WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of five (5) years from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover probes, batteries, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will break the waterproof seal and void the warranty. To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.
8281 E. Evans Rd., Suite #103
Scottsdale, AZ 85260
(480) 948-4448

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at www.sperwarranty.com within 10 days of purchase.

AquaShock® Bluetooth® Conductivity / TDS Meter Kit
850034K
Instruction Manual

Revised 02/19/2019
AquaShock® Bluetooth® Conductivity / TDS Meter Kit
850034K
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EPA Equivalency Method: 120.1

FCC ID: 2AK5U-1300

This device and enclosed comply with part 15 of the FCC Rules. Operation is subject to the two following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Sper Scientific
8281 E. Evans Rd., Suite #103, Scottsdale, AZ 85260
Tel: (480) 948-4448  Fax: (480) 967-8736
Web: www.sperscientific.com

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Mode</th>
<th>Temperature</th>
<th>Conductivity</th>
<th>TDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>32 to 212°F</td>
<td>0 to 19.99 μS</td>
<td>0.0 to 9.99 ppm</td>
</tr>
<tr>
<td></td>
<td>0 to 100°C</td>
<td>0 to 199.9 μS</td>
<td>10.0 to 99.9 ppm</td>
</tr>
<tr>
<td></td>
<td>0 to 1999 μS</td>
<td>0 to 1999 mS</td>
<td>100 to 999 ppm</td>
</tr>
<tr>
<td></td>
<td>0 to 19.99 mS</td>
<td>0 to 19.99 ppm</td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1°F / °C</td>
<td>0.01 μS</td>
<td>0.01 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1 μS</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 μS</td>
<td>1 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.01 mS</td>
<td>0.01 ppt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1 mS</td>
<td>0.1 ppt</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.9°F / ±0.5°C</td>
<td>±1% full scale</td>
<td>±1% full scale</td>
</tr>
<tr>
<td>Input</td>
<td>Temperature Probe Connector</td>
<td>BNC Connector</td>
<td></td>
</tr>
<tr>
<td>Calibrate</td>
<td>5 Points (1 point in each of the 5 ranges)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>99 points per scale (Conductivity, TDS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Compensation</td>
<td>Automatic (ATC) from 32 to 212°F (0 to 100°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>32 to 122°F (0 to 50°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery Specifications</td>
<td>Lithium 1450 mAh (DC7.4V) battery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery Life</td>
<td>&gt; 80 Hours</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Select “Export” to save the data to a file.
5. Enter a filename, using the file type extension .xlsx. The file will be saved as an Excel spreadsheet.
INTRODUCTION
The Sper Scientific AquaShock® Bluetooth® Conductivity / TDS Meter is the most waterproof, rugged and reliable Conductivity / TDS meter on the market. It is fully waterproof, including probe connections, when used with the AquaShock® probe. As with all AquaShock® meters, the Conductivity TDS Meter is fully shockproof, floats, and features a double injection molded case with an integral protective soft grip outer layer, high end antishock, LED backlight display, and is powered by the latest environmentally friendly, long lasting, rechargeable Lithium Ion battery. The meter is highly accurate and stable, very intuitive and includes all of the functions required by most users. Use the meter’s Bluetooth® chip to wirelessly stream readings in real time, and log them on your computer, from up to 100-ft away. Sper Scientific guarantees you will not find any meters more rugged and reliable than AquaShock®.

Datalogging
1. Select “Start” to display real-time data from the meter.
2. To download data, press “Stop” to disable the real-time display.
3. Select “Load Data” to download the data in the meter’s memory.
13. The Datalogger workstation appears.

FEATURES
• Floats
• Shockproof
• IP67 Waterproof
• Protective soft grip outer layer
• Rechargeable Lithium Ion battery
• Also accepts standard BNC probes
  *(Waterproof seal is compromised with non-AquaShock® probes)*
• Multi-line display LCD screen
• Reads Conductivity and TDS
• Auto Ranging
• Automatic Temperature Compensation
• Celsius or Fahrenheit selectable
• 99 data points memory for each measurement type
• Calibration point review
• Internal clock and calendar
• Maximum, minimum and average
• Hold function
• Low battery indicator
• Backlight
• Send data wirelessly

MATERIALS SUPPLIED
• Meter
• Conductivity / TDS / ATC Probe
• Waterproof Probe Input Covers
• 1 Lithium 1450mAh 7.4 V Battery
• USB Adapter for Bluetooth®
• DC Power Adapter
• Instruction Manual
• Hard Carrying Case

OPTIONAL ACCESSORIES
• 840093  Field Tripod
• 850034P  Replacement AquaShock® Conductivity / TDS Probe
### LCD DISPLAY

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ready</td>
<td>Displayed when measuring results are stable</td>
</tr>
<tr>
<td>2 Scale Unit</td>
<td>Current measurement scale unit</td>
</tr>
<tr>
<td>3 Measuring Results</td>
<td>Current measurement value</td>
</tr>
<tr>
<td>4 ATC</td>
<td>Automatic Temperature Compensation indicator</td>
</tr>
<tr>
<td>5 Temperature Scale</td>
<td>Current temperature measurement unit</td>
</tr>
<tr>
<td>6 Temperature Value</td>
<td>Current temperature measurement value</td>
</tr>
<tr>
<td>7 Battery Icon</td>
<td>Current battery power level</td>
</tr>
<tr>
<td>8 Bluetooth® Icon</td>
<td>Indicates Bluetooth® feature is on</td>
</tr>
</tbody>
</table>


10. Click to select your AquaShock® meter from the list of devices.
11. Select “OK” to confirm. The computer will connect to the device.
12. Enter the pass code “1234” when prompted by the computer.
Note...
Different computer systems may require slightly different steps than those below.


---

**LCD DISPLAY**

**Probe Life Icon:**
- More than 90% life remaining
- More than 85–90% life remaining
- More than 80–85% life remaining
- Less than 80% life remaining

**Battery Power Icon:**
- Battery voltage is more than 7.7V shows full.
- Battery voltage between 7.2V and 7.7V shows 2 cells.
- Battery voltage between 6.6V and 7.2V shows 1 cell.
- Battery voltage less than 6.6V shows 0 cells and flashes.

Display showing battery charging from less than 6.6V to fully charged.

**POWER SUPPLY**

This meter is powered by one rechargeable Lithium 7.4V (1450 mAh) battery. The DC power adapter can be used to charge the battery even when the meter is turned off. This meter includes a charge protection function and will automatically stop charging when the battery is full. A complete re-charge takes approximately 8 hours.
FCC ID: 2AK5U-1300

This device and enclosed comply with part 15 of the FCC Rules. Operation is subject to the two following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**BLUETOOTH DATALOGGING**

**Bluetooth Device Setup**

1. If your computer does not have Bluetooth® plug the USB adapter into your computer’s USB port. Port 2.0 is recommended.
2. Press **Power** to turn the meter **on**.
3. Press **Setup** to enter Setup Mode.
4. Press ↑or ↓to select the Bluetooth Setting screen.
5. Press **Setup**, “YES or “NO” displays.
6. Press ↑or ↓to select “Yes.”
7. Press **Setup** to activate Bluetooth®. The meter returns to Normal Mode and the Bluetooth® icon displays on the LCD.

**Note…**
The Bluetooth® feature on the meter turns **off** when the meter is turned off. To turn the Bluetooth® feature on, this procedure will need to be performed again before transferring data.

<table>
<thead>
<tr>
<th>Name</th>
<th>1st Function</th>
<th>2nd Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Power / Backlight / Low Battery</td>
<td>Power on / off</td>
<td>Backlight on / off</td>
</tr>
<tr>
<td>2 Setup</td>
<td>Setting parameters</td>
<td>Confirm setting</td>
</tr>
<tr>
<td>3 MI↑</td>
<td>Store data</td>
<td>↑</td>
</tr>
<tr>
<td>4 MR↓</td>
<td>Recall data</td>
<td>↓</td>
</tr>
<tr>
<td>5 Max / Min / Ave</td>
<td>Max/Min/Ave</td>
<td></td>
</tr>
<tr>
<td>6 Range</td>
<td>Switch measuring scale</td>
<td></td>
</tr>
<tr>
<td>7 Hold / Exit</td>
<td>Hold</td>
<td>Exit</td>
</tr>
<tr>
<td>8 CAL</td>
<td>Calibration</td>
<td></td>
</tr>
</tbody>
</table>
SOFTWARE INSTALLATION

Note...
Different computer systems may require slightly different installation steps than those below.

1. Insert the CD into your computer’s CD drive.
2. If Windows does not run the Setup.exe automatically, open the Start Menu and select “Computer.”
3. Double click on the correct CD drive.
4. Select “Yes” to allow the program Setup.exe to make changes to your computer.
5. Select “Next” to start the installation.
6. Select the folder to install the files and click “Next.”
7. Select the location for the program shortcuts and click “Next.”
8. Select “Next” to begin the configuration.

SETUP MODE

The Setup Mode allows you to customize the following meter preferences and defaults:

- Temperature Scale
- Clock Setting
- Restore Factory Defaults
- Set ATC Temperature Coefficient
- Set TDS Factor

1. Press POWER to turn the meter on before performing any setup function.

Temperature Units

1. Press SETUP to enter the Setup Mode.
2. Press SETUP to enter the Set Temperature screen.
3. The unit °C or °F will flash on the LCD.
4. Press ↑ or ↓ to select the °C or °F temperature unit.
5. Press SETUP to save and return to Normal Mode.
6. Press EXIT to return to Normal Mode without saving the selection.

Note...
When the temperature reading is outside the range, the display will show “HHH” (high) or “LLL” (low).

Real Time Clock

1. Press SETUP to enter the Setup Mode.
2. Press ↑ or ↓ to select the Set Clock screen (see Fig. A).
3. Press SETUP to set the year (see Fig. B). The value will flash on the LCD.
4. Press ↑ to increase the value by 1. Hold down ↑ to continually increase the value.
   Press ↓ to decrease the value by 1. Hold down ↓ to continually decrease the value.
Press **SETUP** to save and the meter automatically moves to the month setting (see Fig. C.).

5. Repeat step 4 to adjust the month, day, hour, and minute (see Fig. D, E & F).

6. Press **EXIT** to return to Normal Mode without saving.

**Note...**
This procedure adjusts the meter’s internal clock which is a 24 hour format only. The internal clock will function when the meter is turned off if the battery is installed.
Maximum, Minimum and Average

1. Press **RANGE** to select the scale.

2. Press **MAX / MIN / AVE**, the maximum recorded value will appear on the LCD (see Fig. A and Fig. B). The date and time are on cyclical display. If no measurements have been taken, “- - - -” is displayed (see Fig. C).

3. Press **MAX / MIN / AVE**, the minimum recorded value will appear on the LCD (see Fig. D and Fig. E). The date and time are on cyclical display. If no measurements have been taken, “- - - -” is displayed (see Fig. F).

4. Press **MAX / MIN / AVE**, the average recorded value will appear on the LCD. The date and time are on cyclical display. If no measurements have been taken, “- - - -” is displayed.

5. Press **MAX / MIN / AVE** to return to the regular mode.

Restore Factory Settings

1. Press **SETUP** to enter the Setup Mode.

2. Press ↑ or ↓ to select the Restore Factory Settings screen (see Fig. A).

3. Press **SETUP** to confirm selection. “NO” will flash on the LCD (see Fig. B).

4. Press ↑ or ↓ to select “YES” or “NO” (see Fig. C).

5. When “YES” is displayed, press **SETUP** to confirm and all parameters will restore to factory settings (except the clock) and the meter returns to Normal Mode.

6. Press **EXIT** to return to Normal Mode without saving.

Factory Defaults

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Parameter Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>2011-1-1 0:0</td>
</tr>
<tr>
<td>CAL Standard</td>
<td></td>
</tr>
<tr>
<td>TDS Factor</td>
<td>0.50</td>
</tr>
<tr>
<td>Offset</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>77.0°F (25.0°C)</td>
</tr>
<tr>
<td>Temperature Unit</td>
<td>°F</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>2.1%</td>
</tr>
<tr>
<td>Saved Point</td>
<td></td>
</tr>
</tbody>
</table>
Set ATC Temperature Coefficient

1. Press SETUP to enter the Setup Mode.
2. Press ↑ or ↓ to select the Set Temperature Coefficient screen (See Fig. A.).
3. Press SETUP to enter the Set Temperature Coefficient screen. The current value setting will flash (see Fig. B).
4. Press ↑ once to increase the value. Hold down ↑ to continually increase the value. Press ↓ once to decrease the value. Hold down ↓ to continually decrease the value. The range may be set from 0.0% to 10.0%.
5. Press SETUP to save and return to Normal Mode.
6. Press EXIT to return to Normal Mode without saving change.

To calculate the temperature compensation coefficient:

1. Set temperature coefficient to 0%.
2. Put conductivity probe into the standard calibration solution.
3. After 5 minutes record the first temperature reading and the corresponding conductivity value.
4. Heat or cool the solution. After a change of 5°C to 10°C record the second temperature reading along with the corresponding conductivity value.
5. Calculate temperature coefficient by formula below:

\[
TC = 100 \times \frac{CT2 - CT1}{CT1(T2 - 25) - CT2(T1 - 25)}
\]

TC = temperature coefficient
CT1 = conductivity value when temperature is 1
CT2 = conductivity value when temperature is 2
T1 = temperature value 1
T2 = temperature value 2
25 = 25°C

Clear Memory

1. Press MI and MR simultaneously for 2 seconds to clear all memory (see Fig. A). The meter will return to Normal mode.

Hold

1. Press HOLD to hold the value (see Fig. A).
2. Press HOLD to release the hold value.

Note...

When in Hold Mode, all other functions will be disabled except turning the meter off, backlight function, saving and exiting Hold Mode.
Recall Memory

1. Press **RANGE** to select the scale for recall.
2. Press **MR** to enter the Recall mode and view the last saved reading (see Fig. A and Fig. B). The date and time are on cyclical display. If there is no saved data “- - - -” is displayed (see Fig. C).
3. Press ↑ or ↓ to view the saved data points. Press ↑ to view the data points increasing by 1. Press ↓ to view the data points decreasing by 1.
4. Press **EXIT** to exit the Recall Mode and return to Normal Mode.

Set TDS Factor

1. Press **SETUP** to enter the Set up mode.
2. Press ↑ or ↓ to select the Set TDS Factor screen (see Fig. A).
3. Press **SETUP** to enter the mode, the current value setting will flash (see Fig. B).
4. Press ↑ once to increase the value. Hold down ↑ to continually increase the value.
   Press ↓ once to decrease the value. Hold down ↓ to continually decrease the value.
   The range may be set from 0.40 to 1.00.
5. Press **SETUP** once to confirm the TDS factor value and return to Normal Mode.
6. Press **EXIT** once to return to Normal Mode without saving changes.

<table>
<thead>
<tr>
<th>Cond. value at 25°C</th>
<th>TDS KCl</th>
<th>TDS NaCl</th>
<th>TDS 442</th>
<th>TDS Your Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>ppm</td>
<td>Factor</td>
<td>ppm</td>
<td>Factor</td>
<td>ppm</td>
</tr>
<tr>
<td>84 μS</td>
<td>40.38</td>
<td>0.5048</td>
<td>38.04</td>
<td>0.4755</td>
</tr>
<tr>
<td>447 μS</td>
<td>225.6</td>
<td>0.5047</td>
<td>215.5</td>
<td>0.4822</td>
</tr>
<tr>
<td>1413 μS</td>
<td>744.7</td>
<td>0.5270</td>
<td>702.1</td>
<td>0.4969</td>
</tr>
<tr>
<td>1500 μS</td>
<td>757.1</td>
<td>0.5047</td>
<td>737.1</td>
<td>0.4914</td>
</tr>
<tr>
<td>8974 μS</td>
<td>5101</td>
<td>0.5685</td>
<td>4487</td>
<td>0.5000</td>
</tr>
<tr>
<td>12880 μS</td>
<td>7447</td>
<td>0.5782</td>
<td>7230</td>
<td>0.5613</td>
</tr>
<tr>
<td>15000 μS</td>
<td>8759</td>
<td>0.5839</td>
<td>8532</td>
<td>0.5688</td>
</tr>
<tr>
<td>80 mS</td>
<td>52,168</td>
<td>0.6521</td>
<td>48,384</td>
<td>0.6048</td>
</tr>
</tbody>
</table>
CALBRATION

Before calibration, place the probe in the standard calibration solution. If measured values exceed the standard solution concentration by ±20%, re-clean your probe or replace it.

Conductivity Calibration

Press **RANGE** to choose the conductivity scale.

1. Press **CAL** for 2 seconds to enter the calibration mode.
   The meter will automatically select the correct range.
   The measured value is displayed above the line, the set calibration value is shown flashing below the line (see Fig. A).
2. Press ↑ once to increase the Calibration value.
   Hold down ↑ to continually increase the value.
   Press ↓ once to reduce the Calibration value.
   Hold down ↓ to continually reduce the value (see Fig. B).
3. Press **SETUP** to save the value and exit the calibration mode (see Fig. C).
4. Repeat steps 1-3 to calibrate at other points.
5. Press **EXIT** to return to Normal Mode without saving changes.

Saving to Memory

1. Press **MI** to save the current measured value and view the data point number (see Fig. A).
2. Up to 99 Memories can be saved for both Conductivity and TDS. If the saved memory exceeds 99, the new data will be written over saved memories beginning with #1.

![Fig. A](image)

![Fig. B](image)

![Fig. C](image)
Turning the Meter On / Off

1. Press **POWER** to turn the meter on. The meter will default to the last used measurement and temperature scales.
2. Press and hold **POWER** for 2 seconds to turn the meter off.

Indicator Light Descriptions

<table>
<thead>
<tr>
<th>Meter Status</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power off</td>
<td>Light off</td>
</tr>
<tr>
<td>Power on</td>
<td>Green light on for 5 seconds, then light off</td>
</tr>
<tr>
<td>Low battery</td>
<td>Red light flashing every 5 seconds</td>
</tr>
<tr>
<td>Charging battery</td>
<td>Blue light on</td>
</tr>
</tbody>
</table>

Scale Selection

1. Press **RANGE** to switch between the Conductivity (µS & mS) and TDS (ppm & ppt) scales (see Fig. A and Fig. B).

TDS Calibration

Press **RANGE** to choose the TDS scale.

1. Press **CAL** for 2 seconds to enter the calibration mode.
   The meter will automatically select the correct range.
   The measured value is displayed above the line, the set calibration value is shown flashing below the line (see Fig. A).
2. Press ↑ once to increase the calibration value.
   Hold down ↑ to continually increase the value (see Fig. B).
   Press ↓ once to reduce the Calibration value.
   Hold down ↓ to continually reduce the value.
3. Press **SETUP** to save the value and exit the calibration mode (see Fig. C).
4. Repeat steps 1-3 to calibrate at other points.
5. Press **EXIT** to return to Normal Mode without saving changes.
**View Calibration Points**

1. Press **RANGE** to choose the scale you wish to view.
2. Press **SETUP** to enter the Setup Mode.
3. Press ↑ or ↓ to select the View Cal Data screen (see Fig. A).
4. Press **SETUP** to enter the View Cal Data Mode. The date and time is a cyclic display (the Conductivity scale will display as in Fig. B and Fig. C. The TDS scale will display as in Fig. D and Fig. E). If there are no calibration points set the display will show “- - - -” (see Fig. F).
5. Press ↑ to view the previous Cal point. Repeat to view all previous Cal points. Press ↓ to view the next Cal point. Repeat to view additional Cal points.
6. Press **SETUP** or **EXIT** to return to Normal Mode.

**MEASUREMENT PROCEDURES**

**Note…**

If the ATC Temperature Probe is not connected, the display will read as in Fig. A. No measurement can be performed until the ATC jack is connected.

**Auto Ranging:**

The meter will measure conductivity in the μS/cm and mS/cm scales and will calculate the TDS value in ppm or ppt according to the TDS conversion coefficient that was entered in the TDS Factor set up procedure.

During measurement and calibration this meter will automatically select the correct range. Measurement ranges are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Conductivity</th>
<th>TDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00-19.99 μS/cm</td>
<td>0.00-9.99 ppm</td>
</tr>
<tr>
<td>2</td>
<td>0.0-199.9 μS/cm</td>
<td>10.0-99.9 ppm</td>
</tr>
<tr>
<td>3</td>
<td>0-1999 μS/cm</td>
<td>100-999 ppm</td>
</tr>
<tr>
<td>4</td>
<td>0.00-19.99 mS/cm</td>
<td>1.00-9.99 ppt</td>
</tr>
<tr>
<td>5</td>
<td>0.0-199.9 mS/cm</td>
<td>10.0-199.9 ppt</td>
</tr>
</tbody>
</table>