

FAN-ASPIRATED RADIATION SHIELD

INSTALLATION MANUAL

(For all models with Mfg. Code beginning with B or higher)

The Fan-Aspirated Radiation Shield uses fan aspiration and passive shielding to minimize the effects of solar radiation and to provide accurate temperature readings. This instruction manual takes you step-by-step through the process of installing and mounting your Fan-Aspirated Radiation Shield.

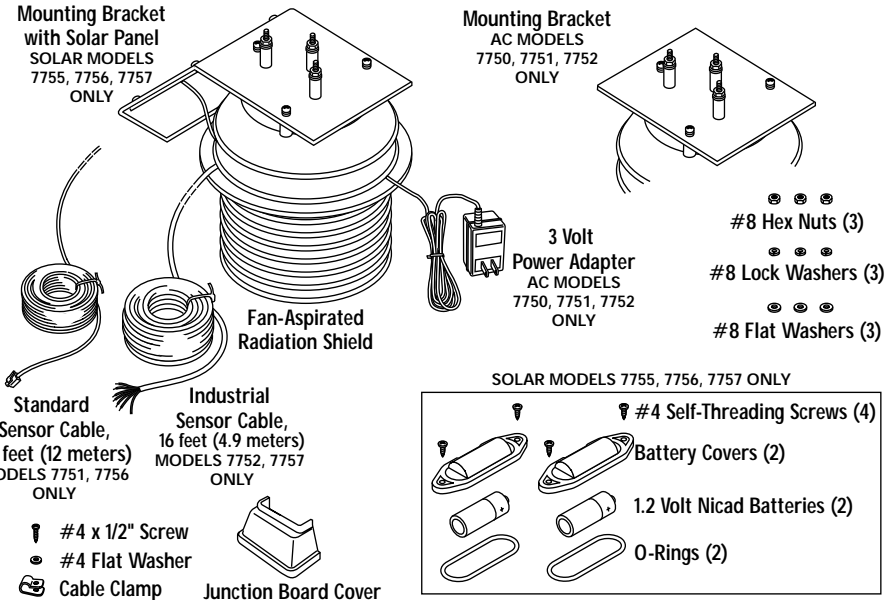
Note: Installation varies according to the shield type, so please take note of your product number before you begin to install. You can find the model number on the label on the underside of the Fan Plate.

Components

The Fan-Aspirated Radiation Shield includes these items:

Mounting Bracket with Solar Panel
SOLAR MODELS
7755, 7756, 7757
ONLY

Mounting Bracket
AC MODELS
7750, 7751, 7752
ONLY



Fan-Aspirated Radiation Shield

3 Volt Power Adapter
AC MODELS
7750, 7751, 7752
ONLY

• • •
#8 Hex Nuts (3)
• • •
#8 Lock Washers (3)
• • •
#8 Flat Washers (3)

Standard Sensor Cable,
40 feet (12 meters)
MODELS 7751, 7756
ONLY

Industrial Sensor Cable,
16 feet (4.9 meters)
MODELS 7752, 7757
ONLY

⚓ #4 x 1/2" Screw

• #4 Flat Washer

🔗 Cable Clamp

Junction Board Cover

SOLAR MODELS 7755, 7756, 7757 ONLY

⚓ #4 Self-Threading Screws (4)

Battery Covers (2)

1.2 Volt Nicad Batteries (2)

O-Rings (2)

A Note About Model Versions

This manual is for all versions of the Fan-Aspirated Radiation Shield manufactured after 9/1/01. Earlier versions have the following differences:

- ◆ Solar-powered modules only use one battery versus two batteries
- ◆ All Junction Board-connections are soldered versus using connectors

Aside from those differences, the installation of the early versions of the Fan-Aspirated Radiation Shield is the same as for current versions.

Tools and Materials Needed

To disassemble, install, and mount your Fan-Aspirated Radiation Shield, you may need the following:

- ◆ A medium Phillips-Head screwdriver.
- ◆ A small Phillips-Head screwdriver.
To install an existing Davis Temperature/Humidity sensor.
- ◆ A small wrench or 3/8" (9 mm) nutdriver.
- ◆ A radiation shield bracket (#7994).
To mount the radiation shield on a mast or pipe if you wish.

Installation Steps

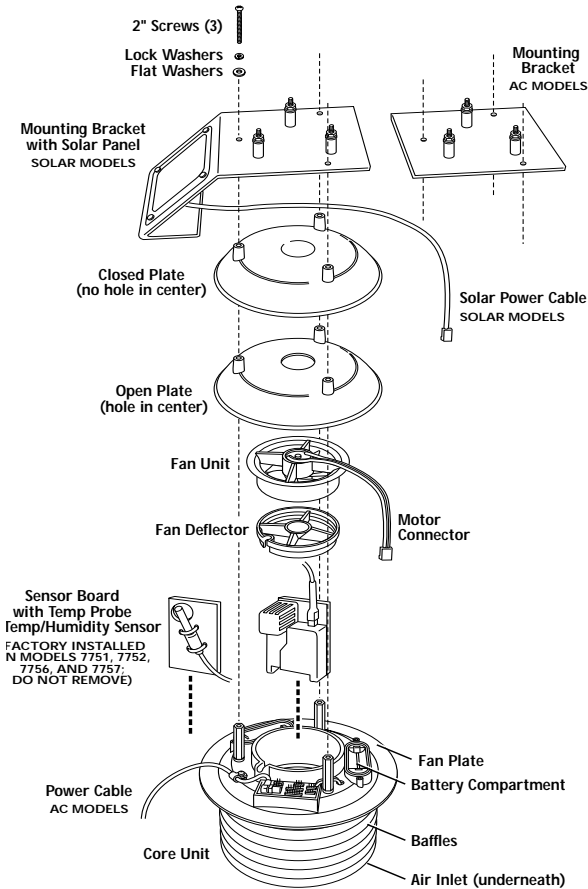
The Fan-Aspirated Radiation Shield comes pre-assembled. Depending on your model number, you may need to disassemble your shield to install a battery and/or a sensor or probe. Here are the installation steps for each shield.

<u>MODEL 7750</u>	<u>MODELS 7751 & 7752</u>	<u>MODEL 7755</u>	<u>MODELS 7756 & 7757</u>
1. Disassemble the shield Page 3	1. Disassemble the shield Page 3	1. Disassemble the shield Page 3	1. Disassemble the shield Page 3
2. Install a sensor or probe Page 4	2. Power the fan Page 8	2. Install a sensor or probe Page 4	2. Power the fan Page 8
3. Install the sensor board Page 6	3. Reassemble the shield Page 12	3. Install the sensor board Page 6	3. Reassemble the shield Page 12
4. Power the fan Page 8	4. Mount the shield Page 15	4. Power the fan Page 8	4. Mount the shield Page 13
5. Route the cables Page 10		5. Route the cables Page 10	
6. Reassemble the shield Page 12		6. Reassemble the shield Page 12	
7. Mount the shield Page 15		7. Mount the shield Page 15	

Disassembling the Radiation Shield

Use a medium Phillips-Head screwdriver to disassemble as described below:

1. Unscrew the three screws at the top of the unit and remove the mounting bracket.
2. Remove the two plates and put aside.
3. Gently remove the fan and the deflector, taking care not to stress the wires soldered to the terminal board.
4. Slide out the sensor board.
5. You are now ready to install a sensor or probe. (See page 5.)



Disassembling the Shield

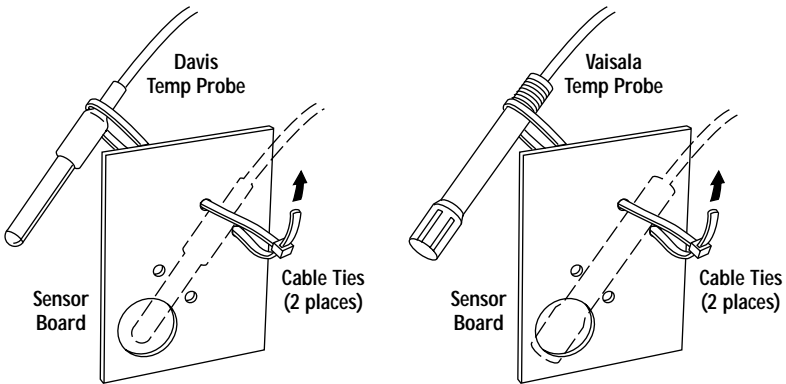
Installing a Sensor or Probe

For models without a pre-installed sensor, continue to the section “**To install a sensor or probe on the sensor board.**” (See below).

If you want to install your own Davis Temperature/Humidity sensor (#7859 or #7860), you must remove your old sensor housing and attach a new and smaller sensor board cover. Please continue to the section “**To attach a new sensor board cover.**” (See below.)

To install a sensor or probe on the sensor board:

1. Attach the sensor or probe to the board using the cable ties.



Installing a Sensor or Probe on the Sensor Board

2. You are now ready to install the sensor board. (See page 6.)

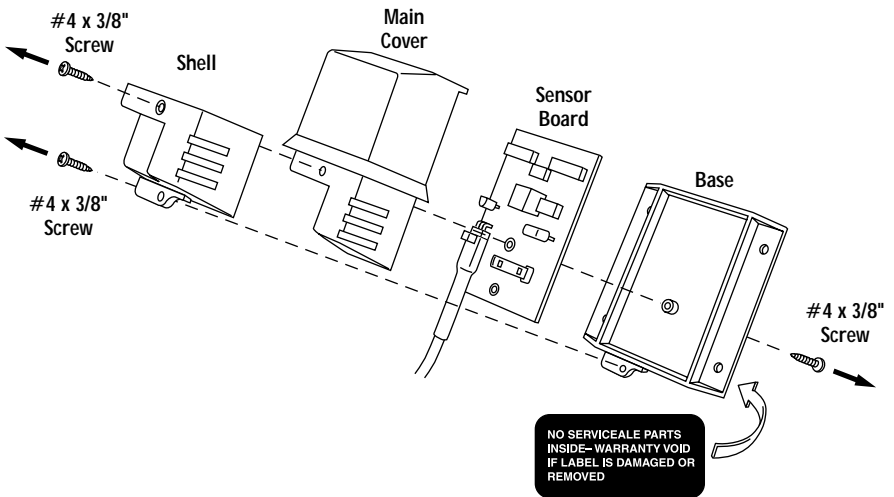
To attach a new sensor board cover:

If you have an existing Temperature/Humidity sensor model # 7859 or # 7860, you need to attach a new sensor cover as follows:

1. Remove the shell and main cover by removing the screw at the front of the board beside the cable exit point.
2. Remove the warranty label on the back of the cover and undo the screw.

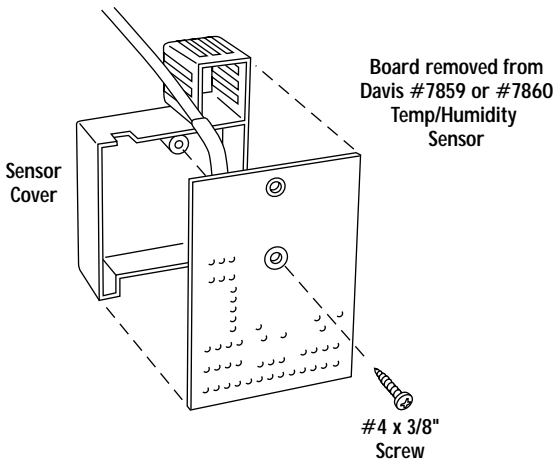
Note: Removing this warranty label to attach a new sensor board does not void your warranty in this instance. To avoid damaging sensitive components on the PC board, hold the board by the edges.

3. Remove the sensor board and discard the "old" cover and shell.



Removing the "Old" Temp/Hum Housing

4. Fit the new sensor cover on the front of the sensor board as shown below.



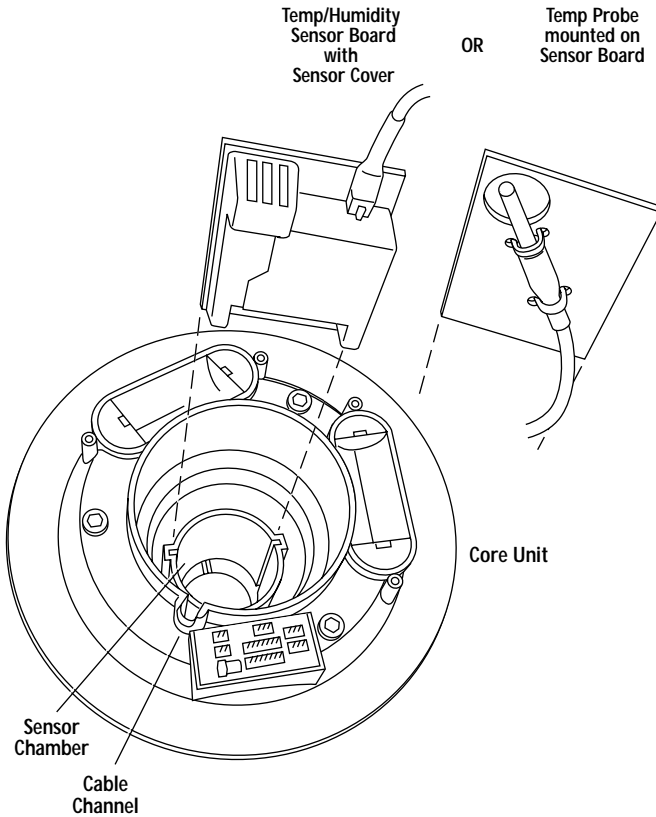
Attaching a New Sensor Board Cover

5. Insert and tighten the #4 x 3/8" (9.5 mm) screw in the back of the sensor board.
6. You are now ready to install the sensor board.

Installing the Sensor Board

Here's how to install the sensor board supplied with the radiation shield:

1. Insert the board into the grooves in the sensor chamber walls.
2. Push the cable gently into the sensor chamber, allowing the cable to loop a little.
3. Route the cable to the cable channel.

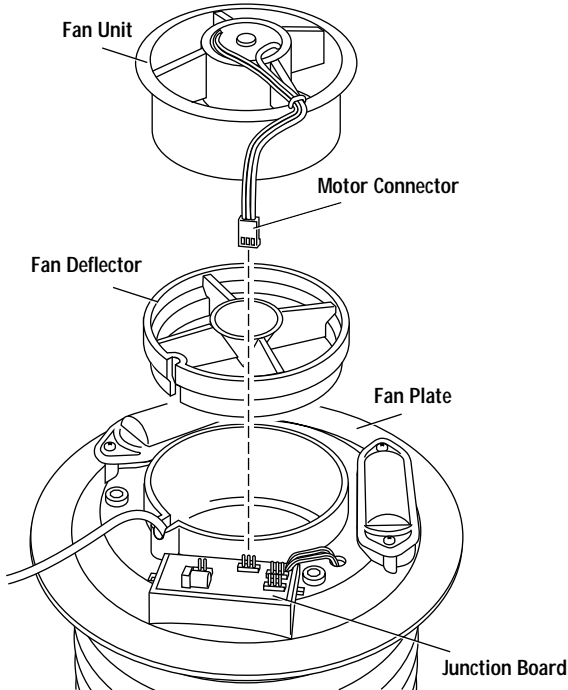


Installing the Sensor Board

Installing the Fan

Here's how to install the fan:

1. Install the fan deflector, ensuring that the sensor cable is in the cable channel molded into the fan deflector and the fan plate.

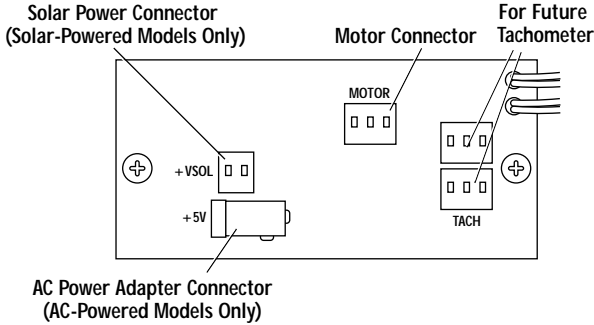


Installing the Fan

2. Place the fan unit on top of the deflector.
3. Connect the motor power cable to the Motor Connector on the Junction Board.

Powering the Fan

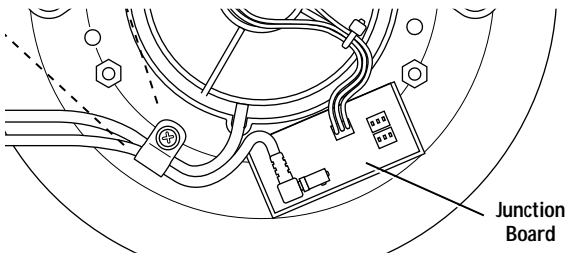
AC-powered models are powered by an AC-power adapter. Solar-powered models have a solar power panel and use batteries for overnight power. Refer to the Junction Board Connections illustration when powering the fan.



Junction Board Connections

AC-Powered Radiation Shield

1. Locate the Junction Board on the fan plate (See page 7).
2. Connect the AC-power adapter to the +5V connector on the Junction Board.
3. Plug the AC-power adapter into an AC outlet.
4. Check to see that the fan is blowing air up and away from the sensor.
5. Unplug the AC power adapter from the AC outlet until you have finished mounting the radiation shield.
6. Secure the AC power cable to the fan plate with the supplied cable clamp.
7. You are now ready to route the cables.

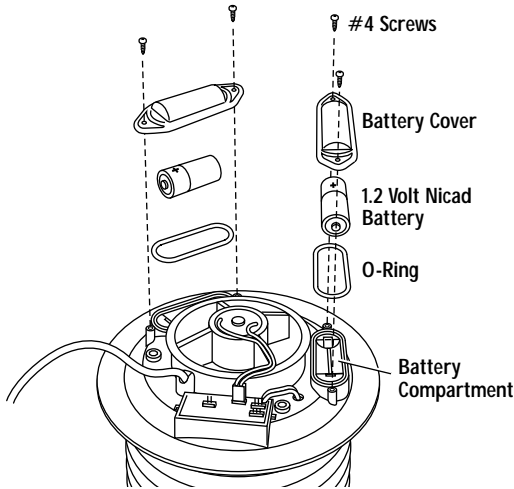


AC Power-Adapter Connections

Solar Powered Radiation Shield

The solar-powered fan will begin operating as soon as you install the batteries. To prevent discharging the batteries, only install the batteries immediately before you mount the radiation shield.

1. On the Radiation Shield fan plate, insert the O-ring in the groove around the edge of each battery compartment.



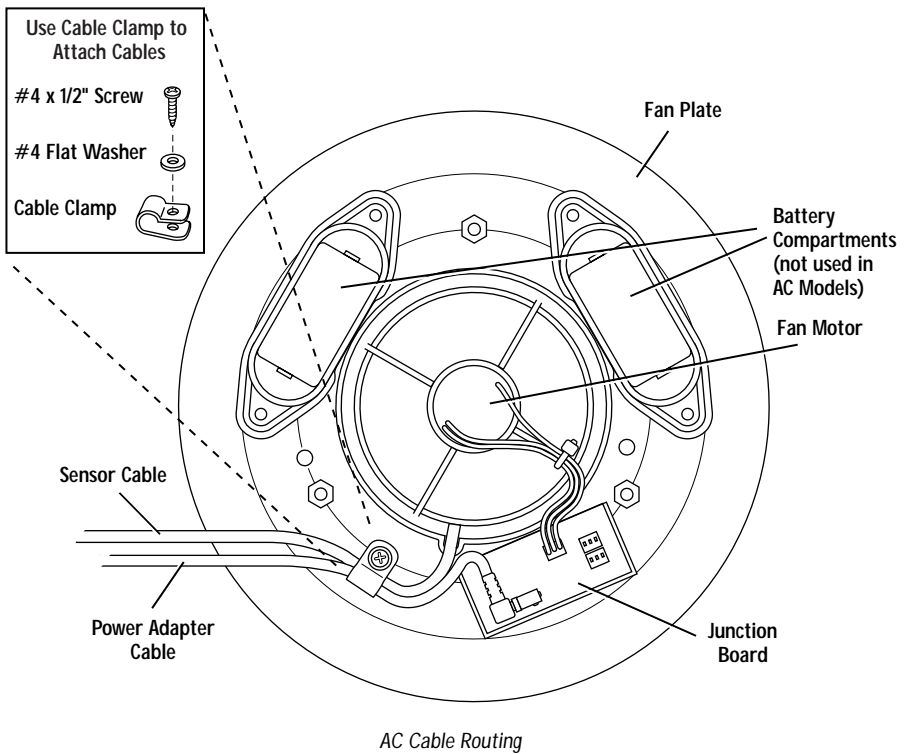
*Installing the Batteries
(Solar-Powered Models Only)*

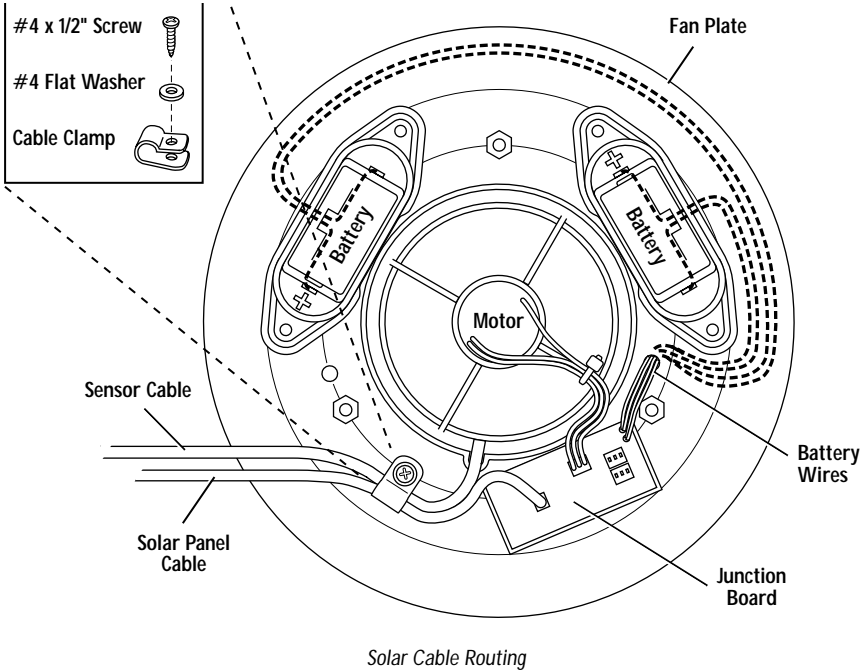
2. Insert a NiCad battery in each compartment, matching the plus (+) sign on the battery with the plus (+) sign in the battery compartment.
3. Verify that the fan is blowing air up and away from the sensor.
4. Attach the battery covers to the battery compartments using two #4 x 3/8" (9.5 mm) screws each.
5. You are now ready to route the cables.

Routing the Sensor and Power Cables

To route the cables do the following:

1. Loosen the cable clamp screws on the top of the unit core, remove the cable clamps.
2. Route the sensor cable and AC or solar power cable through the clamp.
3. Secure the clamp to the unit using the screw provided.
4. Connect the sensor cable to the appropriate connector on the junction box/sensor interface. Consult your station installation manual for more information.
5. For AC-powered models, route the power-adpater cable to an AC outlet





Note: You may want to test the sensor or probe before you mount the radiation shield. Please consult your sensor, or probe installation manual to find out how to conduct the test.

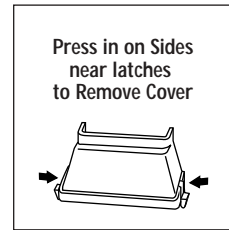
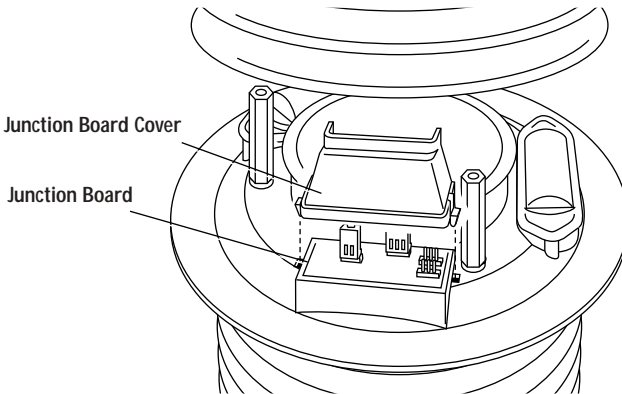
To test the pre-installed Davis sensor:

1. Attach the sensor cable to the appropriate connector on the junction box/sensor interface module (SIM).
Consult the weather station manual or installation manual for more information.
2. Press the appropriate key on your console as necessary to make sure you are getting an outside air temperature reading on the console.
3. If you are using a Temp/Hum sensor, press the appropriate key on your console as necessary to make sure you are getting an outside humidity reading on your weather station console.
4. Once you complete this test, you are ready to reassemble the radiation shield.

Reassembling the Radiation Shield

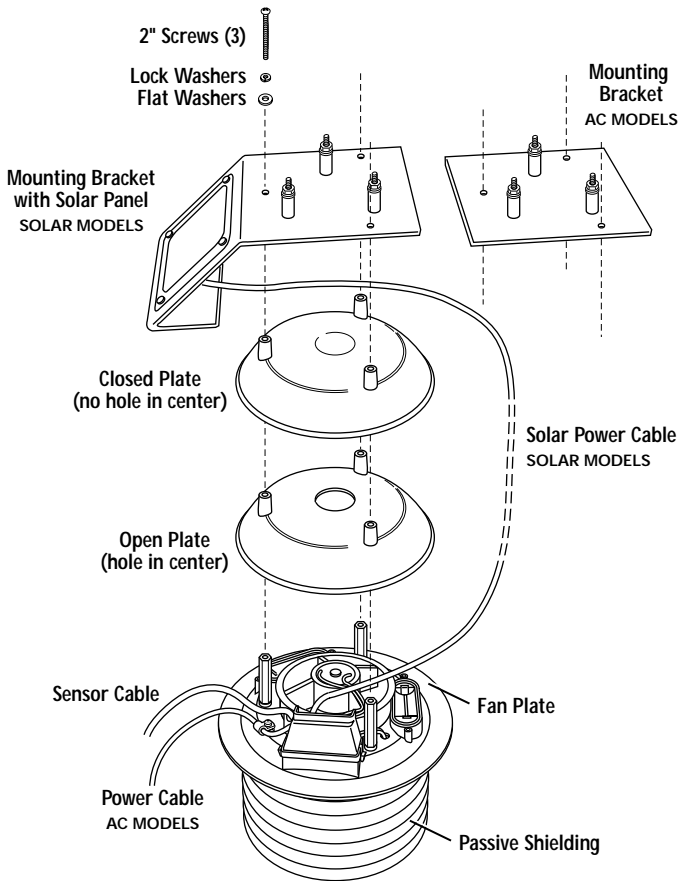
To reassemble the radiation shield, do the following:

1. Make sure the sensor cable runs through the provided cable channels and that the fan unit is seated on the fan plate.
2. Slide the two sections partially together, leaving enough clearance so that you have access to the Junction Board.
3. Check the Junction Board cable connections for the motor and for either the solar power cable or the AC-power adapter cable.
4. Install the Junction Board Cover as shown below. The Junction Board Cover presses easily into place when you are installing it. To remove the cover, press gently in on both sides to release the latches holding it in place.



Junction Board Cover Installation

- Place the open shield plates on top of the three threaded spacers as shown below, making sure to line up the screw holes. Add the closed plate. Use the plastic ridges on the underside of the plates as a guide.



Reassembling the Fan-Aspirated Radiation Shield

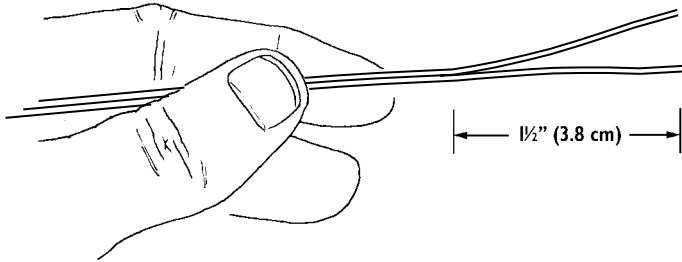
- Secure the two shield plates to the radiation shield mounting bracket using the three 2" screws and washers. Tighten until the radiation shield attaches firmly to the mounting bracket.
- You are now ready to mount the shield. (See page 14.)

Note: If you want to extend the length of the power cable, you will need to connect the cables using splice connectors before mounting the shield. (See page 14.)

Extending the AC Power Cable

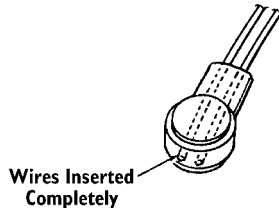
The AC-power adapter has a 12' (4 m) power cable. If you need a longer cable, you can extend the power cable of the radiation shield using 2-conductor speaker cable or zip cord with polarizing identification. That is, a zip cord with one of the wires marked so you can identify the positive (+) and negative (-) wires. If you plan on using the splice connectors supplied with the radiation shield, we recommend a wire size of 19-24 AWG (0.9 -0.5 mm) with a maximum insulation of .082 in (2.08 cm). Connect the additional power cable using splice connectors as follows:

1. Cut the cable ends square.
2. Separate the wires about 1" on both cables. Do not strip the insulation.



Separating the Wires

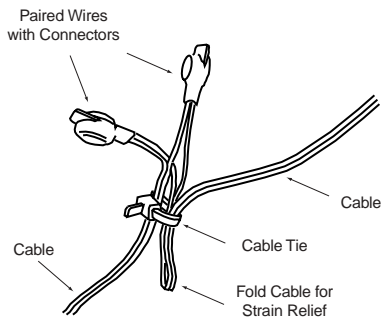
3. Take the striped (or otherwise marked) wire from the supplied cable and place it into one of the holes at the end of a splice connector. Make sure you push the wire all the way into the connector. You can check this by looking through the clear side of the splice connector.
4. Take the striped (or similarly marked) wire from the additional cable and place it into the other hole at the end of the splice connector. Again, make sure you push the wire all the way into the connector.



Using Splice Connector

5. Use pliers to squeeze the green cap into place, securing the wires.

6. Repeat this procedure for the other pair of wires.
7. Using a cable tie, secure the two cables together as shown below. This provides a measure of strain relief which prevents the wires from separating under normal conditions. Cut off the excess cable tie when it is secure.

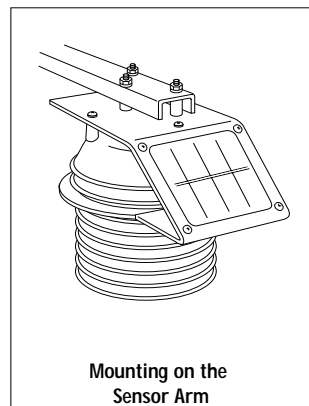
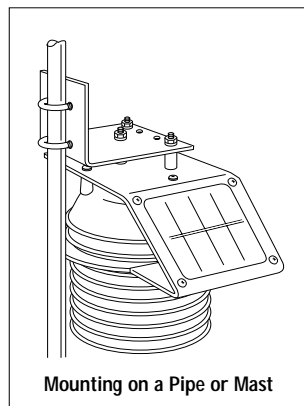


Securing the Two Cables

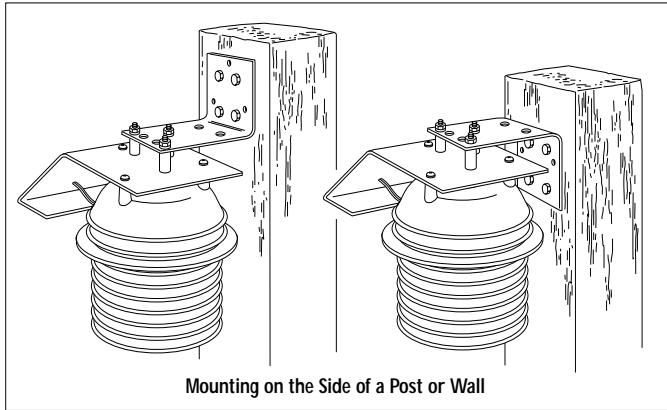
Mounting the Fan-Aspirated Radiation Shield

You can mount the Fan-Aspirated Radiation Shield as follows:

- ◆ On a Davis Sensor Mounting Arm or other horizontal plate up to 0.26" (6.6 mm) thickness.
- ◆ On a metal pipe or mast with outside diameter from 1" (2.5 cm) to 1 1/4" (3.1 cm). To mount this way, you need a radiation shield mounting bracket (part # 7994).



◆ On the side of a wall or post



Location Tips

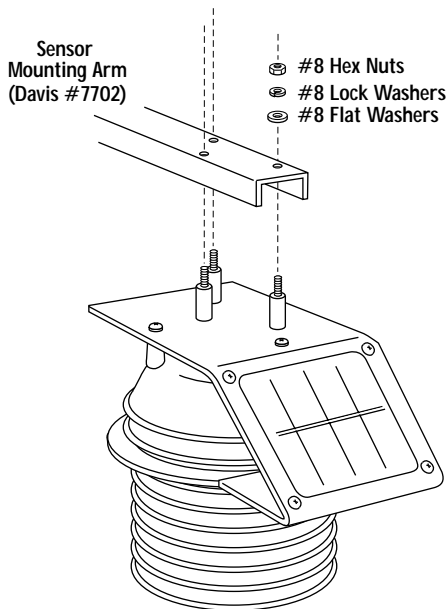
- ◆ Install the shield over plants or soil if possible. Avoid installing over or near sprinklers. The shield does not protect the sensor from water spraying upwards.
- ◆ Place the sensor 5 feet (1.5 m) or more from man-made heat sources.
- ◆ Avoid running the sensor cable across large metal objects if possible.
- ◆ Avoid placing the motor near any curing caulking compounds as deposits from silicone compounds can cause motor failure.

Mounting to a Sensor Mounting Arm:

Use this procedure to attach the Fan-Aspirated Radiation Shield to a Davis Sensor Mounting Arm (part #7702).

To mount to a Sensor Arm you need:

- ◆ Three # 8 split lock washers (supplied with your radiation shield)
 - ◆ Three # 8 flat washers (supplied with your radiation shield)
 - ◆ Three # 8 hex nuts (supplied with your radiation shield)
1. Position the shield below the Sensor Arm to align the three protruding screws from the bracket with the three holes at the end of the arm.
 2. Raise the shield into position and place a flat washer, a lock washer, and a nut on each screw protruding above the arm.
 3. Tighten the nuts.

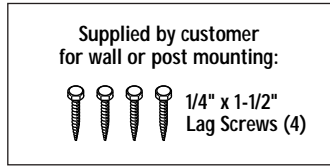
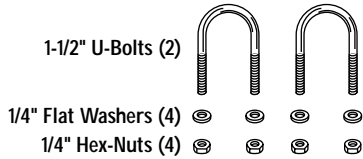
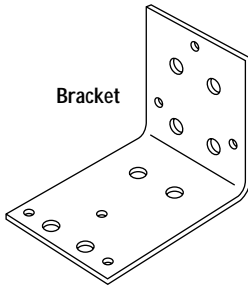


Attaching the Shield to the Sensor Mounting Arm

Mounting to a Pipe or Mast

Use this procedure to mount the Fan-Aspirated Radiation Shield to a metal pipe with outside diameter between 1" (2.5 cm) and 1 1/4" (3.1 cm). To mount to a pipe you need:

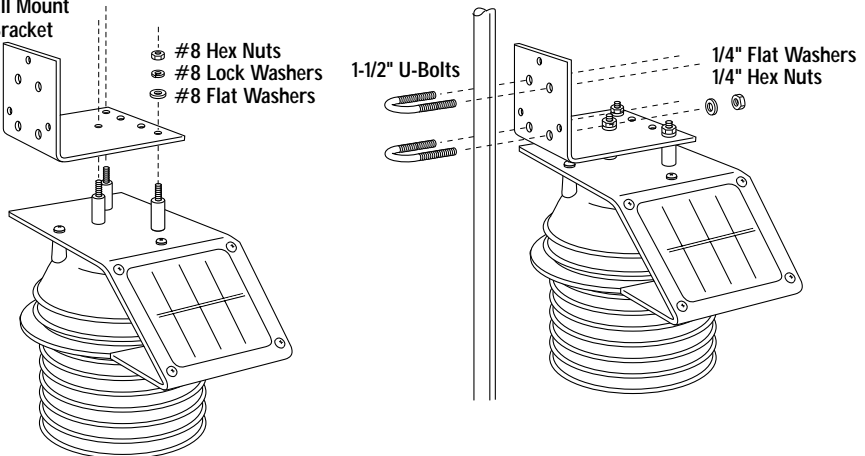
- ◆ A Mounting Bracket for Fan Aspirated Shield (part # 7994-not supplied)
 - ◆ Two 1 1/2" (3.8 cm) U-bolts (supplied with part # 7994)
 - ◆ Four 1/4" (6.3 mm) flat washers (supplied with part # 7994)
 - ◆ Four 1/4" (6.3 mm) hex nuts (supplied with part # 7994)
- ◆ Three # 8-32 x 2" (5.1 cm) screws (supplied with your radiation shield)
- ◆ A 7/16" (1.1 cm) wrench



Pipe Mounting Requirements

Note: You can mount the Fan-Aspirated Radiation Shield on any pipe to a maximum diameter of 2 1/2" (6.35cm). However, you will need to drill additional holes and obtain the larger U-bolts.

Wall Mount Bracket

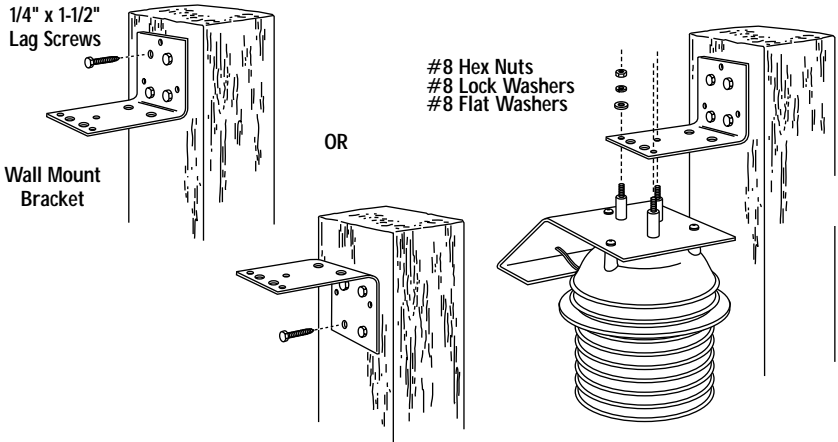


Mounting the shield to a Pipe or Mast

Mounting to the Side of a Post or Wall

To mount the Fan-Aspirated Radiation Shield on the side of a post or wall you need:

- ◆ Four 1/4" (6.8mm) x 1 1/2" (3.8cm) lag screws (not supplied)
- ◆ A Mounting Bracket (part # 7994 - not supplied)



Mounting the Shield to the Side of a Post or Wall

Connecting the Sensor Cable

Once you mount the radiation shield, you can then connect the sensor cable with the appropriate connector on the junction box/sensor interface module (SIM). Consult your weather station owner's manual for further details.

Securing the Sensor Cable

To prevent fraying or cutting of the cable or wires where they are exposed to weather, you must secure them so they do not lash about in the wind. To secure the cable and wires you need to:

- ◆ Use cable clips or weather resistant cable ties to secure the cable.
- ◆ Place clips or ties approximately every 3 to 5 feet (1 to 1.5 m).
- ◆ Avoid using metal staples or a staple gun to secure cables or wires since metal staples installed with a staple gun can cut the cable and wires.
- ◆ Avoid tugging on the sensor cable when you run it. Leaving the connection taut may cause strain and the cable may pull free.

Calibrating the Dew Point and Relative Humidity

If you want to install the Fan-Aspirated Radiation Shield as part of a Weather Monitor II station, you need to calibrate the dew point and relative humidity. Please refer to your weather station owner's manual for calibration instructions.

Maintenance Instructions

- ◆ Keep the surfaces clean as the Fan-Aspirated Radiation Shield is less effective when the surfaces are dirty. Remove dust from the solar panel and the screen with a damp cloth.
- ◆ Remove any debris that obstructs air flow between the radiation shield parts e.g., leaves, twigs, webs, and nests.
- ◆ Avoid spraying insecticide of any kind into the radiation shield as this may damage the sensors and the shield.
- ◆ Once a year:
 - ◆ Replace the fan/motor assembly (Part # 7758 (standard motor) or # 7759 (low current motor))
 - ◆ Replace the batteries (solar-powered models only)
 - ◆ Remove any debris lodged inside the unit

Replacing Fan Batteries

1. Retrieve your Fan-Aspirated Radiation Shield and place on a stable work surface.
2. Disassemble the Radiation Shield (See page 3).
3. Replace the old batteries (See page 9).
4. Assemble the Radiation Shield (See page 12).
5. Mount the Fan-Aspirated Radiation Shield in the desired location.

Replacing The Fan/Motor Assembly

1. Retrieve your Fan-Aspirated Radiation Shield and place on a stable work surface.
2. Disassemble the Radiation Shield (See page 3).
3. Unplug the old motor and remove from it from the Radiation Shield (See page 7).
4. Install the new motor/fan assembly and plug it into the Junction Board (See page 7).
5. Assemble the Radiation Shield (See page 12).
6. Mount the Fan-Aspirated Radiation Shield in the desired location.

Troubleshooting

If you are experiencing problems with your Fan-Aspirated Radiation Shield, first be sure to check all cable connections. If you are unable to solve the problem, please call Davis Technical Support. We'll be glad to help. Most questions can be answered while you're on the phone. You can also email us for support, or visit our website. Sorry, we are unable to accept collect calls.

Note: *Please do not return items to the factory for repair without prior authorization.*

Contacting Davis Instruments

(510) 732-7814 for Technical Support, Monday – Friday, 7:00 a.m. – 5:30 p.m. Pacific Time.

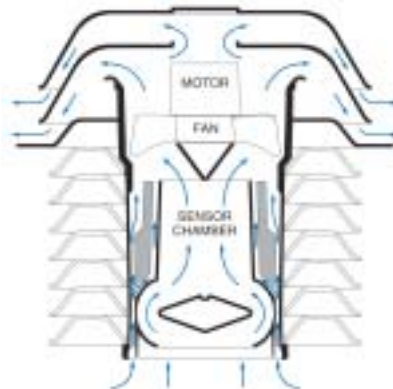
(510) 670-0589 Fax to Customer Service or Tech Support.

support@davisnet.com E-mail to Technical Support.

www.davisnet.com Copies of User Manuals are available on the “Support” page. Watch for FAQs and other updates. Subscribe to the e-newsletter.

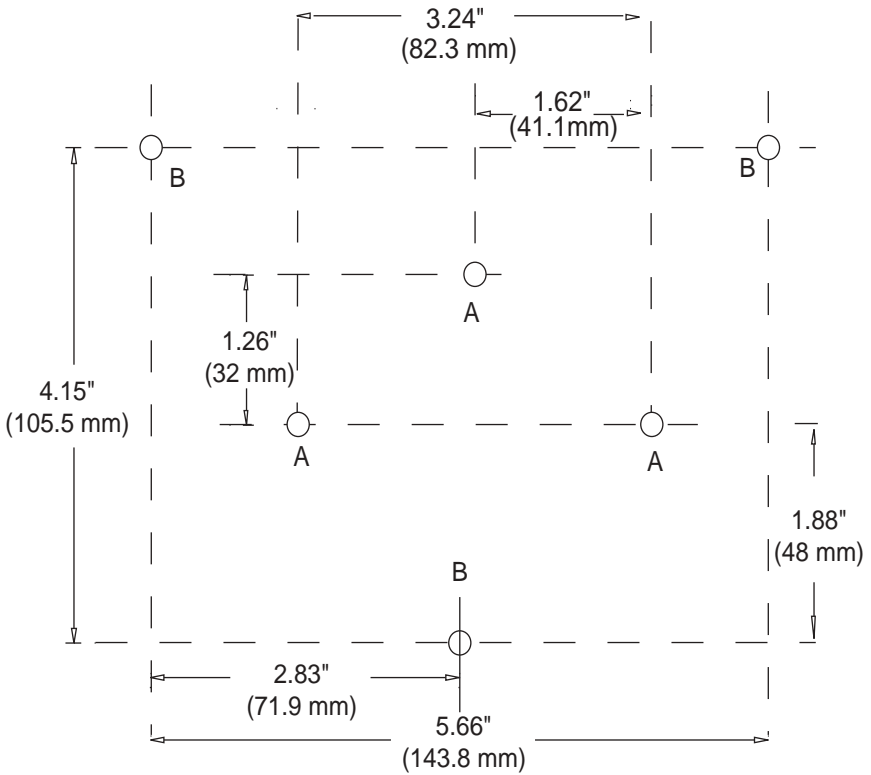
Diagram of Operation

The diagram below shows how the Fan-Aspirated Radiation Shield draws cool outside air up through the sensor chamber and through the walls surrounding the sensor chamber.



Air Flow in Fan-Aspirated Radiation Shield

Template for Mounting Holes



[Either set of 3 holes (A or B) may be used]



Notes

Product Number: 7750, 7751, 7752, 7755, 7756 & 7757

Davis Instruments Part Number: 7395.084

Fan-Aspirated Radiation Shield

Rev. B Manual (9/17/01)

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3465 Diablo Avenue, Hayward, CA 94545-2778

510-732-9229 • Fax: 510-732-9188

E-mail: info@davisnet.com • www.davisnet.com