Детектор диоксида углерода Ax60

Руководство по эксплуатации

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Contents

1 Safety information

Warnings, Cautions and Notes

Warnings are used in this Manual to indicate potentially hazardous situations which could result in serious injury or death. Cautions are used in this Manual to indicate potentially hazardous situations which could result in equipment damage or loss of data. Notes are used in this Manual to indicate supplementary information that is not hazard related.

WARNING: **READ THE SAFETY INFORMATION IN THIS MANUAL BEFORE INSTALLING OR USING THE Ax60.**

WARNING: **DO NOT TEST THE CO_2 ALARM WHEN IT IS CLOSE TO THE EARS. IT HAS A HIGH VOLUME SOUNDER WITH A SOUND LEVEL OF 88 DECIBELS AT A DISTANCE OF 3 METRES.**

WARNING: **DO NOT TEST THE CO_2 ALARM WHEN IT IS CLOSE TO THE EYES. IT HAS A HIGH VISIBILITY STROBE LIGHT WITH A LUMINOUS INTENSITY OF 100 CANDELA.**

WARNING: **PERFORM A RISK ASSESSMENT BEFORE INSTALLING CO_2 SENSORS AND CO_2 ALARMS. IDENTIFY POTENTIAL SOURCES OF CO_2 LEAKS AND AREAS OF HUMAN OCCUPATION. DO NOT USE A SINGLE CO_2 SENSOR TO COVER MORE THAN 80M^3. USE ADDITIONAL CO_2 SENSORS IF AN AREA HAS A COMPLEX SHAPE, PHYSICAL OBSTACLES, POOR VENTILATION OR ZONES WHERE CO_2 MAY COLLECT.**

WARNING: **INSTALL CO_2 SENSORS AT A HEIGHT OF 12" (305MM) TO 18" (457MM) ABOVE FLOOR LEVEL. THIS IS BECAUSE CO_2 IS HEAVIER THAN AIR AND MAY COLLECT AT A LOW LEVEL.**

WARNING: **DO NOT OPEN THE CENTRAL DISPLAY, CO_2 SENSOR OR CO_2 ALARM IF THEY ARE CONNECTED TO THE POWER SUPPLY. FIRST DISCONNECT AND ISOLATE THEM FROM LIVE HAZARDOUS VOLTAGE.**

2 Informations de sécurité

Avertissements, mises en garde et notes

Dans ce manuel, les avertissements sont utilisés pour indiquer les situations potentiellement dangereuses pouvant entrainer des blessures graves voire mortelles. Les mises en garde de ce manuel sont utilisées pour indiquer des situations potentiellement dangereuses pouvant endommager le matériel ou engendrer la perte de données. Les notes de ce manuel indiquent des informations supplémentaires n'impliquant aucun danger particulier.

⚠ **AVERTISSEMENT:** **LIRE LES INFORMATIONS DE SÉCURITÉ CONTENUES DANS CE MANUEL AVANT D'INSTALLER OU D'UTILISER Ax60.**

⚠ **AVERTISSEMENT:** **NE PAS TESTER LE DÉTECTEUR DE CO_2 À PROXIMITÉ DES OREILLES CAR IL POSSÈDE UN ÉMETTEUR TRÈS PUISSANT AVEC UN NIVEAU SONORE DE 88 DÉCIBELS À UNE DISTANCE DE 3 MÈTRES.**

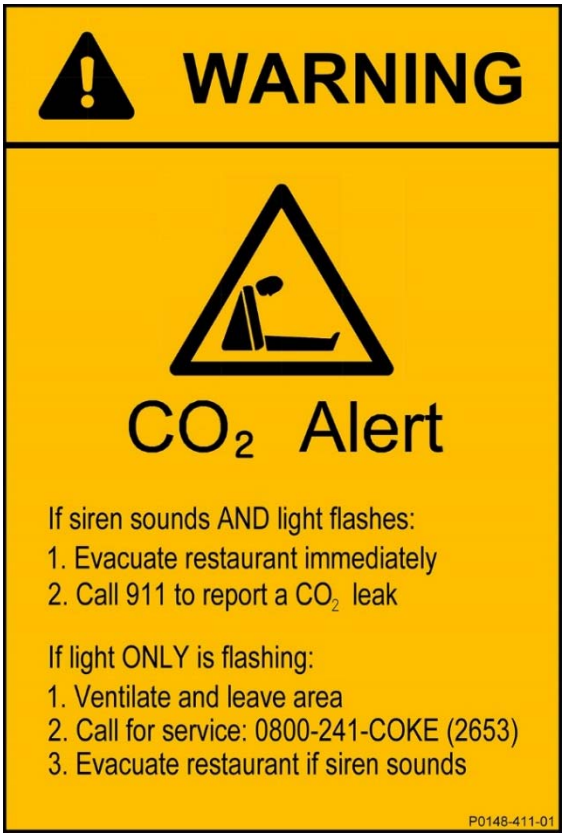
⚠ **AVERTISSEMENT:** **NE PAS TESTER LE DÉTECTEUR DE CO_2 À PROXIMITÉ DES YEUX CAR IL POSSÈDE UNE LUMIÈRE STROBOSCOPIQUE AVEC UNE INTENSITÉ LUMINEUSE DE 100 CANDELAS.**

⚠ **AVERTISSEMENT:** **EFFECTUER UNE ÉVALUATION DES RISQUES AVANT D'INSTALLER LES CAPTEURS DE CO_2 ET LE DÉTECTEUR DE CO_2. IDENTIFIER LES SOURCES POTENTIELLES DE FUITES DE CO_2 ET LES ZONES D'OCCUPATION HUMAINE. NE PAS UTILISER UN SEUL CAPTEUR DE CO_2 POUR COUVRIR UNE SURFACE DE PLUS DE 80 M^3. UTILISER DES CAPTEURS DE CO_2 SUPPLÉMENTAIRES SI UNE ZONE PRÉSENTE UNE FORME COMPLEXE, DES OBSTACLES PHYSIQUES, UNE VENTILATION DE MAUVAISE QUALITÉ OU DES ZONES OÙ LE CO_2 POURRAIT S'ACCUMULER.**

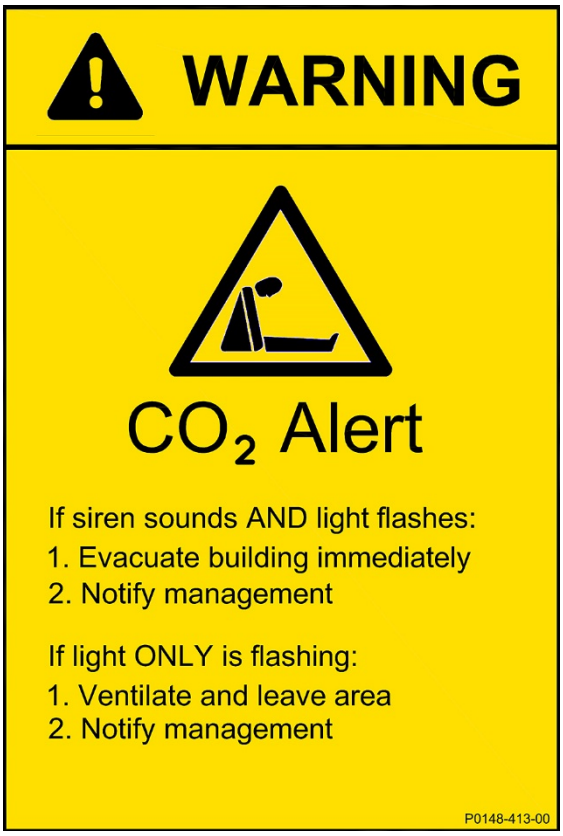
⚠ **AVERTISSEMENT:** **INSTALLER DES CAPTEURS DE CO_2 À UNE HAUTEUR COMPRISE ENTRE 30,5 CM À 45,7 CM AU-DESSUS DU SOL, CAR LE CO_2 EST PLUS LOURD QUE L'AIR ET PEUT S'ACCUMULER PRÈS DU SOL.**

⚠ **AVERTISSEMENT:** **NE PAS OUVRIR L'ÉCRAN CENTRAL, LE CAPTEUR DE CO_2 OU LE DÉTECTEUR DE CO_2 S'ILS SONT CONNECTÉS À UNE SOURCE D'ALIMENTATION. COMMENCER PAR LES DÉBRANCHER ET LES ISOLER DES DANGERS DES COMPOSANTS SOUS-TENSION.**

3 Hazard labels

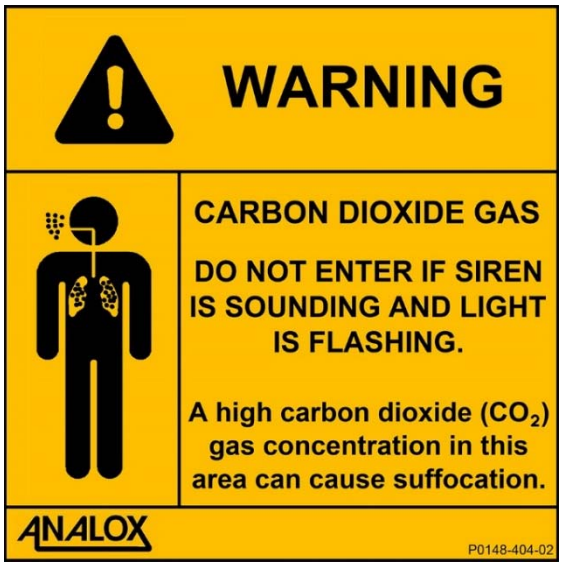


Label 1 (above left) US English; (below left) UK English; (above right) US Spanish

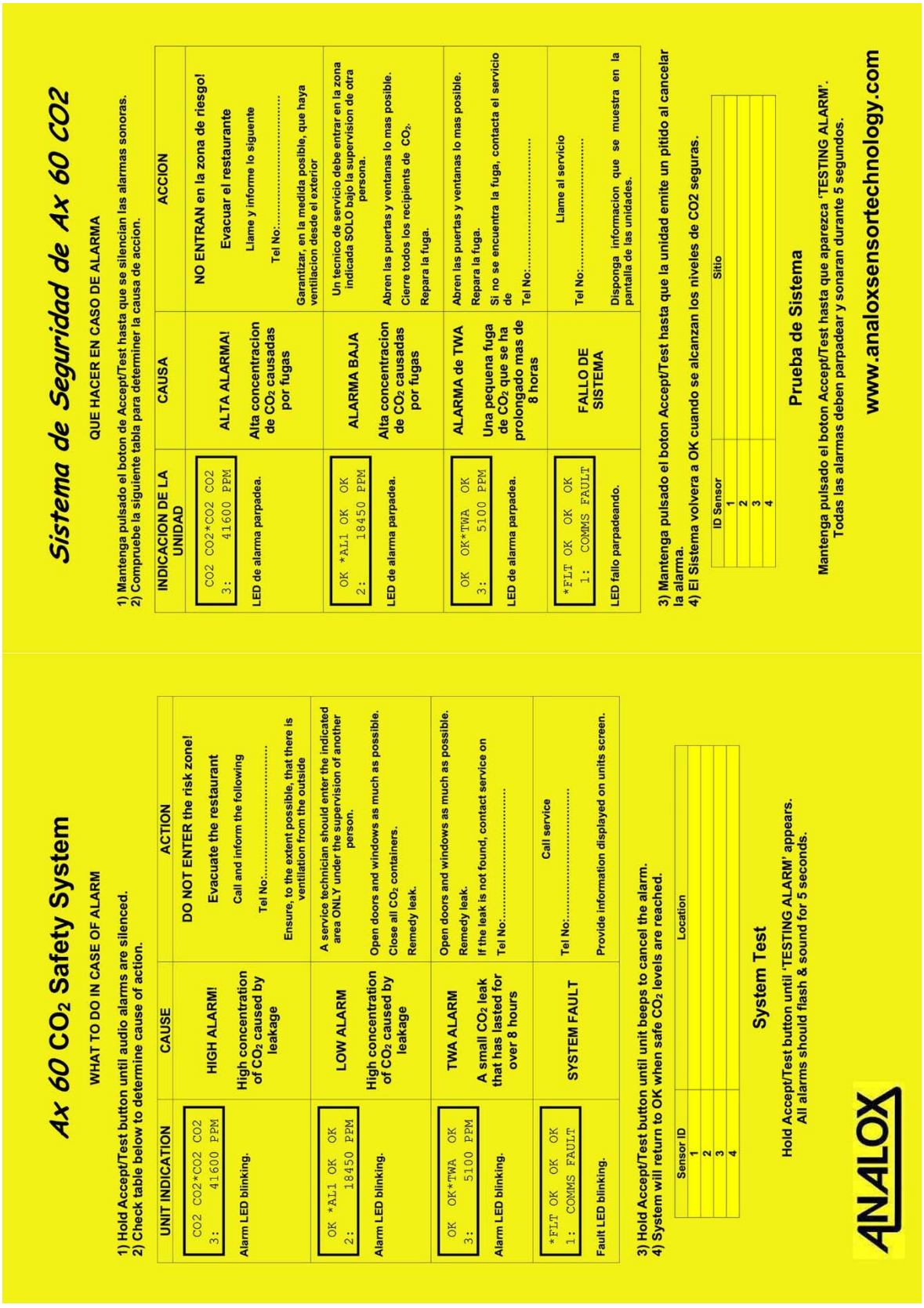


Label 1 should be wall mounted adjacent to the CO_2 Alarm.

Label 2 (below) US and UK English. This label should be wall mounted outside the alarmed area.



This label describes detailed alarm response procedures in both English and Spanish. Sensor locations and emergency telephone numbers must be added by the end user.



Ax 60 CO_2 Safety System

WHAT TO DO IN CASE OF ALARM

1) Hold Accept/Test button until audio alarms are silenced.
2) Check table below to determine cause of action.

UNIT INDICATION	CAUSE	ACTION
CO2 CO2*CO2 CO2 3: 41600 PPM Alarm LED blinking.	HIGH ALARM! High concentration of CO_2 caused by leakage	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
OK *AL1 OK OK 2: 18450 PPM Alarm LED blinking.	LOW ALARM High concentration of CO_2 caused by leakage	A service technician should enter the indicated area ONLY under the supervision of another person. Open doors and windows as much as possible. Close all CO_2 containers. Remedy leak.
OK OK*TWA OK 3: 5100 PPM Alarm LED blinking.	TWA ALARM A small CO_2 leak that has lasted for over 8 hours	Open doors and windows as much as possible. Remedy leak. If the leak is not found, contact service on Tel No:.....
*FLT OK OK OK 1: COMMS FAULT Fault LED blinking.	SYSTEM FAULT	Call service Tel No:..... Provide information displayed on units screen.

3) Hold Accept/Test button until unit beeps to cancel the alarm.
4) System will return to OK when safe CO_2 levels are reached.

Sensor ID	Location
1	
2	
3	
4	

System Test

Hold Accept/Test button until 'TESTING ALARM' appears.
All alarms should flash & sound for 5 seconds.

ANALOX

Sistema de Seguridad de Ax 60 CO2

QUE HACER EN CASO DE ALARMA

1) Mantenga pulsado el boton de Accept/Test hasta que se silencian las alarmas sonoras.
2) Compruebe la siguiente tabla para determiner la causa de accion.

INDICACION DE LA UNIDAD	CAUSA	ACCION
CO2 CO2*CO2 CO2 3: 41600 PPM LED de alarma parpadea.	ALTA ALARMA! Alta concentracion de CO_2 causadas por fugas	NO ENTRAN en la zona de riesgo! Evacuar el restaurante Llame y informe lo siguente Tel No:..... Garantizar, en la medida posible, que haya ventilacion desde el exterior
OK *AL1 OK OK 2: 18450 PPM LED de alarma parpadea.	ALARMA BAJA Alta concentracion de CO_2 causadas por fugas	Un tecnico de servicio debe entrar en la zona indicada SOLO bajo la supervision de otra persona. Abren las puertas y ventanas lo mas posible. Cierre todos los recipients de CO_2. Repara la fuga.
OK OK*TWA OK 3: 5100 PPM LED de alarma parpadea.	ALARMA de TWA Una pequena fuga de CO_2 que se ha prolongado mas de 8 horas	Abren las puertas y ventanas lo mas posible. Repara la fuga. Si no se encuentra la fuga, contacta el servicio de Tel No:.....
*FLT OK OK OK 1: COMMS FAULT LED fallo parpadeando.	FALLO DE SISTEMA	Llame al servicio Tel No:..... Disponga informacion que se muestra en la pantalla de las unidades.

3) Mantenga pulsado el boton Accept/Test hasta que la unidad emite un pitido al cancelar la alarma.
4) El Sistema volvera a OK cuando se alcanzan los niveles de CO2 seguras.

ID Sensor	Sitio
1	
2	
3	
4	

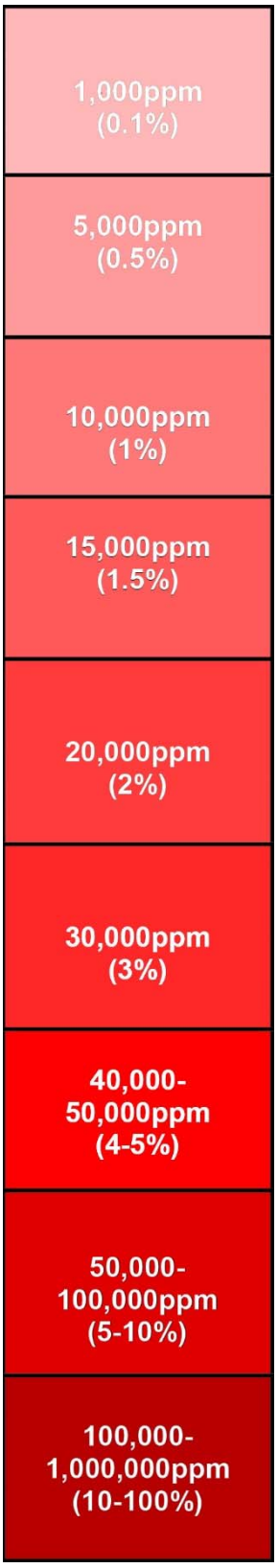
Prueba de Sistema

Mantenga pulsado el boton Accept/Test hasta que aparezca 'TESTING ALARM'.
Todas las alarmas deben parpadear y sonaran durante 5 segundos.

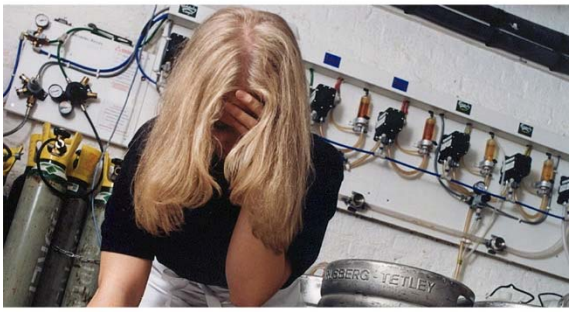
www.analoxsensortechnology.com

Label 3: This label should be wall-mounted adjacent to the Central Display

4 Carbon dioxide



1—1.5%	Slight effect on chemical metabolism after exposures of several hours.
3%	The gas is weakly narcotic at this level, giving rise to deeper breathing, reduced hearing ability, coupled with headache, an increase in blood pressure and pulse rate.
4—5%	Stimulation of the respiratory centre occurs resulting in deeper and more rapid breathing. Signs of intoxication will become more evident after 30 minutes' exposure.
5—10%	Breathing becomes more laborious with headache and loss of judgement.
10—100%	When the CO_2 concentration increases above 10%, unconsciousness will occur in less than one minute. Unless prompt action is taken, further exposure to these high levels will eventually result in death.
Adapted from:	'Carbon Dioxide Physiological Hazards', Safety Info 24/11/E, European Industrial Gases Association.



NOTE:

5 Introduction

This User Manual explains how to install, operate and maintain the Ax60 and Ax60K. It is intended for system installers and end users. For information on servicing, refer to the *Ax60 Service Manual P0159-803*, downloadable from

5.1 Ax60 overview

The Ax60 is a life-safety device that measures the concentration of carbon dioxide (CO_2) in ambient air. It offers protection for people working in the proximity of high-concentration sources of CO_2 and raises an alarm if the gas reaches unhealthy levels.

The Ax60 warns of an increase in CO_2 by offering three types of alarm. A 'TWA' alarm is triggered by a time-weighted average of 5000 ppm (0.5%) CO_2 during the previous eight hours (i.e. a measurement of the average exposure). A 'low' alarm is triggered by 15,000ppm (1.5%) CO_2. A 'high' alarm is triggered by 30,000ppm (3%) CO_2.

CO_2 has many uses in beverage delivery, food production, fire suppression systems and laboratories. It is stored in liquid form in pressurised gas bottles or solid form (dry ice). The potentially lethal effects of CO_2 are compounded by its physical properties—it is a colourless, odourless gas—and it has been known to cause suffocation without warning. Therefore there is a risk to health wherever CO_2 is stored or used in an enclosed area.

Normal fresh air contains a safe CO_2 level of 400 parts per million (0.04%). An increase to 15,000ppm CO_2 (1.5%) may cause drowsiness, headache and increased breathing. A level of 30,000ppm CO_2 (3%) may cause dizziness. If the level approaches or exceeds 100,000ppm CO_2 (10%) this may lead to unconsciousness and eventually death.

5.1.1 Hard Wired and Quick Connect options

The standard Ax60 is available as either a **Hard Wired** or a **Quick Connect** option. This choice must be made when placing the order. Hard Wired systems are intended to be integrated with the building fabric. Quick Connect systems are pre-wired with Cat5e cables fitted with colour-coded RJ45 connectors for an easier installation. Both options require installers to connect the power supply unit and optional beacon to the Central Display. The main Ax60 components are illustrated below:

Central Display
(maximum of 1 per system)

CO_2 Sensor
(maximum of 4 per system)

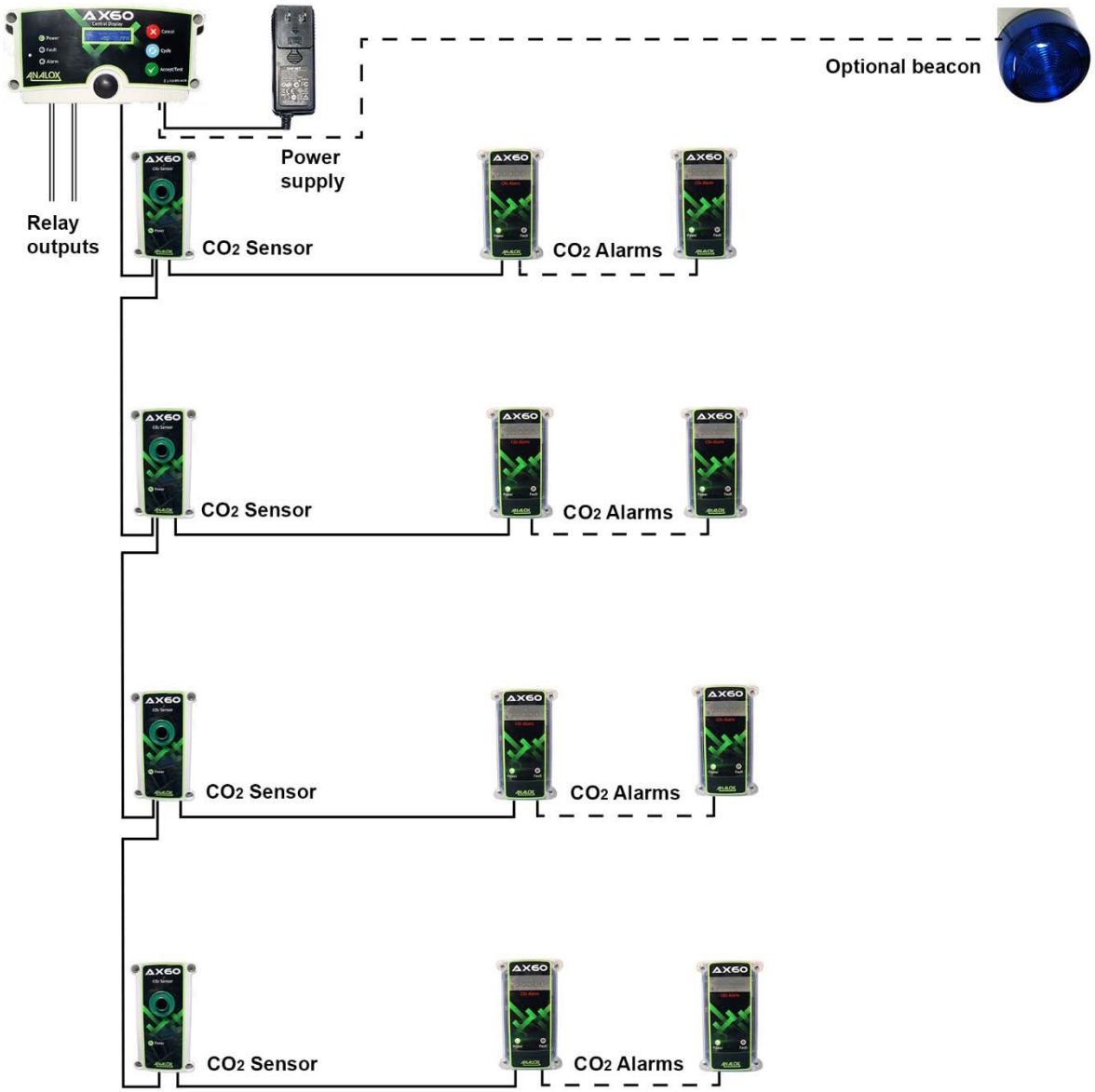
CO_2 Alarm
(maximum of 8 per system)

The standard Ax60 comprises one Central Display, up to four CO_2 Sensors and up to eight CO_2 Alarms. An optional high-visibility flashing beacon can also be connected for remote installation up to 50 metres away. This beacon acts as a highly visible but silent repeater, and is illuminated when any CO_2 Sensor triggers an alarm.

In addition, two relays are available on the Central Display for connection to an external system such as a fire alarm panel or a ventilation fan (via an external mains relay).

5.1.1.1 *Typical arrangement*

The Central Display is usually installed in a central location (e.g. a Manager's office) and connected to one or more CO_2 Sensors fitted in remote areas such as store rooms or service corridors. The CO_2 Sensors send alarm signals to one or more CO_2 Alarm units in locations where they can be observed by management or crew. The Central Display monitors the CO_2 Sensors and displays their current status and CO_2 measurements.



5.1.2 Kiosk option

A compact version of the Ax60, the Ax60K **Kiosk**, is available for outdoor kiosks and food-court restaurants. This incorporates a CO_2 Sensor, CO_2 Alarm and power supply. The CO_2 Sensor constantly monitors the air and detects increases in the level of carbon dioxide. If it detects a level of CO_2 above set limits it sends a signal to the CO_2 Alarm. The CO_2 Alarm uses a high-visibility strobe light and high volume sounder to warn of increased levels of CO_2. The warnings vary depending on the amount of CO_2 detected.

The power supply unit (PSU) supplies 24V DC to the CO_2 Sensor, which in turn supplies power to the CO_2 Alarm. The CO_2 Sensor and CO_2 Alarm are pre-wired with 2-metre connecting cables. A cable coupler is supplied to allow the cables to be connected.

6 Checklist

6.1 Packages, consumables and tools

Package contents (supplied by Analox)	**Ax60K Kiosk (K)**
	1 x CO_2 Sensor, including: • 1 x 2m factory fitted Quick Connect (QC) cable with blue RJ45 connector • 1 x 1m factory fitted power cable to power supply unit (PSU) 1 x CO_2 Alarm (additional CO_2 Alarms can be ordered) including: • 1 x 2m factory fitted QC cable with blue RJ45 connector 1 x mains power supply unit (PSU) (plug-in type complete with interchangeable heads to suit the destination country) 1 x PSU securing strip 1 x RJ45 coupler for connecting the cables 1 x hazard labels, information labels, templates and Quick Start Guide
	Ax60 Quick Connect (QC)
	1 x Central Display, including: 1 x 2m factory fitted Quick Connect (QC) cable with white RJ45 connector (for connection to CO_2 Sensor) 1 x power supply unit (PSU), either hard-wired type or plug-in type depending on the package ordered 1 x PSU securing strip (for plug-in type PSU only) 1 to 4 x CO_2 Sensors (depending on the package ordered) each with: 1 x 2m factory fitted QC cable with white RJ45 connector (for connection to the Central Display or another CO_2 Sensor) 1 x 2m factory fitted QC cable with blue RJ45 connector (for connection to CO_2 Alarm) 1 x 15m QC extension cable with 2 x white RJ45 connectors (for larger installations) 1 to 8 x CO_2 Alarms (depending on the package ordered) each with: 1 x 2m factory fitted QC cable with blue RJ45 connector (for connection to CO_2 Sensor) 1 x 15m factory fitted QC extension cable with 2 x white RJ45 connectors (for larger installations) Selection of RJ45 couplers and RJ45 splitters 1 x high-visibility optional beacon (if ordered) 1 x hazard labels, information labels, templates and Quick Start Guide
	Ax60 Hard Wired (HW)
	1 x Central Display 1 x power supply unit (PSU), either hard-wired type or plug-in type depending on the package ordered 1 x PSU securing strip (for plug-in type PSU only) 1 to 4 x CO_2 Sensors (depending on the package ordered) 1 to 8 x CO_2 Alarms (depending on the package ordered) 1 x high-visibility optional beacon (if ordered) Self-adhesive foam gaskets for use in rear-entry cable installations 1 x hazard labels, information labels, templates and Quick Start Guide
Consumables (depending on package)	Cat5e UTP 24AWG PVC cable, length to suit installation M13 cable glands 5—7mm (nylon), quantity to suit installation Wall plugs and screws (fixing kits), quantity to suit installation
Tools required (NOT SUPPLIED)	PZ1 Pozi screwdriver; 3mm flat blade screwdriver Cat5e cable jacket stripper; 24AWG wire stripper Drill and drill bits for wall plugs; spirit level, tape measure, ruler Small hammer, centre punch and pliers for removing knockouts

7 Installation

NOTE: WHEN THE INSTALLATION IS COMPLETE, FIX THE SUPPLIED HAZARD WARNING/INFORMATION LABELS ON THE APPROPRIATE WALLS AND ENSURE THE LABELS ARE READ AND UNDERSTOOD BY ALL STAFF.

7.1 Kiosk (K)

7.1.1 CO_2 Sensor

Retain the clear protective film on the fascia until the installation is complete. Using the supplied paper template mark out the wall-fixing position for the CO_2 Sensor ensuring it is level. Drill holes in wall, install plugs/ dowels then fix the CO_2 Sensor in position.

WARNING: CARBON DIOXIDE GAS (CO_2) IS HEAVIER THAN AIR AND SHOULD BE MONITORED FROM A LOW HEIGHT. YOU SHOULD THEREFORE INSTALL THE CO_2 SENSOR AT A HEIGHT OF 12–18" (305–457MM) ABOVE THE FLOOR LEVEL.

7.1.2 CO_2 Alarm

WARNING: SOME KIOSKS AND FOOD COURT RESTAURANTS MAY BE EXPOSED TO HIGH-VOLUME BACKGROUND NOISE. INSTALL THE CO_2 ALARM SO THAT IT IS AUDIBLE & VISIBLE FROM ALL ACCESS AND EGRESS POINTS AND BUSY AREAS.

Retain the clear protective film on the fascia until the installation is complete. Using the supplied paper template mark out the wall-fixing position for the CO_2 Alarm ensuring it is level. Drill holes in wall, install plugs/ dowels then fix the CO_2 Alarm in position.

7.1.3 Cables

Route the pre-wired cables from the CO_2 Sensor and CO_2 Alarm securely along the wall. Fit the cable coupler then connect the cables together. Then route the pre-wired cable from the PSU securely along the wall.

7.1.4 Power supply

Fit the appropriate interchangeable plug head for your power socket. Ensure the power supply is off. Insert the plug into the power socket.

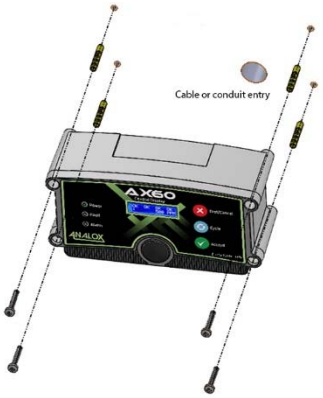
Mark out the wall-fixing position for the PSU securing strip. Drill holes in the wall and install wall plugs/dowels. Fix the securing strip firmly over the PSU.

7.2 Hard Wired (HW) and Quick Connect (QC)

CAUTION: SOME ENCLOSURES ARE SUPPLIED UNFASTENED WITH FIXING SCREWS LOOSE. DO NOT OVER-TIGHTEN THE SCREWS WHEN FASTENING THE LIDS ON.

7.2.1 Central Display

Retain the clear protective film on the fascia until the installation is complete. Using the supplied paper template mark out the wall-fixing position ensuring the Central Display is level. If you are installing cable through the rear of the enclosure, remove the knockout then fit a foam gasket over its aperture to provide a seal against ingress.

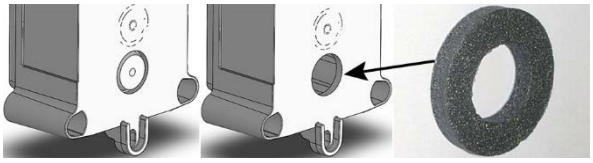


CAUTION: TO PREVENT DAMAGE TO THE FASCIA AND PRINTED CIRCUIT BOARD (PCB), REMOVE THEM FROM THE ENCLOSURE BEFORE REMOVING KNOCKOUT.

Drill holes in the wall then fit wall plugs/dowels. Fasten the lid of the enclosure to the base then fix the Central Display in position. Install the cables in position and cut them to length (HW).

Removing the knockout

To remove the knockout, place the enclosure face down on a solid, non-slip surface. Tap the knockout firmly using a hammer and punch. Use pliers to remove sharp edges from the aperture.



7.2.2 CO_2 Sensor

Retain the clear protective film on the fascia until the installation is complete. Using the supplied paper template mark out the wall-fixing position ensuring the CO_2 Sensor is level. (If installing a cable through the rear, remove the knockout.)

WARNING: CARBON DIOXIDE GAS (CO_2) IS HEAVIER THAN AIR AND SHOULD BE MONITORED FROM A LOW HEIGHT. YOU SHOULD THEREFORE INSTALL THE CO_2 SENSOR AT A HEIGHT OF 12–18" (305–457MM) ABOVE THE FLOOR LEVEL.

Drill holes in wall, install wall plugs/dowels then fit the CO_2 Sensor. Install the cables in position and cut them to length (HW).

7.2.3 CO_2 Alarm

WARNING: LOCATE THE CO_2 ALARM SO AS TO PROVIDE COVERAGE FOR ACCESS AND EGRESS POINTS AND BUSY AREAS.

Retain the clear protective film on the fascia until the installation is complete.

Using the supplied paper template mark out the wall-fixing position ensuring the CO_2 Alarm is level. (If installing a cable through the rear, remove the knockout.)

Drill holes in wall, install wall plugs/dowels then fit the CO_2 Sensor. Install the cables in position and cut them to length (HW).

8 Connection

8.1 Kiosk (K)

The Ax60K Kiosk option is pre-wired with Cat5e cables and colour-coded RJ45 connectors to allow easy connection. The Kiosk components are shown below.

CO_2 Sensor, pre-wired cables and PSU

CO_2 Alarm, pre-wired cable and coupler

8.1.1 Typical layouts

1 x CO_2 Sensor; 1 x CO_2 Alarm; 1 x PSU

1 x CO_2 Sensor; 2 x CO_2 Alarms; 1 x PSU

8.2 Quick Connect (QC)

The Ax60 Quick Connect option is pre-wired with Cat5e cables and colour-coded RJ45 connectors for easy connection. The Quick Connect components are shown below.

8.2.1 Central Display

Pre-wired cable for connection to CO_2 Sensor(s)

The Quick Connect Central Display is pre-fitted with two cable glands (see left). The gland on the right has a 2-metre cable fitted with a white RJ45 connector for connection to a CO_2 Sensor.

The empty gland on the left is for the power supply unit cable. A third gland must be fitted if the optional beacon is to be installed. Both of these cables must be fitted by the installer.

If the built-in relays R1 and R2 are being used, another knockout should be removed from the enclosure and an additional gland should be fitted for the relay cables.

8.2.2 CO_2 Sensor

Pre-wired cables for connection to the CO_2 Alarm (left), and to the Central Display (right)

The Quick Connect CO_2 Sensor is fitted with two cable glands and is pre-wired with two cables:

- 2-metre cable with white RJ45 connector for connection to the Central Display
- 2-metre cable with blue RJ45 connector for connection to the CO_2 Alarm(s)

The cable with the white RJ45 connector is connected to the Central Display via a coupler.

The cable with the blue RJ45 connector should be connected to the CO_2 Alarm (which also has a blue connector) via an RJ45 coupler (or an RJ45 splitter if there is more than one CO_2 Alarm).

8.2.3 CO_2 Alarm

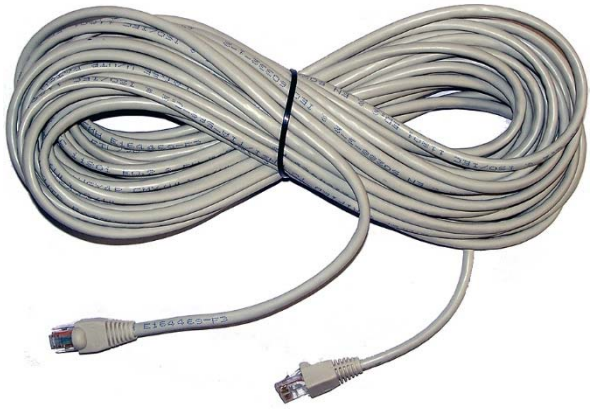
Pre-wired cable for connection to a CO_2 Sensor

The Quick Connect CO_2 Alarm is fitted with one cable gland and a 2-metre cable with a blue RJ45 connector. This should be connected to the CO_2 Sensor which is associated with the Alarm, via an RJ45 coupler (or an RJ45 splitter if there is more than one CO_2 Alarm).

8.2.4 Cables and connectors

The couplers, splitters, connectors and extension cables supplied with the Ax60 Quick Connect are shown below. These provide enough flexibility for a typical installation.

CAUTION: ENSURE THAT THE MAXIMUM CABLE LENGTH BETWEEN THE CENTRAL DISPLAY AND THE FINAL SENSOR IS NOT MORE THAN 100 METRES.



Extension cables

The extension cables supplied with the Quick Connect are 15 metres long. The cables are fitted with a white RJ45 connector at each end.

One 15m extension cable is supplied with each CO_2 Sensor. One 15m extension cable is supplied with each CO_2 Alarm.

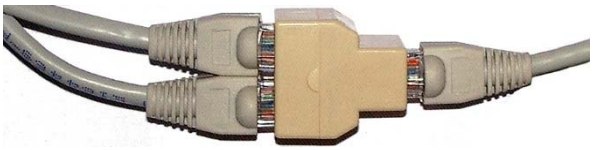
The extension cables are used for installations where a greater cable length is required.

The extension cables may be connected to the 2-metre pre-fitted enclosure cables, using the supplied RJ45 couplers and RJ45 splitters.

RJ45 coupler

The supplied RJ45 coupler (left) is used to connect two white RJ45 connectors. White RJ45 connectors are used for all *Central Display-to-CO_2 Sensor* and *CO_2 Sensor-to-CO_2 Sensor* connections.

The same RJ45 coupler is used to connect the blue RJ45 connectors which are used for all *CO_2 Sensor-to-CO_2 Alarm* connections.

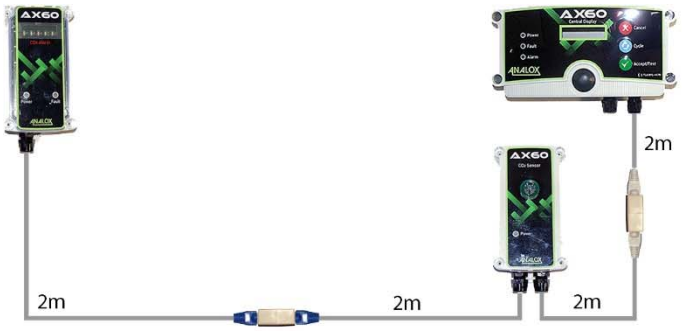


RJ45 splitter

The RJ45 splitter (left) is used to connect two CO_2 Sensors or two CO_2 Alarms on a common cable.

8.2.5 Typical installations

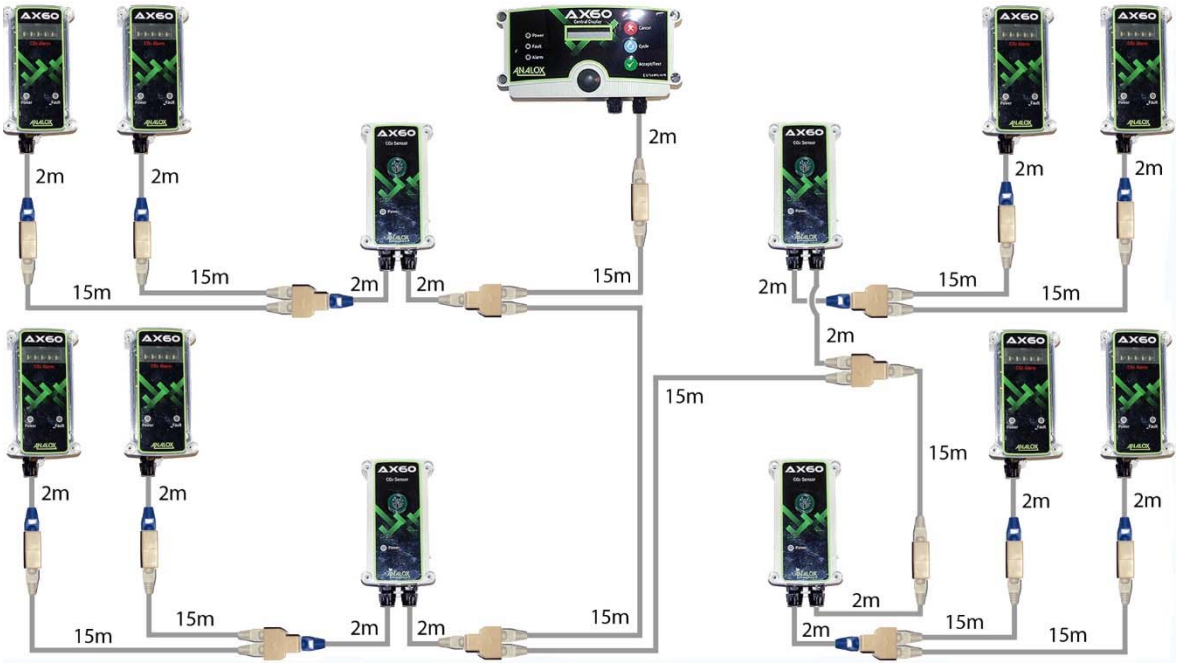
In its simplest form a Quick Connect Ax60 system could incorporate a Central Display, one CO_2 Sensor and one CO_2 Alarm. A larger Ax60 system could incorporate a Central Display, four CO_2 Sensors and eight CO_2 Alarms. Some typical layouts are shown below.



1 x Central Display; 1 x CO_2 Sensor; 1 x CO_2 Alarm

1 x Central Display; 1 x CO_2 Sensor; 2 x CO_2 Alarms

1 x Central Display; 2 x CO_2 Sensors; 4 x CO_2 Alarms



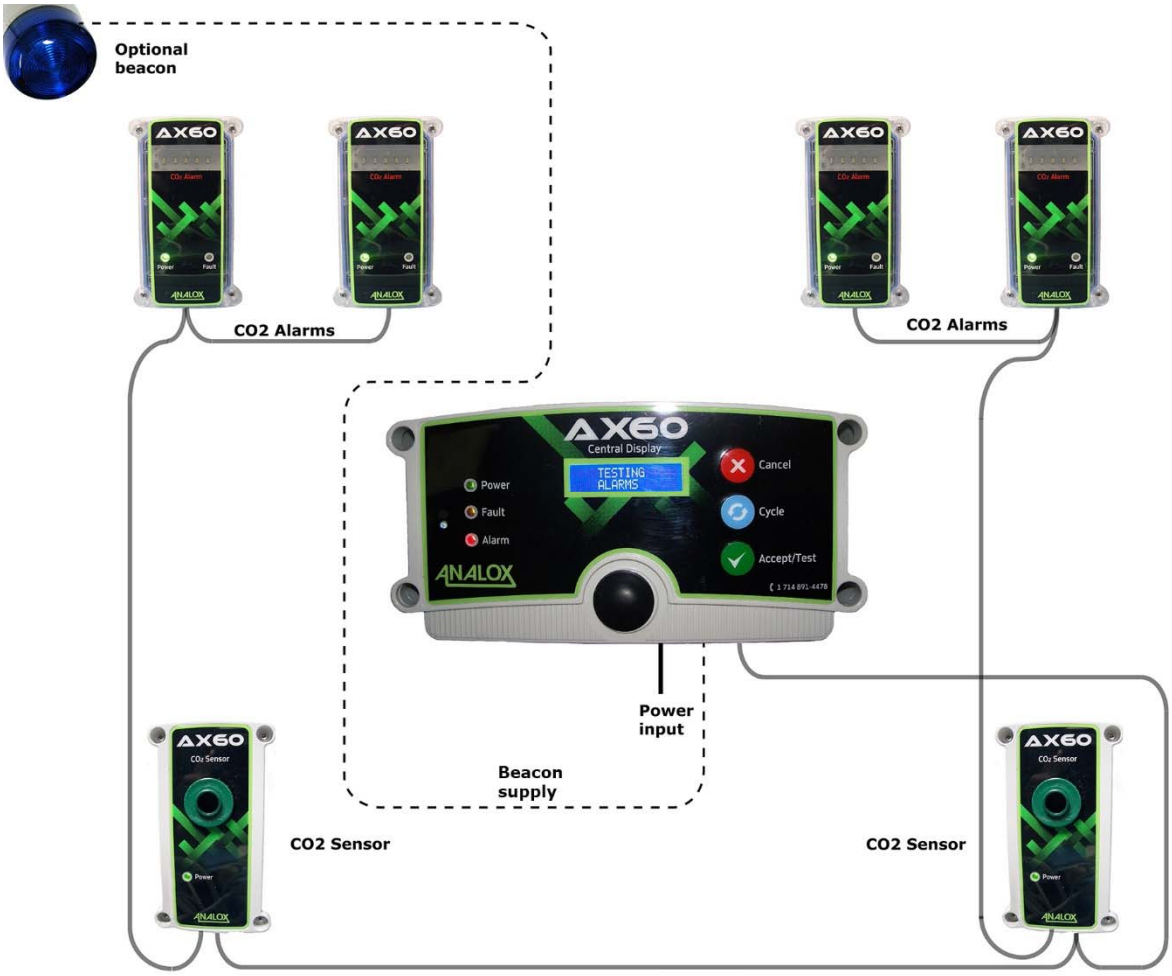
1 x Central Display; 4 x CO_2 Sensors; 8 x CO_2 Alarms

The 2-metre cables shown in the diagrams above are pre-fitted to the enclosures. The supplied 15-metre cables, RJ45 couplers and RJ45 splitters allow the system to be customised to suit the building. Other system layouts are possible, providing that the maximum number of CO_2 sensors (4) and CO_2 alarms (8) are not exceeded.

NOTE: FOR INFORMATION ON CONNECTING THE POWER SUPPLY UNIT, OPTIONAL BEACON AND RELAYS, REFER TO SECTION 8.3 HARD WIRED.

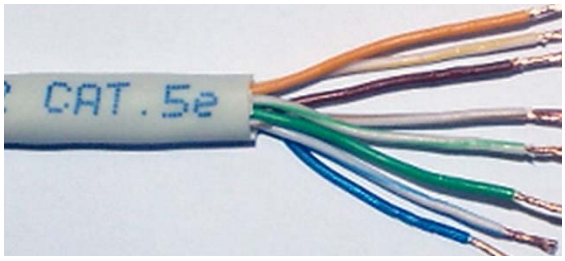
8.3 Hard Wired (HW)

CAUTION: THE RECOMMENDED CABLE ARRANGEMENT IS THE DAISY CHAIN AS SHOWN BELOW. DO NOT USE ANY OTHER CONFIGURATION.



8.3.1 Cable requirements

Cable type	Wire colour	Abbreviation
Cat5e, UTP, 24AWG, PVC	Orange	ORG
	Orange and white	ORG/WHT
	Brown	BRN
	Brown and white	BRN/WHT
	Green and white	GRN/WHT
	Green	GRN
	Blue and white	BLU/WHT
	Blue	BLU

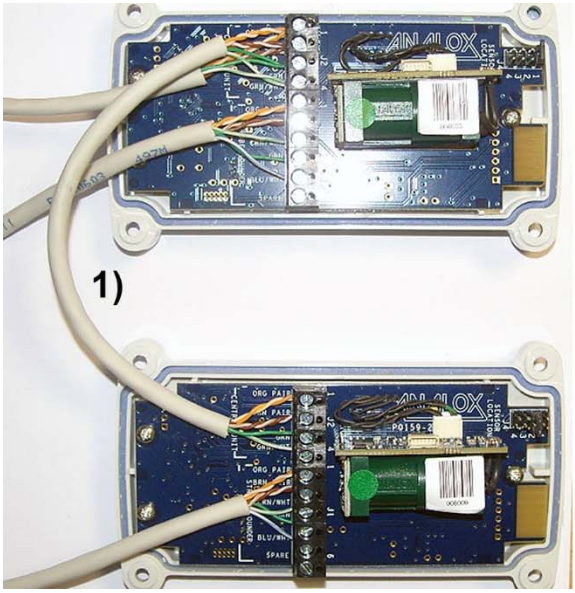


If you install cables through walls, remove the knockout and fit a foam gasket to maintain ingress protection (see below left). If you install cables along wall surfaces, fit cable glands (below right).

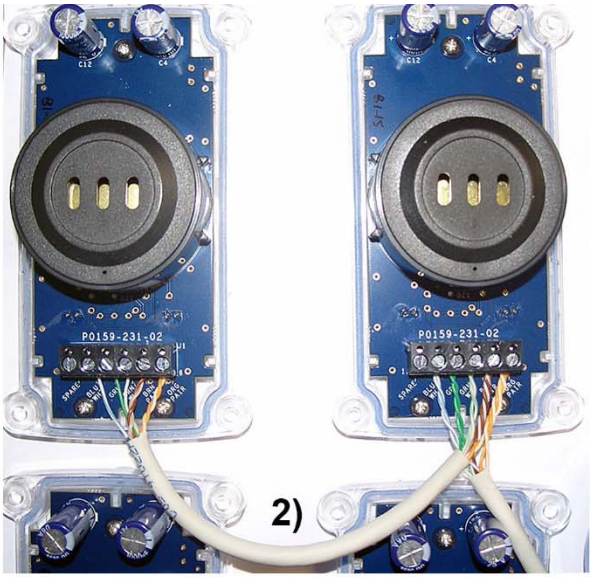
CAUTION: ENSURE THAT THE MAXIMUM CABLE LENGTH BETWEEN THE CENTRAL DISPLAY AND THE FINAL SENSOR IS NOT MORE THAN 100 METRES.

8.3.2 Sensors and Alarms

The recommended cable arrangement for connecting the CO_2 Sensors and CO_2 Alarms is shown below. For the purposes of this example the enclosures have been removed and the cables have been shortened for convenience. The Central Display is not shown.

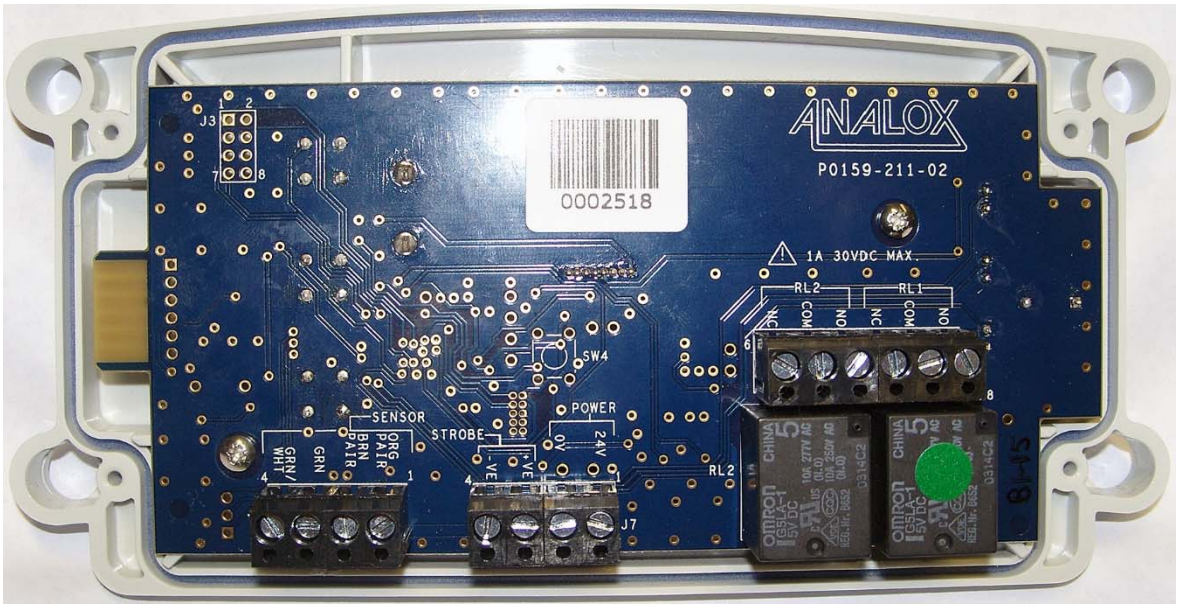


1) CO_2 Sensors connected via daisy-chain



2) CO_2 Alarms connected via daisy-chain

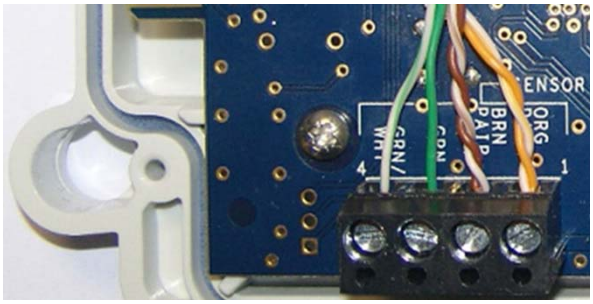
8.3.3 Central Display terminals



CO_2 Sensor	Beacon	Power	Relay 2 Relay 1
(see section 8.3.4)	(see section 8.3.6)	(see section 8.3.5)	SPDT relays rated for 30Vdc, 1A max (refer to the Ax60 Service Manual for further information on using Relays)

⚠ **WARNING:** **TO COMPLY WITH THE SAFETY STANDARDS IN SECTION 16, CIRCUITS CONNECTED TO RELAYS 1 & 2 MUST BE PROTECTED WITH DOUBLE/REINFORCED INSULATION FROM THE MAINS.**

8.3.4 Central Display to CO_2 Sensor



Cable connections from left to right:
GRN/WHT (RS485 A, single cable)
GRN (RS485 B, single cable)
BRN & BRN/WHT (supply negative, two cables twisted together)
ORG & ORG/WHT (supply positive, two cables twisted together)

NOTE: THE BLUE AND BLUE/WHITE CABLES CAN BE REMOVED (CUT OFF).

8.3.5 Central Display to power supply unit (PSU)

Two types of PSU are available, to suit different types of installation. One is a plug-in type, the other is a hard-wired type for connection to a fixed power supply (fused spur).

CAUTION: THE HARD-WIRED POWER SUPPLY UNIT SHOULD BE CONNECTED TO A 3A FUSED SPUR, TO ENSURE THAT THE PSU IS PROTECTED FROM POTENTIAL DAMAGE.

PSU, plug-in type (supplied with plug for specific country)

PSU, hard-wired type (for connection to a fixed power supply)

The plug-in PSU is supplied with a securing strip, wall plugs and screws to reduce risk of accidental disconnection or tampering

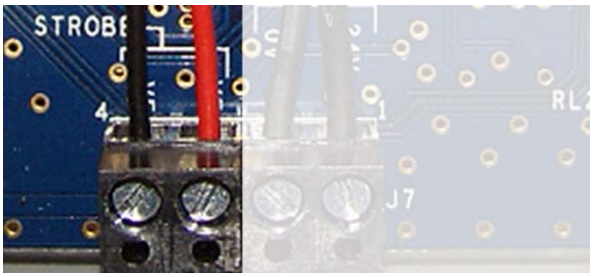
WARNING: THE POSITIVE AND NEGATIVE POWER CABLES ARE IDENTIFIED DIFFERENTLY DEPENDING ON THE TYPE OF PSU SUPPLIED. READ THE INSTRUCTIONS BELOW BEFORE INSTALLING THE PSU CABLE.

Plug-in type PSU cable identification
Black with stripe: Positive (24V)
Black with print: Negative (0V)

Hard wired type PSU cable identification
Black with stripe: Negative (0V)
Black with print: Positive (24V)

NOTE: SURPLUS CABLE CAN BE SHORTENED OR STORED IN THE CENTRAL DISPLAY.

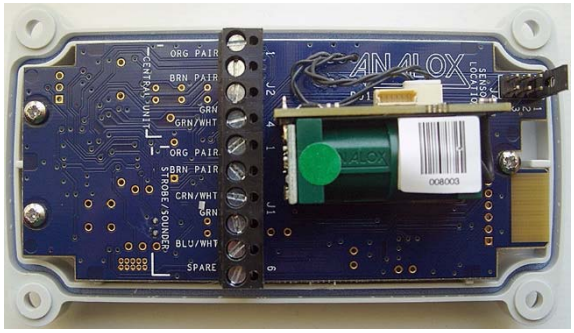
8.3.6 Central Display to optional beacon (labelled 'STROBE' on the PCB)



Cable connections from left to right:
BLK (0V supply to optional beacon)
RED (24V supply to optional beacon)

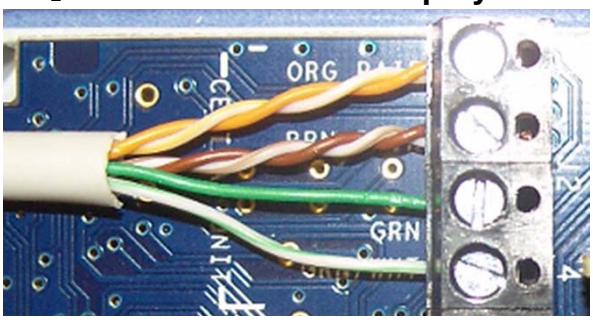
CAUTION: CABLE COLOURS BETWEEN THE CENTRAL DISPLAY AND BEACON MAY VARY. THE INSTALLER MAY USE CAT5E CABLE IF PREFERRED, PROVIDING TWISTED PAIRS ARE USED. 15m CABLE IS SUPPLIED AS STANDARD.

8.3.7 CO_2 Sensor



- **NOTE: THE FOUR UPPER SCREW TERMINALS ARE FOR CONNECTING THE CO_2 SENSOR TO THE CENTRAL DISPLAY. ON THE PCB THESE TERMINALS ARE LABELLED 'CENTRAL UNIT'.**
- **NOTE: THE SIX LOWER SCREW TERMINALS ARE FOR CONNECTING THE CO_2 SENSOR TO THE CO_2 ALARM. ON THE PCB THESE TERMINALS ARE LABELLED 'STROBE/SOUNDER'.**

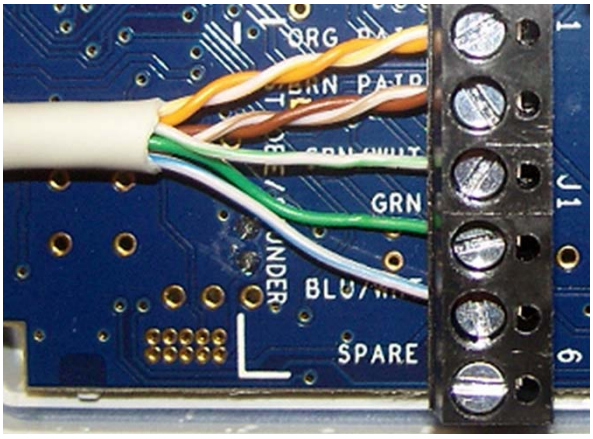
8.3.8 CO_2 Sensor to Central Display



Cable connections from top to bottom:
ORG & ORG/WHT (supply positive, two cables twisted together)
BRN & BRN/WHT (supply negative, two cables twisted together)
GRN (RS485 B, single cable)
GRN/WHT (RS485 A, single cable)

- **NOTE: THE BLUE AND BLUE/WHITE CABLES CAN BE REMOVED (CUT OFF).**
- **NOTE: SENSOR 2 CABLE SHOULD BE DAISY-CHAINED FROM SENSOR 1 TERMINALS.**

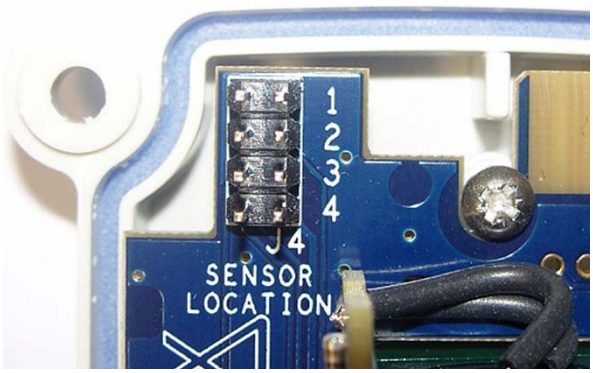
8.3.9 CO_2 Sensor to CO_2 Alarm



Cable connections from top to bottom:
ORG & ORG/WHT (supply positive, two cables twisted together)
BRN & BRN/WHT (supply negative, two cables twisted together)
GRN/WHT (alarm strobe driver, single cable)
GRN (alarm sounder driver, single cable)
BLU/WHT ('Fault' LED driver, single cable)

- **NOTE: THE BLUE CABLE CAN BE REMOVED (CUT OFF).**

8.3.10 CO_2 Sensor jumper locations

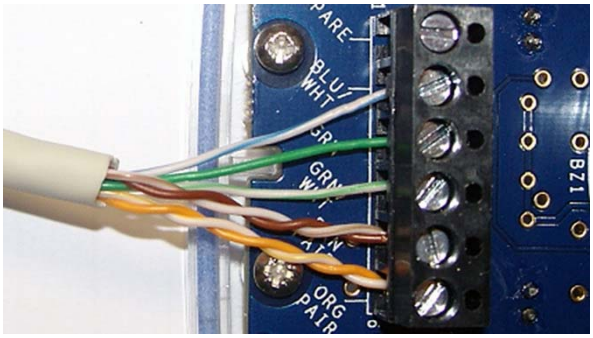


Each CO_2 Sensor PCB contains a SENSOR LOCATION selector with 4 jumper links. One jumper link is provided with each sensor—an example is shown here on the right: 
By default this jumper link is fitted in SENSOR LOCATION 1.
Each CO_2 Sensor must be given a different SENSOR LOCATION by moving its jumper link.
For example, in a 2-sensor system, one sensor's jumper link must be set to SENSOR LOCATION 1, and the other sensor's jumper link must be set to SENSOR LOCATION 2.

8.3.11 CO_2 Alarm

NOTE: ALL CO_2 ALARMS ASSOCIATED WITH A COMMON SENSOR SHOULD BE CONNECTED VIA A DAISY-CHAIN CABLE ARRANGEMENT. FOR EXAMPLE, IF SENSOR 1 IS REQUIRED TO DRIVE TWO ALARMS, ONE CABLE SHOULD BE CONNECTED BETWEEN CO_2 SENSOR 1 AND CO_2 ALARM 1; AND ONE CABLE SHOULD BE CONNECTED BETWEEN CO_2 ALARM 1 AND CO_2 ALARM 2 (SEE THE EXAMPLE IN SECTION 8.3.2).

8.3.12 CO_2 Alarm to CO_2 Sensor



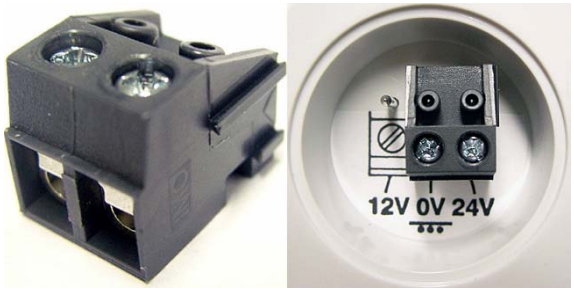
Cable connections from top to bottom:
BLU/WHT (fault LED driver, single cable)
GRN (alarm sounder driver, single cable)
GRN/WHT (alarm strobe driver, single cable)
BRN & BRN/WHT (supply negative, two cables twisted together)
ORG & ORG/WHT (supply positive, two cables twisted together)

NOTE: THE BLUE CABLE CAN BE REMOVED (CUT OFF).

8.3.13 Optional beacon

CAUTION: ENSURE THE TERMINAL BLOCK ON THE UNDERSIDE OF THE BEACON IS FITTED TO THE 0V AND THE 24V PINS. THEN ENSURE THAT THE POWER CABLES ARE CONNECTED TO THE 0V AND THE 24V SCREW TERMINALS.

Black cable: 0V supply to Central Display
Red cable: 24V supply to Central Display



(left) The beacon terminal block. Ensure this is fitted on the 0V and 24V terminals (right)

8.3.14 Beacon locking mechanism

The beacon has a locking mechanism to discourage tampering. To lock the beacon onto its base, locate the spigots in position then twist the beacon clockwise. To unlock the beacon, prise open the locking clip as shown below and twist the beacon anti-clockwise.

9 Operation (Kiosk)

9.1 Powering on

[1] Ensure the components are correctly installed.

[2] Switch on the mains power at the wall socket. The Ax60K powers on and runs a 5-second self-test, during which:

– the CO_2 Alarm indicators illuminate
– the CO_2 Sensor indicators illuminate
– the CO_2 Sensor internal buzzer sounds

Following a successful power-on, the CO_2 Sensor begins continuously monitoring the air for CO_2. During normal operation the status of the system is indicated as shown below:

Normal operation with CO_2 at a safe level	**CO_2 Sensor indication:**	Power indicator flashes once per second. Alarm indicator is off. Buzzer is off.
	CO_2 Alarm indication:	Power indicator is on. Fault indicator is off. Strobe light is off. Sounder is off.

9.2 Understanding alarms

The hazard warning/information labels explain what to do in the event of an alarm. The alarms vary depending on the severity of the CO_2 level. Alarms are indicated as follows:

TWA alarm (0.5% over previous 8 hours)	**CO_2 Sensor indication:**	Power indicator flashes once per second. Alarm indicator flashes ¼ second on, 1¾ seconds off. Buzzer sounds in parallel.
	CO_2 Alarm indication:	Power indicator is on. Fault indicator is off. Strobe light is off. Sounder is off.
Low alarm (1.5%)	**CO_2 Sensor indication:**	Power indicator flashes once per second. Alarm indicator flashes 1 second on, 1 second off. Buzzer sounds in parallel.
	CO_2 Alarm indication:	Power indicator is on. Fault indicator is off. Strobe light flashes 1 second on, 1 second off. Sounder is off.
High alarm (3%)	**CO_2 Sensor indication:**	Power indicator flashes once per second. Alarm indicator flashes ⅛ second on, ⅛ second off. Buzzer sounds in parallel.
	CO_2 Alarm indication:	Power indicator is on. Fault indicator is off. Strobe light and sounder are ½ second on, ½ second off.

9.2.1 Testing alarms

[1] Press and hold down the Accept/Test button for 5–10 seconds. The Ax60K runs a 5-second alarm test, during which:

– the CO_2 Alarm indicators illuminate
– the CO_2 Alarm strobe light illuminates
– the CO_2 Alarm sounder operates
– the CO_2 Sensor indicators illuminate
– the CO_2 Sensor internal buzzer operates

[2] Either press and hold down Accept/Test to stop the alarm test or wait 5 seconds for the alarm test to stop automatically.

9.2.2 Acknowledging/clearing alarms

Press and hold Accept/Test until the buzzer sounds once; the alarm is now acknowledged. The buzzer and sounder are muted and the strobe stays on until the alarm is cleared (it clears automatically as soon as the CO_2 level reduces to below the alarm threshold).

CAUTION: THE Ax60K RETAINS ITS CURRENT ALARM STATE, EVEN AFTER A POWER OUTAGE. IF AN ALARM IS NOT ACKNOWLEDGED BEFORE THE Ax60K IS POWERED OFF, IT RETURNS TO ALARM CONDITION WHEN POWERED ON.

9.3 Controls and indicators

CO_2 Sensor

❶ Power indicator (green LED)

If the **Power** indicator flashes once per second:

- CO_2 Sensor is receiving power and operating correctly

If the **Power** indicator is off:

- CO_2 Sensor is not receiving power, **or** the CO_2 Sensor has a fault

If the **Power** indicator is continuously on:

- CO_2 Sensor has a fault

❷ Alarm indicator (red LED)

The **Alarm** indicator has three flash patterns, one for each type of alarm:

- ¼ second on, 1¾ seconds off = TWA alarm (0.5% CO_2 average over 8 hours).
- 1 second on, 1 second off = 1.5% CO_2.
- ⅛ second on, ⅛ second off = 3% CO_2.

If the **Alarm** indicator is continuously on:

- the alarm is acknowledged; the alarm will clear when the CO_2 level reduces.

❸ Accept/Test button

To use the **Accept/Test** button, press it firmly and hold it down for a couple of seconds. When you release the button, the buzzer will sound once.

❹ Internal buzzer

The internal buzzer sounds briefly when you press **Accept/Test**, continuously for 5 seconds when the Ax60K powers up, once per second to show a fault, and in parallel with the alarms.

❺ Sensor opening

The sensor opening allows air to flow across the carbon dioxide detector. The sensor opening must be kept clean and free from obstructions.

CO_2 Alarm

❶ Power indicator (green LED)

If the **Power** indicator is on (not flashing):

- CO_2 Alarm is receiving power

  NOTE: The CO_2 Alarm receives its power from the CO_2 Sensor.

If the **Power** indicator is off:

- CO_2 Alarm is not receiving power, **or**
- CO_2 Alarm has a fault

  NOTE: If the CO_2 Sensor has a fault, the CO_2 Alarm Fault indicator LED will flash.

❷ Fault indicator (yellow LED)

If the **Fault** indicator is off:

- CO_2 Sensor is functioning correctly

If the **Fault** indicator flashes once per second:

- CO_2 Sensor has a fault

  NOTE: The Fault indicator LED does not mean there is a fault on the CO_2 Alarm, it means there is a fault on the CO_2 Sensor.

❸ Strobe light

The strobe light is a very bright, visible alarm.

NOTE: The strobe window can be supplied in white, blue or red.

The strobe light has two flash patterns:

- 1 second on, 1 second off = 1.5% CO_2.
- ½ second on, ½ second off = 3% CO_2.

❹ Sounder

The sounder is a high-volume audible alarm.

If sounder is ½ second on, ½ second off, the CO_2 Sensor has triggered a high alarm (3%).

10 Operation (HW & QC)

10.1 Central Display

The Central Display is used to configure and operate the system. The three buttons on the front panel allow access to the software functions. The three indicator lamps and the internal buzzer provide information about the system status, as described below.

10.1.1 Indicators and buzzer

Power	Green indicator lamp. Flashes once per second to indicate that the power is on and the unit is operating.
Fault	Yellow indicator lamp. Flashes once per second if there is a fault. Accompanied by a fault message (FLT or COMMS FAULT) and buzzer once per second.
Alarm	Red indicator lamp. Flashes rapidly when alarm is triggered. Accompanied by an alarm message (TWA, AL1 or CO2) and rapid operation of the buzzer.
Buzzer (the small circular aperture on the left of the indicators)	Buzzer sounds briefly each time a button is pressed. Sounds continuously for five seconds when using the TESTING ALARMS function. It sounds rapidly on and off when an alarm is triggered, or once per second for a fault.

10.1.2 Control buttons

Cancel	To use the **Cancel** button, press it firmly then release it quickly. The buzzer will sound briefly. Press this button to cancel a menu option or to return to the previous screen.
Cycle	To use the **Cycle** button, press it firmly then release it quickly. The buzzer will sound briefly. Press this button to go to the next option on the screen.
Accept/Test	To use the **Accept/Test** button, press it firmly then release it quickly; the buzzer will sound. A short press is used to select an option or mute an alarm or fault. A longer press is used to acknowledge the alarm—hold the button until the buzzer sounds. The alarm clears when the CO_2 reduces. **To test the alarms, press and hold down Accept/Test until the buzzer sounds. Alarms, indicators and sounders operate for five seconds.**

10.2 CO_2 Sensor

The CO_2 Sensor has a green **Power** indicator on the bottom left-hand part of the fascia. This is used to indicate the following conditions:

Power indicator

Under normal conditions the **Power** indicator flashes once per second to indicate that the power is on and the unit is operating.

- **NOTE: THE CO_2 SENSOR RECEIVES ITS POWER FROM THE CENTRAL DISPLAY, VIA THE CONNECTING CAT5E CABLE.**

If the **Power** indicator is off, this means the CO_2 Sensor is either not receiving power from the Central Display, or the CO_2 Sensor has a fault.

- **NOTE: CHECK THE CENTRAL DISPLAY; IT MAY BE SHOWING A FAULT CODE.**

If the **Power** indicator lamp is on continuously, this means that there is potentially a more serious CO_2 Sensor fault.

- **NOTE: CHECK THE CENTRAL DISPLAY; IT MAY BE SHOWING A FAULT CODE.**

If a CO_2 Sensor is in fault, any CO_2 Alarms connected to it will also display a fault status (their yellow **Fault** indicator LEDs will flash).

- **NOTE: FAULT CODES ARE DESCRIBED IN DETAIL IN THE SERVICE MANUAL.**

10.3 CO_2 Alarm

The CO_2 Alarm has both a green **Power** indicator and an yellow **Fault** indicator on the bottom part of the fascia. These are used to indicate the following conditions:

Power indicator

Under normal conditions the **Power** indicator is continuously on (not flashing) to indicate that the power is on and the unit is operating.

- **NOTE: THE CO_2 ALARM RECEIVES ITS POWER FROM THE CO_2 SENSOR VIA THE CONNECTING CAT5E CABLE.**

If the **Power** indicator is off this means that the CO_2 Alarm is not receiving power.

Fault indicator

Under normal conditions the yellow **Fault** indicator is off.

- **NOTE: THE FAULT INDICATOR IS NOT USED TO SHOW FAULTS ON THE CO_2 ALARM, IT IS USED TO SHOW FAULTS ON THE SENSOR CONNECTED TO IT.**

If the Fault indicator is flashing it means the CO_2 Sensor connected to the Alarm is in fault.

- **NOTE: FAULT CODES ARE SHOWN ON THE CENTRAL DISPLAY. FOR FURTHER DETAILS SEE THE SERVICE MANUAL.**

11 Software

This section gives a brief overview of the software. For full details of the menu options relevant to calibration and configuration, refer to the *Ax60 Service Manual P0159-803*.

NOTE: THIS SECTION SPECIFICALLY RELATES TO THE Ax60 STANDARD OPTIONS HW AND QC. HOWEVER, A CENTRAL DISPLAY CAN BE TEMPORARILY CONNECTED TO THE Ax60K KIOSK TO ENABLE A SERVICE ENGINEER TO RECONFIGURE THE SYSTEM.

11.1 Powering up

When you power up the Ax60, the software performs an automatic power-on-self-test (POST) which takes about 30 seconds. The results are shown on the Central Display.

Operator input	Software response	Central Display text	Optional text / notes
Switch on power supply to Ax60	Displays vendor name and website (default is Analox Ltd)	Analox Ltd www.analox.net	Vendor name may vary
No further operator input is required. The POST is an automatic process	Performs a checksum configuration check	Config. checksum CORRECT	
	Performs a software validation check	Software failure NO FAILURE	
	Checks the CO_2 Sensor(s) have been calibrated	Cal. settings All in range	Cal. settings No sensors! No sensors are configured
	Confirms top line of LCD OK, no pixels are missing	▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓ Is line 1 OK ?	
	Confirms bottom line of LCD OK, no pixels missing	Is line 2 OK ? ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓	
	Confirms buzzer is off and green LED switches on	Buzzer is off ? Green LED on ?	
	Confirms green LED is off and yellow switches on	Green LED off ? Yellow LED on ?	
	Confirms yellow LED is off and red switches on	Yellow LED off ? Red LED on ?	
	Confirms red LED is off and buzzer switches on	Red LED off ? Buzzer is on ?	
	Displays current software. Buzzer switches off	Software version v1.0.0	

Operator input	Software response	Central Display text	Optional text / notes
		▼	
	Displays unique serial number of the unit	Serial number: 0000000	
		▼	
Wait for CO_2 Sensors to warm up...		>OK OK --- --- 1: Warm-up	
		This screen may display for a few seconds to show CO_2 Sensor warm-up status. It is for information only. It requires no operator input	
		▼	

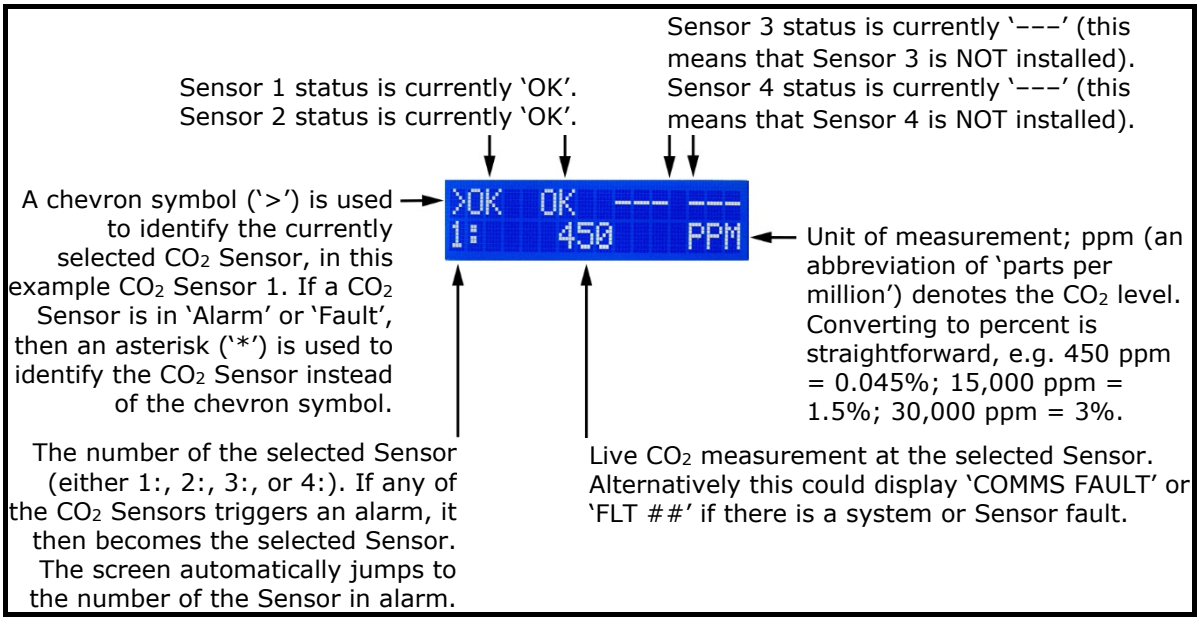
CAUTION: **EACH CO_2 SENSOR MUST HAVE ITS JUMPER SET TO A DIFFERENT LOCATION (E.G. SENSOR 1 = LOCATION 1; SENSOR 2 = LOCATION 2), OTHERWISE THE CENTRAL DISPLAY WILL ANNOUNCE A FAULT. REFER TO SECTION 8.3.10 FOR JUMPER SETTINGS INFORMATION.**

▼

Wait for system status screen...	Displays system status screen. Each CO_2 Sensor is represented by 'OK' in the top line. For example, a system with two CO_2 Sensors displays >OK OK. The '>' character identifies which CO_2 Sensor is highlighted (CO_2 Sensor 1 is highlighted by default)	>OK OK --- --- 1: 450 PPM	The CO_2 concentration is by default displayed in ppm (parts per million). The example shown here displays 450 PPM, which is equal to 0.045%.
	NOTE: THE SYSTEM STATUS SCREEN DISPLAYS UP TO 4 CO_2 SENSORS. A SPARE CO_2 SENSOR LOCATION DISPLAYS AS: '---'		
	The bottom line displays the concentration of CO_2 measured at the Sensor		
		▼	
Press Cycle	Displays CO_2 Sensor 2 details (if installed) and the current level of CO_2	OK >--- --- --- 2: Not installed	In this example, CO_2 Sensor 2 is not installed
		▼	
Press Cycle	Displays CO_2 Sensor 3 details (if installed) and the current level of CO_2	OK ---> 3: Not installed	In this example, CO_2 Sensor 3 is not installed
		▼	
Press Cycle	Displays CO_2 Sensor 4 details (if installed) and the current level of CO_2	OK --- --->--- 4: Not installed	In this example, CO_2 Sensor 4 is not installed
		▼	
Press Cycle	Redisplays the system status screen	>OK OK --- --- 1: 450 PPM	

11.2 Central Display screen

The Central Display has a two-line screen that provides real-time CO_2 readings from up to four CO_2 Sensors. The top line of the screen shows the status of CO_2 Sensors 1, 2, 3 and 4 (if connected), displayed from left to right. The bottom line of the screen shows the number of the highlighted Sensor, its current reading and the unit of measurement. If a system fault or a communications fault occurs, this is displayed on the bottom line in place of the current reading and unit of measurement. Under normal operating conditions the CO_2 Sensor which is currently highlighted is identified by a chevron ('>') directly to its left. The chevron changes to an asterisk ('*') if the Sensor goes into alarm or fault mode. When the alarm / fault is acknowledged the symbol reverts to a chevron.



There are seven possible statuses for each CO_2 Sensor. These are described below:

Status	Meaning	Example
OK	This indicates that a CO_2 Sensor is functioning correctly. In the example on the right, both CO_2 Sensor 1 and CO_2 Sensor 2 are OK. Sensor 1 is currently highlighted ('>')	>OK OK --- --- 1: 450 PPM
---	This indicates that a CO_2 Sensor is not installed. In the example on the right, neither Sensor 3 nor Sensor 4 is installed	>OK OK --- --- 1: 450 PPM
TWA	This indicates that a CO_2 Sensor has exceeded the TWA (time weighted average) of 5000ppm (0.5%) CO_2 in the previous 8 hours; Sensor 1 has triggered a TWA alarm	*TWA OK OK OK 1: 7950 PPM
AL1	This indicates that a CO_2 Sensor has exceeded 15000ppm (1.5%) CO_2 and has triggered a low alarm. In the example on the right, CO_2 Sensor 1 is in alarm	*AL1 OK .... 1: 15100 PPM
CO2	This indicates that a CO_2 Sensor has exceeded 30000ppm (3%) CO_2 and has triggered a high alarm. In the example on the right, CO_2 Sensor 1 is in alarm	*CO2 OK .... 1: 32850 PPM
FLT ##	This indicates that a CO_2 Sensor has developed a system fault. In the example on the right, Sensor 1 is in fault state FLT05 (refer to the Service Manual for fault codes)	*FLT --- --- --- 1: FLT05
FLT COMMS	This indicates that a CO_2 Sensor has developed a comms (communications) fault. In the example on the right, Sensor 1 is in COMMS FAULT (refer to Service Manual)	*FLT --- --- --- 1: COMMS FAULT

NOTE: UNACKNOWLEDGED ALARMS AND FAULTS ARE INDICATED BY AN ASTERISK.

11.3 Alarms

The Ax60 has three default alarm levels. These are pre-set by Analox and may only be changed by an authorised installer or service engineer. They are described below.

Alarm	CO_2 threshold	Annunciation (text, buzzer, indicator, strobe, sounder)		
		Central Display	CO_2 Alarm units	Optional beacon
TWA	0.5% (5000ppm) average, 8hrs	Display text: *TWA; buzzer & red LED on	All CO_2 Alarms off; annunci-ation by Central Display only	Flashing
Low	1.5% (15,000ppm)	Display text: *AL1; buzzer on; flashing red LED on	CO_2 Alarm(s) connected to the affected sensor: slowly flashing strobe (1 second on 1 second off), no sounder	Flashing
High	3% (30,000ppm)	Display text: *CO2; buzzer on; flashing red LED & relays on	All connected CO_2 Alarms: rapidly flashing strobe lights (½ second on ½ second off) and sounders on (½ second on ½ second off)	Flashing

TWA (time-weighted average), 0.5% CO_2 over the previous eight hours. If the CO_2 level exceeds an average of 0.5% over the previous eight hours the Sensor raises a TWA alarm. The Central Display buzzer will sound and the red indicator flashes rapidly. The optional beacon will flash. The screen displays *TWA. CO_2 Alarms will not operate.

Low alarm, 1.5% CO_2 If a Sensor detects a CO_2 level at or beyond the low threshold of 1.5%, it raises a low alarm and informs the Central Display of the alarm condition. The sounders do not operate at this alarm level, but the strobes begin to flash slowly (1 second on 1 second off). If an optional beacon is installed, this also begins to flash. The Central Display screen now identifies the CO_2 Sensor that originated the low alarm by displaying the text '*AL1'.

High alarm, 3% CO_2 If a Sensor detects a CO_2 level at or beyond the high threshold of 3% the Central Display raises an 'evacuation mode' high alarm. This alarm triggers all the installed CO_2 Alarms to switch on. All sounders now operate (½ second on ½ second off) and strobes begin to flash rapidly (½ second on ½ second off). The Central Display identifies the CO_2 Sensor that originated the alarm by displaying the text '*CO2'. The optional beacon and built-in relays switch on.

11.3.1 Muting, acknowledging and clearing alarms

CAUTION: THE Ax60K RETAINS ITS CURRENT ALARM STATE, EVEN AFTER A POWER OUTAGE. IF AN ALARM IS NOT ACKNOWLEDGED BEFORE THE Ax60K IS POWERED OFF, IT RETURNS TO ALARM CONDITION WHEN POWERED ON.

To clear alarms, they must first be muted and acknowledged in the following sequence:

1) Mute: To mute (silence) an alarm, briefly press the **Accept/Test** button. The buzzer will sound once and the CO_2 Alarm sounders will be silenced. However, the strobe lights on the CO_2 Alarm and the optional beacon (if this is installed) will continue to flash.

2) Acknowledge: To acknowledge an alarm, press and hold the **Accept/Test** button for approximately two seconds. The buzzer on the Central Display will sound briefly and the text changes: the asterisk is replaced with a chevron, for example '*AL1' becomes '>AL1'.

3) Clear: An alarm that has been muted and acknowledged will automatically clear as soon as the CO_2 reduces to a safe level (there may be a delay before the alarm clears, if the CO_2 level remains high). When the alarm clears, the screen text changes to '>OK'.

11.3.2 Testing alarms

To test the alarms, press and hold down the **Accept/Test** button for two seconds. The indicator LEDs illuminate, the screen displays 'TESTING ALARMS' and the buzzer sounds. Strobes and sounders on the CO_2 Alarm(s) switch on. The optional beacon flashes (if installed). The alarm test is automatically cancelled (switched off) after five seconds.

11.4 Faults

Faults are reported by the Ax60 if there is a problem with the cable connections, power supplies or system components. A basic understanding of how fault types are displayed may be useful when describing them to an authorised technician or a service engineer.

NOTE: THE Ax60 IS DESIGNED TO PRIORITISE ALARMS OVER FAULTS. FOR EXAMPLE, IN A SYSTEM WITH TWO CO_2 SENSORS, IF SENSOR 1 IS IN FAULT AND SENSOR 2 GOES INTO ALARM, THE ALARM TAKES PRIORITY.

11.4.1 Fault types

A fault may be categorised as either a system fault, a communications fault or a Central Display fault. All three types display the text 'FLT' but in different parts of the screen. A Central Display fault is not announced by the CO_2 Sensors or CO_2 Alarms, but by the Central Display only. The table below shows examples of the three different fault types.

Status	Meaning	Example
FLT (system)	This indicates that a CO_2 Sensor has developed a system fault. In the example on the right, Sensor 1 is in fault state FLT05 (see the Service Manual for fault codes)	
FLT (comms)	This indicates that a CO_2 Sensor has developed a communications fault. In the example on the right, Sensor 1 has a COMMS FAULT (see the Service Manual for fault codes)	
FLT (Central Display)	This indicates that the Central Display has developed a fault. In the example on the right, the Central Display is in fault FLT51 (see the Service Manual for fault codes)	

11.4.2 Muting, acknowledging and clearing faults

Faults are announced by the Central Display buzzer which sounds once per second. CO_2 Alarms do not operate. To clear a fault, it must be muted and acknowledged as below:

1) Mute: To mute (silence) a fault, briefly press the **Accept/Test** button. The internal buzzer will sound once and then be silenced.

2) Acknowledge: To acknowledge a fault, press and hold the **Accept/Test** button for approximately two seconds. The buzzer on the Central Display will sound briefly and the text changes: the asterisk is replaced with a chevron, for example '*FLT' becomes '>FLT'.

3) Clear: A fault that has been muted and acknowledged will automatically clear as soon as the fault is rectified.

NOTE: IF A FAULT IS REPORTED BY MORE THAN ONE CO_2 SENSOR, YOU MUST MUTE, ACKNOWLEDGE AND CLEAR THE FAULT ON THE FIRST SENSOR. THEN PRESS CYCLE TO HIGHLIGHT THE NEXT SENSOR AND REPEAT THE MUTE/ACKNOWLEDGE/CLEAR.

11.4.3 Simultaneous alarms and faults

In a multi-sensor system it is possible for Sensors to be in different states, e.g. Sensor 1 OK; Sensor 2 in alarm level 2; Sensor 3 in fault; Sensor 4 not installed. For example:

Sensor	Status	Meaning	Example
1	**OK**	Sensor 1 is operating normally (OK)	
2	***CO2**	Sensor 2 is in level 2 alarm (CO2), it is unacknowledged (*) and has been highlighted (2:)	
3	**FLT**	Sensor 3 is in fault (FLT) and is unacknowledged	
4	**---**	Sensor 4 is not installed	

12 Configuration

12.1 Sensor hardware settings

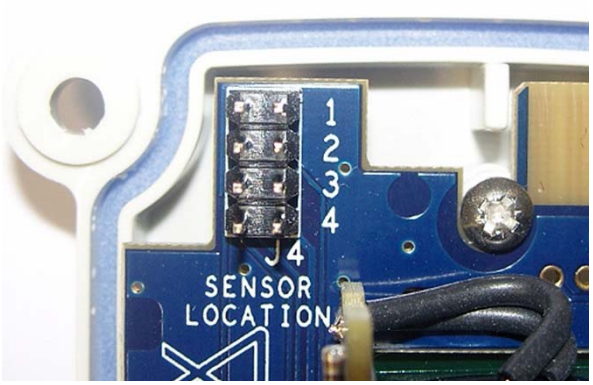
In a standard Ax60 system—not including the Kiosk option—each CO_2 sensor must have its jumper link set to a different location e.g. Sensor 1=location 1; Sensor 2=location 2.

The CO_2 Sensor has a hardware setting that is factory configured for a system with only one Sensor. If a system includes two, three, or four Sensors then the hardware must be reconfigured by moving a jumper link () in each Sensor installed in the system.

⚠ **WARNING: DISCONNECT AND ISOLATE THE Ax60 SYSTEM FROM THE MAINS POWER SUPPLY BEFORE OPENING THE CO_2 SENSOR ENCLOSURES.**

To access the jumper link, open the CO_2 Sensor enclosure. The printed circuit board (PCB) has a SENSOR LOCATION selector with one link, factory installed in LOCATION 1.

For a system with only **one CO_2 Sensor**, the jumper link should be retained in LOCATION 1.
For a system with **two CO_2 Sensors**, the first Sensor's jumper link should be in LOCATION 1 and the second Sensor's link in LOCATION 2.
For a system with **three CO_2 Sensors**, the first Sensor's link should be in LOCATION 1, the second Sensor's link in LOCATION 2 and the third Sensor's link should be in LOCATION 3.
For a system with **four CO_2 Sensors**, the first Sensor's jumper link should be in LOCATION 1, the second Sensor's link in LOCATION 2, the third Sensor's link in LOCATION 3 and the fourth Sensor's link should be in LOCATION 4.



12.2 Sensor software settings

The Central Display software is factory configured for a system that has two Sensors. If the system includes one, three, or four Sensors, the software must be reconfigured. This is done by using the `Top-level Menu`, `Configuration`, `Attached snsrs` option. To enter the `Top-level menu`, press and hold down **Cancel** + **Cycle** for at least six seconds. Then press the **Cycle** button four times to display the `Top-level menu`, `Configuration` option.

NOTE: THE DEFAULT SETTING IS FOR 2 SENSORS. THIS NUMBER CAN BE CHANGED.

Menu option	Operator input	Menu sub-option	Functional description
`Top-level Menu` `Configuration >`	▼		
	Press **Accept/Test** to go to `Config. Menu` `Attached snsrs` ▶	`Config. Menu` `Attached snsrs >`	
	▼		
	Press **Accept/Test** to go to `Num of sensors?` ▶	`Num. of sensors?` `1 >2 3 4`	The screen displays the number of CO_2 Sensors (default number is '>2')
	▼		
	Press **Cycle** to choose another number. Or press **Accept/Test** ▶	`Num. of sensors?` `1 ✓2 3 4`	The screen displays a tick to confirm the number of sensors is now configured
	Press **Cancel** to return to `Config. Menu`, `Attached snsrs`		

13 Maintenance

This section describes routine preventive maintenance for the Ax60. For more detailed information on servicing, refer to the *Ax60 Service Manual P0159-803*.

13.1 Faults

Faults are announced by the **Fault** indicator on either the Central Display or the CO_2 Alarm. This indicator is off during normal operation. If it flashes once per second, the system has a fault. Power off the system and call a service engineer.

13.2 Calibration

The Ax60 CO_2 sensor is factory calibrated and does not require periodic calibration adjustment. However, it incorporates a software option that enables an authorised service engineer to adjust the sensor calibration, should this be required by local Health & Safety regulations.

13.3 Cleaning

Analox recommends periodic cleaning of Ax60 enclosures with a slightly damp cloth.

CAUTION: THE CO_2 SENSOR UNIT MUST BE PROTECTED FROM INGRESS OF WATER.

13.4 Protection

CO_2 Sensors should be mounted at low level and are therefore vulnerable to accidental damage. To protect the CO_2 Sensor, Analox recommends fitting a Sensor Protection Kit, part number P0159-4305K, shown below (not to scale). The splashguard is fitted on the outside of the sensor opening. The sensor protector is wall mounted using the fixing kit.

Optional Ax60 Sensor Protection Kit. Available from Analox: part number P0159-4305K

14 Specification

The Ax60 is designed to be compliant with the following standard: IEC 61010-1:2010. It is designed to be safe at least under the conditions listed below.

⚠ **WARNING: IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY ANALOX, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.**

Notes accompanying the specification text:

(*) Limited energy circuits according to IEC 61010-1:2010 clause 9.
(*) Double insulation and reinforced insulation according to IEC 61010-1:2010.
(**) Please contact Analox for use in condensing environments.
(***) IP protection was not evaluated by UL.

14.1 Central Display

- When supplied by a limited energy double/reinforced insulation power supply (*)
- Indoor use
- Altitude up to 5000m
- Operating temperature range: –5°C to +50°C
- Maximum relative humidity: 95%RH (non-condensing)
- Pollution degree 2
- Operating voltage: 24VDC
- Unit power: <36W
- Ingress Protection: IP54 (***)
- Not for use in corrosive or explosive atmospheres

Features:

- 2 internal SPDT relays, rated for 30VDC, 1A
- Digital communications
- Internal buzzer
- Power/fault/alarm indications
- 16-character x 2-line LCD display
- External beacon drive channel

14.2 CO_2 Sensor

- When supplied by a limited energy double/reinforced insulation power supply (*)
- Indoor/outdoor use
- Range 0 to 5% CO_2
- Warmup time 40 seconds
- Altitude up to 5000m
- Operating temperature range: –5°C to +50°C
- Maximum relative humidity: 98%RH (non-condensing) (**)
- Pollution degree 2
- Operating Voltage: 24VDC
- Unit power: <25W
- Ingress Protection: IP55 (***)
- Not for use in corrosive or explosive atmospheres

Features:

- Green power LED
- Digital Communications

14.3 CO_2 Alarm

- When supplied by a limited energy double/reinforced insulation power supply (*)
- Indoor/outdoor use
- Altitude up to 5000m
- Operating temperature range: -5°C to +50°C
- Maximum relative humidity: 98%RH (non-condensing) (**)
- Pollution degree 2
- Operating Voltage: 24VDC
- Unit power: <5W
- Ingress Protection: IP55 (***)
- Not for use in corrosive or explosive atmospheres

Features:

- Sounder: 88dBA @ 3m
- LED Strobe: 100cd
- Green power LED
- Yellow fault LED

14.4 Sensor performance

NOTE: ALL SPECIFICATIONS ASSUME THE AMBIENT PRESSURE IS 1000MBAR. THE CO_2 SENSOR ACTUALLY MEASURES PARTIAL PRESSURE OF CO_2, NOT CONCENTRATION BY VOLUME.

Parameter	Comments	Min	Max	Units
Range		0	5	% CO_2
Accuracy		0	5	% of alarm setpoint
Temperature sensitivity	Deviation from calibration temperature		50	PPM/°C
Response time	To 90% of final value	30		s
Warmup time	After power on	40		s

NOTE: ANALOX HAS A POLICY OF CONTINUOUS IMPROVEMENT AND RESERVES THE RIGHT TO UPGRADE OR CHANGE SPECIFICATIONS WITHOUT PRIOR NOTICE.

14.5 Operation at altitude

The toxic effects of CO_2 are dependent on the partial pressure, or the quantity of gas molecules, not the percentage in the atmosphere; therefore at altitudes above 900 metres (3000 feet) alarms will operate below the factory calibration point. Please refer to our website for details of suitable alarm setpoints and calibration procedures at altitude. Note that this must be performed by an authorised engineer.

14.6 Product disposal

According to WEEE regulation this electronic product cannot be placed in household waste bins.

Please check local regulations for information on the disposal of electronic products in your area.

15 Warranty

The following Warranty is provided for the Ax60 carbon dioxide detector:

- **5-year Warranty, from the date of the original sales invoice**

We warrant that the equipment will be free from defects in workmanship and materials.

The Warranty does not extend to, and we will not be liable for defects caused by the effects of normal wear and tear, erosion, corrosion, fire, explosion, misuse, use in any context or application for which the equipment is not designed or recommended, or unauthorised modification.

The Warranty will be void and shall cease to be effective in the event that the main CO_2 sensing element is tampered with, or in the event that any alterations or repairs are made or attempted, except in accordance with any specific previous written authorisation from us.

Following a valid Warranty Claim in accordance with the above, the equipment, upon receipt, will be repaired, or replaced without cost or charge, but at our discretion, we may elect instead to provide to you whichever is the lesser of the cost of replacement, or a refund of net purchase price paid, as per the original sales invoice.

We shall have no liability for losses, damages, costs or delays whatsoever.

We shall have no liability for any incidental or consequential losses or damages.

All express or implied warranties as to satisfactory or merchantable quality, fitness for a particular or general purpose or otherwise are excluded and no such warranties are made, or provided, save as set out in this Warranty.

In order to effectively notify a Warranty Claim, the claim with all relevant information and documentation should be sent in writing to:

Analox Sensor Technology Limited
15 Ellerbeck Court
Stokesley Business Park
Stokesley
North Yorkshire
TS9 5PT

Analox reserves the right to require proof of dispatch to us of the notification of Warranty Claim by any of the above alternative means.

The equipment should not be returned without prior written authority.

All shipping and insurance costs of returned equipment, are at the expense of the customer.

All returned items must be properly and sufficiently packed.

По вопросам продаж и поддержки обращайтесь:

Алматы (727)345-47-04
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

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