

Quantum Production Limited

TELEPHONE NUMBER +44 (0) 1844 339993
FAX NUMBER: +44 (0) 1844 339996

ONE 2 ONE OXYGEN DEFICIENCY MONITOR & REPEATER ALARM

Installation and Operating Instructions

Doc: OP\ONE2ONE V5 (05/14)

Description and Application

The ONE 2 ONE O₂ monitor continually monitors the air surrounding the sensor on its base and provides visual and audible alarms when the monitored concentration of oxygen falls below pre-set 'Alarm' levels. The monitor is supplied with a remote repeater pre-wired with a cable that mimics the alarm and should be fitted at the entrance to the monitored room.

Alarm 1 Set 19.5% LOW OXYGEN ALARM
Alarm 2 Set 18% CRITICALLY LOW OXYGEN ALARM

Installation and Positioning

The ONE 2 ONE O₂ monitor should be fitted adjacent to the source of nitrogen. The monitor should be wall mounted by fixing firmly to a clean, dry, vertical surface using the two screws provided.

When deciding where to position the monitor, consideration should be given to
[i] whether the alarm lights and audible alarm can be easily seen and heard and
[ii] whether the unit is placed so that it is monitoring the required area adequately.

The ONE 2 ONE O₂ base unit monitors the surrounding air by natural convection and diffusion into the oxygen sensor through the sensor filter in its base. IT IS IMPORTANT TO ENSURE THAT THE SENSOR FILTER IS NEITHER COVERED NOR BLOCKED and that AIR CAN CIRCULATE FREELY AROUND THIS FILTER AND THE BASE OF THE UNIT.

The ONE 2 ONE O₂ monitor & repeater must not be exposed to, immersed in or sprayed with water, rain, solutions or other solvents.

Operation

The ONE 2 ONE O₂ monitor is powered by internal (non-rechargeable) batteries. It operates continuously and has no ON / OFF switch. The normal operation of the ONE 2 ONE O₂ monitor is summarised in the table below :

Condition	Audible Alarm (monitor & repeater)	19.5% Red LED (monitor)	18% Red LED (monitor)	Battery Amber LED (monitor)	Alarm Red LED & Audible (Repeater)
Normal (Monitored oxygen level above the 'Low Oxygen' threshold and battery voltage satisfactory).	Off	Off	Off	Off	Off
Low Oxygen Alarm - 19.5% (Monitored oxygen level below the 'Low Oxygen' but above the 'Critically Low Oxygen' thresholds).	Bleeping	Flashing	Off	Off	On
Critically Low Oxygen Alarm – 18% (Monitored oxygen level below the 'Critically Low Oxygen' threshold).	Bleeping	Flashing	Flashing	Off	On
Low Battery (Battery voltage unsatisfactory)	Constant tone	Off	Off	Flashing	On

In the 'Normal' condition (monitored oxygen concentration is above the 'Low Oxygen Alarm' threshold and the internal battery voltage is satisfactory) The One 2 One O₂ repeater will display the actual concentration of oxygen measured at the base monitor. All LED's will be off and both audible units will be off.

If the Low Battery condition is observed the ONE 2 ONE O₂ system should be withdrawn from service immediately as it may no longer operate correctly. A replacement Sensor-Battery Pack (Part number One2One-RS) should then be fitted.

The Sensor-Battery pack within the ONE 2 ONE O₂ system must be replaced on or before the date shown on the label which is found on the side of the product. The sensor – battery pack has a 2 year life and should be replaced every two years.

Testing and Calibration

The ONE 2 ONE O₂ system should be tested for functionality on a weekly basis. If the ONE 2 ONE O₂ system fails a properly constituted functionality test, it should be withdrawn from service immediately. We recommend keeping a log of this test and recommend that it should be undertaken as part of routine fire alarm tests in order that staff should recognise the alarm and understand the evacuation procedure.

A functionality test involves admitting gas having an oxygen concentration marginally below the 'Critically Low Alarm' threshold to the sensor and checking that both the 'Low Oxygen' and 'Critically Low Oxygen' red LEDs flash and that the audible alarm bleeps.

This can be carried out using an appropriate test gas or otherwise by gently, slowly and continuously passing exhaled breath close to and in the direction of the sensor filter. The alarms should activate within 30 seconds. The ONE 2 ONE O₂ monitor should return to the normal (non-alarm) state within 60 seconds of fresh air being readmitted to the sensor.

The ONE 2 ONE O₂ system should be recalibrated at intervals of not longer than twelve month and the sensor optimised every month.

To perform a sensor optimisation

First, fresh dry air (or test gas with a concentration of 20.8% oxygen in balance of nitrogen) should be admitted to the sensor filter of the monitor for at least 60 seconds. Whilst still exposed to this gas, a fine blade instrument screwdriver (or trimtool) should be used to adjust the brass coloured calibration screw (20 turn potentiometer) which is located on the top of the monitor. The calibration screw should be adjusted until the Cal High and Cal Low LED's are illuminated when the green cal button is pressed on the top of the unit. If the upper 'Cal High' green light is off, rotate the screw clockwise. If the lower 'Cal Low' green LED is odd rotate the screw Anti-clockwise.

To perform a sensor calibration

Undertake the sensor optimisation procedure outlined above.

A test gas of 18.0% oxygen (balance nitrogen) should then be admitted to the sensor filter (ideally at a flow rate of 0.5 litres per minute). The 'Low Oxygen' and 'Critically Low Oxygen' red LEDs should both flash and the audible alarm bleep within 30 seconds.

When fresh air is admitted again to the sensor filter, the alarm indications should cancel within 60 seconds.

Maintenance

Other than the Sensor-Battery Pack there are no operator serviceable or replaceable parts. It is important that the weekly, monthly and annual checks described above are followed, in order to ensure that the monitor offers appropriate protection to the user for the life of the sensor/battery pack. Failure to do so may lead to false alarms

Technical Specification

Operating conditions Temperature -5 to + 45 °C (-20 to +50 at lower accuracy).
Humidity 0 to 99% RH non-condensing
Pressure range atmospheric +/-10%

Case material

Monitor Polycarbonate 120 x 80 x 55
Repeater Polycarbonate 120 x 80 x 55

Indications Low oxygen LED(monitor)
Critical oxygen LED(monitor)
Cal High LED(monitor)
Cal Low LED(monitor)
Status LED(monitor)
Battery LED(monitor)
Alarm LED(repeater)

LCD Fitted to repeater unit to indicate % oxygen level

Standard Alarm Thresholds(Special thresholds available on request)	Low Oxygen	19.5% oxygen(monitor)
	Critically Low Oxygen	18.2% oxygen
Response Time(for correctly calibrated unit)	Typically less than 10 secs. for alarms to activate when sensor subject to 18% oxygen test gas	
Working Lifetime of the Sensor-Battery Pack	The Sensor-Battery Pack must be replaced by The date shown on the label	

(The sensor has an expected operating life of two years in air whilst the battery lifetime depends on the proportion of its life the system spends in an alarm state. For a battery life of two years of normal operation the system typically can spend 26 days in continuous 'Low Oxygen' alarm state or 22 days in continuous 'Critically Low' alarm state.)

Quantum Production Limited

TELEPHONE NUMBER +44 (0) 1844 339993
FAX NUMBER: +44 (0) 1844 339996

Appendix A. Replacing the Sensor-Battery Pack

When replacing a Sensor-Battery Pack, five steps must be taken

- 1] The old sensor-battery pack must be removed
- 2] The new sensor-battery pack must be fitted
- 3] The system must be calibrated
- 4] The system must be tested.
- 5] The new 'Replace Sensor-Battery Pack by :.... ' label must be fitted.

1] Removal of the Old Sensor-Battery Packs.

The four corner screws retaining the front clear panel of the monitor must be unscrewed carefully and the front cover removed. Next, remove the four screws holding the face plate. Take care to prevent damage to the face plate as it may become scratched.

When the face plate panel has been removed the sensor may be pulled gently to remove from the holder and the battery pack can also be removed from the bottom of the enclosure. The lead must now be carefully disconnected from the PCB.

The four corner screws retaining the front clear panel of the repeater must be unscrewed carefully and the front cover removed. Next, remove the four screws holding the face plate. Take care to prevent damage to the face plate as it may become scratched.

When the face plate panel has been the battery pack can be removed from the bottom of the enclosure. The lead must now be carefully disconnected from the PCB.

2] Fitting the New Sensor-Battery Pack in the Monitor

Check that the 'Replace by..' date of the new Pack being inserted has not expired. Carefully insert the connector attached to the red and black wires of the battery into the connector of the monitor.. The connector is polarised and so can only be fitted one way round. Do NOT force the two halves of the connector together.

The Battery pack should carefully be inserted into the enclosure and the new sensor plugged in to its connector.

The face plate panel can now be replaced with the original four screws and the front panel refitted once again taking care not to scratch either part.

3] Fitting the New Battery Pack in the Repeater

Check that the 'Replace by..' date of the new Pack being inserted has not expired. Carefully insert the connector attached to the yellow & blue wires of the battery into the connector of the repeater.. The connector is polarised and so can only be fitted one way round. Do NOT force the two halves of the connector together.

The Battery pack should carefully be inserted into the enclosure . The face plate panel can now be replaced with the original four screws and the front panel refitted once again taking care not to scratch either part.

4] Calibrating the system after fitting a new Sensor-Battery Pack

After fitting a new Sensor-Battery Pack (or after reconnecting any Sensor-Battery Pack) the system **must be left for a minimum period of 2 hours before an accurate calibration is performed.**

To perform a calibration: First, fresh dry air (or test gas with a concentration of 20.8% oxygen in balance of nitrogen) must be admitted to the sensor filter of the monitor for at least 60 seconds and whilst still subject to this, a fine blade instrument screwdriver (or trimtool) should be used to adjust the brass coloured calibration screw (20 turn potentiometer) which is located on the top of the repeater unit. The calibration screw should be adjusted until the cal high and cal low LED's illuminate when the green calibration button is pressed.

5] Testing the system after fitting and calibrating a new Sensor-Battery Pack

This **must be performed following the calibration** of the system described in the section above.

A test gas of 18.0% oxygen (balance nitrogen) should be admitted to the sensor filter (ideally at a flow rate of 0.5 litre per minute). The 'Low Oxygen' and 'Critically Low Oxygen' red LED's should both flash and the audible alarm bleep within 30 seconds.

When fresh air is admitted again to the sensor filter, the alarm indications should cancel within 60 seconds.

6] Fitting the new 'Replace Sensor-Battery Pack by ...' labels

Two labels will be supplied loose with the replacement Sensor-Battery Packs. The backing paper should be removed and the self-adhesive label fitted should be fitted directly over the previous label (so that previous label is completely covered) on the base monitor and the repeater