63-8	Ar<l.warn.lim.	Argon below lower warning limit	2	Yes	Yes
145	W	63-9	Ar>up.warn.lim.	Argon exceeds upper warning limit	2	Yes	Yes
146	H	64-3	TCP/IP fault	can't initialize TCP/IP sockets	1	No	No
147	H	64-5	file system	file system unexpected behavior	1	No	No
148	H	65-2	Restart archive	Restart archive after cleaning	1	No	No
149	W	70-0	Pulse 1 >max	Pulse output 1 overflow	2	Yes	No
150	W	70-1	Pulse 2 >max	Pulse output 2 overflow	2	Yes	No
151	W	70-2	Pulse 3 >max	Pulse output 3 overflow	2	Yes	No
152	W	70-3	Pulse 4 >max	Pulse output 4 overflow	2	Yes	No
153	W	70-6	I1 outp.<min	Current output 1 below minimum	2	Yes	No
154	W	70-7	I2 outp.<min	Current output 2 below minimum	2	Yes	No
155	W	70-8	I3 outp.<min	Current output 3 below minimum	2	Yes	No
156	W	70-9	I4 outp.<min	Current output 4 below minimum	2	Yes	No
157	W	71-0	I1 outp.>max	Current output 1 exceeds maximum	2	Yes	No
158	W	71-1	I2 outp.>max	Current output 2 exceeds maximum	2	Yes	No
159	W	71-2	I3 outp.>max	Current output 3 exceeds maximum	2	Yes	No
160	W	71-3	I4 outp.>max	Current output 4 exceeds maximum	2	Yes	No

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161	R	71-4	NMA ADC	Namur module A analog/digital-converter	1	No	No
162	R	71-5	NMA overload	Namur module A overload	1	No	No
163	R	71-6	NMA OC PT100	Namur module A open circuit PT100	1	No	No
164	R	71-7	NMA OC mainch.	Namur module A open circuit main channel	1	No	No
165	R	71-8	NMA OC ref.ch.	Namur module A open circuit reference channel	1	No	No
166	R	71-9	NMA OC ENCO	Namur module A open circuit ENCO	1	No	No
167	R	72-0	NMB ADC	Namur module B analog/digital-converter	1	No	No
168	R	72-1	NMB overload	Namur module B overload	1	No	No
169	R	72-2	NMB OC PT100	Namur module B open circuit PT100	1	No	No
170	R	72-3	NMB OC Messk.	Namur module B open circuit main channel	1	No	No
171	R	72-4	NMB OC Vgl.k.	Namur module B open circuit reference channel	1	No	No
172	R	72-5	NMB OC ENCO	Namur module B open circuit ENCO	1	No	No
173	H	73-0	I1 outp.param.	Current output 1 parameterization error	1	No	No
174	H	73-1	I2 outp.param.	Current output 2 parameterization error	1	No	No
175	H	73-2	I3 outp.param.	Current output 3 parameterization error	1	No	No
176	H	73-3	I4 outp.param.	Current output 4 parameterization error	1	No	No
177	H	74-0	K1 outp.param.	Contact output 1 parameterization error	1	No	No
178	H	74-1	K2 outp.param.	Contact output 2 parameterization error	1	No	No
179	H	74-2	K3 outp.param.	Contact output 3 parameterization error	1	No	No
180	H	74-3	K4 outp.param.	Contact output 4 parameterization error	1	No	No
181	H	74-4	K5 outp.param.	Contact output 5 parameterization error	1	No	No
182	H	74-5	K6 outp.param.	Contact output 6 parameterization error	1	No	No
183	H	74-6	K7 outp.param.	Contact output 7 parameterization error	1	No	No
184	H	74-7	K8 outp.param.	Contact output 8 parameterization error	1	No	No
185	H	76-0	Mod. 1A false	Module 1A assembly implausible	2	No	No
186	H	76-1	Mod. 1B false	Module 1B assembly implausible	2	No	No
187	H	76-2	Mod. 2A false	Module 2A assembly implausible	2	No	No
188	H	76-3	Mod. 2B false	Module 2B assembly implausible	2	No	No
189	H	76-4	Mod. 3A false	Module 3A assembly implausible	2	No	No
190	H	76-5	Mod. 3B false	Module 3B assembly implausible	2	No	No
191	W	78-8	FC-BIOS old	Flow computer bios version is to old	1	No	No
192	H	78-9	HART1 status	HART 1 status reports trouble	1	No	No
193	H	79-0	HART2 status	HART 2 status reports trouble	1	No	No
194	H	79-1	HART3 status	HART 3 status reports trouble	1	No	No
195	H	79-5	HART9 status	HART 9 status reports trouble	1	No	No
196	H	79-6	HART10 status	HART 10 status reports trouble	1	No	No
197	A	80-0	dkvk>max.	Maximum deviation at operating point exceeded	2	Yes	No
198	A	83-6	HFX miss.pulses	Counter main channel (HFX) malfunction	2	No	No
199	A	83-7	HFY miss.pulses	Counter reference channel (HFY) malfunction	2	No	No
200	H	85-0	msg1	Extra hint 1 with changeable short text	2	No	No
201	H	85-1	msg2	Extra hint 2 with changeable short text	2	No	No
202	H	85-2	msg3	Extra hint 3 with changeable short text	2	No	No
203	H	85-3	msg4	Extra hint 4 with changeable short text	2	No	No
204	H	85-4	msg5	Extra hint 5 with changeable short text	2	No	No

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205	H	85-5	msg6	Extra hint 6 with changeable short text	2	No	No
206	H	85-6	msg7	Extra hint 7 with changeable short text	2	No	No
207	H	85-7	msg8	Extra hint 8 with changeable short text	2	No	No
208	W	86-0	msg1	Extra warning 1 with changeable short text	2	No	No
209	W	86-1	msg2	Extra warning 2 with changeable short text	2	No	No
210	W	86-2	msg3	Extra warning 3 with changeable short text	2	No	No
211	W	86-3	msg4	Extra warning 4 with changeable short text	2	No	No
212	W	86-4	msg5	Extra warning 5 with changeable short text	2	No	No
213	W	86-5	msg6	Extra warning 6 with changeable short text	2	No	No
214	W	86-6	msg7	Extra warning 7 with changeable short text	2	No	No
215	W	86-7	msg8	Extra warning 8 with changeable short text	2	No	No
216	A	87-0	msg1	Extra alarm 1 with changeable short text	2	No	No
217	A	87-1	msg2	Extra alarm 2 with changeable short text	2	No	No
218	A	87-2	msg3	Extra alarm 3 with changeable short text	2	No	No
219	A	87-3	msg4	Extra alarm 4 with changeable short text	2	No	No
220	A	87-4	msg5	Extra alarm 5 with changeable short text	2	No	No
221	A	87-5	msg6	Extra alarm 6 with changeable short text	2	No	No
222	A	87-6	msg7	Extra alarm 7 with changeable short text	2	No	No
223	A	87-7	msg8	Extra alarm 8 with changeable short text	2	No	No
224	H	88-0	param.ignored	Parameterization ignored	1	No	No
225	H	89-8	HART-Ver. old	Software version HART-card is to old	1	No	No
226	H	89-9	EXI-Ver. old	Software version EXI-card is to old	1	No	No
227	R	90-0	F1 failure	Frequency measurement 1 failed	2	No	No
228	R	90-1	F2 failure	Frequency measurement 2 failed	2	No	No
229	R	91-0	I1 failure	Current measurement 1 failed	2	No	No
230	R	91-1	I2 failure	Current measurement 2 failed	2	No	No
231	R	91-2	I3 failure	Current measurement 3 failed	2	No	No
232	R	92-0	PT1 failure	Resistance measurement 1 failed	2	No	No
233	R	92-2	HART1 failure	HART 1 input failed	2	No	No
234	R	92-3	HART2 failure	HART 2 input failed	2	No	No
235	R	92-4	HART3 failure	HART 3 input failed	2	No	No
236	R	92-8	Corrupt param.	corrupted parameter detected	1	No	No
237	R	93-0	Def.cont.inp.	Contact input failed	2	No	No
238	H	93-3	Function test	A function test is running at the moment	2	No	No
239	H	93-4	USM implaus.	USM transmitter, implausible protocol data	2	No	No
240	A	93-5	USM alarm	USM transmitter signalizes an alarm	2	No	No
241	A	93-6	USM timeout	No more signal from USM transmitter	2	No	No
242	H	93-7	Vo1 implaus.	USM totalizer for Vo1 shows implausible behavior	1	No	No
243	H	93-8	Vo2 implaus.	USM totalizer for Vo2 shows implausible behavior	1	No	No
244	H	93-9	Vo1D implaus.	USM totalizer for Vo1D shows implausible behavior	1	No	No
245	H	94-0	Vo2D implaus.	USM totalizer for Vo2D shows implausible behavior	1	No	No
246	H	94-1	Time sync.para.	Parameterization of time synchronization implausible	2	No	No
247	R	94-2	I9 failure	Current measurement 9 failed	2	No	No
248	R	94-3	I10 failure	Current measurement 10 failed	2	No	No

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249	R	94-6	PT3 failure	Resistance measurement 3 failed	2	No	No
250	R	95-0	Math.problem	Mathematical error	1	Yes	No
251	A	95-1	Corrupt code	corrupt code detected	1	No	No
252	A	95-2	Alarm volume	hard-wired contact of volume transmitter shows alarm	2	No	No
253	W	95-4	Time sync fail	Time synchronization failed	1	No	No
254	H	95-5	Net time error	Net time error	1	No	No
255	R	95-6	HART9 failure	HART 9 input failed	2	No	No
256	R	95-7	HART10 failure	HART 10 input failed	2	No	No
257	A	96-7	Hs GC timeout	No more signal from the superior calorific value transmitter	2	Yes	No
258	A	96-8	sd GC timeout	No more signal from standard density transmitter	2	Yes	No
259	A	97-0	CO2 GC timeout	No more signal from CO2 transmitter	2	Yes	No
260	H	97-3	Hs GC alarm	GC reports loss of superior calorific value	2	Yes	No
261	H	97-4	sd GC alarm	GC reports loss of standard density	2	Yes	No
262	H	97-6	CO2 GC alarm	GC reports loss of carbon dioxide	2	Yes	No
263	W	98-4	CH4<l.warn.lim.	Methane below lower warning limit	2	Yes	Yes
264	W	98-5	CH4>up.warn.lim.	Methane exceeds upper warning limit	2	Yes	Yes
265	A	98-7	Comp.normaliz.	Error occurred during normalization of gas components	2	Yes	Yes
266	A	98-8	Inval.act.key	Invalid activation key	2	No	No
267	H	99-4	Adjusted float	Floating point parameter adjusted to floating-point notation	1	No	No
268	A	99-7	AGA8 alarm	AGA 8 algorithmic error	2	Yes	Yes
269	A	99-8	AGA892DC alarm	AGA 8 92DC algorithmic error	2	Yes	Yes
270	W	88-2	Signature error	Problems with signature	1	No	No
271	H	57-1	Qu param.	Parameter inconsistent flow	2	No	No
272	W	57-2	Memory RAM	less RAM	2	No	No
273	W	57-3	Memory SDCard	less memory on SD-Card	2	No	No
274	H	57-5	MAC ETH2	Reboot required, Eth2 MAC has changed	2	No	No
275	M	57-6	Custody commis.	custody commissioning triggered	2	No	No
276	A	57-7	CRC WinCE	WinCE-Kernel wrong CRC	2	No	No
277	A	57-8	Param.Attack	Parameter file was attacked	1	No	No
278	W	57-9	FilesysWarn	noncritical WinCE file system error	1	No	No
279	A	58-8	FilesysAlarm	critical WinCE file system error	1	No	No
280	H	58-9	Service mode	Service mode is active	1	No	No
281	H	40-3	C6 conflict	Serial interface C6 protocol in conflict	2	No	No
282	H	40-4	C7 conflict	Serial interface C7 protocol in conflict	2	No	No
283	A	10-0	Pulse cmp. 1:1	Pulse comparision error 1:1	1	Yes	Yes
284	A	10-1	Pulse cmp. X:Y	Pulse comparision error X:Y	1	Yes	Yes
285	A	99-0	GERG2008 alarm	GERG2008 algorithmic error	1	Yes	Yes
286	A	99-1	GERG2004 alarm	GERG2004 algorithmic error	1	Yes	Yes
287	A	99-2	AGA8(2017) alarm	AGA8(2017) algorithmic error	1	Yes	Yes
288	A	99-3	GOST 30319 alarm	GOST 30319 algorithmic error	1	Yes	Yes
289	H	19-6	ETH1 DHCP server	DHCP server for ETH1 is not available	1	No	No
290	H	19-7	ETH2 DHCP server	DHCP server for ETH2 is not available	1	No	No
291	W	40-5	counter modified	counter was manually modified	1	No	No

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Appendix

A) Updating software

> ⚠ **Caution**
>
> **A change or update of the software should not be carried out without consulting with the RMG service department!**
>
> **Please have this change or update carried out by the RMG service department.**
>
> **A change to the software breaks the seal. Please refer to the comments in** *chapter 1.5.2 Seal diagram for devices with MID approval.*

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A.1 Advance information

The main components of the device software are:
- The **Flow Computer BIOS**.
- The **application** with a special part, the calibration core.

Each part is identified by:
- **Version number**
- **Checksum**
- **Time stamp** (date and time of creation)

An SD memory card that is inserted at the bottom left behind the front panel contains files in the subdirectory \Bin for the Flow Computer BIOS and the application, e.g.:

    \Bin**ERZ2000DI.exe**   (application)
    \Bin**F2_008.mot**   (Flow Computer BIOS)

When the device is switched off, the SD card can be removed in order to inspect and edit it on an external PC with a card reader. When switching on the device, the application file is read by the SD card and executed under Windows CE (operating system kernel). A new flow computer BIOS must be installed from the SD card to the internal flash memory with a special procedure. Then the BIOS is active!

A.2 Software identification

There are various options for determining version number, checksum and time stamp of the software parts:

- When **switching on** the device
  A few seconds after the device is switched on, the version numbers of BIOS and the application appear on the bottom right of the display under the green area.
  The calibration core is determined from the two first positions of the application e.g. application = V1.0.0, then the calibration core is 1.0

- In the **coordinate system**, in the menu **IE Software identification**, see *Figure 67: Menu IE Software identification*.

The option can be used on the touch screen under the menu "Functions", sub-menu "Type plate" (*chapter 2.7.4.3 Type* plate) or using the web browser.

A.3 Updating software

The update takes place by copying the new software to the SD card in the device.

⚠ **Caution**
- **Consult with the RMG service department to discuss how and in which form you can obtain new software!** - **In doing so, you can ensure that archive content and device parameters are not lost!**

Required tools

- Phillips screwdriver
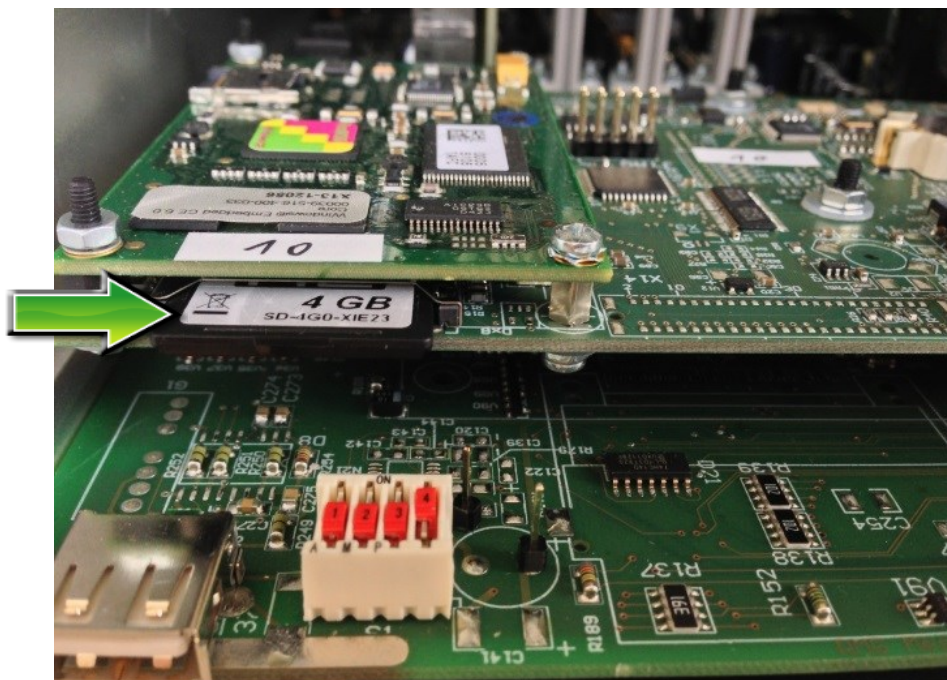- SD card reader

SD card removal

- Switch your measuring system to a safe state. If possible, discontinue the flow through the flow computer, because there is no computing during the software update and accumulating amounts are not measured.

- Switch off the ERZ2000-DI.

- Remove the four screws on the front panel and carefully pull it off.

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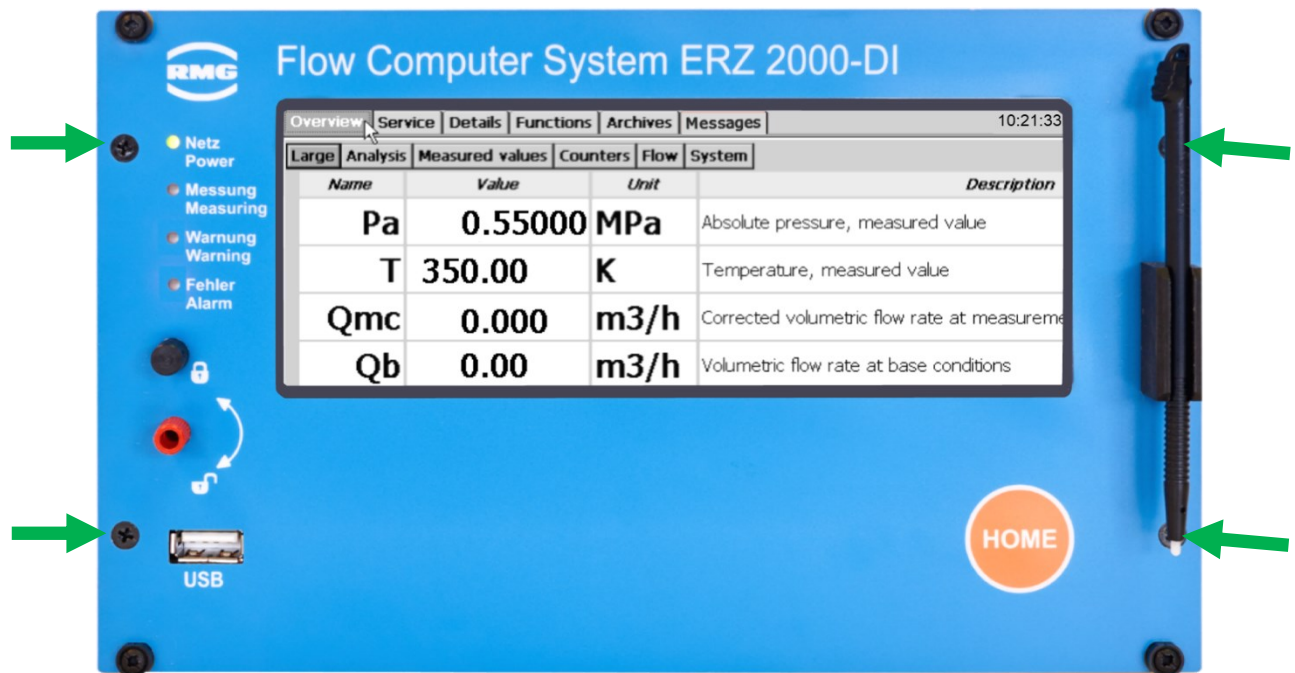
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- Remove the inserted SD card from the holder.

SD card backup

- Backing of the entire SD card is highly recommended so that it is possible to reactivate the old software. This can be necessary, for instance, if an error occurs during the subsequent steps.

- Insert the SD card in a card reader.
- Copy the entire contents of the SD card to a separate backup directory on your PC.

You should have received the software from the RMG service department. Load the following files to the SD card to update the software:

md5.txt
version.txt

and the subdirectories

\Bin
\ERZ2000NG
\HTMLS
\tools

The subdirectory \ERZ2000NG does not contain any files for archive content and parameters. Therefore, an existing file can be overwritten without loss of parameters or archives.

- Insert the SD card (push it in the slot until it engages).
- Re-install the front panel (= reverse order of removal of the front panel).
- Switch on the ERZ2000-DI.

Enter activation key

Enter the activation key for the new software, which is provided under coordinate **IE10 Enable**. The activation key and the target CRC of the WinCe kernel can be found in the approval documentation under "Identification".

Checking BIOS

After the update, a new BIOS on the SD card is not automatically active. Therefore, check the device BIOS to determine whether it should be updated and re-installed if applicable; contact RMG customer service for information about the latest BIOS version.

A.4   Installing BIOS

Open the calibration switch

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Note
Prevent automatic resetting!

- Activate coordinate **LC40 Service mode** ("yes") in order to prevent an automatic device, reset (watchdog) during subsequent steps.

Close the application

- Click on the "Service" tab on the touch screen
- Select and execute the "Close program" function.

Start Windows Explorer

- Click on the "Start" button.
- Click on "Programs".
- Click on "Windows Explorer".

Start FlashloadCE

- "SDCard" (double-click)
- "TOOLS" (double-click)
- "FlashloadCE" (double-click)

Monitor the output window

- After the program start, messages that the COM3 and CAN-bus required for flashing have been opened must appear:

    "CAN opened successfully!"

    "COM3: opened successfully!"

Start the bootloader

- Click on the menu item "Flash > Reset BIOS".

Monitor FlashloadCe

- A message that the connection between FlashloadCE and the bootloader was established appears in the output window (to the right):

    "Device is connected!"

- Various information can be read in the status window (to the left), such as the version of the bootloader.

Load flow computer BIOS

- Click on the menu item "File > Open".
- Select the BIOS file on the "SDCard" in the subdirectory "Bin".

  Such files have the name extension ".mot", e.g. "F2_008.mot".

  Then confirm the file selection with the "OK" button.

Monitor the output window:

- The file is now checked for validity.

  This takes a few seconds and the following message appears

  "Scanning file. Please wait …"

- If the file is valid, some information is displayed:

  "Motorola file"

  "Number of lines"

  "Bytes to program"

  "Checksum"

Delete flash memory

- Click on the menu item "Flash > Clear".

Monitor the output window:

- After the deletion process is successfully completed, a message that the flash memory was deleted appears:

  "Flash memory is blank"

Program the flash memory

- Click on the menu item "Flash > Program".

Monitor the output window:

- The following message appears

  "Programming memory ..."

with a progress indicator. It is possible that the bar makes large jumps. This only means that part of the flash memory does not have to be programmed.

- When the programming process is completed, the following message appears:

  "Device programmed!"

Note
Please check the checksum.

Activate new BIOS

- Click on the menu item "Flash > Make valid" in order to activate the now programmed and verified BIOS.

Note
Attention: This step is important.

Monitor the output window

- The following message appear after the activation:

    "Target has been made valid!"

Start the software

- Click on the menu item "Flash > Start target".

- A window appears in which the program start must be confirmed again with "Yes". In this case, the entire ERZ2000-DI is restarted.

A.5   Activation after software update

There is an activation key for each software package, which must be entered after a software update of the ERZ2000-DI. The device calculates a checksum internally and compares it with the key that has been entered. The ERZ2000-DI is only ready for operation if the result of this comparison is positive. If the activation key is missing or incorrect, the ERZ2000-DI switches permanently to fault status and issues the alarm "A 98-8 Inval. Act. key". The computing functions are executed normally, but the disturbance meters run.

B) Totalizer in the browser view

The following figures and comments show how the totalizers are handled in the browser display.
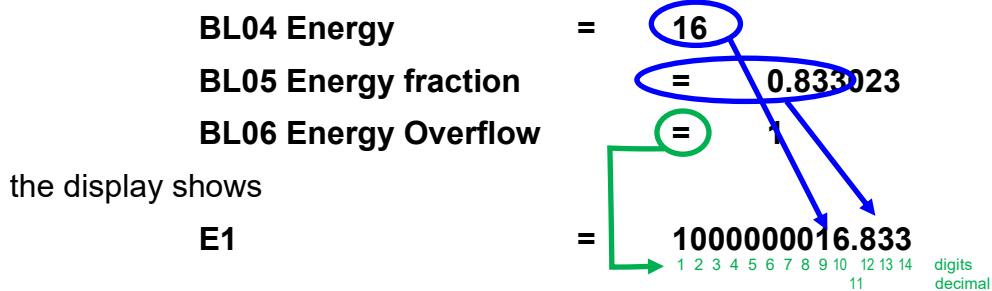
Access	Line	Designation	Value	Unit	Variable
Z *	1	Vol. at base cond.	76810	*100 m3	Vn1
Z *	2	Vol.base fraction	.239998	*100 m3	Vn1R
Z *	3	Vol.at.base ovfl	0		OfVn1
Z *	4	Energy	81792	MWh	E1
Z *	5	Energy fraction	.596735	MWh	E1R
Z *	6	Energy Overflow	0		OfE1
Z *	7	Corr.vol.meas.	111118	m3	Vk1
Z *	8	Corr.vol.meas.frac.	.048975	m3	Vk1R
Z *	9	Corr.vol.meas.ovfl.	0		OfVk1
Z *	10	Vol. at meas.cond.	111118	m3	Vu1
Z *	11	Vol.meas.fraction	.048975	m3	Vu1R
Z *	12	Vol.at.meas ovfl	0		OfVu1
Z *	19	Original totalizer	0	m3	Vo1
Z *	20	Orig.tot.fraction	.000000	m3	Vo1R
F	61	Vol. at base cond.	76810	*100 m3	fVn1
F	62	Vol.base fraction	.239998	*100 m3	fVn1R
F	63	Energy	81792	MWh	fE1
F	64	Energy fraction	.596735	MWh	fE1R
F	65	Corr.vol.meas.	111118	m3	fVk1
F	66	Corr.vol.meas.frac.	.048975	m3	fVk1R
F	67	Original totalizer	0	m3	fVo1
F	68	Orig.tot.fraction	.000000	m3	fVo1R
F	69	Vol. at meas.cond.	111118	m3	fVu1
F	70	Vol.meas.fraction	.048975	m3	fVu1R

BL Totalizer, billing mode 1

Refresh

Figure 92: Menu BL Totalizer, billing mode 1

The totalizers of the 2 billing modes are shown in the menu **B Flow computer** under the sub-menus **BL Totalizer BM 1** and **BN Totalizer BM 2**; the corresponding disturbance totalizer are found in sub-menus **BM Disturbance totalizer BM 1** and **BO Disturbance totalizer AM 2**. Since the structure of these menus is the same, only **BL Totalizer BM 1** is shown here in detail.

The representation is explained based on the example of energy **BL04 Energy**, **BL05 Energy fraction** and **BL06 Energy Overflow** The setting is optimized for the metering of large amounts and has 14 digits plus 3 decimal places

If

BL04 Energy	=	16
BL05 Energy fraction	=	0.833023
BL06 Energy Overflow	=	1

the display shows

E1	=	1000000016.833

1 2 3 4 5 6 7 8 9 10 12 13 14   digits
11   decimal

.

The menu **BP Totalizer undef. BM** also has a similar structure. Then this meter counts if the billing mode is invalid (e.g. in case of an incorrect switch position).

LG Setting totalizers

Access	Line	Designation	Value	Unit	Variable
Q	2	Vb1	-1.000000	*100 m3	setVn1
Q	3	Vc1	-1.000000	m3	setVk1
Q	4	Vm1	-1.000000	m3	setVu1
Q	5	E1	-1.000000	MWh	setE1
Q	7	Vb2	-1.000000	*100 m3	setVn2
Q	8	Vc2	-1.000000	m3	setVk2
Q	9	Vm2	-1.000000	m3	setVu2
Q	10	E2	-1.000000	MWh	setE2
Q	22	DVb1	-1.000000	*100 m3	setSVn1
Q	23	DVc1	-1.000000	m3	setSVk1
Q	24	DVm1	-1.000000	m3	setSVu1
Q	25	DE1	-1.000000	MWh	setSE1
Q	27	DVb2	-1.000000	*100 m3	setSVn2
Q	28	DVc2	-1.000000	m3	setSVk2
Q	29	DVm2	-1.000000	m3	setSVu2
Q	30	DE2	-1.000000	MWh	setSE2
Y	99	Task	Idle		setAufgabe

Enter   Cancel   Load defaults   Refresh

Figure 93: Menu LG Setting totalizers

The values of the 2 meters can be set in the coordinates **LG02 Vb1** to **LG30 DE2**. A negative value means that this meter is not set. The coordinate **LP99 Task** defines the various assignments that can be viewed in the table below.

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Idle	Nothing happens!
All TOT = 0	All totalizers (main+disturbance) and fractions are set to 0. The totalizers are also set to 0 for undefined billing mode.
All DTOT = 0	All disturbance totalizers and fractions are set to 0. The totalizers are also set to 0 for undefined billing mode. The main totalizers remain unaffected
Vm = Vo	All Vm totalizers (uncorrected operating volume) are set to the current value of the assigned Vo totalizer (original totalizer). All other totalizers remain unaffected.
Vc = Vm	All Vc totalizers (corrected operating volume) are set to the current value of the assigned Vm totalizer (uncorrected operating volume). All other totalizers remain unaffected.
Custom	All totalizers that were programmed with a non-negative value in the totalizer settings list are set to this value. In this connection, the portion after the decimal is written to the fraction totalizer. Then the relevant input field in the settings list is set to -1. All totalizers that are negative in the totalizer settings list (explicitly -1) remain unaffected.
All overflow = 0	All overflows are set to 0.

C) Archive assignment, depth and identification

C.1 Archive groups

Multiple menus can be assigned to archives.

> **Note**
>
> **In order to display mean values for pressure, temperature, etc. in the archives or archive groups, a setting not equal to "off" must be selected for the relevant measurement operating mode.**
>
> **If a measurement input works in the ″Random″ operating mode, no entries are created in the archives or log book when alarms are generated and deleted.**

There are various archive groups in which the specified values, including time stamp (date and time) and indenture numbers are specified.

Archive group 1: counters and measured values billing mode 1 Ordinal No. 6965 … 6988

Time stamp	Ordinal No.	* Totalizer BM1 / Original totalizer	* Totalizer BM1 / Corr.vol.meas.	* Totalizer BM1 / Vol. at base cond.	* Totalizer BM1 / Energy	Absolute pressure / Mean for DSfG	Gas temperature / Mean for DSfG	General DSfG / Own bit string	* Totalizer BM1 / Vol. at meas.cond.
-	-	caafd/baag	caagd/baae	caahd/baaa	caald/baac	caajd/bddd	caakd/bdfd	caald/bhfc	caamd/baal
dd-mo-yyyy hh:mi:ss	-	m3	m3	*100 m3	MWh	MPa	K	hex	m3
13-12-2017 10:00:00	6965		111118	76810	81792	0.55		00000001	111118
13-12-2017 11:00:00	6966		111118	76810	81792	0.55		00000001	111118
13-12-2017 12:00:00	6967		111118	76810	81792	0.55		00000001	111118
13-12-2017 13:00:00	6968		111118	76810	81792	0.55		00000401	111118
13-12-2017 14:00:00	6969		111118	76810	81792	0.55		00000001	111118
13-12-2017 15:00:00	6970		111118	76810	81792	0.55		00000001	111118
13-12-2017 15:33:47	6971		111118	76810	81792	0.55		00000001	111118
13-12-2017 15:33:57	6972		111118	76810	81792	0.55		00000001	111118
13-12-2017 15:38:56	6973		111118	76810	81792			00000401	111118
13-12-2017 15:40:11	6974		111118	76810	81792			00000401	111118
13-12-2017 15:45:04	6975		111118	76810	81792			00000400	111118
13-12-2017 15:46:13	6976		111118	76810	81792	0.55	350	00000401	111118
13-12-2017 15:46:30	6977		111118	76810	81792	0.55	293.15	00000001	111118
13-12-2017 15:46:39	6978		111118	76810	81792	0.55		00000401	111118
13-12-2017 15:46:59	6979		111118	76810	81792			00000400	111118

…

Figure 94: Archive group 1

The channel status is specified with color-coding (black, gray, blue, green, turquoise and yellow).

Channel status

- Okay
- Stop
- Default value
- Fixed value
- Holding value
- Revision

Figure 95: Archive group 1 channel status

TSV file

Ordinal No.	Number	state	from	to
6501 ... 6988	488	grows	03-06-2017 20:00:00	14-12-2017 15:00:00
6001 ... 6500	500	complete	12-05-2017 12:00:00	03-06-2017 19:00:00
5501 ... 6000	500	complete	22-04-2017 14:00:00	12-05-2017 11:00:00
5001 ... 5500	500	complete	01-04-2017 23:00:00	22-04-2017 13:00:00
4501 ... 5000	500	complete	12-03-2017 02:00:00	01-04-2017 22:00:00
4001 ... 4500	500	complete	19-02-2017 09:00:00	12-03-2017 01:00:00
3501 ... 4000	500	complete	31-03-2016 12:00:00	19-02-2017 08:25:44
3001 ... 3500	500	complete	17-02-2015 12:00:00	31-03-2016 11:00:00
2501 ... 3000	500	complete	30-09-2014 10:17:58	17-02-2015 11:00:00
2001 ... 2500	500	complete	17-06-2014 07:19:38	30-09-2014 09:50:14
1501 ... 2000	500	complete	21-03-2014 16:00:00	16-06-2014 15:53:18
1001 ... 1500	500	complete	16-12-2013 14:15:46	21-03-2014 15:00:00
501 ... 1000	500	complete	20-09-2013 13:00:00	16-12-2013 14:15:43
1 ... 500	500	complete	18-01-2023 16:04:49	20-09-2013 12:00:00

Figure 96: Archive group 1

The bottom display in the menu **Archive group 1 / Totalizer BM1** shows that the data is saved in TSV files (Excel-compatible format). The files can be read and downloaded by double-clicking on the indenture numbers, e.g. 1 … 500.

The other archives have a similar structure. There are additional archive groups:

JA	Archive group 1	Main totalizer for BM 1 plus measurements
JB	Archive group 2	Disturbance totalizer for BM 1
JC	Archive group 3	Main totalizer for BM 2 plus measurements
JD	Archive group 4	Disturbance totalizer for BM 2
JI	Archive group 9	Instance F 1b
JJ	Archive group 10	Instance F 2a
JK	Archive group 11	Instance F 2b+c
JM	Archive group 13	Totalizer for undefined AM
JN	Archive group 14	Programmable archive

JO   Archive group 15 Freely programmable archive

JQ   Archive group 17 Revision part 1

JR   Archive group 18 Revision part 2

JS   Archive group 19 Revision part 3

JU   Archive group 21 Log book

JV   Archive group 22 Highest load per day, hourly value

JW   Archive group 23 Highest load per month, hourly and daily value

JX   Archive group 24 Highest load per year, hourly and daily value

.C.1.1   JN   Freely programmable archive

JN Free programmable archive

Access	Line	Designation	Value	Unit	Variable
B	1	Record cycle	Gas quality		fpagZyk
B	2	Name Archive grp 15	AG15		ag15Name
B	10	Assign.Channel 1 = CB01 Edit		kWh/m3	fpagk1
B	11	Assign.Channel 2 = CB02 Edit		kg/m3	fpagk2
B	12	Assign.Channel 3 = BL10 Edit		m3	fpagk3
B	13	Assign.Channel 4 = BM04 Edit		MWh	fpagk4
B	14	Assign.Channel 5 = BM01 Edit		*100 m3	fpagk5
B	15	Assign.Channel 6 = YW01 Edit			fpagk6
B	16	Assign.Channel 7 = BL07 Edit		m3	fpagk7
B	17	Assign.Channel 8 = BN01 Edit		*100 m3	fpagk8
B	18	Assign.Channel 9 = BN10 Edit		m3	fpagk9
B	19	Assign.Channel 10 = BO04 Edit		MWh	fpagk10
B	20	Assign.Channel 11 = BO01 Edit		*100 m3	fpagk11
B	21	Assign.Channel 12 = BO10 Edit		m3	fpagk12
B	22	Assign.Channel 13 = BJ01 Edit		kW	fpagk13
B	23	Assign.Channel 14 = BI01 Edit		m3/h	fpagk14
B	24	Assign.Channel 15 = BF01 Edit		m3/h	fpagk15
B	25	Assign.Channel 16 = BC01 Edit		MPa	fpagk16
B	26	Assign.Channel 17 = BD01 Edit		K	fpagk17
B	27	Assign.Channel 18 = CB01 Edit		kWh/m3	fpagk18
B	28	Assign.Channel 19 = CB02 Edit		kg/m3	fpagk19
B	29	Assign.Channel 20 = CB02 Edit		kg/m3	fpagk20

Enter   Cancel   Load defaults   Refresh

Figure 97: Menu JN Freely programmable archive

In order for the freely programmable archive to be detected when loading file as an archive group, an assignment not equal to "off" must be selected in coordinate **JN01 Record cycle** (e.g. "every minute").

C.2 Archive depth

DSfG archive

Archive group 1 to 8	8192 entries, then the oldest entry is overwritten.
Archive group 9 to 11	8192 entries, then the oldest entry is overwritten.
Archive group 12	8192 entries, then the oldest entry is overwritten.
Archive group 13	8192 entries, then the oldest entry is overwritten.
Archive group 14, 15, 16	8192 entries, then the oldest entry is overwritten.
Archive group 17 to 20	4 entries, are rewritten each time.
Archive group 21	8192 entries, then the oldest entry is overwritten.
Archive group 22	180 entries, then the oldest entry is overwritten.
Archive group 23	36 entries, then the oldest entry is overwritten.
Archive group 24	10 entries, then the oldest entry is overwritten.

With the exception of archive group 17-19, the oldest entry is overwritten after the specified number of entries is reached.

D) Test of LED, warning and alarm contact

In the menu **L Factory settings** there is a submenu **LI Hardware test**, which – as superuser – allows the LED functions on the front panel of the ERZ2000-DI to be checked. In normal operation **LI01 hardware test** "no" is active.

If "Power LED" is selected for this menu item, the Power LED (top left) lights up, all other LEDs remain off. The behaviour is analogous when selecting :

- Measuring LED
- Warning LED
- Alarm LED

When set to "Alarm contact" (or "Warning contact"), the "alarm contact" (or "Warning contact") is on for one second each and then off again.

If "contact output" is set, this results in the following dynamic change:

- Contact 1 on for one second, all others off.
- Contact 2 on for one second, all others off.
- Contact 3 on for one second, all others off.
- Contact 4 on for one second, all others off.
- Contact 5 on for one second, all others off.
- Contact 6 on for one second, all others off.
- Contact 7 on for one second, all others off.
- Contact 8 on for one second, all others off.

Also "pulse output" can be checked, it results in:

- Pulse output 1, 1 pulse per second
- Pulse output 2, 2 pulse per second
- Pulse output 3, 3 pulse per second
- Pulse output 4, 4 pulse per second

E) Optional Ex input card

E.1 Instructions for the installer

Code:
Type: EX1-NAMUR-2 / V1 or V2

⟨Ex⟩ II(2)G [Ex ia] IIC

TÜV 06 ATEX 553139 X

Tamb = -20°C …. +60°C

Data: see EC Type approval certificate

Use:
Use of the assembly takes place in combination with the device ERZ2000-DI only. The assembly is intended for galvanic isolation of MSR signals, such as 20 mA current loops or adaptation and/or standardization of signals. The different intrinsically safe current circuits are provided to operate intrinsically safe field devices within explosion-prone areas. The applicable laws and directives for the use and/or planned use must be observed. Version V1 is the standard version for a 1-rail flow computer, version V2 is designed for a 2-rail flow computer (optional expansion level).

Multiple transmitters/sensors can be connected to the EX1-NAMUR-2 card.

2 volume transmitters, with pulse sensors similar to DIN 19234,

1 electronic meter (ENCO),

1 pressure transducer (4 to 20mA or HART),

1 temperature sensor (4 to 20mA or HART),

optionally 1 temperature sensor (PT100 4-wire).

Installation and commissioning in connection with Ex areas:
Installation and commissioning must be carried out exclusively be specially trained and qualified personnel. The device is designed with protection rating IP20 in accordance with EN 60259 and appropriate measures must be taken in unfavorable environmental conditions that exceed contamination degree 2. External heating due to solar radiation or other heat sources must be prevented. The installation of intrinsically safe current circuits must be carried out according to the applicable installation regulations. For connection of intrinsically safe field devices with the intrinsically safe current circuits of the corresponding devices of the ERZ2000-DI, the highest values of the field device and the corresponding device must be observed in consideration of explosion protection.

The EC conformity certificate and/or EC type approval certificate must be observed. Compliance with any "Special conditions" contained therein is especially important.

Commissioning:
The connector plug must be installed correctly in the mating plug intended for this purpose and secured mechanically. Operation must take place in a completely enclosed housing.

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Service / maintenance:
The fuses in the devices must only be replaced when in a de-energized state. Repairs of the device must be carried out exclusively by RMG Messtechnik GmbH.

Disassembly:
When disassembling, it must be ensured that the sensor cable does not come into contact with other live parts. Appropriate protective measures must be taken.

F) Service functions

┌───┐
| ⚠ **Caution** |
├───┤
| **The removal of seals is necessary for this function. This normally entails considerable expenses!** |
| **Therefore, this function reserved for the service department and a calibration official and/or an officially recognized inspection authority. These parties must be present at the measuring station location.** |
└───┘
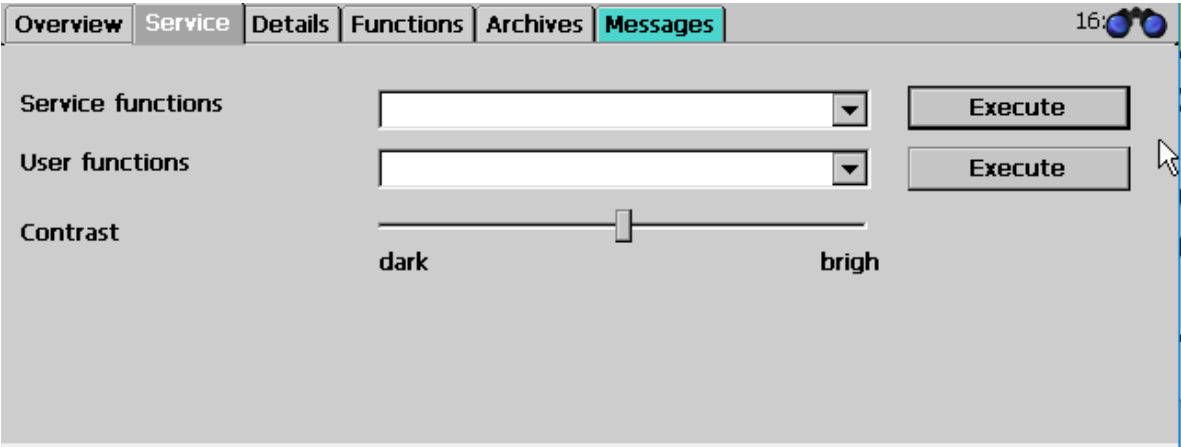
Figure 98: Service menu

If the white field to the right of the **"Service functions"** is touched, then, the **service functions** "Official custody transfer commissioning" and "Close program can be selected with the **open calibration switch**.
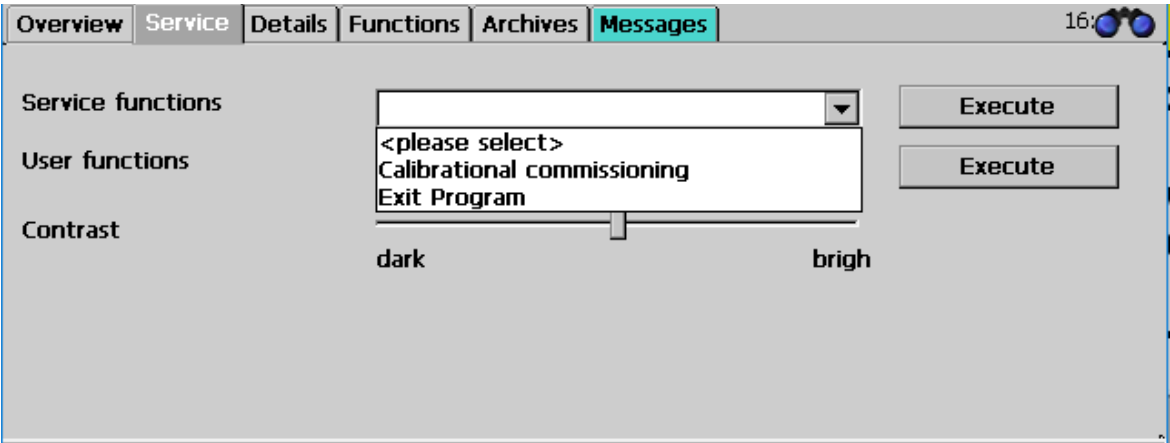
Figure 99: Menu Service / sub-program "Official custody transfer commissioning" and "Close program"

First, an official custody transfer commissioning is initiated with "Execute" in order to reset all parameters of WinCe to the default values (all parameters that are not under the calibration switch). If the ERZ2000-DI application is running, a restart of the kernel is carried out as an essential part of the process and the CRC (cyclic redundancy check) of the complete kernel is calculated and displayed in the matrix element "Kernel CRC IE21". The setpoint is displayed in the matrix element "Kernel CRC, IE22" for comparison.

In order to adopt the newly calculated values according to this service function, an **additional** restart is necessary, which can be initiated via the service function "Close program" with "Execute" (or by disconnecting the power supply).

Note
Attention:
In menu L Factory settings, LC configuration, the coordinate LC40 Service mode must be set to the default value "no".
The setting "yes" is reserved for the service department when settings should be made in WinCE.
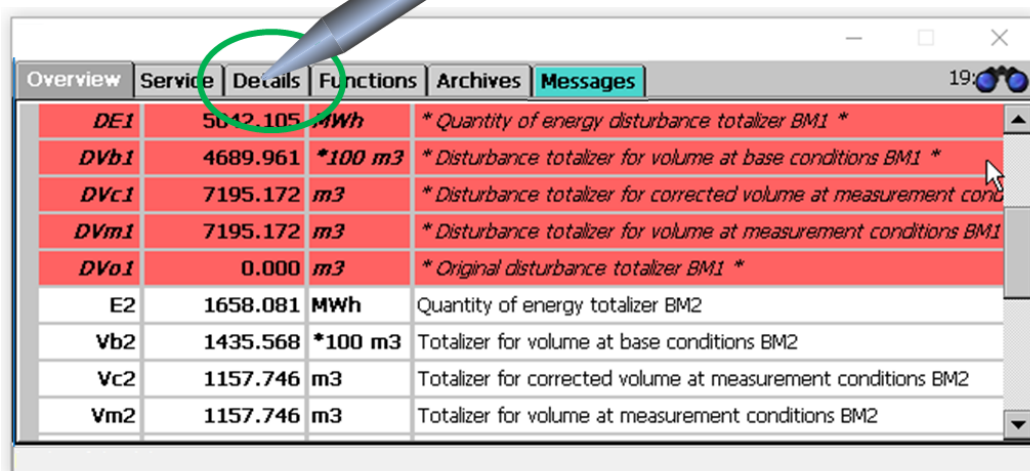
The reason the official custody transfer commissioning is that operating system is a component of the flow computer that must not be replaced without the knowledge of calibration authorities. The setting parameters of the operating system must not be changed without the knowledge of calibration authorities, either. Therefore, the operating system must be set to a status agreed upon with the calibration authority during commissioning. After the commissioning is completed, access to the settings of the operating system is no longer possible.

After a restart, the calibration official checks the CRC; if the check is successful, the calibration switch is closed and the device is sealed by the calibration official. Then the final setup of the ERZ2000-DI can take place. The device is ready for operation when all necessary settings have been made.
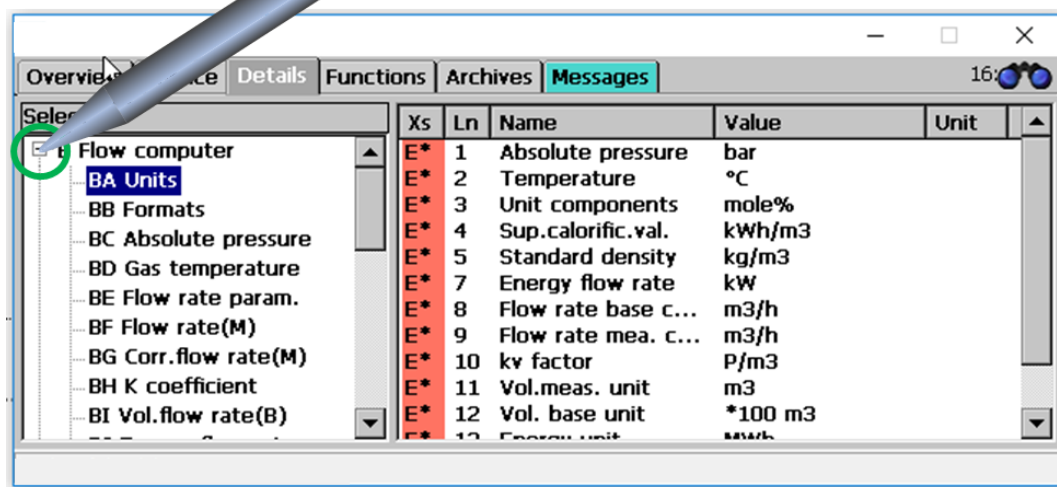
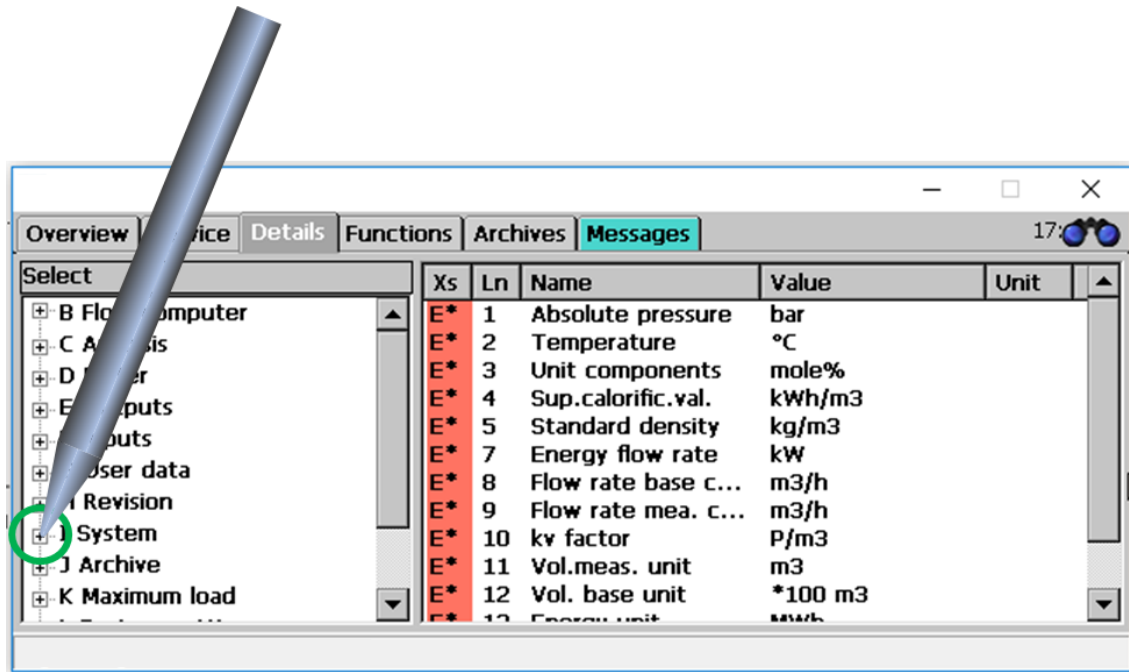# G) Adjustment of the MTU size

Go to **Details**.
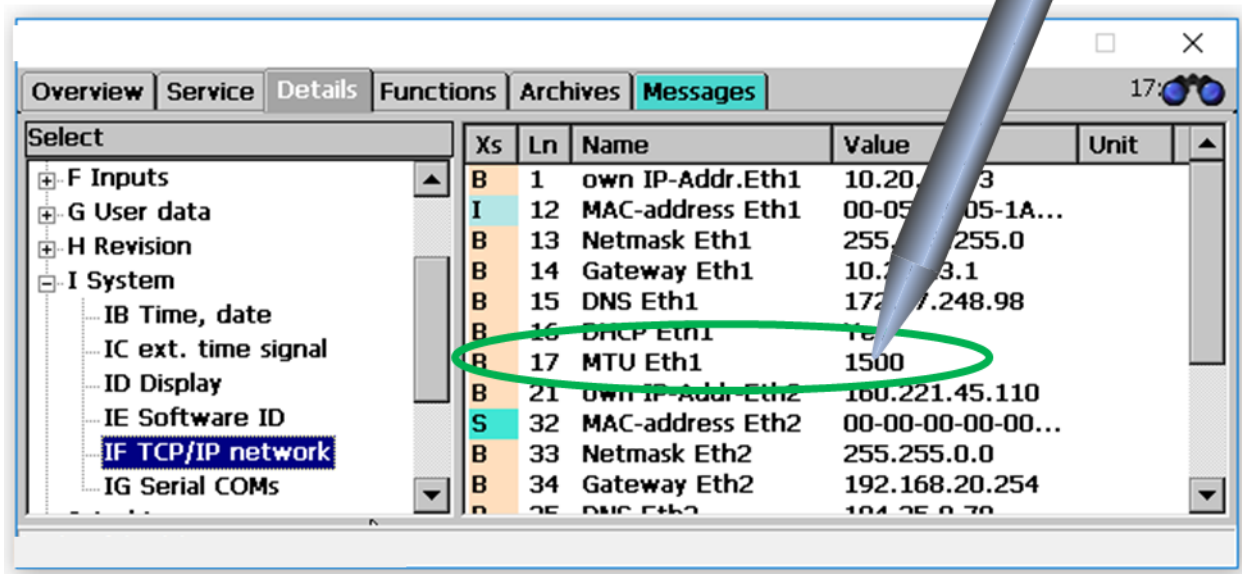

To **B Flo computer**

To **I System**

To **IF TCP/IP network**

To **IF32 MTU Eth1**

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As a superuser (*chapter 2.4 Access protection for data and settings*) you can now change the maximum packet size of the transmission protocol MTU (*chapter 2.7 Display screen*). By scrolling on the right side, you can also access the MTU of Eth2, which you can change analogously if necessary.

Note
Please only make these settings after consulting your IT department if there are connection problems (firewall, mobile phone, ...).

Certificates

Certificates

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EU-Baumusterprüfbescheinigung

EU Type-examination Certificate

Ausgestellt für: *Issued to:*	RMG Messtechnik GmbH Otto-Hahn-Str. 5 35510 Butzbach
gemäß: *In accordance with:*	Anhang II Modul B der Richtlinie 2014/32/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Messgeräten auf dem Markt. *Annex II Module B of the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments.*
Geräteart: *Type of instrument:*	Zustands-Mengenumwerter für Gas *Volume conversion device for gas*
Typbezeichnung: *Type designation:*	ERZ2000-DI
Nr. der Bescheinigung: *Certificate No.:*	DE-17-MI002-PTB008, Revision 1
Gültig bis: *Valid until:*	10.07.2027
Anzahl der Seiten: *Number of pages:*	37
Geschäftszeichen: *Reference No.:*	PTB-1.42-4093129
Notifizierte Stelle: *Notified Body:*	0102

Zertifizierung:
Certification:

Braunschweig, 07.11.2018

Bewertung:
Evaluation:

Im Auftrag
On behalf of PTB

Siegel
Seal

Im Auftrag
On behalf of PTB

Dr. Rainer Kramer

Dr. Roland Schmidt

R3-072097

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Geräteart: *Type of instrument:*	Brennwert-Mengenumwerter *Energy conversion device*
Typbezeichnung: *Type designation:*	ERZ2000-DI
Nr. der Bescheinigung: *Certificate No.:*	DE-17-M-PTB-0036, Revision 1
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Geräteart: *Type of instrument:*	Belastungs-Registriergerät *Load recorder*
Typbezeichnung: *Type designation:*	ERZ2000-DI
Nr. der Bescheinigung: *Certificate No.:*	DE-17-M-PTB-0037, Revision 1
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