



GfG Instrumentation

Worldwide manufacturer of gas detection solutions

GMA 200-MW4

Operations Manual



GfG Instrumentation

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Table of contents

	Page
1. INTRODUCTION	3
1.1 For your safety	3
1.2 Application and purpose	3
1.3 Special conditions for safe application	3
2. GAS DETECTION CONTROLLER GMA 200-MW4	4
2.1 General description	4
2.2 Device design	4
2.2.1 LED status displays	4
2.2.2 Graphical display	5
2.2.3 Visual and acoustic alarm	5
2.3 Internal relays of the GMA 200-MW4	5
2.4 External relay with the relay module GMA 200-RT	5
2.5 Relay configuration	5
3. ASSEMBLY AND INSTALLATION INSTRUCTIONS	6
3.1 Site of installation	6
3.2 Electrical connections	6
3.2.1 Safety information	6
3.2.2 Mains connection and separator	6
3.2.3 Floating relay contacts	6
3.2.4 External 24 V DC voltage supply	7
3.2.5 Connection of transmitters with an analog interface	7
3.2.6 Connection of transmitters with a digital interface (RS485)	7
3.2.7 Connection of further devices with a digital interface (RS485)	7
3.2.8 Using the alarm acknowledgement inputs	7
3.2.9 Using the 4-20 mA current outputs	7
3.3 Commissioning	7
4. OPERATING INSTRUCTIONS	8
4.1 Measuring mode	8
4.2 Alarms	8
4.2.1 Alarm configuration	8
4.2.2 Alarm acknowledgement (Reset)	8
4.3 Relays	9
4.4 Faults	9
4.5 Data logger function (configured using the GMA200Config software)	9
4.6 Analog outputs	10
5. KEYBOARD AND MENUS	10
5.1 Operation and menu navigation	10
5.2 Main menu	11
5.3 Service menu	11
6. APPENDIX	11
6.1 Cleaning and care	11
6.2 Maintenance and service	11
6.2.1 Visual inspection	12
6.2.2 Functional testing	12
6.2.3 System check	12
6.2.4 Repair	12
6.3 Spare parts and accessories	12
6.4 Information on the environmentally sound disposal of used parts	12
6.5 Functional safety and parameters	13
6.6 Technical data	14
6.7 EC declaration of conformity and type examination certificates	15

1. Introduction

1.1 For your safety

This user manual states the intended use of the product according to § 3 of the German Product Safety Act (ProdSG) and helps to prevent hazards.

It must be read and observed by all persons who operate, service, maintain and inspect this product. This product can serve its intended purpose only if it is operated, serviced, maintained and inspected according to the instructions given by GfG Instrumentation.

Otherwise, the warranty provided by GfG Instrumentation becomes void. Settings in service mode should only be carried out by experts.

1.2 Application and purpose

The GMA 200-MW4 is a gas detection controller for wall mounting. Combined with connected transmitters, it forms a fixed gas warning system for the continuous measurement of gas concentrations and is used to issue a warning about combustible gases or vapors in the range below the lower explosion limit and about toxic gases in the ambient air, as well as to measure oxygen. External relay modules GMA 200-RT are additionally available.

The GMA200Config software program is required to configure the GMA 200-MW4 controller and the GMA 200-RT relay module .

The relay module GMA 200-RT/RTD is not described in this user manual.

Operation and maintenance of the various transmitters are described in separate user manuals.

1.3 Special conditions for safe application

At least one internal relay must be configured as the collective message for all measuring point faults (FLT-TRM) and for GMA faults (FLT-GMA).

2. Gas detection controller GMA 200-MW4

2.1 General description

The design of the gas warning controller GMA 200-MW4 ensures flexible, simple and clearly structured operation in industrial and commercial applications for measuring combustible and toxic gases/vapors, and for measuring oxygen concentrations.

Using the GMA200Config software program, it is possible to quickly and easily configure measuring points and relays even when extending GMA 200-MW gas warning systems that are already installed. Measuring point designation, transmitter type, gas type and measuring range, as well as three individual or specified alarm thresholds can be configured for each measuring point.

2.2 Device design

Up to 4 transmitters with 4-20 mA or 0.2-1 mA output can be connected to the analog inputs of the GMA 200-MW4 gas detection controller. A microprocessor evaluates the analog input signals of the connected transmitters, and a clearly structured display and LEDs indicate the status of the gas detection controller, each measuring point and the relays.



2.2.1 LED status displays

During operation, LED status displays at the GMA 200 controller indicate the following statuses according to the event:

- | | |
|--|----------|
| - Operating status (ON) | → green |
| - Alarm 1 (AL1) | → red |
| - Alarm 2 (AL2) | → red |
| - Alarm 3 (AL3) | → red |
| - Service (SRV/SRQ) required | → yellow |
| - Fault (FLT) GMA | → yellow |
| - Fault (FLT) TRM | → yellow |
| - Relay 1 (R1) – Relay 6 (R6) | → red |
| (Relay activated in the case of an alarm or fault) | |

2.2.2 Graphical display

Currently measured values are shown on the display for each measuring point. The display for the measuring points can be optionally set through the menu navigation (also see section 5.1):

Display in normal mode

Display of 8 measuring points

1	20.9 O ₂ Vol%	5	20.9 O ₂ Vol%
2	0.5 CH ₄ LEL	6	0.0 SO ₂ ppm
3	0 CO ppm	7	0 NH ₃ ppm
4	0.0 H ₂ S ppm	8	0 NH ₃ ppm



for displaying
measuring point 9-16

Display of 4 measuring points

5	Building 2 Room 4	20.9 O ₂ Vol%
6	Building 2 Room 5	0.0 SO ₂ ppm
7	Building 3 Floor	0 NH ₃ ppm
8	Building 3 Cellar	0 NH ₃ ppm



for displaying
measuring point 5-8 \ 13-16

Display as single measuring point

5	Building 2 Room 4
20.9 O ₂ Vol%	
Details: ---	



for displaying
measuring point 6 \ 4

Display for alarms

First display for alarms

ALARM 2 Measuring Points			
3	Building 1 Room 16	75 CO Alarm 2	
10	Gas store Center	22.5 CH ₄ Alarm 1	

Alarm for 2 measuring points

1	16.4 O ₂ AL2	5	20.9 O ₂ Vol%
2	0.5 CH ₄ LEL	6	0.0 SO ₂ ppm
3	75 CO AL2	7	0 NH ₃ ppm
4	0.0 H ₂ S ppm	8	0 NH ₃ ppm

each for the gradual display
with 4 measuring points up
to the display of the single
measuring point

The graphical display is backlit; the light intensity can be increased using any control button. In the event of a gas alarm or faults, the display lighting is automatically activated with a red background.

2.2.3 Visual and acoustic alarm

An alarm light and a horn for central visual and acoustic alarm are integrated in the wall mounting housing of the GMA 200-MW4 and triggered when the assigned alarm configuration for one or several measuring points is exceeded or not achieved (for alarm configuration, see section 4.3).

2.3 Internal relays of the GMA 200-MW4

The GMA 200-MW4 controller features a total of 6 relays. In order to realize specified safety measures and alarms, 4 relays can be freely configured using the GMA200Config software program. An additional relay is available for each controller as a safety-related fault message and maintenance relay.

2.4 External relay with the relay module GMA 200-RT

The relay module GMA 200-RT enables the addition of a further 16 freely configurable relays. A total of 4 relay modules with 64 additional relays can be managed via the controller GMA 200-MT. The relay modules RT are connected to the controller GMA 200 via the digital interface RS485 which also enables the spatial separation of the relay modules (max. 3,280 ft. / 1,000 m). The relay module is not described in this user manual.

2.5 Relay configuration

Configuration of the relays using the GMA200Config software offers extensive options, such as the allocation of individual or several measuring points to relays.

Configuration options:

- Single alarm per measuring point and alarm threshold
- Configuration of And/Or conjunctions
- Collective or group alarms
- Fault messages
- Voting functions
- Open-circuit principle / Closed-circuit principle

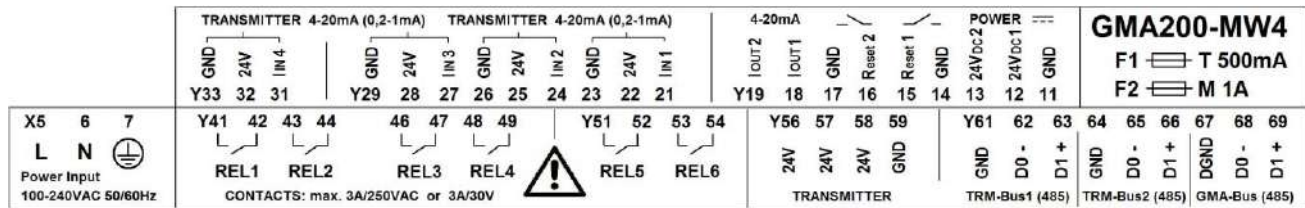
3. Assembly and Installation Instructions

3.1 Site of installation

The GMA 200-MW4 is intended for indoor wall mounting and should not be installed in potentially explosive atmospheres. It should be installed in areas with as little vibration as possible.

3.2 Electrical connections

The voltage supply and transmitters are connected according to the terminal assignment diagram, which is also located inside the housing cover.



If the housing cover is opened, various positions inside the GMA 200-MW4 are marked with symbols. The symbols have the following meaning:



Protective conductor connection



General warning, see user manual



Risk of electric shock

3.2.1 Safety information



Electrical installation must always be carried out to DIN VDE 0100 or a similar country-specific standard. Cables with hazardous live voltages, e.g. 230 V AC, and cables with non-hazardous live voltages, e.g. 24 V DC, must be laid separately. The applied cables must be suitable for the connected transmitters or devices.

If the GMA 200-MW4 is also operated at ambient temperatures of +104 to 131° F, temperatures of +140 to 167° F can arise in the area above the terminals depending on the transmitter load. When selecting the cable type, observe its thermal resistance.

If the housing cover of the GMA 200-MW4 must be opened during operation due to maintenance work, please note that hazardous live voltages may be present at the mains connection terminals X5-X7 and the relay connection terminals Y41-Y54. Never come into contact with these terminals.

3.2.2 Mains connection and separator



If the GMA 200-MW4 is supplied with mains voltage (100-240 V AC) via terminals X5-X7, install a separator in the supply line. This separator must comply with the requirements of IEC60947-1 and IEC60947-3, and must be clearly marked as a separator of the GMA 200-MW4 and be accessible. The mains supply line must have a line cross section of at least 18 AWG and be protected by a suitable overcurrent protection device. The protective conductor must at least have the same cross section as the L and N conductors, and is connected to the terminal X7 marked with the protective conductor symbol.

3.2.3 Floating relay contacts



Additional external warning equipment, e.g. control lamps, acoustic signal transmitters, etc., can be connected to the terminals Y41-54 (contacts of the relays 1-6). The contacts of the adjacent relays 1&2, 3&4 and 5&6 should only be operated with the same voltage category. Hazardous live voltages (e.g. 230 V AC) and protective extra-low voltages (e.g. 24 V DC) should not be connected together at these adjacent relays.

3.2.4 External 24 V DC voltage supply

The GMA 200-MW4 can optionally be operated with an installed power supply unit or with an external 24 V DC power supply. If external 24 V DC voltage is available and should be used to supply the GMA 200-MW4, it is connected via terminal Y13 (24 V DC 2) and Y14 (GND) or, with a redundant design of the supply voltage, via terminal Y12 (24 V DC1) and Y11 (GND). If an external power supply unit is used, it should comply with EN60950-1 or feature reinforced or double insulation between the mains supply circuit and output voltage circuit similar to devices of protection class II (protective insulation □). If the GMA 200-MW4 is operated in a 24 V DC power supply network, it must be safety extra-low voltage (SELV) or protective extra-low voltage (PELV). Otherwise, the same requirements as for the previously described power supply units apply to the 24 V DC power supply network.

3.2.5 Connection of transmitters with an analog interface

Four transmitters with an analog 4-20 mA or 0.2-1 mA interface can be connected at terminals Y21-Y33 to the GMA 200-MW4. Three terminals (IIN, 24 V, GND) are available for each transmitter. The wire cross section depends on the power consumption of the transmitter and the length of the cable. Please refer to the user manual of the connected transmitters for detailed information.

3.2.6 Connection of transmitters with a digital interface (RS485)

Transmitters with a digital interface can be connected to terminals Y61-Y63 (TRM- Bus1) or Y64-Y66 (TRM Bus2). The terminals Y56-Y58 can be used to supply the transmitters with 24 V. The total power consumption of all connected transmitters should, however, not exceed 0.6A.

3.2.7 Connection of further devices with a digital interface (RS485)

In order to extend the GMA 200-MW4 with additional relays, further relay modules can be connected to terminals Y61-Y63 (TRM Bus1), Y64-Y66 (TRM Bus2) or Y67-Y69 (GMA Bus). In this case, the GMA 200 Bus connection must be configured as the master (bus addr. 0).

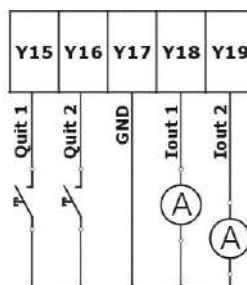
In order to further process the measuring data of the GMA 200-MW4, a respective Bus interface or a central unit can be connected to terminals Y67-Y69 (GMA Bus). In this case, the GMA 200 Bus connection must be configured as the slave (bus addr. 1...255).

3.2.8 Using the alarm acknowledgement inputs

Two freely configurable inputs are located at the terminals Y15 and Y16 for connecting external acknowledgement buttons.

This type of input must be connected to GND to acknowledge alarms.

External button
acknowledgement



External recording
equipment
(4-20 mA recorders or
similar)

3.2.9 Using the 4-20 mA current outputs

Two freely configurable 4-20 mA power outputs are located at the terminals Y18 and Y19. External recording equipment or recorders can be connected to these outputs to GND.

Two freely configurable 4-20 mA power outputs (Iout1, Iout2) are located at the terminals Y18 and Y19. External recording equipment or recorders can be connected to these outputs to GND (see figure in section 3.2.8).

3.3 Commissioning

Commissioning can commence after assembling the GMA 200-MW4 as well as all the transmitters and additional control modules, and once the voltage supply has been connected.

The gas warning system must be inspected and commissioned by an expert after installation. Inspections must be carried out in accordance with the manufacturer's instructions and executed by a fully trained and qualified expert. GfG service technicians as well as experts authorized by GfG are at your disposal.

4. Operating Instructions

4.1 Measuring mode

Normal measuring mode of the gas detection controller GMA 200-MW4 is achieved approximately 30 seconds after connection to the voltage supply. Depending on the type of transmitter and its warm-up period, allocation to the respective measuring point "SRT" takes place in the display during the warm-up period. The warm-up period is usually between 1 and 2 minutes depending on the type of transmitter.

In normal measuring mode, all LEDs are inactive and the operation display ON lights up green. All configured measuring points (max. 8 measuring points, see section 2.2.2, Changes of the Display, see section 5) are shown in the display.

4.2 Alarms

Three alarm thresholds can be configured within the measuring range for each measuring point. If the alarm thresholds are exceeded or not achieved, the alarm LEDs AL1, AL2, AL3 (collective alarm display) and the integrated acoustic alarm are activated according to the status. Detailed information on the gas concentration level, the alarm status (AL1, AL2 or AL3) of the respective measuring point are simultaneously shown in the graphical display (see section 2.2.2).

The configured relays and the relay LEDs R1-R4 (typical configuration) are additionally activated according to the configuration.

4.2.1 Alarm configuration

The following settings can be configured for each measuring point using the GMA200Config software:

- Alarm threshold Alarm 1 (can also be changed in the Main menu / Service menu)
- Alarm threshold Alarm 2 (can also be changed in the Main menu / Service menu)
- Alarm threshold Alarm 3 (can also be changed in the Main menu / Service menu)
- Alarm exceeded, self-locking
- Alarm exceeded, non-self-locking
- Alarm not achieved, self-locking
- Alarm not achieved, non-self-locking
- Alarm with switch-on delay (up to max. 3 minutes)
- Alarm with switch-off delay (up to max. 60 minutes)

4.2.2 Alarm acknowledgement (Reset)

Non-self-locking alarm:

A non-self-locking alarm is automatically reset if the gas concentration is below (above) the alarm threshold and the assigned relay(s) is/are deactivated.

Self-locking alarm:

A self-locking alarm remains even if the gas concentration is below (above) the alarm thresholds. The alarm and the assigned relay(s) can only be acknowledged if the alarm threshold has not been achieved (has been exceeded).

Acknowledgable alarm relays:

Relays can be configured as acknowledgeable and are reserved for connection to acoustic/optical messages only. Acknowledgement can occur via the Reset button at the controller module. Alternatively, acknowledgement is also possible via external reset inputs.

4.3 Relays

The GMA 200-MW4 is equipped with 4 freely programmable relays (normally open contact) which can be configured using the GMA200Config software:

- Single alarm per measuring point and alarm threshold
- Fault messages
- And/Or conjunctions
- Collective or group alarms
- Voting function, e.g. 2 of 3 measuring points
- Open-circuit principle / Closed-circuit principle

Two additional relays are available as a safety-related fault message and for service or maintenance messages.

Up to four external relay modules (GMA 200-RT) can be used for extension purposes (see section 2.4.).

Furthermore, the measuring point(s) and configuration is/are selected (AL1, AL2, AL3, fault) in the relay configuration to activate the integrated visual or acoustic alarm.

4.4 Faults

Fault messages are categorised as GMA controller faults and transmitter measuring point faults. Fault messages are non-self-locking.

FLT/TRM Transmitter or measuring point fault:

A fault can be caused, e.g., by a defective signal line or a defective transmitter.

Note: Observe the respective information in the user manual of the connected transmitter.

FLT/GMA GMA controller fault

Possible causes:

- Defective electronics
- Operating voltage has not been achieved
- Communication error to the external GMA modules (relay module GMA 200-RT)
- One or more defective internal relays or external relays (relay module GMA 200-RT)
- Program error (error in the parameters, check sums, etc.)

Please contact our Service in the case of faults.

4.5 Data logger function (configured using the GMA200Config software)

The gas detection controller GMA 200-MW4 can be equipped with a microSD card for saving measured values. The SD card must be removed and read out externally.

The following is permanently recorded at individually configured intervals:

Mean values – recording intervals: 5/10/15/20/30 seconds or
1/2/3/5/10/15/20/30/60 minutes
Instantaneous values – recording intervals: 5/10/15/20/30/60 seconds
as well as alarm events and faults.

Depending on the configuration, the measured values are saved under a file name according to the calendar:

- Daily (file name: Year/Month/Day/Type*) e.g. 13-0622M.txt
- Weekly (file name: Year/W/Calendar week) e.g. 13-W24M.txt
- Monthly (file name: Year/Month/Type*) e.g. 13-06M.txt
- Annually (file name: Year/Type*) e.g. 13-00M.txt

*M= Mean value / A= Instantaneous value in the case of an alarm

Important information: Prior to removing the SD card, stop or deactivate the data recording (also see the additional information on the service menu).

- Activate the GMA 200 menu by pressing and holding 
- Select "Status Datalogger" (Status data logger); to acknowledge, press 
- Select "Stop Rec" (pause function) by pressing 
- The status (still available storage capacity) is also displayed in this menu item.

Proceed as follows to deactivate the data recording:

- Select "Service Menü" (service menu) via 
- Enter the password (see section 5.3)
- Select "Datalogger" (Data logger)  and acknowledge via 
- Activate the measured value recording 
- Deactivate the measured value recording 
- Press  repeatedly to exit the service menu

4.6 Analog outputs

A 4-20 mA output can be configured for two of the measuring points for transfer, e.g., to a superordinate control center or for external measured value recording.

5. Keyboard and menus

Alarms are acknowledged and the main menu used via the clearly structured keyboard at the gas detection controller.

5.1 Operation and menu navigation

Menu navigation occurs via the control keyboard at the gas detection controller:

Button Function when pressed:



Alarm acknowledgement for self-locking alarms (when the button is pressed briefly)
Main menu activation (when the button is pressed >3 sec).



Access detailed information in the main menu (see section 5.2), change the measured value display to single measuring point display, toggle from the alarm display function to display, select cursor position for entering the password in the service menu.



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



Function when pressed: Exit the detailed information in the main menu, exit the main menu, toggle the display to display of all measuring points, toggle the display function to alarm display function, select cursor position for entering the password in the service menu.



Function when pressed: Toggle to menu items in the main menu, with single measuring point display to single view of other measuring points, activate the auto-scroll function (10 sec or 10 min, automatic change-over of the display), select numerical values for entering the password in the service menu.

5.2 Main menu

Press and hold down the  button to access the main menu. The main menu is divided into:

- Status GMA
- Status data logger
- Info GMA
- Info measuring points
- Info relays
- Info analog outputs
- Tests (test LCD display, LED/horn, external switch)
- Service menu (password protected, see section 5.3)

User navigation in the main menu occurs via the keyboard at the controller GMA 200 (see section 5.1).

5.3 Service menu

Access to the service menu is password protected and set to "0000" as standard upon delivery.

Access to the service menu is locked if the controller is connected to the GMA200Config software. The connection must be disconnected first. The configuration cannot be changed if the service menu is active at the same time.

The service menu is divided into:

- System settings
Time/Date, Password, Language, BUS settings, Display contrast, Horn volume
- Data logger
SD card: REC activation and deactivation of measured value recording
- Measuring points
Change alarm thresholds, carry out fine adjustments, lock (deactivate the measuring points)
- Relays
Test (electrical test of the relay function), lock (deactivate the relay), start the time control
- Analog outputs
Test, measuring point assignment

If settings are changed in the service menu, the following prompt is displayed when exiting the service menu:

Note: Safety-relevant changes should only be carried out by authorized and expert staff.



6. Appendix

6.1 Cleaning and care

External soiling of the device housing can be removed using a cloth dampened with water when the device is de-energized. Do not use solvents or cleaning agents!

6.2 Maintenance and service

Maintenance and service include regular visual inspections, functional testing and system checks, as well as repairs to the gas warning system.

6.2.1 Visual inspection

Visual inspections should be carried out on a regular basis with a maximum interval of one month and include the following tasks:

- Check the operation display and the status messages, e.g. operation display "On", alarm and fault displays "Off"
- Check for mechanical damage and external soiling

6.2.2 Functional testing

Functional testing can be carried out at specific intervals, which depend on the gas hazard being monitored.

It includes the following tasks:

- Visual inspection according to section 6.2.1
- Testing and evaluation of the measured value displays
- Triggering the alarm thresholds
- Triggering the test functions for display elements as well as optical and acoustic signals
- Inspection of saved messages, faults and maintenance requirements

6.2.3 System check

The system check must be carried out at regular intervals. The time between intervals should not exceed 1 year. It includes the following tasks:

- Functional testing according to section 6.2.2
- Inspection of all safety functions, including triggering of switching functions
- Monitoring of parameterization via target / actual comparison
- Inspection of signaling and registration modules

6.2.4 Repair

This includes all repair and replacement tasks. These tasks should only be carried out by the manufacturer and persons who have been authorized to do so by GfG Instrumentation. Only original spare parts and original modules inspected and approved by the manufacturer should be used.

6.3 Spare parts and accessories

	Description	Order No.
1.	microSD card 2 GB	2200202
2.	Spare slow-blow fuse T 500 mA (F1 for GMA 200)	PU=10 pieces 2200301
3.	Spare fuse M 1 A (F2 for transmitter supply)	PU=10 pieces 2200302
4.	Seal for GMA 200-MW cable gland	PU=20 pieces 2200305
5.	Screws for GMA 200-MW4 wall housing	PU=10 pieces 2200313
6.	Flat ribbon cable for GMA 200-MW4 (L=14 cm)	2200314

6.4 Information on the environmentally sound disposal of used parts

The purchaser of the device agrees to dispose of the device or device components in an environmentally sound manner.

6.5 Functional safety and parameters

These safety parameters have been determined for the following safety functions for the gas warning controllers GMA 200-MT6, GMA 200-MT16, GMA 200-MW4 and GMA 200-MW16 individually and in combination with a relay module GMA 200-RT/RTD:

		Single-channel use (1oo1)	Redundant use (1oo2)
	Type of detector	B	
	MTTR	72 h	
	Proof Test Interval	1 year	
	SIL-capability hardware ^{#1}	2 or 1	3 or 2
	HFT	0	1
	β factor	—	5 %
Safety function 1 → Analog input (0-24 mA), → Signal processing, → int. relay switching output of GMA 200-MT/-MW	SFF	94.05 %	
	λ _{DU} [1/h]	5.02 × 10 ⁻⁸	
	λ _{DD} [1/h]	4.82 × 10 ⁻⁷	
	λ _{SU} [1/h]	2.41 × 10 ⁻⁷	
	λ _{SD} [1/h]	7.05 × 10 ⁻⁸	
	PFD [1/year]	2.58 × 10 ⁻⁴	2.58 × 10 ⁻⁴
Safety function 2 → Digital input (RS485), → Signal processing, → int. relay switching output of GMA 200-MT/-MW	SFF	94.16 %	
	λ _{DU} [1/h]	4.96 × 10 ⁻⁸	
	λ _{DD} [1/h]	5.00 × 10 ⁻⁷	
	λ _{SU} [1/h]	2.29 × 10 ⁻⁷	
	λ _{SD} [1/h]	7.05 × 10 ⁻⁸	
	PFD [1/year]	2.57 × 10 ⁻⁴	2.57 × 10 ⁻⁴
Safety function 3 → Analog input (0-24 mA), → Signal processing, → Signal transmission, → ext. relay switching output of GMA 200-RT/-RTD	SFF	95.96 %	
	λ _{DU} [1/h]	6.19 × 10 ⁻⁸	
	λ _{DD} [1/h]	9.37 × 10 ⁻⁷	
	λ _{SU} [1/h]	4.27 × 10 ⁻⁷	
	λ _{SD} [1/h]	1.07 × 10 ⁻⁷	
	PFD [1/year]	3.43 × 10 ⁻⁴	3.43 × 10 ⁻⁴
Safety function 4 → Digital input (RS485), → Signal processing, → Signal transmission, → ext. relay switching output of GMA 200-RT/-RTD	SFF	96.02 %	
	λ _{DU} [1/h]	6.13 × 10 ⁻⁸	
	λ _{DD} [1/h]	9.57 × 10 ⁻⁷	
	λ _{SU} [1/h]	4.16 × 10 ⁻⁷	
	λ _{SD} [1/h]	1.05 × 10 ⁻⁷	
	PFD [1/year]	3.42 × 10 ⁻⁴	3.42 × 10 ⁻⁴
Safety function 5 → Analog input (0-24 mA), → Signal processing, → Digital output (RS485) of GMA 200-MT/-MW	SFF	98.34 %	
	λ _{DU} [1/h]	1.32 × 10 ⁻⁸	
	λ _{DD} [1/h]	4.93 × 10 ⁻⁷	
	λ _{SU} [1/h]	2.21 × 10 ⁻⁷	
	λ _{SD} [1/h]	7.24 × 10 ⁻⁸	
	PFD [1/year]	9.44 × 10 ⁻⁵	9.44 × 10 ⁻⁵
Safety function 6 → Digital input (RS485), → Signal processing, → Digital output (RS485) of GMA 200-MT/-MW	SFF	98.43 %	
	λ _{DU} [1/h]	1.26 × 10 ⁻⁸	
	λ _{DD} [1/h]	5.13 × 10 ⁻⁷	
	λ _{SU} [1/h]	2.09 × 10 ⁻⁷	
	λ _{SD} [1/h]	7.05 × 10 ⁻⁸	
	PFD [1/year]	9.32 × 10 ⁻⁵	9.32 × 10 ⁻⁵

These parameters were calculated by an independent expert from GWW GasWarn Dr.Wenker GmbH.

Comment #1:

According to DIN EN 50402, the SIL capability of the hardware for safety functions 1-4 depends on the contact load of the relay switching output. The higher value only applies if the relay contact is loaded with a max. current of 2 A.
An external fuse or similar component must be used to limit this maximum current.

Abbreviations:

MTTR = Mean Time To Repair

HFT = Hardware Fault Tolerance

SFF = Safe Failure Fraction

PFD = Probability of dangerous Failure on

Demand

λ_{DU}, λ_{DD}, λ_{SU}, λ_{SD} = Error probability (DU=hazardous undetected, DD=hazardous detected, SU=safe undetected, SD=safe detected)

6.6 Technical data

Type designation:	GMA 200-MW4
Display & control elements	2.2" graphical display and 5 buttons 13 status LEDs for alarms, operating and relay statuses
Ambient conditions For storage: For operation: Site of installation:	-13 to +140° F / -25 to +60° C 0..99 % RH (recommended +32 to +86° F / 0 to +30° C) -4 to +131° F / -20 to +55° C 0..99 % RH only indoors up to a height of 6,561 ft / 2,000 m above sea level
Power supply Operating voltage: Power consumption: Fuses:	100-240 V AC 50-60 Hz or/and 24 V DC (20-30 V DC permitted) max.16 VA (without transmitter) max.42 VA (with transmitter) F1=T 500 mA (for GMA 200) F2=M 1A (for transmitter)
Transmitter connections Supply: Analog signals IIN1-16: Digital signals TRM Bus1+2:	24 V DC ± 3 % with installed power supply unit, otherwise 20-30 V DC (see above) 4x 150 mA or Iges=0.6 A with other configuration 4-20 mA or 0.2-1 mA (resistance approx. 50..100 Ω , I _{max} = 70 mA permanently / 500 mA= temporarily) RS485; half-duplex; max. 38,400 Baud
RS485 outputs TRM Bus1+2: GMA Bus:	RS485; half-duplex; max. 38,400 Baud (for GMA 200 relay modules only) RS485; half-duplex; galvanically isolated; max. 230,400 Baud (for GMA 200 relay modules, control center, PC, PLC or Gateway)
Relay outputs Contacts: Contact rating: Insulation distances:	6 relays each with a normally open contact 3 A / 250 V AC or 3 A / 30 V DC Basic insulation between the relays: 1&2, 3&4, 5&6 Double insulation between the relays: 2&3, 4&5
Analogue outputs IOUT1+2:	4-20 mA (resistance max. 560 Ω)
Alarm acknowledgement inputs Reset1+2:	0-3 V DC (alarm acknowledgement occurs at contact with GND; U _{MAX} =30 V DC)
Data logger (optional)	2GB microSD card with FAT (FAT16) format
USB connection	Mini USB port for device configuration via PC
Connection cables Cable glands: Terminal blocks: Cable:	max. 9 pieces M16x1.5 (for cable cross section of 4.5-10 mm) 0.8..2.5 mm ² cross section 3-4 wire ≥ 0.75 mm ² LiYY, NYM (for GMA 200 supply) 2-4-wire 0.5-1.5 mm ² LiYY, LiYCY (for transmitter) 2-wire 1 x 2 x 0.22 mm ² BUS-LD (for GMA Bus with a length <32 ft / 10 m)
Housing Protection class: Material: Weight: Dimensions:	IP65 according to IEC 60529; IK08 according to IEC 62262 Plastic approx. 1 lb 15 oz. / 890 g 8.3 x 7 x 2.5 in / 209 x 180 x 64 mm (W x H x D)
Approvals/Tests Electromagnetic Compatibility: Electrical safety: Functional safety: Functional safety: Metrological suitability:	EN 50270:2015 (interference emission: type class I, interference immunity: type class II) EN 61010-1:2010 (Pollution degree 2, overvoltage category III for relay contacts) EN 50402:2017; IEC 61508-1 to -7:2010 (SIL2/SC3) EN 50271:2018; EN 62061:2016; ISO 13849-1:2015 EN 60079-29-1:2016 (EX); EN 50104:2010 (OX); EN 45544-1/-2/-3:2015 (TOX)

EC- Declaration of Conformity GfG Gesellschaft für Gerätebau mbH

GMA200-MW4

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www.gfg.biz



Edited: 03.12.2014 Amended:

GfG Gesellschaft für Gerätebau mbH develops, produces and sells gas sensors and gas warning devices, which are subject to a **quality management system** as per DIN EN ISO 9001. Subject to supervision by means of a **quality system** -Certificate No. BVS 03 ATEX ZQS / E 187- issued by the notified body, DEKRA EXAM GmbH, is the production of electrical apparatus of instrumentation Group I and II, categories M1, M2, 1G and 2G for gas sensors, gas detectors, gas warning systems in ignition protection classes explosion- proof encasing, increased safety, encapsulation and intrinsic safety, as well as their measuring function

The Gas detection controller **GMA200-MW4** complies with council **directive 2004/108/EC** for electromagnetic compatibility and with **directive 2006/95/EC** for electrical safety.

Labelling

C 6

The directives have been complied with under consideration of the standards mentioned below:

- **Electromagnetic compatibility**
 - Electrical apparatus for the detection and measurement of combustible gases, toxic gases and oxygen.
EN 50270
Radio shielding: Type class 1
Interference resistance: Type class 2
- **Operational safety**
 - Safety requirements for electrical equipment for measurement, control and laboratory use.
General requirements: EN 61010-1

The EMC testing laboratory EM TEST GmbH, Kamen has been charged with testing and evaluation of the electromagnetic compatibility. The company duMont Consulting & Engineering Rellingen was commissioned to verify and to evaluate the electrical safety

Always adhere to the safety notes of the instruction manual Z30-000.40

Dortmund, 10.12.2014

H.J. Hubner
President



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 ISO 13849-1:2015 EN 50402:2017 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

This 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
Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Stephan Hübner

www.ts-products.com
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TÜV Rheinland
Precisely Right.

Translation EU-Type Examination Certificate

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

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

Product: **GMA200**

Manufacturer: **GFG Gesellschaft für Gerätebau mbH**

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

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

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

EN 60079-26-1:2016
EN 50104:2010
EN 50271:2018

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.

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.

The marking of the product shall include the following:



DEKRA Testing and Certification GmbH
Bochum, 2019-05-13

Signed: **Kiliach**
Managing Director

DNKS

This certificate may only be reproduced in its entirety and without any change.
DEKRA Testing and Certification GmbH, Hindenburg 15, 70565 Stuttgart, Germany
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Page 1 of 3 of BVS 19 ATEX G 001 X

Appendix

EU-Type Examination Certificate

BVS 19 ATEX G 001 X

Product description

Subject and type

Control unit GMA200

Description

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 suitable for use in potentially explosive atmospheres.

Parameters

not applicable

Measuring function for explosion protection

This EU-type examination certificate covers:

- Control unit GMA200 with the following versions:
 - Gas detection controller GMA200-MM/4
 - Gas detection controller GMA200-MM/16
 - Gas detection controller GMA200-MT/6
 - Gas detection controller GMA200-MT/16
- 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 nitric acid) 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 V2.10.10
 - GMA200Visual V1.27.00

The EU-type examination includes the following deviations from the operating conditions required by EN 60079-26-1 or EN 50104, respectively:

- Extended range of temperature at operation (GMA200-MM/4, -MM/16): -20 °C to +55 °C
- Deviating range of temperature at operation (GMA200-MT/6, -MT/16): -20 °C to +50 °C

Test report

PFG-no. 41300419P of 2019-05-13

DNKS

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Page 2 of 3 of BVS 19 ATEX G 001 X

17 Special Conditions for Use

- When using 4-20 mA Transmitters, pay particular attention to the following:
 - 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 GIG-transmitters connected to the TCM-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, the alarm delay time shall be set 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 "1").
 - 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 2019-05-13

Managing Director

Page 3 of 3 of BVS 19 ATEX G 001 X

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Translation Type Examination Certificate

- Gas detectors -
PFG 19 G 002 X

Equipment: GMA200

Manufacturer: GIG 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 50104:2010
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. If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for sale use specified in the annex to this certificate.

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

DEKRA Testing and Certification GmbH

Bochum, dated 2019-05-13

Signed: Kilisch

Managing Director

Page 1 of 3 of PFG 19 G 002 X

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DEKRA Testing and Certification GmbH, Hanselerstr. 15, 7065 Stuttgart, Germany
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Appendix 10 Type Examination CertificatePFG 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 suitable for use in potentially explosive atmospheres.

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 following:
 - The specifications of the 0.2-1 mA or 4-20 mA interfaces
 - 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 GIG-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, the alarm delay time shall be set 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 "resolution" above 0.1 %v/v.
 - 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 "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-MT6
 - Gas detection controller GMA200-MT16
 - 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 V2.10.10
 - 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
in the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH
Bochum, 2019-05-13

Managing Director

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Rev. 2 (03/23/21)