Operation Manual

GMA81 / GMA81A

Controller for wall mounting

Content

Introduction

Each detection point of your fixed gas monitoring system consists of a transmitter and a control module GMA81, which are connected by means of a remote sensor cable. The GMA81 provides the power supply for the connected transmitter and receives and processes the sensor signals. Depending on the transmitter type, it monitors the ambient air for the presence of toxic or combustible gases and vapors or for its oxygen content.

The GMA81 offers a variety of features, which allow adapting the gas monitoring system to your specific requirements:

- Reading of linear measurement values in a 3-digit display
- Menu display
- 3 variably adjustable alarm thresholds
- Peak value memory
- Adjustable relay functions: NC / NO contact, open-circuit / closed circuit
- Alarm hysteresis prevents "flickering" of relays
- 4 - 20 mA analog output signal.

The GMA81 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 GMA81 gives a warning by means of the LED displays and controls the relevant alarm relays. In addition to this, the GMA81 provides the measurement value as an analog output signal for further evaluation. The GMA81 is easy to operate and maintenance-free. Should unexpected failures or system faults occur, the comprehensive failure recognition allows a quick and specific service.

For your Safety

According to § 3 of the law about technical working media, this manual points out the proper use of the product and serves to prevent dangers. As any piece of complex equipment, the GfG GMA81 will do the job designed to do, only, if it is used and serviced in accordance with the manufacturer's instructions. 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 voided, if the adjustment of functions or parameters is changed without GfG's permission. They are also voided, if the product is not used and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following them. The above does not alter statements regarding GfG's warranties and conditions of sale and delivery.

> ⚠ **Essential Notice:**
> For the parameter setting of the supplied GMA81 please refer to the test report. Modification of functions or parameters may result in deletion of the type test approval. GfG service is always at your disposal for adapting the monitoring system to your specific requirements.

Application and Purpose

In combination with the connected transmitter, the GMA81 forms a fixed gas monitoring system for continuous measurement of the gas concentration and for the warning from combustible gases and vapors in the range below the LEL, toxic gases in ambient air and oxygen.

The type examination of the GMA81 was done by „DEKRA-EXAM" for the use as warning of explosible gas mixtures. This examination was based on the standard DIN EN 60079-29-1 "Gas detection instruments – General requirements for the operational behavior of devices for the detection of combustible gases" " and DIN EN 50271 "Electrical devices for detection and

measurement of combustible gases, toxic gases or oxygen – Requirements and testing for warning instruments using software and/or digital technology".

The test refers to the combination of the GMA81 with any tested 4 – 20 mA or 0.2 – 1 mA transmitter with linear output signal.

In addition to this the GMA81 was tested in combination with the following transmitters with non-linear output signal for the range 0 – 100 %LEL (see also page 6):

MWG CC 24 EX (type MWG 243x II) for the gases methane and propane
MWG 0238 for the gases methane, propane, nonane und ethanol.

The functions marked $^{(\#)}$ have not been part of the type examination.

Type approval: PFG-Nr. 41300600

With connected Ex-transmitters (for detection in explosion endangered areas), the GMA81 is subject to the regulation 94/9/EG (ATEX 100a) as „Safety, Monitor and Control Device" outside of explosion endangered areas and will be labelled, therefore, as follows:

⚭ II (2)G ⊈ 0158

BVS 03 ATEX G 006 X

The EC type approval is based on the type approval PFG-Nr. 41300600. It does not include the operation with the transmitters MWG 0238.

The model GMA 81 A provides an additional built-in buzzer and an alarm light. This operation manual uses the name „GMA 81" for both models.

Monitoring of Combustible Gases in the range 0 – 100 % LEL

The lower explosion limits are to be used according to the national regulations. In Germany the values fixed in the data base CHEMSAFE of DECHEMA e.V. in Frankfurt a.M. are valid.

If you use catalytic combustion (CC) transmitters for monitoring combustible gases below the LEL, and if a suitable detection range 0…100 % LEL has been adjusted on your controller, please note the following: Due to the detection principle you cannot differ between sensor signals within the detection range and signals for very high concentrations (e.g. >20Vol% CH4). This is why the GMA81 keeps an overrange 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 display indicating the overrange situation (see page 8).

> ⚠ **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.**
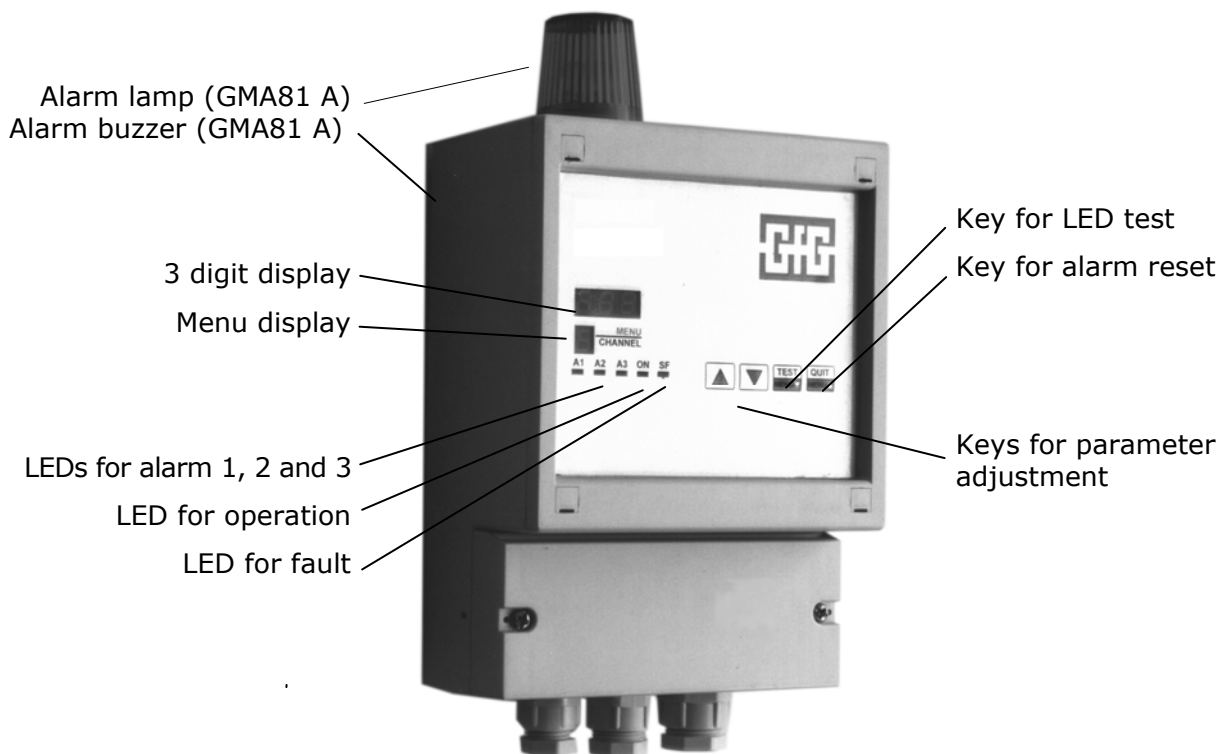
Detection Mode

Front View GMA81

Alarm lamp (GMA81 A)
Alarm buzzer (GMA81 A)

3 digit display
Menu display

LEDs for alarm 1, 2 and 3
LED for operation
LED for fault

Key for LED test
Key for alarm reset

Keys for parameter adjustment

Fig. 1

Function Description

Turning On

Note: Information for initial putting into operation, see page 17!

After having turned the system on, the GMA 81 needs a warm-up time of a few minutes for:
- the self test, which checks functions, memory (ROM and RAM) and parameter memory (approx. 10 seconds),
- the warm-up of the transmitter connected
  (for detailed information please refer to the operation manual for your transmitter).

During the warm-up period the GMA81 displays the detection range, the detection unit, measurement gas and the alarm thresholds one after the other. The LED „**ON**" flashes alternately with the measurement display and the LED „**S F**" lis lit, i.e. the fault alarm is active. Alarm thresholds are not activated during the warm-up period. When the GMA81 re-starts after a mains failure, the gas alarms are only evaluated, once the warm-up is completed. After the warm-up the GMA41 automatically turns to detection mode.

Detection Mode

In detection mode, the green LED „**ON**" is lit. If the 3 digit display is activated, it reads the currently measured gas concentration. All gases are measured continuously, and exceeded limit values are noticed and signalized immediately. Electronic functions like parameter memory and transmitters are monitored permanently and the transmitter cable is checked for short circuit and parting of the cable.

When operating transmitters with a standard output 4..20 mA or 0.2..1 mA and linear output signal, the following display values of the transmission curve "standard" occur.
The transmitters MWG CC 24 EX (type MWG 243x II) and MWG 0238 are covered by a type examination for the gases methane and propane as well as nonane and ethanol (see table Standard Detection Ranges).

The following standard detection ranges have been tested:

Gas	Formula	Detection range	MWG CC 24 EX Ex and Function	MWG 0238 Function only
Methane	CH_4	0 – 100 %LEL	Curve Methane	Set at GMA81
Propane	C_3H_8	0 – 100 %LEL	Curve Propane	Set at GMA81
n-Nonane	C_9H_{20}	0 – 100 %LEL	linear	Set at GMA81
Ethanol	C_2H_5OH	0 – 100 %LEL	linear	Set at GMA81

Transmission characteristics of transmitters which have been tested during the type examination

Input signal		Display in % LEL		
Current		linear transmitters	Linearisation for MWG CC 24 EX	
0.2 – 1.0 mA	4 – 20 mA	Standard	Methane	Propane
0.20	4.0	0	0	0
0.24	4.8	5	9	5
0.28	5.6	10	18	9
0.32	6.4	15	25	14
0.36	7.2	20	31	19
0.40	8.0	25	36	24
0.44	8.8	30	41	29
0.48	9.6	35	46	34
0.52	10.4	40	50	38
0.56	11.2	45	54	43
0.60	12.0	50	58	48
0.64	12.8	55	62	53
0.68	13.6	60	66	58
0.72	14.4	65	70	63
0.76	15.2	70	74	69
0.80	16.0	75	79	74
0.84	16.8	80	83	79
0.88	17.6	85	87	84
0.92	18.4	90	91	89
0.96	19.2	95	96	95
1.00	20.0	100	100	100

For transmitter MWG 0238 no transmission characteristics are shown, as for this type there is no durable reference to the input values. For re-adjustment the setting of the amplification is not done on the transmitter but on the GMA41.

Transmitter CC28 and the transmitters with electrochemical sensors, e.g. types EC28 or EC24 provide a linear output signal. For these transmitters the GMA 81 uses the transmission characteristic „Standard". As the only exception a linearisation is used for the electrochemical detection of oxygen with transmitters EC24 and EC25.

For transmitters with sensors using different detection principles, like infrared or chemosorption, there are specific adaptations of the signal curve. This refers to e.g. transmitters MWG IR24, MWG CS24, MWG CS21 and MWG CI21. The relevant transmission characteristics are shown in the operation manuals of these transmitters.

Please refer to the test report of the GMA to see the type of transmitter for which a transmission characteristic has been programmed in the GMA81. The transmission characteristic can only be changed by a GfG service engineer.

Peak Value Memory

The controller GMA81 provides a peak value memory. Depending on the gas measured by the connected transmitter it stores either the maximum or the minimum value.
The peak value memory is not activated during the warm-up time.

Gas	Peak Value Memory
Oxygen	Minimum value
Comb. Gases	Maximum value
Toxic gases	Maximum value

Press key $\triangle$ to indicate the peak value in the display. Measuring and warning functions are still working while the peak value is indicated. Press keys $\triangle$ and $\boxed{\text{QUIT} \atop \text{MENU▼}}$ simultaneously to reset the memory to the present measurement value. Once you release key $\triangle$, the controller returns to the standard display.

Check of Display and Parameter

⚠ **During these checks the measuring and warning functions are <u>not</u> activated!**

LED Test
In detection mode, press key $\boxed{\text{TEST} \atop \text{MENU▲}}$ shortly to activate the LED test of the GMA81 controller.

⚠ **Fault LED is not tested $\longrightarrow$ just in service menu!**

Display of Detection Range and Alarm Thresholds
Keep key $\boxed{\text{TEST} \atop \text{MENU▲}}$ pressed for approx. 5 seconds. The LED „**ON**" blinks and the display reads the below mentioned parameters one after the other:

	Display, e.g.	LED ON - blinks, additionally lit:	Description of Display
1	100		Detection range
2	LEL, ppm, ppb		Detection unit
3	CH4, NH3, O2 GfG-Gas No.		Gas
4	20 (value in det. range)	**A1**	1. Threshold alarm
5	40 (value in det. range)	**A2**	2. Threshold alarm
6	40 (value in det. range)	**A3**	3. Threshold alarm

Once these readings are complete, the GMA81 turns to detection mode automatically.

Alarm

The GMA81 provides 3 threshold alarms, which are activated as soon as the gas concentration exceeds or falls below the alarm threshold. An activated alarm is indicated by means of the relevant alarm LED. By pressing the key $\boxed{\text{QUIT} \atop \text{MENU▼}}$ or releasing the external acknowledgement (see terminal diagram of BUS board GMA81 and technical data) an activated alarm can be acknowledged.

Alarm	Relevant Alarm LED
has been activated	flashes
has been activated and acknowledged by pressing key `QUIT MENU▼`	lights permanently

Together with the alarm LEDs the GMA81 activates the relevant alarm relay. The model GMA81 A triggers an additional audible and visual alarm by means of the built-in buzzer and alarm lamp. The standard setting for the switching functions is shown below:

Alarm	Function	Resettable during Alarm	Resettable after Alarm	GMA81 A Alarm Lamp / Buzzer	Remark
1	Non-latching	no	self resetting	flashes / -	
2	Latching	no	yes	lights / -	
3	Latching	yes	yes	- / sounds	Threshold as for alarm 2

Overrange

In case the detection range is exceeded by more than 10 %, the GMA81 activates the fault indication in addition to the 3 gas alarms. The display reads ⌐ ‾ ‾ ‾ ⌐. When operating transmitters for the monitoring of 0..100%LEL, all alarms and the fault indication are latching, i.e. the overrange can only be reset by pressing key `QUIT MENU▼`, when the gas concentration has fallen below the full scale value.

> ⚠ **Please notice**:
> **"Monitoring of Combustible Gases in the Range 0-100 % LEL", page 4**

You can set the switching functions of the three alarms individually. For other settings than the standard one please refer to the test report.

Remarks concerning Alarm Functions:

Exceeding / Deviating Alarm
If the reduction of the measured gas concentration means a hazardous situation, e.g. oxygen deficiency, the alarm is a deviating one. Exceeding alarms indicate a dangerous situation caused by rising gas concentrations, e.g. toxic and combustible gases.

Latching / Non-latching Alarm
A latching alarm remains valid until it is reset externally, e.g. by pressing key `QUIT MENU▼` at the GMA81. A non-latching alarm resets automatically, when the gas concentration falls below or exceeds the preset threshold.

Early Recognition of Gas Alarm – Delta Alarm (Catalytic Combustion Transmitter)

This function is standard available only for the use of catalytic combustion transmitters. Should you wish to activate this function for other transmitters as well, please call your GfG service.

The delta alarm is meant for early recognizing of hazards caused by sudden gas concentrations. The alarm activation is defined by the rise of gas concentration within a certain time. As soon as the gas concentration rises by 25 % of the full scale deflection within 1.6 seconds (see fig. 2), the GMA81 indicates **overrange**.

> ⚠ **Please notice**:
> **"Monitoring of Combustible Gases in the Range 0-100 % LEL", page 4**

For the activation of the delta alarm the gas concentration does not need to reach the pre-set alarm threshold. The Delta Alarm is an additional warning to the three thresholds for alarm 1, alarm 2 and alarm 3, which keep their standard functions.
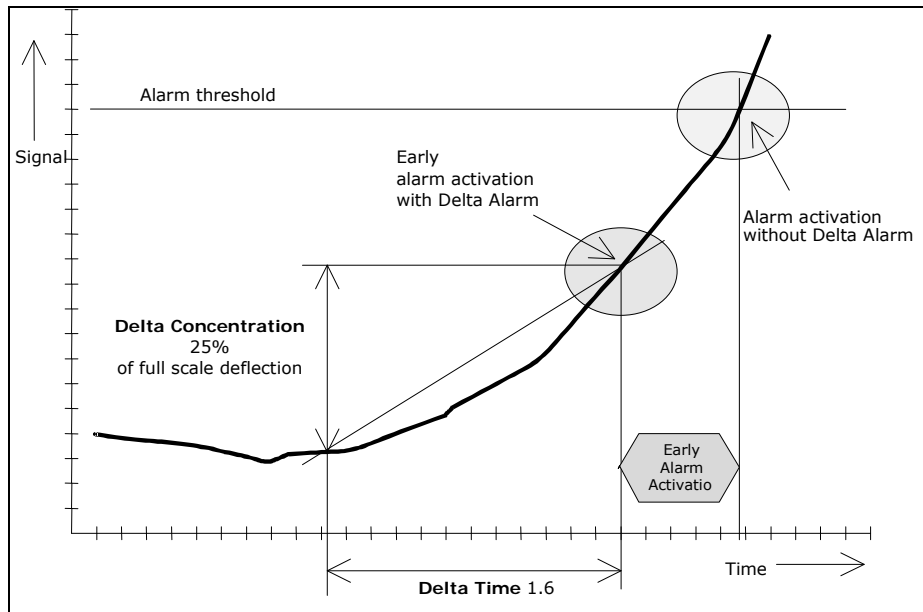
Fig. 2

Time Delay of Alarms (#)

This function, which is not activated in the standard setting, allows for delaying of the activation of the alarm (fig. 3). Should you wish to activate this function, please call your GfG service.
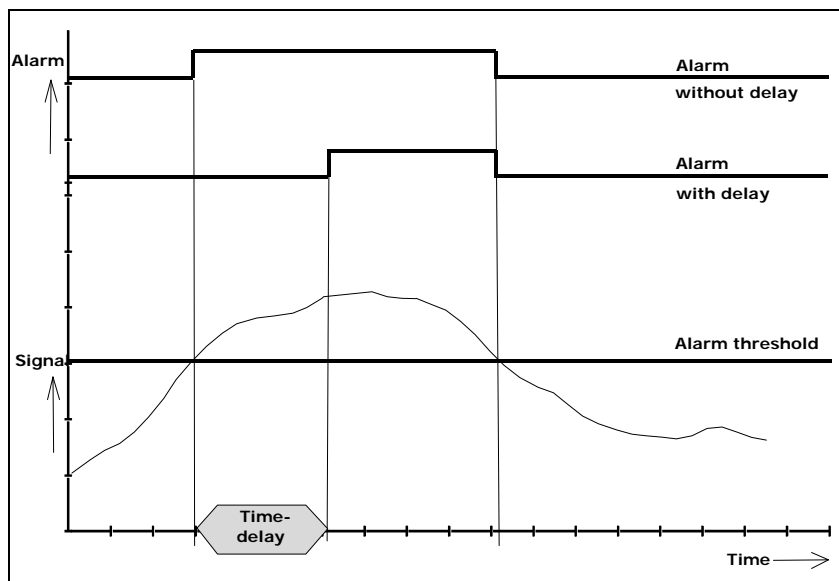
Fig. 3

The time delay prevents a warning from gas concentrations only exceeding the threshold for a very short time. It can be set from 0 to 2 minutes. For safety reasons the time delay should be kept as short as possible, and must not be activated in case of time-critical monitoring tasks.

Fault

In case of failure the yellow LED „**S F**" lights up and the fault relay is activated. A fault is signalized:

- if the cable between MWG and GMA81 is cut;
- if the sensor or the circuit of the transmitter is faulty;
- if the zeropoint is deviated;
- if the detection range is exceeded (together with alarm activation);
- if the CPU self monitoring is faulty.
- if the CPU self monitoring is faulty.

As soon as the fault is repaired, the yellow LED "**S F**" goes out, the fault relay deactivates and the GMA81 returns to standard detection mode.

Relays

The GMA81 provides 4 relays:

- 3 alarm relays for controlling external alarm devices,
- 1 fault relay for signalizing of failures.

The switching behavior of the relays is the same as for alarm or fault signals. Every relay can be operated as NC or NO contact in closed or open circuit systems. In the standard setting all 4 relays are NO contacts. The alarm relays are operated as open circuit system; the fault relay is a closed circuit. This results in the below mentioned switching functions:

In the standard setting the switching functions of the relays are as follows:

| Relay for:	The relay switches:						
	in detection mode (no gas)	during gas alarm not reset / reset		after gas alarm not reset / reset		in case of mains failure	in case of failure	in case of gas alarm and failure
Alarm 1	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]
Alarm 2	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]
Alarm 3	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]
Fault	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]	[switch diagram]

> ⚠ **It is essential to take note of the switching behavior of the relays when connecting external devices. In the standard setting alarm 3 (buzzer relay) can be reset even during gas alarm!**

For special settings of the relay switching functions please contact your GfG service.

Service

Display of Transmitter Signal

Press key ▽ and after approx. 2 seconds the GMA81 displays the signal received from the transmitter in mA (0.2 .. 1 mA for transmitters with 0.2-1 mA output and 4 .. 20 mA for transmitters with 4-20 mA output). This function allows for checking of the zero point of the transmitter at the GMA81 (see page 13).

Indication of Transmitter in Service Mode

⚠ **This function is only available for CC24 EX (type 243x II), CS24 EX and EC25, CC28 and EC28.**

The transmitters CC24 EX, CS24 EX, EC25 provide a service switch. When this is activated during maintenance (see operation manual for the transmitter), the GMA81 automatically turns to fault indication. Alarm signals are being suppressed.

Activation of Service Menus

⚠ **The 4..20 mA voltage output continuously reads the actual measurement value!**

The service menus allow to select and to change all important parameters of the GMA81.

A security code protects the service menus A and B from accidental maladjustment and unauthorized access. Adhere to the following procedure to enter the service menus:

1. Press key ▧QUIT/MENU▼, then key ▧TEST/MENU▲ and keep both keys pressed, until „**SER**" is read in the display.
2. Use keys ▨△▨ and ▨▽▨ to enter the security code.

	Security Code	Adjustments
Menu A	**11**	Alarm thresholds and adjustment
Menu B	**222**	Deactivation points of alarm thresholds

3. Press key ▧QUIT/MENU▼ to confirm the entered security code.
   The GMA81 turns to the selected service menu
   or
   Press key ▧TEST/MENU▲ to return to detection mode.

In the service mode the gas alarms are locked. The GMA81 switches to fault. The LEDs "**ON**" and „**S F**" light up, the fault relay is activated. If in service mode you do not hit any key within 4 hours, the GMA81 returns to detection mode automatically. Any parameter changes will not be stored.

Adjustments in Service Mode

The display of the GMA81 reads the set parameters. The menu display indicates the menu point, where the displayed parameter value can be found. Use keys ▧TEST/MENU▲ and ▧QUIT/MENU▼ to scroll forward and back. For changing of parameters use keys ▨△▨ and ▨▽▨.

Survey of Menu Points

Menu [TEST MENU▲] [QUIT MENU▼]	Description	Display, e.g.	Parameter Setting
[0 1]	Detection unit	LEL, ppm	Display only
[0 2]	Gas	CH4, NH3, O2 or GfG-Gas No.	
[A 1]	Threshold Alarm 1	Value in detection range	Adjustment with [▲] and [▽]
[A 2]	Threshold Alarm 2	Value in detection range	
[A 3]	Threshold Alarm 3	Value in detection range	
[0]	Zeropoint adjustment	0	
[C]	Sensitivity adjustment	Value in detection range	

Menu B [TEST MENU▲] [QUIT MENU▼]	Description	Display, e.g.	Parameter Setting
[A 1]	Threshold Alarm 1	Value in detection range	Adjustment with [▲] and [▽]
[A 2]	Threshold Alarm 2	Value in detection range	
[A 3]	Threshold Alarm 3	Value in detection range	

Check of Relays and Logical Outputs

The display of the GMA 81 reads **"rL"**. The relays and logic outputs can be switched, one after the other, by pressing the keys [▲] and [▽] At the GMA81A the alarm lamp and the buzzer are activated as well. The relevant LEDs for alarm and fault indicate, which relay (and which logical output) was activated. When you set up this menu all alarms are deleted and afterwards newly set.

Setting of Alarm Thresholds

1. Activate service **menu A**.
2. Use keys [TEST MENU▲] and [QUIT MENU▼] to select menu point [A 1], [A 2] or [A 3] for the alarm threshold to be set.
3. Set the new alarm threshold by means of keys [▲] and [▽].
4. Store the parameters (see page 15).

Adjustable alarms	
Highest alarm	**Lowest alarm**
End of measurement range	Begin of measurement range + Hysteresis

It depends on the measurement task and on the transmitter, which adjustment of the lowest alarm threshold makes sense. When detecting combustible gases in the range 0 – 100 %LEL, no alarm should be set to less than 10 %LEL; for most applications the lowest alarm should not be set to less than 5 % of full scale.

Check and Adjustment of Zeropoint

1. Supply zero gas to the transmitter or make sure, that the ambient air is free from interfering gases. Zero gas is a test gas, which is free from combustible or any other interfering components. For details about the gas supply please refer to the operation manual of your transmitter.

2. Wait until the display value is stable. The zeropoint must be adjusted, if the display is different from "0".
   Use key $\boxed{\triangledown}$ to check the transmitter signal. An adjustment of the zeropoint is only possible, if the transmitter signal is within a tolerance band:
   For a transmitter with 0.2 ... 1 mA: Tolerance of 0.15 ... 0.34 mA
   For a transmitter with 4 ... 20 mA: Tolerance of 3 ... 6.8 mA
   (Depending on the transmitter, slightly different tolerances are possible.)

> ⚠ **If the transmitter signal is out of the tolerance band, the zeropoint has to be adjusted at the transmitter first! For details please read the operation manual of the transmitter!**

3. Activate service **menu A**.

4. Use keys $\boxed{\substack{\text{TEST}\\\text{MENU▲}}}$ and $\boxed{\substack{\text{QUIT}\\\text{MENU▼}}}$ to select menu point $\boxed{\Box}$.

5. Press $\boxed{\triangledown}$ key for 3 seconds to adjust the zero point
   The adjustment of the zero point was successful, when the value „0" is flashing in the display.
   If the display is not flashing, the transmitter signal is out of tolerance and has to be adjusted at the transmitter first. Please adhere to the operation manual of your transmitter.

6. Disconnect the zero gas from the transmitter. In case of transmitters for oxygen wait until the displayed gas concentration exceeds the threshold alarm.

7. Store the parameter.

After the zeropoint adjustment, the sensitivity needs to be checked and eventually adjusted.

Check and Adjustment of Sensitivity

Note: **Before checking the sensitivity, make sure that the zeropoint is set correctly.**

The GMA81 allows to check and adjust the sensitivity by means of the peak value memory. This memory is activating automatically, when the menu point $\boxed{\Box}$ is turned on for 2.5 minutes. The GMA81 indicates the activated peak memory by a flashing display.

Check and Adjustment of Sensitivity without Peak Memory

1. Activate service **menu A**.

2. Use keys $\boxed{\substack{\text{TEST}\\\text{MENU▲}}}$ and $\boxed{\substack{\text{QUIT}\\\text{MENU▼}}}$ to select menu point $\boxed{\Box}$.

3. Supply test gas to the transmitter. For details about the gas supply please refer to the operation manual of your transmitter.

4. Wait until the display value is stable. The sensitivity must be adjusted, if the displayed value is different from your test gas concentration.

5. Use keys $\boxed{\triangle}$ and $\boxed{\triangledown}$ to set the parameter value to the concentration of your test gas.

6. Disconnect the test gas supply from the transmitter. In case of transmitters for toxic or combustible gases wait until the displayed gas concentration falls below the threshold alarm.

7. Store the parameter.

Check and Adjustment of Sensitivity with Peak Memory

This adjustment uses the possibility of the GMA81 to store the peak signal value measured during the duration of the test gas supply. The store peak values can be used as sensitivity point. Fig. 4 below shows this procedure.
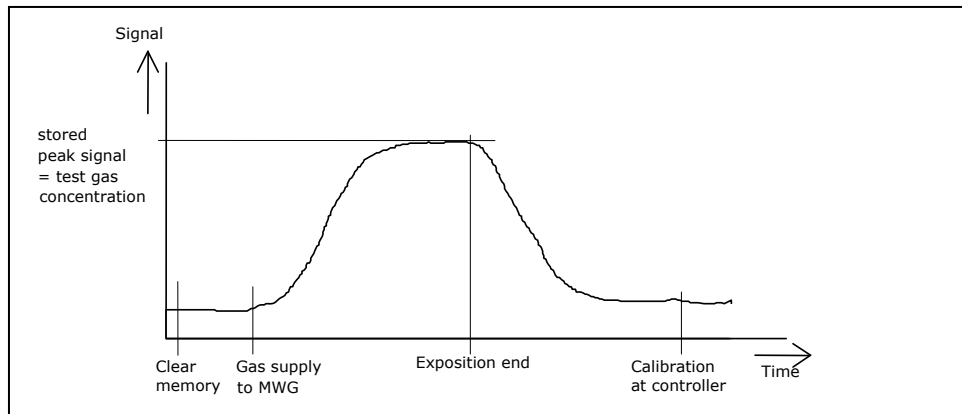
Fig. 4

1. Activate service menu A.
2. Use keys ⌨TEST/MENU▲ and ⌨QUIT/MENU▼ to select menu point ⌷.
3. After 1.5 minutes supply test gas to the transmitter and make sure that the gas is supplied constantly for at least 3 minutes For details about the gas supply please refer to the operation manual of your transmitter.
4. Disconnect the test gas source from the transmitter.
5. Use keys ⌨△ and ⌨▽ to set the parameter value to the test gas concentration.
6. Store the parameter.

Alarm Threshold Hysteresis

This function allows to adjust the hysteresis (point of deactivation) of the alarm thresholds. For exceeding alarms this point can be set from the start of the detection range up to two digits below the alarm threshold. For deviating alarms the deactivation point can be set from two resolution units above the alarm threshold up to the end of the detection range. The parameter setting is done in the unit of the gas to be measured.

Example:
The hysteresis of a controller, which monitors gas in the LEL range, was set to 18 % LEL for alarm 1, 36 % LEL for alarm 2 and 54 % LEL for alarm 3. This results in the alarm activation below:

	Alarm 1	**Alarm 2**	**Alarm 3**
Alarm threshold	= 20 % LEL	= 40 % LEL	= 60 % LEL
Alarm activation	≥ 20 % LEL	≥ 40 % LEL	≥ 60 % LEL
Alarm deactivation	≤ 18 % LEL	≤ 36 % LEL	≤ 54 % LEL

Adjustment of deactivation point:

1. Activate service **menu B**.
2. Use keys ⌨TEST/MENU▲ and ⌨QUIT/MENU▼ to select menu point ⌷⌷, ⌷⌷ or ⌷⌷ for the alarm deactivation point to be set.
3. Use keys ⌨△ and ⌨▽ to adjust the new deactivation point.
4. Store the parameter.

Storing of Changed Parameters and Leaving the Service Mode

All changes done in the service mode have to be stored:

1. Press keys [TEST MENU▲] and [QUIT MENU▼] simultaneously to activate the memory function.
The display reads „**Sto**".

2. **Confirm storage:** Press key [QUIT MENU▼] to confirm the storage of the parameter.
The GMA81 stores all changed parameters and returns to detection mode.

or

No storage: Press key [TEST MENU▲], and the GMA81 returns to detection mode without storing the changed parameters.

☞   You can change several parameters one after the other, without storing them individually. Once you have set all parameters, one storage confirmation is sufficient to store all changed parameters.

Maintenance

After the installation of a gas warning system and before putting it into operation, a function test must be carried out.

DIN EN 60079-29-2 „Gas detection instruments - Selection, installation, use and maintenance of devices for detection and measurement of combustible gases or oxygen" as well as the relevant national directives are to be obeyed. In Germany this means the „Explosion protection regulations", the guideline T 023 (BGI 518) „Gas warning devices for explosion protection – Use and operation" and „BGR 500 part 2 chapter 2.33, 4.4 Test of gas warning devices".

After installation and at the initial putting into operation, an expert has to do a function test of the gas warning system (see DIN EN 60079-29-2 chapter 8.9).

The maintenance of a gas warning system includes inspection, service, calibration and adjustment, the regular function test and repair.

Tests must be done by an expert, who has to report the result in writing.

Inspection, maintenance, calibration and adjustment

During the inspection examinations of the gas measurement systems shall be carried out (see information sheet T023, section 9).

- Pollution by dust
- Condensation by humidity
- Protective equipment for transmitters
- Diffusion inlet for the transmitter

Maintenance and adjustment describe those measures, which retain the nominal status of the gas warning system. They shall be checked in regularly inspection intervals. Inspection intervals should not exceed 4 months. (See DIN EN 60079-29-2 section 11 and in Germany information sheet T023, section 9.2, 9.3).

- Zeropoint
- Sensitivity
- Activation of alarm thresholds
- Response time
- Alarm output visible and audible
- Fault report

Regular function tests

Additionally to the maintenance the function of the gas warning system has to be examined regularly. The function tests may not exceed a period of one year. (for Germany see information sheet T023, Section 9 and BGR500, part 2, chapter 2.33, 4.4).

Overhaul

Overhaul describes all repairs and exchange of components. This has to be done by the manufacturer or persons authorized by him. Only those spare parts and structural components that have been tested and approved by GfG may be used for exchange.

> ⚠️ **Disregard affects the detector safety, the type approvals are void, resp. the detectors are not operated according to ATEX.**

We recommend a regular function test and overhaul and to call GfG's service for the regular maintenance.

P.C.Boards of GMA 81

The **GMA81** controller includes two p.c.boards:

Main Card

Secondary fuse

Transformer

Primary fuse

Voltage-free relays for:

Fault

Alarm 1

Alarm 2

Alarm 3

Code bridge for relays

Open-circuit current

NO

NC

Closed current

NC

NO

Terminals

Fig. 5

Display Card

3-digit display for gas concentration

Menu display

LEDs

Connection for configuration plug

Keys
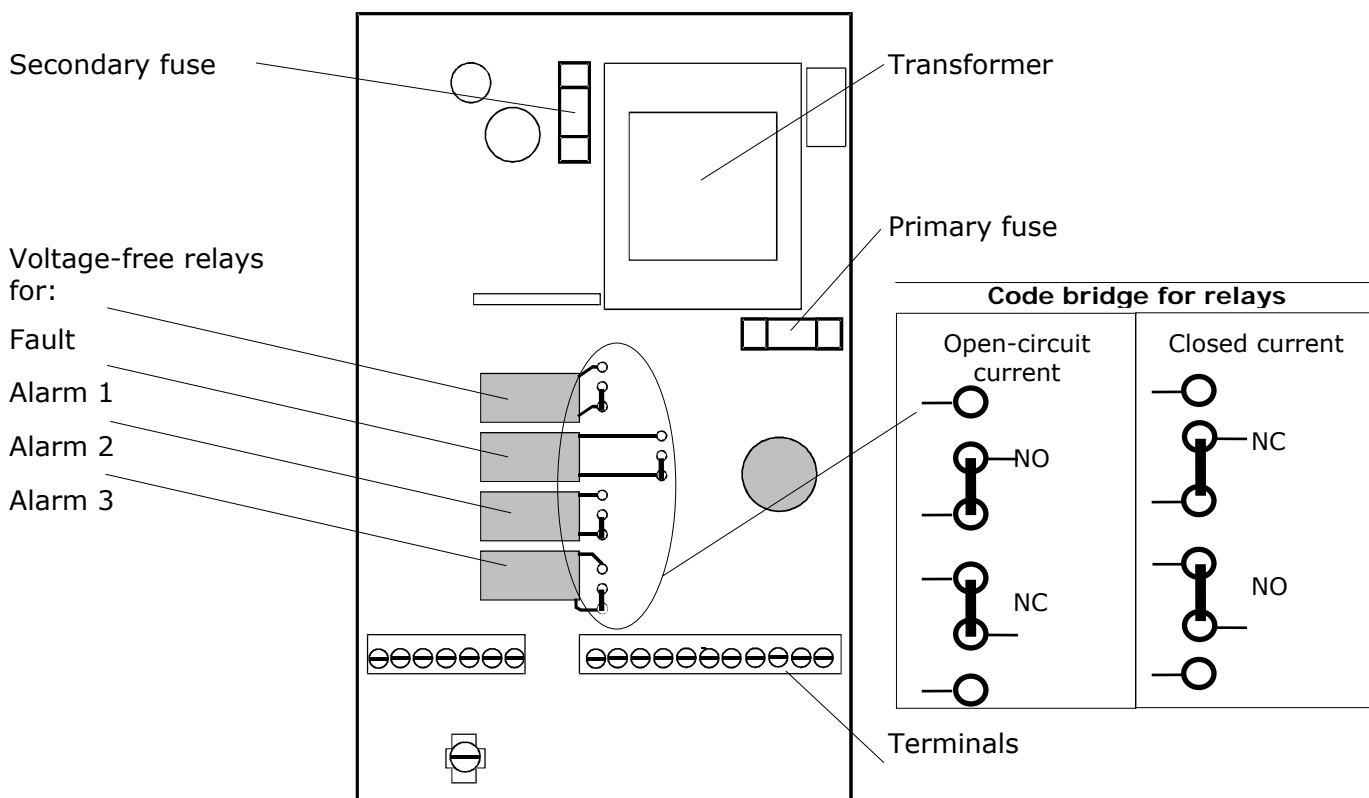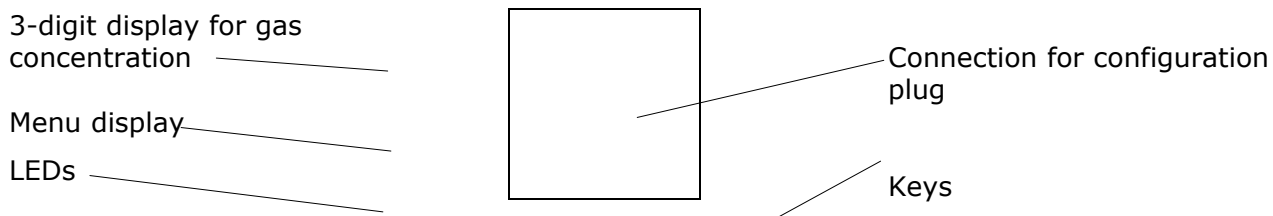
Fig. 6

Changing of Relay Contacts

On the main card of the GMA81 controller every relay has two assembly positions for code bridges. By selecting the position of the code bridge you can determine, whether the relay works as a NC contact or as a NO contact.

Influence of Interfering Gases and Oxygen

Interfering gases, oxygen surplus and oxygen deficiency may affect the measurement of gases by the transmitter. Please adhere to the operation manual of your transmitter.

Instruction for Installation and Putting into Operation

The GMA81 controller must not be installed in hazardous areas. It shall preferably be vibration-free installed. Vibration load may cause short-term fault reports at the relay outputs. The transmitter and the mains supply are connected as shown in the terminal diagram. Make sure that the shield of the transmitter cable is grounded on the printed circuit board. Once the GMA81 is mounted to a wall, all transmitters, control groups and the mains supply are connected, an expert can put the system into operation. For installation and putting into operation of the transmitters please see the operation manual of your sensor.

Putting into Operation

After installation gas warning systems have to be tested for faultless functioning, be adjusted and put into operation, by an expert. The testing and adjustment shall be carried out in accordance with the manufacturers operation manual. They are only allowed to be carried out by an expert. The expert has to write a confirmation on the results (see information sheet T 023 8/99, section 6.3, as well as DIN EN 50073, Section 6.4.1).

Please call GfG's service, or an expert authorized by GfG for putting into operation.

Transmitter Cable

The GMA81 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 (see connection diagram in the manual's annex). Even with the maximum cable lengths the specific power supply for the transmitter has to be guaranteed. For detailed information please refer to the operation manual of your transmitter.

Remarks concerning the Technical Safety of the GMA 81

Contact Protection

Mains supply and relay contacts of the GMA81 provide insulation distances of 3 mm, i.e. they are designed for 250 V operational insulation. In case a contact is operated on a contact-critical potential, the contacts close to it are also considered as contact-critical. According to contact protection the contacts are not considered to be separated safely. Resulting from this, the same applies to the relay contacts of a controller operated on 230 V. Here an operational insulation has been provided as well. The insulation of the secondary circuit from the primary circuit and the relay contacts complies with the requirements for contact protection. Distances of 6.5 mm ensure a safe separation. The secondary circuit operates on extra-low safety voltage.

Trouble Shooting

Failure	Cause	Solution
LED "**S F**" lights, display „**EEP**"	- System error, fault in parameter memory	- Re-start of system - Call GfG service
LED "**S F**" lights, LED „**ON**" flashes	- System is in warm-up period, alarm suppression is still active	- Wait until warm-up period is over
LEDs do not light	- Faulty voltage supply, defective fuse or mains unit	- Ensure proper voltage supply
Sensor signal, but gas-free atmosphere	- Incorrect calibration, incorrect zeropoint adjustment	- Adjust the zeropoint, calibrate
Display ⁻ ⁻ ⁻ LED „**S F**" lights	- ADC overrange - stored overrange - short circuit at the transmitter cable	- If there is a gas-free atmosphere at the transmitter, you can reset the stored measurement value Check transmitter cable - Check transmitter cable
Display _ _ _ LED „**S F**" lights	- Display deviation (< -99) - ADC range deviation - Cable cut - Zeropoint deviation by $I_{IN} \leq 3{,}00$mA (signal input 4..20mA) $I_{IN} \leq 0{,}15$mA (signal input 0,2..1mA) - Service-signal / transmitter - short circuit at the transmitter cable	- Check calibration of transmitter and GMA controller - Check transmitter cable - Check calibration of transmitter and GMA controller Check service key - Check transmitter cable

Service Address

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

GMA81 - Gas List

Gas Nr.	Gas	Chemical Formula	GMA Nr	Gas Nr.	Gas	Chemical Formula	GMA Nr
1	Aceton	CH6O	1	55	Carbon dioxide	CO2	**CO2**
2	Acetonnitrile	C2H3N	2	56	Carbon monoxide	CO	**CO**
3	Acetylene	C2H2	3	57	Coke gas	CO, CH4, H2	57
4	Acrylnitrile	C3H3N	4	58	Air	N2, O2, CO2	58
5	Aminopropane	C3H9N	5	59	Methane	CH4	**CH4**
6	Ammonia	NH3	**nh3**	60	Methanol	CH4O	60
7	Amyl alcohol	C5H12O	7	61	Methyl acetate	C3H6O2	61
8	Benzine 60/95	Mixture	8	62	Methyl alcohol	CH3OH	62
9	Benzine 80/110	Mixture	9	63	Methylbutylketone	C6H12O	63
10	Benzine (fuel)	Mixture	10	64	Methyl chloride	CH3Cl	64
11	Benzene	C6H6	11	65	Methylene chloride	CH2Cl2	65
12	Comb. gases and vapours	Mixture	12	66	Methyl-i-butylketone	C6H12O	66
13	Bromtrifluoromethane (Halon)	C Br F3	13	67	Methylethylketone	C4H8O	67
14	Butadien - 1.3	C4H6	14	68	Methylglycol	C3H8O2	68
15	n-Butane	C4H10	**but.**	69	Methylmethacrylate	C5H8O2	69
16	i-Butane	(CH3)3CH	16	70	Methylpropanol	C4H10O	70
17	Butanol - 1	C4H10O	17	71	Monochlordifluormonobrom.	C Br Cl F2	71
18	Butanon - 2	C4H8O	18	72	n-Nonane	C9H20	**non.**
19	n-Butylacetate	C6H12O2	19	73	i-Octane	C8H18	73
20	i-Butylacetate	C6H12O2	20	74	n-Octane	C8H18	74
21	n-Butyl alcohol	C4H10O	21	75	i-Pentane	C5H12	75
22	1-Butylene	C4H8	22	76	n-Pentane	C5H12	76
23	Chlorine	Cl2	**CL2**	77	Pentanon-2	C5H10O	77
24	Chloromethane	CH3Cl	24	78	Penten-1	C5H10	78
25	Hydrogen chloride	HCl	**HCL**	79	Pentyl acetate	C7H14O2	79
26	Hydrogen cyanide	HCN	**hcn**	80	Perchloroethylene	C2Cl4	80
27	Cyclohexane	C6H12	27	81	Propane	C3H8	**Pro.**
28	Cyclopentan	C5H10	28	82	Propanol-2	C3H8O	82
29	Cyclopropane	C3H6	29	83	i-Propyl acetate	C5H10O2	83
30	Dichlordifluoromethane (R12)	C Cl2 F2	30	84	n-Propyl acetate	C5H10O2	84
31	1.1 Dichlorethane	C2H4Cl2	31	85	n-Propyl alcohol	C3H8O	85
32	Dichlorfluoromethane (R21)	CH Cl2F	32	86	i-Propyl alcohol	C3H8O	86
33	Dichloromethaen	CH2Cl2	33	87	Propylene	C3H6	87
34	1.2 Dichloropropane	C3H6Cl2	34	88	Propylenedichloride-1.2	C3H6Cl2	88
35	Diethylamine	C4H11N	35	89	Oxygen	O2	**O2**
36	Dimethylether	C2H6O	36	90	Sulfur dioxide	SO2	**SO2**
37	Epichlorhydrin	C3H5Cl O	37	91	Sulfurhexafluoride	SF6	91
38	Natural gas (H+L)	Cn Hm, N2	38	92	Hydrogen sulfide	H2S	**H2S**
39	Ethane	C2H6	39	93	Town gas	CO, CH4, H2	93
40	Ethanol	C2H5OH	**Eol.**	94	Nitrogen dioxide	NO2	**no2**
41	Ethyl acetate	C4H8O2	41	95	Nitrogen monoxide	NO	**no**
42	Ethyl alcohol	C2H6O	42	96	Styrene	C8H8	96
43	Ethylen	C2H4	43	97	Tetrachloroethane	C2Cl4	97
44	Ethylen oxide	C2H4O	44	98	Toluene	C7H8	98
45	FAM-Benzine	Mixture	45	99	1.1.1-Trichloroethane	C2H3Cl3	99
46	Jet fuel 40/180	Mixture	46	100	Trichloroethylene	C2HCl3	100
47	Formaldehyde	CH2O	47	101	Trifluoromethane (R23)	CH F3	101
48	Frigen 22	CH Cl F2	**r22**	102	Vinyl acetate	C4H6O2	102
49	Helium	He	49	103	Vinyl chloride	C2H3Cl	103
50	Heptane	C7H16	50	104	Hydrogen	H2	**H2**
51	n-Hexane	C6H14	51	105	Water gas	H2, CO, CH4	105
52	i-Hexane	C6H14	52	106	Xylene	C8H10	106
53	Hexanon-2	C6H12O	53	107	Ozone	O3	107
54	Isobutyl acetate	C6H12O2	54				

Chart 1 - GfG-Gas List

Terminal Plan - GMA81

GMA81

Relay functions,
see page 10

```
   1 2 3 4 5 6 7        8 9 10 11 12 13 14 15 16 17 18

                        Alarm  Alarm  Alarm  Fault
                          3      2      1
```

Sensor
Supply approx.24 V
Ground
Signal 4..20mA / 0.2..1mA

Shield

Ground
Signal output 4..20mA
Voltage supply 24 V DC +

external reset 5..30 V DC

L — Mains connect
N — 230 V AC 50/60 Hz
PE
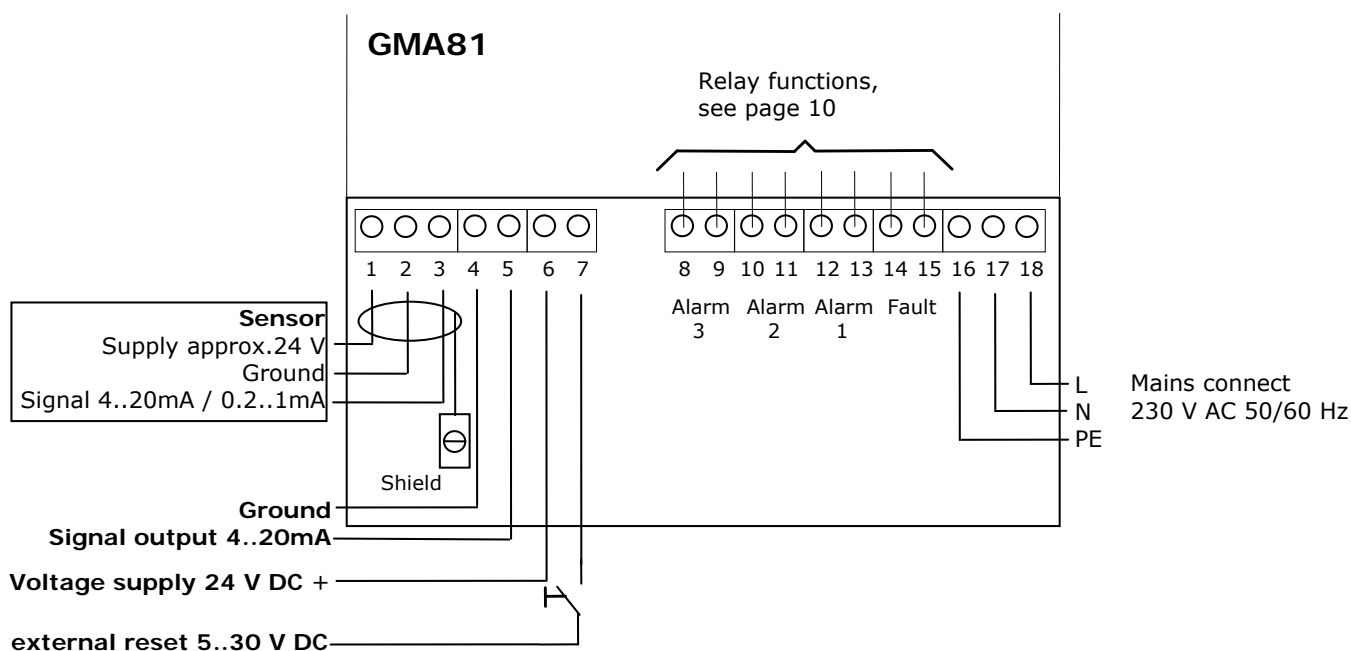
Terminal bar GMA81 / GMA81A

```
⊗⊗⊗⊗⊗⊗⊗        ⊗⊗⊗⊗⊗⊗⊗⊗⊗⊗⊗
1 2 3 4 5 6 7   8 9 10 11 12 13 14 15 16 17 18
```
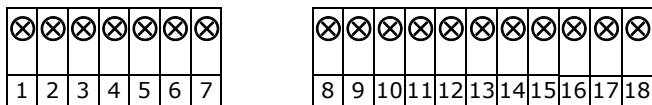
Voltage supply, 230V/AC or 24V/DC

Voltage supply		Terminal
230 V AC	L1	**18**
Neutral	N	**17**
Protection	PE	**16**

or!

Voltage supply	Terminal
Ground, GND	**4**
Voltage supply +24V/DC	**6**

Alarm relays (default setting)

Terminal			
Alarm 1	Alarm 2	Alarm 3	Störung
12 — **13**	**10** — **11**	**8** — **9**	**14** — **15**

Transmitter

	Transmitter 1
Voltage supply 24 V / DC	**1**
Ground, GND	**2**
Signal input 0,2 .. 1 mA or 4 .. 20 mA	**3**

Technical Data

Gas Monitor GMA81	for wall mounting
Type:	GMA81, software version 2.03
Dimensions:	130 x 185 x 95 mm (WxHxD)

Gas Monitor GMA81 A	incl. Buzzer and alarm lamp, for wall mounting
Type:	GMA81 A, software 2.03
Dimensions:	135 x 217 x 95 mm (WxHxD)

Power supply

Operational voltage:	1. 24 V DC (Uin) [21 to 28 V] or
	2. 230 V / 50Hz or 115 V / 60 Hz
Current consumption:	max. 11 W at 230 V AC
Primary fuse:	T 0.08 A G melt fuse
Secondary fuse:	T 0.50 A G melt fuse

Climate Conditions

for operation:	0 to +55 °C, 0 to 99 % r.h. 700 to 1300 hPa
recommended storage conditions for GMA81(A), accessories, spare parts:	-25 to +50 °C, 0 to 99 % r.h.

Transmitter connection

Transmitter connection:	2-, 3-wire transmitter
Voltage supply output:	20 V DC max. 250 mA
Input signals:	4 .. 20 mA, 0.2 .. 1 mA

Outputs

Analog outputs for meas. value:	4 .. 20 mA, max. load 200 Ω (T_{90} = 18 sec.)
Display and alarm activation:	T_{90} < 3 sec.
Sensor signal display:	0.12 .. 1 mA Max. deviation: < 0.2 mA ±0.04 mA
	0.2 .. 0.5 mA $\pm$ 0.02 mA
	> 0.5 mA + 0.05 mA
	2.4 .. 20 mA Max. deviation: < 4 mA $\pm$ 0.08 mA
	4 .. 10 mA $\pm$ 0.4 mA
	> 10 mA + 1 mA
Relays:	max. switch voltage 250 V AC 50/60 Hz or 250 V DC
	max. switch current 4 A AC/DC
	max. switch performance 1000 VA AC or depending on voltage 50..200 W DC
	Relay outputs and mains entry are operation insulated
External reset:	High active from 3 .. 24 V DC (input resistance 11kΩ)

Safety

Protection:	DIN EN 60529 - IP -54
Protective separation:	by safety transformer
	type: EI 48/205 (V11419) PRI 230V / SEC 20 V 50 - 60HZ
Protective insulation:	as per EN 61010 up to over voltage category III and soiling degree 2

Approvals

EMC test:	As per EN 50270 : 2006
EC-Type Examination-Function	PfG-Nr. 41300600 (for tested detection ranges see page 4)
	ⓔ II (2)G
	BVS 03 ATEX G 006 X (EC-Type Examination Certificate)
Production supervision:	C€ 0158 (Notified body: DEKRA-EXAM)

Annex

Terminal Diagram of Transmitters

Transmitter CC 0238 EX

This CC transmitter is a 3-wire transmitter. The supply line and the 0.2 - 1mA output signal use the same ground line. Cable type: e.g. LiYCY 3 x 0.75 mm² (up to 200 m).
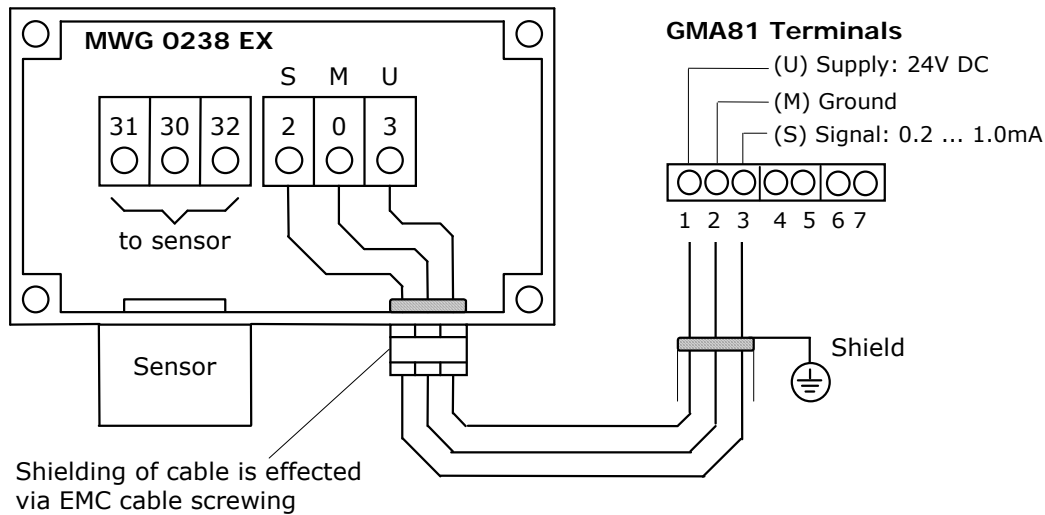
Transmitter CS 21 and CI 21

The CS 21 and CI 21 sensors are designed as 3-wire transmitters.

0.2 - 1mA output signal
The supply voltage and the 0.2 - 1 mA output signal use the same ground line. Cable type:
e.g. LiYCY 3 x 0.75 mm² (up to 200 m)
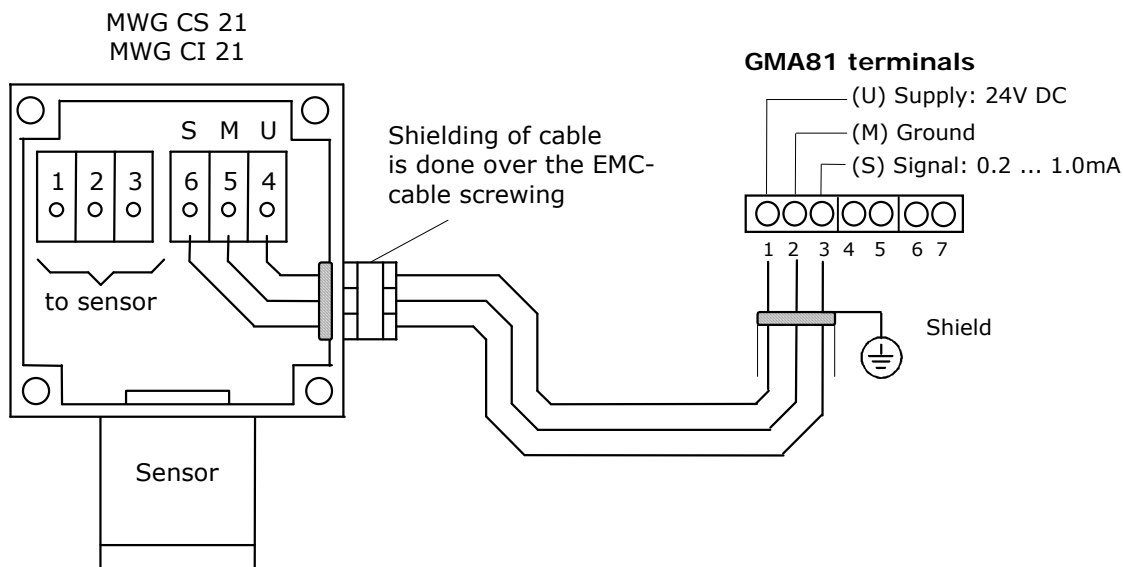
4 - 20mA Output signal
The voltage supply and the 4 - 20 mA output signal use the same ground line.
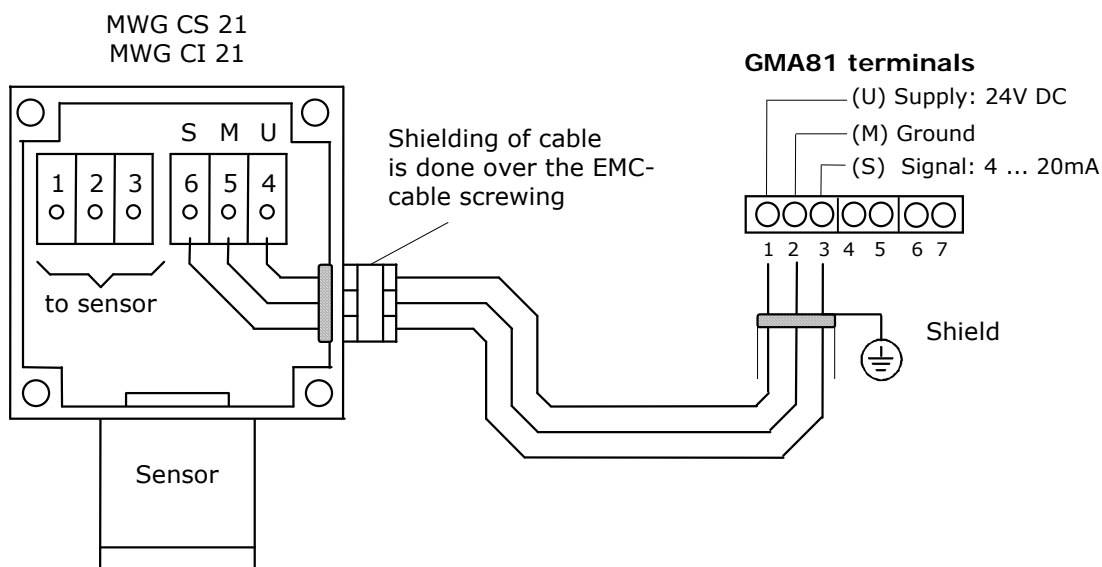
Transmitter EC 24 (models MWG 2412, 2414, 2411 and 2413)

4 - 20 mA output signal
The EC sensors MWG 2412 and MWG 2414 are designed as 2-wire transmitters.
The 4 - 20 mA output signal is provided via the supply line.

MWG 2412
MWG 2414

(S)
M U

6 5 4

Shielding of cable
is done over the EMC-
cable screwing

Sensor

GMA81 terminals

(U) Supply: 24V DC
(M) Ground
(S) Signal: 4 ... 20mA

1 2 3 4 5 6 7

Shield
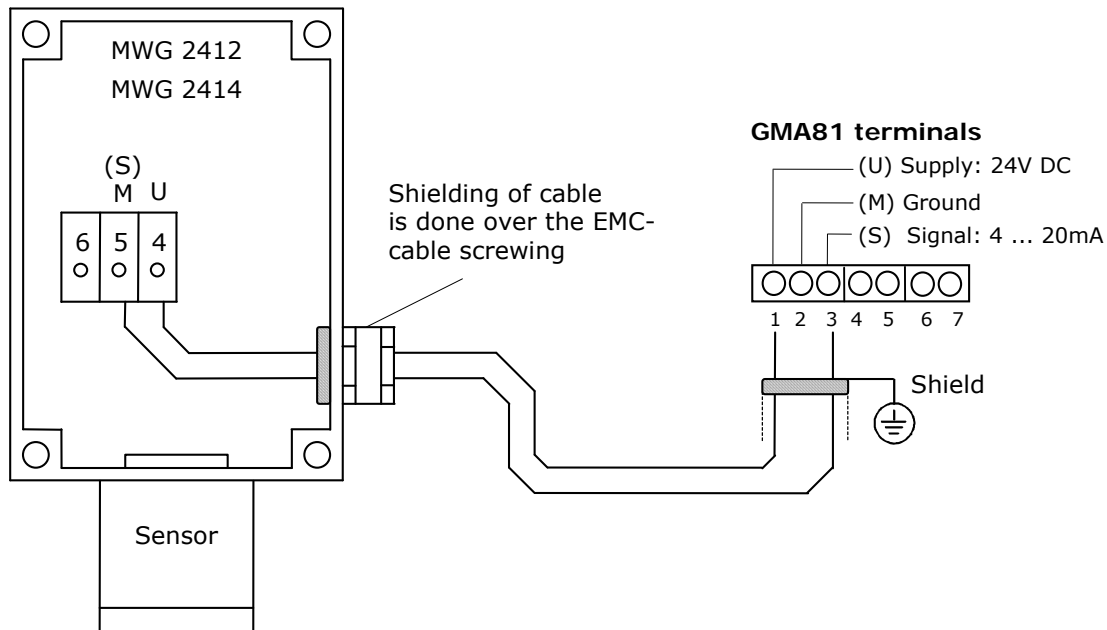
0.2 - 1 mA output signal
The EC sensors MWG 2411 and MWG 2413 are designed as 3-wire transmitters.
The voltage supply and the 0.2 - 1 mA output signal use the same ground line.

MWG 2411
MWG 2413

S M U

6 5 4

Shielding of cable
is done over the EMC
cable screwing

Sensor

GMA81 terminals

(U) Supply: 24V DC
(M) Ground
(S) Signal: 0.2 ... 1.0mA

1 2 3 4 5 6 7

Shield

Transmitter CC 24 EX (models MWG 2431 and 2432),
Transmitter CS 24 EX (models MWG 2471 and 2472),
Transmitter IR 24 (models MWG 2491 and 2492)

0.2 - 1 mA output signal

The CC sensor model MWG 2431, the CS sensor model MWG 2471 and the IR sensor model MWG 2491 are designed as 3-wire transmitters. The supply voltage and the 0.2 - 1 mA output signal use the same ground line.

4 - 20 mA Output signal

The CC sensor model MWG 2432, the CS sensor model MWG 2472 and the IR sensor model MWG 2492 are designed as 3-wire transmitters. The supply voltage and the 4 - 20 mA output signal use the same ground line.
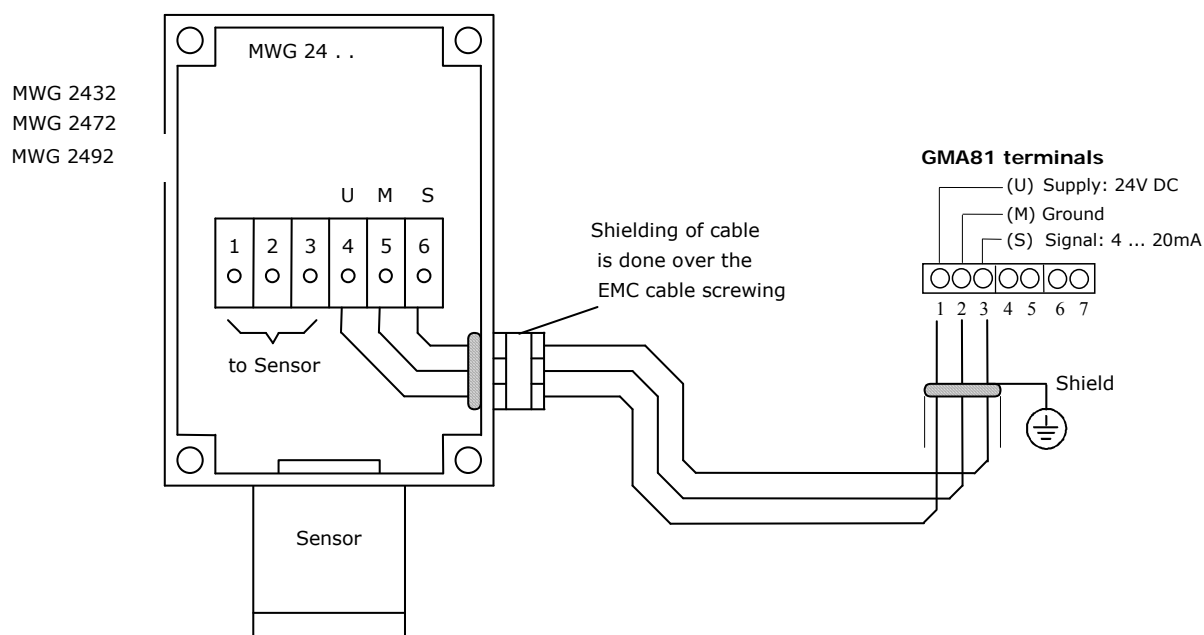
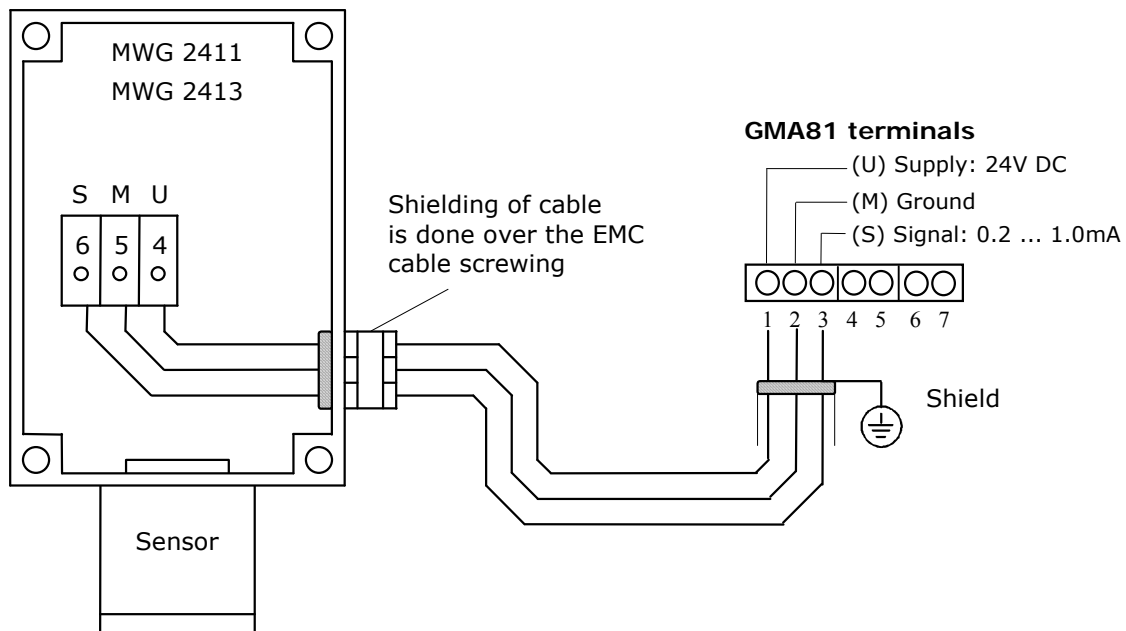# Transmitter EC 25 (models MWG 2502, 2504) without Ex-Barrier

4 - 20 mA output signal
The EC sensor models MWG 2502 and MWG 2504 are designed as 2-wire transmitters.
The 4 - 20 mA output signal is provided via the supply lines.

MWG 2502 MWG 2504		
12-24V	1	o
+/- 0V	2	o
+Sig.	3	o
- Sig.	4	o

Shielding of cable is done over the EMC-cable screwing

GMA81 terminals

(U) Supply: 24V DC

(S) Signal: 4 ... 20mA

1 2 3 4 5 6 7

Shield

Sensor

0.2 - 1 mA output signal
The EC sensor models MWG 2501 and MWG 2503 are designed as 3-wire transmitters.
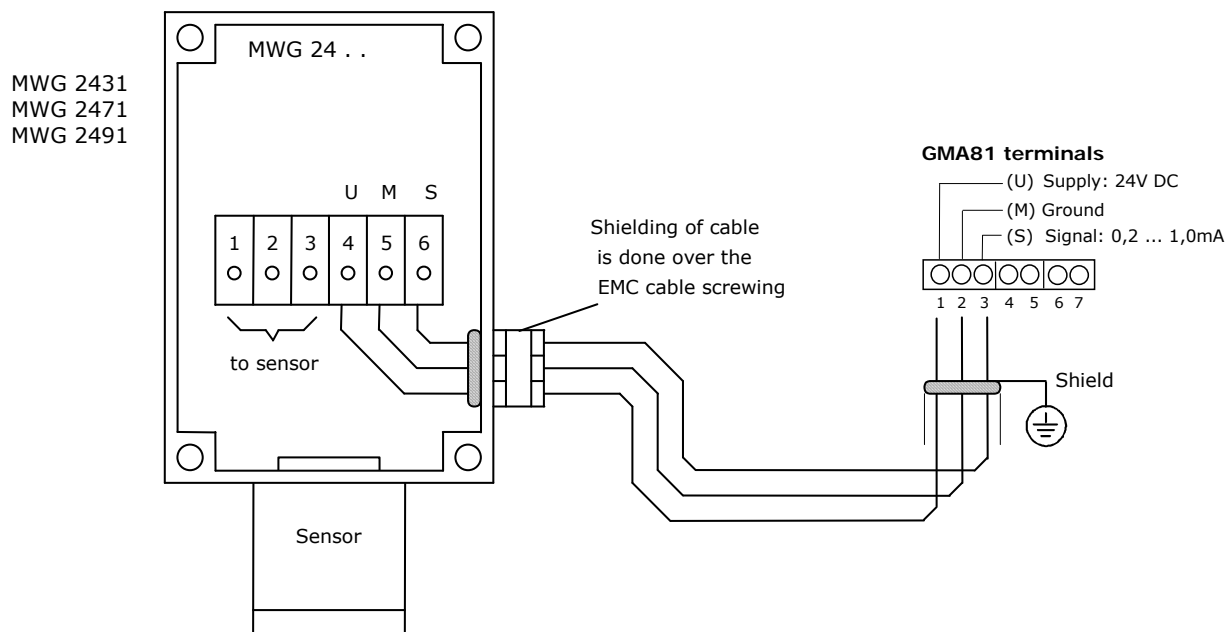The supply voltage and the 0.2 - 1 mA output signal use the same ground line.

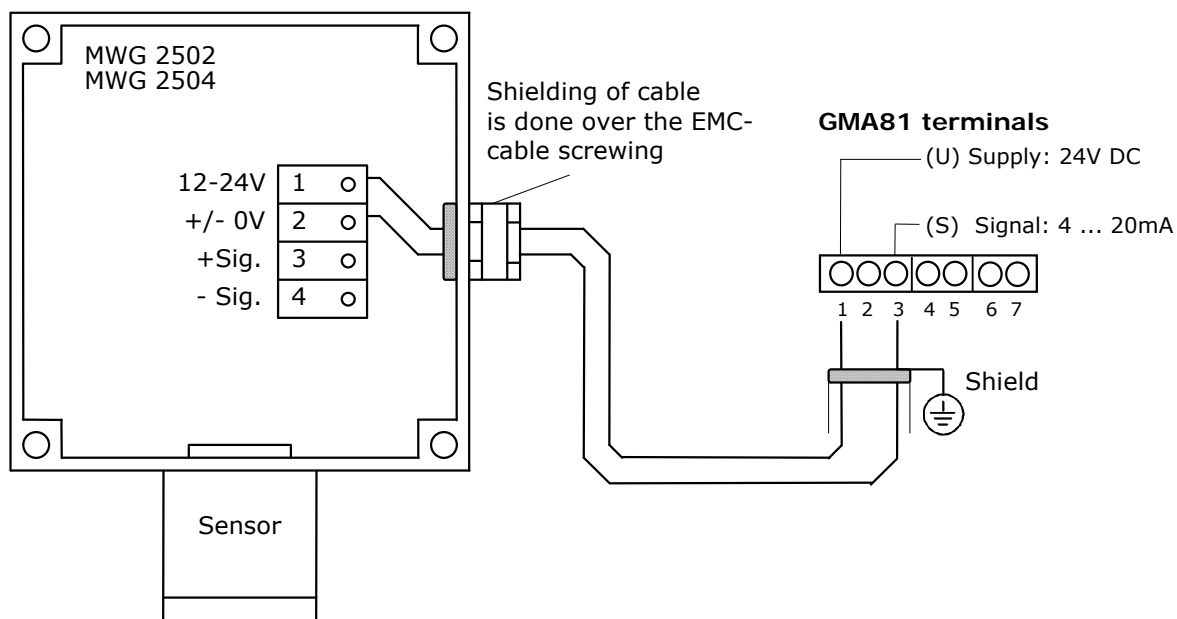| MWG 2501 MWG 2503		
12-24V	1	o
+/- 0V	2	o
+Sig.	3	o
- Sig.	4	o

Shielding of cable is done over the EMC-cable screwing

GMA81 terminals

(U) Supply: 24V DC

(M) Ground

(S) Signal: 0.2 ... 1.0mA

1 2 3 4 5 6 7

Shield
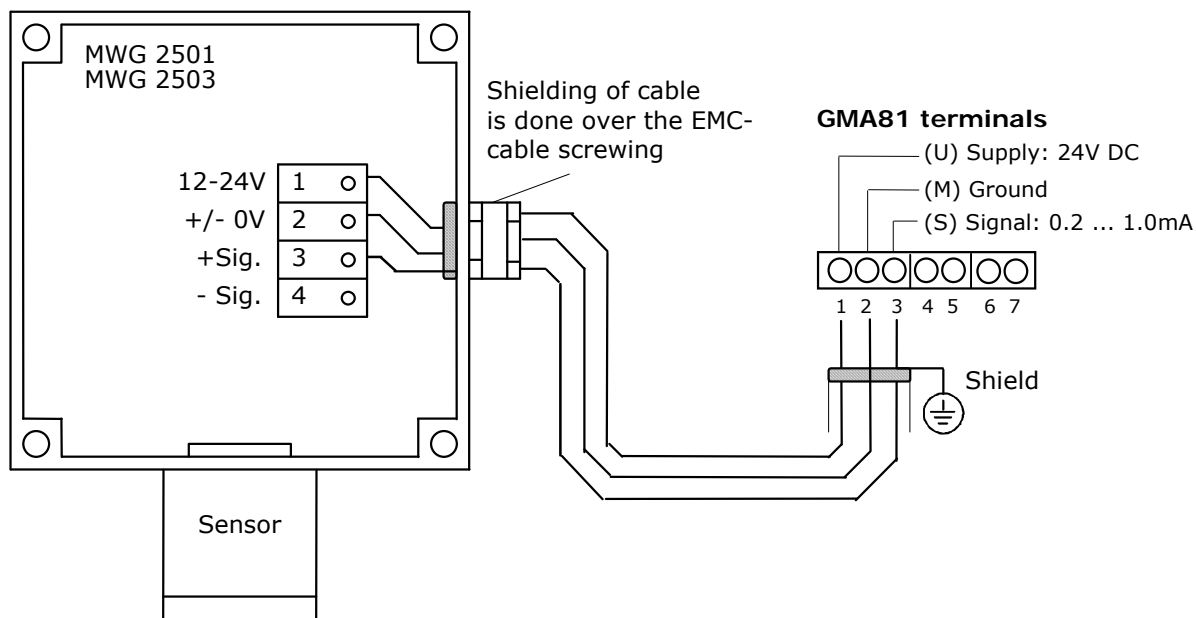
Sensor

Transmitter EC 25 EX (model MWG 2501) with Ex-Barrier

The EC sensor model MWG 2501 is designed as a 4-wire transmitter. Supply and signal lines are separated. The transmitter is considered as 4-pole. For reasons of explosion protection, Ex-barriers are linked between transmitter and GMA81 both in the supply lines and in the signal lines.
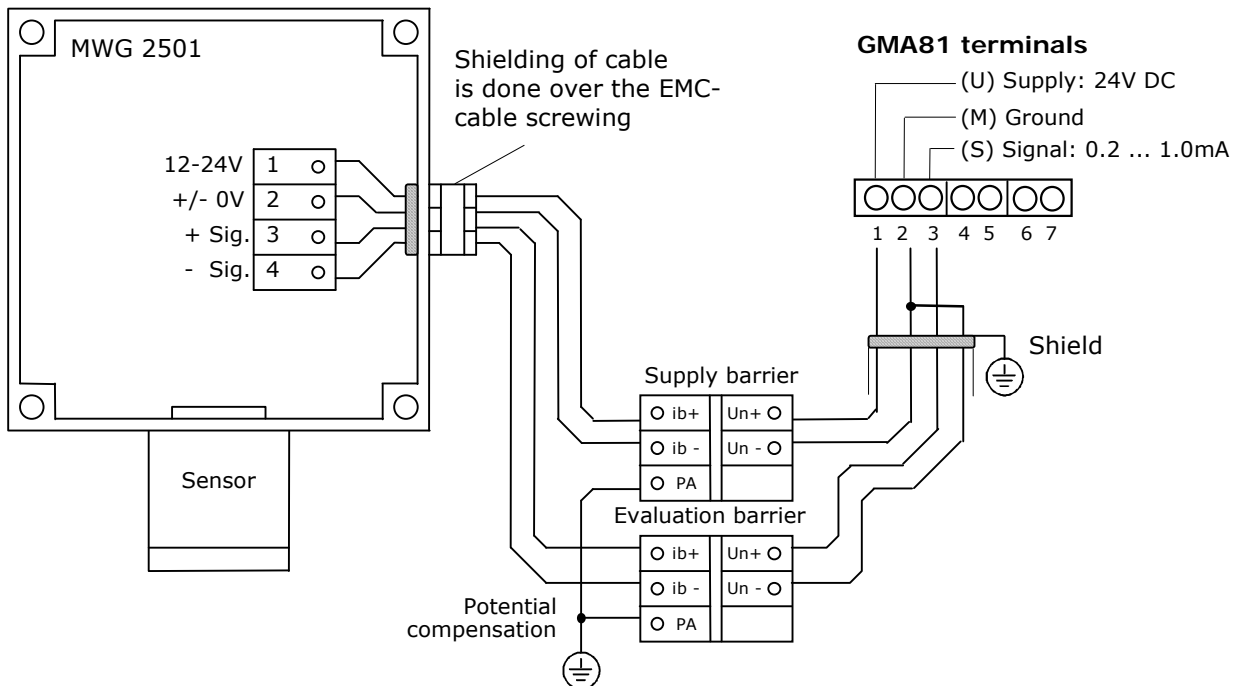
Transmitter CC28

Transmitters CC28, CC28 D and CC28 DA are connected to the GMA81 via 3 wires. Voltage supply and output signal are using the same ground line.
Cable type: e.g. LiYCY 3 x 0,75 mm² (up to 200m)
LiYCY 3 x 1,5 mm² (up to 1 km)

Transmitter EC28 (part 1)

Transmitters EC28, EC28 D, EC28 DA and EC28 DAR are connected to the GMA81 via 3 wires. Voltage supply and output signal are using the same ground line.
Cable type: e.g. LiYCY 3 x 0,75 mm² (up to 500m resp. 200m for EC28 DA/DAR)
                    LiYCY 3 x 1,5 mm² (up to 1 km)
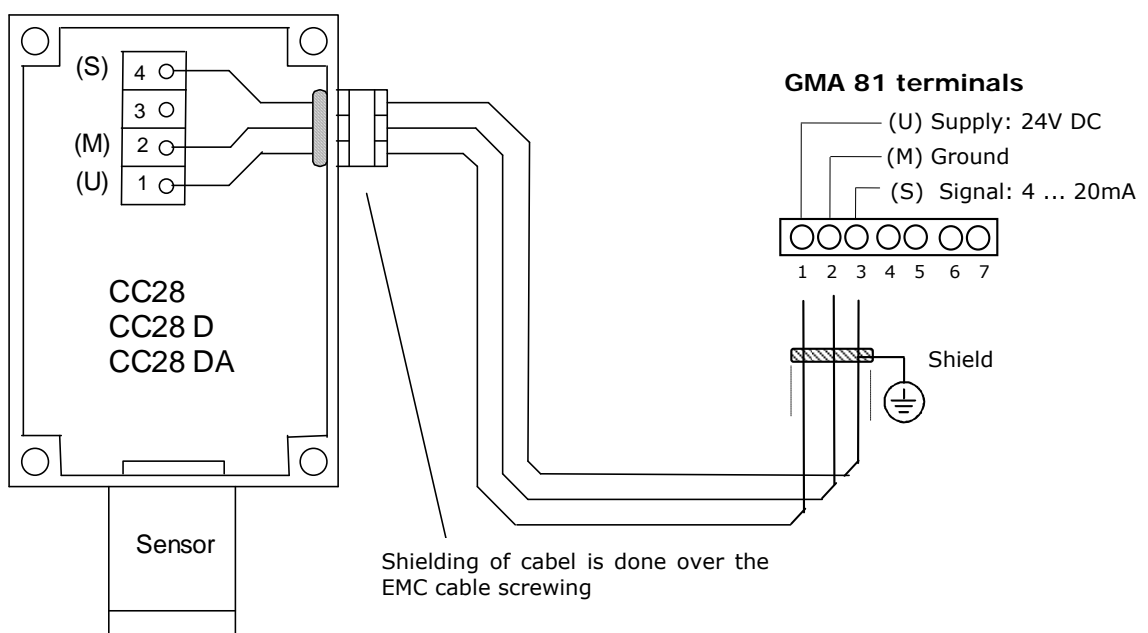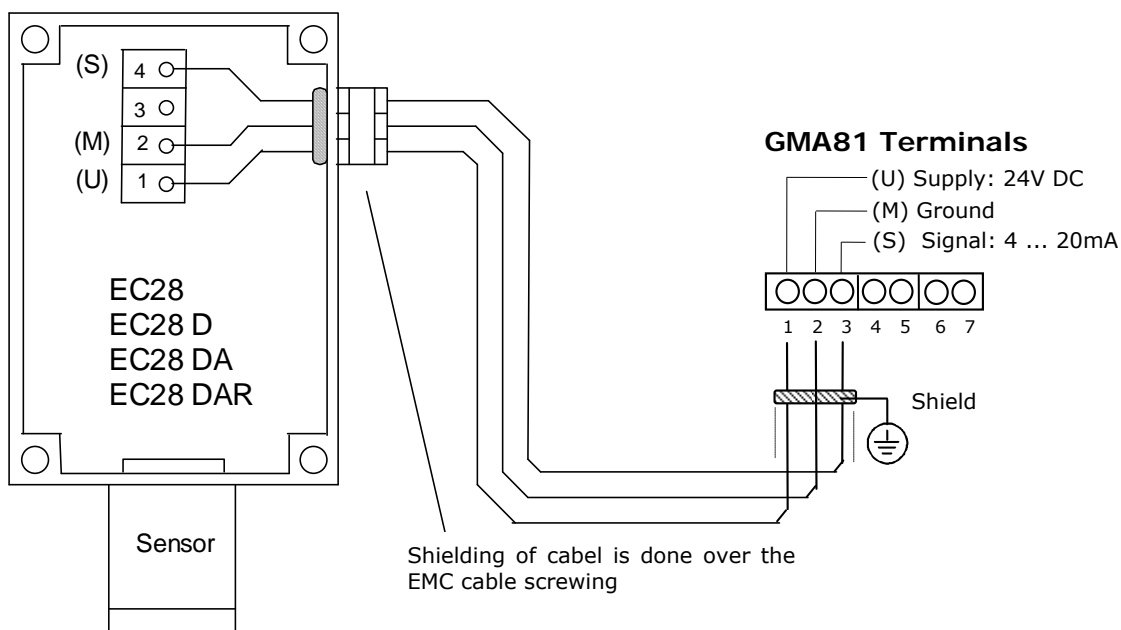

Transmitter EC28 (part 2)

Transmitters EC28 i and EC28 Di are connected to the GMA81 via 2 wires.
Voltage supply and output signal are using the same wire.
Cable type: e.g. LiYCY 2 x 0,75 mm² (up to 500m)
                    LiYCY 2 x 1,5 mm² (up to 1 km)

If the transmitter is installed in explosion endangered areas, connection must be done through a safety barrier
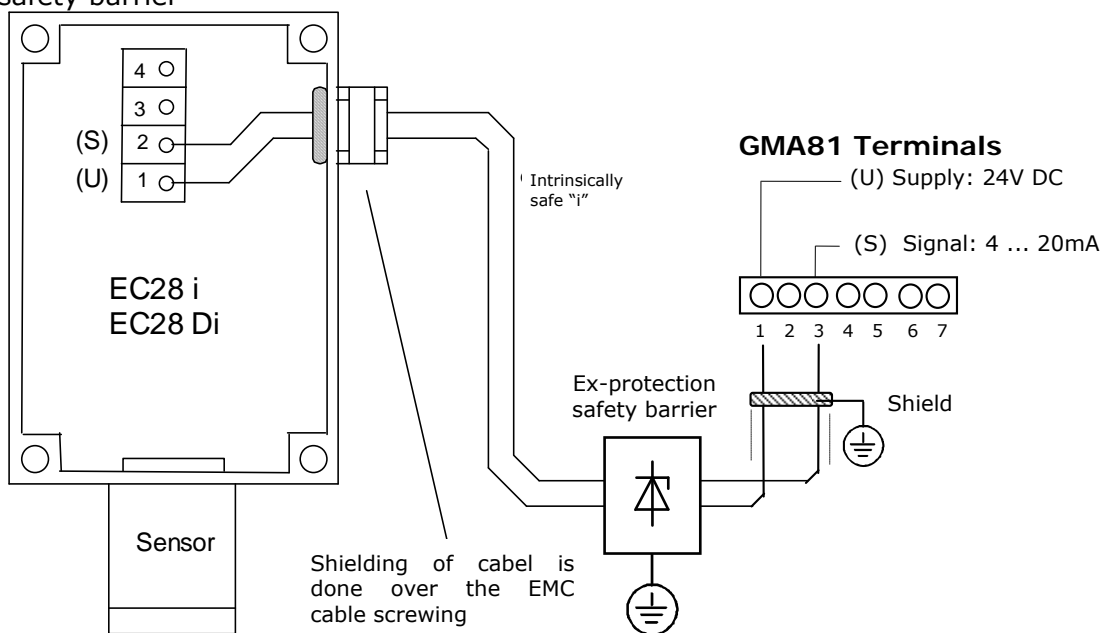
If the transmitter is **not** installed in explosion endangered areas, it may be connected to the GMA81 without an interlinked safety barrier
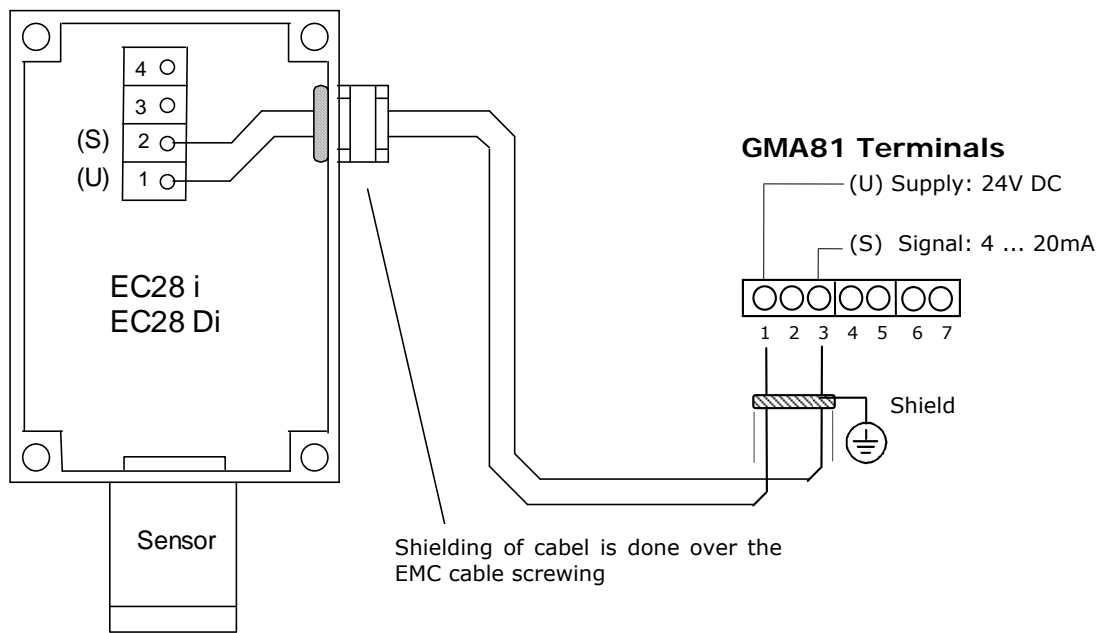
GMA81 Terminals

(U) Supply: 24V DC

(S) Signal: 4 ... 20mA

Shield

Shielding of cabel is done over the EMC cable screwing

Sensor

EC28 i
EC28 Di

EXAM BBG Prüf- und Zertifizier GmbH

(1) Translation
EC-Type Examination Certificate

(2) - Directive 94/9/EC -
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) **BVS 03 ATEX G 006 X**

(4) Equipment: control unit GMA 81 (A)

(5) Manufacturer: Gesellschaft für Gerätebau mbH

(6) Address: D-44143 Dortmund

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.

(8) The certification body of EXAM BBG Prüf- und Zertifizier GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the test reports PFG-no. 41300600P and 41300600P NI.

(9) The Essential Health and Safety Requirements with respect to the measuring function for explosion protection are assured by application of:

DIN EN 50054 (VDE 0400 part 1 / 07.99)
DIN EN 50057 (VDE 0400 part 4 / 07.99)
DIN EN 50271 (VDE 0400 Teil 21 / 05.02)

This EC-type examination certificate covers the measuring function of control units GMA 81 (A), when operated with remote sensors with 0.2-1 mA or 4-20 mA interface, for the gases and vapours listed in the EC-type examination certificate of the remote sensor.
This EC-type examination certificate covers control units with software-version 2.03.

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

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance with Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

page 1 of 3 to BVS 03 ATEX G 006 X

EXAM BBG Prüf- und Zertifizier GmbH

(12) The marking of the equipment shall include the following:

⟨Ex⟩ II (2) G

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, dated 25. June 2003

Signed: Jockers   Signed: Bredenbroeker
EXAM Certification body   Special services unit

page 2 of 3 to BVS 03 ATEX G 006 X

EXAM BBG Prüf- und Zertifizier GmbH

(13) Appendix to

(14) **EC-Type Examination Certificate**

BVS 03 ATEX G 006 X

(15) 15.1 Subject and type

Control unit GMA 81 (A) operated with remote sensors with 0.2-1 mA or 4-20 mA interface

15.2 Description

The control units GMA 81 and GMA 81 A are, when operated with remote sensors with 0.2-1 mA or 4-20 mA interface, fixed systems for the measurement of combustible gases or vapours mixed with air. One control unit is required for each remote sensor. The control units are not suitable for use in potentially explosive atmospheres.

15.3 Parameters

not applicable

(16) Test and assessment report

PFG-no. 41300600P dated 20/12/2000
PFG-no. 41300600P NI dated 25/06/2003

(17) Special conditions for safe use

The following special properties have to be considered at operation of the control unit:
- When operated with remote sensors with 0.2-1 mA or 4-20 mA interface the specifications of the interface and the behaviour below 0.2 mA or 4 mA and above 1 mA or 20 mA have to be considered.

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.
44809 Bochum, 25. June 2003
PFG-Kie

EXAM BBG Prüf- und Zertifizier GmbH

EXAM Certification body   Special services unit

page 3 of 3 to BVS 03 ATEX G 006 X

DEKRA

Translation

1st Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
BVS 03 ATEX G 006 X

Equipment: **Control unit GMA 81 (A)**

Manufacturer: **GfG Gesellschaft für Gerätebau mbH**

Address: **D-44143 Dortmund**

Description

This supplement to the EC-type examination certificate concerns re-testing according to the EN 60079-29-1 series of standards.
The Essential Health and Safety Requirements with respect to the measuring function for explosion protection are assured by application of:

EN 60079-29-1:2007
EN 50271:2001

This supplement to the EC-type examination certificate covers the measuring function of the control units GMA 81 (A), when operated with remote sensors with 0.2-1 mA or 4-20 mA interface, for the gases and vapours listed in the EC-type examination certificate of the remote sensor.

This supplement to the EC-type examination certificate covers devices with software-version 2.03.

Test report

Test report PFG-no. 41300600P NII dated 19/12/2007

Special conditions for safe use

See BVS 03 ATEX G 006 X

DEKRA EXAM GmbH
Bochum, dated 23/10/2009

Signed: Müller   Signed: Nemec
Certification body   Special services unit

Page 1 of 2 to BVS 03 ATEX G 006 X N1

DEKRA

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.
44809 Bochum, 23. October 2009
PFG-Kie

DEKRA EXAM GmbH

Certification body   Special services unit

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EC- Declaration of Conformity GfG Gesellschaft für Gerätebau mbH

GMA81 (A)

Klönnestrasse 99
D-44143 Dortmund
Tel: +49 (231) 56400-0
Fax: +49 (231) 516313
E-Mail: info@gfg-mbh.com
www.gfg.biz

Edited: 17.01.2005   Amended: 27.01.2010

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 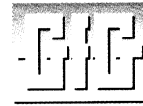in ignition protection classes explosion- proof encasing, increased safety, encapsulation and intrinsical safety, as well as their measuring function.

The Gas Monitor **GMA81** complies with **directive 94/9/EC** for devices and protective systems for proper use in explosion endangered areas (ATEX directive), with **council directive 2004/108/EC** for electromagnetic compatibility and with **directive 2006/95/EC** for electrical safety.

For the measurement function	BVS 03 ATEX G 006 X
Labelling	⟨Ex⟩ II (2G) G
	C€ 0158

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

■ **Safe and accurate measuring function**
- Gas detectors- Performance requirements of detectors for
  flammable gases   EN 60079-29-1
- Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Requirements and tests for apparatus using software and/or digital technologies.   DIN EN 50271

■ **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
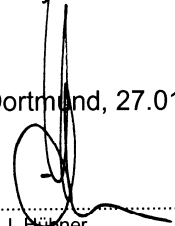
■ **Operational safety**
- Safety requirements for electrical equipment for measurement, control and laboraty use. General requirements.   EN 61010

The evaluation of the health requirements has been done, documented and filed by a notified body with register no. 0158 (DEKRA EXAM GmbH, Dinnendahlstraße 9 D-44809 Bochum).
The EMC testing laboratory EM TEST GmbH, Kamen has been charged with testing and evaluation of the electromagnetic compatibility.

Always adhere to the safety notes of the operation manual 188-000.08.

Dortmund, 27.01.2010

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H.J. Hübner
President

ATEX EG-Kon022/Siebrecht

SIL- Declaration of Conformity GfG Gesellschaft für Gerätebau mbH

GMA81
GMA81A

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Edited: 28.01.2010   Changed:

Operational Conditions

The SIL ability of the controller in combination with the determined error rate is only valid, if the following operational conditions are being complied with:

The relevant transmitter must be mounted in a position which is suitable for the detection task, must be properly connected to the controller GMA81(A), and the gas warning system must be put into operation by the manufacturer GfG Gesellschaft für Gerätebau mbH or by an authorised representative.

The connected transmitter must send defined status signals to the controller for internal failures resp. short circuit, so transmitter failure can be recognized. This is automatically made sure when transmitters are used which are produced by GfG Gesellschaft für Gerätebau mbH.

The ambient conditions e.g. referring temperature, humidity and pressure, which are stated in the manufacturer's documentation, have to be observed.

According to the manufacture's statements the connected transmitter has to be regularly serviced by an expert and must be calibrated with a certified test gas.

The service intervals must be determined according to bulletin BGI 518 of the Association of Workers' Compensation Insurance Carriers (= bulletin T 023 of BG-Chemie, edition 07/2009).

Annual Proof Test

At least once a year a Proof Test of the complete safety chain has to be effected. For the controller the Proof Test is equivalent to a system check as per operational safety regulation and includes the regular calibration / adjustment of the connected transmitter as well as triggering and testing of the switching function of alarm relays and fault relays.

SIL- Declaration of Conformity GfG Gesellschaft für Gerätebau mbH

GMA81
GMA81A

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Edited: 28.01.2010   Changed:

The evaluation unit **GMA81 (A)** complies with the following European standards on functional safety:

Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61508-1:2001

Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen - Requirements and tests for apparatus using software and/or digital technologies
EN 50271:2001

The following nominal values for single channel and dual channel use of the evaluation unit **GMA81 (A)** have been determined:

Safety function	Single channel use	Redundant use
Detection range	Explosion protection	
	0 – 100 % LEL	
SIL ability hardware	2	3
SIL ability software	1	1
Detector type	as per EN 50271	as per EN 50271
SFF	B	
	93.93	
HFT	0	1
β Faktor	—	5 %
PFD	1.19×10^{-4} (per year)	5.99×10^{-6} (per year)
λ_{du}	2.59×10^{-8} (per h)	
λ_{dd}	2.22×10^{-7} (per h)	
λ_{su}	1.66×10^{-7} (per h)	
λ_{sd}	1.26×10^{-8} (per h)	
Proof Test Interval	1 year	
MTTR	24 h	

The calculation of the nominal values was done by GWW GasWarn Dr. Wenker GmbH, and the accuracy of the statement is confirmed by the conformity statement of GWW GasWarn Dr. Wenker GmbH as independent expert.

Always adhere to the following listed Operational conditions and safety notes of the operation manual 188-000.08

Dortmund, 29.01.2010

Dipl.-Ing. J. L. Hübner
President CEO

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