

# Morningstar

## Remote Temperature Sensor

### Installation and Operating Instructions

#### WHEN TO USE

The RTS is compatible with all Morningstar products that support a Remote Temperature Sensor (RTS) option. These products include the ProStar™, SunKeeper™, SunSaver Duo™, SunSaver MPPT™, and TriStar™ solar controllers.

***Note that the RTS may only be used with ProStars manufactured after May 2001 (bar code label: after 0122xx - year 2001 / week 22).***

Use of the RTS is recommended whenever the temperature at the battery will be more than 5 °C (9 °F) different than the temperature at the controller. The TriStar has no on-board temperature compensation; therefore the use of the RTS is required for temperature compensated charging.

#### OPERATION

The RTS is encapsulated in epoxy inside a terminal lug for maximum protection. The RTS will correct for temperatures from -30 °C (-22 °F) to +80 °C (+176 °F). The RTS is also protected from lightning surges and short circuits. As soon as the RTS is connected, the controller will begin to use the battery temperature for charge control. The RTS can be connected at any time during operation. Disconnecting the RTS during operation may cause the controller to enter a fault / error condition. Refer the controller's documentation for more information.

#### TESTING

If the controller has a digital meter, the RTS temperature measurement can be viewed to confirm that the RTS is properly connected. Refer to the product meter documentation for more information.

If the controller does not have a meter or meter option, connect the RTS and then disconnect the RTS. The controller should indicate a fault / error LED sequence. Reconnect the RTS and the fault /error should clear, indicating that the RTS was successfully connected.

#### EXTENDING CABLE LENGTH

If the battery is located more than 10 meters (33 ft) from the controller, the RTS cable length can be extended up to 30 meters (100 ft.).

It is recommended that the original remote sensor cable be cut and the new cable soldered into the middle. Solder the spliced wire connections and tape or seal the bare wires.

The new cable extension should be a shielded, twisted pair cable. The new wires should be at least 0.34 mm<sup>2</sup> (22 AWG), and a larger size 1.0 mm<sup>2</sup> (18 AWG) is recommended for best performance.

#### SPECIFICATIONS

- Power lug housing: 9.5 mm ( 3/8" ) screw hole
- 10 meter 2-conductor copper cable with PVC jacket
- Cable rated UL CMR
- Accuracy +/- 1.5 °C ( 2.7°F )
- UL recognized component for use with TriStar
- CE certified for use with all supported Morningstar Products

#### Morningstar Corporation

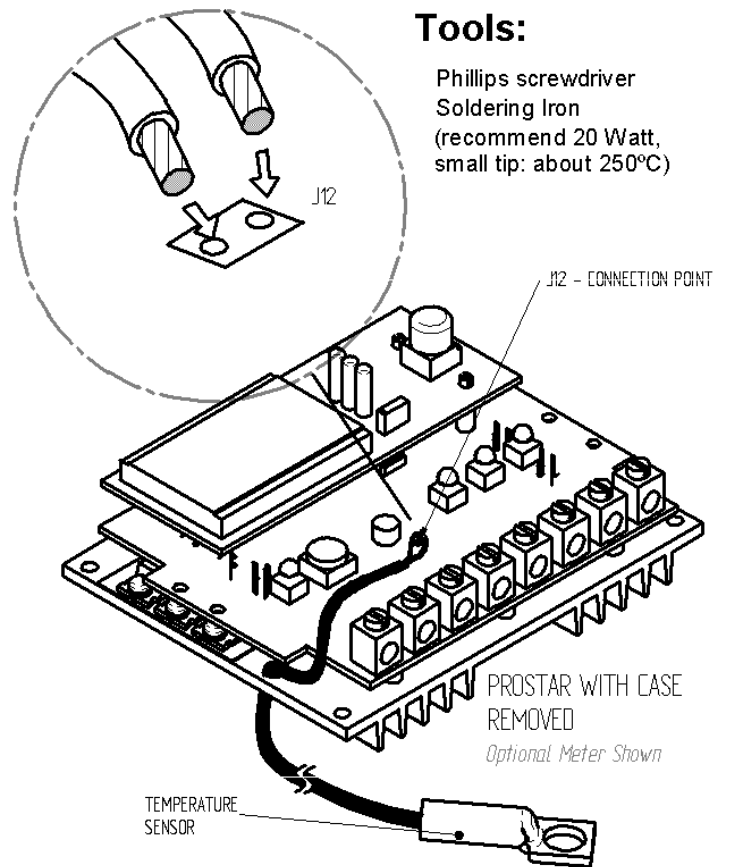
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## ProStar Temperature Sensor Installation Instructions:

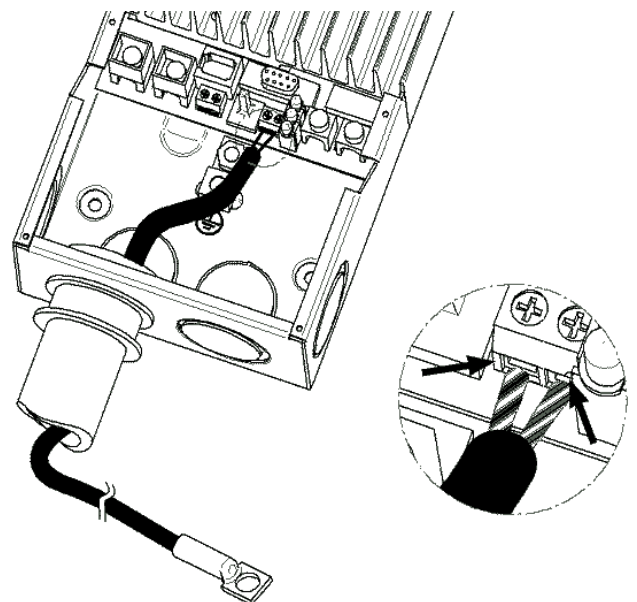
**NOTE:** The ProStar circuits are static sensitive. Be sure to touch a metallic grounded object to discharge built-up static charge on your body before touching the circuits.

1. Remove the 4 Phillips screws in the corners of the heat sink and remove the plastic case.
2. Pull about 3 inches(80mm) of the probe wire through the heat sink as shown.
3. Solder a sensor wire into each of the two holes at J12(see drawing). There is no polarity(+ or -), so either wire can go into either hole.
4. Carefully replace the plastic case. Make sure all 4 corners of the heat sink are flat against the case mounting posts. If the sensor wire interferes with the assembly, push or pull the wire slightly to clear the interference.
5. Replace the 4 case screws. **DO NOT** over-tighten the screws.
6. The temperature sensor should be located next to the battery. For best results, insulate the temperature sensor from surrounding air so that only the temperature of the battery is measured. (note: **DO NOT** place the sensor inside the battery cell)



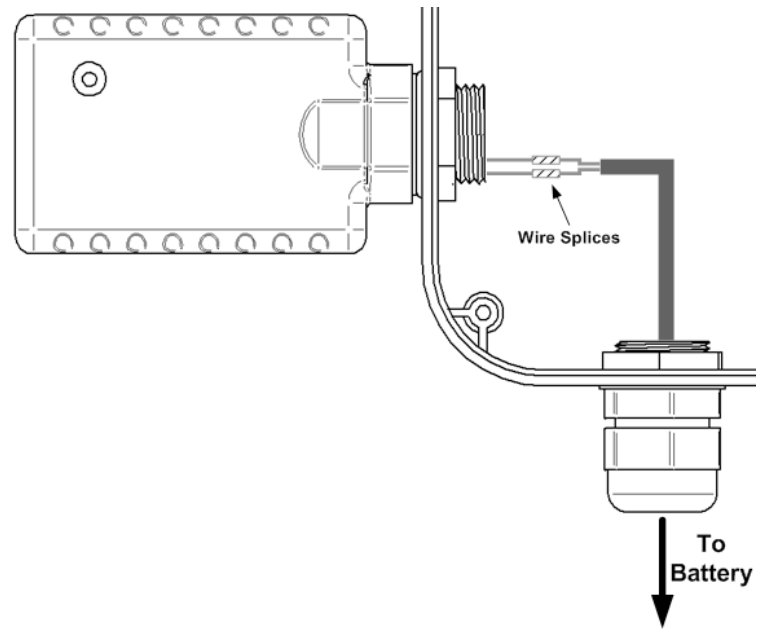
## TriStar Temperature Sensor Installation Instructions:

1. Run the temperature sensor cable down the wire conduit. Be sure to feed enough wire to allow for adjustments.
2. Pull the temperature sensor cable into the TriStar wiring compartment. Inspect the cable end. There should be two conductors with tinned ends. If needed, strip away approximately 0.25" of insulation from each conductor.
3. Insert one (1) conductor into each terminal on the dual terminal block labeled "REM. TEMP" as illustrated. Note that the temperature sensor is not a polar device. Either conductor can go into each of the terminals.
4. Secure the conductors in the terminal block using a flat head or Philips screwdriver.
5. The temperature sensor should be located next to the battery. For best results, insulate the temperature sensor from surrounding air so that only the temperature of the battery is measured. (note: **DO NOT** place the sensor inside the battery cell)



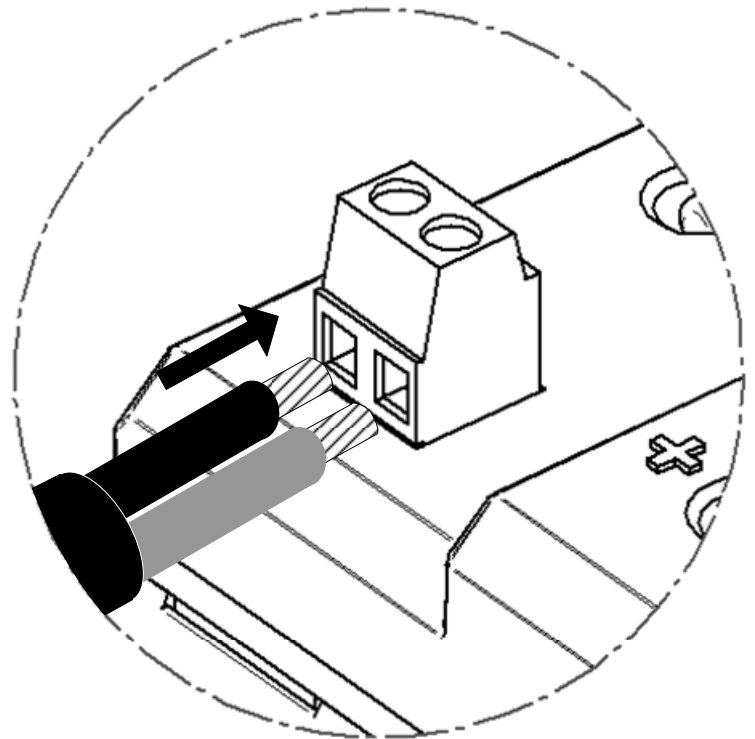
## SunKeeper Temperature Sensor Installation Instructions:

1. Secure the Remote Temperature Sensor lug to one of the battery posts. The RTS lug is electrically isolated. (note: **DO NOT** place the sensor inside the battery cell)
2. Route the RTS cable to the SunKeeper. Route the cable through the conduit or protect the cable with grommets and wire loom as necessary. Excess cable can be trimmed as necessary.
3. Cut the blue Temperature Compensation Loop on the SunKeeper in the middle of the wire loop, creating two (2) equal length wire leads.
4. Strip  $\frac{1}{2}$ " (13 mm) of insulation off all wire leads.
5. Crimp or splice the two (2) blue wire leads to the two RTS wires (red & black). Polarity is not important.
6. Wrap the spliced ends in electrical tape.



## SunSaver Duo Temperature Sensor Installation Instructions:

1. Secure the Remote Temperature Sensor lug to one of the battery posts. The RTS lug is electrically isolated. (note: **DO NOT** place the sensor inside the battery cell)
2. Route the RTS cable to the SunSaver Duo. Protect the cable with grommets and wire loom as necessary. Excess cable can be trimmed as necessary. If needed, strip away approximately 0.25" of insulation from each conductor.
3. Insert one (1) RTS conductor into each terminal on the dual terminal block labeled "Remote Temp." as illustrated. Note that polarity is not important.
4. Secure the conductors in the terminal block using a flat head or Philips screwdriver.



## SunSaver MPPT Temperature Sensor Installation Instructions:

1. Secure the Remote Temperature Sensor lug to one of the battery posts. The RTS lug is electrically isolated. (note: **DO NOT** place the sensor inside the battery cell)
2. Route the RTS cable to the SunSaver MPPT. Protect the cable with grommets and wire loom as necessary. Excess cable can be trimmed as necessary. If needed, strip away approximately 0.25" of insulation from each conductor.
3. Insert one (1) RTS conductor into each terminal on the RTS terminal block as illustrated. Note that polarity is not important.
4. Secure the conductors in the terminal block using a small flat head screwdriver.

