# GMA160

## The Multifunctional Gas Controller


Air – the source of human life – monitored by the latest gas measuring technology for oxygen, toxic and explosive gases – for example,
CO and NO in garages, natural gas in central heating plants
Freons, CO2 and NH3 in refrigeration plants oxygen monitoring in industrial plants chlorine and ozone in swimming pools

**Technology in the Service of Mankind and the Environment**

# GMA160 Gas Controller

## 40 years of experience in gas measurement – practical – compactly packaged – for 8 or 16 measuring probes

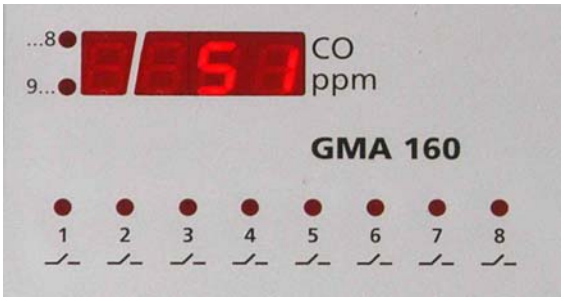
**GMA160 Gas Controller**
The GMA160 is the latest development from GfG in Switzerland. 40 years of experience in manufacturing gas monitoring systems and the specialist expertise of users such as engineers, together with the guidelines and regulations embodied in the clean air ordinance of the SWKI / VDI and government agencies, provide the basis for this gas controller.

Gases are used as a technical means of production or a working substance in many fields (e.g. heating systems, tank farms, etc.). They are stored, transported or occur as waste products.
It is precisely here that the hazards are especially acute for human beings and the environment. However, they are usually underestimated, as these gases are often invisible and are also not necessarily perceptible to our sense of smell.
Yet even minimal concentrations can cause acute poisoning or long-term harm. Fixed gas warning systems such as the GMA160 enable gases of this kind to be detected at an early stage round the clock, without employing additional personnel. The compact GMA160 controller has been developed to comply with the latest and most up-to-date requirements of safety engineering and the environmental protection authorities. This Swiss quality product incorporates a monitoring and control device which is versatile in application, using the latest, space-saving technology and easy-to-mount enclosure. With the GMA160 a controller has been created which can be adapted to customers' needs. A wide variety of applications are possible. Despite this extensive range of possibilities, the GMA160 is striking for its practical and space-saving multiplexer structure. The unit is designed for fitting on a TS35 snap-on rail – with a single click – and the GMA160 is already installed.

- Installation in control panels
- Wall mounting

**Measurement, alarm, control**
The microprocessor integrated in the unit enables a large number of adjustments to be made for the relevant measuring task and alarm transmission or ventilator actuation. 8 or up to 16 sensors can be connected. 8 floating contacts and 2 or 4 analog outputs are provided as interfaces. The floating contacts can be configured both as NC and NO contacts and equipped with a latching (acknowledgment) facility. Even with the alarm version 2 different zones can be monitored independently of each other.
2 different zones can be monitored independently of each other with the alarm version.


**The GMA160 display**
The gas controller measures continuously on all channels. However, the sensor which is currently measuring the highest, i.e. most critical, value is always shown on the display. The large, 7-segment display and the various status LEDs mean that clarity is always a feature of the GMA160.



# GMA160 Gas Controller

## 40 years of experience in gas measurement – practical – compactly packaged – for 8 or 16 measuring probes

**Simple, easy-to-read display**
The first digit on the left of the panel indicates which sensor or channel is currently being displayed. This is followed by the concentration of the gas being measured. The status LEDs provide information on the switching status of the contacts, i.e. alarm concentrations above or below threshold values, ventilation stages and zones in the case of ventilation controls. Malfunctions such as sensor faults / cable breaks, etc., are also indicated by a separate LED.

**All this with just 2 buttons**
We're all too familiar with the confusing array of switches on some instruments, where the development engineer is the only one who knows what's what. It doesn't have to be like this, as the GMA160 Gas Controller demonstrates. All the possibilities offered by the controller can be operated using only two buttons. The function is defined by the relevant control mode (display / measuring / test / programming mode).

**Trust is fine – monitoring is better**
The simple test mode means that anyone can perform a fast, straightforward test of the interfaces without any difficulty. Simply press the SET button for 2 seconds, the controller then switches to the test cycle and displays the preset threshold values and functions in sequence, and the relevant contacts are switched.


**Universally applicable means** – the basic unit is available for 8 or 16 sensors with 1 digital display, or for 2 different physical measured quantities with 2 digital displays.
The most economical production process can therefore be used to manufacture the unit, which is programmed accordingly to conform to customers' specific applications.

**Universally applicable also means:** the unit can be used to actuate ventilation systems with compartmentalisation into a maximum of 3 ventilation zones with up to 3 ventilating stages, and also infinitely variably via an analog output for frequency converters.

**However, universally applicable also means:** when 2 measured quantities have to be recorded, e.g. measuring both petrol and diesel engine exhaust gases at once with a single gas controller in garages and actuating ventilation in accordance with the concentrations of petrol or diesel exhaust gases occurring.

**Universally applicable goes even further:** both CO2 (carbon dioxide) and flammable gases should be monitored in the same premises. Whatever the 2 different measured quantities are – even this is no problem with the GMA 160.

# GMA160 for dual measurement of exhaust gas pollutants CO (petrol-powered vehicles) and NO (diesel-powered vehicles)

**Carbon monoxide (CO - petrol engines)**
Carbon monoxide is a colourless, tasteless and odourless gas. After being inhaled, it is immediately adsorbed by haemoglobin, where it alters blood oxygen content levels: even small quantities of CO are absorbed by the body and thus reduce the availability of atmospheric oxygen. Organs and tissues which are especially susceptible to a lack of oxygen are affected, such as the brain and the cardiovascular system. This results in reduced vitality, headaches, vertigo and nausea. In the case of high concentrations, this can be fatal.

**Nitrogen monoxide (NO - diesel engines)**
The focus here is on nitrogen monoxide (NO), since it develops into the irritant gas nitrogen dioxide (NO2). While up to 90% nitrogen monoxide is discharged from exhausts, it is relevant due to its relatively rapid conversion into toxic nitrogen dioxide. According to estimates by the TÜV study group "Cancer risk due to atmospheric pollution", diesel exhaust gases contribute more than 60% to emission-induced carcinogenic conditions. Diesel-powered vehicles for the most part emit NO, which is converted into toxicologically relevant NO2.

It is therefore clear that the two measured quantities CO and NO combined in a single measurement represent the best solution for recording the effect of vehicle movements with petrol and diesel engines in underground car parks.
A report published by Greenpeace at www.greenpeace.de pays particular attention to this toxic cocktail. The fact that children inhale the toxic gases at face height of 1.2 m is also taken into account. This means that measuring systems for recording exhaust gas concentrations should be installed at heights of approx. 1.5 to 1.75 m above ground level, as also stipulated by VDI regulations (see also Section 3: Measuring Results, in the Greenpeace report).

## GMA 160 for CO and NO - environmentally appropriate, compact, reliable

The new measuring setup consists of a sensor which measures both relevant exhaust gas concentrations (CO - carbon monoxide - and NO - nitrogen monoxide) with two measuring cells integrated in the sensor housing. The signals are transmitted to the new GMA160 Gas Controller.CO/NO and this switches on the ventilation stages and if necessary the alarm signal, depending on the different threshold values for CO and NO. The concentrations are indicated separately via two displays integrated in the controller.

GMA160.CO/NO with dual display


Sensor with one (CO or NO) or two integrated measuring cells (dual measurement)

# GMA160 Gas Controller for ventilation controls

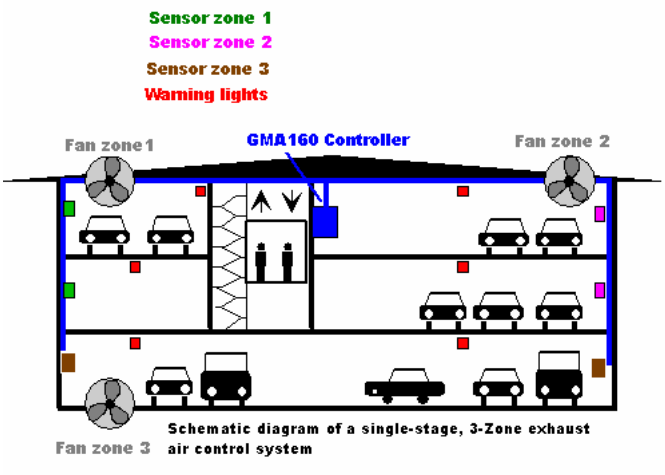
## Select, respond and alarm reliably in underground car parks

### The different GMA160 versions

- GMA160.CO for up to 8 CO sensors
- GMA160.CO/16 for up to 16 CO sensors
- GMA160.NO for up to 8 NO sensors
- GMA160.CO/NO for up to 8 CO/NO dual sensors (i.e. 16 channels)

### Ventilation stages and ventilation zones

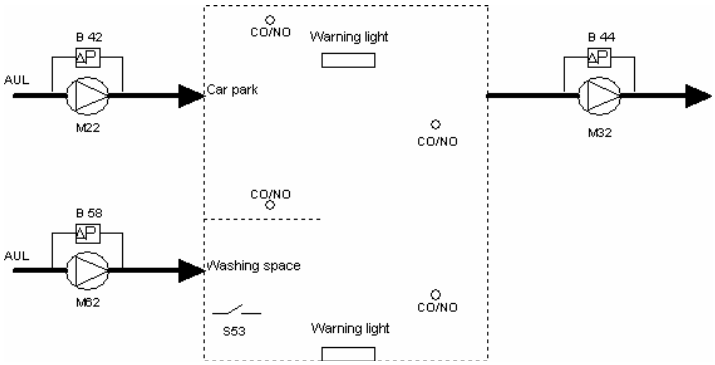
Two or three separate car park areas with one connection, e.g. access for vehicles from area A to B or possibly C. In order to ensure good ventilation, 2 (or possibly 3) ventilation systems have been installed. To date, the requirement that these should be controlled separately had to be met by using two controllers. However, this is not the case with the microprocessor technology of the GMA160, which enables the controller to be operated in a zone mode, depending on the number of ventilation stages. With each version of the GMA160 for ventilation controls a single zone can be operated with up to 3 ventilation stages or 2 zones with up to 2 ventilation stages. With the 16-channel versions (GMA16.CO/16 and GMA160.CO/NO) 3 zones can even be operated with 1 ventilation stage.



Schematic diagram of a single-stage, 3-Zone exhaust air control system

### Variable-speed fans

Actuating a variable-speed fan is no problem with the 4…20 mA or 0…10 VDC continuous analog outputs (corresponding to the highest gas concentration). The 8-channel versions provide two analog outputs, the 16-channel versions as many as four. This even enables a ventilation system to be configured with four zones. The 4…20 mA can also be used at any time for recording purposes (SPS, recorder).




### Only "seeing and hearing" is total alarm actuation

We give some thought to these things, so we have adjusted the height of the warning lights. You are familiar with the problems of fitting warning lights too high: passage height, distance from the wall, etc. This doesn't have to be so; the extra-low GfG warning lights can be fitted anywhere without any difficulty. The warning lights can be used as either wall or ceiling lights. The horn and flashing interval are integrated in accordance with SWKI regulations.

# GMA160.A Gas Controller – alarm version

## Select, respond and alarm reliably in EX / OX / TOX zones

**GMA160 Controller - alarm version**
A new alarm version has also been created with the development of the GMA160 controller for
ventilation controls. The result is a modern, microprocessor-controlled monitoring and control instrument for toxic and explosive gases and oxygen.

**Up to 8 sensors at once**
The GMA160.A enables you to connect up to 8 sensors at once, with only one controller. If two monitoring zones have to be analysed separately, this is no problem with the GMA160.A. You may be thinking that an instrument of this kind is certain to be complicated to use, but you'd be quite wrong in the case of the GMA160.A. We know that user-friendliness is a prerequisite for safety - and the GMA160.A provides you with this. By means of simple programming you tell the instrument how many sensors are connected to the controller and whether there are one or two monitoring zones – what type of sensor is connected – what measuring range is required – and how the relays are switched normally (NO - normally open - or NC - normally closed). You can also tell the instrument whether an alarm has to be acknowledged or not. If you want a pickup delay on alarm contact 1, that's no problem; this can be preset, too.

All this programming is usually performed by GfG specialists and handed over to the user with the commissioning log after commissioning is complete.

**Measurement, alarm actuation and control**
A total of 3 relay contacts are available for each monitoring zone for transmitting signals, shutting down machines or actuating valves, warning lights, etc., plus 1 relay contact for reporting technical malfunctions (centralised alarm). These can be loaded with up to 250 VAC / 6 Amp. The GMA160.A has a logic input via which an alarm override can be actuated for servicing purposes (no alarms are actuated during alarm override). The controller has an event memory which stores alarm events and makes this record available to technical personnel. With its test mode the controller also enables customers to test the functional features of the monitoring systems and the interfaces very easily at any time.

**Fields of application**

- natural gas / methane monitoring
- hydrogen monitoring
- helium monitoring
- propane gas monitoring
- chlorine gas monitoring
- ozone monitoring
- ammonia monitoring
- oxygen monitoring
- solvent monitoring
- nitrogen monoxide monitoring
- Freon monitoring
- carbon monoxide monitoring
- carbon dioxide monitoring
- hydrogen sulphide monitoring
- other gases on request

# Good advice Customer satisfaction

We want to have satisfied customers. That's why we attach great importance to customer satisfaction.
Let us see your construction plans, we'll look after the rest:

- technical advice
- sensor placement
- ventilation control
- alarm concept
- control cabinet assembly
- CAD-produced diagrams

Conceptual advice regarding your water and air monitoring tasks.

Enquire about the water measuring and analysis program. It is often useful to have a single partner for gas and water measurement tasks. GfG can supply measuring instruments in both fields.

GfG products offer not only good market value, but also excellent inherent value.

# Control cabinets Wall-mounted housings

Customised control cabinets for ventilation controls or gas monitors (alarm version) with integrated contactor controls for actuating fans, pressure differential monitors, filter monitors, fire-fighting services, valves or SPS, etc.

On request, we will assemble a control cabinet or a wall-mounted housing ready for connection, specifically for your system.

Efficient, in-house manufacture of control cabinets ensures prompt delivery.

# Accessories

In compliance with legal guidelines and regulations with regard to warning facilities:
- warning lights, alarm horns, sirens
- complete control systems / control cabinets, e.g. ventilation control cabinets, incl. contactor actuators for fresh and exhaust air, with CAD-produced diagrams
- weather protection enclosures for sensors
- throughput adapters for sensors
- emergency power supplies

# GMA160 series gas controllers

## Technical data

### Distinguishing features of the GMA160:

- safe, reliable technology
- compact design
- easy-to-assemble, snap-on rail mounting
- 1 or 2 digital displays of readings
- 8 250 VAC / 6A relay contacts for various switching purposes
- digital adjustment of measuring parameters, such as measuring range, sensor type, threshold values, number of ventilation stages and ventilation/alarm zones
- adjustment of the various delays, both pickup and dropout delays (ventilation controller)
- technical malfunction alarm contact (centralised alarm)
- logic input and relay contact for alarm override and fire alarm (depending on version)
- relay inversion of various contacts K1 - K8
- latching (acknowledgement function) of various contacts K1 - K8, incl. logic input for possible remote acknowledgement
- display mode for viewing the individual sensor signals
- test mode for checking interfaces and switching contacts
- event log for viewing triggered events
- integrated clock for actuating a periodic ventilation phase
- 4 – 20 mA or 0 – 10 VDC analog output for each ventilation or alarm zone; always displays the highest concentration measured per zone
- easy, clear read-off with 7-segment display and status LEDs
- very good price/performance ratio

### Technical data:

**Gases measured**
depending on sensor (see sensor brochure)
**Measuring range**
depending on measuring requirements (see sensor brochure – toxic gases – explosive gases –
oxygen)
**Ambient temperature**
-10 …+55°C
**Power supply**
230 VAC, 50 / 60 Hz or 24 VDC
**Power consumption**
max. 6 W
**Dimensions**
160 x 90 x 60 mm (L x H x D)
conforming to DIN 43880
**Weight**
320g
**Housing**
UL94 V-0, self-extinguishing, IP20 configured for DIN rail mounting (TS35), available with wall-mounted housing up to IP65
**Display**
4-digit, 7-segment display for sensor number and measurement readings; green and red status LEDs for user prompting and operating states
**Operation**
using only two buttons
measuring / display / test / programming mode
**GMA160.A version**
in the case of the GMA160.A alarm version the various sensors need an additional 24 VDC power supply due to the higher power consumption (see wiring diagram)

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