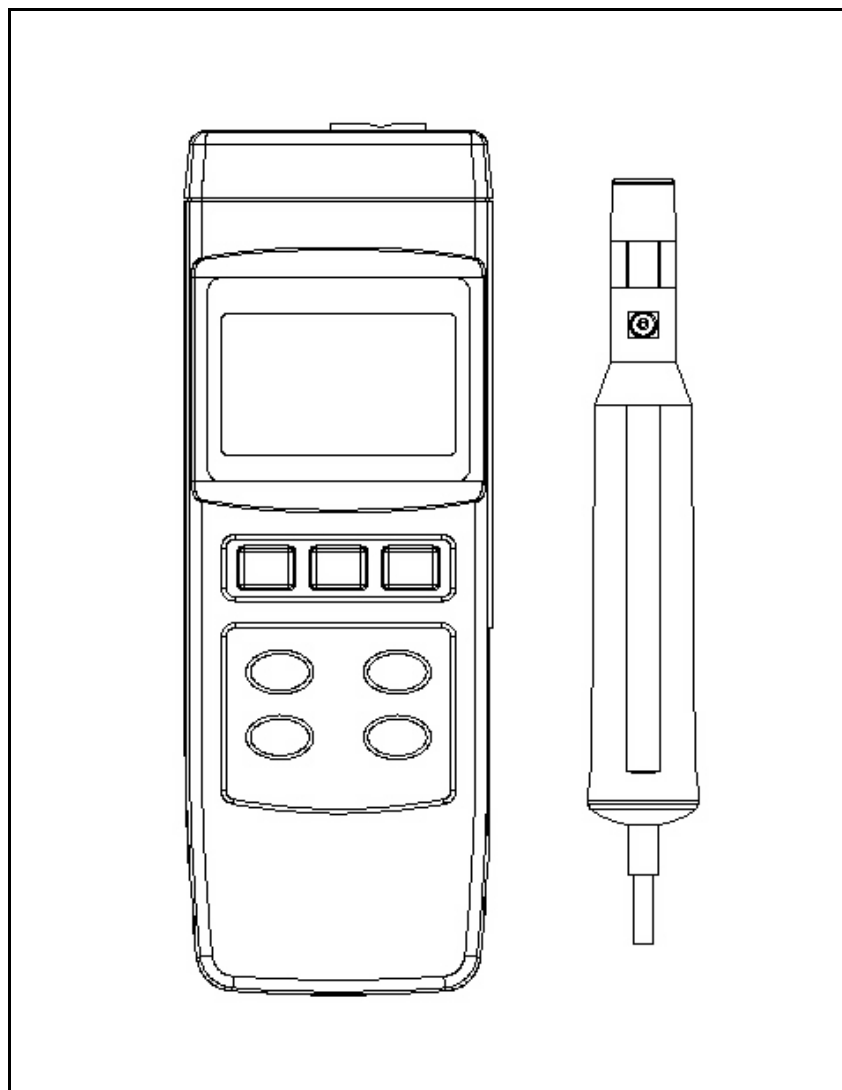


DISSOLVED OXYGEN METER

Model : YK-22DO

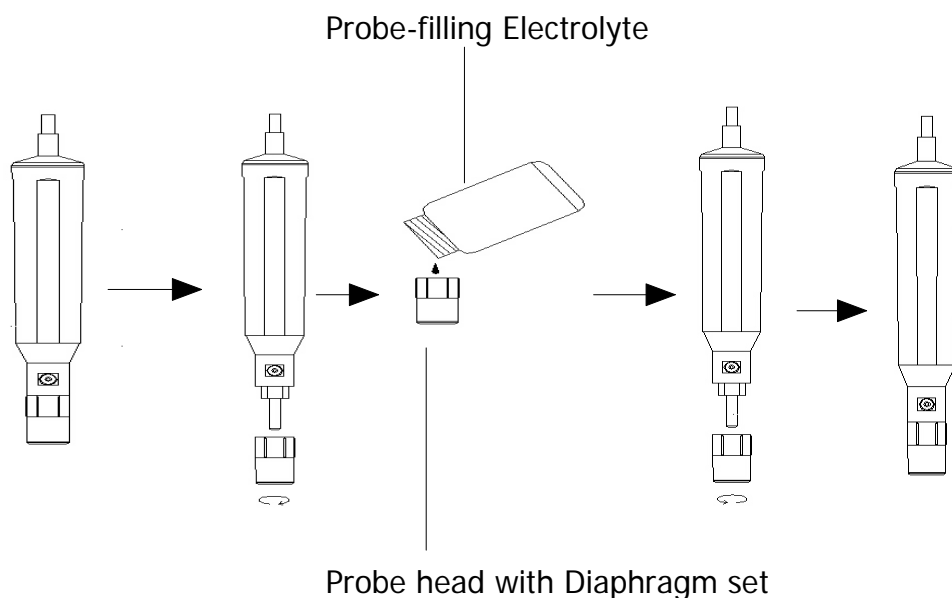


ATTENTION :



Fill the Probe's Electrolyte at first.

Intend to keep the DO probe under the best condition, when user receive the **DIGITAL OXYGEN METER** along the **PROBE**, it should fill the Probe's Electrolyte at first.



The procedures that to fill the Probe's Electrolyte, refer the chapter 9 " PROBE MAINTENANCE ", page 10.

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1. GENERAL DESCRIPTIONS

- * This Digital Oxygen Meter is supplied with a polarographic type probe with an incorporated Temp. sensor which serves for precision Dissolved Oxygen (DO), Temp. measurement.
- * Applications for Aquarium, Medical research, Agriculture, Fish hatcheries, Laboratory, Water conditioning, Mining industry, Schools & Colleges, Quality control...

2. FEATURES

- * The polarographic type oxygen probe with an incorporated Temp. sensor, high precision measurement for Dissolved Oxygen (DO) and Temperature measurement.
- * DO measurement, automatic Temp. compensation from 0 to 50 °C for sensor.
- * Multi-display, show oxygen & Temp. at the same time.
- * Temperature function with °C & °F display unit.
- * Microprocessor circuit, intelligent function.
- * Memorize maximum and minimum readings with recall.
- * Data hold.
- * Auto power off saves battery life.
- * RS 232 PC serial interface.

3. SPECIFICATIONS

3-1 General specifications

Circuit	Microprocessor LSI circuit.
Display	51 mm x 32 mm, dual function LCD display, 15 mm (0.6") digit size.
Measurement	* Dissolved Oxygen * Temperature
DO Sensor Structure	The polarographic type oxygen probe with an incorporated temperature sensor.
DO Probe Temperature Compensation	0 to 50 °C, Automatic.
Memory Recall	Memorize maximum and minimum readings with recall.
Data hold	Hold the current reading value on the display.
Memory Recall	Maximum and minimum reading values can be saved and retrieved by record function.
Power off	Auto power off saves battery life, or manual off by push button.
Data Output	RS 232 computer serial interface.
Overload indication	"- - - -" symbol on the display.
Operating Temperature	0 to 50 °C
Operating Humidity	Max. 80% RH.
Sampling Time	Approx. 0.8 second.
Power Supply	006P DC 9V battery (<i>Alkaline or Heavy duty type</i>).
Power Current	Approx. DC 7.0 mA.
Weight	210 g/0.46 LB (meter only). 450 g/0.99 LB (meter and DO probe).

Size	<i>Main meter :</i> 195 x 68 x 30 mm (7.6 x 2.6 x 1.2 inch).
	Oxygen probe : 190 mm x 28 mm Dia.(7.5" x 1.1" Dia.) * Cable length : 4 meters.
Accessories included	Oxygen probe (OXPB-22)..... 1 PC. Operation manual..... 1 PC. Spare Probe head with Diaphragm OXHD-04.....2 set Probe-filling Electrolyte OXEL-03.....1 set Carrying case, CA-06..... 1 PC.
Optional Accessories	* Oxygen probe..... OXPB-22 * Spare Probe head with Diaphragm set OXHD-04 * Probe-filling Electrolyte..... OXEL-03 * RS232 cable..... UPGB-02 * USB cable..... USB-01 * Data Acquisition software SW-U801-WIN

3-2. Electrical Specifications

Dissolved Oxygen

Range	0 to 20.0 mg/L (liter).
Resolution	0.1 mg/L.
Accuracy @ 23 5 °C	± 0.4 mg/L.

Temperature

Range	°C.	0 to 50 °C.
	°F.	32 to 122 °F.
Accuracy @ 23 5 °C	°C.	± 0.8 °C
	°F.	± 1.5 °F.
Resolution	°C : 0.1 °C, °F : 0.1 °F.	

4. FRONT PANEL DESCRIPTION

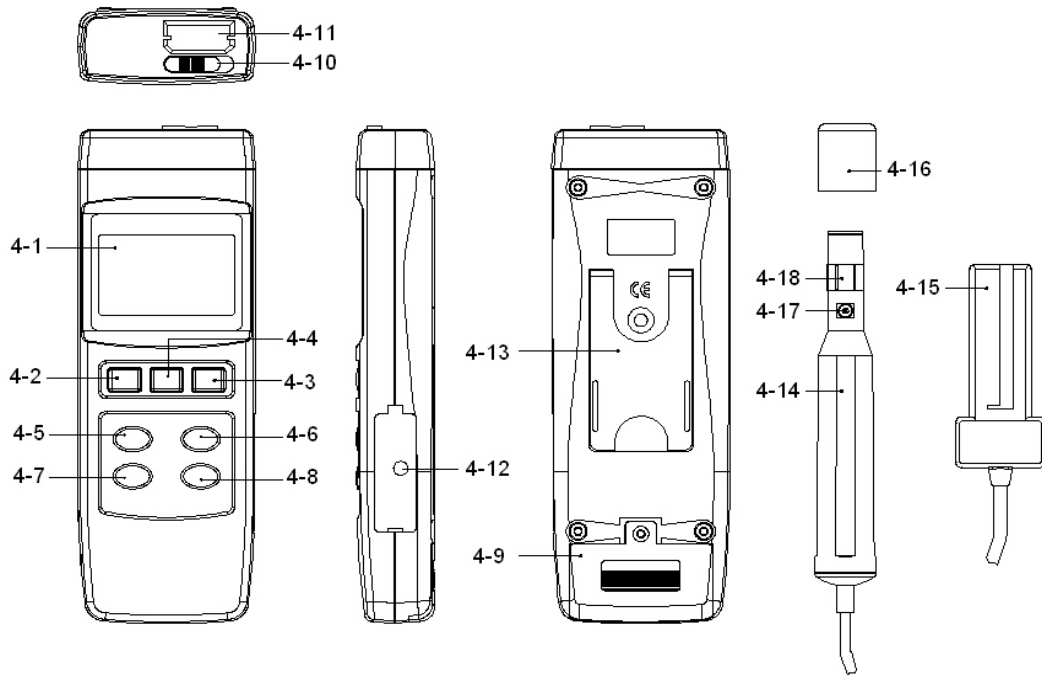


Fig. 1

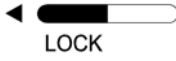
- | | |
|-----------------------------------|------------------------------------|
| 4-1 Display | 4-10 Lock Switch |
| 4-2 Power Button | 4-11 Probe Input Socket |
| 4-3 REC. Button | 4-12 RS-232 Out Terminal |
| 4-4 Hold Button | 4-13 Stand |
| 4-5 °C/°F button | 4-14 Oxygen Probe |
| 4-6 O ₂ , mg/L Button | 4-15 Probe Plug |
| 4-7 ZERO Button | 4-16 Probe Protection Cover |
| 4-8 CAL Button | 4-17 Temperature sensor |
| 4-9 Battery Compartment/
Cover | 4-18 Probe head with diaphragm set |

5. MEASURING PROCEDURE

5-1 Calibration

Before the measurement, it should make following calibration procedures first :

- 1) Connect the " Probe Plug " (4-15, Fig. 1) into the " Probe Input Socket " (4-11, Fig. 1)

Make sure that the " Lock Switch " (4-10, Fig. 1) is in the lock position ().

- 2) Power on the instrument by pushing the " Power Button " (4-2, Fig. 1).
- 3) Push the " O2 mg/L Button " (4-6, Fig. 1) to select the " % O2 " function, the display will show the symbol of " % O2 "
- 4) Push the " Zero Button " (4-7, Fig. 1) once, the LCD will show zero value and then display the " Air Oxygen " value.
- 5) Wait approx. 5 minutes at least until the display reading values become stable & no fluctuation.

Push the " CAL Button " (4-8, Fig. 1) then the display will show the values exact same as 20.9 or 20.8. (As the oxygen in air is 20.9 % typically, so use this data for quick & precise calibration).

Consideration :
Please make calibration procedures under wide and ventilating environment for best effect.

5-2 Dissolved Oxygen (DO) measurement

- 1) After the meter be calibrated (above procedure 5-1), now the meter is ready for Dissolved Oxygen (DO) measurement.
- 2) Push the " O2, mg/L Button " (4-6, Fig. 1) to select the " DO " function, the display will show the symbol of " mg/L " .

5-3 Oxygen in Air (O2) measurement

- 1) After the meter be calibrated (above procedure 5-1), now the meter is ready for O2 measurement.
- 2) Push the " O2 mg/L Button (B Button) " (4-6, Fig. 1) to select the " % O2 " function, the display will show the symbol of " % O2 "
- 3) The display will show the air oxygen in % values for reference.

5-4 Temperature measurement

During the measurement, the lower LCD Display will show the temperature values of measuring solution. Push the " °C/°F Button " (4-5, Fig. 1) once will change the temperature display unit from " °C to °F " or " °F to °C ".

5-5 Other functions (Hold, Memory)

Data Hold

Press the " Hold Button " (4-4, Fig. 1) will hold the measured value & the LCD will indicate a " HOLD " symbol on the display during the measuring.

- * Press the " Hold Button " again to exit the data hold function.

Data Record (Max., Min. reading)

- * The data record function records the maximum and minimum readings. Press the " REC. Button " (4-3, Fig. 1) to start the Data Record function and there will be a " REC " symbol on the display.
- * With the " REC " symbol on the display :
 - a) Press the " REC. Button " (4-3, Fig. 1) once, the " REC Max " symbol along with the maximum value will appear on the display.

If intend to delete the maximum value, just press the " Hold Button " (4-4, Fig. 1) for a while, and then the display will show the " REC " symbol only & execute the memory function continuously.
 - b) Press the " REC. Button " (4-3, Fig. 1) again, the " REC Min " symbol along with the minimum value will appear on the display.

If intend to delete the minimum value, just press the " Hold Button " (4-4, Fig. 1) for a while, and then the display will show the " REC " symbol only & execute the memory function continuously.
 - c) To exit the memory record function, just press the " REC " button for 2 seconds at least. The display will revert to the current reading.

6. AUTO POWER OFF DISABLE

The instrument has " Auto Power Off " function in order to prolong battery life. The meter will shut off automatically if none of the buttons are pressed in approx. 10 min.

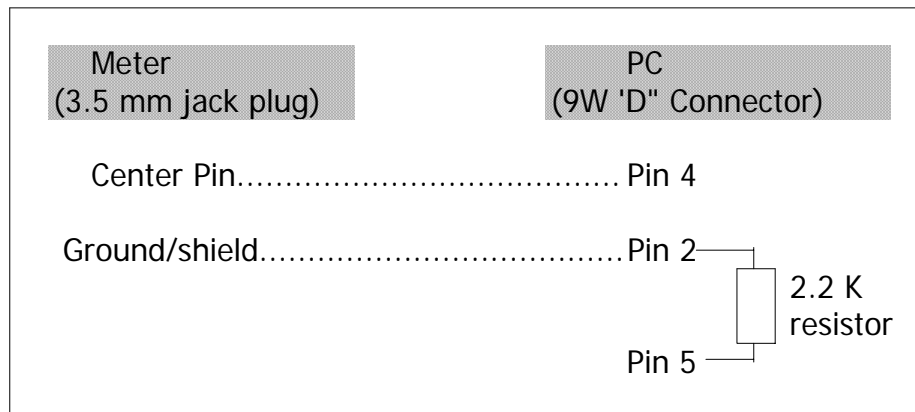
To disable this function, Select the memory record function during the measurement by pressing the " REC. Button " (4-3, Fig. 1).

7. RS232 PC SERIAL INTERFACE

The instrument features RS232 output via 3.5 mm Terminal (4-12, Fig. 1).

The signal output is a 16 digits data stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial interface.



The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

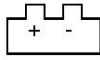
Each digit indicates the following status :

D15	Start Word	
D14	4	
D13	When send the upper display data = 1 When send the lower display data = 2	
D12, D11	Annunciator for Display	
	°C = 01	°F = 02
	O2= 06	mg/L = 07
D10	Polarity 0 = Positive 1 = Negative	
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP	
D8 to D1	Display reading, D8 = MSD, D1 = LSD <i>For example :</i> <i>If the display reading is 1234, then D8 to D1 is :</i> <i>00001234</i>	
D0	End Word	

RS232 setting

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

8. BATTERY REPLACEMENT

- 1) When the left corner of LCD display show "  ", it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears.
- 2) Slide the " Battery Cover " (4-9, Fig. 1) away from the instrument and remove the battery.
- 3) Replace with 9V battery (Alkaline or Heavy duty type) and reinstate the cover.
- 4) Make sure the battery cover is secured after changing the battery.

9. PROBE MAINTENANCE

First time to use the meter :

Intend to let the DO probe keep the best condition, when user receive the DIGITAL OXYGEN METER along the PROBE, it should fill the Probe's Electrolyte at first.

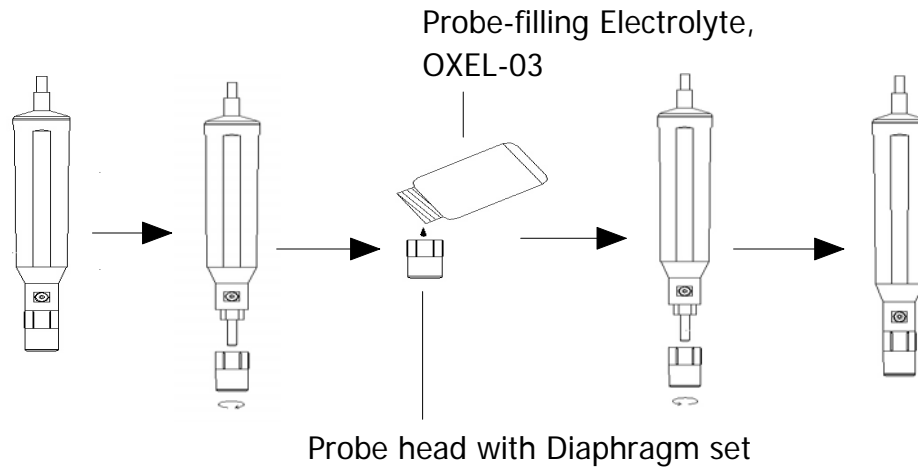
Already use the meter for a certain period :

Whenever user can not calibrate the meter properly or the meter's reading value is not stable, please check the oxygen probe to see if the electrolyte in the probe head container is run out or the diaphragm (probe head with diaphragm set) exist problem (dirty). If yes, please fill the electrolyte or change the " Probe head with diaphragm set " and make the new calibration (refer chapter 5-1, page 5).

The consideration of Diaphragm (probe head with diaphragm set) :

The oxygen probe component is the thin Teflon diaphragm housed in the tip of the probe. The diaphragm is permeable by the oxygen molecules but not by the considerably larger molecules contained in the electrolyte. Due to this characteristic, the oxygen may diffuse throughout the electrolyte solution contained in the probe, and its concentration may be quantified by the measurement circuit.

This sensitive diaphragm is rather delicate & is easily damaged if it comes into contact with solid objects or is subjected to blows. If the diaphragm is damaged (dirty) or the electrolyte is run out, it must be replaced in the following way :



- 1) Unscrew the " Probe head " (9-3, Fig 2).
- 2) Pour out the old Electrolyte from the container of the " Probe head ".
If the diaphragm is damaged (dirty), then change the new " Probe head with diaphragm set " .
- 3) Fill the new Electrolyte (OXEL-03) into the container of the " Probe head " .
- 4) Screw the " Probe head " (9-3, Fig 2) into the probe body.

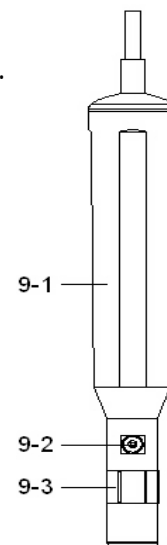


Fig. 2

- 9-1 Probe handle
- 9-2 Temp. sensor
- 9-3 Probe head with diaphragm set

10. OPTIONAL ACCESSORIES

SPARE DIAPHRAGM Model : OXHD-04	Spare Probe head with Diaphragm set. each package with 2 sets.
PROBE FILLING ELECTROLYTE Model : OXEL-03	Electrolyte for dissolved oxygen meter probe.
OXYGEN PROBE Model : OXPB-22	Exclusive oxygen probe for YK-22DO
RS232 cable Model : UPCB-02	Interface cable for connecting between the meter & the computer(COM port).
USB cable Model : USB-01	Interface cable for connecting between the meter & the computer(USB port).
SOFTWARE Model: SW-U801-WIN	Windows version application software applies as the performance of data logging system & data recorder...