



Operation Manual

GMA 36 Pro

Stand Alone Monitor



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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 GMA36 Pro 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 GMA36 Pro please refer to the test report. Warranty might be voided if functions or parameters are modified or changed. GfG service is always at your disposal for adapting the monitoring system to your specific requirements.

General Description

The Stand Alone GMA36 Pro is an „intelligent“ detection system for continuous monitoring of gas concentrations and warning of toxic gases and oxygen deficiency in ambient air. The comprehensive electronics takes over lots of functions which on one hand make operation and maintenance easier and on the other hand improve reliability and accuracy dramatically. The GMA36Pro features:

- Plug-in Smart Sensors
- Scalable detection ranges
- Large illuminated display
- Simple three key operation
- AutoCal function

Furthermore the GMA36 Pro offers two alarm relays, an internal horn with relay and the corresponding status indicators. The GMA36 Pro informs at any time about measured gas concentration, exceeded thresholds and operational status. If the gas concentration exceeds one of the two set thresholds, the GMA36 Pro immediately alarms by its LED indicators and switches the corresponding alarm relays.

The GMA36 Pro is easy to operate. Should faults or errors still occur a comprehensive diagnostics enables a quick and targeted service by maintenance personnel.



Measure & Evaluate



Alarm

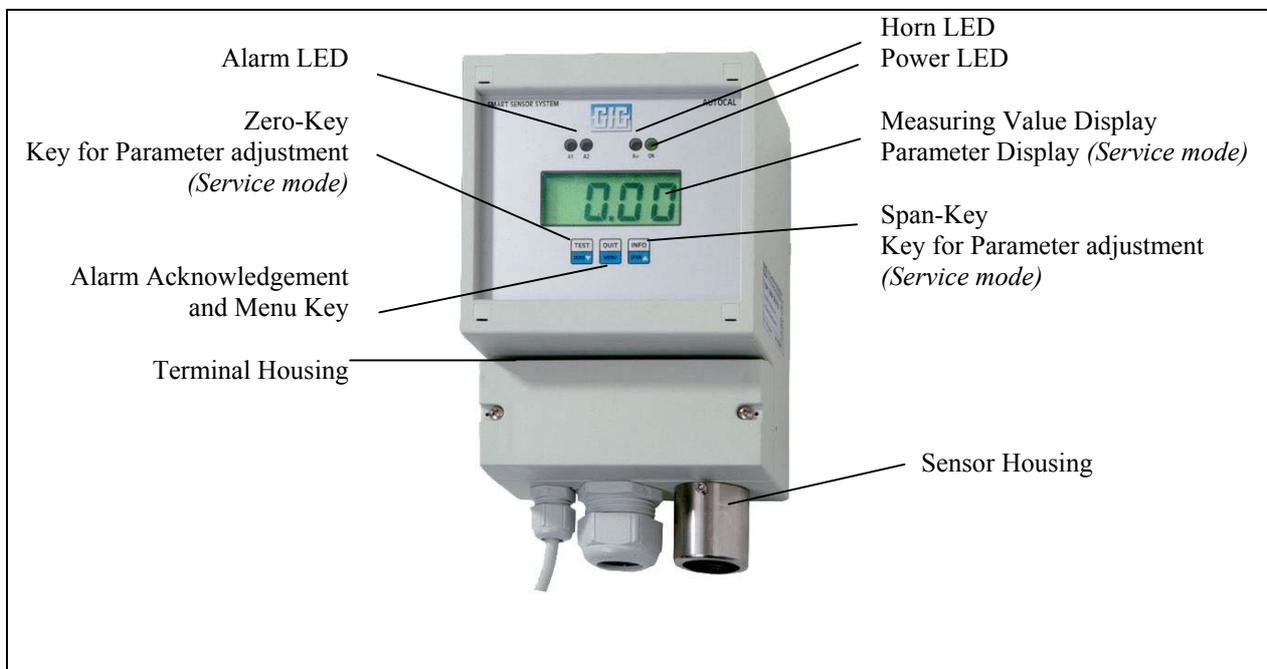
Detection principle

The sensors to be used in the GMA36 Pro are electrochemical cells. Electrochemical cells contain an electrolyte, a working electrode (anode), a counter electrode (cathode) and a reference electrode. The adjustment to the type of gas to be detected is done by choosing the specific electrodes in combination with the suitable electrolyte. Using this technique an electrical signal which is proportional to the gas concentration is generated within the measuring cell. This signal is amplified by the GMA36 Pro and used for displaying, resp. transmitting of the measuring values. The sensor cells work according to the capillary-diffusion-barrier technology. By this technology and an additional temperature compensation negative effects by changing atmospheric pressure and ambient temperature are eliminated.

Layout

The design of the GMA36 Pro is shown in the picture below. The type label (sticker on the right side of the device) indicates the type of device.

Inside the housing the main unit consisting of display and main board and the power supply board can be found. The electronics of the main unit converts the measuring signal for the display. In terminal housing the connectors for the mains supply and the relays are to be found.



Mounting

Positioning the GMA36 Pro

For the determination of the proper mounting position it is essential to know and to consider the ambient conditions. For reliable measurement results the following influences have to be taken into consideration:

- **Ventilation and air flow** and
- **Density of gas.**

The GMA36 Pro is to be installed in a position which allows the gas to reach the sensor even in case of bad ventilation. If necessary, use a smoke cartridge for determination.

Also external influences have to be considered:

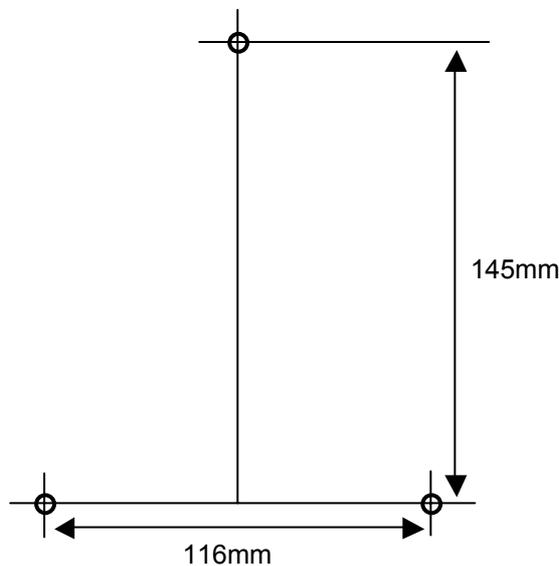
- **Rain water, splash water, drip water, condensate and**
- **Dust load in the atmosphere.**

The GMA36 Pro is ingress protected as far as possible against water and dust (IP 54).

	Warranty might be voided if the sensor is exposed to environmental conditions which were not known by GfG during projecting or delivery.
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When choosing the mounting position it has to be taken into consideration that the GMA36 Pro has to be easily accessible for service and maintenance (calibration). For this purpose the GMA36 Pro should be mounted in an upright position with the sensor pointing downwards. A different position will not affect the measuring accuracy.

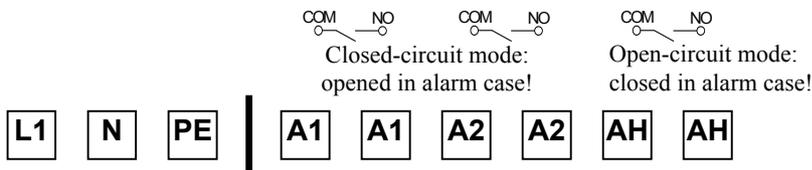
Drilling plan



Electrical Wiring

The installation of the cables and the connection of the electrical cables must be carried out by a specialist following the latest regulations.

Terminal connection



L1, N, PE: Mains supply 85...264V / 50...60Hz

A1: Alarm 1, switching contacts 250V / 5A, closed-circuit mode (not changeable)

A2: Alarm 2, switching contacts 250V / 5A, closed-circuit mode (not changeable)

AH: Alarm horn, switching contacts 250V / 5A, open-circuit mode (not changeable)

Putting into operation

The stand alone GMA36 Pro has passed quality control for correct operation and display before delivery. The calibration was carried out with the appropriate test gases. Depending on transport, mounting and ambient conditions however variations may occur. Therefore the gas warning system has to be taken into operation and function checked by the manufacturer or by a professional which is authorized by the manufacturer (e.g. according to BGV B6 , former VBG61-gases-, resp. BG Chemie T021)

After switching on the gas warning device needs a few minutes of run-in time for:

- Self check of functions, memory (ROM and RAM) and parameter memory (approx. 10 seconds),
- Run-in of the sensor

During warm-up the GMA36 Pro shows on the display the unit, gas type, detection range, alarm thresholds AL1 and AL2 and the calibration gas concentration one after the other. Alarms are not activated during this process. If the GMA36 Pro performs a new start up procedure after a mains failure the alarms will also be evaluated only after the run-in procedure. After completion of this warm-up the GMA36 Pro will automatically switch to detection mode.

On a GMA36 Pro device for the detection of toxic gases the zero-point should be checked after a run-in time of 30 minutes by supplying synthetic air. After this run-in time the display must adjust itself to **0.0** while synthetic air is supplied. Depending on detected gas and detection range it might be possible that the display shows values larger than zero because of e.g. the presence of traces of gas in the ambient air.

On a GMA36 Pro device for the detection of oxygen the display should show a concentration of 20.9 %Vol. oxygen when measuring in ambient air. At temperatures of +25°C or higher it must be taken into consideration that at high levels of humidity 2-3 %Vol. steam can be in the air, reducing the oxygen concentration in ambient air to 20.3-20.5 %Vol.. When adjusting the unit to ambient air using the “span” function the device will be set to display 20.9%Vol.

Detection mode

In detection mode the display shows the current gas concentration. The detection is provided by continuous monitoring. Exceeded thresholds will be immediately recognized and indicated by the GMA36 Pro. Features of the electronics like parameter memory or sensor function are permanently monitored. During trouble-free operation the green LED “ON“ is lit, the yellow LED “AH” (alarm horn) is not lit.



To indicate that the GMA36 Pro is in measuring mode the display alternates every minute to gas type and unit.

Check of LC Display, Relays and Parameters



During these checks the measuring and warning functions are disabled!

Display test

In detection mode a display test can be activated by pressing the key  briefly. Now all the segments **8.8.8.8** will be indicated. If the key  is pressed during that time for a short while the message **PASS.** will appear on the display. With the keys  and  the digits can be changed on the actual position and be confirmed by pressing . After entering the numeric password **1001** the relays and LEDs can be checked individually by means of the keys  and . Hitting the key  switches back to regular detection mode.

Display of detection range and alarm thresholds

To show the detection range and the alarm thresholds the key  has to be pressed. The display will show the following parameters one after the other:

	Display	Description
1	UEG, LEL, VOL, PPM	Unit
2	O2, O3, CL2, CLO2	Gas
3	SCAL / 100, 30, 10	Detection range
4	A1 / 1.5 (value within range)	1. alarm threshold
5	A2 / 2.0 (value within range)	2. alarm threshold
6	CGAS / 5.0 (value within range)	calibration gas concentration

After displaying the a.m. values the GMA36 Pro automatically switches back to detection mode. These informations are also displayed after turning on, resp. putting into operation.

Alarm

The GMA36 Pro features 2 alarm thresholds. An alarm is triggered as soon as the gas concentration exceeds or falls below an alarm threshold. An alarm is indicated by the GMA36 Pro via the corresponding alarm LED. By pressing the key  resp. by activating the external reset an actual alarm can be confirmed.

Simultaneously with the alarm LED the GMA36 Pro switches the corresponding alarm relay. Exceeding the threshold 2 the internal horn and the horn relay are triggered additionally. As a standard setting the thresholds for the specific gases are adjusted and the alarms switch as follows:

Alarm threshold	Alarm	Function	Resettable during alarm	Resettable after gas alarm	Remarks
1	1	non-latching	no	no, since non-latching	
2	2	latching	no	yes	only resettable if concentration has exceeded or fallen below threshold
	Horn	latching	yes	yes	fixed

The switching functions of the horn and of the horn relay are, in contrary to the alarm relays, fixed and cannot be changed.

Remarks to the alarm functions:

Alarm for exceeding / falling below threshold

The alarm is triggered when the gas concentration has fallen below the threshold, if gases are measured which cause hazards by reduced concentrations, e.g. in case of oxygen deficiency. The alarm is triggered for exceeded thresholds, if the danger is caused by rising concentrations, e.g. for toxic and combustible gases.

Latching/ non-latching alarms

A latching alarm is activated until it is reset by pressing the key . A non-latching alarm resets automatically as soon as the gas hazard is decreasing and the measured concentration falls below, resp. exceeds the corresponding threshold.

Fault

In case of any failure the yellow LED „AH“ is lit and the horn together with the horn relay is activated for 0.5 seconds in a 5 seconds interval. A fault may occur if:

- the sensor or the electronics of the transmitter are defective
- no sensor is plugged in
- malfunctions during self-check of the device occur

As soon as the faults are cured the yellow LED „AH“ goes out. The horn and the horn relay switch back and the GMA36 Pro changes to regular measuring mode.

Sensor life

Depending on the gas to be detected, electrochemical sensors are subject to a different lifetime. The end of the sensor life span is indicated by the display showing **CHNG SENS** alternating with the measuring value. The sensor should be exchanged as soon as possible.

Sensor replacement

The GMA36 Pro features pluggable Smart Sensors, shown on pages 14-16. The sensor chip includes information on type of gas, calibration data (sensitivity) and detection range. Once the sensor is replaced, the data of the new, pre-calibrated sensor are transmitted to the controller.

Use an Allen key to loosening the screw at the protective sleeve. Remove the sleeve, pull the old sensor out and fit a new one. Since a pre-calibrated sensor is set to standard parameters and detection ranges, make sure that possibly different values are set properly, when the sensor has been replaced. As the zero values for old and new sensors may be different, we urgently recommend a zeropoint adjustment after a sensor replacement.

Even though the sensors are supplied pre-calibrated, directive T 021 requests putting into operation with gas. This can be done with a gas concentration, which is not precisely defined by sufficient to trigger the alarms. Sensors which layed on the shelf for more than 2 months before being fit, should be calibrated after being plugged in.

Relays

The GMA36 Pro offers 3 relays:

- 2 alarm relays for activation of external alarm devices, valves, etc.
- 1 horn relay for the indication of a fault and activation of the second alarm threshold.

The switching behaviour of the relays follows the same principle as the alarm and fault messages. The alarm relays operate in closed-circuit mode, the horn relay operates in open-circuit mode.

As a standard configuration the switching function of the relays is as follows:

Relay	The relay switches:							
	in detection mode (no gas)	during gas alarm		after gas alarm		at mains failure	at fault	at gas alarm and fault
		not reset	reset	not reset	reset			
Alarm 1								
Alarm 2								
Horn								



When connecting devices take note of the switching behaviour of the relay contacts NO/COM connected to the terminals.

Check and AutoCal adjustment of zero point

A prerequisite for this sensor function is „clean“ ambient air without disturbing, resp. interfering gas components. If this is not for sure the use of synthetic air to be supplied to the sensor is recommended. On Oxygen sensors the zeropoint can only be adjusted by using 100 %Vol. nitrogen.

For checking , resp. adjustment a calibration adaptor has to be attached to the sensor sleeve. Via this adaptor the synthetic air, resp. the nitrogen can be supplied to the sensor at atmospheric pressure with a flow of approx. 0.5 l/min, while the display has to be observed. Is there a deviation from von **0** the zero point has to be adjusted. If the reading is constant the adjustment can be done using the AutoCal feature. The AutoCal program automatically adjusts the zero point signal to the zero gas.

1. Activation of the AutoCal-program by pressing the key  for 3 seconds min.. The display shows **PASS** for a short while.
2. The numeric password **0011** has to be entered now. Using the keys  and  the digits on the actual position can be changed and confirmed by pressing the key .
3. After correct entering the display shows the measuring value alternating with the message **ZERO**. If the measuring value remains constant over a certain period of time (for oxygen sensors a fixed time of 3 minutes) it will be overwritten with the zero value. The AutoCal program will be finished automatically with **SAVE** in the display (for oxygen sensors **END** is displayed additionally to remind to stop the supply of nitrogen. After the recognition of increasing measuring values the unit switches back to detection mode).

The AutoCal program can be shortened by pushing the key  for a longer while. The display briefly shows **SAVE** and the measuring value will be overwritten with the zero value.

To quit the AutoCal program without adjusting the zero point the key  has to be pressed briefly. The display will show **ESC**.

Following error messages might occur during adjustment:

Display	Remarks
CAL ERR.1	No test gas could be detected
CAL ERR.2	The test gas signal is unstable
CAL ERR.3	The calibration data is not plausible

These error messages during adjustment procedure have to be confirmed by pressing the key .

Check and AutoCal adjustment of span

Initially the valid calibration gas concentration can be seen from the test report or from the parameter display by briefly pressing the key . The value of the test gas concentration should be at least 20 % above the 2. alarm threshold. The setting of the alarm thresholds can also be seen from the parameter memory by briefly pressing the key .



Special safety instructions have to be obeyed when handling toxic gases. TLV will point at potential hazards caused by toxic gases.

For checking, resp. adjusting the display sensitivity (span) a calibration adapter has to be attached to the sensor sleeve. Via this adapter the calibration gas can be supplied to the sensor at atmospheric pressure with a flow of approx. 0.5 l/min., while the display has to be observed. Is there a deviation between the displayed value and the actual calibration gas concentration a span calibration is necessary. If the reading

is constant the adjustment can be done using the AutoCal feature. The AutoCal program automatically adjusts the measuring signal to the calibration gas.

1. Activation of the AutoCal program by pressing the key  for 3 seconds min.. The display shows **PASS** for a short while.
2. The numeric password **0011** has to be entered now. Using the keys  and  the digits on the actual position can be changed and confirmed by pressing the key .
3. After correct entering the display shows the measuring value alternating with the message **SPAN**. The unit now waits for a noticeable increase of the gas concentration. If the measured value remains constant within a defined interval after a fixed waiting time of 3 minutes (not applicable to oxygen sensors), the value of the calibration gas concentration is stored (display **SAVE**). The unit now waits for a decreasing test gas concentration and a stabilization of the measuring value (display **ZERO**) until the regular detection mode is resumed.

The AutoCal program can be shortened by pushing the key  for a longer while. The display briefly shows **SAVE** and the measuring value will be overwritten with the test gas concentration.

To quit the AutoCal program without span adjustment the key  has to be pressed briefly. The display will show **ESC**.

Following error messages might occur during adjustment:

Display	Remarks
CAL ERR.1	No test gas could be detected
CAL ERR.2	The test gas signal is unstable
CAL ERR.3	The calibration data are not plausible

These error messages during adjustment procedure have to be confirmed by pressing the key .

The sensitivity of the oxygen sensor is calibrated in synthetic air or ambient air to 20.9 %Vol.. At temperatures of +25°C or higher it must be taken into consideration that at high levels of humidity 2-3 %Vol. steam can be in the air, thus reducing the oxygen concentration in ambient air to 20.3-20.5 %Vol.. When adjusting the unit to ambient air the device would be set to display 20.9 %Vol. – so in this case would be adjusted a little bit too sensitive.

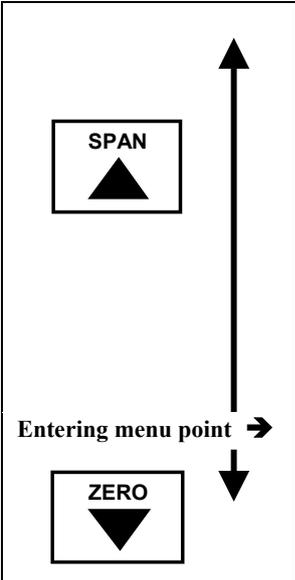
Service mode

Service menu activation

The service menu allows to display and change all important parameters of the GMA36 Pro.

To enter the menu the following steps have to be taken:

1. The key  has to be pressed for 3 seconds min.. The display will show **PASS** for a short while.
2. Now the numeric password **5050** has to be entered. Using the keys  and  the digits on the actual position can be changed and confirmed by pressing the key .
3. After correct entering the display will show **CGAS**. From here the different menu points can be selected with the arrow keys.

	Menu display	Description
	TEST	Funktion test A1, A2, AH
	GAS	Change of gas type
	INFO	Display of software version and serial number
	SCAL	Change of detection range
	P2	Change of alarm function for alarm 2
	P1	Change of alarm function for alarm 1
	H2	Change of hysteresis for alarm 2
	H1	Change of hysteresis for alarm 1
	A2	Change of threshold for alarm 2
	A1	Change of threshold for alarm 1
	CGAS	Change of test gas concentration
	SAVE	Leaving the menu by saving the changed parameters
	ESC	Leaving the menu without saving the changed parameters

The selected menu point is activated by pressing the key  briefly. The adjustment of the parameters can then be done by means of the keys  and . For leaving the menu point, briefly press the key  again.

In service mode the alarms are blocked. If no keys are pressed by the user the unit automatically leaves the service mode after 1 to 5 minutes and returns to normal detection mode with activated alarms.

Adjustments in service mode

Check and adjustment of calibration gas concentration CGAS

1. Activation of the menu point **CGAS** by briefly pressing the key .
2. The display will show the currently adjusted value for calibration gas concentration.
3. The adjustment of this parameter is done by pressing the keys  and .
4. The menu point **CGAS** can be quit by briefly pressing the key .
5. Storing the parameters (see Service menu deactivation, page 12).

Check and adjustment of alarm thresholds A1 resp. A2

1. Activation of the menu point **A1** resp. **A2** by briefly pressing the key .
2. The display will show the currently adjusted value for the alarm threshold.
3. The adjustment of this parameter is done by pressing the keys  and .
4. The menu point **A1** resp. **A2** can be quit by briefly pressing the key .
5. Storing the parameters (see Service menu deactivation, page 12).

Check and adjustment of alarm threshold hysteresis H1 resp. H2

With this function the hysteresis (the deactivation point) of the alarm thresholds can be adjusted. The adjustment of this parameter is done in the unit of the measured gas.

Example:

For a GMA36 Pro which is detecting a gas in a range of 0 .. 100ppm the deactivation point for alarm 1 was set to 4 ppm below the alarm threshold and for alarm 2 to 10 ppm below the alarm threshold. This will lead to following alarm switchings:

	Alarm 1	Alarm 2
Alarm threshold	= 10 ppm	= 50 ppm
Alarm activation	\geq 10 ppm	\geq 50 ppm
Hysteresis	4 ppm	10 ppm
Alarm deactivation	\leq 6 ppm	\leq 40 ppm

Adjustment of hysteresis:

1. Activation of menu point **H1** resp. **H2** by briefly pressing the key .
2. The display will show the currently adjusted value for the hysteresis.
3. The adjustment of this parameter is done by pressing the keys  and .
4. The menu point **H1** resp. **H2** can be quit by briefly pressing the key .
5. Storing the parameters (see Service menu deactivation, page 12).

Check and adjustment of alarm functions P1 resp. P2

1. Activation of menu point **P1** resp. **P2** by briefly pressing the key .
2. The display will show the currently adjusted code for the alarm function (see also chapter alarms).

Parameter display	Description
L S.C	Alarm at falling-below, storing, always resettable
L SC	Alarm at falling-below, storing, only resettable if threshold is exceeded
L NS	Alarm at falling-below
H NS	Alarm at exceeding
H SC	Alarm at exceeding, storing, only resettable if value falls below threshold
H S.C	Alarm at exceeding, storing, always resettable

Code

L Low	H High	S Store	N Not Stored	C Confirm
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3. The adjustment of this parameter is done by pressing the keys  and .
4. The menu point **P1** resp. **P2** can be quit by briefly pressing the key .
5. Storing the parameters (see Service menu deactivation, page 12).

Check and adjustment of detection range SCAL

Because of the scaling function of the GMA36 Pro a single sensor of the GMA36 Pro system can be used for the detection of different ranges. Therefore a maximum of 2 different sensors for the same gas cover most applications, e.g.:

CO 500 ppm	0 .. 500 ppm	400 ppm	300 ppm	250 ppm	200 ppm	100 ppm
CO 2000 ppm	0 .. 2000 ppm	1500 ppm	1000 ppm	500 ppm	400 ppm	
NH ₃ 2000 ppm	0 .. 2000 ppm	1500 ppm	1000 ppm	500 ppm	400 ppm	
NH ₃ 1000 ppm	0 .. 1000 ppm	500 ppm	400 ppm	300 ppm	250 ppm	200 ppm

The maximum detection range (full scale) of each sensor can be scaled down to a sixth. The following pattern is used: 10, 15, 20, 25, 30, 40, 50, 100 ...etc.

 In case of fixed detection ranges (e.g. HF 0..10 ppm) a downscaling cannot be recommended.

 Changing the detection range is stored at the sensor. When a sensor is replaced by a new one, the detection range has to be adapted again.

1. Activation of the menu point **SCAL** by briefly pressing the key .
2. The display will show the currently adjusted value for the full-scale value.
3. The adjustment of this parameter is done by pressing the keys  and .
4. The menu point **SCAL** can be quit by briefly pressing the key .
5. Storing the parameters (see Service menu deactivation, page 12).

After having changed the detection range the alarm thresholds should be checked and, if necessary, adapted to the new range. Should a downscaling result in a threshold which is above the new full scale value, the alarm level will be changed automatically and is set to the full scale value.

Display of software version and serial number **INFO**

1. Activation of menu point **INFO** by briefly pressing the key .
2. The display will show the software version and the serial number of the device.
3. The menu point **INFO** can be quit by briefly pressing the key .

Changing of gas type **GAS** (only valid for sensor MK 397-7)

This function allows to select the gas types ozone, chlorine and chlorine dioxide stored in sensor type MK 397-7. Should the connected sensor not include one of these sensor parameters, the first stored gas type of the connected sensor is chosen automatically.

1. Activation of menu point **GAS** by briefly pressing the key .
2. The display will show the currently adjusted gas type (**O3**, **CL2**, **CLO2**).
3. The gas type can now be selected by pressing the keys  and .
4. Confirmation of gas type by briefly pressing the key .
5. Re-start of the GMA36 Pro with new type of gas (reset).

Function test of alarms and horn

1. Activation of menu point **TEST** by briefly pressing the key .
2. The now activated alarm 1 will be shown on the display as **A1**.
3. Changing from activated alarm 1 (**A1**) to alarm 2 (**A2**) and horn (**AH**) can be done by pressing the keys  and .
4. The menu point **TEST** can be quit by briefly pressing the key .
5. Storing the parameters (see Service menu deactivation, page 12).

Service menu deactivation

The service mode can be quit with or without storing of the changed parameters:

With storing:

Select menu point **SAVE** and activate it by briefly pressing the key .

Without storing:

Select menu point **ESC** and activate it by briefly pressing the key .



Several parameter can be changed one after the other without intermediate storing. One single storing process at the end of the adjustments saves all changes of the selected menu point.

Maintenance

The maintenance of a gas warning system contains, according to the German BGV B6 (UVV Gase = “Accident Prevention Regulation Gases”), the inspection, service, calibration and adjustment, regular function checks and repairs. Also the guideline T021 of BG Chemie (= trade association chemical industry) describes the appropriate measures, amongst them a regular function check with alarm test gas and if necessary test of following functions:

- **Zero point and sensitivity (calibration)**
- **Response time**
- **Gas sampling system, gas processing**
- **Alarm signal triggering**
- **Signalling devices for malfunctions**

The inspection must be carried out by a specialist. The result must be noted in a written test report. The calibration intervals should not exceed 6 months. The function check must be carried out before putting into operation and at least once a year.

Service and inspection

Service and inspection comprise all measures which are necessary to keep the original proper working condition of the gas warning system.

The GMA36 Pro does not need any particular maintenance, but some points should be noted.

- Gas warning systems may perform differently depending on ambient conditions. Therefore it is essential to have at least a visual check about the operational status every day.
- Check of gas processing equipment and filters, where applicable.
- Check of gas supply for soiling. A free gas flow is essential for accurate detection.
- Electrochemical sensors are subject to ageing and using up. The replacement usually has to happen every 24 months. A sensitivity check can only be performed using the appropriate test gas. The span calibration is a professional calibration and usually should only be performed by GfG service or by personnel authorized by GfG.

Trouble shooting

Failure	Cause	Solution
Zero point can not be adjusted	Sensor defective	Sensor replacement
Span can not be adjusted	Sensor defective	Sensor replacement

Gases and detection ranges

Gas	Range Standard	Ranges Min. / Max.	Sensor type
Ammonia (NH ₃)	0...100 ppm	0... 40 to 200 ppm	MK393-7
	0...500 ppm	0...200 to 1000 ppm	MK399-7
Chlorine (Cl ₂)	0...10 ppm	0...10 to 50 ppm	MK390-7
	0...50 ppm	0...50 to 250 ppm	MK304-4
Chlorine dioxide (ClO ₂)	0...2 ppm	0... 1 to 2 ppm	MK391-7
Hydrogen chloride (HCl)	0...10 ppm	0... 5 to 30 ppm	MK392-7
	0...50 ppm	0...40 to 200 ppm	MK309-7
Hydrogen cyanide (HCN)	0...50 ppm	0...10 to 50 ppm	MK409-7
	0...100 ppm	0...40 to 200 ppm	MK336-7
Ethylene oxide (C ₂ H ₄ O)	0...20 ppm	0...20 to 100 ppm	MK340-7
Hydrogen fluoride (HF)	0...10 ppm	—	MK412-7
Carbon monoxide (CO) sensitive for H ₂ S	0...300 ppm	0...100 to 500 ppm	MK174-7
	0...1000 ppm	0...400 to 2000 ppm	MK174-4
Carbon monoxide (CO) insensitive for H ₂ S	0...300 ppm	0...100 to 500 ppm	MK175-7
	0...1000 ppm	0...400 to 2000 ppm	MK175-4
Carbon monoxide (CO) insensitive for H ₂ S reduced sensitivity for hydrogen	0...300 ppm	0...100 to 500 ppm	MK369-7
Ozone (O ₃) for TLV monitoring	0...1 ppm	—	MK411-7
Ozone (O ₃) for leak detection	0...3 ppm	0...1 to 5 ppm	MK397-7
Phosgene (COCl ₂)	0...2 ppm	0...1 to 2 ppm	MK349-7
Oxygen (O ₂)	0...25 Vol.%	0...5 to 30 Vol.%	MK398-7
Sulphur dioxide (SO ₂)	0...10 ppm	0... 10 to 50 ppm	MK306-7
	0...100 ppm	0...100 to 500 ppm	MK307-7
Hydrogen sulphide (H ₂ S)	0...50 ppm	0... 40 to 200 ppm	MK176-7
	0...200 ppm	0...200 to 1000 ppm	MK177-7
Silane (SiH ₄)	0...20 ppm	0...10 to 50 ppm	MK404-7
Nitrogen dioxide (NO ₂)	0...30 ppm	0...10 to 50 ppm	MK310-7
	0...100 ppm	0...40 to 200 ppm	MK310-4
Nitrogen monoxide (NO)	0...100 ppm	0... 50 to 300 ppm	MK179-7
	0...500 ppm	0...300 to 1500 ppm	MK179-4
Hydrogen (H ₂)	0...2000 ppm	0...400 to 2000 ppm	MK305-7
	0...1 Vol.%	0...0.2 to 1 Vol.%	MK402-7
	0...2 Vol.%	0...1 to 4 Vol.%	MK403-7

Sensor specification

MK174-7 (-4) Electrochemical sensor for carbon monoxide CO		
Response time		t_{90} : <40 s
Pressure	800...1200 hPa:	max. ± 3 ppm or $\pm 7\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ± 3 ppm or $\pm 7\%$ of display (related to 50% r.h.)
Temperature	-20...+40(50)°C:	max. $\pm 3(5)$ ppm or $\pm 7(10)\%$ of display (related to 20°C)
Cross sensitivities:		H ₂ S \approx 250% , C ₂ H ₄ <100% , SO ₂ \approx 60% , H ₂ <60% , NO ₂ \approx -60% , HCN \approx 50% , Cl ₂ \approx -50% , NO \approx 30% (*1)
Expected lifetime:		3 Years
MK175-7 (-4) Electrochemical sensor for carbon monoxide CO		
Response time		t_{90} : <45 s
Pressure	800...1200 hPa:	max. ± 3 ppm or $\pm 7\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ± 3 ppm or $\pm 7\%$ of display (related to 50% r.h.)
Temperature	-20...+40(50)°C:	max. $\pm 3(5)$ ppm or $\pm 7(10)\%$ of display (related to 20°C)
Cross sensitivities:		H ₂ S<2% , C ₂ H ₄ <100% , H ₂ <60% , HCN<20% , NO<20% , NO ₂ <-10% , HCl=SO ₂ =Cl ₂ =0% , (*1)
Expected lifetime:		3 Years
MK176-7 Electrochemical sensor for hydrogen sulphide H₂S		
Response time		t_{90} : <40 s
Pressure	800...1200 hPa:	max. ± 1 ppm or $\pm 7\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ± 1 ppm or $\pm 7\%$ of display (related to 50% r.h.)
Temperature	-20...+50°C:	max. ± 1 ppm or $\pm 7\%$ of display (related to 20°C)
Cross sensitivities:		SO ₂ <20% , NO ₂ <-20% , Cl ₂ <-20% , HCN<-10% , NO<6% , CO<0.5% , H ₂ <0.1% (*1)
Expected lifetime:		2..3 Years
MK177-7 Electrochemical sensor for hydrogen sulphide H₂S		
Response time		t_{90} : <40 s
Pressure	800...1200 hPa:	max. ± 1 ppm or $\pm 7\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ± 1 ppm or $\pm 7\%$ of display (related to 50% r.h.)
Temperature	-20...+50°C:	max. ± 1 ppm or $\pm 7\%$ of display (related to 20°C)
Cross sensitivities:		SO ₂ <20% , NO ₂ <-20% , HCN<-15% , Cl ₂ \pm 5% , CO<2% , H ₂ <0.1% , NO=0% (*1)
Expected lifetime:		2..3 Years
MK179-7 (-4) Electrochemical sensor for nitrogen monoxide NO		
Response time		t_{90} : <25 s
Pressure	800...1200 hPa:	max. ± 1 ppm or $\pm 7\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ± 1 ppm or $\pm 7\%$ of display (related to 50% r.h.)
Temperature	-20...+35(50)°C:	max. $\pm 3(6)$ ppm or $\pm 7\%$ of display (related to 20°C)
Cross sensitivities:		H ₂ S \approx 35% , NO ₂ <30% , HCl<20% , SO ₂ =CO=NO=HCN=Cl ₂ =0% (*1)
Expected lifetime:		3 Years
Warm-up time:		3 minutes up to 1 day – depending on time the detector has been turned off
MK304-4 Electrochemical sensor for Chlorine Cl₂		
Response time		t_{90} : <70 s
Pressure	800...1200 hPa:	max. $\pm 0,2$ ppm or $\pm 10\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. $\pm 0,2$ ppm or $\pm 10\%$ of display (related to 50% r.h.)
Temperature	-20...+35(50)°C:	max. $\pm 0,3(0,5)$ ppm or $\pm 10\%$ of display (related to 20°C)
Cross sensitivities:		NO ₂ \approx 100% , H ₂ S<-10% , SO ₂ <-1% , H ₂ =HCN=HCl=NO=CO=0% (*1)
Expected lifetime:		2..3 Years
MK305-7 Electrochemical sensor for hydrogen H₂		
Response time		t_{90} : <60 s
Pressure	800...1200 hPa:	max. ± 5 ppm or $\pm 5\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ± 5 ppm or $\pm 10\%$ of display (related to 50% r.h.)
Temperature	-20...+40(50)°C:	max. $\pm 10(20)$ ppm or $\pm 20\%$ of display (related to 20°C)
Cross sensitivities:		C ₂ H ₄ \approx 80% , NO \approx 30% , HCN \approx 30% , CO<20% , H ₂ S<20% , SO ₂ =NO ₂ =Cl ₂ =HCl=0% (*1)
Expected lifetime:		2..3 Years
MK306-7 Electrochemical sensor for sulphur dioxide SO₂		
Response time		t_{90} : <30 s
Pressure	800...1200 hPa:	max. $\pm 0,2$ ppm or $\pm 5\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. $\pm 0,2$ ppm or $\pm 5\%$ of display (related to 50% r.h.)
Temperature	-20...+50°C:	max. $\pm 0,2$ ppm or $\pm 5\%$ of display (related to 20°C)
Cross sensitivities:		H ₂ S \approx 130% , NO ₂ \approx -120% , HCN \approx 50% , Cl ₂ \approx -50% , HCl \approx 20% , CO<1% , NO=0% (*1)
Expected lifetime:		2..3 Years
MK307-7 Electrochemical sensor for sulphur dioxide SO₂		
Response time		t_{90} : <30 s
Pressure	800...1200 hPa:	max. $\pm 0,2$ ppm or $\pm 5\%$ of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. $\pm 0,2$ ppm or $\pm 5\%$ of display (related to 50% r.h.)
Temperature	-20...+50°C:	max. $\pm 0,2$ ppm or $\pm 5\%$ of display (related to 20°C)
Cross sensitivities:		NO ₂ \approx 100% , Cl ₂ \approx -50% , HCN<50% , CO<2% , H ₂ S=HCl=H ₂ =NO=0% (*1)
Expected lifetime:		2..3 Years
MK309-7 Electrochemical sensor for hydrogen chloride HCl		
Response time		t_{90} : <150 s
Pressure	800...1200 hPa:	max. ± 1 ppm or $\pm 10\%$ of display (related to 1000 hPa)
Humidity	10%...95% r.h.:	max. ± 1 ppm or $\pm 10\%$ of display (related to 50% r.h.)
Temperature	-20...+35(50)°C:	max. $\pm 1(3)$ ppm or $\pm 15(30)\%$ of display (related to 20°C)
Cross sensitivities:		BCl ₃ >200% , HBr \approx 65% , H ₂ S: 60..150% , SO ₂ : 30..70% , NO ₂ <10% , Cl ₂ : -5..+10% , HCN<3% , CO<1% , NO=0% (*1)
Expected lifetime:		2..3 Years
Warm-up time:		10 minutes up to 7 days – depending on time the detector has been turned off

(*1): Displayed value with reference to the supplied gas concentration which lies in the range of the TLV value

MK310-7 (-4) Electrochemical sensor for nitrogen dioxide NO₂		
Response time		t ₉₀ : <45 s
Pressure	800...1200 hPa:	max. ±0,3ppm or ±5% of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ±0,3ppm or ±5% of display (related to 50% r.h.)
Temperature	-20...+40(50)°C:	max. ±0,3(0,5)ppm or ±5% of display (related to 20°C)
Cross sensitivities:		Cl ₂ ≈100% , H ₂ S<-10% , SO ₂ <1% , HCl=HCN=H ₂ =NO=CO=0% (*1)
Expected lifetime:		2..3 Years
MK336-7 Electrochemical sensor for hydrogen cyanide HCN		
Response time		t ₉₀ : <150 s
Pressure	800...1200 hPa:	max. ±1 ppm or ±10% of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ±1 ppm or ±10% of display (related to 50% r.h.)
Temperature	-20...+35(50)°C:	max. ±1(3) ppm or ±15% of display (related to 20°C)
Cross sensitivities:		H ₂ S≈350% , SO ₂ <300% , NO ₂ <-300% , Cl ₂ ≈-50% , NO<40% , CO<12% , H ₂ =0% (*1)
Expected lifetime:		2 Years
MK340-7 Electrochemical sensor for ethylene oxide C₂H₄O		
Response time		t ₉₀ : <150 s
Pressure	800...1200 hPa:	Max. ±1ppm or ±15% of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	Max. ±2ppm or ±15% of display (related to 50% r.h.)
Temperature	-20...+30(50)°C:	Max. ±1(3)ppm or ±15(20)% of display (related to 20°C)
Cross sensitivities:		CO≈40% , CH ₄ O≈150% , C ₂ H ₂ ≈125% , CH ₂ O≈120% , CH ₄ S≈100% , C ₂ H ₄ ≈80% , C ₂ H ₆ O≈55% , C ₇ H ₈ ≈20% , MEK≈10% u.a. (*1)
Expected lifetime:		2..3 Years
Warm-up time:		4 minutes up to 7 days – depending on time the detector has been turned off
MK349-7 Electrochemical sensor for phosgene COCl₂		
Response time		t ₉₀ : <150 s
Pressure	800...1200 hPa:	Max. ±0,02ppm or ±10% of display (related to 1000 hPa)
Humidity	10%...95% r.h.:	Max. ±0,02ppm or ±10% of display (related to 50% r.h.)
Temperature	-20...+40°C:	Max. ±0,02ppm or ±10% of display (related to 20°C)
Cross sensitivities:		C ₂ H ₆ O=CO ₂ =CO=Cl ₂ =H ₂ =HF=PH ₃ =SO ₂ : 0% HCN=H ₂ S: 0% (poisoned by extended gas supply) (*1)
Expected lifetime:		1..1.5 Years
MK369-7 Electrochemical sensor for carbon monoxide CO		
Response time		t ₉₀ : <10 s t ₉₀ : <30 s
Pressure	800...1200 hPa:	Max. ±3ppm or ±10% of display (related to 1000 hPa)
Humidity	15%...90% r.h.:	Max. ±3ppm or ±10% of display (related to 50% r.h.)
Temperature	-20...+50°C:	Max. ±3ppm or ±15% of display (related to 20°C)
Cross sensitivities:		H ₂ : <10% , NO: <9% , H ₂ S: 0% , SO ₂ : 0% (*1)
Expected lifetime:		2..3 Years
MK390-7 Electrochemical sensor for chlorine Cl₂		
Response time		t ₉₀ : <30 s
Pressure	800...1200 hPa:	Max. ±0,2ppm or ±10% of display (related to 1000 hPa)
Humidity	10%...95% r.h.:	Max. ±0,2ppm or ±10% of display (related to 50% r.h.)
Temperature	-20...+50°C:	Max. ±0,2ppm or ±10% of display (related to 20°C)
Cross sensitivities:		F ₂ : ≈44% , ClO ₂ : ≈20% , NO ₂ : ≈12% , H ₂ S: ≈ -3% , HCl: <2% , CO: 0% , SO ₂ : 0% (*1)
Expected lifetime:		2..3 Years
MK391-7 Electrochemical sensor for chlorine dioxide ClO₂		
Response time		t ₉₀ : <120 s
Pressure	800...1200 hPa:	Max. ±0,05ppm or ±10% of display (related to 1000 hPa)
Humidity	10%...95% r.h.:	Max. ±0,05ppm or ±10% of display (related to 50% r.h.)
Temperature	-20...+50°C:	Max. ±0,05ppm or ±10% of display (related to 20°C)
Cross sensitivities:		Cl ₂ : ≈90% , H ₂ S: ≈ -0,2% , H ₂ =CO ₂ =CO=GeH ₄ =B ₂ H ₆ : 0% (*1)
Expected lifetime:		1..2 Years
MK392-7 Electrochemical sensor for hydrogen chloride HCl		
Response time		t ₉₀ : <90 s
Pressure	800...1200 hPa:	Max. ±1ppm or ±10% of display (related to 1000 hPa)
Humidity	10%...95% r.h.:	Max. ±1ppm or ±10% of display (related to 50% r.h.)
Temperature	-20...+50°C:	Max. ±1ppm or ±10% of display (related to 20°C)
Cross sensitivities:		PH ₃ : 300% , H ₂ S: 28% , Cl ₂ : 20% , HCN: 7% , CO: 1% , C ₂ H ₆ O=CO ₂ =H ₂ =HF=N ₂ : 0% (*1)
Expected lifetime:		2..3 Years
MK393-7 Electrochemical sensor for ammonia NH₃		
Response time		t ₉₀ : <60 s
Pressure	800...1200 hPa:	Max. ±1ppm or ±10% of display (related to 1000 hPa)
Humidity	10%...95% r.h.:	Max. ±1ppm or ±10% of display (related to 50% r.h.)
Temperature	-20...+50°C:	Max. ±1ppm or ±15% of display (related to 20°C)
Cross sensitivities:		CO: 0% , CO ₂ : 0% , H ₂ : 0% , C ₂ H ₆ O: 0% , Cl ₂ : 0% , HCN: 0% , N ₂ : 0% , H ₂ S: 0% (in minute range) (*1)
Expected lifetime:		2..3 Years

(*1): Displayed value with reference to the supplied gas concentration which lies in the range of the TLV value

MK397-7 Electrochemical sensor for ozone O₃			
Response time		t ₉₀ : <150 s	
Pressure	800...1200 hPa:	max. ±0,03 ppm or ±10% of display	(related to 1000 hPa)
Humidity	15%...90% r.h.:	max. ±0,03 ppm or ±10% of display	(related to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,05 ppm or ±15% of display	(related to 20°C)
Cross sensitivities:		ClO ₂ ≈200% , NO ₂ ≈80% , H ₂ S≈-70% , Cl ₂ ≈60% , SO ₂ ≈-50% , CO<0,1% (*1)	
Expected lifetime:		2..3 Years	
MK398-7 Electrochemical sensor for oxygen O₂			
Response time		t ₉₀ : <10 s t ₉₀ : <20 s	
Pressure	800...1200 hPa:	max. ±0,2Vol.% or ±2,5% des Messbereiches	(related to 1000 hPa)
Humidity	0%...99% r.h.:	max. ±0,2Vol.% or ±2,5% des Messbereiches	(related to 50% r.h.)
Temperature	-20...+40(50)°C:	max. ±0,3(0,5)Vol.% or ±2(4)% of display	(related to 20°C)
Expected lifetime:		2 Years in air	
MK399-7 Electrochemical sensor for ammonia NH₃			
Response time		t ₉₀ : <90 s	
Pressure	800...1200 hPa:	max. ± 5ppm or ±10% of display	(related to 1000 hPa)
Humidity	10%...95% r.h.:	max. ± 5ppm or ±10% of display	(related to 50% r.h.)
Temperature	-20...+50°C:	max. ±10ppm or ±20% of display	(related to 20°C)
Cross sensitivities:		CO=CO ₂ =H ₂ = C ₂ H ₆ O=Cl ₂ =HCN=N ₂ : 0% H ₂ S: 0% (in minute range) (*1)	
Expected lifetime:		2..3 Years	
MK402-7 Electrochemical sensor for hydrogen H₂			
Response time		t ₉₀ : <90 s	
Pressure	800...1200 hPa:	max. ±0,01Vol.% or ±10% of display	(related to 1000 hPa)
Humidity	10%...90% r.h.:	max. ±0,01Vol.% or ±10% of display	(related to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,02Vol.% or ±20% of display	(related to 20°C)
Cross sensitivities:		CO: <15% , Cl ₂ : ≈800% (*1)	
Expected lifetime:		2..3 Years	
MK403-7 Electrochemical sensor for hydrogen H₂			
Response time		t ₉₀ : <90 s	
Pressure	800...1200 hPa:	max. ±0,01Vol.% or ±10% of display	(related to 1000 hPa)
Humidity	10%...90% r.h.:	max. ±0,01Vol.% or ±10% of display	(related to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,02Vol.% or ±25% of display	(related to 20°C)
Cross sensitivities:		CO: <15% (*1)	
Expected lifetime:		2..3 Years	
MK404-7 Electrochemical sensor for silane SiH₄			
Response time		t ₉₀ : <60 s	
Pressure	800...1200 hPa:	Max. ±0,1ppm or ±10% of display	(related to 1000 hPa)
Humidity	20%...95% r.h.:	Max. ±0,1ppm or ±10% of display	(related to 50% r.h.)
Temperature	-20...+50°C:	Max. ±0,1ppm or ±10% of display	(related to 20°C)
Cross sensitivities:		PH ₃ : 130% , GeH ₄ : 100% , AsH ₃ : 70% , B ₂ H ₆ : 55% , Cl ₂ : -8% , CO: 4% , CO ₂ =H ₂ =HF=0% (*1)	
Expected lifetime:		2 Years	
MK409-7 Electrochemical sensor for hydrogen cyanide HCN			
Response time		t ₉₀ : <60 s	
Pressure	800...1200 hPa:	max. ±0,5 ppm or ±10% of display	(related to 1000 hPa)
Humidity	10%...95% r.h.:	max. ±0,5 ppm or ±10% of display	(related to 50% r.h.)
Temperature	-20...+50°C:	max. ±0,5 ppm or ±15% of display	(related to 20°C)
Cross sensitivities:		NO ₂ : -120% , Cl ₂ : ≈-20% , CO: 0% , CO ₂ : 0% , H ₂ : 0% , HF: 0% , NO: 0% , PH ₃ : 0% (*1)	
Expected lifetime:		2 Years	
MK411-7 Electrochemical sensor for ozone O₃			
Response time		t ₉₀ : <60 s	
Pressure	800...1200 hPa:	Max. ±0,03 ppm or ±10% of display	(related to 1000 hPa)
Humidity	10%...95% r.h.:	Max. ±0,03 ppm or ±10% of display	(related to 50% r.h.)
Temperature	-10...+45°C:	Max. ±0,03 ppm or ±15% of display	(related to 20°C)
Cross sensitivities:		Cl ₂ : 70..210% , ClO ₂ : 60..180% , NO ₂ : 60..80% , F ₂ : ≈70% , PH ₃ : 10% , H ₂ : ≈0% , HCN: -0,3% (*1)	
Expected lifetime:		2 Years	
MK412-7 Electrochemical sensor for hydrogen fluoride HF			
Response time		t ₉₀ : <40 s t ₉₀ : <90 s	
Pressure	800...1200 hPa:	Max. ±0,2ppm or ±10% of display	(related to 1000 hPa)
Humidity	10%...80% r.h.:	max. ±0,2ppm or ±10% of display	(related to 50% r.h.)
Temperature	-20...+40°C:	max. ±0,2ppm or ±10% of display	(related to 20°C)
Cross sensitivities:		Cl ₂ ≈40% , NO ₂ >1% , CO=CO ₂ =H ₂ S=H ₂ =0% (*1)	
Expected lifetime:		1..2 Years	

(*1): Displayed value with reference to the supplied gas concentration which lies in the range of the TLV value

Technical Data

Detector type	GMA36 Pro
Measuring functions	<p>Gas: Toxic gases and vapours, e.g. chlorine, ammonia or oxygen (see test report)</p> <p>Detection range: see test report</p> <p>Gas supply: diffusion</p> <p>Detection principle: electrochemical sensor</p> <p>Response time t_{90}: 15...90 s (depending on type of gas)</p> <p>Sensor life: see Sensor specification</p>
Power supply	<p>Supply voltage: 85...264V / 50-60Hz</p> <p>Power consumption: < 5W</p> <p>Cable gland: screwing M10, cable diameter 5-10mm, max. conductor cross section 3x1.5 mm²</p> <p>Fuse mains unit: 2A</p> <p>Fuse transmitter: 200mA</p>
Climate conditions	<p>Storage: -25...+55°C, 15...96% r.h.</p> <p>Operation: -15...+45°C, 15...96% r.h., 920...1080 hPa</p>
Relay outputs	<p>Max. switching voltage: 250V AC 50/60Hz resp. 250V DC (see below)</p> <p>Max. switching current: 5A AC/DC</p> <p>Max. switching performance: 1000VA AC or depending on voltage 50...200W DC</p> <p>Cable gland: screwing M32 for max. 3 cables, cable diameter 4-9 mm, max. conductor cross section 2x1.5 mm²</p>
Housing	<p>Housing material: compound (PS)</p> <p>Protection: IP 54</p> <p>Sensor holder material: stainless steel</p> <p>Dimensions: 135 x 247 x 95 mm (WxHxD)</p> <p>Weight: 900 g</p>
Safety	<p>Electrical: according to EN 61010-1</p> <ul style="list-style-type: none"> - mains supply up to 300V for industrial applications (soiling degree 2, overvoltage category III) - relay connections up to 300V for home and industrial applications (soiling degree 2, overvoltage category II) - relay connections up to 150V for industrial applications (soiling degree 2, overvoltage category III) <p>The relay terminals A1 and A2 are electrically separated from each other by a basic insulation.</p> <p>Electromagnetic (EMC): according to EN 61000-6-3 resp. EN 61000-6-4 as well as according to EN 50270 type 1 and type 2</p>

Annex

Internal memory GMA36 Pro

Every transmitter is pre-programmed with the data of the most important gases and their additional parameters. In most cases, therefore, the user does not need to change the configuration. The following information is stored in the internal memory of the transmitter:

Gas	Unit	CGAS (test gas)	A1 (Alarm 1)	A2 (Alarm 2)	H1 (Hysteresis A1)	H2 (Hysteresis A2)	P1 (Parameter A1)	P2 (Parameter A2)
O ₂	Vol	20.9	19.0	17.0	0.0	0.0	L NS	L SC
CO	ppm	200	30	60	0	0	H NS	H SC
H ₂ S	ppm	50.0	10.0	20.0	0.0	0.0	H NS	H SC
NH ₃	ppm	100.0	50.0	100.0	0.0	0.0	H NS	H SC
NO	ppm	50.0	25.0	50.0	0.0	0.0	H NS	H SC
HCN	ppm	50.0	10.0	20.0	0.0	0.0	H NS	H SC
NO ₂	ppm	20.0	5.0	10.0	0.0	0.0	H NS	H SC
HCl	ppm	10.0	5.0	10.0	0.0	0.0	H NS	H SC
C ₂ H ₄ O	ppm	10.0	2.0	4.0	0.0	0.0	H NS	H SC
SO ₂	ppm	10.0	2.0	4.0	0.0	0.0	H NS	H SC
Cl ₂	ppm	5.0	0.5	1.0	0.0	0.0	H NS	H SC
O ₃	ppm	1.00	0.30	0.50	0.05	0.05	H NS	H SC
ClO ₂	ppm	1.00	0.10	0.30	0.03	0.03	H NS	H SC
HF	ppm	6.6	3.0	5.0	0.0	0.0	H NS	H SC
COCl ₂	ppm	1.00	0.10	0.20	0.00	0.00	H NS	H SC
SiH ₄	ppm	5.00	5.00	10.00	0.00	0.00	H NS	H SC
H ₂	Vol	1.00	0.20	0.40	0.00	0.00	H NS	H SC
H ₂	ppm	1000	1000	1500	0	0	H NS	H SC

The standard parameters are adapted to the most common detection ranges and sensors for the individual gases. For higher ranges it may make sense to set different values for alarm thresholds and calibration gas concentration.

Should you use a type of sensor which is not yet listed above, the unit sets pre-defined values for alarm threshold and calibration gas, which are related to the detection range. These settings can be individually adapted and stored. Should the transmitter be operated with another sensor, which is unknown to the system, these data are overwritten.

**Worldwide Supplier of Gas
Detection Solutions**



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EC- Declaration of Conformity GfG Gesellschaft für Gerätebau mbH

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GfG Gesellschaft für Gerätebau mbH develops, produces and sells gas sensors and gas detection devices, which are subject to a **quality management system** as per DIN EN ISO 9001 : 2000. - Certificate-Register No. 0410030302 -.

Subject to supervision by means of a **quality system** -Certificate No. BVS 03 ATEX ZQS / E 187- issued by the notified body, EXAM BBG Prüf- und Zertifizier 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 detection systems in ignition protection classes explosionproofed encasing, increased safety, encapsulation and intrinsic safety, as well as their measuring function.

The Gas Monitor GMA 36 Pro complies with **council directive 89/336/EEC** for electromagnetic compatibility and with **council directive 73/23/EEC** on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

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

■ Electromagnetic compatibility

- Electrical apparatus for the detection and measurement of combustible gases, toxic gases and oxygen. EN 50270 1999 (2000-01) Amendment (2000-10)

■ Radioshielding

- Limits and methods of measurement of radio interference characteristics of information technology equipment. EN 55022 1998 + A1 2000
(Noise level measurement and Noise-field intensity measurement class B)

■ Interference resistance

- Electrical Fast Transient/ Burst Test EN 61000-4-4 1995 + A1 2001 + A2 2001
- Electrostatic Discharge Test/ (ESD) EN 61000-4-2 1995+ A1 1998 + A2 2001
- Conducted Immunity Test EN 61000-4-6 1996 + A1 2001
- Radiated Susceptibility Test EN 61000-4-3 1996
- Surge Test EN 61000-4-5 1995 + A1 2001
- Voltage Dips Test EN 61000-4-11 1994 + A1 2001
- Radiated Electromagnetic Field Test ENV 50204 1995

Radioshielding and interference resistance type class 1.

■ Operational safety

- Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements. EN 61010 2002-08

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 183-003.4x

Dortmund, 01.06.2004

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MBA H.J. Hübner
President CEO

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