DUSTTRAK™ AEROSOL MONITOR
SOLAR POWER KIT
MODEL 854060

(FOR DUSTTRAK™ II AND DRX AEROSOL MONITOR
MODELS 8540 AND 8543)

OPERATION AND MAINTENANCE MANUAL

P/N 6008416, REVISION B
JUNE 2016

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a. Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment;
b. DustTrak internal pump for Models 8530 and 8533 is warranted for two (2) years or 4000 hours, whichever comes first;
c. DustTrak External pump for Models 8530EP and 8533EP is warranted for two (2) years or 8760 hours, whichever comes first;
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Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at (800) 874-2811 (USA) or (001 651) 490-2811 (International) or visit www.tsi.com.

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Contents

Safety Information

W A R N I N G S

- Use of components other than those specified by TSI may impair the safety features provided by the equipment.
- The instrument has been design to be used with batteries supplied by TSI. Do ***not*** use a substitute

  Old batteries must be properly recycled in accordance with the local environmental regulations.
- Do ***not*** use non-rechargeable batteries in this instrument. Fire, explosions, or other hazards may result.
- If the solar power kit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Do **not** connect the Solar Cells **directly** to the 854030 Environmental Enclosure as this may result in damage. The Solar Cells **must** be connected to the Solar Battery Enclosure Box so they can be regulated by the Solar Charge Controller.

C a u t i o n

- The enclosure is designed to be water resistant to rain or spray. It has a NEMA rating of 3R. It is not designed to be waterproof when immersed. Setting it in a pool of water will result in flooding the inner compartment with water. This will severely damage both your battery pack.
  Do NOT set the Environmental Enclosure in **water**!

Description of Caution/Warning Symbols

Appropriate caution/warning statements are used throughout the manual and on the instrument that require you to take cautionary measures when working with the instrument.

Caution

Caution
Failure to follow the procedures prescribed in this manual might result in irreparable equipment damage. Important information about the operation and maintenance of this instrument is included in this manual.

Warning

WARNING
Warning means that unsafe use of the instrument could result in serious injury to you or cause damage to the instrument. Follow the procedures prescribed.

Caution and Warning Symbols

The following symbols may accompany cautions and warnings to indicate the nature and consequences of hazards:

	Warns that the instrument contains a laser and that important information about its safe operation and maintenance is included in the manual.
	Warns that the instrument is susceptible to electro-static discharge (ESD) and ESD protection should be followed to avoid damage.
	Indicates the connector is connected to earth ground and cabinet ground.

Reusing and Recycling

As part of TSI Incorporated's effort to have a minimal negative impact on the communities in which its products are manufactured and used:

- Do ***not*** dispose of used batteries in the trash. Follow local environmental requirements for battery recycling.
- If instrument becomes obsolete, return to TSI for disassembly and recycling.

Product Overview

The solar power kit provides power to allow continuous monitoring of Model 854030 Environmental Enclosure.

Setting Up

W A R N I N G

Refer to Solar charger manual for further installation and operation instructions.

The setup of the Environmental Enclosure is an important part in allowing reliable and accurate sampling of aerosols in a wide range of conditions. TSI cannot ensure accurate measurements if any of the components are set up incorrectly. Failure to follow these procedures could result in damage to the enclosure or its components.

Note

Prior to using the Battery Pack for the first time, a full recharge is recommended. **Recharging Battery Pack(s) immediately after use (within one hour maximum) is critical to obtaining optimal recharge time, battery health, and battery life.**

The full Solar Cell Power System is shown in Figure 1. The following section details the setup of this system.

Important
Make all Solar Cell Power System electrical connections in the order outlined below. Damage to the system can occur if connections are not made in this order.

Figure 1: Solar Cell Power System

1. Remove the Solar Battery from its packaging and place it in the Solar Battery Enclosure box. Make sure that the battery positive (+) terminal is on the left (the positive terminal is noted on the battery with a RED marking). Remove the battery terminals using an adjustable wrench and connect the ring terminal ended wires from the solar charge controller to the battery terminals (see Figure 2).

Note
There are two wires coming from the charge controller: one is **BLACK** and is labeled **(+);** the other is **WHITE** and is labeled **(–)**. The **BLACK (+)** wire should be connected to the battery positive **(+)** terminal, which has a red marking on the top of the battery. The **WHITE (–)** wire should be connected to the battery negative **(–)** terminal.

Figure 2: Install the Solar Battery and Connect to Controller

2. The next step is to attach the provided power cables with waterproof connectors to each Solar Cell.

   Remove the Solar Cell from its packaging and access the junction box on the end of the panel. Remove the screws and sealing strip from inside the box and set aside. Remove the center of one of the access holes which is labeled ½". Pass the power cable through that access hole while attaching the individual pieces of the cable strain relief, as shown in Figure 3.

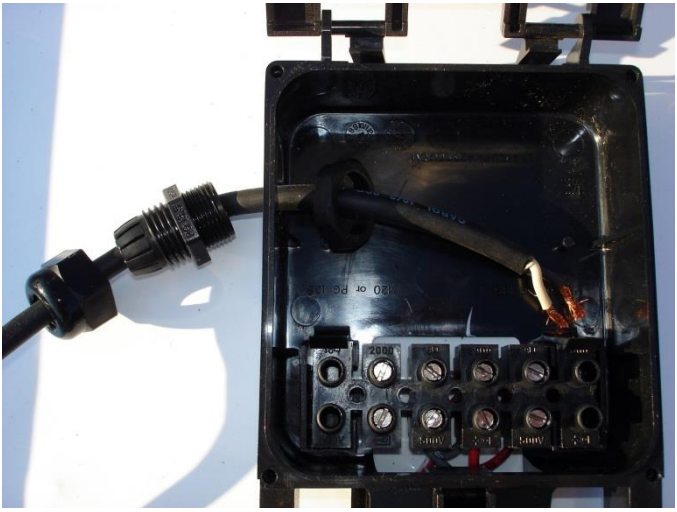

Figure 3: Strain Relief and Power Cable through Access Hole

3. Next, attach the power cable to the Solar Cell screw terminals as shown in Figure 4 and Figure 5.

Note
Make sure the wires are connected as shown below. Connecting the wires incorrectly can cause severe damage to the Solar Power System. Refer to the Solar Cell manufacturer's specification sheet for additional details. **BLACK** power cable wire connected to **RED** Solar Term. This is the **POSITIVE (+)** connection. **WHITE** power cable wire connected to **GREY** Solar Term. This is the **NEGATIVE (-)** connection.

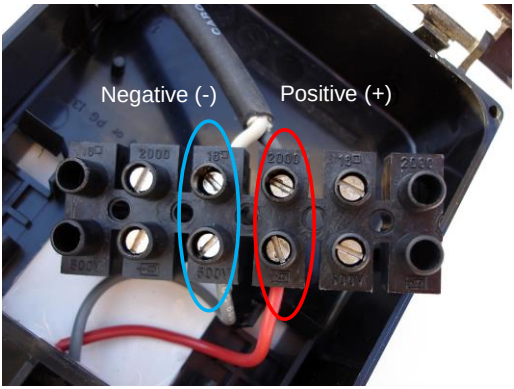

Figure 4: Power Cable Connection to Solar Cell Terminals (Supplier part number 485J and 490J. See solar panel instructions for details.)

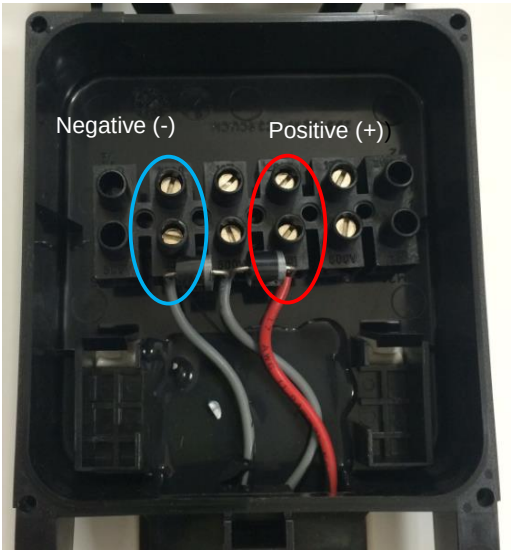

Figure 5: Power Cable Connection to Solar Cell Terminals. (Supplier part number 90J. See solar panel instructions for details).

4. With the wires tightened, secure the terminal block in its retaining clips, and tighten the strain relief connections to the power cable as shown in Figure 6.

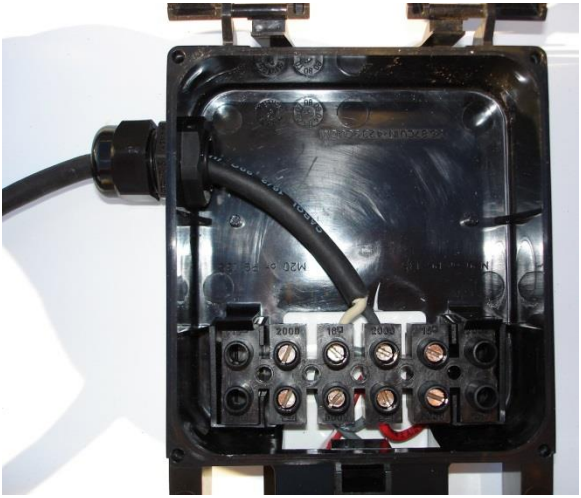

Figure 6: Secure Terminal Block and Tighten Strain Relief

5. Next, attach the sealing strip to the inside of the junction box cover, as shown in Figure 7.

Figure 7: Apply Sealing Strip to Junction Box Cover

6. Then attach the cover to the junction box using the supplied screws, as shown in Figure 8.

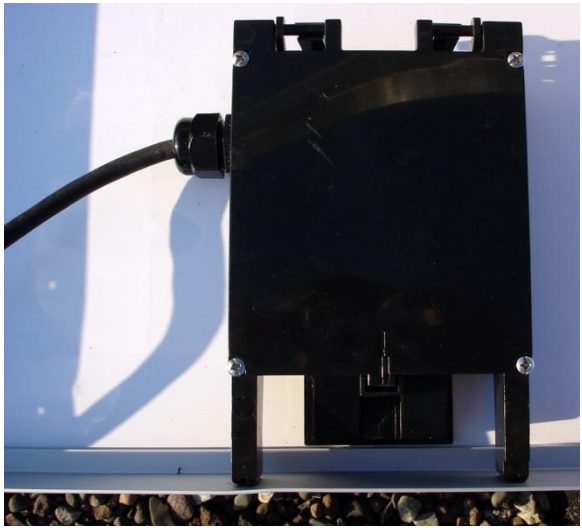

Figure 8: Attach Junction Box Cover

7. Now attach the two Solar Cells to the adjustable angle Mounting Frame using the supplied bolts, as shown in Figure 9.

Figure 9: Assemble the Solar Cells on the Mounting Frame

8. The support bar may also be attached to each side of the Mounting Frame, as shown in Figure 10.

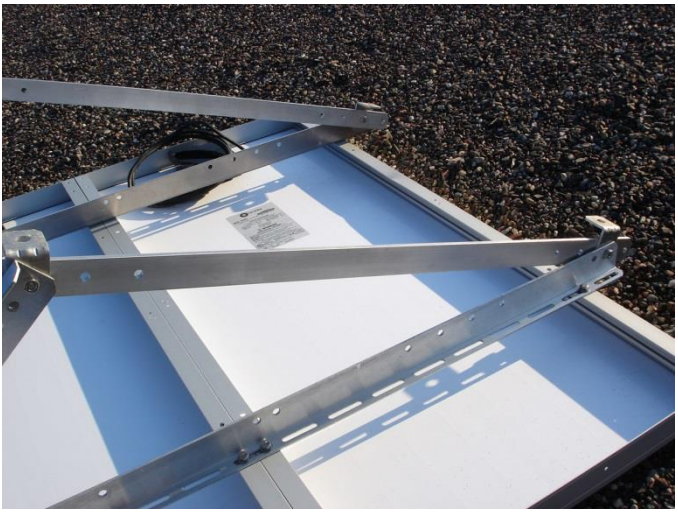

Figure 10: Assemble the Support Bar to the Mounting Frame

For best results, mount the Solar Cells at an angle directly pointed at the path of the sun, allowing the maximum power to be collected by the Solar Cells.

To secure the Mounting Frame to the ground, use the bolt locations at the end of each frame arm, or add sandbags or other weights to the support bar.

9. Connect the Solar Cell cables to the Solar Battery Enclosure box as shown in Figure 11. The Green LED on the Solar Charge Controller will illuminate when sunlight power is available, and the Solar Battery is charging.

W A R N I N G

Do **not** connect the Solar Cells **directly** to the 854030 Environmental Enclosure as this may result in damage. The Solar Cells **must** be connected to the Solar Battery Enclosure Box so they can be regulated by the Solar Charge Controller.

Figure 11: Connect Solar Cells to Battery Enclosure Box

10. Connect the Solar Battery Enclosure to the provided outdoor DC power cable with weatherproof connectors, as shown in Figure 12.

Figure 12: Connect Power from the Solar Cell Power System to the Environmental Enclosure

11. Insert the cable into the cable assembly as shown in Figure 13.

Figure 13: DC Cable Preparation

12. Remove bottom left plastic plug from the DustTrak Environment Enclosure and insert the cable through the hole as shown in Figure 14.

Figure 14: DC Cable Preparation

13. Using a small screwdriver, connect the bare wires to the front panel connector outside of the enclosure as shown in Figure 15. The blue wire to terminal “N” and the brown wire to terminal “L”.

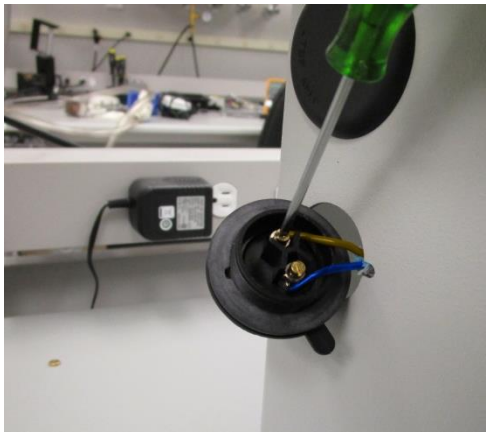

Figure 15: DC Cable Preparation

14. Rotate connector to align tab on the connector to the notch in the enclosure hole. Figure 16.

Figure 16: DC Cable Connector

15. While holding the connecter in the enclosure notch, tighten the back-shell onto the connector as shown in Figure 17.

Figure 17: DC Cable Backshell

16. Tighten the gland nut into the back-shell as shown in Figure 18.

Figure 18: DC Cable Gland Nut

17. Connect phoenix grey connector to the power input on the DIN rail as shown in Figure 19.

Figure 19: DC Cable to DIN rail

18. Affix DC label next to DC input connector as shown in Figure 20.

Figure 20:DC Power Label

19. Connect DC power cord from solar enclosure as shown in Figure 21.

Figure 21: DC Cable from Solar Battery to Environmental Enclosure

Operation

Overview

Prior to using the Solar Cell Power System for the first time, a full recharge of the Solar Battery is recommended. Simply allow the Solar Battery to charge for a day with sunlight power from the connected Solar Cells.

The Solar Charge Controller has built-in low voltage cutout protection for the Solar Battery. If extended non-sunlight conditions occur, causing the Solar Battery to become deeply discharged, the Solar Charge Controller temporarily cuts off output power. The Red LED on the Solar Charge Controller will illuminate when this condition occurs. Once sunlight returns, and the Solar Battery has been recharged to an appropriate level, the Red LED will turn off and the Solar Charge Controller will re-enable the power output.

The Green LED on the Solar Charge Controller will illuminate when sunlight power is available, and the Solar Battery is charging.

Specifications

Specifications are subject to change without notice.

Power Requirements	
Solar System Run-time	Continuous (with adequate sunlight)
Rated Maximum Cell Power	80 watts (per Cell)
Power Tolerance	±5%
Nominal Voltage	12 Volts
Solar System Battery	12 VDC, 100 Ah
Battery Run-time	90 to 120 hours (typical, full-charge to power cutoff, when no sunlight for charging)
Battery Charge Time	<10 hours at 72°F (22°C) (New battery, deep discharge to 95% charge, with adequate sunlight)
Operating Temperature	32 to 120°F (0 to 50°C)
Storage Temperature	-4 °F to 140°F (-20 to 60°C)

Physical (Solar Panels)	
Dimensions (HWD)	2 x 43 x 48 in. (5 x 109 x 122 cm)
Weight	34 lbs (15.3 kg)

Physical (Battery and Case)	
Dimensions (HWD)	8.5 x 15.3 x 17 in. (22 x 39 x 43 cm)
Weight	85 lbs (38.3 kg)

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