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**Operation Manual
Multi-Function Conductivity Meter
Model 3082 Series**



Date: _____
Serial No.: _____
Dwg. Number: _____
Inspected & Calibrated By: _____

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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, Inc.

Exclusions From Warranty

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

Authorization must be obtained from the Amber Science Customer Service Department [Call (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 shipping damage. Items being returned without prior authorization may not be accepted.

Note

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

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 materials and carton. Contact the Shipper and Carrier to file a damage claim.

MODEL 3082 includes the following:

- 1- Model 3082 Conductivity Meter
- 1- U.S. Standard Power Cord (removable)
- 2- Fuses (1/16 amp) for optional 230 VAC operation
- 1- Operation Manual

MODEL 3082-S includes the following:

- 1- Model 3082-S Conductivity Meter with RS-232 & Analog Recorder output
- 1- U.S. Standard Power Cord (removable)
- 2- Fuses (1/16 amp) for optional 230 VAC operation
- 1- Analog Recorder Output Connector
- 1- CD Rom Software Application (for PC data display and logging)
- 1- Operation Manual

Optional CE Version

CE versions are for exporting to the European Union.

CE versions are marked with the CE mark, see page 19 for Declaration of Conformity.

Cells and Accessories

Order Cells separately

800 Series, four wire cell with embedded thermistors

Au Cells are best suited for high purity solutions.

Multi-purpose cells are combination dip, flow and pipette.

Part #	Type	Plate	Cell constant	Cable
815	Dip Cell	Au	10 cm ⁻¹	48"
825	Dip Cell	Pt	10 cm ⁻¹	48"
829	Micro Flow Cell	S/S	100 cm ⁻¹	48"
835	Multi-Purpose Cell	Au	10 cm ⁻¹	48"
845	Multi-Purpose Cell	Pt	10 cm ⁻¹	48"
855	Multi-Purpose Cell	Au	10 cm ⁻¹	2 meter
865	Multi-Purpose Cell	Pt	10 cm ⁻¹	2 meter
858	Macro Flow Cell	S/S	10 cm ⁻¹	2 meter

P/N 8501 Platinizing Station (for re-platinizing (Pt) cells, does not include Platinizing Solution)

P/N 8060 Function Verifier (used to verify proper operation of ranges)

Calibration Standard Reference Solutions Available in Pint, Quart or Gallon Sizes:

Value	Unit of measurement	Temperature
74.7	μS /cm (micro-Siemens/cm)	@ 25°C
718	μS /cm (micro-Siemens/cm)	@ 25°C
1,409	μS /cm (micro-Siemens/cm)	@ 25°C
6,660	μS /cm (micro-Siemens/cm)	@ 25°C
58,700	μS /cm (micro-Siemens/cm)	@ 25°C

Introduction

The Model 3082 Series is a bench top microprocessor based multi-function meter designed for the measurement of Conductivity and Temperature of aqueous solutions. This conductivity meter has six ranges, each from 0 - 3300 counts and is displayed on a large sixteen character dot matrix liquid crystal display. All instruments are shipped from the factory for 115 VAC line operation. The power entry module (PEM) on the rear panel can be easily changed for 230 VAC line operation when necessary.

This meter features four front panel controls, one for manual range selection or auto ranging. One switch (knob) for function selection of Conductivity, Resistivity, TDS, Self Test or Standby. One for parameter selection of Reference Temperature, Temperature Coefficient, Cell Constant and TDS multiplier. The last front panel control is for the display and setting of parameters, (as well as transmit on command for Model 3082-S only).

The Model 3082-S has two additional functions, one for H.P. (high purity) Water and one for measuring Salinity. The Model 3082-S also includes an RS-232 output for a serial printer or PC data display, logging, printing, and an analog output of conductivity and temperature for strip chart recording.

Conductivity

The basic unit of resistance is the ohm, conductance is the reciprocal of resistance. The basic unit of measurement for conductance is the mho (international system of units for mho is Siemens [S]).

In the measurement of aqueous solutions, conductivity is based on the reciprocal of the resistance of a 1-cm cube of material measured between opposite faces. This is a cell constant of 1. Conductivity cells usually consist of two metallic plates of a determined size mounted in a defined area. The cell constant "K" is the length "L" (or distance between the plates) of the conducting path in centimeters divided by the effective cross sectional area "A" of the conducting path in square centimeters ($K = L / A$). The resistance of the conductor is inversely proportional to its cross sectional area and directly proportional to its length.

The Model 3082 Series is designed to use a cell with a constant of 10 cm^{-1} . The instrument's cell constant parameter setting is adjustable from 8.00 to 12.00.

Conduction in aqueous solutions is by ionic movement and increases with temperature. This change is expressed in percent per degree C relative to a reference temperature normally 25.0°C and is commonly called the Slope.

The Model 3082 Series has Automatic Temperature Compensation (ATC) for slope correction with reference temperature parameter adjustable from 12 to 28°C , temperature coefficient parameter adjustable from 0 to 12.5% per degree C and displays conductivity in micro Siemens (μS) or milli Siemens (mS). Note: Siemens is equivalent to mho.

Resistivity

The Model 3082 Series displays resistivity as a reciprocal of the conductivity. Resistivity's basic unit of measurement is the ohm (Ω). The Model 3082 Series displays resistivity in $\text{M}\Omega$ and $\text{K}\Omega$.

HP Water (High Purity Water (Model 3082-S only))

The High Purity Water Function (or H.P. Water) will display conductivity from .055 micro Siemens (μS) to 3.300 micro Siemens. The Temperature Coefficient is preset to 2% and adjustable from 1% to 3%.

Total Dissolved Solids

The Total Dissolved Solids (TDS) in a solution does not change with temperature. Conductivity is sensitive to temperature. The Model 3082 Series automatically calculates the TDS from the conductivity reading by applying the appropriate factor that the user sets or by using the preset [.625] parameter. The Model 3082 Series TDS multiplier is adjustable from 40% to 125% and displays TDS in PPM (Parts Per Million) or PPT (Parts Per Thousand).

Salinity (Model 3082-S only)

Conductivity may also be used to determine the Salinity of seawater in Practical Salinity Units. The Model 3082-S displays Salinity from 2 to 42 SU (Salinity Units) at one atmosphere when the solution temperature is between 0 and 30°C.

Temperature

Temperature of the solution is displayed in degree (°C) Celsius. Each conductivity cell has embedded thermistors for temperature determination. The temperature range is from 0°C to 70°C and will display to the right of the conductivity or resistivity (salinity and H.P. water, Model 3082-S only) measurement.

Operation

The next section in the manual contains operating information and should be read before installing and using the instrument. If you have questions, please contact the Amber Science Technical Support Department by calling (541) 345-6877 or E-mail - info@amberscience.com.

Placement of Instrument

Place the instrument on a dry flat surface. The instrument may also be secured on or under a shelf using the two pre drilled holes in the tilt stand / handle. Apply the correct power to the instrument. See rear panel of instrument for power requirement and page 9 for more information regarding the power entry module. Do not operate the instrument in direct sunlight, extreme temperatures, electro magnetic fields or in explosive or corrosive atmospheres. Do not allow fluids to run into the instrument.

Specifications

CONDUCTIVITY RANGE:

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

<u>RANGE</u>	<u>FULL SCALE</u>	<u>RESOLUTION</u>	<u>ACCURACY</u>
A	0 - 3.300 μ S	.001 μ S	0.3% \pm 1 digit
B	0 - 33.00	.01	0.2% \pm 1 digit
C	0 - 330.0	.1	0.1% \pm 1 digit
D	0 - 3.300 mS	.001 mS	0.1% \pm 1 digit
E	0 - 33.00	.01	0.2% \pm 1 digit
F	0 - 330.0	.1	0.3% \pm 1 digit
AUTO	0 - 330.0 mS	.001 μ S to .1 mS	

Auto Range

Up Range @ 3300

Down Range @ 300

Specifications continued

CELL DRIVE

Low distortion sine wave

<u>RANGE</u>	<u>FREQUENCY</u>	<u>AMPLITUDE</u>	<u>CURRENT @ MID RANGE</u>
A	33 Hz	1.6 V RMS	.264 μ A
B	130 Hz	1.6 V RMS	2.64 μ A
C	510 Hz	1.6 V RMS	26.4 μ A
D	2.2 K Hz	.16 V RMS	26.4 μ A
E	8.8 K Hz	.16 V RMS	.264 mA
F	31 K Hz	.16 V RMS	2.64 mA

RESISTIVITY RANGE

The Manual and Auto range is from 33.33 Meg ohms to 3.03 K ohms (as a function of conductivity).

Note: Resistivity is displayed in A, B & C Range only. Ohms symbol = Ω

RANGE

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

TDS (Total Dissolved Solids) RANGE

Manual and Auto Range displays TDS in Parts Per Million (PPM) or Parts Per Thousand (PPT) as a function of conductivity and the TDS multiplier.

SALINITY RANGE (MODEL 3082-S ONLY)

2.0 to 42.0 SU (Practical Salinity Units)

Range	Automatically set to F range
Reference Temperature	Automatically set to 15°C
Temperature Range	0.0 to 30.0°C
Temperature Coefficient	function of algorithm
Accuracy	0.3% \pm 1 digit

Specifications continued

H.P. WATER (MODEL 3082-S ONLY)

Range .055 micro Siemens to 3.300 micro Siemens (μS)
Temperature Coefficient adjustable from 1% to 3% (preset at 2%)

TEMPERATURE RANGE

0.0°C to 70.0°C
Note: temperature displays with conductivity & resistivity and H.P. Water & Salinity on Model 3082-S only.

TEMPERATURE ACCURACY

Plus or minus .2°C

PARAMETERS

Cell Constant adjustable from 8.00 to 12.00 (displayed in Self Test)
Reference Temperature adjustable from 12.0°C to 28.0°C
Temperature Coefficient adjustable from .00 to 12.50%
TDS Multiplier adjustable from .400 to 1.250

Note: STANDBY function will retain the last parameter settings and may be used in place of power off to blank the display, yet retain all parameter set points.

PRESET PARAMETERS

POWER ON	Parameters reset to:
Reference Temperature	25.0°C
Cell Constant	10.00 cm^{-1}
Temperature Coefficient	1.91%
TDS Multiplier	0.625

AUTO ZERO

Auto zero check is made at POWER ON, when switching from SELF TEST and STAND BY.

DISPLAY

Dot Matrix LCD, .317" character height, 16 characters

ENVIRONMENTAL LIMITS

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

Specifications continued

POWER REQUIREMENTS

Less than 3.5 watts

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

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

Power Entry Module (PEM)

The International safety recognized Power Entry Module (PEM) and transformer can be changed for either 115 VAC or 230 VAC operation.

The instrument is shipped from the factory for 115 VAC operation; unless specified for export orders.

If it is necessary to change to 230 VAC operation:

Disconnect power cord from outlet *and* instrument. Use a small flat blade screw driver 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 VAC should appear in window.

RS-232 Output (Model 3082-S only)

RS-232 output can transmit automatically or on command. Automatic mode transmits measurement data, command mode transmits measurement data or parameter settings. RS-232 output is disabled in SELF TEST, STANDBY and during auto zero check. Software program (CD Rom) is supplied with the Model 3082-S only.

Output data with meter connected directly to a serial printer or a PC serial port. Data is in ASCII format, 9600 Baud, 8 data bits, no parity bit and 2 stop bits.

DB-9 pin assignment: Pin 2 Data Out, Pin 5 Ground Return, Pin 3 Command In.

Note: See page 10 for RS-232 transmit command information

Serial printer or PC options:

The RS-232 output can be connected directly to a serial printer to print measurement data, OR the CD Rom can be installed on a PC (personal computer) to download measurement data to a hard drive. Once the data is downloaded to a computer hard drive, the file can be saved and exported to a spreadsheet program if the user desires to plot or graph the data points.

Software Program / CD Rom (Model 3082-S only)

This program is designed to monitor and record data from your conductivity meter via a serial connection. Install the EC Meter Data Recorder program (from the CD Rom) onto your computer:

A command list is displayed at the bottom of the screen, which allows the user to setup the com port and activate command functions. With exception of the ESC key, all commands are activated by first pressing and holding down the ALT key and then pressing a letter key.

<Esc=Quit>: Ends the program and returns to DOS.

<Alt-S=Select COM port>: Allows the selection of COM port 1 or 2. (F1) Settings: Baud rate: = 9600, Data Bits = 8, Stop Bits =2, No Parity.

<Alt-F=Select Format>: One line or three line data display (choose one line if intention is to export to a spreadsheet application).

<Alt-P=Printer on/off>: Enables the printer port to output data as displayed on the screen. Printer on/off is displayed on the status line.

<Alt-R=Record to file>: Will prompt you to enter a file name, choose to start a new file or append to a file, and then will begin recording the same data that is received by the com port into that file. Record file on/off is displayed on the status line.

<Alt-Q=Quit Recording to File>: Will quit recording and close recorded file.

<Alt-T=Type text>: Will copy typed text to screen for printing or recording. Note: Set Record to File and Print Data on/off FIRST.

<Alt-C=Print configuration>: Will print the current settings of Function, Cell Const, Ref. Temp, Temp Coef, TDS Mult, and Auto Transmit on/off.

<Alt-I=Activate Print Interval>: Forces print at time interval from 1 - 480 minutes.

<Enter or CR=Force Print>: Transmits print command to EC Meter. EC Meter transmit is enabled, Parameter set is disabled.

<Esc=Exit Help>

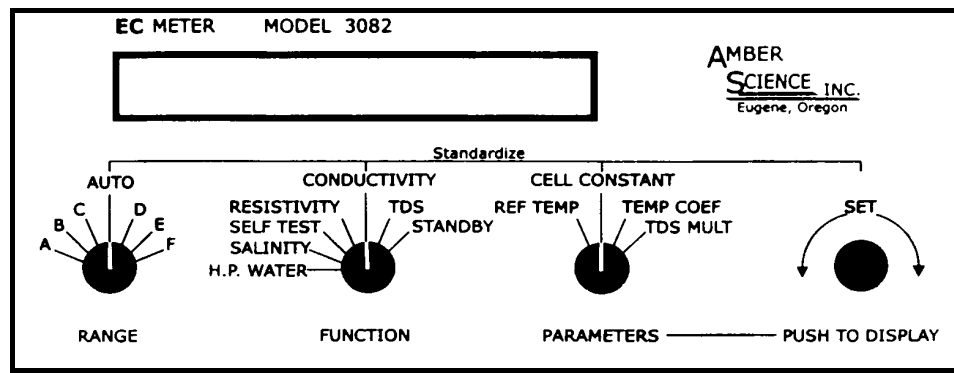
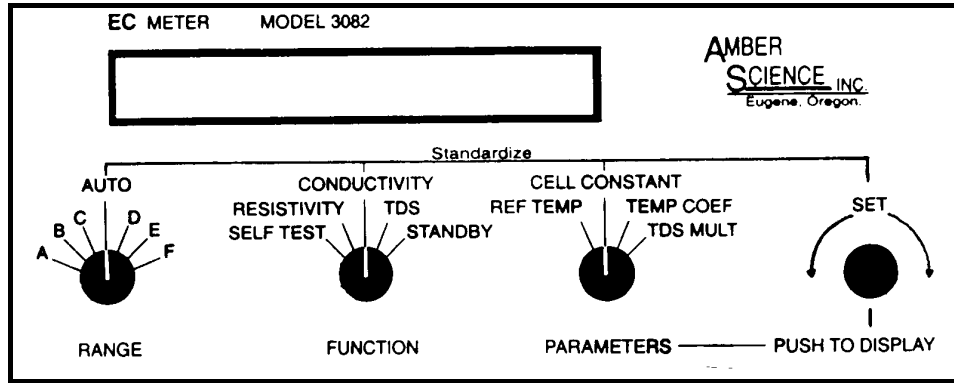
Analog Recorder Output (Model 3082-S only) REAR PANEL

Note: Data from the recorder output is not temperature compensated.
Conductance [C to GND] approx. 0 to 3.3 V for 0 to 3,300 display counts
Temperature [T to GND] approx. 0 to 2.8 V for 0 to 70.0 display counts

Each Conductance range will have a small offset voltage. Zero offset is a function of the Range. When connecting to the analog recorder output from Ground (GND) and Conductance (C) there will be a direct current output with a small voltage offset that will vary slightly from one instrument to another. A 1,000 digits on the display will have approximately 1 volt at the recorder output. Two thousand digits displayed will be 2 volts and 3,000 digits displayed will be 3 volts. When connecting from Ground to Temperature (T) there will be a direct current output of 0 volts at 0 degree C with a small voltage offset that will also vary. This will increase approximately .2 volts for every 5 degrees C. When 25 degrees C is reached, the output will be approximately 1 volt. At 50 degrees C the output will be approximately 2 volts and at 70 degrees C the output will be approximately 2.8 volts. This will enable a recorder or volt meter to be used to record data (conductance) from the conductivity instrument.

Front Panel Controls

Top Drawing: Model 3082 – Front Panel Controls



Bottom Drawing: Model 3082-S – Front Panel Controls

Note: Drawings not to scale.

RANGE

The RANGE switch is seven positions for selecting A through F range with Auto range in the center. When auto ranging, the display will read RANGE CHANGE and the STANDBY L.E.D. will blink momentarily.

FUNCTION

The 3082 FUNCTION switch is five positions for selecting Self Test, Resistivity, Conductivity, TDS and Standby. The 3082-S has two additional positions, one for H.P. (High Purity) Water and one for Salinity. The *Self Test* mode replaces the conductivity cell with a precision resistor of a value that will display the cell constant parameter setting ± 1 digit. *Standby* function will retain the last parameter settings and may be used in place of power off to blank the display, yet retain all parameter set points.

PARAMETERS

The PARAMETER switch is four positions for selecting Reference Temperature, Cell Constant, Temperature Coefficient and the TDS Multiplier.

Controls continued

PUSH TO DISPLAY / SET

The PUSH TO DISPLAY knob has two functions. The first function will display the parameter setting (Ref. Temp., Cell Constant, (cell constant displays momentarily) Temp. Coef., or TDS Multiplier) when pushed. The second function the PUSH TO DISPLAY knob has, will allow the parameters to be set. Once the knob is pushed and the L.E.D. lights (2 second delay), the user can adjust the parameter settings. **Note:** When in TDS function, CELL CONSTANT parameter cannot be changed and when in RESISTIVITY function, no parameters can be changed. When in SALINITY function (Model 3082-S only) REFERENCE TEMPERATURE and TEMPERATURE COEFFICIENT parameters cannot be changed.

STANDBY function will retain the last parameter settings and may be used in place of power off to blank the display, yet retain your parameter set points.

When power to the instrument is turned off and turned back on, the parameters will return to the preset parameter mode (POWER ON RESET).

PUSH TO DISPLAY / SET (MODEL 3082-S ONLY)

The PUSH TO DISPLAY knob has the same two functions listed above as well as the RS-232 transmit functions.

RS-232 TRANSMIT

A toggle switch on the rear panel of the instrument enables auto transmit and push to transmit, at the same time disabling the Push To Set.

TOGGLE SWITCH

Toggle switch ON, RS-232 will transmit automatically with a two digit change of the function displayed.

Toggle switch ON, PUSH TO DISPLAY will transmit RS-232.

Toggle switch ON, Parameters will transmit by PUSH TO DISPLAY when in SELF TEST function.

Toggle switch ON, Parameter set is disabled.

Toggle switch OFF, RS-232 transmit is disabled and parameter set is enabled.

NOTE: See page 9 for RS-232 OUTPUT specifications.

Conductivity Cells

There are several types of conductivity cells available. The (Au) cell is recommended for measurements below 3.3 milli Siemens. The (Au) multi-purpose cell in the flow configuration is recommended for High Purity Water (grab samples of High Purity Water are subject to contamination from the vessel and atmospheric gases). The (Au) cell has much less tendency to carry over solution from one measurement to the next. The (Au) cells require less maintenance than the (Pt) cells but the linearity of the (Au) cell is not guaranteed above 3.3 milli Siemens.

The (Pt) cells are needed for measuring solutions with conductivity readings above 3.3 milli Siemens. The (Pt) cells will require re-platinizing on occasion. Anytime a (Pt) cell is cleaned it should be re-platinized. This can be accomplished by sending the cell back to the manufacturer or the user can re-platinize the cell with the Model 8501 Platinizing Station and with Platinizing Solution (ASTM D1125).

It is important to remember that the conductivity cell is delicate and should be cared for properly. Before using your cell, it should be rinsed in tap or deionized (DI) water if available. Carefully, shake off excess and dry with a clean lab wipe. If possible, rinse cell in a sample of the solution to be measured before the actual measurement is made. Once the cell is placed in the sample for measurement, it is helpful to agitate the cell by moving up and down a few times. This will aid in dislodging any air bubbles. Allow sufficient time for temperature equilibration before recording measurement. When finished using the cell, rinse in an appropriate solvent and dry. The cell should be stored dry.

Cleaning Cells

To clean a conductivity cell, wet a cotton tipped applicator with a solvent appropriate to remove any residue that has contaminated the plates of the cell. Choose a solvent (ie: Isopropanol 99%) that will not damage the epoxy tube the cell is constructed of (do not use Aqua Regia to clean cell or remove old platinum). Insert the wetted swab through the cell. You may need to do this several times until the swab shows no residue. Then clean with a mild detergent and warm DI water. Remember, if it is a (Pt) cell, it will need to be re-platinized after it has been cleaned.

NOTE: A clean dry cell will display no more than 1 digit on any range after auto zero check.

Proper Use of Cells

The conductivity **dip cell** should be immersed in the solution a minimum of 1.5 inches for proper measurement.

Multi-Purpose cells are combination dip, flow and pipette cells. The outside diameter (OD) of the cell is 7/16" or .4375". To connect flexible tubing to the cell for an in-line flow, use 7/16 inside diameter (ID) tubing. Using the (Au) cell in a flow configuration is recommended for measurement of high purity water.

For convenience, the instrument features a built-in cell holder. An o-ring on the conductivity cell allows the cell to be vertically positioned in the cell holder. The cell holder feature is designed for the Dip and Multi-Purpose Cells only.

Conductivity Micro Flow Cell

When using the Part Number 829 Micro Flow Cell, which has a cell constant of 100 cm^{-1} all displayed readings must be multiplied by a factor of 10. Use only non-metallic tubing or fittings for connections on the stainless steel tubing. Refer to the instruction sheet included with the Micro Flow Cell for additional information.

To Read Cell Constant

METHOD 1: Turn Function to SELF TEST and read cell constant on display.

METHOD 2: Turn Parameter to CELL CONSTANT, PUSH TO DISPLAY knob will display cell constant (momentarily).

Cell Constant Adjust

To observe and adjust the cell constant if necessary:

Turn Function to SELF TEST

Turn Parameter to CELL CONSTANT

Push, PUSH TO DISPLAY knob until L.E.D. lights (2 second delay)

By turning PUSH TO DISPLAY knob, the user can adjust the cell constant between 8.00 and 12.00.

Calibration

STANDARDIZE / CALIBRATE INSTRUMENT AND CELL:

STEP 1:

Select a Conductivity Standard Solution of a known value above 50 micro Siemens (μS).

(Values less than 50 μS are not always reliable).

Rinse three (clean) test tubes with a small amount of the standard solution then discard the rinse solution.

Fill the three test tubes with the standard solution to a depth of 30 mm. Hold the three test tubes at 25°C if practical. Soak your cell in deionized (DI) water for 5 minutes (this allows the plates of the cell to be wetted).

(For this example we will use a standard reference of 1409 $\mu\text{S}/\text{cm}$ Calibration Standard Solution)

STEP 2:

Plug Conductivity Cell into meter.

Turn Power >On= (power cord connected to meter and AC outlet).

POWER ON RESET will display (all parameters are reset to preset value).

Turn Range to AUTO

Turn Function to CONDUCTIVITY

Turn Parameter to CELL CONSTANT

Dip cell into 1st test tube sample of standard solution. Agitate cell with a gentle up and down motion and wait for temperature to equilibrate. Remove cell and shake off excess.

Dip cell into 2nd test tube for 10 to 15 seconds, remove and carefully shake off excess.

Dip cell into 3rd test tube and set cell constant by pushing PUSH TO DISPLAY knob (cell constant will display momentarily) when L.E.D. light comes on, turn knob to make display read the value of the calibration standard solution (example: 1409 μS).

The instrument with cell has now been standardized (calibrated) to a known value of solution (see page 18). Use STANDBY mode to retain parameter settings. NOTE: If power to the instrument is removed, parameter settings will return to preset values when instrument power is returned.

Making Conductivity Measurements

Standardize / calibrate the instrument and cell using a conductivity standard (refer to page 14).

Select AUTO RANGE or appropriate manual RANGE, set REFERENCE TEMPERATURE if different than 25°C. Set TEMPERATURE COEFFICIENT if different than 1.91%. Rinse cell in DI water, then rinse cell in a portion of unknown sample if possible. Wait for temperature equilibration of cell to sample. Immerse cell in sample (minimum of 30 mm) agitate cell with gentle up and down motion. When temperature equilibrates, take reading.

Temperature in Degree C (Celsius) will display to the right of the conductivity data.

NOTE: Range changing will be indicated by the STANDBY L.E.D. blinking.

Making Resistivity Measurements

Standardize / calibrate the instrument and cell using a conductivity standard (refer to page 14).

Select AUTO RANGE or the appropriate manual RANGE (A, B or C).

Follow directions under "Making Conductivity Measurements". Turn Function to RESISTIVITY.

When in RESISTIVITY function, parameters cannot be changed.

Temperature in Degree C will display to the right of resistivity data.

MΩ = Meg ohms (1 meg ohm = one million)
KΩ = Kilo ohms (1 k ohm = one thousand)

Making TDS Measurements

Standardize / calibrate the instrument and cell using a conductivity standard (refer to page 14).

When in TDS Function, CELL CONSTANT parameter cannot be changed.

To set TDS multiplier using a TDS standard of your choice:

Follow the three test tube method as described in Standardize / calibrate instrument and cell (refer to page 14).

Select AUTO RANGE or appropriate manual RANGE (A - F).
Turn Function to TDS.
Turn Parameter to TDS MULT

Set the TDS multiplier by pushing the PUSH TO DISPLAY knob (TDS mult will display momentarily).
When L.E.D. light comes on, turn the knob to make display read the same as the TDS standard being used.

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

Making High Purity Water Measurements (Model 3082-S only)

A multi-purpose (Au) cell in the flow configuration should be used when measuring high purity 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 standard reference solution of between 50 and 100 micro Siemens. Use a fresh calibration solution and a very clean (Au) Cell. Follow the calibration instructions (on page 14). After calibration is complete, turn function knob counter clock wise (Full C.C.W.) to the H.P. Water Function, connect plumbing (tubing, etc.) to the conductivity cell and flow solution through the cell. If instrument displays "over range", the conductivity of the solution being measured is higher than 3.300 micro Siemens. Turn function knob to Conductivity and Range knob to Auto. The Conductivity of the solution will now be displayed.

Making Salinity Measurements (Model 3082-S only)

Standardize / calibrate the instrument and (Pt) cell in SALINITY function using a K C I solution having a Practical Salinity value of 35.0 at 15°C. Follow the three test tube method as described in Standardize / calibrate instrument and cell (refer to page 14) except hold at 15°C.

When in SALINITY Function, REFERENCE TEMPERATURE and TEMPERATURE COEFFICIENT cannot be set. The RANGE is automatically set to F and the maximum solution temperature is 30°C.

Checking Instrument Accuracy By Resistor Substitution

Model 8060 Function Verifier is available as an optional accessory. The Model 8060 is a portable unit designed to be used with the Model 3082 series, Model 3084, 4081 or 4083 conductivity instruments. The Model 8060 is used in place of the conductivity cell to simulate conductivity ranges. The Function Verifier is designed to verify proper operation of the conductivity, resistivity, TDS, temperature and salinity functions of the conductivity instrument.

Conductivity Reference Solutions (Also see page 4)

Reference Solution @ 25°C	Approximate Normality of Solution	Grams of K C I weighed in Air per 1 liter of Solution @ 20°C
1408.8 µS	.01	.7440
12856 µS	.1	7.4365
111342 µS	1	74.2460

Salinity Reference Solution

Reference solution @ 15°C	Grams of K C I per 1 kilogram of solution
35.0 Practical Salinity Units	32.4356

Reference Literature

Standard Methods for the Examination of Water and Wastewater, 20th edition.
Annual Book of ASTM Standards 2000, Volume 11.01, Water (I).

ISBN 0-87553-235-7
ISBN 0-8031-2814-2

Maintenance

The Model 3082 series EC Meters requires no general maintenance except routine re-calibration (also known as Standardize). Occasional cleaning may be done with a damp cloth and a mild soap detergent. Do not allow fluids to run into the instrument. Conductivity cells should be cleaned and inspected periodically and replaced when necessary.

Repair and Service

Authorization must be obtained from the Customer Service Department before returning items for any reason. Should the instrument be in need of repair and has not been subject to abuse or misuse, please return freight prepaid and adjustments will be made without charge under warranty. Out of warranty items will be repaired on a charge basis with customer approval. The Customer Service Department will issue an R.A.# and instructions for returning the instrument. Please include any data in the form of a note or letter regarding the reason the item is being returned. See below for information on how to contact the manufacturer - AMBER SCIENCE, Inc.

Note: If the instrument requires repair, internal re-calibration may be required. Internal re-calibration should be performed only by qualified electronic technicians.

Technical Support

If you have any questions regarding the operation of this instrument, please call AMBER SCIENCE and request the Technical Support Department.

Telephone (541) 345-6877
Facsimile (541) 345-6277

Address: 277 Blair Blvd., Eugene, Oregon 97402-4147 USA

E-Mail: info@amberscience.com
Internet: <http://www.amberscience.com>
<http://www.conductivity-meters.com>

Calibration Data Record

DECLARATION OF CONFORMITY

Manufacturer's Name: AMBER SCIENCE, INC.
Manufacturer's Address: 277 BLAIR BLVD.
EUGENE, OR 97402-4147 USA

Declares, that the product

Product Name: EC (electrical conductivity) METER
Model: 3082 & 3082-S
Options: ALL

Conforms to the following:

Application of Council Directives
93/68/EEC
89/336/EEC

Conformity Declared to Standards
EN 61010-1
EN 50081-1
EN 50082-1

and carries the "CE" mark accordingly.

December 1997


David Alsop, Production Manager
Amber Science, Inc., Eugene, OR USA

WARNING: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

This product has special EMI immunity characteristics and requires a high-frequency impedance in the form of a **Ferrite Shield** (FairRite P/N 0444164951 or equivalent) to be placed around the **conductivity cell cable** at the cell connector to attenuate undesired fields. A Ferrite Shield was supplied with the instrument.

Safety protection may be impaired if instrument is not used as instructed.

The following symbols are located on the instrument rear panel (CE Version Only):



Electrical Safety Hazard



General Warning



CE Mark

Ferrite Shield A ferrite shield is included with each Model 3082 series that is CE marked for export to the EU. The ferrite shield is to be placed around the cable of the conductivity cell near the connector.