

Portable Oxygen Monitor



TED 100

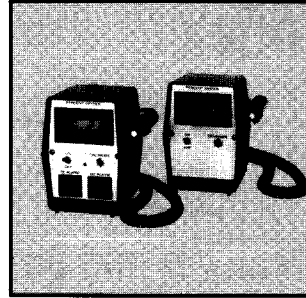


TED 80



TELEDYNE
ELECTRONIC DEVICES

Introduction



The Model TED 100 Monitor & Alarm System provides continuous analysis of oxygen in incubators, respirators, anesthesia machines, and other medical applications where **specific monitoring of oxygen** is vital. The TED 100 is equipped with a liquid crystal digital (LCD) display which is readable from distances of 20 feet and more. Alarm indication is provided by a flashing red indicator light, which has full 360 degree visibility, and also by a pulsating audible alarm. Two fully adjustable alarm setpoints, each with a unique push-to-set feature, are displayed at the base of the TED 100 with white-on-black numerals that are easily readable from a distance.

The TED 100 utilizes a patented Polarographic* Oxygen Sensor that is specifically designed for medical

*U.S. Patent No. 4,077,861

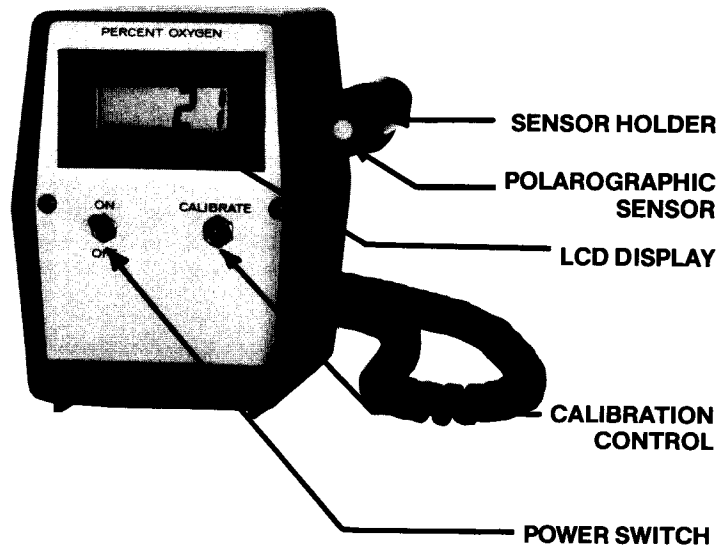
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applications. The sensor is a maintenance-free electrochemical device that requires only periodic calibration to assure reliable and accurate performance. Life of the sensor is typically 6 to 12 months. At the end of its life, the sensor is easily removed from its holder and disposed of like a common flashlight battery. There are no electrolytes or membranes to change. And, the low-cost sensor has an excellent shelf life that makes keeping spares on hand a sensible proposition.

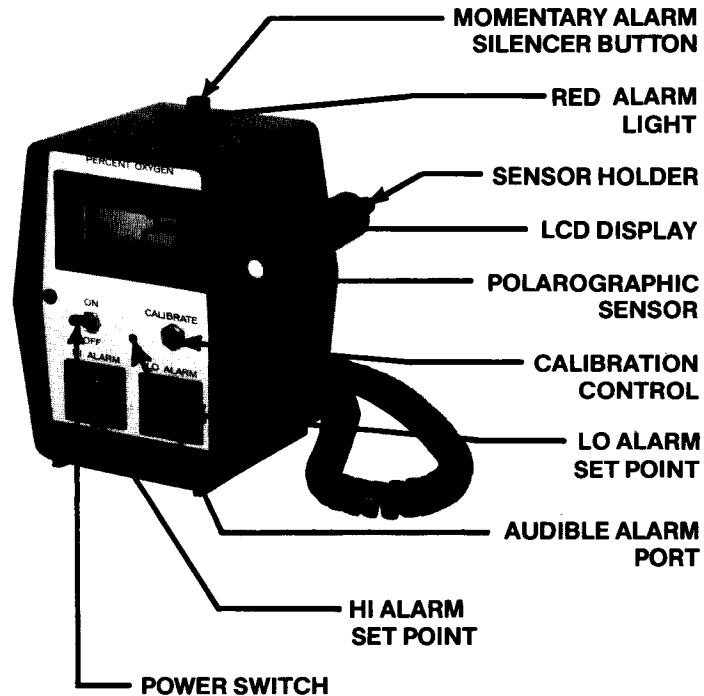
Also available is the **TED 80 Oxygen Monitor**, which is identical to the TED 100 except that alarm features are not included. With this exception, the following description of the TED 100 also applies to the TED 80.

Model
TED 80



Model

TED 100



Description

The TED 100 incorporates a combination of important features. The **Liquid Crystal Digital (LCD) Display** (see Figure 1) provides an easy-to-read meter readout of the oxygen (O_2) content of the gas being monitored. The readout is automatically rounded-off to the nearest whole number (no decimals are used) to minimize the possibility of reading error and to provide accurate information quickly and efficiently.

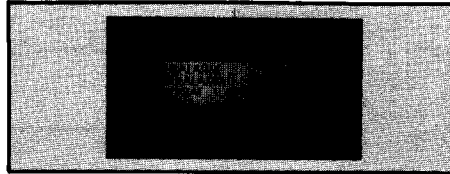


Figure 1. LCD Display

Additionally, separate **word** readouts are incorporated into the LCD display to indicate the following conditions:

- HI ALARM
- LO ALARM
- LO BAT (low battery condition)
- WAIT

The **setpoints** of the 2 adjustable alarms (See Figure 2) are indicated by white-on-black numerals located on the face of the TED 100. These setpoints are adjustable in increments of 1% O₂ and are changed by pushbuttons located above (+ adjust) and below (- adjust) each numeral.

Integral Audible and Visual alarm indicators are included in the TED 100 alarm system. When activated, the audible alarm utilizes an unmistakable **pulsating sound** sufficiently loud to attract attention without being overpowering. The visual alarm indicator is a flashing light located on the top of the TED 100. The Momentary Alarm Silence Button is located directly behind the flashing RED LIGHT ALARM. This is provided to allow bypassing of the audible alarm for about 30 seconds, after which time the audible alarm will again activate. The flashing light remains activated as long as an alarm condition exists.

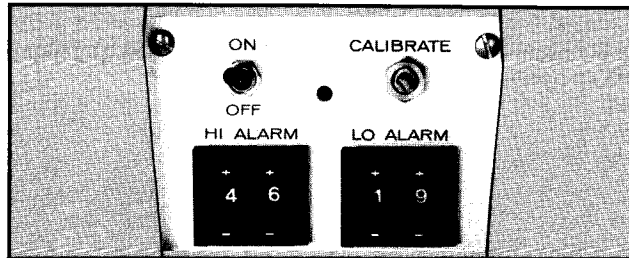


Figure 2

The following conditions activate the alarm indicators:

- When the oxygen reading is **above** the HI ALARM setpoint
- When the oxygen reading is **below** the LO ALARM setpoint
- **Any time the oxygen reading is below 18%**, regardless of the value of the alarm setpoints.

Also conveniently located on the front panel are the ON/OFF power switch and the CALIBRATION control. Two screws securely hold the panel in place and are removable to allow easy access to the two 9V batteries that power the TED 100. Also, the front panel is **recessed** so that the flat front edges of the TED 100's high-impact plastic case can serve to protect the front panel.

The heart of the TED 100 is the patented Polarographic Oxygen Sensor. The sensor is located in the sensor holder (see Figure 3.), which includes a coiled cable extendable to about 6 feet (1.8 meters) and a connector plug.

Sensor Installation

Note: The polarographic sensor must be installed **before** the TED 100 can be operated.

1. Before removing the sensor from the barrier bag, check the freeze indicator in the bag to be sure that the sensor was not damaged (frozen) during shipment.
2. Insert the sensor into the holder until the prongs contact the bottom; then, rotate the sensor until you "feel" the prongs line-up with the holes. **CAUTION: Do not press directly on the white sensing membrane surface when installing the sensor. Pressing on the membrane will cause permanent damage requiring sensor replacement.** Push the sensor straight into the holder by pressing on the lip around the top of the sensor. When the sensor is fully inserted, the lower edge of its lip will be flush with the top of the holder.
3. Insert the holder's connector plug into the female jack located on the backside of the TED 100.

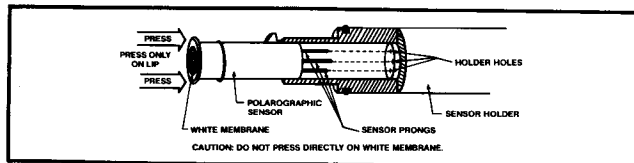


Figure 3. Sensor-to-Holder Alignment

Operating Instructions

1. Turn power switch to ON. The word WAIT is displayed on the LCD for about 3 minutes.
2. After the word WAIT disappears from the LCD display and the numbers stop changing, calibrate the TED 100 by exposing the sensor to 100% O₂ and adjust the CALIBRATE control until 100% O₂ is displayed on the LCD.
3. Expose the sensor to room air; the LCD should read between 20-22% O₂.
4. Check HI ALARM by setting it **below** 21% O₂. The audible and visual alarms should activate, and the words HI ALARM should appear on the LCD. Set HI ALARM to desired level.
5. Check low alarm functions by setting the LO ALARM **above** 21% O₂. While in the alarm state, check the Alarm Silence function by pushing down on the Momentary Alarm Silence button. The audible alarm should remain silent for about 30 seconds. Set LO ALARM to desired level.
6. The TED 100 is now ready for use.

Installation Tips

— Always install the sensor holder in a **horizontal** position. As with all oxygen sensors, excessive condensation on the sensing surface will block the diffusion of oxygen to the sensor. (If this should occur, carefully dry the surface with a cotton swab or absorbant tissue, and continue using the sensor.) Mounting the holder horizontally helps prevent condensation build-up.

— A T-adapter is available for installing the sensor holder in breathing circuits. To install the holder in the T-adapter, align the 2 ridges in the interior of the adapter with the 2 depressions in the rim of the holder. Then insert the holder until it is seated. (See Figure 4.)

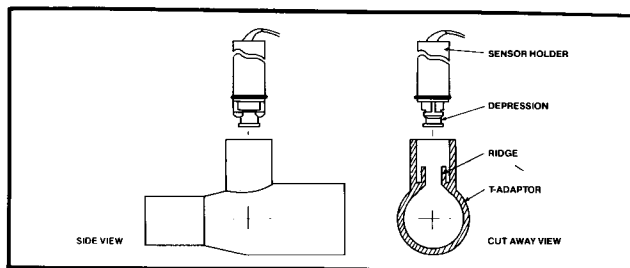


Figure 4. Installing Sensor Holder in T-Adapter

Battery Replacement

1. Open the TED 100 by unscrewing the 2 screws on the front panel and gently pull out the entire panel assembly and bottom plate.
2. Remove the old batteries and place two new 9V mercury batteries in the battery compartments at the rear of the assembly. Place the battery clips on each battery. Note: When mercury batteries are unavailable, the TED 100 can be operated with other types of 9V batteries — such as alkaline batteries — but the batteries must not be shorted when an explosive atmosphere is present.
3. Close the TED 100 by carefully sliding the front panel and bottom plate back into position. Replace the 2 screws.

Precautions

1. Operation or storage of the TED 100 outside its operating temperature range of 32 to 104 degrees F (0 to 40 degrees C) may damage the sensor or electronics.
2. Use of mercury batteries is recommended, although alkaline or other types of 9V batteries can also power the TED 100.
3. Do not press directly on the white sensing membrane surface of the sensor.
4. Do not autoclave or gas sterilize any part of the TED 100. Refer to "Disinfecting and Sterilizing" for recommended methods.
5. Each sensor is packed in a bag with a freeze indicator. This will indicate if the sensor was exposed to freezing temperatures during shipment; if this occurs, return the sensor for replacement.

Disinfecting and Sterilization of Sensor and Sensor Housing

Solutions recommended for disinfecting the sensor are:

- SONACIDE, a potentiated acid glutaral-dehyde made by Ayerst Laboratories, Inc. **OR**
- CIDEX, an activated dialdehyde made by Arbrook, Inc.

To **disinfect** the sensor, dip it for one minute minimum in either of the solutions noted above. Then, using a soft absorbant tissue or swab, blot dry the sensing surface.

For complete **sterilization** to destroy various tubercle bacilli and resistant spores, use either SONACIDE or CIDEX. If SONACIDE is used, immerse and maintain the sensor at 122 degrees F (50 degrees C) for 60 minutes. If CIDEX is used, immerse for a period of 10 hours (overnight), minimum; heating is unnecessary.

Note: Directions for sterilization are plainly and simply described on each solution container. These directions should be followed explicitly.

CAUTION: The sensor and sensor holder are the **only** parts of the TED 100 that can be sterilized or disinfected.

Optional Accessories

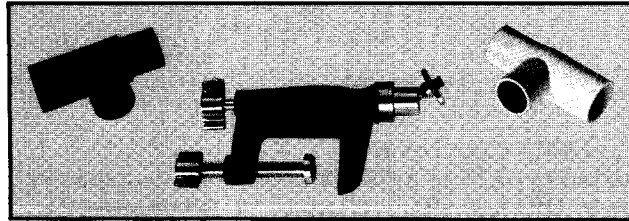


Figure 5.

<u>Description</u>	<u>Part No.</u>
T-Adapter (white)	A-181
T-Adapter, conductive (black)	A-182
Mounting Clamp	C-307

Spare Parts List

<u>Description</u>	<u>Part No.</u>
Class C-4 Polarographic Sensor	C-15443
9V Battery	B-55
Sensor Holder (includes coiled cable and connector plug)	B-31072

Specifications

Range: 0-100% Oxygen

Accuracy: $\pm 2\%$ of full scale at constant temperature

Operating Temperature Range: 32-104 degrees F
(0-40 degrees C)

Response Time: 90% in 6 seconds

Temperature Compensation: $\pm 5\%$ of reading during
worst case of temperature variation from 32 to
104 degrees F (0-40 degrees C)

Power Requirements: Two 9V batteries

Expected Battery Life: 3-9 months, depending on use

Sensor Type: Class C-4 Polarographic

Expected Sensor Life: Typically 6-12 months,
depending on duty cycle

Sensor Warranty: 6 months from date of shipment
(see Warranty Statement)

Dimensions: H=5"xW=3½"xD=4" (12.7x8.9x10.2 cm)
Weight=1.5 lbs (0.7 kgs)

Alarm Setpoint Accuracy: $\pm 1\%$ (TED 100 only)

Warranty

Teledyne warrants that the goods are free from defects of material and of construction for a period of one year from the date of shipment from Teledyne, except in the case of the polarographic sensor for which a six (6) month warranty period applies. The liability of Teledyne, if any, shall be limited solely to the replacement and repair of the goods and shall not include shipping costs or other incidental damages as defined in Section 2-715 of the U.S. Uniform Commercial Code.

This Warranty is null and void if any goods are subjected to misuse, negligence, accident, or repairs other than those performed by Teledyne or an authorized service center.