



ANALOX

looking after the air **YOU** breathe®

ANALOX 7000 Relative Humidity Monitor

User Manual

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WARNING

These instructions should be read and understood by all individuals who will be responsible for operation of this Analyser. The actions taken as a result of the measured values must be in strict accordance with the Company and Government Regulations.

Introduction

The ANALOX 7000 Relative Humidity Monitor provides a continuous digital display of RH% in the ambient gas in the area of the sensor unit. The instrument displays the measured value on a 4 Digit red LED configured to read over the range 0.0% to 100.0%.

The sensor assembly incorporates a Variable capacitance type Detector together with the necessary electronic circuitry to produce a 4-20 mA output signal, proportional to the measured RH%. The Instrument is easy to calibrate using the 'ZERO' and 'CAL' adjustments on the front panel. User adjustable high and low audio/visual alarms, together with relays are fitted as standard and these may be adjusted over the full range of the instrument. The relay outputs are available on the Instrument rear panel. Several power supply options are fitted on all instruments, as standard. Input 1 is a standard IEC 3 pin connector for ac power in the range 115 volts to 230 volts 50/60 Hz WITHOUT switching or selecting. Input 2 is a standard co-axial battery charger type connector or a 2 way screw terminal type connector for low voltage power input in the following range.

DC 12v to 32v

Note: Polarity of connection of DC is NOT Important.

The internal power supply unit also incorporates a re-chargeable nickel cadmium battery, which provides up to 1 hour of normal operation in the event of external power failure. External power status and internal battery condition are indicated by an LED on the front panel.

Calibration

To carry out calibration of the instrument the user will require two reference Capsules: a '0% RH Ref' and a '75% RH Ref'.

- 1. Zero Adjustment:** Locate the detector guard grid on the end of the sensor unit and CAREFULLY unscrew and remove the guard. Avoid touching the delicate detector element within the guard. Unscrew the stopper from the end of the 'ZERO' Capsule and carefully fit the capsule over the detector assembly and screw down until the '0' ring makes a good seal. Within about 10 Minutes, the atmosphere inside the capsule will have stabilised to within 1% of true Zero. If greater



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accuracy is required, it will be necessary to wait several hours - preferable overnight, after which the reference will reach within 0.25% of true Zero.

Using the trimming tool provided with the instrument or a small instrument screwdriver, adjust the 'ZERO' control until the display reads 000.0 Note: The Low alarm will trip during the Zero setting process. Taking care not to touch the detector, remove the '0%' capsule and immediately replace the stopper on the capsule.

- 2. Span Adjustment:** Unscrew the stopper from the '75% RH' Capsule. If droplets of moisture are present on the inside wall of the Capsule they should be removed using a tissue. Fit the Capsule over the detector assembly and screw down until the 'O' ring makes a good seal. Within 15 minutes the atmosphere inside the Capsule should stabilise to within 2% of 75% RH at 20 - 25°C. For greater accuracy the Capsule should be left in place for several hours when the reference will reach within 0.25% of 75% RH. When the reading is steady, adjust the 'CAL' control on the instrument front panel until the LED reads 075.0%. Turning the control clockwise will increase the reading. This completes the calibration process.

Remove the '75% Ref' Capsule, again taking care not to touch the detector assembly and immediately replace the stopper cap on the Capsule. Refit the detector guard grid on the Sensor assembly.

Reference Accuracy: When new, the Zero capsule should provide a reference of 0% RH to +0.25% after 10 hours or 1 - 1.25% after only 10 minutes. The 75% RH capsule should be within + /- 2% of 75% RH at 20 - 25°C within 2 minutes. With age and depending on the time exposed to atmosphere, both capsules will gradually drift toward the ambient humidity in which they are used. Each capsule can withstand exposure to atmosphere in excess of 1 hour, without noticeable error - equivalent to about 350 operations.

If it is suspected that the capsules are no longer active a simple test is to slightly warm the capsule when it is fitted to the sensor - grasping tightly in the hand is usually sufficient. If still active, the reading will increase slightly and then recover. If it is no longer active, the reading will decrease. It is estimated that the capsule life will exceed 1 year in normal use, if care is taken to replace the stoppers immediately after use.

Replacement Calibration capsules are available from Analox Ltd.
Part Number – SA1P16RH



Alarm Operation

If an alarm condition occurs, the internal audible buzzer will sound intermittently and the yellow 'HORN' LED will flash, thereby identifying which instrument is causing the alarm. The appropriate red 'HI' or 'LO' LED will indicate the alarm level. The audible alarm can then be silenced by pressing the 'MUTE' button; this action will also turn off the yellow 'HORN' LED. If the reading is still in an alarm condition, the red 'HI' or 'LO' LED will continue to flash until the measured level returns within the normal band. The red LED will then turn off. If an alarm condition occurs and the measured value then returns to normal before the 'MUTE' button is pressed, then the audible and visual alarms will continue to be active until the 'MUTE' button is pressed. This facility allows the operator to be aware of any alarm occurrence whilst the instrument was unattended.

The alarms have a built-in Hysteresis of approximately 0.25% RH to overcome 'nuisance' triggering when measuring near the set points. This means that if a high alarm occurs with a set point of 75% then having been acknowledged by pressing the MUTE button, the alarm will not clear until the humidity level drops below 74.75%.

Alarm Setting

Before any Adjustments Are made to the 'SET ALARM' controls, the operator should release the locks on the knobs. This is done by moving the small lever located at the edge of the control until the knob turns freely. After adjustment, the locks should be reset in order to prevent accidental movement.

The 'SET HI'/'SET LO' toggle switch is normally biased to its central position to

read the measured Oxygen level. The high alarm trip point is set by moving this switch upward and adjusting the 'SET HI ALARM' control knob until the desired 'HI ALARM' trip level is displayed. The Low alarm trip point is set by moving the switch downward and adjusting the 'SET LO ALARM' control knob until the desired level is displayed.

If the operator only requires to check the currently set alarm points this may be done by just pressing the 'SET HI'/'SET LO' switch to the appropriate position, and reading the levels on the LED Display.

Battery Backup

If the external power supply to the Instrument fails, the power supply circuitry in the instrument will automatically change over to the internal battery if fitted. When the instrument is being driven by its internal battery, the green 'STANDBY' LED on the front panel will be lit and will remain on until external power is restored. The internal battery will provide normal operation for approximately 1 hour. When the battery has been discharged to such a level that instrument operation below this level would not be reliable, then a trip circuit will turn off the complete instrument and indicate this state by flashing the green 'STANDBY' LED at approximately 1 second intervals.



Interference

Whilst all reasonable precautions have been taken within the Instrument circuitry and the case is RF screened, it is still possible, in common with other instruments, that very strong, local Radio Frequency fields could cause interference. This will show up as erratic readings on the LED Display. Where possible, RF sources such as Portable Radio Transmitters or Telephones should not be operated very close to the instrument.

Installation

The 1000 Range of Analox Instruments are available in two forms:

1. Suitable for insertion into a 19" Rack Frame, occupying $\frac{1}{4}$ of a standard 3U Frame.
2. Suitable for direct mounting in an existing instrument panel.

For details of dimensions, cut outs and mounting centres, refer to the specifications on Page 1 of this handbook.

The Frame mounting version should be inserted in a suitable rack and secured by the 4 corner screws and bushes supplied with the Instrument. Refer to connection details below.

When fitting the Panel mounted version, the bushes should be left attached to the instrument as supplied and the whole assembly inserted into the panel, easing the bushes into the 10mm holes. Tightening the 4 screws will expand the bushes, locking them into the panel. If the instrument is subsequently removed from the panel, it is only necessary to remove the screws – the bushes should remain captive in the panel.

Rear Panel Connections

All Inputs to and outputs from the Instrument are connected via various sockets and terminals on the rear panel of the Instrument. All connections are identified by labels on the rear panel but are repeated here for convenience.

Power Supply

Power for the Instrument may be derived from 1 of 2 options:

1. AC Power in the range 115v to 230v 50/60 Hz and connected via a standard IEC 3 pin plug/socket. A suitable lead is supplied with the Instrument. Note that NO voltage selection is required when using this input the instrument will operate from any voltage within the stated range. The fuse for this power input is mounted in the rear panel and is rated at 1 Amp 'T' type.
2. Low Voltage DC in the range 12v to 32v with a ripple not exceeding 1 volt and connected via the battery charger type connector or the 2 way screw terminal type connector. THE LOW VOLTAGE D.C. SUPPLY SHOULD BE EXTERNALLY FUSED at a rating of 1 Amp using a 'T'



type delay fuse. Note that connection polarity is NOT important when using the DC input.

Signal Inputs and Outputs

All signal inputs and outputs are made to removable, screw terminal plugs. The main connector is located down the right side of the rear panel, when viewed from the rear.

Several signal input options are fitted to the Instruments. In the case of the Relative Humidity Model 7000 Instrument, which uses the 4 - 20mA Input, the sensor should be connected to terminals 14 and 18. Pin 18 is the sensor excitation voltage and should be connected to the positive terminal of the sensor.

NOTE: Ensure that there is NO LINK between terminals 15 and 16 - this is only fitted when the instrument is used with a voltage input. Other signal inputs are not used on the 7000 Instrument.

Two Analog outputs, proportional to the measured input signal are available from the Instrument. Pin 8 provides 0 - 1 Volt representing 0 – 100% RH Pin 9 provides a 4-20 mA current representing 0 – 100% RH Pin 7 is the Common connection for both outputs. The Voltage output should NOT be connected to a load less than 10,000 Ohms. The Current output is powered from an internal nominal 24 Volt supply and can operate into a load from 50 Ohms to 500 Ohms.

Alarm Relays

Two relays can be fitted as an optional extra, these operate in conjunction with the HI and LO alarms. The relays have single pole changed over contact arrangements, rated to switch up to 7 amps @ 240v AC or 30v DC.

The relays may be configured to be energised or de-energised, when the instrument is in a non alarm state. If the relays are configured to be in a normally energised state, this will provide a 'Fail-Safe' facility in that a total power failure will cause the relays to release and signal an alarm condition. However, the extra power drawn by the relays being energised for most of the time will reduce the time for which the Instrument will operate on 'Battery Back-up'. Contact arrangement is shown on the rear panel. Instruments normally leave the factory with the relays configured to ENERGISE IN ALARM conditions.

Repair and Service

Apart from periodic Sensor calibration, the Instrument has been designed to provide long, trouble-free service. However, in the event of a fault condition arising, contact your local distributor or Analox Ltd., whose Address, telephone, fax and email appear on the front page of this handbook.



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The Instrument contains complex, precision circuitry which requires special test equipment to ensure correct internal set-up and calibration. Internal repairs or adjustments by the user are therefore NOT recommended.

Analox Ltd WILL NOT ACCEPT RESPONSIBILITY FOR ANY EVENTS OCCURING AS A RESULT OF UNAUTHORISED ADJUSTMENTS OR REPAIRS TO THE INSTRUMENT.



Specification (Electrical)

Range:	0.0% - 100.0%
Resolution:	High 0.1%RH Low 0.1%RH
Accuracy:	+/- 1% of readout
Temperature Effect:	+/- 0.1% of readout per °C
Power Supply: Option	115v to 230v AC 50/60Hz without switching. 12v to 32v DC Max Ripple 1v
Outputs:	0 – 1 Volt for chart recorder 4 – 20mA internally powered
Optional Extra:	Battery Backup 5 Volt 1.4aH Nickel Cadmium Backup time Approx. 1 hour
Alarm Relays:	2 x Single Pole Changeover Rated 7 amp 240v AC, 30v DC Configurable to be energised or De-energised when in Non-Alarm condition.



Specification (Mechanical)

Dimensions	Rack Mounted Version	
	Depth Overall:	245mm
	Height Overall:	129mm
	Width Overall:	107mm
	(1/4 19" x 3U Rack)	
	Weight:	2kg
	Panel Mounted Version	
	Depth Overall:	245mm
	Height Overall:	133mm
	Width Overall:	120mm
	Weight:	2kg
	Panel Cut-out Aperture:	
	Height:	112mm
	Width:	102mm
Mounting Centres		
Holes:	4 x 10mm	
Height:	122.5mm	
Width:	91.4mm	
Centered on cut-out		
Environmental	Operating Temperature:	0 to 60°C
	Storage Temperature:	-40 to +85°C
	Relative Humidity:	95% at 40°C
		Non Condensing



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.