## PSP RAD Sensor Replacement Procedure

### I.    Purpose:

This document describes the steps for removal and replacement of the PSP sensors in the Tropical Western Pacific site.

### II.   Cautions and Hazards:

- The instrument must always be bolted down, except when it is transported or the level is adjusted.

- When removing the sunshield, as required when replacing radiometers, do not slip the screwdriver off the shield screws.  This will scratch the dome.

- The shield should fit tightly around the plastic housing to force the air over the domes rather than out the sides.  Take note of this after new radiometer is attached and sealed.

- The leveling devices must be checked monthly to ensure that the PSP is level.

- The ventilator fan is always running.  Never stick your fingers under the radiometer.

- If the ventilator motor is in need of replacement, please follow the **PSP Fan Motor Replacement Procedure PRO(PSP)-005.**

### III.  Requirements:

- Spare shipping box for radiometer.
- Replacement procedure form.
- Adjustable wrench.
- Screwdriver.
- Spare bolts (10-32).
- Spare screws for sunshield.
- Note PC with RS232/EIA422/Impulse adapter cable.

### IV.   Procedure:

#### A.   PSP Sensor Replacement:

Before starting the following procedure, make sure that the datalogger data has been uploaded to ADaM recently.  Accessing the ZENO software configuration can lead to deletion of all old data.  While this

procedure is being followed, log serial numbers and configuration file differences on Excel formatted replacement record forms (example attached).

1. Prepare a replacement procedure form with all serial numbers, etc. Be sure to complete this form and get information from both of the parts being swapped.

2. Power down the radiometer and ventilator in need of replacement.

3. Remove the 25 cm diameter ventilator cover shield. There should be three screws to remove.

4. Unscrew the sensor from its mount in the ventilator.

5. Unplug the PSP from the DAQ.

6. Place the removed radiometer into a protective and secure box.

7. Install the new sensor. Ensure that the connector path is pointed to the south.

8. Before leveling the new sensor, check inside the ventilator for any debris or bugs. If the ventilator motor needs to be replaced, follow **PSP Fan Motor Replacement Procedure PRO(PSP)-005.**

9. Level the new sensor. Adjust the leveling screws and center the built-in leveling bubbles.

10. Tighten bolts evenly after leveling.

11. Connect the PSP to the datalogger. See the GNDRAD or SKYRAD Sensor Configuration Table for the proper connection.

12. Reinstall the 25 cm diameter shield.

**B. ZENO Configuration:**

**When installing or replacing a Radiometer on SKYRAD or GNDRAD, the sensor calibration and a new configuration version number must be entered into the ZENO configuration. Follow the steps below to ensure proper ZENO configuration.**

1. Connect a notebook PC to the RAD datalogger using the RS232/EIA422/Impulse adapter.

2. Advance or jump to the appropriate record in the Sensor Menu. Refer to the GNDRAD or SKYRAD ZENO Sensor Configuration Table.

3. Enter the calibration values for the new sensor into the datalogger.

If a calibration of the datalogger has a documented voltage offset for this channel, determine the appropriate Sensor Menu offset by multiplying the voltage offset by the sensor calibration.  An offset less than 1 W/m$^2$ is not significant.  Note that the Sensor Menu offset requires the opposite sign of the voltage offset.

If an offset is being used for this channel, determine the new Sensor Menu offset by dividing the old offset by the old sensor calibration and multiplying it by the new sensor calibration.  (Note the sensor calibrations are usually sufficiently close to one another to use the same offset).  An offset less than 1 W/m$^2$ is not significant.

4. Change the Configuration Version Number in the Data Output Menu to include the current date.

5. Save the changes to EEPROM.

6. Use the Test Menu to view the Raw and Scaled (calibrated) data.

7. Download the new Configuration to the notebook computer using the naming convention GNDsssn.txt or SKYsssn.txt, where sss is the datalogger serial number and n is an alphabetic version number.

8. Terminate the connection by selecting Quit.

9. Disconnect the notebook computer and connect the logger to ADaM.

10. Download the new configuration to ADaM.

11. Record all new serial numbers on the daily checklist and site operations log.

12. Make sure all information is filled out on the instrument replacement procedure form.

13. Enter the date, start-time, end-time, and comments into the general comments section of the Site Data Log.

14. Send the sensor serial number and a copy or a listing of the RAD configuration file to the sensor and datalogger mentors.

## V.  References:

1. Email 10/1/95 from Mike Reynolds "Replacement of Radiometers."

## VI.  Attachments:

1. SKYRAD Sensor Configuration Table.
2. GNDRAD Sensor Configuration Table.

## Attachment 1
## SKYRAD SENSOR CONFIGURATION TABLE

| Sensor or Instrument | Designation | Sensor Menu No. | Connector No. |
|---|---|---|---|
| Global Pyrgeometer | PIRG | 1 | 2 |
| Diffuse Pyrgeometer | PIRD | 2 | 6 |
| Global Pyranometer | PSPG | 3 | 1 |
| Diffuse Pyranometer | PSPD | 4 | 5 |
| Pyroheliometer | NIP | 5 | 7 |
| Infra-Red Thermometer | IRT-UP | 6 | 3 |
| UVB Temperature | UVB-T | 7 | 4 |
| UVB Signal | UVB-UV | 8 | 4 |

## Attachment 2
## GNDRAD SENSOR CONFIGURATION TABLE

| Sensor or Instrument | Designation | Sensor Menu No. | Connector No. |
|---|---|---|---|
| Upwelling Pyrgeometer | PIRDN | 1 | 6 |
| Upwelling Pyranometer | PSPDN | 2 | 5 |
| Upwelling IRT | IRT-DN | 3 | 3 |
| Daytime Net Radiation | NET+ | 6 | 9 |
| Nighttime Net Radiation | NET- | 7 | 9 |