Fixed Gas Detection Systems

smart GasDetection Technologies

GMA400 Controller

A future-proof central system for monitoring measured values from up to 128 transmitters

- **Modbus TCP**
- **Web access via Ethernet**
- **8 internal relays and up to 192 external relays**

MADE IN GERMANY

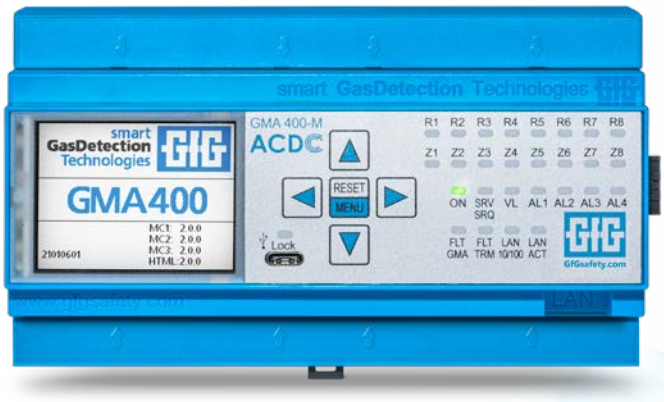
GfGsafety.com

GMA400 Controller

A future-proof central system for monitoring measured values from up to 128 transmitters

Fixed gas detection systems, consisting of one or more central controllers and transmitters, are used in applications requiring continuous monitoring of toxic gases, combustible gases and vapors or oxygen. In situations which make standard solutions hit their limits because of the number of monitored measuring points or zones, the GMA400 controller provides new options for creating complex gas detection systems.

Up to 16 analog or 128 digital GfG transmitters can be connected to one GMA400 controller. An additional 32 virtual transmitters monitor calculated parameters, such as mean values, minimum / maximum values and environmental influences. The compact DIN-rail-mounted controller (T35) is installed in control cabinets or wall-mounted housings.



GMA400 – with Modbus TCP and web access via ethernet

Digital Communication on Analog Lines

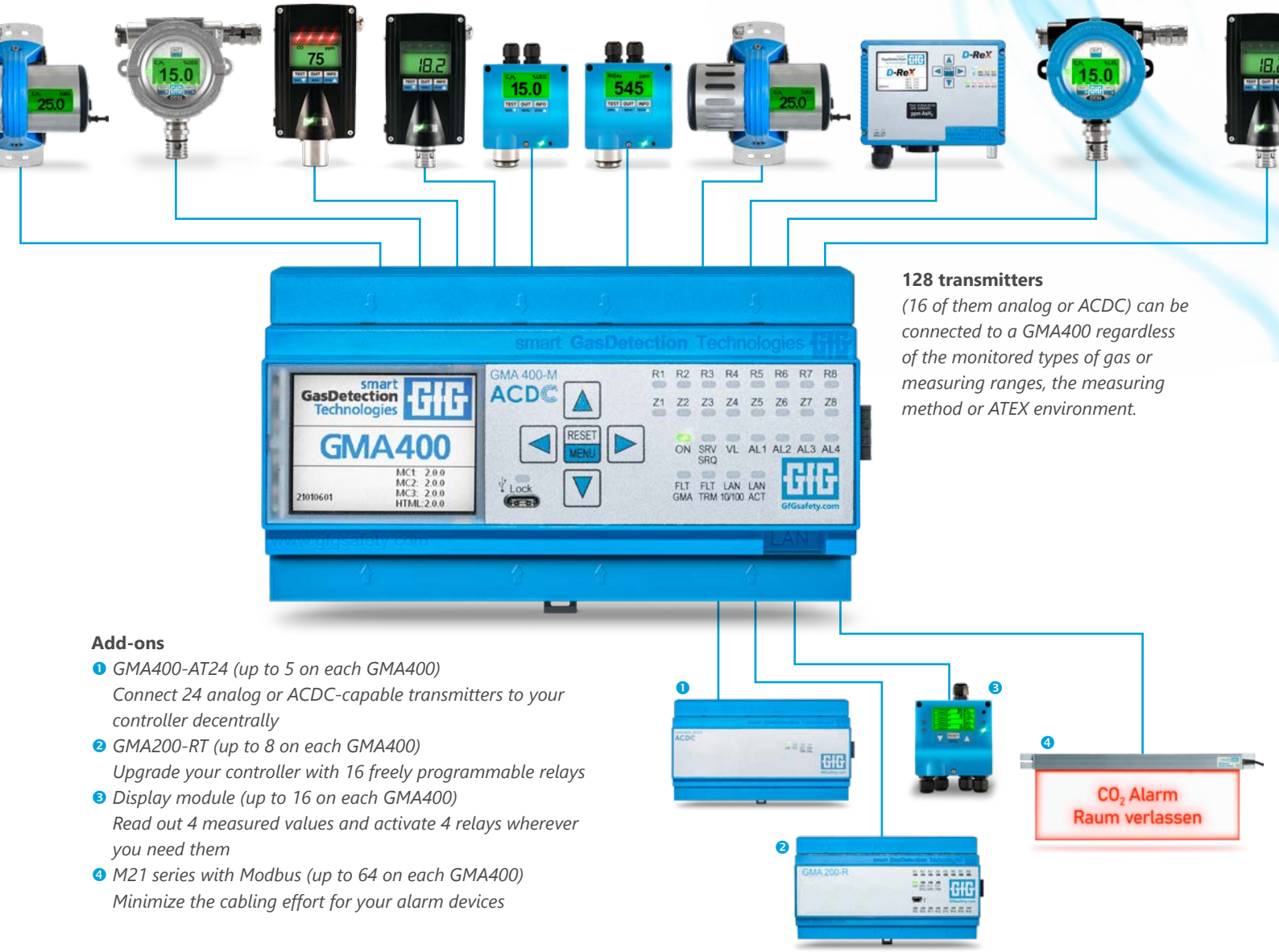
ACDC is a patented technology which allows transmitters to communicate information that goes beyond the plain measured value to the central evaluation unit, using 3-wire 4-20mA line that were already in place. It also receives digital signals from the controller in return. This solution is a significant benefit to your system, as it allows you to use existing analog loops for high-speed transmission of digital data.

Using the analog cabling you already had will allow you to significantly reduce the costs of updating your system – while controllers and ACDC-capable transmitters will still be able to communicate like in a digital system.

The benefits of digital communication

- » Bidirectional transmission of additional data, such as mean values or status notifications
- » Maintenance of transmitters which are difficult to access using remote calibration
- » Higher accuracy and immunity to interferences

Up to 16 ACDC-capable transmitters can be connected directly to the ACDC-capable GMA400. The GMA400-AT24 module lets you upgrade that number to 128. This makes the GMA400 a perfect choice for integrating modern gas detection systems into old but functional infrastructures, as well as for retrofitting or expanding them.



128 transmitters
(16 of them analog or ACDC) can be connected to a GMA400 regardless of the monitored types of gas or measuring ranges, the measuring method or ATEX environment.

Add-ons

❶ *GMA400-AT24 (up to 5 on each GMA400)*
Connect 24 analog or ACDC-capable transmitters to your controller decentrally

❷ *GMA200-RT (up to 8 on each GMA400)*
Upgrade your controller with 16 freely programmable relays

❸ *Display module (up to 16 on each GMA400)*
Read out 4 measured values and activate 4 relays wherever you need them

❹ *M21 series with Modbus (up to 64 on each GMA400)*
Minimize the cabling effort for your alarm devices

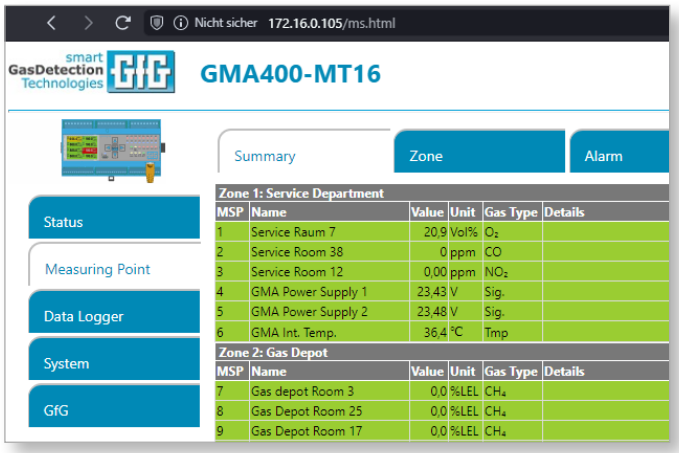
Advanced Connectivity

Connectivity Options

The controller features six BUS interfaces for connecting digital transmitters, relay modules, ACDC modules or BUS-capable alarms (such as the M21 series illuminated signs) as well as for communication with superordinate process control systems. In addition to connection options for eight internal relays and 16 analog (ACDC) transmitters, the GMA400 has eight digital inlets for functions such as alarm acknowledgements and manual alarms.

Easy Integration via Ethernet

The GMA400 can be integrated into existing Modbus TCP infrastructures without additional gateway solutions via the internal network interface (10/100 MBit/s). For other protocols, such as BACnet or Profinet, you can still use gateway solutions as you normally would. The web interface can be used to access detailed information on the gas detection system's status at any time. This includes current measured values as well as mean, minimum and maximum values of every transmitter and incidents such as faults and maintenance notifications. It can also be configured via local network using a PC and the GMAConfig software. Web access is password-protected and access to all parameters can be regulated according to a user's level. Further convenient functions utilizing network integration, such as the new GMA Visual software for visualization on large TFT screens, will also soon be implemented.



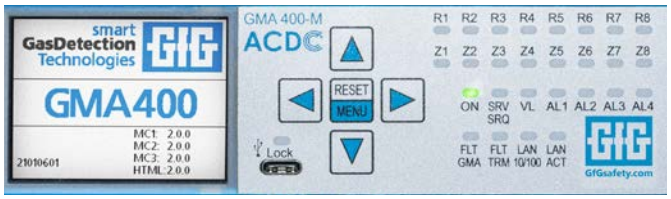
You can view and configure a variety of information on the controller status, overviews of all measuring points, zones and alarms as well as the data logger and system information in the web interface.

System Funktions

LED Status Indications

There are 28 LEDs on the GMA400's front which indicate the different statuses of the system, facilitating quick checks:

- » R1-R8 Internal relay status (active/not active)
- » Z1–Z8 Zone Status
- » ON Operating Status
- » SRV/SRQ Service/Service requirements
- » VL Ventilation control status
- » A1–A4 Alarms 1 to 4
- » FLT/GMA Controller fault
- » FLT/TRM Transmitter fault
- » LAN 10/100 Network connectivity status
- » LAN ACT Active network transmission
- » Lock USB connection active



GMA400 User Inferface with color display, five buttons, USB-C interface and status LEDs

Visualization

For an even clearer overview, you will soon be able to have all information be displayed on a touchscreen TFT display (up to 21.5 inches) using the GMA400 Visual Software.

User Interface

The controller is operated using five buttons. They are mainly used for acknowledging alarms and the menu-based operation of the GMA400. From the menu, you can access information on the status of the controller, the real and virtual transmitters and the relays.

Color Display with Plain Text Information

The 2.4'' color display (320 x 240 pixels) raises the bar when it comes to readability and user friendliness. All system information and error notifications are displayed in clear, plain text instead of cryptic error codes that need to be deciphered first. This allows you to effortlessly identify the source of faults and resolve them efficiently.

The statuses are indicated by different colors, making them easier to identify:

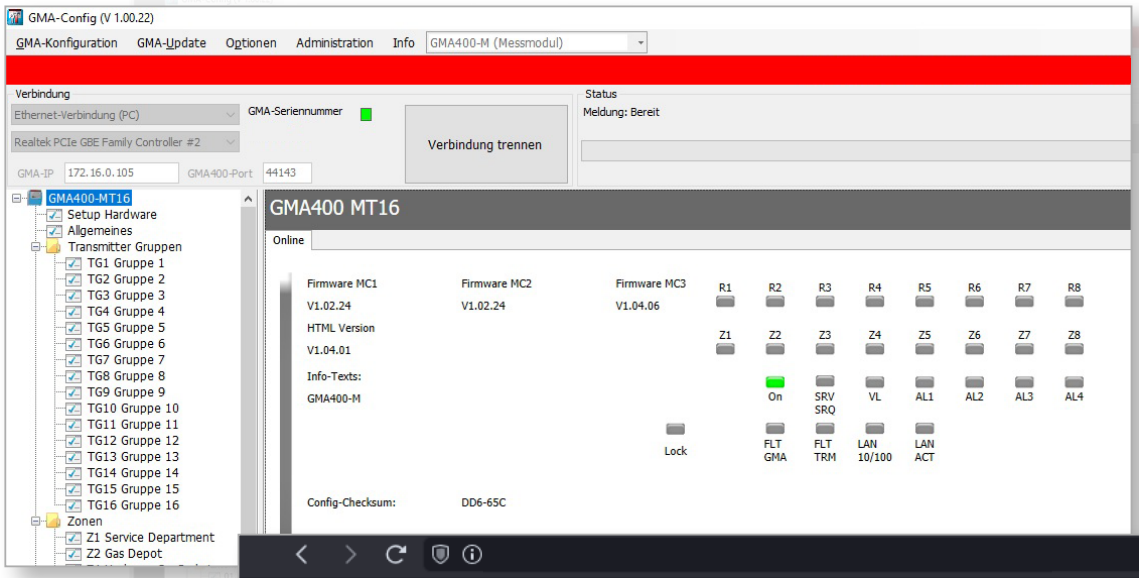
- » Orange: Alarm 1
- » Red: Alarms 2 to 4
- » Yellow: Special statuses (faults, service etc.)
- » Green: Measuring mode

Different Visualizations of alarms and special statuses

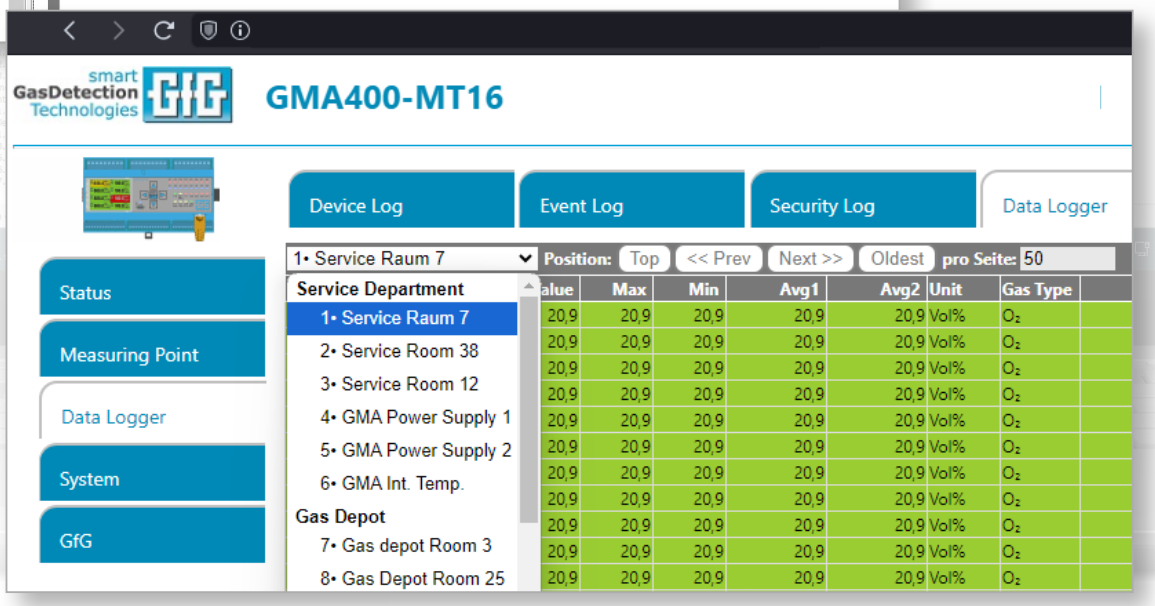
Configuration and Data Logging

GMAConfig-Software

The GMA400 controller is configured using a PC and the GMAConfig software. They are connected to the controller via a USB cable (or by network access). To prevent unauthorized access, there is an authentication process requiring you to enter a user name and password.



GMAConfig software for parameterizing the controller, the transmitters and the relays



GMA400 web interface displaying the data logger and selection of measuring points

Datenlogger

The GMA400's internal data logger records all alarms, measured values and faults in set intervals. This data can then be accessed on the web interface for evaluation of incidents and measured values. You will soon also be able to read out the internal data logger using a USB cable or the network connection. Instead of the internal storage, external storage devices such as a microSD card or a USB stick will then also work.

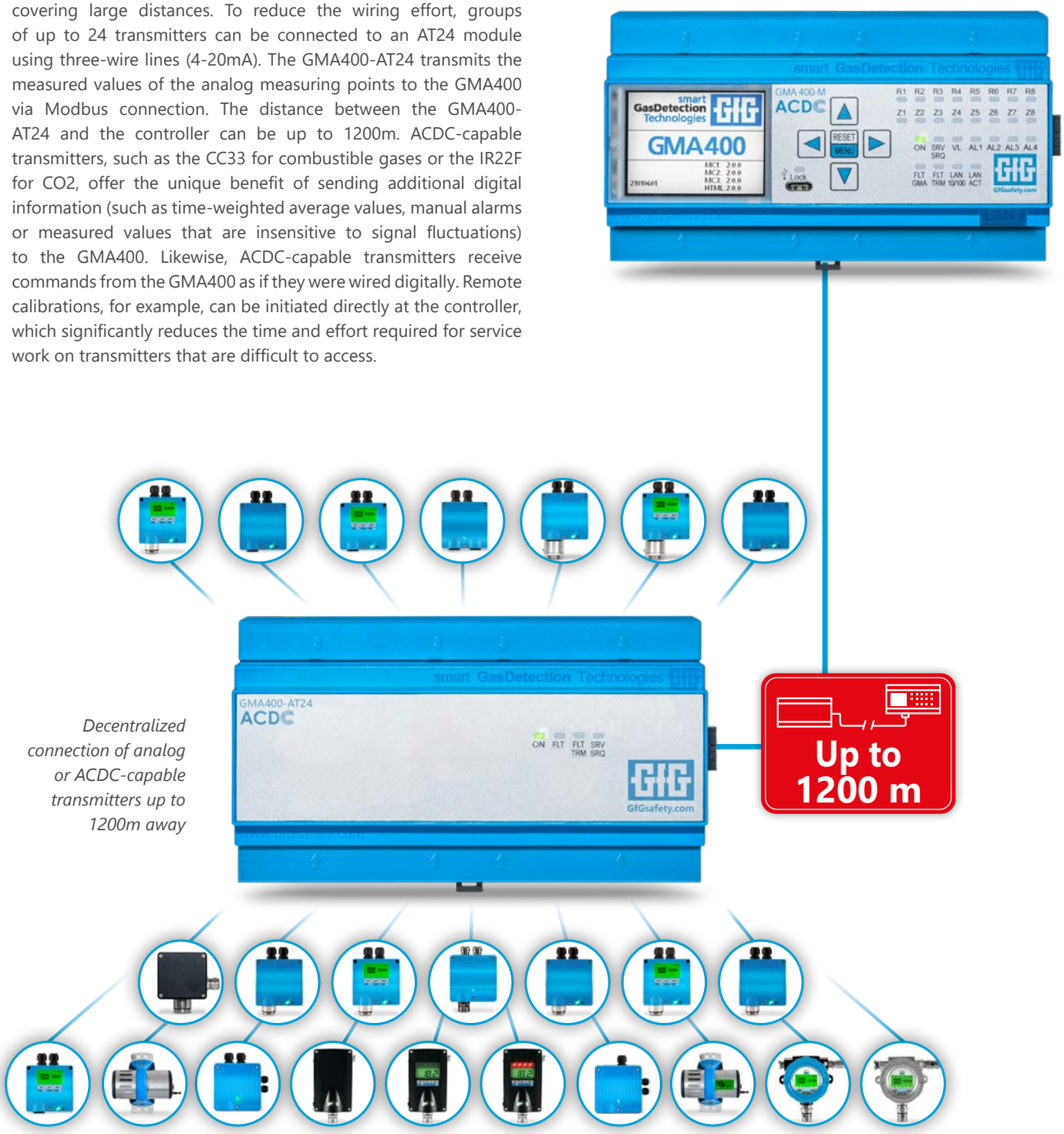
The M21 series illuminated signs will warn you using durable LEDs and a loud horn.

Modbus-capable alarms

To minimize the cabling effort for visual and audible alarm devices which are activated by the GMA400 controller, up to 64 M21 series illuminated signs can be connected digitally via an RS-485 interface and addressed via Modbus. The LED signs are available either with one of our standard texts or individual messages and contain a loud integrated horn (100 db(A)).

Adding analog transmitters and external relays

In many industries, it is not uncommon to see extensive systems covering large distances. To reduce the wiring effort, groups of up to 24 transmitters can be connected to an AT24 module using three-wire lines (4-20mA). The GMA400-AT24 transmits the measured values of the analog measuring points to the GMA400 via Modbus connection. The distance between the GMA400-AT24 and the controller can be up to 1200m. ACDC-capable transmitters, such as the CC33 for combustible gases or the IR22F for CO2, offer the unique benefit of sending additional digital information (such as time-weighted average values, manual alarms or measured values that are insensitive to signal fluctuations) to the GMA400. Likewise, ACDC-capable transmitters receive commands from the GMA400 as if they were wired digitally. Remote calibrations, for example, can be initiated directly at the controller, which significantly reduces the time and effort required for service work on transmitters that are difficult to access.



Decentralized connection of analog or ACDC-capable transmitters up to 1200m away

Each of the up to 16 display modules per GMA400 activates four relay contacts and decentrally displays four measured values.

Additional Relays for Safety Measures

The more complex the gas detection system and the more expansive the area it needs to monitor, the more important it is to use enough relays and ensure short transmission distances between them and devices they need to activate, such buzzers, alarm lights or valves. In addition to the GMA400's eight internal relays, the controller is able to address up to 128 further freely adjustable relays with a floating changeover contact each, using eight external relay modules.

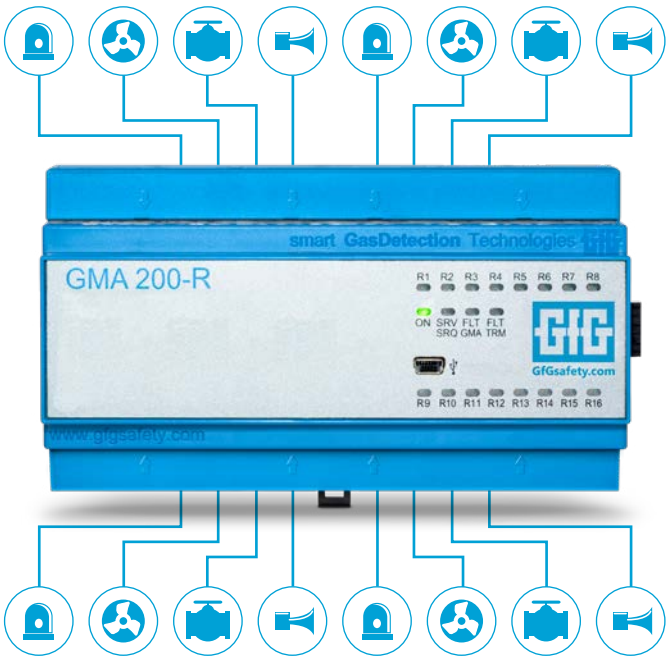
You will also be able to manage up to 64 further relays using 16 external display modules (four per module) in the future. In total, you can therefore let a single GMA400 manage 200 relays.

External Relay Module

GfG's GMA200-RT external relay module, incl. a suitable Modbus protocol for the GMA400, is a great option for expanding your gas detection system. The relay module is designed for DIN rail mounting (TS35) and is connected to the GMA400 via a digital RS-485-BUS. This allows you to either install the relay module (or several ones) in a control cabinet alongside the controller or up to 1200 meters away from the GMA400, in a non-centralized setup.
The costs and effort for laying all necessary lines can thus be minimized. GfG also offers a suitable wall-mounted housing which will protect your device from damages, contaminations and dust and is available either with or without a power supply (integrated).

Displaying Statuses and Relay Activations

The external relay module features 20 status LEDs for displaying the operation status, service requirements and relay statuses. The mini USB slot on the front is used as an interface for configuring the relay module using a PC or laptop and the GMAConfig Software.



Example connection of a GMA200-RT relay module for GMA400 and different safety measures

Visual alarms · Audible alarms · Ventilation controls · System control

Connection and Configuration

The relay module powered by a 24 V DC power supply. You may also use two power supply units for a redundant supply.

They are connected to the controller via the TRM-BUS connector on its side or, alternatively, one of the other TRM-BUS or GMA-BUS connectors. The BUS wiring is continued via the second connector.

In addition to the 16 relays which can be freely configured, the relay module also lets you acknowledge alarms with an acknowledgement button.

GMA400 mit zwei Relaismodulen GMA200-RT im Schaltschrankaufbau

Technical specifications: GMA400

Gases:	Combustible and toxic gases / vapors as well as oxygen in combination with all GfG transmitters
Connection options: GMA400:	 128 transmitters (max. 16 of them analog and / or ACDC-capable)* 32 virtual transmitters for calculated mean values, min. / max. values and environmental parameters 64 warning signs (via RS-485-BUS)
Zones:	8 zones with 2 ventilation outlets each
Inlets:	16 analog inlets: 4–20 mA (max. 50 Ohm input resistance), also for connecting ACDC-compatible transmitters 8 digital inlets: Acknowledgements of alarms, can be configured freely 5x RS-485-BUS (4x TRM-BUS and 1x GMA-BUS) e.g. for connecting digital transmitters in BUS wiring or external relay modules; in Slave mode for digital transmission of measurement and output data to a superordinate control center 1x RS-485-BUS (COM-BUS) for ventilation control[1]
Outlets:	8 relays (NO contacts): 6 relays which can be configured freely for single alarms for each measuring point and alarm threshold, configuration of collective or group alarms, fault notifications and voting functions 1 relay for maintenance (closed current principle) 1 relay for faults (closed current principle) 1 ethernet interface (10/100 Mbit/s) for network and internet access
External relays:	Up to 128 additional, freely-configurable relays (8 additional relay modules with 16 relays each) Up to 64 additional, freely-configurable relays (16 additional display modules[1] with 4 relays each) Can be configured for individual alarms for each measuring point and alarm threshold, configuration of collective and group alarms, fault notifications and voting functions
Alarms:	4 independent threshold alarms for each measuring point (Alarm 1, Alarm 2, Alarm 3, Alarm 4) can be set freely within the measuring range
Alarm funktions:	» values exceeding / falling below the threshold » acknowledgeable (additional buzzer only) » not acknowledgeable » latching / not latching » Alarm with turn on delay (up to max. 3 minutes) » Alarm with turn off delay (up to max. 60 minutes)
Data storage:	Measured values can be stored on internal storage, SD card[1] and via USB type C stick[1] for permanent data recording of measured values, alarms and faults, saving intervals can be set (5s – 60 min), recording of current values and mean values, minimum / maximum concentration
Environmental conditions: Temperature (operation): Temperature (storage): Humidity:	 -20 to +50 °C -30 to +60 °C 0 to 99 % RH
Power supply:	2 x 24 V DC, 20–30 V (1 x redundant power supply)
Power consumption: GMA400: GMA200-RT relay module:	 5 W without transmitter 6 W
Display and control elements: Display: Interface: LEDs: Buzzer:	 LC color display / 2.4'' with 320 x 240 pixels 5 control buttons (RESET/MENU, Up, Down, Right, Left) 28 status LEDs (Green, Yellow, Red, Blue) Integrated, for local alarms
Housing: Dimensions: Mounting: Material: Weight: Protection Class:	 162 x 97 x 62 mm (W x H x D) On mounting rail TS35 Plastic 370 g IP20
Certification / Tests: Electromagnetic compatibility: Electrical safety:	 EN 50270:2015 (Interference Emission: type class I, Interference resistance: type class II) EN 61010-1:2010 (Contamination degree 2, overvoltage category III for relay contacts)

**Number of analog and ACDC capable transmitters, can be expanded to 128 with GMA400-AT24 modules*
[1]Function available soon

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