METER

ATMOS 41 RAIN FUNNEL AND PYRANOMETER REPLACEMENT

Use the following instructions to install a replacement funnel and pyranometer for the ATMOS 41 All-in-One Weather Station. Please contact Customer Support to order the ATMOS 41 funnel with pyranometer solar sensor.

TOOLS NEEDED

Data logger or handheld reader	METER ZSC, ZL6, EM60, PROCHECK, Campbell Scientific, Inc. (CSI) Must be capable of issuing SDI-12 extended commands
Cable Micro-USB USB-to-RS232 **NOTE: ZSC does not require cables.**	 Connect from laptop to ZL6 or EM60 Connect from laptop to PROCHECK or CSI data logger
Software METER ZSC METER ZL6, or EM60 METER PROCHECK CSI data logger	USB cable adapter driver (if applicable) ZENTRA Utility Mobile ZENTRA Utility software TeraTerm software LoggerNet software
Sharp-pointed object	Use to push tabs in when disconnecting pyranometer connector (e.g., ball-point pen)
Rain funnel (PN 20269)	Has the new pyranometer (PYR) solar sensor installed **NOTE: Part number 20269 is for the rain funnel model with waterproof connector and strain relief cable (serial number newer than ATM-410002462). If an older model is needed, please request the older style from Customer Support.**

PREPARATION

1. Download the software needed to connect the ATMOS 41 with the new rain funnel to a laptop or smart device (phone, tablet).
2. Carefully read this document all the way through.

   Figure 1 shows an image of the new model with waterproof connector and cable strain relief and the old model.

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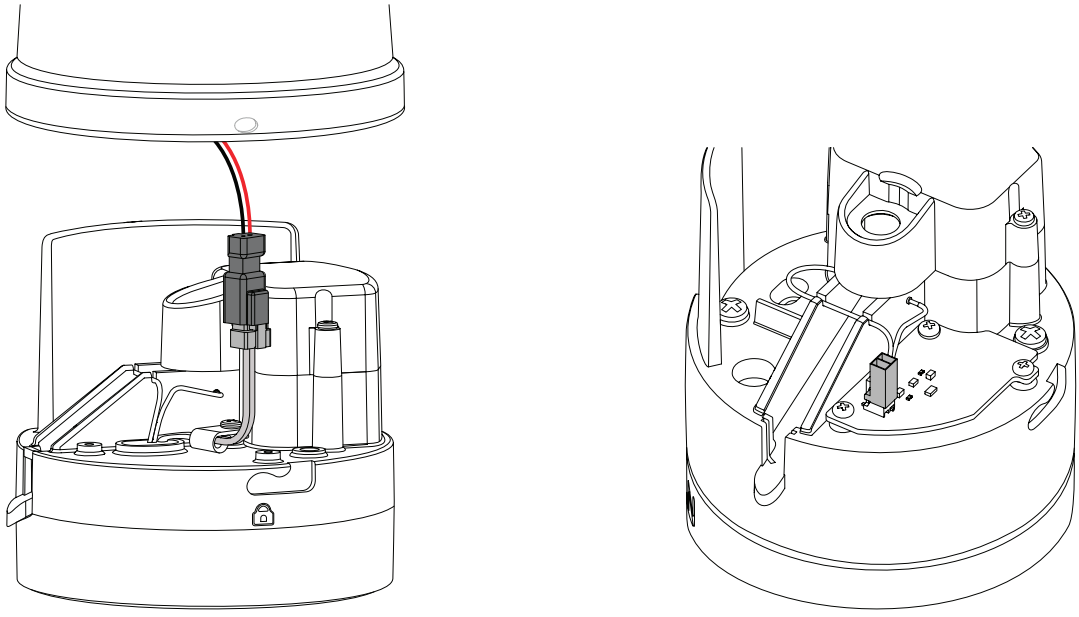

Figure 1 Rain funnel and pyranometer connector

INSTALL NEW RAIN FUNNEL

The instructions below explain how to remove the old rain funnel and install the new rain funnel with a waterproof connector and cable strain relief.

1. Unplug the ATMOS 41 from the data logger or reader.
2. Touch any conductive material connected to the ground to discharge static electricity from the body (e.g., metal pole).

   CAUTION: Electrostatic discharge (ESD) can damage ATMOS 41 electronics.
3. Press and hold the rain funnel down to compress the internal spring.
4. Twist counter-clockwise to unlock from the ATMOS 41 base (Figure 2).
5. Carefully lift the funnel just enought to reach the pyranometer connector.
6. Press in the tabs on both sides of the connector locking mechanism with an object with a sharp point (e.g., a ball-point pen, Figure 3).

   NOTE: If the rain funnel pyranometer connect does not look like the one in Figure 3, just pull the connectors apart.

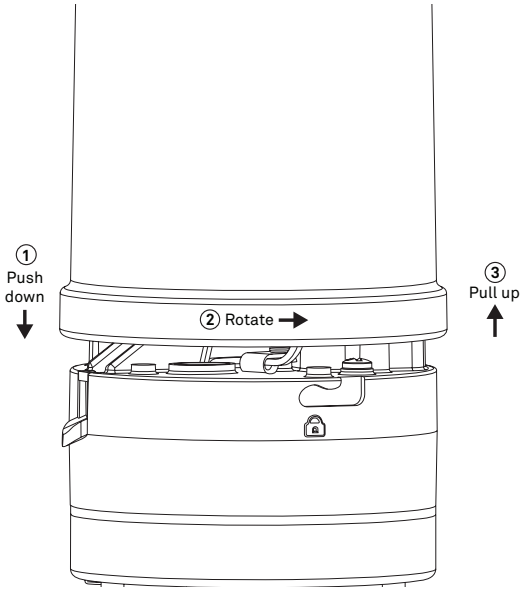

Figure 2 Removing ATMOS 41 rain funnel

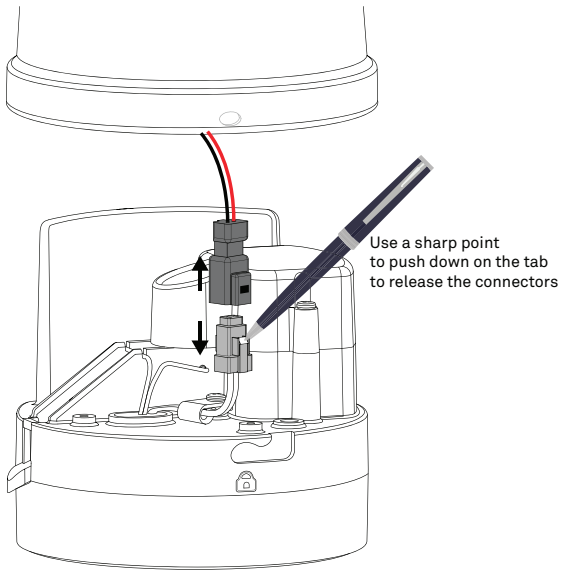

Figure 3 Disconnect pyranometer connector

7. After the tabs are released, pull the connectors apart and remove the funnel.

   The funnel just removed may be discarded.

8. Write down the calibration factor (CAL Factor) for the new pyranometer, located on the inside of the new funnel (Figure 4).

9. Connect the new rain funnel pyranometer cable connector to the ATMOS 41 connector (Figure 5).

   Make sure the cable does not get pinched by the spring or interfere with the raindrop path to the gold electrodes.

   NOTE: The connector is keyed and will only connect if oriented correctly.

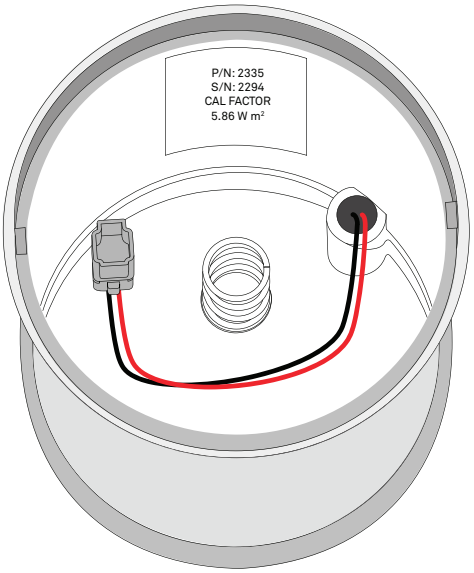

Figure 4 CAL Factor for new pyranometer sensor

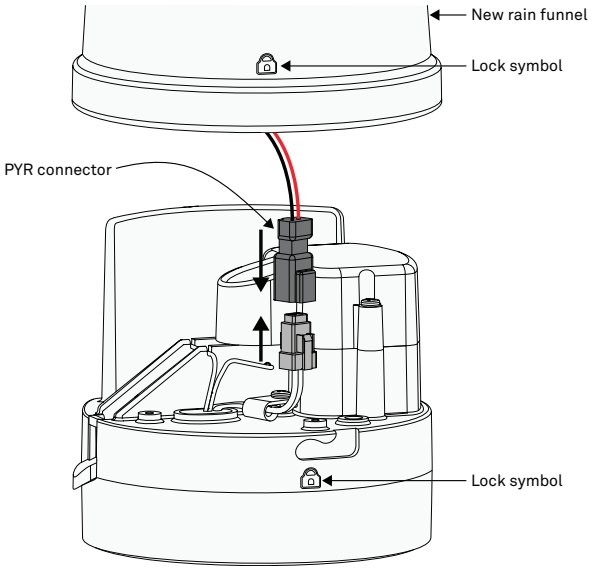

Figure 5 Pyranometer cable connector

10. Line up the pegs on the inside of the funnel with the notches on the ATMOS 41 (Figure 6).
11. Press down and turn the rain funnel clockwise.

    On newer ATMOS 41 designs, the gray lock symbol on the rain funnel should be lined up with the lock symbol molded into the ATMOS 41 base (Figure 5).

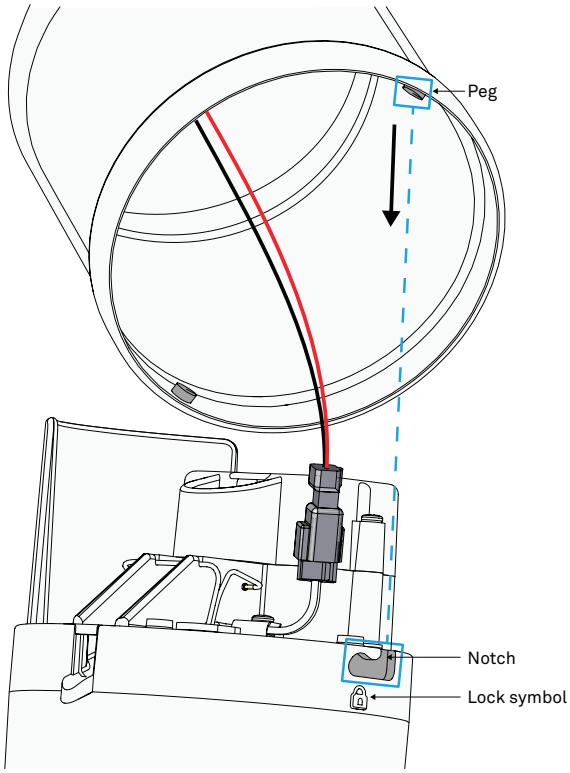

Figure 6 Align new funnel

UPDATE PYR CALIBRATION FACTOR

This section describes how to connect to an ATMOS 41 and update the pyranometer CAL Factor using various data acquisition devices. The CAL Factor is located inside the rain funnel and should have been written down before attaching the new rain funnel.

GO TO—

Update with a ZSC Bluetooth® Sensor Interface

Update with a ZL6 or EM60 Data Logger

Update with a PROCHECK Handheld Reader

Update with a Campbell Scientific Data Logger

UPDATE WITH A ZSC BLUETOOTH® SENSOR INTERFACE

The following instructions explain how to connect to an ATMOS 41 and update the pyranometer CAL Factor using a ZSC and ZENTRA Utility Mobile.

1. Download ZENTRA Utility for iOS or Android mobile device.

   Either scan the QR code shown in Figure 7 to access the ZENTRA Apps website or search for ZENTRA Utility in the appropriate app store (Figure 8).

   Skip this step if ZENTRA Utility is already loaded.

Figure 7 QR code to ZENTRA Apps website

2. Plug the sensor stereo connector into the ZSC stereo port (Figure 9).
3. Press the button on the ZSC.
4. Confirm that the LED on the ZSC begins blinking blue.

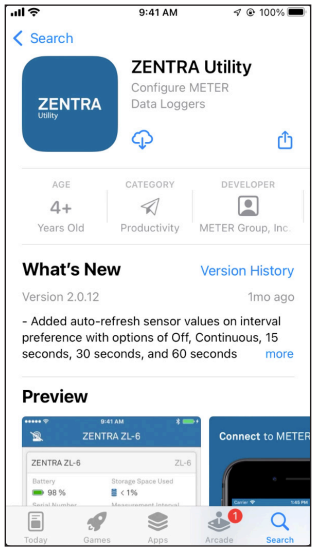

Figure 8 ZENTRA Utility in mobile app

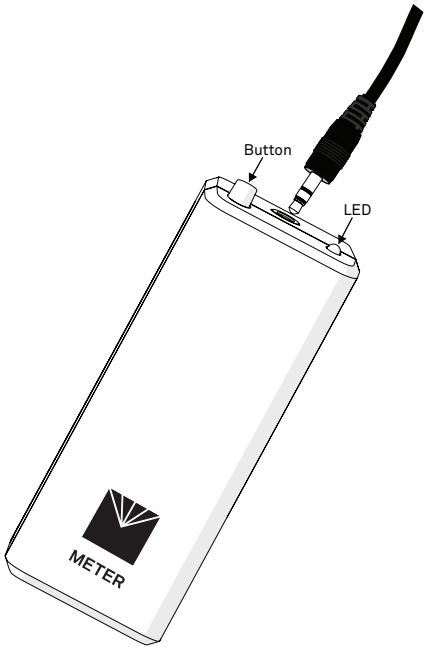

Figure 9 Plug sensor stereo connector into ZSC

5. Open ZENTRA Utility on mobile device.

   Figure 10 shows the Connect screen on a mobile device. ZENTRA Utility Mobile will search for and display nearby Bluetooth-enabled ZENTRA devices.

6. Press the ZSC (Figure 11) to establish a Bluetooth connection.

   Figure 12 shows the ZSC making a connection with the ATMOS 41.

   Once a connection is made, the ZSC Device screen will appear (Figure 13). The ZSC is now connected to the ATMOS 41 and ready to update the pyranometer CAL Factor.

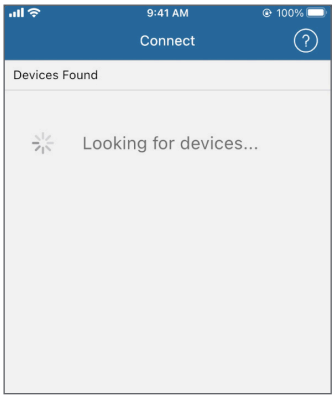

Figure 10 Connect screen

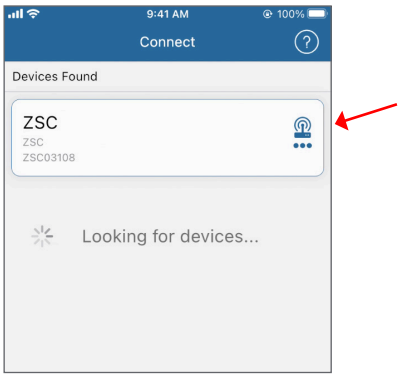

Figure 11 ZENTRA Utility window

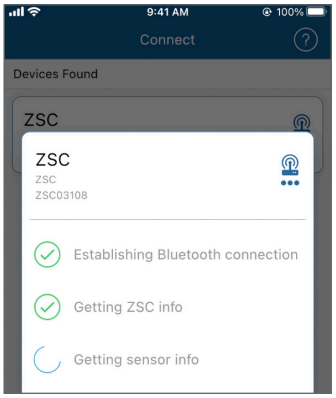

Figure 12 Establishing Bluetooth connection

7. Press the menu dots located in the lower right-hand corner of the Device screen (Figure 13) to open the More screen.
8. Select Sensor Tools on the More screen (Figure 14) to open the Sensor Tools screen.
9. In the Sensor Tools screen, press on the `Pyranometer Calibration` button (Figure 15).

   This will bring up the Pyranometer Calibration screen.

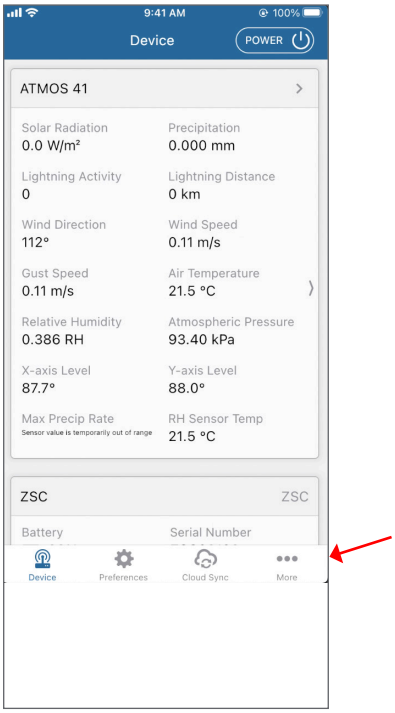

Figure 13 Open More screen

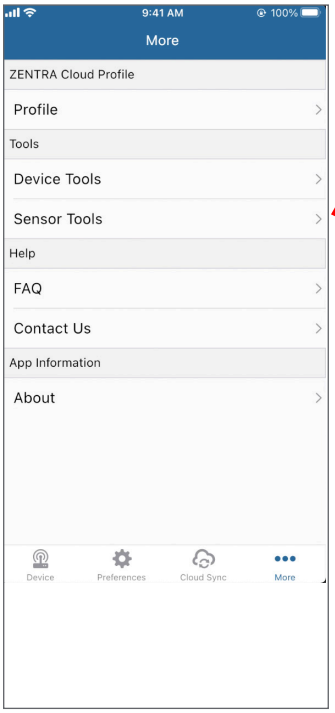

Figure 14 Open Sensor Tools screen

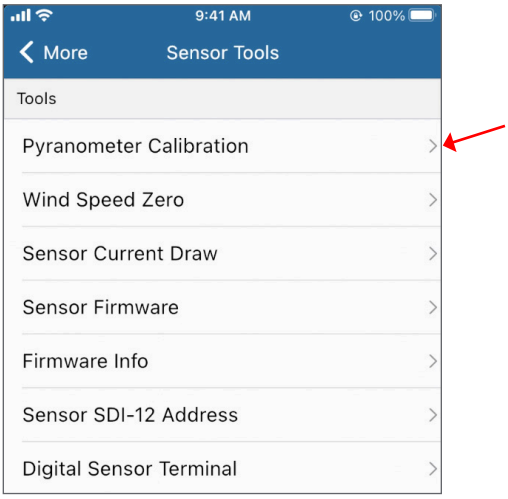

Figure 15 Sensor Tools screen

10. Confirm that the ZSC ATMOS 41 All-in-one Weather Station is the sensor listed (Figure 16).
11. In the text box below the label `Pyranometer Calibration Factor: W · m-2` (Figure 16), enter the new pyranometer CAL Factor printed on a label inside the ATMOS 41 replacement funnel (Figure 6).
12. Press the **`Update`** button.
13. Verify the Pyranometer Calibration screen returns the following message (Figure 17):

    `Calibration Successful`
14. Proceed to Verify Rain Funnel Installation to complete the process and put the ATMOS 41 back in service.

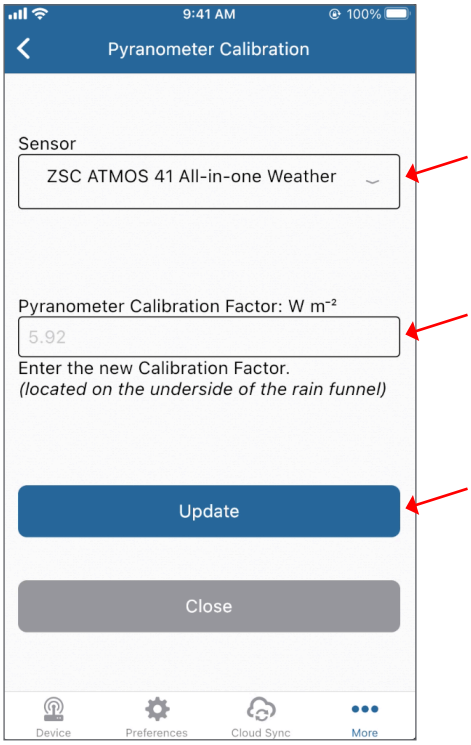

Figure 16 Enter CAL Factor value

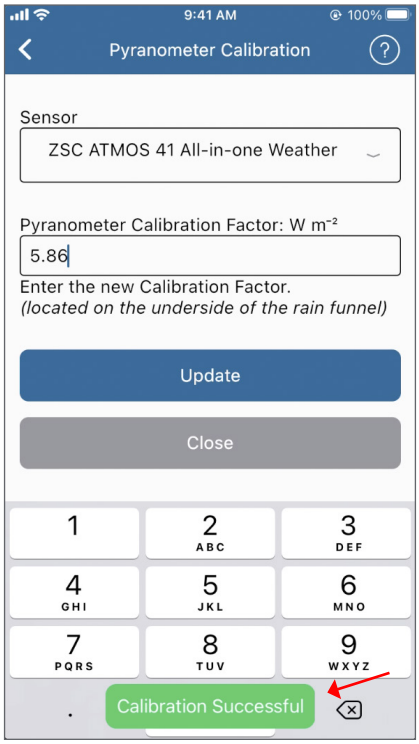

Figure 17 Verify CAL Factor value

UPDATE WITH A ZL6 OR EM60 DATA LOGGER

The following instructions explain how to connect to an ATMOS 41 and update the pyranometer CAL Factor using a METER ZL6 or EM60 data logger. Please go to metergroup.com/downloads and download the most current data logger firmware before beginning.

1. Connect the ATMOS 41 to the data logger using the stereo plug connector.
2. Connect the data logger to a computer with a micro-USB cable.
3. Open ZENTRA Utility and click on Connect to connect to the ZL6 or EM60 data logger (Figure 18).
4. Select the correct logger from the COM dropdown (Figure 18).

   The data logger should show up with every connected sensor. Push **Scan** if the newly connected ATMOS 41 does not show up immediately.
5. On the Menu bar (Figure 18), select `Actions > Digital Sensor Terminal`.

   `The Digital Sensor Terminal` window will appear (Figure 19).
6. Select the correct sensor port from the Sensor Port dropdown list.
7. Enter the `?I!` command in the prompt field (Figure 20).

   NOTE: Erase previous command from the prompt field first, if one appears.
8. Click the **Send** button to return sensor information (Figure 21).

   When SDI-12 address is `0`, the returned output should be similar to `013METER ATM41 XXXATM-41000XXXX` (Figure 21).
9. Enter the `?Xc Y.YY!` command in the prompt field where `Y.YY` is the new pyranometer CAL Factor (Figure 22).

   NOTE: Erase previous command from the prompt field first, if one appears.

   The new pyranometer CAL Factor is printed on a label inside the ATMOS 41 replacement funnel (Figure 6).

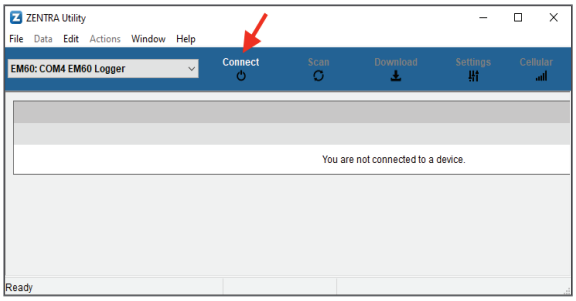

Figure 18 Connect to ZL6 or EM60

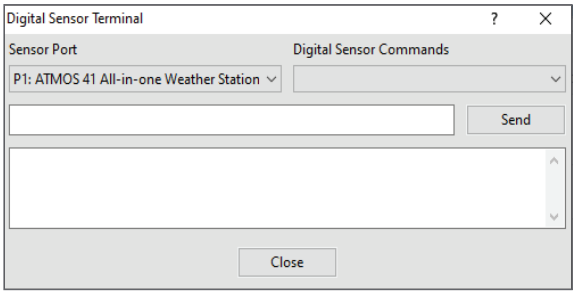

Figure 19 `Digital Sensor Terminal` in ZENTRA Utility

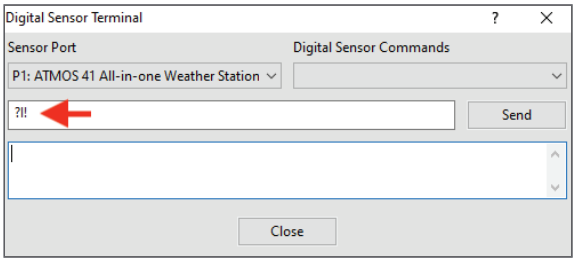

Figure 20 `?I!` command entered

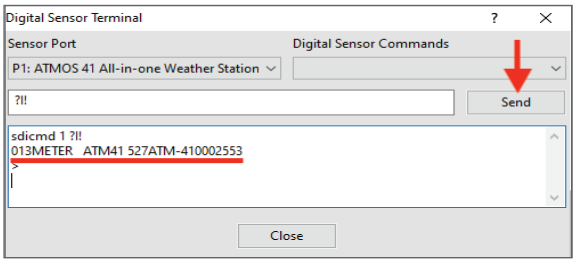

Figure 21 `?I!` command response

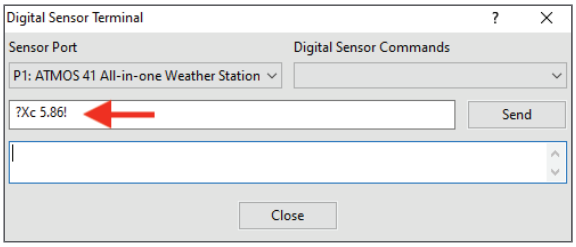

Figure 22 `?Xc Y.YY!` command entered

10. Click the **Send** button to enter the new CAL Factor.

    The returned output should be **OOK** (zero, capital o, capital k) (Figure 23).

11. Enter the **?Xc!** command in the prompt field to verify the CAL Factor value was entered correctly (Figure 24).

    NOTE: Erase previous command from the prompt field first, if one appears.

12. Click on the **Send** button.

    The response should be the new CAL Factor value entered in step 9. Figure 25 shows the ATMOS 41 returning a CAL Factor of 5.86.

13. Proceed to Verify Rain Funnel Installation to complete the process and put the ATMOS 41 back in service.

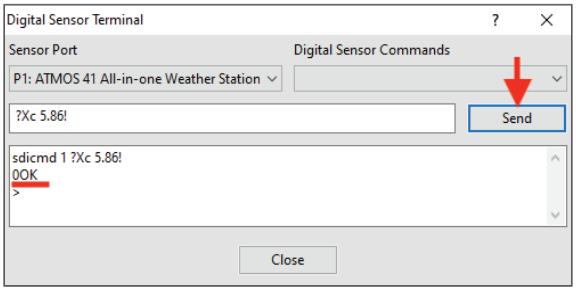

Figure 23 ?Xc Y.YY! command response

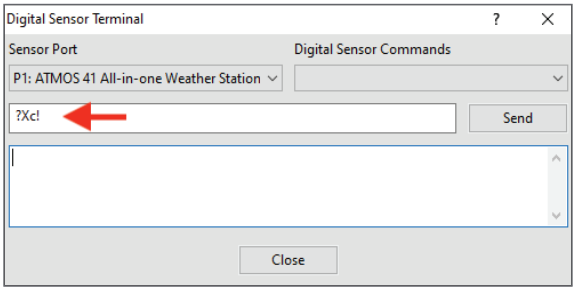

Figure 24 ?Xc! command to verify CAL Factor, entered

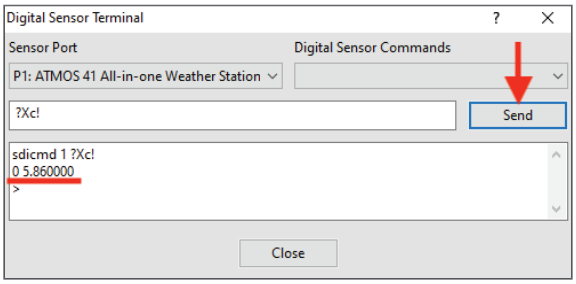

Figure 25 ?Xc! command verified CAL Factor, response

UPDATE WITH A PROCHECK HANDHELD READER

The following instructions explain how to connect to an ATMOS 41 and update the pyranometer CAL Factor using a PROCHECK handheld reader.

1. Connect the ATMOS 41 stereo plug connector into the PROCHECK stereo port.
2. Connect the PROCHECK to a computer with a USB-to-RS232 cable adapter.
3. Open Tera Term (Figure 26).
4. Select the radio button next to `Serial` in the New Connection window.
5. Select the correct COM Port from the dropdown list next to `Port`.
6. Click on the **OK** button.

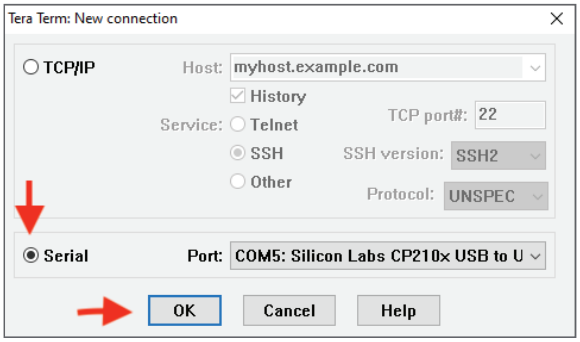

Figure 26 New connection

7. Click on the Setup menu item at the top of the window and select Terminal.

   This opens the `Tera Term Terminal setup` window shown in Figure 27.

8. In the `New-line` area of the Terminal setup dialog box do the following:

   a. Select `CR+LF` from the Receive: dropdown list.

   b. Leave Transmit: set to `CR`.

   c. Click the Local echo checkbox to select.

   d. Click the **`OK`** button (upper right corner).

9. Type `[` in the COM window (Figure 28) to enter the direct communications mode on the PROCHECK when connected to the ATMOS 41.

   When the sensor address is `0`, the returned DDI string will look like a random string of characters (e.g., **`{UEy)ek`**) after entering the direct communications mode (Figure 28).

10. Enter `?I!` to view sensor information.

    When SDI-12 address is `0`, the returned output should be similar to **`013METER  ATM41  XXXATM-41000XXXX`** (Figure 29).

11. Enter `?Xc Y.YY!`, where **`Y.YY`** **is** the new pyranometer CAL Factor.

    The new CAL Factor is printed on a label inside the ATMOS 41 replacement funnel (Figure 6).

    The returned output should be **`0OK`** (zero, capital o, capital k) (Figure 30).

12. Enter the `?Xc!` command (Figure 31) to verify the new CAL Factor that was entered in step 11.

    If the value returned is not correct, repeat step 11 and step 12.

13. Proceed to Verify Rain Funnel Installation to complete the process and put the ATMOS 41 back in service.

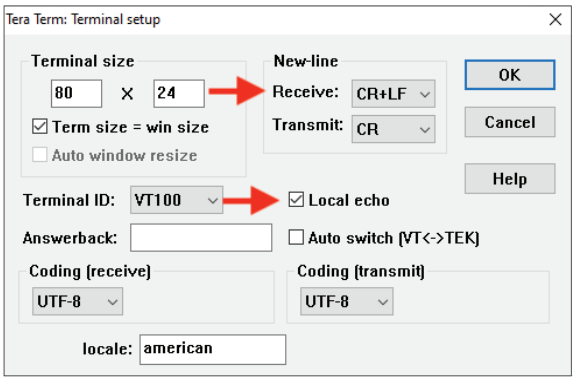

Figure 27 Terminal setup

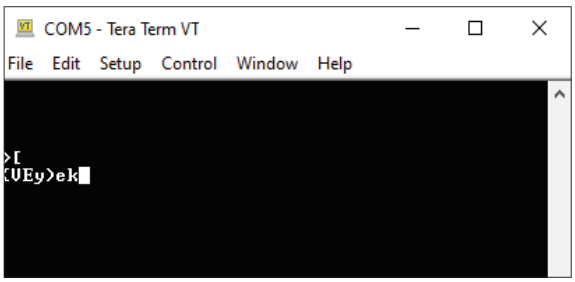

Figure 28 View sensor information

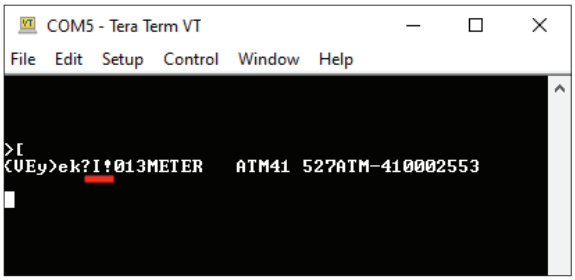

Figure 29 Enter direct communication mode

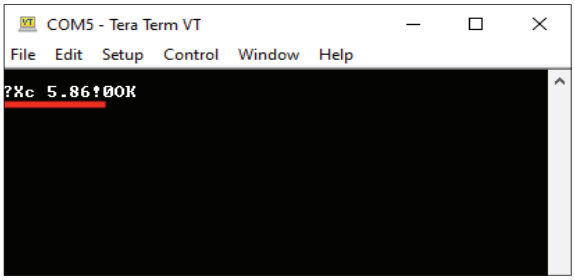

Figure 30 Enter CAL Factor value for replacement funnel

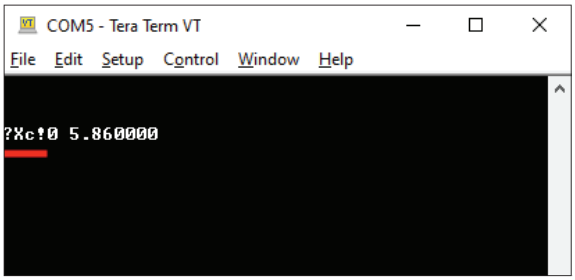

Figure 31 Verify CAL Factor value

UPDATE WITH A CAMPBELL SCIENTIFIC DATA LOGGER

The following instructions explain how to connect to an ATMOS 41 and update the pyranometer CAL Factor using a Campbell Scientific data logger (this example uses a CR850).

1. Attach a Probe Adapter Pigtail to the ATMOS 41 stereo plug connector.
2. Connect the pigtail wires to the CR850 (or other CSI data logger) according to the user manual.
3. Connect the CR850 (or other CSI data logger) to a computer with a USB-to-RS232 cable adapter.
4. Update the data logger firmware at campbellsci.com,if needed.

   Go to product page and downloads (e.g., campbellsci.com/cr850 in this example) and follow CSI instructions.
5. Download the LoggerNet software to the computer if it is not already on the computer from campbellsci.com/loggernet-admin.
6. Open LoggerNet.
7. Select `Connect` from the Main menu (Figure 32) to enter the Connect Screen (Figure 33).
8. Select the desired data logger listed in the Station section of the Connection window (`CR850` for this example; Figure 33).
9. Click on the **`Connect`** button on the Connect Screen (Figure 33).
10. From the top menu bar click on `Data Logger > Terminal Emulator` (Figure 34).

    The Terminal Emulator window will open in a Closed (not active) state (Figure 35).

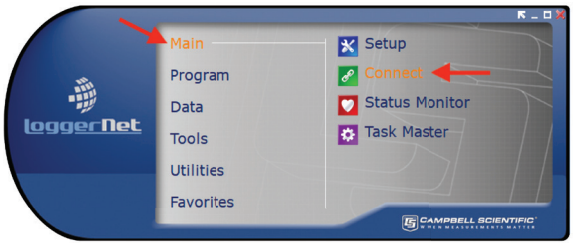

Figure 32 LoggerNet Connect screen

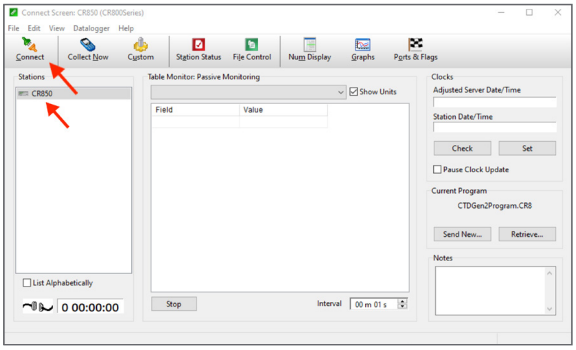

Figure 33 Select and connect data logger

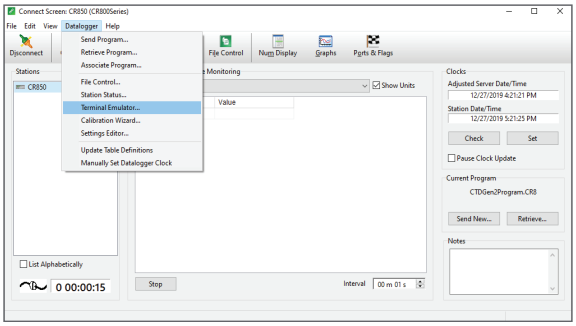

Figure 34 Open terminal emulator window

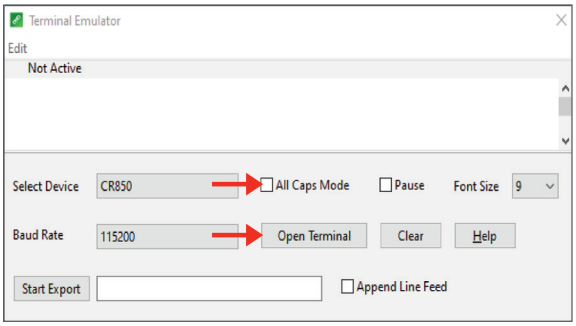

Figure 35 Terminal emulator window in Closed state

11. Uncheck the `All Caps Mode` checkbox if it is checked (Figure 36).
12. Click on the `Open Terminal` button (Figure 36).

    NOTE: The `Closed Terminal` and `Open Terminal` button toggles between Open Terminal and Close Terminal.
13. Place the cursor in the Open Terminal Emulator window (Figure 37).
14. Press the **`Enter`** key a few times.

    A **`CR800>`** prompt should appear (or the series name of the data logger being used).
15. Type **`SDI12`** next to the **`CR800>`** prompt and press **`Enter`**.

    NOTE: The data logger will exit this mode relatively quickly, so if a response is not received, repeat step 13 and step 15.

    The data logger will respond with available ports such as **`Enter Cx Port 1, 3, 5, or 7`** or something similar (Figure 38).
16. Enter the control port number that the ATMOS 41 sensor is connected to, and press **`Enter`**.

    The data logger will respond with **`Entering SDI12 Terminal`** (Figure 39).

    NOTE: Sensors must be updated individually, so only one sensor may be connected to the communications port at a time.

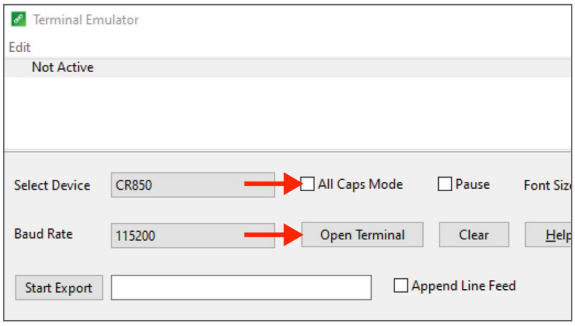

Figure 36 Closed Terminal Window

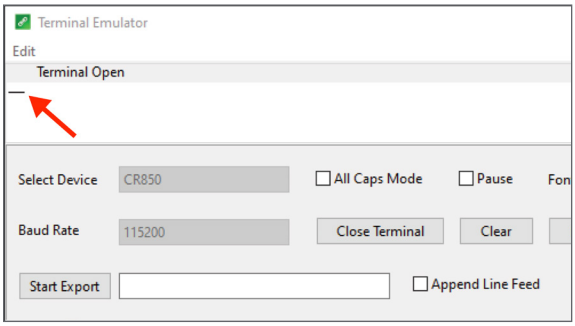

Figure 37 Open Terminal window

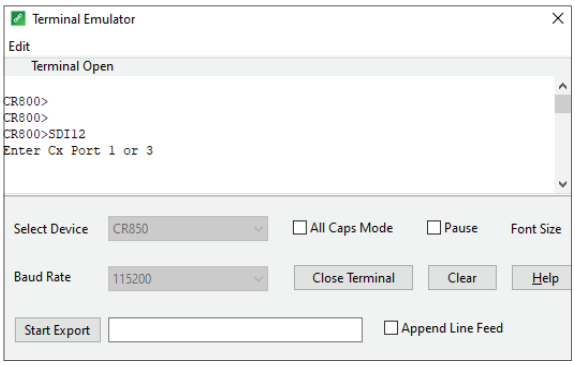

Figure 38 Enter SDI12

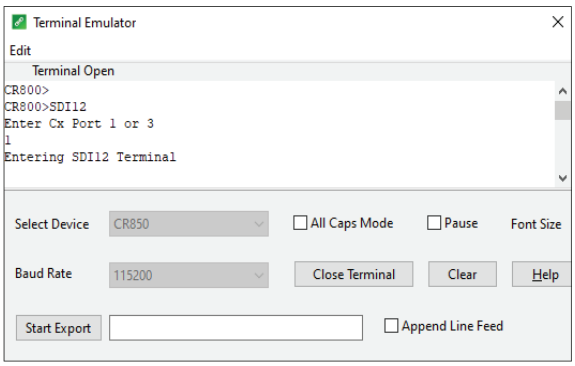

Figure 39 Set control port

17. Enter the `?I!` sensor information command and press **Enter**.

    When SDI-12 address is `0`, the returned output should be similar to `013METER ATM41 XXXATM-41000XXXX` (Figure 40).

18. Enter `?Xc Y.YY!`, where `Y.YY` **is** the new pyranometer CAL Factor.

    The new CAL Factor is printed on a label inside the ATMOS 41 replacement funnel (Figure 6).

19. Press **Enter**.

    The data logger will respond with `OOK` (zero, capital o, capital k), `No answer from sensor`, or `SDI12 Failed` from the Terminal Emulator screen.

    - `No answer from sensor`—Check to see if the calibration was successful by entering `?Xc!`. If the CAL Factor returned is the correct (new) one, command was successful. Otherwise, try entering `?Xc Y.YY!` again.
    - `SDI12 Failed`—Close the terminal and disconnect the data logger. Then repeat step 8 through step 18.

20. Enter the `?Xc!` command and press **Enter**.

    The new CAL Factor entered in step 18 should be returned (Figure 42) . If the value returned is different from the value entered, repeat step 18 through step 20.

21. Proceed to Verify Rain Funnel Installation to complete the process and put the ATMOS 41 back in service.

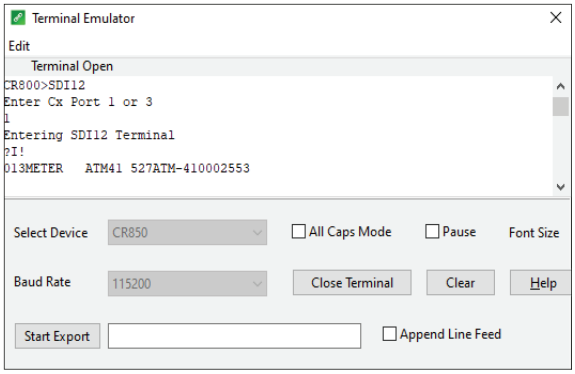

Figure 40 Sensor information

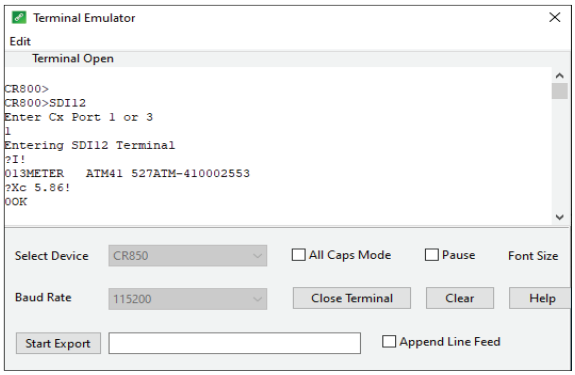

Figure 41 CAL Factor value

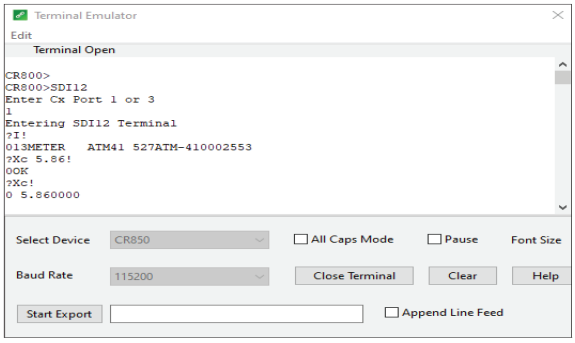

Figure 42 Verify CAL Factor value

VERIFY RAIN FUNNEL INSTALLATION

To verify that the ATMOS 41 pyranometer is working properly, follow the steps listed below.

1. Reconnect ATMOS 41 to the correct data logger and port.
2. Check the data and verify that the PYR is providing reasonable data.
3. Ensure that the engraved N is pointing toward True North.
4. Ensure the ATMOS 41 is level (±2 degrees from [0,0]).

This completes the process of replacing the ATMOS 41 rain funnel. Please contact Customer Support if you have any problems any part of these instructions.

CUSTOMER SUPPORT

NORTH AMERICA

Customer service representatives are available for questions, problems, or feedback Monday through Friday, 7:00 am to 5:00 pm Pacific time.

Email: support.environment@metergroup.com
sales.environment@metergroup.com

Phone: +1.509.332.5600

Fax: +1.509.332.5158

Website: metergroup.com

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Customer service representatives are available for questions, problems, or feedback Monday through Friday, 8:00 to 17:00 Central European time.

Email: support.europe@metergroup.com
sales.europe@metergroup.com

Phone: +49 89 12 66 52 0

Fax: +49 89 12 66 52 20

Website: metergroup.de

If contacting METER by email, please include the following information:

Name	Email address
Address	Instrument serial number
Phone number	Description of problem

NOTE: For products purchased through a distributor, please contact the distributor directly for assistance.