

APPLICATION NOTE NUMBER 23

HOW TO INSTALL A REMOTE TEMPERATURE SENSOR

Introduction

Temperature compensation is a system that varies the output voltage of the charger depending on inputs from a temperature sensor. Temperature compensation reduces charger output voltage at high temperatures, and vice-versa. Remote temperature compensation is required for ultracapacitor charging and should be used in applications where battery and charger are located in different ambient conditions. The following describes connecting a remote temperature sensor (RTS) for such applications. See the appropriate charger user manual for further temperature compensation information.

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IQ Charger& battery: Installation

Remote temperature sensing is available in the IQ charger when an optional CommsGenius communications board is included.

A. Secure RTS at battery/ultracapacitor:

- 12 or 24V systems (two options):
 1. Connect the RTS to a *grounded* battery/ultracapacitor terminal using the battery/ultracapacitor clamp bolt as shown in Figure 1, OR
 2. Connect the RTS to the battery/ultracapacitor case as shown in Figure 2. When securing to the case, use an adhesive/glue properly rated for the application material and temperature, such as Super Glue®.
- 48V, 120V, 240V systems:

Connect the RTS only to the battery/ultracapacitor case as shown in Figure 2. When securing to the case, use an adhesive/glue properly rated for the application material and temperature, such as Super Glue®.

FIGURE 1

12V & 24V ONLY:
RTS mechanical connection to negative ground



FIGURE 2

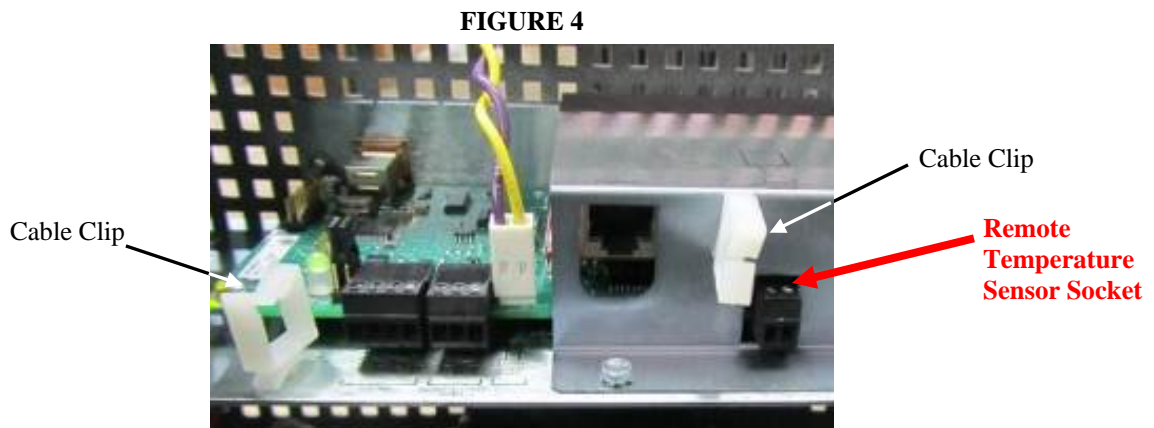
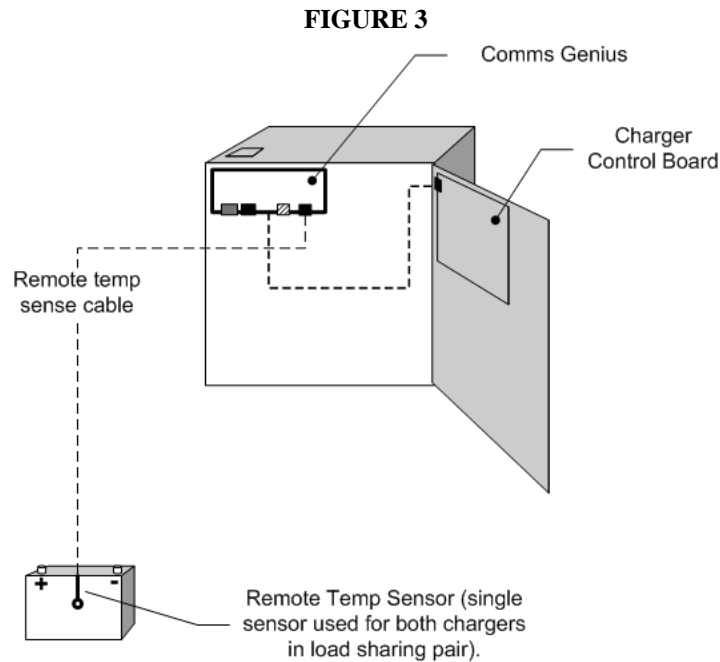
48V, 120V, 240V
RTS adhesive connection to case ONLY



Note: In systems with more than two batteries/ultracapacitors, attach the RTS to the case of the middle battery/ultracapacitor, which is normally the hottest battery/ultracapacitor and the best representation of overall battery/ultracapacitor temperature.

B. Connect RTS in charger:

1. Attach the sensor to the two-position connector provided with the CommsGenius communications board by inserting RTS wire ends in connector and tightening screws. The temperature sensor is not polarity-sensitive.
2. Cable enters the charger at the opening at the top left side of the chassis. Keep signal cables away from the AC and DC power wiring!
3. The two-position connector attaches to the mating socket on the CommsGenius communications board. Use the cable clips on the CommsGenius communications board bracket to support the cable and connector. See Figures 3 and 4.



NRG Charger & battery: Installation

A. Secure RTS at battery/ultracapacitor (two options):

1. Connect the RTS to a *grounded* battery/ultracapacitor terminal using the battery/ultracapacitor clamp bolt as shown in Figure 5, OR
2. Connect the RTS to the battery/ultracapacitor case as shown in Figure 6. When securing to the case, use an adhesive/glue properly rated for the application material and temperature, such as Super Glue®.

FIGURE 5

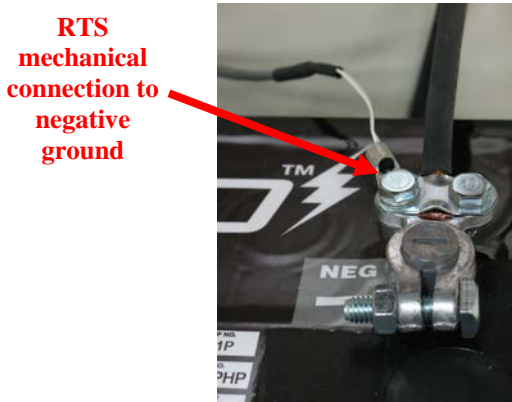
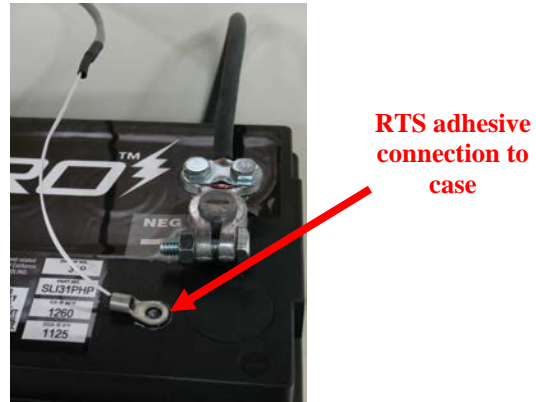


FIGURE 6

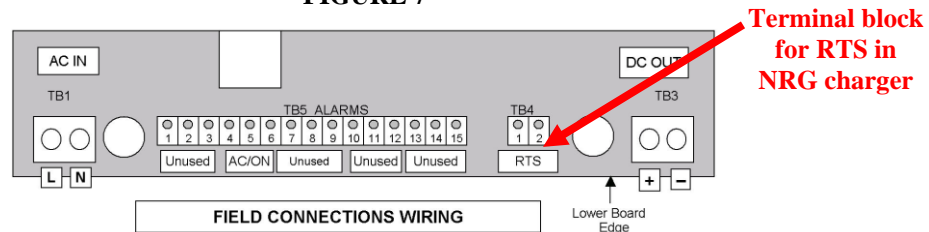


Note: In systems with more than two batteries/ultracapacitors, attach the RTS to the case of the middle battery/ultracapacitor, which is normally the hottest battery/ultracapacitor and the best representation of overall battery/ultracapacitor temperature.

B. Connect RTS in charger:

1. Remove the internal sensor (thermistor) from TB4 on the circuit board. See Figure 7.
2. Connect the remote sensor leads to TB4. The sensor is not polarized, it does not matter which lead connects to terminal 1.
3. Route sensor wiring through the plastic bushing below TB5, keeping the conductors at least ¼ inch (6 mm) away from DC wiring, AC wiring, and the circuit board.

FIGURE 7



MicroGenius 150 Charger & battery: Installation

A. Secure RTS at battery/ultracapacitor (two options):

1. Connect the RTS to a *grounded* battery/ultracapacitor terminal using the battery/ultracapacitor clamp bolt as shown in Figure 8, OR
2. Connect the RTS to the battery/ultracapacitor case as shown in Figure 9. When securing to the case, use an adhesive/glue properly rated for the application material and temperature, such as Super Glue®.

FIGURE 8

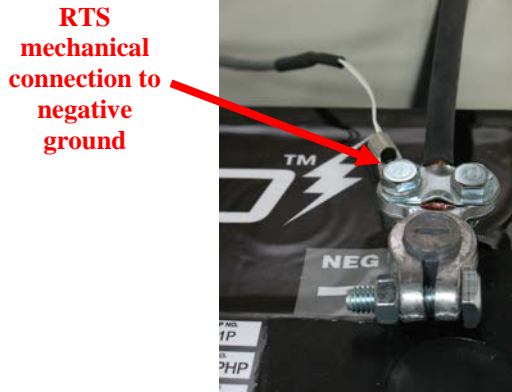
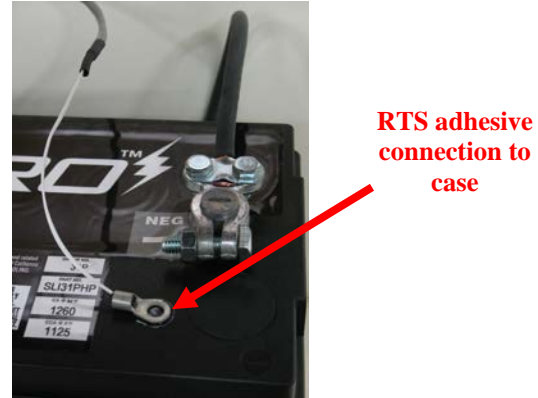


FIGURE 9

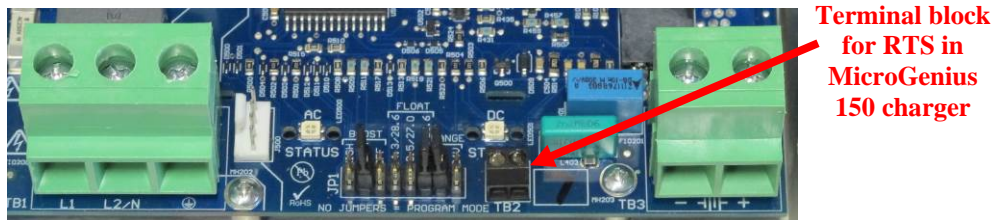


Note: In systems with more than two batteries/ultracapacitors, attach the RTS to the case of the middle battery/ultracapacitor, which is normally the hottest battery/ultracapacitor and the best representation of overall battery/ultracapacitor temperature.

B. Connect RTS in charger:

1. Remove the internal sensor (thermistor) from TB2 on the circuit board (if present). See Figure 10.
2. Connect the remote sensor leads to TB2. The temperature sensor is not polarity-sensitive.
3. Route sensor wiring through the center conduit opening at bottom of charger, keeping the conductors at least ¼ inch (6 mm) away from DC wiring, AC wiring, and the circuit board.

FIGURE 10



MicroGenius 2 Charger & battery: Installation

A. Secure RTS at battery/ultracapacitor (two options):

1. Connect the RTS to a *grounded* battery/ultracapacitor terminal using the battery/ultracapacitor clamp bolt as shown in Figure 11, OR
2. Connect the RTS to the battery/ultracapacitor case as shown in Figure 12. When securing to the case, use an adhesive/glue properly rated for the application material and temperature, such as Super Glue®.

FIGURE 11

**RTS
mechanical
connection to
negative
ground**



FIGURE 12

**RTS adhesive
connection to
case**

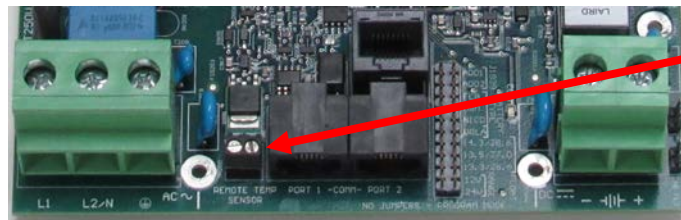


Note: In systems with more than two batteries/ultracapacitors, attach the RTS to the case of the middle battery/ultracapacitor, which is normally the hottest battery/ultracapacitor and the best representation of overall battery/ultracapacitor temperature.

B. Connect RTS in charger:

1. Connect the remote sensor leads to TB900. The temperature sensor is not polarity-sensitive.
2. Route sensor wiring through the center conduit opening at bottom of charger, keeping the conductors at least ¼ inch (6 mm) away from DC wiring, AC wiring, and the circuit board.

FIGURE 13



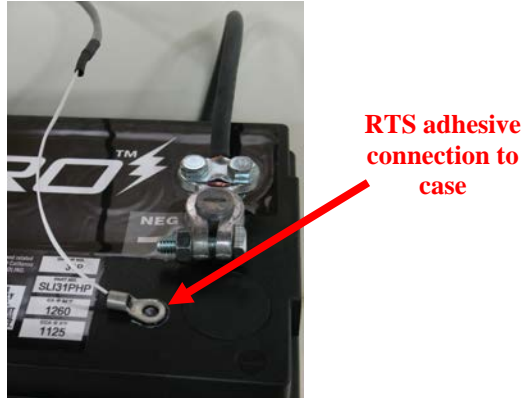
**Terminal block
for RTS in
MicroGenius 2
charger**

ECU Charger & battery: Installation:

A. Secure RTS at battery/ultracapacitor:

Connect the RTS only to the battery/ultracapacitor case as shown in Figure 11. When securing to the case, use an adhesive/glue properly rated for the application material and temperature, such as Super Glue®.

FIGURE 14



Note: In systems with more than two batteries/ultracapacitors, attach the RTS to the case of the middle battery/ultracapacitor, which is normally the hottest battery/ultracapacitor and the best representation of overall battery/ultracapacitor temperature.

B. Connect RTS in charger:

- Remove the internal sensor (thermistor) from TB1 on the Control Board. See Figure 12.
- Connect the remote sensor leads to TB1, positions 1 and 2. The temperature sensor is not polarity-sensitive.
- Route sensor wiring as directly as possible from Control Board to the conduit opening on the top left of charger enclosure, keeping the conductors at least ¼ inch (6 mm) away from DC wiring, AC wiring, and the circuit boards.

FIGURE 15

**Remote Temperature
Sensor Terminal
Block TB1**

