

User's Manual

MkVII

CO₂ Safety System





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

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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.

LogiCO2 bears no legal responsibility for the functionality of the CO2 Safety System if installed by a company that has not been certified by LogiCO2.

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 3% it has dangerous effects. According to the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), an Immediate Danger to Life and Health (IDLH) begins at 4% CO2 concentration.

The equipment that stores and uses CO2 is designed for normal safe operation when properly maintained. Leaks may cause High concentrations of CO2 creating unsafe conditions. CO2 is 1 ½ times heavier than air. It will concentrate in low areas posing a risk of asphyxiation/suffocation to anyone in or entering those areas. The quantity of gas in relation to the size of a room or space is what defines if a area is to be considered a confined area.

The CO2 Safety System continuously monitors CO2. The system is designed to monitor CO2 gas concentration and to provide an alarm at three pre-set elevated levels.

CO2 Concentration Levels (%) and Effects

<u>(%)</u>	<u>Effect</u>
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
0.1-0.3	High values in office
0.04	Fresh air

TWA (Time Weighted Average)

In most countries the Hygienic Limit Value over 8 hours/day or 40 hours/week is 0,5% or 5000 ppm. It is considered unhealthy to be exposed to more than this value during an 8-hour working day. In Europe there is a EU directive regarding TWA. (Patented measuring method.)

II General Description

Product Description and Performance

The Carbon Dioxide (CO₂) Safety System is designed to measure CO₂ concentration in a confined space environment. It is designed to provide an alarm in the event that a CO₂ level considered dangerous is measured in the area being monitored.

The basic CO₂ Safety System is a precision instrument comprising one central unit (with a digital display), one (up to four) sensor unit, one warning lamp and one optional siren each using microelectronic components. A separate electronic transformer supplies power to the system. The sensor unit uses infrared analysis for detecting CO₂. The system provides visible indication of CO₂ levels and temperature in the area where the remote sensor is located.

When installed properly, the CO₂ Safety System will continuously monitor CO₂ concentration and temperature wherever a sensor unit is located. A green light emitting diode (LED) on the central unit indicates normal safe conditions. If ambient conditions at the sensor unit reach a CO₂ concentration level of 1.5% (preset low alarm), the central unit will emit an intermittent audible tone and the « low alarm » red LED will blink. If equipped, a remote warning lamp will be activated. This will also happen if the TWA for 8 hours also surpasses 5000 ppm. The difference can be acknowledged on the display.

Central Unit

- Displays results of sensor unit measurements.
- Controls the operation of the system.
- Displays measurement results and alarm indications.
- The display alternates between CO₂ (0.0%-10.0%), TWA (ppm) and temperature. If more sensors are connected the values from them is also displayed indicating which sensor the value is from.
- The display also shows what kind of alarm is activated and also the error code when an error is being indicated.
- The central unit also has LEDs indicating that the unit is on (green LED), error (yellow LED).

and Alarm/Alert (red LED). A buzzer sounds when there is a error or alarm/alert. Error and alerts are indicated by a intermittent sound and alarm by a continuous sounding buzzer.

- Under the right bottom side of the unit there is a sound mute / reset button. Muting is done by quickly pressing the button, resetting is accomplished by pressing the button until the text Cleared appears on the display together with short beeps.



Sensor Unit

- Display alternates between CO₂ (0.0%-10.0%), TWA (ppm) and temperature.
- Displays measurement results and alarm indications.
- Red LED lights when CO₂ concentration is at or above 1.5% (depending on local legislation).
- Yellow LED lights when there is a error code. A wrench is also shown on the digital display.
- Green LED lights when the system is active.



General Description II

At the low alarm level the tone may be switched off by pressing the reset button shortly. At a low alarm, the red LED will continue until 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. If ambient conditions at the sensor reach a concentration level of 3% or more, the central unit's main alarm will activate emitting a constant audible tone, the red LED will light and the digital display will read ALARM. **The room in which the sensor is located must not be entered when the CO2 concentration is over 3%!**

A CO2 Service agent must be contacted!

In the event of a system fault, the yellow « error » LED blinks. The error code will be shown in the display until the fault has been rectified.

Error codes on the Central Unit

C0001 Communication error. Check for loose cable.

E0032 A measured value on a sensor is out of range. Check readings on the CO2 sensor display. Alternatively, connect a PC with the LogiCO2 software to the CO2 sensor to make analyses. Please observe the Central Unit must be disconnected before connecting the PC to the sensor.

II General Description

The warning signs provided with the CO₂ Safety System.
All signs must be mounted in a secure, permanent way to eliminate any risk that they fall down.

Sign 1 "CO₂ Safety System" should be placed next to the central unit.

CO₂ Safety System

What to do in case of an ALARM?

1. Keep Calm !

2. Turn off the acoustic alarm on the blue Central Unit by pressing the RESET button on the bottom right side.

3. Check the type of alarm and which sensor is giving the alarm by following the instructions below.

INDICATION	CAUSE	ACTION
Blue Central Unit: • The red diode is ON • Continuous acoustic signal Display: 1. ALARM, Sensor Number and CO ₂ % 2. This is shown each cycle.	HIGH-ALARM ! TAKE PRECAUTIONS High concentration of CO ₂ caused by a leak.	DO NOT ENTER the risk zone Evacuate the restaurant. Call and inform the following tel no : Ensure, to the extent possible, that there is ventilation from the outside.
Blue Central Unit: • The red diode is ON • Intermittent acoustic signal Display: 1. LOW-ALARM, Sensor Number and CO ₂ % 2. This is shown each cycle.	LOW-ALARM High concentration of CO ₂ caused by a leak.	A service technician should enter the room in question ONLY under the supervision of another person. Open the doors and the windows as much as possible. Close all CO ₂ Containers. Remedy Leakage
Blue Central Unit: • The red diode is ON • Intermittent acoustic signal Display: 1. TWA-ALARM, Sensor Number and CO ₂ ppm 2. This is shown 3 times each cycle.	TWA-ALARM There is a small CO ₂ Leak that has lasted for over 8 hours	Open the doors and the windows as much as possible. Remedy leakage If the leak is not found, call service on tel no :
Blue Central Unit: • The yellow diode is ON • Intermittent acoustic signal Display: Fault no, Sensor no and fault code	SYSTEM FAULT	Check the manual
C0001 : Communication Error		ErrorCheck that the cables between the sensor and the blue Central Unit are not damaged and correctly connected.
E0002 : Sensor Value Out of Range		Call Service tel no :
After Alarm, always reset System.	ALARM RESET	Press reset button until "CLEARED" is shown in the display.
To insure that all warning lamps and sounders function	ALARM TEST	Press reset button until "TESTING-ALARM" is shown in this display.

Sensor	Place
1	
2	
3	
4	

(1)

Sign 2 "CO₂ ALERT" should be placed next to the warning beacon and sign 3 "WARNING" next to the horn/strobe.

Alarm Functionality Low Alarm 1.5%: Red Warning beacon Flashes - Call Service.
High Alarm 3.0%: White Strobe Flashes and Horn Sounds - Evacuate Premises.
TWA 5000 ppm: TWA warning indication on Central Unit.

!

CAUTION

CO₂ Alert!

If Light is Flashing,
Call Service at:

Open doors to ventilate

(2)

!

WARNING

!

!

CO₂ ALERT

CARBON DIOXIDE GAS

If alarm sounds and light flashes:

• Evacuate Restaurant

• Call Emergency Services

.....

(3)

Observe the System's Operation

The CO2 Safety System is packaged with its sensor, central unit, warning lamp (beacon), siren (optional), power supply (transformer) and connection cables. It is immediately operational when connected to normal 100-240 VAC power supply. Please observe that you have to connect the appropriate plug adaptor to the power supply depending on in which country you are.

To become familiar with the system's operation, carefully remove its components from the box and plug the power supply into an electrical supply outlet. Notice that a yellow and a green LED will illuminate, shortly followed by the red LED on the CO2 sensor unit. When the red LED lights, the relays will activate the external and internal siren/buzzer and the external beacon. This test startup procedure takes about 10 seconds. On the display the word HEAT is shown while the sensor is in startup mode. The unit is in normal running mode when only the green LED is on.

On the Central Unit the red, yellow and green LED will light up. MiniC followed by the software version number is shown on the display, this is followed by the display indicating the default sensor number (1-4 pcs), this is followed by indicating Startup. When the Central Units startup procedure is finished, the display will show OnLine and measured sensor values.

Determine Proper Location for System Components

- The CO2 sensor should be placed in the room where CO2 equipment is being used or where CO2 is likely to accumulate in the event of leak. Please observe, that this does not necessarily have to be where the CO2 is stored, for example when the CO2 is stored outside.
NOTE: CO2 is a heavy gas and it will collect in low areas and confined spaces.

- One sensor unit will monitor a room of up to approximately 100m² / 1000 ft² (without functioning natural ventilation or open entry way). **NOTE: If the room has only mechanical ventilation it should have a sensor.**

- The sensor should be installed so it has clear exposure to room air but is away from ventilation inlets or outlets. Its digital display should be visible.

- A warning beacon, if equipped, must be located where its flash is visible at any entrance to the area being monitored. This may require more than one beacon.
- The horn/strobe should be mounted on the wall above the sensor.
- The central (control) unit must be placed outside the room being monitored, preferably in the managers office. If the Central unit is placed in the manager's office there should also be a warning lamp outside the door to make the personnel observant that there is a alarm situation.
- NOTE: The central unit and sensor unit are connected to each other by conductor cable that may need to be disconnected for purposes of cable routing or installing a longer cable.
When reconnecting cable leads make sure they are securely connected to their proper terminals. Refer to the diagram on page 9 for assistance.

Try to route all conductor cables in cable conduits for a neat appearance.

Install the (black) Sensor Unit

Try to position the unit where it will be out of the way of moving objects and where its digital display is visible. Use the supplied screws and wall anchors. The stainless steel protection should be mounted so that it does not block the view of the display.

Install the (blue) Central Unit

Place the central unit in a dry location. It should be placed at a height where it can be easily seen but where it is least likely to be damaged by items such as mop handles or boxes being moved. Use the supplied screws and wall anchors as necessary.

- Be sure the reset button can be pushed without obstructions.
- Mount the Pluglock so that the power supply cannot be disconnected without the use of mechanical tools.
- **Be sure the central unit is not placed in the risk area that is being monitored!**

III Installation

Install the Warning Beacon

The CO2 Safety System is equipped with a pre-wired warning beacon. Its power cord has a blue connector at the end terminal that is connected to the splitter, marked with a blue dot.

1. Separate the beacon from its mounting base using a counter clockwise twist.
2. Mount the base in a proper location using screws through the knockouts on the « back » of the base. Refer to the following description and diagram on page 9.
3. Attach the beacon to its base using a clockwise twist.

An additional beacon can be added, if necessary, at another entrance to the room being monitored. Simply connect it to the extra pair of terminals in the « first » beacon using two-conductor (20 or 24 AWG) cable (not supplied). Route the cable through a knockout on each base using cable strain reliefs. Make sure the (+) and (-) terminal connections are consistent between beacons.

- To ensure proper operation, the combined distance between (farthest) warning beacon, sensor unit, and central unit, should not exceed 100m.

A properly connected system will begin to operate immediately when plugged into to a (100-240V AC) power supply. No additional start-up procedure or adjustment is necessary.

Install the Horn/Strobe

The CO2 Safety System is equipped with a pre-wired horn/strobe. Its power cord has a blue connector at the end terminal that is connected to the splitter, marked with a blue dot.

1. Mount the horn/strobe in a proper location above the CO2 sensor. Refer to the description and diagram on page 9.

A properly connected system will begin to operate immediately when plugged into to a (100-240V AC) power supply. No additional start-up procedure or adjustment is necessary.

Optional Temperature Surveillance

Referring to the diagram on page 9, locate Jumper 56 in the sensor unit. The unit is delivered with the jumper in this position. While the jumper is in this position the temperature alarm is not active although the system monitors temperature conditions. Removal of Jumper 56 activates the temperature limit alarm at the central unit.

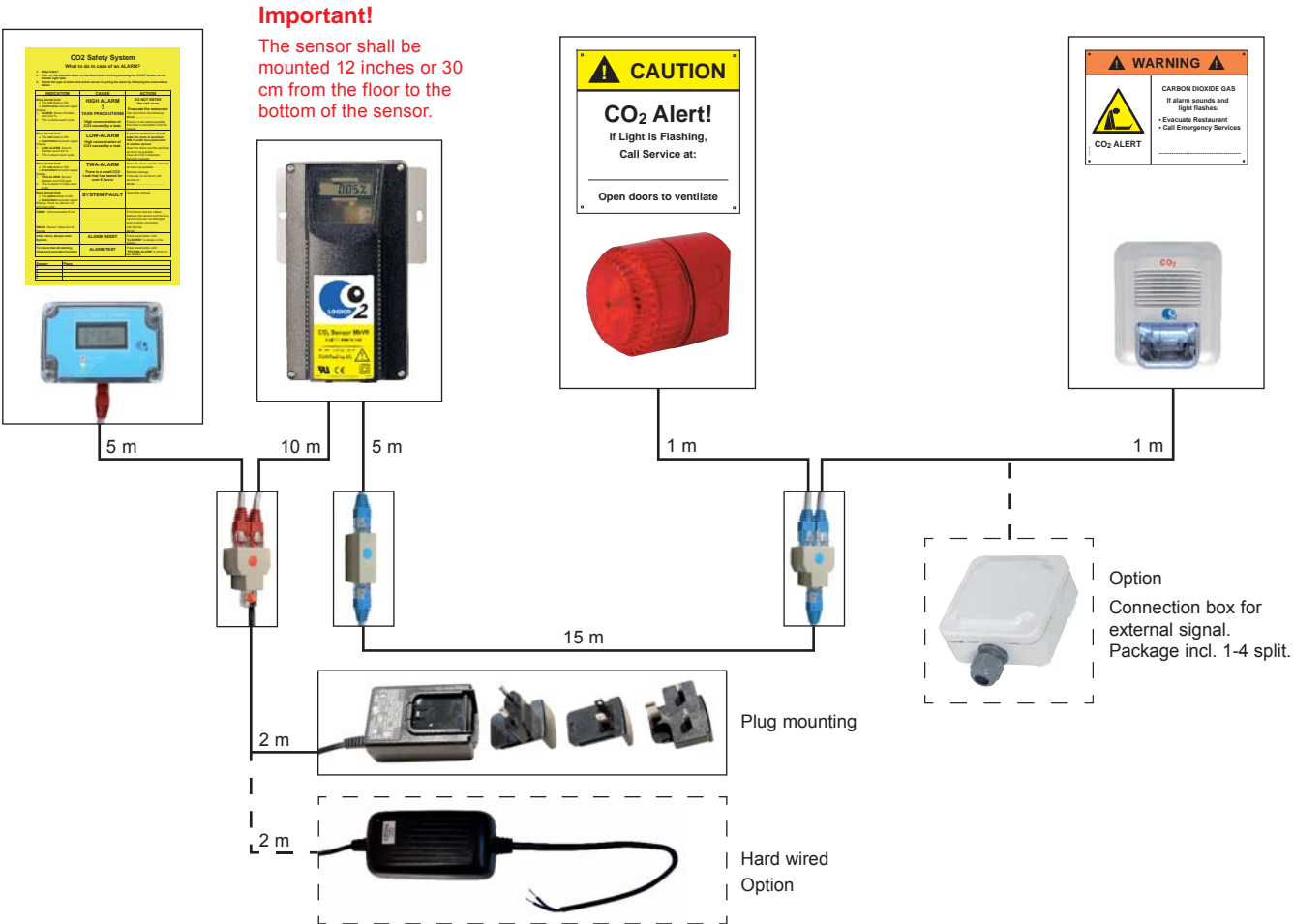
- The temperature is displayed on the Central Unit and the CO2 sensor. If Jumper 56 is removed the chosen temperature limits will be activated. If activated the alert will be shown on the Central Unit.

Disconnection from supply source

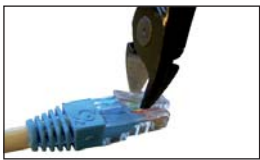
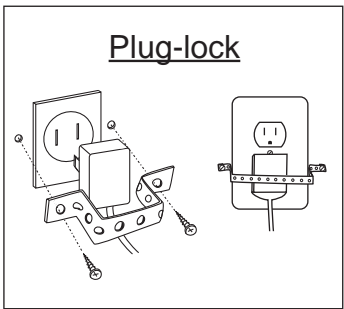
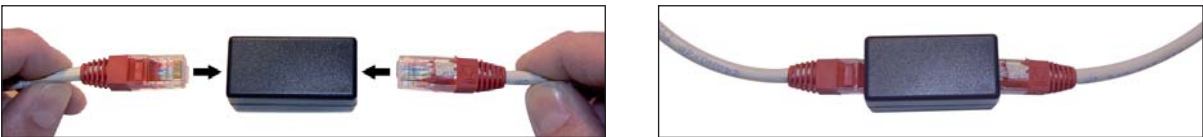
When installing the CO2 Safety System to the power net please ensure that the fuse that the system runs on is clearly marked. This makes it easy to disconnect the power to the system, if needed.

IV Connection Diagrams

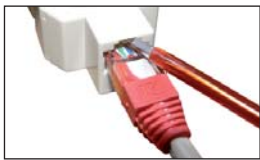
Connection diagram



Cable extension connector



Cut off the prolongations of the lock-release on the RJ45 connectors to secure unauthorized disconnection of the CO2 Safety System.



Use a small screwdriver to disconnect the RJ45 plugs.

IV Connection Diagrams

CO2 Sensor unit

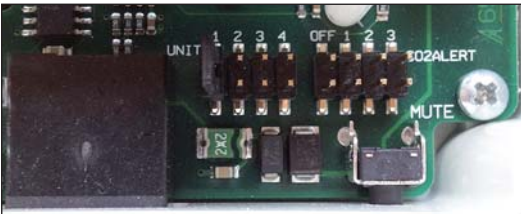
Jumpers	Connected (default)	Disconnected
JP7	AZC deactivated	AZC activated
JP52	Relay 1 Common to voltage	Relay 1 potential free
JP53	Relay 2 Common to voltage	Relay 2 potential free
JP56	Temp deactivated	Temp activated
JP59	LogiCO2-program	MODBUS



Central unit

Number of Sensors connected

Jumper	Connected	Disconnected
Unit 1	1 CO2 Sensor	1 CO2 Sensor
Unit 2	2 CO2 Sensors	
Unit 3	3 CO2 Sensors	
Unit 4	4 CO2 Sensors	



Important Records V

Proper function of this product is entirely dependent on its correct installation.

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 Safety System has been properly installed and tested by an authorized person.

Operation instructions have been provided by:

Date: _____

Signature/Installation company:

Signature/Store Manager:

V Important Records

Example of proper placement of Sensor (black), Control Unit (blue), Lamp/beacon (red) and Horn/Strobe (white).



Illustration shows a backroom/basement installation

Function test

Sensor				
No 1	Date		Name	
No 2	Date		Name	
No 3	Date		Name	
No 4	Date		Name	
No 5	Date		Name	

Ordering Service and Parts VI

Service and Maintenance

1. Service or maintenance work on the CO2 Safety System 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 thorough function check be performed on the CO2 Safety System by a qualified professional service agent at least once every year. The check should be done to insure safety and optimal performance of the system.
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 sensor and central unit housing must NEVER be opened by unauthorized personnel.**
6. Cleaning is done by use of water on a moistened cloth.

Ordering Parts or Service

CO2 Set 1, Fahrenheit	Part.no. CO2 SET 1 UL MKVII C
CO2 Set 1, Celsius	Part.no. CO2 SET 1 CE MKVII C
CO2 Central Unit	Part.no. CO2 CENTRAL UNIT III
CO2 Sensor Set, Fahrenheit	Part.no. CO2 SENSOR SET UL
CO2 Sensor Set, Celsius	Part.no. CO2 SENSOR SET CE C
CO2 Sensor, Fahrenheit	Part.no. CO2 SENSOR UL MKVII
CO2 Sensor, Celsius	Part.no. CO2 SENSOR CE MKVII
Warning lamp, Red, 1m cable RJ45	Part.no. FLASH-24-R
Horn/Strobe, White, 1m cable RJ45	Part.no. HORN/STROBE CE
Cable Blue 15m, RJ45	Part.no. RJ45 CABLE B15M
Cable Blue 5m, RJ45	Part.no. RJ45 CABLE B5M
Cable Red 10m, RJ45	Part.no. RJ45 CABLE R10M
Cable Red 5m, RJ45	Part.no. RJ45 CABLE R5M
Extension connector	Part.no. RJ45 1-1 EXTENSION
RJ45 Splitter 1-2	Part.no. RJ45 1-2 SPLIT
RJ45 Splitter 1-4	Part.no. RJ45 1-4 SPLIT

For parts or service contact your local authorized supplier or equipment service agent.

VII Specifications

CO₂ SENSOR

Product:

Operating principle	Non-dispersive infrared (NDIR) and thermistor
Measurement range - temperature	0...+40°C (+32°F...+102°F)
Measurement range - CO ₂	0-3 Vol.%
Extended range - CO ₂	3-10 Vol.%
Gas sampling mode	Diffusion

TWA:

Time Weighted Average (TWA) calculation 8 h time span (most recent) with 4 min sample period. (Pat. Pend.)

Accuracy:

Temperature:	±1°C (±1.8°F)
Digital resolution	1°C (1.8°F) on display 0.01°C via RS485
CO ₂ :	
At full operating temp range (0...+40°C)	+5% of measured value
Digital resolution	0.01 Vol.%
Pressure dependence	+0.21% of reading per mm Hg in relation to calibration value or +1,6% of reading per kPa
Annual zero point drift	<0.01 Vol.% with automatic self calibration feature

Ambient temperature:

0-40°C (+32°F...102°F)

General performance:

Compliance with	89/336/EEC
Sensor life expectancy	> 15 years
Operating humidity range	0 to 95% RH (non condensing)
Warm-up time (22°C)	1 min.
Dimensions (LxWxD)	180 x 100 x 52 mm / 7" x 4" x 2"
	Overvoltage Cat II, Pollution degree II

- Please observe that since this is a safety product we recommend that a function control be carried out once a year

Power:

Power input	12-24V DC
Maximum 50 Hz ripple	5V peak-peak AC sine wave (if within power input range)
Power consumption	≤ 0.8 Watts average of DC (external optional warning lamp not included)
Average current	72 mA @ 12V DC
Peak current	0.6A during 10 ms, 0.2A during 250 ms
Wiring connections	RJ45

Outputs:

Digital interface	RS485 serial port - MODBUS
Display	4 digit LCD display with TWA ppm, CO ₂ % and Temp. °C indication
Status lights (LEDs)	Yellow - maintenance & interference Red - alarm Green - operation

2 relays:

Type	1A/50V AC/24V DC, min. 1mA/5V (We recommend that our warning beacon is used)
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Ingress protection:

IP 54

Approval:

Manufactured in accordance with DIN 6653-2. The CO₂ Safety System is tested by the German TÜV-Rheinland.
EN 50081-1 / EN 50082-2 / CE.
Certified by UL.

Filter:

Insect protection according to EN 54-7:1994

CO₂ CENTRAL UNIT

Supply:	12-24V DC
Current consumption:	40 mA
Communication:	RS485, Modbus
Display:	Two row: 2 x 8 digit
Acoustic signal-strength:	70 dB (1m) max.
Ambient temperature:	0-40°C (+32°F...102°F)
Humidity:	0-90% non-condensing
Ingress protection:	IP 20
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)	98 x 66 x 41 mm

WARNING LAMP (BEACON)

Nominal voltage:	10-60V DC +/- 1+%
Average current:	88 mA @ 24V DC supply
Flash energy:	2 Joule
Flash frequency:	60/min
Ambient temperature:	-10°C...70°C (14°F...158°F)
Dimensions:	Ø 91 x Height 96 mm / Ø 3.6" x Height 3.8"
Ingress protection:	IP 54

HORN/STROBE CE

Nominal voltage:	18-24V DC
Average current:	120 mA @ 24V DC supply
Decibel:	110 dB / 1 m
Flash intensity:	75 CD
Flash frequency:	65/min
Ambient temperature:	-5°C...50°C (23°F...122°F)
Dimensions (LxWxD):	134 x 115 x 61 mm / 5.3" x 4.5" x 2.4"
Ingress protection:	IP 21

PLUG-IN POWER SUPPLY

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

Warranty VIII

Warranty Policy

LogiCO2 warrants to the Purchaser of the CO2 Safety System equipment for 2 years from the installation date. If installed by a LogiCO2 certified authorized installer the warranty is 5 years, 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 5 (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 warranties expressed herein.

Warranty Claims Procedure

All warranty claims must be previously authorized by: LogiCO2 / electronic approval may be obtained by contacting:

LogiCO2 International S.A.R.L.

P.B. 172

7502 Mersch

Luxembourg

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.



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