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Sensing Ltd

건우트레이딩 ¹⁹⁸⁴

OMD-480
Portable Percent Oxygen Analyzer

Instruction Manual

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Part 1 Introduction

1.1   General Introduction

The Southland Sensing OMD-480 Portable Percent Oxygen Analyzer is a microprocessor based portable analyzer designed for continous or intermittent measurements in a variety of applications and gas mixtures.

The analyzer was designed with the customer in mind keeping the operations simple, while still featuring a fast response and rugged design. Every effort has been made to use modern industrial components and materials which has resulted in an advanced design, excellent performance and an overall low cost of ownership.

Southland Sensing Ltd. appreciates your business and recommends to read through the complete manual to be able to get the full experience from your new oxygen analyzer.

1.2   Principle of Operation - The Oxygen Sensor

The precision electrochemical oxygen sensor used in the OMD-480 is designed and manufactured by Southland Sensing Ltd under a strict quality proceedure.

To understand how the oxygen analyzer functions, it is important to understand a little bit of the sensor characteristics.

The active components in the precision electrochemical oxygen sensor is the anode, cathode and aqueous electrolyte which is all housed in a cell body. The oxygen molecules in the application pass through the front sensing membrane. A chemical reaction occurs and a raw electrical current is generated.

This electrical current is proportional to the amount of oxygen in the application. The analyzer than processes this raw electronic signal, compensates for temperature and barometric pressure variations and converts the data into a parts-per-million or percent oxygen measurement value.

Once the data is displayed in real time on the full color backlite display, the user can then data log the results via an analog 0 - 1V DC output or the built in USB Flash Drive.

Precision Electrochemical Oxygen Sensor

OMD-480
Portable Percent Oxygen Analyzer

Precision Electrochemical Sensor Technology
Large Color Display w/ User Friendly Menu
5 Standard Analysis Ranges
Auto-Ranging or Manual Range Mode
Continuous Analysis During Battery Charging
USB Datalogging via Flash Drive

Specifications:

Accuracy:	< 1% of Full Scale Range*
Analysis Range:	0-1%/5%/10%/25%/100%
Battery Indicator:	Integrated into Color Display
Calibration:	Periodically
Classification:	IP66 / NEMA4X
Data Logging:	Removable USB Flash Drive
Dimensions:	8.80 x 7.50 x 3.90 inch
Display:	Full Color with Backlight
Enclosure:	Rugged Polypropylene
Flow Sensitivity:	0.5 - 5 SCFH
Gas Connections:	1/8" Swagelok Tube Fitting
Output (Analog):	0 - 1V DC
Power:	Rechargeable Battery 100 - 240 VAC AC Adapter
Pressure:	Inlet, 5 - 50 PSIG
Response Time:	T90 in 10 Seconds
Sensor:	PO2-160 Percent O2 Sensor
Sensor Life:	60 months
Temperature:	0 - 50 deg C
Temperature Compensation:	Integral
Warranty:	12 months
Weight:	4.8 lbs

Applications:

- Glove box or Pipeline Leak Detection
- Air Separation & Liquification
- Headspace Gas Analysis
- Beverage Grade CO2 Monitoring
- Heat Treating & Bright Annealing
- Inert Gas Welding of Exotic Materials

"Inquiry for Application Expertise"

Optional Accessories:

- Optional Ranges: Fully Configured From Factory
- Customizeable Sample System w/Bypass Valve
- PO2-24 Oxygen Sensor with > 0.5% CO2 Present
- International Language Support (Coming Soon)

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2.1   Receiving your New Oxygen Analyzer

As soon as you receive your new Portable Percent Oxygen Analyzer, carefully unpack the unit and accessories and inspect the electronics module, sensor housing for damage and also verify the oxygen sensor is present.

CAUTION: Do not open the oxygen sensor packaging at this time. It is packed in a Nitrogen purged bag. It is recommended that you read through the instruction manual installation and operation sections before attempting to open the bag the oxygen sensor is packed in. For questions, please contact the factory.

If damage to any portion of the new analyzer is present, stop and report damage to the shipping company as well as the factory

The analyzer is shipped with all materials needed to install and prepare the system for operation. In some instances, added sample system components are necessary to condition the gas sample before entering the sensor housing. Southland Sensing offers free application consultation, and we encourage you to take advantage of our engineers and their expertise.

Remote sensor housing installation: The sensor housing can be installed up to 6 feet from the electronics module. Further than 6 feet will cause signal degredation which can cause the unit to give erronous readings. It is also important to be mindful of EMI / RFI noise interference. Protection from EMI / RFI noise is important for accurate readings.

2.2	Rugged Enclosure Overview

All menu control and local backlite display is accessible from the inside front of the front door mounted on a panel. The front panel has 5 push button membrane switches, a large backlite display which includes the oxygen reading, battery life, time and date and USB icon.

Right below the display is a power switch with POWER on / off toggle, an OUTPUT connector for the 0 - 1V DC analog output, and a CHARGE connector for the 12VDC power needed to re-charge the battery. On the right side of the panel is a mounted USB connector.

The OMD-480 can be used as an online unit if necessary, the 12V DC charged can be left plugged in to the unit while it operates 24/7 continously.

The OMD-480 is designed for indoor and outdoor installation usings its NEMA4X, IP66 enclosure.

Refer to part 3 operation section of this instruction manual for more information on how to operate the controls and other functions of this advanced oxygen analyzer.
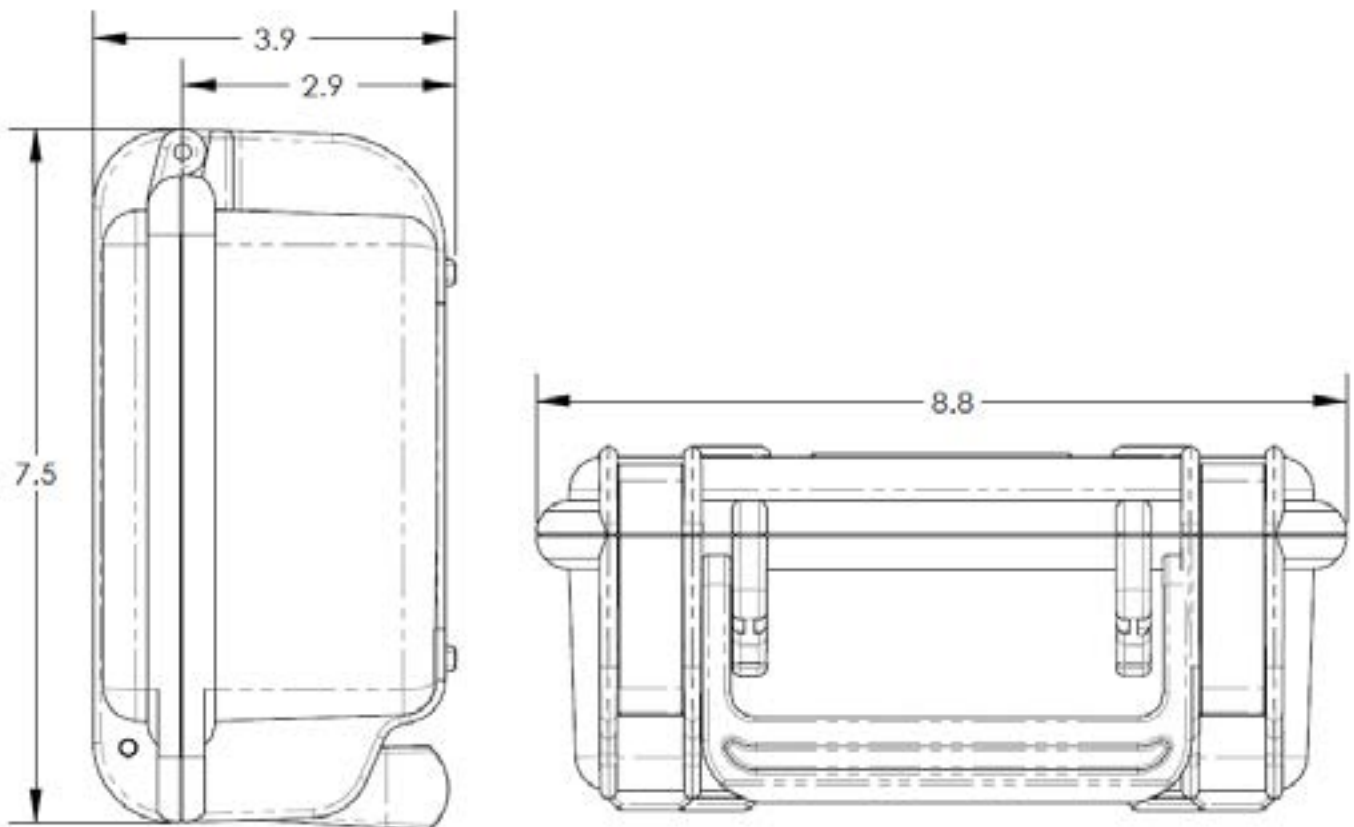
2.3   Power / Charging Connections

The OMD-480 is powered by a rechargeable ni-cad battery. The portable analyzer accepts a 12V DC wall charge power supply with a 0.5A current rating. Southland Sensing supplies a universal 100 - 240V AC wall charger that has optional plugs for almost all countries.

One of the unique features about the OMD-480 is its ability to be charging while it is functioning. This allows the user to plug in the OMD-480 and use it continously 24/7 while measuring oxygen or data logging via the USB flash drive.

In the left corner of the display is a battery icon. This shows the user how much battery life is remaining. The icon will show three bars and be in green when it is fully charged. Two bars and yellow means it is at the middle of its charge capacity and one bar and a red color and the unit should be recharged. While charging the icon will have a AC Plug through the unit showing that the battery is indeed being charged.

Supplied Power Supply with International Adapters

2.4   Gas Connections

The OMD-480 with its standard H3 flow through housing is designed for positive pressure samples and requires incoming sample lines. The sample connections are 1/8" Swagelok tube fittings. The user is responsible for added sample system components as well as sourcing a calibration gas.

There is no recommended flow direction, the either bulkhead can be used as the inlet / outlet.

It is recommended to use Stainless Steel Tubing or a low permeable plastic tubing.

- Flow rate should be between 0.5 - 5.0 SCFH
- Inlet pressure should be between 5 - 50 PSIG
- Analyzer should be vented to atmosphere, take precaution to make sure vent does not get blocked

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| 2.5 | Installing the Oxygen Sensor using H3 Flow Through Sensor Housing |

CAUTION: Prior to installing the oxygen sensor. Read section 4.1 on performing a span calibration.

The OMD-480 can accept either a PO2-160 or PO2-24 (CO2 Applications) percent oxygen sensor. For proper selection with your application, please view our online application guide or contact your local sales rep.

Connect the process gas line and set your flow between 0.5 - 5.0 SCFH.

To Install the Sensor:

- Remove the cell holder cap by unscrewing the stainless steel collar.
- Lift up on the top of the sensor housing and set to the side.
- Inspect O'ring for cracking, replace if necessary. **Always lube your Orings!**
- Remove the sensor from its box. With scissors, open nitrogen purged packaging and remove the sensor.
- Visually inspect sensor for damage, if damaged notify the factory immediately.
- Remove the shorting pins across the back of the sensor board contacts.
- Place the sensor inside the housing with the metal screen mesh facing down and the circuit board contacts facing up.
- Return upper portion of the sensor housing to the stainless steel bottom. Tighten collar. Hand tight is acceptable to create an airtight seal.
- Start purge of process gas.
- If the analyzer has not been calibrating, refer to section 4.1 for more information.

H3 Sensor Housing

Top portion of sensor housing

Stainless Steel Collar

Bottom portion of sensor housing

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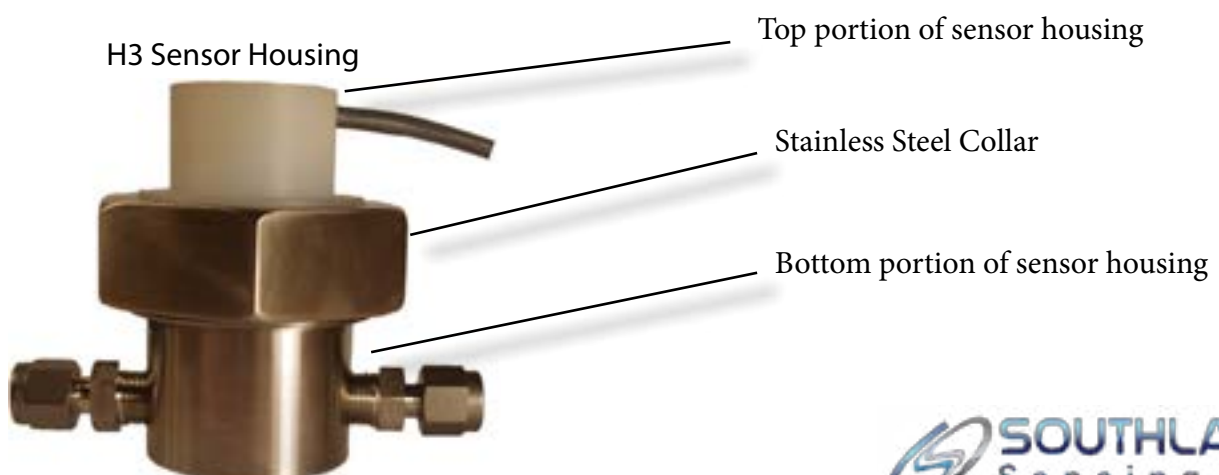
3.1	Understanding the Controls and their Operation

The OMD-480 Portable Percent Oxygen Analyzer is a feature packed unit with an easy to use menu interface. The key attributes within the menu are the ability to select a measurement range, both manually or set it to the auto-range mode. To calibrate the unit with a known gas, also refered to as a SPAN Calibration or SPAN CAL. Adjust the Date / Time stamp on the display and to set the "minutes" interval when data logging via USB flash drive.
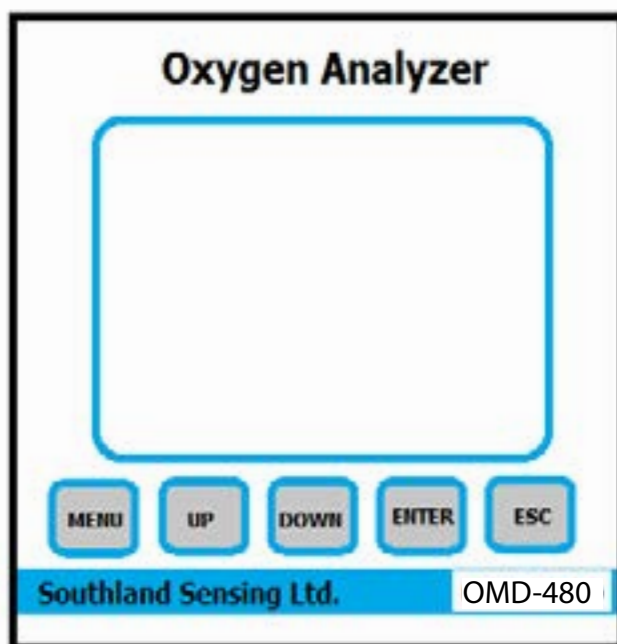
All features are programmable / selectable through the MENU bottom. The UP / DOWN arrows will allow you to select your setpoints and the enter buttom saves the data. If you want to cancel your selection, or return to the previous screen the escape key ESC will allow you to do this. Once the unit starts up, the following HOME Screen will appear:

3.2	Measurement Range Overview

The OMD-480 Portable Percent Oxygen Analyzer allows the user to field select 5 available ranges - custom ranges are available upon request. These ranges can be selected in manual mode meaning they are locked into that range by the user (only the analog output is locked), or they can be set to auto-range so the analyzer will adjust to give you the best full scale resolution. The OMD-480 has the following ranges as standard:

Range 1	0 - 1%
Range 2	0 - 5%
Range 3	0 - 10%
Range 4	0 - 25%
Range 5	0 - 100%

From the HOME screen, press the MENU key and the display will indicate:

Use the UP / DOWN keys to move the cursor to allow the user to select AUTO-RANGE which will all ow the unit to cycle through all five ranges or MANUAL RANGE which will allow the user to select a specific range and lock the analog output.

MAIN MENU

AUTO RANGE
MANUAL RANGE
SPAN CALIBRATION
Set Time
Set Data Logger
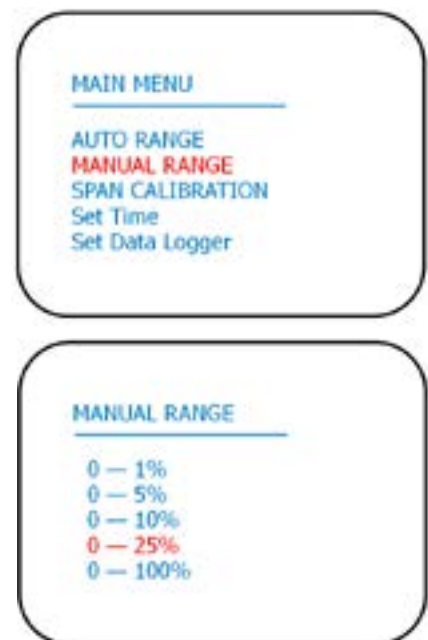
Decide which option will work best for your application. Move the cursor button over the selection and press the ENTER key. If you have selected AUTO RANGE, it will blink for a second indicating this was selected. If you have selected the MANUAL RANGE, the following screen will be brough up:

MANUAL RANGE

0 — 1%
0 — 5%
0 — 10%
0 — 25%
0 — 100%

Use the UP / DOWN keys and bring the cursor besides the range to be selected and press the ENTER key. The selected range will blink for a second indicating the range has been selected.

Press the ESC key to move back to the previous screen.

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3.3   Setting the Time and Date

The OMD-480 Portable Percent Oxygen Analyzer is equiped with an onboard time and date stamp. This function is important to keep accurate if you are going to be taking advantage of the onboard USB Data logger.

Since most of our customers are located outside of the pacific standard time zone, it is suggested to adjust the time and date to your local standard time.

To Set the Time, simply select the MENU key and select the SET TIME function. From here, it will allow you to adjust the seconds, minutes and hours.

To Set the Date, simply select the MENU keyand select the SET DATE function. From here, it will allow you to adjust the day, month and year. For the year adjustment, simply use the last two numbers (Example, for 2015 select 15).

The correct time and date should now be showing on the bottom center of your screen.

Time & Date

3.4   Advanced USB Data logging

** Caution: We have tested 100's of USB flash drives and 99% of them work just fine. Prior to data logging important data, make sure to test your USB thumb drive and verify it is logging.

To install a USB flash drive, simply plug it into the right side of the display panel. This port will allow the electronics to talk to your USB flash drive and save the stored data in an .csv file (excel compatible).

The data is stored in files by date and can be configured to save data at 1 minute intervals up to 120 minutes.

To select your data logging interval, simply go into the MENU screen and select SET DATA LOGGING. this will prompt you to a screen where you can set the value by minutes. Once selected, press enter and your interval will be saved.

** For data logging purposes, it is important to correctly set the date and time so that the time stamp will be saved along with the recorded oxygen value. To set the time and date, refer to section 3.3.

3.5   Analog Output 0 - 1V DC

** Caution: Analog output is internally powered and does not require external power. DO NOT supply any voltage across these terminals as the output will be damaged. It is also important to assure proper grounding of the external recording device.

The Analog output can be connected via the front display panel inside the analyzer door with the connector marked "OUTPUT". The connector takes an audio phono jack which is supplied with the analyzer. The Center pin is your positive and outer pin is negative.

The analog 0 - 1 VDC output is scaled to the analyzer range. If a specific output is needed such as 0 - 1% or 0 - 25%, select MANUAL RANGE in the menu and select the appropriate output.

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4.1	Span Calibration using Ambient Air

Calibration involves using a known span gas to match and adjust the oxygen sensor / analyzer combo to a known value. This can be as simple as using ambient air that tends to be a constant 20.9% which is what we will focus on for section 4.1. For calibrating with a certified SPAN gas, please proceed to section 4.2. For a decision on which type of calibration is good for your application, consult the factory for a recommendation.

Calibration using Ambient Air:

If using ambient air to calibrate the sensor, it is recommended to read through the calibration proceedure prior to performing an air calibration to make sure all instructions are understood. Consult the factory if any questions arise.

If the sensor is already installed in the sensor housing, you will need to open up the H3 flow housing and with two fingers, hold the sensor to the top portion of the housing, making sure the sensor PCB contacts are firmly touching the gold pogo pins on the housing.

Let the reading stabilize for about 1 minute and than proceed to the following steps in the OMD-480 menu:

SPAN Calibration: To calibrate the analyzer, press the MENU key, use the UP / DOWN keys to bring the cursor besides the option SPAN CAL and press ENTER.

Use the UP / DOWN keys to set the required value. You can shift to the next digit by pressing the ENTER key. A final enter is needed to save the value and change the display.

Once ENTER has been pressed, the display will show PASSED or FAILED. If Passed, promptly put the sensor back into the sensor housing and you can begin to monitor your process application. If FAILED, repeat steps and contact the factory if questions arise.

CALIBRATE WITH SPAN GAS:

To calibrate with a span gas, you will follow the same proceedure within the menu however instead of exposing the sensor to ambient air, you will install the sensor making sure the screen side is facing down and the gold PCB's are facing up to make contact with the gold pogo pins. You can than hook your calibration gas up to the Inlet port (Note: it does not matter which port is the inlet and which port is the outlet on the sensor housing). Set the gas flow rate between 0.5 - 5.0 SCFH and let the ready stabilize. Proceed to calibration proceedure within the menu.

4.2   Procedure for Replacing the Oxygen Sensor

Oxygen Sensor Replacement:

The characteristics of a precision electrochemical fuel cell are similar to those of a battery in that they both provide an output that is nearly constant throughout their usefule life and simply fall of sharply towards zero at the end.

If the process sample that is being analyzed is in the low range (0 - 1 %) of oxygen concentration, cell failure will be indicated by the inability to properly calibrate the analyzer. The user will also find that very little adjustment of the span calibration feature will be necessary to keep the analyzer in calibration during the sensors useful life. If a large adjustment is needed to calibrate the unit or calibration cannot be reached, the sensor should immediately be replaced.

** Note, make sure to read section 2.6 "Installing the Oxygen Sensor" before replacing the sensor.

No tools are required to replace the sensor. Simply unscrew (Counter-Clockwise) the collar (H3 flow through sensor housing). Once free, open the top portion of the sensor housing exposing the old oxygen sensor. Remove the old oxygen sensor, disposing like you would a lead-acid battery in accordance with your local regulations.

Remove the new sensor from its package and remove the shorting strips. Place the sensor screen side down in the sensor housing with the copper circuit board pointed up. Proceed to re-connect the collar (H3 flow through sensor housing).

After the sensor has been replaced, proceed to the Span Calibration section and purge with inert gas.

4.3   Troubleshooting

For troubleshooting and advanced maintenance techniques, please contact your factory representative for assistance.

Email: sales@sso2.com
Ph: 1-949-398-2879

5.3   Material Safety Data Sheet (MSDS)

Product Identification
Product Name	Oxygen Sensor Series – PO2, TO2 series
Synonyms	Precision Electrochemical Sensor
Manufacturer	Southland Sensing Ltd, 848 North Rainbow Blvd. Las Vegas, NV 89107 USA
Emergency Phone Number	1-949-398-2879
Preparation / Revision Date	April 23rd, 2012
Notes	Oxygen sensors are sealed, contain protective coverings and, in normal conditions, do not present a health hazard. Information applies to electrolyte unless otherwise noted.

Specific Generic Ingredients
Carcinogens at levels > 0.1%	None
Others at levels > 1.0%	Potassium Hydroxide or Acetic Acid, Lead
CAS Number	Potassium Hydroxide = KOH 1310-58-3 or Acetic Acid = 64-19-7, Lead = Pb 7439-92-1

General Requirements
Use	Potassium Hydroxide or Acetic Acid - electrolyte, Lead - anode
Handling	Rubber or latex gloves, safety glasses
Storage	Indefinitely

Physical Properties
Boiling Point Range	KOH = 100 to 115 C or Acetic Acid = 100 to 117 C
Melting Point Range	KOH -10 to 0 C or Acetic Acid – NA, Lead 327 C
Freezing Point	KOH = -40 to -10 C or Acetic Acid = -40 to -10 C
Molecular Weight	KOH = 56 or Acetic Acid – NA, Lead = 207
Specific Gravity	KOH = 1.09 @ 20 C, Acetic Acid = 1.05 @ 20 C
Vapor Pressure	KOH = NA or Acetic Acid = 11.4 @ 20 C
Vapor Density	KOH – NA or Acetic Acid = 2.07
pH	KOH > 14 or Acetic Acid = 2-3
Solubility in H2O	Complete
% Volatiles by Volume	None
Evaporation Rate	Similar to water
Appearance and Odor	Aqueous solutions: KOH = Colorless, odorless or Acetic Acid = Colorless, vinegar-like odor

Fire and Explosion Data
Flash and Fire Points	Not applicable
Flammable Limits	Not flammable
Extinguishing Method	Not applicable
Special Fire Fighting Procedures	Not applicable
Unusual Fire and Explosion Hazards	Not applicable

5.3 Cont.   Material Safety Data Sheet (MSDS)

Reactivity Data

Stability	Stable
Conditions Contributing to Instability	None
Incompatibility	KOH = Avoid contact with strong acids or Acetic Acid = Avoid contact with strong bases
Hazardous Decomposition Products	KOH = None or Acetic Acid = Emits toxic fumes when heated
Conditions to Avoid	KOH = None or Acetic Acid = Heat

Spill or Leak

Steps if material is released	Sensor is packaged in a sealed plastic bag, check the sensor inside for electrolyte leakage. If the sensor leaks inside the plastic bag or inside an analyzer sensor housing, do not remove it without rubber or latex gloves and safety glasses and a source of water. Flush or wipe all surfaces repeatedly with water or wet paper towel (fresh each time).
Disposal	In accordance with federal, state and local regulations.

Health Hazard Information

Primary Route(s) of Entry	Ingestion, eye and skin contact
Exposure Limits	Potassium Hydroxide - ACGIH TLV 2 mg/cubic meter or Acetic Acid - ACGIH TLV / OSHA PEL 10 ppm (TWA), Lead - OSHA PEL .05 mg/cubic meter
Ingestion	Electrolyte could be harmful or fatal if swallowed. KOH = Oral LD50 (RAT) = 2433 mg/kg or Acetic Acid = Oral LD50 (RAT) = 6620 mg/kg
Eye	Electrolyte is corrosive and eye contact could result in permanent loss of vision.
Skin	Electrolyte is corrosive and skin contact could result in a chemical burn.
Inhalation	Liquid inhalation is unlikely.
Symptoms	Eye contact - burning sensation. Skin contact - soapy slick feeling.
Medical Conditions Aggravated	None
Carcinogenic Reference Data	KOH and Acetic Acid = NTP Annual Report on Carcinogens - not listed; LARC Monographs - not listed; OSHA - not listed
Other	Lead is listed as a chemical known to the State of California to cause birth defects or other reproductive harm.

Special Protection

Ventilation Requirements	None
Eye	Safety glasses
Hand	Rubber or latex gloves
Respirator Type	Not applicable
Other Special Protection	None

Special Precautions

Precautions	Do not remove the sensor's protective Teflon and PCB coverings. Do not probe the sensor with sharp objects. Wash hands thoroughly after handling. Avoid contact with eyes, skin and clothing. Empty sensor body may contain hazardous residue.
Transportation	Not applicable

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5.4   Certificate of Conformance

Model Number: OMD-480 Portable Percent Oxygen Analyzer

                        Serial Number: _____

Sensor Selection: (   ) PO2-160 Percent Oxygen Sensor

                         (   ) PO2-24 Percent Oxygen Sensor CO_2 > 0.1%

                        Serial Number: _____

Sensor Housing Selection: (   ) H3 Flow Through Sensor Housing 1/8" BSPP

                         (   ) H3 Flow Through Sensor Housing 1/4" BSPP

Configuration:

         Ranges: 0 - 1%, 0 - 5%, 0 - 10%, 0 - 25%, 0 - 100%

         Power: 12V DC Rechargeable Battery

         Analog Output: 0 - 1V DC

         Data Loggin: USB Flash Drive

         Display: Graphical with Backlight

         Enclosures: IP66 NEMA 4X Outdoor Enclosure

Accessories:

         (   ) Wall Mount Power Adapter, 100 - 240VAC w/ International Plugs

         (   ) Analog Output Audio Jack

We certify that the parts shipped to you are manufactured in the USA and conform to all requirements of the Purchase Order. These parts have been manufactured and tested to the highest quality standards and in accordance with all required specifications, instructions and technical drawings.

Date: _____   Signature: _____

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