INSTRUCTION MANUAL IM 329 E

Device: Flow Computer GDR 1530
Content: Instruction manual and connection diagram
Rev. No.: IM 329 E V0.6-2023-10-23, FW G12.37

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User information

- Read the operating instructions completely before installing or operating the device for the first time.
- Pay attention to all important notes and warnings in this document.
- Please refer to the nameplate for the serial number of the device, which you will need to order spare parts, and the correct voltage supply. You will find it on the outside of the device.
- Installation, commissioning, operation and maintenance may only be carried out by a qualified electrician. The guidelines applicable at the installation site must be observed.
- For reasons of personal safety, maintenance work may only be carried out when the device is de-energized.
- To ensure operational safety, only original spare parts from the manufacturer may be installed.
- If the device is not used for its intended purpose, any claims under warranty and product liability become invalid. In particular, improper use is deemed to have occurred if the information in the operating instructions was not observed during installation, commissioning, operation and maintenance.
- The device must be integrated into the lightning protection concept of the system operator.

Please note that the device must always be used in accordance with the operating instructions. Any deviations will invalidate the operating safety.

Technical developments may result in deviations from this document. If you require further information or if special problems arise which are not dealt with in detail in these operating instructions, you can obtain information at the following address:

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Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

Table of Contents

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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Index of Figure

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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Index of Tables

List of abbreviations

EP	Enumeration parameters
NP	Numerical parameters
FS	Factory settings

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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1 Common

The Flow Computer GDR 1530 is used to determine the current gas volume. The current gas quantity can be displayed in cubic meters or liters on an hourly or minute basis. The total quantity counter can be output either in cubic meters or liters. The totalizer can display up to 999 million cubic meters with 9 digits. The resolution is 0.1 liters.
The Flow Computer calculates the standard volume based on the operating volume determined by the connected gas flow meter and the measured values for pressure and temperature. The standardization can be calculated according to the standards DIN 1343, DIN 6358, DIN ISO 2533 or DIN 102/ ISO 1-1975.

Inputs: Gas volume

The GDR 1530 processes the measured values of the Fluidistor gas flow meter GD 300 (Ex) and GD 500 (Ex). In the Non ATEX area the Fluidistor gas flow meter can be connected directly to the GDR 1530 via the platinum wire sensor or via a native HB 300-R000000. In the ATEX area, the connection is made via the HB 300 Ex-R000000, which is built into the Fluidistor gas flow meter as an ATEX barrier.

Inputs: pressure and temperature

In addition to a pt100 input, the units also have mA inputs for pressure and temperature sensors as well as an integrated barometric sensor for recording atmospheric pressure.

Outputs and bus systems:

The 0(4) - 20 mA current output provides the current flow rate in the form of operating or standard cubic meters. Flow rates, unit status, error messages or limit values can be passed on to higher-level systems for further processing via 2 solid-state relays.
The Modbus RTU and TCP bus system is optionally available for data transmission.

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2 Technical data

2.1 Input

The devices can process an input signal regarding the flow rate. The following alternatives are available for the input signal:	
FLOW RATE	– Input for platinum wire sensor (GD 300/GD 500) (only NON-ATEX) or
FLOW RATE IMPULSE INPUT	– Impulse input for HB 300 (Ex)-R0000 (GD 300 (Ex)/GD 500 (Ex)) Definition of minimum threshold to distinguish between gas flow and standstill possible (creeping quantity suppression).
The following inputs are integrated for connecting external sensors for pressure and temperatures:	
TEMPERATURE	– 4 - 20 mA, 2 wire = -100 - 999 °C (17 bit) or – Pt100, 3 wire (12 bit)
PRESSURE	4 - 20 mA, 2 wire = 0 - 1000 bar (17 bit) Fixed value (absolute): -500mbar...+1000bar Resolution 1 mbar
HYDROSTATIC SENSOR	Integrated barometric sensor for detecting atmospheric pressure (ambient pressure)

2.2 Output

OUTPUT	0 (4) - 20 mA = 0 - (x) Bm³/h, l/h, Bm³/min, l/min, Nm³/h, NL/h, Nm³/min, NL/min) flow rate (freely programmable), input resistance 500 Ohm
K1:	Relay (NO) freely programmable – pulse output (0,1, 1 or 10 or 100 m³ per impulse, freely programmable), counter output quantity or – limit value or device status
K2:	Relay (NO) freely programmable – pulse output (0,1, 1 or 10 or 100 m³ per impulse, freely programmable), counter output quantity or – limit value or device status

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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2.3 Electrical values

ACCURACY	± 0,05 % EW ± 1 Digit with 23°C
POWER SUPPLY	– 24 V, DC ± 3 V , max. 200 mA (Standard) – 100 - 240 V, AC, 0,33 - 0,14 A, max. 47 - 63 Hz (optional, Retrofit kit)

2.4 Environmental influences

AMBIENT TEMPERATURE	-10 to +55°C
STORAGE TEMPERATURE	-20 to +85°C
TEST VOLTAGE	3 kV
HUMIDITY CLASS	E-DIN 40040
ELECTROMAGNETIC COMPATIBILITY	acc. to EN 50082-2

2.5 Display and value ranges

LCD DISPLAY	4 rows à 20 characters Size: 66 x 40mm, font size 4.8 mm Display colour: black on white
DATE	Acc. to ISO8601/EN28601
COUNTER PULSES	Max. 999.999.999.999.999.999 Pulse (1*10^18 - 1 pulse), resolution 1 pulse (In the event of a counter overflow, the counter starts at zero.)
PULSE OUTPUT	0,001 - 1.000.000 m^3/pulse, resolution 1l/pulse Max. 10 pulses/s for Bm^3 or Nm^3
FLOW „OPERATIONAL“	Max. 100 Bm^3/s, 360.000 Bm^3/h
FLOW „STANDARDIZED“	Max. 1.000 Nm^3/s, 3.600.000 Nm^3/h
COUNTER OPERATING QUANTITY STANDARDIZED QUANTITY	Max. 99.999.999.999.999,9999999 m^3 (<1*1015) resolution 0,1cm^3 Display: 99.999.999.999.999,9 m^3 or Nm^3 (In the event of a counter overflow, the counter starts at zero.)

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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2.6 Interfaces and additional functions

WLAN	Integrated WLAN hotspot for direct connection to the unit. The unit can be operated using a web browser.
LAN	LAN connection for integration into the local network
MODBUS RTU (OPTIONAL)	Data transmission via Modbus RTU interface
MODBUS TCP (OPTIONAL)	Data transmission via Modbus TCP interface (For the Modbus TCP interface, the LAN connection option is a prerequisite.)

2.7 Housing & mounting parts

STANDARD HOUSING WALL MOUNTING	Dimensions: 151 mm (W) x 125 mm (H) x 60 mm (D) Material: polycarbonate UL 94 V0 Protection class: IP 65 Weight: approx. 600 g
DIN RAIL MOUNTING	– Fastening element for DIN rail mounting
MOUNTING ON GAS FLOW METER (OPTIONAL) ONLY NON-ATEX	– Fastening element for direct mounting on gas flow meter GD 300 / GD 500 with flange connection – Mounting element for direct mounting on gas flow meter GD 300 / GD 500 with wafer connection

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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3 Device codes

GDR 1530	
Inputs	
1: Flow rate: input for platinum wire sensor (GD 300/GD 500) (only NON-ATEX) or	•
1: Flow rate: impulse input for HB 300-R000000 (GD 300/GD 500), HB 300 Ex-R000000 (GD 300 Ex/GD 500 Ex)	•
2: Temperature[1)]: 4 - 20 mA, 2 wire = -100 - 999 °C (17 bit) or	•
2: Temperature (Pt100) [1)]: 3 wire (17 bit)	•
3: Pressure[1)]: 4 - 20 mA, 2-Leiter = 0 - 1000 bar (17 bit)	•
Output	
1: 4 - 20 mA = 0 - (x) Bm³/h, l/h, Bm³/min, l/min, Nm³/h, NL/h, Nm³/min, NL/min) flow rate (freely programmable), input resistance 500 Ohm	•
Relay	
K1 (NO) freely programmable	•
K2 (NO) freely programmable	•
Further Functions	
Limit value monitoring (2 limit values)	•
Integrated barometric sensor	•
Remote control via web browser via integrated WLAN hotspot	•
Optional Functions	
LAN	•
Modbus RTU	•
Modbus RTU & Modbus TCP	•

[1)] virtual input for freely programmable fixed values

Table 1: Device codes

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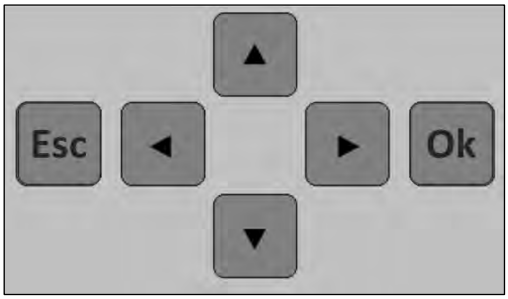
4 Operating overview

4.1 Keypad

The GDR 1530 is programmed directly on the unit using the keypad below the display.

Menu navigation is via the keys:

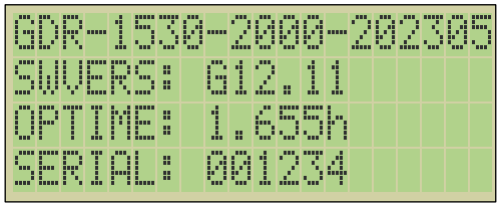


◄	Left
►	Right
▲	upwards
▼	downwards
Esc	Cancel, Escape
Ok	Confirm, Enter

Figure 1: Keypad

4.2 Display

The GDR 1530 has a 4-line display.



Line 1
Line 2
Line 3
Line 4

Figure 2: 4-line display

The start-up screen appears when the device is started. After approx. 10 seconds, the device automatically switches to the first Live Screen.

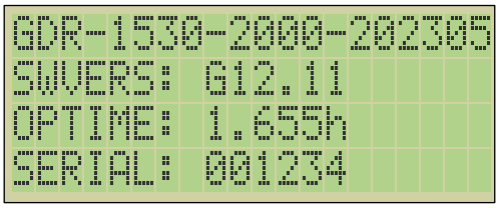


Figure 3: Display device start

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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5 Screen – Modi und Navigation

The GDR 1530 distinguishes between two screen modes, the so-called Live Screen including error messages and the Parameter screen. The Live Screens contain an overview of the current measured values and parameterizations of the unit. The parameterization or configuration of the unit is carried out within the Parameter screens.

5.1 Live Screen and navigation

In the Live Screens, the current measured values and settings relating to the connected sensors are displayed in the individual Live Screens according to the unit's parameterization.
Displays (screens) that are not relevant for the operating mode of the unit are hidden accordingly.
Switching between the individual Live Screens can be done automatically. The display interval can be set by the user with parameter #1207 - Display time (menu item: System). A setting of zero prevents automatic switching. The prerequisite for this is that the parameter #1227 - Switch display is set to the value „Time triggered".
In addition to a title, a Live Screen has an assigned number (e.g. Flow A [1.1]) which is shown in line 1 of the display.
The type of numbering shows whether a Live Screen has a subordinate screen.
The corresponding system settings can be taken from the subordinate screens.

X.**0**	Live Screen does not have any subordinate screens (exception error status)
X.**1**	Live Screen has subordinate screens

Navigation in Live Screen	
◄ ►	Switch between the Live Screens
▲ ▼	Within a Live Screen (e.g. limit value) it is possible to scroll within the screen.
Esc	Back to Live Screen
Ok	LONG HOLD/ PRESS (approx. 3 seconds) Opening the PARAMETER screen or settings menu

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5.1.1 Live Screen: Flow A [1.x]

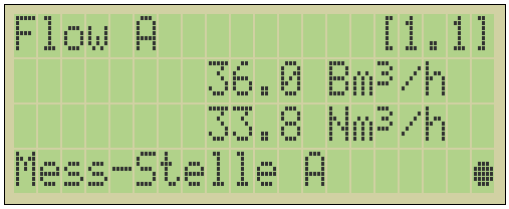

Figure 5: Measured value flow A [1.1]

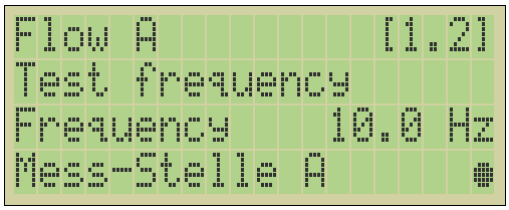

Figure 4: Settings flow A [1.2]

Legend	
	Measuring point A is connected and supplies measured values
	Measuring point does not supply any measured values, check and see Live screen error status [16.0].

5.1.2 Live Screen: Gas volume A [3.0]

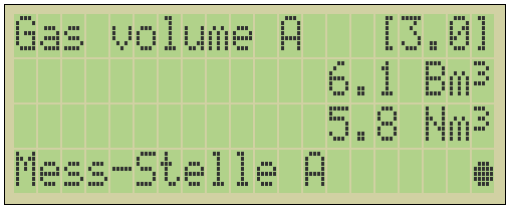

Figure 6: Gas quantity A [3.0] counter reading

Legend	
	Measuring point A is connected and supplies measured values
	Measuring point does not supply any measured values, check and see Live screen error status [16.0].

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5.1.3 Live Screen: Temperature [5.x]

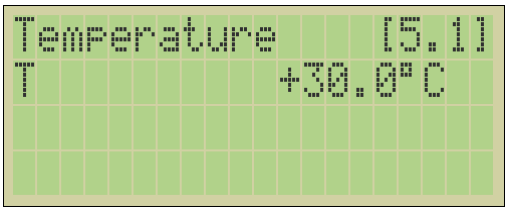

Figure 7: Measured value temperature [5.1]

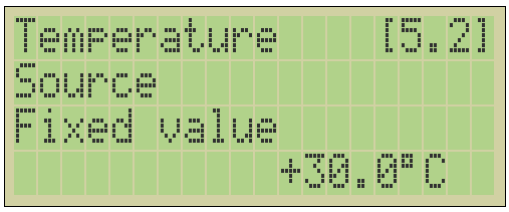

Figure 8: Settings temperature [5.2]

5.1.4 Live Screen: Pressure [6.x]

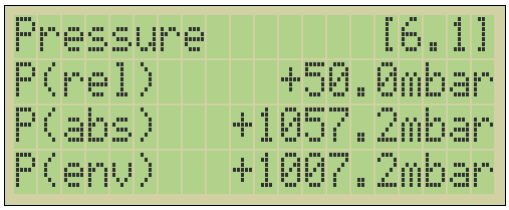

Figure 10: Measured value pressure [6.1]

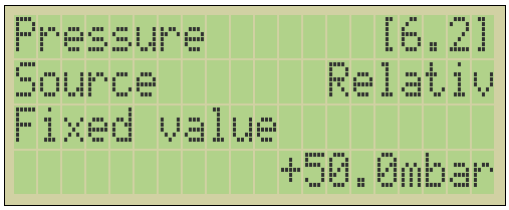

Figure 9: Settings Drucksensor [6.2]

5.1.5 Live Screen: Barometric pressure [7.x]

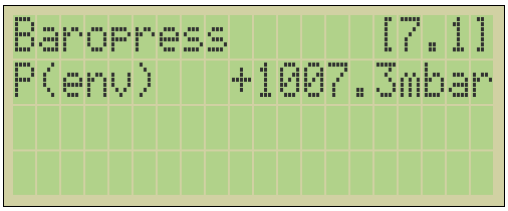

Figure 11: Measured value barometric pressure [7.1]

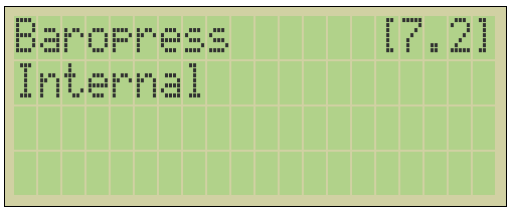

Figure 12: Settings barometric pressure [7.2]

5.1.6 Live Screen: Current output [8.x]

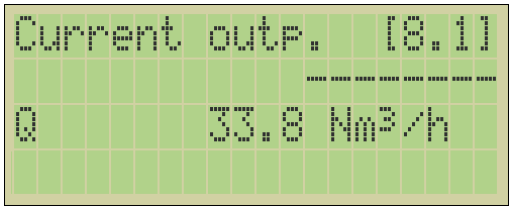

Figure 14: Current output [8.1]

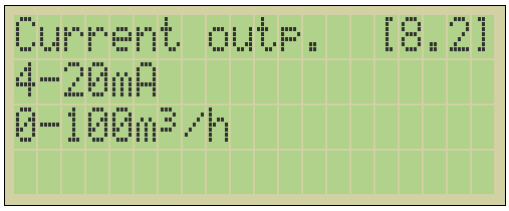

Figure 13: Settings current output [8.2]

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5.1.7 Live Screen: Relay[1] [9.0]

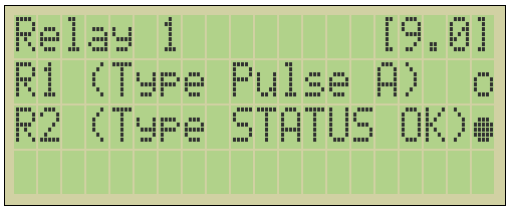

Figure 15: Relay [9.0]

Legend	
	Relay 1 (R1) Example Pulse A: Relay 2 (R2) Example Device status: There is no error, status ok!
	Relay 1 (R1) Example Pulse A Relay 2 (R2) Example Device status: There is an error! See also Live Screen Error Status [16.0].

[1] The relays are so-called normally open (NO) contacts.

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5.1.8 Live Screen: Limit value A [10.x]

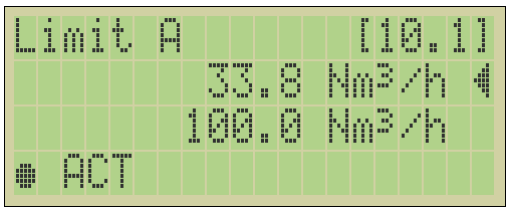

Figure 17: Limit value A [10.1]

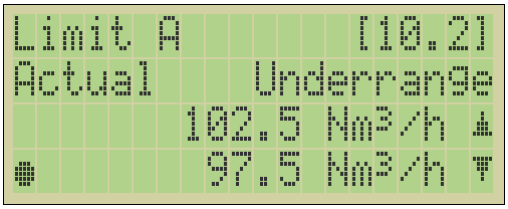

Figure 16: Settings limit value A [10.2]

Legend	
	Current measured value (line 2)
	Limit value A is triggered
	Limit value A is not triggered
	Limit value range based on defined hysteresis (line 3 and 4)

5.1.9 Live Screen: Limit value B [11.x]

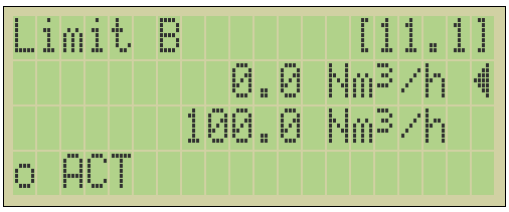

Figure 19: Limit value B [11.1]

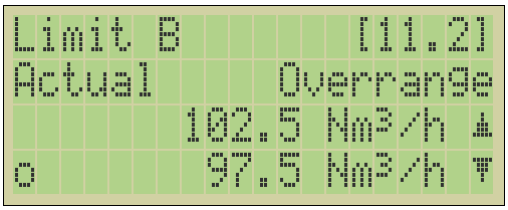

Figure 18: Settings limit value B [11.2]

Legend	
	Current measured value (line 2)
	Limit value B is triggered
	Limit value B is not triggered
	Limit value range based on defined hysteresis (line 3 and 4)

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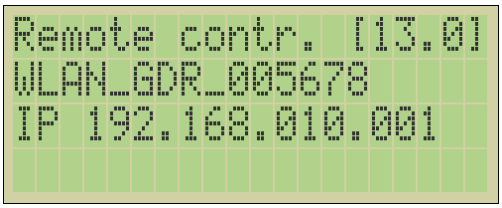
5.1.10 Live Screen: Modbus [12.x]

Figure 20: Modbus [12.1]

Figure 21: Settings Modbus [12.2]

5.1.11 Live Screen: Remote Control [13.0]



Line 2: Name (SSID) of the WLAN hotspot of the device
Line 3: IP address for accessing the web page of the device.

Figure 22: Remote control [13.0]

5.1.12 Live Screen: LAN Netzwork [14.x]

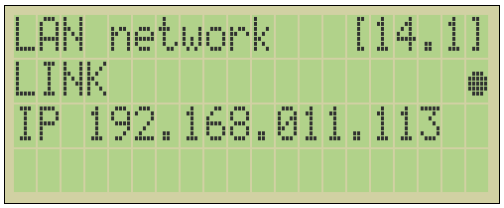


Figure 24: LAN Netw. [14.1]

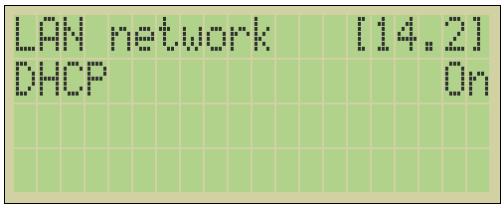


Figure 23: Settings LAN Netw. [14.2]

Legend	
	LINK: Device is connected to LAN network
	LINK: Device is not connected to LAN network

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5.1.13 Live Screen: WIFI Network [15.x][2]

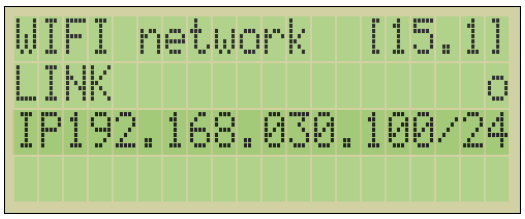

Figure 26: WIFI Netw. [15.1]

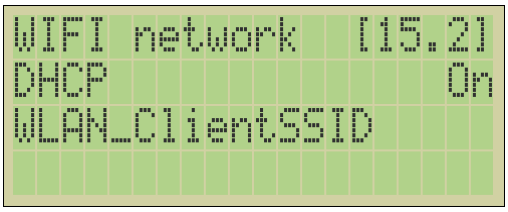

Figure 25: WIFI Netw. settings [15.2]

Legend	
	LINK: Device is connected to WIFI network
	LINK: Device is not connected to WIFI network

5.1.14 Live Screen: Error state [16.0]

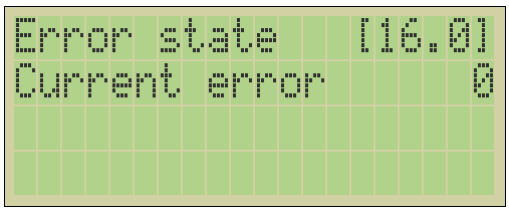

Figure 27: Error state [16.0] – no error

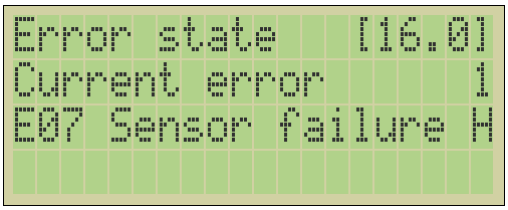

Figure 28: Error state [16.0] – 2 error

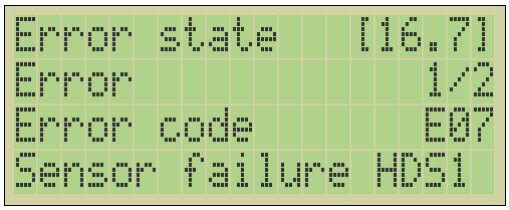

Figure 29: Error state [16.0] – 1 of 2 error

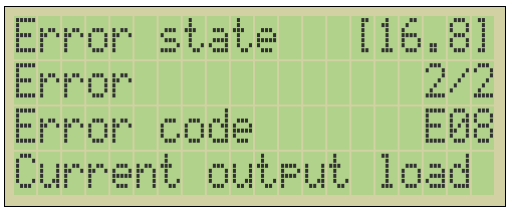

Figure 30: Error state [16.0] – 2 of 2 error

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5.1.15 Live Screen: System status [17.x]

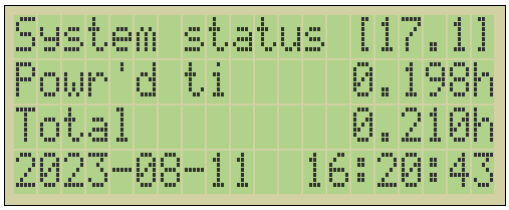

Figure 32: System status [17.1]

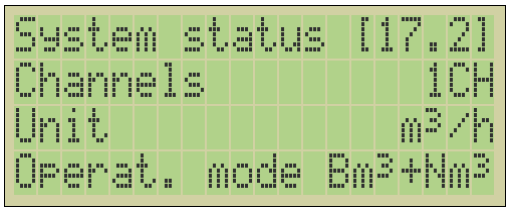

Figure 31: System status [17.2]

5.2 Display: PARAMETER screen (settings menu) and navigation

The device is parameterized on the PARAMETER screen. Starting from the Live Screen, you can reach the PARAMETER screen by holding down the ENTER key (3 seconds).

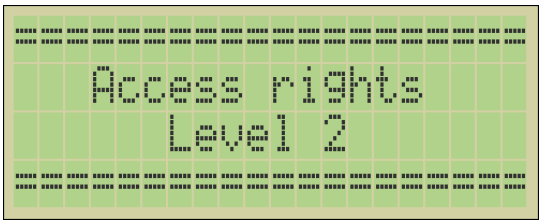

Figure 34: Displaying the hierarchy level when opening the PARAMETER screen (approx. 3 sec.)

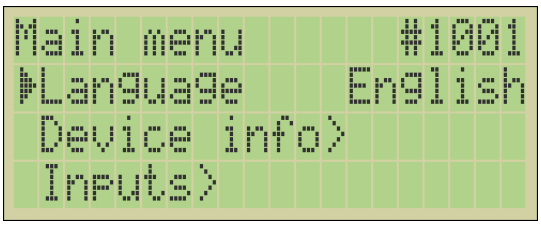

Figure 33: Main menu (PARAMETER screen)

The settings menu or PARAMETER screen opens on a newly delivered device with the write rights of "Access rights Level 2". When opening the menu, the display of the access rights level appears for approx. 3 seconds before switching to the menu.
Within the " Access rights Level 2", the user can make all the necessary system settings for commissioning. A PIN code (PIN1) can be defined to protect the parameters. The PIN assigned ex works is: 10000. The factory-defined PIN code results in the device being "open" and thus access to the parameter setting is not protected. The parameter settings are only protected against unauthorized access after an individual PIN code has been assigned. When the device is restarted or when the user logs off, the device is downgraded to the "Access rights Level 1". If the keys on the device are unused within 300 seconds, an automatic logout and thus downgrading to access level (1) takes place.

In the "Access rights 1 Level", no changes can be made to the settings. The information is only available in read mode. To change the access rights, logging on to the system is required (see Section).
All other access levels are only accessible by customer service. In the event of such a support case, the customer service representative will instruct you accordingly.

[2] WIFI network function not available in firmware version 12.11.

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5.2.1 Explanations of the menu (PARAMETER screen)

The main menu is shown as a tree structure. Tree nodes can be setting values (PARAMETERS), commands (COMMANDS) or submenu items. Every parameter and every menu tree node have a unique ID code. A parameter can be "open" (adjustable) or closed (locked). This is indicated by a symbol (open or closed diamond).

Legend	
Unique parameter ID or menu node ID	#1522
Open/ adjustable parameter Parameter can be changed.	▶Festwert +11.000
For better readability, a separator "-" is inserted between the name and value of the parameter in longer texts of open parameters.	▶Relativ/abs◆Relativ
Closed/ locked parameter Cannot be changed at the current access level.	▶Festwert🔒 +11.000
For better readability, a "space" separator is inserted between the name and value of the parameter in longer texts of locked parameters	▶Relativ/ab🔒 Relativ
Command	▶Abmelden
Sub menu	▶Zugriffsrechte>

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5.2.2 Navigation in the menu tree (PARAMETER screen)

Navigation in the menu tree (PARAMETER screen)	
▲ ▼	Switch a menu item down or up
◄ ►	LEFT: Temporarily hide parameter values Press and hold RIGHT: Load default value for the displayed parameter (if not locked)
Ok	- Opens a submenu item - Executes a command or - Edits a parameter [3]
Esc	- Goes back one menu level - LONG HOLD/ PRESS Exits menu and returns to Live Screen

5.2.3 Setting parameters

Navigate according to the previous explanations to the desired parameter, which you want to adjust and confirm with Enter. The editing mode appears.
A distinction is made between enumeration parameters (EP) and numerical parameters (NP).

For the enumeration parameters, the value can be set using the predefined selection. In the case of numerical parameters, the setting is made by defining the individual digits. Here, the glancing cursor marks the position of the item to be changed.

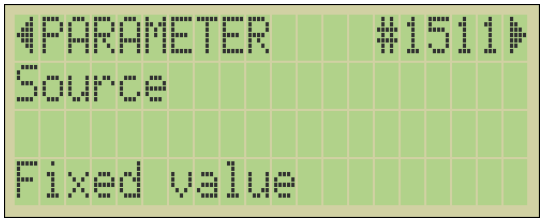

Figure 35: Enumeration parameter (EP)

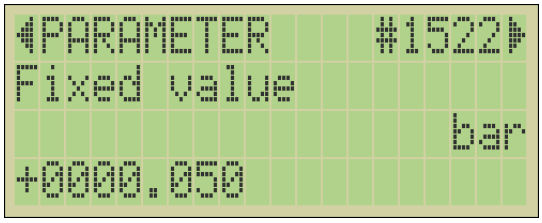

Figure 36: Numerical parameter (NP)

[3] If a parameter cannot be edited due to locking, a parameter info display opens instead.

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Navigation in editing mode	
▲ ▼	- **Enumeration parameters (EP)**: adjust option - **Numerical parameters (NP):** adjust digits (The cursor marks the digit to be adjusted, flashes alternately with the digit located there).
◄ ►	- **Enumeration parameters (EP)**: adjust option - **Numerical parameters (NP):** move cursor
Ok	Save value and exit editing mode
Esc	Do not save value and exit editing mode

After leaving the editing mode by pressing the OK key (Save), you will be returned to the previous position in the menu tree.
If it was a "chained" parameter, the next following parameter of the chain is opened for editing instead. The chain is interrupted if a parameter is not saved because the menu item was exited with ESC.

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6 Menu structure and parameter IDs (PARAMETER screen)

6.1 Menu structure: Main menu

ID	MENU STRUCTURE: MAIN MENU
#1001	**LANGUAGE** The device software has different languages, which can be set according to customer requirements. - - German as factory setting (FS)
#1100	**DEVICE INFO** Display of relevant device information, e.g. device family, firmware, serial number, ... Upgrade Keys Input
#1500	**INPUTS** Settings related to the connected units, such as flow meter, temperature and pressure sensor.
#2400	**OUTPUTS** Setting the relay outputs and the current output.
#2900	**LIMITS** Defining the limit values A and B
#1270	**REMOTE ACCESS** Deactivating or activating the remote control function via the unit's internal WLAN hotspot.
#2945	**NETWORK** Defining the type of network
#2805	**Modbus** Definition of the Modbus connection
#1200	**SYSTEM** Definition of system settings, such as operating mode, display, LED status, error display, ...
#1900	**WIZARDS** Selection of wizards, such as quick start via menu ID, restart of the device, reset to factory settings, ...
#1950	**ACCESS RIGHTS** Functions such as logging in and out of the device in relation to the access levels as well as setting a separate device pin for the access levels 2.
#1300	**COUNTER VALUE** Display of the quantity and pulse counters

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6.2 Menu structure: Language

6.2.1 Setting the language: New device

For new devices and devices that have been reset to factory settings, the firmware starts in German. The LANGUAGE setting parameter is opened automatically. The change is made according to the explanations for enumeration parameters from section 5.2.3 Setting parameters.

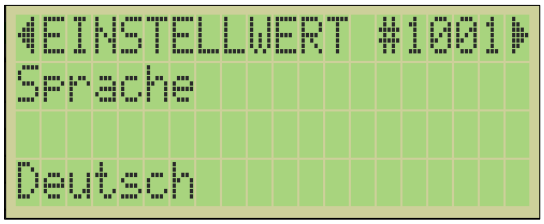

Figure 37: Language setting for new devices

6.2.2 Setting the language: Configured device.

The language can only be changed in the "Access rights 2 Level". If no PIN code (factory setting (FS): 10000) has been assigned and no previous logout has taken place, it is not necessary to log in to the device again. The device is therefore open and does not need to be unlocked. The change is made according to the explanations for enumeration parameters from section 5.2.3 Setting parameters.

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6.3 Menu structure: Device info (#1100)[4]

All parameters within the device info are locked parameters and cannot be changed by the customer.
Only the parameter Measuring point for changing the designation can be changed.

#1100	MENU STRUCTURE: DEVICE INFO	PARA.-TYPE
#1102	**Firmware** Displaying the firmware version, e.g. G12.02	-
#1008 #1011	**PcbID** Display of the installed hardware PcbID (main) PcbID (piggy)	-
#1965	**Modell** Specification of the device type	-
#1103	**Serial number** Displaying the serial number of the device	-
#1107	**Production year** Display the year of manufacture of the device	-
#1108	**Production month** Display the month of manufacture of the device	-
#1104	**Operating hours** Displaying the total operating hours of the device	-
#1290	**Probe index**[5] Setting the designation of the measuring point – Probe index A	NP
#1968	**Upgrade-Key** Entering the upgrade key for function expansion **Upgrade options that can be purchased later:** – LAN interface (provided that a LAN socket is available on the unit) – Modbus RTU – Modbus RTU + TCP	NP

[4] The menu item is not available in previous versions.
[5] The setting for "Measuring point" can be found in previous versions under the "System" menu item.

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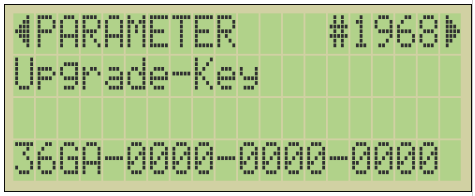
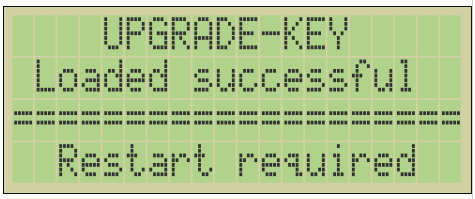
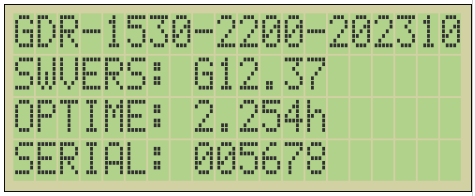
#1100	MENU STRUCTURE: DEVICE INFO	PARA.-TYPE
#1968	**Upgrade-Key** Entering the upgrade key for function expansion **Upgrade options that can be purchased later:** – LAN interface (provided that a LAN socket is available on the unit) – Modbus RTU Modbus RTU + TCP	NP
	Entering the activation key Use the arrow keys (up/down) to change the specification of the individual items. Use the arrow keys (left/right) to move the cursor between the positions. After entering the complete key, exit the menu item by pressing the "ok" key.  After successfully entering the activation key, the device must be restarted. To restart, briefly remove the power supply from the device and reconnect to the power supply.  **Check the change of the option code** Exit the settings menu by pressing the "Esc" key repeatedly until you are back in the live screen. There you press the "Ok" key once and a screen with information about your device appears. In the first line you will find the device type.  GDR-1530-XXXX-202310, XXXX defines the option codes. Check whether the option codes have changed according to the specifications of the functions.	

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6.4 Menu structure: Inputs (#1500)

6.4.1 Input: Flow rate

#1500	MENU STRUCTURE: INPUT FLOW	PARA.-TYPE
#1206	**Typ-CH-A** Flow rate signal: channel A Type selection: – Off – GD-Sensor direct (FS) (further settings required) – HB300[6]/SC300/UNI100 (further settings required) – Test frequency (further settings required) **NOTE:** **GD-Sensor direct:** In the NON-ATEX area, the gas flow meter GD 300/ GD 500 and the predecessor model GD 100 can be connected directly. If an SC 300 is installed in the current installation situation, it no longer needs to be connected. **HB300/SC300/UNI100** – HB 300 Ex-R000000 / UNI-100: In the ATEX area, the gas flow meter GD 300 Ex/ GD 500 Ex is connected via the integrated volume corrector HB 300 Ex-R000000. Older installations with UNI-100 of the predecessor model GD 100 can be connected. – HB 300 -R000000 / SC 300 / SC 310: In the NON-ATEX area the gas flow meter GD 300/ GD 500 can be connected via the integrated volume corrector HB 300-R000000 or via the external signal conditioners SC 300[7] and SC 310.	EP
#2500	- **Test frequency** (Display only when selected: Test frequency) Type selection: – 0,1 Hz – 0,2 Hz – 0,5 Hz – 1 Hz – 2 Hz – 5 Hz (FS) – …. – 1 kHz	EP

[6] Only the HB300 integrated volume correctors with type code HB 300-R0000 / HB 300 Ex-R0000 can be connected.
[7] Signal conditioners SC 300 and SC 310 can be connected, but it is possible to connect the gas flow meter GD 100 / GD 300 / GD 500 also directly via the platinum wire.

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#1500	MENU STRUCTURE: INPUT FLOW	PARA.-TYPE
#2110	**Sensor curve CH-A** (Display only when selected: GD-300 Sensor direct, HB300/SC300/UNI100) **#2101 Valid Points** - 02 (FS) **NOTE:** The definition of the number of interpolation points can take place as follows: – Transfer of the resolution/ native pulses (liters/pulse), specification from the nameplate of the gas flow meter. – (Examples see section **Error! Reference source not found. Error! Reference source not found.**) This applies to connections with HB 300 (Ex)-R000000 or direct connection of the gas flow meter GD 300/ GD 500 and if no calibration protocol is available. Number of points: 2 – Take over of values from factory calibration protocol Number of points: n+1 n+1 = number of measuring points of the calibration protocol plus 1 (For details see section 11.2 Factory calibration certificate for gas flow meter **#2111 Justierung (Adjustment)** - 00 (FS)	NP NP

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#1500	MENU STRUCTURE: INPUT DURCHFLUSS	PARA.-TYPE
	Continuation: Sensor curve CH-A (Display only when selected: GD-300 Sensor direct, HB300/SC300/UNI100)	
	#220x Charline Number depending on the number of specified measuring points in #2101, where the first measuring point is always 0 # 2201 Frequency 1 (NP): 0 Hz (FS) # 2202 Volume1 (NP): 0 l (FS) # 2203 Frequency 2 (NP): x.x Hz (FS) # 2204 Volume 2 (NP): x.x l (FS) … # 220x Frequency n (NP): x.x Hz # 220y Volume n (NP): x.x l **NOTE:** – Adoption of the resolution (liter/pulse) data from the nameplate of the gas flow meter. Example acc. to **Error! Reference source not found. Error! Reference source not found.** # 2201 Frequency 1 (NP): 0.0 Hz # 2202 Volume 1 (NP): 0 # 2203 Frequency 2 (NP): 1 Hz # 2204 Volume 2 (NP): 0,5002 l (Example) – Transfer of values from factory calibration record Number of points: n+1, corresponding to number of measuring points in the protocol plus 1 Example acc. to 11.2 Factory calibration certificate for gas flow meter # 2201 Frequency 1 (NP): 0.0 Hz # 2202 Volume 1 (NP): 0 # 2203 Frequency 2 (NP): 3.16 Hz # 2204 Volume 2 (NP): 2.1982 l # 2205 Frequency 3 (NP): 17.27 Hz # 2206 Volume 3 (NP): 2.1974 l …. # 2212 Frequency 7 (NP): 82.69 Hz # 2213 Volume 7 (NP): 2.18994 l A maximum of 32 measuring points can be defined.	NP

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6.4.2 Input: Temperature (Temp)

#1510	MENU STRUCTURE: INPUT TEMPERATURE (TEMP)	PARA.-TYPE
#1511	**Source** Definition of the source for the measured value temperature Type selection: – Fixed value (FS) (further settings required) – 4-20mA (further settings required) – PT100-3W (3 wire) – PT100-4W (4 wire) – PTE-3W (3 wire) – PTE-4W[8](4 wire)	EP
#1512	**Fixed value °C** (Display only when selected Fixed value) Specification of the desired fixed value in °C (FS: +30 °C)	NP
#1513	**Minimum °C** (Display only when selected 4-20mA) min. measurement range of the sensor in °C (min. -100 °C) **NOTE:** Please take the information from the connected pressure sensor or set it according to the settings of the higher-level system (value supplier).	NP
#1514	**Maximum °C** (Display only when selected 4-20mA) max. measurement range of the sensor in °C (max. +800 °C) **NOTE:** Please take the information from the connected pressure sensor or set it according to the settings of the higher-level system (value supplier).	NP

[8] PTE-3W, PTE-4W Esters resistance thermometers for the GD 600, only usable for IFC 16XX!

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6.4.3 Input: Pressure

#1520	MENU STRUCTURE: INPUT PRESSURE	PARA.-TYPE
#1521	**Source** Definition of the source for the measured value pressure Type selection: – Fixed value (FS) (further settings required) – 4-20mA (further settings required)	EP
#1525	**Relative/ absolut** Definition of the type of connected sensor (also for fixed value) – Relative (FS) – Absolut	EP
#1522	**Fixed value bar** (Display only when selected Fixed value) Specification of the desired fixed value in bar (FS: 0.050 bar)	NP
#1523	**Min value mbar** (Display only when selected 4-20mA) min. measuring range of the sensor in mbar (min. -500 mbar) **NOTE:** Please take the information from the connected pressure sensor or set it according to the settings of the higher-level system (value supplier).	NP
#1524	**Max value mbar** (Display only when selected 4-20mA) max. measuring range of the sensor in mbar (max. +1000 bar) **NOTE:** Please take the information from the connected pressure sensor or set it according to the settings of the higher-level system (value supplier).	NP

6.4.4 Input: Barometric pressure

#1540	MENU STRUCTURE: BAROMETRIC PRESSURE	PARA.-TYPE
#1541	**Hydr. Press** Definition of the source for the ambient pressure measured value – Internal (FS) – Fixed value (further settings required)	EP
#1542	**Hydr. Fixed value** (Display only when selected fixed value) Specification of the desired fixed value in mbar (FS: 1013.0 mbar)	NP

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6.4.5 Input: Conversion (Standardization)

#1550	MENU STRUCTURE: CONVERSION (STANDARDIZATION)	PARA.-TYPE
#1530	**Standard** (Display only when selected System > Operating mode (#1201): Bm^3+Nm^3) Definition of the calculation formula for standardization, selection of standards: – DIN1343 (FS) – DIN6358 – ISO2533“ – DIN102 – Other (further settings required)	EP
#1531	**Ref. Temp. °C** (Display only when selected Other) Reference temperature in °C (FS: +20°C)	NP
#1532	**Ref. Press. mbar** (Display only when selected Other) Reference pressure in mbar (FS: +1013 mbar)	NP

6.5 Menu structure: Outputs (#2400)

6.5.1 Output: Relays

#1600	MENU STRUCTURE: RELAYS	PARA.-TYPE
#1610	**Relay 1** **Definition of the output of the relay 1** Type selection: – Type Off – Type Pulse A (FS) (further settings required) – Type Status OK – Type Error code – Type Limit A – Type Limit B	EP
#1611	**Relay 2** **Definition of the output of the relay 2** Type selection: – Type Off – Type Pulse A (further settings required) – Type Status OK (FS) – Type Error code – Type Limit A – Type Limit B	EP

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#1600	MENU STRUCTURE: RELAY	PARA.-TYPE
#1220	**Pulse weight m^3/pulse** (Display only when selected Pulse A) X m^3/pulse (FS: 1 m^3/pulse) **NOTE:** The pulse weighting depends on the flow rate and must be defined analogously for the receiver.	NP
#1603	**Pulse/pause in milliseconds** (Display only when selected Pulse A) Selection: – 500/500 (1Hz) (FS) – 250/250 (2Hz) – 100/100 (5Hz) – 50/50 (10Hz) – 10/10 (50Hz) – 5/5 (100Hz) – 1/2 (333Hz) – 1/1 (500Hz) – Custom (further settings required) **NOTE:** The pulse weighting depends on the flow rate and must be defined analogously for the receiver.	EP
#1601	**Pulse length in milliseconds** (Display only when selected Pulse/pause: Custom) xxx ms (FS: 500 ms)	NP
#1602	**Pulse length in milliseconds** (Display only when selected Pulse/pause: Custom) xxx ms (FS: 500 ms)	NP

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6.5.2 Output: Current output

#1800	MENU STRUCTURE: CURRENT OUTPUT	PARA.-TYPE
#1804	**Function** Definition of the current output. Type selection: – Off (FS) – 0-20 mA (further settings required) – 4-20 mA (further settings required)	EP
#1802	**Source** (Display only when selected 0-20mA or 4-20mA) Type selection: – Standard volume (FS) – Operational volume	EP
#1810	**Flow in m³/h** (Display only when selected 0-20mA or 4-20mA) Definition of the output range. Type selection: – 0-5 m³/h – 0-10 m³/h – 0-20 m³/h – 0-50 m³/h – 0-100 m³/h (FS) – 0-200 m³/h – 0-400 m³/h – 0-800 m³/h – 0-1000 m³/h – 0-1500 m³/h – 0-2000 m³/h – 0-3000 m³/h – 0-5000 m³/h – 0-7000 m³/h – 0-10000 m³/h – 0-20000 m³/h – 0-50000 m³/h – 0-100000 m³/h – 0-200000 m³/h – 0-500000 m³/h – 0-1000000 m³/h – 0-2000000 m³/h – 0-5000000 m³/h – Custom (further settings required) **NOTE:** – The selection depends on the max. flow per hour of the gas flow measurement or the plant. – If the data is standardized, the standardized values (Nm³/h) are passed on, otherwise in m3/h. – Please note that the settings at the data receiver are configured correspondingly with respect to type and unit. – Example.: For an expected flow rate of 950 m³/h the type 0-1000 m³/h (or 0-1500 m³/h) should be selected.	EP
#1810	**Flow (20mA)** (Display only when selected: Custom) (FS: 100.00)	NP

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6.6 Menu structure: Limits (#2900)

#2900	MENU STRUCTURE: LIMITS	PARA.-TYPE
#2910	**Limit A**	EP
#2913	**Function** Defines the function of the limit value of the device. – Underrange – Overrange (FS) – Band – Notch	EP
#2911	**Limit A** xxx.xx m^3/h (FS: 100.00 m^3/h)	NP
#2912	**Hysteresis A** xxx.x % (FS 2.5 %)	NP
#2920	**Limit B**	EP
#2923	**Function** Defines the function of the limit value of the device. – Underrange – Overrange (FS) – Band – Notch	EP
#2921	**Limit B** xxx.xx m^3/h (FS: 100.00 m^3/h)	NP
#2922	**Hysteresis B** xxx.x % (FS 2.5 %)	NP

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6.7 Menu structure: Remote Access (#1270)

#1270	MENU STRUCTURE: REMOTE ACCESS	PARA.-TYPE
#1271	**REMOTE ACCESS** Activation and deactivation of the remote control via integrated WLAN-HOTSPOT, WLAN or LAN. Type selection: - Off (FS) - ON **NOTE**: – Remote control of the unit via WLAN and LAN network is only available if the two optional functions are available accordingly.	EP
#1274	**WLAN Server SSID** Assigning the SSID of the WLAN hotspot of the device SSID: WLAN_GDR_00XXXX (FS) **NOTE:** – The name of the SSID of the WLAN hotspot cannot be changed. – The SSID defined at the factory consists of WLAN_GDR_00 plus the serial number (XXXX) so that each device can be clearly identified.	NP
#1275	**WLAN Server Password** Assigning the password for the WLAN access point of the machine Password: 12345678 (FS) **NOTE**: Passwords cannot contain spaces.	NP

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6.8 Menu structure: Network (#2940)

#2940	MENU STRUCTURE: NETWORK	PARA.-TYPE
#2945	**Type** Activating and deactivating the network accesses Type selection: – Off (WE) – LAN (Only available if function is enabled) – WLAN (Only available if function is enabled)	EP
#2960	**LAN** (Display only when selected LAN and LAN+WLAN)	
#2961	**DHCP** Type selection: – On (FS) – Off (further settings required)	EP
#2962	**IP address** (Only if DHCP Off is selected) Set the defined IP address of the machine for the network.	NP
#2963	**Gateway** (Only if DHCP Off is selected) Set the default gateway for the network.	NP
#2964	**DNS server** (Only if DHCP Off is selected) Set the DNS server for the network.	NP
#2950	**WLAN** (Display only when selected LAN and LAN+WLAN)	
#2951	**DHCP** Type selection: – On (FS) (further settings required) – Off (further settings required)	EP
#1272	**WLAN Client SSID** Enter the SSID of the WLAN to which the device is to be added.	NP
#1273	**WLAN Client Password** Enter the password of the SSID of the WLAN to which the device is to be added.	NP
#2952	**IP address** (Only if DHCP Off is selected) Set the defined IP address of the machine for the network.	NP
#2953	**Gateway** (Only if DHCP Off is selected) Set the default gateway for the network.	NP
#2954	**DNS server** (Only if DHCP Off is selected) Set the DNS server for the network. **NOTE**: – WLAN SSIDs must not contain spaces. – Passwords must not contain spaces.	NP

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6.9 Menu structure: Modbus (#2805)

#1200	MENU STRUCTURE: MODBUS	PARA.-TYPE
#1201	**Bus type** Defines the type of Modbus interface – Off (FS) – Modbus RTU – Modbus TCP LAN – Modbus TCP WLAN **NOTE:** For Modbus TCP to work via LAN or WLAN, the connection must be activated and parameterized in the Network area.	AP
#2810	**Bus address** (Only if Modbus RTU is selected) Defines the bus address of the Modbus RTU interface – 001 (FS)	NP
#2820	**Baud rate** (Only if Modbus RTU is selected) Defines the baud rate of the Modbus RTU interface – 19200 (FS)	NP
#2830	**Parity** (Only if Modbus RTU is selected) Defines parity of the Modbus RTU interface – EVEN (FS) – NONE	AP
#2840	**Parameter access** – No access (FS) **NOTE:** Locked parameter	
#2855	**Port** (Only if Modbus TCP LAN is selected) Entering the defined port (FS 502)	NP
#2840	**Parameter access** – No access (FS) **NOTE:** Locked parameter	

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6.10 Menu structure: System (#1200)

#1200	MENU STRUCTURE: SYSTEM	PARA.-TYPE
#1201	**Operating mode** Defines the operating mode of the device. – 1:1 – Bm^3 – Bm^3+Nm^3 (FS) **NOTE:** **Operating mode Bm^3+Nm^3:** This operating mode must be selected to standardize the measured values. Measured values for pressure and temperature must be provided accordingly. The measured values can be processed by connected temperature and pressure sensors or by a higher-level system via mA input in the GDR 1530. In systems without measured value fluctuations for pressure and temperature, corresponding fixed values can be defined. Please still define at "Inputs > Standard (#1530)" the standard to be applied (FS DIN1243) **Operating mode 1:1:** For third-party gas flow meters for 1:1 transfer of measured values.	EP
#1700	**Mean value** The mean value is used to calm the indication of the measured value in the display in case of strongly and quickly fluctuating flows. The setting has no influence on the measured values themselves. **#1701 Flow operational:** Filter for operating volume (FS 10) **#1702 Flow standard:** Filter for normalized volume (FS 10) **#1704 freqGate:** Filter for Frequency in seconds (FS 10)	 EP EP EP
#1703	**Min Frequency** Definition of a minimum threshold to distinguish between gas flow and standstill xx.x Hz (FS 0.0 Hz)	NP
#1202	**Display** Defines the measuring unit to be shown on the device´s display. – m^3/h (FS) – m^3/min – l/h – l/min	EP

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#1200	MENU STRUCTURE: SYSTEM	PARA.-TYPE
#1204	**LED** Setting the status of the left "Status" LED – Device status (FS) – Pulse input – Pulse output **NOTE:** The left LED labeled "Status" on the housing of the device can be assigned individually.	EP
#1207	**Display switch** Defines the display change in the Live Screen. – Off – On error (FS) – Time triggered **NOTE:** **On error:** An ERROR screen is appended to each Live Screen in the event of an active error message. In the event of an error, the system switches directly to the error screen. If the error is corrected, the system switches to the last Live Screen. New errors are prioritized and displayed according to their priority. Once all errors have been corrected, the system switches back to the last Live Screen displayed. **Time triggered:** Rolling change between the Live Screens based on the defined time.	EP
#1227	**Display time** (Display only when selected: Time triggered) Define number of seconds Xx s (FS 10 s)	NP
#1248	**Menu preview** Definition of the display time in seconds regarding the menu preview before the configuration of the individual parameters is displayed. – Off – 1s (FS) – 2.5s – 5s – 7.5s – 10s	EP
#1210	**Time&date** Definition of date and time.	NP

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6.11 Menu structure: Wizards (#1900)

#1900	MENU STRUCTURE: WIZARDS	PARA.-TYPE
#1006	**Service** Direct call of settings by means of parameter or menu ID.	NP
#1901	**Reboot** Restart the device.	EP
#1902	**Clear counters** Deletes the data of all volume and pulse counters.	EP
#1903	**Factory settings** Resets the device to factory settings (FS), all individual settings are lost. **NOTE:** Please note that this also deletes the factory-set individually predefined support curve/characteristic curve in relation to the connected gas flow meter. The data for the characteristic curve are contained in the factory calibration record (see 7.2 Factory calibration certificate for gas flow meters). The description regarding the settings on the device is given in section 6.4.1 Input: Flow rate.	EP
#1905	**Welcome** Activates the automatic language request at device start.	EP

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6.12 Menu structure: Access rights (#1950)

#1950	MENU STRUCTURE: ACCESS RIGHTS	PARA.-TYPE
#1007	**Logout** (only displayed if logged in at a higher level than "Access rights level 1"). Logout from the current access level and back to "Access rights level 1". No changes can be made to the settings within "Access rights level 1", they can only be read.	-
#1002	**Login** Display only if logged on to "Access rights level 1". Login to higher access level with PIN code.	NP
#1205	**PIN Code** Change the PIN Code for „Access Level 2“. (FS: 10000) **NOTE:** If a brand-new device is to be locked against unintentional changing of settings, a separate PIN code must be defined. The factory-defined code "10000" has the effect that the device is "open". Any other PIN code locks the device as soon as it is restarted, the user logs off or no keys have been used on the device for a longer period of time. After 300 seconds, the settings menu closes automatically and after another 900 seconds, the device logs out automatically. Re-registration is then only possible with the previously assigned PIN code.	NP

6.13 Menu structure: Counter values (#1300)

#1300	MENU STRUCTURE: COUNTER VALUES	PARA.-TYPE
#1301	**Volume CH-A** Display of the info screen for the respective meter readings.	-
#1303	**Pulses CH-A** Display of the info screen for the respective meter readings.	-

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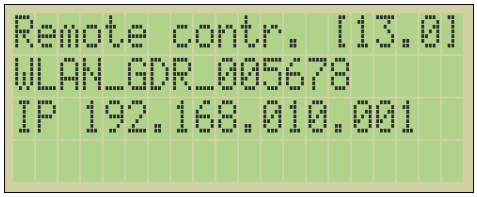
7 Remote control of the unit via web browser

The unit can be operated directly via the keyboard. In addition, however, there is the option of remote control via web browser.

The unit has its own WLAN hotspot. However, the function must be activated on the unit via the keyboard. In the LIVE screens, it can be checked whether the function is activated. If the LIVE screen "Remote control [13.0] is displayed, the remote control is active.



Line 2 shows the SSID of the WLAN hotspot.
Line 3 shows the IP address for accessing the web page of the device.

Figure 38: Remote control [13.0]

7.1 Connecting to WLAN hotspot (mobile devices)

Connect your mobile device to the device hotspot "WLAN_GDR_00xxxx" (example: WLAN_GDR_001234). The password is identical to the WLAN hotspot SSID[9] ex works. If the connection is successful, your mobile device may display a message such as "no Internet connection" or "unsecured network". However, this is irrelevant for remote control, as only access directly to the device is required. The GDR 1530 automatically assigns an IP address to the connected end device. This is in the IP space 192.168.4.x by default. The IP address of the GDR 1530 is 192.168.4.1.

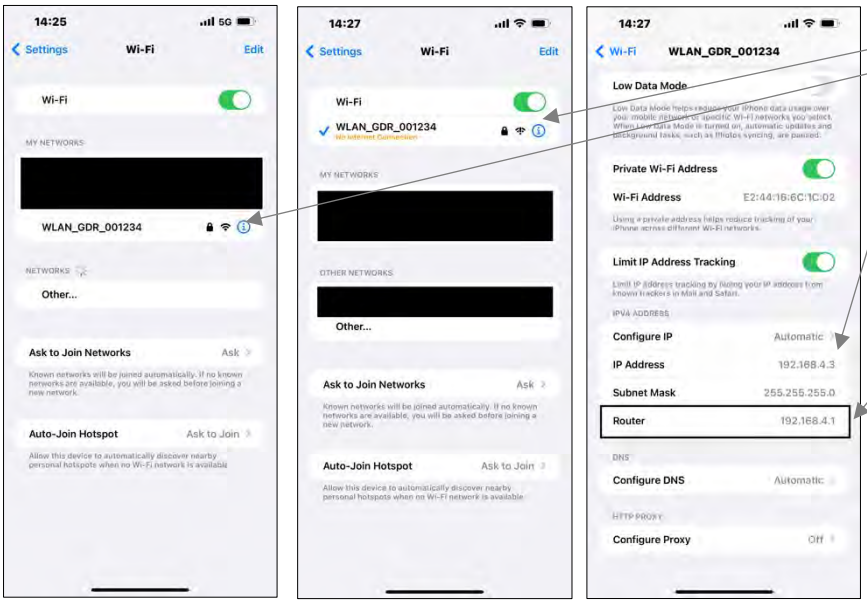


Figure 39: Connection of WLAN hotspot with mobile device

[9] The WLAN hotspot SSID and the password can be changed (see 6.7 Menu structure: Remote Access (#1270)).

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7.2 Remote control via Web-Browser: WLAN Hotspot

Open the web browser on your mobile device and type in the URL http://192.168.4.1 (or the router IP address from the WLAN connection). The web page of the device is then opened.
The IP address can also be read on the live screen remote control (LIVE Screen [13.0] remote control line 3).

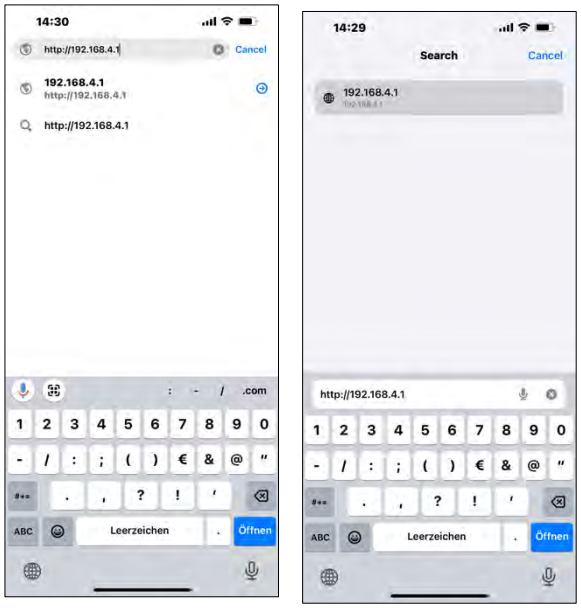

Figure 40: Enter URL in web browser (e.g. Google Chrome, Safari)

After successfully entering the URL, you are directly on the page for remote control of the unit. The operation is analogous to the operation on the keyboard.

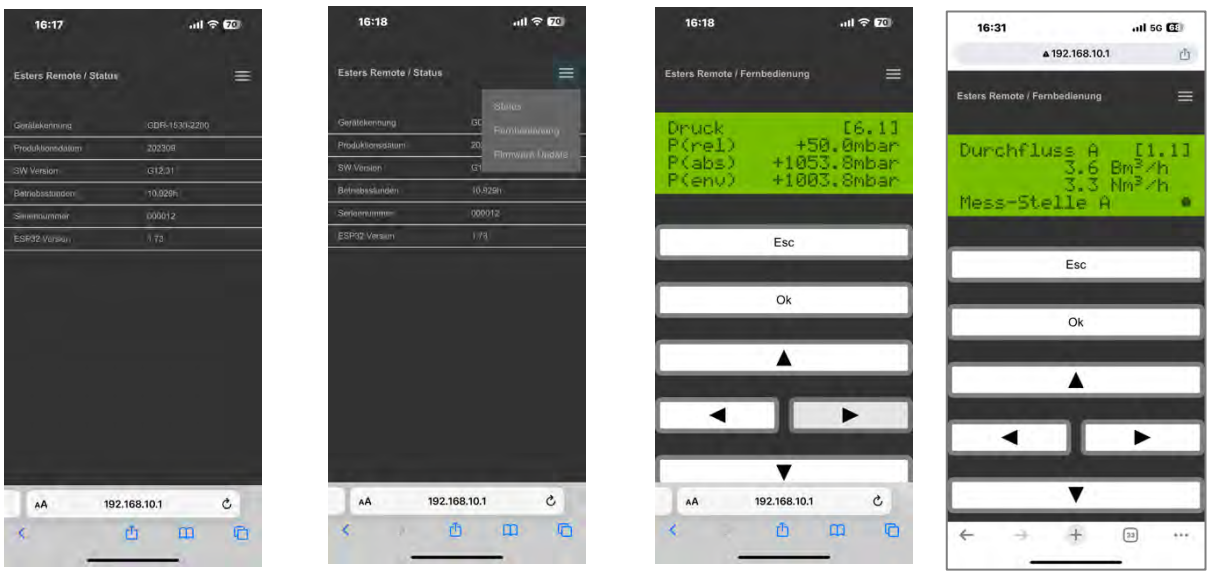

Figure 41: Web page for remote control of the device (e.g. Google Chrome, Safari)

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7.3 Remote control via Web-Browser: LAN or WLAN connection in the own network

The IP address for access via web browser can be found in the respective LIVE screens (LAN net. [14.1] or WLAN network [15.1] in the 3rd line. Enter this IP address in the web browser.

Figure 42: Web page for remote control of the device II

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8 Modbus RTU data record (optional function)

Offset	Format	Content	Unit
0x00	U16	Counter approx. 10 Hz	-
0x02	U64	Operating quantity „A“	Bl
0x0A	U64	Standardized quantity „A“	Nl
0x12	U32	Flow rate „A“	0.1 l/h
0x16	U32	Flow rate standardized „A“	Bl/h
0x1A	U64	Operating quantity „B“	Bl
0x22	U64	Standardized quantity „B“	Nl
0x2A	U32	Flow rate „B“	0.1 l/h
0x2E	U32	Flow rate standardized „B“	Nl/h
0x32	U32	Gas pressure	0.1 mbar
0x36	U16	Air pressure	0.1 mbar
0x38	S16	Gas temperature	0.1 °C
0x3A	U16	Gas 1	0.1 %
0x3C	U16	Gas 2	0.1 %

NOTES:

- All data are in MOTOROLA format on the bus.
- For 32-bit values, the HI word comes first, then the LO word.
- For 64-bit values, the most significant word comes first, followed by the remaining three words in descending order of significance.
- For signed values, the two's complement applies.

Rev.-Nr.: IM 329 E V0.6-2023-10-23, FW G12.37

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9 Connecting diagram

Always observe the following safety instructions:

- Only connect in a de-energised state
- If overvoltages or voltage peaks are to be expected, install overvoltage protection devices.
- Before commissioning, make sure that the voltage supply corresponds to the specifications on the type plate.

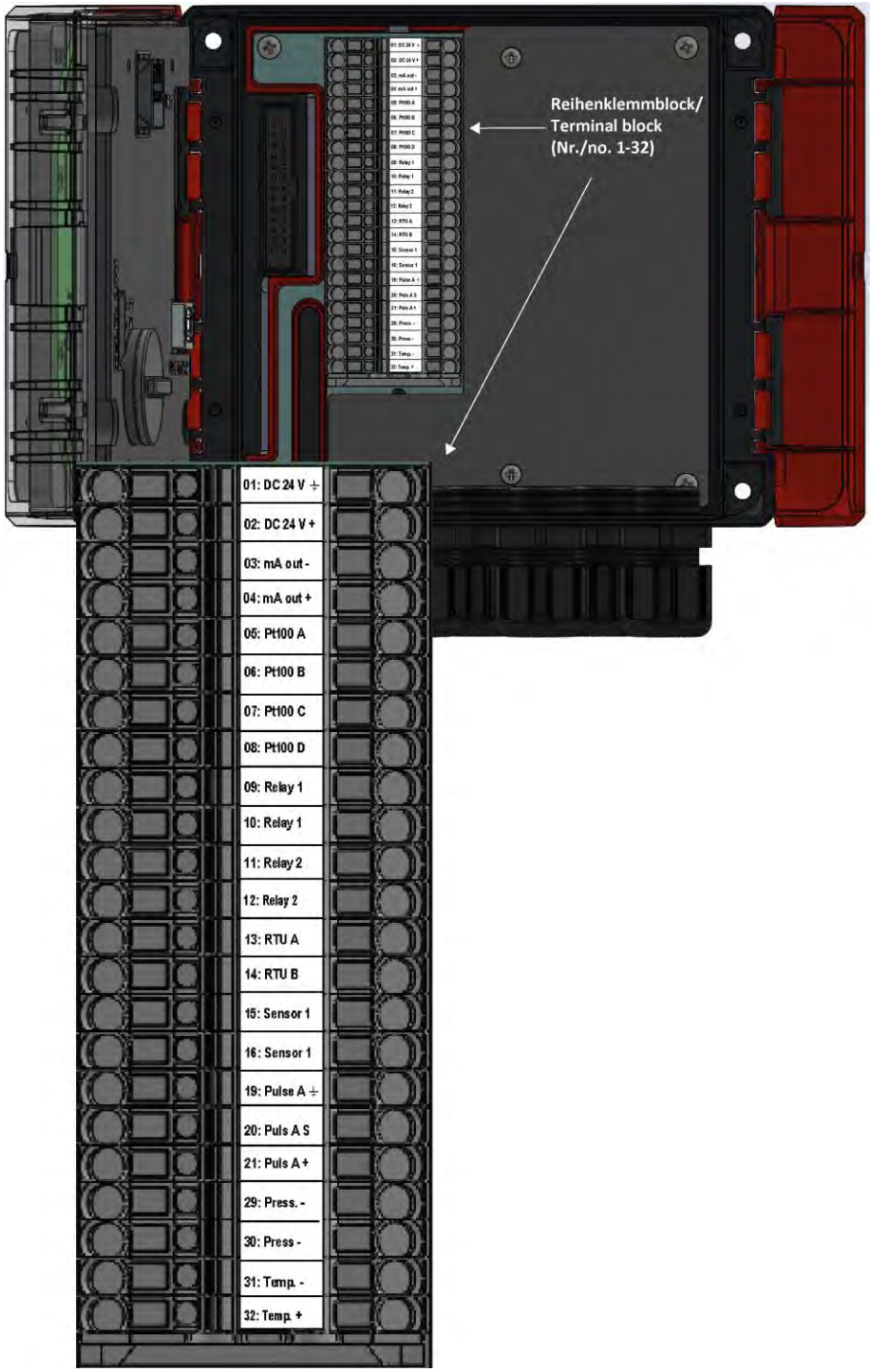

Figure 43: Connection terminals GDR 1530

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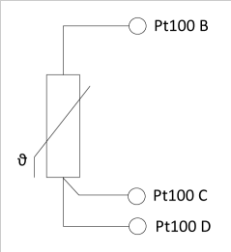
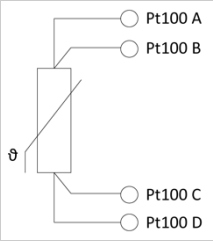
	Connection terminal no.		
Power supply	01	DC 24 V ⏚	
	02	DC 24 V +	
Current output: mA	03	mA out -	
	04	mA out +	
Pt100 sensor, 3 wire or Pt100 sensor, 4- wire			3-Leiter  4-Leiter 
	05	Pt100 A	
	06	Pt100 B	
	07	Pt100 C	
	08	Pt100 D	
Relay: K1 (NO)	09	Relay 1	
	10	Relay 1	
Relay: K2 (NO)	11	Relay 2	
	12	Relay 2	
Modbus RTU (optional)	13	MB RTU A	
	14	MB RTU B	
Platinum sensor: #1	15	Sensor 1	
	16	Sensor 1	
Pulse A: HB 300 / HB 300 Ex	19	Pulse A ⏚	
	20	Pulse A S	
	21	Pulse +	
Pressure (P): mA	29	-	
	30	+	
Temperature (T): mA	31	-	
	32	+	

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10 Error code list

CODE	GERMAN	ENGLISH
E01	EEP Hardware	EEP hardware
E02	Parametersatz	Param data
E03	Seriennummer	Serial number
E04	**Eingang Überl. CH-A**	**Input overflow CH-A**
E05	**Ausgang Überl. CH A**	**Output overflow CH-A**
E06	**Ausgang Überl. CH-B**	**Input overflow CH-B**
E07	**Sensorfehler CH A**	**Sensor error CH-A**
E08	**Stromausgang Bürde**	**Current output load**
E09	Key Hardware	Key Hardware
E10	LCD Hardware	LCD Hardware
E11	RTC Hardware	RTC Hardware
E12	**Uhrzeit Datenverlust**	**Time data lost**
E13	**Sensorfehler Temp.**	**Sensor failure temp**
E14	**Sensorfehler Druck**	**Sensor failure press.**
E15	System param. 171x	System param. 171x
E16	**Sensorfehler CH-B**	**Sensor break CH-B**
E17	**Eingang Überl. CH-B**	**Input failure CH-B**
E18	**Überl. Betrieb CH-A**	**Overflow CH-A oper.**
E19	**Überl. Betrieb CH-B**	**Overflow CH-B oper.**
E20	**Überl. Normiert CH-A**	**Overflow CH-A std.**
E21	**Überl. Normiert CH-B**	**Overflow CH-B std.**
E22	Hardwareaufbau	Hardware
E23	Hydrostatischer Druck	Hydrostatic pressure

The error messages printed in bold type can occur on the customer side of the unit during normal operation. The other messages may occur during unit production, troubleshooting or unit defect.

Table 2: Error code list

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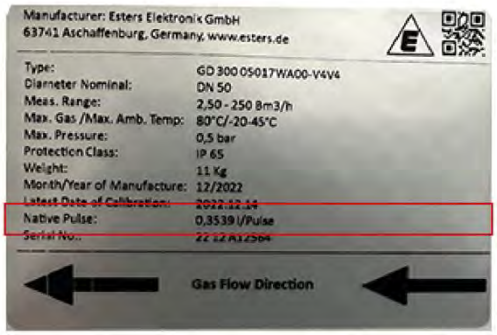
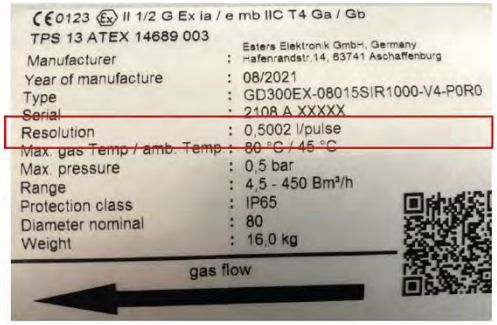
11 Appendix

11.1 Overview of nameplates GD 300 (Ex) and GD 100

Example: Nameplate GD 300

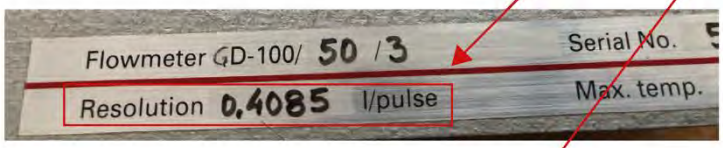


Example: Nameplate GD 300 Ex



Resolution or native pulses (liter/pulse) for defining the support curve

Example: Nameplate GD 100



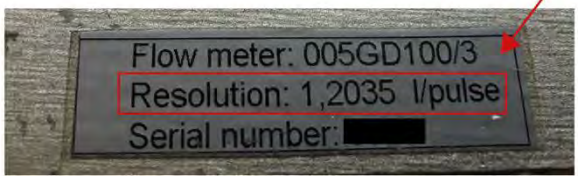


Figure 44: Overview nameplates GD 300 (Ex) und GD 100

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11.2 Factory calibration certificate for gas flow meter

Werkskalibrierschein

Prüfstelle für Gasdurchflussmesser

Esters Elektronik GmbH
Hafenrandstr. 14
63741 Aschaffenburg
Tel.: +49 6021/45807-0
E-Mail: info@esters.de

Prüfer	John		
gemessen	Datum	Unterschrift	
	[redacted]		
Gültigkeit *	07.2023		
Baujahr	2021	Messintervall (Sek.)	45
Datum	28.07.2021	Druckstufe	PN 10
Typ	GD300_100_17	Druckprüfung	☑ Bestanden
Seriennummer	[redacted]	Kanaltausch Prüf/Norm	☑ Aktiv

Durchflussrichtung	unidirektional
Normierung	Abgleich in Bm³
Normal Zähler 1	Aerzen Zc 11.4 / KANR:61-341297-00
Normal Zähler 2	Aerzen Zc 038.06 / KANR:61-341297-01
Liter-Puls-Zahl (l/Puls) Prüfling	2,1930
Liter-Puls-Zahl (l/Puls) Normalzähler 1	1,00
Liter-Puls-Zahl (l/Puls) Normalzähler 2	10,00

Messung	Prüfling Frequenz/Hz	Normalzähler Frequenz/Hz	m³/h Prüfling	Liter-Puls-Zahl Prüfling	Abweichung Mittelwert/%
1	3,16	7,34	24,97	2,1982	0,24
2	17,27	40,15	136,59	2,1974	0,20
3	34,49	80,17	272,77	2,1969	0,18
4	48,16	111,36	378,88	2,1855	-0,34
5	70,13	162,53	552,98	2,1902	-0,13
6	82,69	191,60	651,89	2,1899	-0,14
				2,1930	Prüfung

Support curve:
No. of points: n
Example: n+1 = 7
Acc.to no.of measuring points plus 1

Support curve:
Frequency:
1 = 0
2 = 3,16
...
7 (n+1) = 82,69

Support curve:
Volume:
1 = 0
2 = 2.1982
...
7 (n+1) = 2.1899

Liters-Pulses-No. acc. to type plate
No. of interpolation points n = 2
Example.:
Frequency 1 = 0
Volume 1 = 0
Frequency 2 = 1
Volume 2 = 2,1930

It is preferable to enter the entire support curve n+1 rather than just the liter/pulse number on the nameplate, since entering the support curve achieves a higher degree of accuracy.

Figure 45: Factory calibration certificate for gas flow meter

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