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## Instruction Manual Electrical Conductivity Meter Model 3084



Model 3084 shown with Dip Cell

Ship Date: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Calibrated By: \_\_\_\_\_

## Table of Contents

Title	Page
<u>Section 1</u>	
Shipping Checklist.....	3
Conductivity Cells.....	3
Accessories (optional).....	3
Calibration Solution.....	3
Introduction Model 3084.....	4
Specifications: (Function & Range)	
Conductivity.....	4
Resistivity.....	4
High Purity (HP) Water.....	5
Salinity.....	5
Total Dissolved Solids (TDS).....	5
Temperature.....	5
Self Test.....	5
Parameters:	
Parameter Settings.....	6
Standardize to Cell K.....	6
Temperature Coefficient.....	6
Reference Temperature.....	6
TDS Multiplier.....	6
RS-232 Output.....	6
RS-232 Software Application.....	6
Reset Parameters.....	7
Auto Zero.....	7
<u>Section 2</u>	
Instrument Placement & Operation.....	7
Environmental Limits.....	7
Power Requirements.....	7
Power Entry Module (PEM).....	7
Front Panel Diagram.....	8
Rear Panel Diagram.....	8
RS-232 Output.....	9
RS-232 Manual Transmit.....	9
RS-232 Auto Transmit.....	9
<u>Section 3</u>	
Conductivity Cells.....	10
Standardize (calibrate) to Cell K.....	11
Standardize to Cell K continued.....	12
Making Conductivity Measurements.....	12
Making Resistivity Measurements.....	12
Making HP Water Measurements.....	13
Making Salinity Measurements.....	13
Salinity Reference Solution.....	13
Making TDS Measurements.....	13
Making TDS Measurements continued.....	14
<u>Section 4</u>	
Self Test Function.....	14
Reset Parameters.....	14
Checking Instrument Accuracy.....	15
Calibration Frequency.....	15
Reference Literature.....	15
Trouble Shooting.....	15
Maintenance, Repair and Service.....	15
Technical Support.....	16
<u>Section 5</u>	
Warranty, Exclusions.....	16
Limited Liability.....	16
Design Changes.....	16
Calibration Data Form.....	17

### **Shipping Checklist**

Upon receipt, the instrument should be carefully unpacked and inspected for shipping damage. All material in the container should be checked against the enclosed Packing List. If the instrument has been damaged in transit, retain all packing material and carton. Contact the Shipper and the Carrier to file a damage claim.

### **The Model 3084 includes:**

- (1)..... Model 3084 EC Meter
- (1)..... Power Cord, removable
- (2)..... Fuses, 1/16 amp (for optional 230 V AC operation)
- (1)..... Software Disk - CD Rom (for PC data display & logging)
- (1)..... Cell holder with mounting bracket (pre-attached)
- (1)..... Pint 1,409 micro Siemens Calibration Solution
- (1)..... Instruction Manual

### **Conductivity Cells**

Order Conductivity Cell separately  
800 Series, four wire Cell with embedded thermistors  
Cell (K) constant approximately 10 cm<sup>-1</sup> (except # 829)

<b>Part #</b>	<b>Description</b>
815	Dip Cell (Au) with 48" cable
825	Dip Cell (Pt) with 48" cable
829	Micro Flow Cell S/S with 1 meter cable [K= 100 cm <sup>-1</sup> ]
835	Multi-Purpose Cell (Au) with 48" cable
845	Multi-Purpose Cell (Pt) with 48" cable
855	Multi-Purpose Cell (Au) with 2 meter cable
865	Multi-Purpose Cell (Pt) with 2 meter cable
858	Macro Flow Cell S/S with 2 meter cable

### **Accessories (optional)**

<b>Part #</b>	<b>Description</b>
8060	Function Verifier (use to verify proper operation of ranges)
8061	Function Verifier (Conductivity, Conductance & Temp. only)
8501	Platinizing Station (use to replatinize (Pt) Cells) Note: Station does not include Platinizing Solution.
890	Cell Cup (designed for measuring ½ ml of solution with Dip or Multi-purpose Cells only)

**Calibration Solution** KCl standards available in Pint, Quart or Gallon Sizes:

<b>Value</b>	<b>Unit</b>
74.7	Micro Siemens (µS) @ 25°C
718	Micro Siemens (µS) @ 25°C
1,409	Micro Siemens (µS) @ 25°C
6,660	Micro Siemens (µS) @ 25°C
58,700	Micro Siemens (µS) @ 25°C

## **Introduction Model 3084**

The Model 3084 is a bench top, line powered, microprocessor based, multi-function EC meter designed to precisely determine the conductivity of aqueous solutions. It covers six ranges (auto or manual) with a maximum full scale of 3300 counts. Measurement data is displayed on a 2 line by 20 characters each, backlit dot matrix (LCD) liquid crystal display. All instruments are shipped from the factory for 115 V AC operation. The power entry module (PEM) on the rear panel can be easily changed for 230 V AC operation when necessary.

The meter features 5 keypads: (1) Range, (1) Function, (1) Parameter and (2) Set key-pads. The Range keypad allows the user to choose manual Range A – F or Auto range. The Function key selects Conductivity, Resistivity, Self Test, High Purity (HP) water, Salinity, or Total Dissolved Solids (TDS). The Parameter key enables the setting of scale factors for the function chosen. Parameters include: Standardize (calibrate) to Cell K, Temperature Coefficient, Reference Temperature, TDS multiplier, and general parameters of RS-232 transmit (manual or auto), Reset of parameters and auto zero options. The Set Keys [Λ] up and [V] down allows for Parameter Selection and the [X] key is for saving the selection entered.

The cell drive in the Model 3084 is a low distortion, amplitude stable sine wave. Frequency and amplitude are determined by range.

**Specifications:** Note: Accuracy based on using EC Meter with an Amber Science 800 series Cell.

### **Conductivity Range**

Manual and Auto Range from .001 micro Siemens ( $\mu$ S) to 330.0 milli Siemens (mS)

<b>Range</b>	<b>Full Scale</b>	<b>Resolution</b>	<b>Accuracy <math>\pm 1</math> count</b>	<b>Cell Drive Frequency</b>
A	0 – 3.300 $\mu$ S	.001 micro Siemens	0.3%	35 Hz
B	0 – 33.00 $\mu$ S	.01	0.2%	347 Hz
C	0 – 330.0 $\mu$ S	.1	0.1%	3440 Hz
D	0 – 3.300 mS	.001 milli Siemens	0.1%	10180 Hz
E	0 – 33.00 mS	.01	0.2%	18240 Hz
F	0 – 330.0 mS	.1	0.3%	30940 Hz
AUTO	0 – 330.0 mS	.001 $\mu$ S to .1 mS		

Auto Range    Up Range @ 3300    Down Range @ 300

### **Resistivity Range**

Manual and Auto range from 33.33 M ohms to 3.03 K ohms (as a function of conductivity)

Note: Resistivity is displayed in A, B, C and Auto Range only.

#### **Range**

A	33.33 M ohm to 3.34 M ohm 3.333 M ohm to .303 M ohm
B	3.333 M ohm to .334 M ohm 333.3 K ohm to 30.3 K ohm
C	333.3 K ohm to 33.4 K ohm 33.33 K ohm to 3.03 K ohm
AUTO	33.33 M ohm to 3.03 K ohm

**Specifications continued:**

**High Purity (HP) Water**

High Purity Water (or HP Water) is a function of the Algorithm and Temperature Coefficient. The High Purity Water Function will display conductivity from .055 micro Siemens to 3.300 micro Siemens. The Temperature Coefficient is preset to 2% and is adjustable from 1% to 3% with the Reference Temperature automatically set to 25°C. A gold (Au) plated multi-purpose cell in the flow configuration is recommended to measure high purity water.

HP WATER:

Range:	.055 micro Siemens to 3.300 micro Siemens
Temperature Coefficient:	Adjustable from 1% to 3% (preset at 2%)
Reference Temperature:	Automatically set to 25°C
Accuracy:	0.3% ± 1 count

**Salinity**

Conductivity may also be used to determine the Salinity of seawater in Practical Salinity Units (SU). The Model 3084 displays Salinity from 2 to 42 Salinity Units (SU) at one atmosphere when the solution temperature is between 0 and 30°C.

SALINITY:

Range:	Automatically set to "F"
Reference Temperature:	Automatically set to 15°C
Temperature Range:	0.0 to 30.0°C
Temperature Coefficient:	Function of Algorithm
Accuracy:	0.3% ± 1 count

**Total Dissolved Solids (TDS)**

The Model 3084 automatically calculates the TDS from the conductivity reading by multiplying the preset factor [.625] or by the factor that the user enters using the Parameter and Set keys. Manual Range (A – F) and Auto Range displays TDS in Parts Per Million (PPM) or Parts Per Thousand (PPT) as a function of conductivity and the TDS multiplier. The TDS multiplier is adjustable from 40% to 90%.

**Temperature Range and Accuracy**

Temperature displays next to the measurement on the display.

Range:	0.0°C to 70.0°C
Accuracy:	± .2°C

**Self Test**

The Self Test function allows the user to display the temperature coefficient, reference temperature and the TDS multiplier for approximately 4 seconds then displays the Cell (K) constant set point until the function is changed.

### **Parameter Settings:**

Cell Constant:	Adjustable from 8.00 to 12.00	Preset @ 10.00 cm <sup>-1</sup>
Temperature Coefficient:	Adjustable from .00% to 9.99%	Preset @ 1.91%
Reference Temperature:	Adjustable from 15.0°C to 35.0°C	Preset @ 25.0°C
TDS Multiplier:	Adjustable from .400 to .900	Preset @ .625
RS-232 (output):	Manual or Automatic transmit	User selectable
Reset (parameters):	Yes or No	User selectable
Auto Zero Check	Yes or No	User selectable

### **Standardize (calibrate) to Cell K**

Standardize to Cell K is used to calibrate the instrument with cell to a known value conductivity calibration standard solution. Refer to page 11 & 12 for instructions on calibrating the instrument.

### **Temperature Coefficient**

If the Temperature Coefficient (TC) is adjusted to .00%, the automatic temperature compensation (A.T.C.) is turned off. If unsure of the temperature coefficient, the preset parameter of 1.91% can be used. Refer to ASTM method D1125 for more information on temperature coefficients.

### **Reference Temperature**

The reference temperature is preset at 25.0°C and is adjustable from 15.0 to 35.0°C. To change the reference temperature, press the Parameter key until "Set Ref Temp" appears in display. Use the Set Keys [Λ] up or [V] down to enter the desired Reference Temperature then, when prompted press the Parameter [⌘] key to save the scale factor entered.

### **TDS Multiplier (Scale Factor)**

The Total Dissolved Solids (TDS) in a solution does not change with temperature unlike Conductivity, which is sensitive to temperature. The Model 3084 automatically calculates the TDS from the conductivity reading by applying the appropriate factor that the user sets or by using the preset factor of .625. The TDS multiplier is adjustable from .400 to .900. The instrument displays TDS in Parts per Million (PPM) or Parts per Thousand (PPT).

To change the TDS multiplier, press the Parameter [⌘] key until "set TDS mult" appears in the display. Use the Set Keys [Λ] up or [V] down to enter the desired scale factor and then, when prompted press the Parameter [⌘] key to save the scale factor entered.

### **RS-232 Output (Rear Panel)**

9600 Baud	8 data bits	No parity bit	2 stop bits
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DB-9 pin assignment:

Pin 2	Data out (ASCII)
Pin 3	Command In
Pin 5	Ground Return

### **Software Application for RS-232**

The software program titled EC METER DATA RECORDER included with each instrument is designed to record data from the conductivity meter via a serial connection to a PC (PC, printer and cable not supplied). Refer to page 9 for additional information on RS-232.

### **Reset Parameters**

To reset the parameters press the [X] key six times until Reset Parameters appears in the display then choose Set [^] key and confirm by pressing the [^] key again. The parameters will change to the following:

Reference Temperature:	25°C
Cell Constant:	10.00 cm <sup>-1</sup>
Temperature Coefficient:	1.91%
TDS Multiplier:	0.625

If parameters have been reset, the instrument should be standardized (calibrated) before using. See pg. 11.
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### **Auto Zero**

Auto Zero check is made at Power On or by pressing the Parameter [X] key seven times until Auto Zero Check displays, then press Set [^] for Yes to complete the Auto Zero Check.

### **Instrument Placement and Operation**

Place the instrument on a dry flat surface. Apply the correct power to the instrument. See rear panel of instrument for power requirement and section below for information on the Power Entry Module (PEM). Do not operate the instrument in direct sunlight, extreme temperatures, electromagnetic fields or in explosive or corrosive environments. Do not allow fluids to run into the instrument. Keep connectors dry. If you have any questions regarding the operation of the instrument, please call telephone (541) 345-6877 and request Tech Support. Questions can also be e-mailed to [info@amberscience.com](mailto:info@amberscience.com) and will be answered as quickly as possible.

### **Environmental Limits**

Temperature:	5 to 45°C (41 to 113°F)
Humidity:	10 to 90% (relative, non condensing)

### **Power Requirements**

#### Less than 3.5 watts

105 to 125 V AC      60 Hz 1/8 amp fuse (fast acting)  
210 to 250 V AC      50 Hz 1/16 amp fuse (fast acting)

A removable U.S. standard power cord set with IEC 320 appliance connector is supplied.

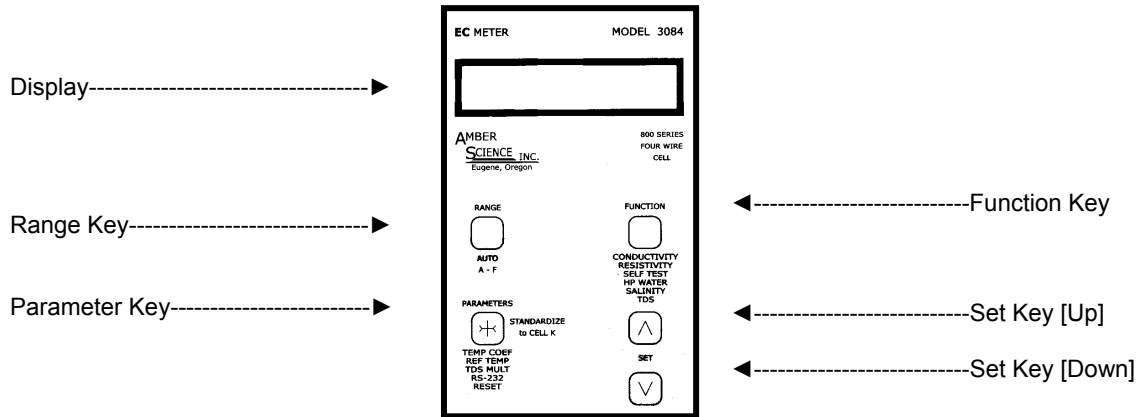
### **Power Entry Module**

International safety recognized Power Entry Module and power transformer are "VDE", "CSA" and "UL" approved. The PEM can be changed for either 115 V AC or 230 VAC operation. Model 3084 is factory shipped for 115 V AC operation.

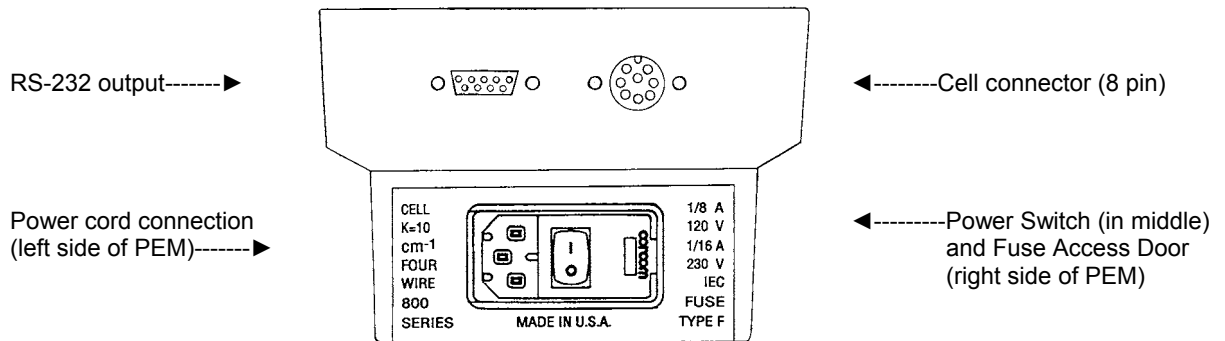
#### If it is necessary to change instrument to operate on 230 V AC operation:

*Disconnect* power cord from outlet and instrument. Use a small flat blade screwdriver to open the cover on the power entry module (Fuse Access Panel) located on the rear panel of the instrument. Use the screwdriver to carefully remove the fuse holder. Replace the (2) 1/8 amp fuses with (2) IEC Type "F" 1/16 amp fuses (supplied). Rotate 180° and insert the fuse holder into the power entry module (PEM) and with the Access Panel Door closed, 230 V AC will appear in window.

**Front Panel Diagram**



**Rear Panel Diagram**



Note: Drawings not to scale.

Caution: Do not allow fluids to come in contact with the connectors on the backside of instrument. Keep connections clean and dry. This EC Meter is designed for indoor use only.

Caution: Incorrect measurement data may be displayed if using a Conductivity Cell other than the 800 series designed to be used with this instrument. In order for correct measurement data to be displayed, a cell with a specific type of thermistor and cell constant must be used. If a different type or make of Conductivity Cell is to be used with the Model 3084, contact Technical Support for compatibility information.



## **RS-232 Output**

The RS-232 feature can be used two ways:

1. Output data directly to a serial printer.
2. Output data directly to a PC with Data Recorder Software.

Software Application is not necessary when transmitting data to only a serial printer (option #1). Software Application (CD Rom included) is required to transmit data to a PC (option #2).

Data can be transmitted two ways:

- Auto transmit mode.
- Manual transmit mode (on command).

Two additional ways when used with a PC:

- Remote Command from a PC keyboard.
- Time interval command from PC.

Auto Transmit Note: Auto transmit mode will transmit only when data changes by two counts or more. Manual transmit can be accomplished in Auto transmit mode by pressing the [Λ] key.

Remote Command Note: The PC will send a print command two ways. At a time selected interval OR by pressing the CR [Enter] key.

The RS-232 output can transmit data automatically or manually to a PC or serial printer (PC, printer and cable not supplied). For transmitting data to a PC, a software application program (CD Rom) is supplied which can be loaded on a PC 286 with MS-DOS 5.0 or better.

Step 1: Connect a DB-9 pin cable (not supplied) to connector on rear of instrument. Connect the other end of the cable to either a serial printer or PC. If connection is to be made to a serial printer, then proceed to Step 2. If connection is made to a PC, proceed to Step 3.

Step 2: Decide on method of transmitting data: A) AUTO or B) MANUAL and follow steps listed.

Step 3: Install software program to computer. Once software is loaded on the PC and the COM port selected, review HELP screen and then follow steps listed:

### **RS-232 Manual Transmit**

Press the Parameter [X] key five times until RS-232 MAN. Transmit appears in the display.

Press [Λ] Set key for Yes.

Next prompt: MAN. Transmit [Λ] or off [V]. For manual transmit press the [Λ] key.

This will transmit data to your serial printer or PC display.

Press the [Λ] key each time to command a manual transmit.

Hold down the [Λ] key to continually transmit data.

To Exit Manual (MAN.) transmit, press the [V] key for off.

Next display will prompt user for Auto Transmit

Press [Λ] key for YES or the [V] key for NO.

User can also press the Parameter [X] key anytime to return to parameter prompts

OR continue to press the Parameter [X] key to return to measurement data mode.

### **RS-232 Auto Transmit**

Press the Parameter [X] key five times until RS-232 MAN. Transmit appears in the display.

Press the [V] key to decline manual (MAN.) transmit

Display will prompt user for RS-232 AUTO TRANSMIT: Press [Λ] key for yes.

Auto transmit will appear in display.

Measurement data should now transmit to the PC Display or serial printer.

Anytime measurement data changes by two counts or more, it will automatically transmit.

To Exit Auto Transmit Press the [V] key for off.

User can also press the Parameter [X] key anytime to return to parameter prompts

OR continue to press the Parameter [X] key to return to measurement data mode.

## **Conductivity Cells**

There are several types of conductivity cells available. Choose one that is suitable for your application.

### **Gold (Au) Cells**

The (Au) cell is recommended for measurement of low conductivity or high purity solutions. Use the (Au) cell when measuring conductivity in Ranges A – D. For measuring High Purity Water choose the (Au) Multi-purpose Cell and use it in the Flow configuration to avoid exposing the high purity water to atmospheric gases, which will contaminate your sample. The (Au) cell has much less tendency to carry over solution from one measurement to the next and the (Au) cell requires less maintenance than the (Pt) cell since no re-platinizing is required.

### **Platinum (Pt) Cells**

The (Pt) cells are needed for measuring solutions with high conductivity such as Sea Water. The (Pt) cells will require re-platinizing on occasion. Anytime a (Pt) cell is cleaned it should be re-platinized. This can be accomplished with the Model 8501 Platinizing Station and with (ASTM D-1125) Platinizing Solution. The cell may also be returned to Amber Science for cleaning and re-platinizing for a nominal charge.

### **Dip Cells**

Dip cells are used to dip into a test tube or beaker. They require a minimum sample of 1 ml in the smallest diameter test tube the cell will fit into (i.e. 12 mm I.D. test tube). Dip cells are available with (Au) or (Pt) plates, with each cell having a cell constant of approximately  $10 \text{ cm}^{-1}$ . An instruction sheet is included with each dip cell outlining care, cleaning and use of the cell.

### **Multi-Purpose Cells**

The multi-purpose cell can be used three ways – dip cell, flow cell or pipette cell. The multi-purpose cell is also available with (Au) or (Pt) plates with each cell having a cell constant of approximately  $10 \text{ cm}^{-1}$ . Choose the (Au) multi-purpose cell for measuring high purity water and use it in the flow configuration for most accurate results. Each multi-purpose cell includes an instruction sheet with directions on care, cleaning and use of the cell.

### **Micro Flow Cell**

The micro flow cell with S/S plates is designed for measuring high conductivity solutions. When using the P/N 829 micro flow cell (which has a cell constant of  $100 \text{ cm}^{-1}$ ) all displayed readings must be multiplied by 10. Use only non-metallic tubing or fittings for connections on the stainless steel tubing. The maximum temperature is  $50^\circ\text{C}$  and the maximum pressure is 50 P.S.I. Mount the micro flow cell so that the solution flows upward. This will help clear any air bubbles. A separate instruction sheet is included with the micro flow cell that offers tips for mounting and using the micro flow cell.

### **Macro Flow Cell**

The macro flow cell is a large diameter flow cell constructed of durable epoxy tubing with S/S plates. The P/N 858 macro flow cell is capable of flowing up to four gallons of solution per minute at sixty PSI. Like the Dip and Multi-purpose Cell, the Macro Flow Cell has an approximate Cell constant of  $10 \text{ cm}^{-1}$ . A separate instruction sheet is included with the macro flow cell that offers tips for mounting and using the macro flow cell.

### **Care for Cells**

It is important to remember that the conductivity cell is a delicate sensor and should be cared for properly. After use, rinse the cell in DI water or a solvent appropriate to remove any residue, which may have contaminated the plates of the Cell. Carefully shake off excess solution and dry with a clean lab wipe. Conductivity cells should be stored dry when not in use. Periodically examine the conductivity cell and replace when necessary.

## **Standardize (calibrate) to Cell Constant (K)**

### Suggested Materials needed:

1. Calibration Solution of known value (close to range of expected measurement).
2. Conductivity Cell (Clean and Dry). Connect at rear panel of instrument.
3. Conductivity Meter (Power On). Instrument will perform an Auto Zero Check.
4. Test Tubes or Beakers for Calibration Solution (Clean and Dry) x 3.
5. One clean Beaker containing de-ionized (DI) water [for rinsing Cell].
6. Calibration Data Form (Copy last page in this manual) to record calibration.
7. Writing instrument (Pen).

Caution: Select a Conductivity Calibration Solution of a known value above 50 micro Siemens. Values less than 50 micro Siemens are not always reliable and can become easily contaminated.

### There are two methods that can be used to Standardize (Calibrate) the instrument:

1. "Three Test Tube Method"
2. "One Beaker Method"

Note: The Three Test Tube Method is the preferred choice, but if time is limited the One Beaker Method may suffice. Make sure the calibration solution is not expired and has been stored properly if not new. Do not fill test tube or beaker more than half way, this will prevent spill out when cell is inserted. Discard Calibration Solution after use. Do not re-use calibration solution.

### Three Test Tube Method:

- A. Line up three **clean** test tubes and fill Test Tube # 1 with calibration solution.
- B. Swirl solution around in test tube then pour into Test Tube # 2.
- C. Swirl solution around in Test Tube # 2 and Pour into Test Tube # 3. Now only Test Tube # 3 contains calibration solution.
- D. Pour calibration solution from bottle into Test Tube # 1, swirl around and pour into Test Tube # 2. Now Test Tubes # 2 and # 3 both contain calibration solution.
- E. Pour calibration solution from bottle into Test Tube # 1. Now all three Test Tubes contain calibration solution and Test Tube # 1 is the least contaminated and # 3 is the most contaminated.
- F. When calibrating – Start with Test Tube # 3 and work down to Test Tube # 1.

### Standardize / Calibrate Procedure:

1. If practical hold the calibration solution at 25°C.
2. Dip Cell into a beaker containing only DI water and soak cell for one to two minutes. This helps to wet the plates of the cell. Remove cell from DI water and gently shake off excess water.
3. Next dip cell into the 3<sup>rd</sup> Test Tube (most contaminated) of calibration solution. Gently move up and down a few times to dislodge any air bubbles that may have become trapped. Remove Cell, shake off excess solution and place into Test Tube # 2.
4. Repeat the process above by moving cell up and down a few times and again remove cell from beaker and shake off excess solution. Place Cell into beaker #1 (least contaminated calibration solution).
5. Once Cell has been placed into beaker number # 1 you are ready to standardize. Follow step # 6.
6. Press Parameter [X] key one time "Calibrate" will appear in display. Use the Set key and press up [^] or down [v] to make the display read the value of the solution. Wait a few seconds and the instrument will prompt the user to save the setting. Press the Parameter [X] key to save. Fill in the information requested on the Calibration Data Form and note the Cell constant (K). The instrument is now standardized (calibrated).

## **Standardize (calibrate) to Cell Constant (K) continued**

### **One Beaker Method:**

1. Fill one **clean** beaker with a known value of calibration solution. Make sure the calibration solution is not expired and has been stored properly if not new. Do not fill beaker more than half way. This will prevent spilling over when cell is inserted.
2. If practical hold the calibration solution at 25°C.
3. Dip Cell into beaker containing only DI water and soak cell for one to two minutes. This helps to wet the plates of the cell. Remove Cell from DI water and gently shake off excess water.
4. Next dip cell into the beaker that contains calibration solution of known value. Gently move up and down a few times to dislodge any air bubbles that may have become trapped. Wait for reading to become stable then press the Parameter [K] key one time "Calibrate" will appear in display. Use the Set key and press up [Λ] or down [V] to make the display read the value of the solution. Wait a few seconds and the instrument will prompt the user to save the setting. Press the Parameter [K] key to save. Fill in the information requested on the Calibration Data Form and note the Cell constant (K). The instrument is now standardized (calibrated).

## **Making Conductivity Measurements**

Once the instrument has been standardized by one of the two methods previously listed, the user will now be ready to make determinations of unknown conductivity values.

Select RANGE either Auto or appropriate manual range.

Set REFERENCE TEMPERATURE if different than 25°C.

Set TEMPERATURE COEFFICIENT if different than 1.91% (if unsure, leave at 1.91%).

(Note: To turn A.T.C. off, adjust TEMP COEF to .00%)

Rinse Conductivity Cell in de-ionized (DI) water and gently shake off excess water.

Place the cell in a sample of the unknown solution to be measured.

Move the cell in an up and down motion a few times (agitate cell) to dislodge any air bubbles.

Wait until reading on display becomes stable then record measurement.

## **Making Resistivity Measurements**

Standardize (calibrate) the instrument with the Cell using a Conductivity Calibration Solution.

Refer to Standardize to Cell K section, page 11.

To make resistivity measurements, select Resistivity from the Function keypad. The display will read 'out of range' until the cell is placed in solution.

Resistivity measurements will display in A, B,C, or Auto Range only. If the meter is in the manual C Range and the display reads 'out of range' press the Range key until you go to B Range. If the display still reads 'out of range' press Range key until A or Auto Range is reached. Record Resistivity measurement once it becomes stable.

Note: If display continues to read 'out of range' in all Resistivity Ranges, press the Function key five times to reach the Conductivity Function and take the measurement in Conductivity instead.

Cell K Note: The Cell (K) constant cannot be changed when in the Resistivity Function.

### **Making HP Water Measurements**

A Multi-purpose (Au) Cell installed in the flow configuration should be used when measuring high purity water (HP Water) in order to avoid contamination from atmospheric gases, dust and other airborne contaminants. Prior to measuring high purity water, standardize (calibrate) the instrument using a calibration solution between 50 and 100 micro Siemens. Use a fresh calibration solution and a very clean (Au) Cell. Follow the instructions on Page 11 to Standardize to Cell K (calibrate). After standardizing (calibrating), press the Function Keypad until the HP Water mode is displayed. Connect tubing to the Conductivity Cell and begin flowing high purity water thru the Cell. If instrument displays 'out of range' then the solution being measured is greater than 3.3 micro Siemens. Change the instrument to the Conductivity Function by pressing the Function keypad three times until the Conductivity mode is displayed. Take measurement in Conductivity instead then, determine why the high purity water sample is exceeding the HP Water Range.

Cell K Note: The Cell (K) constant cannot be changed when in the HP Water Function.

### **Making Salinity Measurements**

Standardize (calibrate) the instrument and a (Pt) Cell in SALINITY Function using a KCl solution having a Practical Salinity value of 35.0 at 15°C. Follow the instructions on page 11 to Standardize to Cell K (calibrate) EXCEPT hold solution at 15°C instead of 25°C. When in SALINITY function, Reference Temperature and Temperature Coefficient cannot be set. The Range is automatically set to "F" Range and the maximum solution temperature is 30°C.

### **Salinity Reference Solution**

<u>Reference solution @ 15°C</u>	<u>Grams of KCl per 1 kilogram of solution</u>
35.0 Practical Salinity Units (SU)	32.4356

For additional information on Salinity, refer to Reference Book titled:  
*Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> edition.*  
ISBN 0-87553-235-7 Page 2-48 "2520 SALINITY"  
2520 A. Introduction and 2520 B. Electrical Conductivity Method.

### **Making TDS Measurements**

When making Total Dissolved Solids (TDS) determinations, the preset multiplier of .625 may be used or- the user may set a different TDS multiplier (between .400 and .900). Before setting the TDS multiplier the EC meter should be standardized to the Cell K with a conductivity standard calibration solution (see page 11).

To determine a new TDS multiplier, use a TDS standard solution of choice:

Continued on next page.

## **Making TDS Measurements continued**

### **Suggested Materials needed:**

- A. Calibration Solution of known TDS value (fresh and not expired).
- B. Conductivity Cell (Clean and Dry). Connect to rear panel of instrument.
- C. Conductivity Meter (Power On). Instrument will perform an Auto Zero Check.
- D. One Beaker for Calibration Solution (Clean and Dry).
- E. One clean Beaker containing DI Water (for rinsing Cell).
- F. Writing instrument (Pen) and Paper to record data if desired.

1. Select AUTO Range or appropriate manual Range (A-F).
2. Press Function keypad to change to TDS mode if not already in the TDS mode.
3. Press Parameter keypad to change to TDS MULT.
4. Dip Conductivity Cell in beaker of TDS standard solution.
5. Press the up [^] or down [V] key to set the value of the solution in PPM or PPT.
6. The display will prompt user to 'Save' by pressing the Parameter [K] key.
7. Make Note of the new TDS multiplier as displayed.
8. Rinse Cell in DI water and gently shake off excess solution.
9. Proceed to measure unknown solution.

TDS will display in PPM (Parts per Million) or PPT (Parts per Thousand).

Note: When in TDS Function, Cell Constant parameter cannot be changed.

## **Self Test Function**

The Self Test Function can be used to verify the following settings:

TC	Temperature Coefficient
RT	Reference Temperature
TDS MULT	TDS multiplier
CELL K	Cell constant

Note: These settings are subject to change when the instrument is re-standardized (re-calibrated) or when Reset Parameters is chosen.

## **Reset Parameters**

To reset parameters back to the instrument's preset parameters, press the Parameter [K] key until Reset Parameters appears in display and then choose yes by pressing the up [^] key. The instrument will prompt the user to confirm change by pressing the [^] key again. The parameters will change to the following:

Reference Temperature:	25°C
Cell Constant:	10.00 cm <sup>-1</sup>
Temperature Coefficient:	1.91%
TDS Multiplier:	0.625

If parameters have been reset, the instrument should be standardized (calibrated) before using. See pg. 11.
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### **Checking Instrument**

Model 8060 & 8061 Function Verifiers are available as an optional accessory. The Model 8060 and 8061 are portable units designed to be used with the Model 3082 series, 3084, 4081 or the Model 4083 EC Meters. The Function Verifier is used in place of the conductivity cell to simulate conductivity ranges. Model 8060 is designed to verify proper operation of the Conductivity, Resistivity, TDS, Salinity and Temperature functions of the EC Meter. Model 8061 is used to verify proper operation of the Conductivity, Conductance and Temperature functions only.

### **Calibration Frequency**

The Model 3084 should be standardized (calibrated) on a regular basis with a known value Conductivity Standard Calibration Solution. A record of the calibration data should be maintained (see page 17). Only a qualified electronic technician should perform internal calibration of the instrument. Internal calibration will be necessary if any repairs are made to the instrument.

### **Reference Literature**

Books:

Annual Book of ASTM Standards 2000, Volume 11.01 Water (I), Revised Annually, ISBN 0-8031-2814-2, ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428 Tel (610) 832-5000 Fax (610) 832-9555

Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Edition, ISBN 0-87553-235-7, Publication office, American Public Health Association, 1015 Fifteenth Street NW, Washington DC 20005-2605

### **Trouble Shooting**

*To contact Technical Support, see page 16.*

#### **No Display:**

1. Check to make sure the instrument's power cord is plugged into the PEM and the outlet,
2. Check to make sure that the fuses located in the Power Entry Module are good.
3. Check to make sure the instrument's power input requirement is correct with the outlet's power output.

#### **Unstable Display:**

1. Check to make sure cell is immersed in an adequate amount of solution.
2. Determine if the solution to be measured is subject to contamination causing the conductivity to be rising.
3. Inspect the Conductivity Cell. If cell is dirty, clean the cell according to instructions.

### **Maintenance and Repair Service**

The Model 3084 requires no periodic maintenance other than Standardizing (calibration) on a routine basis. Keep the connectors on the rear panel dry. Do *not* allow fluids to run into the instrument's enclosure. Should the instrument be in need of repair, contact Amber Science by Telephone (541) 345-6877, Fax (541) 345-6277 or E-mail - [info@amberscience.com](mailto:info@amberscience.com), to request a Return Authorization number and instructions for returning the instrument for repair service.

### **Technical Support**

Amber Science Technical Support department can be reached by calling telephone number (541) 345-6877 during normal business hours (7 am – 4 pm Pacific Time Zone, Monday thru Friday, excluding Holidays) or questions may be e-mailed to: info@amberscience.com. Please provide the Model number, Serial number and Part number of the Conductivity Cell being used when contacting the Technical Support department with any questions.

### **Warranty**

Amber Science, Inc. warrants this product to be free from defects in materials and workmanship for a period of one year from date shipped. Warranty will be allowed whenever possible, however all warranty claims will be reviewed by Amber Science.

### **Exclusions**

This warranty shall not apply to fuses, disposable batteries, (rechargeable type batteries, pH electrodes, temperature probes and conductivity cells are warranted for 90 days), or any product or part which have been subject to misuse, neglect, tampering, accident or abnormal conditions of operation.

### **Limited Liability**

Amber Science, Inc., is pleased to offer suggestions on the use of this product; however, we have no control over its use or intended use. No representation or warranty, whether of merchantability, fitness for any particular purpose is made beyond the repair, replacement or refund of purchase price at the sole discretion of Amber Science, Inc. In no event shall Amber Science, Inc. be liable for special or consequential damages for injury to person or property, which may result from the use of this product. Users shall determine the suitability of this product for its intended applications before using and users shall assume all risk and liability whatsoever in connection therewith regardless of our suggestions as to applications or constructions.

### **Return of Items**

Authorizations must be obtained from the Amber Science Customer Service Department [Call telephone (541) 345-6877 or e-mail: info@amberscience.com] before returning any item for any reason. When applying for authorization, please include any data regarding the reason the item is being returned. All items must be carefully packed as to prevent shipping damage and insured against loss and shipping damage. Amber Science, Inc. will not be responsible for any loss or damage that may occur during transit. Items being returned without prior authorization may not be accepted.

### **Design Changes**

Amber Science, Inc. reserves the right to make changes in specifications, designs, construction and appearance of our products without notice.



