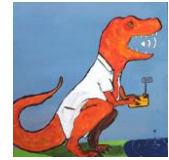


T-HRECS TM7 QuickStart



INTRODUCTION

The Temperature – High Resolution Electrical Conductivity Serial (T-HRECS) device is a high resolution (0.001 $\mu\text{S}/\text{cm}$) device for measuring electrical conductivity, temperature, and calculating Electrical Conductivity – Temperature Compensated (EC.T). The device accuracy is stated as $\pm 2\mu\text{S}/\text{cm}$, provided that the three point calibration is done over the range of interest. There are two versions, the Radio unit and the Serial unit.

FEATURES

1. High resolution EC.T (0.001 $\mu\text{S}/\text{cm}$)
2. High resolution Temperature (0.001°C)
3. Serial Features
 - a. Galvanically isolated serial communication.
 - b. Low Power consumption
 - c. Powered by QiQuac datalogger
 - d. SDI-12 Interface, USB, and RS232 interface available
4. Radio Features
 - a. Internal LiIon battery power (2600mAh)
 - b. Approximately 20 hours of battery life at 5 second measurement interval.
 - c. USB mini charging circuitry and feedback.

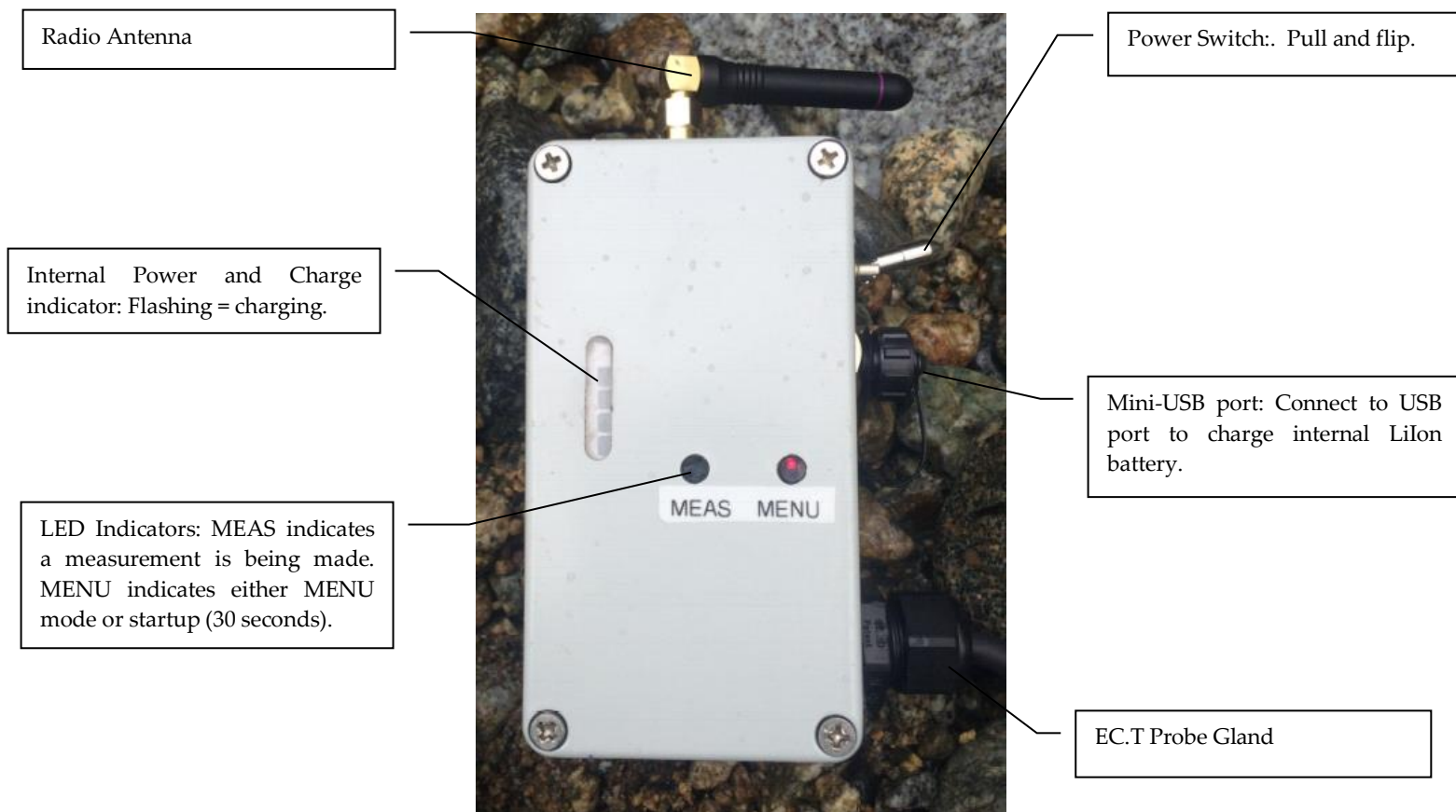
OPERATION

1. Serial: Plug in to Datalogger-Power Source.
Radio: Flip locking toggle switch to On. Battery will indicate charge status momentarily..
2. T-HRECS will send a comma delimited measurement string every time interval. The MEAS indicator will flash green when taking a measurement.
3. To charge the internal LiIon battery, plug in a mini USB cable to the port and a power source such as a laptop. The battery status indicator will blink when charging

NOTES

1. For Salt Dilution measurements, high resolution, repeatability, linearity and stability are more important attributes than absolute accuracy in Electrical Conductivity, so long as in situ calibration is performed..

DEVICE DESCRIPTION



MAIN MENU MODE

To access the Menu mode, you must use a serial terminal. There is a serial terminal built into the QQ under Setup > Serial Term. You can also use a PC based terminal program such as RealTerm, TerraTerm, or Hyperterminal. To enter the T-HRECS Menu Mode, you must send the unit a "1" followed by a <CR>. It is also possible to enter the Menu mode by shorting the electrodes.

1. Select the menu option within 10 seconds. Once a valid selection is made, there is no time limit.
2. The Main Menu selections are:
 - 1) Cal EC (Initiate sequential EC calibration routine)
 - 2) Cal Temp (Initiate sequential temperature calibration routine)
 - 3) Select Th Dev (Set thermal device)
 - 4) Set Int (Set reporting interval between 1 and 3600 seconds)
 - 5) Factory Reset (Restore factory defaults)
 - 6) Advanced Menu (Go to Secondary Menu)

7) Exit and Save (Select to Save settings, including calibrations)

To select an option from the Main Menu, enter the number followed by a Carriage Return (CR). On the QQ, rotate the dial clockwise to select the number and push the dial, then rotate counterclockwise to select the ¶ symbol. The “SEND” label will invert in colour. Push the dial to send the string to the serial port.

1) CALIBRATE EC

The T-HRECS should be calibrated from time to time (annually) or when the following condition applies: 1) a new EC.T probe is used, 2) the derived CF.T is consistently greater than 0.50 or less than 0.46, or 3) deviation from another EC.T meter is noticed. The calibration is a 4 point (dry, low EC, Mid EC, and high EC) calibration. The Low and Mid solutions should span the range of interest, such as 50µS/cm and 2000 µS/cm. Validation tests should be within 1% of a reference solution or probe. The High EC extends the useful range up to 10,000 µS/cm, but only to an accuracy of +/-10%. Use a secondary probe with a reliable calibration to attain the EC. If using another T-HRECS, it will need to be connected to a second terminal program to see the raw EC values. Any calibrated EC meter can be used, or two std solutions of known EC and temperature. Note that we are calibrating EC, not EC.T.

1. Select “1) Calibrate EC” from the Main Menu.
2. When “Dry Cal” appears, attach the probe. Ensure the probe electrodes are dry by blowing on them. Push the dial again to send a ¶ to the T-HRECS (you can send “1¶” and the T-HRECS will ignore the 1).
3. When “Enter Low Cal” appears, place the probe in the low EC solution and stir. Ensure no bubbles are on the electrodes by knocking it on the container walls. Attain the EC (not EC.T) from the reference meter, or read the EC from the standard bottle for the measured temperature. Dial in the raw EC (not EC.T) into the QQ, or enter it into the terminal program, and send to the serial port with a CR.
4. When “Enter Mid Cal” and “Enter High Cal” appears, repeat step 3.
5. The T-HRECS will report that the settings are saved and begin its measurement program.

***From here on, selection of the ¶ symbol and dial push to send the string will simply be denoted by “Select” or “Enter”.**

2) CALIBRATE TEMPERATURE

The temperature should not require calibration after the initial calibration. However, if the unit is reset, or a new probe is attached, calibration may be required. Temperature calibration is more time-consuming than EC calibration because the probe must reach equilibrium with the water. It also requires three water baths 1) near zero degrees, 2) an arbitrary temperature between zero and ~40 degrees, and 3) a third equal to twice the difference between 1 and 2. If an AD590 probe is used, the calibration is a simple single arbitrary temperature entry.

1. Select "2) Calibrate Temperature" from the Main Menu.
2. When "1)AD590 or 2)Thermistor" appears, select the correct temperature sensor. (Factory Default is AD590)
3. When "Calibrate? 0=no 1=yes" enter 0 to use the default calibration and begin measurements, or 1 to perform the calibration procedure.
4. If AD590 is selected, when "Enter Temp" appears, enter the temperature from the reference meter. Go to step 8.
5. If Thermistor is selected, when "Enter Low Temp" appears, place the probe in the low temperature solution and stir. This should be an ice bath and the temperature should be near zero. Attain the temperature from the reference meter. Enter the low temperature.
6. When "Enter Med Temp" appears, repeat step 3 in a solution around room temperature.
7. When "Use High Temp:" appears, followed by a required temperature, ensure the temperature bath is equal to the required temperature within 0.1° and send a CR.
8. The T-HRECS will report the current temperature. Send a CR to enter the measurement program.

3) SELECT THERMAL DEVICE

Select the thermal device being used. In most cases this is a 10k NTC Thermistor

4) SET INTERVAL

This is the measurement interval in seconds. Factory default is 5 seconds.

5) FACTORY RESET

Use this option to reset the T-HRECS to factory defaults, including the temperature calibration

6) ADVANCED MENU

- 1) Set Probe K (Set the probe k constant. Factory default is 0.1)
- 2) Set Dec Places (Set the decimal places to report. Factory default is 2)
- 3) CMD Mode (Set the T-HRECS into Command Mode)
- 4) Cal Values (Print the current calibration values)



Fathom
Scientific Ltd.
1561 Whitesails Dr.
Bowen Island, B.C.
V0N-1G2 +1.604.612.5501
www.fathomscientific.com

5) Exit Menu

7) EXIT AND SAVE

Changes to the settings are not saved until this item is selected.