Ax 50™

Carbon Dioxide Analyser

***** WARNING *****

Please read the safety information on
Pages 9 and 24 before installing this product.

Analox Ltd.
15 Ellerbeck Court, Stokesley Business Park
North Yorkshire, TS9 5PT, UK
T: +44 (0)1642 711400 **F:** +44 (0)1642 713900
W: www.analox.net **E:** info@analox.net

This support line is closed on UK public holidays

How to fit an Ax 50™


3
TOP
BLACK & DECKER


4
Status
OK
Mode
ANALOX 50
Carbon Dioxide Detector
ANALOX

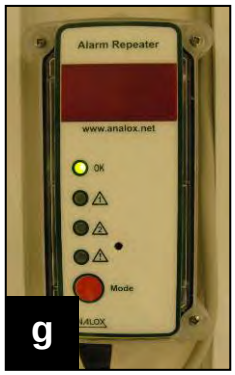

5


6
ANALOX 50
Alarm Repeater
www.analox.net
OK
Mode


7
PLEASE
DO NOT
SWITCH OFF


8
WARNING
CO_2
IT IS ONLY SAFE TO ENTER IF THE GREEN LIGHT IS FLASHING SLOWLY
IF ANY OF THE ALARMS ARE ACTIVATED OR ACTIVATE WHILST YOU ARE IN THE ROOM YOU MUST CARRY OUT THE FOLLOWING BEFORE ENTERING
Green light is continuously on
Call Service Engineer
Alarm 1 light on and horn is sounding
Vacate area and do not enter. Ventilate area until alarm light goes out then repair leak
*CONTACT:
TEL:
Alarm 1 and 2 lights are on and horn is sounding faster
Vacate area and do not enter. Ventilate area until all alarm lights go out then repair leak
*CONTACT:
TEL:
Fault light is on and horn is sounding very fast
Call service engineer to recalibrate or trace fault
*Complete these boxes before attaching inside and outside the CO2 store.
ANALOX 50
Alarm Repeater
www.analox.net
OK
Mode

Ax 50™ Accessories



Effects of Carbon Dioxide

1,000ppm (0.1%)
5,000ppm (0.5%)
10,000ppm (1%)
15,000ppm (1.5%)
20,000ppm (2%)
30,000ppm (3%)
40,000-50,000ppm (4-5%)
50,000-100,000ppm (5-10%)
100,000-1,000,000ppm (10-100%)

For a more detailed outline of the dangers of CO2, please visit our website **www.analox.net** or contact us at **info@analox.net**

LIST OF CONTENTS

1. SAFETY NOTES

Every gas monitor installation should be risk assessed. The correct location of monitor(s) must consider the potential sources of gas leaks and the location of expected human occupation in the area. Where large areas must be monitored, it is often advised that no single monitor should cover a volume in excess of 80m3. The installation of more monitors should be considered where an area is complex in shape, filled with obstacles, has a lack ventilation or air circulation, or if there are dead zones where gas can collect

a) The Ax 50™ must be installed according to these instructions which should be read entirely before commencing installation.

b) For your convenience the Remote Alarm Repeater is pre-wired to the Ax 50™ sensor unit.

c) If you need to disconnect the cable for ease of installation. DISCONNECT FROM THE REMOTE ALARM REPEATER END

d) The system MUST NOT be switched on until all connections have been correctly made.

e) We do not recommend you access the main unit. Potentially lethal voltages exist within the Ax 50™. It should only be opened by a Qualified Technician, and must be isolated from the electrical supply before opening.

f) The Ax 50™ does not require routine maintenance. All you need to do is check that the green light is flashing and press the mode button periodically to make sure that the Horn and alarm lights are functioning.

2. PACKAGING CONTENTS CHECK

The following items are enclosed:

a) Ax 50™ main unit, with power lead to a plug (where necessary)

b) User manual for standard Ax 50™

c) Test certificate

d) Rawl plugs and screws for wall mounting

e) Remote Alarm Repeater and 8 metres of interconnecting cable connected to the Ax 50™.

f) Warning label

3. ABOUT THE Ax 50™

The Ax 50™ unit is designed to detect the presence of Carbon Dioxide in ambient air for the protection of people in confined spaces. The Ax 50™ provides audible and visual indication of potentially dangerous levels of Carbon Dioxide in the air surrounding the instrument. The instrument uses an Infra Red detector system, together with state of the art technology. It is housed in an IP65 splash proof enclosure, and is designed to provide long, trouble free service, with minimum maintenance. The Remote Alarm Repeater mimics the status indicators on the main Ax 50™. It also provides a push-button which operates in the same manner as the Mode switch on the Ax 50™.

If you have more than one entrance to your cellar or store room you may need more than one Remote Alarm Repeater. Up to three repeaters can be daisy chained (one repeater linked to another) covering up to three entrance doors.

Optional items fitted to, or supplied with the unit may include the following (as shown in the photographs on Page 6):

a) Extra Remote Alarm Repeaters
b) Oxygen sensor*
c) Medium duty relays*
d) 4 to 20mA current loop output (or 0-1V)*
e) Battery back-up*
f) 4 digit display*
g) Remote Alarm Repeater with high intensity strobe beacon*
h) Splash guard
i) Calibration gasses

* Please note these items cannot be retro fitted.

3.1. BATTERY BACK-UP ENDURANCE

If fitted the Battery back-up will give the Ax 50™ between 7 and 14 hours normal operation in the event of a power failure, some examples are listed below:

Instrument Type	Battery Back-up Endurance
Standard Ax 50™ with 1 Remote Alarm	14 Hours
Ax 50™ including 4-20mA Output, 1 Relay Output and 2 Remote Alarms	11 Hours
Ax 50™ including 4-20mA Output, 2 Relay Outputs and 2 Remote Alarms	7 Hours

In normal operating conditions using an external power source (Mains AC or DC) the Battery Back-up should last up to approximately 5 years or 200 cycles.

4. INSTALLATION

4.1. Wall Mounting

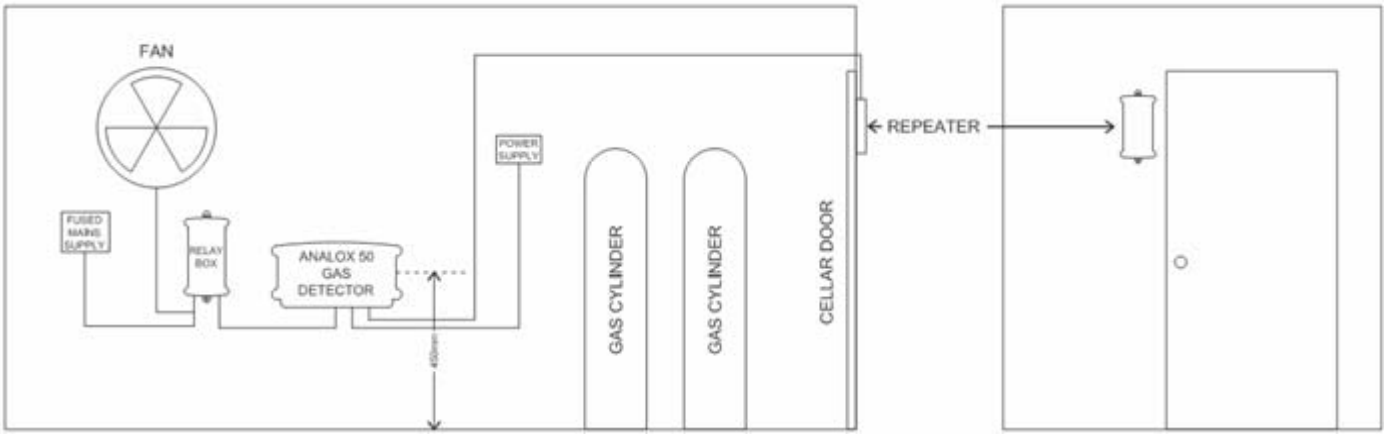
The power socket that the equipment plugs into must be positioned so that it is close to the equipment and in easy reach of the operator.

If the power supply for the Ax 50™ is not positioned so that it is close to the equipment and in easy reach of the operator, a local means of double pole isolation must be provided. Isolation can be achieved either by means of a non-locking plug or a double pole switch of suitable rating.

A label must be placed by the local disconnection point for the Ax 50™ stating

"REMOVE PLUG TO DISCONNECT Ax 50™"

The Ax 50™ should be mounted onto a wall using the mounting lugs on the unit. Rawl plugs and screws are provided for this purpose. It is not necessary to dismantle the Ax 50™ main unit in any way prior to installation. You need to ensure the mains plug fused at 5amp is in easy reach of a power socket.



Attach the main unit to the wall 450mm from the floor as close to the valves and manifolds as possible. An 8 metre 8 core cable is pre-wired to the Ax 50™ and has a Remote Alarm Repeater pre-attached. Run the Remote Alarm Repeater cable to the outlet door, safely securing the cable with cable clips.

A drilling template is included with this booklet.

4.2. Remote Alarm Repeaters

The Remote Alarm Repeater should be located at eye level and attached to the outside or immediately inside the access door. If you need to disconnect the Remote Alarm Repeater, reconnection is in one of the following ways:-

4.2.1. To connect a "Hard Wired" Remote Alarm Repeater

1) Disconnect the power supply from the Ax 50™.
2) Open the Remote Alarm Repeater unit by removing the 4 screws in the front of the case and carefully pulling the case apart. The connecting wires from the Ax 50™ pass through one of the cable glands on the Remote Alarm Repeater.
3) Terminate the wires in accordance with the table below

REPEATER CABLE COLOURS			Ax 50
Type 1	Repeater Term	Type 2 (Cat 5)	ST1 Terminal No
	8		3
	7		2
	6		4
	5		5
	4		6
	3		7
	2		8
	1		1

4) Replace the lid of the Remote Alarm Repeater, insert and tighten the 4 screws, and mount it in the desired position using the 2 fixing lugs.
5) Restore power to the Ax 50™. Press the switch on the Remote Alarm Repeater once, and ensure that the four indicators flash. Note that in the presence of a genuine alarm, this test feature is disabled.

4.2.2. To connect a "Quick Connect" Remote Alarm Repeater

1) Disconnect the power supply from the Ax 50™.
2) Insert the connector on the end of the wire into either socket on the bottom of the Remote Alarm Repeater.
3) Restore power to the Ax 50™. Press the switch on the Remote Alarm Repeater once, and ensure that the four indicators flash. Note that in the presence of a genuine alarm, this test feature is disabled.

4.2.3. To connect a "Strobe LED" Remote Alarm Repeater

1) Disconnect the power supply from the Ax 50™.
2) Open the Remote Alarm Repeater unit by removing the 4 screws in the front of the case and carefully pulling the case apart. The connecting wires from the Ax 50™ pass through one of the cable glands on the Remote Alarm Repeater.
3) Terminate the wires in accordance with the table below

REPEATER CABLE COLOURS			Ax 50
Type 1	**Repeater Term**	**Type 2 (Cat 5)**	**ST1 Terminal No**
	8		**3**
	7		***See Note 4**
	6		**4**
	5		**5**
	4		**6**
	3		**7**
	2		**8**
	1		**1**

4) For units **NOT** fitted with internal relay(s): Connect the free wire (Brown or Orange) to A50-231 main PCB at JP13 terminal 5.

   For units fitted with internal relay(s): Connect the free wire (Brown or Orange) to A50-231 main PCB at IC10 terminal 2 and move the wire from terminal 4 (Green/white or green) to terminal 2 of ST1.

5) Replace the lid of the Remote Alarm Repeater, insert and tighten the 4 screws, and mount it in the desired position using the 2 fixing lugs.

6) Restore power to the Ax 50™. Press the switch on the Remote Alarm Repeater once, and ensure that the four indicators and the LED strobe flash. Note that in the presence of a genuine alarm, this test feature is disabled.

4.3. Alarm Relay Output Models

You may have ordered your Ax 50™ with relays (only 1 relay available if O2 sensor specified). Relays are available in 2 different formats as follows:

Internal relays

The relays are fitted internal to the main unit with a pre-wired 1m 6-core cable supplied connected to relay contacts. With all power isolated, make wiring connections to the Relay cable.

The relay contacts are 'Volt-Free' single pole Changeover and are rated 50VAC/DC, 1 Amps (max).

External relays

A pre-wired junction box is supplied with the Ax 50™ main sensor unit. There is no need to open the main sensor unit. With all power isolated, make wiring connections to the Relay Terminal Box.

The relay contacts are 'Volt-Free' single pole Changeover and are rated 240VAC/28VDC, 2 Amps (max).

For either internal or external the relays are normally non-latching which means the relays will only activate when an alarm is raised and deactivate when the alarm cancels.

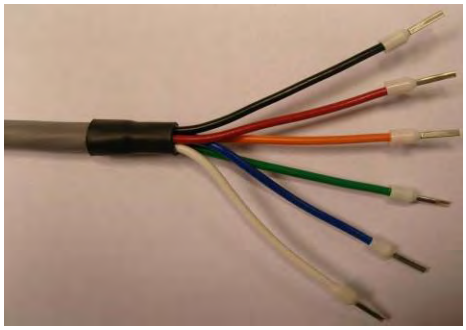
Latched versions are available; if relays are latched they will only cancel once the alarm state has cleared, and the mode switch on the Ax 50™ or Remote Alarm Repeater is pressed.

The relays are normally supplied 'Fail Safe' i.e. normally energised, and will de-energise when in alarm state. The relay will also be in its alarm state during the forty second warm up period.

4.4. Relay Wiring

Internal relays

Ensure that the load is within the limits of the relay, 50VAC/DC, 1 Amps (max).

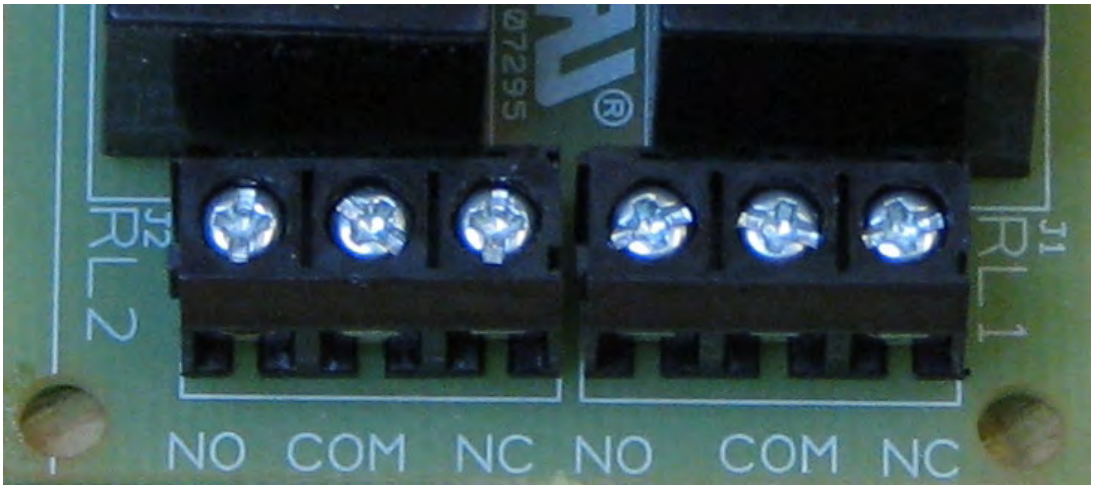


Cable core	Relay terminals
	Relay 1 COM
	Relay 1 N.O.
	Relay 1 N.C.
	Relay 2 COM
	Relay 2 N.O.
	Relay 2 N.C.

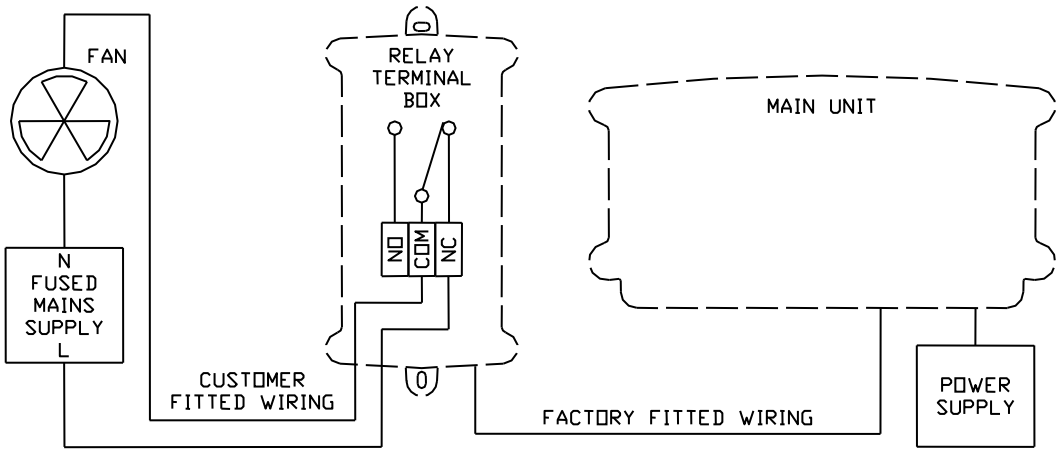
External relays

The cable gland is for cables of outside diameter between 5 and 7mm, if cable fitted is outside that range, a suitably specified cable gland must be used. Ensure that the gland is properly tightened. Test that the cable is adequately gripped by the cable gland. Ensure that the cable is suitable for purpose, the load is within the limits of the relay, 240VAC/28VDC, 2Amps, and the insulation of the external circuit meets the requirements for basic insulation 240VAC/28VDC, 2 Amps. After completing wiring, ensure that the terminal box cover is securely replaced.

RELAY TERMINAL BOX TERMINATIONS



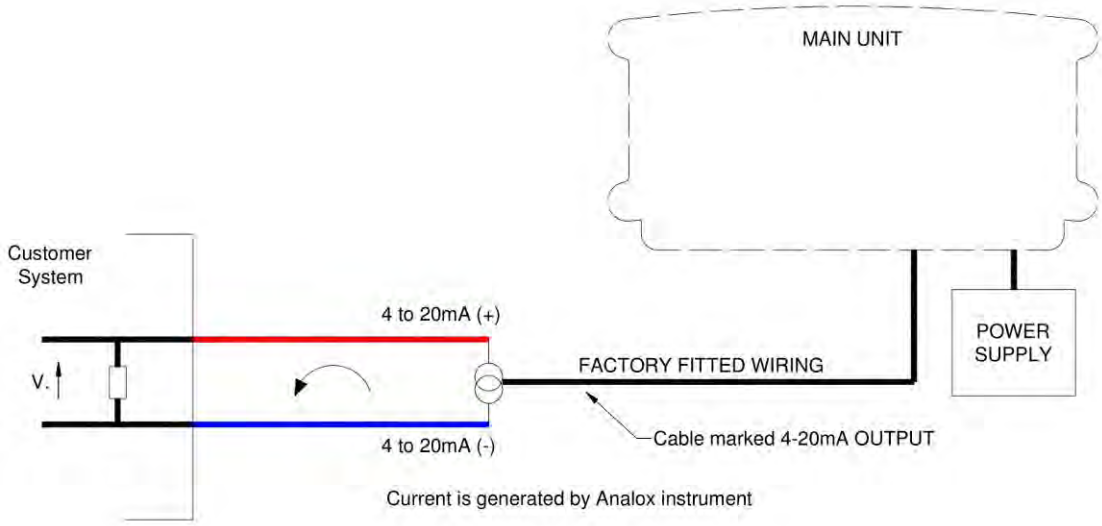
SIMPLIFIED RELAY WIRING DIAGRAM



4.5. 4 to 20mA output models

You may have ordered your Ax 50™ with a 4 to 20mA output. A 2m cable is factory fitted to the instrument. The 4 to 20mA output current is generated by the instrument. The customer system should be connected to this cable as follows and as per the following drawing:

1) Blue wire 4 to 20mA negative
2) Red wire 4 to 20mA positive



(Max load 150 Ω)

4.6. Cleaning

All parts of the Ax 50™ may be cleaned with a soft cloth, moistened with water.

5. OPERATION

When mains power is first applied to the Ax 50™, it requires a period of approximately 40 seconds to stabilise. During this period, The 'Good/OK' and 'Fault' status indicators will be turned on. The 'Good/OK' status indicator will flash briefly every few seconds, indicating normal operation and after the initial stabilising period has expired, the 'Fault' status indicator will turn off. The Ax 50™ will then be in its normal operating condition. During normal operation, the 'Good/OK' green light will flash on/off, thus indicating that the system is operating correctly. The green light status indicator on any Remote Alarm Repeaters will also flash on and off.

5.1. Operation at Altitude

The toxic effects of Carbon Dioxide 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 www.analox.net for details of suitable alarm set points and calibration procedures at altitude.

6. ALARM INDICATIONS

Standard unit

If the Ax 50™ detects a Carbon Dioxide concentration which exceeds the first alarm level, then the red First Alarm indicator will begin to flash and the Horn will sound.

If the measured concentration of Carbon Dioxide continues to rise above the second alarm level, then the red Second Alarm indicator will also begin to flash and the pace of the Horn will increase. This condition will be repeated on any Remote Alarm Repeaters. The alarms are self-cancelling when the Carbon Dioxide level falls below the alarm limits.

Alternatively latched alarm versions are available, on which the Ax 50™ will stay in the alarm mode until the gas concentration has fallen below the alarm set point and the mode switch has been pressed to accept the alarm.

	**Alarm 1**
	**Alarm 2**

Pre-alarm unit

If the Ax 50™ has a 0.5% pre-alarm and it detects a Carbon Dioxide concentration which exceeds this first alarm level, then the red First Alarm indicator will begin to flash but the Horn will not sound.

If the measured concentration of Carbon Dioxide continues to rise above the second alarm level, then the red Second Alarm indicator will also begin to flash and the Horn will sound. This condition will be repeated on any Remote Alarm Repeaters. The alarms are self-cancelling when the Carbon Dioxide level falls below the alarm limits.

If the measured concentration of Carbon Dioxide continues to rise above the third alarm level, then the red third Alarm indicator will also begin to flash and the pace of the Horn will increase. This condition will be repeated on any Remote Alarm Repeaters. The alarms are self-cancelling when the Carbon Dioxide level falls below the alarm limits.

	**Alarm 1 (Pre alarm)**
	**Alarm 2**
	**Alarm 3**

6.1. Lamp and Alarm Test

Momentarily pressing the 'Mode' button on either the Ax 50™ or any Remote Alarm Repeaters, in the absence of any alarm conditions, causes a lamp and alarm test to be performed. The indicator lamps will flash 4 times, together with the alarm Horn. This test should be carried out each time the area is entered.

Please note that the optional relays which may be fitted to the instrument are NOT operated during this test. Therefore any lights or sirens which may be connected to the instrument will NOT be tested by this operation.

6.2. Fault Conditions

During normal operation, the instrument carries out a continuous self-test procedure. As long as the green light is flashing, the instrument is working.

If there are no indicator lamps lit on the Ax 50™, check that power is connected and that the fuses are OK.

1) If the 'OK' indicator is permanently on, contact your Service Engineer.

2) If the fault light is illuminated and the Horn is sounding the unit needs attention and you should contact your Service Engineer.

	**Fault**

7. TECHNICAL SPECIFICATIONS

Carbon Dioxide	Range 0.1-5%
Response Time	60 Seconds to T90
Optional Oxygen Range	0.1 to 25%
Operating Temperature	-5 to +40°C
Temperature Effect	<0.1%FS/°C
Sensor Type - Carbon Dioxide	Analox Infra Red Detector, featuring microprocessor based compensation for temperature effects and IR source ageing
Sensor Type – Oxygen	Galvanic Electrochemical Cell
Optional Display	4 digit Liquid Crystal Display
Optional 4 to 20mA Output (or 0-1V)	Gas Concentration Output (Max load 150 Ω)
Alarms	2/3 x Carbon Dioxide Visual Indicators 1 x System Fault Indicator 1 x Status Indicator 1 x Optional Oxygen Visual Indicator Common Audible Alarm - Horn
Relays	Internal: 2 x Optional Independent Relays, Volt-Free single pole Changeover, rated 50VAC/DC, 1 Amp, (only one relay if oxygen sensor specified). or External: 2 x Optional Independent Relays, Volt-Free single pole Changeover, rated 240VAC/ 28VDC, 2 Amps, (only one relay if oxygen sensor specified).

Analox has a policy of continuous improvement and we reserve the right to upgrade or change specifications without prior notice.

The Analox 50™ conforms to DIN 6653-2:2004.

8. WARRANTY INFORMATION

We provide the following Warranties for the Ax 50™:

A 15 year CO2 Sensor Warranty.

A 2 year electronics Warranty.

In both cases the Warranty period runs from the date of our 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 sensor unit is opened 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 return to us, would be repaired or replaced without cost or charge but in our discretion we may elect instead to provide to you which ever is the lesser of the cost of replacement or a refund of net purchase price paid as per our Invoice on initial purchase from us. 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 Clause 7.

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

Or by e-mail to : info@analox.net

Or by Fax to : +44 1642 713900

We reserve the right to require from you proof of dispatch to us of the notification of Warranty claim by any of the above alternative means.

The equipment should not be sent to us without our prior written authority. All shipping and Insurance costs of returned equipment are to be born by you and at your risk. All returned items must be properly and sufficiently packed.

9. DISPOSAL

According to WEEE regulation this electronic product can not be placed in household waste bins. Please check local regulations for information on the disposal of electronic products in your area.

10. SAFETY

The Ax 50™ is designed to be compliant with the following standards: BS EN 61010-1: 2001, IEC 61010-1: 2001, CAN/CSA C22.2 Nr. 61010-1-04, ANSI / UL Std. No. 61010-1 (2nd edition). It is designed to be safe at least under the following conditions.	
a.	Indoor use
b.	Altitude up to 2000m
c.	Temperature -5°C to +40°C
d.	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
e.	Mains voltage supply fluctuations not to exceed 10% of the nominal voltage
f.	Impulse withstand (over-voltage) category II of IEC 60364-4-443
g.	Pollution degree 2
h.	Mains voltage:- 230V AC (Not Adjustable - Instrument will be factory set) 110V AC (Not Adjustable - Instrument will be factory set) 24V DC (Not Adjustable - Instrument will be factory set)
i.	Mains power:- Less than 5VA – 110V AC and 230V AC Versions Less than 5W – 24V DC Version.
j.	Mains frequency - 50/60Hz
k.	The Quick Connect Remote Alarm Repeater has ingress protection to IP43: direct sprays of water up to 60° from the vertical in accordance with EN 60529:1991 + A1. The Main Unit, Hard Wired Remote Alarm Repeater, Battery Backup and Relay Terminal Junction Box all have ingress protection to IP65: low pressure water jets from all directions and totally protected from dust in accordance with EN 60529:1991 + A1.
l.	Insulation: - Reinforced insulation, class II product according to IEC536.
m.	Not for use in corrosive or explosive atmospheres
n.	Not approved for use in vehicles, ships or aircraft

NOTE:
Item 'n' of the above table only relates to CSA requirements (North America only)

Fuse ratings:-
230V AC, 500mA, F rating 250V (20mm x 5mm Glass Cartridge)
110V AC, 500mA, F rating 250V (20mm x 5mm Glass Cartridge)
9-24V DC, 200mA, AS rating 250V (20mm x 5mm Glass Cartridge)

Battery Back-Up:-
The Battery Back-Up is non repairable. Please return faulty units to Analox for refurbishment/replacement.

4 to 20mA (or 0-1V) Output:-
External connected equipment must meet the requirements for reinforced insulation or must be a Safety Extra Low Voltage (SELV) circuit as defined in IEC60950-1.

The above statement refers to the risk of externally connected equipment introducing hazardous voltages into the A50 (O2NE, Safe-Ox or CO Clear). It is the responsibility of users of this product to ensure that their equipment/accessory is safe before connecting it.

NOTE - If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

11. DECLARATION OF CONFORMITY

Analox Sensor Technology Ltd

ANALOX
looking after the air you breathe

DECLARATION OF CONFORMITY

Document Number:	A50-921-02
Manufacturers name:	Analox Sensor Technology Ltd
Manufacturers address:	15 Ellerbeck Court, Stokesley Business Park, Stokesley, North Yorkshire, TS9 5PT
It is declared that the following product: Product name:	Analox 50
Conforms to all applicable requirements of:	EN50270:1999 EN61000-6-3:2001+A11:2004 BS EN 61010-1:2001 IEC 61010-1(2ed) DIN 6653-2:2004 (TRSK313) AS61010.1-2003 (Australia & New Zealand)
The above product complies with the requirements of the EMC Directive 89/336/EEC, as amended. The above product complies with the requirements of the Low Voltage Directive 73/23/EEC, as amended.	
The above product is approved for use in the USA and Canada. $_{c}CSA_{US}$, Master Contract 239512, Certificate 1909026 The above product is approved for use in Europe, CB Test Certificate NO44944	
The above product complies with the Australian and New Zealand EMC requirements for C-Tick marking	
Signed on behalf of: Analox Sensor Technology Ltd Date: 19 May 2008 Signed: Name: Mark Lewis Position: Managing Director	

SA127 Issue 2 September 2006