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# CONDUCTIVITY METER

Model : PCE-CM 41



Your purchase of this CONDUCTIVITY 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

- \* All in one pen type conductivity meter provides fast, accurate readings with digital reading.
- \* Conductivity measurement ( uS, mS ) or TDS ( Total Dissolved Solids, ppm ) can be selected.
- \* Conductivity : Two ranges, 2,000 uS, 20.00 mS.
- \* TDS : Two ranges, 20,000 ppm, 2,000 ppm.
- \* Carbon rod electrode for long life.
- \* Build in temperature sensor, ATC ( auto temperature compensation ).
- \* Temperature measurement, °C, °F.
- \* IP67, water proof and protection.
- \* LCD with two displays show conductivity and Temp. value at same time.
- \* Data hold function for freezing the desired value.
- \* Auto power off to save the battery life.
- \* Records max. and min. value with recall.
- \* Microcomputer circuit, intelligent function, high accuracy.
- \* Compact size, light weight.
- \* Power supply by DC 1.5 V battery ( UM4/AAA ) x 4 PCs,
- \* Available for wide applications, such as aquarium, beverage, fish hatcheries, food processing, photography, laboratory, quality control, school & colleges, swimming pools, water conditions.

## 2. SPECIFICATIONS

Display	LCD, size : 20 mm x 28 mm.
Measurement	* Conductivity ( uS, mS ) * TDS ( Total Dissolved Solids, ppm ) * Temperature ( °C, °F)
Ranges * <i>two ranges</i> * <i>auto range</i>	<i>Conductivity:</i> 2000 uS, 20.00 mS
	<i>TDS :</i> 2,000 ppm 20,000 ppm
Accuracy * $23 \pm 5 \text{ } ^\circ\text{C}$	$\pm ( 2\% \text{ FS} + 1 \text{ d} )$ * <i>FS : full scale</i>
Temperature Compensation	Automatic from 0 to 60 °C (32 - 140 °F), with temperature compensation factor variable between 0 to 5.0% per C.
Conductivity Probe Structure	Carbon rod electrode for long life.
Data Hold	Freeze the display reading.
Memory Recall	Maximum & Minimum value.
Sampling Time	Approx. 0.8 second.
Circuit	Custom one-chip of microprocessor LSI circuit.
Power off	Auto shut off saves battery life or manual off by push button. * <i>Power will off automatically after 10 min., if no button be pressed.</i>
Operating Temperature	0 to 50 °C ( 32 to 140 °F ).
Operating Humidity	Less than 80% RH.

Power Supply	DC 1.5V battery ( UM-4/AAA ) x 4 PCs.
Power Consumption	Approx. 5.7 mA.
Dimension	190 x 40 x 40 mm ( 7.5 x 1.6 x 1.6 inch ).
Weight	171 g/0.38 LB.
Standard Accessories	Instruction Manual..... 1 PC
Power off	Auto shut off saves battery life or manual off by push button. <i>* Power will off automatically after 10 min., if no button be pressed.</i>
Standard Accessories	Instruction Manual..... 1 PC
Optional Accessories	* PCE-CDS-1413-250 Conductivity solution 250 ml; 1413 $\mu$ S / cm; Potassium chloride 0.01 mol / l in dosing bottle with certificate

## 2-2 Electrical Specifications (23± 5 °C)

### A. Conductivity

Range	Measurement	Resolution	Accuracy
2000 uS	0 to 2000 uS	1 uS	± (3% F.S.+1d)
20 mS	2 to 20.00 mS	0.01 mS	* F.S. - Full scale
<p>* Auto range.            * Temperature Compensation :            Automatic from 0 to 60 °C ( 32 - 140 °F ), with temperature compensation factor variable between 0 to 5.0% per C.            * mS - milli Simens * uS - micro Simens * 23± 5°C</p>			

### B. TDS ( Total Dissolved Solids )

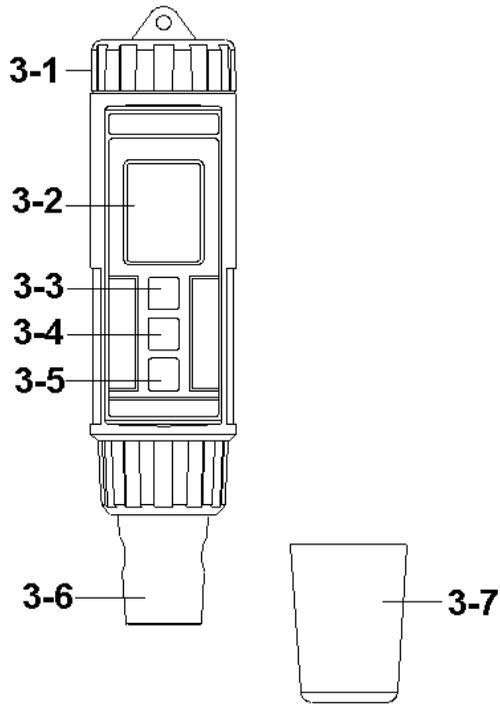
Range	Measurement	Resolution	Accuracy
2,000 ppm	0 to 1,320 ppm	1 ppm	± (3% F.S.+1d)
20,000 ppm	1,320 to 13,200 ppm	10 ppm	* F.S. - Full scale
<p>* Auto range.            * Temperature Compensation :            Automatic from 0 to 60 °C ( 32 - 140 °F ), with temperature compensation factor variable between 0 to 5.0% per °C.            * ppm - parts per million * 23± 5°C</p>			

### C. Temperature

Function	Measuring Range	Resolution	Accuracy
°C	0 °C to 60 °C	0.1 °C	0.8 °C
°F	32 °F to 140 °F	0.1 °F	1.5 °F
* @ 23± 5°C			

\* Above specification tests under the environment RF Field Strength less than 3 V/M & frequency less than 30 MHz only.

### 3. FRONT PANEL DESCRIPTION



- 3-1 Battery compartment/Cover
- 3-2 Display
- 3-3 Power Button
- 3-4 Hold Button, Unit Button
- 3-5 REC Button ( °C/°F Button )
- 3-6 Conductivity Electrode
- 3-7 Protection Cover

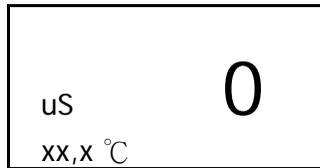
## 4. MEASURING PROCEDURE

### 4-1 Conductivity measurement

1) Turn on the meter by pressing the " Power Button " ( 3-3, Fig. 1 ) momentarily.

*\* Press the " Power Button " ( 3-3, Fig. 1 ) momentarily again will turn off the meter.*

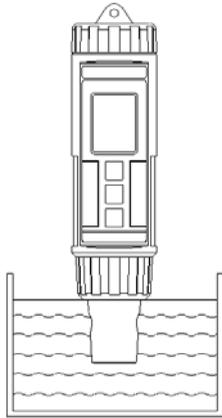
The " Display " ( 3-2, Fig. 1 ) will show the unit as :



Now the meter is ready for the conductivity measurement.

2) Hold the meter by hand and immerse the " Sensing Electrode " ( 3-6, Fig. 1 ) immersed wholly into the measured solution. Shake the " Sensing Electrode " to let the electrode's internal air bubble drift out from the sensing Electrode.

" Display " ( 3-2, Fig. 1 ) will show the conductivity mS ( uS ) values, at the same time the left bottom display will show the Temp. value of the measured solution.



When make the measurement should immerse the " Sensing Electrode " immersed wholly into the measured solution.

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

Same procedures as above " 4-1 Conductivity measurement " but should select the measuring unit to " ppm " at first, the procedures are following :

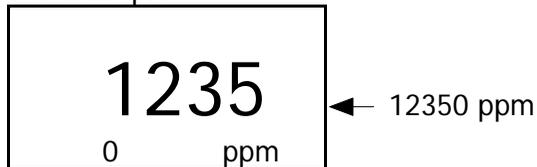
*Press " Unit Button " ( 3-4, Fig. 1 ) continuously at least two seconds until the " Display " show the unit " ppm " instead of " uS ", then release the button.*

*Now the meter is ready for TDS ( Total Dissolved Solids ) measurement.*

*Remark :*

*If the measurement value > 9990 ppm, then the last digit will present in the low display as :*

For example :



### **4-3 Data Hold**

- 1) During the measurement, press the " Hold Button " ( 3-4, Fig. 1 ) momentarily to hold the measured value. The LCD will show a " HOLD " symbol.
- 2) Press the " Hold Button " once again to release the data hold function.

### **4-4 Data Record ( Max., Min. reading )**

- 1) The data record function records the maximum and minimum readings. Press the " REC Button " ( 3-5, Fig. 1 ) momentarily to start the Data Record function, shows " REC " on the display.
- 2) With the " REC " symbol on the display.
  - a) Press the " REC Button " ( 3-5, Fig. 1 ) momentarily, the " REC MAX " symbol along with the maximum value will appear on the display.
  - b) Press the " REC Button " ( 3-5, Fig. 1 ) momentarily again, the " REC MIN " symbol along with the minimum value will appear on the display.
    - \* *When display shows " REC MAX " or " REC MIN ", press the " Hold Button " ( 3-4, Fig. 1 ) momentarily will delete the max. ( min. ) value, the display will show the " REC. " only and execute the memory function continuously.*
  - c) To exit the memory record function, press the " REC " button for 2 seconds at least. The display will revert to the current reading, not show " REC " indicator.

#### ***4-5 Change Temp. unit °C, °F***

- 1) The temperature units can be selected to °C or °F.
- 2) Pressing the " REC Button, °C/°F Button " ( 3-5, Fig. 1 ) continuously at least 2 seconds, then Temp. unit will change from °C to °F or °F to °C.
- 3) After the temperature unit is selected, it will be memorized into the memory circuit . If power off and on again will present the existing selection Temp. unit.

#### ***4-6 Auto power off management***

The meter has built-in "Auto Power Shut-off " function in order to prolong battery life. The meter will switch off automatically if none of the buttons are pressed within 10 min..

## 5. REPLACEMENT OF BATTERY

- 1) When the 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 before the instruments instrument become inaccurate.
- 2) To replace the battery, rotate and remove the " Battery Cover " ( 3-1, Fig. 1 ), take out the old batteries and insert **DC 1.5V battery ( UM-4/AAA ) x 4 PCs.**
- 3) When install the batteries, pay attention to the battery polarity.**
- 4) After installing the batteries, reinstall the battery cover again.