

### Operating Principles

The Solinst Model 107 TLC measures temperature, level and conductivity. Temperature and conductivity readings are displayed on the LCD screen and water level is read from the tape as with a conventional Water Level Meter. When the probe is immersed in a conductive fluid, a circuit is completed and the water level is indicated by a tone and light.

Conductivity measurements are read from 0-80,000  $\mu\text{S}/\text{cm}$  with readings giving accuracy of 2% of reading or 30  $\mu\text{S}$  (which ever is greater). The 'smart probe' displays conductivity which has been standardized to 25°C, i.e. Specific Conductance. Temperature measurements are read from -15°C to +50°C. The TLC will not operate outside this temperature range and displays "^^^^^^" to indicate that temperature is outside the operational range.

**Note:** If this device is used in a manner not specified by Solinst, the protection provided by the equipment may be impaired.

### Conductivity Sensor Operation

The TLC was specifically designed to be an economical temperature and electrical conductivity profiler and water level meter. As a conductivity profiling instrument it is quite precise when used to determine conductivity change or difference. Its measurement of relative conductivity change over the range is more accurate than its absolute reading of conductivity. Whereas its absolute reading accuracy may fall within +/-2% of actual, the accuracy of relative conductivity change approaches 1% or better.

The Solinst TLC conductivity sensor uses calibration markers and complex, integer polynomial equations to determine the Specific Conductance of a fluid. Readings have an overall accuracy of +/-2%, including calibration readings. When calibrating for Specific Conductance, the cleaning and calibration procedure described in the Instructions sheet should be followed. The TLC Meter should then calibrate to within +/-2% of the Calibration Solution Value. Subsequent TLC readings will fall within the stated accuracy of +/-2%.

**Note:** It is not necessary to achieve a perfect match between the Displayed Calibration Reading on the TLC Meter and the Calibration Solution Value.

If after 3 repetitions of the calibration procedure, an accuracy of +/-2% difference between Displayed Calibration Reading and Calibration Solution Value cannot be achieved (which may occur in very cold or very hot environments) then manual compensation of subsequent readings can be achieved as follows:

1. Record the TLC Calibration Solution Value and the corresponding Displayed Calibration Reading.
2. Calculate the Compensation Multiplier (CM = Calibration Solution Value/Displayed Calibration Reading). For example when calibrating to 1413  $\mu\text{S}/\text{cm}$ , if the Displayed Calibration Reading is 1455 the compensation multiplier will be  $1413/1455 = 0.9711$ .
3. Multiply all subsequent TLC readings by the Compensation Multiplier. For example if the displayed TLC reading is 1650  $\mu\text{S}/\text{cm}$  the actual conductivity reading will be  $0.9711 \times 1650 = 1602 \mu\text{S}/\text{cm}$ .

**Notes:**

1. The zero measurement point of the TLC Meter is the tip of the shorter sensor pin visible within the shroud at the bottom of the probe.
2. If the display indicates 'LOW BATT' there is still some life left in the battery, but it is recommended that you change the batteries as soon as possible.

### Measuring Water Levels, Temperature and Conductivity

1. Remember to calibrate the probe before each measurement session. (See Calibration Section.)
2. Turn the probe on and lower into water. A tone and light indicate that water has been reached and the depth can be read off the tape and recorded. The LCD screen is blacked out for about one second as the probe enters water. A weaker tone sounds as the probe is removed from water. Lower and raise the probe slowly a few times to verify the depth.

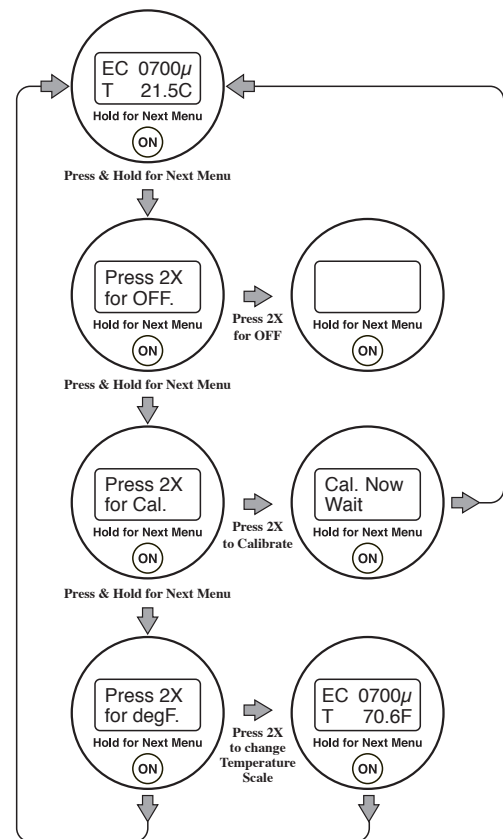
**Notes:**

1. The water level sensor has a slight delay (~1 sec.).
2. Measure static water level on entry into water only (i.e. not on removal) and wait 1 second before repeat measurements.

3. Once in water, the screen displays specific conductance and temperature of the water at the zero point. Lower the probe to the desired depth. Record the depth and the associated conductivity and temperature readings when stabilized. Typically 10 seconds/°C of temperature change are required for stabilization.

**To conserve battery power, the display has an auto off after 8 minutes of use.** If the display is blank when you wish to take a measurement, click the ON button to display temperature and conductivity readings.

4. Repeat at each desired depth allowing 10 seconds/°C temperature change for stabilization.
5. After each use remove the probe shroud and clean the probe sensors with a cloth or paper towel, then rinse thoroughly with de-ionized water (see cleaning section for more details).



The LCD Display Menu

## Cleaning

1. Pull the plastic shroud straight off the probe. (Do not twist)
2. Clean probe and sensors with a cloth or paper towel
3. To remove hard deposits or stains on the probe and sensors, use either pure white vinegar (acetic acid) or CLR diluted by 50%. Try a 30 minute soak followed by gently rubbing with Q-tip, cloth or paper towel.
4. Rinse thoroughly with de-ionized water
5. If about to calibrate rather than storing the TLC, rinse in the calibration solution you are using according to the instructions below.
6. Replace the shroud by rotating it until it seats, then push to lock in place.

## Calibration Instructions

- Notes:**
1. Calibrate only with 1,413  $\mu\text{S}/\text{cm}$  and 80,000  $\mu\text{S}/\text{cm}$  solutions. Calibrating with other solutions will cause errors in readings.
  2. Do not let the probe rest on the bottom of the calibration cylinder.

Regular probe calibration is necessary. If, at any time, readings appear to be less accurate than usual, clean the probe thoroughly, then re-calibrate. A two point calibration should be performed prior to each measuring session. The TLC Meter automatically determines each solution being used. When measuring water of less than 10,000  $\mu\text{S}/\text{cm}$ , better accuracy can be obtained if a further single point calibration at 1413  $\mu\text{S}/\text{cm}$  is performed after the usual 2 point calibration.

**Caution:** The 1413  $\mu\text{S}/\text{cm}$  solution can be seriously affected by salts left on the probe. Clean probe thoroughly before 1413  $\mu\text{S}$  calibration by rinsing in de-ionized water until the conductivity reading reaches about 20  $\mu\text{S}$ .

1. Turn the meter on. Conductivity should be displaying 'EC 0000u'.
2. Start with the 1413  $\mu\text{S}/\text{cm}$  standard solution (Solinst P/N 101582).
3. Clean probe and sensors as described above and give a final rinse with the calibrating solution you are about to use.
4. Replace the shroud by rotating until it seats, then push to lock in place.
5. Immerse the probe in the calibration solution. Press and hold the 'ON' button until the next screen appears as 'Press 2x for Off'.
6. Again press and hold the 'ON' button until the next screen appears as 'Press 2x to Cal'.
7. Press the 'ON' button 2 times and 'Cal. Now Wait' appears. The probe is now being calibrated to the calibrating solution. After a few seconds, the calibration is complete and the LCD returns to the main 'EC and T' display.
8. Repeat Steps 3-7 above, using the 80,000  $\mu\text{S}/\text{cm}$  (Solinst P/N 101417) calibrating solution.
9. Your Solinst Model 107 TLC Meter is now calibrated and ready to use.

**Notes:** The displayed reading should be within 2% of the calibration standard being used, if not, repeat calibration. (For 1413,  $\pm 2\% = 1384$  to 1441  $\mu\text{S}/\text{cm}$ , for 80,000  $\pm 2\% = 78,400$  to 81,600  $\mu\text{S}/\text{cm}$ )

- Notes:**
1. The de-ionized water, calibration solutions and the probe should all be at room temperature when conducting the calibration.
  2. Always ensure that no bubbles are trapped inside the probe shroud. Air bubbles will result in inaccurate calibrations.
  3. A repeat of the full calibration procedure.

## Equipment Check

Upon receipt of your Solinst Model 107 TLC Meter, and always before heading out to the field, the following checks are recommended:

1. Turn the meter on. If the battery is low a 'LOW BATT' warning appears and the 9 volt alkaline battery should be replaced.
2. Ensure the probe tip and shroud are clean.
3. Calibrate the probe. (See calibration instructions)

## Tape Guide Instructions

1. Fit the Tape Guide over the top of the well, small end in.
2. Insert the leg of the TLC Meter into the hole on the Tape Guide and rest the TLC Meter on the side of the well casing. (See Installation diagram.)
3. Take all measurements at the 'V' notch on the Tape Guide, and adjust readings according to the offset stamped on the Tape Guide.
4. When finished, store the Tape Guide by clipping it onto the support bracket on the back of the TLC Meter.

