TRANS INSTRUMENTS
for the professionals

# Professional Portable Dissolved Oxygen meter HD3030

## Operation Manual

## INTRODUCTION

Your purchase of this professional Dissolved Oxygen meter HD3030 marks a step forward for you into the field of precision measurement. Although this meter is a complex and delicate instruments, its ruggedness will allow many years of use if proper operating techniques are observed and practiced.

Please read the following instructions carefully and always keep this manual within easy reach.

## 1. FEATURES:

- Dual DO and temperature display
- Abel to put display reading on hold
- One touch calibration in air
- Able to set salinity compensation
- Able to set atmospheric pressure
- Save up to 99 data memory with Real time clock
- Able to recall Maximum and Minimum readings over saved data
- Backlite for night display
- Make online data logging on PC with optional RS232 kit.

## 2. CONTENT:

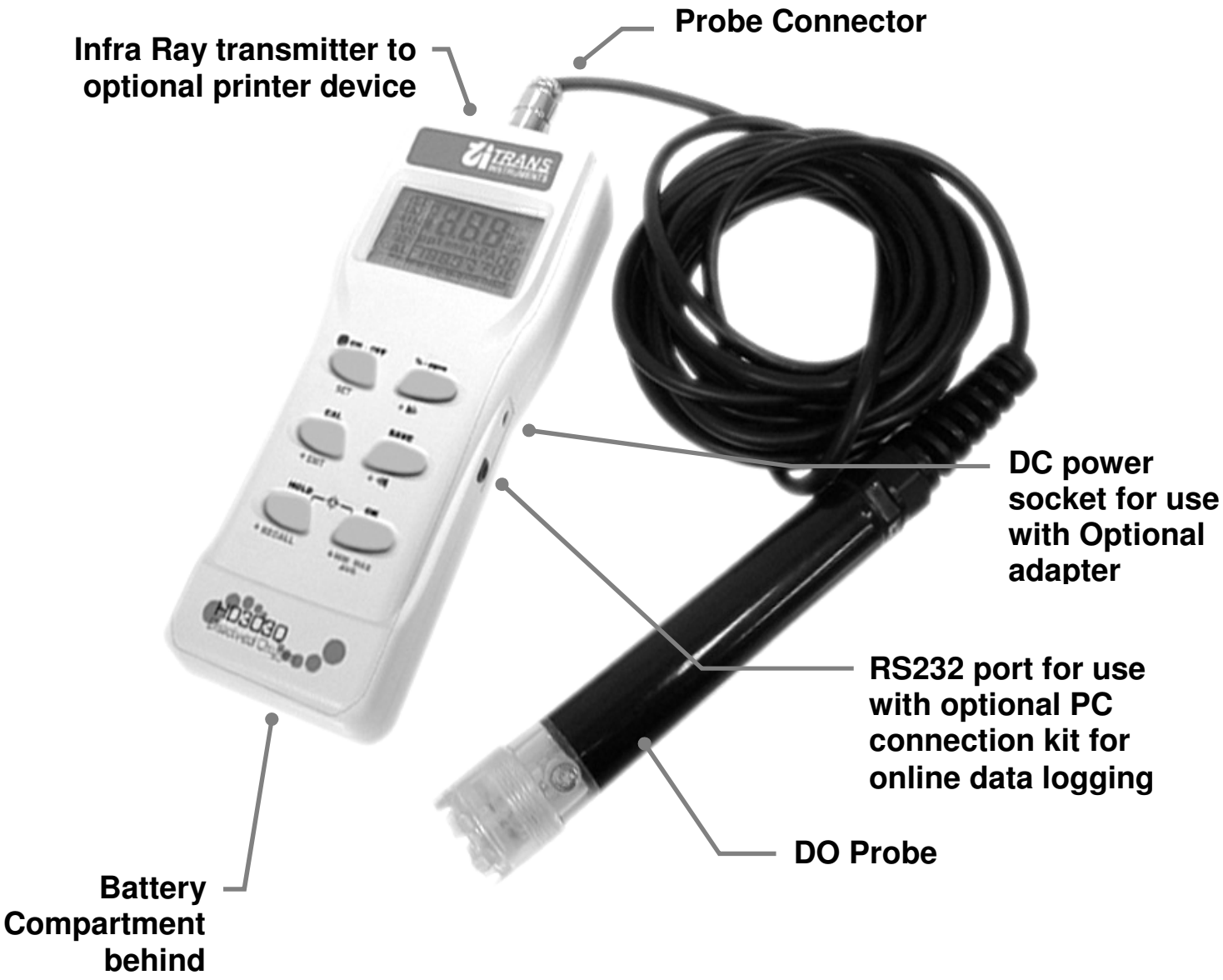
This package contain the following items:

a. Main unit
b. Dissolved Oxygen probe with 3 meter cable
c. Syringe set
d. 2 X Bottle of electrolyte
e. 2 X DO Membrane Cap & Oring
f. Operations manual
g. Hard carrying case

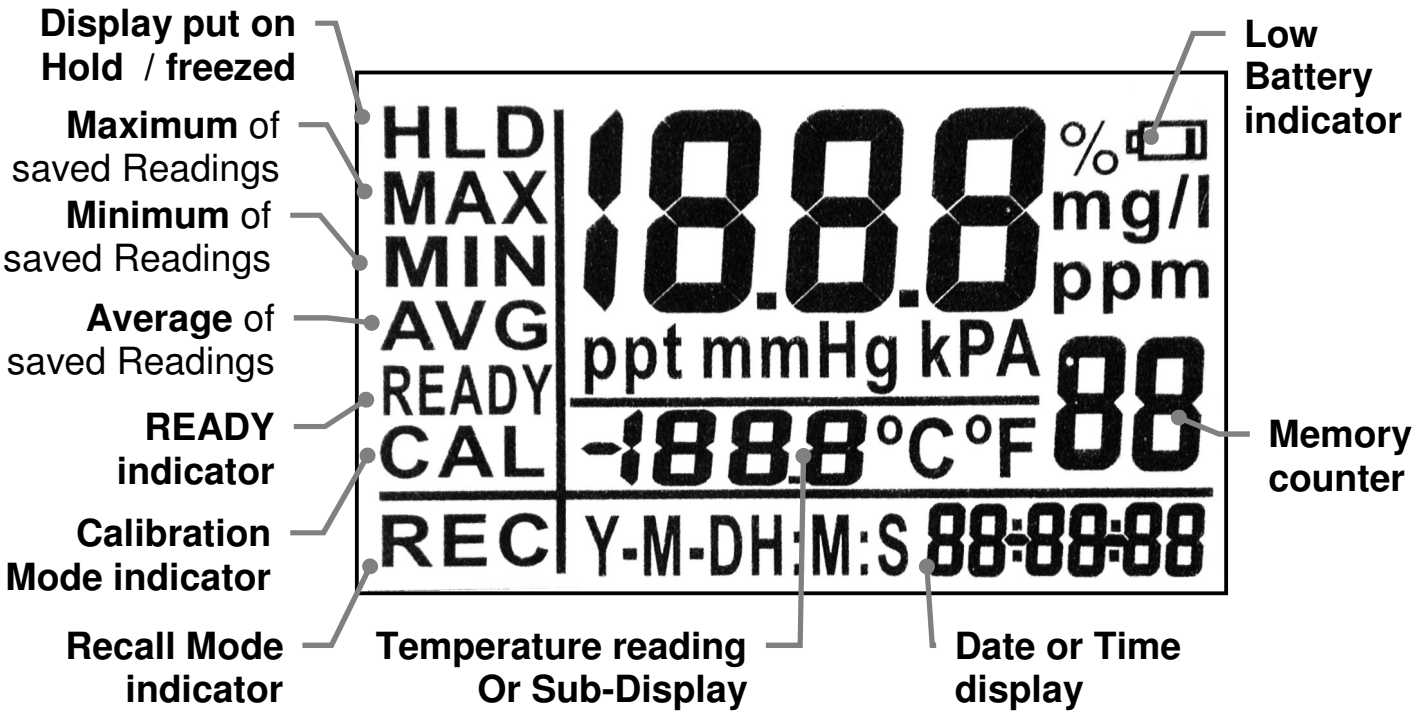
## 3. SPECIFICATION:

| | | |
|---|---|---|
| **Range** | 0 to 19.99ppm | 0 to 50ºC |
| **Resolution** | 0.01ppm | 0.1ºC |
| **Accuracy** | ±1.5% F.S. | ±0.3ºC |
| **Battery** | 4 x 1.5Volt AAA size battery | |
| **Calibration** | Single point calibration in air at 100% | |
| **Size** | 195 x 40 x 36mm | |
| **Weight** | 150g | |

## 4. PRODUCT LAYOUT:



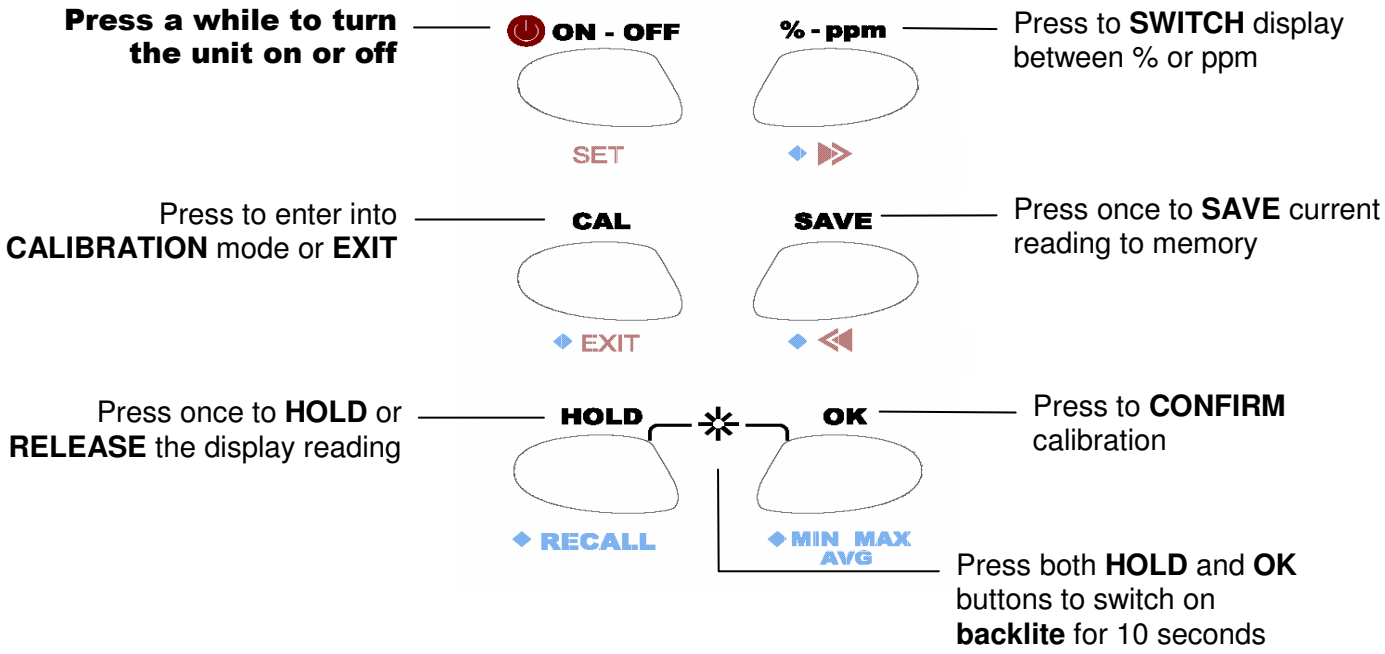
## 5. DISPLAY PANEL DESCRIPTION:



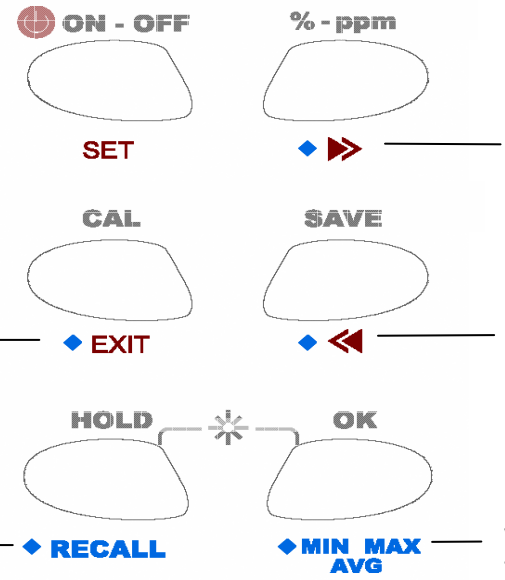

## 6. KEY FUNCTION & OPERATION:

This meter has very easy to understand keys. Familiarizing these buttons will make operation a breeze.

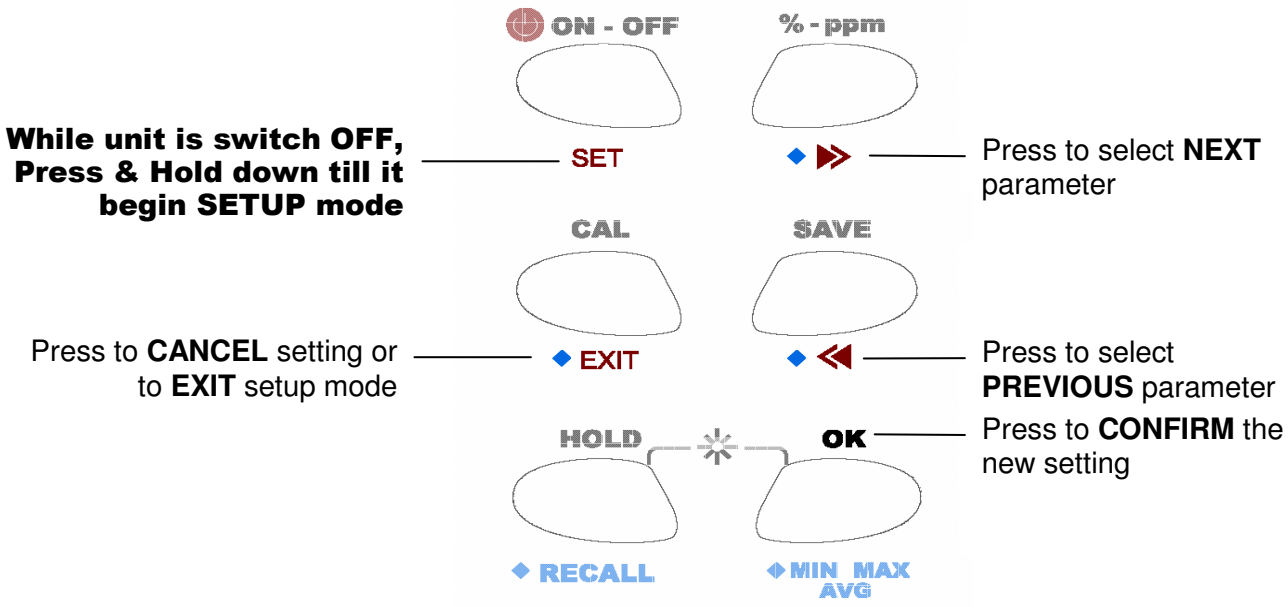
## BASIC OPERATION FUNCTION (in black):



## RECALL MEMORY FUNCTION (in blue):




## SETUP FUNCTION (in Red):




## 6. SETUP THE UNIT:

6.1 Before you begin using the unit, it is important to define your measuring requirements. These will allow the unit to display accurately on the condition of sample that is being measured. Conditions such as atmospheric pressure, salinity, membrane coefficient, real time clock setting etc.

6.2 While the unit is switched OFF, press and hold down the **SET** key until display shows *Prn* **(*P0.0*).**

6.3 Press ►> to go to next parameter and <◄ to go to previous parameter. Below are the description of each parameter setting:
*(Anytime during setup, press* **EXIT** *to cancel or return to measuring mode)*

## Prn (P0.0) PRINTER TRANSMISSION

If you have purchased the optional printer, you can transmit saved data via infa-red signal to begin printing. Make sure you switch on the printer and point the infa-red emitter to the printer's receiver.

1. Press **OK** and display will show Prn **(P0.1)** flashing, indicating that transmission is in progress.
2. When transmission is completed, display will stop flashing and return to Prn P0.0.
3. Press ►> to go to next parameter.

## CLr (P1.0) CLEAR MEMORY

This setting will clear all the saved memory in the unit.

1. Press **OK** and display will show P1.1 with n (No) flashing.
2. Press ►> once to select between Y (yes) or n (No). If you select Y (yes) and press **OK**, all memory will be cleared. Otherwise select n (No) then press **OK**, display will return to CLr **(P1.0)**.
3. Press ►> to go to next parameter.

## Unt (P2.0) UNIT OF MEASUREMENT

This setting allow you to set the unit of measurement for temperature or DO.

1. Press **OK** and display will show Unt **(P2.1)** with **℃** flashing.
2. Press ►> to change between **℉** or **℃**.
3. Press **OK** to confirm setting.
4. do **(P2.2)** will be displayed and **ppm** flashing.
5. Press ►> to change between **mg/l** or **ppm**
6. Press **OK** to confirm setting, display will return to Unt **(P2.0)**.
4. Press ►> to go to next parameter.

## COF (P3.0) SENSOR CORRECTION (ALTITUDE & SALINITY)

Atmospheric pressure and salinity has an effect on to sensor. If you make measurement at different altitude, a correction is necessary to compensate for the pressure effect. Similarly, different salinity in water will also affect measurements and require compensation. This meter will automatically compensate these errors and give accurate measurements if they are carefully set.

1. If you are making measurement at sea level and in fresh water, you can skip this section. Press ►> to go to next parameter.

2. To change, while in COF **(P3.0)**, press **OK** to begin setting and display will show 760**mmHg (P3. 1)** for altitude setting.
3. Press ►> or <◄ to change the value. The pressure should be the same altitude where you are making the measurement. Below is a chart to correlate altitude against pressure:

| **ALTITUDE** | | **Pressure (mmHg)** |
|---|---|---|
| **Meter** | **Feet** | |
| **0** | **0** | **760** |
| **152** | **500** | **746** |
| **305** | **1,000** | **732** |
| **457** | **1,500** | **720** |
| **610** | **2,000** | **707** |
| **762** | **2,500** | **694** |
| **914** | **3,000** | **681** |
| **1,067** | **3,500** | **668** |
| **1,219** | **4,000** | **656** |
| **1,372** | **4,500** | **644** |
| **1,524** | **5,000** | **632** |
| **1,676** | **5,500** | **621** |
| **1,829** | **6,000** | **609** |

4. Press **OK** to confirm the setting, 101.3 **kPA (P3.2)** will be displayed for setting pressure in kPA. Change this value if you have an accurate pressure meter as a reference.
5. Press ►> or <◄ to change this value.
6. Press **OK** to confirm changes and display will show 0.0**ppt (P3.3)**. Here you can change the salinity value to that of the water you are about to measure.
7. Press ►> or <◄ to change this value.
8. Press **OK** to confirm the setting, display will return to COF **(P3.0)**.
9. Press ►> to go to next parameter.

## rdy (P4.0) ENDPOINT INDICATOR

This setting allow you to switch ON or OFF the endpoint indicator. When a measurement is still in progress, the **READY** sign will flash. When the **READY** sign will stop flashing, it indicates that a stable endpoint reading has reached. This will be helpful to eliminate guesswork. In some special case, especially where the reading is exceptionally slow in response, switch OFF the indicator for independant user's judgement.

1. Press **OK** and display will show **rdy P4.1** with OF (off) flashing.
2. Press ►> to change to on or OF.
3. Press **OK** to confirm setting, display will return to rdy **(P4.0)**
4. Press ►> to go to next parameter.

## AUt (P5.0) AUTOMATIC SHUTOFF

This setting allow you to set a different time for the unit to automatically shutoff after last button pressed, longer timing should be set where multiple tests are required.

1. Press **OK** and display will show 40 **(P5.1)**.
2. Press ►> or <◄ to change to 20, 30, 40, 60, 90 or 120 minutes shutoff.
3. Press **OK** to confirm setting, display will return to AUt **(P5.0)**
4. Press ►> to go to next parameter.

## rtc (P6.0) REAL TIME CLOCK

This setting allow you to change the date and time on the unit.

1. Press **OK** and display will show rtc **(P6.1) Y-M-D** 00-00-00 with first 2 digit flashing.
2. Press ►> or <◄ to change the value of Year.
3. Press **OK** to confirm, display will show next 2 digit flashing.
4. Press ►> or <◄ to change the value of Month.
5. Press **OK** to confirm, display will show next 2 digit flashing.
6. Press ►> or <◄ to change the value of Day.
7. Press **OK** to confirm setting, display will show rtc **(P6.2) H:M:S** 00-00-00 with the first 2 digit flashing.
8. Press ►> or <◄ to change the value of Hour.
9. Press **OK** to confirm, display will show next 2 digit flashing.
10. Press ►> or <◄ to change the value of Minutes.
11. Press **OK** to confirm, display will show next 2 digit flashing.

12. Press ▶> or <◀ to change the value of Seconds.
13. Press **OK** to confirm setting, display will return to rtc **(P6.0)**
14. Press ▶> to go to next parameter.

## bEt (P7.0) MEMBRANE COEFFICIENT

This setting allow you to change the temperature coefficient of the membrane. The supplied membrane is 4.8, but different manufacturer's membrane may have different value. Use only membrane with known coefficient value.

1. Press **OK** and display will show 4.8 **(P7. 1)**
2. Press ▶> or <◀ to change the value.
3. Press **OK** to confirm setting, display will return to bEt **(P7.0)**
4. Press ▶> to go to next parameter.

## CAL (P8.0) REVIEW CALIBRATION DATA

This setting allow you to review the last calibration information.

1. Press **OK** and display will show **Last Calibration Slope Value (P8. 1) with Date and time alternating.**
2. Press **OK** and display will show the **Temperature of the Last Calibrated Value.**
3. Press **OK** to return to CAL **(P8.0)**
4. Press ▶> to go to next parameter.

## rSt (P9.0) MASTER RESET

This setting allow you to reset the unit to the factory's default.

1. Press **OK** and display will show rSt (P9. 1) with n flashing.
2. Press ▶> once to select between Y (yes) or n (No). If you select Y (yes) and press **OK**, all setting will be cleared and reset to factory default. Otherwise select n (No) then press **OK**, display will return to rSt **(P9.0)**.
3. Press ▶> to return to beginning or press **EXIT** to end setup.

## 7. PROBE INSTALLATION:

7.1 For prolong storage, the DO Probe comes without electrolyte filled.

7.2 Please read **Section 10** on probe maintenance and part name.

7.3 **Probe Guard** is loosely install. Unscrew the **Electroyte Refill Port**. Fill the electrolyte solution as in 10.9 to 10.13 and then tighten the **Probe Guard**.

## 8. CALIBRATION:

***Before making a series of measurement, always calibrate the unit first. Note that this meter utilize a polarographic sensor which requires 10 minutes of stabilization prior to use.***

8.1 Ensure you are in an environment, which is open with good air circulation and not crowded. If you in a higher altitude above sea level, setup the altitude compensation (see Page 6 on COF – P3.0) before you continue.

8.2 Hold the probe in air with the sensor facing downwards and switch on the unit. Wait at least 10 minutes for the sensor to get stabilized. Set the auto-shutoff timing to 30 minutes or longer to prevent auto-shutoff (see Page 7 on AUt - P5.0).

8.3 After sensor is polarized, press the **CAL** button to activate calibration. The display will show reading in **%** while the **Ready** sign flashes.

8.4 When the **Ready** sign stops flashing, press the **OK** button.

8.5 Display will show 100% reading and calibration is completed.

8.6 Press the **%-ppm** button to switch to ppm or mg/l reading and proceed to take a measurement in water.

### CALIBRATION FAILURE:

8.7 If the unit is not able to calibrate or gives a very low reading, it is possible that there are air pocket between the membrane and the probe tip. Carefully study section 9 to understand the probe assembly.

8.8 Place the probe horizontally on the table and tap the probe head on the table lightly several times to allow any air pocket to be filled with electrolyte. Recalibrate again.

8.9 If calibration still fails, remove the probe guard, loosen the **LockRing Assembly** and repeat step 7.8, replace the **Probe Guard** and recalibrate.

8.10 If calibration still fails, it could be that the membrane is damaged or the electrolyte is expired.

8.11 Perform a full membrane change as in section 9.

## 9. MAKING MEASUREMENT:

9.1 Always calibrate the meter before a series of tests.

9.2 Avoide switching off the unit if a series of tests are to be made, this is to save time so you do not have to polarize the sensor everytime the unit is switched on.

9.3 Dip the sensor into the water and the required depth.

9.4 This meter utilizes a polarographic electrode, which consumes oxygen on the membrane surface. **A constant stirring or jiggling of the sensor probe is required** during measurement.

9.5 When the **Ready** sign stops flashing, it indicates a stabilized endpoint reading has reached. You can now take the measurement.

9.6 Press the **HOLD** button to freeze the display as desired. **HLD** will appear on the top left of display. Press again to release it for another measurement.

### BACKLIGHT FUNCTION

9.7 Under dim or dark environment, the display can be illuminated with a backlight. Press both the **HOLD** and **OK** buttons and backlight will be switched on for 10 seconds.

### SAVING DATA TO MEMORY

9.8 To save the displayed data into the meter's memory, press the **SAVE** button.

9.9 The digit 01 will appear on the right side of the display, indicating that the last reading is stored in data number 1.

9.10 99 data can be saved together with date and time of measurement.

9.11 To recall the saved data, press and hold down the **RECALL** button until **REC** appear flashing on the left side of the display.

9.12 Follow the blue key function in Page 4 under **RECALL MEMORY FUNCTIONS**, to recall the desired data.

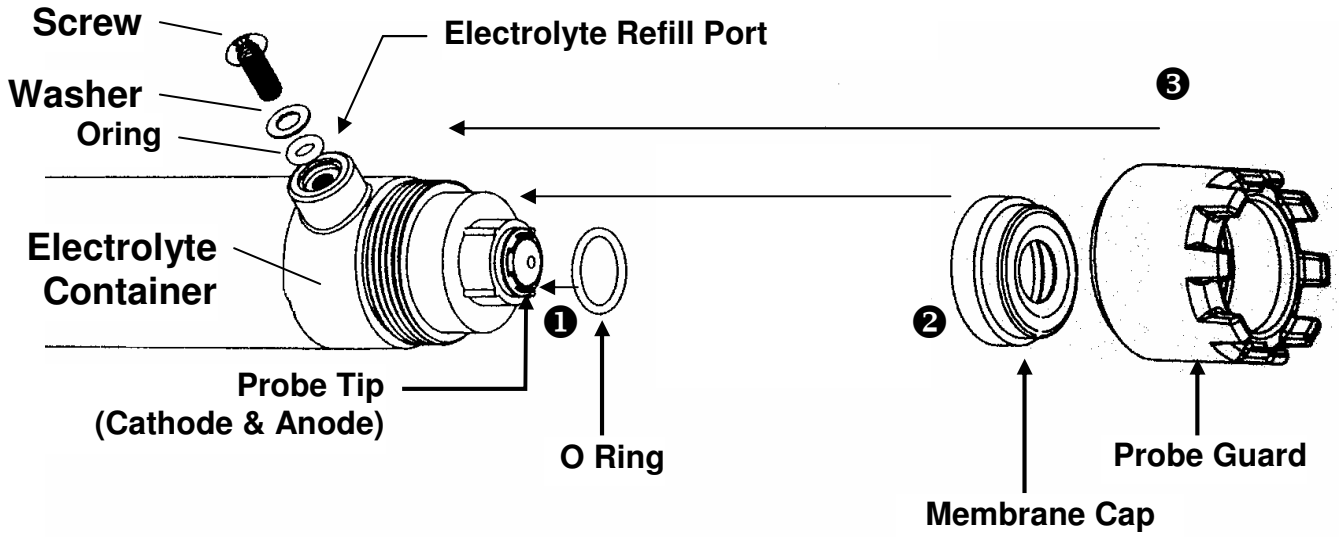
9.13 Press **EXIT** to return to measuring mode.

9.14 To clear all data, follow the instructions under **SETUP** on page 5 of CLr (P 1.0)

## 10. DO PROBE ASSEMBLY & MAINTENANCE:

10.1 The DO probe is one of the main components in the measuring system. Keeping the sensor in good conditions will ensure prolong of operation.

10.2 The Probe consist of several parts and it is important to understand the construction:




10.3 The membrane will allow oxygen to permeate onto the Cathode and Anode to make measurement. It can be damaged or punctured.

10.4 To replace the membrane, unscrew the **Probe Guard** and remove item ❶ & ❷ as above. You may need a knife assist in separating item ❷.

10.5 Unscrew the **Electroyte Refill Port** and drain away the electrolyte.

10.6 Clean and rinse the probe tip with distilled water, use a tissue paper to polish the probe tip if required. ***DO NOT USE*** sand paper.

10.7 To re-assemble the probe, place the new **O Ring** on the probe tip ❶.

10.8 Push in place the **Membrane Cap** onto the probe tip ❷.

10.9 Place the probe horizontally with the **Refill Port** facing up.

10.10 Extract the fresh electrolyte with the syringe and gradually fill the Electrolyte container till half filled.

10.11 Tap on the table to allow electrolyte to filled to the probe tip. If air is trap between the probe tip and membrane, it will cause calibration and measuring problem (E01, E03). Unscrew **Probe Guard**, slightly loosen **Membrane Cap** then replace **Probe Guard**.

10.12 Replace the **Probe Guard** and screw tight ❸.

10.13 Then fully fill the container; replace the Oring, Washer and tighten the Screw onto the **Electroyte Refill Port**.

**Electrolyte Refilling:**

10.14 From time to time, electrolyte may evaporate and dry out.

10.15 The electrolyte may also degrade after prolong usage. When bubbles appear in the electroyte container or the sensitivity of the meter becomes low, or error messages of inaccurate reading, the electrolyte should be replace completely.

10.16 Unscrew the **Electrolyte Refill Port** and refill with elelctroyte.

10.17 Change the membrane and replace electrolyte as in 10.4 to 10.13

**Probe Maintenance:**

10.18 After about 50hours of continuous use, the **Probe-Tip** anode or cathode may get tarnished due to polarization.

10.19 Disassemble the probe and drain the electrolyte. Rinse probe tip with distilled water and polished it with diamond power paste. Rinse and re-assemble with new membrane and electrolyte as 10.8 to 10.13

10.20 Membrane life is around 6-12 months. Membrane life can shortened if measured in non-aequous liquid like oil or grease. If reading becomes slow or takes a long time to stablized during calibration or measurement, change the **Membrane Cap**.

**Probe Storage**:

10.21 If the probe is not use more than 2 days, it is advisable to drain the electrolyte, rise the probe tip with distilled water and try them. Loosely install the **Membrane Cap** and **Probe Guard** without tightening.

10.22 If short term storage, soak the probe head in distilled water.

## 11. TROUBLESHOOTING & ERROR CODES

### 11.1 **Power cannot switch on**:

a. Press the switch a short while to switch on. If press too fast, unit will not swtich on.

b. Check battery is place correctly or if the battery had expired.

c. System hanged: - Remove battery for 1 minute then replace.

### 11.2 **Error Codes**:

| | |
|---|---|
| E01 | Air bubble trap in membrane sensor. See 9.11.<br>Lack of electrolyte or sensor tarnished. See 9.14 to 9.19<br>Probe connection problem or probe damaged. |
| E01°C | Probe Temperature sensor damage or connection problem. |
| E02 | Reading is below measuring range. Rectify as E01. |
| E03 | Reading is over and above measuring range of DO or temperature. Rectify as E01. |
| E04 | Relative value error. |
| E 17 | Calibration error. See section 9.11; 9.14 to 9.19. |
| E21 | Temperature is beyond ±10℃ of the last calibrated temperature. |
| E31 | IC analog to digital error. |
| E32 | IC memory error. |

## 12. MAINTENANCE:

12.1 When the low battery sign appears, it means that the batteries must be replaced.

12.2 Open the battery compartment at the back of the unit and change all 4 batteries with new ones according to polarity.

## 13. ONLINE DATA LOGGING TO PC: (OPTIONAL ITEM REQUIRED)

13.1 This unit can be linked to any computer via the RS232 connection port to perform real time online data logging on the computer. RS232 connection software kit can be purchased separately.

13.2 Data will be collected at defined intervals and a graph will be ploted.

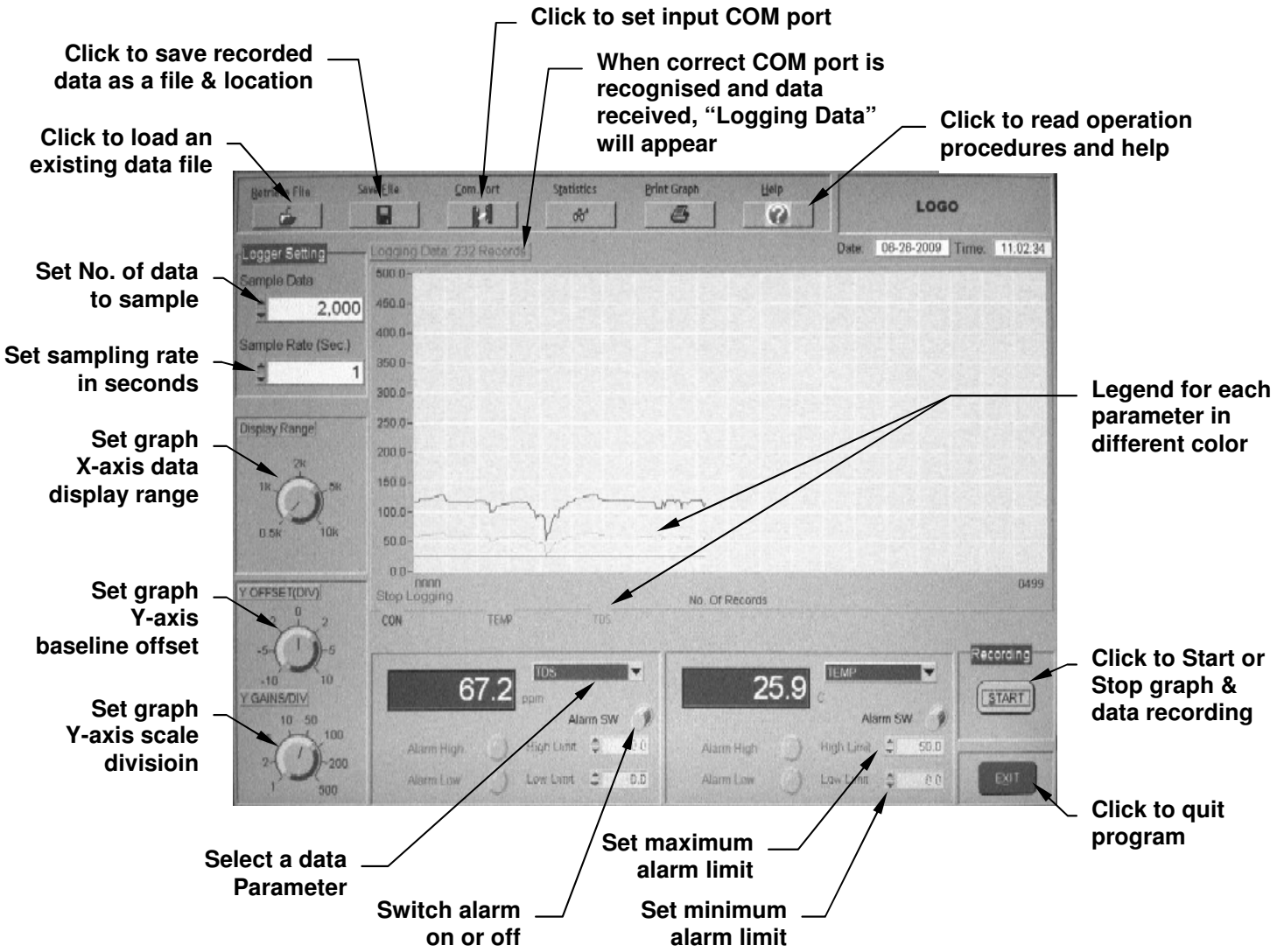
13.3 Connect the RS232 mini phone jack connector to the back of the meter and the RS232 jack to the COM port on the computer socket. (optional USB connector can be purchased and used)

13.4 Insert the PC connect CD-ROM to begin software installation.

13.5 Run the setup program.

13.6 After loading completed, run the program.

13.7 Read the instructions under help for detail setting.



## WARRANTY

Trans Instruments (Singapore) Pte. Ltd., warrant this product for a period of 12 months on the main unit and 3 months on probe & electrode, from date of purchase against all defects in material and workmanship.

This warranty does not apply to the abuse or misuse of the instrument. If repairs or adjustments are required, please return the defective product freight prepaid. Instrument within warranty will be repaired at no charge.

Make sure that the product is properly packed and insured against possible damage or loss in shipment. Purchase invoice **MUST** accompany the returned product or else warranty void.

Please obtain authorization through your local sales representatives or Trans Instruments (Singapore) Pte. Ltd., prior to returning the product. Trans Instruments staff can be contact at the following email address:

sales@transinstruments.com

http://www.transinstruments.com

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