

MiniMAX XT

PERSONAL GAS MONITOR



USER AND
MAINTENANCE MANUAL

 Lumidor

A Division of Zellweger Analytics

1. INTRODUCTION

The MiniMAX XT is a disposable, easy to use, personal gas monitor, designed for 2 years continuous monitoring of the atmosphere for potentially hazardous levels of Oxygen deficiency or toxic gas.

SAFETY INFORMATION



- Substitution of components may impair intrinsic safety
- Do not activate the detector after the date on the packaging
- Perform a self-test prior to each day's use
- Do not use in oxygen-enriched atmospheres
- Before each day's use test the MiniMAX XT with a known concentration of gas that is above the alarm levels of the instrument, and ensure the instrument produces an alarm.

IMPORTANT NOTICE

Lumidor can take no responsibility for use of its equipment if this is not done in accordance with the appropriate issue and/or amendment of the relevant manual. If further details are required which do not appear in this manual, contact Lumidor or their agent.

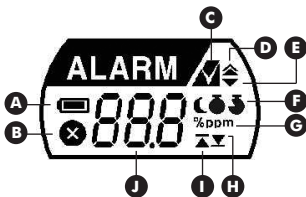
Lumidor shall not be liable for any incidental or consequential damages in connection with any deletions, errors or omissions in this Manual.

2. ACTIVATING THE DETECTOR

Press the test button as shown below. The detector will emit 5 beeps and 5 flashes. MiniMAX XT will warm up for one minute, showing a countdown in seconds and the Test Pass icon (✔) will be flashing. It will then set the remaining-life clock and perform a self-test. If the detector passes the Test Pass icon (✔) is displayed. If the Test Fail icon (✘) is displayed then the detector has failed the self-test – please refer to the instructions in Section 8.



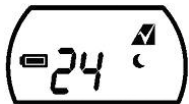
3. DISPLAY FEATURES



- (A) Battery
- (B) Test Fail icon
- (C) Test Pass icon
- (D) Level 1 alarm: CO, H₂S, O₂
Level 2 alarm: CO, H₂S
- (E) Level 2 alarm: O₂
- (F) Lifetime: Months ☾, days ●, hours ⚡
- (G) Concentration units
- (H) Low peak (O₂)
- (I) High peak (CO, H₂S)
- (J) Readout



4. REMAINING LIFETIME CLOCK

The remaining lifetime clock indicates how much longer the detector will operate. This is shown on the display as a countdown of remaining months (indicated by the ☾ icon), then days (●) and finally hours (⚡). The example to the right shows 24 months remaining.



5. GAS ALARMS

The MiniMAX XT has two levels of gas alarm, of which the level 2 alarm is more urgent than the level 1 alarm. The alarm setpoints are:

Gas Type	Level 1 Alarm	Level 2 Alarm		
H ₂ S	10 ppm	15 ppm		
CO	35 ppm	100 ppm		
O ₂	23.5%v/v	19.5%v/v		
Alarm Level	Display	Audible Alarm	Visual Alarm	
Level 1 alarm		3 beeps per second	3 flashes per second	
Level 2 alarm		5 beeps per second	5 flashes per second	

Note: When the detected gas levels returns to a safe level the gas alarm will stop. The user cannot cancel an alarm.

For units fitted with a vibrating alarm, the unit will vibrate for level 1 and level 2 alarms.

6. GAS CONCENTRATION DISPLAY

Should the MiniMAX XT unit be exposed to a level of gas in excess of the alarm setpoints the unit will display the concentration of the gas. If the measured reading exceeds the range of the instrument then the numerical digits will flash.

7. MAXIMUM GAS READING

The MiniMAX XT records the maximum readings measured under an alarm condition, and records the number of hours since this occurred. As each new higher level of gas is detected this counter is reset to zero, and after 24 hours has elapsed the counter is also reset to zero hours.

The maximum gas readings (minimum for Oxygen) can be viewed by pressing the Test button within 24 hours of the gas alarm. This will cause the instrument to perform a self-test (see Section 8), after which the alarm setpoints and the maximum readings will be displayed. For instance,

a) the level 1 and level 2 alarm setpoints



Level 1 CO



Level 2 CO



Level 1 O₂

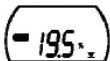


Level 2 O₂

b) the maximum reading measured

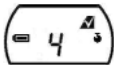


Level 1 CO



Level 2 CO

- c) the time elapsed since the maximum reading occurred in hours
(e.g. 4 hours)



4 hours

8. PERFORMING A SELF-TEST

When the Test button is pressed the unit checks the sensor, circuit, batteries, and audible and visual alarms and vibrating alarm (where fitted).

After 24 hours has elapsed since the self-test was last performed the Test Pass icon (☑) will be blinking. The self-test must then be performed, by pressing the Test button. The detector will do the following:

- Turn on all the display elements
- Tests the audible and visual alarms (and vibrating alarm if fitted)
- Check the battery, electronic circuit and sensor
- Perform a sensor test
- Display the level 1 and level 2 alarm setpoints
- Display the maximum (minimum for O₂) gas reading (if such a reading has occurred)
- Display the time elapsed since this reading in hours (within last 24 hours), if such a reading has occurred

- The result of the self-test as follows:

Self-Test Result	Display	Audible Alarm	Visual Alarm
Pass	✔	None	None
Fail	✘	1 long beep	1 flash

If the self-test fails repeat the self-test. The MiniMAX XT will warm up for one minute before the next self-test is performed. If it fails three consecutive times then the detector will display an error code (see Section 11).

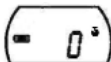
Additionally, the MiniMAX XT will periodically check its battery, electronic circuit and sensor. If it fails the Test Fail icon (✘) will be shown and the Test Pass icon (✔) will blink. If it passes then the Test Pass icon will be displayed.

9. END OF LIFE ALARM

When the MiniMAX XT has less than 1 day of remaining life it will flash the digits, as below:



End of Life Warning



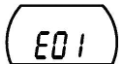
End of Life Reached

When the MiniMAX XT's life has ended the display will blink as shown above, the audible will beep once every 15 seconds, and the visual will flash once every 15 seconds, (and if fitted the vibrator will operate once every 15 seconds) until the Test button is pressed. The audible will then be turned off, and the detector will shutdown, displaying the relevant error code (see Section 11).

10. SAFETY SHUTDOWN

In the event that the battery runs out before the end of life is reached (due to excessive alarms) the battery icon will blink, the audible alarm will beep once every 15 seconds, and the visual alarm will flash once every 15 seconds, until the Test button is pressed. The audible will then be turned off, and the detector will shutdown. A shutdown condition can also occur due to failure of the electronic circuitry or sensor. The relevant error code is shown (Section 11).

11. ERROR CODES



Sensor Output Range Error

Error Code

E 01

E 02

E 04

E 08

E16

Reason

Sensor Output Range error

Battery has run out

End of Life reached


System Fault

EEPROM Error


12. ZERO CALIBRATION (OXYGEN SPAN)

This must be performed in a clean atmosphere, and it is recommended that it be performed daily or after any gas alarm. Depress the Test button for 5 seconds. The instrument will initiate a zero by showing a countdown showing a '0' for zero calibration, followed by a countdown from '20' to '00'.



When the zero calibration has been completed the MiniMAX XT will indicate a pass by beeping twice and flashing 3 times, and the () symbol will flash for 5 seconds.



If the zero calibration is not OK then the MiniMAX XT will give a single beep and a single flash, the Test Fail icon () will be displayed, and the zero calibration should be repeated.



13. OPTIONAL SPAN CALIBRATION (CO AND H₂S VERSIONS ONLY)

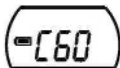
While the MiniMAX XT requires no calibration for its lifetime of 24 months there may be an occasion when it is deemed necessary to carry out a calibration, for instance, if a self-test fails. To carry out the span calibration the user requires the following additional equipment to be available, which can be purchased from Lumidor.

- Gas cylinder containing a known concentration calibration gas as follows:

Toxic Gas	Calibration concentration
H ₂ S	25ppm in air
CO	100ppm in air

- A gas regulator supplying the gas at 300ml/min flow rate
- Tubing for use between the regulator and the test adaptor (supplied)

Carry out the zero calibration procedure as described in Section 12. Only if the zero calibration is successful can a span calibration be performed. At the end of the zero calibration procedure, the test button must be pressed continuously for 5 seconds while the (▲) symbol is still flashing. Connect the gas cylinder and test adaptor and apply the gas at 300ml/min. The instrument will display a 'C' (for calibration), and count down from '60' to '00'.



If the span calibration is successful the unit will give 2 beeps, 3 flashes and displays the Test Pass icon (▲). If it fails the instrument gives a long beep, long flash and displays the Fail icon (⊗) (the calibration remains as it was before the span calibration was attempted).



Span calibration - pass



Span calibration – fail

14. WARRANTY

All products are designed and manufactured to the latest internationally recognized standards by Lumidor under a Quality Management system that is certified to ISO 9001. As such Lumidor warrants its products against defective parts and workmanship and will repair or (at its option) replace any instruments which are or may become defective under proper use within 24 months from date of activation provided this takes place prior to the Activate Before date. Defective goods must be returned to Lumidor premises accompanied by a detailed report.

Lumidor shall not be liable for any loss or damage whatsoever or howsoever occasioned which may be a direct or indirect result of the use or operation of the Contract Goods by the Buyer or any Party. This warranty covers instrument and parts sold to the Buyer only by authorised distributors, dealers and representatives as appointed by Lumidor.

This warranty supercedes all existing warranty statements and Lumidor makes no other warranty expressed or implied except as stated above. The warranties set out in this clause are not pro rata, i.e. the initial warranty period is not extended by virtue of any works carried out there under.

For full statement of warranty terms please contact Lumidor.

15. SPECIFICATIONS

Maximum Operating Life	2 years after activation, assuming 3 minutes of alarm per day													
Sensor Range	CO H ₂ S O ₂	0 to 1000 ppm (display: 0-200ppm) 0 to 100 ppm (display: 0-100ppm) 0 to 30%v/v (display: 0-25%v/v)												
Alarm Setpoints	CO H ₂ S O ₂	<table border="1"> <thead> <tr> <th></th> <th>Level 1</th> <th>Level 2</th> </tr> </thead> <tbody> <tr> <td>CO</td> <td>35 ppm</td> <td>100 ppm</td> </tr> <tr> <td>H₂S</td> <td>10 ppm</td> <td>15 ppm</td> </tr> <tr> <td>O₂</td> <td>23.5%</td> <td>19.5%</td> </tr> </tbody> </table>		Level 1	Level 2	CO	35 ppm	100 ppm	H ₂ S	10 ppm	15 ppm	O ₂	23.5%	19.5%
	Level 1	Level 2												
CO	35 ppm	100 ppm												
H ₂ S	10 ppm	15 ppm												
O ₂	23.5%	19.5%												
Calibration	CO/H ₂ S O ₂	Zero adjustment (optional Span) Span adjustment												
Shelf Life	12 months: CO/H ₂ S 6 months: O ₂													
Operating Temperature	-20°C to +50°C													
Humidity	5-95% RH (non-condensing)													
Audible Alarm	95db @ 10cm													
Visual Alarm	High intensity Red LEDs													
Vibrating alarm	Optional (adds 1.5g to weight of unit)													
Display	Custom LCD													
Sensor Type	Electrochemical													
Battery	3.6V non-replaceable Lithium battery													
IP Rating	IP54													

15. SPECIFICATIONS CONTINUED

Intrinsic Safety

Europe: EEX ia IIC T4 (ATEX)
UL/cUL: Class 1 Div 1 Groups A, B, C, D T4

RFI/EMC

CE EN50270:1999 and EN55011

Dimensions

3.4"(H) x 2"(W) x 1.1"D
(87mm x 50mm x 27mm)

Weight

CO/H ₂ S	71.5g (2.52 oz)
O ₂	80.8g (2.85 oz)

16. CONTACTING LUMIDOR

To contact Lumidor, call:

Tel: +1 954 433 7000
Tel toll free +1 800 433 7220 (USA and Canada only)

Or visit our web-site at www.lumidor.com

17. SENSOR CROSS-SENSITIVITY DATA

H₂S SureCell Cross Sensitivity Data

Gas Type	Concentration Applied (ppm)	Reading (ppm H₂S)
Carbon monoxide	50	0
Sulfur dioxide	2	0
Nitrogen dioxide	3	0
Nitric oxide	25	0
Chlorine	0.5	0
Hydrogen	100	0
Ethylene	100	0
Carbon dioxide	5000	0

CO SureCell Cross Sensitivity Data

Gas Type	Concentration Applied (ppm)	Reading (ppm CO)
Hydrogen sulfide	25	0
Sulfur dioxide	50	0.5
Nitrogen dioxide	800	20
Nitric oxide	50	8
Chlorine	2	0
Hydrogen	100	20
Ethylene	100	85
Ammonia	100	0

17. SENSOR CROSS-SENSITIVITY DATA CONTINUED

O₂ Cross Sensitivity Data

Gas Type	Concentration Applied	Reading (%v/v O₂)
Hydrogen	100%	-9%
Methane	100%	0
Nitrogen Dioxide	25ppm	0

18. ACCURACY STATEMENT

To achieve optimal accuracy for displayed gas concentrations, the XT should be supplied with a known concentration test gas, and if the readings applied are outside of 15% of the reading, a Span Calibration should be performed, under conditions of standard temperature, humidity and pressure.