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# User's Guide



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## PHH-224

## Conductivity TDS Meter



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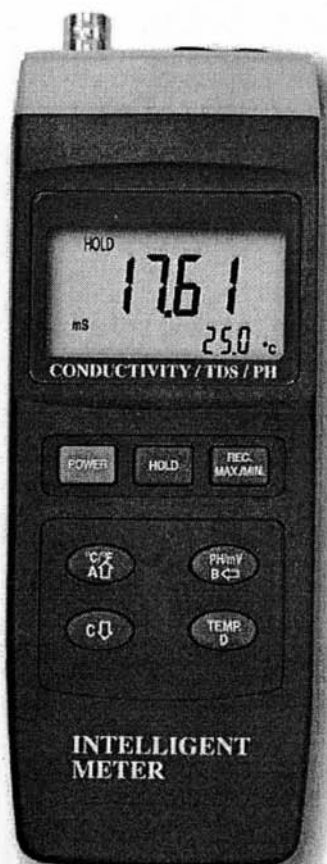
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**WARNING:** These products are not designed for use in, and should not be used for, human applications.

# CONDUCTIVITY TDS METER



Your purchase of this CONDUCTIVITY/TDS METER marks a step forward for you into the field of precision measurement.

Although this METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.

## OPERATION MANUAL

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## 1. FEATURES

- \* Conductivity/TDS ( Total Dissolved Solids ) Meter + PH Meter, multi functions & intelligent features.
- \* Conductivity includes 2 ranges : 2 mS, 20 mS.  
TDS has 2 ranges : 2,000 PPM, 20,000 PPM.  
Temperature measurement range from 0 – 60 °C / 32 – 140°F.
- \* Conductivity/TDS meter build in automatic temperature compensation circuit, adjustable between 0 to 5.0% per °C.
- \* Conductivity/TDS meter uses carbon rod electrode with long life using separated probe is convenient for remote measurement.
- \* PH meter has mV ( millivolt ) function for mV measurement ( Be plugged with optional ORP probe ORP-04 to be a professional ORP meter)
- \* PH meter with wide manual temperature compensation adjustment and optional ATC (Automatic Temp. Compensation) probe is available.
- \* Microprocessor circuit, intelligent function.
- \* Records maximum and minimum readings with recall.
- \* Data hold.
- \* Auto shut off saves battery life.
- \* RS 232 PC serial interface.
- \* Temperature function with °C & °F display unit.

## 2. SPECIFICATIONS

### 2-1 General specifications

|                       |                                                                                                                                                                                        |                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Circuit               | Microprocessor LSI circuit.                                                                                                                                                            |                    |
| Display               | 51 mm x 32 mm, dual function LCD display, 15 mm ( 0.6" ) digit size.                                                                                                                   |                    |
| Measurement           | <ul style="list-style-type: none"> <li>* Conductivity</li> <li>* TDS ( Total Dissolved Solids )</li> <li>* Temperature ( use the CD/TDS probe )</li> <li>* PH</li> <li>* mV</li> </ul> |                    |
| Memory Recall         | Records 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 shut 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 – main instrument.<br>0 to 60 °C – Conductivity/CT probe only.                                                                                                              |                    |
| Operating Humidity    | Max. 80% RH.                                                                                                                                                                           |                    |
| Sampling Time         | Approx. 0.8 second.                                                                                                                                                                    |                    |
| Power Supply          | 006P DC 9V battery<br>( Alkaline or Heavy duty type ).                                                                                                                                 |                    |
| Power Current         | Meter only                                                                                                                                                                             | Approx. DC 4.2 mA. |
|                       | Meter + CD/TDS probe                                                                                                                                                                   | Approx. DC 6.0 mA. |
| Weight                | 250 g/0.55 LB ( battery included ).<br>* Main meter only, not including probe.                                                                                                         |                    |

|                      |                                                                       |
|----------------------|-----------------------------------------------------------------------|
| Size                 | <i>Main meter :</i><br>195 x 68 x 30 mm ( 7.6 x 2.6 x 1.2 inch ).     |
|                      | <i>Conductivity/TDS probe :</i><br>Round, 22 mm Dia. x 120 mm length. |
| Accessories included | Conductivity/TDS probe.....1 PC.                                      |
|                      | Operation manual.....1 PC.                                            |
| Optional Accessories | Carrying case, CA-06.....1 PC.                                        |
|                      | PH electrode.....PE-03, PE-11, PE-01                                  |
|                      | ATC probe for PH meter.....YK-200PATC                                 |
|                      | ORP electrode.....ORP-04                                              |
|                      | RS232 cable, UPCB-02.....UPCB-02                                      |
|                      | Application Software.....SW-U801-WIN                                  |

## 2-2. Conductivity/TDS/Temp. specifications

### A. Conductivity

| Range                                                                                                                                                                                                         | Measurement     | Resolution | Accuracy                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------|---------------------------------------------|
| 2 mS                                                                                                                                                                                                          | 0.2 to 2.000 mS | 0.001 mS   | $\pm ( 3 \% \text{ F.S. } + 1 \text{ d } )$ |
| 20 mS                                                                                                                                                                                                         | 2 to 20.00 mS   | 0.01 mS    | * F.S. – Full scale                         |
| <i>* Temperature Compensation :</i><br>Automatic from 0 to 60 °C ( 32 – 140 °F ), with temperature compensation factor variable between 0 to 5.0% per C.<br><i>* mS – milli Simens</i><br><i>* @ 23 ± 5°C</i> |                 |            |                                             |

## B. TDS ( Total Dissolved Solids )

| Range      | Measurement         | Resolution | Accuracy                                |
|------------|---------------------|------------|-----------------------------------------|
| 2,000 PPM  | 132 to 1,320 PPM    | 1 PPM      | $\pm (3 \% \text{ F.S.} + 1 \text{ d})$ |
| 20,000 PPM | 1,320 to 13,200 PPM | 10 PPM     |                                         |
|            |                     |            | * F.S. – Full scale                     |

\* Temperature Compensation :

Automatic from 0 to 60 °C ( 32 – 140 °F ), with temperature compensation factor variable between 0 to 5.0% per C.

\* PPM – parts per million

\* @ 23  $\pm$  5°C

## C. Temperature

| Function         | Measuring Range | Resolution | Accuracy                           |
|------------------|-----------------|------------|------------------------------------|
| °C               | 0 °C to 60 °C   | 0.1 °C     | $\pm 0.8 \text{ }^{\circ}\text{C}$ |
| °F               | 32 °F to 140 °F | 0.1 °F     | $\pm 1.5 \text{ }^{\circ}\text{F}$ |
| * @ 23 $\pm$ 5°C |                 |            |                                    |

## 2–3 PH meter specifications

|                                             |                                                                                  |                                                             |
|---------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------|
| Measurement                                 | PH                                                                               | 0 to 14 PH                                                  |
|                                             | mV                                                                               | – 1999 mV to 1999 mV                                        |
| Resolution                                  | PH                                                                               | 0.01 PH                                                     |
|                                             | mV                                                                               | 1 mV                                                        |
| Accuracy<br>* Meter only                    | PH                                                                               | $\pm (0.02 \text{ PH} + 2 \text{ d})$                       |
|                                             | mV                                                                               | $\pm (0.5\% + 2 \text{ d})$                                 |
| Input Impedance                             | 10 <sup>-12</sup> ohm                                                            |                                                             |
| Temperature Compensation for pH measurement | Manual                                                                           | 0 to 100 °C, be adjusted by push button on front panel.     |
|                                             | Automatic ( ATC )                                                                | With the optional TEMP. probe ( YK–200PATC )<br>0 to 65 °C. |
| pH Calibration                              | PH7, PH4, and PH10, 3 points calibration ensure the best linearity and accuracy. |                                                             |
| PH Electrode                                | Optional,<br>Any PH electrode with BNC connector.                                |                                                             |



### 3. FRONT PANEL DESCRIPTION

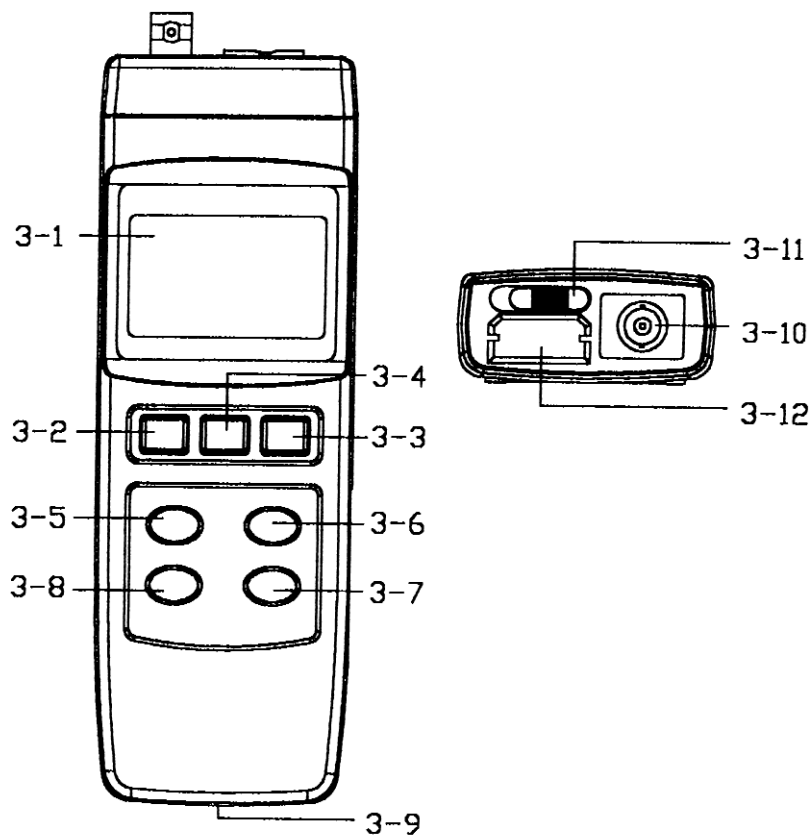


Fig. 1

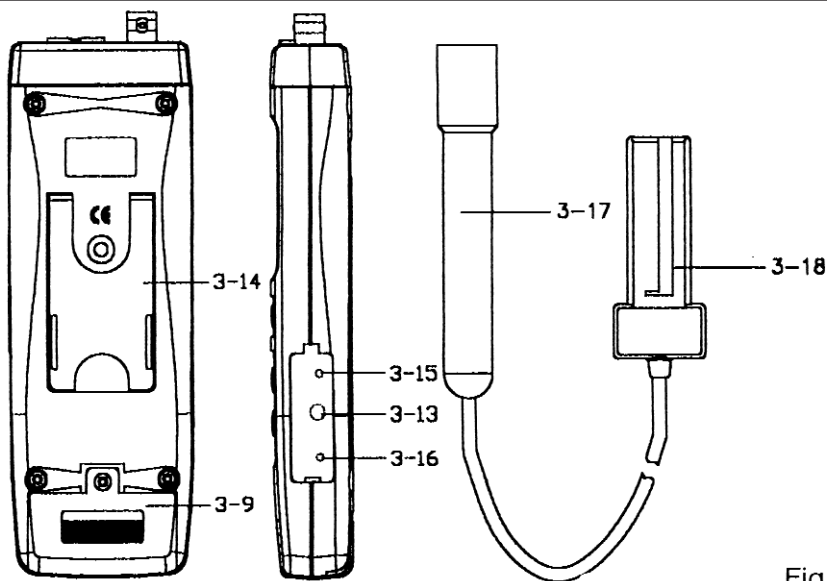


Fig. 1

- 3-1 Display
- 3-2 Power Button
- 3-3 REC. Button
- 3-4 Hold Button
- 3-5 **A Button ( °C, °F Button )** \_\_\_\_\_  
up Button
- 3-6 **B Button ( Range Button )** \_\_\_\_\_  
PH/mV Button/left Button
- 3-7 **C Button ( CD/TDS Button )** \_\_\_\_\_  
CAL Button/down Button
- 3-8 **D Button ( TEMP. C Button )** \_\_\_\_\_
- 3-9 Battery Compartment/Cover
- 3-10 PH BNC Input Socket
- 3-11 Lock Switch
- 3-12 Conductivity/TDS Input Socket
- 3-13 RS-232 Out Terminal
- 3-14 Stand
- 3-15 PH 7 VR
- 3-16 PH 4/PH 10 VR
- 3-17 Conductivity/TDS Probe
- 3-18 Conductivity/TDS Probe pPlug

## 4. MEASURING PROCEDURE

### 4-1 Conductivity measurement

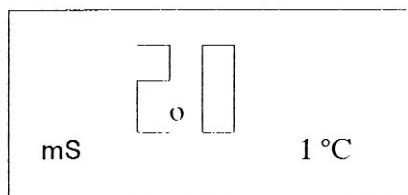
- 1) Plug the " Conductivity/TDS Probe plug " ( 3-18, Fig.1 ) into the " Conductivity/TDS Socket " ( 3-12, Fig. 1 )

**Make sure that the probe lock switch ( 3-11, Fig. 1 ) should slide to the lock position (  ).**

- 2) Power on the instrument by pushing the " Power Button " ( 3-2, Fig.1 )
- 3) Push the " CD/TDS " Button ( C Button ) ( 3-7, Fig. 1 ), and select the function to the conductivity measurement. The display will show the unit of " mS ".
- 4) The instrument will default to 2% per °C Temperature Compensation factor. The meter has built-in Automatic Temperature Compensation adjustable between 0 to 5.0 % per °C.

In order to change the default value carry out the following procedures :

- a. Push the " Temp. C Button ( D Button ) " ( 3-8, Fig. 1 ), the display will show :



b. *Use the*

" up Button ( A Button ) " ( 3-5, Fig. 1 ),  
" left Button ( B Button ) " ( 3-6, Fig. 1 )  
" down Button ( C Button ) " ( 3-7, Fig. 1 )  
to select the desired value of Temperature  
*Compensation factor.*

c. *Once the desired value is reached, push the "Temp.  
C Button ( D Button ) " ( 3-8, Fig. 1 ) to set the new  
value.*

5) Select the applicable range, by using the " Range Button  
( B Button ) " ( 3-6, Fig. 1 ).

\* If the display shows "— — — —", it indicates an overload  
condition, select the next higher range.

\* If the display shows " \_ \_ \_ \_ ", it indicates an  
*out-of-range condition, select the next lower range.*

6) Immerse the head of " Conductivity/TDS Probe " ( 3-17, Fig. 1 )  
into the solution, up to the immersion level.

7) During the measurement, the lower LCD Display will  
show the temperature of the solution.

\* Push the " °C/°F Button " ( 3-5, Fig. 1 ) to change  
the temperature display unit from " °C to °F "  
or " °F to °C ".

#### **4-2 TDS measurement**

The operation procedures are same as the above 4-1,  
except that push the " CD/TDS " Button ( C Button ) ( 3 -7,  
Fig. 1 ), and select the function to the TDS measurement. The  
lower display will show the text of " P ".

### **4-3 Calibration procedures of Conductivity meter**

The meter has been calibrated during manufacture. However, it may be necessary to re-calibrate periodically. Particularly when the instrument is used for a long period or when the conductivity electrode is changed. To re-calibrate the instrument, follow the procedures shown below :

#### **Range 1 ( 2 mS range ) calibration**

- 1) Prepare a " 1.413 mS Calibration Solution ".
- 2) Immerse the head of " Conductivity Probe " ( 3-17, Fig. 1 ) into the 1,413 mS solution up to the immersion level.
- 3) Select the range to the " 2 mS " position.
- 4) Set the temperature coefficient factor value to " 2.0% per °C ".
- 5) At the same time push the following buttons together :
  - a. REC.( MAX./MIN. ) Button ( 3-3, Fig. 1 )
  - b. HOLD Button ( 3-4, Fig. 1 )

The upper display will show the flashing text of " CAL ".

The low display will show the flashing text of " 1.413 ".

- 6) Please release the two buttons when the display shows as above and start flashing and then when the text stop flashing, the range 1 will be calibrated to 1.413 mS ( There maybe a little deviation, and it is normal ).

*\* After released two buttons but before the text (CAL, 1.413 ) stop flashing, if push the " HOLD Button " will cancel the calibration procedures, the meter will return to previous calibration value.*

### **Range 2 ( 20 mS range ) calibration**

- 1) Prepare a " 12.88 mS Calibration Solution ".
- 2) Immerse the head of " Conductivity Probe " ( 3-17, Fig. 1 ) into the 12.88 mS solution up to the immersion level.
- 3) Select the range to the " 20 mS " position.
- 4) Set the temperature coefficient factor value to " 2.0% per °C "
- 5) At the same time push the following buttons together :
  - a. REC.( MAX./MIN. ) Button ( 3-3, Fig. 1 )
  - b. HOLD Button ( 3-4, Fig. 1 )

The upper display will show the flashing text of " CAL ".

The low display will show the flashing text of " 12.88 "

- 6) Please release the two buttons when the display shows as above and start flashing and then when the text stop flashing, the range 2 will be calibrated to 12.88 mS ( There maybe a little deviation, and it is normal ).

*\* After released two buttons but before the text (CAL, 12.88 ) stop flashing, if push the "HOLD Button " will cancel the calibration procedures, the meter will return to previous calibration value.*

#### **4-4 PH meter**

- \* Make sure that the probe lock switch ( 3-11, Fig. 1 ) had switched to the lock position (  ).
- \* Make sure that the " Conductivity/TDS Plug " ( 3-18, Fig. 1 ) had taken away from the meter.

##### **a. PH Measurement**

Whenever the calibration procedures are recommended to be done before PH measurement.

- 1) Connect the PH ELECTRODE to the " PH BNC Input Socket " ( 3-10, Fig. 1 ).
- 2) Power on the instrument by pressing the " Power Button " ( 3-2, Fig. 1 ).
- 3) Press the " PH/mV Button " ( 3-6, Fig. 1 ) to select the PH function with a "PH" symbol on the display.
- 4) \* If the operating is under the " Manual temperature compensation ", then please refer to the " 4-4, d " calibration procedures.
  - \* If the operating is under the " Automatic temperature compensation ", then please refer to the " 4-4, e " calibration procedures.
- 5) Place the electrode into the solution, and then the instrument will have the PH value on the display.
- 6) After the measurement, please rinse the electrode with distilled water.

### **b. mV Measurement**

The instrument built in mV ( millivolt ) measurement function, which enable you to make ion-selective, ORP (oxidation-reduction potential), and other precise mV measurements.

Press the " PH/mV Button " ( 3-6, Fig. 1 ) to select the mV function with a " mV " symbol on the display.

### **c. Temp. Measurement**

- 1) Plug the " Optional ATC Temp. Probe, YK-200PATC " into the " Probe Input Socket " ( 3-12, Fig. 1 ).
- 2) \* If you intend to measure " °C ", then press the " °C/ °F Button " ( 3-5, Fig. 1 ) and select the " °C " unit.  
\* If you intend to measure " °F ", then press the " °C/ °F Button " ( 3-5, Fig. 1 ) and select the " °F " unit.
- 3) Place the " Temp. Probe " into the solution, and the instrument will have the temperature value on the display.

### **d. Manual temperature compensation**

Before the manual temperature compensation adjust procedures, make sure there are no ATC probe or other probe in the " Probe Input Socket" ( 3-12, Fig. 1 ).

- 1) Power on the instrument by pressing the " Power Button " ( 3-2, Fig. 1 ).



- 2) Press the " PH/mV Button " ( 3–6, Fig. 1 ) to select the PH function with a " PH " symbol on the display
  - \* Press the " TEMP. C Button " ( 3–8, Fig. 1 ) first, The upper display will show the measured PH values. the lower display will show the manual temperature compensation value.
  - \* Use the " Left Button " ( 3–6, Fig. 1 ), " Up Button " ( 3–5, Fig. 1 ) and the " Down Button " ( 3–7, Fig. 1 ) to adjust the manual temperature compensation value.

#### **e. Automatic temperature compensation**

- 1) Plug the " Optional ATC Temp. Probe, YK–200PACT " into the " Probe Input Socket " ( 3–12, Fig. 1 ).

**Make sure that the probe lock switch ( 3–11, Fig. 1 ) should slide to the lock position (  ).**

- 2) Power on the meter.
- 3) Press the " PH/mV Button " ( 3–6, Fig. 1 ) to select the PH function with a "PH" symbol on the display
- 4) Place the "Temp. Probe" into the solution, then temperature will be compensated automatically for PH measurement.

## **f. Two Points Calibration**

### **PH 7 calibration**

Connect the PH ELECTRODE with the " BNC socket " ( 3–10, Fig. 1 ) and immerse the electrode in the PH7 buffer solution ( optional ).

Press the " CAL Button " ( 3–7, Fig. 1 ) then the upper display shows texts of " CAL " and the lower display shows the default calibration value.

- \* The texts " CAL " will flash for around 5 seconds.  
After that, the meter calibrates itself automatically.  
The upper display will show the calibrated value,  
the lower display will show the temperature value.

### **PH 4 or PH 10 calibration**

- 1) Rinse the electrode with distilled water.
- 2) Immerse the electrode in the PH4 buffer solution ( or PH10 buffer solution ).
- 3) Press the " CAL Button " ( 3–7, Fig. 1 ) then the upper display shows texts of " CAL " and the lower display shows the default calibration value.

- \* The texts " CAL " will flash for around 5 seconds.  
After that, the meter calibrate itself automatically.  
The upper display will show the calibrated value,  
the lower display will show the temperature value.

- 4) Rinse the electrode with distilled water again and then
- 5) Repeat above (2) to (4) procedures two times at least.
- 6) The instrument and electrode are now finished the " TWO POINTS CALIBRATION " & ready for the measurement.

#### **4-5 Other functions ( Hold, Memory )**

##### **Data Hold**

Press the " Hold Button " ( 3-4, 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 " ( 3-3, 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 " ( 3-3, 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 " ( 3-4, 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 " ( 3-3, 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 " ( 3-4, 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.

## 5. 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.

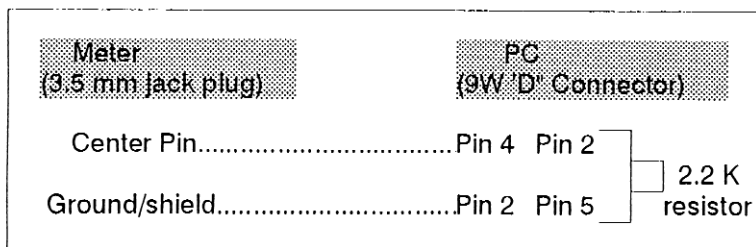
To disable this function, Select the memory record function during the measurement by pressing the " REC. Button " ( 3-3, Fig. 1 ).

## 6. RS232 PC SERIAL INTERFACE

The instrument features RS232 output via 3.5 mm Terminal ( 3-13, 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 :

|           |                                                                                                                                   |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------|
| D0        | End Word                                                                                                                          |
| D1 & D8   | Display reading, D1 = LSD, D8 = MSD<br><i>For example :</i><br><i>If the display reading is 1234, then D8 to D1 is : 00001234</i> |
| D9        | Decimal Point(DP), position from right to the left<br>0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP                                      |
| D10       | Polarity<br>0 = Positive    1 = Negative                                                                                          |
| D11 & D12 | Annunciator for Display                                                                                                           |
|           | °C = 01      °F = 02      PH = 05                                                                                                 |
|           | mV = 18      mS = 14      PPM = 19                                                                                                |
|           | O2 = 06      mg/L = 07                                                                                                            |
| D13       | When send the upper display data = 1<br>When send the lower display data = 2                                                      |
| D14       | 4                                                                                                                                 |
| D15       | Start Word                                                                                                                        |

RS232 FORMAT : 9600, N, 8, 1

## 7. 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 " (3-14, 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.

## 8. OPTIONAL PROBES & ACCESSORIES

|                                        |                                                                                                                                            |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| ORP ELECTRODE<br><br>Model :<br>ORP-04 | ORP electrode ORP-04 plug into the meter ( select to the mV function ) to become a professional ORP (oxidation-reduction potential) Meter. |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|

|                                                             |                    |                |
|-------------------------------------------------------------|--------------------|----------------|
| ATC<br>PROBE<br><br>Model :<br>YK-200PATC                   | <i>Measurement</i> | <i>Range</i>   |
|                                                             | °C                 | 0 °C to 65 °C  |
|                                                             | °F                 | 32°F to 149 °F |
| * Automatic Temperature Compensation Probe for PH function. |                    |                |

|                                                  |                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PH ELECTRODE<br>Model :<br>PE-03                 | General purpose, laboratory & field usage. 12 mm dia. x 130 mm. Epoxy body, 1 – 13 pH.                                                                                                                                                                                                                                                                 |
| PH ELECTRODE<br>Model :<br>PE-11                 | General purpose, laboratory & field usage. 9.5 mm dia. x 120 mm. Epoxy body, 1 – 13 pH.<br>(0 – 14 pH typical)                                                                                                                                                                                                                                         |
| PH ELECTRODE<br>Model :<br>PE-01                 | Professional, laboratory & field usage. 9.5 mm dia. x 120 mm. Epoxy body, 0 – 14 pH.                                                                                                                                                                                                                                                                   |
| SPEAR TIP<br>PH ELECTRODE<br><br>Model : PE-04HD | The "Spear Tip pH electrode" is perfect for those pH measurements in applications where sample piercing is required. Meat, sausage and cheese are ideal applications. The electrode features a very durable glass measuring spear packaged in a rugged virtually unbreakable epoxy body.<br>Measuring range : 0 to 14 pH .<br>Size 12 mm dia. x 150 m. |
| BUFFER SOLUTION<br>PH-07                         | PH 7.00 standard buffer solution. for calibration purpose.                                                                                                                                                                                                                                                                                             |
| BUFFER SOLUTION<br>PH-04                         | PH 4.00 standard buffer solution. for calibration purpose.                                                                                                                                                                                                                                                                                             |
| RS232 cable<br>UPCB-02                           | RS232 cable for connecting between the meter & the computer.                                                                                                                                                                                                                                                                                           |
| SOFTWARE<br>SW-U801-WIN                          | Windows version application software applies as the performance of data logging system & data recorder...                                                                                                                                                                                                                                              |

**NOTES:**



## NOTES:

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## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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