

# OPERATION MANUAL

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## JENCO MODEL 9173 MICROCOMPUTER BASED Dissolved Oxygen/Temperature BENCH METER

**JENCO** ELECTRONICS, LTD.  
MANUFACTURER OF PRECISION INSTRUMENTS

## INITIAL INSPECTION

Carefully unpack the instrument and accessories. Inspect for damages made in shipment. If any damage is found, notify your **Jenco** representative immediately. All packing materials should be saved until satisfactory operation is confirmed.

## GENERAL INTRODUCTION

The Jenco Model **9173** Bench Dissolved Oxygen/Temperature System is a microprocessor based instrument designed for the use in field, laboratories and process control applications. Using a polygraphic type sensor, it is an essential tool for precise measurements of dissolved oxygen and temperature.

The model **9173** micro-processor allows the user to easily recalibrate the parameters for the probe. The system requires only a single calibration, regardless of which dissolved oxygen display you use.

The system simultaneously displays temperature in °C along with either dissolved oxygen in % air-saturation or dissolved oxygen in ppm (parts per million). The user can switch back and forth from the two displays by just pressing the [MODE] key.

A calibration bottle is included with the instrument. A small sponge in the bottle can be moistened to provide a water saturated air environment which is ideal for air calibration procedures. This bottle is also designed for transporting and storing the probe. When the probe is stored in the bottle, the moist environment will prolong effective membrane performance and probe life.

This instrument is powered by six 1.5V batteries or with a UL approved AC adapter(Output: DC 9V). The instrument also displays a "LO BAT" message when the batteries are in need of replacement.

Optional RS-232C can track all displayed values and interface the meter with computers. This is only for **9173R**.

Other features include large LCD display , touch keys with audio feedback, pressure & salinity compensation, percentage of power supply display.

## **USING THE JENCO MODEL 9173**

### **PRECAUTIONS and MAINTENANCE**

#### **THE PROBE**

1. Membranes will last long time if installed properly and maintained regularly. Erratic readings are a result of damaged or fouled membranes or from large bubbles in the electrolyte reservoir. If unstable readings or sign of membrane damage occurs, you should replace the membrane and KCl solution. The average replacement interval is two to four weeks.
2. Unstable readings may occur if the membrane cap is coated with oxygen consuming (e.g. bacteria) or oxygen evolving (e.g. algae) organisms.
3. Chlorine, sulfur dioxide, nitric oxide and nitrous oxide can affect readings by behaving like oxygen at the probe.
4. Avoid any environment which contains substances that may damage the probe materials. Some of these substances are concentrated acids, caustics and strong solvents.
5. The probe's gold cathode must always be bright. If it is tarnished (which can result from contact with certain gases), or plated with silver (which can result from extended use with a loose or wrinkled membrane), the gold surface must be restored. To restore the cathode, you may either return the instrument to your nearest Jenco representative or clean it using the Jenco Probe Reconditioning kit. Never use chemicals or abrasives not supplied with this kit.
6. It is also possible for the silver anode to become contaminated which will prevent successful calibration. To clean the anode, remove the O-ring and membrane and soak the probe overnight in 3% ammonium hydroxide. Rinse the sensor tip and KCl reservoir with deionized water, add a new KCl solution, and install a new membrane and O-ring. Turn the instrument on and allow to stabilize for 30 minutes. If, after several hours you are still unable to calibrate, return the instrument to your authorized Jenco representative.
7. If the O-ring is wrinkled or loose, replace it with the appropriate O-ring provided in the Jenco O-ring pack.
8. To keep the electrolyte from drying out, store the probe in the calibration bottle with the moistened sponge.

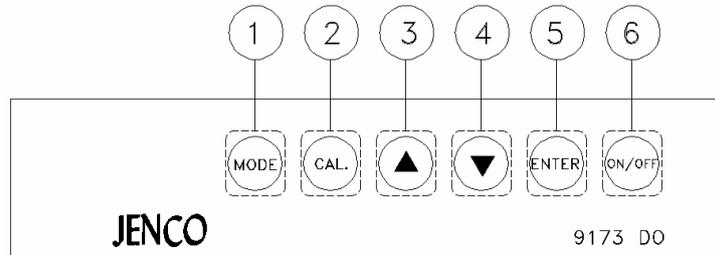
## **PROBE PREPARATION**

The Jenco model **9173** probe is shipped dry. The protective cap on the probe must be removed and replaced the KCl solution before using the probe.

To prepare for installation of a membrane cap on your Jenco model **9173** probe :

1. Unscrew the probe membrane cap.
2. Thoroughly rinse the sensor tip and KCl reservoir with distilled water.
3. Prepare the electrolyte according to the directions on the KCl solution bottle.

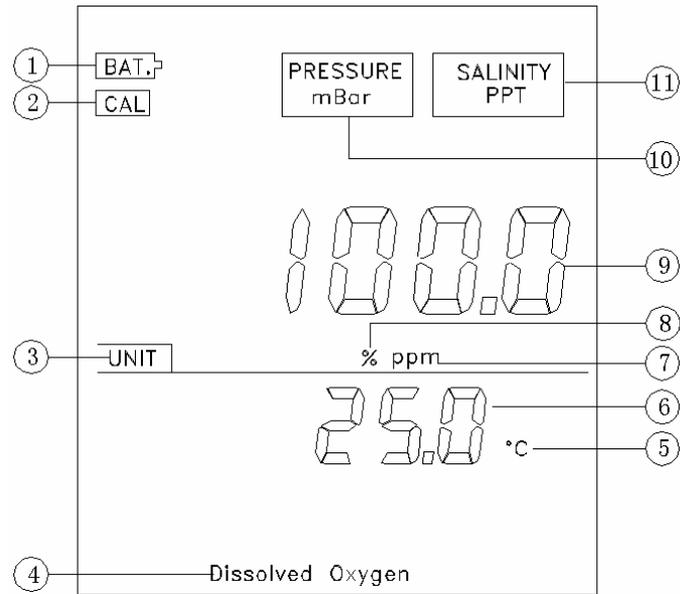
## **THE KEYPAD**



**FIGURE 1**

1. The [**MODE**] key. In normal operation, this key will change the display to Dissolved Oxygen in % air saturation or Dissolved Oxygen in ppm. In Calibration mode, this key will exit the current calibration and go to the next calibration parameter.
2. The [**CAL**] key. During normal operation, this key will change the mode from normal to Calibration mode. See CALIBRATION SET-UP.
3. The [ **▲** ] key. This key is used during Calibration to increment the value of the display.
4. The [ **▼** ] key. This key is used during Calibration to decrement the value of the display.
5. The [**ENTER**] key. During Calibration set-up, this key will save the current parameter .
6. The [**ON/OFF**] key. This key will turn on or turn off the instrument. The last display mode will be saved.

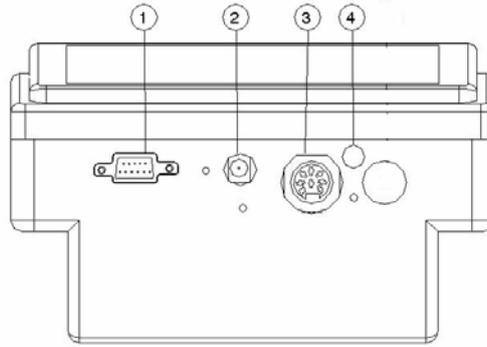
## THE DISPLAY



**FIGURE 2**

- |                    |   |                             |
|--------------------|---|-----------------------------|
| 1.BAT.             | : | Low battery indicator       |
| 2.CAL              | : | Calibration mode indicator  |
| 3.UNIT             | : | Unit indicator              |
| 4.Dissolved Oxygen | : | Type of the meter           |
| 5.°C               | : | Temperature unit            |
| 6.25.0             | : | Second display(Temperature) |
| 7.ppm              | : | DO unit(ppm) indicator      |
| 8.%                | : | DO unit(%) indicator        |
| 9.100.0            | : | Main display(DO)            |
| 10.PRESSURE mBar   | : | Pressure & unit indicator   |
| 11.SALINITY ppt    | : | Salinity & unit indicator   |

## CONNECTORS



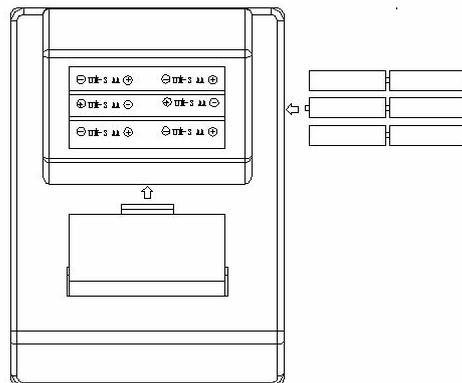
**FIGURE 3**

- |  |               |
|--|---------------|
| 1. RS-232C connector (for <b>9173R</b> only) | 2. AC ADAPTER |
| 3. DO/TEMP PROBE connector                   | 4. No use     |

## REPLACING THE BATTERIES

Follow the procedures to replace the internal batteries.

1. Replace batteries when the **BAT** indicator appears on the LCD . The instrument can operate within specifications for approximately one hour after **BAT** starts to appear.
2. The battery compartment is located at the bottom side of the meter (Refer to Figure 4). Flip the meter over so that the bottom side is facing up. Lift the battery cover to expose the battery compartment.
3. Replace all six type AA batteries.
4. Replace battery cover.



**FIGURE 4**

## **TURNING ON/OFF THE INSTRUMENT**

Once the batteries are installed correctly and/or an AC adapter is installed, you can press the [ON/OFF] key to turn on or turn off the instrument. When the unit is not in use, the user should turn off the instrument to save battery life. By just unplugging the AC adapter will not turn off the instrument if batteries are present. It would automatically switch to battery power and will continue to operate.

After the self-diagnostic is complete, the temperature will be displayed in the lower right of the display and the instrument is ready to make a measurement. Just immerse the probe half-way to the liquid. If possible do not allow the probe to touch any solid object in the solution. There should be no air bubbles around the probe either. Shaking or moving the probe vigorously before recording any measurement will dislodge any bubble formed in the probe.

## **MODEL 9173 MODES**

This instrument is designed to provide 3 distinct measurements:

1. Temperature - current temperature of the solution which is always displayed.
2. Dissolved Oxygen % - a measurement of oxygen in percent saturation.
3. Dissolved Oxygen ppm - a measurement of oxygen in ppm.

Note : Every time the unit is turned OFF the last mode is saved so that when you turn the instrument ON again it will return to this mode.

To choose any measurement mode (temperature is always included) simply press and release the [MODE] key . Carefully observe the annunciators units at the center of the LCD.

## **CALIBRATION SET-UP**

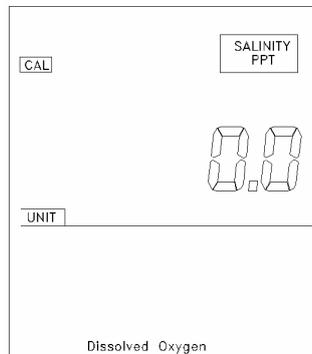
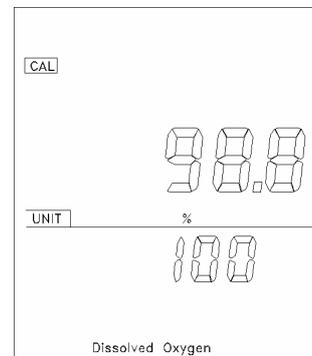
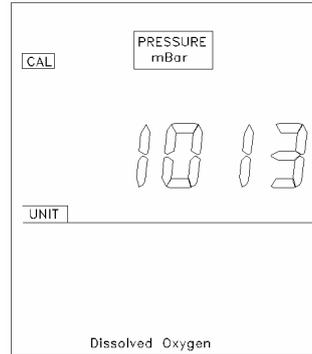
### **CALIBRATION REQUIREMENTS**

To accurately calibrate the Jenco Model **9173**, you will need the following information:

1. The approximate pressure (in mBar) of the region in which you plan to take your dissolved oxygen measurements.
2. The approximate salinity of the water you will be analyzing. Fresh water has a salinity of approximately zero. Sea water has a salinity of approximately 35 parts per thousand (ppt).

## CALIBRATION PROCEDURES

1. Place 5-6 drops of distilled water on the sponge inside the calibration bottle. Turn the bottle over and allow any excess water to drain out of the bottle. The wet sponge creates a 100% water saturated-air environment for the probe which is ideal for calibration, transport and storage of the Model **9173** probe.
2. Screw in the bottle into probe allowing at least 5 mm space between the probe and the sponge.
3. Turn on the instrument by pressing the **[ON/OFF]** key. Wait around 30 minutes for the dissolved oxygen and temperature readings to stabilize.
4. Press the **[CAL]** key.
5. The LCD will prompt you to enter the local pressure in mBar. Use the **[Δ]** or **[▽]** keys to increase or decrease the pressure compensation value respectively.
6. When the proper pressure value appears on the LCD, press the **[ENTER]** key once to view the calibration value in the lower center of the LCD and a second time to move to the salinity compensation procedure.
7. The LCD will prompt you to enter the approximate salinity of the water you about to analyze. You can enter any number from 0 to 40 parts per thousand (ppt) of salinity. Use the **[Δ]** or **[▽]** keys to increase or decrease the salinity compensation value respectively. When the correct salinity appears on the LCD, press the **[ENTER]** key.
8. Once the calibration process is complete, the only keys you need to use are the **[MODE]** and **[ON/OFF]** keys unless you need to calibrate the instrument again. You can move back and forth from reading either dissolved oxygen in % air saturation mode or ppm mode by pressing the **[MODE]** key.
9. Each time the Jenco Model **9173** has been turned off, it may be necessary to re-calibrate before





## SPECIFICATIONS

| Display                            | Range          | Accuracy      | Resolution |
|------------------------------------|----------------|---------------|------------|
| Dissolved O <sub>2</sub> (ppm)     | 0 to 20.00 ppm | ±0.2% of span | 0.01 ppm   |
| Dissolved O <sub>2</sub> % air-sat | 0 to 200.0 %   | ±0.2% of span | 0.1%       |
| Temperature (°C)                   | -6.0 to 50.0°C | ±0.3°C        | 0.1 °C     |

|   |  |
|---|--|
| Pressure compensation                             | From 600 to 1100 mBar                              |
| Salinity compensation                             | From 0.0 to 40.0 ppt                               |
| Temperature sensor                                | Thermistor, 10k Ω , at 25 °C                       |
| Display (DO : Temp)                               | 21mm : 16mm high LCD                               |
| Calibration Back-up                               | Yes (FLASH)  |
| Audio Feedback                                    | All Touch Keys                                     |
| Power Supply<br>Batteries/Adapter<br>Battery Life | : Six 1.5V batteries/AC adaptor<br>About 500 hours |
| Ambient Temp. Range                               | From 0 to 50 °C                                    |
| Relative Humidity                                 | Up to 95%  |
| Communication                                     | RS-232C output (only for 9173R)                    |
| Dimensions  | 230mm x 165 mm x 80 mm                             |
| Weight (Batteries not included)                   | 650 grams  |

## WARRANTY

Jenco Instruments, Ltd. Warrants this product to be free from significant deviations in material and workmanship for a period of 1 year from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse, within the year period, please return-freight-prepaid and the correction of the defect will be made without charge. If you purchased the item from our Jenco distributors and it is under warranty, please contact them to notify us of the situation. Jenco Service Department alone will determine if the product problem is due to deviations or customer misuse.

Out-of –warranty products will be repaired on a charge basis.

## RETURN OF ITEMS

Authorization must be obtained from one of our representatives before returning items for any reason. When applying for authorization, please have the model and serial number handy, including data regarding the reason for return. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Jenco will not be responsible for damage resulting

from careless or insufficient packing. A fee will be charged on all unauthorized returns.

**NOTE:** Jenco Instruments, Inc reserves the right to make improvements in design, construction, and appearance of our products without notice.

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|------|----------|------|-------|------|------------|
| 机型   | 9173     | 文件名称 | 使用说明书 |      |            |
| 文件编号 | K9173-02 | 编制人  | 豆林奇   | 编制日期 | 2003/07/08 |
| 版本号  | 01       | 核准人  |       | 核准日期 |            |

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