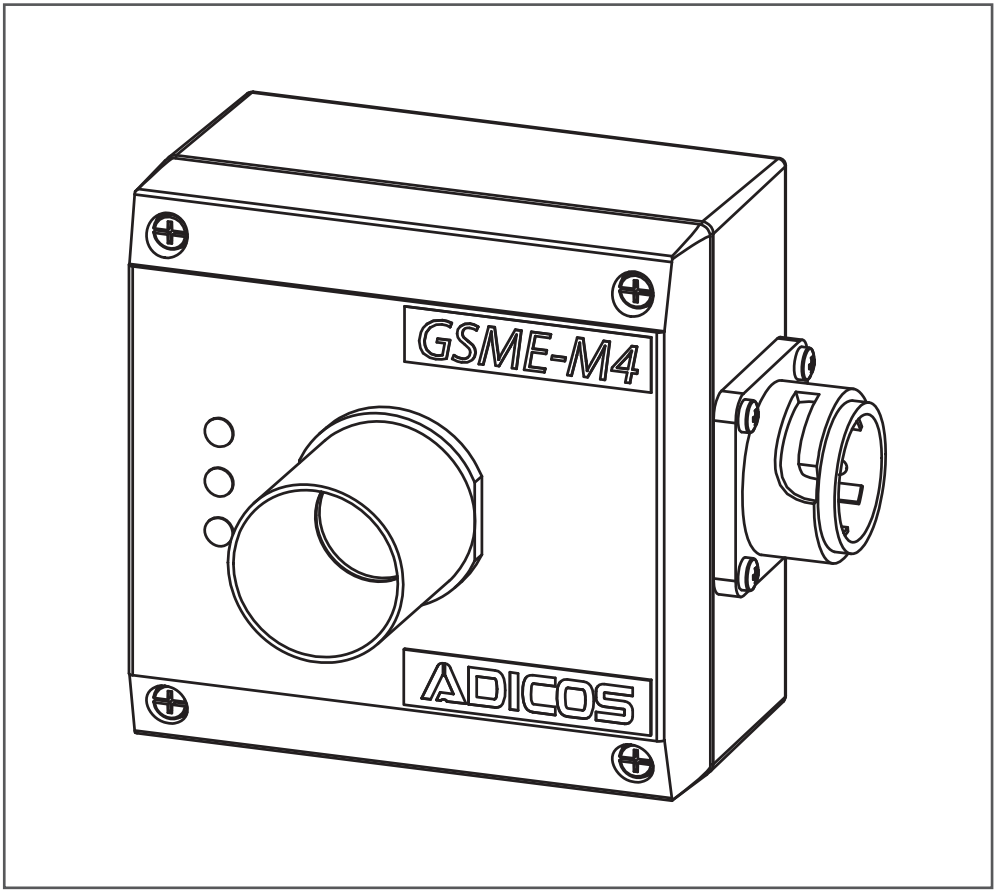

EN CE IP64

Operating Manual

Fire Gas Detector GSME®

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Abstract

The Advanced Discovery System (ADICOS®) is used for early detection of fires in industrial environments. It is comprised of various, separate detector units. By parameterizing and arranging the detectors appropriately, the system fulfills a predefined detection goal. The ADICOS system ensures reliable early detection of embers and smoldering fires even in adverse environments.

GSME fire gas detectors detect at an early stage gases that are characteristic for developing fires. They detect both open and concealed smoldering fires. Highly sensitive and at the same time robust, they are ideal for fire gas detection in industrial environments – and already in the incipient stage.

Four parameterizable semiconductor gas sensors monitor and evaluate the concentration curve of these gases according to multi-criteria technology. This enables the GSME detectors to distinguish real fires from interference signals. In industrial environments, this often occurs under harsh conditions, e.g. due to vehicle exhaust fumes, dust, mist or vapor.
With the ADICOS software, all detector states and concentration curves can be displayed graphically. Sensitivities as well as alarm thresholds can be parameterized individually for each detector. The GSME fire gas detectors can be used in almost any indoor plant area, taking into account the air flow conditions.

In case special interface modules are used, the devices can also be integrated into fire alarm systems of common manufacturers and transmit their operating status to the fire alarm control panel.

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1 About this manual

1.1 Objective

This manual describes the special requirements on installation, wiring, commissioning and operation of ADICOS detectors of the type "GSME". After commissioning, it is used as reference work in the case of faults.
It is intended to be used only by properly qualified personnel (–› Chap. 2, For your Safety).

1.2 Explanation of Symbols

This manual follows a certain structure to make it easy to work with and understand. The following designations are used throughout.

Operational objectives

Operational objectives specify the result to be achieved by following the subsequent instructions. Operational objectives are shown in **bold print**.

Instructions

Instructions are the steps to be taken in order to achieve the previously stated operational objective.
Instructions appear like this

► Indicates a single instruction

1 First of a series of instructions
2 Second of a series of instructions
3 etc.

Intermediate states

When it is possible to describe intermediate states or events resulting from the instruction steps (e.g. screens, internal function steps, etc.), they are shown like this:

▷ Intermediate state

Warnings

The following types of notes are used through this manual:

DANGER!
This combination of symbol and signal word indicates an immediately dangerous situation which could lead to death or severe injuries if it is not avoided.

WARNING!
This combination of symbol and signal word indicates a possibly dangerous situation which could lead to death or severe injuries if it is not avoided.

CAUTION!
This combination of symbol and signal word indicates a possibly dangerous situation which could lead to minor injuries if it is not avoided.

NOTICE!
This combination of symbol and signal word indicates a possibly dangerous situation which could lead to property damage if it is not avoided.

Tips and recommendations
This type of note provides information that is directly relevant for the further operation of the device.

1.3 Abbreviations

The following abbreviations are used through this manual:

Abbr.	Meaning
ADICOS	Advanced Discovery System
AAB	ADICOS Junction Box
GSME	Gas Sensor Detector Unit
M4	Multi evaluation with 4 sensors
M-BM	ADICOS M-BUSMASTER
NT	ADICOS Power Supply NT V40-A3
FDnet	Field Device Network (fire alarm bus of SIEMENS fire alarm systems)
LSNi	Local Security Network (fire alarm bus of BOSCH fire alarm systems)
sb	slow-blowing (fuse)
TF	Test Fire
ESD	Electro Static Discharge
EF	Sensitivity Factor
NO_x	Nitrogen oxides
H_2	Hydrogen
CO	Carbon monoxide
HC	Hydrocarbons

1.4 Storing the manual

Store this manual near the detectors, in a place where it can easily be accessed when needed for reference.

2 Safety Instructions

When properly installed, started up, operated and serviced, ADICOS GSME devices ensure operational safety at your facility. But it is imperative that the manual, including all safety notes, be read, understood and followed completely.

WARNING!
Personal injury and property damage!
Incorrect installation and operating errors can cause death, serious injury and damage to industrial equipment.
- **Read the entire manual and follow the instructions!**

2.1 Intended Use

ADICOS GSME are point-type fire gas detectors for the detection of fire scenarios in the industrial environment. They are exclusively intended for operation within ADICOS systems. In this context, the operating parameters described in Chap. 11, »Technical Data« must be met. Intended use also includes following the instructions in this manual and complying with all relevant local regulations.
The ADICOS GSME may not be used for any other purpose. If the device is used in any other way, or if changes are made to the product, including in the course of installation and maintenance, the warranty claim is no longer valid.

NOTICE
Do not use for potentially explosive atmospheres!
ADICOS GSME in their standard version may **not be installed in explosive atmospheres**! Special GSME variants are available for operation within explosive atmospheres.

2.2 Standards and Regulations

The safety and accident prevention regulations applicable for the specific application must be observed during detector installation, commissioning, test and maintenance.

The following standards and directives in their current version are of particular importance when handling fire detector systems:

Regulation	Description
VDE 0100	Erection of Power Installations with Rated Voltages below 1000 V
VDE 0800	Telecommunications - General Concepts - Requirements and Tests for the Safety of Facilities and Apparatus
VDE 0833	Alarm Systems for Fire
VDE 0845	Protection of Telecommunication Systems Against Lightning, Electrostatic Discharges and Overvoltages From Electric Power Installations - Measures Against Overvoltages
VdS 2095	Guidelines for Automatic Fire Detection and Fire Alarm Systems - Planning and Installation
DIN 14675	Fire Detection and Fire Alarm Systems - Design and Operation
DIN EN 54-7	Fire Detection and Fire Alarm Systems - Part 7: Smoke Detectors - Point Detectors Using Scattered Light, Transmitted Light or Ionization

2.3 Personnel Qualification

Only properly trained and qualified persons may work on ADICOS equipment. Qualified persons are those who have received relevant professional training, have the required skills and experience and who are aware of applicable regulations, enabling them to work on electrical equipment and detect potential hazards.

WARNING!
Personal injury and property damage!
Improperly performed work on and with the device can lead to malfuctions.
- **Installation, startup, parameterization and maintenance may be performed only by authorized and properly trained personnel.**

2.4 Modifications

WARNING!
Risk of property damage by any form of unauthorized modification!
Any form of unauthorized modification or extension can lead to a failure of the detector system. The warranty claim expires.
- **Never make unauthorized modifications on your own authority.**

2.5 Accessories and Spare Parts

WARNING!
Property damage due to short circuit or failure of the detector system
The use of parts other than the manufacturer's original spare parts and original accessories may result in property damage due to short circuits.
- **Only use original spare parts and original accessories!**
- **Original spare parts and accessories may only be installed by trained specialist personnel.**
- **Qualified personnel are persons as described in Chap. 2.3**

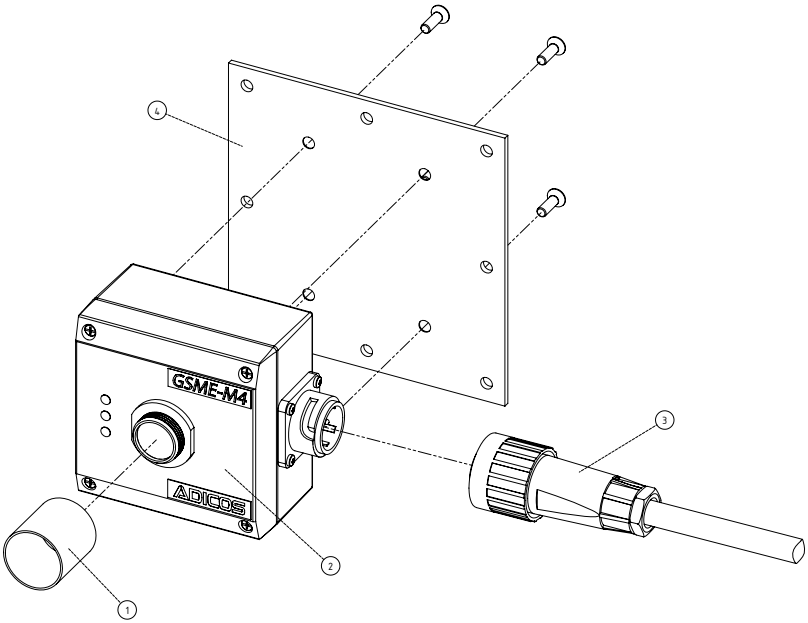
2.6 Handling outgassing adhesives, sealants and lubricants

NOTICE!
Material damage due to the use of siloxanes
Silicone-containing hydrocarbons (siloxanes) damage the surface of the semiconductor gas sensors of the ADICOS GSME.
- **Do not use any outgassing adhesives, sealants, or lubricants (e.g. silicone) in the surroundings of the detector!**

3 Structure

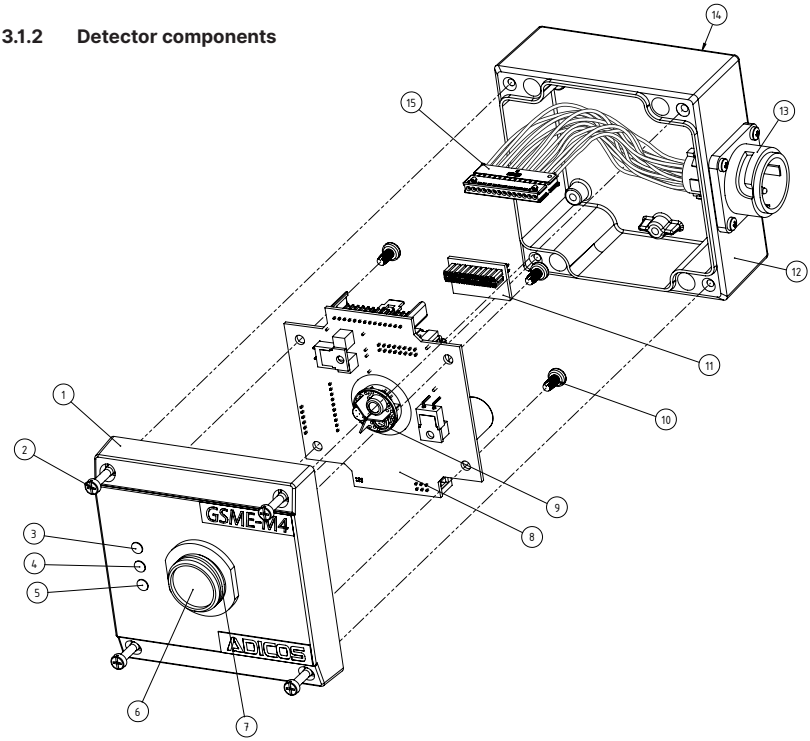
3.1 Overview

3.1.1 Detector and add-on parts



No.	Description
①	GSME spray protection
②	GSME-M4
③	ADICOS connection cable
④	ADICOS mounting plate (optional)

3.1.2 Detector components



No.	Description
①	Enclosure cover
②	Enclosure screws (4x)
③	Signal LED »Alarm«
④	Signal LED »Operation«
⑤	Signal LED »Fault«
⑥	Sintered metal filter
⑦	Screw connection for spray protection
⑧	Main circuit board
⑨	Semiconductor gas sensors
⑩	Circuit board screws (4x)
⑪	Configuration module
⑫	Lower enclosure part
⑬	Detector connection
⑭	M5 mounting thread (on rear side, not shown) (4x)
⑮	Connector for detector connection

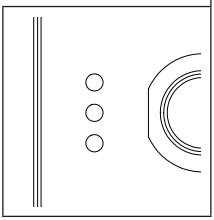
3.2 Display Elements

Signal LEDs

For indicating operating conditions, three light pipes are recessed in the enclosure cover of the detector. They are used to visualize the signal LEDs located on the detector board.

The top signal LED »Alarm« is red, the center »Operation« is green and the bottom »Fault« is yellow.

For the function of the signal LEDs, see *Chap. 4.2, »LED signals«*.

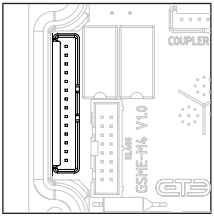


3.3 Circuit Board Connections

Slot "detector connection"

The detector connection slot is a coded, 14-pin connector on the left side of the detector board.

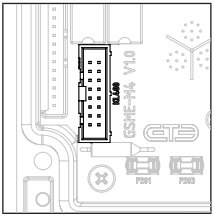
In the factory configuration, it is connected to the detector connection (Amphenol bayonet plug-in coupling) in the lower enclosure part.



Slot "configuration module"

The configuration module slot is a coded, 16-pin connector on the right side next to the detector connection slot and underneath the signal relay on the detector board.

Depending on the order configuration the slot is equipped with a configuration module, on which the resistors for the limit value contacts is defined.

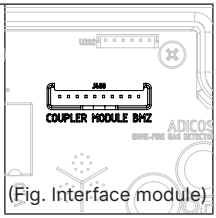


Slot "interface module"

The interface module slot is a coded, 10-pin connector above the gas sensors on the detector board.

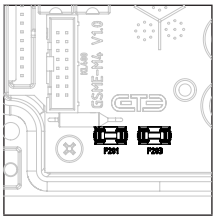
Depending on the ordered configuration, it is eqiupped in the factory configuration with an interface module board, which enables integration of the detector in external fire alarm systems.

As an alternative, the pre-alarm module can be inserted here.

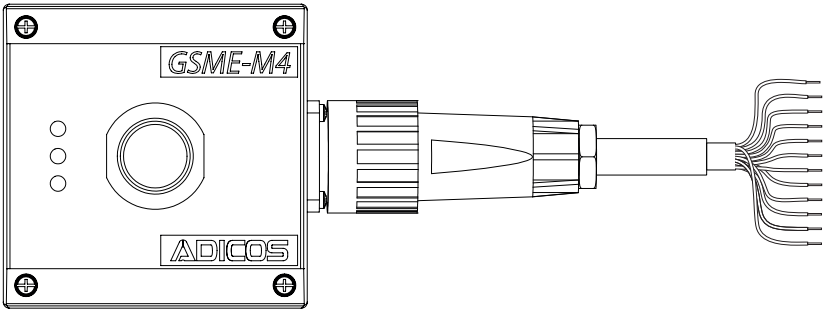


(Fig. Interface module)

Slots “fuses”
There are two slots for fuses at the bottom left on the detector board. These are marked with labels F201 and F203. In the factory configuration, the fuse slots are equipped with one slow burning 500 mA fuse each.



3.4 Cable Assignment



Color	Signal	Potential-free contact
red black	Operating voltage 21.6 ... 40 V DC non-polarized	
yellow	Relay output X6 e	Alarm (NO)[1]
white	Relay output X6 a	Alarm (NO)[1]
brown	Relay output X7 a	Failure (NC)[1]
green	Relay output X7 e	Failure (NC)[1]
pink	Fire panel interface B-in	Auxiliary assembly (optionally in factory configuration)
blue	Fire panel interface A-in	
purple	Fire panel interface B-out	
gray	Fire panel interface A-out	
blue/red gray/pink	M-Bus max. 40 V non-polarized	

[1] with series resistor

Coupling module option

Color	Signal	Siemens FDnet	BOSCH LSNi
pink	Coupling module B-in	FDnet-A (–)	LSN b1 in
blue	Coupling module A-in	FDnet (+)	LSN a in
purple	Coupling module B-out	FDnet-B (–)	LSN b2 out
gray	Coupling module A-out	FDnet (+)	LSN a out

Option auxiliary relay

Color	Auxiliary relay	
blue	Normally closed	
purple	Normally open	
gray	Common	

3.5 Sintered metal filter and sensors

The sintered metal filter (–› Chap. 3.1.2) is the central element on the detector front. It is screwed into the enclosure cover and contains a continuous element made of sintered metal granules. The fire gases to be detected can diffuse through the pores of this sintered metal and reach the gas sensors located behind, while dust and moisture cannot penetrate the inside of the detector. Thus, the sensors are protected from environmental influences, but can be reached by fire gases.

3.6 Spray protection

The spray protection (–› Chap. 3.1.1) is a mechanical add-on for the ADICOS GSME. It is bolted onto the sintered metal filter and reduces the risk of condensation in the sensor area and offers a certain protection from drip and spray water in the installation environment.

4 Function

During operation, the ADICOS GSME monitors the signals of its gas sensors and triggers an alarm according to the set limit value combinations. If an ADICOS central unit (ADICOS M-BUSMASTER) is used, the detector transmits additionally all sensor and operating data to be displayed in the ADICOS System Software via M-Bus (↦ Chap. 4.5). If the detector is connected to a fire alarm panel using an integrated interface module, the alarm display of the detector is controlled by the central fire alarm panel.

4.1 Detection

The ADICOS GSME is equipped with four semiconductor gas sensors that can provide four differnt detection signals depending on actuation and evaluation.

4.1.1 Detection variables and cross-sensitivities

Index	Detection variable	Cross-sensitivity
1	Carbonmonoxide (CO)	Hydrogen, alcohols
2	Hydrogen (H_2)	-/-
9	Phenolic hydrocarbons (HC)	Ozone, amines, hydrogen, alcohols
10	Nitrogen oxides (NO_X)	Ozone, ammonia

The specified cross-sensitivities represent an exemplary selection. Cross-sensitivities must also be expected in the case of high concentrations of other gases.

4.1.2 Configuration and evaluation

The ADICOS GSME is characterized by its particular intelligence and flexibility during signal detection and evaluation. The detector electronics does not only investigate the concentrations of individual fire gases, but considers the relations of the detection concentrations as well. These relations are configured through limit value combinations. Every detector features two sets with five limit value combinations each.

In the factory configuration, every detector is equipped with a basic configuration of meaningful alarm parameters. At first, both parameters have identical default values. For this reason, one set of limit value combinations is described only in the following sections. The second parameter set is of particular importance, e.g., when a pre-alarm module is used (→ Chap. 7.2.4).

Basic configurations »Standard«, »Extended 1«, »Extended 2« and »Robust« are currently available. Depending on the application, an individual basic configuration is possible upon request. The following table shows the suitability of the basic configurations for typical detection objectives.

	Basic configuration			
Typical detection objective	**Standard**	**Extended 1**	**Extended 2**	**Robust**
Smoldering wood fire (TF2*)	✓✓✓	✓✓		☑
Smoldering cotton fire (TF3*)	✓✓✓	✓✓	✓✓	☑
Flaming PU fire (TF4*)	✓✓✓			
Flaming n-heptane fire (TF5*)	✓✓✓			
Smoldering lignite fire	✓✓	✓✓	✓	☑
Smoldering bituminous coal fire	✓✓			☑
Smoldering wood chip fire				
1. Ignition phase		✓✓	✓	
2. Propagation phase	✓✓	✓✓	✓✓	☑
3. Full ember	✓✓	✓✓	✓	☑
Smoldering plastic/rubber				
1. Phase: Steam				
2. Phase: Pyrolysis		✓	✓	
3. Phase: Ember	✓✓	✓✓	✓	☑

✓✓✓ Suitable (*tested per EN 54-7)
✓✓ Suitable
✓ Suitable with low sensitivity
☑ Suitable within compact, non-vented enclosures (e.g., silos)

4.1.2.1 Basic configuration “Standard”

In the “Standard” basic configuration, the following limit values are set as default during factory configuration.

Index	Detection variable	Limit value combination*				
		1	2	3	4	5
2	H_2	5	10	0	5	0
9	HC	–	–	25	3	–
1	CO	40	20	20	15	5
10	NO_x	–	–	–	–	10

*The limit values approx. correspond to the concentrations in ppm for hydrogen and carbon monoxide. However, as the particles to be detected are often present as aerosols, the limit values should rather be considered as characteristics without dimensions. In addition, the function for automatic zero-point adjustment leads to a discrepancy between parameter and actual concentration.

Zero-point adjustment

To prevent incorrect displaying due to sensor aging, the “Standard” basic configuration features sliding zero-point adjustment of the sensor signals. However, the longtime constant of this zero-point adjustment of ≥ 6 hours also hides slowly increasing signal backgrounds.

i Smoldering fires that develop over a timeframe of days, cannot be detected in the “Standard” basic configuration!

4.1.2.2 Basic configuration “Extended 1”

In the “Extended 1” basic configuration, the following limit values are set as default during factory configuration.

Index	Detection variable	Limit value combinations				
		1	2	3	4	5
3	HC	5	10	3	5	–
0	HC	–	–	5	3	–
1	CO	40	20	15	15	–
10	NO_x	–	–	–	–	–

4.1.2.3 Basic configuration “Extended 2”

In the “Extended 2” basic configuration, the following limit values are set as default during factory configuration.

Index	Detection variable	Limit value combinations				
		1	2	3	4	5
2	H_2	50	20	0	3	–
9	HC	–	–	25	10	–
1	CO	20	80	20	30	–
10	NO_X	–	–	–	–	–

4.1.2.4 Basic configuration “Robust”

In the “Robust” basic configuration, the following limit values are set as default during factory configuration.

Index	Detection variable	Limit value combinations				
		1	2	3	4	5
2	H_2	90	90	50	50	–
9	HC	–	–	10	20	–
1	CO	40	20	50	20	–
10	NO_X	–	–	–	–	–

i The “Robust” basic configuration is exclusively suited for operation within closed, non-vented enclosures (e.g. silos or bunkers)! **The free volume within the enclosure should not exceed 10 m³!**

4.1.2.5 Basic configuration “Individual”

If an application environment requires limit value combinations deviating from the “Standard”, “Extended” and “Robust” basic configurations, a set of individual limit value combinations can be programmed as factory configuration upon request. In such cases, the basic configuration is referred to as “Individual”.

4.1.2.6 Customized configuration changes

Using the ADICOS System Software, all limit values of the ADICOS GSME can be change independently from the delivered basic configuration. If the limit values of the basic configuration are replaced with freely selected limit values, an individual detector configuration is chosen.

CAUTION!
Ineffectiveness due to incorrect parameterization
Faulty limit value combinations can lead to complete ineffectiveness of the detector!
- **The detector parameters may only be changed by experienced specialist personnel!**

4.2 LED Signals

The current operating condition of the detector is indicated by three signal LEDs on the front of the detector. The following table explains the illumination states.

LED	State	Function
green	flashing	Initialization /not ready for operation yet
	on	Normal operation
	off	Detector system off/detector, fuse, or cable defective
yellow	on	Detector fault
	off	Normal operation
with fire panel module:		
red	off	Normal operation
	on	Alarm to central fire alarm panel
	flashing	Detector alarm, however, without central fire alarm panel alarm
with pre-alarm module:		
red	off	Normal operation
	on	Alarm
	flashing	Pre-alarm
without fire panel module:		
red	off	Normal operation
	on	Alarm

4.3 Signal Relays

The ADICOS GSME is equipped with two signal relays that signal the “Alarm” and “Fault” states. The “Alarm” signal relay is realized as normally open contact, the “Fault” signal relay as normally closed contact. The signal lines of the signal relays are integrated into the ADICOS connection cable (–› Chap. 3.4).

4.4 Detector Heating

In the factory configuration, the ADICOS GSME is equipped with an integrated heating unit. It heats the detector enclosure and prevents condensation of ambient humidity. Depending on the ordered configuration, it is already activated with the basic configuration of the detector at the factory. During operation, detector heating can be switched on and off via the ADICOS System Software. The power consumption of detector heating is up to 10 VA.

In the case of undervoltage, detector heating is switched off automatically. Once the undervoltage is corrected, heating becomes only active again after a detector reset.

Beyond that, the heating function is limited through enclosure temperature monitoring. If the pre-set maximum temperature (default: 40 °C) is exceeded, the heating unit switches off automatically, until the enclosure temperature is lowered again. In the case of a very high ambient temperature and high air humidity, it may thus be necessary to adjust the set limit temperature for the heating function accordingly.

4.5 ADICOS M-Bus

The ADICOS M-Bus is a proprietary two-wire data line, which is used to transfer all detector parameters as well as operating and detection data. With the help of the ADICOS System Software this data is displayed and archived. Furthermore the parameters of each connected detector can be adjusted.

The M-Bus lines are integrated into the ADICOS connection cable (–› Chap. 3.4).

5 Installation

WARNING!
Danger of malfunction and failure of the detector system
Improper installation of ADICOS detectors can lead to faults and failures of the detector system.
- **Installation work may only be performed by specialist personnel!** (→ Chap. 2.3, Personnel qualification)

5.1 Installation Location

DANGER!
Explosion danger in potentially explosive atmospheres
ADICOS GSME in their standard version may **not be installed in explosive atmospheres**!
- **Only use approved GSME variants for operation within explosive atmospheres!**

NOTICE!
Correct alignment
Arrangement and alignment of ADICOS detectors are highly important for a reliable detection. Unfavorable placement can lead to complete ineffectiveness of the detector!
- **Only experienced specialist planners may define detector position and alignment!**

5.1.1 Protection aspects

The following aspects must be considered when selecting the installation location to ensure fault-free operation of the ADICOS GSME detector.

Temperature

The ambient temperatures at the planned installation location must not exceed and/or undercut the specified temperature range (→ Chap. 11) of the ADICOS GSME detector even in the worst-case scenario. Special attention must be paid to the waste heat of heating-up system components in the surroundings. Intensive solar irradiation should be avoided as well.

Condensation and contamination

The ADICOS GSME detector is basically suited for operation in dust-loaded environments (not in explosive atmospheres). In the case of condensation or permanent contact with damp or oil-containing dusts, the sintered metal filter can be clogged. This reduces the detectivity of the detector and can lead to ineffectiveness. In the case of condensation, detector heating and spray protection must be used. Beyond that, the sintered metal filter must be regularly checked for incrustation.

WARNING!
Danger of sensitivity loss and failure of the detector system
In dust environments with simultaneous high humidity, there is a risk that the sintered sintered metal filter may become clogged and thus impair the functionality of the detector.
- **In this case the detector must NOT be used in this environment!**

Moisture

If drip or spray water is to be expected in the planned installation environment, direct contact with the sintered metal filter must be prevented. This also applies in the case of regular building cleaning with water. Spray protection must be used in the case of moisture!

Vibration

Strong vibrations can damage the electronics of the ADICOS GSME detector. If strong vibration sources can be found in the surroundings of the planned installation location, the detector must be positioned such that it is protected from vibrations.

Sensor toxins

Silicone-containing hydrocarbons (siloxanes) can oxidize and thus damage the surface of the semiconductor gas sensors of the ADICOS GSME detector. No outgassing adhesives, sealants and lubricants (e.g., silicone) may be used in the surroundings of the detector.

Electromagnetic radiation

Electromagnetic radiation can impact the electronics of the ADICOS GSME detector. Do not mount the detector in the immediate surroundings of power current equipment. Use shielded cables only.

5.1.2 Detection aspects

The following aspects must be considered when selecting the installation location to ensure reliable and sensitive operation of the ADICOS GSME detector.

Building geometry and air flow

The way fire gases propagate depends on numerous factors and is far less intuitive as generally assumed. It is thus difficult inside industrial systems with complex building geometry, possibly with ventilation systems and machines generating waste heat. There it is a particular challenge to ensure that the gas emissions from a smoldering fire reach the detector's sensors in sufficient concentration.

Thus, all influencing factors of the air flow within the building must be considered when defining the installation locations for ADICOS GSME detectors. It may be necessary to perform a fire test at the location of the expected fire source to identify these factors.

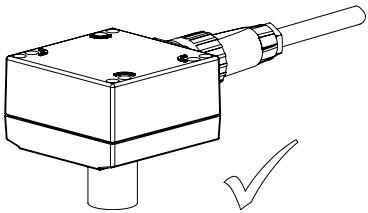
False variables

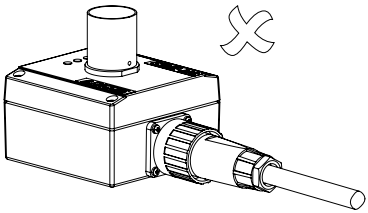
Different false variables can negatively impact the detector function and lead to false alarms and sensor aging. No exhaust gases e.g. from conveyor vehicles or fermentation gases from biological or thermal decomposition must be present at the planned installation location.

5.2 Installation Orientation

NOTICE!
Property damage due to incorrect installation
A sintered metal filter clogged with dust deposits reduces the detectivity of the detector and can lead to ineffectiveness! Water accumulation on the filter can damage the detector.

- **Mount the detector with the sintered metal filter pointing downward!**
- **Use heating if humidity is present!**



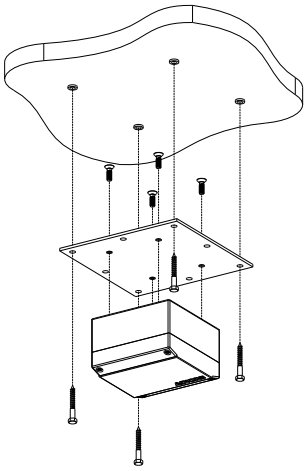


5.3 Mounting

The ADICOS GSME detector features four M5 threaded holes for mounting. They can be found on the rear of the enclosure.

Mounting the GSME

1 Bolt the ADICOS mounting plate (↔ Chap. 12.1) using M5 countersunk screws (included in the scope of delivery of the mounting plate) on the rear of the detector enclosure



For ceiling mounting:

2 Drill four mounting holes arranged in a square at a distance of 130 mm
3 Press dowels into the mounting holes
4 Attach mounting plate including detector using suitable screws

For any other mounting location (e.g., gallows construction):

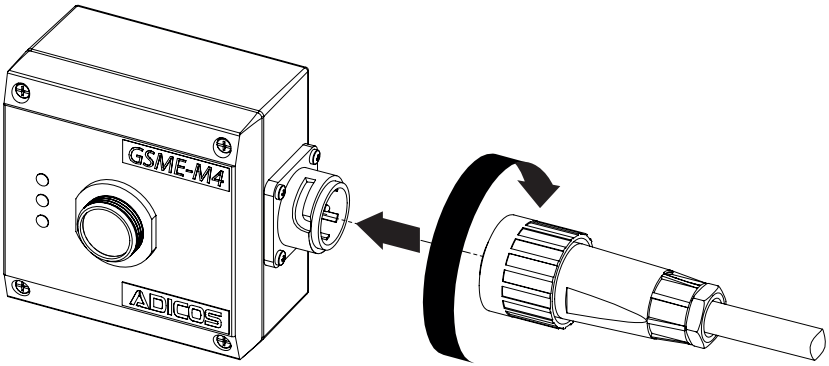
2 Bolt mounting plate including detector to the gallows construction using suitable M6 screws, nuts and lock washer

5.4 Wiring

NOTICE!
Faults and failures of the detector system by improper wiring!
Incorrect wiring of ADICOS detectors can lead to faults and failures of the detector system.

- **Wiring may only be performed by specialist personnel!** (–› Chap. 2.3, Personnel qualification)
- **De-energize the entire detector system for any wiring!**
- **Use ADICOS connection cables only for connecting detectors as well as ADICOS junction boxes!**

5.4.1 Connecting a GSME detector with the connection cable



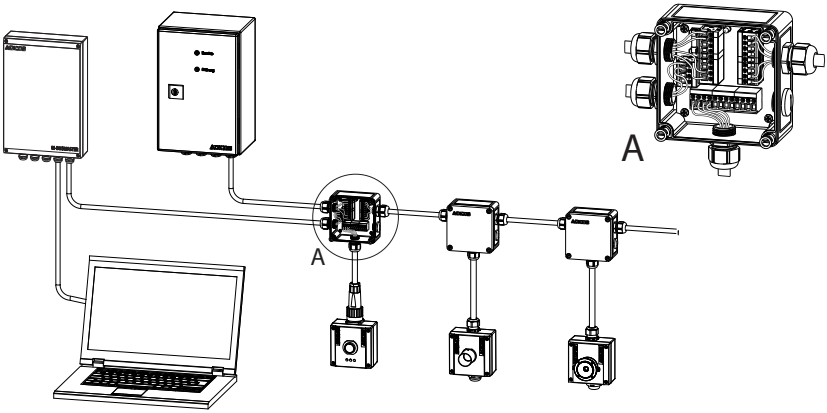
1 Push the bayonet plug-in coupling of the ADICOS connection cable against the detector connection

2 Carefully turn the entire bayonet plug-in coupling to find the correct orientation of the anti-rotation protection

3 Turn the bayonet ring of the coupling forcefully to attach cable

5.4.2 Connecting the connection cable with the ADICOS AAB

Depending on the system and detector configuration, the specific wiring of the ADICOS connection cable and the ADICOS branching and connection box (ADICOS AAB) varies. The following procedure applies for all wiring variants.



Wiring the ADICOS AAB

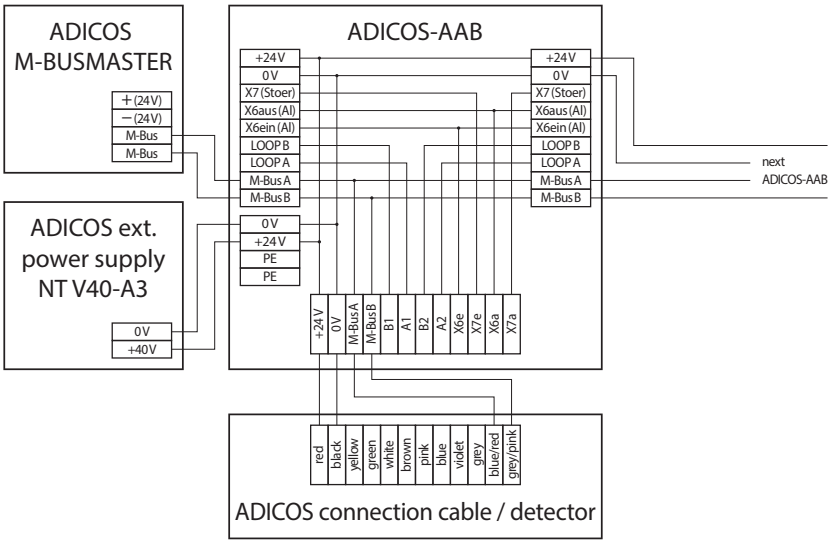
1. Open the enclosure cover of the ADICOS AAB
2. Open the lower cable gland of the ADICOS AAB
3. Route the ADICOS connection cable through the lower cable gland into the ADICOS AAB
4. Connect the wires to the connection terminals of the ADICOS AAB according to the wiring diagram
5. Close the cable gland of the ADICOS AAB
6. Close the enclosure cover of the ADICOS AAB

i Further information on the installation of the ADICOS junction box can be found in **ADICOS instructions no. 430-2410-001**!

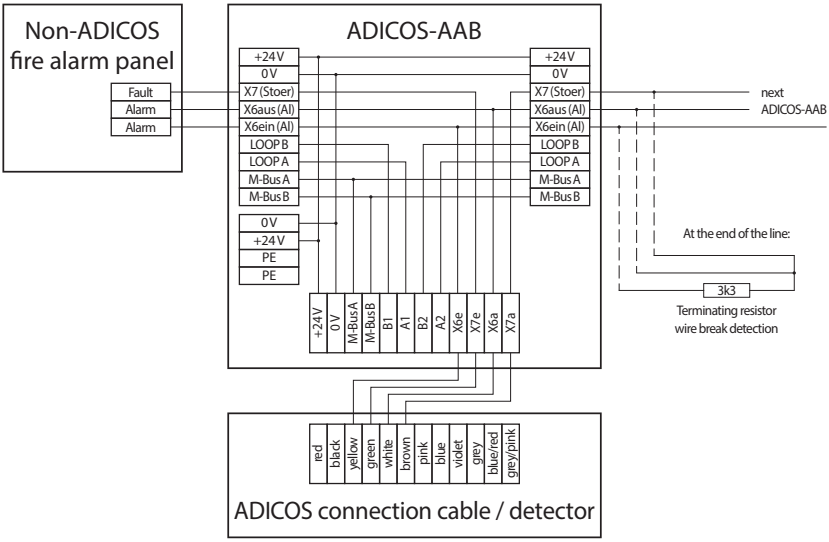
5.4.3 Wiring variants

Specific wiring of the detectors with the ADICOS branching and connection boxes varies depending on the system configuration. The following wiring diagrams outline the most frequent system configurations and/or wiring variants.

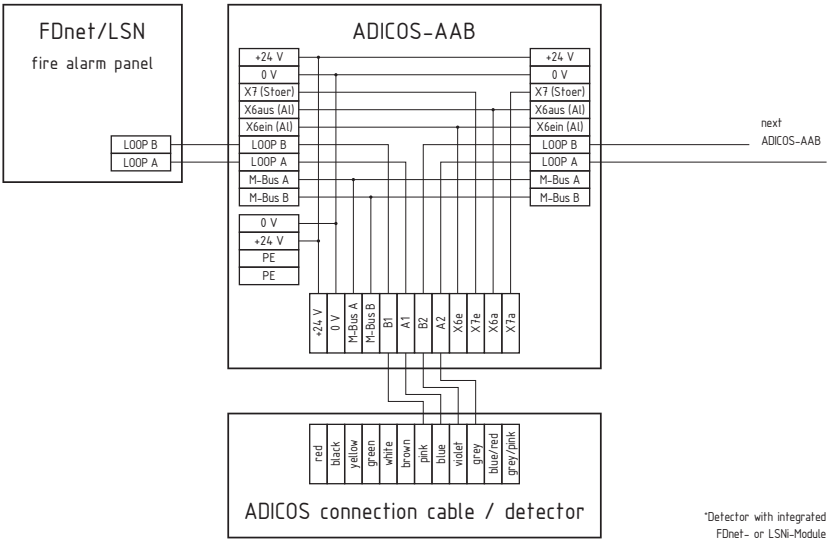
ADICOS M-Bus and external power supply



Limit value detection lines “Fault” and “Alarm”

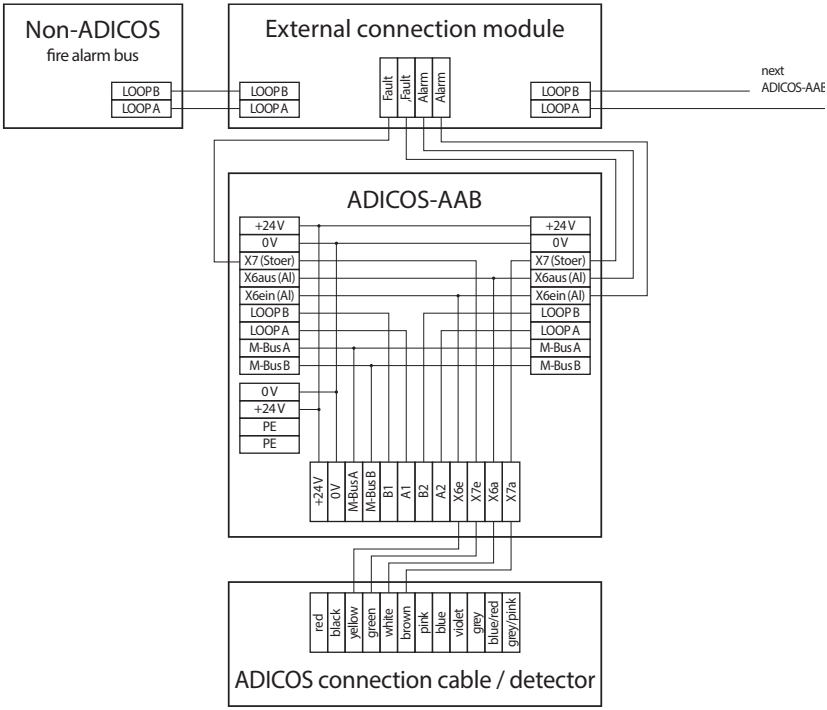


External fire alarm LOOP with LSN / FDnet (internal interface module)

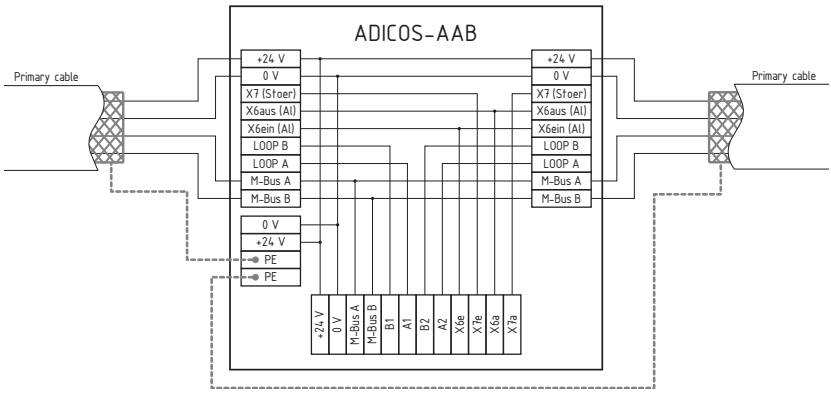


*Detector with integrated
FDnet- or LSNi-Module

External fire alarm LOOP with other bus (external coupling module)



Primary cable shielding



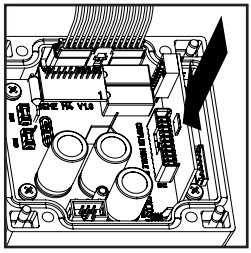
5.5 Retrofitting of Interface Modules for Fire Panels

NOTICE!
Property damage due to electrical voltage!
Detector electronics and interface modules are sensitive assemblies, which can be damaged on contact due to **electrostatic discharge**.

- **De-energize the entire detector system for any wiring and secure against unintentional reactivation!**
- **Apply ESD measures when working on the detector electronics!**
- **Do not touch electronic components!**

The electronics of the ADICOS GSME features a slot for interface modules. Depending on the ordered configuration, the detector electronics is populated with the necessary module in the factory configuration. However, interface module retrofits are required on site in special cases. In addition to the electrical installation, it must be observed that a configuration change of the detector using the ADICOS System Software is usually also required to use the module functionalities.

Retrofitting the interface module



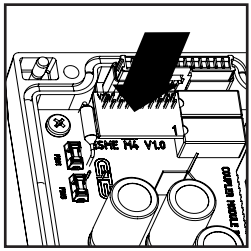
1. Using the SL/PH2 screwdriver, loosen the enclosure screws in the detector cover
   The screws remain in the cover.
2. Carefully remove the enclosure cover with the detector electronics
   The plug connector for detector connection remains connected.
3. Insert the interface module into the module slot on the detector board
4. Close the detector enclosure, required torque 1.5 Nm

5.6 Replacing the Configuration Module

NOTICE!
Property damage due to electrical voltage
Electrical voltages can cause damage to property.
- De-energize the detector for any wiring **and secure against unintentional reactivation!**
- **Apply ESD measures when working on the detector electronics!**
- **Do not touch electronic components!**

The configuration module is a compact electronics module, which is populated in the factory configuration in the configuration module slot of the detector. It is used to define the resistances of the ralay contacts of the detector. Configuration modules must be replaced on site in special cases.

Replacing the configuration module



1 Using the SL/PH2 screwdriver, loosen the enclosure screws in the detector cover
The screws remain in the cover.

2 Carefully remove the enclosure cover with the detector electronics
The plug connector for detector connection remains connected.

3 Carefully pull off the old configuration module

4 Insert the new configuration module in the correct orientation into the configuration module slot on the detector board

5 Close the detector enclosure, required torque 1.5 Nm

6 Commissioning

DANGER!
Property damage due to electrical voltage!
ADICOS systems work with electrical current, which can cause equipment damage and fire if not installed properly.

- **Before switching on the system, verify that all detectors are properly mounted and wired.**
- **Startup may be performed only by properly trained personnel.**

WARNING!
Risk of faults and failures of the detector system
The degree of protection of ADICOS detectors specified in the technical data is only guaranteed when the enclosure cover is completely closed. Otherwise a false alarm can be triggered or the detector can fail.

- **Before startup, check that all of the detector enclosure covers are completely closed, ohterwiese the ADICOS system will not work properly.**

The ADICOS detectors do not have to be started up individually. When the ADICOS power supply unit is switched on, all of the detectors start automatically.

The ADICOS detector indicates a malfunction until the startup process is completed.

► Supply voltage to the device to start up the ADICOS GSME.

► Start up the ADICOS system as described in the manual for the M-BUSMASTER interface unit used.

▷ The approx. 5-minute start-up process starts automatically.

▷ The green signal LED »Operation« flashes.

▷ The yellow signal LED »Fault« illuminates continuously.
The detector remains in fault, until the end of the start-up process.

▷ The detector electronics is initiated and all sensors are subsequently heated to operating temperature.

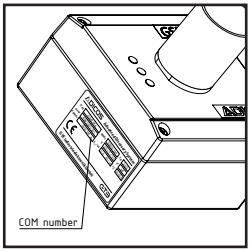
▷ Once the start-up process is completed, the signal LED »Operation« illuminates green continuously and the yellow signal LED »Fault« goes off.

7 Operation

During operation, the detector monitors the fire gas concentrations captured by the sensors per its basic configuration and triggers an alarm, when the set alarm limit values are exceeded. The query interval of the sensors amounts to 30 seconds.

7.1 Software Access

If a M-Bus interface is used, detailed detector information can be called up via the ADICOS M-Bus. For this purpose, a service PC with the ADICOS System Software connected to the ADICOS M-BUSMASTER is required.

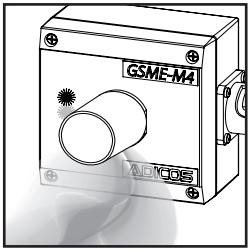


Using the communication number (COM or K.N.) printed on the type plate and the front of the detector, a single view of the detector can be called up in the software. Within this single view, the concentration profiles of the gas sensors can be called up as chart, for example. The alarm thresholds of the detector can be adjusted here as well.

Detailed information regarding the use of the ADICOS System Software as well as the specific approach to changing the detector settings is available upon request.

7.2 Alarm

If the gas concentrations detected by the detector sensors exceed the set alarm thresholds, the detector triggers an alarm. The internal alarm relay is activated and the red signal LED is illuminated (without fire panel module). This status is also transmitted via the M-Bus.



If an alarm delay (see Chap. 7.2.3) has been set, the alarm is not triggered until the alarm conditions have been met for longer than the set duration.

Fire Detection System Operation

If the detector is connected to a central fire alarm panel, the alarm is transmitted to the central fire alarm panel via the interface module. The fire panel switches the detector in alarm state and the alarm relay as well as the red signal LED of the detector are switched on. If the fire panel does not switch the ADICOS GSME into alarm state, the red signal LED flashes.

7.2.1 Resetting the alarm

The ADICOS GSME remains in alarm state, as long as the alarm condition is met. The state is newly determined in every query cycle (30 seconds interval). As soon as the alarm condition is not met, the alarm state is automatically reset. Signal LED »Alarm« is only reset after a respective delay, if an alarm holding time (–› Chap. 7.2.2) is set.

If the alarm LED is controlled via central fire alarm panel, the alarm state can be reset via the alarm reset contact of the fire panel. Beyond that, an alarm can only be reset via a detector reset, which is expressly discouraged.

7.2.2 Alarm holding time

The alarm holding time is an optional parameter that can be adjusted via the ADICOS System Software. If set, the signal LED »Alarm« is only reset after a respective delay after the alarm condition is not met anymore. By default, the alarm holding time amounts to approx. 7.5 minutes.

7.2.3 Alarm delay

The alarm delay is an optional parameter that can be adjusted via the ADICOS System Software. If set, the alarm state is only triggered, if the alarm condition is met over the set minimum timeframe (in minutes).

NOTICE!
Faulty parametrizing!
Incorrect parameterization of the alarm delay function can lead to ineffectiveness of the detector!

- **The detector parameters may only be changed by experienced specialist personnel!**
- **In case of doubt, contact the manufacturer!**

7.2.4 Pre-alarm

If the ADICOS GSME is equipped with a pre-alarm module and respectively configured, set 2 of the limit value combinations (–› Chap. 4.1) is automatically evaluated as trigger criterion for the pre-alarm. If the limit values from set 2 are exceeded, the pre-alarm module relay switches and the red signal LED »Alarm« flashes.

8 Maintenance

The following maintenance measures must be performed in the specified cycle.

Measure	Cycle		
	daily	quarterly	yearly
Check for fault message via fire panl and/or software (⇀ Chap. 9, Fault)	✓		
Visual inspection for condensation on the detector enclosure (⇀ Chap. 8.1, Condensation and contamination)	✓*		
Visual inspection for damage on detector, attachment and connection cable		✓	
Visual inspection for pollution of the sintered metal filter (⇀ Chap. 8.1, Condensation and contamination)		✓	
Function test of the “Alarm” and “Fault” signal relays (⇀ Chap. 8.3, Function test of the signal relays)		✓	
Measurement of the supply voltage in the connection boxes (Permissible voltage range 21,6 ... 40 V)		✓	
Function test with ADICOS GTL-3 GSME tester (⇀ Chap. 8.4, Annual function test)			✓

* Within the first three months after commissioning

8.1 Condensation and Contamination

Condensation on the detector enclosure, in particular in the area of the sintered metal filter, can lead to reduced sensitivity of the ADICOS GSME detector. If damp dusts form deposits on the detector, the sintered metal filter can become polluted, which leads to reduced detectivity or even ineffectiveness of the detector.

For this reason, condensation must be avoided under any circumstances. In the case of condensation, switch on detector heating and use spray protection! In addition, the sintered metal filter must be checked for pollution within the scope of quarterly maintenance as well as regularly within the first three months after commissioning.

8.2 Cleaning

In the normal case, the ADICOS GSME also works with heavy contamination. Dry dust can be removed using a vacuum cleaner as needed.

NOTICE!
Clogging of the sintered metal filter!
The sintered metal filter can clog when coming in contact with water and dirt.
- **Clean the sintered metal filter dry only!**

8.3 Function Test of the Signal Relays

The “Alarm” and “Fault” signal relays must be checked for function quarterly. For this purpose, they can be switched for test purposes via the ADICOS System Software.

NOTICE!
Switching through the relays!
The function test of the signal relays triggers an alarm resp. fault state in the connected central fire alarm panel.
- **Switch the fire panel into inspection mode prior to the function test!**

8.4 Annual Function Test

WARNING!
Malfunction of the detector!
To ensure correct function of the detector, a test with the ADICOS GTL-3 tester is required.
- **Perform at least one test triggering per year with the GTL-3!**
- **Observe ADICOS instructions no. 430-2410-102!**

NOTICE!
The function test of the detector triggers an alarm state in the connected central fire alarm panel.
- **Switch the fire panel into inspection mode prior to the function test!**

8.5 Detector Replacement

The maximum service life of the sensors of the ADICOS GSME detector is limited to eight years. Depending on the ambient conditions, the sensitivity of the sensor can also decrease earlier and make a detector replacement necessary.

Replace ADICOS GSME detectors no later than eight years after commissioning!

The same information apply to detector replacement like for their initial installation (→ Chap. 5, Installation).
Proceed as follows to replace the detector:

8.5.1 Save inventory data

Save the inventory data if any of these cases apply:

- The ADICOS System Software is used permanently for monitoring measurement data.
- The alarm thresholds of the old units do not correspond to the alarm thresholds of the new units and should be available for data transfer.

To save the inventory data of a detector, an installed ADICOS System Software is required.

Create a backup file

1 Open ADICOS System Software
2 Call up “Service functions”
3 Select “Test”
4 Save table

▷ The backup file with all relevant unit data is now located under:
C:\GSME\Melder_Liste_komplett.csv

8.5.2 Prepare new unit for use

If the ADICOS System Software is used permanently for monitoring measurement data, it is necessary to prepare the new device for use at a specific position. A specific position is identified by a line number, for example.

The prerequisite for a 1-to-1 exchange of the new unit and the old unit is an identical M-Bus address.

► Adopt the M-Bus address of the old unit for the new unit before commissioning it on the M-Bus.
► If the alarm thresholds before and after the detector replacement are to be identical, adopt the alarm thresholds of the old unit for the new unit.

The M-Bus address and the alarm thresholds of the replacement device are stored in the backup file (see 8.5.1 Save inventory data).

8.5.3 Replace detector

If the ADICOS System Software is used permanently for monitoring measurement data, it is necessary to store the serial number of the new device correctly.

► For this purpose, adopt the M-Bus address of the old unit for the new unit on the M-Bus before commissioning (see 8.5.2 Prepare new unit for use).

If interface modules for a fire alarm bus are transferred from old to new units, make sure that the electronics of the units are protected from external damage when opening the new units.

When closing the unit, tighten all screw connections with a torque of 1.5 Nm to ensure dust-tightness.

8.5.4 Update unit data

If the ADICOS System Software is used permanently for monitoring measurement data, an update of the device data at the ADICOS System Software is mandatory.

An update of the device data on the ADICOS System Software has no effect on the functionality of the new device.

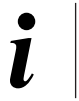
Call up the unit for updating

1 Open ADICOS System Software
2 Call up “Service Funktoinen”
3 Select the button “Unit input”. (Device input) button
4 Select the old unit in the “Aktive Geräte” table by double-clicking on it

▷ „GSME-Dateneingabe“ window is open

5 Read in the serial number of the new device by pressing the “Von Melder lesen” button. Then confirm with “OK”

8.5.5 Optimise alarm thresholds (optional)



Even if you exactly transfer the alarm thresholds from an old device to a new device, the performance of the new device may differ from the previous performance of the legacy device.

Possible reasons for different performance with identical alarm thresholds are:

- marginally varying cross-sensitivities
- Contamination of the sintered metal filter of old units whose influence on the measurement result cannot be compensated.

► Optimise alarm thresholds or set new alarm thresholds using the following methods:

- **Long-term recording**
  Long-term recordings are used to record the usual fire gas concentrations at the site of operation.
- **Fire test**
  Fire tests are used to determine the expected fire gas concentration in the event of an alarm.

9 Fault

A fault of the ADICOS GSME is indicated by illumination of the yellow signal LED »Fault« as well as by deactivation of the »Fault« signal relay.

The following fault states and/or causes are recognized by the detector:

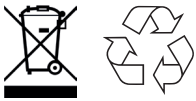
Fault	Description	Measure
Undervoltage/ power outage	Operating voltage drops below 20 V (including temporarily)	Check supply voltage; Check wiring; Use stronger or additional power supply; Self-resetting
Checksum ROM / EEPROM	The checksum is incorrect after a new start or reset.	1. Update checksum 2. Detector replacement with aid of System Software
Heating temperature	One or several heating temperatures do not reach the target value.	Observe; Detector replacement, if necessary
Test fault	A test fault was triggered using the ADICOS System Software.	Cancel test fault using ADICOS System Software
Sensor fault	The conductance of at least one sensor is exceeded resp. undercut.	Detector replacement
Start-up sequence	The detector always remains in fault, until the end of the start-up process.	Self-resetting

Use the ADICOS System Software for a detailed analysis of the fault states!

The ADICOS GSME does not offer automatic contamination detection for the sintered metal filter.

10 Disposal

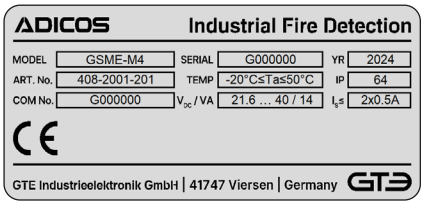
Return the device to the manufacturer when it reaches the end of its serviceable life. The manufacturer will ensure that the components are disposed of properly, in an environmentally friendly manner.



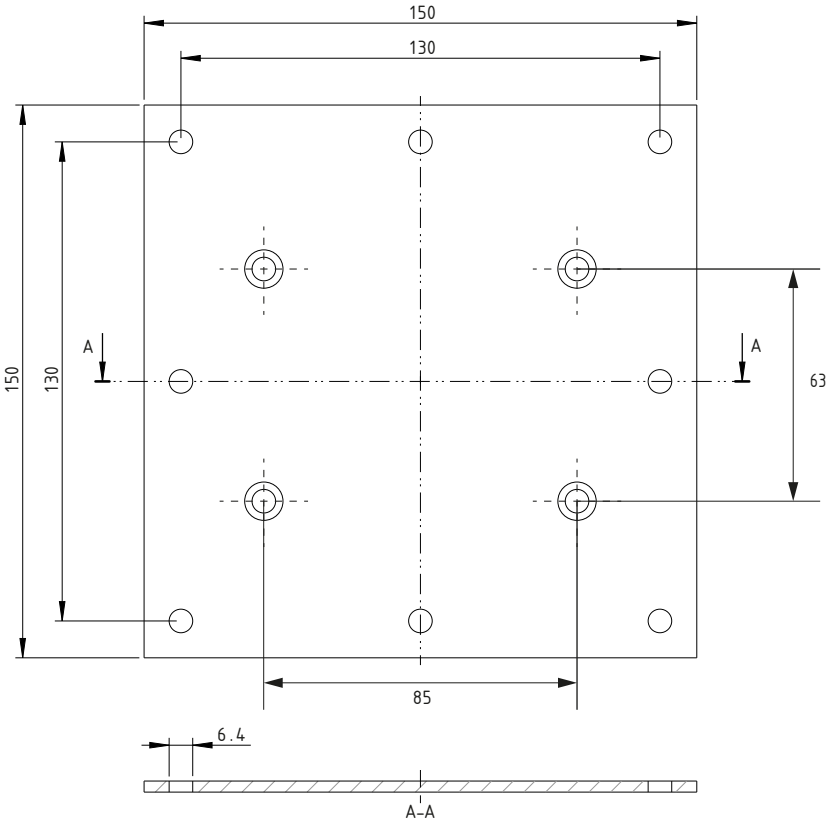
11 Technical Data

General		
Model:		GSME-M4
Item No.:		408-2001-201
Enclosure dimensions:	mm	120 x 100 x 100 (Length x Width x Depth) (Length: bayonet connector included, Depth: spray protection incl.)
Weight:	kg	0.7
Degree of protection:		IP 64
Enclosure:		Aluminum die casting, powder coated
Electrical properties		
Voltage range:	V	DC 21.6 ... 40
Maximum power consumption (without heating):	VA	4
Maximum power consumption (with heating):	VA	14
Internal fuse:	mA sb	2 x 500
Environmental conditions		
Ambient Temperature:	°C	–20 ... +50
Relative humidity	%	≤ 95 (non-condensing)
Detection data		
Sensor combination:		CO — H_2 — HC — NO_x
Response time:	s	> 30
Detection scenarios:		Smoldering fires per EN 54-7 Smoldering coal fires
Other		
Bending radius connection cable	mm	> 91,5

11.1 ID Plate



Model:	Device model	SERIAL:	Serial number (variable)	YR:	Year of production (variable)
ART-Nr:	Article number (variable)	TEMP:	Ambient temperature	IP:	Degree of protection
COM-NR:	Communication number (variable)	V_{DC}/VA:	Voltage range / maximum power consumption (heating incl.)	I_S:	Internal fusing (Short-circuit current)
	CE marking				

12 Appendix

12.1 ADICOS Mounting Plate