Handi+

OPERATING MANUAL & INSTRUCTIONS FOR USE

R218P15
Industrial

Maxtec
2305 S 1070 W
Salt Lake City, Utah 84119
USA

TEL (800) 748.5355
FAX (801) 270.5590
www.maxtec.com

CE

CLASSIFICATION

Protection against electric shock: . . . . . Internally powered equipment.
Protection against water: IPX1
Mode of Operation: . . . . . Continuous
Flammable anesthetic mixture:. . . . . Not suitable for use in presence of a flammable anesthetic mixture

Product Disposal Instructions:

The sensor, batteries, and circuit board are not suitable for regular trash disposal. Return sensor to Maxtec for proper disposal or dispose according to local guidelines. Follow local guidelines for disposal of other components.

WARRANTY

Maxtec warrants to the original purchaser, that the HANDI+ analyzer to be free from defects in material and workmanship for a period of two-(2) years from the date of shipment from Maxtec or from one of Maxtec's authorized dealers. Parts found to be defective as determined by Maxtec, will be repaired or replaced free of charge if shipped prepaid to the factory in the original shipping carton. This warranty is void if the product has been subject to misuse or abuse, including but not limited to: exposure to water, humidity-temperature- shock or pressure outside of the listed specifications, or has not been operated in accordance with instructions, or if the identifying markings on the product label have been altered or removed. Routine maintenance items are excluded from this warranty.

The seller assumes no liability for consequential damages of any kind, and the buyer, by acceptance through purchase of this product, will assume all liability for the consequences of its use or misuse by the buyer, his employees, or others.

It is the sole responsibility of the buyer/user to determine if this product is suitable for the intended application.

WARNINGS ⚠

Indicates a potentially hazardous situation, if not avoided, could result in death or serious injury.

- **The HANDI+ is not rated intrinsically safe nor is it designed for use in areas where flammable vapors are present.**
- This device does not contain automatic barometric pressure compensation.
- **Do not use near any type of flame or flammable/explosive substances, vapors or atmosphere.**
- The HANDI+ is a verification tool and should not be used to control the gas blending or process control applications.
- The HANDI+ should be disposed of properly in accordance with local regulations.
- **Do not incinerate or expose the HANDI+ to flame or high temperatures.**

CAUTION:

Indicates a potentially hazardous situation, if not avoided, could result in minor or moderate injury and property damage.

- Read the manual in its entirety before attempting use.
- Always use protective eyewear and observe proper safety procedures when working with pressurized gases.
- Always assure the pressure of gas entering the HANDI+ is 3psig or less.
- Always calibrate the HANDI+ at an equivalent pressure and flow rate to the measured gas.
- Always calibrate the HANDI+ whenever the point of use elevation changes more than 500 feet (i.e.: Mexico City vs. San Diego,...).
- Dispose of the HANDI+ properly when it has expired.
- Ensure the protective freshness seal has been removed from the sensing port before use.
- Ensure the HANDI+ has been properly calibrated before use.
- If the HANDI+ display goes blank immediately after the on button is pushed, or the HANDI+ will not properly calibrate, the unit has expired. **Do not use, dispose of properly.**
- The display is not valid when in Over Range Mode. Recalibrate the HANDI+ and observe the proper operating procedure.
- Never immerse the HANDI+ or expose it to high humidity or moisture. It is not watertight.
- Never expose the HANDI+ to high temperatures.
- Never expose the HANDI+ directly to unregulated gas lines, cylinder gas, … These may contain high gas pressures which may cause the HANDI+ to rupture.
- There are no internal user-serviceable parts in the HANDI+.

TABLE OF CONTENTS

SYMBOL GUIDE

The following symbols and safety labels are found on the the Handi+:


Do not throw away. Follow local guidelines for disposal.


Contains acid

Contains lead


Meets ETL standards


Warnings


On/off Button


Manufacturer


Calibration Button


Follow instructions for use


Do Not

Serial Number

Catalog Number

Lot code/Batch code

Drip Proof

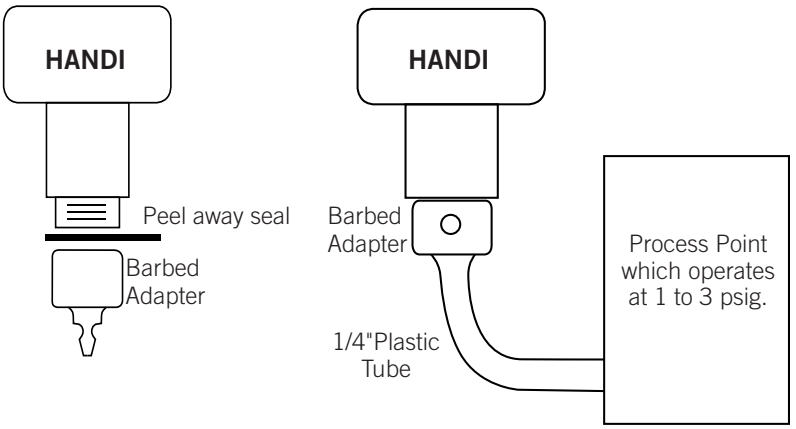
1.0 INTRODUCTION

Intended Use: The HANDI+ is a flexible tool, which is ideal for many applications. Compact and easy to operate, the HANDI+ can quickly monitor oxygen deficiency in ambient air or check process gas streams.
The HANDI+ features the model MAX-250 oxygen sensor that offers superior performance over conventional sensors. Based on a weak acid electrolyte, the MAX-250 is unaffected by CO2 or other combustion gases. Additionally, the MAX-250 sensor offers extra life and excellent stability.
The sensing port of the HANDI+ is threaded to adapt to a wide variety of sampling accessories. With the barbed fitting, the HANDI+ can be quickly connected to a flexible tube for checking nitrogen or oxygen sources. With the flow through head accessory, the HANDI+ can be connected to process gas streams for a quick check of oxygen.

2.0 OPERATION

2.1 General

The plastic freshness seal on the sensing port should be removed and discarded when you are ready to use the HANDI+ for the first time. This seal ensured freshness of the HANDI+ during shipping and storage. Once the seal is removed, you should expect to obtain the normal life from the HANDI+. Included in the kit you will find the barbed adapter, which will screw onto the sensing port.

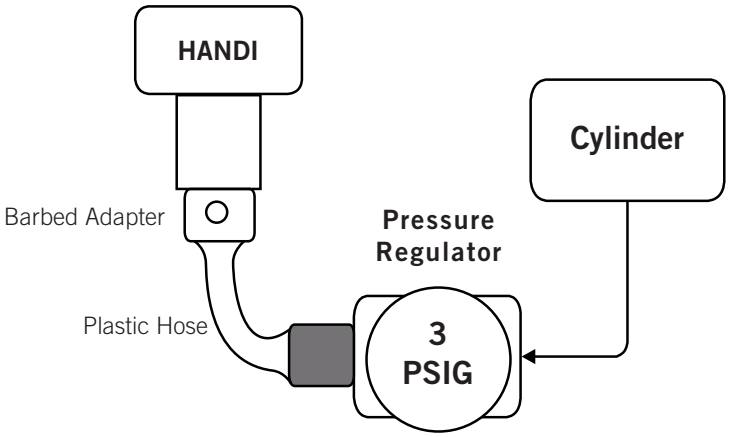


2.2 Using the Barbed Adapter

The HANDI+ is supplied with a 1/4" barbed adapter and short length of flexible 1/4" tubing. The tubing can be connected to process points using an equivalent barbed fitting. Gas from the process point (up to 3 psig) will be directed to the HANDI+ and exhaust through a small vent hole on the side of the barbed adapter. Allow some gas to pass through the barbed adapter and then observe the concentration of oxygen displayed. Please note the wetted parts of the HANDI+ are manufactured of CPVC. The barbed adapter is manufactured of ABS. Avoid process gases, which may attack these materials and cause shortened life. Maxtec also offers barbed fittings as an accessory for connection at the process point.

2.3 Working with High Pressures

The HANDI+ should never be connected to pressures greater than 3 psig. This could cause major failure of the sensing mechanism and may also cause the HANDI+ housing to rupture. The sample pressure must always be regulated down to the working pressure of the HANDI+ (0-3 psig). If you wish to measure the pressure directly at the high-pressure source, a suitable pressure regulator is required. The regulator must bring the gas entering the HANDI+ to 0-3 psig.



2.4 Measuring Room Air

The HANDI+ may be used to measure ambient air in cases where oxygen deficiency may be a concern. The barbed adapter supplied with the HANDI+ may slow down the response time when measuring room air. For this reason, it is important to unscrew and remove the Barbed Adapter from the HANDI+. The HANDI+ is now ready to measure ambient air. Calibration on air known to be 20.9% should be performed before room air measurements. It is also important to note the HANDI+ is not rated intrinsically safe nor is it designed for use in areas where flammable vapors are present.

3.0 CALIBRATION

To simplify operation the Handi+ Analyzer automatically determines the calibration gas being used as compressed air (20.9%) or high grade (100%).

For best performance and accuracy, the HANDI+ should be calibrated on a frequent basis. It is preferable to calibrate each day it will be used or at least once a month on a known source of oxygen. Clean, dry compressed air is a suitable cal gas.

Clean dry air typically contains approximately 20.9% oxygen. Expose the HANDI+ to air (compressed or ambient) and push the "CAL" button. The display will indicate the concentration of oxygen of the Calibration gas. It is recommended that the calibration gas be controlled to a pressure and flow rate equivalent to the measured gas. This may be accomplished by using the same gas sampling apparatus for calibration as for measuring in the intended application. For example, if the HANDI+ is used to check a nitrogen gas line, use the same sampling setup when calibrating. If the intended use is for checking room air, then calibrate the HANDI+ on clean ambient air (20.9% Oxygen). After adjusting the display to 20.9%, the HANDI+ is now calibrated and may be used to verify oxygen concentrations.

Always recalibrate the HANDI+ if the point of use elevation has changed by 500 feet. If unable to adjust the calibration pot so the display correctly indicates the value of the calibration gas, the HANDI+ has probably expired. If still within the warranty period, the unit should be returned to the factory for evaluation.

4.0 CALIBRATION ERRORS AND ERROR CODES

The Handi+ analyzers have a self test feature built into the software to detect faulty calibrations, oxygen sensor failures, and low operating voltage. These are listed below, and include possible actions to take, if an error code occurs.

E03: No valid calibration data available
Make sure unit has reached thermal equilibrium. Press and hold the Calibration Button for three seconds to manually force a new calibration.

E04: Battery below minimum operating voltage
Unit is at end of life, see page I for proper disposal.

CAL Err St: O2 Sensor reading not stable
Wait for displayed oxygen reading to stabilize when calibrating the device at 100% oxygen. Wait for unit to reach thermal equilibrium (Please note that this can take up to one half hour, if the device is stored in temperatures outside the specified operating temperature range).

CAL Err lo: Sensor voltage too low
Press and hold the Calibration Button for three seconds to manually force a new calibration. If unit repeats this error more than three times, contact

Maxtec Customer Service for possible replacement.

CAL Err hi: Sensor voltage too high
Press and hold the Calibration Button for three seconds to manually force a new calibration. If unit repeats this error more than three times, contact Maxtec Customer Service for possible replacement.

CAL Err Bat: Battery voltage too low to recalibrate
Unit is at end of life, see page I for proper disposal.

5.0 CLEANING, MAINTENANCE, AND DISPOSAL

The HANDI+ analyzer requires little maintenance. For best performance and accuracy, the HANDI+ should be calibrated on a frequent basis. For general use, it is recommended the HANDI+ be calibrated once a month on a known source of oxygen such as clean dry (compressed) air. Reference the calibration section in this manual for more details.

If the unit becomes wet, it should be dried off immediately with a soft dry towel. The display may indicate low concentrations of oxygen if the sample port of the sensor becomes wet. In this case, remove the barbed adapter and thoroughly dry inside and out with a soft dry towel or cotton applicator tip. Additionally, dry the face of the sensor with a cotton applicator tip and allow to air dry for one half-hour (or until the oxygen display returns to normal). Exposure of the HANDI+ to water or extremely high RH may result in shortened life or cause the electronic circuit or battery to fail.

Disposal: Please note the materials of construction for proper disposal. The material of the HANDI+ housing is a polycarbonate and ABS blend. The sensing portion of the HANDI+ contains lead and acetic acid. The HANDI+ contains a printed circuit board and a Lithium Battery.

6.0 SPECIFICATIONS

6.1 Analyzer Specifications

Sensor Type: . . . . . Maxtec MAX-250 galvanic cell w/ Temperature Compensation (Non-Replaceable). Extra-Life Oxygen Sensor, galvanic cell type.

Measurement Range: . . . . . .0.0 - 100.0% oxygen (gas)

Resolution/Display: 0.1%
The three digit LCD indicates values between 0.0 - 99.9% oxygen.
Over range indicated by one decimal point on display located after the first digit.

Accuracy and Linearity: . . . . . ± 1% of full scale at constant temperature, R.H. and @ 15˚C - 40˚C pressure when calibrated at full scale.
± 3% actual oxygen level over full operating temperature.

Response Time: . . . . . .< 15 seconds for 90% step change. (at 25˚C)

Warm-up Time: None required

Operating Temperature: . . . . . 15˚C - 40˚C (59˚F - 104˚F)

Storage Temperature: . . . . . .-15˚C - 50˚C (5˚F - 122˚F)

Operating Pressure: . . . . . Atmospheric pressure to 3psig.

Environmental: . . . . . General purpose housing equivalent to NEMA 1.
The Handi+ is not waterproof. 0-95% RH, non-condensing.

Warranty: . . . . . .Twenty-four months in normal operating conditions.

Power Requirements: . . . . . Powered by one internal, non-replaceable Lithium battery, CR2450.
Power on push button automatically shuts off after 80 seconds time-out.
Electronics rated general purpose;
not for use in hazardous areas or for use with flammable gases.

Weight: . . . . . Approx. 60 grams

Battery Life: . . . . . .Approx. 1850 hours (74,000 cycles)

Sample Port: . . . . . .M16 x1 Thread with barbed tubing adapter.

Operating Pressure: . . . . . .Atmospheric pressure to 3 psig

Expected Storage Life : . . . . . .Two months with freshness seal on sensor.

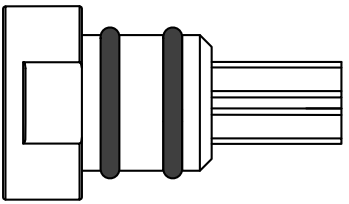
7.0 HANDI+ SPARE PARTS AND ACCESSORIES

7.1 Standard Replacement Parts and Accessories

Part Number	Item
R218P15	Industrial Handi+
R207P17	Barbed Adapter
R218M15	Manual
R100P92-002	Clear Tubing
R213P92	Lanyard
R218P09	Handi+ Cover

Accessories:

Flow Diverter Fitting
(For use with medical tee)
#R110P10-001



Standard BC Adaptor: #RP11P28