Instruction Manual

CON 510

Bench Conductivity/TDS Meter

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Rev 2 01/04

Preface

This manual serves to explain the use of the CON 510 bench meter. It functions in two ways, firstly as a step by step guide to help you to operate the meter. Secondly, it serves as a handy reference guide. It is written to cover as many anticipated applications of the meter as possible. If there are doubts in the use of the meter, please do not hesitate to contact the nearest Authorized Distributor.

Eutech Instruments/ Oakton Instruments cannot accept any responsibility for damage or malfunction to the meter caused by improper use of the instrument.

The information presented in this manual is subject to change without notice as improvements are made, and does not represent a commitment on the part of Eutech Instruments Pte Ltd/ Oakton Instruments.

Note: Eutech Instruments Pte Ltd/ Oakton Instruments reserves the right to make improvements in design, construction, and appearance of our products without notice.

Rev 2 01/04

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1 INTRODUCTION

Thank you for selecting the CON510 bench meter. This meter is a microprocessor-based instrument that is designed to offer advanced yet user-friendly features for discerning users - ideal for laboratory and plant applications. It measures Conductivity, Total Dissolved Solids (TDS) and temperature (^{o}C/^{o}F). It incorporates large memory capacity of up to 50 data sets and user-customisable functions – all are accessible through the membrane tactile keypad. A pull-out reference card (concealed at bottom of meter) provides a quick handy guide to the functions of the individual keys as well as useful troubleshooting hints for your reference.

The meter is packaged with a 2-ring Stainless Steel Ultem-body Conductivity/TDS electrode (cell constant K = 1.0) with built-in temperature sensor (Order Code: EC-CONSEN91W/ 35608-50) and an integral electrode holder. For the list of accessories refer to the Section 12 on Accessories.

Please read this manual thoroughly before operating your meter.

2 DISPLAY AND KEYPAD FUNCTIONS

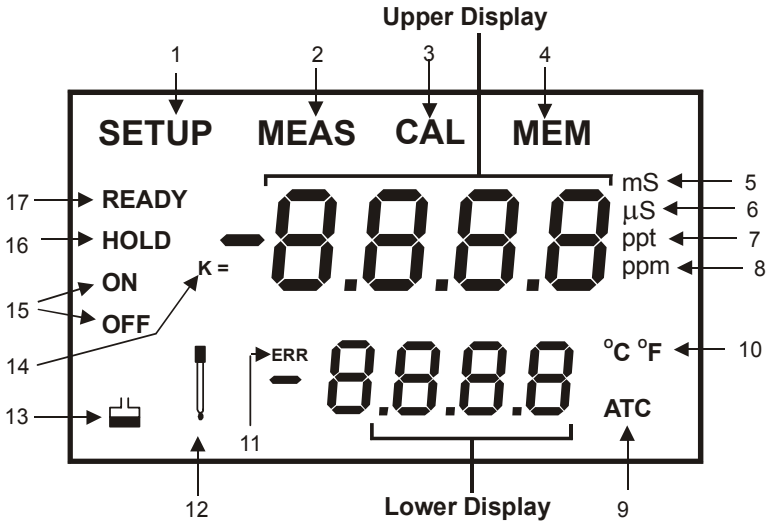
2.1 Display

The LCD (Liquid Crystal Display) has an upper and lower display.

The upper display shows the measured conductivity or TDS reading.

The lower display shows the measured temperature.

The display also shows error messages, keypad functions and program functions.



1. SETup mode indicator

2. MEASurement mode indicator

3. CALibration indicator

4. MEMory mode indicator

5. millisiemens indicator (mS)

6. microsiemens indicator (µS)

7. parts per thousand indicator (ppt)

8. parts per million indicator (ppm)

9. Automatic Temperature Compensation indicator

10. Temperature scale indicator (^{o}C ^{o}F)

11. ERRor indicator

12. Probe indicator

13. Calibration solution indicator

14. Cell constant indicator

15. ON / OFF indicator

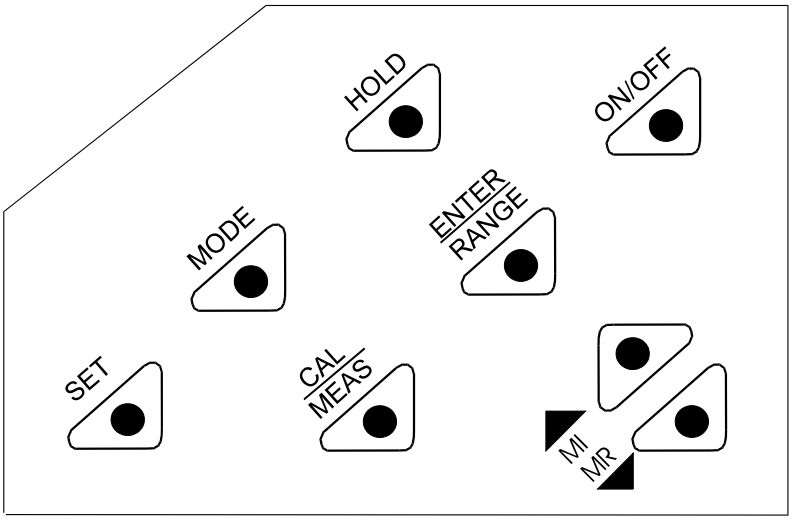
16. HOLD indicator

17. READY indicator

2.2 Keypad

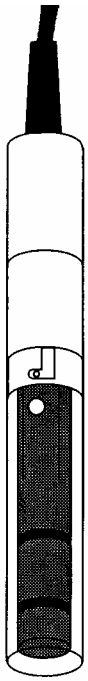
The splash-proof membrane tactile keypad allows easy key entry. Each button, when pressed, has a corresponding graphic icon or indicator displayed on LCD. Some buttons have several functions depending on its mode of operation.

Key	Function
ON/OFF	Powers on and shuts off the meter. When you switch on the meter, the meter starts up in the mode that you last switched off from. For example, if you shut the meter off in TDS measurement mode, the meter will be in TDS measurement mode when you switch the meter on.
HOLD	Freezes the measured reading. To activate, press HOLD while in measurement mode. To release, press HOLD again.
MODE	Selects the measurement parameter. Toggles between conductivity and TDS.
CAL/MEAS	Toggles between Calibration and Measurement mode. **NOTE**: Temperature calibration is available from conductivity/TDS calibration mode.
ENTER / RANGE	*ENTER function:* Press to confirm values in Calibration mode and to confirm selections in SETUP mode. *RANGE function:* Press to enter manual ranging function. The MEAS indicator blinks while in manual ranging function.
MI & MR **▼/▲**	**In Measurement mode:** Press MI (memory input) to store values with its corresponding temperature values in the memory. Press MR (memory recall) to retrieve data from memory (Last-In-First-Out Sequence). **In Calibration mode:** Press to scroll through calibration values. **In SETUP mode:** Press to scroll through the setup subgroup program.
SETUP	Takes you into the SETUP mode. This mode lets you customize meter preference and defaults, and view calibration data and select cell constant.



3 PREPARATION

3.1 Conductivity Electrode Information



The CON510 bench meter is supplied with a Conductivity/TDS electrode (with a sturdy locking 6-pin connector). This Conductivity/TDS electrode (Code No: ECCONSEN91W/ 35608-50) comes with Stainless Steel rings, cell constant of K = 1.0, and a built-in temperature sensor for Automatic Temperature Compensation (ATC). Its specially designed Ultem-body housing has good chemical-resistant properties. It provides fast temperature response and reduces air bubble entrapment, which makes it easy to obtain accurate, stable readings.

The probe materials used which have good chemical durability include:
1. Polyetherimide (Ultem) – protective probe guard
2. Polybutylterphalate (Valox) – sensor housing
3. Stainless Steel (SS 304) – 2 steel bands

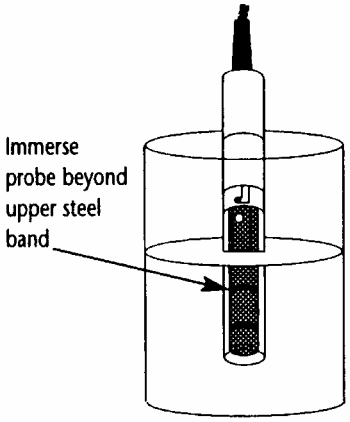
Proper use of probe is essential to ensure that the optimum measurement is taken in a short time. The removable protective plastic probe guard is meant for simple periodic maintenance and it must be kept in tact during measurement and calibration.

Always immerse the probe beyond upper steel band.

NOTE: **DO NOT** remove the protective probe guard during measurement and calibration as it may affect your readings.
NOTE: We recommend that you do not submerge the probe above the protective probe guard. You can submerge the cable for brief periods of time, but not continuously.

See Section 8 for “Probe Care and Maintenance” information.

3.2 Connecting the Probe to the Meter



1. Align the notch and 6 pins on the meter with the holes in the 6-pin connector. Push down and turn the locking ring clockwise to lock into place.
2. To remove probe, turn the locking ring counterclockwise on probe connector until it is free. Pull probe gently away from the meter.

CAUTION: DO NOT pull on the probe cord or the probe wires might disconnect.

NOTE: Keep connectors clean. Do not touch connector with soiled hands.

3.3 Connecting the AC/DC Adapter

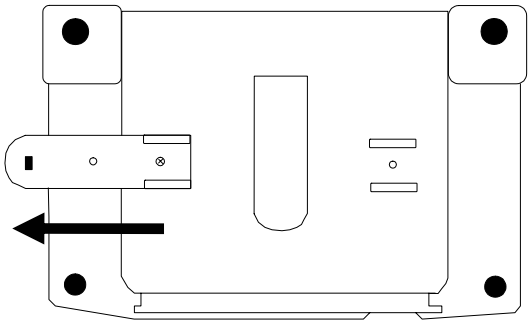
Slide the AC/DC adapter jack into the socket marked DC of the meter until it is firmly seated. Ensure that the power to the AC/DC adapter is switched off. For AC/DC adapter always ensure that main voltage matches that of the adapter. AC/DC adapters used should have the following specifications or settings. Output: - Voltage: 9 VDC Current: 500 mA.

NOTE: Ensure that the input main voltage (110/220 V) matches your adapter requirements before connection.

3.4 Connecting the Electrode Holder

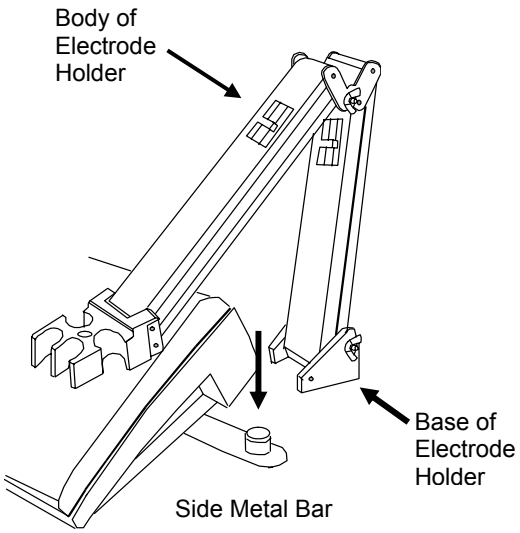
The integral electrode holder serves as a handy holder for a few electrodes or a separate temperature probe during measurement or when not in use.

This bench meter's base plate has a side metal bar to which you can attach an integral swivel electrode holder. You can mount the electrode holder on either right or left side of the meter.



To position the electrode arm:

Use a Phillips screwdriver to remove the screw holding the electrode holder. Slide the side metal bar until the second screw slot lines up with the original screw hole. Use the screw removed earlier to secure the electrode holder into position. Note the side metal bar is reversible. If desired, remove screw holding electrode holder base and slide out of brackets, slide base into brackets on opposite side, and tighten screw.



To install the electrode arm to the meter:

To mount the electrode arm into the metal rod on the side bar, align the slot with the metal rod and base of electrode arm. Push it downwards until it fully sits into position. Avoid using excessive force when fixing or removing. The electrode arm is ready for use.

NOTE: Move the base of the electrode holder if you wish to swing the electrode holder. To prevent the meter from toppling over causing accidental spills, **DO NOT** swing the body of the electrode holder.

4 CALIBRATION

4.1 Important Information on Meter Calibration

The CON 510 bench meter allows you to perform automatic calibration (only for Conductivity mode) or manual calibration (applicable to both Conductivity/TDS mode). The meter can calibrate either single point or multi-point up to 5 calibration points (manual mode) with a maximum of 1 point in each measurement range. Use single-point automatic calibration when calibrating using Conductivity standard calibration solutions (as mentioned in Section 4.6) as it suffices.

When calibrating using uncommon or non-standard Conductivity/TDS calibration solutions which are freshly prepared, use the manual calibration option as it allows you to manually set to the desired value to match the standards being used. However if you are measuring sample values in more than one range, it is recommended to calibrate each of the ranges which you are measuring to ensure best meter accuracy.

- If you are measuring in ranges near to or greater than 20 mS (10 ppt if TDS factor is set to 0.5), or near to or lower than 100 µS (50 ppm), calibrate the meter at least once a week to get specified ±1% Full Scale accuracy.
- If you are measuring in the mid-ranges and you washed the probe in de-ionized water and stored it dry, calibrate the meter at least once a month.
- If you take measurements at extreme temperatures, calibrate the meter at least once a week.

For best results, select a standard value close to the sample value you are measuring. Alternatively, use a calibration solution value that is approximately 2/3 the Full-Scale value of the measurement range you plan to use. For example, in the 0 to 2000 µS/cm conductivity range, a 1413 µS/cm solution is a good solution for calibration.

The following table lists all the corresponding conductivity and TDS ranges. You should calibrate each range using a suitable standards solution that falls between the values in the “recommended calibration solution range” column.

Range Indicator	Conductivity Range	Recommended Calibration Solution Range	TDS Range	Recommended Calibration Solution Range
r 1	0 – 20.00 µS/cm	6.00 - 17.00 µS/cm	0 – 10.00 ppm	3.00 - 8.50 ppm
r 2	0 – 200.0 µS/cm	60.0 - 170.0 µS/cm	0 – 100.0 ppm	30.0 - 85.0 ppm
r 3	0 – 2000 µS/cm	600 - 1700 µS/cm	0 - 1000 ppm	300 - 850 ppm
r 4	0 – 20.00 mS/cm	6.00 - 17.00 mS/cm	0 – 10.00 ppt	3.00 - 8.50 ppt
r 5	0 – 200.0 mS/cm	60.0 - 170.0 mS/cm	0 - 100 ppt	30.0 – 85.0 ppt

When you recalibrate your meter, old calibration values are replaced on that specific measurement range. For example, if you previously calibrated the meter at 1413 µS/cm in the 0 - 2000 µS/cm range and you recalibrate at 1500 µS/cm (in the same range of 0 - 2000 µS/cm), the meter will replace old calibration data (1413 µS/cm) in that range if the meter is in the multi-point calibration mode and the meter will retain all calibration data in other ranges. Or else, the calibration data replaces with new data for all ranges (in single-point calibration mode).

To view calibrated solutions and its corresponding cell constants at respective range, see SETUP main-menus P1.0 and P2.0.

To completely recalibrate your meter, or when you use a replacement probe, it is best to clear all the calibration data in the meter’s memory. To erase all the old conductivity and TDS calibration data completely from memory, see SETUP main-menu P7.0.

Temperature Coefficient: This meter is factory set to a temperature coefficient of 2.1 % per °C. For most applications this will provide good results. See SETUP sub-menu P4.1 to set the temperature coefficient to different value. See also Addendum 2, “Calculating Temperature Coefficients” to determine the appropriate temperature coefficient for your solution.

Normalization Temperature: The factory default value for normalization temperature is 25 °C. If you need to normalize to a value other than 25 °C, see SETUP sub-menu P4.2.

4.2 Preparing the Meter for Calibration

Before starting calibration, make sure you are in the correct measurement mode. Otherwise press **MODE** key to toggle between measurement modes. When you switch on the meter, it starts up in the last unit of measure when you last shut off the meter.

DO NOT reuse calibration solutions after each calibration has been performed. Contaminants in the solution can affect the calibration, and eventually the accuracy of the measurements. Use fresh calibration solution each time you calibrate your meter. Always remember to rinse thoroughly with de-ionized water or a rinse solution after each calibration to prevent any carry-over.

NOTE: When entering calibration mode, the meter will display the uncalibrated value.

To abort or exit from any calibration mode or SETUP options without confirming any set values, DO NOT press the ENTER key. Press CAL/MEAS instead. This will retain the meter's old calibration data in the specific measurement range or previous SETUP options.

4.3 Calibration with Conductivity Standards and TDS factor

The concentration of salts dissolved in solution increases the conductivity of that solution. This relationship varies from salt to salt and is roughly linear over a given range for a given salt. The TDS conversion factor is the number used by the meter to convert from conductivity to TDS. Default is 0.50; allowed window is 0.40 to 1.00.

Instead of calibrating for TDS directly, you can calibrate the CON 510 bench meter by:
1. calibrating to conductivity standards and then
2. entering the appropriate TDS conversion factor into the meter.

To determine the conductivity to TDS conversion factor for your solution:

Addendum 2 lists some commonly used conversion factors.
Addendum 3 describes how to calculate the TDS conversion factor for other solutions.

Enter the TDS conversion factor into your meter as described under SETUP sub-menu P3.4.

4.4 Calibration for TDS Standards Directly

The factory default setting for TDS conversion factor is 0.50. If your solution has a different TDS factor, you can improve the calibration accuracy by setting the correct TDS factor (0.40 to 1.00) prior to calibration in SETUP sub-menu P3.4.

4.5 Selection of Automatic or Manual Calibration

This meter is capable of performing either automatic for Conductivity measurement mode or manual calibration method for both Conductivity and TDS measurement modes. In the automatic calibration mode, the meter automatically detects and verifies the appropriate known calibration standards solutions being calibrated before accepting these particular calibration standards as one of its calibration values in a specific measurement range. This automatic calibration mode frees you from cumbersome calibration procedure. While in the manual calibration, non-standards calibration values can be used for calibration, in which you can manually input the appropriate values as your desired calibration standards in each specific range.

Proceed to SETUP main-menu P5.0 to select the type of calibration method before performing calibration.

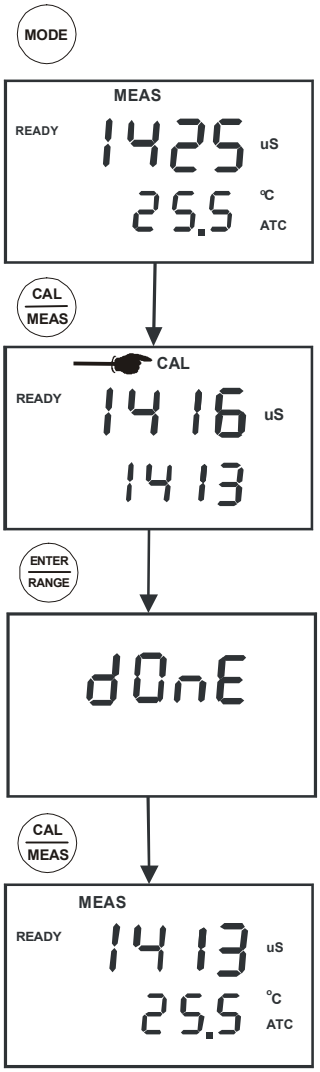
4.6 Automatic Calibration (Only for Conductivity)

In the automatic calibration mode, the CON 510 bench meter is capable of accepting either single-point or up to 4 points for multi-point calibration with maximum of 1 point per specific measurement range using known calibration standards values which include: 84 µS/cm (0 – 200.0 µS/cm), 1413 µS/cm (0 – 2000 µS/cm), 12.88 mS/cm (0 – 20.00 mS/cm) and 111.8 mS/cm (0 – 200.0 mS/cm).

NOTE: You need to set your desired option i.e. number of calibration points in the SETUP main-menu P5.0 before performing calibration.

4.6.1 Conductivity Automatic Calibration

1. If necessary, press the **MODE** key to select conductivity mode.
2. Rinse the probe thoroughly with de-ionized water or a rinse solution, then rinse with a small amount of calibration standard.
3. Dip the probe into the calibration standard. Immerse the probe tip beyond the upper steel band. Stir the probe gently to create a homogeneous sample. Allow time for the reading to stabilize.
4. Press **CAL/MEAS** to enter conductivity calibration mode. The [CAL] indicator will appear in the upper right corner of the display.
5. The lower display will scan and lock the closest set calibration values momentarily. Pressing before the set displayed value being locked will be prompted by an error message and remain in the calibration mode.
6. Wait for [READY] indicator to appear before pressing **ENTER** key to confirm calibration value. The upper display will show “dOnE” once the calibration is successfully performed. The meter returns to the [MEAS] measurement mode.
7. To abort calibration without confirming, press **CAL/MEAS** to revert back to measurement mode. No calibration is performed at this stage.
8. To perform the next point calibration in the multi-point calibration, repeat step 1-7 again until all points have been calibrated if necessary.

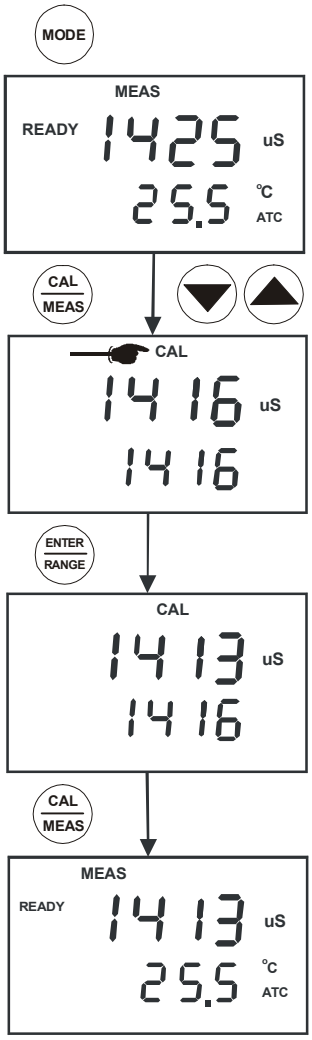


4.7 Manual Calibration (Conductivity/TDS)

The meter accepts either single point or multi-point (up to 5 points) manual calibration with maximum of 1 point per measurement range. Freshly prepare your standards solution before calibration. Refer to the table in Section 4.1 for more details of the recommended standards calibration range.

You can offset or manually adjust the Conductivity or TDS reading up to ±40% from its default setting. If your measured value differs by more than ±40%, clean or replace probe as needed. Refer to Section 8 for Probe Maintenance.

NOTE: You need to set your desired option i.e. number of calibration points in the SETUP main-menu P5.0 before performing calibration.



4.7.1 Conductivity Manual Calibration

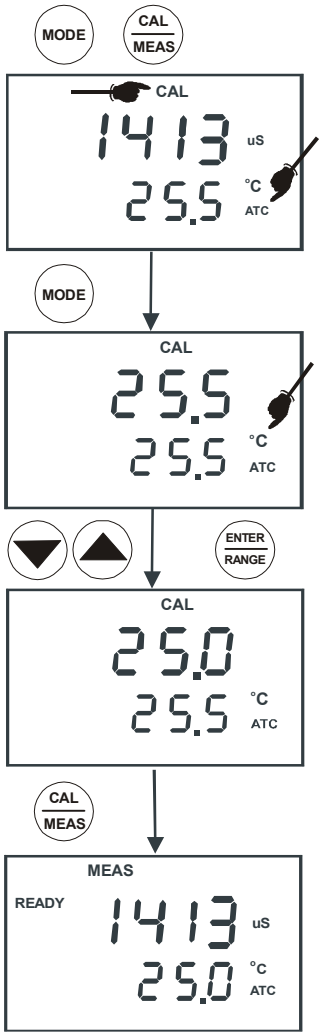
1. If necessary, press the **MODE** key to select conductivity mode.
2. Rinse the probe thoroughly with de-ionized water or a rinse solution, and rinse with a small amount of calibration standard.
3. Dip the probe into the calibration standard. Immerse the probe tip beyond the upper steel band. Stir the probe gently to create a homogeneous sample. Allow time for the reading to stabilize.
4. Press **CAL/MEAS** key to enter conductivity calibration mode. The [CAL] indicator will appear in the upper right corner of the display.
5. Use **MI/▲** or **MR/▼** key to adjust the value on the upper display to match the value of the calibration standards.
6. Press **ENTER** to confirm calibration value. The meter returns to the [MEAS] measurement mode.
7. To abort calibration without confirming, press **CAL/MEAS** key to revert back to measurement mode. No calibration is performed at this stage.
9. For single-point calibration the meter automatically reverts back to the measurement mode.
10. For multi-point calibration repeat steps 2 to 6 for the second to fifth calibration value in specific measuring ranges. To abort calibration at any calibration points, press **CAL/MEAS** once and the meter reverts to measurement mode.

4.7.2 TDS Manual Calibration

The calibration sequence is exactly the same as Conductivity manual calibration. Ensure that you set the correct TDS factor before calibration. Refer to Section 7.4 for details.

4.8 Temperature Calibration

The Conductivity electrode (EC-CONSEN91W/ 35608-50) has a built-in temperature sensor for ATC. The temperature sensor is factory calibrated to the meter. Calibrate your sensor only if you suspect temperature errors that may have occurred over a long period of time or if you have a replacement probe.



Temperature Calibration

1. Make sure the electrode is attached to the 6-pin connector.
2. Power the meter on. The [ATC] indicator will appear at the right-hand side of the LCD to indicate that the temperature sensor is in good working condition. If the ATC indicator does not light up, see SETUP sub-menu P3.3 to switch it on.
3. Press **MODE** key to select either conductivity or TDS mode.
4. Press **CAL/MEAS** to enter either Conductivity or TDS calibration mode. The [CAL] indicator appears above the upper display.
5. While you are in the Conductivity or TDS calibration mode, press **MODE** to enter into Temperature calibration mode. The upper display shows current temperature reading and the lower display shows the factory default temperature value.
6. Dip the electrode into a solution of known temperature (i.e. a constant temperature bath). Allow about 3 to 5 minutes for the built-in temperature sensor to stabilize its measured reading.
7. Adjust using the **MI/▲** or **MR/▼** key to set to the correct temperature value (i.e. the temperature of the constant temperature bath) in increments of 0.1 °C. Maximum allowable offset temperature value is 5.0 °C.
8. Once you have selected the correct temperature, press **ENTER** key. To abort or exit this calibration mode without confirming the temperature calibration value, **DO NOT** press **ENTER** key. Press **CAL/MEAS** key instead and the meter automatically reverts back to the measurement mode.

5 MEASUREMENT

The CON 510 bench meter measures up to 5 different measurement ranges with auto-ranging capability which automatically detects and promptly switches to the appropriate range. The meter also allows measurements to be taken with automatic or manual temperature compensation. The factory default is ATC on.

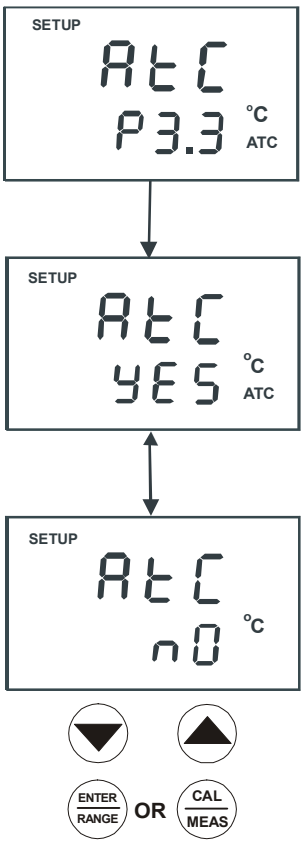
ATC basically compensates for any temperature variances of measured sample solution temperature automatically from the normalization temperature set. Default normalization temperature is 25.0 °C (77.0 °F). However if you need to adjust the default value from 15.0 to 30.0 °C, you may access SETUP sub-menu P3.4 first before measurement.

5.1 Automatic Temperature Compensation

For automatic temperature compensation (ATC) simply plug the conductivity/TDS probe into the meter. The [ATC] indicator will light on the LCD. Default is ATC “YES”.

NOTE: If the ATC indicator does not light up, manual temperature compensation may be set in the SETUP sub-menu P3.3. See SETUP sub-menu P3.3 for directions on selecting ATC or MTC.

To select option either ATC “YES” or “nO”, use either **MI/▲** or **MR/▼** key. Press **ENTER** to confirm. Otherwise press **CAL/MEAS** key to abort option selection.

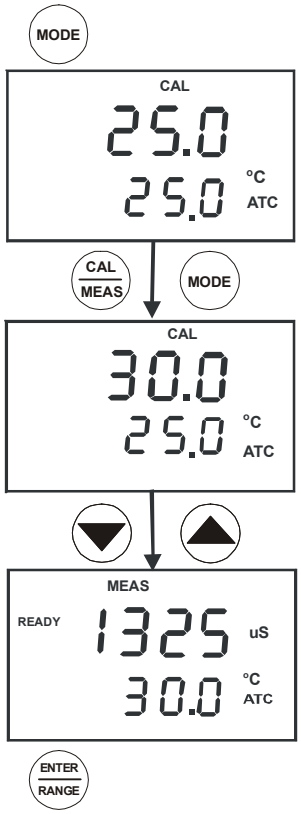


5.2 Manual Temperature Compensation

NOTE: For manual temperature compensation, you must deactivate the ATC mode to 'nO' as shown in SETUP sub-menu P3.3.

5.2.1 Setting a manual temperature compensation value

To set manual temperature compensation value, you need to determine and enter the desired temperature value into the meter. This value is based on which reading will be manually temperature compensated. You may select any temperature between 0 and 100 °C (32 to 212 °F). Default value is 25.0 °C.



1. Switch the meter on if necessary. Press **MODE** to select any measurement mode.
2. If necessary, select ATC to OFF as described in Section 5.1. Note the [ATC] indicator should not appear on the display.
3. Press **CAL/MEAS** to enter into either conductivity or TDS calibration mode. The [CAL] indicator will appear above the upper display.
4. While in Conductivity or TDS calibration mode, press **MODE** key to enter into temperature calibration mode. The upper display shows the current temperature setting and the lower display shows the default value 25.0 °C (77.0 °F) or its last set temperature value.
5. Check the temperature of your sample solution using an accurate thermometer.
6. Use **MI/▲** or **MR/▼** key to offset and match the temperature to the measured value of the sample solution.
7. Press **ENTER** key to confirm the set temperature value and the meter returns to the conductivity or TDS measurement mode.

The meter will now display your newly set temperature value in the lower display and will compensate Conductivity or TDS readings accordingly based on this set temperature.

NOTE: To exit this program without confirming the manual temperature compensation value, DO NOT press **ENTER** key in step 7. Press **CAL/MEAS** key instead and note that no change is being made at this stage.

5.3 Taking Measurements

To take readings:

1. Always rinse the probe with de-ionized or distilled water before use and after each sample to remove any impurities adhering to the probe body. Shake or air dry. To avoid contamination or dilution of your sample, rinse probe with a small volume of your sample solution.
2. Press **ON** to switch on the meter and the [MEAS] indicator appears on the top of the LCD.
3. Dip the probe into the sample. Ensure that the solution level is above its upper steel band. Stir the probe gently in the sample to create a homogenous sample.
4. Allow time for the reading to stabilize. Note the reading on the display.
5. Press **MODE** to toggle between Conductivity and TDS measurement.

Taking measurements with READY indicator selected on

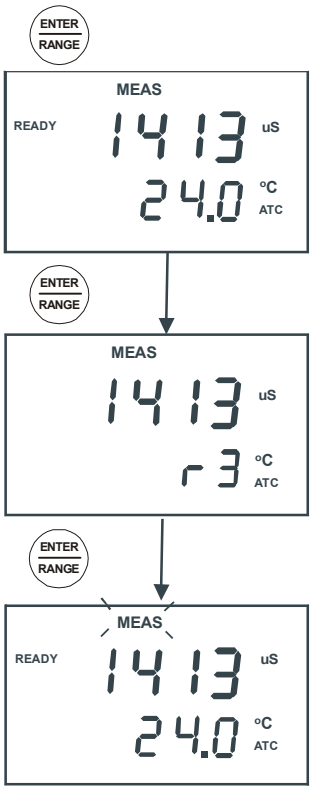
If the READY indicator has been activated, the [READY] indicator lights whenever the reading has stabilized. You may switch the READY indicator on or off by following the sequence as described in SETUP sub-menu P3.1.

Taking measurements with the Auto-Hold feature selected on

When a reading has stabilized for more than 5 seconds, the Auto-Hold feature automatically "freezes" the displayed reading and the [HOLD] indicator appears. Press **HOLD** once to release the reading. You may deactivate the Auto-Hold feature as described in SETUP sub-menu P3.1.

5.4 Using Manual Ranging Function

Although the CON 510 bench meter has an automatic ranging capability, you may also manually select any specific measurement range you wish to work on by pressing RANGE each time for every range.

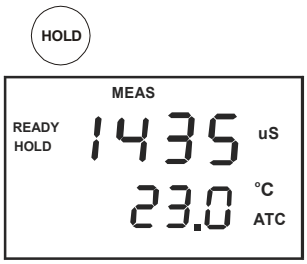


Range Indicator	Conductivity Range	TDS Range (if TDS factor is 0.5)
r 1	0 – 20.00 µS/cm	0 – 10.00 ppm
r 2	0 – 200.0 µS/cm	0 – 100.0 ppm
r 3	0 – 2000 µS/cm	0 – 1000 ppm
r 4	0 – 20.00 mS/cm	0 – 10.00 ppt
r 5	0 – 200.0 mS/cm	0 – 100 ppt

1. To manually select the desired measuring range, press **RANGE** key while you are in the measurement mode. The first range will appear on the display and the [MEAS] indicator blinks.
2. Press **RANGE** key again (if needed) until the desired range is selected.
3. To re-select the Auto-ranging function, repeatedly press **RANGE** key until the [MEAS] indicator appears without blinking. The display will then scroll through the various ranges and the Auto-ranging function resumes. Or simply power off and on again will restart meter into Auto-ranging function as default.

NOTES: If the value of the solution you are measuring is higher than the range selected, an error message code “Or” will appear on the upper display indicating an over-range condition. Press **RANGE** key until the correct range is selected. However the meter reverts back to the Auto-ranging function once it is powered off.

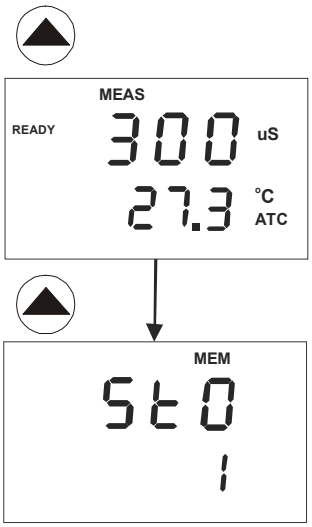
5.5 HOLD Function



This feature allows you to freeze the displayed reading momentarily when activated in the measurement mode and the [HOLD] indicator appears on the LCD. To release the held value, press **HOLD** again and the [HOLD] indicator disappears. You may continue to take measurements.

6 MEMORY AND DATA INPUT FUNCTIONS

6.1 Memory Input



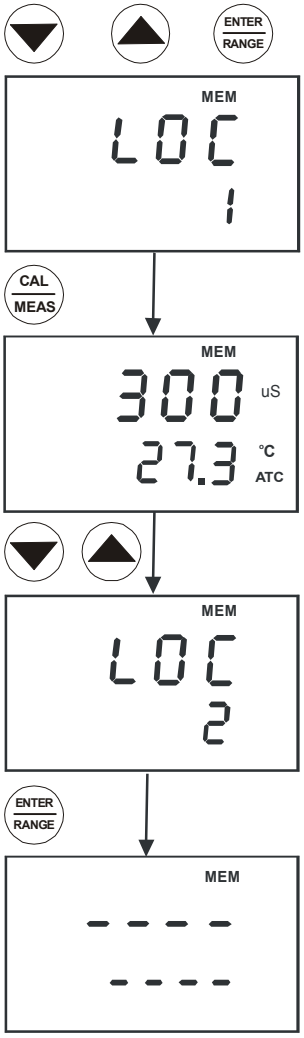
The meter's non-volatile memory can store and recall up to 50 data sets which include Conductivity and temperature or TDS and temperature. Data sets are retained even if the power is shut off unless these stored data sets are being overwritten by new ones.

To store a reading:

1. During any measurement mode press **MI/▲** key to input any data into the memory.
2. MEM, "Sto" and memory location number will be displayed to indicate that the readings are being stored into meter's memory at that specific location number. The meter then returns to the measurement mode.
3. To continue storing data sets, press **MI/▲** to input subsequent data into memory.

NOTE:
If the memory is full, the first data set value stored will be overwritten to create space for the new value. Data sets are stored sequentially in the next unoccupied memory location and cannot be selectively input into specific memory location to be stored.

6.2 Memory Recall



You can access memory recall from any measurement mode only. This function recalls and displays previous readings being stored in the meter's memory in "Last-In-First-Out" sequence. For example the most recent reading stored in location 20 will be displayed first when memory recall is activated. To selectively view any specific memory location, use **MI/▲** or **MR/▼** to select and press **ENTER** to view the corresponding data set value stored in that memory location.

To recall readings:

1. Press **MR/▼** key once to retrieve the last reading stored. The memory location screen – **MEM, "Loc" and the memory number** will flash on the display.
2. Press **ENTER** to recall the reading stored under that memory number.
3. To view the next memory location, press **ENTER** key once and the display automatically moves to the next memory location.
4. Press **CAL/MEAS** key to revert back to measurement mode if you do not wish to access memory recall further.
5. If necessary, press **MI/▲** or **MR/▼** key to select any specific memory location. Press **ENTER** key to view the stored values in that memory location. If there is no data stored in particular memory location, both upper and lower displays will show "----".

7 SETUP FUNCTIONS

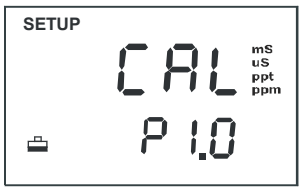
The setup mode allows you to customize the meter's setting to your individual preferences. The CON510 meter features different main program menus and sub-menus which organize individual parameters like a matrix-format.

Details of each main program menu:

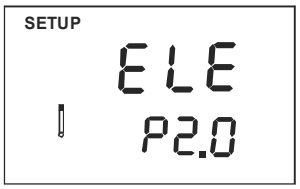
1. P1.0: Viewing previous calibration data - all calibrated solutions for each range
2. P2.0: Viewing electrode diagnosis - effective cell constants for each range
3. P3.0: Meter configuration – Ready, Auto-Hold, Temperature unit of measure, ATC or MTC, TDS Factor
4. P4.0: Setting of Temperature Coefficient, Normalization Temperature
5. P5.0: Setting of Automatic or Manual and Single or Multi-point calibration
6. P6.0: Setting of cell constant
7. P7.0: Resetting meter to factory defaults

7.1 SETUP Mode Overview

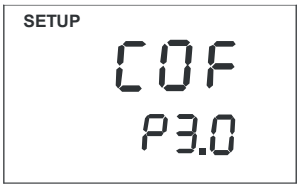
Press **SETUP** to enter into the setup mode with [SETUP] indicator on the top left of LCD display. Use the **MI/▲** and **MR/▼** keys to scroll up and down respectively through main menus. At each main menu, press **ENTER** to enter into a particular sub-menu to make specific changes from the meter's default settings. See Addendum 4 for a table of meter factory default settings.



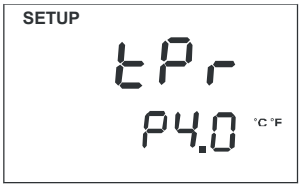
P1.0: Viewing Previous Calibration Data
P1.1 First range calibration solution
P1.2 Second range calibration solution
P1.3 Third range calibration solution
P1.4 Fourth range calibration solution
P1.5 Fifth range calibration solution



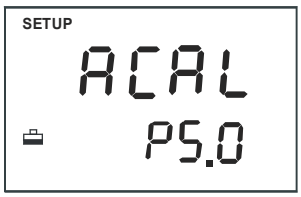
P2.0: Viewing Calibrated Cell Constants
P2.1 Effective cell constant for first range
P2.2 Effective cell constant for second range
P2.3 Effective cell constant for third range
P2.4 Effective cell constant for fourth range
P2.5 Effective cell constant for fifth range



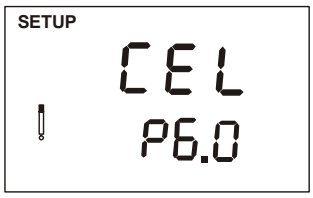
P3.0: Meter Configuration
P3.1 READY indicator On/Off and Auto-Hold On
P3.2 Select °C or °F
P3.3 Select Automatic or Manual Temperature Compensation
P3.4 Setting TDS conversion factor (available in TDS mode)



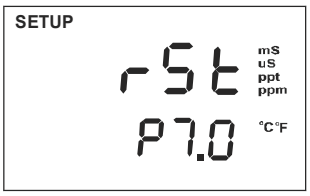
P4.0: Temperature
P4.1 Adjusting temperature coefficient
P4.2 Adjusting normalization temperature



P5.0: Mode of Calibration
Selection of Automatic or Manual Calibration
(only in Conductivity mode)
Selection of Single or Multi-point Calibration



P6.0: Selecting cell constant
Selecting cell constant K: 0.1, 1.0, 10.0



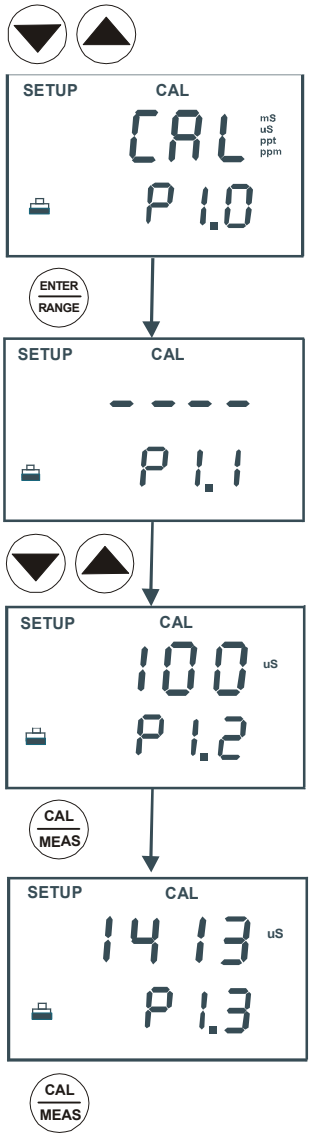
P7.0: Reset to factory defaults
Reset meter to factory defaults

7.2 P1.0: Viewing Calibration Data

This mode lets you recall previous calibration data of Conductivity/TDS. This is for viewing only and no changes can be made.

1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** to scroll through sub-menus until you view main-menu CAL P1.0 on the display.
3. Press **ENTER** repeatedly to view all previous calibration data, starting from the first range till fifth range. The meter will display the calibration value of that particular range provided calibration is performed. If any of range is not being calibrated the upper display shows "---".
4. When you have scrolled through all calibration data, you will automatically return to the SETUP main-menu P1.0. Press **CAL/MEAS** key if you wish to return to measurement [MEAS] mode. Or to exit from viewing of any range in respective sub-menus, press **CAL/MEAS** key reverts to the SETUP main-menu P1.0.

NOTE: If you enter into the setup mode from Conductivity measurement mode, calibration data will be in µS or mS. Similarly if you enter into the setup mode from TDS measurement mode, calibration data will be in ppm or ppt.

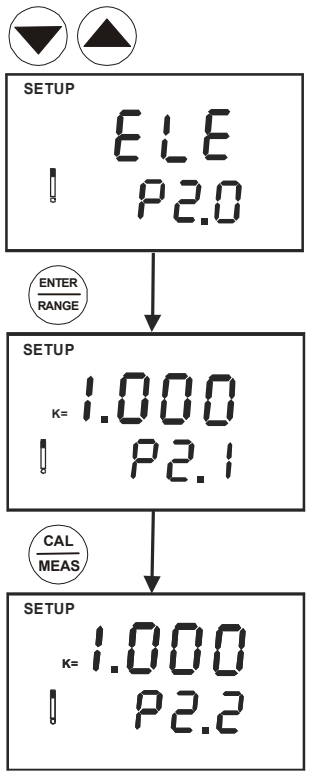


7.3 P2.0: Viewing Electrode Diagnosis

Main program 2.0 shows the effective cell constant for each range being calibrated. The cell constant is adjusted according to your calibration options that let you check the probe's parameters for diagnostic purposes.

1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through sub-menus until you view main-menu ELE P2.0 on the display.
3. Press the **ENTER** key repeatedly to view the effective cell constant for each range.
4. When you have scrolled through all calibration data, you will automatically return to the SETUP main-menu P2.0. Press **CAL/MEAS** key if you wish to return to measurement [MEAS] mode.

NOTE: Cell constants of electrode will degrade with time and usage depending on your maintenance and wear and tear of the electrode being used. You can use this feature to prompt you the need for a new probe prior to total failure. Recommended value as an indicator for a replacement of probe is either 0.60 or 1.40 (±40% of 1.000).



7.4 P3.0: Meter Configuration

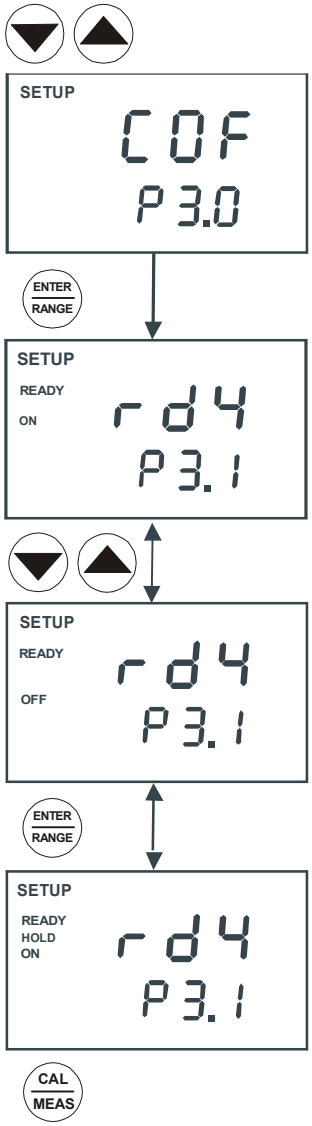
P3.1: READY indicator and Auto-Hold function

Program P3.1 allows you to select "READY ON", "READY OFF" and activate the Auto-Hold function. "READY" indicator is a useful feature that prompts you whenever your measured reading has stabilized. Once activated you will see [READY] indicator lights up whenever your readings have stabilized. At this moment, you may depress **MI/▲** to store the reading into meter's memory.

Select "READY OFF" for instantaneous measurement with no [READY] indicator being lighted up on the display.

You may activate the Auto-Hold function which automatically freezes measured reading after it has stabilized for more than 5 seconds. Once the display is frozen, the [HOLD] indicator appears on the display. At this moment, you may depress **MI/▲** to store the reading into meter's memory. Press **HOLD** once to release the held reading and to access other functions in the measurement mode. You may deactivate this feature by selecting either "READY ON/OFF".

1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the sub-menus until you view SETUP main-menu P3.0 on the display.
3. Press **ENTER** key to select sub-menu P3.1 with upper display showing "rdY".
4. Use **MI/▲** or **MR/▼** key to select the appropriate configuration you require. Selecting ON switches the READY indicator on; OFF switches the READY indicator off; ON and HOLD together switches the Auto-Hold feature on.
5. Press **ENTER** to confirm selection and to proceed to Program P3.2. If you do not wish to continue P3.2, press **CAL/MEAS** to return back to the measurement [MEAS] mode.

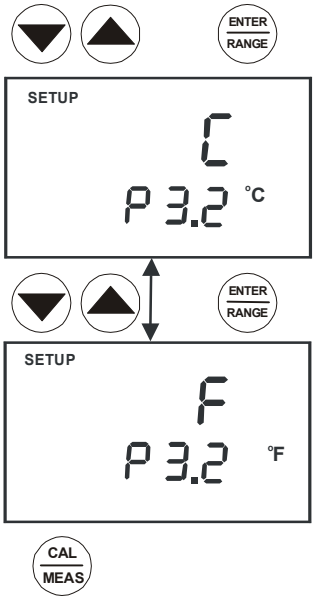


P3.2 Selecting °C or °F

You can select between °C and °F as unit of measure for temperature readings. Meter default is °C.

1. From measurement mode, press **SETUP** key to enter into Setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the SETUP main-menu P3.0 and press **ENTER** until you can view sub-menu P3.2 on the display.
3. Use **MI/▲** or **MR/▼** key to toggle between °C and °F.
4. Press **ENTER** to confirm selection and you will automatically return to the SETUP main-menu P3.0. Press **CAL/MEAS** key if you wish to return to measurement [MEAS] mode.

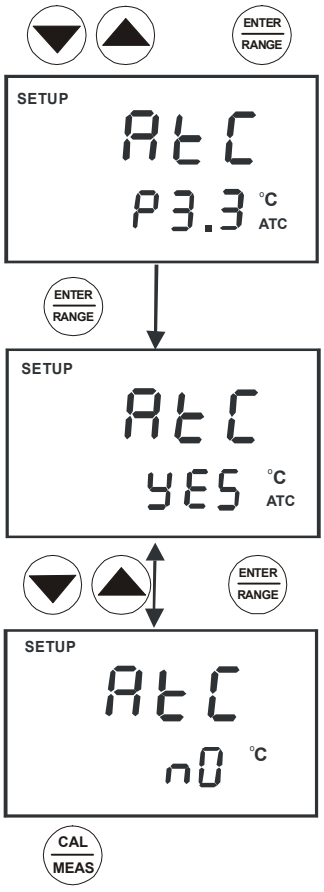
NOTE: Similarly if you are accessing SETUP main-menu P3.0, pressing **ENTER** twice will take you to this SETUP sub-menu P3.2.



P3.3 Selecting Automatic or Manual Temperature Compensation

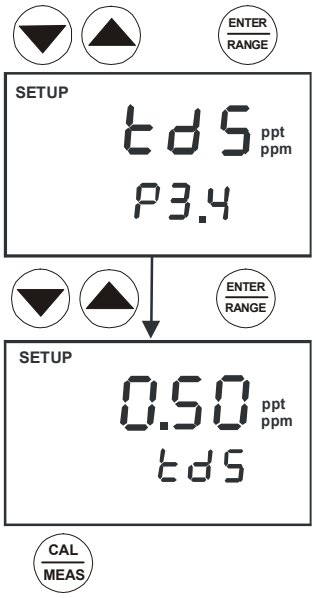
This Program P5.3 allows you select between Automatic Temperature Compensation (ATC) and Manual Temperature Compensation. Meter default is ATC.

1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the main-menus “COF P3.0” and press **ENTER** key repeatedly until you come to the SETUP sub-menu P3.3 which the upper display shows “ATC” and “P3.3” on the lower display.
3. Press **ENTER** key again. The upper display shows “ATC” and the lower display shows “YES” or “NO”.
4. Use **MI/▲** or **MR/▼** key to select the Automatic Temperature Compensation on or off. YES = ATC on; NO = ATC off
5. Press **ENTER** key to confirm selection and to return to the SETUP sub-menu P3.3. Press **CAL/MEAS** key to return to measurement [MEAS] mode.



P3.4 Setting the TDS factor (In TDS Mode)

The concentration of salts dissolved in solution increases the conductivity of that solution. This relationship varies from salt to salt and is roughly linear over a given range for a given salt. The TDS conversion factor is the number used by the meter to convert from conductivity to TDS.



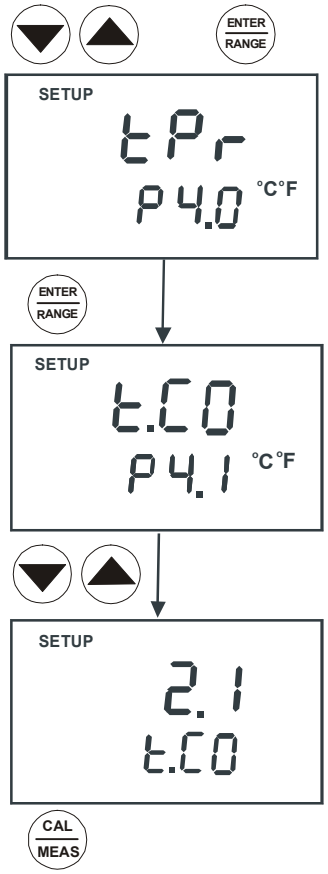
To determine the conductivity to TDS conversion factor for your solution:
Addendum 2 lists some commonly used conversion factors.
Addendum 3 describes how to calculate the appropriate TDS conversion factor for other solutions. You can manually set TDS conversion factor between 0.40 and 1.00; meter's default is 0.50.

1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the SETUP main-menus "COF P3.0" and press **ENTER** key repeatedly until you come to the sub-menu Program P3.4 which the upper display shows "tds" and "P3.4" on the lower display.
3. Press the **ENTER** key again to make changes to the displayed value. The upper display shows a value and the lower display shows "tdS".
4. Use **MI/▲** or **MR/▼** key to set your calculated TDS conversion factor.
5. Press the **ENTER** key to confirm selection and to return to the SETUP sub-menu P3.0. Press **CAL/MEAS** key to return to measurement [MEAS] mode.

7.5 P4.0: Temperature

P4.1 Adjusting the Temperature Coefficient

The temperature coefficient is the amount of change in conductivity per degree of temperature; it is expressed in percent per °C or °F. Entering the exact temperature coefficient of your solution lets you accurately compensate temperature for almost any solution*. You can adjust 0.0 to 10.0 % per °C or °F. Meter default is 2.1% per °C or °F.



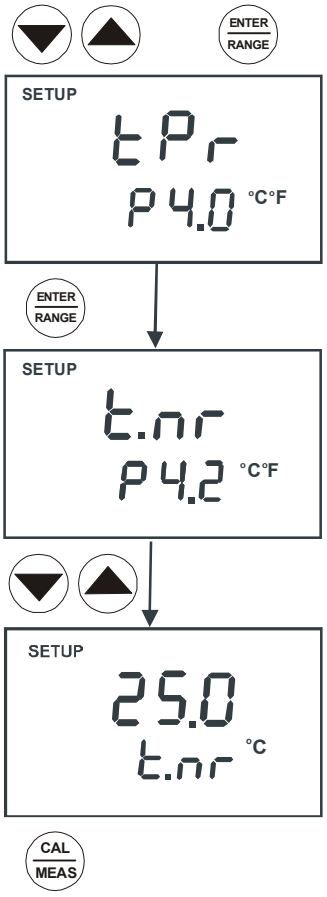
1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the SETUP main-menu "tPr P4.0" and press **ENTER** until you can view sub-menu P4.1.
3. Press **ENTER** key to make change to the displayed value. The upper display shows the temperature coefficient and the lower display shows "t.CO".
4. Press **MI/▲** or **MR/▼** key to set the temperature coefficient of your solution.
5. Press **ENTER** to confirm selection and to proceed to SETUP sub-menu P4.2. Press **CAL/MEAS** key twice to return to measurement [MEAS] mode.

NOTE: If you do not know the temperature coefficient of your solution you can determine the correct value using the formula in Addendum 3 "Calculating Temperature Coefficients".

P4.2 Adjusting the Normalization Temperature

Your meter will normalize its conductivity measurements to a standard temperature that you can select. You can adjust the normalization temperature from 15 to 30 °C (59 to 86 °F). Meter default is 25.0 °C (77 °F).

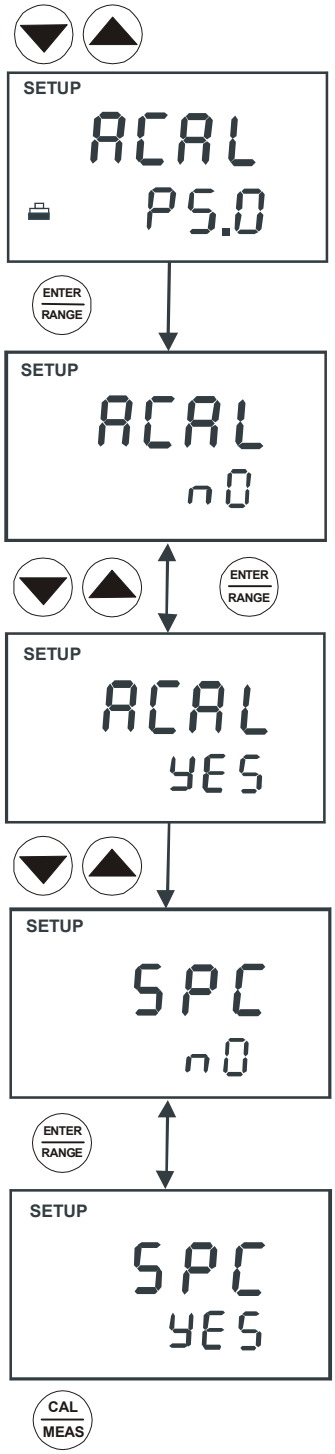
1. From measurement mode, press **SETUP** to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the SETUP main-menu P4.0 and press **ENTER** thrice repeatedly until you can view the sub-menu P4.2 which the upper display shows “t.nr” on and “P4.2” on the lower display.
3. Press **ENTER** key to make change to the displayed value. The upper display shows the normalization temperature and the lower display shows “t.nr”.
4. Press **MI/▲** or **MR/▼** key to set the normalization temperature (in the specific unit of temperature which is set at SETUP sub-menu P3.2).
5. Press **ENTER** to confirm selection and to return to the SETUP main-menu P4.0. Press **CAL/MEAS** key to return to measurement [MEAS] mode.



7.6 P5.0 Mode of calibration

The CON 510 bench meter allows you to perform automatic (only for Conductivity mode) or manual calibration (applicable to both Conductivity/TDS mode). Similarly you may choose to perform either single-point or multi-point calibration (up to 4 preset calibration standards in automatic calibration mode). Refer to the Section 4 for details on calibration.

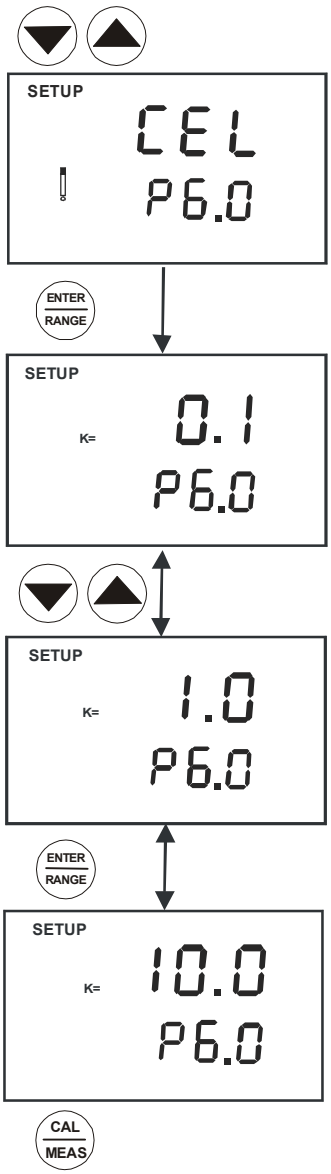
1. From measurement mode, press **SETUP** to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through main-menu “ACAL P5.0”.
3. Press **ENTER** key to enter into this main-menu for selection of Automatic Calibration either “nO” (Manual) or “YES” (Automatic) using **MI/▲** or **MR/▼** key.
4. Once the option is selected, press **ENTER** key to confirm. The next display shows the option of Single-point Calibration (SPC) or Multi-point Calibration.
5. Use **MI/▲** or **MR/▼** key to select “YES” if you wish to perform Single-point Calibration and “nO” to perform Multi-point Calibration.
6. Press **ENTER** key to confirm after appropriate selection is made and to return to the SETUP main-menu P5.0. Press **CAL/MEAS** key to return to measurement [MEAS] mode.



7.7 P6.0 Selecting the cell constant

This program allows you to select the appropriate cell constant of K = 0.1, 1.0 or 10.0 which is suitable for measurement range being used.
Use a cell of K = 1.0 for mid-range measurements
Use a cell of K = 10 for high range measurements (above 20 mS or 10 ppt).
Use a cell of K = 0.1 for low range measurements (below 20 μS or 10 ppm).
The cell included with your meter has a cell constant of K = 1.0.

1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the main-menu “CELL P6.0” and press **ENTER** key to enter into the selection options for the cell constant.
3. Use **MI/▲** or **MR/▼** key to select the cell constant between K = 1.0, 0.1, or 10.
4. Press **ENTER** key to confirm selection and to return to the main-menu. Press **CAL/MEAS** key to return to measurement [MEAS] mode.



NOTES:
When using a cell of K = 0.1, the lowest measuring range will be 0 to 2.000 μS/cm (0 to 1.000 ppm), the highest measuring range will be 0 to 20.00 mS/cm (0 to 10.00 ppt).

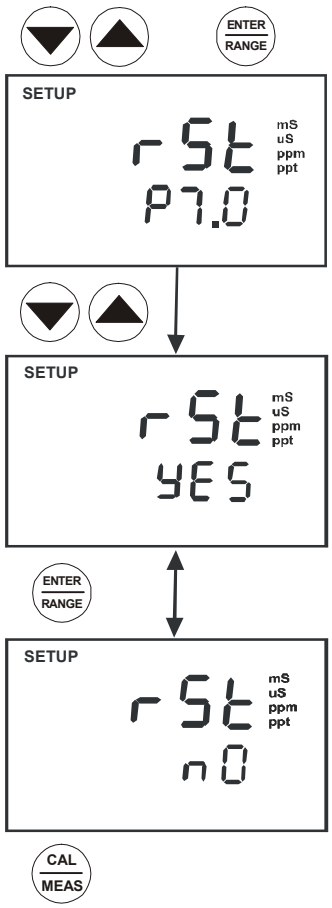
When using a cell of K = 10, the highest measuring range will be 0 to 2000 mS/cm (0 to 1000 ppt) and the lowest measuring range will be 0 to 200.0 μS/cm (0 to 100.0 ppm).

7.8 P7.0: Resetting to factory default settings

Program 7.0 allows you to reset all parameters to factory default settings. This clears all calibration data, memory, and any other setup functions you might have changed. **IMPORTANT:** Once activated the meter's settings and calibration data will be erased and always exercise caution as meter reset is not reversible.

1. From measurement mode, press **SETUP** key to enter into setup [SETUP] mode.
2. Use **MI/▲** or **MR/▼** key to scroll through the main-menu "rSt P7.0" and press **ENTER** key to enter into the selection options for the meter reset.
3. Use **MI/▲** or **MR/▼** key to toggle between NO and YES.
   NO retains current settings; YES resets to factory default settings.
4. Press **ENTER** key to confirm selection and to return to the measurement mode. Otherwise press **CAL/MEAS** key to return to measurement [MEAS] mode without resetting to factory default.

NOTE: See Addendum 4 for a table of factory default settings.



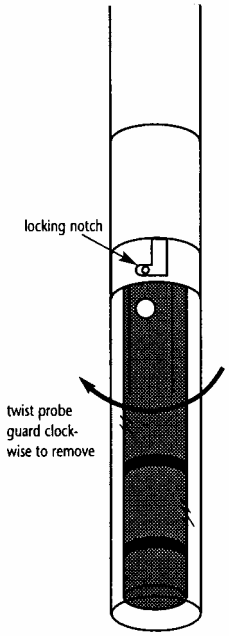
8 PROBE CARE AND MAINTENANCE

Keep the Conductivity/TDS probe clean. Rinse the probe twice, and gently swirl it while you take readings. For best accuracy, soak a dry probe for at least 5 to 10 minutes or longer before calibration. Rinse probe with deionized or tap water before storing. Never scratch the bands with a hard substance. Do not strike the probe against any hard surface.

Do not immerse the probe in oily solutions. Clean the electrode thoroughly by stirring it in a mild detergent bath or isopropyl alcohol. Wipe the probe with a soft tissue paper. Rinse thoroughly in tap water and then in deionized water. Recalibrate the meter after cleaning the probe.

The conductivity probe (Order Part No. EC-CONSEN91W/ 35608-50) which is included with your meter features a removable probe guard to make cleaning easy.

To remove probe guard:
1. Grip yellow probe guard and twist clockwise. The locking notch will release.
2. Slide probe guard off end of probe.



9 TROUBLE SHOOTING GUIDE

Problem	*Possible Cause*	*Solution*
No display	A. AC outlet not switched on.	A. Switch on power supply.
	B. AC adapter socket not inserted properly	B. Re-insert AC adapter socket.
Unstable readings	A. Air bubbles in probe	A. Tap probe to dislodge air bubbles.
	B. Dirty probe	B. Clean probe and recalibrate.
	C. External noise pickup	C. Move away from noise.
	D. Broken probe	D. Replace probe.
“Or” on upper display	A. Probe is shorted.	A. Test probe.
	B. Probe is in too-high solution for measurement range.	B. Use different solution or select different range.
Not able to calibrate	A. Dirty/Oily probe	A. Clean
	B. Incorrect probe cell constant	B. Replace and use correct probe.

10 ERROR MESSAGES

LCD Display	*Indicates*	*Possible Cause*	*Solution*
Err. annunciator	Unrecognised key entry	Incorrect key entry or selection	Release key. Check mode. Select appropriate key.
CAL & Err annunicator blink	Calibration error	Incorrect value input during calibration. Dirty or faulty probe.	Check value. Clean or replace probe.

11 SPECIFICATIONS

SPECIFICATIONS	CON510
Conductivity Range	0 to 20.00, 200.0, 2000 µS/cm; 0 to 20.00, 200.0 mS/cm
TDS Range	0 to 10.00, 100.0, 1000 ppm; 0 to 10.00, 100.0, 100 ppt (max. 200 ppt depending on factor setting)
Resolution	0.05 % Full Scale
Accuracy	±1% Full Scale
Temperature Range	0.0 to 100.0 °C; 32.0 to 212 °F
Temperature Resolution / Accuracy	0.1 ° / ± 0.5°C or ± 0.9°F
Cell Constant	0.1, 1.0, 10.0 (selectable)
Temperature Compensation	Automatic / Manual (from 0 to 100 °C)
Temperature Coefficient	0.0 to 10.0% / °C
Normalization Temperature	15.0 to 30.0 °C (adjustable)
Conductivity to TDS Conversion factor	0.40 to 1.00
Number of calibration points (Automatic)	4; Maximum 1 per range
Number of calibration points (Manual)	5; Maximum 1 per range
Auto-ranging	Yes
Hold Function	Yes
Memory	50 data sets
Averaging/Stability (READY)/Auto-hold	Selectable
Input	6-pin round connector
Display	Custom Dual LCD
Power Requirements	110/220VAC mains, 50/60 Hz
Dimension	230 x 180 x 63 mm (meter only); 395 x 260 x 90 mm (boxed)
Weight	750 gm (unit); 1250 gm (boxed)

Note:
In presence of strong electric field, the accuracy in the worst scenario could be 5%.

12 ACCESSORIES

Replacement Meter and Accessories

Item Description	Eutech Instruments Order Code No.	Oakton Instruments Order Code No.
CON 510 Bench Conductivity/TDS meter complete with conductivity/TDS electrode (EC-CONSEN91W/ 35608-50) and integral electrode stand	EC-CON510/03S	35611-00
2-ring Stainless Steel, Ultem body Conductivity/TDS Electrode with built-in temperature sensor (for ATC), cell constant k = 1.0, dimension: 12x110 mm, 1m cable length	EC-CONSEN91W	35608-50
110/120VAC power adapter, 50/60 Hz	EC-120-ADA	35615-07
220/230VAC power adapter, 50/60 Hz	EC-220-ADA	35615-08

Calibration Solutions

Item Description	Eutech Instruments Order Code No.	Oakton Instruments Order Code No.
1,413 µS KCl Calibration Solution in 480 ml leak-proof bottle (1 pint)	EC-CON-1413BT	00653-16
12.88 mS KCl Calibration Solution in 480 ml leak-proof bottle (1 pint)	EC-CON-1288BT	00606-10
2,764 µS KCl Calibration Solution in 480 ml leak-proof bottle (1 pint)	EC-CON-2764BT	00653-20
447 µS Conductivity Sachets (20 units x 20 ml per box)	EC-CON-447BS	35653-10
1,413 µS Conductivity Sachets (20 units x 20 ml per box)	EC-CON-1413BS	35653-11
2,764 µS Conductivity Sachets (20 units x 20 ml per box)	EC-CON-2764BS	35653-12
15,000 µS Conductivity Sachets (20 units x 20 ml per box)	EC-CON-15000BS	35653-13

Note: Solutions have ±1% accuracy at 25 °C.
Sachets are individually sealed, single use pouch containing 20 ml of fresh, contamination free calibration solution.

13 NOTE: CONDUCTIVITY AND TDS SOLUTIONS HAVE ±1% ACCURACY AT 25°C ADDENDUM 1: CALIBRATION TIPS

You only need **one** calibration for measurement throughout the entire range of the meter. If a range was not calibrated, the meter automatically detects the closest range calibrated and uses that calibration information. However, only the ranges that were calibrated have maximum accuracy.

If you are measuring in ranges near to or greater than 20 mS (10 ppt), or near to or lower than 100 µS (50 ppm), calibrate the meter at least once a week to get specified ±1% F.S. accuracy.
If you are measuring in the mid-ranges and you washed the probe in deionized water and stored it dry, calibrate the meter at least once a month.

Wet the probe for 10 minutes before calibrating or taking readings to saturate the probe surface and minimize drift. If you make measurements at extreme temperatures, calibrate the meter at least once a week.

You should only use the conductivity/TDS probe specified for the meter. This probe has a built-in temperature sensor. If you use a different probe without a temperature sensor, you must measure the solution temperature separately and manually enter the solution temperature (see manual temperature compensation section).

14 ADDENDUM 2: CALCULATING TDS CONVERSION FACTORS

You can calibrate your meter using TDS calibration standard solutions. The calibration standard only needs to give the TDS value at a standard temperature such as 25 °C. To determine the conductivity-to-TDS conversion factor use the following formula:

Factor = Actual TDS ÷ Actual Conductivity @ 25 °C

Definitions:

Actual TDS: Value from the solution bottle label or as a standard you make using high purity water and precisely weighed salts.
Actual Conductivity: Value measured using a properly calibrated Conductivity/Temperature meter.

Both the Actual TDS and the Actual Conductivity values must be in the same magnitude of units. For example, if the TDS value is in ppm the conductivity value must be in µS; if the TDS value is in ppt the conductivity value must be in mS.

Check your factor by multiplying the conductivity reading by the factor in the above formula. The result should be in TDS value.

15 ADDENDUM 3: CALCULATING TEMPERATURE COEFFICIENTS

To determine the temperature coefficient of your sample solution use this formula:

$$tc = 100 \times \frac{C_{T2} - C_{T1}}{C_{T1}(T_2 - 25) - C_{T2}(T_1 - 25)}$$

Where:

tc = Temperature coefficient
25 = 25 °C
$\mathbf{C_{T1}}$ = Conductivity at Temp 1
$\mathbf{C_{T2}}$ = Conductivity at Temp 2
$\mathbf{T_1}$ = Temp 1
$\mathbf{T_2}$ = Temp 2

NOTE: A controlled temperature water bath is ideal for this procedure.

1. Immerse the probe into a sample solution and adjust the temperature coefficient to 0% (that is, no compensation) by performing the following:
   A. From measurement mode, press the **SETUP** key to enter into [SETUP] mode.
   B. Use **MI/▲** or **MR/▼** key until the lower display shows "P5.0".
   C. Press **ENTER** key twice. The lower display reads tCO and the upper display shows the temperature coefficient value.
   D. Press the **MR/▼** key until the upper display shows 0.0.
   E. Press **ENTER** key to confirm the value.
   F. Press **CA/MEAS** key to return to measurement mode.
2. Wait for 5 minutes. Note $\mathbf{T_1}$ and $\mathbf{C_{T1}}$ (conductivity at $\mathbf{T_1}$).
3. Condition the sample solution and probe to a temperature ($\mathbf{T_2}$) that is about 5 °C to 10 °C different from $\mathbf{T_1}$, and note the conductivity reading $\mathbf{C_{T2}}$.

NOTE: Record your results for future reference. Ideally $\mathbf{T_1}$ and $\mathbf{T_2}$ should bracket your measurement temperature, and should not different by more than 5 °C.

4. Calculate the temperature coefficient of your solution according to the formula shown above.
5. Enter the temperature coefficient you calculated into the meter by repeat step A to C. Use **MI/▲** or **MR/▼** key to set the desired value. Press **ENTER** key to confirm selection and then press **CAL/MEAS** key to return to measurement mode.

The calculated temperature coefficient will not be applied to all the meter readings.

16 ADDENDUM 4: METER FACTORY DEFAULT SETTINGS

Type	Parameter	Default	Remarks
P1.1	Viewing calibration solution	—	No calibration data for first range
P1.2		—	No calibration data for second range
P1.3		—	No calibration data for third range
P1.4		—	No calibration data for fourth range
P1.5		—	No calibration data for fifth range
P2.1	Viewing probe data	1.000	No offset for effective cell constant (first range)
P2.2		1.000	No offset for effective cell constant (second range)
P2.3		1.000	No offset for effective cell constant (third range)
P2.4		1.000	No offset for effective cell constant (fourth range)
P2.5		1.000	No offset for effective cell constant (fifth range)
P3.1	Ready indicator / Auto-hold	READY/ON	Ready indicator on; Auto-Hold off
P3.2	Select °C/°F	°C	Degrees Celsius
P3.3	ATC on or off	ATC YES	—
P3.4	TDS factor	0.5	Adjustable from 0.4 to 1.0
P4.1	Temperature coefficient	2.1 % per ° C	Adjustable from 0 to 10%
P4.2	Normalization temperature	25° C	Adjustable from 15 to 30° C
P5.0	Auto or manual calibration	Auto YES	Auto or manual
P5.1	Single or multi-point calibration	Single-point YES	Single or Multi-point calibration
P6.0	Cell constant	1.0	Select from k=0.1, 1.0 or 10
P7.0	Factory default	No	Retains your current settings

17 WARRANTY

The CON 510 bench meter is supplied with a **3-year** warranty from manufacturing defects and electrodes for **6 months** from the date of purchase.

If repair or adjustment is necessary and has not been the result of abuse or misuse within the designated period, please return – freight pre-paid – and correction will be made without charge. Eutech Instruments/ Oakton Instruments will determine if the product problem is due to deviations or customer misuse.

Out of warranty products will be repaired on a charged basis.

Exclusions

The warranty on your instrument 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

18 RETURN OF ITEMS

Authorization must be obtained from our Customer Service Department or authorized distributor before returning items for any reason. A “Return Goods Authorization” (RGA) form is available through our Authorized Distributor. Please include data regarding the reason the items are to be returned. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Eutech Instruments/ Oakton Instruments will not be responsible for damage resulting from careless or insufficient packing. A restocking charge will be made on all unauthorized returns.

NOTE: Eutech Instruments Pte Ltd/ Oakton Instruments reserves the right to make improvements in design, construction, and appearance of products without notice.

For more information on Eutech Instruments/ Oakton Instruments' products, contact your nearest distributor or visit our website listed below:

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