

User's Manual

O₂ Safety System



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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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 O2-detection

The LogiCO2's O2 Safety Systems measures the O2 concentration in a confined space environment and provides alerts/alarms in the event that O2 levels in that space reaches the pre-set alarm levels. The O2 sensing devices uses optical analysis for detection of O2.

If a sensor detects a low or high O2 level, the O2 sensor alerts via sound and light-diodes as well as remotely connected warning lamps, horns or horn/strobes which will be activated. If it is connected to our Mk9 central unit it will also display which sensor has detected an alarm O2 level.

First after a self-diagnostics program has been done by the system the sensor will begin to detect O2 levels when powered on. The system is delivered pre-connected. With auxiliary kits, functionality can be substantially extended. There is a set which is comprised of one O2 sensor, one central unit, one horn/strobe as well as appropriate signs. As well as one with the Stand alone version.



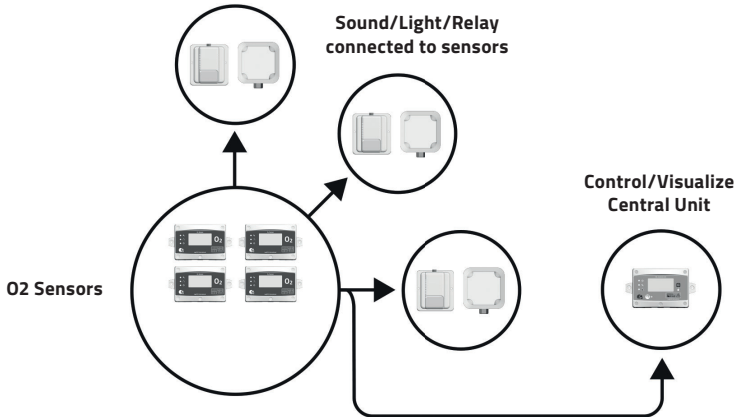
O2 concentration levels (%) and effects

(%)	Effect
20.9	Normal.
19.0	Some unnoticeable adverse physiological effects.
16.0	Increased pulse and breathing rate, impaired thinking and attention, reduced coordination.
14.0	Abnormal fatigue upon exertion, emotional upset, faulty coordination, poor judgment.
12.5	Very poor judgment and coordination, impaired respiration that may cause permanent heart damage, nausea and vomiting.
<10.0	Inability to move, loss of consciousness, convulsions, death.

Source: Compressed Gas Association, 2001.

2. General LogiCO2 Safety System description

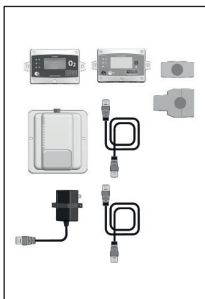
LogiCO2's O2 Safety Systems measure O2 concentration in a confined space environment and provides alerts/alarms in the event that O2 levels in that space reaches a preset level. The O2 sensing devices uses an optical sensor for accurate detecting of O2. When installed properly, the system will continuously monitor the O2 concentration where a O2 sensor is located.



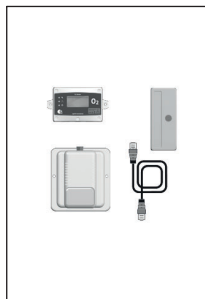
If a sensor detects a low or high O2 level, the O2 sensor alerts via sound and light and remotely connected warning lamps, horns or horn/strobes will be activated. The central unit will alert with sound and display which sensor that has detected a low or high O2 level. A properly installed system will begin to detect O2 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 O2 sensors, with auxiliary central unit/s, horn/s and relay boxes.

Examples of sets and kits:



Mk9 O2 set
2056



Mk9 O2 sensor kit
2124

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 power supply source: when installing the O2 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 O2 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.



3. If you test a Mk9 detector set, please check that all LEDs on the central unit and the sensors illuminate and 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) should 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 O2 Sensor

Correct placement of the O2 Sensor

The O2 sensor should be placed in the room where there is a risk for unsafe oxygen concentration – this would be at the distribution points of the nitrogen, nitrogen generator or nitrogen tank as well as mixed gas with nitrogen. Please observe, this does not necessarily have to be where the asphyxiant gas is stored, for example when it 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 asphyxiant gas is used and stored in relationship to the volume of the room in question.

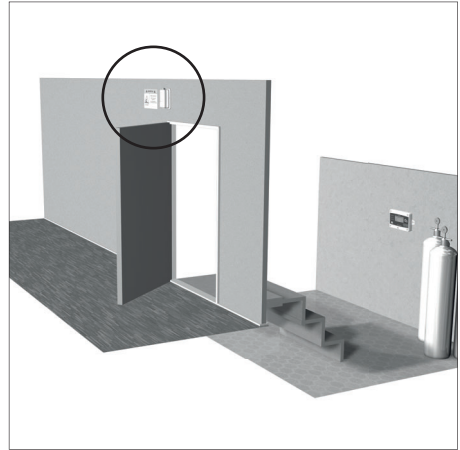
NOTE: If the room has only mechanical ventilation, it should have a sensor.



Installation of the O2 Sensor

The O2 sensor should be installed at breathing height, between 150-180 cm/5-6 feet from the floor. Try to find an installation position where the unit is least likely to be damaged. Mount the O2 sensor with supplied mounting screws.

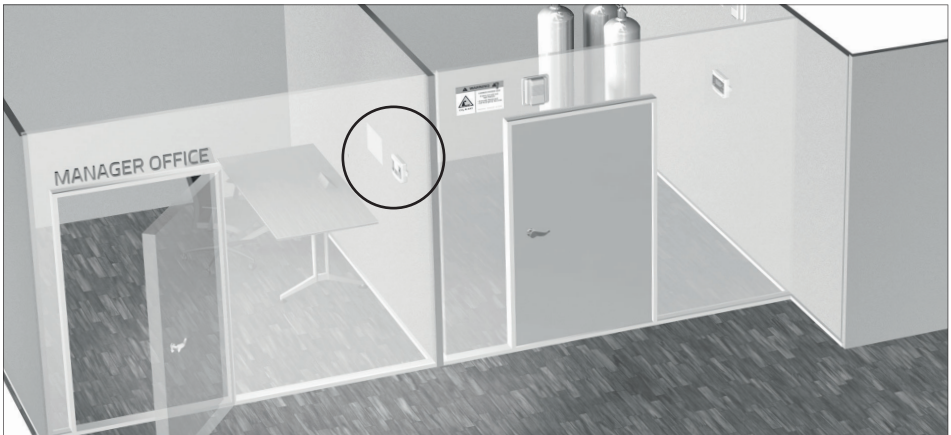
3.3 Installation of the Horn/Strobe



1. The horn/strobe/s must be installed on the wall above the O2 sensor, approximately 2-2.4 m/80-96 inches (as per NFPA 72) above the floor, clearly visible from any entrance of the area being monitored. It is recommended that a second horn/strobe be placed OUTSIDE the area being monitored, preferably placed over the door/s leading to the monitored area. This will 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 horn/strobes, in a permanent way.

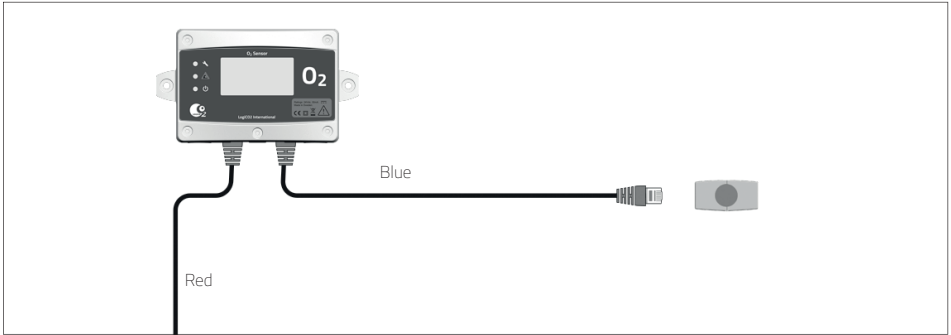
3.4 Installation of the Central Unit



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 must be installed at a clearly visible and reachable height.

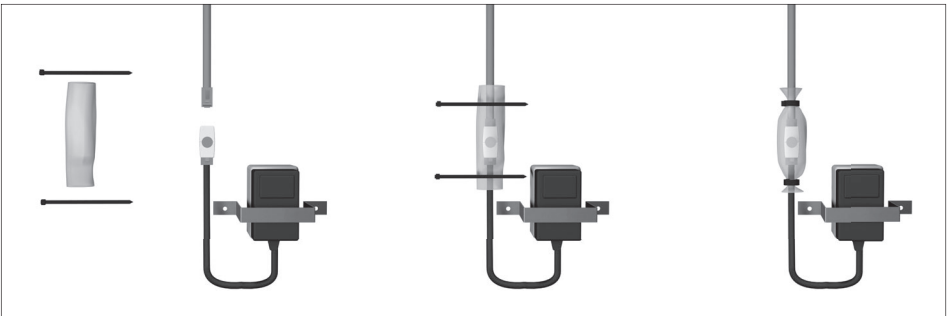
2. Mount the included information signs clearly visible, next to or above the units, in a permanent way.

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 is for communication and power. Please observe, all cables have splitters at the end to facilitate extended cable lengths. 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. Make sure to mount the protective collar seals with the tie-wraps in order to protect the connections from dirt and water. The collar seals as well as the tie-wraps are also delivered in the box that the sensor comes in. If possible, route the cables through cable conduits between the units, for a neat and safe installation.

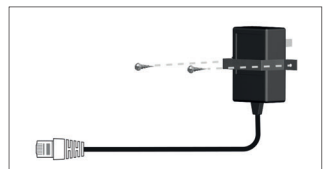
Protective collar seals and cable ties are included. They must be used as below to protect the RJ45 1-1 connector or RJ45 1-2 splitter from moisture and dust.



3.6 Connection of the power supply

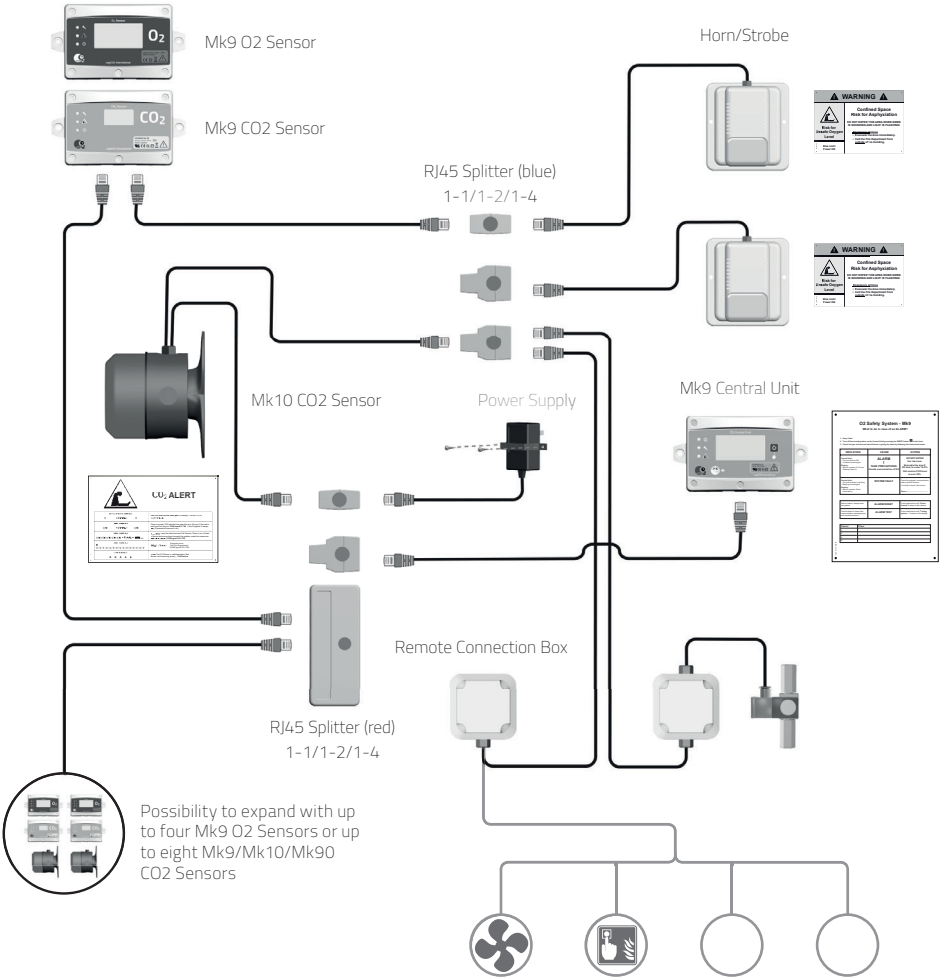
A separate power supply (100-240 VAC) supplies power to the system. Please observe that you have to connect the appropriate plug adaptor to the power supply depending on which country you are in.

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 where it is needed.



4. Connection diagram

This connection diagram shows an example of how the system can be installed.



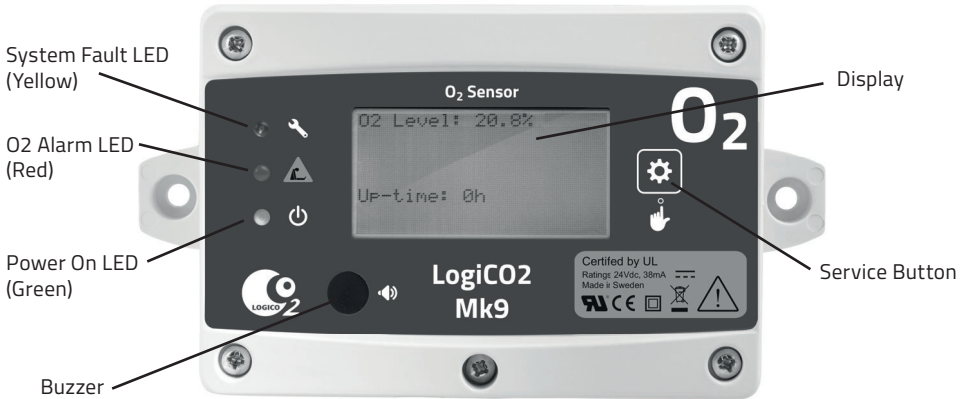
Please note:

A separate installation manual is provided with each extra O2 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
<p>Central Unit:</p> <ul style="list-style-type: none"> ▪ The red diode is ON ▪ Constant sound signal <p>Display:</p> <ul style="list-style-type: none"> ▪ Sensor number, O2 % and Gateway Alarm A 	<p>ALARM! TAKE PRECAUTIONS</p> <p>Unsafe concentration of O2</p>	<p>DO NOT ENTER the risk zone.</p> <p>Evacuate the area if O2 level is under 19.5%.</p> <p>Call service if O2 level is over 23%.</p>
<p>Central Unit:</p> <ul style="list-style-type: none"> ▪ The yellow diode is blinking ▪ Beeping sound signal <p>Display:</p> <ul style="list-style-type: none"> ▪ Sensor number, (Fault information) 	<p>SYSTEM FAULT</p>	<p>Check the manual, communication cables and O2-Sensor.</p> <p>If no fault is found, call service.</p>
<p>After an alarm, always reset the system.</p>	<p>ALARM RESET</p>	<p>Press reset button on Central Unit until "Alarm cleared!" is shown in the display</p>
<p>Test the alarm to insure that communication, warning lamps and sounders function.</p>	<p>ALARM TEST</p>	<p>Press reset button on Central Unit until "Testing system" is shown in the display</p>

6. Mk9 O2 Sensor, General information



6.1 General Description

The sensor is an O2 sensor with display that is used to monitor the O2 levels of a confined space. This unit can be connected to a Central Unit or to an existing Mk9 CO2 System for full functionality. Horn/strobes, flash units or external connection boxes can also be connected to the sensor for added functionality. The O2 sensor display shows the current O2 level and the current alarm settings.

The LogiCO2 oxygen sensor (O2) has a FBO oxygen sensor with built-in temperature and pressure adjustment. The oxygen sensor is factory calibrated and measures the ambient oxygen partial pressure (ppO₂) levels. The sensor benefits from low power operation and a long lifetime (> 5 years) due to the non-depleting sensing principle.

The O2-sensor is compatible with LogiCO2 Mk9 CO2 Safety System. It communicates via Modbus RTU with the LogiCO2 Mk9 Central unit and can be used together with the different LogiCO2 CO2 sensors. The unit is delivered together with a horn and strobe alarm device.

6.2 Qualified Calibration

Note: Only to be performed by trained or certified personnel.

It is possible to perform a fresh air O2 calibration (20,9%). Use either fresh outdoor air or O2 gas from a cylinder, with a O2 concentration of 20,9%.

How to perform the calibration, see paragraph 6.7: Service Mode Three.

6.3 Automatic background calibration (AUTO-CAL)

It is possible to activate an automatic background calibration (AUTO-CAL) that compensates for possible long-term drift of the O2 sensor element. The AUTO-CAL is by default deactivated.

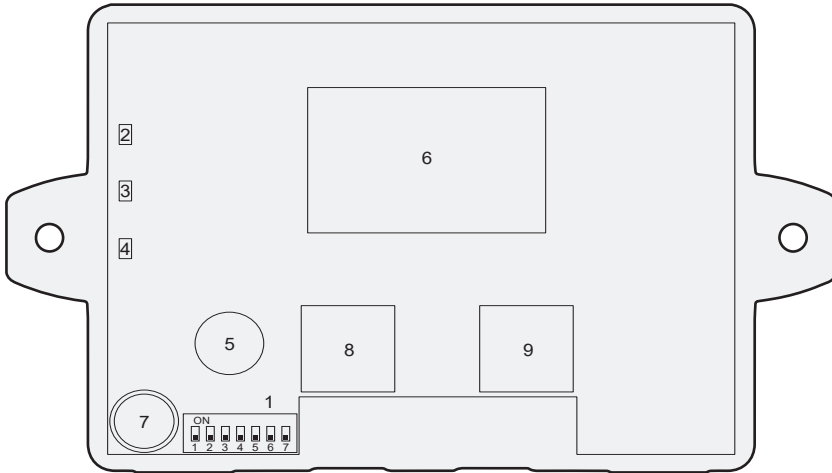
The AUTO-CAL requires that the O2 Sensor is placed in an area that normally contains fresh air.

NOTE! If the O2 Sensor is used in an area that can have an abnormally high O2 concentration, the AUTO-CAL **must** be deactivated by setting the DIP-switch number 6 (on the printed circuit board) in **up** position. An example is when nitrogen generators are used, which is becoming more and more common. The generators take the nitrogen out of the air, with a higher oxygen level as a result. This makes it impossible for the AUTO-CAL to function correctly because the reference oxygen value will be incorrect, and therefore the AUTO-CAL **must** be deactivated.

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

Indication	Explanation
Green LED on	Unit in operation
Red LED on and constant sound signal	Alarm. Ambient O2 concentration level is under or over the alarm settings. The display on the O2 sensor will show the current O2 level and the information text: "EVACUATE AREA: Very critical O2 level!". If the O2 level is under 19.5%, evacuate the area. If the O2 level is over 23%, call service. The Central Unit will emit constant sound signal and the digital display will show "Gateway Alarm A". Connected remote horns/strobes will be activated.
Yellow LED on and intermittent audible tone	Error. The display on the O2 sensor will show "Sensor error" or "System error", together with an information text. 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.

6.5 Mk9 O2 Sensor, Internal layout



O2 Sensor

1. DIP-switch

2. LED yellow

3. LED red

4. LED green

5. Buzzer

6. Display

7. O2 Sensor

8. RJ45 input connector

9. RJ45 output connector

Function/Indication

ID settings

Fault

Alarm

Power ON

High-Alarm

Measurement and alarm information





O2 measurement sensor

Power and communication (red connector)








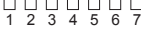
Alarm outputs (blue connector)

6.6 Mk9 02 Sensor, DIP-switch settings



ID-address 1-4:

ID- address	Dip1	Dip2	
ID1	OFF	OFF	
ID2	ON	OFF	
ID3	OFF	ON	
ID4	ON	ON	

Alarm levels:

Alarm level	Dip3	Dip4	Dip5	
A-ALARM: <19.5% >23.0% B-ALARM: <19.5% >23.0%	OFF	OFF	OFF	
A-ALARM: <18.0% >23.0% B-ALARM: <19.5% >23.0%	ON	OFF	OFF	
A-ALARM: <18.0% >23.0% B-ALARM: <18.0% >23.0%	OFF	ON	OFF	
A-ALARM: >23.0% B-ALARM: >23.0%	ON	ON	OFF	
A-ALARM: <19.5% B-ALARM: <19.5%	OFF	OFF	ON	
A-ALARM: <18.0% B-ALARM: <19.5%	ON	OFF	ON	
A-ALARM: <18.0% B-ALARM: <18.0%	OFF	ON	ON	
A-ALARM: PC-software settings B-ALARM: PC-software settings	ON	ON	ON	

Automatic background calibration:

Automatic background calibration	Dip6	Dip7	
AUTO-CAL activated	OFF	OFF	
AUTO-CAL deactivated Default setting	ON	OFF	

6.7 Mk9 O2 Sensor, Display information

Display information during start-up:

Start-up software version	Start-up test
LogiCO2 O2 Gateway FW: 1608 ID: 1	Testing system...

Display information during no alarm mode:

Operation O2 concentration	Normal view
O2 Level: 20.6% A-ALARM: <19.5% >23.0% B-ALARM: <19.5% >23.0% AUTO-CAL OFF	<p>In normal view, the displays shows:</p> <p>The current O2 concentration in %. Also, the A-ALARM trig level and the B-ALARM trig level. These levels can be the same depending on the setting. The A-ALARM activates the audible (Horn) alarm device and the B-ALARM activates the optical (Strobe) alarm device.</p> <p>Information about whether the automatic calibration (AUTO-CAL) is turned ON or OFF is also shown in the normal view.</p>

Display information during alarm mode:

O2 High-Alarm	
O2 Level: 19.4% A-ALARM: <19.5% >23.0% B-ALARM: <19.5% >23.0% AUTO-CAL OFF EVACUATE AREA: Very crit...*	<p><i>* Information text is only shown during alarm or error situations.</i></p>

Display information during error/fault mode:

Error/Fault	
O2 Level: 20.6% "Sensor error" A-ALARM: <19.5% >23.0% B-ALARM: <19.5% >23.0% AUTO-CAL OFF Information text...*	<p><i>* Information text is only shown during alarm or error situations.</i></p>

Display information - The service buttons three functions:

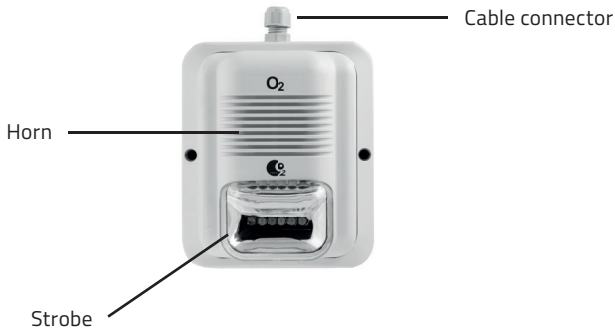
1. Service Mode One	
<pre>O 02017.1 T +24.1 P 1026 % 020.66 e 0000 Up-time: 1568h Cal-time: 287h CAL 0.00% (OFF)</pre>	<p>One short push:</p> <ol style="list-style-type: none"> a. Reading of sensor element data, total run-time of the O2-sensor, time since the last Qualified Calibration and readout of the correction factor (CAL) for the automatic background calibration (AUTO-CAL) function – if AUTO-CAL is activated. b. To return to “normal display view”, push the button short or wait for 30 seconds.
2. Service Mode Two	
<pre>O 02017.1 * T +24.1 P 1026 % 020.66 e 0000 Up-time: 1568h Cal-time: 287h CAL 0.00% (OFF)</pre>	<p>In the “normal display view” push and hold the button for 10 seconds:</p> <ol style="list-style-type: none"> a. Reset of the correction factor (CAL. RESET!) for the automatic background calibration (ABC) function – if ABC is activated. Release the button. b. To return to “normal display view”, wait for 30 seconds. c. In this mode it is possible to go to Service Mode Three.
3. Service Mode Three	
<p>Entering Service Mode Three</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <pre>O 02017.1 * T +24.1 P 1026 % 020.66 e 0000 Up-time: 1568h Cal-time: 287h ...</pre> </div> <p style="text-align: center;">Service Mode Three</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Qualified Calibration</p> <ol style="list-style-type: none"> 1. Apply O2 gas 2. Push the button </div> <p style="text-align: center;">Service Mode Three calibration</p> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Qualified Calibration</p> <p>Keep applying gas for 90S</p> </div>	<p>Qualified calibration*: In the “normal display view”, push and hold the button for 10 seconds:</p> <ol style="list-style-type: none"> a. When the asterisk (*) in the upper right corner of the display is lit, push the button shortly. Repeat this five times in a row to enter Qualified Calibration mode. For each correct push of the button, a dot will be lit in the lower left corner. If an incorrect push happens, the procedure starts over again. The reason for this advanced way to enter the Qualified Calibration is to avoid unintentional calibration. b. If no further actions is performed for 1 minute, in Qualified Calibration mode, the O2 Sensor will go back to Service Mode One. c. As the instructions in the display says, apply gas/air with a O2 concentration of 20,9%. Push the button short and a 90 second timer starts counting down. Keep applying 20,9% O2 gas until the timer has reached 0. If the calibration is successful, the display will show “Calibration OK” and go back to Service Mode One, for 30 seconds, and then go to “normal view”. <p>If the display says “Calibration Error”, check that the calibration gas (20,9% O2) is correct and make a new Qualified Calibration. If the calibration still fails, replace the O2-sensor.</p>
<p><i>* Qualified calibration - Only to be performed by trained and certified service personnel.</i></p>	

6.8 Mk9 O2 Sensor, Specifications

Power supply:	24V DC
Power consumption:	<30 mA
Wiring connections:	RJ 45
Digital interface:	RS485 serial port MODBUS
Outputs:	2 x transistor output 24V DC, Min 1 mA
Display:	Graphical 128x64, backlit
Acoustic signal-strength:	76 dBa (1m) max.
Operating principle:	FB-optical
O2 measuring range:	0-25 Vol.%
Accuracy O2:	<2% FC
Ambient temperature:	-20 to +50°C (-4 to +122°F). Only for indoor use.
LED indications	
Green:	Operation
Yellow:	Fault
Red:	Alarm (<19.5% O2)
Sound indications	
Beeping:	Fault
Continuous:	Alarm
Approvals:	Tested in accordance with DIN6653-2, applied to O2 sensors.
Dimensions (LxWxD):	90 x 161 x 38 mm / 3.5" x 6.3" x 1.5"
Ingress protection:	IP54

Please observe that since this is a safety product we recommend that a function control should be carried out at least once a year. For more information see paragraph 8.5 "Test the system" and 6.2 "Qualified Calibration".

7. Horn/Strobe LED, General information



7.1 General Description

The horn/strobe is equipped with a pre-wired cable for connection to the O₂ Safety System. The horn/strobe is power supplied from the O₂ sensor. Horn/Strobe LED is a loud warning horn (110 dB/1 m) and high intensity strobe (115 cd).

7.2 Horn/Strobe, Warning Sign

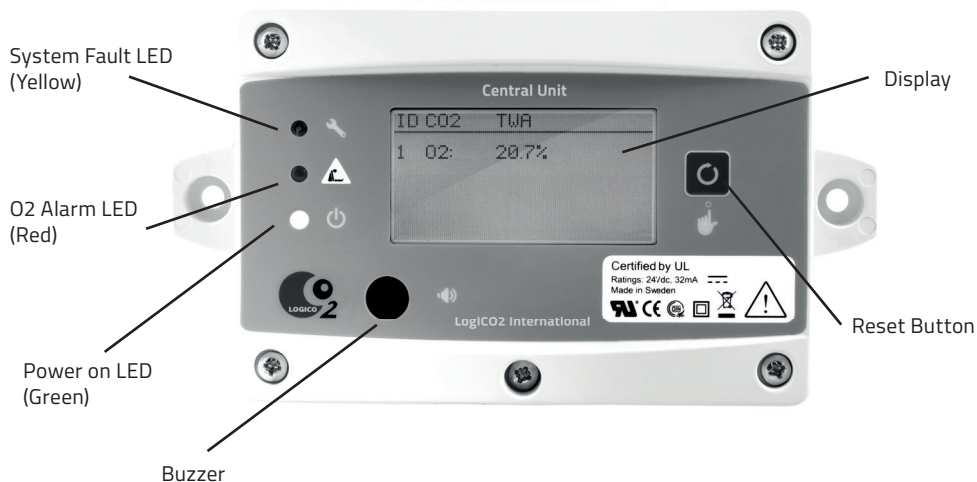
The sign for the horn/strobe should be mounted in a permanent way next to the unit.



7.3 Horn/Strobe LED, Specifications

Nominal voltage:	18-24V DC
Average current:	120 mA @ 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 an O2 Safety System with up to four sensors. The central unit is multi-lingual and it displays information text for all alarm and error conditions. It also displays the O2 values of all connected O2 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 on and constant sound signal	Alarm. Ambient O2 concentration level is under or over the alarm settings. The display will show "Gateway Alarm A", indicating which sensor the alarm comes from. Connected remote horn/strobes will be activated. If the O2 level is under 19.5%, evacuate the area. If the O2 level is over 23%, call service.
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 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.

8.4 O2 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 O2 level is within the alarm level settings.

8.5 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.

8.6 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.

8.7 Removal of the Mk9 unit cover

If the cover of the Mk9 central unit or the O2 sensor needs to be removed please observe the following order of screw reassembly.

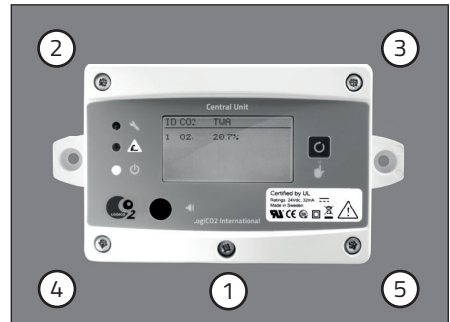
Note! When remounting the cover, be careful not to damage the reset button.



Mute/reset button

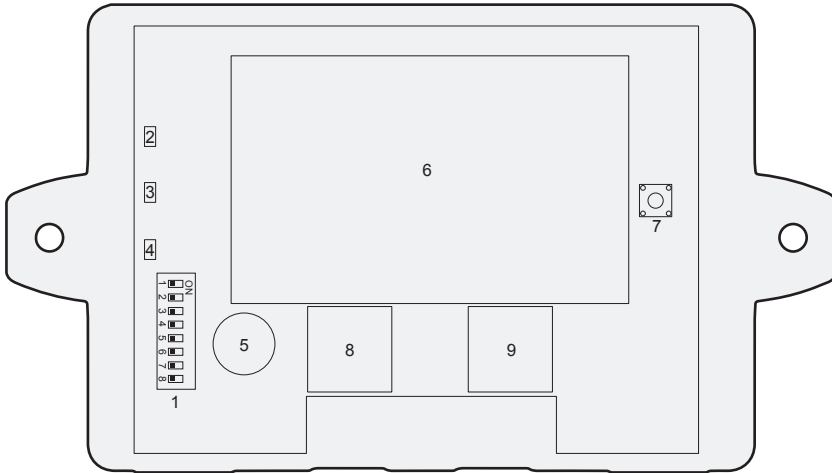


System fault indicator



Reassembling order of the screws

8.8 Mk9 Central Unit, Internal layout



Central Unit

Function/Indication

1. DIP-switch	Setting number of connected O2 sensors
2. LED yellow	Fault
3. LED red	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

8.9 DIP-switch settings

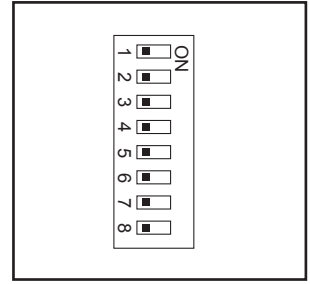
All DIP-switches are set to OFF as default.

Default functions/settings:

- Connection to one O2 sensor

The number of connected O2 sensors is set on dip 1-3.

Dip 4-8 are not used and must be in position OFF.



8.10 DIP-switch settings, Number of connected sensors

Dip 1-3. **NOTE! Dip 4-8 is not in use and must be placed in "OFF" position**

Number of connected sensors	Dip1	Dip2	Dip3	Dip 4-8 Not used	DIP-switch
1 connected sensor	OFF	OFF	OFF	OFF	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>
2 connected sensors	ON	OFF	OFF	OFF	1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>
3 connected sensors	OFF	ON	OFF	OFF	1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>
4 connected sensors	ON	ON	OFF	OFF	1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/>
5 connected sensors	OFF	OFF	ON	OFF	1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/>
6 connected sensors	ON	OFF	ON	OFF	1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/>
7 connected sensors	OFF	ON	ON	OFF	1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/>
8 connected sensors	ON	ON	ON	OFF	1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/>

8.11 Mk9 Central Unit, Display information

Display information during start-up:

Software version	Cycle/Start-up						
<pre>LogiCO2 Central unit FW: 1420*</pre> <p><i>*FW = Firmware version</i></p>	<table border="1"><thead><tr><th>ID</th><th>CO2</th><th>TWA</th></tr></thead><tbody><tr><td>1</td><td>Heating...</td><td></td></tr></tbody></table>	ID	CO2	TWA	1	Heating...	
ID	CO2	TWA					
1	Heating...						

Normal display information, One O2 sensor attached:

One O2 sensor is attached								
	<table border="1"><thead><tr><th>ID</th><th>CO2</th><th>TWA</th></tr></thead><tbody><tr><td>1</td><td>O2:</td><td>20.62%</td></tr></tbody></table>	ID	CO2	TWA	1	O2:	20.62%	
ID	CO2	TWA						
1	O2:	20.62%						

Display information during O2 alarm mode:

O2 Alarm								
	<table border="1"><thead><tr><th>ID</th><th>CO2</th><th>TWA</th></tr></thead><tbody><tr><td>1</td><td>O2</td><td>15.98%</td></tr></tbody></table>	ID	CO2	TWA	1	O2	15.98%	
ID	CO2	TWA						
1	O2	15.98%						
Gateway Alarm A								

8.11 Mk9 Central Unit, Display information, continue

Display information during error alarm mode:

Central unit display together with blinking yellow LED and intermittent internal buzzer.
Fault in the O2 sensor measuring device

Error Alarm	
ID	CO2 TWA
1	Out of range
Information text...*	

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


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

Fault message	Measures
Out of range!	O2-measuring fault.
Sensor error!	Internal fault in O2-Sensor.
Lost sensor!	Communication error. Check red cabling and connectors. Check affected O2 Sensors ID- number.

8.13 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.

O2 Safety System - Mk9
What to do in case of an ALARM?

1. Keep Calm
2. Turn off the alarming status on 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										
Overpressure - Tripped pressure switch - Contact closed signal Display: - Alarm number: O2 16 and - Alarm status: 3	ALARM TAKE PRECAUTIONS! (Oxygen concentration < 0.2)	DO NOT ENTER the risk zone. - Evaluate the area if O2 level is under 19.5%. - Call services if O2 level is over 22%.										
Contact break - Tripped safety status inhibiting - Broken contact signal Display: - Alarm number: O2 17 and - Alarm status: 3	SYSTEM FAULT	Check the network, communication cables and O2 device. If no fault is found, call service. Phone: _____										
After an alarm, always reset the alarm. Test the alarm to make sure that the components, wiring system and hardware function.	ALARM RESET ALARM TEST	Press the RESET button (Alarm Cancel) at the bottom of the keypad. Press reset button with "Testing system" in green in the keypad.										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Sensor</th> <th style="width: 90%;">Place</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>_____</td> </tr> <tr> <td>2</td> <td>_____</td> </tr> <tr> <td>3</td> <td>_____</td> </tr> <tr> <td>4</td> <td>_____</td> </tr> </tbody> </table>	Sensor	Place	1	_____	2	_____	3	_____	4	_____		
Sensor	Place											
1	_____											
2	_____											
3	_____											
4	_____											

100-013-100000

8.14 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 O2 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: IP44

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 where it is needed.

10. Environmental conditions for the system

- a) For indoor use.
- b) Calibrated for altitude up to 2 000 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 O2 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 O2 Safety System by a qualified professional service agent at least once every year.
3. The O2 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 O2 sensor and central unit housing must NEVER be opened by unauthorized personnel.
6. Cleaning is done by use of water on a moistened cloth.

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 O2 alarm, 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 O2 levels of the O2 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 O2 alarm, 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:		

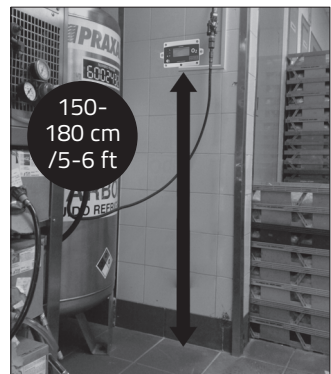
12.3 O2 Values displayed on the Central Unit

When the system is running properly, the O2 level measured by each sensor is displayed in % (actual value). The values are displayed on the second line of the display. The first character displayed is the sensor ID and the value is displayed after.

Checklist O2 Values	Value in %
Sensor 1	
Sensor 2	
Sensor 3	
Sensor 4	
Sensor 5	
Sensor 6	
Sensor 7	
Sensor 8	

12.4 Mk9 O2 Sensor check

Each sensor should be mounted at breathing height, between 150-180 cm/5-6 feet from the floor. The warning lamp should be mounted so that it can easily be seen by the restaurant personnel without entering the zone at risk. Under normal conditions the O2 value displayed should read between 20-21%.



Checklist Mk9 Sensor 1, Specifications

Sensor serial number (normally written on a sticker on the side of the sensor housing).

O2 Value on sensor

%

Checklist Mk9 Sensor 1

YES

NO

Is the green diode ON?

Is the yellow diode ON?

Is the red diode ON?

Is the horn/strobe mounted at a height of 2.0-2.4 m/80-96 inches, so that the staff can see it without any obstructions in the way?

Is there a O2 warning sign mounted next to the horn/strobe, with a telephone number to the service provider?

Is the O2 warning sign next to the horn/strobe or warning lamp mounted in a permanent way?

Is a horn/strobe installed above the sensor at a height of 2.0-2.4 m/80-96 inches?

Is there a O2 warning sign mounted next to the horn/strobe?

Is this O2 warning sign, next to the horn/strobe, mounted in a permanent way?



Horn/strobe with sign

Checklist Mk9 Sensor 2, Specifications	
Sensor serial number (normally written on a sticker on the side of the sensor housing).	
O2 Value on sensor	%

Checklist Mk9 Sensor 2	YES	NO
Is the green diode ON?		
Is the yellow diode ON?		
Is the red diode ON?		
Is the horn/strobe mounted at a height of 2.0-2.4 m/80-96 inches so that the staff can see it without any obstructions in the way?		
Is there a O2 warning sign mounted next to the horn/strobe, with a telephone number to the service provider?		
Is the O2 warning sign next to the horn/strobe mounted in a permanent way?		
Is a horn/strobe installed above the sensor at a height of 2.0-2.4 m/80-96 inches?		
Is there a O2 warning sign mounted next to the horn/strobe?		
Is this O2 warning sign, next to the horn/strobe, mounted in a permanent way?		

12.5 Installation Record

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

Installing company:	
Name of installer:	
The LogiCO2 O2 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 O2 Safety System equipment for two years from the installation date that said equipment shall be free from any defects in workmanship and materials. 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 O2), 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 warranted 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.

Contact information

Sales and service contact:

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

Company:.....

Phone:.....

Place company stamp or sticker here



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Web: www.logico2.com