

ARCS PROCEDURE:	T/RH PROBE REPLACEMENT	PRO(TRH)-005.002
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T/RH Probe Replacement

I. Purpose:

This document describes the procedures necessary for replacing a T/RH Probe.

II. Cautions and Hazards:

- **Before starting the following procedure, make sure that the datalogger data was recently uploaded to ADaM. Accessing the ZENO software configuration can lead to deletion of all old data.**

III. Requirements:

- Vaisala Temperature/Relative Humidity Probe.
- Notebook PC with RS232/EIA422/Impulse adapter cable.
- Insulated box (e.g., an ice chest).
- Dewer flask or Styrofoam cup.
- Watertight cover for T/RH probe (e.g., a balloon).
- Reference Digital Thermometer.
- Vaisala HMI31/HMP35 Digital Temperature/Relative Humidity Meter.

IV. Procedure:

A. Determination Of The Temperature Sensor Calibration:

While conducting this procedure, log serial numbers and configuration file changes on Excel-formatted replacement record forms (examples attached).

1. Connect the new Temperature/Relative Humidity Probe to the SMET datalogger.
2. Put a watertight cover (e.g., a balloon) over the tip of the SMET probe. Put about 5 cm of water into a Dewer flask or Styrofoam cup and place it in the insulated box. Put the Reference Thermometer and the SMET probe into the water and close the lid.
3. Connect a notebook PC to the SMET datalogger using the RS232/EIA422/Impulse adapter.
4. Select the ZENO System Function Menu and change the Real-Time Output Format to ASCII (C4/1).
5. Quit to view the output message.

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6. Compare the ZENO air temperature to the reference temperature and the ZENO resistance ratio to the Resistance/Temperature Table for the temperature.
7. If they disagree, then perform the following:
 - a) Change the multiplier in Process 4 up or down several hundredths or thousandths (the value of this constant should be about 13.000).
 - b) Quit to view the output message. Wait several minutes for the change to take effect. You may view the raw data from the Test Menu until nonzeros appear to ensure that the changes took effect, and then quit to view the output message.
 - c) If the temperatures do not agree within $\pm 0.05^{\circ}\text{C}$, repeat steps a) and b) until they agree.
8. Remove the cup or flask from the insulated box. Remove the watertight cover from
9. the SMET probe. Put the probe and the reference Vaisala sensor into the insulated box.
10. From the ZENO System Function Menu change the Real-Time Output Format to none (0).
11. Use the Test Menu to view Scaled Sensor Data. Compare the ZENO and reference RH values. They should agree within $\pm 4\%$.
12. From the Data Output Menu change the Configuration Version Number to include the current date.
13. Save the changes to EEPROM.
14. Download the new Configuration into the notebook computer.
15. Quit to terminate the connection.
16. Disconnect the notebook computer and connect the logger to ADaM.
17. Download the new SMET ZENO configuration to ADaM.
18. Send a copy or a listing of the new SMET configuration file to the SMET mentor.

Note: After the Determination of the Temperature Sensor Calibration and before Installation of the Probe into the Aspirated Radiation Shield, perform a verification of the probe as described in **PRO(TRH)-001**.

B. Installation Of The Probe into The Aspirated Radiation Shield:

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1. While holding the old probe from twisting loosen the locking nut and remove it from the radiation shield.
2. Put the replacement probe into the radiation shield.
3. While holding the probe to prevent it from twisting, tighten the locking nut until the probe is held firmly. There is no need to over tighten the nut.
4. Use a small cable tie to attach the cable to the probe so that the cover slides over easily. Try not to make a sharp bend in the cable.
5. Slide the cover over the probe so that the cable exits the cover through the notch in the cover. This notch should face the back, or motor end, of the aspirator.
6. Using some clear packing tape, tape the cover in place, by wrapping the tape around the seam.
7. Using some black cable ties secure the cable to the aspirator tube.
8. Record the date, start-time, end-time, and any comments in the site operations log.

V. References:

1. Hart, Dick

VI. Attachments:

None.