# Kalstein®

Serie YR01830

Benchtop Conductivity Meter

# Instruction Manual

Thank you very much for purchasing our Serie YR1830 Benchtop Conductivity Meter.

Please read the "Operating Instructions" and "Warranty" before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the "Warranty" at a hand place for future reference.

⚠️ Warning: Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

![Kalstein logo]

# Benefits and Support

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## Name and model

Benchtop Conductivity Meter      YR01830

## Use

This user manual provides a step-by-step guide to help you operate the meter, please carefully read the following instructions before use. Any use outside of these instructions may invalidate your warranty and cause

permanent damage to the meter.

## Environmental Conditions

Before unpacking, ensure that current environmental conditions meet the following requirements.

• Relative humidity is less than 80%

• Ambient temperature between 0°C (32°F) and 50°C (122°F)

• No potential electromagnetic interference

• No corrosive gas exists

## Packing List

The following list describes all components of the meter. If any items are missing or damaged, contact the supplier immediately.

- 510 meter

- Electrode arm

- 9V DC power adapter
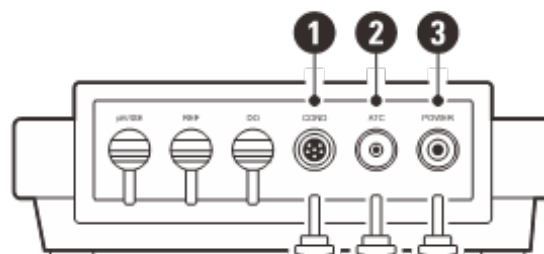
- CON-1 conductivity electrode

- TP-10K temperature probe

- Conductivity standard solutions 84 µS/cm, 1413 µS/cm, 12.88 mS/cm

## Meter Overview
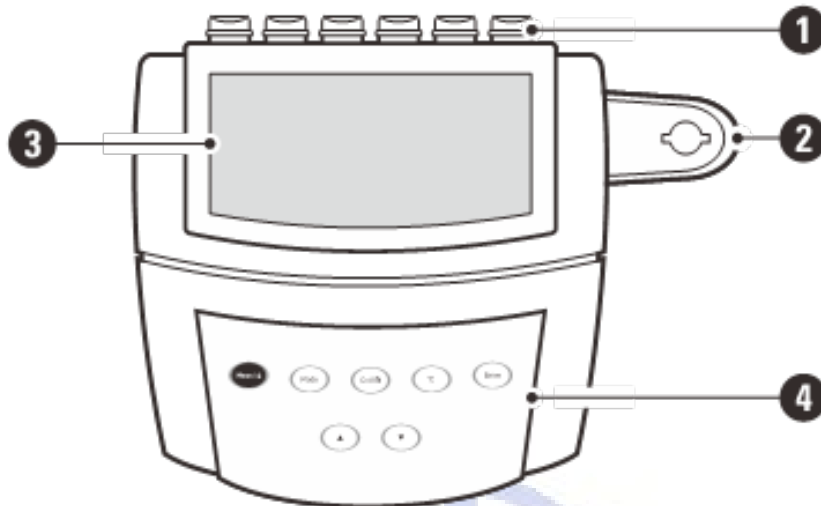


- Sensor connections

- Base plate of electrode arm

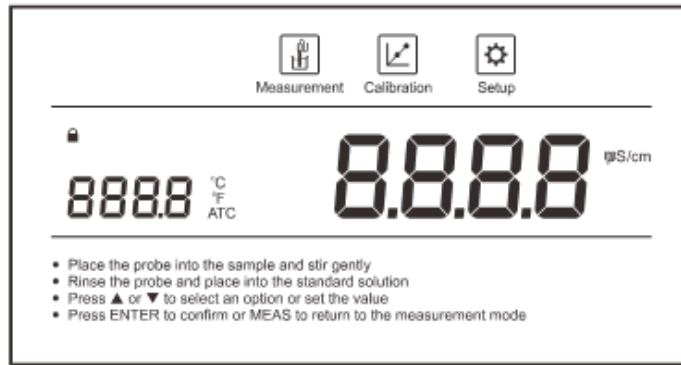- Display

- Membrane keypad

1. Connectors



- Socket for conductivity electrode (6-pin mini DIN)

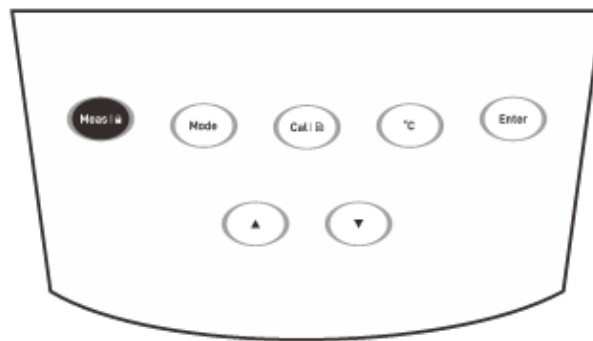- Socket for temperature probe (3.5 mm jack)

- Socket for power adapter

2. Display



- Icon Description

- Indicates that the meter is in the measurement mode

- Indicates that the meter is in the calibration mode

- Indicates that the meter is in the setup mode

- Indicates that the measurement is locked

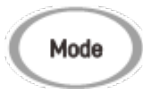- Indicates that the automatic temperature compensation is enabled

3. Keypad



Key Function

- Switch the meter on or off

- Lock or unlock the measurement

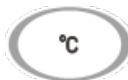- Exit the calibration, settings and return to the

| | measurement mode. |
|---|---|
| Mode | • Toggle between the conductivity and TDS measurement modes. |
| Cal \| ▤ | • Start calibration<br>• Press and hold the key to enter the setup menu |
| °C | • Set the temperature |
| ▲ | • Increase value or scroll up through a list of options |
| ▼ | • Decrease value or scroll down through a list of options |
| Enter | • Confirm the calibration or displayed option |

## Installing the Electrode Holder

Take out the electrode arm from the accessory box. The base plate of electrode arm has a circular hole, the electrode arm has a connecting rod. Insert the connecting rod into the circular hole and swivel the electrode arm 90 degrees. The electrode holder is now ready to swing into desired position.
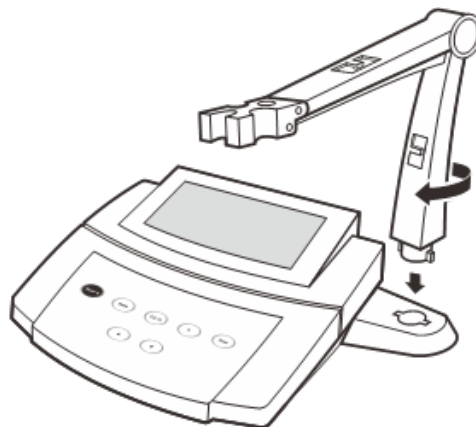
## Adjusting the Electrode Arm

After installation, if the electrode arm automatically rises or falls, you are able to adjust the screw until arm locate at any position.

1.  Remove the plastic cover from the right side of the electrode arm.
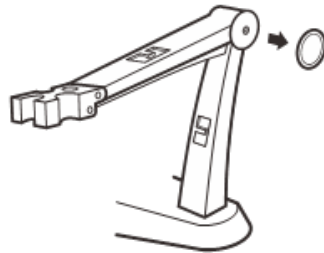


2.  Use the screwdriver to tighten the screw moderately.
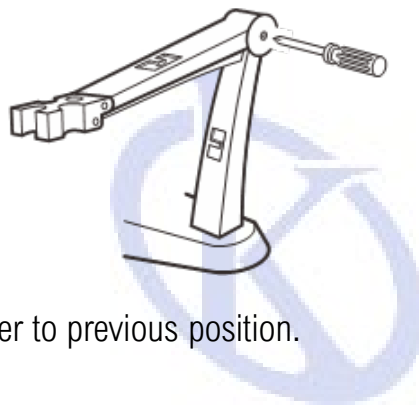


3.  Insert the plastic cover to previous position.

## Connection

a.Connecting the Conductivity Electrode

1.1  Take out the electrode from packaging. Follow the steps below   to      place electrode into the left or right side of the electrode arm.

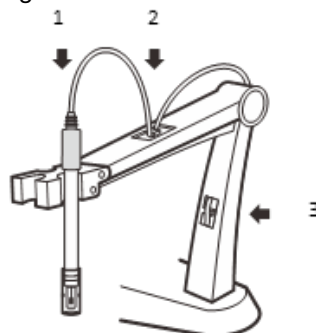1.2 Insert 6-pin connector into the connector socket labeled COND. Ensure the connector is fully seated.
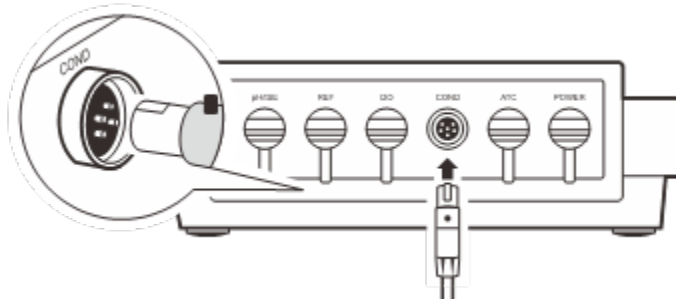


1.3 After the connection is completed, DO NOT pull on the cable.

b. Connecting the Temperature Probe

2.1 Place the temperature probe into the circular hole located at the center of the electrode arm.
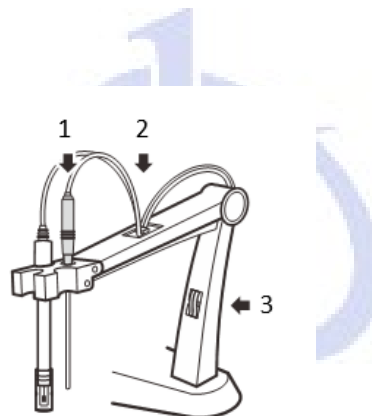


2.2 Insert the jack plug to the connector socket labeled ATC. Ensure the connector is fully seated.
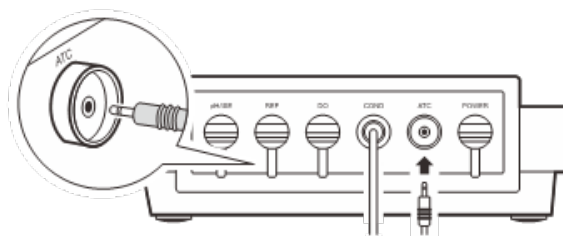


c.Connecting the Power Adapter

3.1 Insert the connector of power adapter to the power socket.

3.2 Plug the 9V DC power adapter into the wall outlet.
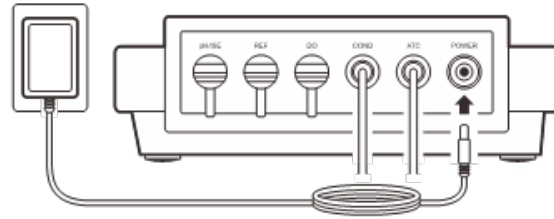
## Prior to Use

Soak the conductivity electrode for about 10 minutes in tap water to remove dirt and oil stains on the sensor surface.

**10 minutes**
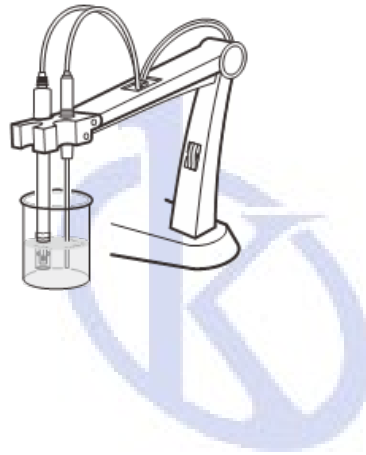


## Switching the Meter On and Off

Press the Meas key for about 3 seconds and release to switch on the meter.

• Press and hold the Meas key to switch off the meter.

## Meter Setup

The Kalstein´s YR01830 Series contains an integrated setup menu for customizing the displayed option to meet measurement requirements. The following table describes the functions of each menu item.

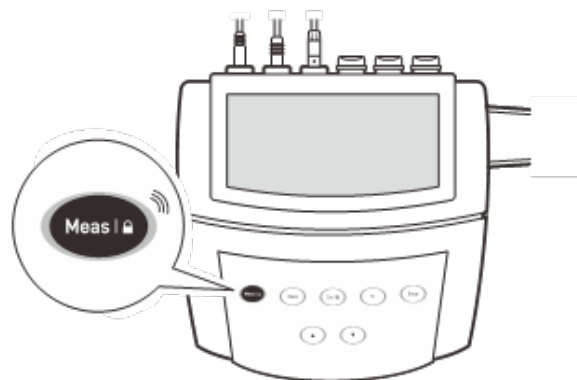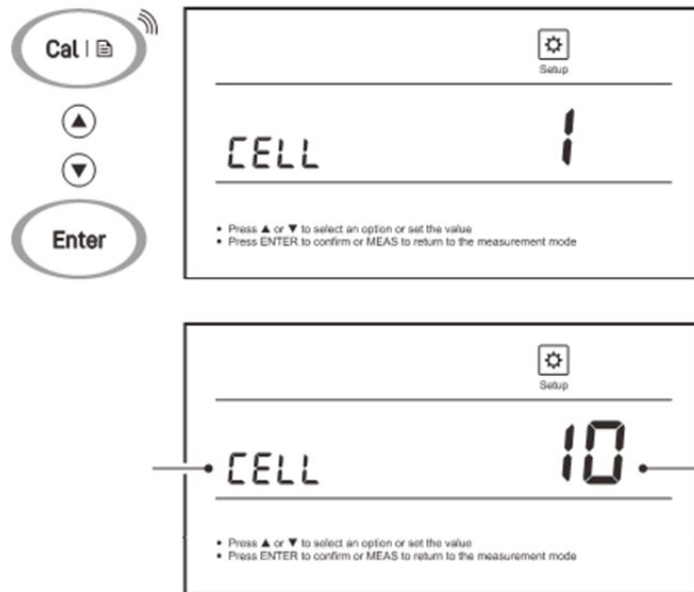| Menu Item | Option and Description | | |
|---|---|---|---|
| | **Cell Constant** | | |
| | Set the cell constant to match connected conductivity electrode. | | |
| CELL | 0.1 | K = 0.1 | |
| | 1 | K = 1 (default) | |
| | 10 | K = 10 | |
| | USEr | Custom | |
| | **Calibration Points** | | |
| | Set the number of calibration points. | | |
| CAL | 1 | 1 point (default) | |
| | 2 | 2 points | |
| | 3 | 3 points | |
| | **Temperature Coefficient** | | |
| COE | Set the temperature coefficient for linear temperature compensation. | | |
| | 2.1 | 0.0 to 9.9%/°C (default 2.1) | |
| | **TDS Factor** | | |
| tdS | Set the default TDS conversion factor. | | |
| | 0.5 | 0.1 to 1.0 (default 0.5) | |

| | **Measurement Unit** | |
|---|---|---|
| | Set the default temperature unit. | |
| UN it | °C | Degrees Celsius (default) |
| | °F | Degrees Fahrenheit |
| | **Auto-Hold** | |
| | If enabled, the meter will automatically sense and lock the measurement endpoint. | |
| HOLd | YES | Enable |
| | NO | Disable (default) |
| | **Auto-Power Off** | |
| | If enabled, the meter will automatically switch off if no key is pressed within 3 hours. | |
| OFF | YES | Enable |
| | NO | Disable (default) |
| | **Factory Reset** | |
| | Reset the meter to factory default settings. Note, the meter must be recalibrated. | |
| rSt | YES | Enable |
| | NO | Disable (default) |

Part 1                                                    Part 2

## Setting the Default Option

1. In the measurement mode, press and hold the 📄 key to enter the setup menu.

2. Press the ▲ / ▼ key to select an option, press the Enter key to confirm and switch to the next menu item.

3. Repeat the steps above until the meter returns to the measurement mode.

Cal | 🗎

▲

▼

Enter

⚙ Setup

CELL                    1

• Press ▲ or ▼ to select an option or set the value
• Press ENTER to confirm or MEAS to return to the measurement mode

⚙ Setup

CELL                   10

• Press ▲ or ▼ to select an option or set the value
• Press ENTER to confirm or MEAS to return to the measurement mode

🛈

To exit the setup menu without saving changes, press the **Meas** key.

## Temperature Compensation

The temperature compensation has a large effect on the conductivity measurement. If enabled, the meter will use the measured conductivity and temperature readings to calculate the results and automatically compensate to the selected reference temperature. If the temperature coefficient is set to 0, the temperature compensation will be disabled and the meter only shows the actual conductivity at the measured temperature.

### Automatic Temperature Compensation

Connect the temperature probe to meter, the ATC icon appears on the display, the meter is now switched to the automatic temperature compensation mode.
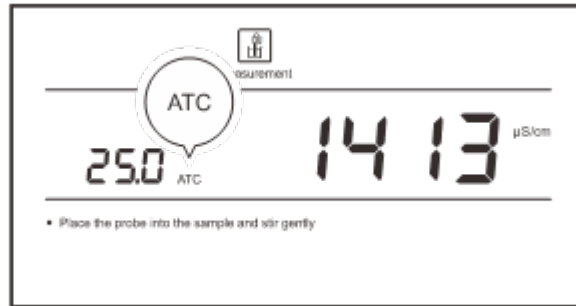
ℹ Refer to the Connecting the Temperature Probe section on page 3.

Manual Temperature Compensation

If the meter does not detect a temperature probe, the degrees Celsius icon (°C) will show on the display indicating the meter is switched to the manual temperature compensation mode. To set the temperature value follow the steps below.

ℹ Press the °C key to enter the temperature setting.

2. Press the ▢ / ▢ key to modify the temperature value.

3. Press the Enter key to save.

Press and hold the ▲ / ▼ key will make the value change faster.

### Selecting a Conductivity Electrode

The Kalstein´s YR01830 Series is capable of using three types of the conductivity electrodes. Before the calibration and measurement, ensure that you have selected a suitable electrode according to the anticipated sample conductivity. The following table lists the selectable electrode and its effective measurement ranges.

| Electrode | Measurement Range | Cell Constant |
|---|---|---|
| CON-0.1 | 0.5 to 100 µS/cm | K = 0.1 |
| CON-1 | 10 µS/cm to 20 mS/cm | K = 1 |
| CON-10 | 100 µS/cm to 200 mS/cm | K = 10 |

CALIBRATRION

Conductivity Calibration

Automatic Calibration

The Kalstein´s YR01830 Series allows 1 to 3 points conductivity calibration. Before calibration, ensure that selected cell constant (K = 0.1, 1, 10) matches connected electrode. If you have selected the manual calibration (USEr), the meter will wait to enter a cell constant.

For better accuracy, we recommend to perform 3 points calibration or select a standard solution closest to the sample conductivity you are measuring. The meter will automatically detect the standard solution and prompt the user to perform the calibration. The following table shows the default standard solution for each measurement range.

| Measurement Range | Default Standard Solution |
|---|---|
| 0 to 20 µS/cm | 10 µS/cm |
| 20 to 200 µS/cm | 84 µS/cm |
| 200 to 2000 µS/cm | 1413 µS/cm |
| 2 to 20 mS/cm | 12.88 mS/cm |
| 20 to 200 mS/cm | 111.8 mS/cm |

If you have changed the conductivity electrode, the meter must be recalibrated. Every electrode has a different cell constant.

Single Point Calibration

Ensure that you have selected 1 point calibration in the setup menu.

1.1 Press the **Cal** key, the display shows ----/CAL1, the meter waits for recognizing the standard solution.
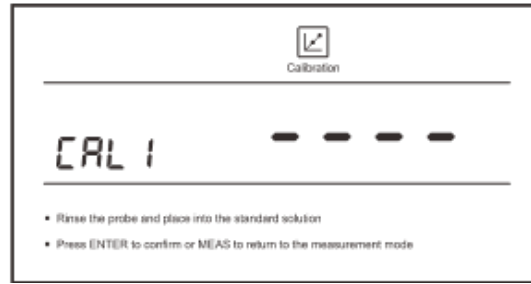
1.2 Rinse the conductivity electrode with distilled water, then rinse with a small amount of standard solution.

1.3 Place the electrode (and temperature probe) into the standard solution, stir gently to remove air bubbles trapped in the slot of the sensor.
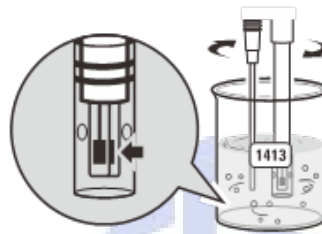


The meter will automatically show the calibration standard (e.g., 1413 µS/cm).

1.4 Press the Enter key, the default calibration value begins flashing.
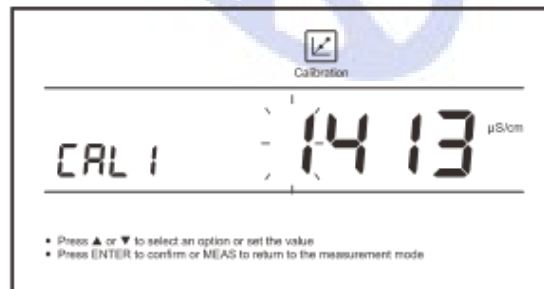


1.5 If necessary, press the ▲ / ▼ key to modify the calibration value, press the **Enter** key to confirm and move to the next digit. When the setting is completed, make sure that the displayed value matches the calibration standard.

1.6 Press the **Enter** key, the Calibration icon begins flashing. When the reading has stabilized, the meter will show End and return to the measurement mode.

## Multipoint Calibration

Ensure that you have selected 2 or 3 points calibration in the setup menu.

2.1 When the first calibration point is completed, the display will show ----/CAL2.

The meter prompts you to continue with second     point calibration.

2.2 Repeat steps 1.2 through 1.4 above until the meter shows End.

Calibration is completed.

## Manual Calibration

The Kalstein´s YR01830 Series provides an easy manual calibration mode. If the conductivity standard solution is not ready, you are able to use this method to calibrate the meter.

3.1 Press and hold the 📄 key to enter the setup menu.

USEr CELL

3.3 Press the **Enter** key, the default value begins flashing.

3.4 Press the ▲ / ▼ key to set the cell constant, press the **Enter** key to confirm until the setting values stop flashing.

3.5 Press the **Meas** key to return to the measurement mode.

- ⓘ Performing the conductivity calibration will simultaneously calibrate the corresponding TDS value.

- To exit the calibration without saving changes, press the **Meas** key.

## Temperature Calibration

The Kalstein´s YR01830 Series is supplied with a temperature probe for measurement and temperature compensation. If the measured temperature reading differs from that of an accurate thermometer, the probe needs to be calibrated.
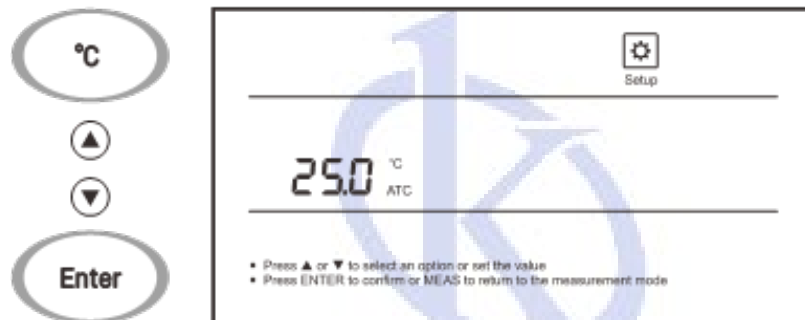
1.  Connect the temperature probe to the meter and place into a solution with a known accurate temperature.

2.  Press the **°C** key to enter the temperature setting.

3.  Press the ▲ / ▼ key to modify the temperature value.

4.  Press the **Enter** key to save.

## Measurement

1.  Press the **Mode** key, the display shows ᴄᴏ̄ᴺᴅ (conductivity), ᴛᴅ5(TDS) and automatically switch to the corresponding measurement mode.

ℹ️ If the TDS (total dissolved solids) mode is selected, ensure that    you    have

set a correct conductivity-to-TDS conversion factor in   the setup menu (default 0.5).

2.   Rinse the conductivity electrode with distilled water. Place the electrode (and temperature probe) into the sample solution and stir gently. Ensure that no air bubbles on the sensor surface.
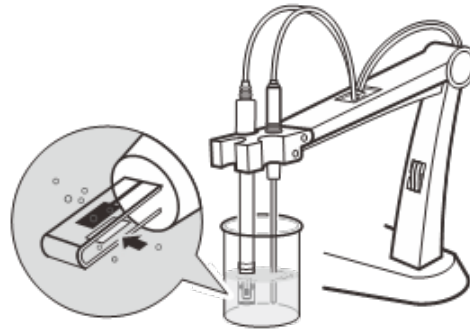


3.   If the Auto-Hold option in the setup menu is enabled, the meter will automatically sense a stable reading and lock measurement, the icon appears on the display. Press the **Meas** key to resume measuring.

If the option is disabled, the meter will continuously measure   and   update   the readings.



4.   Wait for the measurement to stabilize and record the reading.

5.   When all of the samples have been measured, rinse the electrode   with distilled water.

ℹ️    If the meter shows ---- indicating the measurement exceeds the range, replace a conductivity electrode that is appropriate for the conductivity range of the

sample solution you are measuring.

## Electrode Maintenance

- Rinse the conductivity electrode thoroughly with distilled water    after use.

- Do not touch the platinum black coating on the sensor surface    and   always keep it clean.
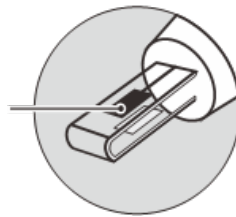


Platinum black

- If there is a build-up of solids inside the sensor, remove carefully,     then recalibrate the electrode.

- If you do not use the electrode for long periods, wipe clean with        a lint-free tissue and store the electrode in a dry and cool area.

- If your electrode is model CON-10, store the electrode with tap    water.   This sensor needs to be kept wet always.

## Appendix

## Preparation of Conductivity Standard Solutions

1.   Place the analytical grade potassium chloride (KCl) in a beaker  and  dry  in  an oven for about 3 hours at 105°C (221°F), then cool     to room temperature.

2.   Add the reagent to a 1 liter volumetric flask according to the instructions in table below.

| Conductivity Standard | Reagent | Weight |
|---|---|---|
| 84 µS/cm | KCl | 42.35 mg |
| 1413 µS/cm | KCl | 745.5 mg |
| 12.88 mS/cm | KCl | 7.45 g |
| 111.8 mS/cm | KCl | 74.5 g |

3. Fill the distilled water to the mark, mix the solution until the reagent is completely dissolved.

## Calculating the Cell Constant

1. Refer to the *Manual Calibration* section to set the cell constant to 1.00.

2. Place the electrode into a standard solution and record the reading.

3. Calculate the cell constant using the following formula.

$$K = \frac{Cstd}{Cmeas} \times G$$

Where:

$K$ = Cell constant

$C_{std}$ = Value of conductivity standard solution

$C_{meas}$ = Measured value

$G$ = Raw cell constant (0.1, 1 or 10)

## Calculating the Temperature Coefficient

1. Do not connect the temperature probe to the meter.

2. Press and hold the **°C** key to enter the temperature setting.

3. Press the ▲ / ▼ key to set the temperature to 25°C and press the **Enter**

key to confirm.

4.  Place the conductivity electrode into the sample solution, record      the temperature value $T_A$ and conductivity value $C_{TA}$.

5.  Condition the sample solution and electrode to a temperature $T_B$      that      is about 5 to 10°C different from $T_A$. Record the conductivity   value $C_{TB}$.

6.  Calculate the temperature coefficient using the formula below.

$$T_C = \frac{CTB - CTA}{CTA\,(TB - 25) - CTB\,(TA - 25)}$$

Where:

   $T_C$   = Temperature coefficient

   $C_{TA}$      = Conductivity at temperature A

   $C_{TB}$      = Conductivity at temperature B

   $T_A$   = Temperature A

   $T_B$   = Temperature B

### Calculating the TDS Conversion Factor

To determine the TDS factor of sample solution, use the formula below.

$$\text{Factor} = \frac{\text{Actual TDS}}{\text{Actual Conductivity}}$$

For example:

Dissolve 64 grams of the potassium chloride (KCl) reagent in 1 liter distilled water. If

measured conductivity is 100 mS/cm, then TDS factor is 0.64.

## Conductivity to TDS Conversion Factors

| Conductivity at 25°C | TDS (KCl) | | TDS (NaCl) | |
|---|---|---|---|---|
| | ppm | Factor | ppm | Factor |
| 84 µS/cm | 40.38 | 0.5 | 38.04 | 0.4 |
| 1413 µS/cm | 744.7 | 0.5 | 702.1 | 0.5 |
| 12.88 mS/cm | 7447 | 0.5 | 7230 | 0.5 |

## Optional Accessories

### Conductivity Electrodes

| Order Code | Description |
|---|---|
| CON-0.1 | For measuring the pure water |
| CON-1 | For general purpose applications |
| CON-10 | For measuring the high conductivity liquids |

### Temperature Probe

| Order Code | Description |
|---|---|
| TP-10K | 3.5 mm jack plug, 1 m (3.3 ft) cable |

### Solutions

| Order Code | Description |
|---|---|
| ECCS-84 | Conductivity standard solution 84  µS/cm, 480 ml |
| ECCS-1413 | Conductivity standard solution 1413    µS/cm, 480 ml |
| ECCS-1288 | Conductivity standard solution 12.88   mS/cm, 480 ml |
| ECCS-1118 | Conductivity standard solution 111.8   mS/cm, 480 ml |

### Power Supply

| Order Code | Description |
|---|---|
| DCPA-9V | 9V DC   power adapter,  european  standard plug |

## Meter Specifications

| | |
|---|---|
| Model | YR1830 |
| **Conductivity** | |
| Range | 0.01 µS/cm to 200.0 mS/cm |
| Resolution | 0.001, 0.01, 0.1, 1 |
| Accuracy | ±1% F.S. |
| Calibration Points | 1 to 3 points |
| Calibration Solutions | 10 µS/cm, 84 µS/cm, 1413µS/cm, 12.88 mS/cm, 111.8mS/cm |
| Temperature Compensation | 0 to 100°C (32 to 212°F), manual or automatic |
| Temperature Coefficient | 0.0 to 9.9%/°C |
| Reference Temperature | 25°C |
| Cell Constant | K = 0.1, 1, 10 or custom |
| **TDS** | |
| Range | 0.00 to 10.00 ppt (max. 200 ppt) |
| Resolution | 0.01, 0.1, 1 |
| Accuracy | ±1% F.S. |
| TDS Factor | 0.1 to 1.0 (default 0.5) |
| **Temperature** | |
| Range | 0 to 105°C (32 to 221°F) |
| Resolution | 0.1°C (0.1°F) |
| Accuracy | ±1°C (±1.8°F) |
| Calibration Point | 1 point |
| **Other Specifications** | |
| Operating Temperature | 0 to 50°C (32 to 122°F) |
| Storage Temperature | 0 to 60°C (32 to 140°F) |
| Relative Humidity | < 80% (non-condensing) |
| Display | LCD, 135 × 75 mm (5.3 × 2.9 in.) |
| Power Requirements | 9V/400mA DC power adapter |
| Auto-Off | 3 hours after last key pressed |
| Dimensions | 210 (L) × 205 (W) × 75 (H) mm, (8.2 × 8.0 × 2.9 in.) |
| Weight | 1.5 kg (3.3 lb) |

## Troubleshooting

| Fault | Cause and Corrective Action |
|---|---|
| - - - - | Electrode dried out. Soak the conductivity electrode in tap water for about 10 minutes. Measurement exceeded the maximum range. Check the electrode and sample. |
| Drifting erratic readings | Check whether electrode is contaminated, clogged or broken. |
| $Err$ | Setting value does not match calibration solution. Reset the calibration value or check the calibration solution. |
| | Electrode is broken. Replace the conductivity electrode. |

## Disposal

This product is required to comply with the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC and may not be disposed of in domestic waste. Please dispose of product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.
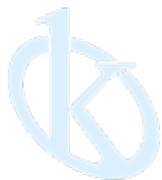
## Warranty

The warranty period for meter is one year from the date of shipment. Above warranty does not cover the electrode and standard solutions. Out of warranty products will be repaired on a charged basis.

The warranty on your meter shall not apply to defects resulting from:

• Improper or inadequate maintenance by customer

• Unauthorized modification or misuse

• Operation outside of the environment specifications of the products.

For more information, please contact the supplier.