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# GMA 301

## Operation Manual

Part Number 7004-300

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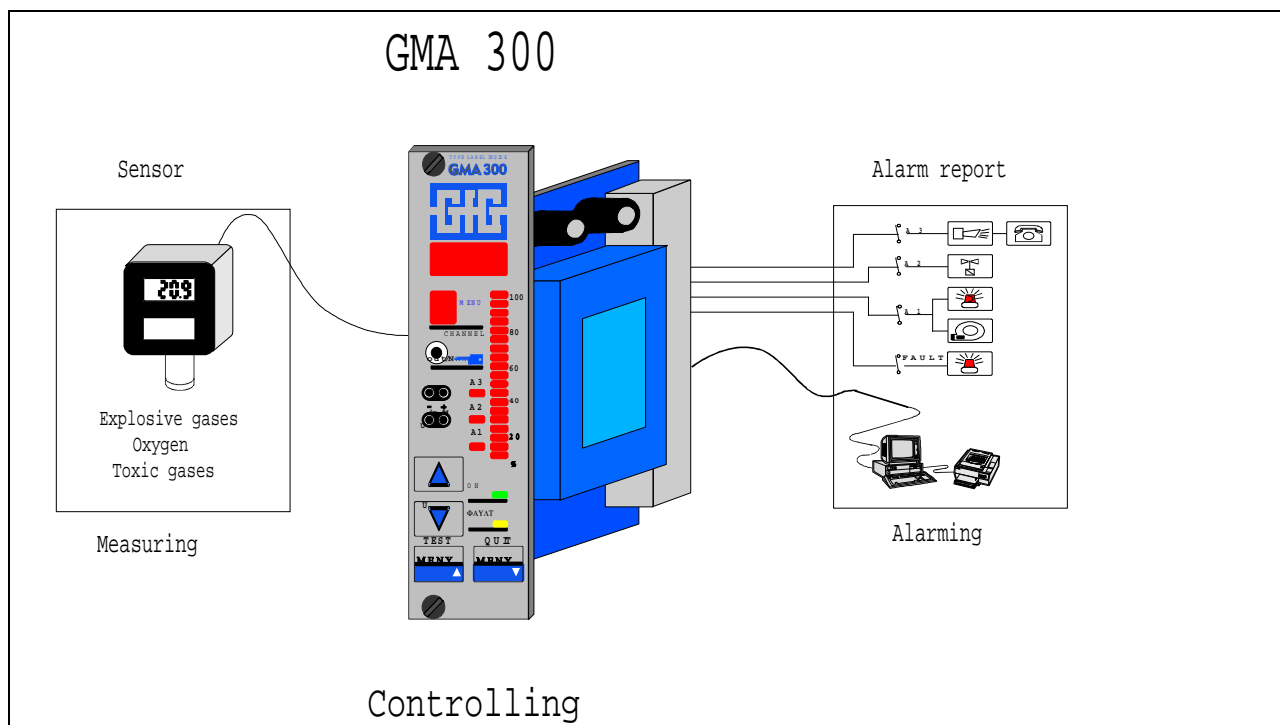
# Introduction

Each detection point of your fixed gas monitoring system consists of a transmitter and a control module GMA 301, which are connected by means of a transmitter cable. The GMA 301 provides the power supply for the connected transmitter and receives and processes the sensor signals. It monitors the ambient air for the presence of toxic or combustible gases and vapors or for its oxygen content.

The GMA 301 is a development from the GMA 100 and offers an additional variety of features, which allow to adapt the gas monitoring system to your specific requirements:

- Sensor signal filter and linearization.
- CAN Bus for data transfer to a computer.
- Alarm for rapid rise of the gas concentration, even before pre-set levels are exceeded.
- Variable setting of three gas alarm thresholds.
- Time delay for the alarms.
- Deactivation of alarms only when the relative threshold is deviated (alarm hysteresis).
- Relays for alarms and failure.
- Leveling of sensor signals to avoid false alarms.
- 4 - 20 mA analog output signal.

You can set all functions by just using the front keypad and the LED display.



The GMA 301 continuously provides information on the measured gas concentration, exceeded alarm thresholds and its operational status. As soon as the gas concentration exceeds one of the three pre-set levels, the GMA 301 gives a warning by means of the LED displays and controls the relative alarm relays. In addition to this, the GMA 301 provides all important data as an analog and digital output signal for further evaluation. The GMA 301 is easy to operate and maintenance-free. Should unexpected failures or system faults occur, the automatic failure recognition allows a quick and specific service.

## Application and Purpose

In combination with the connected transmitter, the GMA 301 forms a fixed gas monitoring system for continuous measurement of the gas concentration and for the warning from combustible gases and vapors in the LEL range, toxic gases and oxygen in the ambient air. The function and accuracy of the GMA 301 have been tested by "DMT-Gesellschaft für Forschung und Prüfung mbH, Fachstelle für Sicherheit - Prüfstelle für Grubenbewetterung" for the use as a warning system for hazards from combustible gas mixtures. The test was based on DIN EN 50054 "Electrical apparatus for finding and measuring combustible gases - General requirements and test methods" and DIN EN 50057 "Electrical apparatus for finding and measuring combustible gases - Requirements of the operational behavior of Group II devices with a detection range up to 100 % of the Lower Explosion Limit". The tests included the listed standard detection ranges in combination with transmitters type MWG 0238 EX and MWG 2432. The functions marked (#) have not been part of the function test.

### **The following standard ranges have been tested:**

MB-NR	Gas	Detection range
3	CH <sub>4</sub> Methane	0 .. 100 %LEL
4	C <sub>3</sub> H <sub>8</sub> Propane	0 .. 100 %LEL
6	C <sub>9</sub> H <sub>20</sub> n-Nonane	0 .. 100 %LEL
7	C <sub>2</sub> H <sub>5</sub> OH Ethanol	0 .. 100 %LEL

## For your Safety

Like any piece of complex equipment, the GfG GMA 301 will do the job designed to do only, if it is used and serviced in accordance with the manufacturer's instructions. This manual must be carefully read by all individuals who have or will have the responsibility for using and servicing this product.

The warranties made by GfG with respect to the product are voided, if the product is not used and serviced in accordance with the instructions in this manual. They are also voided, if function or parameter settings are effected without authorization from GfG. The above does not alter statements regarding warranties and conditions of sale and delivery offered by GfG.



### **Strictly note:**

For the set parameters of the supplied GMA 301 please refer to the test report. Changing functions or parameters may affect the certification. Please call for GfG to adapt your system to your specific requirements.

## Important for LEL Monitoring

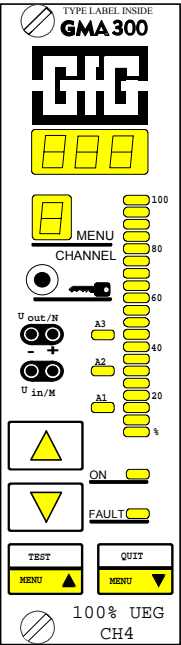
If you use catalytic combustion (CC) transmitters for LEL monitoring, and if a suitable range has been adjusted on your GMA 301 controller, please note the following: Due to the detection principle you cannot differ between sensor signals in the LEL range and signals for very high concentrations (e.g. > 20 Vol.% CH<sub>4</sub>). This is why the GMA 301 keeps an over range signal stored, even if the transmitter sends lower signals in the meantime. This status is characterized by all gas and failure alarms being activated and by the bar-graph and digital display indicating the over range situation (see pages 5)



**Do not press the QUIT button to reset the stored alarm status, before you have made sure that the gas concentration at the transmitter does no longer exceed the LEL range. Use a portable or fixed detector, for example, with a range from 0 to 100 Vol.-% to check.**

# Measuring Mode

During the measuring mode all important data are indicated by means of LED's.



The diagram shows the front panel of the GMA 300 device. At the top left, it says 'TYPE LABEL INSIDE' and 'GMA 300'. Below this is a large square display area. Underneath is a 3-digit LED display. To the right of the 3-digit display is a vertical bar graph with 100 segments, labeled 'CHANNEL' and 'MENU'. Below the bar graph are two sets of terminals: 'U<sub>out</sub>/N' with terminals A3 and A2, and 'U<sub>in</sub>/M' with terminal A1. Below these are two indicator lights: a yellow triangle pointing up labeled 'ON' and a yellow triangle pointing down labeled 'FAULT'. At the bottom are two buttons: 'TEST' with a yellow triangle pointing up, and 'QUIT' with a yellow triangle pointing down. Below the buttons, it says '100% UEG' and 'CH4'.

**Concentration Display**

- 3-digit display for measurement value.
- Blinks during alarm suppression and after switching the GMA on.

**Bar graph Display for Trends**

- The bar graph display is equivalent to the detection range.
- Blinks if full scale is exceeded by more than 5%.

**Analog Output (U<sub>N</sub>)**

- Output of measurement value as a voltage signal (0 .. 10V)  
(4 .. 20 mA analog output signal).

**Sensor Signal from transmitter (U<sub>M</sub>)**

- Non-linearized transmitter signal (0,2 .. 1V).

**Status Display**

- Lights during trouble-free measuring mode.
- Blinks if detection range is deviated by more than 5%.
- Blinks for CAN bus problems in data transmission.

**Fault Display**

- Blinks in case of failure and indicates the error.
- Lights during service mode.

**Gas Label**

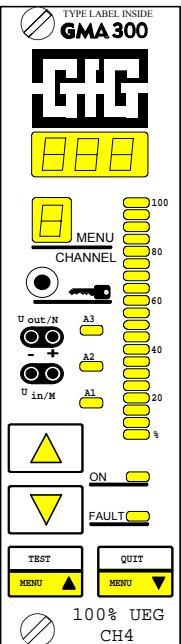
- Unit and type of gas.

**LED Test**

- Press the button to test all LED's. Blinking stands for proper functioning.

# Gas Alarm

The GMA 301 provides 3 alarm thresholds, which are variably adjustable over the whole detection range. Gas alarm is activated, if the measurement value exceeds (EX and TOX) or falls below (OX) a pre-set level.



**Alarm Indicators** ■ ■ ■

- Blink, if the pre-set alarm levels have been exceeded resp. fallen below.

**Alarm Reset**

- Press QUIT  
MENU ▼ to reset the alarm indicators and their relays. The relays react according to the relative display (see "Relays", page 13).

**In Standard Range the alarms react as follows:**

**Alarm 1** ■ ■

- Blinks for gas alarm.
- Lights during gas alarm after having been reset.
- Non-latching if the gas concentration has fallen below the alarm threshold, even if not being reset.

**Alarm 2** ■ ■

- Blinks for gas alarm.
- Lights during gas alarm after having been reset.
- Alarm status remains valid even if the gas concentration has fallen below the threshold.
- Can only be reset if the gas concentration has fallen below the alarm threshold.

**Alarm 3 (= buzzer relay)** ■ ■

- Blinks for gas alarm.
- Alarm status remains valid even if the gas concentration has fallen below the threshold.
- Goes out after reset, even if the alarm threshold is still exceeded.

## Switching On

After switching the system on, allow 1 to 5 minutes (depending on the detection range) for:

- the self-test, which checks all important functions (approx. 10 seconds),
- the warm-up time of the transmitter connected.

During the warm-up time all indications will blink. "Fault" is activated, and the alarms are de-activated. Once the warm-up is completed, the GMA 301 automatically returns to the measuring mode.

Should the GMA 301 be re-started after a mains failure, allow the same warm-up time as above. The alarm is only evaluated after the warm-up is completed.

## Check of Zero Point

1. Supply zero gas to the transmitter or make sure that the ambient air is free from interfering gases.
  - Please refer to the operation manual of your transmitter.
  - Zero gas is a test gas without any combustible or interfering components.
2. Wait until the display is stabilized.
3. Check the voltage signal  $U_M$ .
  - $U_M$  should be 0,2 V. Should you notice a deviation of more than  $\pm 15 \%$ , adjust the output signal of the transmitter first (refer to the operation manual of your transmitter).
4. Check the display at the GMA 301 controller. Should the display be different from "0", adjust the Zero Point (page 11).

## Check of Sensitivity

1. Go to the service mode by plugging in the black service key in (page 8). In the service mode the alarms are suppressed.
2. Put the calibration adapter on the transmitter.
3. Supply standard test gas to the transmitter.
  - (For details please see the operation manual of your transmitter.)
4. Check the display at the GMA 301 controller. Should the display be different from your test gas concentration, recalibrate the system (page 11).
5. Remove the service key.

**Note:** You do not have to go to the service mode to check the sensitivity. Be aware, however, that the alarms are activated when you supply test gas to the transmitter.

## Cleaning

Use a soft, damp cloth to clean the faceplate with the indicator elements.

## Maintenance

The function test must be done before putting into operation and at least once a year and checks:

- the Zero Point and the sensitivity (calibration),
- the response time,
- the activation of alarms,
- the fault signal.

This test has to be done by an expert, and a written test result must be filed.

## Service and Inspection

Maintenance and inspection describe those measures which retain the nominal status of the gas warning system. They include a regular check and adjustment of sensitivity and Zero Point. In addition to this, the working order of the system is to be checked as well. Inspection intervals should not exceed 16 weeks.

Regular maintenance should be done by GfG or by a GfG authorized trained professional.

## Service Mode

In the service mode you can select and change all important parameters of your GMA 301. Plug the black service key in to activate the service mode.

## Service Keys



You need a service key to select and change the parameters.

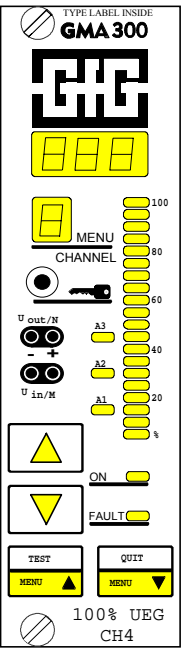
Service key:

**BLACK**

Customer's key

The GMA 301 is always supplied with the customer's key (black).

## Display in Service Mode



The diagram shows the GMA 301 display panel with the following components:

- TYPE LABEL INSIDE GMA 300** and the **GfG** logo.
- A **3-digit LED display**.
- A **MENU CHANNEL** indicator with a scale from 0 to 100.
- A **key symbol** indicating the service key position.
- Two sets of terminals: **U<sub>out</sub>/N** (A3, A2) and **U<sub>in</sub>/M** (A1).
- An **ON** indicator.
- An **FAULT** indicator.
- TEST** and **QUIT** buttons, each with a **MENU** label and a directional arrow.
- Bottom text: **100% UEG CH4**.

**Parameter Display**

- Indicates the presently selected parameter value.

**Bar graph Display**

- Indicates the percentage of the adjustable parameter value.

**Menu Display**

- Indicates the menu point of the displayed parameter value.

**Service Lock**

- For changing to the service mode.

**LED "FAULT"**








- Lights during service mode, failure activated.

**Changing parameters**

**Selection of menu points resp. storing the new parameters**

## Selecting and Changing of Parameters



	Action	Buttons	Display	Note
1.	Change to service mode	 Plug service key in service lock	LED "FAULT" lights	Alarm relays retain their positions Failure is activated
2.	Select menu point	 and 	Menu point indication	(page 9 ff)
3.	Set new parameter	 and 	Parameter indication	(page 9 ff)
4.	Store parameter.	 +  simultaneously	"STO" (Store) in parameter display	All changed parameters keep their old value unless they are stored
5.	Return to measuring mode	Remove service key from service lock	As in measuring mode	The GMA 301 returns automatically to the measuring mode








Storing saves **ALL** changed parameters - even those which were changed in previous menu points. Should you have changed a parameter by mistake, you should remove the service key from the service lock to give all parameters their initial values.

## Functions and Adjustments






### Unit of Gas

The indication shows the unit of the gas concentration.

Key		Menu	Parameter	Standard adjustment
BLACK		 	(cannot be changed)	
Unit of gas		 	---, ppm, Vol%, %UEG, ppb, $\mu\text{g}/\text{m}^3$	Specific for detection range





### Type of Gas

The type of gas is indicated either as a chemical formula or as an abbreviation. Abbreviations which cannot be displayed, are indicated as a figure from the GfG Gas List.

Key		Menu	Parameter	Standard adjustment
BLACK		 	(cannot be changed)	
Type of gas		 	(GfG Gas List, page 15)	Specific for detection range

## Full Scale

The display reads the full scale value, which is equivalent to the full scale input signal,  
e.g. 1 mA resp. 20 mA → Display 100.









Key 	Menu	Parameter (cannot be changed)	Standard adjustment
BLACK	 		
Full scale		1 .. 999	Specific for detection range

## Alarm Thresholds

The alarm thresholds are those levels, which are pre-set at the GMA 301 controller and which activate the warning in case they are exceeded or fallen below. The alarm thresholds can be variably adjusted over the whole detection range. According to its adjustment, every threshold controls a relay, which can be used for external alarm devices.



Adhere to the regulations for your specific monitoring site before changing the alarm thresholds.

Key 	Menu	Parameter	Standard adjustment
BLACK	 	 	
Alarm threshold 1		within detection range	Specific for detection range
Alarm threshold 2		within detection range	Specific for detection range
Alarm threshold 3		within detection range	Specific for detection range

## Standard Calibration

The standard calibration is used to adapt the detection range of the GMA 301 controller exactly to the input signal (fig. 1). Both the Zero Point and the sensitivity are adjusted.

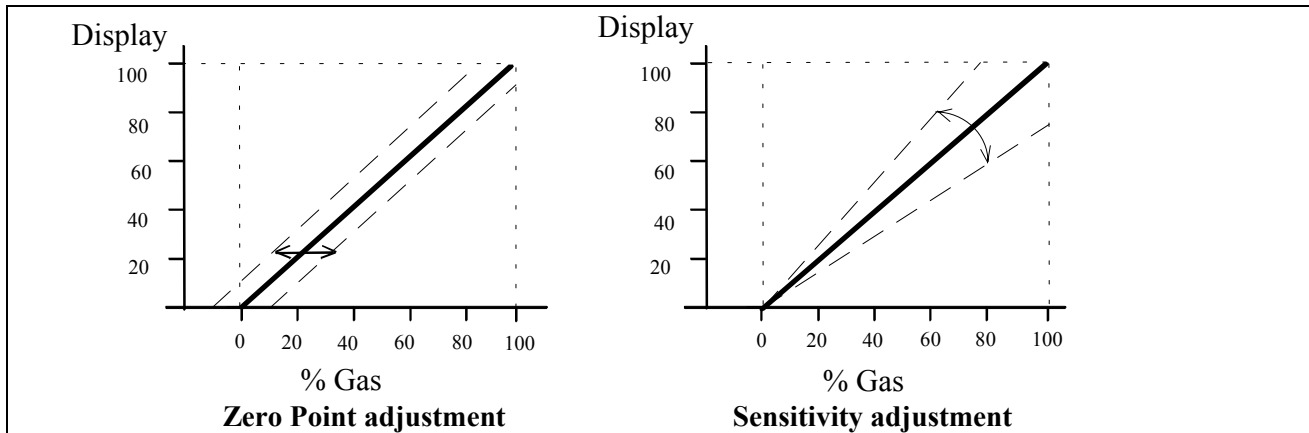
















Fig. 1







If possible, the adjustment should be done at the transmitter first, and then at the GMA 301. Please also refer to the operation manual of the connected transmitter.

### Zero Point Adjustment

1. Go to the service mode by plugging the service key into the service lock (page 8).
2. Supply zero gas to the transmitter or make sure that the ambient air is free from interfering gases.
  - Zero gas is a test gas without any combustible or interfering components.
  - For details please refer to the operation manual of your transmitter.
3. Wait until the display is stabilized.
4. Press  and  to select menu point "  ".
5. Use  and  to set the parameter value to 0.
6. Press  +  simultaneously to store the parameter value.
7. Leave the service mode.

### Sensitivity Adjustment:

1. Make sure that the Zero Point has been adjusted first.
2. Put the calibration adapter on the transmitter.
3. Go to the service mode by plugging the service key into the service lock (page 8).
4. Supply standard test gas to the transmitter.
  - For details refer to the operation manual of your transmitter.
5. Wait until the display is stabilized.
6. Press  and  to select menu point "  ".
7. Use  and  to set the parameter value to the concentration of your standard test gas.
8. Press  +  simultaneously to store the parameter value.
9. Leave the service mode by removing service key.

Key 	Menu 	Parameter  	Standard adjustment
BLACK		within detection range	0
Zero Point adjustment		within detection range	(pre-calibrated)

## DIP Switches

You can read the position of the 16 DIP switches without pulling the controller off the rack. In the Standard Range the number is displayed. In the Special Range the display reads "SPE". The bargraph display shows the position of the DIP switches (fig. 2). A lit LED means that the respective DIP switch is in position "ON".

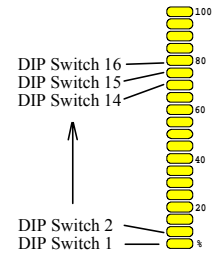















Fig. 2

Key 	Menu	Parameter (*2)	Standard adjustment				
BLACK	<table border="1"> <tr> <td>TEST</td> <td>QUIT</td> </tr> <tr> <td>MENU ▲</td> <td>MENU ▼</td> </tr> </table>	TEST	QUIT	MENU ▲	MENU ▼	is only displayed	
TEST	QUIT						
MENU ▲	MENU ▼						
DIP Switch	-	0 to 47 or SPE	acc. to gas				

(\*2) The parameter display reads alternating "DIP" and the parameter value.

## Summary of Parameter Settings

	Menu 	Parameter 	Standard adjustment	 Service key	Page
Unit of gas	 (*1)	--- , ppm, Vol%, %UEG (%LEL), ppb, $\mu\text{g}/\text{m}^3$	specific for range	display only	9
Type of gas	 (*1)	factory preset	specific for range	display only	9
Full scale of detection range		within range	specific for range	display only	10
Alarm threshold 1	 (*1)	within range	specific for range	display and adjustment	9
Alarm threshold 2	 (*1)	within range	specific for range	display and adjustment	
Alarm threshold 3	 (*1)	within range	specific for range	display and adjustment	
Zero Point adjustment		within range	0	display and adjustment	11
Sensitivity adjustment		within range	pre-calibrated	display and adjustment	
DIP Switches		DIP (+Number)	specific for range	display only	12

(\*1) in case of two menu points the menu display reads them alternating.

## Relays

The GMA 301 controller provides:

- three relays for controlling external alarm devices,
- one relay for fault signal.

The chart below shows the switching behavior of the relays in the Standard Range:

Relay for	in measuring mode	in case of gas alarm		after gas alarm		in case of mains failure	in case of fault	in case of gas and fault alarm
		not reset	reset	not reset	reset			
Alarm 1	off	on	on	off	off	off	off	on
Alarm 2	off	on	on	on	off	off	off	on
Alarm 3	off	on	off	on	off	off	off	on
Fault	on	on	on	on	on	off	off	off

Chart 1 - Relay circuit



Always take the switching behavior of the relays into consideration when connecting external devices. In all Standard Ranges, relay 3 can be reset even during a gas alarm and is to be used, therefore, as a buzzer relay only.

## Effect of Interfering Gases and Oxygen

Interfering gases, excess or deficiency of oxygen may affect the transmitter. Please see the operation manual of your transmitter.

## Instructions for Installation and Putting into Operation

The GMA 301 controller must not be installed in hazardous areas. The transmitters and the mains supply are connected to the GMA 301 motherboard (back panel) according to the terminal diagram 147-200.10 (page 15). Make sure that the shield of the transmitter cable is already grounded in the cable gland. Inside the wall mount casing respectively the cabinet the sensor cable should be laid separately from other control and mains cable. In case the cable shield cannot be grounded in a cable gland (e.g. in a cabinet), the shield is to be grounded directly behind its entry into the cabinet. The mains supply for the GMA 301 is generally to be fed over a mains filter (e.g. FN 610). This filter should also be mounted and grounded close to the cable entry. The GMA 301 controller is grounded over the motherboard and the conductive rack bars. The rack, therefore, must be grounded to the casing.

Once the GMA 301 is mounted into a casing, all transmitters, control groups and the mains supply are connected, an expert can put the system into operation. In case you use the CAN interface for further data processing, make sure that different CAN Network addresses have been set for each controller.

For installation and putting into operation of the transmitters please see the operation manual of your sensor. Only experts are authorized to put the transmitters into operation.

## Transmitter Cable

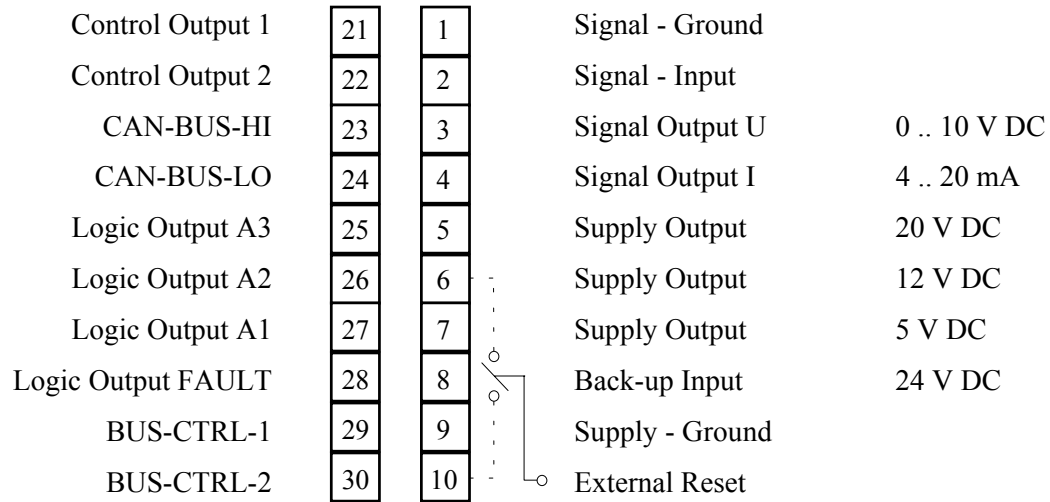
The GMA 301 controller and the transmitter are connected by means of a shielded transmitter (data) cable (LIYCY). The cross section of the cable cores depends on the current consumption of the transmitter and on the cable length. For detailed information please refer to the operation manual of your transmitter.

## Using the GMA 301 CAN Bus Interface <sup>(#)</sup>

The transmission of measurement values and alarms over the CAN bus is effected by means of GfG specific GMA Monitor Program. This Monitor Program allows online indication, storing and printing of measurement values and alarms. To inter-link the GMA 301 controllers and the computer you need a suitable data cable (e.g. Li2YCY(TP) 2x2x0.50) and a CAN communication card for the PC. Cable, communication card and software are available from GfG. The distance between the controllers and the computer depends on the transmission rate of the CAN bus. The standard setting at the controller is done for 115,2 kBit. The following distances are possible:

Transmission Rate	Transmission Distance
115,2 kBit	up to 200 m
57,6 kBit	up to 500 m
28,8 kBit	up to 1000 m

# Terminal Diagram for Motherboard



## Connection of transmitter cable to GMA 301 motherboard (back panel)

### 2-wire MWG connection

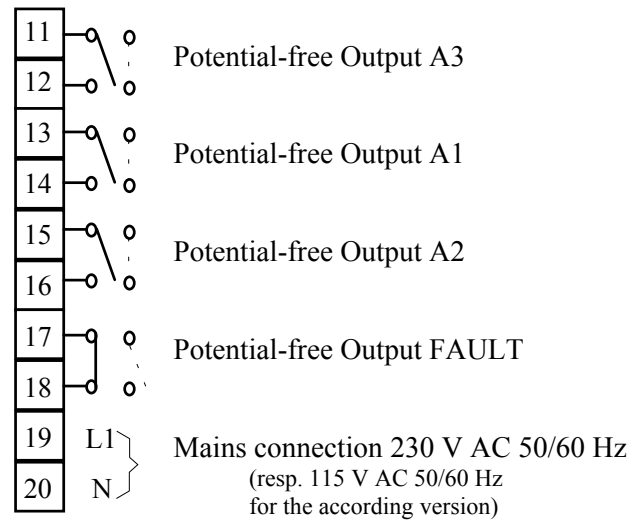
2	Signal	(4 - 20 mA)
5	Supply	20 V DC

### 3-wire MWG connection

1	Ground	
2	Signal	
5	Supply	20 V DC

### 4-wire MWG connection

1	Signal-Ground	
2	Signal-Input	
5	Supply	20 V DC
9	Supply-Ground	



## Trouble Shooting

Failure	Cause	Solution
LED "FAULT" blinks, display reads error code	- System fault, see chart 2	- Re-start the system by pressing the key "QUIT" - Call GfG service
LED "FAULT" blinks	- System is warming up, alarm suppression is still active - Detection range is exceeded or deviated	- Allow completion of warm-up time - Adjust the Zero Point - Calibrate the system
"FAULT" lights up	- Service key is in service lock	- Remove service key
LED "ON" blinks	- Detection range is deviated - CAN bus problem	- Check the Zero Point - Calibrate the system
Bar graph display blinks	- Detection range is exceeded	- Calibrate the system - (no activity required in case of gas presence)
LED's do not light	- Voltage supply has failed Fuse or mains supply circuit is faulty	- Make sure that voltage supply is operating
Measuring signal without gas	- Faulty calibration, faulty Zero Point adjustment	- Calibrate the system - Adjust the Zero Point
LED "ON" + Bar graph display + Digital display blink	- Transmitter is warming up	- no activity required
<div style="border: 1px solid black; display: inline-block; padding: 2px;">- - -</div> in display	- Display over range (> 999) - ADC-Over range	- Make sure that the sensor is not exposed to gas, then reset measurement value memory
	- Over range of stored detection range	
<div style="border: 1px solid black; display: inline-block; padding: 2px;">- - -</div> in display	- Display deviation (< -99) - ADC-Range deviation	- Check calibration of transmitter and GMA 301 controller
	- Cable cut	- Check cable

**Chart 2 - Trouble Shooting**



## Error Report

The GMA 301 recognizes most operational failures and indicates their reason as an "Error Code" in the display. At the same time the yellow LED "FAULT" blinks.

Error Code	Cause	Reason
001	DIP switch	- DIP switches are not adjusted correctly
011	RAM	- Incorrect reading or writing of information during the RAM test
012	EPROM	- Faulty program memory
021	EEPROM	- Incorrect writing of hardware parameter
023	EEPROM	- Incorrect reading of parameter from the standard range
024	EEPROM	- Incorrect writing of parameter from the standard range
025	EEPROM	- Incorrect reading of parameter from special range
026	EEPROM	- Incorrect writing of parameter from special range
031	ADU	- Faulty input channels
041	DAU	- Analog output is not calibrated - Analog output is operated on too high load - Defective hardware at GMA controller
051	Calibration	- A transmitter is connected to the analog output - Hardware failure in the test sockets - Incorrect position of plug bridges - Analog output not calibrated
052	Calibration	- (as Error 051).
053	Calibration	- Analog input channel does not work properly
054	Calibration	- Gas monitoring system could not be calibrated

**Chart 3 - Error Code List**

## Accessories

<b>Casings:</b>	Different sizes of panel mount or wall mount casings are available for sliding in different quantities of control modules
<b>Relay Module (#):</b> P# 2130201	This module plugs on the motherboard (back panel) and groups the logic outputs of several control modules for a collective gas or fault alarm
<b>Key-operated switch Module (#):</b> P# 2105004	This module allows to control a collective alarm. In addition to this, it provides the possibility of alarm suppression, e.g. during service or maintenance. You just have to make sure that the alarm devices are connected to the relays of the key-operated switch module.
<b>Battery back-up (#):</b> Call GfG	The gas monitoring system GMA 301 is optionally available with a battery back-up.

(#) These components have not been part of the function test according to EN 50054 and 50057.

Storage conditions for accessories are mentioned under "Technical Data".

## Spare Parts

Description	Part Nr.
GMA 301 Primary fuse for controller 230 V                      80 mA T	2131306
GMA 301 Primary fuse for controller 115 V                      160 mA T	2131307
GMA 301 Secondary fuse    500 mA T	2131308
GMA 301 Driver p.c. board with display and screws	2131305
GMA 301 Main p.c. board	2131301
GMA 301 EPROM	2131450
GMA 301 Face plate with keypad and screws	2131303

Storage conditions for spare parts are mentioned under "Technical Data".

# Technical Data

## Control Module GMA 301

Type: Slide-in module for 19" rack  
Dimensions: Height: 129 mm, Width: 35,2 mm, Depth 160 mm

## Power Supply

Operational Voltage: 1. 230 V / 50Hz or 115 V / 60 Hz \*<sup>1</sup>  
2. 24 V DC (U<sub>in</sub>)  
Power Consumption: max. 13 W for 230 V and 115 V  
max. 11 W for 24 V DC  
Primary fuse: T 0,08 A (for 230 V), T 0,16 A (for 115 V)\*<sup>1</sup> G-Fuse  
Secondary fuse: T 0,50 A TR5 - Fuse (\*<sup>1</sup> not tested by VDE)

## Climate Conditions

for operation: -10 .. +55 °C, 0 .. 99 % r. h., 700 .. 1300 hPa

## Recommended Storage Conditions

for GMA 301/Accessories/Spares: 0 .. 30 °C, 20 .. 80 % r. h.

## Transmitter Connection

Transmitter Connection: 2-, 3- or 4-wire transmitter  
Power Supply Output: 20 V DC max. 250 mA  
Input Signals: 0 .. 30 (90) mA  
0 .. 1,5 (4,5) mA  
0 .. 1,5 (4,5) V

## Outputs

### Analog Output for Measurement

Value: 0 .. 10 V max. load 10 mA (1k $\Omega$ )  
4 .. 20 mA max. load 300  $\Omega$

Digital Outputs (#): CAN-Bus with ISO / DIS 11898 - Interface

Relay Outputs (#): max. switch voltage 250 V AC 50/60 Hz or 250 V DC  
max. switch current 4 A AC/DC  
max. switch power 1000 VA AC or depending on voltage  
50 .. 200 W DC  
Relay outputs and mains connection are operation insulated

Logic Outputs (#): 4 open collector outputs - FAULT, A1, A2, A3  
operation allowed on low safety voltage only  
max. switch voltage 30 V  
max. switch current 100 mA

External Reset: high active 3 .. 24 V DC (input resistance 11 k $\Omega$ )

Service Lock (front): Access rights for menu selection and parameter adjustment.

Test Sockets (front): Transmitter Signal 0 .. 1,00 V.  
Standardized Output Signal 0 .. 10,0 V.

Connectors: DIN 41612 form F

## Safety

Protection: DIN 40050 - IP30 (controller in 19" rack)  
DIN 40050 - IP00 (individual controller)  
Protective Separation: by means of safety transformer  
type: KLF-EN 14VA PRI 2x115V / SEC 2x18V 50-60Hz  
Protective Insulation: acc. to EN 61010 up to over-voltage category III and soiling degree 2  
Safety Certificate: VDE Report-Nr. 87918  
IBS/PFG-Nr. 41300596

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