Waterproof Conductivity Testing Pen

Specifications - Installation and Operating Instructions

1-31/64 [37.80]

LCD SCREEN

6-11/32 [161.21]

PROBE
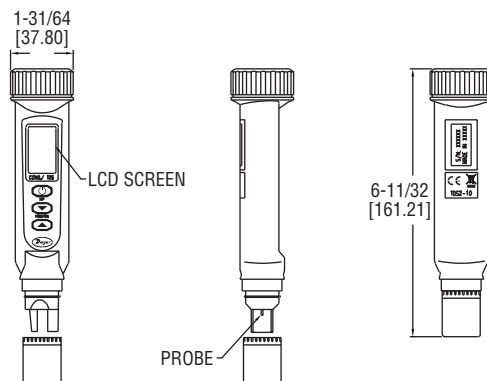
The Model EC2-10 Conductivity Testing Pen can monitor conductivity levels by determining the resistance between the electrodes. Conductivity of water is useful in monitoring the quality of public drinking water and deionized water for industrial applications. This pocket sized tester is constructed of a durable ABS plastic waterproof housing and 316 SS electrodes to protect against corrosion. A large LCD display is easy to read and shows both the conductivity and temperature measurements simultaneously. Since change in temperature can affect accuracy, the EC2-10 has automatic temperature compensation. Batteries are included in packaging.

OPERATING INSTRUCTIONS
Introduction
Please read the manual completely before using this meter. Filing and keeping the manual for future reference is recommended. It is also recommended to soak the electrode for at least 30 minutes before using the meter to clear anything affecting the probe.

Power Supply
The meter is powered by 4 LR44 button cell batteries. Check the batteries if it is your first time use, if the battery symbol appears on the LCD, or if the meter cannot power on.

To install the batteries:
1. Turn off the meter.
2. Loosen the battery cover in the counterclockwise direction (DON'T discard the black washer!).
3. Replace the old batteries with four new button cell LR44 batteries.
4. Make sure the batteries are in place and the polarity is correct.
5. Put the battery cover back and turn it tightly in the clockwise direction.

| NOTICE | Remove the batteries from instruments that you do not plan to use for a month or more. Do not leave batteries in the |

instrument.
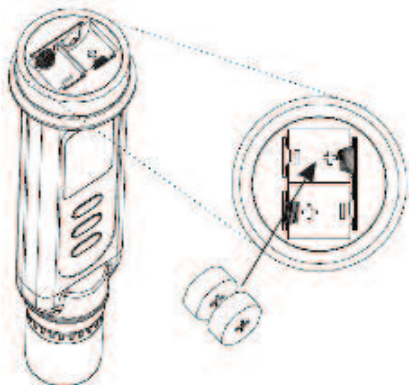
SPECIFICATIONS
Wetted Materials: ABS plastic and 316 SS.
Range: 0 to 1999 µS or 0 to 19.99 mS.
Accuracy: ±1% FS.
Display: 30 mm H x 18 mm W LCD dual display.
Resolution: 1uS or .01 mS.
Temperature Limit: 32 to 122°F (0 to 50°C).
Power Requirements: (4) 1.5 V LR44 alkaline batteries, installed functional, user replaceable.
Enclosure Material: ABS.
Enclosure Rating: IP65.
Weight: 4.3 oz (115 g).
Agency Approval: CE.

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46360, U.S.A.

Phone: 219/879-8000
Fax: 219/872-9057

www.dwyer-inst.com
**e-mail: info@dwyer-inst.com**

LCD Display
- The top shows the measured reading.
- The bottom shows the reading of the temperature.
- Cal = Calibration mode.
- Hold = Data hold.
- Microseconds (uS) or milliseconds (mS) is the unit of Conductivity.
- C or F is the unit of the liquid temperature.
- ▯ is the battery low icon.

Keypad

Operation
1. Remove the probe cover from the meter to expose the electrode.
2. Press ⏻ to power on the meter. The LCD will display parameters (ex: tnr, tCo, tds, rAn) in turns and then it will enter normal display.

Remove the cover from the bottom of meter to expose the electrode.
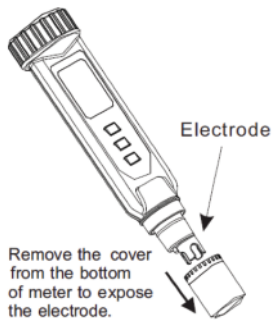
3. The meter is default in auto-ranging status once powered on. Auto-ranging determines and selects a range which gives you the greatest resolution and accuracy. Alternatively, you can manually select the ranges. For example, if you prefer the meter to display a reading such as .50 mS instead of 500 uS, you press ▲ for more than 2 seconds.

NOTICE - Accuracy is a percent of the full-scale, so using your meter in the lowest range will result in the greatest accuracy.
- The LCD will display E02/E03 if the measured value is below or over the limit value, please re-select the range.

4. Set the temperature coefficient to the correct value. The meter is factory set to 2.1%/°C. This will normally provide good results. See the setup section to set the temperature coefficient if needed.
5. Select the normalization temperature. The meter is factory set to 77°F (25°C). If you need to normalize the meter to 68°F (20°C), see the set up section for details.
6. Rinse the probe with de-ionized or distilled water before use. This will remove any impurities adhering to the electrode. If the meter is not used for a long time, please soak the probe for more than 30 minutes to clear up the lazy effect of the probe.

7. Dip the probe into the sample. Make sure there are no air bubbles trapped in the slot of the probe. To remove air bubbles, give the probe a gentle stir. Make sure the electrode tip is submerged when you stir it.
8. Stir the probe gently in the sample to create a homogeneous sample. Allow a few seconds for it to reach temperature equilibrium (wait about 15 minutes to get a stable reading).
9. The unit of measurement will flash on the LCD to indicate that the meter is in measurement mode. When the reading is stable, the unit will stop flashing.

10. Press ▼ to freeze current readings. The text "Hold" will appear on the LCD. Press ▼ again to release.
11. Turn off the meter by pressing ⏻.
12. Make sure your electrode is clean and store it carefully. Before storage, rinse it carefully in de-ionized water and store dry with the cap. Remember the storage temperature limits. For more information, see the maintenance section.
13. Air bubbles can easily adhere around the gap between the electrode and the meter; this will affect the accuracy. See the troubleshooting section for more details on how to remove air bubbles.

Auto Power off (Sleep Function)
This meter will shut off automatically after 20 minutes of inactivity. For a longer operating time, you can disable sleep mode.

To disable the auto power off:
Before power on, press ⏻ + ▼ simultaneously until an "n" appears on the screen. Then, release the keys to return to normal mode.


NOTICE The disable sleep mode will be invalid after every power off.

Setup
The advanced setup mode lets you customize your meter's preferences and defaults. To change the parameters, you can press ⏻ for more than 2 seconds. You will enter setup mode when the meter is in measurement mode.

P1.0 Temperature Parameter Setting (t)

1. When the meter is in measurement mode, press ⏻ for more than 2 seconds to enter setup mode.
2. Press ▼, ▲, or ▲ to select P1.0.
3. Press ⏻ momentarily again to enter unit setting.
4. Press ▲ or ▲ to select C or F.
5. Press ⏻ momentarily to confirm the unit, or press it for more than 2 seconds to return to P1.0 without saving.
6. While in P1.0, press ⏻ for more than 2 seconds to return to measurement mode.
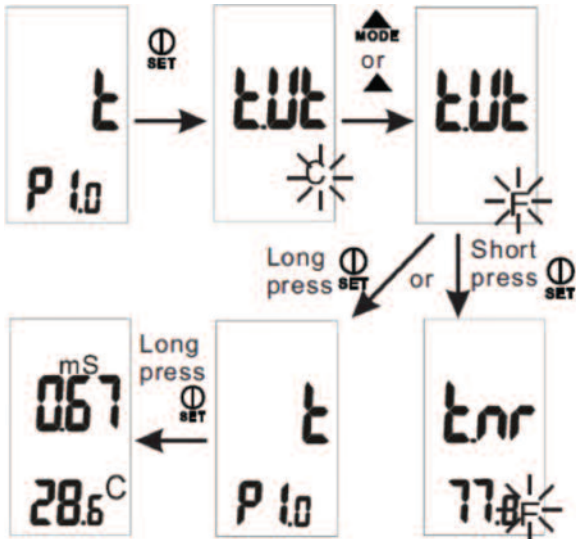
NOTICE   The text P1.1, P1.2, P1.3, P2.1, P3.1 will not display on the LCD.

P3.0 Reset Meter (rSt)

When you decide to reset the meter, all parameters will be reset to factory default values, including the calibration information.

P3.1 Reset

1. In P3.0, press ⏻ momentarily to enter P3.1.
2. Press ▲ or ▲ to select Y or N.
3. Press ⏻ momentarily to confirm the state and return to P3.0, or press it for more than 2 seconds to return to P3.0 without confirming the P3.1 value.
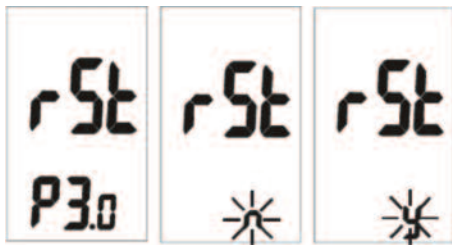
P4.0 Review Calibration Information (CAL)

In P3.0, press ▲ or ▲ to select P4.0.

P4.1 Range 1 Calibration Information

In P4.0, press ⏻ momentarily to enter P4.1 and you will see the last calibration concentration. If the meter is not yet calibrated, "---"will display on the LCD.

P4.2 Range 2 Calibration Information

In P4.1, press or to enter P4.2 and you will see the last calibration concentration. If range 2 is not yet calibrated, "---" will display on the LCD.

In P4.1 or P4.2, press ⏻ momentarily to confirm the state and return to P4.0.
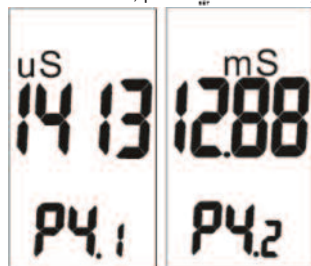
NOTICE   P4.1 & P4.2 are only for you to "review" the calibration information, not for calibration.
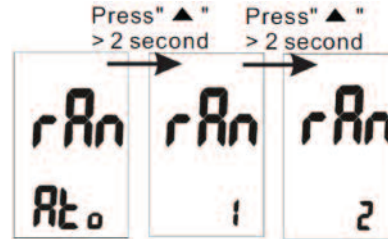
In P1.0, P2.0, P3.0, P4.0, you can press ⏻ for more than 2 seconds to return to normal measurement mode.

Select Measure Range (rAn)

Two measurement ranges are available, 0 to 1999 uS and 0 to 19.99 mS.
To manually select the measurement range:
1. Turn off the meter and stay in normal measurement mode.
2. Press ▲ or ▲ for more than 2 seconds to select the range.

(Default)

Calibration Mode (CAL)
Preparing for Calibration

Two issues need to be considered and prepared for before operation. **First, what is the right calibration standard? Second, when should you calibrate?**

What is the right calibration standard?

For best results, select a conductivity standard near the sample value that you are measuring. Alternatively, use a calibration solution value which is approximately 2/3 of the full-scale range you plan to use.

DO NOT reuse the calibration solution. Contaminants in the solution will affect the calibration and the accuracy. Be sure to use fresh solution each time.

When should you do a calibration?

Calibration is necessary and should be done regularly.
If you are measuring the mid-ranges, calibrate the meter at least once a month. Soak the probe for 15 minutes before calibration or measurement. This can saturate the probe surface and minimize drift.
If measured at the extreme temperatures or in a concentration of <100 uS or >2 mS, calibrate the meter at least once a week to get specified accuracy.

Conductivity Calibration

Please follow the below steps for the conductivity meter calibration:
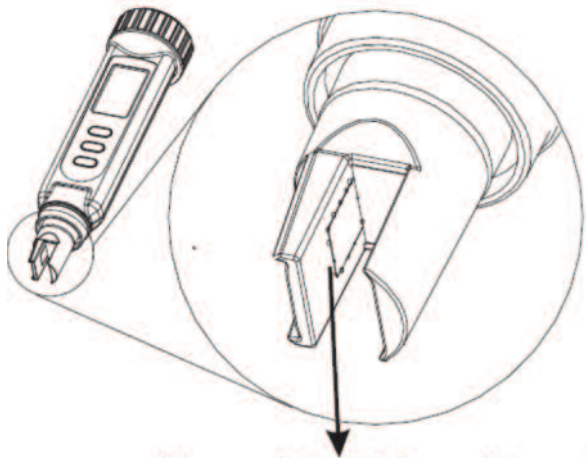1. Insert the probe into de-mineralized or distilled water for about 30 minutes to rinse the probe.
2. Select the conductivity standard which is close to your measurement range.
3. Pour 3 cm height of the standard into two separate and clean containers.
4. Turn on the meter.
5. Rinse the probe in one of the containers. Gently stir the probe. Rinsing could remove contaminants that affect the calibration and could prevent error.
6. Dip the rinsed probe into the other container. Tap the probe at the bottom of the container to remove air bubbles. Let the probe stabilize to the solution temperature.
7. Press ▼ for more than 2 seconds to begin the calibration. The conductivity value will blink on the LCD.
8. Press the ▲ or ▼ to adjust the value to match the value to the calibration standard. You can adjust the conductivity reading up to ±30% from the detected value. If the detected value and standard values differ by more than ±30%, it means that the electrode needs to be cleaned.
9. When the "CAL" stops blinking, you can press to confirm the value. The meter will switch back to conductivity measurement mode. If "CAL" always blinks, check the solution and make sure it is stable. Make the input in step 8 equal to the solution value.
10. Repeat steps 1 through 9 for other ranges if needed.

NOTICE   If the standard buffer is over the measuring limit or less than 10% of the measuring limit, the displayed value will equal the range limit or 10% of the range limit.

When switching the meter from measurement to calibration mode, the meter will display the factory default value. If the meter was previously calibrated, the display may seem to jump to the factory default value when entering calibration.

Symptom	Action
Power on but no display	1. Make sure the time of pressing the power key is more than .3 seconds. 2. Check that the batteries are in place and make good contact, minding polarities. 3. Replace new batteries. 4. Move the battery away for one minute and then put back in.
Display disappeared	Check whether the low battery icon was on before the display went off. If yes, replace with new batteries.
Air bubbles adhere on electrode	1. Stir the electrode completely and dip it into the solution at an oblique angle. Dipping the electrode in vertically creates many air bubbles. 2. After soaking the electrode in solution for 15 to 30 minutes, inspect the electrode carefully to make sure no air bubbles adhere. If they still exist, tap the bottom of the container gently and stir the electrode to remove the air bubbles. 3. If the above method is not working, remove the electrode out of the solution and blow at the electrode to remove the air bubbles.

Many air bubbles adhered!

Error Code	Meaning	How to Handle?
Parameter: Conductivity		
---	Meter is in manual ranging 1; however, the conductivity measured value is higher than 1999uS.	Press "UP" key more than 2 seconds to change the mode to manual ranging 2 or auto ranging.
E03	Conductivity value is over the range limit (19.99mS) or meter is damaged.	Put the meter in standard buffer (the buffer concentration must be lower than range limit). If E03 still appears, send back for repair.
E04	The original temp. error results in this error.	Refer to below error code of temp. After solving the error of temp, E04 of conductivity will disappear.

Parameter: Temperature			
E01		Temperature circuit is damaged.	Send back for repair.
		Temperature value is lower than range limit (0°C) or temperature circuit is damaged.	Put the meter in room temperature for 5 minutes to make the readying back to normal. If E02 still appears, send back for repair.
E02			
		Temperature value is higher than range limit (50°C) or temperature circuit is damaged.	Put the meter in room temperature for 5 minutes. If E02 still appears, send back for repair.
E03			

Appendix: Meter Factory Default Setting

Type	Parameters	Default	Remark
P1.1	Select °C/°F	°C	Temperature Unit
P1.2	Nor. Temp.	25°C	Selectable: 25 or 20°C
P1.3	Temp. Coefficient	2.1%/°C	Adjustable from 0.4 to 10%
P3.1	Factory Default	NO	Retain Your Current Settings
P4.1	Viewing Previous	---	No Calibration Data for 1st Range
P4.2	Calibration Data	---	No Calibration Data for 2nd Range

MAINTENANCE/REPAIR

Upon final installation of the Series EC2-10, no routine maintenance is required. The Series EC2-10 is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

WARRANTY/RETURN

Refer to "Terms and Conditions of Sales" in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.