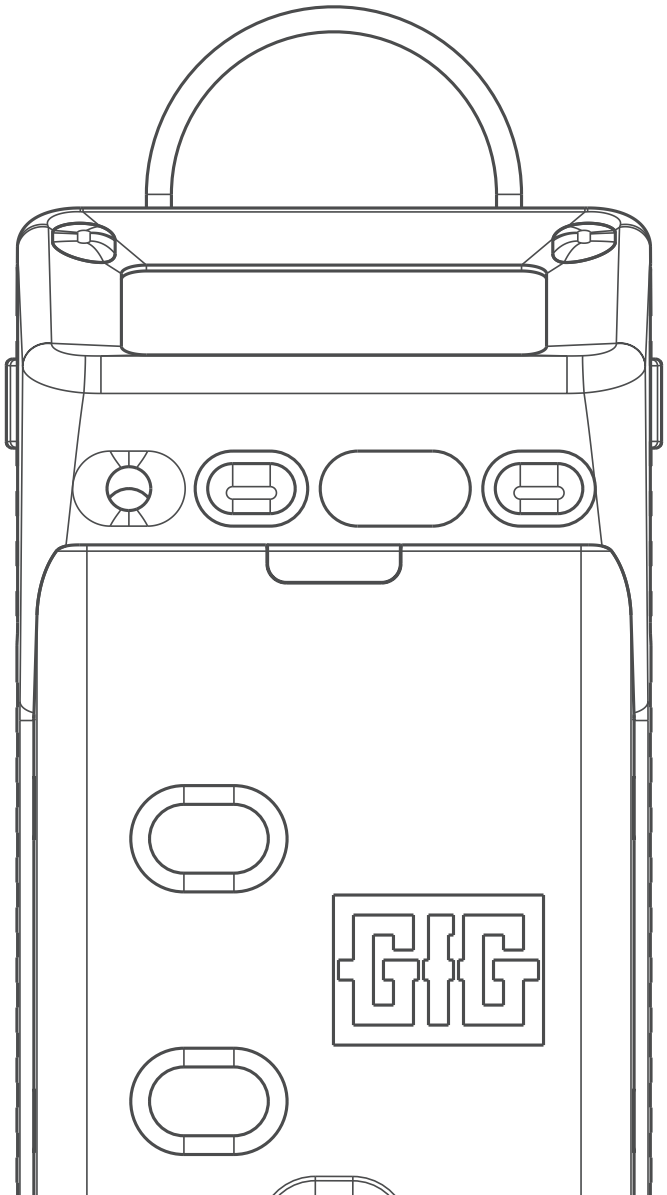
Portable gas detector for
monitoring 1 or 2 gases

smart
GasDetection
Technologies

Operations Manual
G222E



GfGsafety.com/us-en

GfG Instrumentation, Inc.

1194 Oak Valley Dr, Ste 20
Ann Arbor, MI 48108
USA

Phone: 800-959-0329
Fax: 734-769-1888
Email: info@goodforgas.com
Web: GfGsafety.com/us-en

The original operation manual was created in German.

This operation manual enables you to safely and efficiently use the Micro 5 G222E portable gas detector, hereinafter called G222E. It is part of the product and must be kept close to the gas detector, available to any user, at any time.

ATTENTION

Read this operation manual carefully before beginning any work.
Observe all stated safety and operation instructions.
Observe all national and international safety and accident prevention regulations.

GfG customer service

USA
Phone: 800-959-0329
Email: service@goodforgas.com

Revision history

Revision	Date of issue	Change	Editing	Approval
1	August 1, 2024	First edition	Mironiuk	Böttger
2	November 7, 2024	Contact information and some language	Shovels	Poley

Table of contents

1. Overview

The G222E is a small, portable 1 or 2 gas detector for monitoring toxic gases and vapors, the oxygen concentration or hydrogen. It is approved for use in Ex zone 0. The device continuously monitors air in diffusion mode and warns the person wearing it of any gas dangers in three ways: visually, audibly and with a vibration alarm.

It monitors gas concentrations using an electrochemical sensor with a short response time, high accuracy, stability and long service life.

These sensors contain an electrolyte, a working electrode (anode), a counter electrode (cathode) and, depending on the type of sensor, a reference electrode. Specific electrodes in combination with a suitable electrolyte are used to adjust the sensor to the monitored type of gas.

When the measured gas is converted at the electrolyte / electrode border, an electrical signal proportional to the concentration of the harmful substance is generated. The GfG sensor works on capillary diffusion barrier technology. This method and an additional temperature compensation minimize the effects pressure and temperature have on the device.

The G222E is approved for use in potentially explosive areas and was certified with an EU Type Examination Certificate by DEKRA Testing and Certification GmbH according to 2014/34/EU:

EU Type Examination Certificate: BVS 18 ATEX E 027X
IECEX Certificate of Conformity: IECEx BVS 18.0020X

G222E Label:	I M1 Ex ia I Ma	-20 °C ≤ Ta ≤ +55° C
	II 1G Ex ia IIC T3 Ga	-20 °C ≤ Ta ≤ +55° C
	II 1G Ex ia IIC T4 Ga	-20 °C ≤ Ta ≤ +45° C

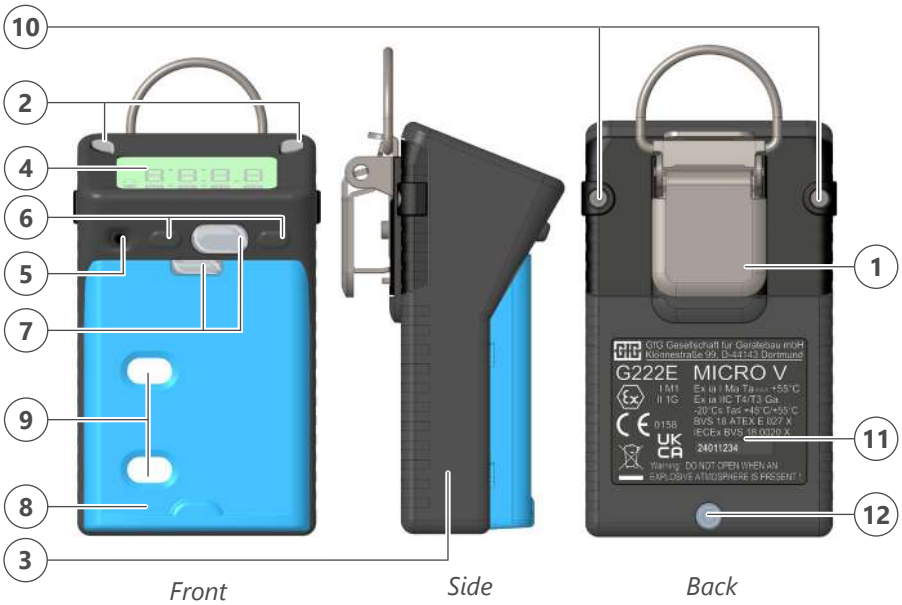
The durable device (IP54) features a 2 x 4 segment LC display, two alarm LEDs, a buzzer and two control buttons. It warns users visually, using displayed information on the screen and two red alarm LEDs, as well as audibly and using a vibration alarm.

An internal data logger which can be read out on an IrDA interface records all measured values and alarms. It is powered by a single AA battery.

1.1 Design G222E

1.1.1 Housing

1 Fastening clip
2 Alarm LEDs
3 Housing
4 Display
5 Horn (95 dB(A))
6 Control buttons
7 IrDA interface
8 Housing cover
9 Diffusion openings
10 Mounting screws
11 Type label
12 Safety screw for housing cover



Front *Side* *Back*

ATTENTION

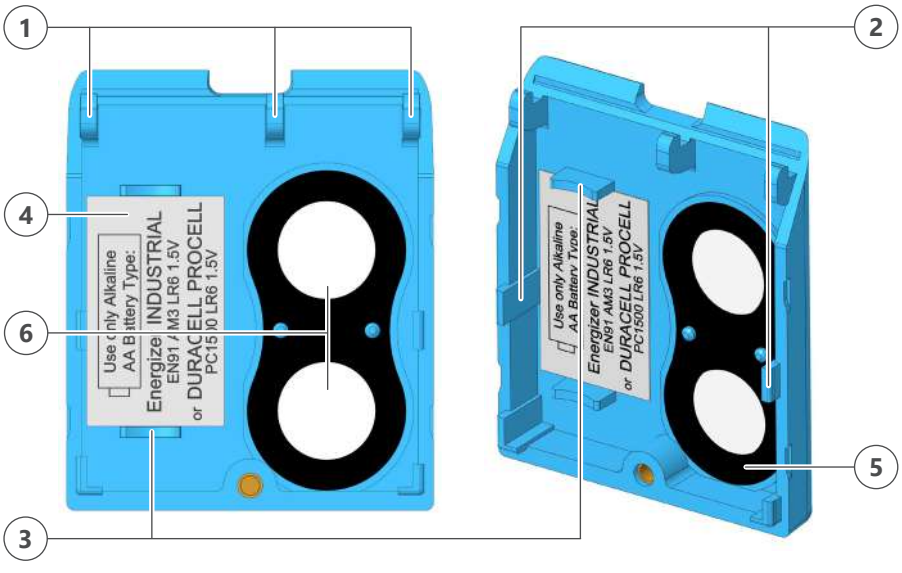
Never loosen mounting screws (10)!
Loosening the mounting screws (10) can result in defects. To remove the housing cover, loosen only the safety screw at the bottom (12) until it can be moved easily. Do not remove the screw completely. Then, detach the side of the housing cover and lift it off.

ATTENTION

The type label (11) must be legible and undamaged!
The gas detector's type label may not be damaged or covered. If the type label is damaged it needs to be replaced by GfG service staff.

1.1.2 Housing cover

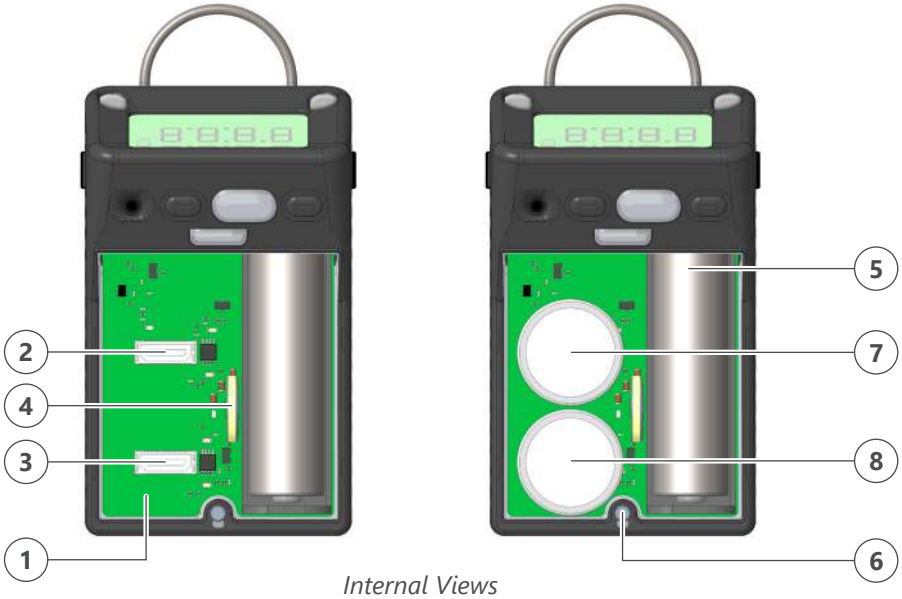
1 Cover mount
2 Cover guide
3 Battery mount
4 Safety notice Orientation and authorized batteries
5 Sensor seal
6 Diffusion opening
7 Thread for safety screw



Housing cover – inside *Housing cover – perspective*

1.1.3 Housing internal view

1 Main board
2 Sensor slot 1
3 Sensor slot 2
4 Internal battery
5 AA battery
6 Safety screw of the housing cover
7 Sensor 1
8 Sensor 2



Internal Views

1.2 Optional components

The following accessories are available for the G222E:

Accessories	Part number
Calibration cap for zero and test gas	1320250
Smart calibration cap with IR interface for reading out the data logger, without USB cable	1320251
Datalogging Kit for G222 (includes USB cable, calibration cap and software)	1320252

The G222E is powered by a 1.5 V alkaline battery. This battery may only be obtained from GfG. An internal monitoring function ensures that only batteries which comply with the EU Type Examination Certificate are in use.

Currently permitted battery types:
» INDUSTRIAL BYDURACELL ID1500 LR6 AA
» DURACELL PROCELL PC1500 LR6 AA
» Energizer EN91 Industrial AA

1.3 Further applicable documents

This technical document is complete in itself.

The following table lists all further applicable documents.
If required, GfG will send you more information and additional copies of these documents.

» Configuration	Included upon delivery
» Testing protocol	Included upon delivery
» Declaration of conformity	(► page 32)
» EU-Type Examination Certificate	(► page 33)

You must also adhere to all relevant laws, norms and guidelines for accident prevention and environmental protection of the country the product is used in.

If you think this operation manual contains any mistakes, discrepancies or ambiguities, contact the manufacturer before using this product.

2. Safety

This operation manual contains detailed descriptions for the safe and proper installation, connection, commissioning, use, maintenance and testing of the product. It also contains safety instructions and general information about the product.

It is intended exclusively for specially trained users and authorized technical personnel.

Read this technical document carefully to familiarize yourself with the product. Pay special attention to the information in this chapter.

2.1 Disclaimer

All information and notes in this technical document have been compiled taking into account the applicable standards and regulations, current state of the art technology and our many years of knowledge and experience.

The manufacturer does not assume liability for damages due to:

- the use of unauthorized accessories
- the use of non-approved spare parts
- technical modifications
- failure to comply with these instructions
- use not in accordance with the intended purpose
- unauthorized modification
- operation by employees without appropriate training or specialist knowledge

The obligations agreed in the delivery contract, the general terms and conditions and delivery conditions of the manufacturer as well as the legal regulations valid at the time of the conclusion of the contract shall apply.

2.2 Subject to alterations

The information contained in this technical document corresponds to the technical specifications released at the time of publication. Changes will be taken into account in a new edition of the operation manual.

2.3 Place of storage

This document as well as any further applicable documents must be kept on hand and accessible at all times for later use.

2.4 Symbols in this manual

Safety instructions are identified by symbols in this manual. The safety instructions are introduced by a signal word expressing the extent of the hazard.

DANGER

Specific designation of the type of hazard
Behavior to avoid danger

This combination of symbol and signal word indicates an **imminently** hazardous situation which, if not avoided, will result in **death or serious injury**.

WARNING

Specific designation of the type of hazard
Behavior to avoid danger

This combination of symbol and signal word indicates a **potentially** hazardous situation which, if not avoided, could result in **death or serious injury**.

CAUTION

Specific designation of the type of hazard
Behavior to avoid danger

This combination of symbol and signal word indicates a **potentially** hazardous situation which, if not avoided, may result in **minor injury or moderate injury**.

ATTENTION

Specific designation of the type of hazard
Behavior to avoid danger

This combination of symbol and signal word indicates a **potentially** hazardous situation which, if not avoided, may result in **property damage**.

2.5 Safety information in handling instructions

Safety instructions may refer to individual instructions for action. Such safety instructions are embedded in the action instruction so that they do not interrupt the flow of reading while performing the action. The previously described signal words are used.

Example:

Contaminations on the device's exterior may be removed with a damp cloth. Do not use solvents or cleaning agents!

ATTENTION

Possible damages to the G222E or sensor
Solvents can damage the housing of the G222E. Some cleaning agents also contain ingredients which may act as sensor poisons and could thus affect the function and / or lifetime of the sensor!*

* This example refers to the manner of presentation and not the content of this technical document.

2.6 Warning signs used in this document

The following warning signs are used to draw attention to particular hazards in safety instructions:

Warning sign	Type of danger
	General warning sign
	Warning of dangerous electrical voltage
	Fire hazard

Tips and recommendations

	This symbol highlights useful tips and recommendations as well as information for efficient and trouble-free operation.
	Reference to another chapter in this document.

2.7 Other markings

The following paragraphs provide an overview of the spelling and abbreviations used in these operating instructions.

2.7.1 General notation

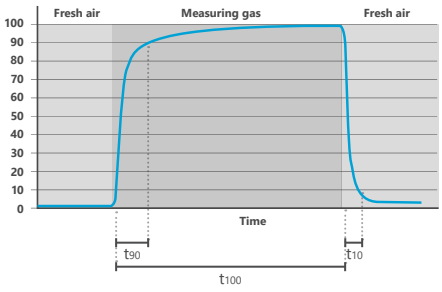
Within this document, certain information is highlighted by special notations to ensure better readability.

Notation	Usage	Example
VERSALIA	Hardware operating element	ON/OFF switch
Underlined	Software operating element	Press Next button
[Bracket]	Keyboard key	[ctrl] + [alt]
Bold	System notification	**Alarm1** limit value exceeded
Text > Text	Menu path	Parameter > Control parameter
(► page page number)	Cross reference	(► page 23)
1. Text 1 2. Text 2	Step by step instructions	1. Disconnect mains plug 2. Remove housing cover. For this...
» ...	Enumeration without order	

2.7.2 Definition of terms

For better comprehension, some definitions of terms used in these operating instructions are listed below:

- **Measured gas:** The gas or gas compound you are monitoring. It usually consists of air, the target gas and other components. In case of the G222E, it reaches the sensor by diffusion.
- **Target gas:** Gaseous substance you are trying to detect in the measured gas and want to be warned of.
- **Test gas:** Gas compounds of known composition used for calibration and adjustment of gas detection systems.
- **Replacement test gas:** Gas/air mixture used as a substitute for difficult-to-handle gas.
- **Zero gas:** Test gas that contains neither the target gas nor interfering impurities.
- **Interfering gas:** A gas that causes the sensor to react even if the target gas is not present, or that falsifies the measurement result when target gas is present.
- **Cross sensitivity:** It represents the sensitivity of a measuring device to quantities other than the one being measured.
- **Calibration:** Comparison of a gas detector's / sensor's displayed result with a known test gas concentration without adjusting.
  Depending on the degree of deviation detected, the device:
  - can continue to be operated within the permissible deviation from the set value
  - must be adjusted
  - must be repaired
- **Adjustment:** Adjustments of the zero point and sensitivity of the gas detector / sensor with a known zero gas or test gas.



- **Adjustment time:** The adjustment time **t100** is the time span required by a measuring device to react to sudden changes in the value of the measured quantity and with a corresponding change of the measuring signal. The change in measurement signal itself is not abrupt but rather follows the shape of a curve, which gradually approaches the target value. The shorter the adjustment time, the faster a transmitter will display the actual current concentration of a gas.

  Since it takes a disproportionately long time to settle to the last 10% accuracy both when rising and when falling, intermediate values such as **t90**, **t50** or, in the case of decreasing gas concentration, **t10** are much more important. They provide significantly better response times with sufficient accuracy.

» **Non-latching alarm:** A non-latching alarm is reset automatically as soon as the target gas concentration falls back below (or, in case of O_2, rises above) alarm threshold 1.

» **Latching alarm:** A latching alarm will stay active when the target gas concentration falls back below (or, in case of O_2, rises above) alarm threshold 1. It has to be reset manually.

» **Occupational exposure limits (OEL):** The occupational exposure limit is the limit for time-weighted average concentrations of a substance in the ambient air at the workplace within a given reference time. It indicates the concentration of a substance up to which acute or chronic harmful effects on the health of employees are generally not to be expected. The occupational exposure limit is displayed in ppm. The most common international occupational exposure limits include STEL (short-term exposure limit) and PEL (permissible exposure limit). In any case, the national guidelines of the country the device was installed in apply.

» **STEL (short-term exposure limit):** The short-term exposure limit (STEL) is the permissible average exposure for a short time, usually 15 minutes, as long as the time-weighted average (TWA) is not exceeded.

» **PEL (permissible exposure limit):** The permissible exposure limit (PEL or OSHA PEL) is a national limit value guideline in the United States which regulates the exposure of an employee to a chemical substance. PELs are usually given as time-weighted averages (TWA).

» **TWA (time-weighted average):** The TWA value is the average exposure over a certain amount of time, usually eight hours. This means that a worker may be exposed to concentration levels above the PEL for limited periods of time as long as the TWA value is not exceeded. In many places, the term TWA is used as a synonym for the occupational exposure limits for times of up to eight hours.

2.7.3 Abbreviations and SI units (International System of Units)

In this document, abbreviations are shown and used in the same way as they are shown in the display for reasons of space. SI units are used according to international guidelines.

2.8 Due diligence of the operator

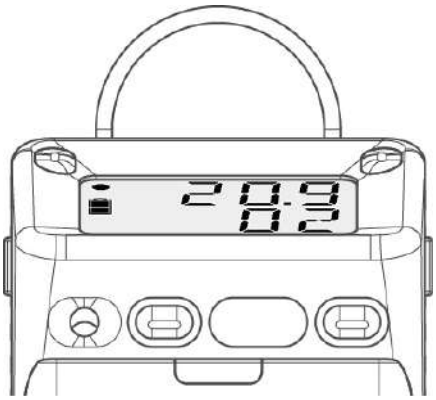
To avoid accidents, malfunctions and undue effects on the environment, those responsible for installation, operation, maintenance and disposal must ensure the following:

- All safety instructions and hazard warnings must be observed
- Employees are instructed regarding occupational safety and proper use of the product, especially with regards to the safety instructions in this operation manual
- Regulations, operating instructions for safe handling and the instructions on staff behavior in case of alarms are kept easily accessible at all times. If necessary, that means posting them on the premises
- The product is only used in perfect, functional condition
- The scheduled inspection intervals and maintenance cycles are adhered to.
- Only spare parts and auxiliary materials approved by the manufacturer are used
- The specified operating conditions and requirements regarding the installation location are observed

The operator is responsible for ensuring that the product is used as intended.

3. Functional design and controls

3.1 Control buttons



» The TWO CONTROL BUTTONS
» The IrDA interface and
» The alarm opening

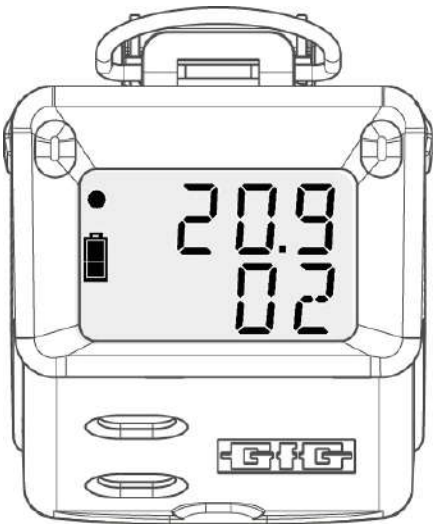
The above are located on the front of the G222E.

The RIGHT BUTTON will allow you turn the device off.

In measuring mode, the BUTTONS will let you switch between displaying the measured values and the battery level, access the service menu or turn the device off.

In the service menu, the BUTTONS will let you navigate the menus or adjust the settings.

3.2 Display



» Two red alarm LEDs and
» The backlit display

The above are located on the top of the G222E.

To ensure the measured values can be read while you are wearing the device, the screen can be rotated permanently.

Press both BUTTONS simultaneously to rotate the screen by 180°.

This display mode remains active until you either change it back or the device is turned off. It will return to its default display mode when it is turned on again.

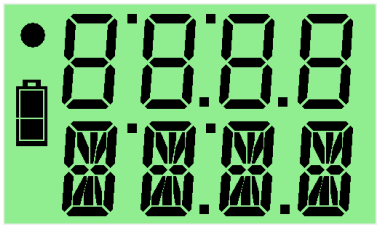
Pressing any of the function buttons will also activate the display's backlight for 3.5 seconds.

3.3 Turning the device on and off

3.3.1 Turning the device on

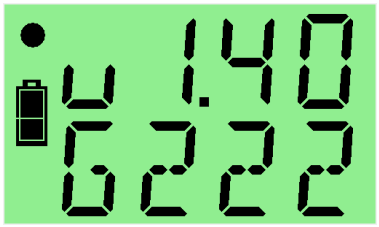
Briefly press the right button to turn on the device. The G222E will then run a self-test, the boot process and a short warm-up phase.

First, the two red alarm LEDs above the display will light up briefly.
The device will then display different information screens during the start process:



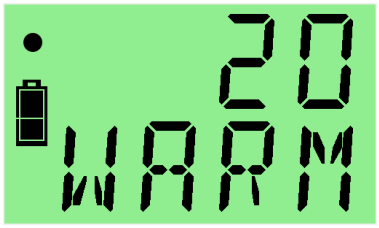
» A display test

» A notification indicating the **boot process**



» The **firmware version** (in this example: v1.40) and **device type**

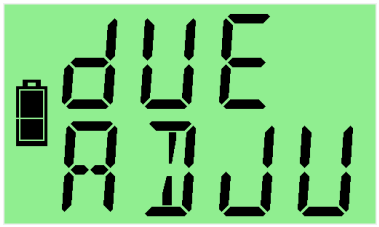
» The **parameters of the sensor(s)**
(gas, measuring range, alarm thresholds, STEL, TWA)
(in this example: Alarm 1 at 20 ppm)



» The remaining time of the **warm-up phase**

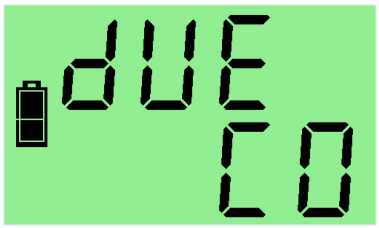
An audible signal will indicate that the start process has been completed.

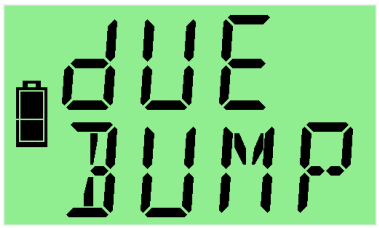
3.3.2 Possible notifications



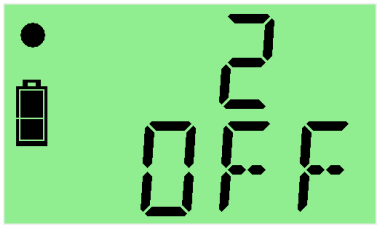
During the start-up process, there may be indications of **overdue service requirements.** The alarm LEDs flash alternately and an alarm tone sounds.

Press one of the two FUNCTION BUTTONS to acknowledge the message and carry out the service as quickly as possible.





3.3.3 Turning the device off



Hold the RIGHT BUTTON down to turn the device off.
A **turn off countdown** will be displayed.

When the turn off process is completed, the screen turns off and the alarm LEDs flash briefly. There is also an audible signal. You can then release the BUTTON.

If you release the BUTTON before this point, the turn off process is cancelled and the device returns to normal measuring mode.

3.4 Different types of alarm

Depending on the sensors you are using, the device can monitor different threshold values or mean values.

Type of alarm	Type of sensor	Number of alarm levels	Explanation
Current value (AL)	Oxygen	3	Are triggered immediately when the current gas concentration exceeds a set value or falls below it (O_2). Current value alarms can be adjusted individually.
	Combustible gases (H2)	3	
	Toxic gases	2	
Short-term exposure limit (STEL)	Toxic gases	1	The short-term exposure limit monitors the exposure of the last 15 minutes.
Time-weighted average (TWA)	Toxic gases	1	The time-weighted average monitors the exposure of the last 8 hours.

The G222E uses a visual alarm (display and red alarm LEDs) as well as an audible and a vibration alarm to warn you.

ATTENTION

Do not block the alarm!
Ensure that nothing is a clogging, blocking or covering the alarm opening, so as not to muffle the audible alarm.

The battery level is also monitored. The flashing battery icon to the right indicates that the battery needs to be replaced.

3.5 Data logger

The G222E features an internal data logger which can record up to four parameters. The data logger's memory can store up to 2,600 measuring points. This means that it can log the values and alarms of more than 60 hours on a recording interval of 60 seconds.

The default settings are listed below:

Parameters:

- Sensor EC1 with its current values
- Sensor EC2 with its current values
- Internal temperature of the device °C
- Battery voltage in mV

Recording mode:

- Endless – If the data logger's memory is full, the current value will overwrite the oldest value.

The monitored parameters and the recording mode can be changed using the PDGConfig software.

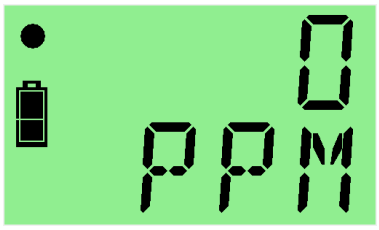
You will also need the PGDConfig software to read out the data logger. It displays the data as a chart and as a table. The data can also be exported as a PDF or CSV file. This process is carried out using the IrDA interface.

3.6 Displayed information in measuring mode

3.6.1 Measured values

In measuring mode, the device alternately displays the information below:

» Current measured value and gas
» Sensor slot (1)
» Battery level



» Current measured value and unit
» Sensor slot (1)
» Battery level

In case the device is equipped with a second sensor, it will also display (for example):

» Current measured value and gas
» Sensor slot (1)
» Battery level

» Current measured value and unit
» Sensor slot (1)
» Battery level

3.6.2 Sensor slots

The **displayed dot** identifies the sensor in slot 1 (top). The **dot** is not displayed for the sensor in slot 2 (bottom).

Slot on 1-gas detectors
If you are using the G222E as a 1-gas detector, the sensor will always be located in slot 1. Slot 2 will be filled by a dummy sensor to protect the contacts from contaminants.

3.6.3 Battery charging level

The battery symbol in the main view provides a rough estimate of the **battery level**. The icons represent:

When the battery level drops below 5%, the **battery icon** will start flashing. Replace the battery as soon as possible.

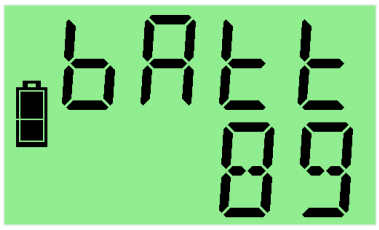
ATTENTION

Do not replace battery in Ex zones!
The device may only be opened outside of potentially explosive areas! The battery may therefore also only be replaced outside if potentially explosive areas!

Batteries may only be sourced from the manufacturer, GfG. Internal monitoring ensures that only batteries which comply with the type examination status are used.

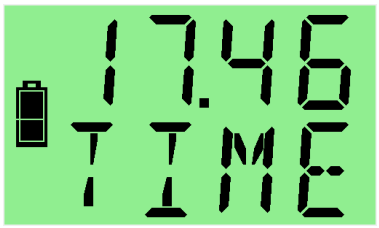
Currently permitted battery types:
- » INDUSTRIAL BY DURACELL ID1500 LR6 AA
- » DURACELL PROCELL PC1500 LR6 AA
- » Energizer EN91 Industrial AA

Briefly press the RIGHT BUTTON for more information on the **battery level**.

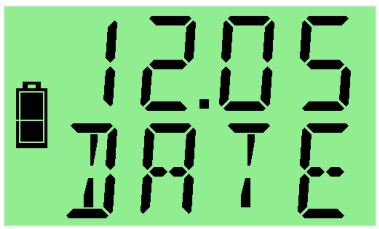


- » Battery level
- » Battery level in % percentage

3.6.4 Time and date



You can display the current **time** and **date**.
Briefly press the LEFT BUTTON twice to bring up the display.



3.6.5 Smart electrochemical sensors (EC)

GfG provides smart EC sensors for a variety of different gases for the G222E. They can be used in any combination. You can also use two sensors of the same type.

Typical sensors and their measuring ranges and alarm thresholds

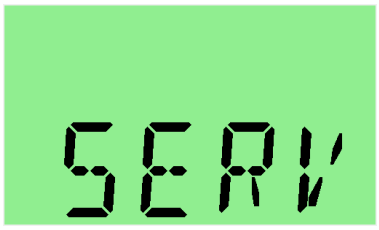
Type of gas	H_2	O_2	CO	H_2S	NO	NH_3	HCN	HCl	C_2H_4O	ClO_2	$COCl_2$	PH_3	SiH_4	HF	Cl_2	O_3	NO_2	SO_2
Measuring range	4.0 *vol %*	25.0 *vol %*	500 *ppm*	100 *ppm*	100 *ppm*	200 *ppm*	50 *ppm*	30 *ppm*	20 *ppm*	2.0 *ppm*	2.0 *ppm*	10.0 *ppm*	20 *ppm*	10.0 *ppm*	10.0 *ppm*	1.0 *ppm*	30 *ppm*	10.0 *ppm*
Alarm A1	0.2	19.5	35	10	25	20	5	5	2	0.1	0.1	0.3	5	1.0	0.5	0.1	3	2
Alarm A2	0.4	17.0	50	30	50	40	10	10	5	0.2	0.2	1	10	2.0	1.0	0.2	5	5
Alarm A3	0.6	23.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Test gas	2%	20.9	200	20	50	100	20	10	10	1.0	1.0	5.0	10	10.0	10.0	1.0	10	5

For more detailed information on the sensors, please refer to the sensor data sheets.

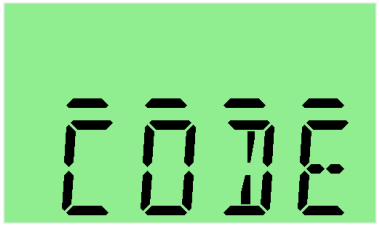
Below is a list of available sensors, sorted by gases.

Gas	Formula	Measuring Range	Part Number
Ammonia	NH_3	300 ppm	1990735
Ammonia	NH_3	200 ppm	1990736
Ammonia	NH_3	1000 ppm	1990740
Chlorine	Cl_2	10 ppm	1990725
Chlorine dioxide	ClO_2	2.00 ppm	1990730
Hydrogen chloride	HCl	30.0 ppm	1990755
Hydrogen cyanide	HCN	50.0 ppm	1990760
Ethylene oxide	C_2H_4O	20.0 ppm	1990775
Hydrogen fluoride	HF	10.0 ppm	1990765
Carbon monoxide	CO	500 ppm	1990705
Ozone	O_3	1 ppm	1320815
Phosgene	$COCl_2$	2.00 ppm	1990800
Phosphine	PH_3	10.00 ppm	1990770
Oxygen	O_2 (5-year)	25% vol.	1990718
Sulfur dioxide	SO_2	10.00 ppm	1990720
Hydrogen sulfide	H_2S	100 ppm	1990700
Silane	SiH_4	20.00 ppm	1990780
Nitric Oxide	NO	100 ppm	1990745
Nitrogen dioxide	NO_2	30.0 ppm	1990750
Tert-butyl mercaptan (TBM)	$C_4H_{10}S$	20 ppm	1320810
Tetrahydrothiophene (THT)	C_4H_8S	25 ppm	1990805
Hydrogen	H_2	2000 ppm	1990785
Hydrogen	H_2	1.00% vol.	1990790
Hydrogen	H_2	4.00% vol.	1990795

3.6.6 Service menu

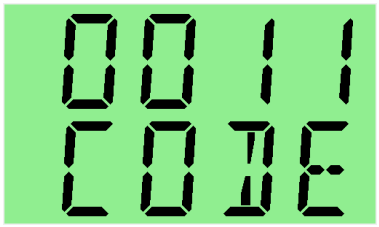


The service menu can only be accessed after entering an access code. This prevents important functions from being changed accidentally or by unauthorized people. No alarms are triggered while the device is in service mode.

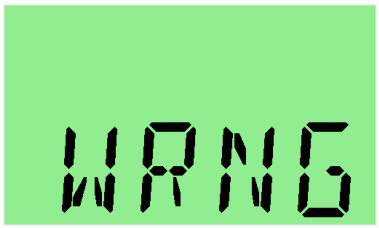


Press the LEFT BUTTON > 1 second to activate the service menu.
Enter the 4-character access code.
The default service menu access code is 1100.

Briefly pressing the LEFT BUTTON = Value +1
Holding down the LEFT BUTTON = Value - 1
Briefly pressing the RIGHT BUTTON = move one position to the right / confirm
Holding down the RIGHT BUTTON = move one position to the left



You will then be informed whether the password was entered successfully.



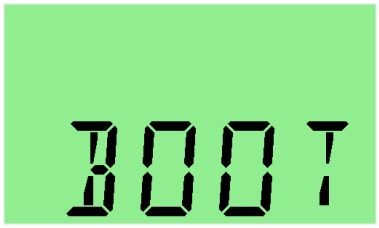
4. Bump Test and Adjustment

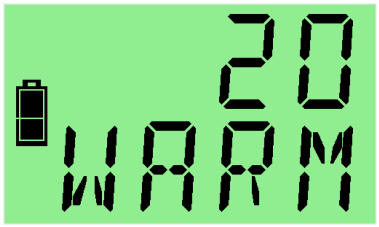
You will need the following items for test gas adjustments: G222E, Calibration cap or smart calibration cap for G222E, Test gas cylinder* with attached regulator and connected test gas hose.

ATTENTION

Any adjustments using test gas should only be performed in well ventilated rooms for safety reasons!

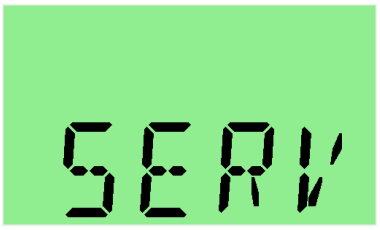
To adjust the device, proceed as follows:

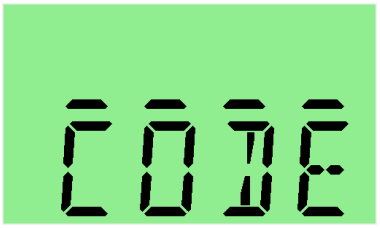




1. Starting your device
   Briefly press the RIGHT BUTTON to start the device. The starting sequence is initiated and the device will then enter a warm-up phase lasting several seconds. If no special notifications are displayed, a short beep will indicate that the device is in measuring mode.

* The test gas or test gas compound has to be suitable for the sensor configuration of the gas detector you need to adjust.



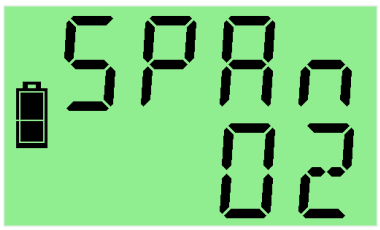


2. Activating the service menu
   Hold the LEFT BUTTON down to activate the service menu. The service menu is protected from non-authorized access by a four-character service code. The service code is 1100.

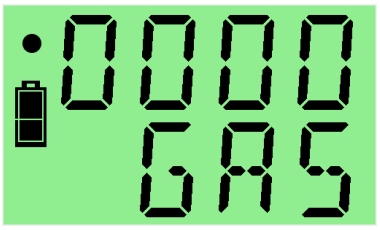
   Briefly pressing the LEFT BUTTON increases the number by one. To decrease the number, hold the LEFT BUTTON down. Briefly pressing the RIGHT BUTTON navigates to the next position. To go back to the previous position, hold the RIGHT BUTTON down. When you have entered all four characters, confirm the service code with the RIGHT BUTTON to access the service menu.

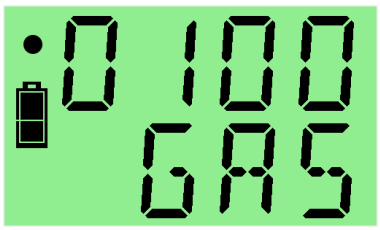
3. The first menu item is the preparation for zero point adjustments of the first sensor, as denoted by the dot above the battery symbol. Pressing the RIGHT BUTTON will take you to the first sensor's zero point adjustment, pressing the left one will take you to its sensitivity adjustment.

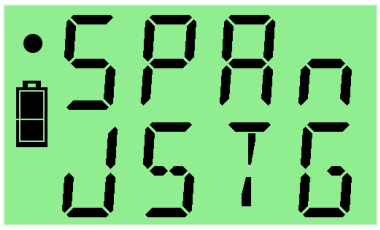
If there are sensors in both slots, pressing the LEFT BUTTON again will take you to the zero point adjustment of the second sensor, and pressing it yet again will then take you to the second sensor's sensitivity adjustment.



4. Zero point adjustment with fresh air (e.g. CO)
   Press the right button to display the zero gas concentration (generally 0000). Press the right button again to start the zero point adjustment. You can then start the zero gas (fresh air) adjustment by pressing the LEFT BUTTON. **CO** and **JSTG** will be displayed alternately to indicate that the adjustment is in progress. The completion of the adjustment is signaled by either **OK** or **ERR**. Then, confirm the process by pressing any BUTTON and save by pressing the RIGHT BUTTON [Y] or discard the adjustment by pressing the LEFT BUTTON [N].

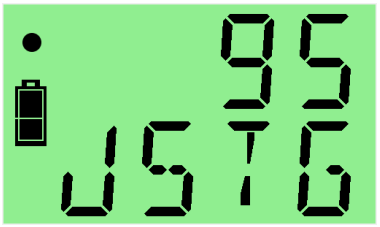


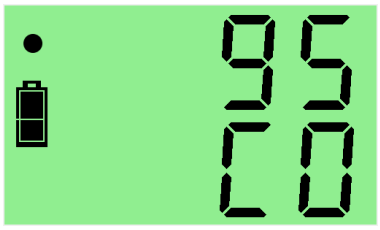




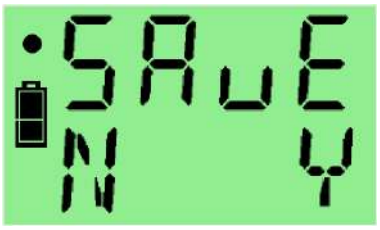
5. Sensitivity adjustment with test gas (e.g. CO)
   Press the right button to access the gas concentration display / input screen. To change the test gas concentration, navigate to the Changes screen by pressing the LEFT BUTTON. Change the value using the instructions below: Briefly pressing the LEFT BUTTON increases the number by one. To decrease the number, hold the LEFT BUTTON down. Briefly pressing the RIGHT BUTTON navigates to the next position (to the right). To go back to the previous position, hold the RIGHT BUTTON down. When you have entered all four characters, confirm the value by pressing the RIGHT BUTTON. Changed gas concentrations can either be saved (RIGHT BUTTON [Y]) or discarded (LEFT BUTTON [N]). Press the RIGHT BUTTON again to start the sensitivity adjustment.

   Attach the calibration cap to the sensor cover (clip in the left side, push down on the right side) until it audibly clicks into place. Attach the end of the hose of the test gas cylinder to the calibration cap's lower gas inlet. If necessary, a hose for exhaust air can be attached to the calibration cap's upper gas outlet. Then, open the valve of the test gas cylinder and press the LEFT BUTTON to start the adjustment.





6. The measured gas concentration will then be displayed in alternation with the **type of gas** and **"JSTG"**. When the measured value has stabilized and is within an adjustable range, the current measured value is adjusted to the target value. The completion of the adjustment is signaled by either **OK** or **ERR**.



7. Close the test gas cylinder's valve. Then, confirm the process by pressing any BUTTON and save by pressing the RIGHT BUTTON [Y]. The calibration cap can be removed again by pushing it downwards, following the directions given by the arrows.

Particularities of oxygen sensors
Use a calibration cap and zero gas of 0.0 % vol. O_2 (with 100 % vol. N_2) for the zero point adjustment of oxygen sensors. For the sensitivity adjustment, use either the calibration cap and a test gas compound containing oxygen or fresh air.

5. Service

5.1 Technical specifications

Type designation	G222E also known as Micro 5
Gas sensors	
Measuring method:	Electrochemical
Slots:	Two for smart EC sensors
Gases:	See lists of available sensors (► page 23)
Sample gas supply:	Through diffusion opening
Display & Control elements	Two-line LC display (8-segment and 15-segment line, plus special characters) 2 alarm LEDs Backlight 2 Control buttons
Alarms	
Alarm thresholds:	3 or 2 current value alarms, depending on the type of gas, plus one exposure value for mean gas concentrations over a certain time (STEL = 15 min, TWA = 8 h)
Alarm:	Visual (2 red alarm LEDs), audible and vibration alarm Battery alarm (flashing icon being displayed)
Zero point and Sensitivity adjustment	Manually or automatically using calibration software, (if applicable) sample gas supply using “SMART CAP”, at 0.5 to 0.6 slpm (standard liter per minute)
Power supply	
Battery:	1.5 V alkaline battery Currently permitted battery types: INDUSTRIAL BY DURACELL ID1500 LR6 AA DURACELL PROCELL PC1500 LR6 AA Energizer EN91 Industrial AA
Operating life:	9 months with an assignment duration of 10 hours per working day
Environmental conditions	
Operation	
Temperature:	-4 to +131 (+113) °F / -20 to +55 (+45) °C
Humidity:	5 to 95 % r.h.
Pressure:	70 to 1300 kPa
Storage	
Temperature:	-13 to +131 (+113) °F / -25 to +55 (+45) °C (+32 to +86 °F / 0 to +30 °C recommended)
Humidity:	5 to 95 % r.h.
Pressure:	70 to 1300 kPa
Housing	
Dimensions:	2 x 3.35 x 1 in / 50 x 85 x 27 mm (W x H x D)
Weight:	4.4 to 4.9 oz / 123 to 138 g (depending on sensor configuration)
Material:	rubberized plastic
Protection Class:	IP 54

Examinations/Certifications*			
Labels & Ignition protection type:	G222E:	I M1 Ex ia I Ma	-20 °C ≤ Ta ≤ +55 °C
		II 1G Ex ia IIC T3 Ga	-20 °C ≤ Ta ≤ +55 °C
		II 1G Ex ia IIC T4 Ga	-20 °C ≤ Ta ≤ +45 °C
EC Type Examination Certificat:	BVS 18 ATEX E 027X		
IECEx Certificate of Conformity:	IECEx BVS 18.0020X		
Electromagnetic Compatibility:	EN 60079-0:2012 + A11:2013		General requirements
	EN 60079-11:2012		Intrinsic Safety "i"

** Only when using batteries of the permitted types.*

5.2 Declaration of Conformity

EU Declaration of Conformity

G222E

Edited: 13.04.2018 Amended:27.08.2021

GfG Gesellschaft für Gerätebau mbH

Klönnestraße 99
44143 Dortmund
Tel: +49 (231) 56400-0
Fax: +49 (231) 516313
E-Mail: info@gfg-mbh.com
www.gfg.biz

GfG Gesellschaft für Gerätebau mbH develops produces and sells gas sensors and gas warning devices which are subject to a **quality management system** as per DIN EN ISO 9001.
Subject to supervision by means of a **quality system**, surveilled by the notified body, DEKRA Testing and Certification (0158), is the production of electrical apparatus of instrumentation Group I and II, categories M1, M2, 1G and 2G for gas sensors, gas detectors, gas warning systems in types of protection flameproof enclosures, increased safety, encapsulation and intrinsic safety, as well as their measuring function.

The portable detector **G222E** complies with directive **2014/34/EU** (ATEX) for devices and protective systems for proper use in potentially explosive atmospheres, directive **2014/30/EU** for electromagnetic compatibility and with directive **2011/65/EU** (RoHS) on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

For electrical explosion protection	BVS 18 ATEX E 027 X
Labelling G222E:	Ⓔx II **1G** Ex ia IIC T4/T3 Ga
	Ⓔx I **M1** Ex ia I Ma

The directive 2014/34/EU is complied considering the following standards:

Explosive atmospheres		
- General requirements	EN 60079-0	: 2018
- Intrinsic safety "i"	EN 60079-11	: 2012

The rating of the danger of ignition was done and documented. The EU-Type Examination Certificate was issued by the notified body with ID number 0158 (DEKRA Testing and Certification, Dinnendahlstraße 9, D-44809 Bochum).

The directive 2014/30/EU is complied considering the following standard:

- Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen	EN 50270	: 2015
Emitted interference	Type class 1	
Interference immunity	Type class 2	

The EMC test laboratory AMETEK CTS Germany GmbH at Kamen has tested and certified the electromagnetic compatibility.

The directive 2011/65/EU is complied considering the following standard:

- Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances	EN 50581	: 2012

Dortmund, 27 August 2021

i.V. .....

B. Siebrecht
QMB

ATEX EU-Kon079/Siebrecht

Translation

1 # EU-Type Examination Certificate

2 **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU**

3 EU-Type Examination Certificate Number: **BVS 18 ATEX E 027 X**

4 Product: **Gas detector type G222E**

5 Manufacturer: **GfG Gesellschaft für Gerätebau mbH**

6 Address: **Klönnestr. 99, 44143 Dortmund, Germany**

7 This product and any acceptable variations thereto are specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA EXAM GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. BVS PP 18.2045 EU.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012 + A11:2013	**General requirements**
EN 60079-11:2012	**Intrinsic Safety "i"**

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

Ex II 1G Ex ia IIC T4/T3 Ga Details see 15.3

DEKRA EXAM GmbH
Bochum, 2018-03-29

Signed: Jörg Koch
Certifier

Signed: Dr Franz Eickhoff
Approver

DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,
telephone +49.234.3696-105, fax +49.234.3696-110, zs-exam@dekra.com

13 **Appendix**

14 **EU-Type Examination Certificate**
BVS 18 ATEX E 027 X

15 **Product description**

15.1 **Subject and type**

Gas detector type G222E

15.2 **Description**

The Gas detector type G222E is a portable instrument with a replaceable power supply battery. It is used for the detection of gases in ambient air under atmospheric conditions.

The Gas detector type G222E contained 2 electro-chemical cells for gas measuring.

The measurement values are shown on a built-in display. If the present limits are reached, a visual alarm, an audible alarm and a vibrating alarm are produced.

The gas detector type G222E is powered by one alkaline battery which has to be changed only outside of the hazardous area.

15.3 **Parameters**

Power supply battery (one primary cell, AA LR6)

Nominal voltage 1.5 V

The approved alkaline battery type is listed in the manufacturer instructions of GfG Gesellschaft für Gerätebau mbH.

Ambient temperature range depend on temperature class:

Temperature class	Ambient temperature range
T4	$-20\ °C \leq T_a \leq +45\ °C$
T3	$-20\ °C \leq T_a \leq +55\ °C$

16 **Report Number**

BVS PP 18.2045 EU, as of 2018-03-29

17 **Special Conditions for Use**

The measuring function according to annex II paragraph 1.5.5 of the directive 2014/34/EU is not part of this EU-type Examination Certificate.

DAkkS Deutsche Akkreditierungsstelle D-ZE-12069-01-00

DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,
telephone +49.234.3696-105, fax +49.234.3696-110, zs-exam@dekra.com

18 **Essential Health and Safety Requirements**

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH
Bochum, dated 2018-03-29
BVS-Rip/Nu A 20170485

Certifier

Approver

DEKRA EXAM GmbH, Dinnendahlstrasse 9, 44809 Bochum, Germany,
telephone +49.234.3696-105, fax +49.234.3696-110, zs-exam@dekra.com

Translation

1 EU-Type Examination Certificate Supplement 1

2 **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU**

3 EU-Type Examination Certificate Number: **BVS 18 ATEX E 027 X**

4 Product: **Gas detector type G222E**

5 Manufacturer: **GfG Gesellschaft für Gerätebau mbH**

6 Address: **Klönnestr. 99, 44143 Dortmund, Germany**

7 This supplementary certificate extends EU-Type Examination Certificate No. BVS 18 ATEX E 027 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA Testing and Certification GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. BVS PP 18.2045 EU.

9 The Essential Health and Safety Requirements are assured in consideration of:

EN IEC 60079-0:2018	**General requirements**
EN 60079-11:2012	**Intrinsic Safety "i"**

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

II 1G Ex ia IIC T4/T3 Ga
I M1 Ex ia I Ma Details see 15.3

DEKRA Testing and Certification GmbH
Bochum, 2021-08-19

Signed: Jörg-Timm Kilisch

Managing Director

DEKRA Testing and Certification GmbH, Handwerkstr. 15, 70565 Stuttgart, Germany
Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com

13 **Appendix**

14 **EU-Type Examination Certificate**

BVS 18 ATEX E 027 X
Supplement 1

15 **Product description**

15.1 **Subject and type**

Gas detector type G222E

15.2 **Description**

Reason for this supplement:

- The Gas detector type G222E was tested in accordance to the standard EN IEC 60079-0:2018.
- The Gas detector type G222E can also be used in Group I areas. The marking was enhanced with I M1 Ex ia I Ma.

Description of Product:

The Gas detector type G222E is a portable instrument with a replaceable power supply battery. It is used for the detection of gases in ambient air under atmospheric conditions.

The Gas detector type G222E contained 2 electro-chemical cells for gas measuring.

The measurement values are shown on a built-in display. If the present limits are reached, a visual alarm, an audible alarm and a vibrating alarm are produced.

The gas detector type G222E is powered by one alkaline battery which has to be changed only outside of the hazardous area.

15.3 **Parameters**

Power supply battery (one primary cell, AA LR6)

Nominal voltage 1.5 V

The approved alkaline battery type is listed in the manufacturer instructions of GfG Gesellschaft für Gerätebau mbH.

Ambient temperature range depend on temperature class:

Temperature class	Ambient temperature range
T4	-20 °C ≤ T_a ≤ +45 °C
T3 and Group I	-20 °C ≤ T_a ≤ +55 °C

16 **Report Number**

BVS PP 18.2045 EU, as of 2021-08-19

17 **Special Conditions for Use**

The measuring function according to annex II paragraph 1.5.5 of the directive 2014/34/EU is not part of this EU-type Examination Certificate.

DEKRA Testing and Certification GmbH, Handwerkstr. 15, 70565 Stuttgart, Germany
Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com

18 **Essential Health and Safety Requirements**

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH
Bochum, 2021-08-19
BVS-Rip/Mu A20210777

Managing Director

DEKRA Testing and Certification GmbH, Handwerkstr. 15, 70565 Stuttgart, Germany
Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com

This page intentionally left blank.

GfG Instrumentation, Inc.
1194 Oak Valley Dr. Suite 20
Ann Arbor, MI 48108
USA

US/Canada:	(800) 959-0329
US/Canada Fax:	(734) 769-1888
International:	+1 734 769 0573
International Fax:	+1 734 769 1888
Website:	www.GfGsafety.com/us-en

smart GasDetection Technologies

2024 7004-222 Rev. 2 (11/27/24)