English

User's Manual

CO_2 Safety System

Mk9/Mk90

NOTE: Always test your set, BEFORE INSTALLATION!
The different sets are delivered pre-connected in the package.
Be aware! During the test a very loud sound will be emitted from the horn.

The test procedure is described in chapter 3.1 in this manual.

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Explanations of symbols for the CO2 Safety System

Please note that whenever installing or disconnecting a system, refer to this manual first!

Double insulation protected equipment may also be called “Class 2”.

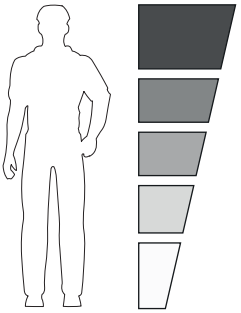
Symbol for the marking of electrical and electronic equipment. (The symbol indicating separate collection for electrical and electronic equipment).

1. General information on CO2 and CO2-detection

What is CO2 and why do we want to measure it?
CO2 is a colorless, odorless gas which normally exists at a concentration of about 0.04% in the air we breathe. CO2 gas does not support life and in concentrations above 4% it has dangerous effects on the human organism (IDLH).

Equipment that stores and uses CO2 is designed for normal safe operation when properly maintained, but leaks may cause high concentrations of CO2, creating unsafe conditions. As CO2 is 1 ½ times heavier than air, it will "sink" and concentrate in low areas, posing a risk of asphyxiation/suffocation to anyone in or entering those areas.

LogiCO2´s CO2 Safety Systems is designed to measure CO2 concentration in an enclosed space environment and continuously monitor CO2 gas concentration in the surrounding air. If the CO2 level exceeds the preset alarm levels, the system indicates/alarms with light and sound.



CO2 concentration levels (%) and effects

(%)	Effect
20.0	Death within a few seconds.
10.0	Convulsion, Unconsciousness, Death.
7.0	Dizziness, Vomiting, Headache, Reduced blood supply to brain.
4.0	IDLH -Immediate Danger to Life and Health.
3.0	Normal exhale concentration; increased breath and pulse rates.
1.0	Shortness of breath possible.
0.5	Maximum for working conditions (TWA 8 hr.PEL).
0.1-0.2	Recommended max value in public areas.
0.04	Fresh air.

TWA (Time Weighted Average)

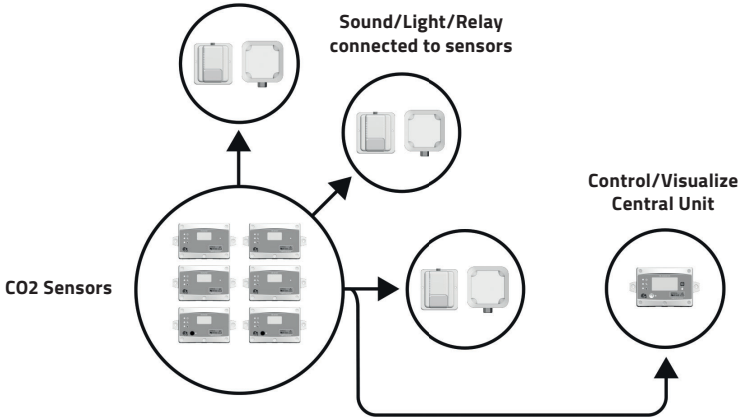
It is generally considered unhealthy (In Europe there is EU Legislation regarding TWA) for humans to be exposed to more than the TWA value of CO2 during an 8-hour working day. In most countries the Hygienic Limit Value exposure of CO2 over 8 hours/day is 0,5% or 5000 ppm CO2.

US Safety Codes and Norms

Notification level		CO2 Concentration or fault indicator	Reference regulatory code
1	Awareness Indication	5000 ppm (0.5%)	2018 International Fire Code
2	Indication	5000 ppm (0.5%) 8-hour Time Weighted Average	National Fire Protection Association 55 and OSHA
3	Pre-Alarm	15000 ppm (1.5%)	International and Manufacturers recommendation/old NBIC
4	High-Alarm	30000 ppm (3.0%)	NBIC/NFPA/OSHA

2. General LogiCO2 Safety System description

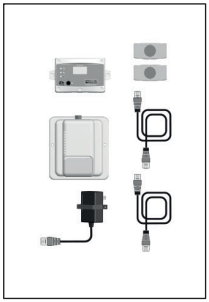
LogiCO2´s CO2 Safety Systems measure CO2 concentration in an enclosed space environment and provides alerts/alarms in the event that CO2 levels in that space reaches preset levels. The CO2 sensing devices uses NDIR (Non Dispersive Infrared) infrared analysis for accurate detecting of CO2. When installed properly, the system will continuously monitor the CO2 concentration where a CO2 sensor is located.



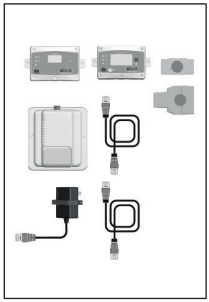
If a sensor detects a raised CO2 level, the CO2 sensor alerts via sound and light and remotely connected warning lamps, horns or horn/strobes will be activated. The central unit will alert with sound and display which sensor that has detected a raised CO2 level. A properly installed system will begin to detect CO2 levels when powered on, after a self-diagnostics program has been made by the system. No additional start-up procedure or adjustment is necessary.

The system is delivered as pre-connected sets with auxiliary kits to extend the function of the sets. The sets are comprised of one or more CO2 sensors, with auxiliary central unit/s, warning lamp/s, horn/s and relay boxes. The Mk90 CO2 sensor is a combination of a CO2 sensor and a sound/light indicator.

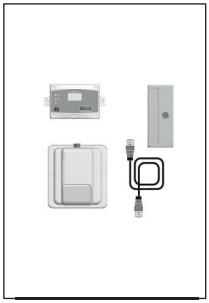
Examples of sets and kits:



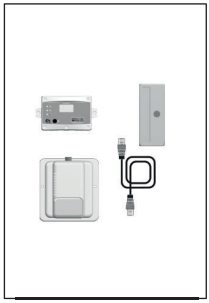
Mk90 set 2090



Mk9 set 2049



Mk9 sensor kit 2117



Mk90 sensor kit 2119

3. Test and installation

LEGAL NOTICE

All persons responsible for the operation and maintenance of this equipment must read and understand the safety and operating information contained in this guide. Installation and service of this equipment should be performed only by professionals. The function of the equipment will be impaired if it is not properly installed. Disconnection from supply source: When installing the CO2 Safety System to the power net, please ensure that the fuse that the system runs on is clearly marked. This makes it easy to disconnect the power to the system, if needed.

It is very important to be aware that the CO2 Safety System does not function if disconnected from power mains.

3.1 Testing set, BEFORE INSTALLATION

The different sets are delivered pre-connected in the package. Always test the set before installation to verify proper function! **NOTE:** Be aware that during the test a very loud sound will be emitted from the horn.

1. Open the box and carefully take the components out of the package.

2. Find the power supply in the package and attach the correct mains-adaptor for your country's outlet, then connect the power supply to the electrical outlet. The set should now activate.

3a. If you test a **Mk9** detector set, please check that all LEDs on the central unit and the CO2 sensors illuminate and that the built-in buzzers beep. This is part of the self-diagnostics program. Approximately 3 seconds after connection all external horns and/or strobes (connected to the sensor) will be activated for approximately 5 seconds.

3b. If you test a **Mk90** detector set, please check that all LEDs on the CO2 sensor illuminate and that the built-in buzzer beeps. This is part of the self-diagnostics program. Approximately 3 seconds after connection all external horns and/or strobes (connected to the sensor) will be activated for approximately 5 seconds.

4. Now your set is tested and you can start the installation.

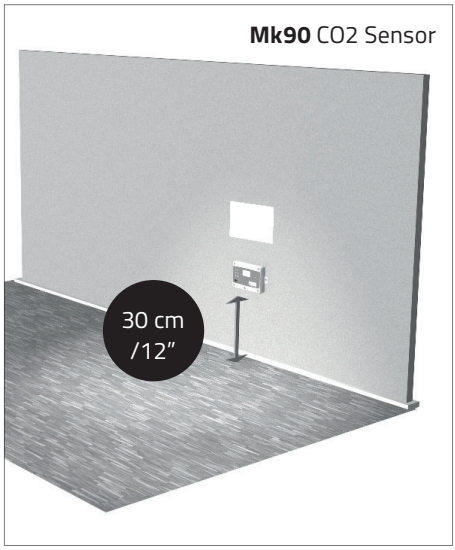
Note! If additional kits are to be installed. Please check appropriate part of the manual for correct DIP-switch setting (ID-address).

3.2 Installation of the CO2 Sensor

Correct placement of the CO2 Sensor

The CO2 sensors (Mk9 or Mk90) should be placed in the room where the CO2 is being used and for locations with a basement (with the tank upstairs), where CO2 is likely to accumulate in the event of leak. Please observe, this does not necessarily have to be where the CO2 is stored, for example when the CO2 is stored outside and the gas is routed into the building via pipes.

It is also VERY IMPORTANT to be aware that the danger always is relative to how much CO2 is used and stored in relationship to the volume of the room in question.
NOTE: If the room has only mechanical ventilation, it should have a sensor.

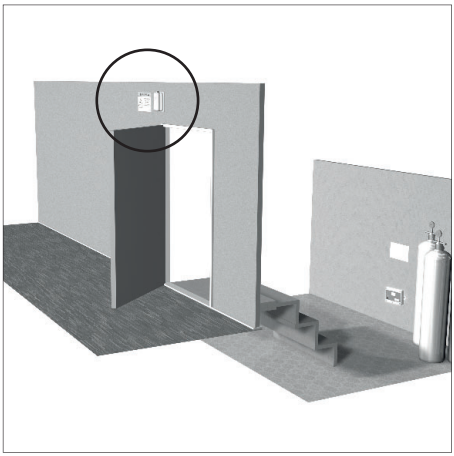


Installation of the CO2 Sensor

1. The CO2 sensors (Mk9 or Mk90) should be installed at a maximum height of 30 cm/12” from the floor and maximum 5 m/16,4 ft away from the CO2 distribution point. The sensors cover an area of maximum 78 m^2/840 ft^2. Try to find an installation position where the unit is least likely to be damaged by items such as mop handles or boxes being moved. Mount the CO2 sensor with supplied mounting screws.

2. Mount the included information signs clearly visible, next to or above the units, in a permanent way.

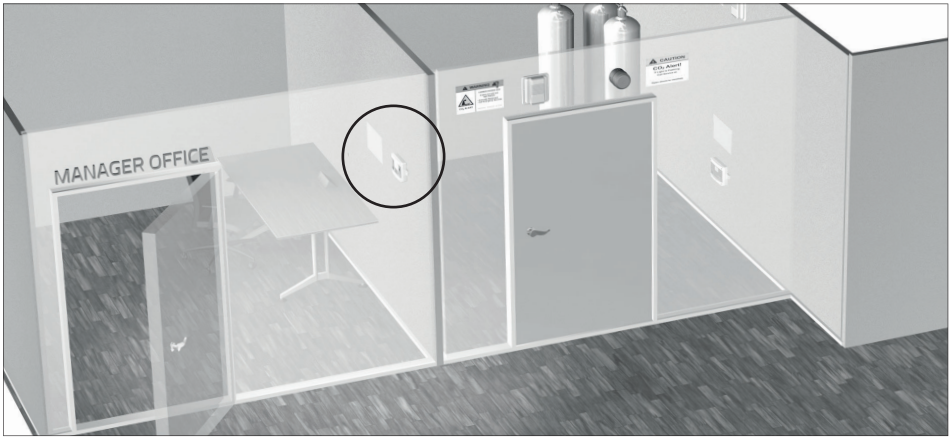
3.3 Installation of the Horn/Strobe



1. If your set includes a horn/strobe/s, one of these must be installed on the wall above the CO2 sensor, approximately 2-2.4 m/80-96 in (as per NFPA 72) above the floor, clearly visible from any entrance of the area being monitored. A second horn/strobe must also be placed OUTSIDE the area being monitored, preferably placed over the door/s leading to the monitored area. This may require more than one horn/strobe. Mount the unit with supplied mounting screws.

2. Mount the included warning signs so they are clearly visible, next to or above the units, in a permanent way.

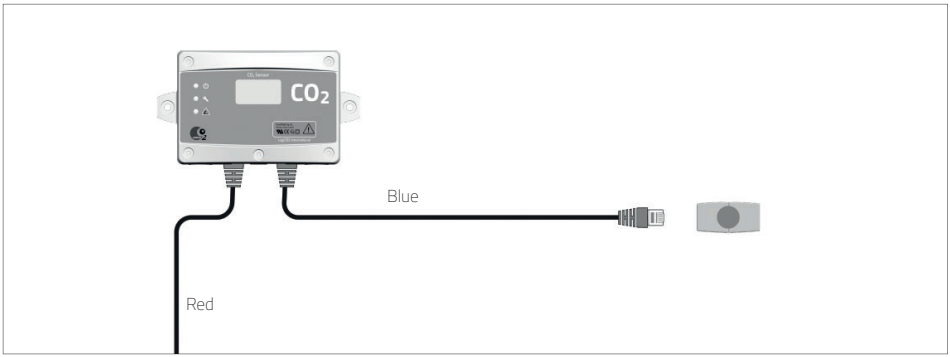
3.4 Installation of the Central Unit



1. If your set includes a central unit, it must be installed outside the area or room being monitored, for example on a wall in the manager's office. The central unit should be installed at a clearly visable and reachable height.

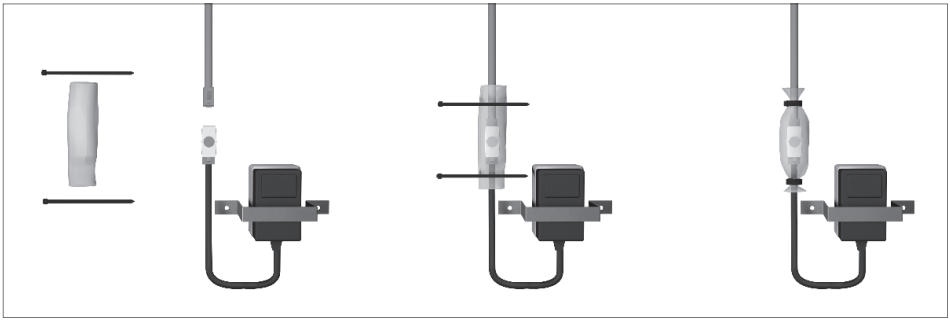
2. Mount the included information signs clearly visible, next to or above the units, in a permanent way.

3.5 Installation and connection of the cables



The different units are connected to each other by cables. The blue marked cable is used for signalisation (horn/strobe, warning beacon and remote control box). The red marked cable are for communication and power. Please observe, all cables have splitters at the end to facilitate extended cable lenghts. When installing, the cables may need to be disconnected for purposes of cable routing. When reconnecting, please make sure that you connect to the original splitters and connectors. If possible, route the cables through cable conduits between the units, for a neat and safe installation.

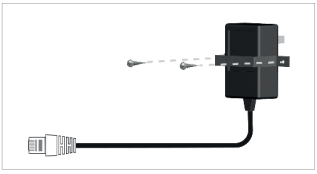
Protective collar seals and cable ties are included. They must be used as below to protect the RJ45 1-1 connector or RJ45 1-2 splitter from moisture and dust.



3.6 Connection of the power supply

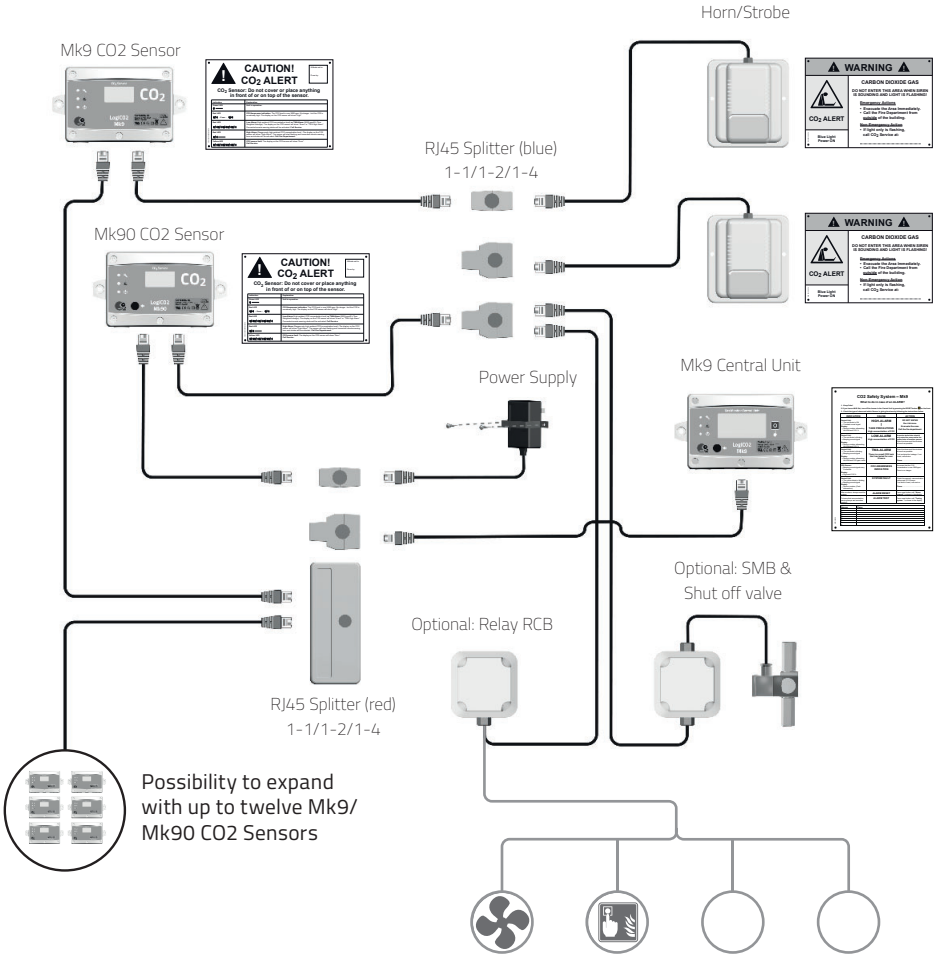
A separate power supply (100-240 VAC) supplies power to the system. Please observe that you have to connect the appropriate plug adaptor to the power supply depending on which country you are in.

Connect the power supply to the electrical outlet.
Mount the included plug-lock so that the power supply cannot be disconnected without the use of tools.
It is also possible to order a hardwired power supply option when and were it is needed.



4. Connection diagram

This connection diagram shows an example of how the different systems (Mk9 and Mk90) can be installed.



Please note:

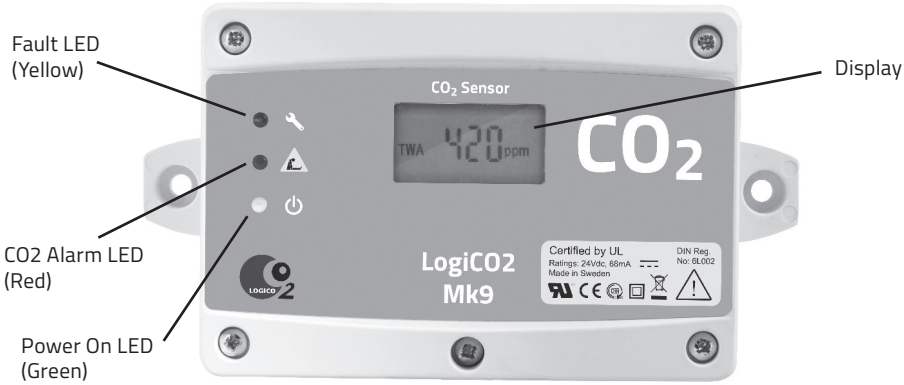
A separate installation manual is provided with each extra CO2 sensor kit explaining the simple installation process for adding additional sensors to an existing set.

5. What to do in case of an Alarm?

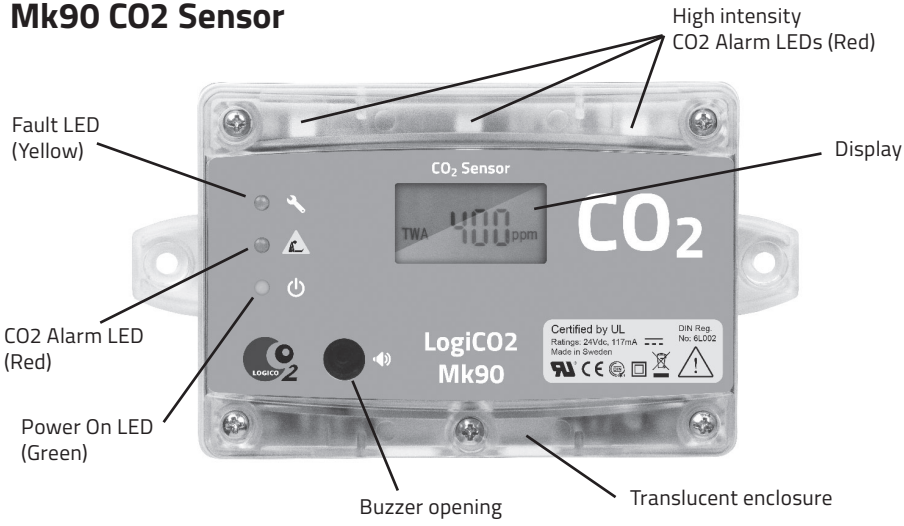
INDICATION	CAUSE	ACTION
Central Unit: ▪ The red diode is ON ▪ Constant sound signal **Display:** ▪ Sensor number, alternating ALARM and CO2 %	**HIGH-ALARM!** **TAKE PRECAUTIONS** High concentration of CO2	**DO NOT ENTER** the risk zone. Evacuate the area. Call the fire department.
Central Unit: ▪ The red diode is blinking ▪ Beeping sound signal **Display:** ▪ Sensor number, alternating ALARM and CO2 %	**LOW-ALARM** High concentration of CO2	A service technician should only enter the room under the supervision of another person. Open the doors and the windows as much as possible.
Central Unit: ▪ The red diode is blinking ▪ Beeping sound signal **Display:** ▪ Sensor number, alternating ALARM and CO2 ppm value	**TWA-ALARM** There is a small CO2 leak that has lasted for over 8 hours	Open the doors and the windows as much as possible. Find and stop the leakage, if not found, call service.
Mk9 and Mk90 CO2 Sensor: ▪ Beeping sound signal and the red diod is blinking every 5 seconds **Display:** ▪ High and CO2 %	**CO2 AWARENESS INDICATION**	Be aware that the CO2 concentration is over 5000 ppm. There is no danger.
Central Unit: ▪ The yellow diode is blinking ▪ Beeping sound signal **Display:** ▪ Sensor number, (Fault information)	**SYSTEM FAULT**	Check the manual, communication cables and CO2-Sensor. If no fault is found, call service.
After an alarm, always reset the system.	ALARM RESET	Press reset button on Central Unit until "Alarm cleared!" is shown in the display
Test the alarm to insure that communication, warning lamps and sounders function.	ALARM TEST	Press reset button on Central Unit until "Testing system" is shown in the display

6. Mk9/Mk90 CO2 Sensor, General information

Mk9 CO2 Sensor



Mk90 CO2 Sensor



6.1 General Description

The Mk9 CO2 sensor is a CO2 and temperature sensor with display that is used to monitor the CO2 levels of an enclosed space. This unit should be connected to a central unit for full functionality. Horn/strobes, flash units or external connection boxes can also be connected to the sensor for added functionality. The CO2 sensor display alternates between CO2 (0.0%- 6,7%), TWA (ppm) and temperature (°C or °F), if temperature alarm is activated.

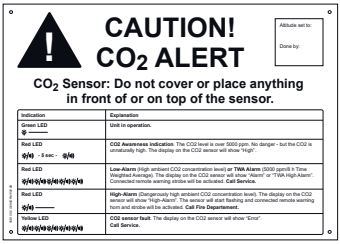
The Mk90 CO2 sensor is similar to the Mk9 CO2 sensor, but it has a translucent enclosure and high intensity red alarm LEDs.

6.2 LED (Light Emitting Diode), buzzer and display indications

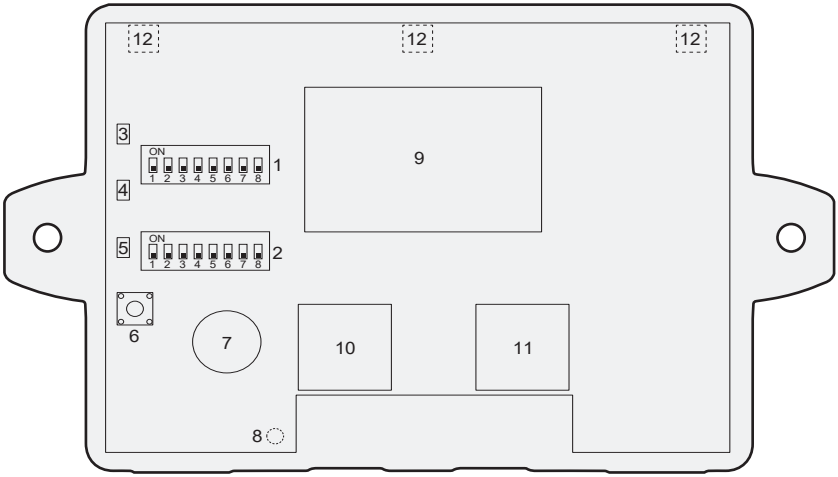
Indication	Explanation
Green LED on	**Unit in operation**
Beeps and blinks once every 5 sec.	**CO2 Awareness indication**. Ambient CO2 concentration level of 5000ppm. In accordance with IFC 2015 (USA). The text “High” and “%” will blink in the display on the CO2 sensor.
Red LED blinks and intermittent audible tone	**Low-Alarm** (Ambient CO2 concentration level of 1.5%) **or TWA Alarm** (5000 ppm/8 h Time Weighted Average). The display on the CO2 sensor will show “Alarm”. The central unit will emit an intermittent audible tone and connected remote warning lamps will be activated.
Red LED on and constant sound signal **Mk90: also blinking with high intesity red alarm LEDs.**	**High-Alarm** (Ambient CO2 concentration level of 3% or more). The display on the CO2 sensor will show “High-Alarm”. The central unit will emit constant sound signal, and the digital display will show “ALARM”. Connected remote warning lamps will be activated.
Yellow LED on and intermittent audible tone	**CO2 sensor fault**. The display on the CO2 sensor will show “Error”. A beeping tone will be made by the central unit. The error will be described in the display of the central unit until the fault has been rectified and cleared/reset on the central unit.

6.3 CO2 Sensor, Information Sign

The sign for the CO2 sensor should be mounted in a permanent way next to or above the unit.



6.4 CO2 Sensor, Internal layout



CO2 Sensor	Function/Indication
1. DIP-switch 1	Setting of alarm levels and alarm functions
2. DIP-switch 2	Service mode and ID settings
3. LED yellow	Fault
4. LED red	Blinking: Low-Alarm. Continuous: High-Alarm.
5. LED green	Power ON
6. Service button	Service functions
7. Buzzer	Intermittent: Low-Alarm/Error. Continuous: High-Alarm.
8. Temperature sensor (backside of PCB)	Temperature monitoring and alarm
9. Display	Measurement and alarm information
10. RJ45 input connector	Power and communication (red connector)
11. RJ45 output connector	Alarm outputs (blue connector)
12. High intensity LEDs red (only on Mk90)	Blinking 1 Hz: Low-Alarm. Blinking 5 Hz: High-Alarm.

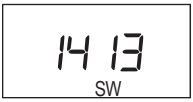
6.5 CO2 Sensor, DIP-switch settings, ID-address 1-12

Observe! DIP-switch 2, Dip 3-7

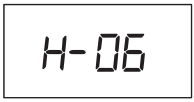
ID- address	Dip3	Dip4	Dip5	Dip6	Dip7	
ID1	OFF	OFF	OFF	OFF	OFF	
ID2	ON	OFF	OFF	OFF	OFF	
ID3	OFF	ON	OFF	OFF	OFF	
ID4	ON	ON	OFF	OFF	OFF	
ID5	OFF	OFF	ON	OFF	OFF	
ID6	ON	OFF	ON	OFF	OFF	
ID7	OFF	ON	ON	OFF	OFF	
ID8	ON	ON	ON	OFF	OFF	
ID9	OFF	OFF	OFF	ON	OFF	
ID10	ON	OFF	OFF	ON	OFF	
ID11	OFF	ON	OFF	ON	OFF	
ID12	ON	ON	OFF	ON	OFF	

6.6 CO2 Sensor, Display information

Display information during start-up:

Software version	Communication address	Heating/Start-up
		

Alternating display information during no alarm mode:

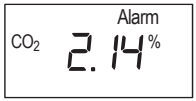
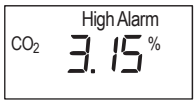
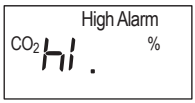
CO2 concentration	CO2: TWA*	Altitude	Temperature (if activated)
	 *TWA (Time Weighted Average): Average CO2 exposure over the latest 8 hours	 Example showing: Height index 6 = 1200 M / 3937 Ft. See altitude index table	

Altitude adjustment height index table:

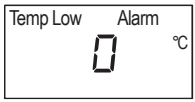
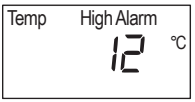
Height index	Meter	Feet
H-00	0	0
H-01	200	656
H-02	400	1312
H-03	600	1969
H-04	800	2625
H-05	1000	3281
H-06	1200	3937
H-07	1400	4593
H-08	1600	5249
H-09	1800	5906
H-10	2000	6562
H-11	2200	7218
H-12	2400	7874

Height index	Meter	Feet
H-13	2600	8530
H-14	2800	9186
H-15	3000	9843
H-16	3200	10499
H-17	3400	11155
H-18	3600	11811
H-19	3800	12467
H-20	4000	13123
H-21	4200	13780
H-22	4400	14436
H-23	4600	15092
H-24	4800	15748
H-25	5000	16404

Display information during alert/alarm modes:

Awareness Indication	CO2 TWA Alarm	CO2 Low-Alarm
		
CO2 High-Alarm	**CO2 High-Alarm over 6% CO2***	
	 *Out of range – Extremely high CO2 concentration: Over 6% CO2 concentration.	

Display information during temperature alarm (if activated):

Temperature to cold	Temperature to warm
	

6.7 CO2 Sensor, Specifications

Power supply:	24V DC
Power consumption:	No alarm status: 56 mA Alarm status: Mk9: 68 mA / Mk90: 117 mA (External optional warning lamp not included)
Wiring connections:	RJ 45
Digital interface:	RS485 serial port MODBUS
Outputs:	2 x transistor output 24V DC, Min 1 mA
Display:	LCD
Acoustic signal-strength:	Mk9: 76 dBa / Mk90: 80 dBa (1m) max.
Approval:	Manufactured in accordance with DIN 6653-2 2015-06. The CO2 Safety System is tested and approved by the German TÜV-Rheinland. EN 50081-1 / EN 50082-2 /CE. Certified by UL.
Operating principle:	Non-dispersive infrared (NDIR) and thermistor
CO2 measuring range:	0-3 Vol.%
Extended CO2 range:	3-6,7 Vol.%
Gas sampling mode:	Diffusion
TWA (Time Weighted Average):	Calculation 8 h time span (most recent) with 2 min sample period. (Pat. Pend.)
Accuracy:	
Temperature:	±1°C (±1.8°F)
Resolution:	1°C (1.8°F)
CO2:	Accuracy ±200 ppm ±10% of reading (Notes 1 and 2). Note 1: In normal IAQ applications. The product is delivered factory calibrated, but accuracy is defined after minimum 180 days of continuous operation with ABC. However, some industrial applications do require maintenance. Please, contact LogiCO2 for further information! Note 2: Accuracy is specified over operating temperature range. Specification is referenced to certified calibration mixtures. Uncertainty of calibration gas mixtures (+-2% currently) is to be added to the specified accuracy for absolute measurements.
Resolution:	0.01 Vol.%
Annual zero point drift:	<0.01 Vol.% with automatic self calibration feature
Operating temperature range:	0 to +45°C (32 to +113°F). Only for indoor use.
General performance	
Compliance with:	2004/108/EG Sensor Life expectancy: > 15 years
Operating humidity range:	0 to 95% RH (non condensing)
Warm-up time (@ 22°C):	1 min.
Dimensions (LxWxD):	90 x 161 x 38 mm / 3.5" x 6.3" x 1.5"
Ingress protection:	Mk9: IP56 / Mk90: IP54
Overvoltage:	Category II
Pollution degree:	II

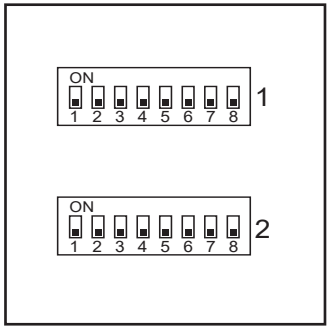
Please observe that since this is a safety product we recommend that a function control should be carried out at least once a year.

6.8 Advanced DIP-switch settings CO2 Sensor

The example below shows US standard settings.

Default functions/settings:

- CO2 Awareness Alert	0,5%
- CO2 Low Alarm	1,5%
- CO2 High Alarm	3%
- CO2 TWA Alarm	5000ppm
- Temperature alarm	OFF
- Communication address/ID	1



NOTE: It is up to each installer to set the alarm levels and values in accordance with statutory limits for each country.

The CO2 alarm levels and functions are set on DIP-switch 1. Low alarm activates the strobe (flash) and high alarm activates the alarm horn. Temperature alarm (if selected) and CO2 TWA alarm are classified as Low alarms.

CO2 awareness indication (>5000 ppm CO2) is default activated. To deactivate: set switch no. 2 on DIP2 in ON-position. CO2 awareness indication is indicated by 0,5 sec. beep every 4,5 sec. in the CO2 sensor and blinking text “High” and “%” on the display.

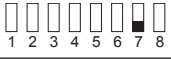
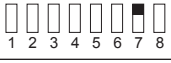
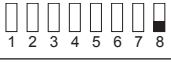
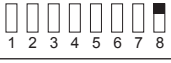
6.9 Advanced DIP-switch settings, Alarm levels

Observe! DIP-switch 1, Dip 1-4

“Low” alarm	“High” alarm	Dip1	Dip2	Dip3	Dip4	DIP-switch 1
1,5%	3%	OFF	OFF	OFF	OFF	1 2 3 4 5 6 7 8
0,5%	0,5%	ON	OFF	OFF	OFF	1 2 3 4 5 6 7 8
0,5%	1%	OFF	ON	OFF	OFF	1 2 3 4 5 6 7 8
0,5%	1,5%	ON	ON	OFF	OFF	1 2 3 4 5 6 7 8
0,5%	3%	OFF	OFF	ON	OFF	1 2 3 4 5 6 7 8
1%	1%	ON	OFF	ON	OFF	1 2 3 4 5 6 7 8
1%	1,5%	OFF	ON	ON	OFF	1 2 3 4 5 6 7 8
1%	3%	ON	ON	ON	OFF	1 2 3 4 5 6 7 8
1,5%	1,5%	OFF	OFF	OFF	ON	1 2 3 4 5 6 7 8
3%	3%	ON	OFF	OFF	ON	1 2 3 4 5 6 7 8

6.10 Advanced DIP-switch settings, Functions

Observe! DIP-switch 1, Dip 5-8

Function	Dip5	Dip6	Dip7	Dip8	DIP-switch 1
Temp alarm OFF	OFF				
Temp alarm ON	ON				
Temp format: °C		OFF			
Temp format: °F		ON			
CO2 TWA alarm ON			OFF		
CO2 TWA alarm OFF			ON		
TWA Alarm 5000 ppm				OFF	
TWA Alarm 2500 ppm				ON	

6.11 Advanced DIP-switch settings, Service and Awareness indication

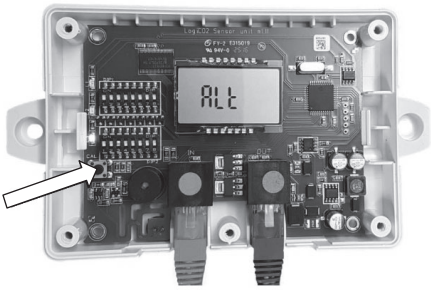
Observe! DIP-switch 2, Dip 1-2

Function	Dip1	Dip2	Dip8 Not used	DIP-switch 2
Service mode OFF	OFF		OFF	
Service mode ON	ON		OFF	
Awareness Indication 5000 ppm ON		OFF	OFF	
Awareness Indication 5000 ppm OFF		ON	OFF	

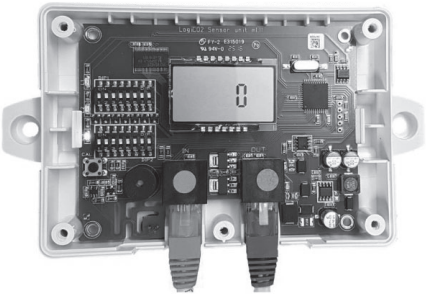
6.12 CO2 Sensor, Altitude adjustment

To change the altitude adjustment on Mk9 and Mk90 CO2 sensor, please follow the simple instructions below.

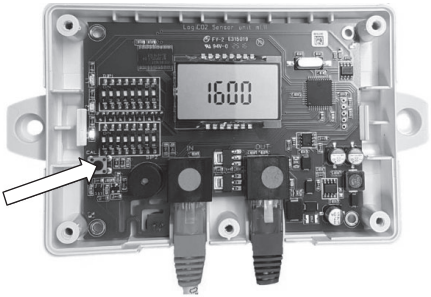
1. Press the push button, the display shows Alt.



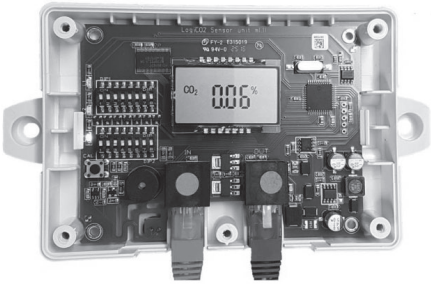
2. Current altitude setting is then shown.



3. Press the button to adjust the altitude setting, in steps of 200 m (for feet, see the converter table). **Observe!** Adjust the altitude to the closest higher value for the location. To confirm setting, wait 10 seconds.



4. The display returns to normal view after 10 seconds. Finished.

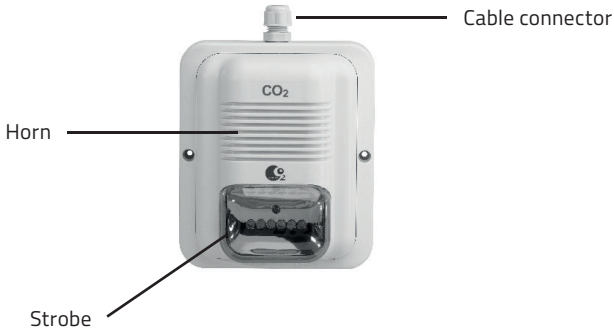


Altitude adjustment converter table

Meter	Feet
0	0
200	656
400	1312
600	1968
800	2625
1000	3281
1200	3937
1400	4593
1600	5249
1800	5905
2000	6562
2200	7218
2400	7874

Meter	Feet
2600	8530
2800	9186
3000	9842
3200	10499
3400	11155
3600	11811
3800	12467
4000	13123
4200	13779
4400	14436
4600	15092
4800	15748
5000	16404

7. Horn/Strobe LED, General information

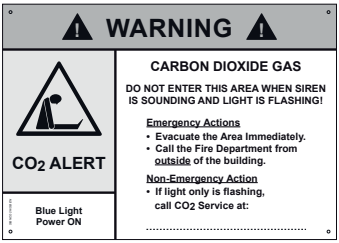


7.1 General Description

The horn/strobe is equipped with a pre-wired cable for connection to the CO2 Safety System. The horn/strobe is power supplied from the CO2 sensor (Mk9 or Mk90). Horn/Strobe LED is a loud warning horn (110 dB/1 m) and high intensity strobe (115 cd).

7.2 Horn/Strobe, Warning Sign

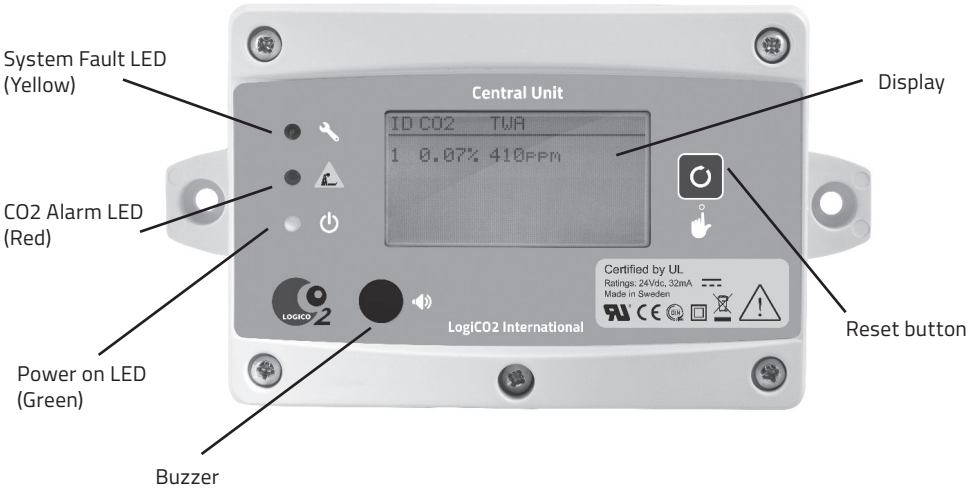
The sign for the horn/strobe should be mounted in a permanent way next to the unit.



7.3 Horn/Strobe LED, Specifications

Nominal voltage:	18-24V DC
Power consumption:	80 mA peak @ 24V DC supply
Decibel:	110 dB / 1 m (High-Alarm)
Flash intensity:	115 cd (Low-Alarm)
Flash frequency:	65/min
Ambient temperature:	-5°C to +50°C (+23°F to +122°F)
Dimensions (LxWxD):	134 x 115 x 61 mm / 5.3” x 4.5” x 2.4”
Ingress protection:	IP65

8. Mk9 Central Unit, General information



8.1 General Description

The Central Unit has a display that is used to monitor and control a CO2 Safety System with up to twelve sensors. The central unit is multi-lingual and it displays information text for all alarm and error conditions. It also displays the CO2 values of all connected CO2 sensors, indicating which sensor the value comes from. The central unit has an alarm memory that remembers and reactivates any alarm after a power interruption.

8.2 LED (Light Emitting Diode), buzzer and display indications

Indication	Explanation
Green LED on	**Unit in operation**
Red LED blinks and intermittent audible tone	**Low-Alarm** (Ambient CO2 concentration level of 1.5%) **or TWA Alarm** (5000 ppm/8 h Time Weighted Average).The display will show "ALARM", indicating which sensor the alarm comes from. Connected remote warning lamps will be activated.
Red LED on and constant sound signal	**High-Alarm** (Ambient CO2 concentration level of 3% or more). The display will show "ALARM", indicating which sensor the alarm comes from. Connected remote horns will be activated.
Yellow LED on and intermittent audible tone	**System fault.** The error will be described in the display until the fault has been rectified and cleared/reset on the central unit.

8.3 Selectable temperature alarm function

If the temperature alarm function is activated on a CO2 sensor, the current temperature at that CO2 sensor will be shown in the central unit's display. For more information see chapter 6.10.

8.4 Mute/reset button

On the right side of the display, there is a sound mute/reset and test button. A short push on the reset button mutes the internal buzzer during an alarm situation. Push and hold the reset button for approximately 4 seconds to clear/reset an alarm. "Alarm Cleared!" is shown in the display.

Mute/reset button

8.5 CO2 Alarm

In case of Alarm, the buzzer in the central unit may be muted by pressing the reset button shortly. The alarm can only be totally cleared/reset when the CO2 level drops below 1.5% (the Low-Alarm). At a Low-Alarm, one person, supervised by another, may check for the leakage cause.

8.6 Test the system

To test all alarm indications (horn/strobe/LED/buzzer), push and hold the reset button for approx. 10 seconds. "Testing system..." is shown in the display.

8.7 System fault

In the event of a system fault, the yellow LED is activated and a beeping tone will be made by the central unit. The error will be described in the display until the fault has been rectified and cleared/reset on the central unit.

System fault indicator

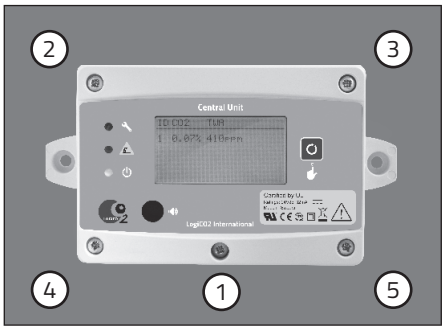
8.8 Changing the display language

Disconnect the power. Push and hold the reset button, connect the power and keep the Reset button pushed for approximately 5 seconds. The display shows now: "Language" and blinking English/ Spanish, which is the default language.
Push the reset button shortly to browse through the different languages. To select a language, wait approximately 3 seconds. The language is automatically saved when the display switches to the standard view.

8.9 Removal of the cover

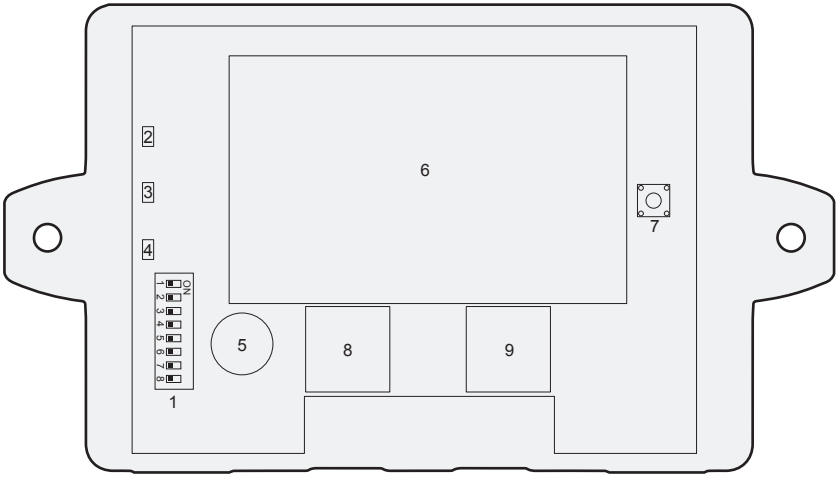
If the cover of the central unit or the CO2 sensor needs to be removed please observe the following order of screw reassembling.

Note! When remounting the cover, be careful not to damage the reset button.



Reassembling order of the screws

8.10 Mk9 Central Unit, Internal layout



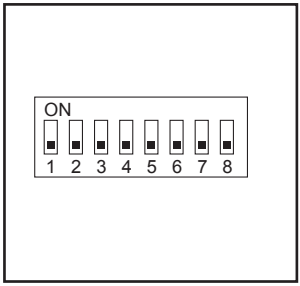
Central Unit	Function/Indication
1. DIP-switch	Setting number of connected CO2 sensors
2. LED yellow	Fault
3. LED red	Blinking: Low Alarm – Fixed: High Alarm
4. LED green	Power ON
5. Buzzer	Alarm
6. Display	Measurement and alarm information
7. Mute/Reset/Test button	Mute/Reset/Test button
8. RJ45 input connector	Power and communication
9. RJ45 output connector	Power and communication

8.11 DIP-switch settings

All DIP-switches are set to OFF as default.

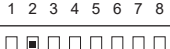
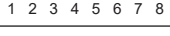
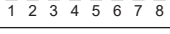
Default functions/settings:
- Connection to one CO2 sensor

The number of connected CO2 sensors is set on dip 1-4.
Dip 5-8 are not used and must be in position OFF.



8.12 DIP-switch settings, Number of connected sensors

Dip 1-4. NOTE! Dip 5-8 is not in use and must be placed in "OFF" position

Number of connected sensors	Dip1	Dip2	Dip3	Dip4	Dip 5-8 Not used	DIP-switch
1 connected sensor	OFF	OFF	OFF	OFF	OFF	
2 connected sensors	ON	OFF	OFF	OFF	OFF	
3 connected sensors	OFF	ON	OFF	OFF	OFF	
4 connected sensors	ON	ON	OFF	OFF	OFF	
5 connected sensors	OFF	OFF	ON	OFF	OFF	
6 connected sensors	ON	OFF	ON	OFF	OFF	
7 connected sensors	OFF	ON	ON	OFF	OFF	
8 connected sensors	ON	ON	ON	OFF	OFF	
9 connected sensors	OFF	OFF	OFF	ON	OFF	
10 connected sensors	ON	OFF	OFF	ON	OFF	
11 connected sensors	OFF	ON	OFF	ON	OFF	
12 connected sensors	ON	ON	OFF	ON	OFF	

8.13 Mk9 Central Unit, Display information

Display information during start-up:

Software version	Cycle/Start-up
LogiCO2 Central unit FW:1420*	ID CO2 TWA TEMP 1 Heating…
**FW = Firmware version*	

Normal display information, One CO2 sensor attached:

One CO2 sensor is attached
ID CO2 TWA*1 TEMP*2 1 0.04% 400 5 °C *
**1 TWA (Time Weighted Average): Average CO2 exposure over 8 hours.*
**2 Temperature measurement is only shown when temperature alarm is activated on the CO2 sensor.*

Alternating display information during CO2 alarm mode:

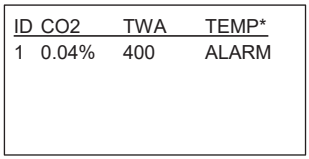
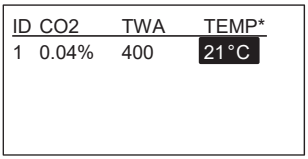
CO2 Alarm	CO2 concentration is shown highlighted
ID CO2 TWA 1 ALARM 440ppm Information text…*	ID CO2 TWA 1 3,14% 440ppm Information text…*
** Information text is only shown during alarm or error situations.*	

Alternating display information during TWA alarm:

CO2 TWA Alarm	CO2 TWA concentration shown highlighted
ID CO2 TWA 1 0,14% ALARM Information text…*	ID CO2 TWA 1 0,14% 5444PPM Information text…*
** Information text is only shown during alarm or error situations.*	

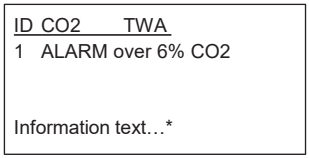
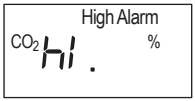
8.13 Mk9 Central Unit, Display information, continue

Alternating display information during temperature alarm mode:

Temperature alarm	Temperature shows in highlighted text
	

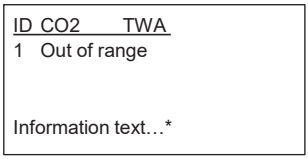
Display information at CO2 alarm levels over 6% CO2:

CO2 concentrations that exceed the CO2 sensors measuring range gives the following display indications, together with continuous red LED and internal buzzer.

CO2 Alarm	CO2 Sensor display
	

Display information during error alarm mode:

Central unit display together with blinking yellow LED and intermittent internal buzzer.
Fault in the CO2 sensor measuring device



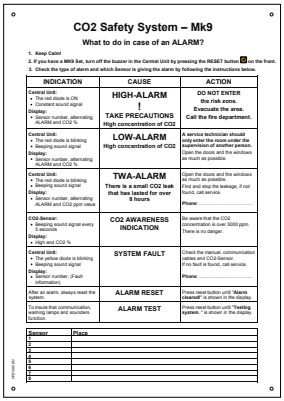
** Information text is only shown during alarm or error situations.*

8.14 Error alarm codes (shown in the Central Unit display):

Fault message	Measures
Out of range!	CO2-measuring fault. When CO2 level has dropped to within measuring range clear error by pressing reset button until "cleared" is displayed.
Sensor error!	Internal fault in CO2-Sensor.
Lost sensor!	Communication error. Check red cabling and connectors. Check affected CO2 Sensors ID- number.

8.15 Mk9 Central Unit, Warning Sign

The sign for the Mk9 central unit should be mounted in a permanent way next to or above the unit.



CO2 Safety System – Mk9

What to do in case of an ALARM?

1. **Keep Calm!**
2. **If you have a MK9 Set, turn off the buzzer in the Central Unit by pressing the RESET button on the front.**
3. **Check the type of alarm and which Sensor is giving the alarm by following the instructions below.**

INDICATION	CAUSE	ACTION
Central Unit: • The red diode is On • Continuous sound signal **Display:** • Sensor number, alternating, ALARM and CO2 %	**HIGH-ALARM** **!** **TAKE PRECAUTIONS** **High concentration of CO2**	**DO NOT ENTER the risk zone.** **Evacuate the area.** **Call the fire department.**
Central Unit: • The red diode is blinking • Sleeping sound signal **Display:** • Sensor number, alternating, ALARM and CO2 %	**LOW-ALARM** **High concentration of CO2**	A service technician should only enter the room under the supervision of a second person. Open the doors and the windows as much as possible.
Central Unit: • The red diode is blinking • Sleeping sound signal **Display:** • Sensor number, alternating, ALARM and CO2 ppm value	**TWA-ALARM** **There is a small CO2 leak that has lasted for over 8 hours**	Open the doors and the windows as much as possible. Find and stop the leakage, if not found, call service. **Phone:** .....
CO2-Sensor: • Beeping sound signal every 5 minute **Display:** • High and CO2 %	**CO2 AWARENESS INDICATION**	Be aware that the CO2 concentration is over 5000 ppm. There is no danger.
Central Unit: • The yellow diode is blinking • Beeping sound signal **Display:** • Sensor number, (Fault information)	**SYSTEM FAULT**	Check the interval, communication cables and CO2-Sensor. If no fault is found, call service. **Phone:** .....
After an alarm, always reset the system.	**ALARM RESET**	Press reset button until **"Alarm cleared"** is shown in the display.
To insure that communication, warning lamps and sounders function	**ALARM TEST**	Press reset button until **"Testing system."** is shown in the display

Sensor	Place
1	
2	
3	
4	
5	
6	
7	
8	

art mss sv

8.16 Mk9 Central Unit, Specifications

Supply:	24V DC
Current consumption:	No alarm status: 21 mA Alarm status: 32 mA
Communication:	RS485, Modbus
Display:	Graphical 128x64, backlit
Acoustic signal-strength:	80 dBa (1m) max.
Ambient temperature:	0 to +40°C (+32°F to +102°F)
Humidity:	0-90% non-condensing
Approval:	CE: Emission tests according SS-EN 61000-6-3 and the immunity tests according to SS-EN 61000-6-2. Manufactured in accordance with DIN 6653-2. The CO2 Safety System is tested by the German TÜV-Rheinland. Certified by UL.
Dimensions (LxWxD):	90 x 161 x 38 mm / 3.5” x 6.3” x 1.5”
Ingress protection:	IP54 according to TÜV, IP44 according to UL

9. Plug-In Power Supply, Specifications

Type:	Model FJ-SW2401000N
Input voltage:	100-240V AC, 50/60 Hz, max 0.5 A.
Output:	24V DC, max 1.0 A
Ambient temperature:	0-40°C (+32°F to +102°F)
Dimensions (LxWxD):	82.4 x 44.5 x 36.2 mm / 3.2" x 1.8" x 1.4" + input plug

It is also possible to order a hardwired power supply option when and were it is needed.

10. Environmental conditions for the system

a) For indoor use.

b) Calibrated for altitude up to 5 000 m.

c) Ambient temperature 0 °C to +40 °C.

d) Maximum relative humidity 95 % (non condensing).

e) Mains supply voltage fluctuations up to ±10 % of the nominal voltage.

f) Transient overvoltages up to the levels of overvoltage category II.
NOTE: These levels of transient overvoltage are typical for equipment supplied from the building wiring.

g) Pollution degree 2.

11. Service and maintenance

1. Should be performed only by authorized professional service agents who are familiar with the CO2 Safety System and all pertinent safety and service procedures. Contact your representative for the name of the authorized service agent(s) in your area.
2. Since this is a safety product we recommend that a function check be performed on the CO2 Safety System by a qualified professional service agent at least once every year.
3. The CO2 Safety System has no user serviceable parts. All service work should be performed by an authorized professional agent.
4. NOTE: Any attempt to service the equipment by unauthorized persons or to perform unauthorized modifications will void the warranty.
5. The CO2 sensor and central unit housing must NEVER be opened by unauthorized personnel.
6. Cleaning is done by use of water on a moistened cloth.

CAUTION ELECTROSTATIC DISCHARGE DAMAGE
This component is sensitive to electrostatic discharge (ESD). Take normal ESD precautions in handling this product to prevent ESD-induced damage and/or degradation. Failure to comply with these instructions will result in product damage.

12. Function and installation check

Store Name (Store Number)	
Address	
City	
State / Region	
Zip Code	
Country	
Date of inspection	
Service Provider's Company Name	
Repair Company Name (if different)	

12.1 Power supply control

If a plug-in power supply is used, make sure that the plug-lock is mounted in a way to eliminate the risk for the power supply to be un-plugged.

Checklist Power supply	YES	NO
Is it a hardwired power-supply (directly connected to the power network without any plug, OBSERVE not for the US)?		
Is it a plug-in power supply?		
If it is a plug-in power supply, is the plug-lock securely mounted (or any other mechanical system that eliminates the risk for the power supply to be un-plugged)?		

12.2 Central Unit check

The central unit must be mounted at a height and where it is easily reachable (to control/reset the system and to read the values/messages). The sign "What to do" must be mounted in a permanent manner (NOT TAPE) next to the central unit so that the personnel can easily read it. Phone number of the service provider responsible if there is a CO2 leak, should be registered on the "What to do" sign.
When the central unit is running properly, the green diode (ON) is ON, and the screen should display the CO2 levels of the CO2 sensor or sensors that are connected.

Checklist Central Unit	YES	NO
Is the central unit mounted in a way that makes it easy to read?		
Is the "What to do" sign mounted next to the central unit and is it easily readable?		
Is the "What to do" sign mounted in a permanent way?		
Is the phone number of the service provider which is responsible if there is a CO2 leak written on the "What to do" sign?		
Is the green diode ON?		
Is the yellow diode (Error) ON?		
Is the red diode (Alarm/Alert) ON?		
Is any error message displayed? if yes, what is it:		

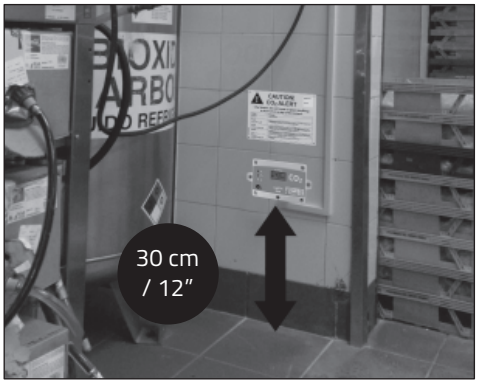
12.3 CO2 Values displayed on the Central Unit

When the system is running properly, the CO2 level measured by each sensor is displayed in % (actual value) and in ppm (Time Weighted Average over 8 hours). The values are displayed sequentially on the second line of the display. The first character displayed is the sensor ID, the value is displayed after.

Checklist CO2 Values	Value in %	Value in ppm
Sensor 1		
Sensor 2		
Sensor 3		
Sensor 4		
Sensor 5		
Sensor 6		
Sensor 7		
Sensor 8		
Sensor9		
Sensor 10		
Sensor 11		
Sensor 12		

12.4 CO2 Sensor check

Each sensor should be mounted not higher than 30 cm/12 inches from the floor in the lowest part of the room. The sensor should be mounted within 5 m/15 feet from the potential CO2 leak source. The sensors cover an area of 78 m^2/840 ft^2 (in an enclosed space, for example a beer cellar). The warning lamp should be mounted so that it can easily be seen by the restaurant personnel without entering the zone at risk. If there is a door leading to a lower area, for example, a basement, then a sensor is also needed in this area, to insure CO2 safety in that area. Under normal conditions the CO2 value displayed, should read between 0.03% and 0.2%.



Checklist Mk9 and Mk90 Sensor 1, Specifications	
Sensor serial number (normally written on a sticker on the side of the sensor housing).	
CO2 Value on sensor	%
CO2 TWA on sensor	ppm

Checklist Mk9 and Mk90 Sensor 1	YES	NO
Is the green diode ON?		
Is the yellow diode ON?		
Is the red diode ON?		
Is there a CO2 information sign mounted next to or above the CO2 sensor?		
Is the CO2 information sign next to the CO2 sensor mounted in a permanent way?		
Is the horn/strobe or warning lamp mounted at a height of 2-2.4 m/80-96 in (as per NFPA 72) so that the staff can see it without any obstructions in the way?		
Is there a CO2 warning sign mounted next to the horn/strobe or warning lamp, with a telephone number to the service provider?		
Is the CO2 warning sign next to the horn/strobe or warning lamp mounted in a permanent way?		

Checklist Mk9 and Mk90 Sensor 2, Specifications	
Sensor serial number (normally written on a sticker on the side of the sensor housing).	
CO2 Value on sensor	%
CO2 TWA on sensor	ppm

Checklist Mk9 and Mk90 Sensor 2	YES	NO
Is the green diode ON?		
Is the yellow diode ON?		
Is the red diode ON?		
Is there a CO2 information sign mounted next to or above the CO2 sensor?		
Is the CO2 information sign next to the CO2 sensor mounted in a permanent way?		
Is the horn/strobe or warning lamp mounted at a height of 2-2.4 m/80-96 in (as per NFPA 72) so that the staff can see it without any obstructions in the way?		
Is there a CO2 warning sign mounted next to the horn/strobe or warning lamp, with a telephone number to the service provider?		
Is the CO2 warning sign next to the horn/strobe or warning lamp mounted in a permanent way?		

Horn/strobe with sign

Optional: Warning lamp with sign

12.5 Installation Record

The Five year warranty as of the date of installation is only valid when this form has been completed.

Installing company:	
Name of installer:	
The LogiCO2 CO2 Safety System has been properly installed and tested by an authorized person. Operation instructions have been provided by:	
Date:	
Signature/installation company:	
Signature/user:	

13. Warranty

Warranty Policy
LogiCO2 warrants to the Purchaser of the CO2 Alert System equipment for 5 years from the installation date that said equipment shall be free from any defects in workmanship and materials. LogiCO2 also warrants the reliability of the calibration in the CO2 Safety System for five years from the date of the original installation. Purchaser agrees that as a pre condition to any LogiCO2 liability hereunder, Purchaser or its appointed agents shall fully inspect all goods immediately upon delivery and shall give LogiCO2 written notice of any claim or defect within ten (10) days after discovery of such defect.

As a further pre condition to any LogiCO2 liability about hereunder, both parts replacement and labour must be supplied by an approved LogiCO2 service company. LogiCO2 may elect to repair or replace such equipment or any defective component or part thereof which proves to be defective, or to refund the purchase price paid by the original Purchaser. LogiCO2 shall not be liable for defects caused by the effects of normal wear and tear, erosion, corrosion, fire, explosion, misuse, or unauthorized modification. Alterations or repair by others than those designated and approved by LogiCO2 or operation of such equipment in a manner inconsistent with LogiCO2 accepted practices and all operating instructions, unless pre authorized in writing by LogiCO2, shall void this Warranty.

LogiCO2's sole and exclusive liability under this Warranty is to the Purchaser and shall not exceed the lesser of the cost of repair, cost of replacement, or refund of the net purchase price paid by the original Purchaser. LogiCO2 is not liable for any losses (including CO2), damages, or costs of delays, including incidental or consequential damages. LogiCO2 specifically makes no warranties or guarantees, expressed or implied, including the warranties of merchantability or fitness for a particular purpose or use, other than those warrantied expressed herein.

Warranty Claims Procedure
All warranty claims must be previously authorized by: LogiCO2 / electronic approval may be obtained by contacting: E-mail info@logico2.com.

Authorization must be obtained from LogiCO2 prior to shipping any equipment to LogiCO2 facilities. The customer returning the goods is responsible for all freight, proper packing, and any damage incurred during shipment of the goods back to LogiCO2.

IMPORTANT
All persons responsible for the use and maintenance of this equipment must read and understand the safety and operating information contained in this guide. Installation and service of this equipment should be performed only by professionals. The function of the equipment will be impaired if it is not properly installed.

Important information regarding third party products
The functionality of LogiCO2's products are only warranted if connected to LogiCO2's systems and products. LogiCO2 is not liable for the functionality of any systems if LogiCO2 components or parts are connected to third party products. LogiCO2 permits its products to be connected to external relays controlling ventilation and valves as well as fire alarm panels and building management systems.