Детектор угарного газа 3050/AIR ALERT 3D

Руководство по эксплуатации

1 INTRODUCTION

The Instrument is designed to measure and indicate the concentration of Carbon Monoxide (CO) in the gas sample presented to its input port. The range of measurement can be specified by the user, but the present design is configured for 0 to 50ppm with a resolution of approximately 0.3ppm.

2 ABOUT THE 3050/3D

The Instrument is powered from an SELV (Safety Extra Low Power) PSU (Power Supply Unit). The PSU input voltage is 100-240Vdc (50-60Hz) and the PSU output voltage to the instrument is 9Vdc. Current consumption is approximately 30 mA.

Provision is made to operate external audible and visual alarms. The Alarm circuit also incorporates a low voltage relay which has 'volt-free' contacts, permitting connection of remote warning devices. The relay is configured in the 'Fail-Safe' mode, i.e. it is energised in the Non-Alarm state and releases in any alarm condition or in the event of a power failure.

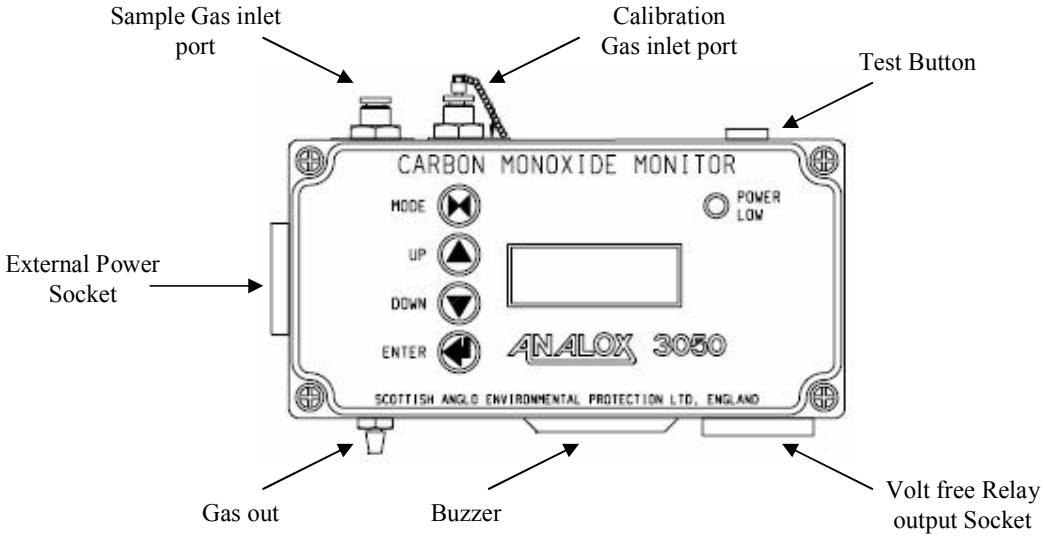
The Instrument is housed in an ABS box measuring 160mm x 80mm x 85mm - the entire electronics being built in the lid of the box, to permit easy installation and servicing.

CO concentration is measured using an Electro-Chemical sensor followed by high grade amplification. The resultant electrical signal is then passed to a Microprocessor, which carries out the following functions:

a. Linearisation of the signal using Calibration constants.
b. Conversion of the signal into a form, suitable for the Instrument Display.
c. Monitoring for an Alarm condition with reference to a preset level.
d. Provide facilities for Audible and Visual Gas Alarms.
e. Provide Simple means of user Calibration.
f. Provide Authorised Personnel access to change the Alarm Setpoint.
g. Carry out continuous monitoring of the Battery condition and warn when Low.

3 INSTRUMENT DETAILS

ANALOX 3050/AIR ALERT 3D



SELV PSU

The 3050/3D is powered using a SELV (Safety Extra Low Power) PSU (Power Supply Unit). The PSU input voltage is 100-240Vdc (50-60Hz) and the PSU output voltage to the instrument is 9Vdc.

The mains plug of the PSU should be connected to a supply of 100-240Vdc (50-60Hz).

Connection of the PSU plug to the instrument socket is very simple. The plug and socket are 'Polarised' to ensure that the plug can only fit into the socket in the correct orientation only.

Position the plug so that it mates with the socket and then push the plug fully in to the socket. Push the plug sleeve up against the enclosure and then rotate it clockwise until the screw thread is tightened to secure it in place.

To remove the plug, unscrew the plug sleeve and then remove the plug from the socket.

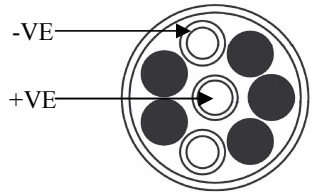
3.1 Instrument Input and Output connections

Sample Gas Inlet Port - This is located on the upper face of the enclosure. This is a push-fit connector used to pass the sample gas across the instrument sensor.

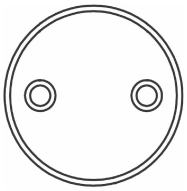
Calibration Gas Inlet Port – This is located on the upper face of the enclosure. This is a push-fit connector used to pass calibration gas across the instrument sensor.

Gas Outlet – This is located on the lower face of the enclosure. This is a barbed connector used to exhaust gas from the instrument sensor.

External Power Socket – This is located on the left face of the enclosure. The electrical connections are shown below. For safety the power supply plug can only be fitted into the socket in one orientation



Volt Free Relay Output Socket – This is located on the lower face of the enclosure. When connecting to an external device the polarity is unimportant.
NOTE: The Volt free contacts MUST only be connected to another SELV or SELV equivalent source or a Class 3 device.



4 OPERATION

4.1 Switching On

When the Instrument is first switched on, it carries out a self test procedure and during this operation the display will show the word ' tESt '. This procedure takes approximately 5 seconds. This is followed by a 20 Second period to allow the electro-chemical sensor to stabilise, during which, the Display is Clamped to read 000.0 . After this time, the Instrument is ready to monitor the input gas.

Carbon Monoxide concentration in the input sample is indicated on the 4 Digit LCD display.

Pressing the TEST button at any time will test the audible alarm. This should be done as a matter of course each time the instrument is used to ensure that the buzzer is operating correctly.

4.2 Gas Alarm

As long as the measured CO concentration remains below the pre-set alarm level the relay will be Energised and the Normally Open Contact will be connected to the Common Contact. The Alarm LED and Audible alarm will be inactive.

If the CO concentration exceeds the pre-set alarm level then the following actions will take place:

a. The Relay will De-energise resulting in the Common Contact connecting to the Normally Closed Contact and breaking the connection to the Normally Open Contact.
b. The Alarm LED will be turned on.
c. The Audible Alarm will be activated.

These conditions will prevail until the measured CO concentration drops 1 ppm below the alarm setpoint. The difference between the points at which the alarm triggers and clears is called Hysteresis and is used to stop the Instrument going rapidly in and out of alarm when measurements are being taken at or very near the setpoint.

The Alarm Setpoint value depends on Local Health and Safety regulations and varies depending on Country of use. The Instruments are normally pre-set at the factory to 10ppm but Authorised Personnel may be instructed on the procedure for changing this setting (See Appendix A to this document).

5 CALIBRATION

This is a fairly simple procedure which requires a source of clean, CO free air and a mixture of CO / Air of concentration approximately 50ppm CO.

IT SHOULD BE CARRIED OUT WITH CARE, SINCE THE ACCURACY OF THE SUBSEQUENT READINGS IS ONLY AS GOOD AS THE ACCURACY OF THE LAST CALIBRATION.

The procedure uses the Four Membrane keys on the front panel, just to the left of the display, marked 'MODE' , 'UP' , 'DOWN' and 'ENTER' . The keys carry

out simple functions allowing the 'Zero' and 'Span' calibration points to be entered.

The information entered during this procedure is stored in Non-Volatile Memory which means that it is not lost when the Instrument is switched off.

5.1 Button functions

a. 'MODE' button - is used to initiate the calibration process. It also acts as an Abort key, if say the Calibration process is entered accidentally or the user realises that a wrong value has been entered and he wishes to cancel the operation.

b. 'UP' button - is used to Increment the displayed value, during the Span Calibration process. 1 is added to the displayed value, each time the key is pressed and released.

c. 'DOWN' button - is used to Decrement the displayed value, during the Span Calibration process. 1 is subtracted from the displayed value, each time the key is pressed and released.

d. 'ENTER' button - is used to confirm the end of each step in the Calibration procedure. When pressed and released it automatically advances the calibration process to the next level.

During the first two stages of the calibration procedure, a 3 digit number will appear on the display. These numbers DO NOT actually mean anything to the user, they are only used to indicate a Steady input condition.

5.2 Setting Zero

Connect a source of Clean Air to the Calibration Gas Inlet and adjust the flow rate to between 30 and 60 Litres/Hour. Press and release the 'MODE' Key Once. The Display will show three short horizontal bars (≡) in the Left hand digit position followed by three numbers. As the 'Zero' gas flows, the numbers on the display will change. Wait until the reading is steady (the right hand digit may flicker ±1 Digit) and then press the 'ENTER' Key. The Display will change to show ' Cxxx ' where xxx are the three digits which were displayed before the 'ENTER' key was pressed.

5.3 Setting Span

Connect a source of Air/CO having a concentration of approximately 50ppm CO and adjust the flow rate to between 30 and 60 Litres/Hour. Observe the display and ensure that the numeric value is increasing. Wait until the reading is steady - this should occur at about 200 with a 50ppm Air/CO mixture. When the reading is steady press and release the 'ENTER' key. The Display will then change to show 'E050'.

NOTE: If a reading of between 180 and 240 cannot be achieved then the sensor is probably exhausted. The Calibration procedure should be aborted by pressing the 'MODE' key and the Sensor should be replaced (See Section 3.2 below).

5.4 Setting the Gas Concentration

When the Display is showing 'E050' , pressing and releasing the 'UP' Key will add 1 to the displayed value and pressing the 'DOWN' Key will subtract 1 from the displayed value. Use the 'UP' and 'DOWN' keys to change the displayed reading to match the actual concentration of the Air/CO mixture being used. When the Air/CO concentration reading is correct, press the 'ENTER' key and the process is complete.

Note: There is built-in Upper and Lower limits for the Air/CO gas concentration. These are set at 60 ppm and 25 ppm respectively. Values outside these limits, cannot be entered during the process in 5.4

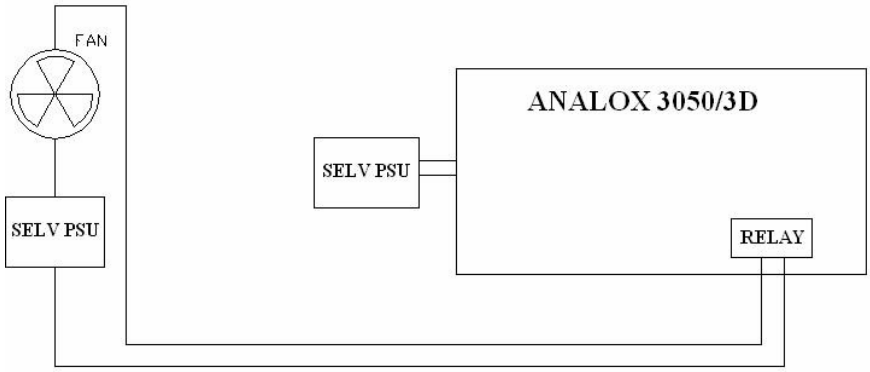
The data collected during the Calibration process is not transferred to the Non-Volatile memory until the final operation of the 'ENTER' key in step 5.4 . The procedure may be aborted at any time up to this point simply by pressing the 'MODE' key. The data entered during the previous calibration will then be used to linearise the measurement.

Pressing the keys in combinations other than as described above will have no effect on the Instrument's operation. During the operation of the Keys the actual effect of the key only takes place when it is released.

6 RELAY CONNECTION

The internal relay is a 'Volt-Free' contact relay, rated 24Vdc 1Amp.
The relay is configured in the 'Fail-Safe' mode, i.e. it is energised in the Non-Alarm state and releases in any alarm condition or in the event of a power failure.

Shown below is an example of how the relay can be used to operate an external extractor fan when the gas alarm is activated.



e.g. Relay Connection

NOTE: The Volt free contacts MUST only be connected to another SELV or SELV equivalent source or a Class 3 device.

7 MAINTENANCE

7.1 Sensor Replacement

The Electrochemical Sensor has a life, in air, of about 18 months. However, this will be shortened if it is constantly subjected to Carbon Monoxide, particularly high concentrations.

a. Switch off the Instrument and remove the DC supply connector. Undo the four corner screws in the front panel (they are captive in the front panel) and carefully withdraw the panel from the housing body. Disconnect the wiring loom from the front panel by releasing the small retaining clips on the White plastic connectors and remove the front panel. Locate the Sensor Cell - this is a 32mm diameter component at the end of the printed circuit board. It is a plug-in device having 4 small pins. Carefully ease the sensor out of its 4 sockets.

b. Replacement sensors are supplied in a Gas tight package, which should NOT be opened until they are to be fitted in an Instrument. Examine the New sensor and note that there is a thin spring shorting clip fitted to three of the gold pins. Remove this spring clip and carefully fit the new sensor in to the 4 PCB sockets, ensuring that it is secure. Check that the 'O' ring seal is correctly located on the front of the sensor and that there is no foreign matter on the face of the seal. At this point, it is a good policy to make a note of the sensor serial number and enter the date of replacement in a record book, so that the next replacement may be anticipated.

c. Refit the White plastic connector on the front panel and refit the front panel to the housing body checking that the orientation is correct i.e. that the sensor will mate with the gas flow adaptor in the housing body. Secure the 4 corner screws and re-fit the power supply connector.

d. Switch on the Instrument and allow the new sensor to settle for about 30 minutes, and then carry out a full calibration procedure as described in section 5 above.

There are no other User-Serviceable parts in the Instrument. If the Instrument fails to perform as expected, then contact your Distributor for assistance.

8 SPECIFICATION

Range	3D-3050 0-50ppm (other ranges on request)
Resolution	0.3% CO
Accuracy	+/- 2% of scale
Response Time	<30 seconds to T90
Sensor Type	Electrochemical
Sensor Life	18 months in air
Max. Pressure at Inlet	2 BarG (3050), 5 BarG (3D)
Power Supply	9vDC from 100/240V AC power pack supplied*
Alarms	audible 90db Horn/Visual High intensity LED
Display	LCD 4-digit
Alarm Relay	1 amp at 24v DC volt free contracts
Alarm Set Points	Normally 10ppm
Alarm Hysteresis	1 ppm
Dimensions	160 x 80 x 85 mm
Pressure	Up to 7 Bar through the optional restriction

*The PSU supplied with the instrument is SELV (Safety Extra Low Power). If an alternative is used it must be SELV equivalent with a maximum available current (output) of 8 Amps. The PSU must be approved to a relevant BS EN/IEC safety standard.

9 ENVIRONMENTAL CONDITIONS

The Analox 3050/3D is designed to be used in a dust free, dry environment across a temperature range of 0-40°C.

10 GENERAL CARE

- Keep the instrument free from dust
- Keep the instrument out of direct sunlight
- The instrument should be protected from salt water spray at all times
- Use a damp cloth to clean the instrument

11 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.

APPENDIX A

IT IS VERY IMPORTANT THAT THE FOLLOWING ROUTINES ARE ONLY CARRIED OUT BY AUTHORISED PERSONNEL.

THEY DIRECTLY AFFECT THE ACCURACY OF THE INSTRUMENT IN A WAY WHICH WILL NOT BE OBVIOUS TO THE USER.

IF EITHER ROUTINE IS IMPLEMENTED, THEN THE OPERATION SHOULD BE RECORDED FOR FUTURE REFERENCE.

RESETTING THE ALARM POINT

Since the Safe working limits for Toxic Gas Concentrations are laid down by Health and Safety organisations and the alarm setpoints are related to these limits, it is recommended that access to the procedure for changing the setpoint is limited to Authorised Personnel.
It is recognised that different Countries use different limits and this instrument can have its setpoint adjusted to any level between 5 and 15 ppm CO in Air, to a resolution of 1 ppm.

PROCEDURE

Switch off the Instrument and whilst holding down the 'UP' Key, switch on again. Release the 'UP' Key. The Display will show 'A010' where 010 is the default value, in ppm, of the Gas Alarm Setpoint. Use the 'UP' or 'DOWN' key to increase or decrease the setpoint, within the limits of 5 - 15 ppm. When the desired value is displayed press the 'ENTER' key. The Instrument will then return to its normal Power-On and test routine.
Note that the new setpoint is recorded in Non-Volatile Memory when the 'ENTER' key is pressed and will be used during all subsequent operations until it is changed again.

ENTERING CALIBRATION DEFAULT VALUES

If for any reason the Instrument has become mal-adjusted due to incorrect operating procedure or other reason and Calibration gas is not available to allow a correct Re-calibration procedure to be carried out, a set of 'Default' calibration parameters can be inserted into the Instrument memory. This will allow the Instrument to at least operate correctly but with possible reduced accuracy, since the values entered will be the theoretically ideal values and not the real values as seen during a Calibration procedure.

PROCEDURE

Switch off the Instrument and whilst holding down the 'ENTER' Key, switch on again. Release the 'ENTER' Key.
The Display will show 'dFLt' . Press the 'ENTER' Key again and the Default values will be transferred and the Instrument begin its normal start-up procedure.

По вопросам продаж и поддержки обращайтесь:

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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
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Новосибирск (383)227-86-73
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Орел (4862)44-53-42
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