GREISINGER
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Operating manual

EN

G 1910-20

Compact CO2 monitor with alarm

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1 About this documentation

1.1 Foreword

Read this document carefully and familiarise yourself with the operation of the product before you use it. Keep this document ready to hand and in the immediate vicinity of the product so that it is available to the personnel/user for reference at all times in case of doubt.

The product was developed according to the state of the art and fulfils the requirements of the applicable European and national Directives. All corresponding documents are available from the manufacturer.

Only technically qualified persons are permitted to carry out commissioning, operation, maintenance and decommissioning. The qualified personnel must have carefully read and understood the operating manual before beginning any work.

1.2 Purpose of the document

- This document describes the operation and maintenance of the product.
- Provides important information for working safely and efficiently with the product.
- In addition to the quick reference guide with all relevant legal and safety content in hard copy, this document is a detailed reference option for the product.

1.3 Legal notices

The liability and warranty of the manufacturer for damages and consequential damages are voided with misuse, disregarding this operating manual, disregarding safety notices, assignment of inadequately qualified technical personnel and arbitrary modifications of the product.

Only carry out the maintenance and service tasks on this product that are described in this documentation. In the process, adhere to the specified steps. For your own safety, only use original spare parts and accessories of the manufacturer. We assume no liability for the use of other products and resulting damage.

This document is entrusted to the recipient for personal use only. Any impermissible transfer, duplication, translation into other languages or excerpts from this operating manual are prohibited.

The manufacturer assumes no liability for print errors.

1.4 Correctness of content

The contents of this document were checked for corrected and are subject to a continuous correction and updating process. This does not rule out potential errors. In the event that errors are discovered or in case of suggestions for improvement, please inform us immediately via the indicated contact information in order to help us make this document even more user-friendly.

1.5 Layout of this document

Description

Each chapter is explained at the beginning in the description.

Prerequisite

All mandatory prerequisites are then listed for each step.

Instruction

Tasks to be carried out by the personnel / user are represented as numbered instructions. Adhere to the sequence of the specified instructions.

Representation

Shows an illustrative instruction or a configuration of the product.

Formula

Some instructions include a formula for a general understanding of a configuration, programming or a setting of the product.

Outcome of an action

Result, consequence or effect of an instruction.

Emphases

In order to simplify legibility and provide a clearer overview, various sections / information are emphasised.

- 1234 Display elements
- *Mechanical controls*
- ***Product functions***
- **Product labels**
- Cross-reference [▷ p. 4]
- *Foot notes*

1.6 Further information

Software version of the product:

- V1.1 or later

2 Safety

2.1 Explanation of safety symbols

DANGER

This symbol warns of imminent danger which can result in death, severe bodily injury, or severe property damage in case of non-observance.

CAUTION

This symbol warns of potential dangers or harmful situations which can cause damage to the device or to the environment in case of non-observance.

NOTE

This symbol indicates processes which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

2.2 Foreseeable misuse

The fault-free function and operational safety of the product can only be guaranteed if generally applicable safety precautions and the device-specific safety instructions for this document are observed.

If these notices are disregarded, personal injury or death, as well as property damage can occur.

DANGER

Incorrect area of application!

In order to prevent erratic behaviour of the product, personal injury or property damage, the product must be used exclusively as described in the chapter Description [p. 9] in the operating manual.

- Do not use in safety / Emergency Stop devices!
- The product is not suitable for use in explosion-prone areas!
- The product must not be used for diagnostic or other medical purposes on patients!
- The product is not intended to come into direct contact with food!
- Not suitable for use with requirements on functional safety, e.g. SIL!

DANGER

Danger due to elevated CO_2 concentration

The product is not suitable for use as personal protective equipment with elevated CO_2 levels. However, it can indicate an elevated CO_2 value. The measured value appears in the display as a % or ppm value.

G 1910-02	G 1910-20	CO_2 concentration		Effect
		%	ppm	
		20		Death within a few seconds
		10		Loss of consciousness, death, dizziness, vomiting, headaches, reduced blood flow to brain
		4.0		IDLH - immediate danger to life and health
		3.0		Normal exhalation concentration, elevated breathing and pulse rate
		1.0	10,000	Possible shortness of breath
		0.5	5000	TWA – Maximum for working conditions
		0.1 .. 0.2	1000 .. 2000	Recommended maximum value in public areas
		0.04	400	Fresh air

	Product is not permitted for the area
	Expanded measuring range. The product can be used conditionally
	Area of application of the product with specified accuracy

The values are guideline values. Depending on the health condition and duration of exposure, problems can also occur below the indicated concentrations under certain circumstances.

2.3 Safety instructions

This product has been designed and tested according to the safety requirements for electronic measuring devices.

CAUTION

Erratic behaviour!

On suspicion that the product can no longer be operated without danger, it must be decommissioned and prevented from recommissioning with appropriate labelling. The safety of the user can be impaired by the device if, for example, if it shows visible damage, it no longer works as specified or if it was stored for an extended period of time under unsuitable conditions.

– Visual inspection!
– In case of doubt, send the product to the manufacturer for repair or maintenance!

NOTE

This product does not belong in children's hands!

2.4 Intended use

The product is designed exclusively for measurements in ambient air and environments with slightly elevated CO_2 concentrations in areas that are not harmful to the health. It is designed to be carried on the body for mobile use. The user can be warned optically and acoustically of elevated CO_2 concentrations based on variable alarm limits. Example applications for this are:

– Use as a monitor for recording of the mean value weighted over 8 hours (TWA) or 15 minutes (STEL).
– Monitoring of air quality.

2.5 Qualified personnel

For commissioning, operation and maintenance, the relevant personnel must have adequate knowledge of the measuring process and use of the measurements, for which purpose this document makes a valuable contribution. The instructions in this document must be understood, observed and followed.

In order to ensure that no risks arise from the interpretation of the measurements in the concrete application, the user must have additional technical knowledge, because the user is liable in case of damage/danger due to misinterpretation as a result of inadequate technical knowledge.

3 Description

3.1 Scope of delivery

Please check to ensure the completeness of the product after opening the package. You should find the following components:

- Quick reference guide
- Handheld measuring device, ready for operation, including rechargeable batteries
- Micro USB to USB type A connection cable

3.2 Functional description

The product offers precision, speed and reliability in a compact, ergonomic housing. It is distinguished by an illuminated 3-line display. The product can be switched on, switched off and configured and the measurements and parameters can be adjusted and held with the operating elements. The product is equipped with an integrated optical carbon dioxide sensor. In addition to display of the currently measured CO_2 value, the mean value weighted over 8 hours (TWA) or 15 minutes (STEL) can be output.

An integrated two-stage alarm also issues an optical signal and an acoustic signal as a warning when the adjusted limits are exceeded.

- A pre-alarm issues a text warning or the backlight flashes with a brief horn when the limit is exceeded depending on the setting.
- A pre-alarm issues a text warning or the backlight flashes rapidly with a continuous horn when the limit is exceeded depending on the setting.

4 The product at a glance

4.1 The G 1910-20

LCD Display

G 1910-20

Sensor openings

Micro USB socket

4.2 Display elements

Display

Charge status display	Evaluation of the charge status
Unit display	Display of units or type of mode, min/max/hold
Main display	Measurement of the current conductivity value or value for min/max/hold
Auxiliary display	Display of the mean value
Bar graph	Visualisation of the CO_2 value

4.3 Operating elements

On / Off button

Press briefly	Switch on the product Activate / deactivate lighting
Long press	Switch off the product Reject changes in a menu

Up / Down button

Press briefly	Display of the min/max value Change value of the selected parameter
Long press	Reset the min/max value of the current measurement
Both simultaneously	Rotate display, overhead display

Function key

Press briefly	Freeze measurement
	Return to measurement display
	Call up next parameter
Long press, 2s	Open menu, frozen measurement is displayed
	Close menu, changes are saved
Long press, 2s	Start menu configuration, ConF appears in the display
Long press, 4s	Start automatic calibration, CAL appears in the display

4.4 Connections

Micro USB socket	Charging the batteries

5 Operation

5.1 Commissioning

5.1.1 Explanation

Description

The product is switched on with the *On/Off button*. It may be necessary to configure the product after switching on. See Configuration [▶ p. 12].

A self-test is conducted after switching on. The following increasing CO_2 values 1000, 2000, 4000 and 8000 are shown in the display. tESt is shown in the secondary display. If an alarm is active and is in one of these relevant areas, it is triggered.

If ---- appears in the display after the self-test, the sensor is not ready for measurement.

If batteries are drained and the product is not used for an extended time, it can take up to 30 seconds until the measurement starts. If no measurement is received by the sensor within 30 seconds, the product issues an alarm.

Prerequisite

– The rechargeable batteries have been charged via the micro USB socket.

Instruction

– Press the *On/Off button*.

Outcome of an action

Information about the configuration of the product appears in the display.

tESt	Self-test	An automatic self-test is carried out during system start-up. The bar indicator for the threshold value is displayed and the alarm is tested if it has been activated.
PoFF	Automatic shut-off	Automatic shut-off activated. The product is switched off if no buttons have been pressed after the adjusted time

– The product is now ready for measurement.

5.2 Configuration

5.2.1 Explanation

The following steps describe how to adapt the product for your purposes.

NOTE

There are various configuration parameters available depending on the product version and configuration. They can differ depending on the product version and configuration.

5.2.2 Opening the configuration menu

Description

In order to configure the product, you must first open the ***Configuration*** menu. The menu is opened as shown in the illustration.

Prerequisite

Instruction

1. Press the *Function key* for 2 seconds to open the ***Configuration*** menu.
2. ConF appears in the display. Release the function key.
3. By briefly pressing the *Function key*, you can scroll through the parameters. Select the parameter you would like to configure.

4. When you have selected the desired parameter, change the parameter to the desired value with the *Up button* and the *Down button*.
5. The changes are saved after running through the entire ***Configuration*** menu. Stor appears in the display. The ***Configuration*** menu can be exited from any arbitrary parameter by pressing and holding the *Function key* for 2 seconds. The changes made up that point are saved.

Representation

Call up menu	Next parameter	Change value	Save changes	Discard changes
2s		Press: Single step Hold: Rapid change	2s	2s Product is switched off

Outcome of an action

The ***Configuration*** menu is closed after the last parameter.

NOTE

If the product is switched off without saving the configuration, the last save value is reproduced on the next start-up of the product.

5.2.3 Configuring parameters of the configuration menu

Description

The following representation shows the available parameters and various configuration options.

Prerequisite

– The ***Configuration*** menu is open. See Opening the configuration menu [▷ p. 12].

Instruction

1. Select the desired parameter you would like to configure.
2. Adjust the desired configuration in the selected parameter with the *Up button* and *Down button*.
3. The available configuration options are listed for each parameter in the following representation.

Outcome of an action

The changed value is saved and the ***Configuration*** menu is closed. Stor appears in the display. If necessary, the product is restarted automatically in order to adopt the changed values.

NOTE

The configuration is closed if no button is pressed for 2 minutes. Any changes made up to that point are not saved. c.End appears in the display.

Representation

Parameter	Values	Meaning
Input		
InP		
	%	CO_2 measurement in %
	PPm	CO_2 measurement in ppm

Alarms		
AL.		
	oFF	No active alarm
	on	Alarm alerting via text display, acoustic signal and flashing of the backlighting
	bEEP	Alarm alerting via text display and acoustic signal
	Li tE	Alarm alerting via text display and flashing of the backlighting
AL1		Depending on the setting of the parameter value InP
	0.000 .. AL2	Min. alarm limit in % or ppm; a pre-alarm is triggered when the value is exceeded
	0 .. AL2	
AL2		Depending on the setting of the parameter value InP
	AL1 .. 3.200	Max. alarm limit in %; the main alarm is triggered when the value is exceeded
	AL1 .. 19.999	Max. alarm limit in ppm; the main alarm is triggered when the value is exceeded
Mean value		
Lcd.2		
	8 h	Time weighted over 8 hours, mean value TWA
	StEL	Time weighted over 15 minutes, mean value STEL
	oFF	Mean value determination deactivated
Shut-off time		
PoFF		
	oFF	No automatic shut-off
	0:15 0:30 1:00 4:00 12:00	Automatic shut-off after a selected time in hours and minutes, during which no buttons have been pressed
Backlighting		
Li tE		
	oFF	Backlighting deactivated
	0:15 0:30 1:00 4:00	Automatic shut-off of the backlighting after a selected time in minutes and seconds, during which no buttons have been pressed
	on	No automatic shut-off of the backlighting
Factory settings		
In it		
	no	Use current configuration
	YES	Reset product to factory settings. In it donE appears in the display

5.2.4 Call-up of the expanded settings menu

Description

In order to configure the product, you must first open the ***Expanded settings*** menu. The menu is opened as shown in the illustration.

Prerequisite
– The product is switched off.

Instruction
1. Press and hold the *Down button*.
2. Press the *On/Off button* to switch on the product.
3. Release the *On/Off button* after 1 second and then the *Down button* in order to call up the ***Expanded settings*** menu. The display shows the first parameter.
4. By briefly pressing the *Function key*, you can scroll through the parameters. Select the parameter you would like to configure.
5. When you have selected the desired parameter, change the parameter to the desired value with the *Up key* and the *Down key*.
6. In order to save the new parameter value, press and hold the *Function key* for longer than 2 seconds.

Representation

Call up menu

Hold | 1s | Release | Release

Outcome of an action
The ***Expanded settings*** menu is closed after the last parameter.

NOTE

If the ***Expanded settings*** menu is processed completely, the changes are saved automatically. Stor appears in the display. However, it can be exited at any time by pressing the *Function key* for 2 seconds. The changes made up that point are also saved.

If the product is switched off without saving the configuration, the last save value is reproduced on the next start-up of the product.

5.2.5 Configure parameters of the expanded settings menu

Description
The following representation shows the available parameters and various configuration options.

Prerequisite
– The ***Expanded settings*** menu is called up. See Call-up of the expanded settings menu [▷ p. 14].

Instruction
1. Select the desired parameter you would like to configure.
2. Adjust the desired configuration in the selected parameter with the *Up key* and *Down key*.
3. The available configuration options are listed for each parameter in the following representation.

Representation

Parameter	Values	Meaning

Calibration

CAL

oFF	No calibration
2.Pt	2-point calibration
1.Pt	1-point calibration
HArd	Basic sensor calibration Only 0 ppm or 0.000 % can be selected as a set-point value for the calibration, such as, for example on nitrogen or 400 ppm or 0.040 % for calibration on clean ambient air.

Gradient compensation specification

C.SL

0.010 .. 3.200 100 .. 19, 999	Setpoint value in % or in ppm for 1.Pt or 2.Pt calibration
0 / 400 0.000 / 0.040	Setpoint value in % or in ppm for HArd calibration

NOTE

The setpoint value of 400 ppm or depending on selection 0.040 % can be used for a simple comparison in clean ambient air. Otherwise, use the expected value of the test gas according to the analysis certificate or display value of the reference device.

Outcome of an action

The changed value is saved and the ***Expanded settings*** menu is closed. Stor appears in the display.

NOTE

If the product is switched off without saving the configuration, the last save value is reproduced on the next start-up of the product.

6 Bases for measurement

6.1 NDIR CO_2 sensor

6.1.1 Explanation

The sensors are based on non-dispersive infrared sensor technology, NDIR. This is the most widely used sensor technology for CO_2 measurement.

The principle of the NDIR sensor is that an IR light source is focusses so that an optical beam is created, which passes through the existing gas, including CO_2. After an optical band pass filter is passed, an IR sensor measures the level of IR light, wherein the CO_2 values in the optical path are displayed.

6.1.2 Design

1. Gas inlet
2. Gas outlet
3. IR lamp
4. Optical filter
5. Thermopile detector

IR detectors

A sensor module with single-channel detectors is used for the product.

IR radiation source

A micro light bulb is used as an IR radiation source. It emits a broadband spectrum. The sensor is long-lasting and maintenance-free. In order to be able to maintain the specified accuracy for many years to come, regular calibration must be carried out depending on the required accuracy.

7 Maintenance

7.1 Operating and maintenance notices

CAUTION

Damage to the sensor

A sensitive optical sensor is installed in the product. The sensor parameters can change due to impact or falling. This can result in incorrect measurements.

– Protect the product from impact and falling!
– The measurements must be checked after the product falls or is jarred. If the values deviate, a basic sensor calibration must be carried out!

NOTE

The product must be handled with care and used in accordance with the technical data. Do not throw or strike.

NOTE

If the product is stored at a temperature above 50 °C, or is not used for an extended period of time, the batteries must be removed or recharged regularly. This prevents leaks from the rechargeable batteries and increases the life of the rechargeable batteries.

7.2 Battery

7.2.1 Charge status display

If the battery status display blinks, the batteries are depleted and must be recharged. However, the device will still operate for a certain length of time.

If the bAt display text appears in the main display, the rechargeable battery voltage is no longer adequate for operation of the product. Now the rechargeable battery is fully depleted.

7.2.2 Charging the batteries

– Charge via Micro USB socket with the accompanying cable.
– Must be operated on a USB port or USB mains adapter with an output voltage of 4.75 V .. 5.25 V, which can deliver a current of 500 mA.
– The charging process is visualised in the charge status display.
– If the charging process has concluded bAt FuLL is shown in the display.
– Charging at room temperature in a range of 0 .. 40 °C is permitted.
– The device can heat up during charging. Max. up to 50 °C.
– Charging time approx. 8 hours.
– The charging time can take longer in ambient temperatures above 30 °C.
– The rechargeable battery temperature is monitored. At temperatures below 0 °C and above 50 °C, the charging is interrupted.

– In order to protect the batteries, the charging process is not started when the charge cable is plugged in, if fully charged batteries are detected based on the voltage monitor.

7.2.3 Rechargeable battery replacement

DANGER

Danger of explosion!

Using damaged or unsuitable rechargeable batteries can generate heat, which can cause the rechargeable batteries to crack and possibly explode!

– Only use high-quality and suitable NiMH rechargeable batteries!

CAUTION

Damage!

If the rechargeable batteries have different charge levels, leaks and thus damage to the product can occur.

– Use new, high-quality rechargeable batteries!
– Do not use different types of rechargeable batteries!
– Remove depleted rechargeable batteries and dispose of them at a suitable collection point!

NOTE

Read the following handling instructions before replacing rechargeable batteries and follow them step by step. If disregarded, the product could be damaged or the protection from moisture could be diminished.

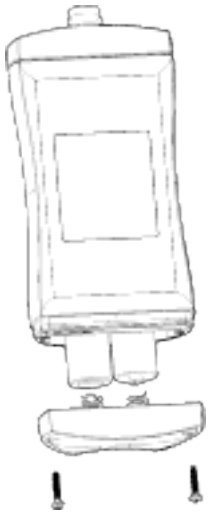
Description

Proceed as follows to replace the rechargeable batteries.

Prerequisites

– The product is switched off.

Instruction



1. Unscrews the Phillips screws and remove the cover.
2. Replace the two type AA rechargeable batteries carefully. Ensure that the polarity is correct! It must be possible to insert the rechargeable batteries in the correct position without using force.
3. The O-ring must be undamaged, clean and positioned at the intended depth. In order to facilitate assembly and avoid damage, a suitable grease can be applied.
4. Fit the cover on evenly. The O-ring must remain at the intended depth!
5. Tighten the Phillips screws.

Outcome of an action

The product is now ready for use again.

7.3 CO_2 calibration

Description

In order to improve the accuracy, the carbon dioxide sensor can be calibrated. In order to conduct a CO_2 calibration, proceed as follows.

1-point calibration

Used for optimisation of the accuracy at the calibration point. The best possible accuracy can be achieved even with elevated CO_2 concentrations

2-point calibration

Used for optimisation of the accuracy for extreme requirements over a wide measuring range beginning from 0 ppm.

Basic sensor calibration

Used to reset the sensor in case of deviations beyond the normally expected deviations. The values of all prior calibrations are reset and cannot be restored. A plausibility check of the carbon dioxide concentrations does not take place. Depending on the setting, calibration to 0 ppm CO_2 test gas or fresh outside air can take place. Ensure that the setting of the gradient compensation setpoint C.SL was entered correctly in the ***Expanded settings*** menu.

If reliable values can no longer be displayed, we recommend performing basic sensor calibration of the zero point at 0 ppm CO_2 with nitrogen and a possibly necessary additional gradient compensation via 1-point calibration.

If incorrect values are displayed after the calibration, e.g. Err.2 at 0 ppm CO_2, the calibration must be repeated.

NOTE

Calibration can be carried out in clean ambient air or with test gases (optionally available gas extraction device recommended). 1-point calibration at any arbitrary point above 350 ppm and 2-point calibration at 0 ppm and an arbitrary point above 350 ppm are both possible.

For automatic calibration, open the ***Calibration*** menu.

Prerequisite

- The product is switched on.
- Clean ambient air or test gas for gradient correction
- Test gas 0 ppm CO_2 for zero point adjustment for 2-point calibration or basic sensor calibration at 0 ppm
- Gas extraction device, if applicable

Instruction

1. If you would like to perform a calibration with test gas, connect the extraction device to the product first.

2. Press the *Function key* for 4 seconds to start the calibration. ConF appears in the display first, then CAL.
3. 1-point, 2-point or basic sensor calibration is started. This depends on what was adjusted in the ***Expanded settings*** menu.

1-point calibration

1. C.SL appears in the display for 1-point calibration.
2. The product determines a stable value first. If the measured value is outside of the value range integrated in the product, the display flashes briefly and an acoustic signal is issued every 10 s.
3. If a stable correct value is reached, the display flashes briefly, an acoustic signal sounds and the bar indicator blinks.
4. You can change the value of the gradient compensation with the *up key* and *down key*. Otherwise, confirm the preadjusted value with the *function key*. The 1-point calibration is finished.

2-point calibration

1. C.oF appears in the display for 2-point calibration.
2. Allow the test gas to flow at about 0.5 l/min at 0 ppm of CO_2. The product determines a stable value first. If the measured value is outside of the value range integrated in the product, the display flashes briefly and an acoustic signal is issued every 10 s.
3. If a stable correct value is reached, the display flashes briefly, an acoustic signal sounds and the bar indicator blinks. C.SL appears in the display.
4. Remove the test gas and connect a second test gas to the extraction device. The product determines a stable value first. If the measured value is outside of the value range integrated in the product, the display flashes briefly and an acoustic signal is issued every 10 s.
5. If the display flashes briefly, an acoustic signal sounds and the bar display blinks, a stable correct value has been achieved.
6. You can change the value of the gradient compensation with the *up key* and *down key*. Otherwise, confirm the preadjusted value with the *function key*. Remove the extraction device. The 2-point calibration is finished

Basic sensor calibration

1. HArd appears in the display for basic sensor calibration.
2. Depending on the specification C.SL, let the test gas with 0 ppm CO_2 flow in at approx. 0.5 l/Min or move the product into clean ambient are with 400 ppm CO_2. The product determines a stable value first. If the displayed measurement is outside of the measuring range of the sensor, the product cannot perform stability recognition. It must be ensured that the carbon dioxide concentration at the sensor is stable before the calibration is started.
3. If a stable correct value is reached, the display flashes briefly, an acoustic signal sounds and the bar indicator blinks.
4. Remove the extraction device, if applicable.

NOTE

Current test gases normally have accuracies of ± 2 %. This tolerance must be taken into consideration with the measurement uncertainty. The specifications on the analysis certificate must always be observed.

NOTE

For information about the available calibration settings, refer to Configuring parameters of the configuration menu [▷ p. 13].

Outcome of an action

After the calibration is finished CAL donE is displayed.

Then, the current measurement is shown in the display again.

If the calibration is not completed successfully an error message is displayed. CAL Err. appears in the display. See Error and system messages [▷ p. 23]. Confirm the error message pressing the *Function key*. The product restarts. The values of the last correctly performed calibration are restored.

Configure parameters of the expanded settings menu [▷ p. 15]

8 Error and system messages

Display	Meaning	Possible causes	Remedy
----	No signal from the sensor	Sensor not ready	Wait the start-up time of the sensor
		CO_2 concentration too high	Place the product in clean outdoor air
	Measurement far outside of the measuring range	Defective sensor calibration	Perform sensor calibration
		Sensor defect	Send in for repair
No display, unclear characters or no response when buttons are pressed	Rechargeable battery depleted	Rechargeable battery depleted	Charge battery
			Replace rechargeable battery
	System error	Error in the product	
	Product is defective	Product is defective	Send in for repair
bAt Lo	Rechargeable battery depleted	Rechargeable battery discharged	Charge battery
			Replace rechargeable battery
		Rechargeable battery defect	
CAL Err.1	Zero point calibration defective	Incorrectly measured CO_2 concentration for calibration	Expose sensor to a test gas with 0 ppm CO_2
CAL Err.2 CAL Err.3	Defective gradient compensation	Incorrectly measured CO_2 concentration for calibration	Expose sensor to a test gas with known CO_2 concentration
		Incorrect CO_2 concentration	Enter correct value
CAL Err.5	Time for stability recognition exceeded	Stability recognition lasts longer than 10 minutes	Provide a consistent flow with a constant CO_2 concentration
Err.1	Measuring range exceeded	Measurement too high	The measurement is above the permissible range
		Defective sensor calibration	Perform sensor calibration
		Sensor defect	Send in for repair
Err.2	Measuring range is undercut	Defective sensor calibration	Perform sensor calibration
		Sensor defect	Send in for repair
Err.7	Sensor error	Defective sensor calibration	Perform sensor calibration
		Sensor defect	Send in for repair
Err.t	Temperature error	Permissible temperature range during charging exceeded or undercut	Charging of battery only at 0 .. 40 °C
			Bring product to room temperature and restart charging process
SYS Err	System error	Error in the product	Switch product on/off
		Sensor defect	Replace rechargeable batteries
			Send in for repair

StAb	No measurement change within 2 minutes	Product in extremely constant environment Sensor defect	Place the product in clean outdoor air Perform sensor calibration Send in for repair

9 Disposal

Separation by material and recycling of device components and packaging must take place at the time of disposal. The valid regional statutory regulations and directives applicable at the time must be observed.

NOTE

The device must not be disposed of with household waste. Return it to us, freight pre-paid. We will then arrange for the proper and environmentally-friendly disposal.

Private end users in Germany have the possibility of dropping off the product at the municipal collection centre.

Please dispose of empty batteries at the collection points intended for this purpose.

NOTE

Fill in the return form available from the information base online at www.ghm-group.de and sent it in with the product.

10 Technical data

Measuring range (specified accuracy)		0 .. 19.999 ppm	0.000 .. 2.000 %
Measuring range (not specified)		0 .. 19.999 ppm	0.000 .. 3.200 %
Accuracy		± 0.02 % ± 3 % measurement	
Measuring cycle		2 seconds	
Display		3-line segment LCD, additional symbols, illuminated (adjustable white, permanent illumination)	
Additional functions		Min/Max/Hold TWA calculation / STEL 2-stage alarm (optical and acoustic)	
Calibration		1-point, 2-point and basic sensor calibration	
Housing		Break-proof ABS housing	
	Protection rating	IP30	
	Dimensions L*W*H [mm] and weight	108 * 54 * 28 mm without measuring cell or kink protection 180 g, incl. battery and measuring cell	
Operating conditions		0 to 50 °C; 0 to 85 % r.h. (non-condensing)	
Storage temperature		-20 to 70 °C	
Current supply		2*AA-NiMH batteries (included in delivery)	
	Current requirement/ Rechargeable battery life	approx. 50 mA, approx. 60 mA with lighting Life approx. 24 hours with NiMH batteries (without backlight) charging time of about 8 hours	
	Battery indicator	4-stage charge status indicator, Charge indicator for low charge level: "BAT LO"	
	Plug connector	Micro USB socket (not a data connection)	
Auto-power-OFF function		The device switches off automatically if this is activated	
Directives and standards		The devices conform to the following Directives of the Council for the harmonisation of legal regulations of the Member States: 2014/30/EU EMC Directive 2011/65/EU RoHS Applied harmonised standards: EN 61326-1:2013 Emission limits: Class B Immunity according to Table 2 Additional errors: < 1 % FS EN 50581:2012 The device is intended for mobile use and/or stationary operation in the scope of the specified operating conditions without further limitations.	

11 Spare parts and accessories

A selection of spare parts and accessories for this product is listed below.

Article

Number	Name	Description
410355	NiMH re-chargeable bat-tery	NiMH replacement rechargeable battery
411907	GKK 1002	G1000 series case, 235 x 185 x 48 mm
476698	GZ-18	Gas cylinder with 12 l test gas: 5000 ppm CO_2
476699	GZ-19	MiniFlo extraction device for 12 l gas cylinders incl. Quickconnect adapter and seal screw
	Micro USB to USB type A con-nection cable	Connection cable

A complete list of all accessories and spare parts is available in our product catalogue or on our home page. We can also provide further information by phone.

12 Service

12.1 Manufacturer

If you have any questions, please do not hesitate to contact us:

Contact

GHM Messtechnik GmbH
GHM GROUP - Greisinger
Hans-Sachs-Str. 26
93128 Regenstauf | GERMANY

WEEE reg. no. DE 93889386

CE

12.2 Repairs processing

Defective products are repaired professionally and quickly in our service centre.

Open hours and contact

Monday to Thursday from 8:00 to 16:00
Friday from 8:00 to 13:00
GHM Messtechnik GmbH
GHM GROUP - Greisinger
Hans-Sachs-Str.26
Service Centre
93128 Regenstauf | GERMANY

NOTE

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