

GMA 313

CO₂ Gas Monitor for one detection point

Operations Manual



GfG Instrumentation

1194 Oak Valley Dr, Ste 20, Ann Arbor MI 48108 USA
(800) 959-0329 • (734) 769-0573 • www.gfg-inc.com

GfG Products for Increased Safety

Congratulations on your purchase of a high technology product from GfG – you have made an excellent choice!

Our detectors are characterized by reliability, safety, peak performance and economic efficiency. They comply with national and international directives.

This manual will help you operate the detector quickly and safely.

Please take note of these instructions before putting the device into operation!

If you have any questions, please feel free to contact us.

GfG Instrumentation, Inc.
1194 Oak Valley Drive, Ste 20
Ann Arbor, MI 48108 USA

Phone: (800) 959-0329 or (734) 769-0573

Fax: (734) 769-1888

E-mail: info@gfg-inc.com

Website: www.gfg-inc.com

Table of Contents

Introduction	1
For Your Safety	1
Application and Purpose	1
Detection Principle - Infra-red	2
Operation Notes	3
Turning On	3
Function Test	3
Detection Mode	3
Display and Operation Elements	3
Alarm for Gas Hazards	4
Remote Reset	4
Quick Adjustment - Yellow LED	4
Fault - Red and Yellow LED's	4
Service	5
Checking and Adjusting Alarm Thresholds	5
Maintenance and Inspection	6
Mounting	6
Accessories	6
Notes for Technical Safety	7
Contact Protection	7
Technical Data	7
Connection Diagram GMA 313	8

Introduction

For Your Safety

Like any piece of complex equipment, the GMA 313 will do the job it is designed to do only if it is used and serviced in accordance with the manufacturer's instructions.

CAUTION: For safety reasons, this equipment must be operated and serviced by qualified personnel only. Read and understand the instruction manual completely before operating or servicing this device.

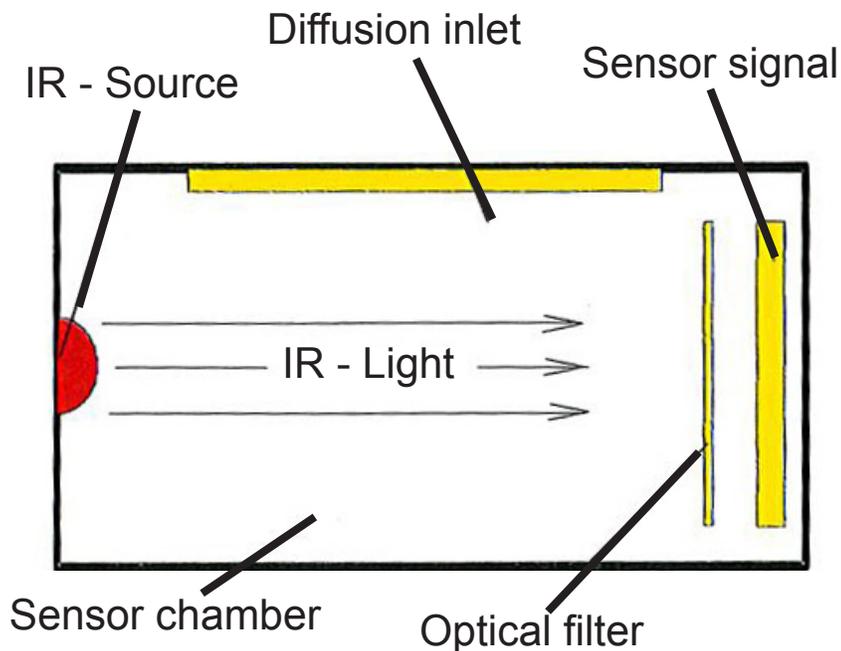
The warranties made by GfG with respect to the product are voided if the product is not used and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following them. The above does not alter statements regarding GfG's warranties and conditions of sale and delivery.

Application and Purpose

The GMA 313 is a compact gas monitor for continuous monitoring of ambient air against carbon dioxide (CO₂) hazards. Sensor and controller are integrated in one casing. Should the CO₂ concentration exceed a threshold, the GMA 313 gives an audible and visual warning. In addition to this, a relay is activated.

Detection principle - Infra-red

The GMA 313 uses the infra-red detection principle (NDIR) for accurate and reliable measurement of carbon dioxide (CO₂). Infra-red light is lead through the sensor chamber. The gas from the ambient air enters the sensor chamber by means of diffusion. Carbon dioxide absorbs a part of the light in a narrow spectral region. The light remaining in this spectrum is measured by the detector. The difference between the light emitted and received is proportional to the gas concentration. Water vapor and other gases, which might be in the sensor chamber, do not affect the absorption of light in this spectral region. A special thermostat control eliminates temperature effects.



Operational Notes

Turning ON

Once you have connected the GMA 313 to 110 V main voltage, the detector is turned on. Allow 30 minutes warm-up time. During this time, the yellow LED "F" and the red LED "A" are lit. During the warm-up period the GMA 313 cannot detect an increased CO₂ concentration. Once the warm-up time is completed, the GMA 313 turns to the detection and warning mode automatically.

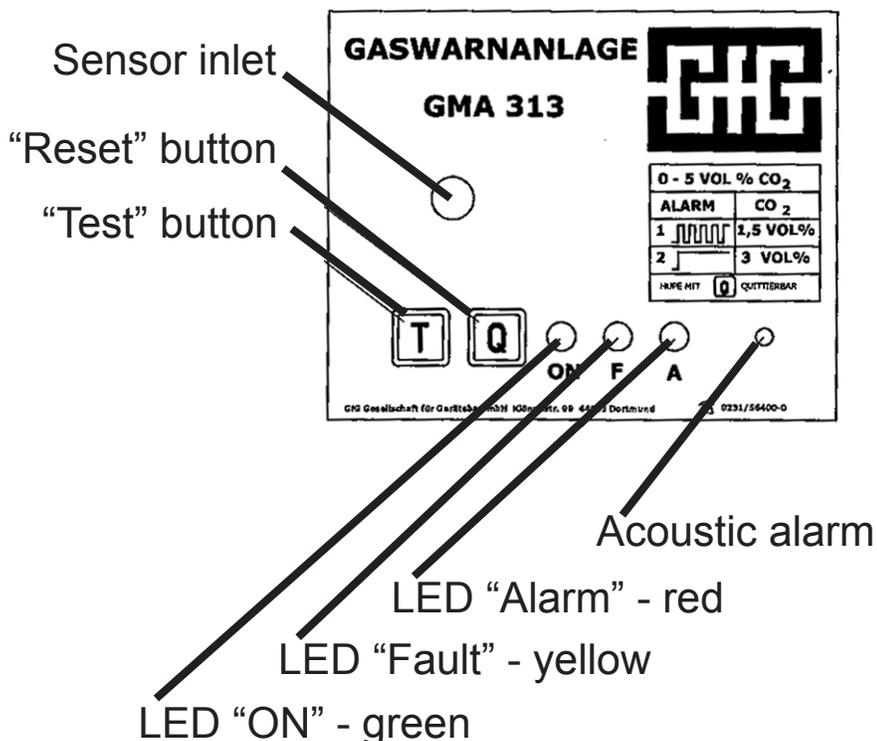
Function test

Press button "T" for a short self-test of the gas monitor. Operational and fault LED as well as the buzzer and the alarm relay are shortly activated and checked for their function.

Detection mode

After the warm-up time the yellow and the red LED ("F" and "A") go out. The GMA 313 turns to the detection mode automatically. The green LED "ON" lights and indicates, that the GMA 313 now monitors the ambient air continuously for hazards caused by carbon dioxide (CO₂).

Display and operation elements



Alarm for gas hazards

The GMA 313 provides two alarm thresholds: Alarm 1 (low alarm) and Alarm 2 (high alarm). These thresholds are set to standard values. Should the carbon dioxide (CO₂) concentration exceed a threshold, the GMA 313 gives a warning by means of the red alarm-LED and the buzzer. In addition to this, a relay is activated. The difference between alarm 1 and alarm 2 is indicated by pulsed or permanent alarm signals.

Alarm	Threshold	Signal	Alarm Storing
1	1.5% Vol. CO ₂	Pulsed alarm	Non-latching
2	3.0% Vol. CO ₂	Permanent alarm	Latching

Alarm 1 is non-latching and goes out automatically, when the gas concentration has fallen below the threshold, i.e. if there are less than 1.5% Vol. CO₂. Alarm 2 is latching. Once it is triggered, it remains stored, even if the gas concentration has fallen below the setpoint. Alarm 2 must be reset by pressing the reset button "Q".

The buzzer in the GMA 313 can be reset at any time by pressing the reset button "Q".

The alarm relay is activated according to alarm 1 and alarm 2.

Remote Reset with GMA 313 EQ (optional)

The GMA 313 EQ is a remote alarm and reset unit. For connection of the remote reset GMA 313 EQ the gas monitor must include the component "External Reset".

Quick adjustment - when the yellow LED is lit

If the yellow LED is lit, press the button "Q" for approx. 10 seconds to re-adjust the GMA 313. In case the yellow LED should not go out during this time, call for GfG service.

Fault - when the red and yellow LEDs are lit

In case of a fault, the yellow LED "F" and the red LED "A" at the GMA 313 and the alarm lamp at the remote reset GMA 313 EQ will be lit. A fault message is indicated:

- During the warm-up period. If the yellow LED "F" does not go out after this period, the microprocessor or the memory module may be faulty.
- In case of overrange.
- If the IR source is faulty.

In case of a fault, disconnect the GMA 313 from the main voltage for a few seconds. Then re-connect and allow another warm-up period of approx. 30 minutes. Should the unit still indicate a fault, call for GfG service.

Service

Checking and adjusting the alarm thresholds

For checking or adjusting the alarm thresholds, use the calibration adapter to supply a test gas concentration (1.5 Vol. or 3% Vol.) of carbon dioxide (CO₂) to the sensor. Adjustment is done by means of the buttons “T” and “Q”. Before you do any adjustment, make sure that the GMA 313 has been turned on for at least 4 hours and is operating in the detection mode without any fault indications. Adhere to the following procedure to adjust the alarm thresholds:

1. Fix the calibration adapter into the sensor inlet.
2. Press button “Q” and keep it pressed, then press button “T” and keep both buttons pressed for approx. 3 seconds. Now the GMA 313 turns to service mode. The yellow LED “F” blinks in short intervals. In this mode the alarm signal from the relay is blocked. The GMA 313 returns automatically to detection mode after approx. 30 minutes, even if you do not do any adjustment.
3. Use the calibration adapter to supply a carbon dioxide (CO₂) concentration of 3% Vol. for adjustment of alarm threshold 2. Make sure that the flow rate is approx. 0.6 l/minute.
4. Purge the sensor with the gas for at least 2 minutes. A permanent acoustic sound indicates that the sensor has adapted to the gas concentration.
5. Once the sensor has adapted to the gas concentration, press button “Q” to accept the supplied concentration for alarm 2. Should the GMA 313 note a calibration error, the yellow “F” will light for approx. 5 seconds. In this case you should repeat the calibration from point 3. If you do not want to accept the supplied gas concentration, press button “T”.
6. The yellow LED “F” blinks slowly, and you may - for a very accurate adjustment - set the alarm 1 threshold (points 7 to 9). Pressing button “T” again overrides the second adjustment, and the GMA 313 returns to detection mode.
7. For adjusting the alarm 1 threshold use the calibration adapter and supply a concentration of 1.5% Vol. carbon dioxide (CO₂) to the sensor. Make sure that the flow rate is approx. 0.6 l/minute.
8. Purge the sensor with the gas for approx. 2 minutes. A permanent acoustic sound indicates that the sensor has adapted to the gas concentration.
9. Once the sensor has adapted to the gas concentration, press button “Q” to accept the supplied concentration for alarm 1. Should the GMA 313 note a calibration error, the yellow “F” will light for approx. 5 seconds. In this case you should repeat the calibration from point 7. If you do not want to accept the supplied gas concentration, press button “T”. The GMA 313 returns to detection mode.

Maintenance and inspection

Maintenance and inspection are measures, which maintain the nominal status of the gas monitor and include regular checks and adjustments of the alarm setpoints. In addition to this, the functions of the gas monitor must be checked. Both maintenance and inspection may be done by an expert. The maintenance interval should not exceed 1 year according to BGI 836. In case of repair make sure that only the manufacturer's genuine spare parts are being used.

Mounting

For deciding on the mounting position you have to know and to consider the ambient conditions, e.g. ventilation, exactly. Do not forget, furthermore, that carbon dioxide is heavier than air. Mount the GMA 313, therefore, approx. 12 inches from the floor. Make sure that the gases reach the sensor even in case of bad ventilation. The sensor inlet must be accessible and free from any obstacles after the installation. The GMA 313 is protected against water and dust (IP54). Additional safety against mechanical damage is provided by the impact protection (optional). The mounting lugs (optional) allow quick and easy wall mounting without having to open the top of the GMA 313.

Accessories

	Part Number
GMA 313 EQ External additl' alarm/reset for complete sets	2313201-1
GMA 313 Calibration adapter with tubing	2313203-1
Mounting brackets for wall mounting	2313207-1
Protective housing includes installation material	2313206-1

Notes for technical safety

Contact protection

The main supply and relay contacts of the GMA 313 provide insulation distances of 3 mm, i.e. they are designed for 110V operational insulation. In case a contact is operated on a contact-critical potential, the contacts closest to it are also considered as contact-critical. According to contact protection the contacts are not considered to be separated safely. The insulation of the secondary circuit from the primary circuit and the relay contacts complies to the requirements for contact protection. Distances of 6.5 mm ensure a safe separation. The secondary circuit operates on extra-low safety voltage.

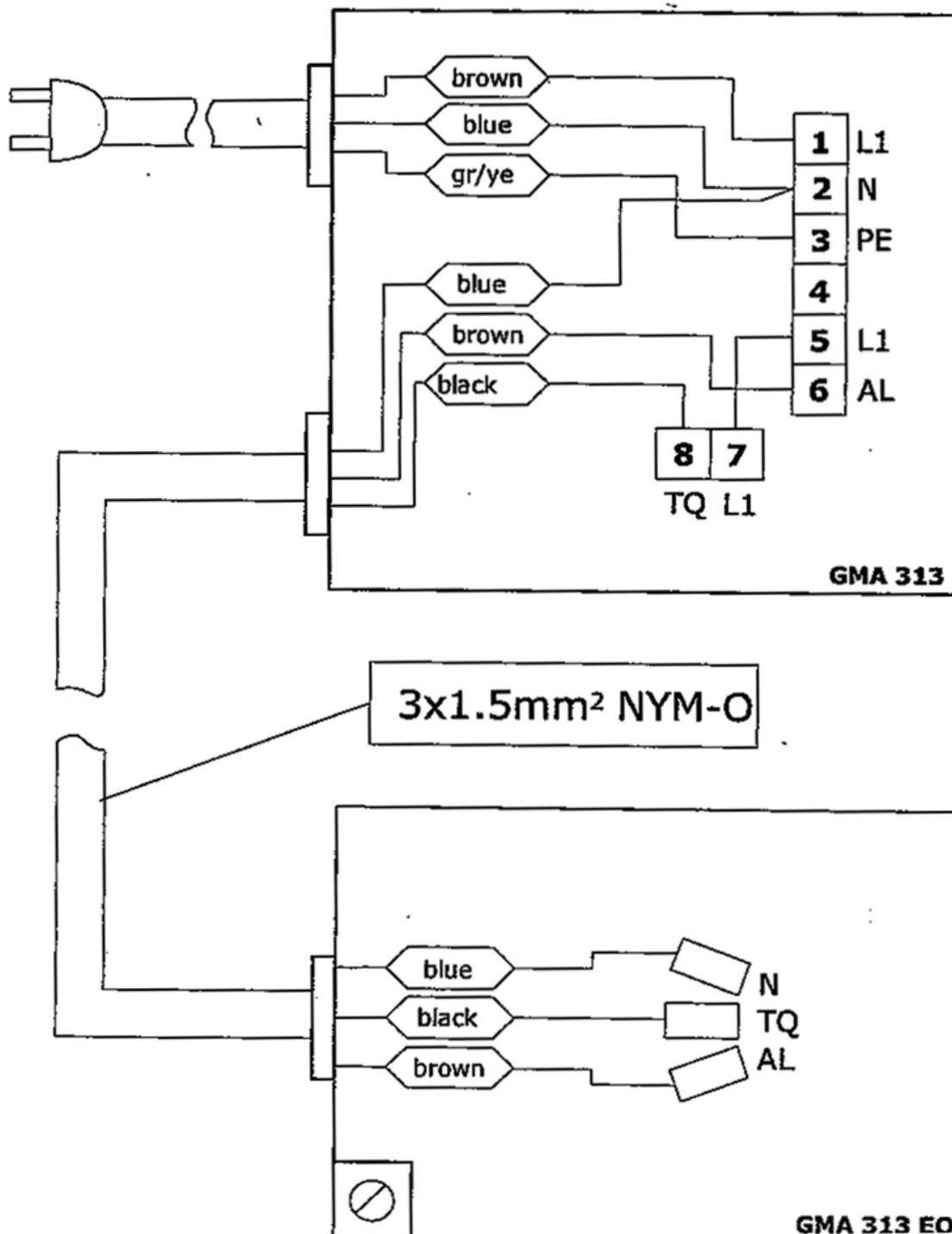
Technical Data

Gas Monitor Type:	
Detection range: Alarm thresholds:	GMA 313 0.0 ... 5.0% Vol. CO ₂ 1.5 and 3.0% Vol. CO ₂
Casing Dimensions:	Height: 100 mm, Width: 100 mm, Depth: 57 mm
Protection class:	IP 54
Gas supply	Diffusion
Climate conditions	-5 ... +45°C, 0 ... 99 % r.h., 700 ... 1300 hPa
Operation: Storing:	-25 ... +55°C, 20 ... 80 % r.h.
Power supply	
Operational voltage:	
Power consumption:	110 V / 50-60 Hz max. 13 W
Fuse:	Fuse .064 A
Outputs Relay output:	max. switch voltage 250 V AC 5 A 50/60 Hz
Testing Type approval:	According to TRSK 313 by TÜV Rheinland
Low voltage regulation:	According to EN61010 – High voltage category II
Electromagnetic compability:	and soiling degree 1 as per EN50270 Radio shielding and interference resistance type class 1

Connection Diagram GMA 313

One detection point, main connection by plug, connection of GMA 313 EQ optional.

Cable of 0.5 to 1.5 mm², cable gland (PG11) may be adapted to cable diameter by means of a reducer.



GfG Instrumentation, Inc.

1194 Oak Valley Dr.

Suite 20

Ann Arbor, MI 48108

USA

US/Canada: (800) 959-0329

US/Canada Fax: (734) 769-1888

International: +1 734 769 0573

International Fax: +1 734 769 1888

Website: www.gfg-inc.com



GfG Instrumentation

Worldwide Manufacturer of Gas Detection Solutions

2013 Rev 2 (06/06/13)