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Emergency Calibration of a Sensor

PME recommends that all SCAMP sensors be calibrated by PME. However sometimes customers obtain uncalibrated sensors which they intend to calibrate themselves.

A correct calibration requires that the customer supply a suitable reference and experimental set up such that the reference reports the same value as the SCAMP is exposed to. Some method of concurrently reading SCAMP's output is also required. PME has not provided this method in SCAMP's software in a way that customers can computationally access so correct calibrations have several problems.

A rough temperature calibration can be accomplished as follows. Other calibrations can be accomplished using similar technique.

Initialize

Connect SCAMP to a computer.

Run CONTROL.EXE

Select the Channel tab

Select the sensor to be calibrated in the Name drop-down box

Change the Units to be "CR"

Change C0 to 0.0

Change C1 to 1.0

Change C2 to 0.0

Change C3 to 0.0

If a new sensor has been installed change Sensor Positions to 0,0,0 if you are unable to measure the installed position. Otherwise place the correct values.

If a new sensor has been installed change SensorID to the correct serial number.

Press the Apply button

Press the OK button, exiting CONTROL.EXE.

Experiment

Run CONTROL.EXE again.

Select the Test tab

Under Channel Test group select the sensor to be calibrated in the drop-down box

Place the SCAMP sensors into a bath of known temperature.

Press the Analog Test button

Read the CR average value from the resulting graph.

Record this value together with the known temperature in a table similar to that

shown below

| Reference Temperature T (deg C) | SCAMP CR |
|---------------------------------|----------|
| | |
| | |
| | |

Change the bath temperature and repeat the measurement.

Collect as many points as possible. SCAMP sensors (especially conductivity) have more-or-less linear responses over short spans so two points are the minimum required.

Data Analysis

Use some computational method to find the least square best fit coefficients for this formula: $T \text{ (deg C)} = C0 + C1 * CR + C2 * CR^2 + C3 * CR^3$. If you have collected only two points then $C2 = 0$ and $C3 = 0$.

Set SCAMP Calibration

Connect SCAMP to a computer.

Run CONTROL.EXE

Select the Channel tab

Select the sensor to be calibrated in the Name drop-down box

Change the Units to be "deg C"

Place the computed C's in the Calibration group.

Change the Comment to some appropriate statement.

Press the Apply button.

Press the OK button, exiting CONTROL.EXE

If you do not have a reference or a calibration bath then you may use SCAMP's other sensors and end cover. At each calibration point fill the end cover with water of the appropriate temperature. After reading the CR in the step above use the same technique to read one of the other temperature sensors, thus producing a calibrated reference value.

Special note: SCAMP's conductivity sensors do not operate in distilled water. Do not use distilled water as a 0 conductivity reference point. Add at least a very small amount of salt to give more than 500 uS/cm conductivity. This can be used as an approximate 0 for calibrations in the sea water range.