INSTRUCTION MANUAL
TED 200-T OXYGEN MONITOR

I. INTRODUCTION

The TED 200-T is an easy-to-use, cost-effective Portable Oxygen Monitor that provides fast and accurate oxygen analysis and alarm capability. Because it is microprocessor-based, the TED 200-T has a unique combination of features and functions that makes it ideal for use in respiratory therapy, anesthesiology, neonatal care, and other medical applications.

The TED 200-T's long list of features includes:

- Large high-contrast liquid crystal display (LCD)
- Fast response
- Operator-initiated pushbutton calibration
- Automatic diagnostics
- Dual alarms
- Red LED and audible alarm indicators
- Unique alarm test
- Tamper-resistant key operation
- "Smart" memory
- Word prompters for key functions
- Long battery life
- User-friendly design
- Rugged construction
- 24 month warranty (TED 200-T exclusive of sensor)

The TED 200-T uses Teledyne's Class T-7 Micro-Fuel Cell oxygen sensor. The T-7 represents a new class of sensor that features:

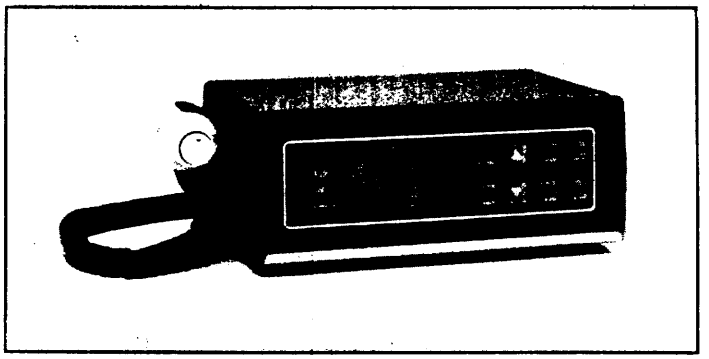
Fast response. 90% full scale response in less than 10 seconds (6-8 seconds typical) at 5 liters/minute flow rate.

Long life. Designed to provide over 10 months life in 100% oxygen (equivalent to 48 months of life in room air).

Small size. Fits easily into incubators and other medical equipment (a T-adapter is included with the TED 200-T).

Maintenance-free operation. The T-7 is easily replaced requiring no electrodes to clean or membranes and electrolyte to replace.

One year limited warranty. Backed by Teledyne's 20 years experience with electrochemical oxygen sensors.



TED 200-T

A. MAIN FEATURES

1. The TED 200-T is equipped with a safety feature that prevents the user from inadvertantly interrupting continuous 02 monitoring. The TED 200-T is designed to require two (2) key strokes in succession when using the "CAL", "ALARM TEST", and "ON/OFF" keys. If one of these keys is pressed only once, the TED 200-T will wait 5 seconds and then return to normal operation.
2. When the "CAL" key is pressed twice the TED 200-T detects whether the sensor is in AIR or 100% O_2. It then calibrates itself to the appropriate gas.
3. The HI/LO ALARM set points are adjustable in increments of 1% O_2. They appear on the display and are set by pressing the "SET HI ALARM" or "SET LO ALARM" key and then pressing the UP or DOWN arrow keys. If the HI ALARM setting exceeds 100% the word "OFF" will be displayed and "ALARM DEFEATED" will flash. If the O_2 level is above the HI ALARM or below the LO ALARM set point, the TED 200-T will display a flashing red light and sound a pulsating alarm.
4. The "ALARM SILENCE" key overrides the audible alarm. To override the audible alarm press this key once for 30 seconds, twice for 90 seconds, three times for 180 seconds, and four times to discontinue the override.
5. The TED 200-T warns of a low battery condition when its batteries need to be replaced. Pressing the "BATT. TEST" key displays the battery life remaining in hours. When the batteries become depleted, the TED 200-T will cease displaying an O_2 reading, and will eventually turn itself off completely. (See Section VIII).

II. SET UP

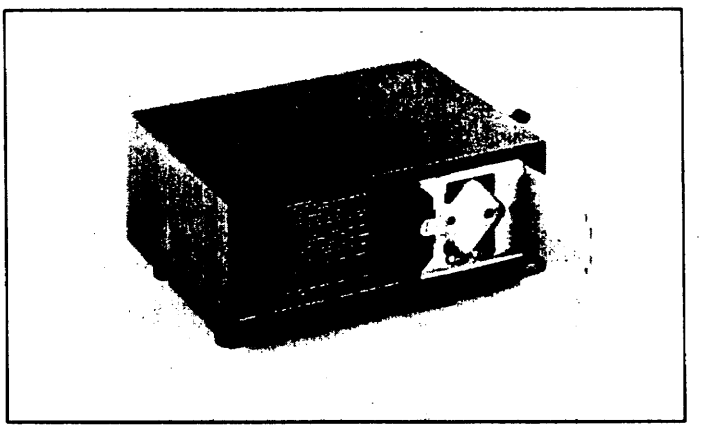
NOTE: UPON RECEIPT, INSPECT THE ENTIRE UNIT FOR DAMAGE. IF DAMAGE IS FOUND, NOTIFY THE SHIPPER. CHECK UNIT, AND INCLUDED ACCESSORIES, FOR BROKEN OR LOOSE PARTS.

A. BATTERY INSTALLATION OR REPLACEMENT

NOTE: Four "AA" alkaline batteries must be installed in the unit before the TED 200-T can be operated.

1. Turn the unit off.
2. Pull open the battery compartment door from left to right.
3. Remove the battery holder and take out the batteries, if present. NOTE: Use alkaline batteries only, other types will give erroneous "BATT TEST" readings and reduce battery life.
4. Install 4 "AA" alkaline batteries, observing proper polarity. The use of carbon zinc batteries is not recommended.

   WARNING: If the batteries are installed improperly, damage to the circuitry may occur causing the batteries to become hot and battery life to shorten.
5. Replace the battery holder.
6. Close the compartment door.



Battery Compartment

B. SENSOR INSTALLATION OR REPLACEMENT

NOTE: The Micro-Fuel Cell (T-7) must be connected to the sensor cable before the TED 200-T can be operated.

CAUTION: Do not autoclave the sensor. Recommended storage temperature is 10-30° C (50-86° F).

1. Remove the new sensor from its protective bag.
2. Plug one end of the coiled cable jack into the telephone jack receptacle, located on the base of the T-7 sensor, observing key orientation.

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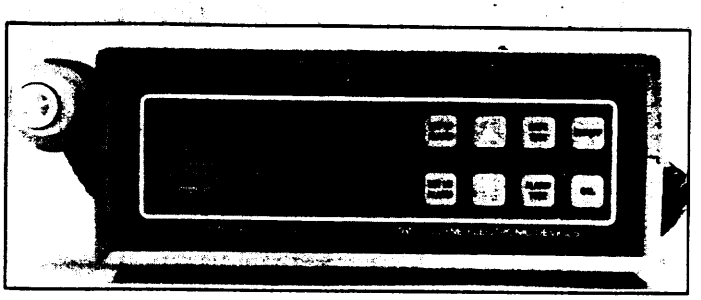
3. Plug the other end of the coiled cable receptacle into the right side panel of the TED 200-T, observing key orientation.
4. A T-adapter is available for installing the sensor in breathing circuits. To install the sensor in the T-adapter, screw on the flow diverter and insert the holder into the adapter until it is seated.

   NOTE: If the instrument is used for diffusion sampling (e.g. incubators, oxygen tents, etc.) the flow diverter should be removed from the T-7 sensor to maximize response characteristics.

III. OPERATING INSTRUCTIONS

1. Make sure the T-7 Micro-Fuel Cell is properly connected to the cable.
2. Make sure the sensor cable is plugged into the receptacle on the right side of the TED 200-T. No warm-up period is required. The unit may be used immediately after connecting the sensor to the unit.
3. Turn the unit on by pressing the "ON/OFF" key once. NOTE: If new batteries have just been installed the display will flash "AIR CAL". HI alarm will read 100%; LO alarm will read 17%. The oxygen value will be blank on the display until the unit is calibrated.
4. Place the sensor in room air (uncontaminated with excess oxygen or other gases) with the flow diverter removed. Press the "CAL" key once (twice after initial calibration). NOTE: It is very important that air calibration is performed every time a sensor is installed on the TED 200-T. The microprocessor cannot perform its task properly without this data. After 10 seconds a reading of 21 will be displayed. "CAL IN 100%" will flash for a period of 5 seconds during which time the reading of 21 persists. Set the LO and HI alarm limits to 17 and OFF respectively (refer to Step 5 below). Replace the flow diverter and using the T-adapter, flow 100% oxygen over the sensing surface of the T-7 sensor assembly and allow the reading to stabilize. If the reading is other than 100, press the "CAL" key twice. After 15 seconds a reading of 100 will be displayed.
5. To set the HI alarm press the "SET HI ALARM" key. Press the "UP" or "DOWN" keys (within 5 sec.) for desired value. NOTE: If the HI alarm value exceeeds 100%, the display will show "OFF" and flash "ALARM DEFEATED." Follow same procedure to set the LO alarm using "SET LO ALARM" key. NOTE: The TED 200-T is designed to prevent crossing of HI/LO alarm settings. If you try to make the LO alarm higher than the HI alarm, it will push the HI alarm setting up as you continue to raise the LO alarm set point (this also applies when setting the HI alarm lower than the LO alarm).
6. To test the alarms, press the "ALARM TEST" key twice. The display will show "ALARM TEST." The O_2 reading on the display will sequence to the HI alarm value and activate the audible/visual alarm (1-2 sec.). It will then sequence down to the LO alarm value and activate the audible/visual alarm (1-2 sec.).
7. To override the audible alarm, press the "ALARM SILENCE" key (press once for 30 sec.; twice for 90 sec.; three times for 180 sec.; four times to discontinue override). The display will flash "ALARM SILENCE" and then countdown the remaining alarm silence time. The unit will continue monitoring and displaying the O_2 concentration.
8. To check the batteries, press the "BATT TEST" key once. The display will show "BATTERY HRS LEFT" (up to a maximum of "999" hrs) of remaining battery life. NOTE: The TED 200-T is designed to automatically (once per hr.) check its battery life. NOTE: When setting the HI/LO alarms or checking the batteries, the unit will freeze the O_2 reading momentarily. This is completely normal.
9. The TED 200-T is now ready for use. NOTE: To turn the unit off, press the "ON/OFF" key twice.



TED 200-T Keyboard Panel

IV. INSTALLATION TIPS

1. Water Condensation.

As with all oxygen sensors, excessive condensation on the sensing surface will block the diffusion of oxygen to the sensor, making it inoperative. TED recommends installing the sensor on the dry side of the breathing circuit. If this is not possible, install the sensor holder at a 45° angle from vertical, which minimizes condensation of water on the sensing surface. The sensor should be removed from the breathing circuit periodically (once every 2-3 hrs.), dried and calibration checked to assure that communication with the sensing surface is not blocked by excessive water condensate.

The TED 200-T includes a T-Adapter for mounting the sensor in a standard 22 mm circuit as shown in Figure 1. Optional adapters are available.

2. Pressure Effects.

The effect of PRESSURE is a trait common to virtually all electrochemical sensors used in medical oxygen analyzers. Because sensors measure the partial pressure of oxygen, it is normal for them to respond to changes in total pressure. For example, a positive pressure cycle of 100 cm of water will produce a 10.6% change in the oxygen reading. For a 50% O_2 mixture, that means a positive pressure of 100 cm of water will result in a reading of 55.3% O_2. The sensor will approach this reading (55.3% O_2) depending upon the response time of the sensor and the duration of the pressure pulse. A fast responding sensor, such as the T-7, will track pressure transients more than slower responding sensors.

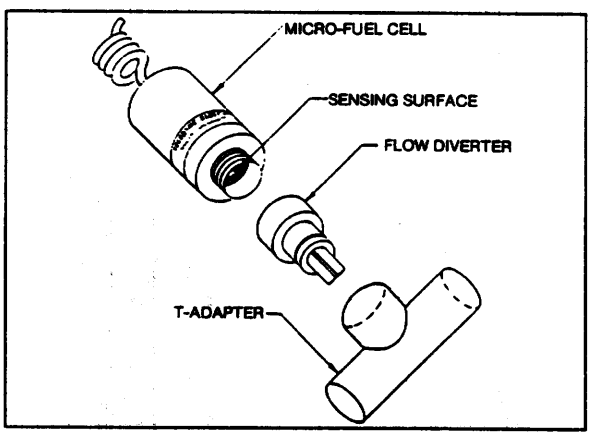


Figure 1. Mounting of Sensor in T-Adapter

V. PRECAUTIONS

1. Do not autoclave or gas sterilize any part of the TED 200-T. Refer to "Disinfecting and Sterilization" for recommended methods.
2. The TED 200-T should not be used in the presence of flammable gases or vapors.
3. The T-7 sensor contains a caustic mixture, which is harmful if touched, inhaled, or swallowed. In case of eye contact, immediately flush eyes with water for at least 15 minutes. Call a physician. Material Safety Data Sheets (MSDS) are available from TED.