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**POA500**  
**Trace Oxygen Analyzer**  
**Manual**

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Read this manual before using the analyzer. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this analyzer.

Please visit our website [www.phymetrix.ca](http://www.phymetrix.ca) for other products that may be applicable to your needs. Every effort has been made to ensure accuracy in the contents of this manual. Should there be any doubts to the accuracy of the content please contact the manufacturer. The contents of this manual are subject to change without notice.

The instructions, procedures, drawings, specifications and concepts contained in this manual are the property of Phymetrix Ltd., and shall not be used as the basis for the manufacture or sale of apparatus or services, or reproduced or copied or transmitted in any form or by any means without written permission.

### **Warranty**

While Phymetrix's instrument has no problem in materials and workmanship, the manufacturer shall have the right to make the decision to repair or replace the analyzer. The battery is not

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within the scope of this quality assurance. This warranty is effective from the date of delivery to the original purchaser. If Phymetrix determines that the equipment was defective, the warranty period is:

- one year from delivery for electronic or mechanical failures

If Phymetrix determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified, the repairs are not covered under this warranty.

Normal wear and tear, parts damaged by abuse, misuse, negligence or accidents are specifically excluded from the warranty. Purchaser acknowledges that in accepting and using this analyzer, notwithstanding any contrary term or provision in the purchaser's purchase order or otherwise, the only warranty extended by Phymetrix is the express warranty contained herein. Purchaser further acknowledges that there are no other warranties expressed or implied, including without limitation, the warranty of merchantability or fitness for a particular purpose; that there are no warranties which extend beyond the description of the face hereof; that no oral warranties, representations, or guarantees of any kind have been made by Phymetrix, its distributors or the

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agents of either of them, that in any way alter the terms of this warranty; that Phymetrix and its distributors shall in no event be liable for any consequential or incidental damages, including but not limited to injury to the person or property of the purchaser or others, and from other losses or expenses incurred by the purchaser arising from the use, operation, storage or maintenance of the product covered by the warranty; that Phymetrix's liability under this warranty is restricted to repair or replacement of defective parts at Phymetrix sole option; and that Phymetrix neither assumes nor authorizes any other person to assume for it any other warranty. The warranty shall be void if serial numbers affixed to the products are removed, obliterated or defaced.

### **Return Policy / Procedures**

If equipment malfunction is suspected or it is determined that the analyzer needs recalibration, please contact York Instrument, who is Phymetrix's general agent in China.

Communicate the instrument model number, serial number, application including oxygen concentration range being measured, and the details of the problem.

If the analyzer needs factory service you will be issued a RMA and shipping instructions.

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The factory will diagnose the equipment and upon determining the problem will notify you whether the terms of the warranty cover the required repair. If the costs are not covered you will need to approve the estimated cost in order to proceed with the repair.

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# 1 Introduction

POA500 trace oxygen analyzer is mainly used for online testing trace oxygen content, it's a high intelligent online continuous monitor, it can convert from the PPM level to the percentage concentration automatically, and various other measurement units. The trace oxygen analyzer has many distinct characteristics ,such as fast response time, stability, reliability making it a value added product for its low price. POA 500 finds it's presence in many industries, such as iron, steel, metallurgy, thermal power, petrochemical, chemical, coking, etc.

## **The Performance Characteristics:**

- Minimal sample gas requirement. Direct connection to instrument after removal of grease & dust
- User can set the high and low alarm value manually, allowing for automatic signalling.
- Multiple program settings available
- The analyzer has a high brightness LED lamp, allowing the interface to be clearly visible even in dark environments



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## **Application fields**

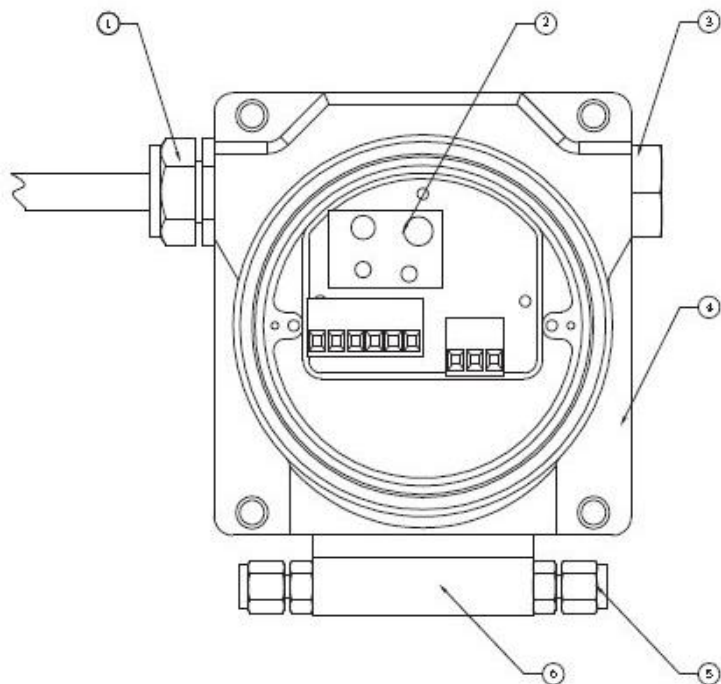
- Power plant - water treatment
- Paper - wastewater treatment
- Chemical refining - wastewater treatment
- Water and wastewater treatment plant
- Semiconductor production processes
- Metallurgical and mining production processes
- Food and beverage production processes
- Pharmaceutical industry biological reactions and fermentation processes

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## 2 Installation

### 2.1 Wiring

#### 1 DC power line connection



Remove the analyzer capping by loosening the screw. On the left

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side of the panel, open the panel gently and you will see the circuit board as shown in the figure.

You can see three sockets of the connecting terminal in the circuit board cavity

The table below identifies the circuit identification

No.	Circuit Identification	Definition
1	PWR	+24V
2	GND	ground wire
3	B	485 - B
4	A	485 - A
5	I	Current Output 4-20mA

Twist off the nut on the left connection hole, access a piece of three core shielded wire from the outgoing. Connect the two root at the end of the line to the five terminal plug named PWR & GND, the other end corresponds to 24V power supply. If users need to monitor the current, you can connect the third line of the shielded wire, connect its one end to five hole terminal plug I, the other end from the GND line connected to the output of the

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ammeter. Connect the five hole wiring plug into the five hole socket, adjust the length of export cable, replace & tighten the nut, and this will complete the DC power line connection.

## 2 AC power line connection

The table below identifies the circuit identification

No.	Circuit identification	definition
1	AC	~220V
2	AC	
3	GND	ground wire

If users need to use alternating current (AC), connect the two lines of the three core shielding wire to the three hole wiring plug's two ports named AC, and the third line connected to GND, the other ends of the three core connects to the access alternating current (AC) source, plug the three hole wiring plug into the three hole socket and this will complete the AC power line connection.

## 3 Hight & Low relay port connection

The table below identifies the circuit identification

No.	Definition
1	High relay alarm output
2	
3	Low relay alarm output
4	

Twist off the nut on the right connection hole, lead a piece of four core shielded wire from the exterior and connect the two wires at the end of the line to the four hole terminals named 1,2. Connect the two wires at the end of the lines to the four hole terminals named 3,4. Identify the other end of the four lines, adjust the length of export cable, cover on the nut, and tighten.

When the measured value is higher than the high alarm value, high relay will signal and the LED lamp H be displayed. You can extract lines 1&2 from the 4 core shielded wire to confirm it's signals.

When the measured value is lower than the low alarm value, low relay will signal and the LED lamp L be displayed. You can extract lines 1&2 from the 4 core shielded wire to confirm it's signals.

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After the connecting and testing, cover the panel carefully, tighten the screw and the cover.

## 2.2 Fix the analyzer

On the sides of the analyzer, there are four mounting holes on the analyzer panel, users can choose the screw type listed in the table below according your needs.

Thread specification					
No.	First	Second	Third	L	Notes
1	1/4-20UNC	1/4-28UNF	1/4-32UN EF	3/4	American
2	1/4-20BSW	1/4-26BSF		3/4	Inch
3	M6*1	M6*0.75		20	Metric

Choose four screws, which is one type listed in the table. Fixing the analyzer in a place, where it is convenient to measure the gas & service the analyzer if required.

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## 3 Function

### 3.1 Panel description



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Power on the analyzer, then press the confirm key, which will take you to the options screen, pressing the up and down key, the analyzer shows six menus: "calibration value set" - "high alarm value set" - "low alarm value set" - "high current value set" - "low current value set" - "current sensor life".

## 1. LED – C



When pressing the confirm key, the “LED C” will brighten, when pressing the confirm key again, the displayed value will flicker, meaning the analyzer can be calibrated now.



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By pressing the up and down keys, the user can adjust the calibration value, setting it to the correct calibration value and by pressing the confirm key again, the digital display will show “Fn”, meaning the completion of this calibration.

## 2. LED-H



- LED-H turned on, displaying the measured value with no flicker, this means high alarm
- LED-H turned off, displaying the measured valued with

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no flicker, this means there is no high alarm

- LED-H turned on, displaying the measured value and flickering, this means the user can set the high alarm value by pressing the up and down keys, user can adjust the value and set to the required value and press the confirm key, the digital display will show “Fn”, meaning the completion of this task.

### **3. LED – L**



- LED-L turned on, displaying the measured valued with no flicker ,it means low alarm
- LED-L turned off, displaying the measured valued with no flicker, it means there is no low alarm
- LED-L turned on, displaying the measured value and flickering, it means the user can set the low alarm value by pressing the up and down keys. User can adjust the value and set to the required value and press the

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confirm key. The digital display will show “Fn”, meaning the completion of this task

#### 4. LED – H、LED – C



First press the confirm key, adjust the current state by pressing the up and down key, until the LED lamp H, C both turns on, the analyzer will display the measured value and flicker, this means the user can set the measured value to match with the highest current (20mA), set the value by

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pressing the up and down key, then press the confirm key, the digital display will show “Fn”, meaning the completion of this task.

## 5.LED – L、LED – C



First press the confirm key, adjust the current state by pressing the up and down key, until the LED lamp L, C both turn on, the

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analyzer will display the measured value and flicker, this means the user can set the measured value to match with the lowest current(4mA), set the value by pressing the up and down key, then press the confirm key, the digital display will show “Fn”, meaning the completion of this task.

## 6.LED-%、LED-PPM



The measurement units will switch automatically.

7. When all of the LED lamp are turned off, digital display will show an integer between 0-100%, this value is the current life of the sensor.

## 8. Up & Down key

Can change the value in current state;

## 9. Confirm key

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Enter the current state, or confirm the selected value.

## **10 Digital Display**

It displays the measured value when there is no flicker. If it displays the current setting value when flickering, it allows for alteration. If the user doesn't press any key within 20 seconds, it will stop flashing, cancel this alteration, and revert back to displaying measured values automatically.

## **3.2 Process**

### **3.2.1 Power on**

- All of the LED lamp will briefly turn on, testing LED state;
- Digital display will show "analyzer model - the version number - the sensor life - high current value - low current value- high alarm value - low alarm value - 0.00% - the current measured value".
- Once booting up is completed, it will goto the measurement state.

### **3.2.2 Regular work mode**

If the analyzer is not connected with RS485 network, operation will be as previously stated.

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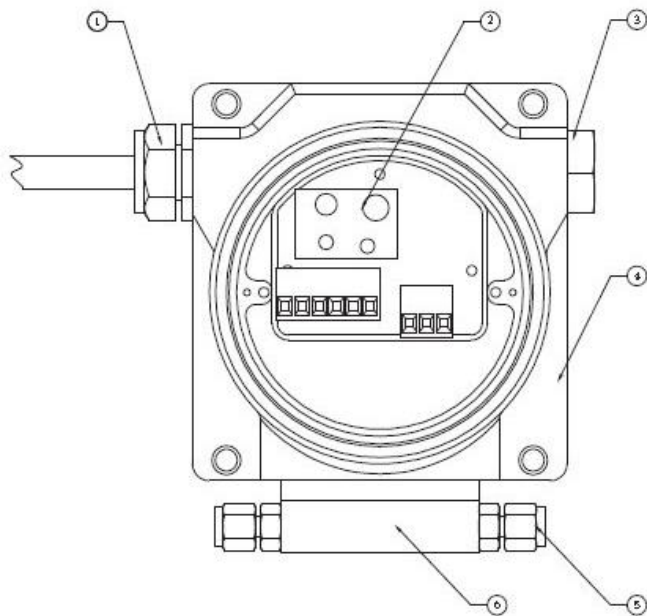
### **3.2.3 Network work mode**

When the analyzer is connected with RS485 network cable, the analyzer will continue to operate & respond as per regular operation. Data feed & other operations may be customized to user needs. Please contact us for more information.



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## 4 Sensor Installation



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Prior to removal, please begin by blowing in low oxygen concentration gas into inlet port, if possible, high purity or other inert gas will be preferred. As shown in the figure, unscrew the four M3 screws, remove the cover of the sampling pod at the bottom of analyzer, Prepare the sensor, securely put it into the sampling pod, make sure the conductive surface contacts the probes with the induction surface face down. Once complete, replace the sample pod cover, and tighten the screws. Thus completing the sensor 's installation.

Replacing the sensor would also involve the same steps.

**Attention:**

Extended exposure of the trace oxygen sensor to air will greatly reduce the life of sensor, and even damage it. After installation, please place the sensor into an airtight environment or low oxygen concentration environment.

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## 5 Using the analyzer

### 5.1 Power on



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- All LED lamps will turn on momentarily, testing the LED lamps
  - The digital display will show "analyzer model - the version number - the sensor life - high current value - low current value- high alarm value - low alarm value - 0.00% - the current measured value".

Example: Power on - digital display could show:

"500-1206-100-1% - 0-1000-10-0.00-150"

500: the analyzer's model is POA500

1206: the version number is 1206

100: current sensor life is 100%

1% :the measured value matched with the high current value  
(20mA)is 1%

0 PPM:the measured value matched with the low current value  
(4mA)is 0ppm

1000 PPM: the high alarm value is 1000 PPM

10 PPM: the low alarm value is 10 PPM

150 PPM: the current measured value is 150 PPM

- Once booting up is completed it will go to the measurement state.

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## 5.2 Using the analyzer

On the front panel of the analyzer: Up key, down key, confirm key, LED digital display, In/Out gas ports

The keys:

NO.	keys	functions
1	UP	Used to adjust the values
2	DOWN	
3	CONFIRM	After you identify the desired value, you should press this key to confirm. Otherwise, the adjustment operation is considered nil. You can also press this key to enter settings menu

**LED digital display:** shows the current oxygen content in regular operation; shows the adjusted value when in settings menu; shows the calibrated value when in calibration mode; also displays the sensor life remaining.

**In/Out Gas Ports:** be sure to seal the two ports when not in operation, to ensure that the sensor is in a sealed environment, if

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not, the sensor may be slowly consumed, and/or even damaged.

**Inlet Port:** 1/8 or 1/4 stainless steel sleeve joint

**Outlet Port:** 1/8 or 1/4 stainless steel sleeve joint

**Electrical Terminal:** including high and low alarm test, 4 - 20mA or AC output.

### **Set the alarm value**

- When the current value is greater than the high alarm value, high alarm relay will turn on, the low alarm relay turned off;
- When the current value is less than the low alarm value, low alarm relay will turn on, the high alarm relay turned off
- When the current value is between the high and low alarm value both alarms will be turned off.
- The two way relay control circuits are controlled independently. Please avoid frequent relay switches to avoid influencing system operation.
- When the selected high alarm value is less than low alarm value, high alarm is preferred

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**Output Setting:**

The low output current is 4 mA, usually selected as the measurement lower bound, the high output current is 20 mA, you can set the upper bound according to your needs.

For example, you need to set the analyzer's measurement range to 0-1000 PPM, you can set the high current to 1000 PPM, set the low current to 0 ppm.

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## **6 Calibration and measurement**

### **6.1 Calibration**

Connect the standard gas source with the analyzer. Measuring the standard gas until the measured value stabilizes, the reading should be close to the oxygen content value of the standard gas, adjust the displayed data to the reference value and then press the confirm key to finalize. Once complete it will return to the oxygen content display.

Attention: It is rather common to find that when you introduce calibration gas into the analyzer, the reading is quite different from what you expect. This is normally caused by errors in gas handling, rather than by calibration errors. If the gas doesn't read close to calibration gas values, please refer to the troubleshooting section of the manual rather than simply adjusting the calibration to what may be a completely incorrect value.

### **6.2 Measurement**

Power on the analyzer, securely connect the measuring gas to the



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inlet port. Control the sample gas pressure and flow carefully. When the sample gas begins to pass through the oxygen sensor, the LED display screen will display the reading. As the reading stabilizes, it is the measured oxygen content value.

Attention:

- The pressure of the measured gas can not be too big. If the gas pressure is greater than  $0.5 \text{ kg/cm}^2$ , one must use a proper valve decompression orifice, otherwise will damage the precise oxygen sensor.
- The measured gas cannot contain excessive  $\text{CO}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{HCl}$  or other acidic gas, etc. Acidic gases can react with the internal  $\text{KOH}$  solution, making the sensor fail prematurely. If required, please contact us for models capable of handling acidic environments.
- The temperature of measured gas should be regulated, the suitable measuring temperature is  $41\text{-}95 \text{ }^\circ \text{F}$ .
- If the measured gas has a lot of oil or particle impurities, one should remove the oil and filter impurities before

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prior to measurement. Please contact us for additional info.

- If you don't use the analyzer, be sure to seal the inlet and outlet ports to prevent air leakage. Otherwise, the sensor will be consumed prematurely.
- The sensor is an electrochemical cell; that being said, its working life will slowly be consumed, once close to expiry, please contact the factory to replace it.

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## 7 Specifications

- 1、 Measurement ranges: (Units switch automatically in regular operation) 0-10ppm、 0-100ppm、 0-1000ppm and 0-1% auto-ranging.
- 2、 Display: 4 LED
- 3、 Resolution: 0.01 PPM
- 4、 Response time: 100 PPM ~ 1% < 10 seconds  
0 ~ 10 PPM < 25 seconds
- 5、 Operating Temperature: 32 ~ 113 °F (0 ~ 45 °C)
- 6、 Humidity: 0-85%, no condensation allowed
- 7、 Sensor life: 9 months (typical)
- 8、 Power supply: DC 12 V ~ 30 V consumption < 10 w  
AC 220 V/50HZ consumption < 10 w
- 9、 Alarm output: Electrical relays, both relays controlled independently
- 10、 Relay: 3A 250VAC or 3A 30VDC
- 11、 Signal output: 4 - 20mA standard current output
- 12、 Working pressure: Inlet Port < 7 psig, Outlet Port - joint flowmeter

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13、 Safety: Intrinsically Safe

14、 Dimensions: Height: 5.51” \* Width: 5.71” \* Depth: 4.13”

15、 Weight: 88.18oz (2.5 Kg)

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## **8 Maintenance & Sensor Replacement**

### **8.1 Maintenance**

Within one year from the acquisition date, any damages due to material or poor workmanship, we will provide free maintenance. This warranty does not cover misuse, improper installation, the use of unauthorized equipment, or operating conditions outside of the guidelines specified

### **8.2 Periodic Calibration**

Under regular operation, the analyzer's calibration period is approximately two weeks. If you use the analyzer frequently, or use it in demanding conditions, you can increase the calibration frequency

### **8.3 Sensor Replacement**

If the sensor begins to react slowly, or have been used over nine months; please replace the sensor.

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## 8.4 Sensor Replacement Steps

- (1) Turn off the analyzer;
- (2) Prepare a new sensor to replace;
- (3) Connect the analyzer with a low oxygen concentration gas, high purity nitrogen or other inert gas will yield the best results. Open the sampling pod cover, remove the old sensor, put the the sensor into the sampling pod quickly, to prevent exposure of the new sensor to air for too long. Make sure the conductive surface contacts the probes, and the induction surface face down.
- (4) Once complete, cover the sample pod and tighten the screws.

### **Attention:**

- (1) After replacing the sensor, tighten the screw to seal the sensor , if the analyzer is not used immediately, be sure to seal the two ports.
- (2) You must not loosen the sample pod cover at any time other than to replace the sensor. Otherwise, the sensor may be exposed to air, causing irreversible damage!
- (3) Do not stock any sensors, as the sensors' life will slowly

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decrease even in storage conditions. A sensor should only be ordered timely prior to sensor replacement.

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## **9 Troubleshooting**

### **9.1 Analyzer does not power up.**

Check that the charger is plugged into a receptacle and that the receptacle is itself powered.

### **9.2 Analyzer reads too low**

1. No sensor calibration, flow gas calibration through it as described and then adjust the calibration, until the analyzer reads appropriately.
2. If sensor readings are still too low, with air calibration check calibration gas, and the calibration gas may not be correct.
3. Use the calibration of gas is not correct, the use of natural gas calibration air as to calibrate analyzer to measure gas calibration, if reading is not correct, replace gas calibration.
4. The tank of compressed air you are using is manufactured air whose oxygen content is not 20.9%. Calibrate the analyzer using natural air as the calibration gas ,and measure the bottled air. If it reads incorrectly, replace it with a tank of certified.



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### **9.3 Analyzer readings were too high**

1. Verify that there is no flow restriction in the vent line of the analyzer.
2. If less than 20.9% of the concentration in the fault phenomena appear, increase the sample gas flow through analyzer, if reading drop, this shows that the sample gas pipeline into or unit piece of a leak phenomenon, with "Snoop TM" or similar soap to check whether air leakage joint.
3. Remove the sensor, confirm analyzer reads zero, if not, there is moisture or corrosion between the sensor contacts in the cell block; clean the contacts and the area around them with isopropyl alcohol, dry with dry compressed air or nitrogen, then replace the cap on the cell block again.
4. Oxygen diffusion can be a serious problem, make sure there is no plastic or other plastic components used in the trace oxygen analyzer, including pressure regulating valve, diaphragm valve packing and so on.
5. Confirm that when the calibration gas is air, expose to the air as little time! Calibration gas appear error is very common, analyzer has better linear than calibration gas.

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6. Remove the sensor and confirm the analyzer reading is zero, if not, it means there is damp or corrosion between the sensor and cell block contact surface, clean the contact surface and the nearby area with isopropyl alcohol, then air dry it with dry nitrogen or air, and put the cover.

## **9.4 Analyzer reads zero**

1. Confirm the position of the sensor is right, it is no upside down. Once the position upside down, please check whether the diaphragm is damaged, it means whether there is electrolyte on the sensor's surface , if not, put the sensor's face on the right place.
2. Confirm the spring needles and sensor contact good, if the spring needles are not pressed, remove sensor, blend the contact strip a bit gently , in order to better contact.
3. Confirm gold plated contact line is clean, if not, clean them gently with Q type rod or other clean tool, don't use belt grinding agent cleaning tools, in order to avoid damage the metal plating.

Still useless , please return the analyzer factory for maintenance.

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## 10 Safety of the analyzer

Understand the following safety prevention measures to avoid injury, and prevent damage to the product and the other connecting products. To avoid possible danger, please be sure to operate within the guidelines when using this product.

1. Only allow qualified personnel to perform maintenance programs.
2. Avoid fire and injury.
3. Use certified power cables. Only use the manufacturer's supplied power cable applicable for use in the country.
4. Insure correct installation & gas extraction.
5. Products must be properly grounded. This product is grounded by power grounding wires. To avoid electric shocks, conductor must be grounded. Prior to powering up or operation of this product, please make sure this product is grounded.
6. Connected to the probe properly. View all ratings of terminal. To avoid fire and excessive pressurization, please check all the ratings and specifications of this product. Please consult the manual before operating products in order to understand the ratings and other detailed information.
7. Do not open the front cover. Do not open sampling pod cover

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when powered on.

8. Avoid any exposed circuit when powered on, please do not contact any of the exposed components.
9. If malfunction is suspected, please do not operate. When in doubt, please contact a qualified service personnel for inspection.
10. Please keep the product surface clean from dust or debris.

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## 11 Safety of sensor

Electrolyte's primary route of entry to human body:  
Ingestion, eye/skin

### **The Effects of overexposure:**

1. **Ingestion:** May be fatal if swallowed. The electrolyte will cause a burning sensation; the lead will cause symptoms such as loss of sleep, loss of appetite, metallic taste and fatigue.
2. **Eye :** The electrolyte is corrosive: it will produce a burning ,soapy sensation ,irritation or severe chemical burns.
3. **Dermal:** The electrolyte will cause a soapy, slippery feel, and eventually a burning sensation. It may cause irritation and chemical burns.
4. **Inhalation :** Inhalation of the electrolyte will cause severe irritation and chemical burns.

### ➤ **Symptoms of exposure:**

The electrolyte is harmful if swallowed, inhaled or absorbed through the skin. It is extremely destructive to the mucous

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membranes, stomach, mouth, upper respiratory tract, eyes and skin. The lead will cause symptoms such as loss of sleep, loss of appetite, metallic taste and fatigue.

➤ **Medical conditions aggravated by exposure:**

Persons with pre-existing skin disorders, eye condition or impaired respiratory function may be more susceptible to these substances. Lead exposure may aggravate blood diseases and/or blood forming organs, hypertension, kidney damage, nervous and possibly reproductive system damage.

➤ **Emergency and first aid procedures**

Eye contact: Flush eyes with water for at least 15 minutes and receive immediate medical attention.


Skin contact: Wash affected area with plenty of water and remove contaminated clothing.

Ingestion: Give large amounts of cold water. Do not induce vomiting. Seek medical attention. Do not administer liquids to an unconscious person.

Inhalation: Liquid inhalation is unlikely. If it occurs, provide fresh air and seek immediate medical attention.

➤ **Handling information**

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 **NOTE: Oxygen sensors are sealed and under normal circumstances their contents do not present a health hazard. The following information is given as a guide in the event of a leak.**


Hygienic practices: Wash hands after handling.

Protective clothing: Rubber gloves, chemical splash goggles.

Clean up procedures: Wipe down the area several times with a wet paper towel. Using a fresh towel each time.

➤ **Protective measures during sensor replacement:**

Before opening the bag containing the sensor, check the sensor for leakage. If any leakage is found, do not open the bag. If there is liquid around the sensor installed in the instrument, put on gloves and eye protection before removing it.

 **NOTE: The above information is derived from the supplier's MSDS. This information is believed to be correct, but is not necessarily inclusive, thus should be used only as a guide. Phymetrix shall not be held liable for any damage arising out of using or abusing this product.**

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## **12 Glossary of Terms**

### **Accuracy**

In general with analyzers when we use the word “accuracy” we imply “repeatability” as well; which is the degree to which an analyzer can repeat the same measurement reading on the same gas. All factory analyzers are compared using a measured gas against a known standard, and the accuracy of the measurement is therefore dependent upon this standard.

### **Come-down**

A term referring to the operation of an analyzer reducing its reading from a high level to a low or zero level. For trace analyzers this can be quite long, as it can take a long time for the final traces of oxygen to diffuse out of the gas sampling system.

### **Electrochemical**

A type of chemical reaction which produces an electrical current as part of the reaction. In this case, the oxygen sensors produce an electrical current in proportion to the amount of oxygen present at their membrane surface.



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## **Membrane**

A thin layer of permeable material (normally teflon or a similar fluoro-carbon) that controls the rate of diffusion of oxygen into the electrochemical sensor. It also controls the rate of diffusion of electrolyte out of the sensor. If the membrane is torn the sensor must be discarded.

## **Output-voltage or current**

An analog voltage or current proportional to the oxygen measurement as a percentage of range, suitable for data acquisition via a chart recorder or computer input.

## **Range**

The operational measurement range of the analyzer. This range is dependent on its amplifier sensitivity forming the analyzer working measurement range. This process is performed via an induction amplifier. If the Oxygen concentration is above the full scale value, it will not be measured accurately. Usually, the analyzer can measure oxygen concentrations between the range values of the 20-80% accurately.

## **Response**

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The response time of an analyzer is defined as the time taken to go from the beginning of a noticeable change to 90% of the final level. The beginning is often defined as 10% of the final level. This is also called the “t90” time. The transit time of the gas is not included in this measurement.

### **Calibration**

Regularly performed on the upper end range of measurement, as opposed to the bottom end or zero. Generally this is done by exposing the sensor to a gas of known concentration, and making the analyzer read that value.

### **Trace**

Low levels of, in this case, oxygen. This term is used to describe unwanted levels of oxygen as a contaminant, typically in the low ppm levels.