



GfG Instrumentation

Worldwide Manufacturer of Gas Detection Solutions

GMA 200-MT

Operation Manual



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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-MT6 and GMA 200-MT16 are gas detection controllers for mounting rail assembly. Combined with connected transmitters, they form a fixed gas warning system for the continuous measurement of gas concentrations and are 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 controllers GMA 200-MT6 and GMA 200-MT16 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, DIN EN 45544 and DIN EN 50104) at least one alarm threshold with self-locking must be configured for potentially hazardous gas concentrations.

Gas detection controller GMA 200-MT

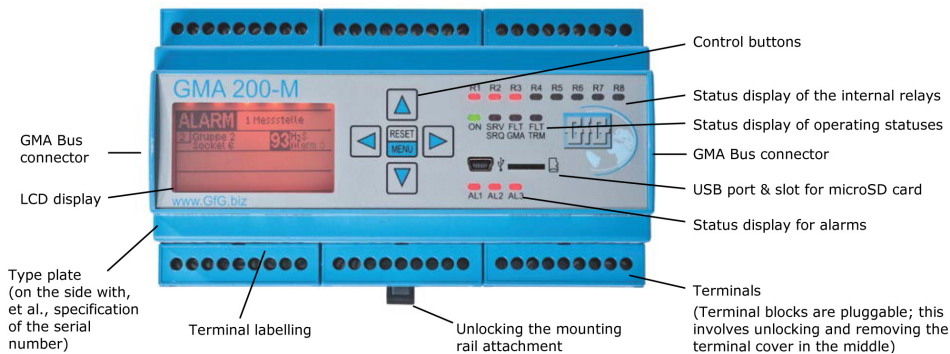
Function Description

The fundamental configuration and design of the GMA 200-MT6 and GMA 200-MT16 gas detection controllers ensure flexible, simple and clearly structured operation in industrial and commercial applications for measuring combustible and toxic gases/vapors and oxygen concentrations.

Using the "GMA200Config" software program, it is possible to quickly and easily configure measuring points and relays even when extending already installed GMA200 gas warning systems. Among other things, 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 6 transmitters can be connected to the analog inputs of the GMA 200-MT6 and up to 16 transmitters with 4-20 mA or 0.2-1 mA output to the GMA 200-MT16. A microprocessor evaluates the analog input signals of the connected transmitters, and a clear structured display with LEDs indicate the status of the gas detection controller, each measuring point and the relays.



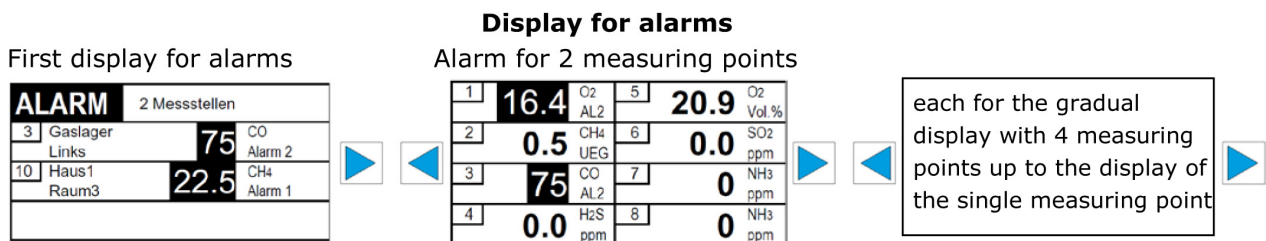
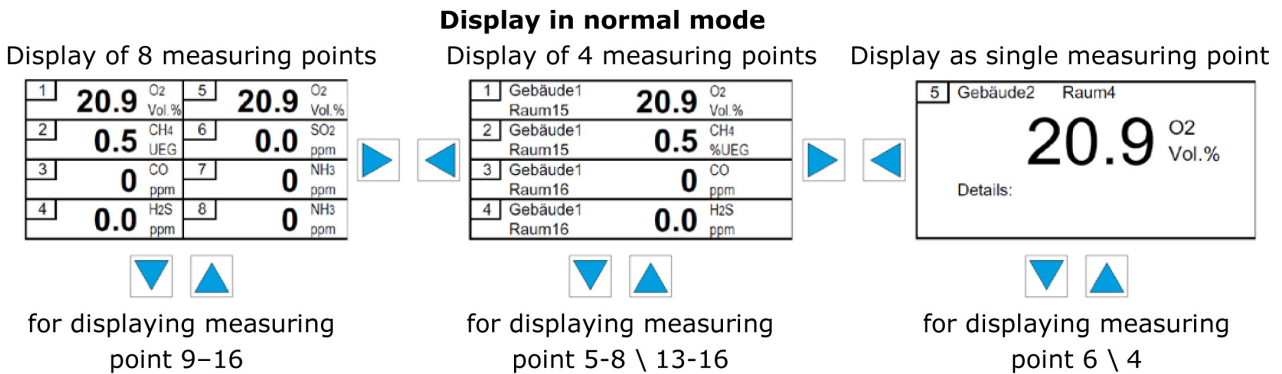
LED status displays

During operation, the LED status displays at the GMA 200 controller indicating 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.



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.

Internal relays of the GMA 200- MT

The GMA 200-MT6/ GMA 200-MT16 controllers feature 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 GMA 200-MT relay module

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 controller GMA 200-MT. The relay modules GMA 200-RT are connected to the GMA 200 controller using the RS-485 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

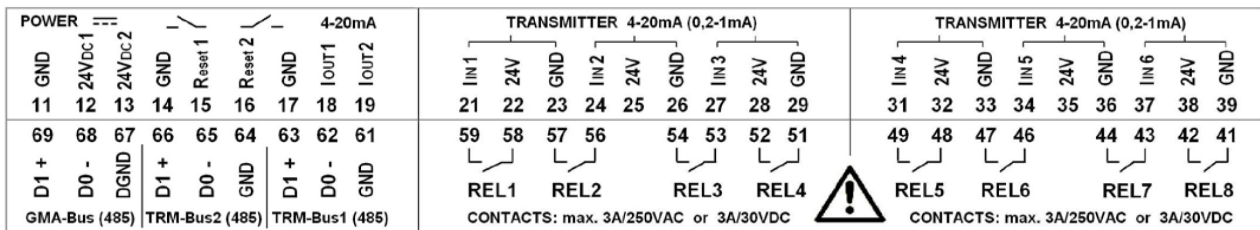
Assembly and installation instructions

Site of installation

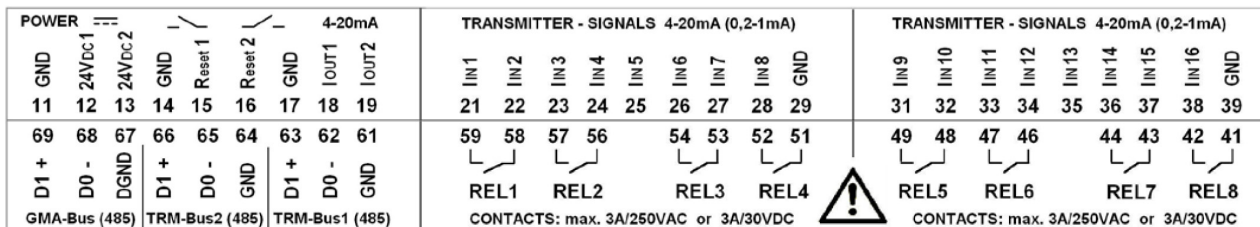
The GMA 200-MT6 and GMA 200-MT16 are designed for assembly on mounting rails in control cabinets or wall-mounted housings and should not be installed in potentially explosive atmospheres. They should be installed in areas with as little vibration as possible.

Electrical connections

The voltage supply and transmitter are connected according to the terminal assignment diagram located at the GMA 200 housing near the terminal covers.



The top terminal assignment applies to the GMA 200-MT6 and the bottom terminal assignment applies to the GMA 200-MT16.



This symbol shown on the terminal assignment diagram means:

General warning, see user manual.

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 maintenance work is carried out on the GMA 200-MT6/ GMA 200-MT16 during operation, please note that hazardous live voltages may be present at the relay terminals Y41-59. Never come into contact with these terminals.

Floating relay contacts



Additional external warning equipment, (e.g. control lamps, acoustic signal transmitters, etc.), can be connected to the terminals Y41-59 (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-MT6 and GMA 200-MT16 are usually supplied with voltage from an external 24 V DC power supply unit or a 24 V DC power supply network. This voltage is connected to the terminals Y12 (24 V DC1) and Y11 (GND). A second 24 V DC power supply unit or a second 24 V DC power supply network can be optionally connected to the terminals Y13 (24 V DC2) and Y14 (GND) to ensure a redundant voltage supply. The power supply unit should comply with EN60950-1 or feature reinforced or double insulation between the main supply circuit and output voltage circuit similar to devices of protection class II (protective insulation).

If the GMA 200-MT6/ GMA 200-MT16 is operated in a 24 V DC power supply network, for safety reasons it must be safety extra-low voltage (SELV) or protective extra-low voltage (PELV). In addition to the same requirements as for the previously described power supply units that apply to the 24 V DC power supply network.

Connection of transmitters with an analog interface

When using the GMA 200-MT6, six transmitters with analog 4-20 mA or 0.2-1 mA output signals can be connected to the terminals Y21-39. Three terminals (IIN, 24 V, GND) are available for each transmitter. The wire cross section to be used depends on the power consumption of the transmitters and the length of the cable. Please refer to the user manual of the connected transmitters for detailed information.

When using the GMA 200-MT16, only the signal lines of 16 transmitters with an analog 4-20 mA or 0.2-1 mA interface can be connected to the terminals Y21-38. Only one terminal (IIN) is available per transmitter; the power supply of the transmitters must therefore occur separately and be connected through external terminals.

Connection of transmitters with a digital interface (RS485)

Transmitters with a digital interface (RS485) can be connected to the terminals Y61-63 (TRM-Bus1) or Y64-66 (TRM Bus2). Three terminals (GND, D0-, D1+) are available per transmitter bus. The 24 V power supply of the transmitters is connected according to the type of GMA 200.

When using the GMA 200-MT6, available 24 V terminals (Y22, Y25, Y28, Y32, Y35 or Y38) can be used for the 24 V transmitter power supply. The total power consumption of all connected transmitters should, however, not exceed 900 mA. Please refer to the user manuals of the connected transmitters for detailed information. The wire cross section to be used depends on the power consumption of the transmitters and the length of the cable.

When using the GMA 200-MT16, the 24 V DC power supply of the transmitters must occur separately and be connected through external terminals.

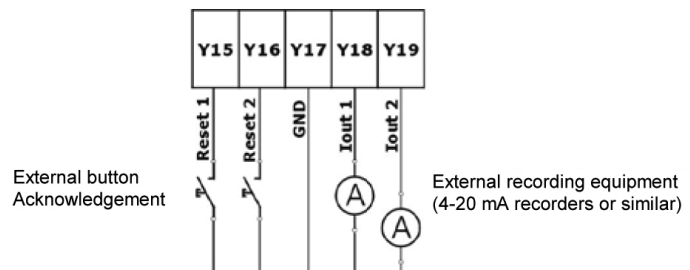
Connection of further devices with a digital interface (RS485)

In order to extend the GMA 200-MT6 or GMA 200-MT16 with additional relays, further relay modules can be connected to the terminals Y61-63 (TRM Bus1), Y64-66 (TRM Bus2) or Y67-69 (GMA Bus) or at the GMA Bus connector. 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 GMA200-MT6 or GMA 200-MT16, a central unit or a respective Bus interface can be connected to the terminals Y67-69 (GMA Bus) or the GMA Bus connector. 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 the terminals Y15 and Y16 for connecting external acknowledgement buttons.



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

Using the 4 – 20 mA current outputs

Two 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 the figure above).

Commissioning

Commissioning can commence after assembling the GMA 200-MT6 or GMA 200-MT16 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 a 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 upon request.

Operating instructions

Measuring mode

Normal measuring mode of the GMA 200 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-MT is equipped with 6 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

Furthermore, 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.

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 gas warning system GMA 200 can be equipped with a microSD card for saving measured values as well as alarm events and faults.

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




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

Proceed as follows to deactivate the data recording:

- Select "Service Menu" via 
- Enter the password (reference under Service Menu on page 13)
- Select "Datalogger"  and acknowledge via 
 - . Activate the measured value recording 
 - . Deactivate the measured value recording 
- 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:



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  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

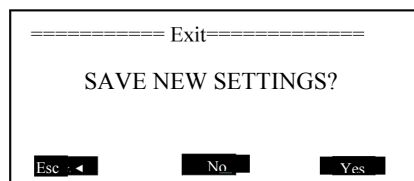
Access to the service menu is password protected and set to "0000" as standard upon delivery.

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 relays), trigger timer
- Analog outputs Test, measuring point assignment

The following appears in the display if changes have been carried out and when exiting the menu item:



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 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

Functional testing

Functional testing can be carried out at specific intervals, which depend on the gas hazard being monitored. With gas warning systems for explosion protection, the time limit is 4 months, and when measuring toxic gases and oxygen, the time limit is 6 months.

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
- Monitoring of parameters via target / actual comparison
- Inspection of signaling and registration modules

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:

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Parts and accessories

| | Description | Part Number |
|----|---|--------------------|
| 1. | 48 W power supply unit for mounting rail assembly (input: 100-240 V AC output: 24 V DC / 2.0 A) | 4024-020 |
| 2. | 76.8 W power supply unit for mounting rail assembly (input: 100-240 V AC output: 24 V DC / 3.2 A) | 4024-032 |
| 3. | 120 W power supply unit for mounting rail assembly (input: 100-240 V AC output: 24 V DC / 5.0 A) | 4024-050 |
| 4. | GMA200-BC terminals for GMA Bus connector | 2200200 |
| 5. | microSD card 2 GB | 3005-MSDC |
| 6. | Spare fuse T 500 mA (F1 for GMA200) 10 pack | 2200301 |
| 7. | Spare fuse M 1 A (F2 for transmitter supply) 10 pack | 2200302 |
| 8. | Flat ribbon cable for GMA200-MT/-RT (L=22 cm) | 2200309 |
| 9. | Terminal cover for GMA200-MT/-RT (9-hole) | 2200310 |

Technical data

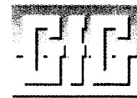
| Type designation: | GMA 200-MT6 | GMA 200-MT16 |
|---|--|---|
| Display & control elements | 2.2" graphical display and 5 buttons 15 status LEDs for alarms, operating and relay statuses | |
| Ambient conditions For storage: For operation: Site of installation : | -25..+60 °C 0..99 % RH (recommended 0...+30 °C) -20..+50 °C 0..99 % RH in a control cabinet or in a wall housing up to a height of 2,000 m above sea level | |
| Power supply Operational voltage: Power consumption: Fuses: | 24 V DC (20-30 V DC permissible) max. 5 W (without transmitter) max. 30 W (with transmitters) F1= T 500 mA (for GMA200) F2= M 1 A (for transmitter) | 24 V DC (20-30 V DC permissible) max. 5 W F1= T 500mA |
| Transmitter connections Supply: Analog signals IN: Digital signals TRM Bus 1+2: | 24 V DC (20-30 V DC see above) 6x 150 mA or I _{total} = 900 mA with other configuration 6x 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 | not possible 16x 4-20 mA or 0.2-1 mA |
| RS485 connections TRM Bus 1+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: | 8 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, 7&8 Double insulation between the relays: 2&3, 4&5, 6&7 | |
| Analog outputs OUT 1+2: | 4-20 mA (resistance max. 560 Ω) | |
| Alarm acknowledgement inputs Reset 1+2: | 0-3 V DC (alarm acknowledgement occurs at contact with GND; U _{MAX} = 30 V DC) | |
| USB connection | Mini USB port for device configuration via PC | |
| Housing Attachment: Protection class: Material: Weight: Dimensions: | on mounting rail TS35 according to DIN 60715 IP20 Plastic approximately 370 g 6.3780 x 3.8189 x 2.4409 inches / 162 x 97 x 62 mm (W x H x D) | |
| Connection cables Terminal blocks: Cable: | 0.8..2.5 mm ² cross section 2-4-wire 0.5-1.5 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 >10 m) | |
| Approvals/Tests Electromagnetic compatibility: Electrical safety: | EN 50270:2006 Emitted interference: Type class I Interference resistance: Type class II EN 61010:2010 Degree of soiling 2 Overvoltage category III for relay contacts | |

EG-Konformitätserklärung

GfG Gesellschaft für Gerätebau mbH

GMA200-MT6
GMA200-MT16

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Erstellt: 12.04.2013

Geändert:

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.

Die Gasmesscomputer der Serie **GMA200-MT** entsprechen 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

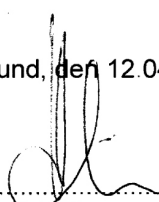
▪ Elektrische Sicherheit

- 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 222-000.20 sind zu beachten.

Dortmund, den 12.04.2013


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Dipl. Kfm. H.J. Hübner
Geschäftsführer

EG-Kon511Siebrecht



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