GfG Instrumentation

Worldwide Manufacturer of Gas Detection Solutions

GMA 200-MW

Operation Manual

1194 Oak Valley Drive, Suite 20, Ann Arbor, MI 48108 ● 800-959-0573 ● 734-769-0573

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Introduction

For your safety

As with any piece of complex equipment, the GMA 200-MT will do the job it is designed to do only if it is used and serviced in accordance with the manufacturer's instructions. Please protect yourself and your employees by following the instructions in this manual. All individuals who have or will have the responsibility for using and servicing this product must carefully read this manual. The warranties made by GfG with respect to the product are void if functions or parameters are changed without the permission of GfG. They are also void if the product is not used and serviced in accordance with the instructions in this manual. Failures or false alarms caused by interfering gases or electrical signals are not part of the warranty obligation. The above does not alter any statements by GfG regarding warranties, conditions of sale and/or delivery.

Application

The GMA 200-MW16 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 controller GMA 200-MW16 and the relay module GMA 200-RT.

Special conditions for safe operation

According to the requirements stipulated, (e.g., by DIN EN 60079-29-1 section 4.2.3.2, DIN EN 45544 and DIN EN 50104) at least one alarm threshold with self-locking must be configured for potentially hazardous gas concentrations.

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

Gas Detection Controller GMA 200-MW16

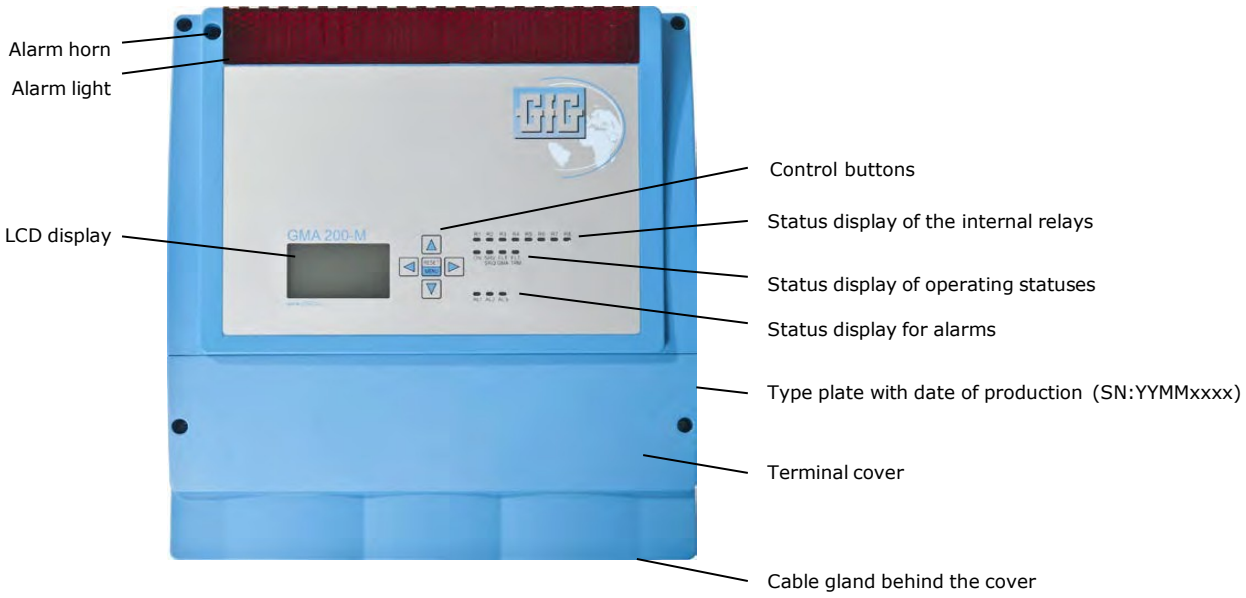
General description

The fundamental configuration and design of the GMA 200-MW16 gas warning controller 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 already installed GMA 200-MW gas warning systems. Among other thing, 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.

Device design

Up to 16 transmitters can be connected to the analog inputs of the GMA 200-MW16 gas detection controller with 4-20 mA or 0.2-1 mA output. A microprocessor evaluates the analog input signals of the connected transmitters, and a clearly structured display with LEDs indicate the status of the gas detection controller, each measuring point and the relays.



LED status displays

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

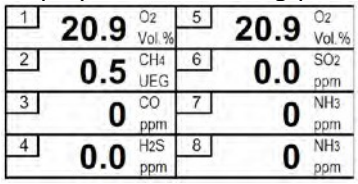
Event	LED status display
Operating status (ON)	green
Alarm 1 (AL1)	red
Alarm 2 (AL2)	red
Alarm 3 (AL3)	red
Service (SRV/SRQ) required	yellow
Fault (FLT) GMA	yellow
Fault (FLT) TRM	yellow
Relay 1 (R1) – Relay 8 (R8)	red
(Relay activated in case of an alarm or fault)	

Graphical display

The display shows the currently measured values for each measuring point. The display for the measuring points can be optionally set through the menu shown below.

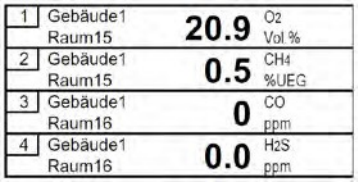
Display in normal mode

Display of 8 measuring points



for displaying measuring point 9–16

Display of 4 measuring points



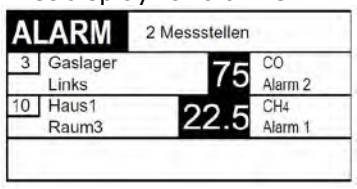
for displaying measuring point 5-8 \ 13-16

Display as single measuring point

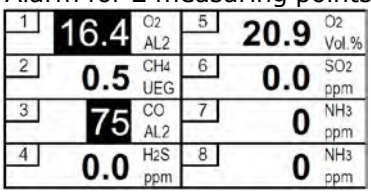
for displaying measuring point 6 \ 4

Display for alarms

First display for alarms



Alarm for 2 measuring points



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

The 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.

Visual and acoustic alarm

An alarm light and a horn for central visual and acoustic alarm are integrated in the wall mounting housing and triggered when the assigned alarm configuration for one or several measuring points is exceeded or not achieved.

Internal relays of the GMA 200-MW16

The GMA 200-MW16 gas detection controller features a total of 8 relays. In order to realize specified safety measures and alarms, 6 relays can be configured using the "GMA200Config" software program. An additional relay is available for each controller as a safety-related fault message and maintenance relay.

External relay with the relay module GMA 200-RT

The GMA 200-RT relay module enables the addition of 16 more freely configurable relays. A total of 4 relay modules with 64 additional relays can be managed via the GMA 200-MT controller. The RT relay modules are connected to the GMA 200 controller using the RS485 digital interface, which also enables the spatial separation of the relay modules (max. 1,000 m).

The relay module is not described in this user manual.

Relay configuration

Configuration of the relays using the "GMA200Config" software offers extensive options, e.g. 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

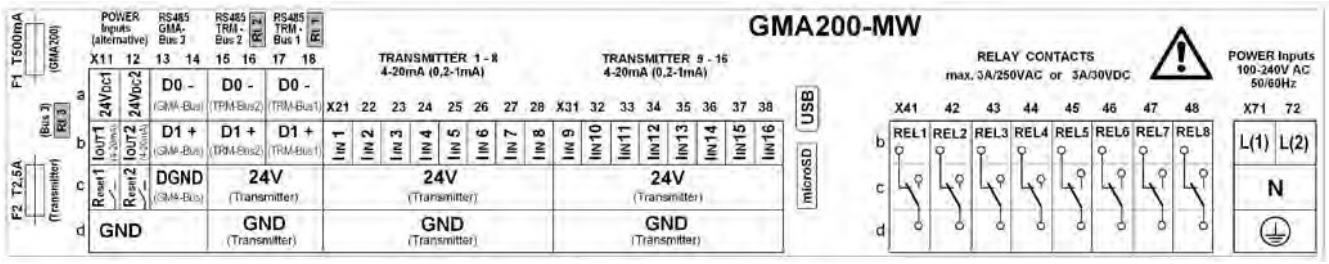
Assembly and Installation Instructions

Site of installation

The GMA 200-MW16 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. The voltage supply and transmitters are connected according to the terminal assignment diagram which is also located inside the terminal cover.

Electrical connections

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



If the terminal cover is opened, various positions inside the GMA 200-MW16 are marked with symbols. The symbols have the following meaning:

General warning see user manual

Risk of electric shock

Protective conductor connection

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 terminal cover of the GMA 200-MW16 must be opened during operation due to maintenance work, please note that hazardous live voltages may be present at the relay terminals X41-48 and the mains connection terminals X71-72. Never come into contact with these terminals.

Mains connection and separator

If the GMA 200-MW16 is supplied with mains voltage (100..240 V AC) via terminals X71 or X72, 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-MW16 and be accessible. The mains supply line must have a line cross section of at least 0.75 mm^2 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 at terminal X71d or X72d to the terminal marked with the protective conductor symbol.

Floating relay contacts

Additional external warning equipment, (e.g. control lamps, acoustic signal transmitters, etc.), can be connected to the terminals X41-48 (contacts of the relays 1-8). The contacts of the adjacent relays 1&2, 3&4, 5&6 and 7&8 should only be operated with the same voltage.

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.

24 V DC voltage supply

The GMA 200-MW16 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-MW16, it is connected via terminal X11a or, with a redundant design of the supply voltage, via terminal X11a and X12a to the terminal marked 24 V DC1 or 24 V DC2 and to GND.

Connection of transmitters with an analog interface

When using the GMA 200-MW16, 16 gas transmitters with an analog 4-20 mA or 0.2-1 mA interface can be connected at terminals X21-38. 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.

Connection of transmitters with a digital interface (RS485)

Transmitters with a digital interface (RS485) can be connected to terminals X17-18 (TRM- Bus1) or X15-16 (TRM Bus2). Four terminals (GND, 24 V, DO-, D1+) are available per transmitter bus. The total power consumption of all connected transmitters should, however, not exceed 2.4 A.

Connection of further devices with a digital interface (RS485)

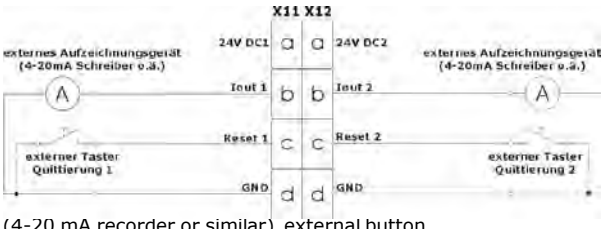
In order to extend the GMA 200-MW16 with additional relays, further relay modules can be connected to terminals X17-18 (TRM Bus1), X15-16 (TRM Bus2) or X13-14 (GMA Bus). If the GMA Bus is used for this extension, it must be configured as the master (addr.0).

In order to further process the measuring data of the GMA 200-MW16, a central unit or a respective Bus interface can be connected to terminals X13-14 (GMA Bus). In this case, the GMA Bus connection must be configured as the slave (addr.1...255).

Using the alarm acknowledgement inputs

Two configurable alarm acknowledgement inputs (Reset1, Reset2) are located at terminals X11c and X12c for connecting external acknowledgement buttons.

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



(4-20 mA recorder or similar) external button
Acknowledgement 1 Acknowledgement 2

Using the 4-20 mA current outputs

Two configurable 4-20 mA power outputs (Iout1, Iout2) are located at terminals X11b and X12b. External recording equipment or recorders can be connected to these outputs to GND (see figure above).

Commissioning

Commissioning can commence after assembling the GMA 200-MW16 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 Qualified GfG Representative after installation. Inspections must be carried out in accordance with the manufacturer's instructions and executed by a fully trained and qualified GfG Representative. Qualified GfG Representatives are available at your request.

Operating Instructions

Measuring mode

Normal measuring mode of the gas detection controller GMA 200-MW16 is achieved approximately 10 seconds after connection to the voltage supply. Device readiness is indicated by a short optical signal.

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 Graphical Display Diagram and, Changes of the Display) are shown in the display.

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. 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 shown previously in this manual.

The configured relays and the relay LEDs R1-R6 (typical configuration) are additionally activated according to the configuration.

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)

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).

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

Relays

The GMA 200-MW is equipped with 6 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.

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.

Faults

Fault messages are categorized as GMA controller faults and transmitter measuring point faults.

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 for the connected transmitter in the user manual.

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 the GfG Service Center in case of faults.

Data logger function (configured using the "GMA200Config" software)

The GMA 200-MW16 gas detection controller can be equipped with a microSD card for saving measured values.

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 case of an alarm

The SD card must be removed and read externally.

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 RESET MENU
- Select "Status Datalogger" (Status data logger); to acknowledge, press ▶
- Select "Stop Rec" (pause function) by pressing RESET MENU
- The status (still available storage capacity) is also displayed in this menu item

Proceed as follows to deactivate the data recording:

- Select "Service Menu" (service menu) via ▼
- Enter the password (reference under Service Menu on page 10)
- Select "Datalogger" (Data logger) ▼ and acknowledge via RESET MENU
    - Activate the measured value recording ▶
    - Deactivate the measured value recording RESET MENU
- Press ◀ repeatedly to exit the service menu

Analog outputs

A 4-20 mA output can be configured for 2 measuring points for transfer, (e.g., to a control center or for external measured value recording).

Keyboard and menus

Alarms are acknowledged and the main menu is accessible from the keyboard at the controller.

Operation and menu navigation

Menu navigation occurs by using the control keyboard at the controller:

RESET MENU	Function when pressed: Alarm acknowledgement for self-locking alarms, Main menu activation.
▶	Function when pressed: Access detailed information in the main menu, 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.
▲	Function when pressed: 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.

Main menu

Press and hold down the RESET MENU 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)

User navigation in the main menu occurs by using the keyboard at the GMA 200 controller.

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 an authorized GfG Representative.

Appendix

Cleaning and care

External soiling of the device housing can be removed using a cloth dampened with water when the device has no power source. Do not use solvents or cleaning agents!

Maintenance and service

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

Visual inspection

Visual inspections should be carried out on a regular basis with a maximum interval of once a 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

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 as noted above
- 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 signal transducers, without triggering switching functions
- Inspection of saved messages, faults and maintenance requirements

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 as noted above
- Inspection of all safety functions, including triggering of switching functions
- Calibration of controller
- Inspection of signaling and horn

Repair

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

For additional questions on the product or in case of failure and problems please contact:

GfG Instrumentation, Inc.
1194 Oak Valley Drive Suite 20
Ann Arbor, MI 48108
Phone: (734) 761-5987
Fax: (734) 769-1888
E-Mail: info@gfg-inc.com

Parts and accessories

Description		Part Number
MicroSD card 2 GB		2200202
Spare slow-blow fuse T 500 mA (F1 for GMA 200)	PU=10 pieces	2200301
Spare slow-blow fuse T 2.5 A (F2 for transmitter supply)	PU=10 pieces	2200303
Screws for GMA 200 wall housing	PU=10 pieces	2200304
Seal for GMA 200-MW cable gland	PU=20 pieces	2200305
75 W power supply unit GMA200-MW (input: 88-264 V AC output: 24 V DC/3.2A)		2200306
100 W power supply unit GMA 200-MW (input: 88-264 V AC output: 24 V DC/4.2A)		2200307
Flat ribbon cable for GMA 200-MW (L=33 cm)		2200308

Technical data

Type designation:	**GMA 200-MW16**
Display & control elements	2.2" graphical display and 5 buttons 15 status LEDs for alarms, operating and relay statuses
Ambient conditions	
For storage:	-13..+140°F / -25..+60 °C | 0..99 % RH (recommended 0...+86°F / +30 °C)
For operation:	-4..+131°F / -20..+55 °C | 0..99 % RH
Site of installation:	only indoors up to a height of 6,500 feet / 2,000 m above sea level
Power supply	
Operating voltage:	100-240 V AC 50-60 Hz or/and 24 V DC (20-30 V DC permitted)
Power consumption:	max.10 W (without transmitter) max.90 W (with transmitter)
Fuses:	F1= slow-blow T 500 mA (for GMA 200) F2= slow-blow T 2.5 A (for transmitter)
Transmitter connections	
Supply:	24 V DC ±3 % with installed power supply unit, otherwise 20-30 V DC (see above) 16x 150 mA or Itotal=2.4 A with other configuration
Analogue signals IIN1-16:	4-20 mA or 0.2-1 mA (resistance approx. 50..100 Ω, Imax=70 mA permanently / 500 mA temporarily)
Digital signals TRM Bus1+2:	RS485; half-duplex; max. 38,400 Baud
RS485 outputs	
TRM Bus1+2:	RS485; half-duplex; max. 38,400 Baud (for GMA 200 relay modules only)
GMA Bus:	RS485; half-duplex; galvanically isolated; max. 230,400 Baud (for GMA 200 relay modules, control center, PC, PLC or Gateway)
Relay outputs	
Contacts:	8 relays each with a changeover contact
Contact rating:	3 A / 250 V AC or 3 A / 30 V DC
Insulation distances:	Basic insulation between the relays: 1&2, 3&4, 5&6, 7&8 Double insulation between the relays: 2&3, 4&5, 6&7
Analog 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)	2 GB microSD card with FAT (FAT16) format
USB connection	Mini USB port for device configuration via PC
Connection cables	
Cable glands:	max. 20 pieces M16x1.5 (for cable cross section of 4.5-10 mm)
Terminal blocks:	0.8..2.5 mm^2 cross section
Cable:	3-4-wire ≥0.75 mm^2 LiYY, NYM (for GMA 200 supply – 18 GA) 2-4-wire 0.5-1.5 mm^2 LiYY, LiYCY (for transmitter – 16-20 GA) 2-wire 1 x 2 x 0.22 mm^2 BUS-LD (for GMA Bus with a length >33' / 10 m – 16-18 GA)
Protection class:	IP65
Material:	Plastic
Weight:	Approximately 4.4 lb. / 2.0 kg.
Dimensions:	11 x 11.5 x 3.9 inches / 270 x 290 x 98 mm (W x H x D)
Approvals/Tests	
Electromagnetic Compatibility:	EN 50270:2006 Emitted interference: Type class I Interference resistance: Type class II
Electrical safety:	DIN EN 61010:2010 Degree of soiling 2 Overvoltage category II for mains power supply Overvoltage category III for relay contacts

EC declaration of conformity

EG-Konformitätserklärung

GMA200-MW16

Erstellt: 12.04.2013 Geändert:

GfG Gesellschaft für Gerätebau mbH
Klönnestrasse 99
44143 Dortmund
Tel: +49 (231) 56400-0
Fax: +49 (231) 516313
E-Mail: info@gfg-mbh.com
www.gasmessung.de
www.gfg.biz

Die GfG Gesellschaft für Gerätebau mbH entwickelt, produziert und vertreibt Gassensoren und Gaswarnanlagen unter Anwendung eines **Qualitätsmanagementsystems** nach DIN EN ISO 9001 Überwacht wird die Produktion von elektrischen Betriebsmitteln der Gerätegruppen I und II, Kategorien M1, M2, 1G und 2G für Gassensoren, Gasmessgeräte, Gaswarnanlagen in den Zündschutzarten Druckfeste Kapselung, Erhöhte Sicherheit, Vergusskapselung und Eigensicherheit mit deren Messfunktion mit Hilfe eines **Qualitätssicherungssystems** – Zertifikats-Nr. BVS 03 ATEX ZQS / E 187 - durch die benannte Stelle, DEKRA EXAM GmbH.

Der Gasmesscomputer **GMA200-MW16** entspricht der **Richtlinie 2004/108/EG** für die elektromagnetische Verträglichkeit und der **Richtlinie 2006/95/EG** für Niederspannungen.

Kennzeichnung CE

Die Richtlinien wurden unter Berücksichtigung der folgenden Normen eingehalten:

- **Elektromagnetische Verträglichkeit**

  - Elektrische Geräte für die Detektion und Messung von brennbaren Gasen, toxischen Gasen und Sauerstoff. EN 50270
    Störaussendung: Typ 1
    Störfestigkeit: Typ 2

- **Elektrische Sicherheit**
  - Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte. Allgemeine Anforderungen. EN 61010-1

Mit der Prüfung und Bewertung der elektromagnetischen Verträglichkeit wurde das EMV Messlabor EM TEST GmbH, Kamen beauftragt. Mit der Prüfung und Bewertung der elektrischen Sicherheit wurde das Ingenieurbüro du.tronic Consulting & Engineering, Ratingen beauftragt.

Die Sicherheitshinweise in der Betriebsanleitung 222-000.22 sind zu beachten.

Dortmund, den 12.04.2013

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Dipl. Kfm. H.J. Hübner
Geschäftsführer

EG-Kon050-S ebrecht

GfG Instrumentation

1194 Oak Valley Drive, Suite 20
Ann Arbor, Michigan 48108 USA
Phone: (800) 959-0329 or (734) 769-0573
Fax (734) 769-1888
E-mail: info@gfg-inc.com
Website: www.goodforgas.com

GfG reserves the right to change part numbers,
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7004-200 Ver. 1 (September 2014)