CO2 Gas Warning System
Assembly and Operating Instructions

Table of contents

0. Introduction

These assembly and operating instructions contain all of the information necessary for the installation, commissioning and maintenance of the CO2 Gas Warning System.

0.1 Safety information

Symbol	Definition
	Caution! Observe the instructions in the manual!

1. Area of application

1.1 Use in accordance with BGR 228

The CO2 Gas Warning System was designed in accordance with the requirements of the former TRSK 313 (Technical Requirements for Gas Detection Devices), the current DIN6653-2 and the former TRSK 403 (Requirements for Installation, Operation and Repair), and today in accordance with BGR 228, and complies with all statutory required functions.

Since 07/05/1996, the legislative authority requires special protective measures in order to be able to prevent hazards due to gas leaks (Betr.Sich.V.). A specific protective measure requires premises 1.5 m below ground level to be fitted with permanent ventilation/floor extraction, or alternatively, a gas detection system. Walk-in cold chambers must always be secured, regardless of their installation location!

1.2 Use in refrigeration systems with CO_2 coolant

Special safety system requirements in *CO2 Gas Warning System PA, CO2 Gas Warning System AM* and *CO2 Gas Warning System AM +* versions, are installed for the monitoring of refrigeration systems (DIN EN 378) with CO_2 coolant, mainly in the food trade and processing industries.

Normally, the machine room, freezers, cold chambers and partially refrigerated access ways are monitored. In supermarkets, staff rooms are also monitored when these come into contact with the coolant lines.

1.3 System description

Method of measurement:

CO_2 is detected using an infrared measurement system in the *sensor unit*.

System structure:

As a base system, the CO2 Gas Warning System basic package consists of a *sensor unit*, a *warning unit* and a *distributor*. Where multiple spaces are at risk, the system can be expanded to include a second *sensor unit*.

Optionally, the system can also be expanded to up to 2 devices (any combination of *signal units / switching units*).

a) CO2 sensor unit

The *sensor unit* is installed in the hazard area and is connected by means of a *distributor* to the *warning unit.* A visual and audible warning on the *sensor unit* enables warnings even in the hazard area itself.

b) CO2 warning unit

The *warning unit* is installed in front of the hazard area and warns individuals wishing to enter the area of a potential hazard.

c) AM / AM + add-on module

The add-on module contains the *PA warning unit* and enables the floating transmission of the operating status at 230 V / 50 Hz. Also available are a large, integrated alarm light with horn on the AM + version and the possibility of attaching further alarm devices. The basic functions are identical to the standard CO2 Gas Warning System version.

d) Distributor

The *distributor* and control lines connect all of the components into a system.

e) Switching unit

The *switching unit* can activate power consumption devices, such as fans or external signal devices, in the event of an alarm.

f) Signal unit

The *signal unit* is connected to the warning unit (central unit) and is used when multiple entry areas must be secured in the hazard area (additional cellar entrances, doors). The *signal unit* can also be used as a monitoring display in the counter area.

The *signal unit* has no central function, but merely serves as an additional visual/audible indicator unit.

g) Alarm unit

The 230 V version of the *alarm unit* is used to provide additional visual and audible alarms in hazard areas as well as in the entrances to hazard areas. When used in combination with the *CO2 Gas Warning System AM* version, these can be directly connected, supplied with power, and their alarms switched off directly on the add-on module.

h) Luminous warning panel

The 230 V and 24 V versions of the *luminous warning panel* are used to provide additional visual alarms in the entrances to hazard areas.

i) Mode of operation

The *sensor unit* determines the CO_2 content of the air and transmits the measured values to the *warning unit*. CO2 Gas Warning System has 2 alarm thresholds.

Under normal operating conditions, the **green** power light is lit.

Pre-alarm:
The pre-alarm is triggered when a CO_2 content of 1.5% is exceeded. An intermittent warning sound and the flashing red LED on the *warning unit* and *sensor unit* indicate a hazard.

Main alarm:
When the CO_2 content increases above 3%, the main alarm is triggered. This is indicated by means of a continuous sound and continuously lit red LED on the *warning unit* and *sensor unit*.

⚠ CAUTION	When the main alarm is triggered, no further access to the hazard area must be allowed! The hazard can only be eliminated by switching on a fixed or mobile air extraction unit or by the fire brigade!

All audible signals can be switched off by pressing the *Alarm off* key.

In the event of a pre-alarm, the visual alarm indicator switches off automatically once the gas concentration drops to normal levels. In the event of a main alarm, the visual alarm indicator can only be switched off by once again pressing the key if the CO_2 gas concentration is lower than 1.5%. If the gas concentration is between 1.5% and 3%, the indicator will switch from continuous to flashing light.

In the event of a system fault due to a cable break, short-circuit, sensor failure or other cause, the yellow indicator (Fault) on the *warning unit* and *sensor unit* and/or the green flashing LED on the *signal unit* will flash and an audible signal will sound; these can be acknowledged and/or cancelled by pressing the key. The yellow indicator will remain lit until the system fault is eliminated and acknowledged by once again pressing the key.

⚠ CAUTION	When used in freezer units, the sensor units must be adjusted to the ambient temperature before commissioning. Otherwise, undefined fault messages will be shown, which will disappear once the sensor units are acclimatised. Only then will your system be ready to run!

1.4 System configuration

The *sensor unit* is installed in all spaces at risk (cellars/cold rooms, storage areas and holding spaces for gas cylinders, freezer units, etc.).

The *warning unit/add-on module* must be installed directly in front of the hazard area. The *warning unit* and *sensor unit* are connected to each other by means of a *distributor*.

The *switching unit* switches on an extraction unit or other power consumption device in the event of an alarm. The *signal unit* secures the hazard area from further access.

⚠ CAUTION	The *warning unit* must be installed immediately in front of the entrance to the hazard area! Where there are multiple entrances to the hazard area, a *signal unit* and/or additional alarm unit must be installed in front of each additional entrance!

a) Installation in a dispensing system
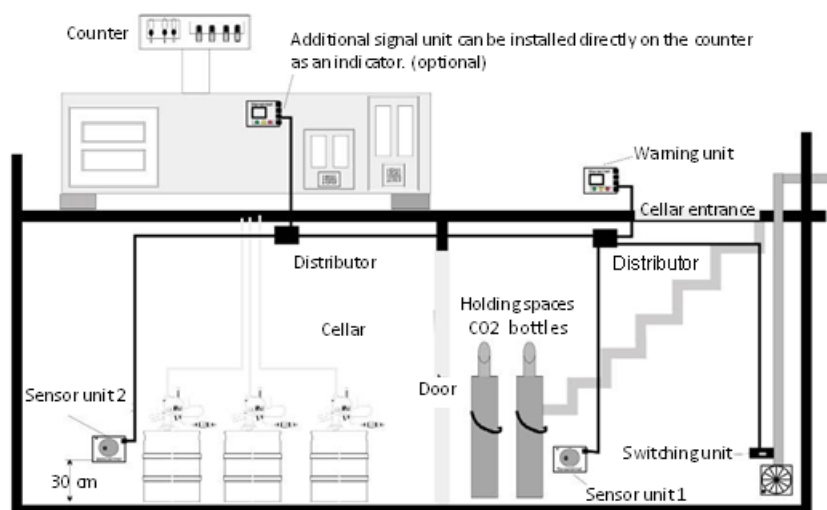
b) CO2 Gas Warning System add-on module installation for a CO2 cooling system
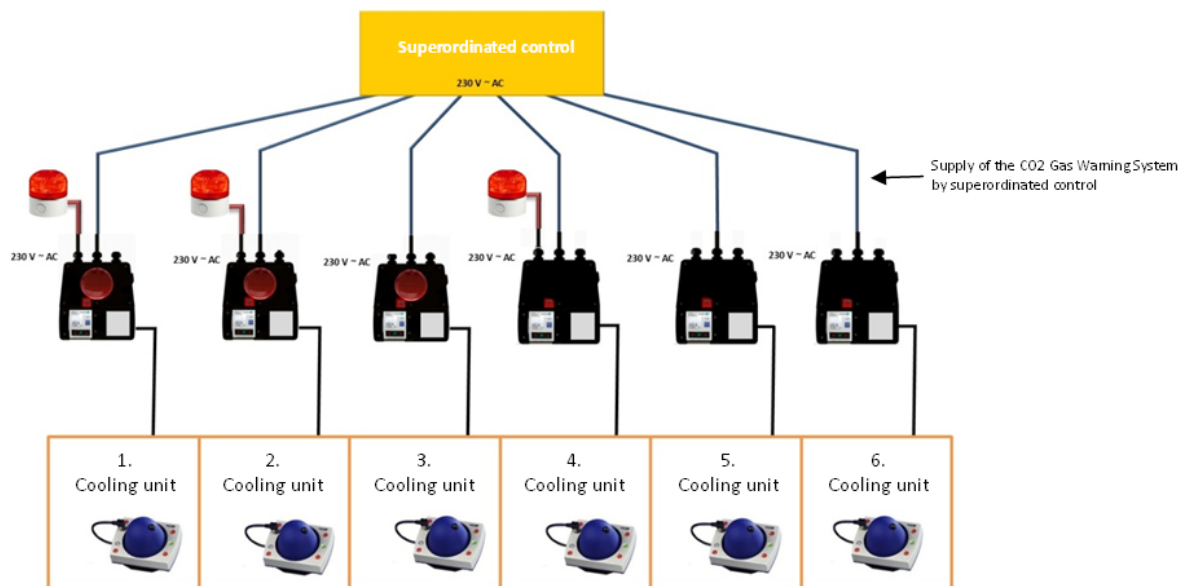
In grocery stores, cold rooms, freezer rooms and machine rooms are mostly secured with *CO2 Gas Warning System* Alarm and fault messages are controlled at the refrigeration control system. Alarms are acknowledged directly in a decentralised manner on the add-on module.

2. Assembly

2.1 General notes in accordance with BGR 228

⚠ CAUTION	The gas detection system installer is responsible and therefore liable for the correct installation and handover of the equipment.
⚠ CAUTION	Gas detection devices (equipment requiring special monitoring) may only be planned, installed and maintained by specialist personnel.
⚠ CAUTION	To ensure safe operation, only ancillary components approved by the manufacturer may be connected to the CO2 Gas Warning system.

BGR 228 /DIN 6653-2 stipulates all of the statutory measures and the state of the art for the installation and operation of gas detection equipment in dispensing systems.

DIN EN 378 refers to the state of the art for the application, operation and functional checking of gas detection devices in the refrigeration field.

The rules therein must normally be observed and complied with. All further measures for the installation/assembly of the CO2 Gas Warning system are given in the sections below.

Note: Please observe the separate assembly instructions for *CO2 Gas Warning System AM*!

2.2 System design

The overview identifies the possible system component connections via the *distributor*. The PA version has a second control line (5-wire) to the building control/control system.

The sensor unit may only be operated in an upright, assembled condition (see Fig.).

- control line 3m
- control line variable
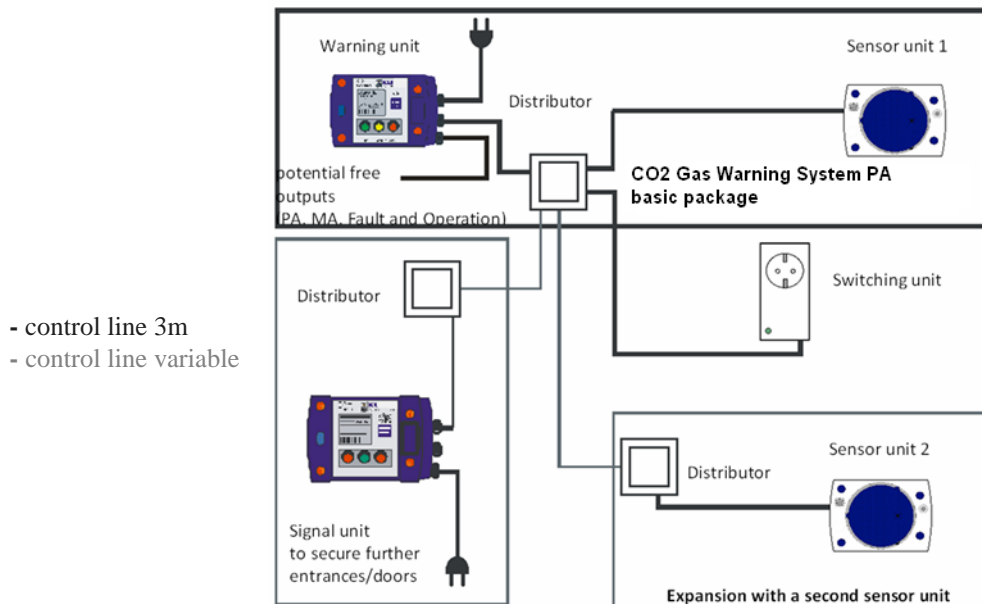
The CO2 Gas Warning System AM / AM+ version is supplied with power through the control line from the building control/control system. An input for power supply and control is available for additional alarm units.

- control line 3m
- control line variable
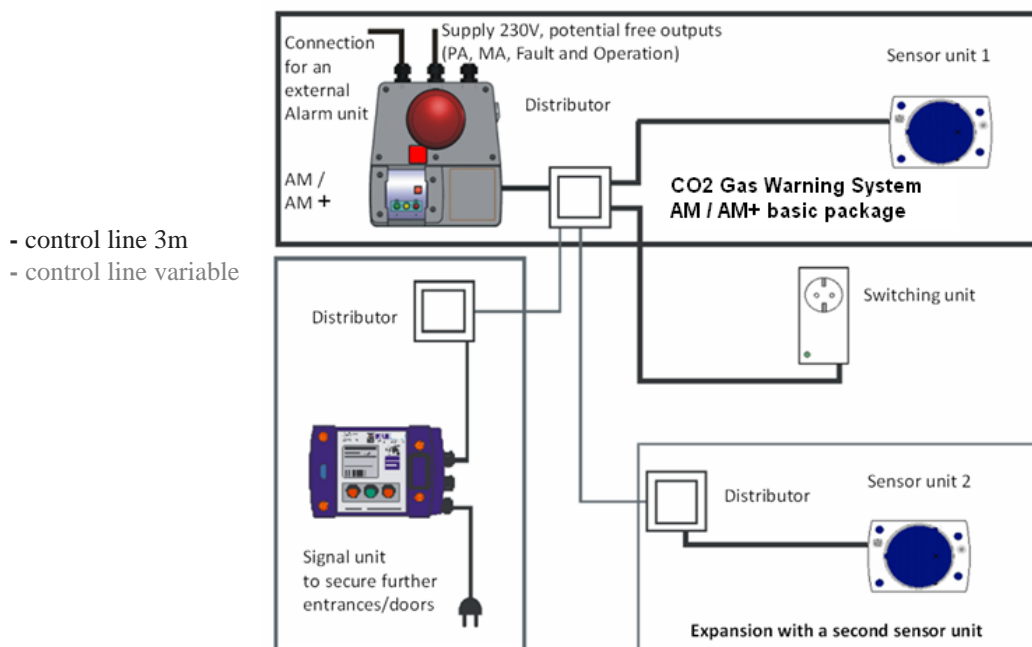
2.3 CO2 sensor unit installation

Select an installation point in such a way that:

- The *sensor unit* is not exposed to direct draughts. <u>When used in freezer rooms, the sensor unit must first be acclimatised to the ambient temperature.</u>
- The *sensor unit* reaches the deepest point in the monitoring area
- It is approx. 30 cm away from the floor
- The *sensor unit* can be installed on a vertical wall
- The *sensor unit* is protected from mechanical impacts as far as possible

Drill two holes at a distance of 40 mm with an 8 mm drill and insert the dowels (1). Use the screws (3) to screw the DIN rail (2) to the wall and tighten the screws.

Position the lower part of the *sensor unit* (4) housing onto the rail from above, and press the *sensor unit* downward until the clamping mechanism snaps in with an audible click. The *sensor unit* can be removed again from the DIN rail by pulling the terminal snap-in mechanism.. Secure the control cable to the *sensor unit* using the plug (5). Tighten the union nut on the plug.

A maintenance plate is mounted on the *sensor unit*. Mark this with the next replacement date with a ballpoint pen or screwdriver. This should be replaced every 4 years of operation.

CO2 sensor unit installation
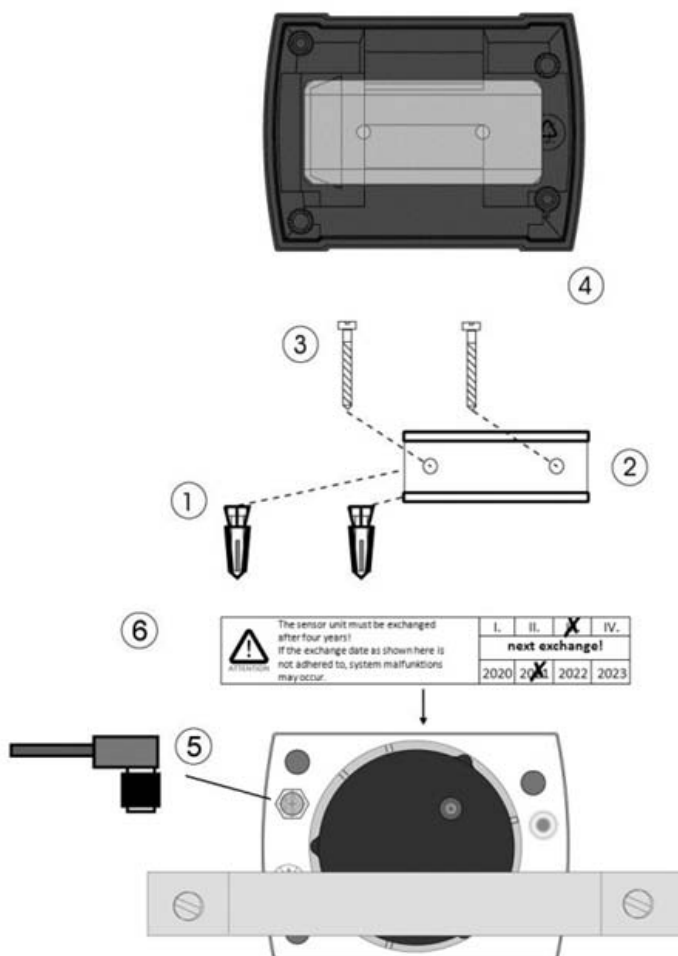
2.4 Installing the CO2 warning unit (PA)

As a precondition for installation, a qualified electrician must first of all install a power distributor or socket at ceiling height in the entrance area.

The *warning unit* is fitted with a 2.5 m long power cable and plug. The *warning unit* can be connected to the mains power either permanently, or via a plug. You must make sure that a continuous power supply can be ensured.

The *PA warning unit* can only be permanently connected to a 230 V / 50 Hz power supply and comes with a plug for the necessary "one-man initialisation".

Disconnect the *PA warning unit* during initialisation and when switching off the power.

⚠ CAUTION A permanent installation may only be performed by a qualified technician (electrician)!

⚠ CAUTION The *warning unit* must be installed immediately in front of the danger area!

Select the mounting point in such a way that a system warning cannot be ignored before entering the danger area.

⚠ CAUTION Please only use sockets and circuits which are constantly in operation and which cannot be switched on and off as required!

The PA version provides 4 floating outputs for switching. Pre-alarm, main alarm, operation and fault messages can be forwarded.

CO2 Gas Warning System PA version

Connection and colour layout of the floating outputs

An input voltage for the PA outputs of up to max. 60 VDC / 125 VAC at max. 0.5 A can be applied.

white:	Input 24V AC/DC
grey:	Pre-alarm
brown:	Main alarm
green:	Operation
yellow:	Fault

CO2 Gas Warning System AM / AM + versions

See *CO2 Gas Warning System AM / AM + assembly instructions*

2.5 Setting the geographic height

On the side of the *warning unit*, there is a rotary switch for setting the location height at which the detection system is installed. Ask the operator the height of the restaurant above sea level. Check this against the height range given in the table and set the position (0...9) of the switch so that the number on the switch is above the marking on the housing.

Setting of the altidude above sea level according to the table

After setting the height, the housing on the rotary switch must be sealed with the attached transparent adhesive film!
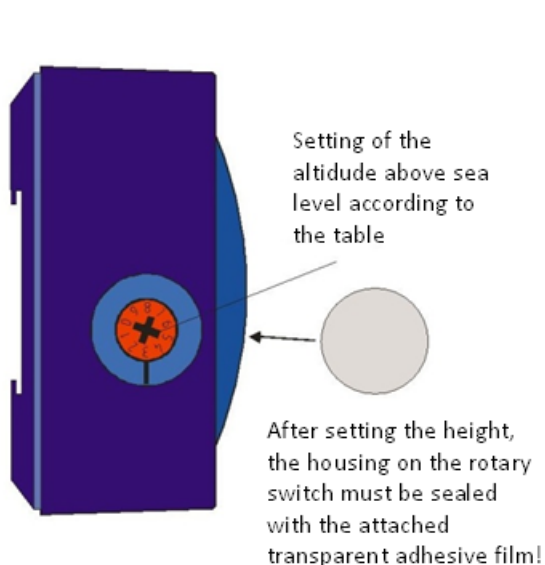
Level	Height [m] above sea level
0	0 .. 250
1	250 .. 500
2	500 .. 750
3	750 .. 1000
4	1000 .. 1250
5	1250 .. 1500
6	1500 .. 1750
7	1750 .. 2000
8	2000 .. 2250
9	2250 .. 2500

2.6 Installing the AM / AM + add-on module

(See *CO2 Gas Warning System AM / AM+* assembly instructions)

2.7 Installing the distributor

The distributor housing (1) is screwed onto the wall using 2 screws/dowels (2). You must ensure that the O-rings (3) on the cover of the distributor are used to seal the screws.

The control lines must be drawn through the PG glands (4). The PG glands can be screwed tight as required through openings in the housing. If a cable line to the PG gland cannot be assigned to a control line (5), the opening must be sealed using the plastic plug (6) provided.

The individual wires of the control lines must be arranged on the clamping strip (7) in accordance with the system design diagram (see 2.2).

Then, secure the clamping strip in the distributor housing using adhesive tape as shown in the illustration.
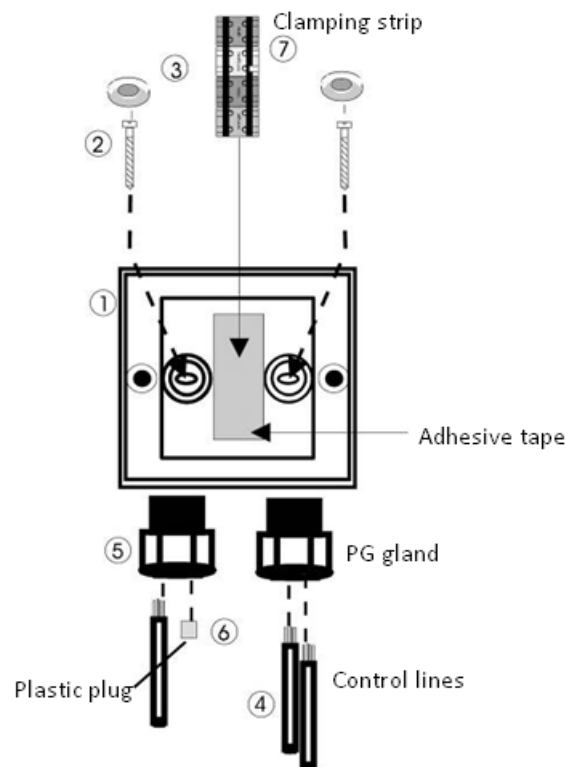
2.8 Line connection to the distributor

There is a connector clamping strip with 4-colour terminal blocks in the *distributor*. Each block is fitted with 4 identical terminals. The control lines for the system components must be connected to the terminals in accordance with the diagram. Insert a screwdriver into the slit on the top of the clamping strip and open it by pressing the terminal. The cable ends of the control line can now be inserted laterally into the clamping strip before then removing the screwdriver.
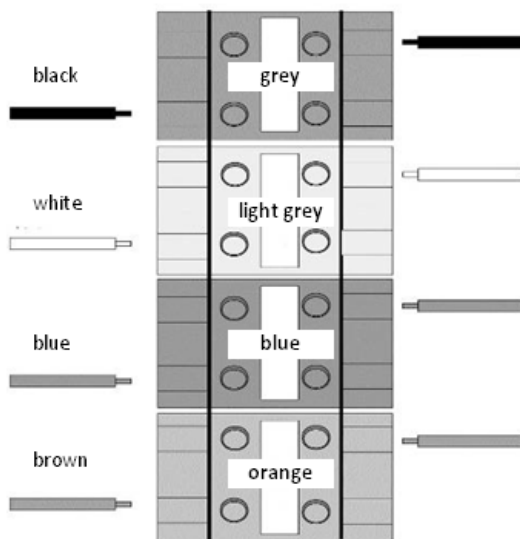
2.9 Accessories

2.9.1 Switching unit

In the event of an alarm, the *switching unit* can activate power consumption devices such as a fan, additional visual and audible warning signals with a maximum load of 16 A. The *switching unit* is connected by means of a distributor to the warning unit (see 2.2).

The *switching unit* itself can be plugged into a 230 V / 50 Hz power socket.

On the rear of the unit, you will find a *switch* inserted into the housing. This allows the relay to be selected in the event of a main or pre-alarm.
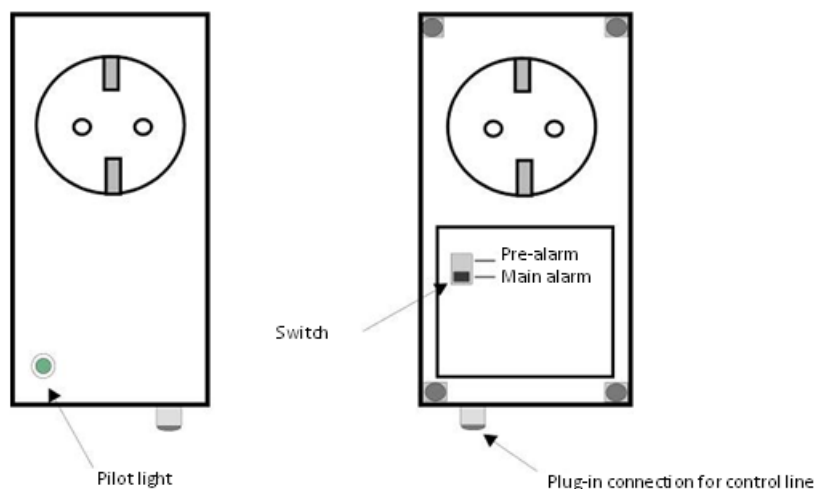
2.9.2 Signal unit

The *signal unit* is installed in the same way as the *warning unit* (2.4).

Like all of the other system components, the *signal unit* is connected by means of the distributor to the *warning unit*. The control lines are connected to the distributor in a colour-identical manner as shown in 2.5.

A plug and/or permanent connection is necessary for independent power supply.

⚠ CAUTION	When initialising the entire system (on the *warning unit* only!), you must ensure that the mains power is provided to the *signal unit*; i.e. the *signal unit* must be running during initialisation.
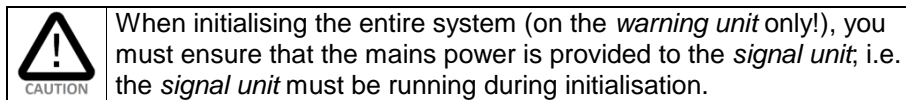
2.9.3 Protective guard

The *sensor unit* can optionally be fitted with a protective guard to protect it against external damage. Two versions are available: in widths of 30 mm and 80 mm. When installing the protective guard, please ensure that the indicator light on the sensor unit remains visible.

Mount the protective guard with 2 wall dowels over the *sensor unit* directly onto the wall, as shown in the Figure below.
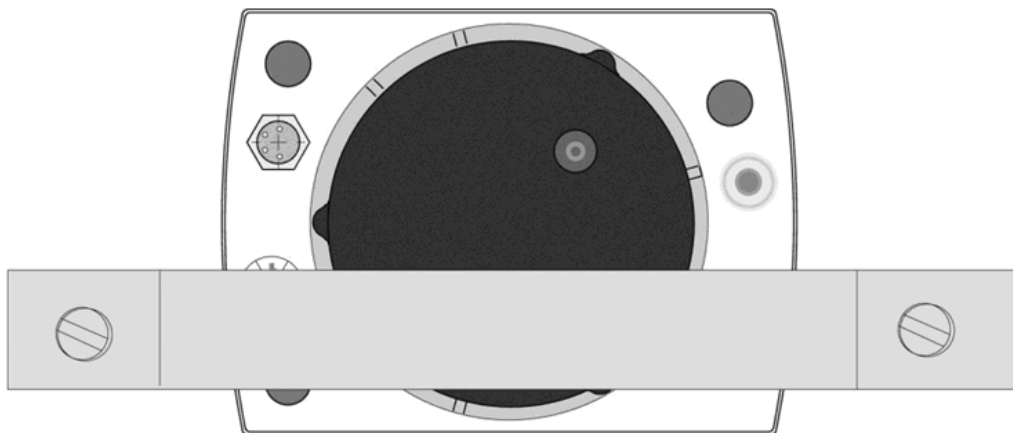
2.9.4 Alarm unit horn/light

(See *alarm unit* installation instructions)

3. Commissioning/system check

3.1 Initial commissioning

System initialisation
Once the complete gas detection system has been installed, the system must be initialised using the *warning unit*. For the *CO2 Gas Warning System AM / AM +* versions, see the additional notes in the *CO2 Gas Warning System AM / AM + installation sheet.*

1. If the system is to be supplied with power from the mains plug, before inserting the mains plug, the **ALARM OFF** button on the *warning unit* must be pressed until the buzzer sounds. Then, release the button. Upon a successful start of initialisation, you will hear a short beep and ticking from the *warning unit*. The system will then initialise by itself. The process ends with 4 short signal sounds and the green power lights on the system components will light. After this, each device must be checked to ensure that all of their green power lights are lit. If this is not the case, the procedure described above must be repeated.

2. If the system is to be connected directly via the distributor (230 V / 50 Hz) to the power supply, the fuse for the corresponding circuit must be switched off and switched on again with the **ALARM OFF** button pressed until the buzzer sounds. Then, release 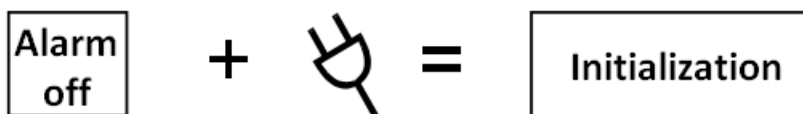the button. The initialisation process will then continue in the same way as in 1. above. For the AM and AM + versions, see the notes on the *CO2 Gas Warning System AM / AM + installation sheet.*

Alarm off	+	✂ (plug)	=	Initialization

⚠ CAUTION	Once initialisation is complete, check all of the connected components to ensure that the green operating lights are lit! In the event of a faulty power light, check the system once again and repeat the initialisation process.

When initialisation fails, the system will switch to alarm mode after approx. 2 minutes.

3.2 System check

Once initialisation is complete, the system's function can be checked by means of CO_2 contact testing. The CO_2 concentration should be between 3% and 100 % in order to trigger an alarm.

The blue protective cover on the *sensor unit* is fitted with a nozzle, through which gas can be fed into the *sensor unit*. If the gas has a CO_2 concentration of 1.5%, it will trigger the pre-alarm; at 3% CO_2, it will trigger the main alarm.

Test the fault message by disconnecting the plug on a *sensor unit*.

⚠ CAUTION	When used in freezer units, the sensor units must be adjusted to the ambient temperature before commissioning. Otherwise, undefined fault messages will be shown, which will disappear once the sensor units are acclimatised. Only then will your system be ready to run!

3.2.1 In-service inspections

a) Inspections

Periodic inspections by a nationally recognised body for periodic inspections will allow a check of the correct entries for the gas detection system in the dispensing log, the approval of the system and the regular maintenance of the equipment. The time left till the next maintenance can be seen on the maintenance plate on the *sensor unit* or in the *dispensing log sheet*.

b) CO_2 refrigeration

Regular annual checks of the safety device in accordance with DIN EN 378, during which alarm triggering with CO_2 is not only used to check the CO2 Gas Warning System but also in particular the transmission and subsequent actions by the control system and/or building management system. No checks of the alarm thresholds and their tolerance ranges with a test gas are required! Calibration is performed at our plant after 4 years of operation, by swapping out the sensor on site. For further details, please see the *CO2 Gas Warning System AM / AM +* installation instructions.

3.2.2 Power failure

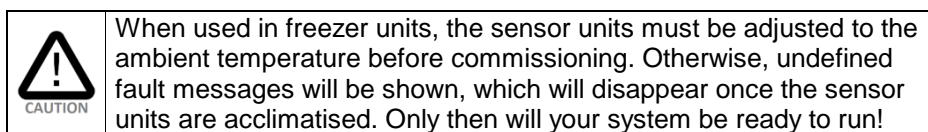The green power light will turn off in the event of a power failure. Once the power supply is restored, the unit will reset to its start mode prior to the power failure. No work on the device is required after a power failure. The unit will continue to run seamlessly in operating mode.

3.3 Re-commissioning after swapping-out

The *sensor unit* must be replaced after 4 years of operation. The operator will receive a re-conditioned replacement unit. The old *sensor unit* will be checked for functionality, cleaned and calibrated at our plant. When the *sensor unit* is swapped out, the gas detection system must be re-initialised (see 3.1 System initialisation and the additional notes in the *CO2 Gas Warning System AM / AM +* installation sheet for the *CO2 Gas Warning System AM / AM +* versions).

Re-commissioning after system expansion
When the system is subsequently expanded (with a second sensor, signal unit or other), the entire system must be re-initialised once the components have been installed (see 3.1).

⚠ CAUTION	When used in freezer units, the sensor units must be adjusted to the ambient temperature before commissioning. Otherwise, undefined fault messages will be shown, which will disappear once the sensor units are acclimatised. Only then will your system be ready to run!

3.4 Instruction for the operator

Once the gas detection system has been successfully installed, the operator and their staff must be trained to use the equipment.

The following points must be explained:
- Functionality
- Recognising and differentiating between the pre- and main alarms
- Recognising malfunctions
- Measures to be taken in the event of a gas alarm (see Chapter 6)
- Entries in the dispensing log / test documentation

⚠ CAUTION	The operator is responsible in accordance with the Betr.Sich.V. for informing and training their staff about the gas detection system and their behaviour in the event of a gas alarm!
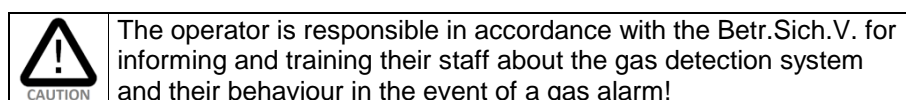
3.5 Documentation in the dispensing log

The gas detection system must be documented in the dispensing log.
This is done using the "Dispensing log sheet" form which is included in the basic package. The form must be completed together with the operator.

By signing this, the operator confirms the functionality of the gas detection system and their complete understanding of the system.

An additional maintenance plate will also be glued to the dispensing log sheet.

	The sensor unit must be exchanged after four years! If the exchange date as shown here is not adhered to, system malfunctions may occur.	I.	II.	~~III.~~	IV.
ATTENTION		next exchange!			
		2020	2~~02~~1	2022	2023

Recurrent tests and functional checks (of the pre-/main alarm, faults) should also be entered into the dispensing log sheet, together with the date of the test.

For the *CO2 Gas Warning System AM / AM +* versions, see the additional notes in the *CO2 Gas Warning System AM / AM + installation sheet.*

4. Maintenance / servicing

4.1 General remarks

Safety devices on monitoring equipment must be maintained regularly at the intervals specified by the manufacturer. The maintenance of the equipment can for example be performed in accordance with BGR 228 by the installation company. The system is maintenance-free except for the *sensor unit*. The *sensor unit* must be replaced by the installer with a replacement unit after 4 years of operation.

4.2 Replacing the CO2 sensor unit

CAUTION	The removal of a *sensor unit* without connecting a replacement unit is prohibited! The installer can request replacement units directly from our plant.

A replacement unit must be available before replacing any *sensor unit*. The seamless operation of the gas detection unit must be ensured.

After swapping the units, pack the old *sensor unit* in the packaging of the replacement unit and send this back to our plant. After replacing any system component, the **system must be re-initialised!**

Important note:
After replacing, the new maintenance plate indicating the replacement date must be applied to the *sensor unit,* and entered in the *dispensing log sheet*.

	The sensor unit must be exchanged after four years! If the exchange date as shown here is not adhered to, system malfunctions may occur.	I.	II.	~~III.~~	IV.
ATTENTION		next exchange!			
		2020	2~~02~~1	2022	2023

4.3 Cleaning

Cleaning of the unit is not planned for, nor is this permitted.

4.4 Functional check

A functional check (minimum requirement for the monitoring of detection devices in accordance with BGR 228) of the CO2 Gas Warning System is not required, and not necessary due to any maintenance replacement. Where desired, the system can be tested using CO_2 at any time, and the alarm function checked. **<u>No test gas is necessary for this</u>**! Since an on-site functional check does not provide sufficient testing of the threshold value tolerances (lack of temperature and pressure constants), this can only be performed at our plant in accordance with the prescribed test guidelines.
For the *CO2 Gas Warning System AM / AM +* versions, see the additional notes in the *CO2 Gas Warning System AM / AM + installation sheet.*

5. Technical data

5.1 CO2 Gas Warning System sensor unit

Technical data	
Alarm thresholds:	1.5% - visual/audible pre-alarm 3% - visual/audible main alarm
Method of measurement:	Selective IR absorption
Measurement range/volume flow:	0 - 5 vol. % / diffusion
Cross-sensitivity:	negligible
Connection:	RS485 bus connection 3 m control line, 4-wire
Max. control line length (extension via distributor)	max. 100 m to the warning unit
Power supply:	via warning unit (7 - 20 V DC)
Temperature range: Storage temperature range Operating temperature range	 -30 °C to + 70 °C -30 °C to + 40 °C -30 °C (*acclimatisation required!)
Visual display/audio	LED green Power light LED yellow Malfunction / 70 dB alarm sound LED red Alarm / 70 dB alarm sound
Readiness for operation:	Immediately following initialisation (* acclimatisation)
Dimensions (H x W x D):	80 x 108 x 80 mm
Weight:	325 g
Protection rating:	IP54
Fastening	via DIN rail, perpendicular to the wall
Certified according to:	TRSK 313, test no. 432 - 986701

* For use in one freezer cell

5.2 CO2 Gas Warning System PA warning unit

Technical data	
Alarm thresholds:	1.5% - visual/audible pre-alarm 3% - visual/audible main alarm
Malfunction	Yellow LED flashes plus audible warning sound
Connection:	RS485 bus connection 3 m control line, 4-wire Mains cable, 2.5 m, incl. angled plug 4 floating outputs, external power supply up to 60 VDC/125 VAC at max.0.5 A, 3 m control line 5-wire (PA version)
Rated voltage: Rated current / rated output:	230 V / 50 Hz 10 mA / 6 W
Temperature range: Storage temperature range Operating temperature range	 -20 °C to +70 °C 0 °C to +40 °C
Readiness for operation:	Immediately following initialisation
Visual display:	LED green Power light LED yellow Malfunction LED red Alarm
Audible warning	>90 dB
Weight:	200 g
Protection rating: Design protection class:	IP54 ☐ Protection class II
Dimensions (H x W x D):	125 x 80 x 52 mm
Device plug-in possibilities:	max. 4 components, of which max. 2 sensor units
Certified according to:	TRSK 313/DIN 6653-2 Test no. 432 – 986701, EC conformity 2013

5.3 AM / AM + add-on modules such as "5.2 CO2 PA warning unit" in addition:

Technical data	
Alarm thresholds:	1.5% - visual/audible pre-alarm 3% - visual/audible main alarm
Malfunction	Yellow LED flashes plus audible warning sound
Connection:	5 floating outputs, 230V/50 Hz, external power supply/control for one external alarm device, 230V/50Hz
Rated voltage: Nominal power: Maximum current load per output:	230 V / 50 Hz 23 VA (max.) / 10 VA (type) 2 A / 230 V AC)
Temperature ranges: Storage temperature range Operating temperature range	 -20 °C to +70 °C 　0 °C to +40 °C
Readiness for operation:	Immediately following initialisation
Additional visual displays: AM +	Flashing / continuous light, red
Audible warning sound AM +	typ. 100 dB
Weight:	AM 1000 g / AM +1200 g
Protection rating: Design protection class:	IP54 ☐ Protection class II
Dimensions (H x W x D):	220 x 205 x 52 (122) mm
Device plug-in possibilities:	External alarm unit
Declaration of Conformity	EC conformity 2015

5.4 Signal unit

Technical data	
Alarm thresholds:	1.5% - visual/audible pre-alarm 3% - visual/audible main alarm
Malfunction:	Green LED flashes, audible warning sound
Connection:	RS485 bus connection 3m control line, 4-wire Mains cable, 2.5 m, incl. angled plug
Control line length:	max. 100 m to the warning unit
Rated voltage: Rated current / rated output:	230 V / 50 Hz 10 mA / 6 W
Temperature range: Storage temperature range Operating temperature range	 -20 °C to +70 °C 　0 °C to +40 °C
Readiness for operation:	Immediately following initialisation
Visual display:	1 LED green　　Power 1 LED red　　　Pre-alarm 1 LED red　　　Main alarm
Audible warning	>90 dB
Weight:	200 g
Protection rating: Design protection class:	IP54 ☐ Protection class II
Dimensions (H x W x D):	125 x 80 x 52 mm
Fastening	DIN rail
Certified according to:	TRSK 313 Test no. 432 - 986701

5.5 Switching unit

Technical data	
Rated voltage: Rated current / rated output:	230 V / 50 Hz 10 mA / 6 W
Max. switching current:	16 A
Control line:	RS485 bus connection 3 m control line, 4-wire
Power light:	Green LED
Control line length:	max. 100 m to the warning unit
Control line connection:	via plug connection
Dimensions:	66 x 125 x 50 mm
Weight:	200 g
Protection rating: Design protection class:	IP 00 ▢ Protection class II
Switching thresholds:	Pre-alarm or main alarm
System configuration:	max. 2 switching units per system

5.6 Accessories / spare parts

Designation	Order number
Protective guard, to protect the sensor unit from damage, 30 mm	I99/0023-03
Protective guard, to protect the sensor unit from damage, 80 mm	I99/0023-07
Connection distributor	I99/0023-01
Alarm unit	I99/0023-08
Control cable	I99/0023-02
Sensor unit (replacement unit within warranty period)	I06/0001-00 A
Sensor unit (maintenance replacement with new 4-year warranty)	I06/0001-00 C
Luminous warning panel, 230V/50Hz	I99/0023-09
Luminous warning panel, 24V	I99/0023-06

6. **Measures in the event of a malfunction/gas alarm**

For the *CO2 Gas Warning System AM / AM +* versions in a CO_2 refrigeration equipment area, please observe the notes in the *CO2 Gas Warning System AM / AM + installation sheet*!

⚠ CAUTION	When the main alarm is triggered, no further access to the hazard area must be allowed! To eliminate the hazard, an extraction unit (where available) must be activated or the local fire brigade must be called.

Alarm mode	Display	Measure
Main alarm	Continuous warning sound, red warning light lit	Keep calm! Do not enter the hazard area!! Press the *Alarm off* key to switch off the warning sound. Open all doors wide open! 1. Switch on fans (where available). 2. Leak elimination by service team. 3. Only call the fire brigade to eliminate a hazard if there is no other way to eliminate the hazard. 4. Once the hazard has been eliminated, press the *Alarm* off key on the warning unit to reset the system to normal operating conditions; if the red LED remains lit, CO_2 in excess of 3% is still present!

Alarm mode	Display	Measure
Pre-alarm	Intermittent warning sound, red warning light flashes	Only enter the hazard area if a second person is present adjacent to the hazard area. Open all doors wide open! 1. Shut off all of the gas bottles. 2. Find and fix the leak and/or fault. Call in the dispensing system service team if necessary! 3. When the CO_2 content drops below the threshold value, the alarm will reset automatically.
Fault	Intermittent warning sound, yellow warning light lit	These can include: 1. Cable break → The cable must be replaced 2. Device fault → Replace the component 3. Sensor unit fault → Replace the sensor unit 4. When replacing the sensor unit with no re-initialisation → Initialise the system 5. Heavy smoke → Eliminate the cause; the system will return to operating mode by itself 6. Severe sudden temperature variations → After a short time, the system will return to normal operating mode Pressing the ALARM OFF key will restart the gas detection system. If the system fault reoccurs, the equipment will need to be repaired by the service team.

7. Warranty

The manufacturer provides a warranty for technical defects arising from the manufacture of the gas detection system within 24 months following the date of assembly and commissioning.

⚠️ CAUTION	The device is designed and certified in accordance with TRSK313, and today in accordance with DIN 6653-2. It must not be modified in any way. Any change to the device will void any warranty claims!

The warranty covers the replacement or repair of the device free of charge. Additional costs incurred thereby are not covered.

The warranty is only valid when the card attached to the device is retained by the equipment operator, and the attached postcard has been completed by the installation service and returned by the owner.

Please ensure that the serial number of the installed device is entered on the postcard.

The manufacturer guarantees that the system requires no calibration and/or adjustments within 4 full years of operation. After 4 years of operation, a calibration will be performed at our plant at cost (see 4. Maintenance).

The warranty excludes: damages attributable to improper use, normal wear, and defects that have only a negligible influence on the device's value or suitability for use. Liability for the functioning of the unit shall pass at all events to the owner or operator if the unit is improperly maintained or repaired or if it is used other than for its intended purpose. Euro-Gas accepts no liability for damage caused by failure to observe the above information. The warranty expires in the event that work is carried out by agents we have not authorised or if parts are used other than original spare parts.

Claims under the warranty may be made in all countries where authorised dealers sell this device. In the event of any claim under the warranty, please return the device to us. The buyer shall bear the costs of transportation and the risk while the device is in transit. The execution of work under the warranty does not affect the warranty period in any way.

8. Instructions for the prevention of hazards due to CO$_2$ gas

8.1 Code of conduct

1. Keep calm!

2. Acknowledge the audible alarm by pressing the "ALARM OFF" key on the warning unit, and another alarm off switch on the *AM / AM +* version.

3.   Determine which alarm is involved!

Main alarm:	**Continuous sound**	**Red light lit**
Pre-alarm:	**Intermittent warning sound**	**Red light flashes**
Malfunction:	**Intermittent warning sound**	**Yellow light flashes**

For the *CO2 Gas Warning System AM / AM +* versions in a CO$_2$ refrigeration equipment area, please observe the notes in the *CO2 Gas Warning System AM / AM +* *installation sheet*!

> ⚠️ **CAUTION** **When the main alarm is triggered, no further access to the hazard area must be allowed! To eliminate the hazard, an extraction unit (where available) must be used, or the local fire brigade must be called.**

8.2 Fault remedy

Main alarm ⚠️ CAUTION	1. Switch on fans (where available). 2. Call the fire brigade to eliminate the hazard. 3. Once the hazard has been eliminated, press the *Alarm off* key on the warning unit to reset the system to normal operating conditions. 4. Leak elimination by the dispensing system service team.
Pre-alarm	Only enter the hazard area if a second person is present adjacent to the hazard area. Open all doors wide open! 1. Shut off all of the gas bottles. 2. Find and fix the leak and/or fault. Call in the dispensing system service team if necessary! 3. When the CO$_2$ content drops below the threshold value, the alarm will reset automatically.
Malfunction	Check that all system cables are connected correctly. Check the mains plug! In the event of doubt: Contact the service team!

9. Appendix

For all technical and sales enquiries or assistance, please contact Euro-Gas:

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08/16