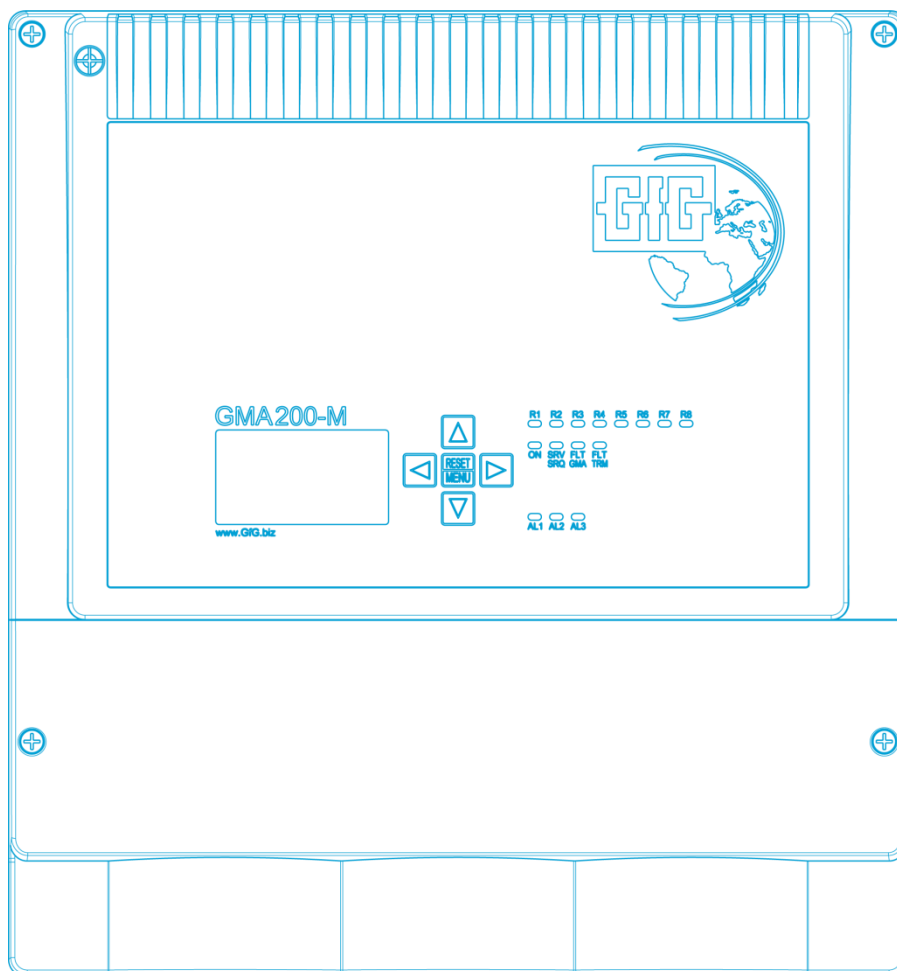## Operation Manual

GMA200-MW16

Wall-mounted controller

Translation of the original operation manual

Table of Contents

1 INTRODUCTION

1.1 For Your Safety

In accordance with the Product Safety Act (ProdSG), this operations manual refers to the proper use of the product and is designed to prevent hazards. It must be read and observed by all persons who apply or use, maintain, service and inspect this product. This device can serve its intended purpose only if it is operated, serviced, maintained and inspected according to the instructions given by the Gesellschaft für Gerätebau mbH.

Otherwise, the warranty assumed by GfG Gesellschaft für Gerätebau mbH shall expire. Adjustments in service mode may only be carried out by qualified personnel.

1.2 Field of application and intended use

The GMA200-MW16 is a gas detection controller for wall mounting which, in conjunction with connected gas detection transmitters, forms a stationary gas warning system for the continuous measurement of gas concentrations. It is used to warn against combustible gases and vapors in the area below the lower explosion limit, against toxic gases in the ambient air and for oxygen measurement (lack, excess or inertisation). External relay modules GMA200-RT/RTD are also available. Section 3.4 „Examples of different system variants" shows some variants for the interconnection of such system components.

The GMA200-MW16 gas detection controller has been tested by TÜV Rheinland Industrie Service GmbH to meet the requirements of the product standard EN 50402, IEC 61508 and IEC 62061 for SIL2 and PL-d according to EN ISO 13849-1. It can be used in a single-channel HFT=0 structure up to SIL2/PL-d and in a redundant HFT=1 architecture up to SIL3/PL-e. A corresponding certificate N°: 968/FSP 1324.01/17 is available.

The GMA200-MW16 has a type examination in accordance with ATEX Directive 2014/34/EU on metrological suitability for warning against explosive gas mixtures. This test was carried out by DEKRA Testing and Certification GmbH on the basis of DIN EN 60079-29-1 "Gas detectors – Performance requirements of detectors for flammable gases" and DIN EN 50271 " Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen – Requirements and tests for apparatus using software and/or digital technologies". As "safety, control and regulating devices" for use outside of hazardous areas it is therefore marked as follows:

II (2)G   BVS 19 ATEX G 001 X $C\epsilon$ 0158

In addition, the GMA200-MW16 was also tested by DEKRA Testing and Certification GmbH for its metrological suitability with regard to the measurement of oxygen deficiency, excess oxygen and inertisation in accordance with DIN EN 50104 "Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods" and for the measurement of toxic gases in accordance with DIN EN 45544-1/-2/-3 „ Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours - Part 1: General requirements and test methods ", Part 2: "Performance requirements for apparatus used for exposure measurement" and Part 3: "Performance requirements for apparatus used for general gas detection". A corresponding EU-Type Examination Certificate with the following number is available:

PFG 19 G 002 X

The GMA200Config software program is required to configure the GMA200-MW16 controller and the GMA200-RT and GMA200-RTD relay modules, which were tested as an accessory during the type examination. The GMA200Config configuration software is not described in these operations manual. (For further information please see OM 222-000.48). The GMA200-RT/RTD relay modules are also not described in these operating instructions. (For reference see OM 222-000.44). The GMA200-Visual software program can be used to display the measured values and status information provided via the GMA bus, which was also tested as an accessory during the type examination

Function and maintenance of the different transmitters are described in separate operating instructions.

1.3 Safety functions

The GMA200 system allows you to use up to six different safety functions. Further details are given in section 5.5 "Functional safety and parameters". The information flow of the security functions (SF) was as follows:

SF1: ➔ Analog transmitter input of the GMA200-M (4-20 mA or 0.2-1 mA)
  ➔ Signal processing in the GMA200-M
    ➔ internal relay outputs the GMA200-M

SF2: ➔ Digital RS485 transmitter input of the GMA200-M (TRM bus)
  ➔ Signal processing in the GMA200-M
    ➔ internal relay outputs the GMA200-M

SF3: ➔ Analog transmitter input of the GMA200-M (4-20 mA or 0.2-1 mA)
  ➔ Signal processing in the GMA200-M
    ➔ Data transmission with RS485 bus (TRM bus or GMA bus)
      ➔ Signal processing in the GMA200-M
        ➔Relay outputs of the GMA200-R

SF4: ➔ Digital RS485 transmitter input of the GMA200-M (TRM bus)
  ➔ Signal processing in the GMA200-M
    ➔ Data transmission with RS485 bus (TRM bus or GMA bus)
      ➔ Signal processing in the GMA200-M
        ➔ Relay outputs of the GMA200-R

SF5: ➔ Analog transmitter input of the GMA200-M (4-20 mA or 0.2-1 mA)
  ➔ Signal processing in the GMA200-M
    ➔ Data transmission via RS485 to downstream system (GMA bus)

SF6: ➔ Digital RS485 transmitter input of the GMA200-M (TRM bus)
  ➔ Signal processing in the GMA200-M
    ➔ Data transmission via RS485 to downstream system (GMA bus)

If the fault relay drops, the outputs of safety functions SF1, SF2, SF3 and SF4 are invalid. It is therefore absolutely essential to evaluate the switching state of the fault relay. It must also be possible to detect short-term disturbances of about 3 seconds.

It is also possible that during maintenance work on transmitters or by locking measuring points or relay outputs, the safety function may be at least partially restricted (inhibit). For this reason, it is also necessary to evaluate the switching status of the maintenance relay.

1.4 Special Requirements for Safe Usage

For safety reasons, only components authorized by the manufacturer GfG may be used.

The "time control" function of relays was not part of the type tests.

The requirements below, as specified in metrological standards EN 60079-29-1 (EX) and EN 50104 (OX), also need to be considered:

- Alarms with an active switch-on delay should not be used for safety-related purposes. If this cannot be avoided, the time delay must be set to the smallest value possible for the application. Consider the maximum possible rate of increase of the gas concentration when setting the switch on-delay.
- When measuring combustible gases with transmitters that can provide signals in the measuring range at concentrations above the full scale, the latching function must be activated when the measuring range is exceeded ("Filter time constant" setting 0 s)
- When measuring flammable gases, the "Resolution" parameter may be set to a maximum of 1% of the measuring range and the "Tolerance band" parameter may be set to a maximum of 5 % of the measuring range.
- When measuring oxygen, the parameter "Error message when measuring range underflow" must not be set to a value below -5 % of the measuring range end value.
- When measuring oxygen, the "Resolution" parameter may be set to a maximum of 1 % of the measuring range end value but not higher than 0.1 vol %. The "Tolerance band" parameter may be set to a maximum of 2 % of the measuring range end value.

Also consider the factors below, based on the metrological standards EN 45544-1 (EX) and EN 45544-3 (TOX):

- When used according to EN 45544-2, the GMA200 is suitable for operation with transmitters where the output current at the workplace limit is between 4.48 mA and 12 mA.
- When used according to EN 45544-2, the "Resolution" parameter may be set to a maximum of 1 % of the measuring range and not higher than 5 % of the occupational exposure limit. The lower range value is a maximum of 0.6 % of the measuring range. It becomes smaller if the "Resolution" parameter is set to a smaller value.
- When used according to EN 45544-2, the "Tolerance band" parameter must be set to the measuring range start value (calculated for the combination of GMA200 and connected transmitter) or to a smaller value.
- When used according to EN 45544-3, the "Resolution" parameter may be set to a maximum of 1 % of the measuring range end value and the "Tolerance band" parameter to a maximum of 5 % of the measuring range end value.

According to the requirements of EN 60079-29-1, EN 45544-1/-2/-3 and EN 50104, the alarms with the highest safety significance must be configured to be latching for each measuring point. Additionally, relays for safety-relevant switching actions must be configured in such a way that they cannot be reset in active alarm situations.

Likewise, at least one internal relay must be configured as a collective message for all measuring point faults (FLT/TRM) and for GMA faults (FLT/GMA).

For measuring points for monitoring toxic gases and vapors according to EN45544-2 (exposure measurement), the following configuration restrictions apply to transmitters with analogue interface:

- a transmitter with analog 4-20 mA interface must be parameterized.
- a linear transfer characteristic must be parameterized.
- the measuring range end value may be a maximum of 33 times the smallest limit value to be monitored, i.e. the alarm threshold may be a minimum of 3 % of the measuring range end value.

According to the requirements of EN 50271 section 4.5, the following is for digital data transmission between transmitter and GMA200, when using the internal relays, the measured value evaluation and alarming is only suitable for transmitter setting times from T90 ≥ 10 s.
If there are more than 16 transmitters and relay modules on the same TRM bus and the data transmission is only at 9600 baud, the cycle time on the TRM bus is extended from 1.0 to max. 1.3 seconds.

If the GMA200-MW16 is used in the scope of application of the Machinery Directive according to EN 62061 or ISO 13849-1, the alarm relays must be parameterized in the closed-circuit current principle. Alternatively, comparable safety requirements must be met (e.g. by using a redundant or fail-safe power supply).

2 Controller GMA200-MW16

2.1 General Description

The design and construction of the GMA200-MW16 controller facilitates flexible, simple and easy use in industrial and commercial applications for measuring combustible and toxic gases/vapors and for measuring oxygen concentrations.

Using the "GMA200Config" software, measuring points and relays can be configured quickly and easily, even when expanding already installed GMA200-MW16 gas detection systems. It allows you to configure the measuring point designation, transmitter type, gas type and measuring range etc. as well as three individual or pre-set alarm threshold values per measuring point.

2.2 Device Setup

The GMA200-MW16 can be connected to transmitters with analog 4-20 mA or 0.2-1 mA interfaces as well as transmitters with digital RS485 interfaces. A microprocessor evaluates the analog or digital input signals of the connected transmitters and displays the measured values. LEDs signal the status of the controller, the measuring points and the relays. The connection of transmitters with analogue interface is described in section 3.2 "Electrical ".

Alarm horn
Alarm signal light
LCD display

Housing cover
Control buttons
Status display of the internal relays
Status display of operating states
Status display of alarms
Type plate showing serial number
(e.g. SN:1502xxxx
15 = year of production
02 = month of production)
Terminal cover
Cable gland under the cover
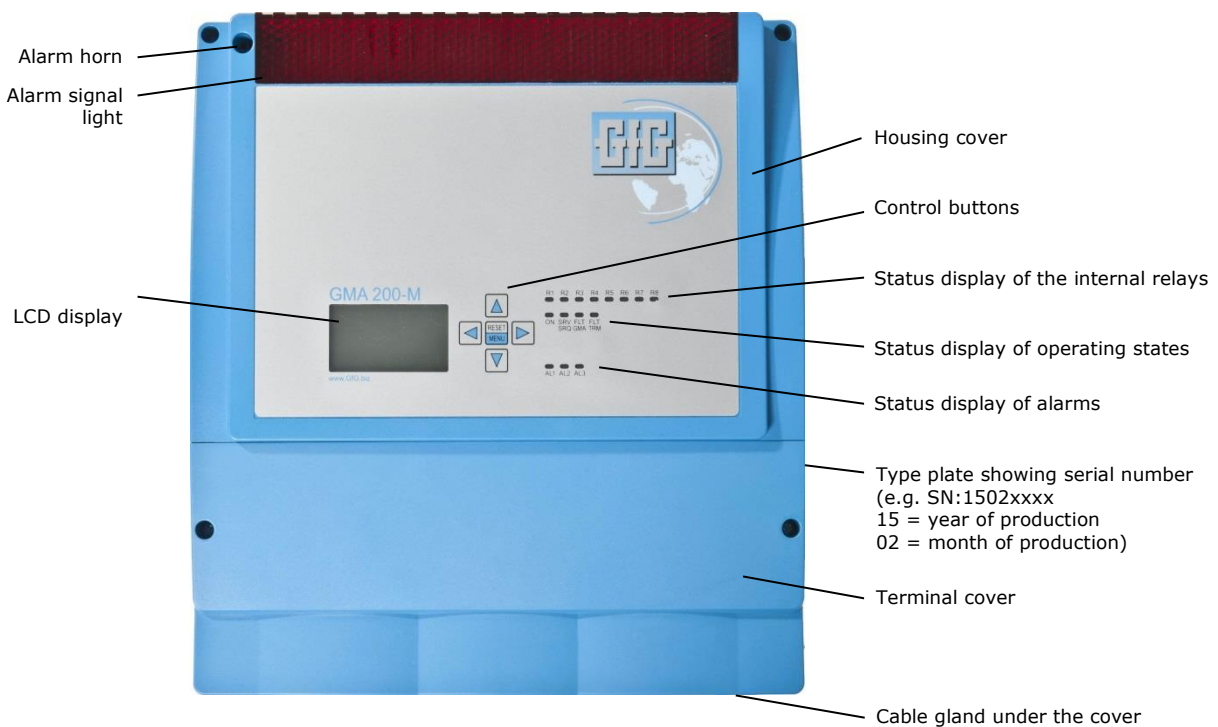
2.2.1 Control buttons
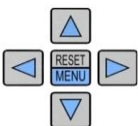
In measuring mode, the arrow keys are used to navigate between the different screens, which display the measuring points in various ways, and the RESET key is used for alarm acknowledgement. The buttons are also used for menu control, to call up information and, in service mode, to change some of the settings. This is explained in more detail in section 4 "Operating Instructions".

2.2.2 LED status indications

The GMA200 controller's status LEDs may indicate the following statuses during operation, depending on the event:

| green LED	"ON"	➔ Device in operating mode
yellow LED	"SRV/SRQ"	➔ Service operation (continuously lit) / service request (flashing)
yellow LED	"FLT/GMA"	➔ GMA malfunction
yellow LED	"FLT/TRM"	➔ transmitter or measuring point malfunction
red LED	"AL1"	➔ Alarm 1
red LED	"AL2"	➔ Alarm 2
red LED	"AL3"	➔ Alarm 3
red LED	"R1...R8"	➔ Relay 1 to 8 (activated in case of alarm or malfunction)

If an alarm has been triggered, the corresponding red alarm LED will flash until the alarm conditions are no longer met (for non-latching alarms). The alarm is then reset automatically.

If any alarm condition is still met and you "acknowledge" the alarm by pressing the RESET button (or an external alarm acknowledgement button) however, the LED will stop flashing and instead be lit red continuously. If another alarm is triggered by another measuring point, the corresponding alarm LED will start flashing again.

2.2.3 LC graphic display

In measuring mode, the measuring points are displayed with numbers, designations and the current measured values. You can switch between collective and individual view using the buttons. In case of an alarm, the system switches to alarm display automatically.
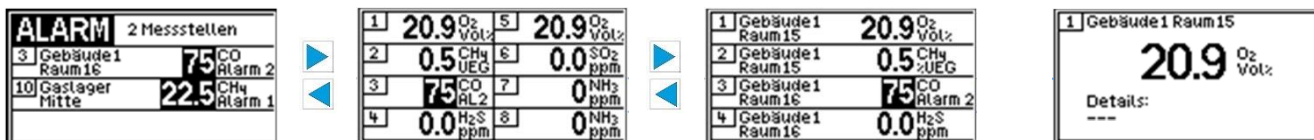
The LC display is equipped with a red/green backlight, which can be made brighter by pressing any control button. In the event of an alarm or fault, the green backlight is automatically replaced by the red one. Faults (FLT), maintenance requests (SRQ) and other messages (MSG) can still be displayed even after they have been acknowledged by pressing the RESET button in the main menu (GMA status).
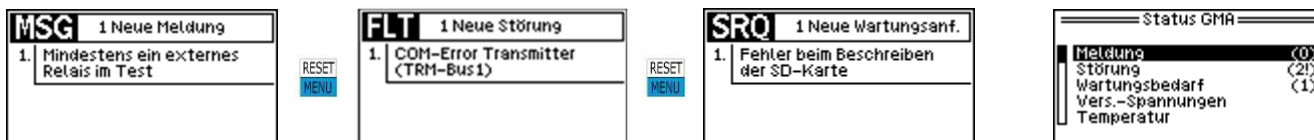
For more details on displayed information, operation and menus, refer to section 4 "Operating Instructions".

2.2.4 Visual and audible alarm

The GMA200-MW16's wall-mounted housing contains an alarm lamp and a horn. When the measured values of one or more measuring points exceed or fall below the alarm configuration, they act as a central alarm and are triggered simultaneously (for configuration see section 4.2.2.1). Like an "internal relay", the horn can be assigned to certain alarm functions and measuring points using the GMA200Config software.

2.2.5 USB socket and microSD slot

A USB socket and a slot for a microSD card are located behind the housing's cover of the GMA200-MW16. The USB socket acts exclusively as an interface for configuration purposes. The GMA200-MW16 can be configured for a wide range of measuring tasks using a PC or laptop connected via USB cable and the GMA200Config software. The microSD card slot is designed for normal microSD cards up to a capacity of 2GB. This memory card can be used as a data logger if the GMA200 is configured for the data logger option (see section 2.8 "Memory card as data logger") for more information.

2.3 Analog inputs

Up to 16 transmitters with analog 4-20 mA or 0.2-1 mA interfaces in two-wire or three-wire technology can be connected directly to the GMA200-MW16. You can configure whether a transmitter with a 4-20 mA signal or one with a 0.2-1 mA signal is connected to the analog input can be configured using the GMA200Config software. The analog inputs are identical regarding their hardware.

2.4 Digital RS485 interfaces

The GMA200-MW16 provides three digital RS485 interfaces. Up to 16 GfG transmitters with digital RS485 interfaces and up to four external GMA200-RT/RTD relay modules can be connected to two of these interfaces, the TRM-Bus1 and the TRM-Bus2. These external relay modules can also be connected to the third RS485 interface, the GMA bus. Alternatively, the GMA bus can be used to transmit measuring values, alarms and other status information to another device on request. Such a device can be a higher-level control unit, a PLC, a gateway or a panel PC for visualization of the measured data. The connections of the three digital RS485 interfaces are described in section 3.2 "Electrical ".

2.5 Relays

Internal relays

The GMA200-MW16 has a total of 8 internal relays, each with one floating changeover contact. To implement defined safety measures and alarms, 6 relays can be freely configured using the "GMA200Config" software. An additional relay is available for indications of safety-related faults and another one for indicating the maintenance status. The connections of the internal relay contacts are described in section 3.2 "Electrical ". If the number of internal relays is not sufficient, it can be extended by external relay modules.

External relay modules:

A GMA200-RT/RTD relay module allows you to expand your system by a further 16 freely configurable changeover relays. A total of 4 relay modules – and hence 64 additional relays – can be managed using the GMA200-MW16 controller. The GMA200-R relay modules are connected to the GMA200-MW16 controller via a digital RS485 interface, which also permits spatial separation of the relay modules (max. 1200 m).

Data transmission to external relay modules is typically performed with a cycle time of 1 s. However, if there are more than 16 transmitters and relay modules on the same TRM bus and the data transmission rate is 9600 baud, then the cycle time is extended from 1.0 to max. 1.3 s. If the data transmission is interrupted briefly, the reaction time of the relay module can be extended to <4 s. If the data transmission to the relay module is interrupted for a longer period of time, a fault is reported on the GMA200-MW16 from the third faulty data transmission in succession.

The relay module is not described in this operating manual (for reference see OM 222-000.44).

Configuring the relays

The internal and external relays are configured exclusively via the GMA200Config software, which offers extensive options for assigning the relays to the alarm functions and to individual measuring points or measured value groups.

Configuration options:

- Open-circuit principle / closed-circuit principle
- Individual alarms per measuring point and alarm limit value
- Collective or group alarms
- Fault notifications
- Configuration of And/Or links
- Voting functions (e.g. 2 out of 3 measuring points)

2.6 External alarm acknowledgement

In addition to the internal RESET button, which is used for alarm acknowledgement of all measuring points, two external buttons can be connected, allowing alarms from individual measuring points or measuring point groups to be acknowledged remotely. The GMA200Config software is used to define which measuring point is assigned to which acknowledgement input. The connections of the alarm acknowledgement inputs are described in section 3.2 "Electrical ".

2.7 Analog Outputs

The GMA200-MW16 also has two 4-20 mA analog outputs that can be used to output the measured values of two measuring points. These analog signals can easily be processed further by higher-level control systems, since the measured values are already linearized. Measuring points are assigned to analog outputs in the service menu of the GMA using the GMA200Config software. The connections of the analogue outputs are described in section 3.2 "Electrical ". The following table shows which output current corresponds to which GMA state.

Output current	States in measuring mode and special states
approx. 0.0 mA	No active measuring point assigned
approx. 0.0 mA	GMA in the start-up phase
approx. 0.0 mA	GMA fault (affecting the measured value acquisition of the measuring points)
1.0 mA (for 5 s)	Measuring point assignment changed within the last 5 s (self-recovering)
1.2 mA	Fault at the assigned measuring point
1.6 mA	Start-up of the assigned measuring point
2.0 mA	GMA in configuration mode (maintenance)
2.4 mA	Maintenance at the assigned measuring point
2.8 mA	Measured value <= -7.5 % of the measuring range (if clamping is not active)
2.8 mA to 4.0 mA	Measured value <= 0 % of the measuring range (if clamping is not active)
4.0 mA	Measured value <= 0 % of the measuring range (if clamping is active)
4.0 mA to 20(22) mA	Measured value 0 % to 100(112.5) % of measuring range
22.0 mA	Measured value >=112.5 % of measuring range
manual specification	Test mode active (maintenance)

2.8 Memory card as data logger

The GMA200-MW16 can optionally be equipped with a data logger for storing measured values. You can insert a normal microSD card (up to a capacity of 2GB) behind the terminal cover to act as a storage medium inside the GMA. This microSD card has to be formatted as FAT(FAT16). For more details on the operation of the data logger, refer to section 4.2.3 "Data logger function".

3 MOUNTING AND INSTALLATION

3.1 Mounting location and housing attachment

The GMA200-MW16 is intended for indoor wall mounting and must not be installed in hazardous areas. If possible, it should be mounted in such a way that it is not exposed to vibrations. The housing is fixed with 4 pan-head or cylinder head screws with a diameter of 3.5 mm to 4.5 mm. The screw heads should have a diameter of 7 to 10 mm with a flat bearing surface (use washers if necessary). The two upper screws have to be screwed into the wall to a point where they leave a gap of 3-4 mm for attaching the housing. The two lower screws must be tightened with a torque of approx. 1 Nm above the screw-in torque.

3.2 Electrical Connections

The power supply and transmitter are connected according to the terminal assignment diagram, which can be found on the inside of the terminal cover.
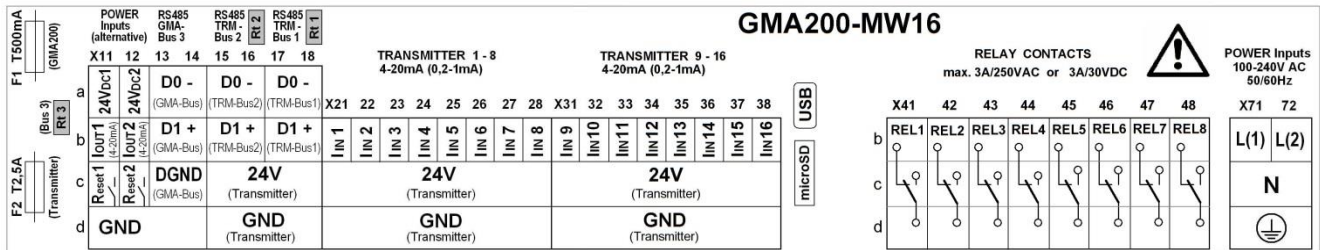
When you open the terminal cover, you will find that various locations on the inside of the GMA200-MW16 are marked with symbols. These symbols are explained below:

⚠️ **General Warning** Consult operation manual

⚡ **Danger due to** electric shock

⏚ **Protective grounding connection**

3.2.1 Safety information

⚠️ The electrical installation must always be carried out in accordance with DIN VDE 0100 or an equivalent national standard. Cables with voltages dangerous to the touch, e.g. 230 V AC, and cables with non-hazardous voltages, e.g. 24 VDC, must be laid separately. The cables you use must be suitable for the connected transmitters or devices.

If the housing cover of the GMA200-MW16 has to be opened during operation for maintenance work, please note that potentially dangerous voltages are present around the mains connection terminals X41-48 and in the area of the relay connection terminals X71-72. Avoid any contact with these areas under all circumstances.

3.2.2 Mains connection and isolating device

⚠️ If the GMA200-MW16 is supplied by a mains voltage (100 V AC to 240V AC) via terminals X71 or X72, an "isolating device" must be provided on the supply line. This isolating device must meet the requirements of IEC60947-1 and IEC60947-3, be clearly marked as an isolating device of the GMA200-MW16 and be accessible. The mains supply line must have a conductor cross-section of at least 0.75 mm^2 and be protected by an appropriate overcurrent protection device. The protective conductor must have at least the same cross-section as the L and N conductors, and is connected to terminal X71d or X72d at the terminal marked with the protective conductor symbol.

3.2.3 Floating relay contacts

⚠️ Additional external warning devices such as indicator lights, acoustic signaling devices etc. can be connected to terminals X41-48 (contacts of relays 1-8). The contacts of the adjacent relays 1&2, 3&4, 5&6 and 7&8 may only be operated with the same voltage category.

Voltages dangerous to the touch (e.g. 230 Vac) and protective low voltages (e.g. 24 VDC) must not be connected together on these adjacent relays.

3.2.4 External voltage supply with 24 V DC

GMA200-MW16 can be operated either with built-in power supply or with external 24 VDC supply. If an external 24 VDC voltage is available and is to be used to supply the GMA200-MW16, it is connected via terminal X11a or, if the supply voltage is redundant, via terminals X11a and X12a to the terminal marked 24VDC1 or 24VDC2 and to GND.

3.2.5 Connecting transmitters with an analog interface

16 transmitters with analog 4-20 mA or 0.2-1 mA interfaces can be connected to the GMA200-MW16 at terminals X21-38. Three connection terminals (I_{IN}, 24 V, GND) are available per transmitter. For transmitters with two-wire technology, only two terminals (I_{IN}, 24 V) are required. The wire cross-section depends on the current consumption of the transmitter and the cable length. Please refer to the operating manual of the connected transmitters for more detailed information.

Caution: If you accidentally connect 24 VDC to the I_{IN} terminals, the GMA input may be damaged or destroyed.

3.2.6 Connecting transmitters with a digital interface (RS485)

Transmitters with a digital interface can be connected to terminals X17-18 (TRM-Bus1) or X15-16 (TRM-Bus2). Four connection terminals (GND, 24 V, DO-, D1+) are available per transmitter bus. However, the total current consumption of all connected transmitters must not exceed 2.4 A. Please refer to the operating manual of the connected transmitters for more detailed information. The wire cross-section depends on the current consumption of the transmitter and the cable length.

On the mainboard behind terminals X18a, X17a as well as next to terminal X11a, there are three red slide switches by which a 120 Ohm terminating resistor can be switched on for each of the bus connections if the GMA is connected at the end of the line (factory setting: TRM-Bus1=ON; TRM-Bus2=ON; GMA-Bus=OFF). The bus assignment of these slide switches can be found on the label on the inside of the terminal cover.

3.2.7 Connecting further devices with a digital interface (RS485)

To expand the GMA200-MW16 with additional relays, further relay modules can be connected to terminals X17-18 (TRM bus1), X15-16 (TRM bus2) or X13-14 (GMA bus). If the GMA bus is used for this extension, the GMA bus connection has to be configured as master (Addr. 0).
To further process the measured data of the GMA200-MW16, a central unit or a corresponding bus interface can be connected to terminals X13-14 (GMA bus). In this case, the GMA200 bus connection must be configured as slave (Addr. 1 to 247).

3.2.8 Using the alarm acknowledgement inputs (Reset1+2)

Terminals X11c and X12c provide the two freely configurable alarm acknowledgement inputs (Reset1, Reset2) for connection of external acknowledgement buttons.

If the reset input is configured accordingly, the alarm is acknowledged on edge changes to GND.

Their functionality is described in detail in section 4.2.2.2 "Alarm acknowledgement (reset)".
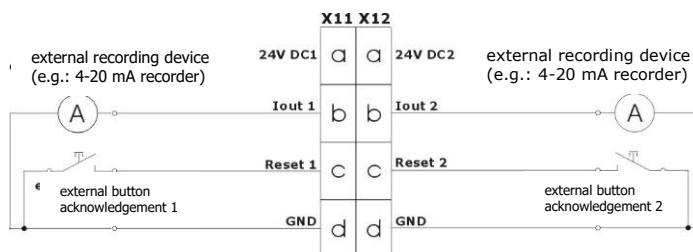
3.2.9 Using the 4-20 mA current outputs

There are two freely configurable 4-20 mA current outputs (Iout1, Iout2) at terminals X11b and X12b. External recording devices or recorders can be connected to these outputs against GND (see figure in section 3.2.8).

3.3 Commissioning

After installing the GMA200-MW16 and all transmitters as well as all additional control modules and ensuring the power supply, the commissioning process can be started.

According to national regulations, gas detection devices must be checked for proper operation by a qualified person after installation and before initial operation. In Germany, the following standards apply: "DGUV Information 213-056 (leaflet T 021 / previously BGI 836 Section 8.1)" and "DGUV Information 213-057 (leaflet T 023 / previously BGI 023 Section 8.1)".

3.4 Examples of different system variants

The two illustrations below show transmitters with analog interfaces which are connected to the GMA200-MW16 in star wiring. In the right illustration, a GMA200-RT external relay module is connected to the GMA bus or one of the TRM buses.
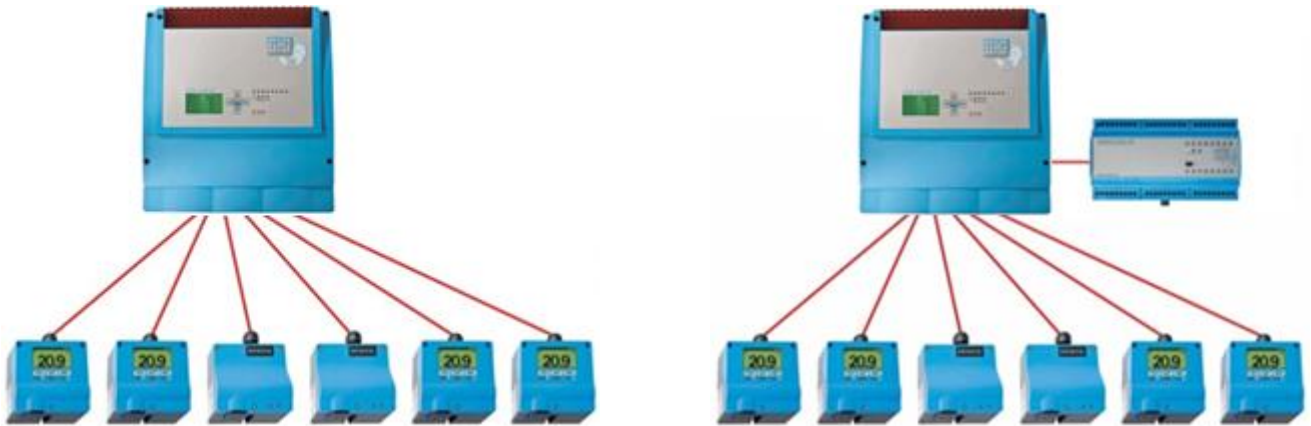
The two illustrations below show transmitters with digital interfaces which are connected via bus cabling (on the left as separate strings on TRM-Bus1 and TRM-Bus2 and on the right as a ring on the TRM ring bus). In both cases two more relay modules are connected to the GMA bus.

The two illustrations below show transmitters with digital interfaces which are connected via bus cabling (on the left as separate strings on TRM-Bus1 and TRM-Bus2 and on the right as a ring on the TRM ring bus). In both cases, a gateway is also connected to the GMA bus for further data processing.
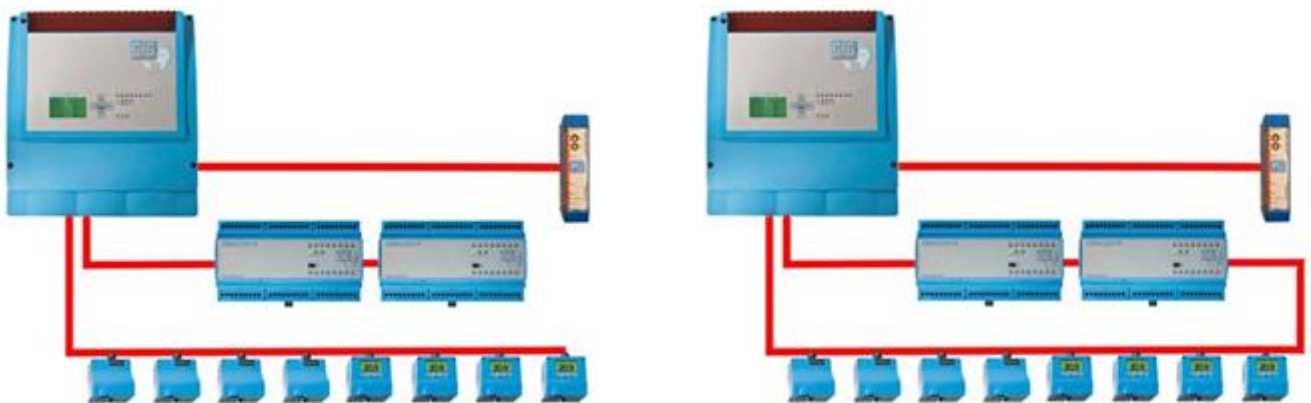
4 Operating Instructions

4.1 Control buttons and operation

You can acknowledge displayed alarms and notifications using the GMA200's control buttons. They also allow you to navigate the main menu and the service menu and can be used to change some of the configuration settings in the service menu. The functions of the individual keys and how to navigate through the menus are described below:

Button   **Function when pressed:**

RESET / MENU   Alarm acknowledgement for latching alarms (pressing button briefly)
Activation of main menu (holding button down >3 s)

▶   Access to detailed information in the main menu (see section 4.4 "Main menu"), modification of the measuring point display up to the individual measuring point display, switching from alarm display function to display function, selection of cursor position for entering your password in service menu.

▲   Toggle through menu items in the main menu, in case of individual measuring point view to individual view of other measuring points, toggle to total display (1-8, 9-16), select numerical values for entering the password in the service menu.

◀   Exit detailed view in the main menu, exit the main menu, change the display until all measuring points are displayed, change from display function to alarm display function, select cursor position for entering the password in the service menu.

▼   Toggle through menu items in the main menu, in individual measuring point view to individual view of other measuring points, activation of the auto scroll function (10 sec. or 10 min., automatic switching of displayed data), selecting digits for entering the password in the service menu.

If the GMA200 is in measuring mode, you can access the menus by holding down the RESET/MENU button. The main menu is then displayed first. From there, you can also switch to the "Service menu".

4.2 Measuring mode

The GMA200-MW16 will start its regular measuring function approximately 30 seconds after switching on the power supply. A short optical signal indicates when it is ready to measure. Depending on the transmitter type and its running-in time, the "SRT" is displayed next to the respective measuring point during the running-in time. Typically, the run-in time is between one and two minutes, depending on the transmitter.

In normal measuring mode, all LEDs are inactive and the ON indicator is lit green. The display shows all configured measuring points (up to 8 measuring points, see section 2.2.3 "LC graphic display", for changes to the displayed information see section 4.1).

4.2.1 Measuring ranges and tolerance band (dead band)

The measuring ranges can be displayed in the main menu of the GMA200 under "Info measuring points" (see section 4.4.4). For a better overview, the details of the configured measuring ranges with range starts, tolerance bands and resolutions are documented on the "Measuring point overview" page of the supplied GMA200 configuration document.

With older, purely analog transmitters (such as the CS21, CI21 or EC24), the tolerance band is used to suppress small fluctuations in measured values in the zero point range for toxic and combustible Gases from the GMA200. When measuring oxygen, slight fluctuations of 20.9 vol % O_2 (fresh air range) may be suppressed. To avoid spikes in measurement, the displayed value is adjusted to the actual measured value up to twice the value of the tolerance band. This tolerance band is always activated, but can be switched off for individual measuring points using the GMA200Config software.

With processor-controlled transmitters with analog or digital output signal (e.g. CS22, EC22 and CC28), such small fluctuations in measured values are already suppressed in the transmitter.

In this case, the tolerance band can be deactivated directly at the transmitter. The operating manuals of these gas transmitters describe the measuring range, tolerance band and resolution in more detail.

4.2.2 Alarms

Three alarm thresholds within the measuring range can be configured for each measuring point. If the alarm thresholds are exceeded or undercut, the red alarm LEDs AL1, AL2, AL3 (collective alarm display) and the integrated visual and acoustic alarm are activated. Detailed information on the gas concentration level, alarm status (AL1, AL2 or AL3) of the respective measuring point are simultaneously shown on the graphic display (see section 2.2.3 "LC graphic display").

Collective (3) alarm view	Collective (8) view	Collective (4) view	Individual view
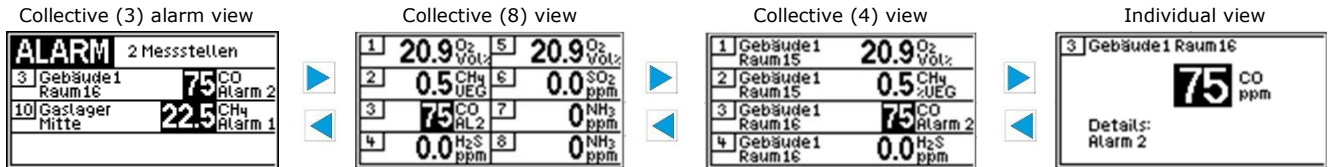
Depending on the configuration, the configured relays and the relay LEDs R1-R6 (standard configuration) are also activated.

4.2.2.1 Alarm configurations

With the GMA200Config software, the following settings can be configured for each measuring point:

Alarm threshold Alarm 1 (can be modified in the main menu / service menu)
Alarm threshold Alarm 2 (can be modified in the main menu / service menu)
Alarm threshold Alarm 3 (can be modified in the main menu / service menu)
Alarm exceeding, latching
Alarm exceeding, non-latching
Alarm undercut, latching
Alarm undercut, non-latching
Alarm with switch-on delay (up to max. 3 minutes)
Alarm with switch-off delay (up to max. 60 minutes)

4.2.2.2 Alarm acknowledgement (reset)

The behavior of the alarm LEDs before and after alarm acknowledgement is described in section 2.2.2 "LED status indicat".

Non-latching alarm:
A non-latching alarm is automatically reset when the gas concentration is below (above) the alarm threshold and the associated relay(s) is (are) deactivated.

Latching alarm:
A latching alarm remains in effect even if the gas concentration is below (above) the alarm thresholds. The alarm and the assigned relay(s) can only be acknowledged with the RESET button on the controller once the measured values fall back below (exceed) the alarm threshold. Alternatively, they can also be acknowledged using the external reset inputs if they are configured accordingly.

Acknowledgeable alarm relay:
Relays can be configured to be acknowledgeable and are reserved exclusively for connection with audible / visual notifications. They can be acknowledged by pressing the RESET button on the controller module. Alternatively, they can also be acknowledged using the external reset inputs if they are configured accordingly.

4.2.3 Data logger function

If the GMA200 is equipped with the optional data logger, the measured values from all measuring points can be stored on a FAT(FAT16)-formatted microSD card.

The measured values are always saved in an average value file with a configured recording interval and a configured file replenishment. In this file, the minimum and maximum values for each measuring point are stored for each interval in addition to the average values, so that no essential information is lost even with longer recording intervals (default setting = 5 minutes).

As soon as an alarm is triggered, the current values of all measuring points are also stored in an additional alarm file, usually at a shorter recording interval (factory setting = 10 seconds).

The data logger is configured via the GMA200Config software. This allow the recording intervals for both file types to be set as follows:
- Average file: 5/10/15/20/30 seconds or 1/2/3/5/10/15/20/30/60 minutes
- Alarm file: 5/10/15/20/30/60 seconds

Depending on the configuration, the measured values are saved under a calendar file name. For example, the times at which new files are created can be configured as follows:
- daily   (file name: year-month/day/type*) e.g. 13-0622M.txt
- weekly   (file name: year-W/KW/type*) e.g. 13-W24M.txt
- monthly   (file name: year-month/type*) e.g.13-06M.txt
- yearly   (file name: year-00/type*) e.g. 13-00M.txt

*M=mean value / A=Actual values in the case of an alarm

To read out the data, the SD card has to be removed.

⚠️ **Before removing the SD card, the data recording must be temporarily stopped as follows (pause function)**
- Activate the main menu of the GMA200 by pressing and holding the 🔲RESET/MENU button
- Select "Status data logger" and confirm by pressing the ▶ button
- Select "Stop REC by pressing the 🔲RESET/MENU button. This menu also gives information on the status (remaining memory capacity).
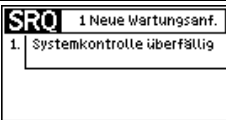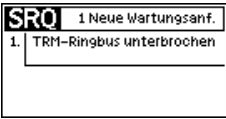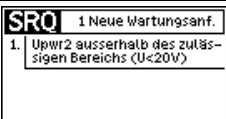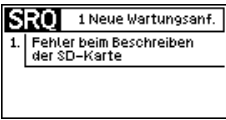
If the SD card is inserted into the slot again after reading, data recording can be restarted in the same menu item by pressing "Start REC". If this is not done manually, an automatic recording start is initiated 15 minutes after the recording stopped.

However, if the SD card will not be inserted again within these 15 minutes and the data logger is configured to trigger a maintenance request in case of a missing or faulty SD card, then the data recording should be switched off correctly in the service menu. This is described in section 4.5.2 "Service Menu / "Datalogger"".

4.2.4 Maintenance request

During normal measuring operation, a maintenance request (SRQ) may be triggered. In this case, the yellow "SRV/SRQ" LED flashes and a corresponding message appears on the display. Optionally, relays can be parameterized to switch when maintenance is required. The maintenance request has no influence on the normal measuring operation. The SRQ message in the display can be acknowledged by pressing the "RESET" button. The notification can still be accessed from the "Main menu" (in "Status GMA" / "Maintenance required"). The table below lists possible triggers for a maintenance request:

Maintenance request by the GMA200

Service Request	Cause and remedy
SRQ 1 Neue Wartungsanf. 1. Systemkontrolle überfällig	In this case, the deadline for the next system check has been exceeded. It usually has to be carried out once a year. **Remedy** Perform the system check as soon as possible. The date for the system check can only be changed using the GMA200Config software.
SRQ 1 Neue Wartungsanf. 1. TRM-Ringbus unterbrochen	The TRM ring bus, whose cabling starts at the connections of TRM bus1, leads to all transmitters one after the other, possibly also relay modules, and then ends at the connections of TRM bus2, was interrupted at least one point. If a communication fault is not reported at the same time, then at least all bus participants can still be reached. **Remedy** Check bus cabling as soon as possible and repair it if necessary.
SRQ 1 Neue Wartungsanf. 1. Upwr2 ausserhalb des zuläs-sigen Bereichs (U<20V)	This maintenance request appears if monitoring of both supply inputs is configured on the GMA200, but then one of the two supply voltages (Upwr2 or Upwr1) becomes too low or fails. **Remedy** The failed supply voltage should be restored as soon as possible.
SRQ 1 Neue Wartungsanf. 1. Fehler beim Beschreiben der SD-Karte	An error has occurred while writing to the SD card, so that the data logger no longer records data. The cause may be a defect in the SD card itself or in its contacts. It is also possible that the SD card was removed without stopping to record data (permanently). **Remedy** Remove the card and read out and save the data on the PC. Then format the SD card with FAT and reinsert it or replace it completely if necessary.

SRQ 1 Neue Wartungsanf. 1. Ungültige RTC Zeitangabe	The date and time in the GMA200's clock module are invalid. This indicates that the buffer battery of the clock module is empty or not properly contacted, so that when the GMA200 is switched off, the clock module cannot continue to operate and date and time are lost. **Remedy** Set the date and time in the service menu. If this happens again, call GfG service (replace GMA200). The battery cannot be changed.
SRQ 1 Neue Wartungsanf. 1. Kommunikationsstörung mit externem RTC	Date and time cannot be read by the clock module. This indicates a hardware defect on the mainboard of the GMA200. However, the measured values can still be acquired and evaluated regardless of the time information. **Remedy** Set the date and time in the service menu. If this happens again, call GfG service (replace GMA200).
SRQ 1 Neue Wartungsanf. 1. Kommunikationsstörung mit externem EEPROM	The GMA200 can no longer communicate with the external EEPROM. This means that data stored in the second parameter memory (e.g. designation texts) cannot be accessed. This means that no backup copy of the parameters is available in the RAM. **Remedy** If this maintenance request is still displayed as current in the main menu, then the GfG service should be called (replace GMA200).
SRQ 1 Neue Wartungsanf. 1. Parameter Sicherheitskopie fehlerhaft	The parameters stored in the backup copy are incorrect. Copying the parameters from the RAM to the backup copy did not eliminate this error either. **Remedy** If this maintenance request is still displayed as current in the main menu, then the GfG service should be called (replace GMA200).
SRQ 1 Neue Wartungsanf. 1. Temperatur ausserhalb des zul. Bereichs (T<-30°C) **SRQ** 1 Neue Wartungsanf. 1. Temperatur ausserhalb des zul. Bereichs (T>85°C)	Temperature on the mainboard of the GMA is outside the permissible range (T<-30 °C) respectively (T>85 °C). If the temperature does not actually have this value, this is an indication of a hardware defect on the GMA's mainboard. If the temperature falls below -30°C, the measured values in the display are also updated much more slowly. **Remedy** Normalize temperature influence or, if necessary, call GfG service (replace GMA).

Maintenance request by the transmitter

Service Request		Cause and remedy
3 Gebäude1 Raum16 **-5.5** CH₄ %UEG Details: Underrange, SRQ	3 Gebäude1 Raum16 ↓↓↓ CH₄ %UEG Details: Underrange, SRQ	The signal zero point at the transmitter has drifted away negatively, so the value was clearly below the transmitter's measuring range (under range typ. <-5 % of measuring range). **Remedy:** The zero point of the transmitter needs to be adjusted.
1 20.9 O₂ SRQ 5 20.9 O₂ Vol% 2 0.0 CH₄ %UEG 3 0 CO ppm 4 0.0 H₂S ppm	1 Gebäude1 Raum15 **20.9** O₂ Vol% Details: SRQ	Maintenance request for a transmitter with digital RS485 interface. In this example, the sensor hast to be replaced as it will soon be used up. A corresponding message or signal is given at the transmitter. **Remedy** Call GfG service (replace sensor if necessary).

4.3 Special states

The device can be in various special states.

4.3.1 Starting the system

After you switch the device on, the GfG logo, name of the device and version numbers of the bootloader (first) and mainboard firmware (second) are displayed.

During this time, the GMA will perform various internal self-tests. After these internal tests have been completed, it will also briefly test the display, all LEDs and the horn.

The yellow FLT/GMA fault LED will be, the relays will be de-energized and the analog outputs will emit approx. 0 mA for the entire duration of these tests.

If no errors occurred during the internal self-tests, the device will then switch to the special state "Startup" (warm-up time) or to normal measuring mode.

4.3.2 Startup (warm-up time)

The connected transmitters usually require a warm-up time. To enable digital transmitters to perform their own start-up, the GMA200 will wait for 30 seconds after it is switched before addressing transmitters equipped with a digital RS485 interface.
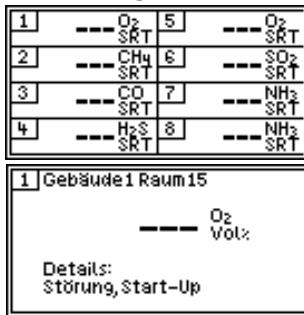
 Even if only transmitters with an analog interface are connected, the wait time is at least 30 seconds. Depending on the connected transmitter, the duration of the warm-up time may vary and last from a few seconds to up to a few minutes. During this process, "**SRT**" or "**Fault, Startup**" is displayed for each of the individual measuring points. Different transmitters and sensor types may switch to normal measuring mode at different times. For the duration of this process, an appropriately configured current output emits 1.6 mA. The relays behave according to the configured functionality, and the fault relay has dropped out. The yellow "FLT/TRM" fault LED is on and will only turn off when all measuring points are ready for operation.

4.3.3 Fault

For fault notifications, a distinction is made between transmitter faults (yellow LED "FLT/TRM") and GMA controller faults (yellow "FLT/GMA" LED). In the event of a fault, the matching yellow LED lights up, the corresponding fault relay is de-energized and the correspondingly configured current output emits either 1.2 mA or approx. 0 mA, depending on the cause of the fault. Fault notifications are non-latching.

The following fault messages apply to transmitters with an **analog** interface (**mA**):

Fault [FLT/TRM]	Cause and remedy
	In this case the level of the analog transmitter signal exceeds the current measuring range of the GMA200-M (I_{IN} >24 mA respectively I_{IN} >1,2 mA). This may be caused by a gas concentration which is to high being present or a defect of the transmitter or the wiring. **Remedy** When you have ensured that the gas concentration has stabilized, check the output signal directly at the transmitter. If necessary, replace the transmitter. Otherwise, check and repair the transmitter wiring (if necessary).
	In this case the measuring range of the transmitter was exceeded to such an extent that the signal level has reached the error level. The current intensity that defines the error level is transmitter-dependent (e.g. 22 to 24 mA or 1.1 to 1.2 mA). **Remedy** Reduce the gas concentration at the measuring point.
	In this case, the measured values have fallen so far below the measuring range of the transmitter that the signal level has reached the error level. The current intensity that defines the error level is transmitter-dependent (e.g. 2.8 mA or 0.14 mA). **Remedy** If you can rule out gas at the measuring point as the source of this problem (causing a negative cross-sensitivity), adjust the zero point of the transmitter.
	The level of the analog transmitter signal has fallen below the current measuring range of the GMA200-M (I_{IN} = 0 mA). The cause may be a missing transmitter power supply, a defect of the transmitter or a disruption in the line. **Remedy** If you are sure that the transmitter's power supply is not damaged, check the output signal directly at the transmitter. Replace the transmitter if necessary. Otherwise, check and repair the transmitter wiring (if necessary).
	In this case, a short circuit in the transmitter cable or at the cable end on the side of the transmitter is detected. The analog current signal does not behave as if it came from a current source. **Remedy** Check the current signal at the GMA200 input and the transmitter output with a current meter. If necessary, check and repair the cable routing from the transmitter to the GMA200.

Please note: Observe the relevant instructions in the operating manuals of the connected transmitters.

The following fault messages apply to transmitters with a **digital** interface (**Bus**):

Fault [FLT/TRM]	Cause and remedy
	The transmitter is in the start-up phase. During this time, the sensor warms up. This warm-up period depends on the transmitter and sensor and can last several minutes. **Remedy** Please wait until the process is completed.

1 Gebäude1 Raum15 ↑↑↑ O₂ Vol% Details: Störung,Overrange/AD	In this case, the sensor signal in the transmitter has exceeded the measuring range of the transmitter electronics. This may be caused by a gas concentration at the transmitter being too high or a gas with a very high cross-sensitivity. It may also indicate that the sensor or the transmitter electronics are defective. **Remedy** If you can ensure that the problem is not caused by a high gas concentration or a gas with a high cross-sensitivity, check the transmitter. Please also refer to the operation manual of the transmitter.
1 Gebäude1 Raum15 ↑↑↑ O₂ Vol% Details: Störung,Overrange	In this case, the sensor signal in the transmitter has clearly exceeded the transmitter's measuring range (usually >112 %). This may be caused by a high gas concentration at the transmitter or a gas with a very high cross-sensitivity. It may also indicate that the sensor or the transmitter electronics are defective. **Remedy** If you can ensure that the problem is not caused by a high gas concentration or a gas with a high cross-sensitivity, check the transmitter. Please also refer to the operation manual of the transmitter.
1 Gebäude1 Raum15 ↓↓↓ O₂ Vol% Details: Störung,Underrange	In this case, the sensor signal in the transmitter has clearly fallen below the transmitter's measuring range (usually <-7.5 %). It is possible that a gas with a negative cross-sensitivity is present at the point of measurement or that the zero point signal has drifted away due to ageing of the sensor or environmental influences. **Remedy** Please refer to the operation manual of the transmitter.
1 Gebäude1 Raum15 ↓↓↓ O₂ Vol% Details: Störung,Underrange/AD	In this case the sensor signal in the transmitter has fallen below the measuring range of the transmitter electronics. It is possible that a gas with a negative cross-sensitivity is present at the point of measurement or that the zero point signal has drifted away due to ageing of the sensor or environmental influences. **Remedy** Please also refer to the operation manual of the transmitter.
1 Gebäude1 Raum15 ??? O₂ Vol% Details: Störung,COM-Error	In this case the communication between the GMA and a digital transmitter is disturbed. The cause could be a missing power supply of the transmitter, a wrong bus assignment, a wrongly set bus address or baud rate at the GMA200-M or at the transmitter. It could also be a hardware-related interruption of the communication line or the lines have been connected incorrectly. However, a defect in the transmitter could also have led to the malfunction. **Remedy** Check the power supply of the transmitter, the correct bus assignment, the settings of the bus addresses and baud rates and correct them if necessary. Check bus cabling and adjust if necessary.
1 Gebäude1 Raum15 ??? O₂ Vol% Details: Störung,TRM-Error	In this case, the digital transmitter is malfunctioning. This might be caused by the supply voltage of the transmitter being too low or too high or there could be a defect in the transmitter itself. **Remedy** Check the transmitter's power supply and, if necessary, check the transmitter itself. Please refer to the operation manual of the transmitters for detailed information.
1 Gebäude1 Raum15 ??? O₂ Vol% Details: Störung,CNF-Error	In this case the configuration in the GMA does not match the configuration of the connected transmitter. There may be differences in gas type, unit, measuring range or number of decimal places. However, it is possible that merely the assignment of the transmitter is incorrect due to an improper bus address. **Remedy** Check correct transmitter assignment and bus address. Check the correct measuring range setting on the transmitter and if necessary correct. Otherwise, adjust the configuration of the measuring point in the GMA.

Please note: Also observe the relevant instructions in the operation manuals of the connected transmitters.

The following fault messages apply to the GMA itself:

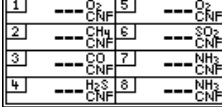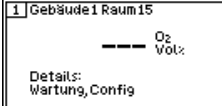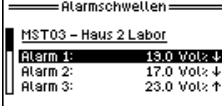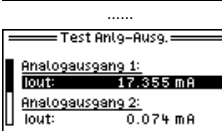| Fault [FLT/GMA]	Cause and remedy
FLT 1 Neue Störung 1. Unzulässige GMA Versor- gungsspannung (U<20V) **FLT** 1 Neue Störung 1. Unzulässige GMA Versor- gungsspannung (U>30V)	For configuration, the GMA can be **supplied with power from the PC** via USB cable. In this case, the message "Invalid GMA supply voltage (U < 20 V)" is always displayed along with the message "Invalid relay supply voltage (U < 18.2 V)". This is normal in this case. Otherwise the supply voltage of the GMA200 is too low (U < 20 V) or too high (U > 30 V)>. The reason could be a defective power supply unit or the malfunction of the redundant power supply. **Remedy** For normal operation, check power supply and replace power supply unit if necessary.
FLT 1 Neue Störung 1. Unzulässige Relais Versor- gungsspannung (U<18.2V) **FLT** 1 Neue Störung 1. Unzulässige Relais Versor- gungsspannung (U>19.5V)	For configuration, the GMA can be **supplied with power from the PC** via USB cable. In this case the message "Invalid relay supply voltage (U < 18.2 V)" is always displayed along with the message "Invalid GMA supply voltage (U< 20 V)". This is normal in this case. If the impermissible relay supply voltage is only reported because the voltage supply of the internal relays and the current outputs is too low (U < 18.2 V) or too high (U > 19.5 V), it indicates that the GMA200 is defective. **Remedy** Call GfG service.
FLT 1 Neue Störung 1. Unzulässige CPU Versor- gungsspannung (U<3.1V) **FLT** 1 Neue Störung 1. Unzulässige CPU Versor- gungsspannung (U>3.5V)	The voltage supply of the internal electronics is too low (U < 3.1 V) or too high (U > 3.5 V). This indicates a defect in the GMA200. **Remedy** Call GfG service.

Display	Description
FLT 1 Neue Störung 1. COM-Error Transmitter (TRM-Bus1)	Communication error between the GMA200-M and a transmitter on the TRM bus1. The cause could be a missing power supply of the transmitter, a wrong bus assignment, an incorrectly set bus address or baud rate at the GMA200-M or at the transmitter. It could also be a hardware-related interruption of the communication line or the lines have been connected incorrectly. However, a defect in the transmitter could also have led to the malfunction. **Remedy** Check the Power Supply of the transmitter, the correct bus assignment, the settings of the bus addresses and baud rates and correct them if necessary. Check bus cabling and adjust if necessary.
FLT 1 Neue Störung 1. COM-Error Rel.Mod. 1,2,3 (GMA-Bus, TRM-Bus1+2)	Communication error between the GMA200-M and external relay modules GMA200-R. In this case there should be one relay module on the GMA bus, one relay module on the TRM bus1 and one relay module on the TRM bus2. This could be caused by a lack of power supply to the relay modules, incorrectly set baud rates or bus addresses on the GMA200-M or the GMA200-R. The relay modules could have been simply mixed up here, for example. It could also be a hardware-related interruption of the communication line or the lines have been connected incorrectly. **Remedy** Check the power supply of the relay modules, correct device assignment, the setting of the bus addresses and baud rates and adjust correctly if necessary. Check bus cabling and adjust if necessary.
FLT 1 Neue Störung 1. Kommunikationsstörung mit Display-PCB	The internal communication between mainboard and displayboard is disturbed. The most probable cause is a defect in the ribbon cable connecting both circuit boards. A defect on one of the two circuit boards is also possible. **Remedy** Replace ribbon cable as a precaution and call GfG service if necessary.
FLT 1 Neue Störung 1. 2x Multiplexer defekt (Mux: 1,3)	A persistent error has occurred at the corresponding multiplexers of the analogue input signals. The reason for this may have been a contact problem on the mainboard or an excessive error voltage at the analogue inputs. **Remedy** If the error occurs repeatedly after a restart, the GMA200 has to be replaced.
FLT 1 Neue Störung 1. 3x int. Relais defekt (Rel: 3,5,8)	The switching function may no longer be possible at the corresponding internal relays. The reason for this may have been a contact problem on the mainboard or an excessive error voltage at the analogue inputs. **Remedy** If the error occurs repeatedly after a restart, the GMA200 has to be replaced.
FLT 1 Neue Störung 1. 2x ext. Relais defekt (Relaismodul: 1)	The switching function may no longer be possible at the relays of the external relay modules GMA200-RT/-RTD. This can be caused by a defect in the relay, a contact problem on the relay board or a defect in the monitoring circuit. **Remedy** If the error occurs repeatedly after restarting the external relay module, it has to be replaced.
FLT 1 Neue Störung 1. 1x Relaismodul Störung (Relaismodul: 1)	An external relay module GMA200-RT/-RTD signals a fault. There can be various reasons for this (e.g. wrong supply voltage, defective program memory, defective data memory, defective parameter memory, etc.) **Remedy** If the external relay module is equipped with a display, the displayed information can be used for error analysis. If there is no display, first check its supply voltage and then, if necessary, connect to the GMA200Config software via the USB port. If the cause cannot be found and eliminated, the external relay module has to be replaced.
FLT 1 Neue Störung 1. Systemtakt außerhalb des zulässigen Bereichs	The system cycle of the GMA200 is too fast or too slow, or the reference cycle is disturbed. The cause is a hardware defect on the mainboard. It is possible that communication via the RS485 buses and the USB interface is also disturbed. **Remedy** The GMA200 has to be replaced.
FLT 1 Neue Störung 1. Externer Überwachungs-baustein defekt	A malfunction was detected when checking the external monitoring module on the mainboard. **Remedy** If the error still occurs after restarting the GMA200, the GMA200 has to be replaced.
Parameter Fehler Arbeitsspeicher nicht reparierbar Reset□	The parameters in the main memory contain incorrect data that cannot be corrected automatically due to a hardware defect on the mainboard. **Remedy** If the error still occurs after restarting the GMA200, the GMA200 has to be replaced.
FLT 1 Neue Störung 1. Parameterspeicher inkonsistent	The parameters in the RAM and in the backup copy are each without errors, but have different contents. This may have been caused by a power failure during a configuration change. **Remedy** The parameters are saved from the RAM to the backup copy by simply acknowledging this message. The then valid configuration can be checked and, if necessary, corrected with the GMA200Config software.
FLT 1 Neue Störung 1. Systemkontrolle 30 Tage überfällig	The malfunction was triggered because the deadline for the system check was exceeded by at least 30 days. The fact that this triggered a fault has been configured as an option. **Remedy** Carry out system check and have a new date set for the system check.
FLT 1 Neue Störung 1. Logischer Programmablauf-fehler	The normal program operation has been interrupted, which means the correct function of the GMA200 can no longer be guaranteed. Possibly there is a defect on the mainboard or the display board. **Remedy** The GMA200 will automatically restart three seconds after this error occurs. If this error is reported again, the GMA200 has to be replaced.
FLT 1 Neue Störung 1. Datenspeicher (RAM) des Hauptprozessors defekt	The RAM of the main processor on the mainboard is defective. **Remedy:** The GMA200 will automatically restart three seconds after this error occurs. If this error is reported again the GMA200 has to be are replaced.

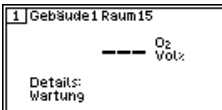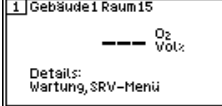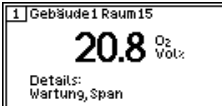|	
FLT 1 Neue Störung 1. Datenspeicher (RAM) des Nebenprozessors defekt	Memory of the slave processor on the display board is defective. **Remedy** If the error occurs repeatedly after a restart, the GMA200 has to be replaced.
FLT 1 Neue Störung 1. Programmspeicher (ROM) d. Hauptprozessors defekt Boot V1.32 GMA 200 Error: Main	The program in the program memory of the main processor on the mainboard is faulty. **Remedy** The GMA200 will automatically restart three seconds after this error occurs. If the check of the program memory by the bootloader shows again an error, then a GfG service technician has to carry out a firmware update. If the error cannot be eliminated by the update, the GMA200 has to be replaced.
FLT 1 Neue Störung 1. Programmspeicher (ROM) d. Nebenprozessors defekt	The program in the program memory of the slave processor on the display board is faulty. **Remedy** If the error still occurs after restarting and cannot be removed by a GfG service technician with a firmware update, the GMA200 has to be replaced.
FLT 1 Neue Störung 1. Der Nebenprozessor läuft im Bootloader	After a restart the slave processor on the display board only runs in the bootloader because the program of the slave processor is faulty. **Remedy** If the error still occurs after restarting the GMA200, a firmware update of the processor on the display board has to be performed using the GMA200Config software.
FLT 1 Neue Störung 1. Kein Bootloader auf dem Hauptprozessor installiert	The bootloader of the main processor on the mainboard does not work properly or was not installed properly due to a memory defect. **Remedy** If the error still occurs after restarting the GMA, the GMA has to be replaced.
FLT 1 Neue Störung 1. Kein Bootloader auf dem Nebenprozessor installiert	The bootloader of the slave processor on the display board does not work properly or was not installed correctly due to a memory defect. **Remedy** If the error still occurs after restarting the GMA, the GMA has to be replaced.
FLT 1 Neue Störung 1. Unzulässige Relaismodul- Konfiguration	For at least one of the following reasons, this configuration for an external relay module is not permitted: - Although the TRM busses are configured as a ring under "General" in "Bus Communication", either TRM bus 1 or TRM bus 2 was configured for the external relay module during bus connection. - Although the TRM busses are **not** configured as a ring under "General" in "Bus Communication", the TRM ring bus was configured at the bus connection for the external relay module. - Although under "General" in "Bus Communication" the setting of the GMA bus address is not equal to zero (no MASTER), the GMA bus was configured at the bus connection for the external relay module. - Several external relay modules on the same bus are assigned the same bus address. **Remedy** Check and correct the configuration for the external relay modules with the GMA200Config software. Call GfG service.
FLT 1 Neue Störung 1. Unzulässige Analog-Trans- mitter Konfiguration	For one of the following reasons, this configuration for transmitters with analogue interface is not permitted: - At least one analogue transmitter connection is assigned to several measuring points. - The number of analogue transmitter connections, depending on the GMA200 type, has been exceeded. (e.g. max. 4 for GMA200-MW4 or max. 6 for GMA200-MT6) - At least one linearization table is incorrectly assigned to a transmitter with an analogue interface, because the linearization table was changed after the assignment. **Remedy** Check and correct the configuration for measuring points with analogue interface with the GMA200Config software. Call GfG service.
FLT 1 Neue Störung 1. Unzulässige Digital-Trans- mitter Konfiguration	For one of the following reasons, this configuration for transmitters with digital interface is not permitted: - Although the TRM busses are configured as a ring under "General" in "Bus Communication", the digital interface for a transmitter was configured either for TRM-Bus1 or TRM-Bus2. - Although the TRM busses are **not** configured as a ring under "General" in "Bus Communication", the TRM ring bus was configured for the digital interface of a transmitter. - Several digital transmitters on the same bus are assigned the same bus address. **Remedy** Check and correct the configuration for measuring points with digital interface with the GMA200Config software. Call GfG service.
FLT 1 Neue Störung 1. Aktiver Alarm o. Verknüpf. mit nicht-rücksetzb. Relais	Invalid relay or alarm configuration. At one measuring point an alarm was configured which is not linked to any relay. **Remedy** Check and correct the configuration for all measuring points with the GMA200Config software. Call GfG service.
yellow LED "FLT/GMA" lights up, although no fault is displayed under "Status-GMA"	If the GMA200 is working properly, but the yellow fault LED "FLT/GMA" is permanently lit and does not go out even during the LED test, then the ribbon cable between the mainboard and the display board may not be entirely okay. A defect on one of the two circuit boards is also possible. **Remedy** Replace ribbon cable as a precaution and call GfG service if necessary.

4.3.4 Maintenance

The GMA200 will switch to maintenance mode whenever its safety functionality is only available to a limited extent or no longer at all due to deliberate intervention by the operator or service personnel. In either case, maintenance mode is indicated by the yellow "SRV/SQR" LED being permanently on and by the maintenance relay being active. Maintenance mode may be caused by any of the options listed below:

GMA200 maintenance

	Changes to the configuration using the GMA200Config software • Locking measuring points or relays • Changing the measuring point or relay configuration • Changing the general GMA configuration • Testing internal relays or relays on external relay modules • Testing analog outputs
	Changes to the configuration using the service menu of the GMA200 • Modifying the alarm thresholds of measuring points • Adjusting the ZERO and SPAN values of analog measuring points • Changing the BUS settings • Locking at least one measuring point (INH = inhibit) • Locking at least one relay • Testing internal relays or relays of external relay modules • Testing of analog outputs

Transmitter maintenance

	On several transmitters with an analog interface, the current level indicates to the GMA200 that there is currently maintenance work being done on the transmitter. When this is the case, no measured value is displayed and, depending on the screen, "**SRV**" is displayed for "gas type" and "**Maintenance**" for "detail".
	On transmitters with a digital interface (bus), the GMA receives a signal containing the information that maintenance work is being performed on the transmitter. Depending on the screen, "**SRV**" is displayed for "gas type" or "**Maintenance**" in individual view for "details", in combination with "**SRV Menu**", "**Zero**" or "**Span**". Usually, no measured value is displayed in this case. A measured value is only displayed in individual view, during zero point (Zero) and sensitivity (Span) adjustment.

Depending on what caused the GMA200 to go into maintenance mode, only certain parts of its safety functionality may have been cancelled at this point. The safety functionality may still be active for the unaffected parts. But maintenance mode is only fully canceled, i.e. the yellow SRV/SRQ LED will turn off and the maintenance relay is switched off, after all causes have been eliminated.

4.3.5 Configuration by parameterization

The configuration of the GMA200 itself can only be changed to a very limited extent by changing parameters in the device's service menu. For more details see section 4.5 "Service Menu". However, the GMA200 can be fully configured using a PC and the "GMA200Config" configuration software via a USB connection. Once the configuration software has established a connection with the GMA200, you can no longer operate the device via the service menu. If you

 then change the configuration of the GMA200 with the configuration software, the device will indicate its changed status by displaying "**CNF**" for all measuring points. In this configuration phase, the special state "Maintenance" is also active (see section 4.3.4 "Maintenance"). Once the configuration is completed and you have disconnected the configuration software, the GMA200 returns to normal measuring mode.

4.4 Main menu

Navigate the main menu using the GMA200 controller's keypad (see section 4.1 "Control buttons and operation"). Any text referenced below applies only if the device is set to "English".

The main menu is divided into:
- Status GMA
- Status data logger
- Info GMA
- Info measuring points
- Info relays
- Info analogue outputs
- Tests (Test LCD display, LED/horn, external button)
- Service menu (password-protected, refer to section 4.5)

To return from the main menu to the display of measured values in measuring mode, press the button ◀.

4.4.1 Main menu / "Status GMA"

The "Status GMA" menu consists of:
- Message
- Fault
- Maintenance requirement
- Supply voltages
- Temperature

The numbers in brackets after Message, Fault and Maintenance Requirement represent the number of messages that can be retrieved. A "**!**" behind the number is an indicator for notifications which are currently active. If there is no "**!**" behind the number, the notifications are stored for archiving purposes but no longer active.

The menu item "Supply voltages" displays the GMA supply voltages Upwr1 and Upwr2, at least one of which should typically be at 24 V or in the range of 20 V to 30 V. The internal relay supply voltage Urel is also displayed. It should typically be 18.8 V or in the range of 18.2 V to 19.5 V, while the CPU supply voltage Ucpu, which is displayed too, should typically be 3.3 V or in the range of 3.1 V to 3.5 V.

The Temperature menu displays the temperature measured inside the device, which might be slightly higher than the ambient temperature depending on the activity of the internal relays, the electronics and (if applicable) the power supply.

4.4.2 Main menu / "Status data logger"

You can start and stop the data logging function in this menu.
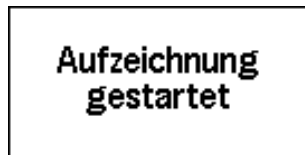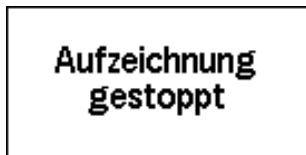
Please note: You must stop the recording before removing the memory card; if you do not, data on the memory card may be lost.
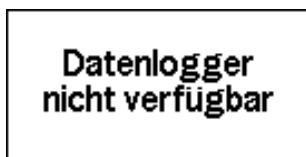
Please note:
The data logger is an optional component. If you would like to use this function, please contact a service or sales representative of the manufacturer.

4.4.3 Main menu / "Info GMA"

```
══════Info GMA══════
┃ GMA-Typ:      GMA200-MT16
┃ FW-Version:          2.06
┃ SN:             12111327
┃ Uhrzeit:         11:32:38
┃ Datum:        24.Apr 2017
```

```
══════Info GMA══════
┃ GMA-Bus Modus:      Master
┃ GMA-Bus Baud:       115200
┃ TRM-Bus1 Baud:       19200
┃ TRM-Bus2 Baud:       19200
```

The following information can be displayed in "Info GMA":
- GMA type (device type)
- FW version (version of the firmware)
- SN (serial number of the GMA200)
- Current time of the clock module of the GMA200
- Current date of the clock module of the GMA200
- GMA bus mode for master operation or
  GMA bus address for slave operation
- Baud rate settings of GMA bus, TRM bus1 and TRM bus2

4.4.4 Main menu / "Info measuring points"

Use this menu to check the parameterization of the analog and digital transmitters. You will not be able to make any changes.

Some examples are shown below:

```
══════Messstelle 1══════
┃ ID:         Haus 1 Keller
┃ MB:       0 .. 25.0 Vol% O₂
┃ AL1:          19.0 Vol% ↓
┃ AL2:          17.0 Vol% ↓
┃ AL3:          23.0 Vol% ↑
                      ▶2▶
```

```
══════Messstelle 1══════
┃ TRM:        EC28 (MK398-7)
┃ Input:        lin1 (4-20mA)



                      ◀1◀
```

```
══════Messstelle 2══════
┃ ID:          Haus 1 Garage
┃ MB:        0 .. 300 ppm CO
┃ AL1:             30 ppm ↑
┃ AL2:             60 ppm ↑
┃ AL3:            100 ppm ↑
                      ▶2▶
```

```
══════Messstelle 2══════
┃ TRM:        EC28 (MK174-7)
┃ Input:      TRM-Bus1 (Adr.2)



                      ◀1◀
```

```
══════Messstelle 3══════
┃ ID:           Haus 2 Labor
┃ MB:       0 .. 25.0 Vol% O₂
┃ AL1:          19.0 Vol% ↓
┃ AL2:          17.0 Vol% ↓
┃ AL3:          23.0 Vol% ↑
                      ▶2▶
```

```
══════Messstelle 3══════
┃ TRM:        EC28 (MK398-7)
┃ Input:      TRM-Bus2 (Adr.3)



                      ◀1◀
```

```
══════Messstelle 4══════
┃ ID:         Haus 2 Gaslager
┃ MB:     0 .. 100.0 %UEG CH₄
┃ AL1:         20.0 %UEG ↑
┃ AL2:         40.0 %UEG ↑
┃ AL3:         60.0 %UEG ↑
                      ▶2▶
```

```
══════Messstelle 4══════
┃ TRM:        IR29 (MK237-1)
┃ Input:        lin4 (4-20mA)



                      ◀1◀
```

```
══════Messstelle 5══════
┃ ID:        Haus 3 Kühlraum
┃ MB:      0 .. 1000 ppm HFO
┃ AL1:            200 ppm ↑
┃ AL2:            400 ppm ↑
┃ AL3:            600 ppm ↑
                      ▶2▶
```

```
══════Messstelle 5══════
┃ TRM:        CS21 (MK327-3)
┃ Input:        lin5 (4-20mA)



                      ◀1◀
```

```
   Keine aktiven
   Messstellen
```

Please note: You can adjust minor options, as explained in section 4.5.3 "Service menu / "Measuring Points". Any more complex changes (such as adding or removing measuring points) can only be made using the configuration software GMA200Config.

4.4.5 Main menu / "Info Relay"

Select "Internal Relay" to view information on the individual relays.

```
══════Info Relais══════
┃ Interne Relais
┃ Relais Modul 1
┃ Relais Modul 3
```

```
══════Info int. Relais 1══════
┃ Name:            Voralarm
┃ Status:                Ok
┃ Zustand:              OFF
┃ Arbeitsprinzip:  Arbeitsstrom
┃ Rücksetzbar:          Nein
```

```
══════Info int. Relais 2══════
┃ Name:          Hauptalarm
┃ Status:                Ok
┃ Zustand:              OFF
┃ Arbeitsprinzip:  Arbeitsstrom
┃ Rücksetzbar:          Nein
```

Selecting "Relay Module X" will call up information about the external relay module and its individual relays.

```
══════Info Relais══════
┃ Interne Relais
┃ Relais Modul 1
┃ Relais Modul 3
```

```
══════Relais Modul 1══════
┃ Name:        Lüftersteuerung
┃ Typ:          GMA200-RTD
┃ Status:               Ok
┃ Bus/Adr:      GMA-Bus/1
```

```
══════Info ext. Rel.1/Mod.1══════
┃ Name:             Lüfter 1
┃ Status:                Ok
┃ Zustand:              OFF
┃ Arbeitsprinzip:  Arbeitsstrom
┃ Rücksetzbar:          Nein
```

```
══════Info ext. Rel.2/Mod.1══════
┃ Name:             Lüfter 2
┃ Status:                Ok
┃ Zustand:              OFF
┃ Arbeitsprinzip:  Arbeitsstrom
┃ Rücksetzbar:          Nein
```

4.4.6 Main menu / "Info Analog Outputs"

```
══════Info Analogausgänge══════
Analogausgang 1:
  MST01 - Haus 1 Keller
Analogausgang 2:
  Inaktiv
```

In this example, analog output 1 is assigned to measuring point 1 with the measuring point designation "House 1 Cellar".

Analog output 2 is not assigned to any measuring point.

4.4.7 Main menu / "Tests"

Use the "Tests" menu to start a test of the LC display and the internal horn.

You can also test the external alarm acknowledgement inputs for proper function using "Test ext.AL-Reset".

4.4.7.1 Tests / "Test LCD"

A display test will start automatically after switching on the device. This test can also be triggered here. If it detects any faults, the device has to be replaced.

4.4.7.2 Tests / "Test LED/Horn"

An LED/horn test will start automatically after switching on the device. This test can also be triggered here. If it detects any faults, the device has to be replaced.
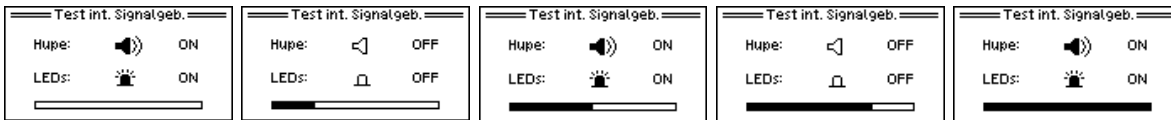
4.4.7.3 Tests / "Test ext.AL-Reset"

If required, you can check the functionality of the alarm reset inputs in this menu. For this purpose, terminal X11c (Reset1) or terminal X12c (Reset2) has to be bridged with terminal X11d (GND).
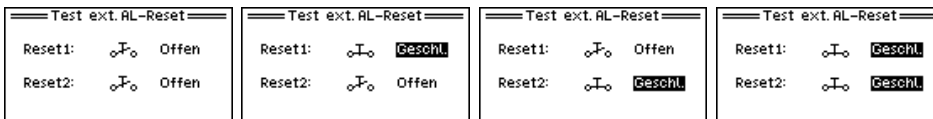
4.4.8 Main menu / "Service Menu"

Settings can be viewed and changed in the service menu. The scope of each function is explained in detail in the next section.

4.5 Service Menu

Please note: Access to the "Service menu" is blocked while the GMA200 is connected to the GMA200Config software. It will have to be disconnected first.
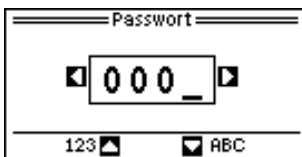
Because of this special functionality, access to this menu is password protected. On delivery, the password is set to "0000" by default. This password can be changed in the service menu.

Please note: Neither is it possible to connect to the GMA200 using the GMA200Config software if the "Service Menu" is active on the GMA200 at the same time.

The "Service Menu" is divided into five submenus: 1 - System Setup, 2 – Data logger, 3 - Measuring Points, 4 - Relay and 5 - Analog Outputs.

These are described in the following sections.

4.5.1 Service Menu / "System Setup"
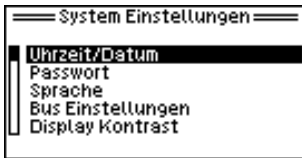
The "System Setup" menu is divided into another six sub-menus: 1 - Time/Date, 2 - Password, 3 - Language, 4 - Bus Setup, 5 - Display Contrast and 6 - Horn Volume

4.5.1.1 System Setup / "Time/Date"

Use this menu to change the parameters below:
* Time
* Date
* Date format (DD.MM.YYYY or YYYY-MM-DD)

4.5.1.2 System Setup / "Password"
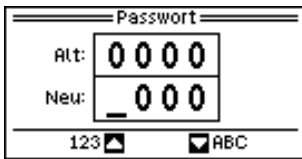
Use this menu to change the password for access to the "Service Menu". It must be alphanumeric.

Please note: If you forgot your password, it can only be read out and changed using the GMA200Config configuration software.

4.5.1.3 System Setup / "Language"
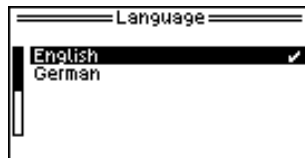
Use this menu to select a display language. You can choose between German and English.

(Default = German).

4.5.1.4 System Setup / "Bus Setup"
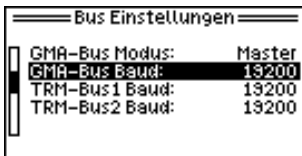
Use this menu to change a number of different bus settings. If it is set to "**GMA Bus Mode: Master**", only the baud rates for the three buses can be changed. In master mode, the bus address for the GMA bus cannot be set. The mode can only be changed using the GMA200Config software.

If the GMA200 on the GMA bus is not in master mode, the bus address can be set to any number from **1 to 247** at "**GMA-Bus Adr:**".

The baud rates of the three buses can be set as follows:
* GMA bus baud: 9600/19200/38400/57600/115200/230400 Bit/s (Default = 115200)
* TRM bus1 baud: 9600/19200/38400 Bit/s (Default = 19200)
* TRM bus2 baud: 9600/19200/38400 Bit/s (Default = 19200)

4.5.1.5 System setup / "Display Contrast"

Use this menu to adjust the contrast of the LC display between 0 % and 100 % in 5 % steps to suit local conditions.
(default = 40 %).

4.5.1.6 System Setup / "Horn Volume"
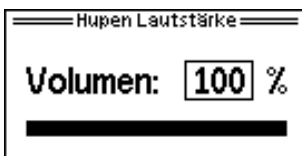
Use this menu to adjust the volume of the internal horn between 0% and 100% in 5% increments.
(default = 50 %).

4.5.2 Service Menu / "Datalogger"
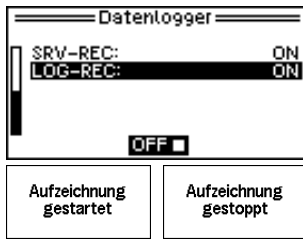
The "SRV-REC" option is used to start and stop the data logging function, which is useful for service purposes. Data is stored on the microSD card and be recorded for a maximum of 8 hours. This data recording for **S**ervice purposes works even if the GMA has no data logger. (file name: **S*.txt)

In the "LOG-REC" option, recording by the regular data logger can be activated or deactivated.

4.5.3 Service menu / "Measuring Points"

The "Measuring Points" menu consists of three submenus: 1 - Alarm Limits, 2 - Calibration and 3 – Inhibit.

4.5.3.1 Measuring Points / "Alarm Limits"
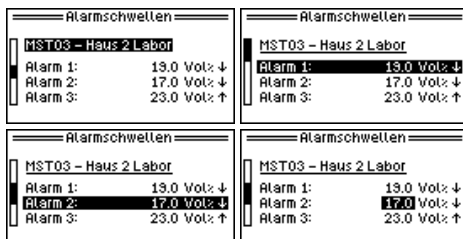
"Alarm Limits" allows you to change the limit values for Alarm 1, Alarm 2 and Alarm 3 within the measuring range after you have selected the measuring point. If the alarm threshold is set to 0.0 (zero), the alarm is switched off.

The alarm direction is marked by an arrow behind the gas unit (exceeding or falling below).

4.5.3.2 Measuring Points / "Calibration"
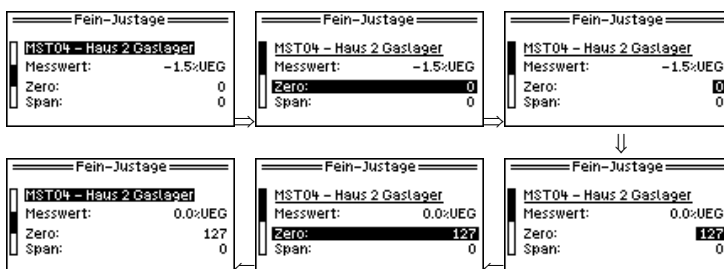
The measured value of the GMA may show small deviations compared to the current signal of a transmitter with an analog interface. These small deviations can be compensated with "Calibration".

"Zero" lets you adjust the lower threshold value while "Span" lets you use the upper threshold value. Both can be adjusted by ±1.27 % of the measuring range.

The number for "Zero", which can be set anywhere in a range of -127 to 0 to 127, is an additive correction value which changes the measured value by -1.27 % to 0 % to +1.27 % of the measuring range. The number for "Span", which can be set in the range of -127 to 0 to 127, is a correction value which changes the normal characteristic curve slope by -1.27 % to 0 % to +1.27 % of the measuring range, i.e. a measured value at the end of the measuring range would be changed by this value.

4.5.3.3 Measuring Points / "Inhibit"

Measuring points can be "inhibited" (locked) for maintenance purposes (INH=inhibit).
This allows you to carry out service work at the measuring points without triggering a gas alarm.

Please note: If a measuring point is inhibited, the special condition "Maintenance" is activated. This means that the maintenance relay remains switched on even during measuring operation. In measuring mode, the yellow "SRV/SRQ" LED then lights up continuously and the collective screen displays "---" for the locked measuring point instead of the measured value and "SRV" instead of the gas unit. In the individual display of the inhibited measuring point, "SRV-INH" is then displayed under Details. The condition is not limited in time. Even if the power supply is interrupted and the GMA is then put back into operation, the status will remain unchanged.

4.5.4 Service menu / "Relay"

The "Relay" menu consists of three submenus: 1 - Test, 2 - Inhibit and 3 - Time Control Start

4.5.4.1 Relay / "Test"
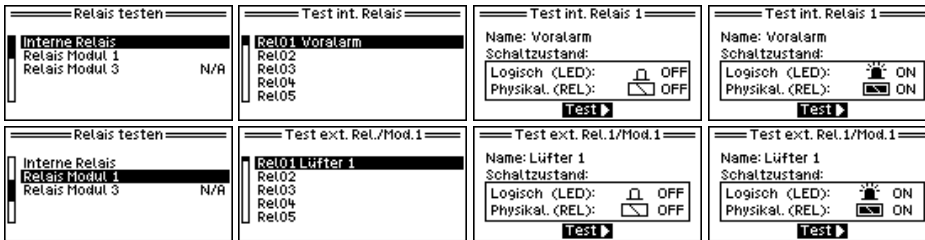
Use the Relay -> "Test" function to test the activation of internal relays of the GMA200 and of relays on the external relay modules.

4.5.4.2 Relay / "Inhibit"

Individual or multiple relays can be inhibited for maintenance purposes (INH=inhibit).
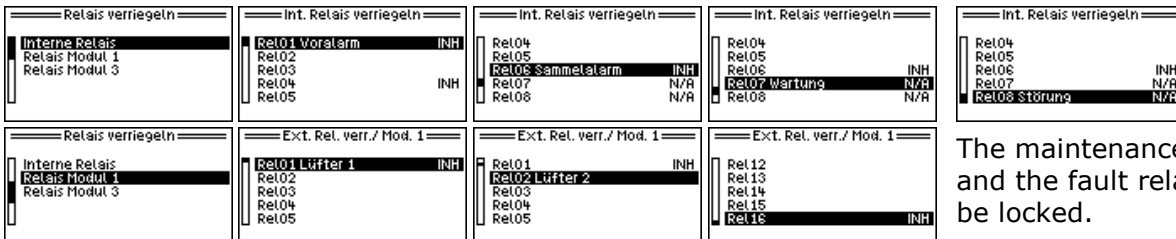
The maintenance relay and the fault relay cannot be locked.

Please note: If a measuring point is inhibited, it automatically switches to the special condition "Maintenance". This means that the maintenance relay is active. In measuring mode, the yellow "SRV/SRQ" LED is then permanently lit. "Status GMA" -> "Messages", which can be accessed from the main menu, displays that "at least one relay has been locked" since a certain date.
The condition is not limited in time. Even if the power supply is interrupted and the GMA is then put back into operation, this status will remain unchanged.

4.5.4.3 Relay / "Time Control Start"

The GMA200 optionally offers the possibility of time-controlled relay activation. When this time control function has been configured and "button (service menu)" has been set as the starting condition in the GMA200Config software, the time control can be started from here.

4.5.5 Service menu / "Analog Outputs"
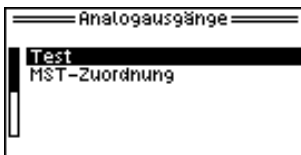
The "Analog Outputs" menu consists of two sub-items: 1 - Test and 2 - MSP-Allocation

4.5.5.1 Analog outputs / "Test"
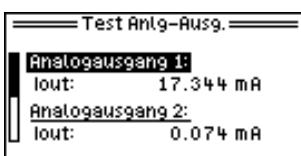
In "Test Anlg-Outp", the two analog outputs can be tested within the range from 0.4 mA to 24.0 mA.

This requires the DC supply voltage of the GMA200 to be within a range of 20 V to 30 V (typically 24 VDC).

4.5.5.2 Analog outputs / "MSP-Allocation"

```
═══Zuordng. Anlg-Ausg.═══
▌Analogausgang 1:
▌MST01 – Haus 1 Keller
 Analogausgang 2:
 Inaktiv
```
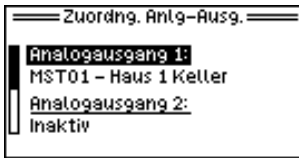
This menu allows you to assign measuring points to the analog outputs and change previous assignments.

4.5.6 Exit Service Menu

To return from the service menu to the main menu, press the button. Pressing the button again will take you to measuring mode from the display of measured values. If settings have been changed in the service menu, the following prompt will appear when you exit the service menu:

```
═══════Verlassen═══════
 NEUE EINSTELLUNG
   SPEICHERN?
 [Abbr◄]  [Nein☐]   [Ja►]
```

Please note:
Only authorized and qualified personnel may carry out safety-relevant changes.

To verify that changes to the settings have been adopted after saving, return to the service menu. This check must be carried out, especially after changing safety-relevant settings, such as the alarm thresholds.

5 Annex

5.1 Cleaning and Care

External contaminations of the housing can be removed with a damp cloth while the device is not connected to the mains supply. Do not use solvents or cleaning agents!

5.2 Service and Maintenance

Service and maintenance includes regular visual inspections, functional checks and system checks as well as any repair work of the gas detection system (see DIN EN 60079-29-2 Section 11, DIN EN 45544-4 Section 8 as well as the regulations "DGUV Information 213-056 (Merkblatt T 021 Section 9)" and the "DGUV Information 213-057 (Merkblatt T 023 Section 9)" issued in Germany.

5.2.1 Visual Inspection

The visual inspection should be carried out regularly, with a maximum interval of one month, and should include the following activities:

- Checking the operation LED and status messages,
  "e.g. operating LED "On", alarm and fault LEDs "Off"
- Check for mechanical damage and external soiling

5.2.2 Function Check

The function check can be carried out at intervals that depend on the gas hazard to be monitored. For gas detection systems for toxic gases/vapors and oxygen as well as for gas detection systems for explosion protection, the inspection interval is 4 months in accordance with the requirements of the regulations T 021 and T 023 of the Employer's Liability Insurance Association BG RCI.

It comprises the following activities:

- Visual inspection according to section 5.2.1 "Visual Inspection"
- Check and evaluation of the measured value displayed
- Triggering the alarm thresholds
- Triggering the test functions for signaling elements as well as optical and acoustic signal transmitters without triggering switching functions
- Check of saved messages, faults and maintenance requirements

5.2.3 System check (Proof Test)

The system check has to be carried out at regular intervals. The period may not exceed 1 year. It comprises the following activities:
- Functional check according to section 5.2.2 "Function Check"
- Check of all safety functions including the triggering of switching functions
- Check of the parameterization by target/actual comparison
- Check of the reporting and registration facilities

5.2.4 Repair

"Repair" includes all maintenance and replacement work. It may only be performed by the manufacturer and by persons authorized by the manufacturer GfG Gesellschaft für Gerätebau mbH. Only original spare parts and assemblies tested and approved by the manufacturer may be used.

If one of the GMA-internal fuses has to be replaced (F1 for the GMA200 or F2 for the transmitters), the terminal cover and, if necessary, the housing cover need to be removed first.

Please note: When you unfasten the housing cover, take care not to damage the ribbon cable. Also pay attention to the ESD protection of the components on the circuit boards when replacing the fuse.
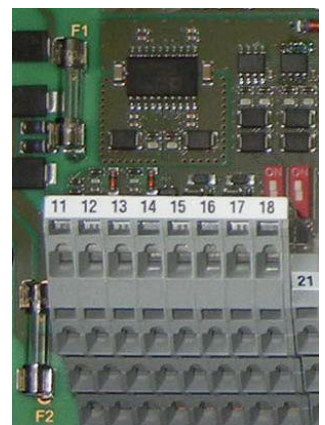
5.3 Spare parts and accessories

	Designation		Part No.
1.	microSD card 2GB		2200202
2.	Spare fuse T 500 mA (F1 for GMA200)	PU = 10 pieces	2200301
3.	Spare fuse M 1 A (F2 for transmitter supply)	PU = 10 pieces	2200303
4.	Screws for GMA200-MW16 wall-mounted housing	PU = 10 pieces	2200304
5.	Sealing cap for GMA200-MW Cable gland	PU = 20 pieces	2200305
6.	75 W power supply for GMA200-MW16 (Input: 88 Vac to 264VAC; Output: 24 VDC / 3.2 A)		2200306
7.	100 W power supply for GMA200-MW16 (Input: 88 Vac to 264 VAC; Output: 24 VDC / 4.2 A)		2200307
8.	Ribbon cable for GMA200-MW16 (L=33cm)		2200308

5.4 Notes on the environmentally friendly disposal of used parts

According to GfG's general terms and conditions, the customer assumes responsibility for the environmentally safe disposal of the device or any device components (such as replaced sensors). In Germany, this is regulated by §§11, 12 ElektroG. On request, GfG in Dortmund can also handle the proper disposal.

5.5 Functional safety and parameters

The safety parameters for the following safety functions have been determined for GMA200-MT6, GMA200-MT16, GMA200-MW4 and GMA200-MW16 gas detection controllers. When they are connected to a GMA200-RT/-RTD external relay module, the relevant safety parameters from the operating instructions of the relay module must also be considered.

#1:
This value is only valid when the device is used within the scope of the Machinery Directive according to EN 62061 or ISO 13489-1.

		Single channel use (1oo1)	Redundant use (1oo2)
	Device type	B	
	MTTR	72 h	
	Proof Test Interval	1 year	
	max. request rate (see #1)	75 per year	
	Performance level	PL d	PL e
	SIL capability (see #2)	2 or 1	3 or 2
	HFT	0	1 (β-Factor 5 %)
Safety function 1 → Analog input (4-20 mA / 0.2-1 mA) → Signal processing → internal relay switching output of the GMA200-MT/-MW	SFF	90.8 %	
	λ_{SD} [1/h]	1.7×10^{-7}	
	λ_{SU} [1/h]	2.4×10^{-7}	
	λ_{DD} [1/h]	3.8×10^{-7}	
	PFH $= \lambda_{DU}$ [1/h]	8.0×10^{-8}	4.1×10^{-9}
	PFD$_{avg}$ [1/year]	3.8×10^{-4}	1.9×10^{-5}
	MTTF$_d$ [years]	1427	27843
Safety function 2 → Digital input (RS485) → Signal processing → internal relay switching output of the GMA200-MT/-MW	SFF	97.2 %	
	λ_{SD} [1/h]	3.5×10^{-6}	
	λ_{SU} [1/h]	2.3×10^{-7}	
	λ_{DD} [1/h]	4.0×10^{-7}	
	PFH $= \lambda_{DU}$ [1/h]	1.2×10^{-7}	6.1×10^{-9}
	PFD$_{avg}$ [1/year]	5.6×10^{-4}	2.9×10^{-5}
	MTTF$_d$ [years]	951	18714
Safety function 3 → Analog input (4-20 mA / 0.2-1 mA) → Signal processing → Signal transmission to external relay module e.g. GMA200-RT/-RTD	SFF	98.1 %	
	λ_{SD} [1/h]	3.5×10^{-6}	
	λ_{SU} [1/h]	2.5×10^{-7}	
	λ_{DD} [1/h]	3.9×10^{-7}	
	PFH $= \lambda_{DU}$ [1/h]	8.0×10^{-8}	4.1×10^{-9}
	PFD$_{avg}$ [1/year]	3.8×10^{-4}	1.9×10^{-5}
	MTTF$_d$ [years]	1427	27843
Safety function 4 → Digital input (RS485) → Signal processing → Signal transmission to external relay module e.g. GMA200-RT/-RTD	SFF	98.1 %	
	λ_{SD} [1/h]	3.5×10^{-6}	
	λ_{SU} [1/h]	2.4×10^{-7}	
	λ_{DD} [1/h]	4.1×10^{-7}	
	PFH $= \lambda_{DU}$ [1/h]	8.0×10^{-8}	4.1×10^{-9}
	PFD$_{avg}$ [1/year]	3.8×10^{-4}	1.9×10^{-5}
	MTTF$_d$ [years]	1427	27843
Safety function 5 → Analog input (4-20 mA / 0.2-1 mA) → Signal processing → Digital output (RS485) of the GMA200-MT/-MW	SFF	98.1 %	
	λ_{SD} [1/h]	3.5×10^{-6}	
	λ_{SU} [1/h]	2.5×10^{-7}	
	λ_{DD} [1/h]	3.6×10^{-7}	
	PFH $= \lambda_{DU}$ [1/h]	8.0×10^{-8}	4.1×10^{-9}
	PFD$_{avg}$ [1/year]	3.8×10^{-4}	1.9×10^{-5}
	MTTF$_d$ [years]	1427	27843
Safety function 6 → Digital input (RS485) → Signal processing → Digital output (RS485) of the GMA200-MT/-MW	SFF	98.1 %	
	λ_{SD} [1/h]	3.5×10^{-6}	
	λ_{SU} [1/h]	2.4×10^{-7}	
	λ_{DD} [1/h]	3.8×10^{-7}	
	PFH $= \lambda_{DU}$ [1/h]	8.0×10^{-8}	4.1×10^{-9}
	PFD$_{avg}$ [1/year]	3.8×10^{-4}	1.9×10^{-5}
	MTTF$_d$ [years]	1427	27843

#2: According to DIN EN 50402, the SIL-capability of the hardware for safety functions 1, 2 and the GMA200-RT/-RTD depends on the contact load of the relay switching output. The higher value only applies if the relay contact is loaded with a maximum current of 2 A. Use an external fuse or comparable component to limit this maximum current.

Abbreviations:
HFT = **H**ardware **F**ault **T**olerance
SFF = **S**afe **F**ailure **F**raction
MTTR = **M**ean **T**ime **T**o **R**epair
MTTF$_d$ = **M**ean **T**ime **T**o dangerous **F**ailure
PFH = **P**robability of dangerous **F**ailure per **H**our for high demand mode
PFD = **P**robability of dangerous **F**ailure on **D**emand for low demand mode
λ_{DU}, λ_{DD}, λ_{SU}, λ_{SD} = error rates (DU = dangerous undetected, DD = dangerous detected, SU = safe undetected, SD = safe detected)

Faults that lead to measurement errors of more than the specified measurement tolerances of the GMA are also considered dangerous (λ_{DU}, λ_{DD}). In case of both dangerous (λ_{DD}) and harmless (λ_{SD}) faults, the fault relay will signal their occurrence and, for SF5 and SF6, the GMA bus will also transmit fault information.

5.6 Technical data

Type Designation	GMA200-MW16
Display & Control Elements	2.2" graphic display, 5 buttons, alarm light and adjustable horn max. 100dB(A) 15 status LEDs for alarms, operating and relay states
Ambient Conditions	
for storage:	-25 °C to +60°C | 0 % RH to 99% RH (recommended 0 °C to +30 °C | 40 % RH to 60 %RH)
for operation:	-20°C to +55 °C | 0 % RH to 99 % RH
Mounting location	only indoors up to an altitude of 2000 m above sea level
Power Supply	
Operating voltage Ue	100 V to 240V AC 50 Hz to 60 Hz mains voltage or/and 24 VDC (20 VDC to 30 VDC) through stabilized SELV or PELV power supply
Power consumption:	max. 10 W (without transmitter) max. 90 W (with transmitter)
Fuse:	F1=T 500 mA (for GMA200) F2=T 2.5A (for transmitter)
Transmitter Connections	
Supply:	24 VDC ±3 % using built-in power supply, otherwise 20 VDC to 30VDC (see above) 16x 150 mA or Iges = 2.4 A with different allocation
Analog signals I_{IN}1-16:	4-20 mA or 0.2-1 mA measuring tolerance (#2): ±0.3 % MR at 4 to 20 mA or ±1.2 % MR at 0.2 to 1 mA (MR=measuring range) (load approx. 50 Ω to 100Ω, Imax=70 mA permanent / 500 mA short time)
Digital signals TRM bus1+2:	RS485; half duplex; max. 38400 baud
Measured Value Processing	
Update rate:	1 s (If there are more than 16 transmitters and relay modules on the same TRM bus and data is transmitted at 9600 baud, the cycle time is extended from 1.0 to max. 1.3 s, so the time of 1 s cannot be maintained)
Adjustment time for RS485:	Time to increase T50 <2s and T90 <2s Time to decrease T50 <2 s and T10 <2 s
for 4 to 20 mA:	Time to increase T50<2 s and T90 <4 s Time to decrease T50 <2 s and T10 <4 s
for 0.2 to 1 mA:	Time to increase T50 <6s and T90 <10s Time to decrease T50 <6 s and T10 <10 s (extended by the adjustment times of the transmitters)
Readiness delay:	<40 s (might also be extended by warm-up times of transmitters)
RS485 outputs GMA bus:	RS485; half duplex; max. 230400 baud (for GMA200 relay modules, control center, PC, PLC or gateway)
TRM bus1+2:	RS485; half-duplex; max. 38400 Baud (only for GMA200 relay modules)
Relay outputs Contacts:	8 relays with a changeover contact each
Contact load capacity:	3 A / 250 Vac or 3 A / 30 VDC
Minimum switching current:	10 mA
Minimum switching voltage:	5 V
Switching frequency:	max. 100 per year (per relay contact), valid for SIL applications according to EN 50402
Insulation clearances:	basic insulation between relays: 1&2, 3&4, 5&6, 7&8 double insulation between relays: 2&3, 4&5, 6&7
Analogue outputs IOUT1+2:	4-20 mA with linear transfer function (load max. 560 Ω)
Accuracy:	±0.3 %MR at 10°C to 30 °C or ±0.8 %MR at -20°C to 50 °C (MR = measuring/signal range)
Alarm acknowledgement inputs Reset1+2:	0-3 VDC (alarm acknowledgement occurs on contact with GND; U_{MAX} = 30 VDC)
Data logger (optional)	max. 2 GB microSD card with FAT formatting (FAT16)
USB connection	Mini B USB socket for device configuration via PC
Housing Protection type:	IP65 in accordance with IEC 60529; IK08 in accordance with IEC 62262
Material:	plastic
Weight:	approx. 2.0 kg
Dimensions (H x W x D):	270 x 290 x 98 mm
Power cable Cable:	3-4 wire ≥0.75 mm² LiYY, NYM (for GMA200 supply) 2-4 wire 0.5-1.5 mm² LiYY, LiYCY (for transmitters) 2-wire 1x2x0,22mm² BUS-LD (for GMA bus with length >10 m)
Cable glands:	max. 20 x M16x1.5 (for cable diameter 3-7 mm respectively 5-10 mm)
Terminal blocks:	0.08 mm² to 2.5 mm² cross-section
Approvals/Tests	
Electromagnetic compatibility:	EN 50270:2015 (interference emission: type class I, interference immunity: type class II)
Electrical safety:	EN 61010-1:2010 (Pollution degree 2, overvoltage category II for mains supply) (Pollution degree 2, overvoltage category III for relay contacts)
Functional safety:	EN 50402:2017; IEC 61508-1 to -7:2010 (SIL2/SC3)
Functional safety:	EN 50271:2018; EN 62061:2016; ISO 13849-1:2015
Metrological suitability:	EN 60079-29-1:2016 (EX); EN 50104:2019 (OX); EN 45544-1/-2/-3:2015 (TOX)
Service life	20 years

#2: This is only the measuring tolerance of the GMA. The transmitters have additional tolerances.

5.7 EU Declaration of Conformity and Type Examination Certificates

EU Declaration of Conformity

GfG Gesellschaft für Gerätebau mbH

Klönnestraße 99
44143 Dortmund
Tel: +49 (231) 564 00-0
Fax: +49 (231) 564 00-895
E-Mail: info@gfg-mbh.com
www.gasmessung.de

GMA200-MW16

Edited: 31.07.2017   Amended: 05.05.2021

GfG Gesellschaft für Gerätebau mbH develops, produces and distributes gas sensors and gas warning devices in accordance with the **Quality Management System:** DIN EN ISO 9001. The production of electrical devices in equipment groups I and II, categories M1, M2, 1G and 2G for gas sensors, gas measuring instruments, gas warning systems in the ignition and flameproof enclosures, increased safety, encapsulation and intrinsic safety and their measuring function is supervised by a quality assurance system monitored by the notified body, DEKRA Testing and Certification GmbH (0158).

The Controller **GMA200-MW16** is in compliance with multiple directives, including: **2014/34/EU** (ATEX) for devices and protective systems for proper use in potentially explosive atmospheres, **2014/30/EU** for electromagnetic compatibility, with directive **2014/35/EU** for electrical safety and **2011/65/EU** (RoHS) on the restricted use of certain hazardous substances in electrical and electronic equipment.

For the measurement function	BVS 19 ATEX G 001 X
Labelling	Ⓔ II (2) G
	CE 0158

The directive 2014/34/EU is observed in compliance with the following standards:
- Gas detectors– Performance requirements of detectors for flammable gases   EN 60079-29-1 : 2016
- Electrical apparatus for the detection and measurement of oxygen. Performance requirements and test methods   EN 50104   : 2019
- Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Requirements and tests for apparatus using software and/or digital technologies.   EN 50271   : 2018

The EU-Type Examination Certificate was issued by the Notified Body, ID number 0158 (DEKRA Testing and Certification, Dinnendahlstraße 9, D-44809 Bochum).

The directive 2014/30/EU is observed in compliance with the following standard:
- 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 2014/35/EU is observed in compliance with the following standards:
- Safety requirements for electrical equipment for measurement, control and laboraty use. General requirements.   EN 61010-1   :2010

The company du.tronic Consulting & Engineering at Ratingen has tested and certified the electrical safety.

The directive 2011/65/EU is observed in compliance with the following standard:
- Technical documentation for the assessment of electrical and electronic products concerning the restriction of hazardous substances   EN 50581   : 2012

Dortmund, 05 May 2021

i.V.

B. Siebrecht
QMB

ATEX EU-Konf025-3.2/Siebrecht

Certificate

No.: 968/FSP 1324.01/17

Product tested	Gas Detection Controller	**Certificate holder**	Gesellschaft für Gerätebau mbH Klönnestr. 99 44143 Dortmund Germany
Type designation	GMA200-MT6, GMA200-MT16, GMA200-MW4, GMA200-MW16		
Codes and standards	IEC 61508 Parts 1-7:2010 EN 50402:2017	EN ISO 13849-1:2015 IEC 62061:2015	
Intended application	The gas detection controllers GMA200-M... comply with the requirements of the product standard EN 50402, IEC 61508 and IEC 62061 for SIL 2 and PL d acc. EN ISO 13849-1. They can be used in a single channel architecture (HFT=0) up to SIL 2 / PL d and in a redundant HFT=1 architecture up to SIL 3 / PL e.		
Specific requirements	The instructions of the associated operation manual shall be considered. In safety applications the fault relay resp. the GMA-status register has to be evaluated in addition to the alarm relay. In SIL 2 / PL d applications and higher the relay contact current has to be limited to 2 A. In machinery applications the alarm relays have to be configured following the idle current principle. Alternatively a redundant power supply may be used. The demand rate of the safety function shall not exceed 75 demands a year.		

Valid until 2022-10-04

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/FSP 1324.01/17 dated 2017-10-04.
This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln

Köln, 2017-10-04

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Stephan Häb

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Translation

EU-Type Examination Certificate
Supplement 01

1

2   Device with a measuring function for explosion protection
Directive 2014/34/EU

3   EU-Type Examination Certificate Number: **BVS 19 ATEX G 001 X**

4   Product: **GMA200**

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

6   Address: **Klönnestraße 99, 44143 Dortmund, Germany**

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

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 test report PFG-no. 41300419P NI.

9   The Essential Health and Safety Requirements with respect to the measuring function for explosion protection are assured in consideration of:

EN 60079-29-1:2016
EN 50104:2019
EN 50271:2018

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 (2) G
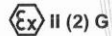
DEKRA Testing and Certification GmbH
Bochum, 2021-04-28

Signed: Kilisch
Managing Director

Page 1 of 3 of BVS 19 ATEX G 001 X / 01   Jobnumber 342264700
This certificate may only be reproduced in its entirety and without any change.

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

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13   **Appendix**

14   **EU-Type Examination Certificate**

BVS 19 ATEX G 001 X
Supplement 01

15   **Product description**

15.1   **Subject and type**

Control unit GMA200

15.2   **Description**

Reason for the supplement:
Retesting according to EN 50104:2019
Modification of the PC-Software GMA200Config

The control unit GMA200, when operated with transmitters with a 0.2-1 mA or 4-20 mA interface or a digital interface, is a fixed system for the measurement of flammable gases or vapours, of oxygen or of toxic gases. The control unit is intended for wall mounting or rail mounting. The control unit is not intended for use in potentially explosive atmospheres.

15.3   **Parameters**

not applicable

15.4   **Measuring function for explosion protection**

This EU-type examination certificate covers:

- Control unit GMA200 with the following versions:
    - Gas detection controller GMA200-MW4
    - Gas detection controller GMA200-MW16
    - Gas detection controller GMA200-MT6
    - Gas detection controller GMA200-MT16
    with software versions V2.10 (GMA200 Main) and V2.10 (GMA200 Display)

- when operated with transmitters with a 0.2-1 mA or 4-20 mA interface (2-wire or 3-wire) the measurement of the flammable gases and vapours which are listed in the EC- or EU-type examination certificate of the transmitter

- when operated with transmitters with a 0.2-1 mA or 4-20 mA interface (2-wire or 3-wire) the measurement of oxygen (measurement of inertisation) according to the EC- or EU-type examination certificate of the transmitter

- use of the following outputs for safety relevant purposes:
    - relays
    - GMA-Bus

- use of the following options and accessories:
    - PC-Software GMA200Config V2.10.20
    - GMA200Visual V1.27.00

The EU-type examination includes the following deviations from the operating conditions required by EN 60079-29-1 or EN 50104, respectively:
- Extended range of temperature at operation (GMA200-MW4 / -MW16):   -20 °C to +55 °C
- Deviating range of temperature at operation (GMA200-MT6 / -MT16):   -20 °C to +50 °C

Page 2 of 3 of BVS 19 ATEX G 001 X / 01   Jobnumber 342264700
This certificate may only be reproduced in its entirety and without any change.

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

Left Page

16   **Test report**

PFG-no. 41300419P NI of 2021-04-28

17   **Special Conditions for Use**

- When using 4-20 mA transmitters, pay particular attention to the followings:
  - The specifications of the 0.2-1 mA or 4-20 mA interface
  - Behaviour with currents less than 0.2 mA or 4 mA, respectively
  - Behaviour with currents in excess of 1 mA or 20 mA, respectively
- The operation with GfG-transmitters connected to the TRM-bus is permitted but not subject of this EU-type examination certificate with respect to the measuring function of the control unit with such transmitters.
- Configure the alarm with the highest significance for safety as latching for each channel.
- Configure relays for safety-related switching operations in such a way that they cannot be reset while the alarm condition is present.
- Time delayed alarms should not be used for safety related purposes.
  If their use is unavoidable, set the alarm delay time to the minimum value that is feasible for the required operation. Take the maximum possible rate of increase of gas concentration into account when determining the alarm delay time.
- The function "Time control" for relays is not subject of this EU-type examination certificate.
- Measurement of flammable gases or vapours:
  - Activate Over range latching when used with transmitters that may give indications within their measuring range at gas concentrations above the measuring range (Set parameter "Filter time const." to "0").
  - Do not set the parameter "resolution" above 1 % of the upper limit of the measuring range.
  - Do not set the parameter "Tolerance band" above 5 % of the upper limit of the measuring range.
- Measurement of oxygen (measurement of inertisation):
  - Do not set the parameter "Fault message when Measure underrange" below -5 % of the upper limit of the measuring range.
  - Do not set the parameter "resolution" above 1 % of the upper limit of the measuring range and not above 0.1 %(v/v).
  - Do not set the parameter "Tolerance band" above 2 % of the upper limit of the measuring range.

18   **Essential Health and Safety Requirements**

The Essential Health and Safety Requirements with respect to the measuring function for explosion protection are covered by the standards listed under item 9.

19   **Drawings and Documents**

Drawings and documents are listed in the confidential test 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, dated 2021-04-28

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Managing Director

Page 3 of 3 of BVS 19 ATEX G 001 X / 01   Jobnumber 342264700
This certificate may only be reproduced in its entirety and without any change.

DEKRA Testing and Certification GmbH, Handwerkstr. 15, 70565 Stuttgart, Germany
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Right Page

Translation

1st Supplement

to the Type Examination Certificate

- Gas detectors -

PFG 19 G 002 X

Equipment: GMA200

Manufacturer: GfG Gesellschaft für Gerätebau mbH

Address: Klönnestraße 99, 44143 Dortmund, Germany

The certification body of DEKRA Testing and Certification GmbH certifies that this equipment has been found to comply with the requirements of the standards

EN 50104:2019
EN 45544-1:2015
EN 45544-2:2015
EN 45544-3:2015
EN 50271:2018

with regard to the measuring function for

- oxygen (measurement of oxygen deficiency and enrichment) in the measuring range 0 - 25 %(v/v)
- toxic gases in the measuring range 0.6 % to 100 % of the upper limit of measurement of the used transmitter (apparatus according to EN 45544-2)
- toxic gases in the measuring range 0 % to 100 % of the upper limit of measurement of the used transmitter (apparatus according to EN 45544-3)

On the basis of DIN EN ISO/IEC 17065, this certification includes a type examination. The examination and test results and the design of the equipment are recorded in the test report PFG-Nr. 41300419P NI.

If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the annex to this certificate.

The manufacturer declares the conformity of the manufactured products with the certified design by marking them with the number of this type examination certificate.

DEKRA Testing and Certification GmbH

Bochum, dated 2021-04-28

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Signed: Kilisch

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Managing Director

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Appendix to

1st Supplement to the Type Examination Certificate
PFG 19 G 002 X

Description of the gas detector

The control unit GMA200, when operated with transmitters with a 0.2-1 mA or 4-20 mA interface or a digital interface, is a fixed system for the measurement of flammable gases or vapours, of oxygen or of toxic gases. The control unit is intended for wall mounting or rail mounting. The control unit is not intended for use in potentially explosive atmospheres.

Reason for the supplement:

Retesting according to EN 50104:2019
Modification of the PC-Software GMA200Config

Type of protection

        not applicable

Special conditions for use

- When using 0.2-1 mA or 4-20 mA transmitters, pay particular attention to the followings:
  - The specifications of the 0.2-1 mA or 4-20 mA interface
  - Behaviour with currents less than 0.2 mA or 4 mA, respectively
  - Behaviour with currents in excess of 1 mA or 20 mA, respectively

- The operation with GfG-transmitters connected to the TRM-bus is permitted but not subject of this type examination certificate with respect to the measuring function of the control unit with such transmitters

- Configure the alarm with the highest significance for safety as latching for each channel.

- Configure relays for safety-related switching operations in such a way that they cannot be reset while the alarm condition is present.

- Time delayed alarms should not be used for safety related purposes. If their use is unavoidable, set the alarm delay time to the minimum value that is feasible for the required operation. Take the maximum possible rate of increase of gas concentration into account when determining the alarm delay time.

- The function "Time control" for relays is not subject of this type examination certificate.

- Measurement of oxygen:
  - Do not set the parameter "Fault message when Measure underrange" below -5 % of the upper limit of the measuring range.
  - Do not set the parameter "resolution" above 0.1 %(v/v).
  - Do not set the parameter "Tolerance band" above 2 % of the upper limit of the measuring range.

- Operation according to EN 45544-2:
  - GMA200 is suitable for use with 4-20 mA transmitters where the output at the limit value is between 4.48 mA and 12 mA.
  - Do not set the parameter "resolution" above 1 % of the upper limit of measurement and not above 5 % of the limit value. The lower limit of measurement is 0.6 % of the upper limit of measurement in this case. It decreases if the parameter "resolution" is set to a smaller value.
  - Do not set the parameter "Tolerance band" above the lower limit of measurement (calculated for the combination of GMA200 and the connected transmitter).

- Operation according to EN 45544-3:
  - Do not set the parameter "resolution" above 1 % of the upper limit of measurement.
  - Do not set the parameter "Tolerance band" above 5 % of the upper limit of measurement.

Additional Information

- The measuring function of the control unit for flammable gases according to directive 2014/34/EU is subject of the EU-type examination certificate BVS 19 ATEX G 001 X.

- This type examination certificate covers:
  - Control unit GMA200 with the following versions:
    - Gas detection controller GMA200-MW4
    - Gas detection controller GMA200-MW16
    - Gas detection controller GMA200-MT6
    - Gas detection controller GMA200-MT16
    with software versions V2.10 (GMA200 Main) and V2.10 (GMA200 Display)

  - use of the following outputs for safety relevant purposes:
    - relays
    - GMA-Bus

  - use of the following options and accessories:
    - PC-Software GMA200Config V2.10.20
    - GMA200Visual V1.27.00

- The type examination includes the following deviations from the operating conditions required by EN 45544-1 or EN 50104, respectively:
  - Extended range at the test Unpowered Storage: -25 °C to +60 °C
  - Extended range of temperature at operation (GMA200-MW4 / -MW16):   -20 °C to +55 °C
  - Deviating range of temperature at operation (GMA200-MT6 / -MT16):   -20 °C to +50 °C

We confirm the correctness of the translation from the German original.
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DEKRA Testing and Certification GmbH
Bochum, 2021-04-28

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Managing Director