JA5015-51
(http://www.atseries.net/PDFs/JA5015-51.pdf)

Installation & Operating Instructions

ATevo Series
REMOTE BATTERY TEMPERATURE PROBE
(p/n EJ5304-##)

INSPECTION

Upon opening this bagged kit (manufacturer's ordering p/n EJ5304-##), please inspect and check that the following items are included:

- ☐ one (1) battery temperature probe (A10)
- ☐ one (1) cable assembly of desired length
- ☐ six (6) plastic zip ties
- ☐ one (1) print of JA5015-51 (*this instruction*)

BACKGROUND

Battery manufacturers specify recommended float and equalize voltages at 25 °C (77 °F) for their product. In order to prolong battery life and ensure reliable operation, temperatures above or below the *nominal* 25 °C require slightly lower or higher voltages (respectively). The Battery Temperature Compensation (or TempCo) feature for ATevo automatically *adjusts* the charger's dc output voltage, based upon battery temperature. The external battery probe allows ATevo to provide:

- voltage compensation based on battery temperature
- battery temperature value (°C) *monitoring*
- a battery overtemp *alarm*

The **A10** probe contains a temperature-dependent resistor encased within an epoxy module. For mounting, the epoxy is housed within a tin-plated crimped ring lug. The probe is installed on (or near) the battery. The entire TempCo option can be purchased with ATevo, or easily field installed later.

| NOTICE | *If the ATevo TempCo feature is being utilized with a* **HindleHealth+** *smart battery shunt, use these instructions along with HH+ document* (JA5136-00)*.* |

SETUP

| ⚠ WARNING | *DISCONNECT AND LOCK OUT ALL AC AND DC POWER SOURCES TO THE BATTERY CHARGER BEFORE PROCEEDING. ONLY QUALIFIED SERVICE TECHNICIANS SHOULD PERFORM THE FOLLOWING PROCEEDURES. FOLLOW ALL NEC, LOCAL, AND SITE SAFETY STANDARDS AND PROCEDURES.* |

There are four (4) stages to installation. The full detailed procedure is found in pages 2-6:

1) install TempCo interconnection cable into ATevo
2) connect charger-end of cable to ATevo BATT TEMP terminal block (**TB8**)
3) mount probe assembly (**A10**) on or near battery
4) configure ATevo to recognize TempCo feature

ATevo TempCo

PROBE

The ATevo battery temperature probe (**A10**) is the same for all battery types (size, chemistry & technology). The same probe (spare p/n EJ5032-01) works with all ATevo models, regardless of dc bus voltage. TempCo accessory kits (p/n EJ5304-##) differ, depending on cable length (25ft, 50ft, 100ft, etc).

INSTALLATION (for standard *external* probe)

1) Turn off (open) both ATevo front panel circuit breakers (CB1/CB2).
2) De-energize and lock out all external ac and dc voltages.
3) Allow internal voltages to dissipate.
4) Open the ATevo front panel door, and remove safety shield.
5) Verify no hazardous voltages are present (with a voltmeter).
6) Install supplied TempCo cable:
    - Identify end of cable with two (2) stripped wires and a quick-connect terminal.

    - Insert *this* end to inside of ATevo enclosure.
    - Run cable through conduit that does *not* contain power wiring.
    - Leave 30in / 762mm of cable inside ATevo.
    - Coil up excess cable.
    - Make sure all wiring conforms to NEC, local, and site requirements.
    - Route other end of cable toward the battery.
7) Attach interconnection cable to the ATevo signal terminal block marked "**BATT TEMP**".
    - See page 3 (**7A**) for mounting in **Style-5054** enclosure on Power Board (A2).
    - See page 4 (**7B**) for mounting in **Style-5070** enclosure on I/O / MOV Board (A9).
    - See page 5 (**7C**) for mounting in **Style-5030**, **Style-163**, or **Style-198** enclosures on Power Board (A2).

INTERNAL PROBE (*optional*)

1) If the unit features an *internal* TempCo probe (option p/n EJ5304-00), no installation is required.
2) The ATevo is set up for charger dc voltage compensation, based on the ambient temperature *inside* the charger enclosure, not the temperature *at* the battery.
3) The temperature probe is securely mounted inside the enclosure assembly.
4) The TempCo probe signal cable is factory pre-wired to the Power Board (A2).
5) Jump to the **CONFIGURATION** Section, on page 7.

STYLE-5054

7A) Refer to the images below of the Style-5054 Power Board (A2). This component is mounted on the life side the ATevo assembly. Connect the TempCo signal cable per the bulleted steps:

- Route TempCo cable to lower end of the Power Board (A2). **A**
- Locate the 2-position **BATT TEMP** terminal block (**TB8**) on the Power Board. **B**
- Using the stripped ends from the twisted pair, insert one (1) wire into each position of terminal block (A2-TB8). **C** Connection points are *not* polarity sensitive.
- Tighten screws at the front of terminal block (TB8) onto secure wires. **D**
- Locate the EARTH quick-connect terminal, at the bottom of the Power Board (A2). **E**
- Carefully pull off the quick-connect terminal (and wire) from the EARTH terminal.
- Attach the quick-connect slip-on lug, at the end of TempCo cable's shield wire, onto the Power Board EARTH terminal. **F**
- Connect the quick-connect terminal, removed from EARTH terminal, to 'piggy-back' terminal on the end of the TempCo cable's shield wire. **G**
- Fasten the TempCo cable to existing wire harness with plastic zip ties.
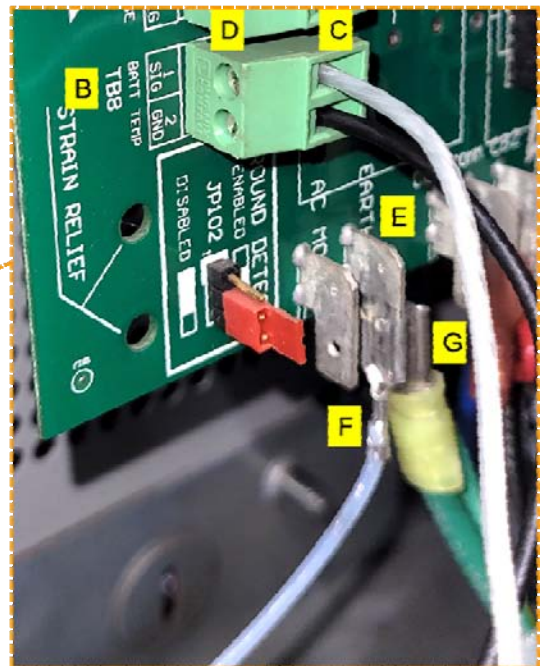
- Refer to the detail image to the right.
- Identify the A2-**TB8** terminal block.
- Identify the EARTH quick-connect spade terminal.
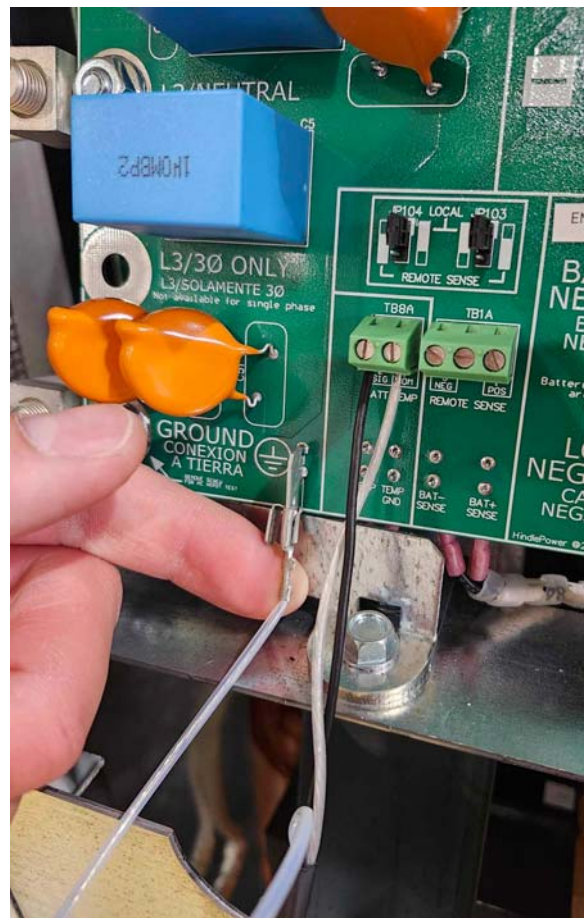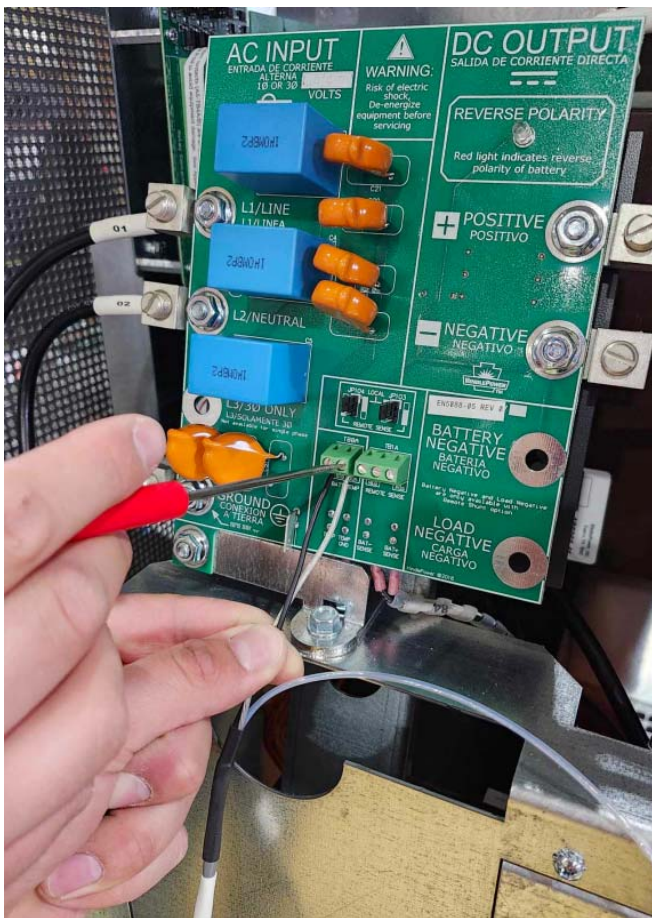
- Skip forward to Step 8 on page 6.
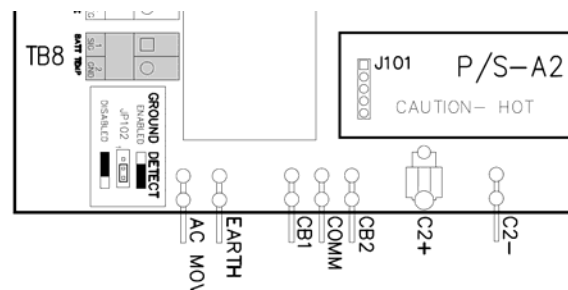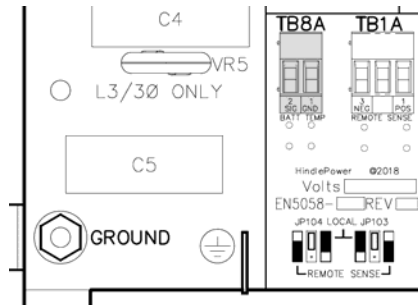
ATevo TempCo

STYLE-5070

7B) Refer to the images below of the Style-5070 I/O Board (A9). This component is mounted at the center-front of the ATevo assembly. Connect the TempCo signal cable per the bulleted steps:

- Route the TempCo cable to the lower end of the I/O Board (A9).
- Locate the 2-position **BATT TEMP** terminal block (**TB8A**) on the I/O Board.
- Using the stripped ends from the twisted pair, insert one (1) wire into each position of terminal block (A9-TB8A). Connection points are *not* polarity sensitive.
- Tighten screws at the front of terminal block (TB8A) onto secure wires.
- Locate the GROUND quick-connect terminal, at the bottom of the I/O Board (A9).
- Attach the quick-connect slip-on lug at the end of the TempCo cable's shield wire.
- Fasten the TempCo cable to existing wire harness with plastic zip ties.

- Refer to the detail image to the right.
- Identify the A9-**TB8A** terminal block.
- Identify the GROUND quick-connect spade terminal.

- Skip forward to Step 8 on page 6.

STYLE-5030, -163, -198

7C) Refer to the images below of the Style-5030/163/198 Power Board (A2). This component is bracket-mounted in the upper-right corner of the ATevo assembly. Connect the TempCo signal cable per the bulleted steps:

- Route the TempCo cable to the bottom-left corner of the Power Board (A2)
- Locate the 2-position **BATT TEMP** terminal block (**TB8**) on the Power Board.
- Using the stripped ends from the twisted pair, insert one (1) wire into each position of terminal block (A2-TB8). Connection points are *not* polarity sensitive.
- Tighten screws at front of terminal block (TB8) onto secure wires.
- Locate the SHIELD quick-connect terminal, to the right and below TB8.
- Attach the quick-connect slip-on lug at the end of the TempCo cable's shield wire.
- Fasten the TempCo cable to ATevo sidewall with plastic zip ties.
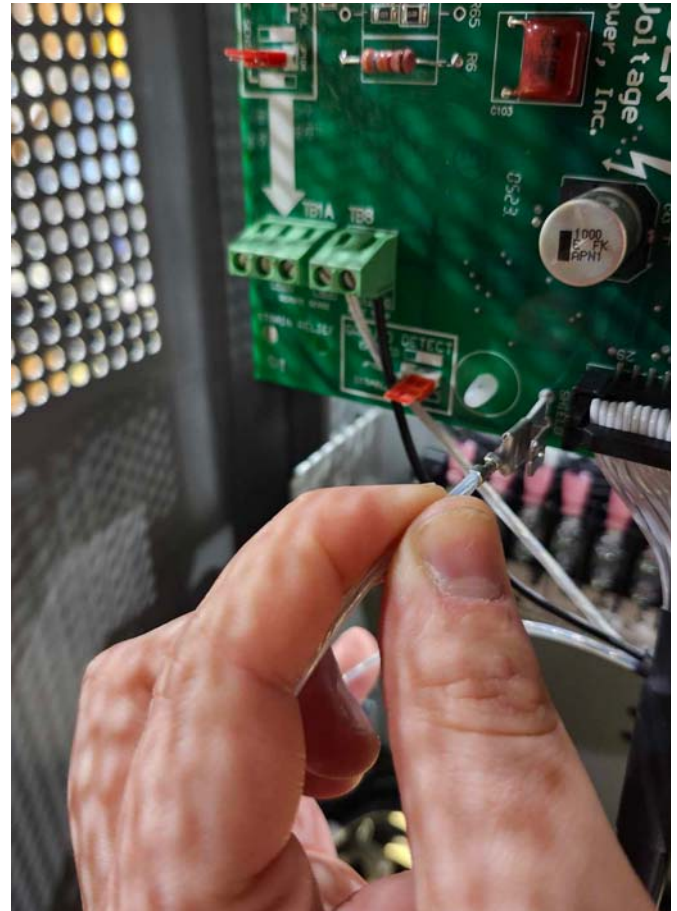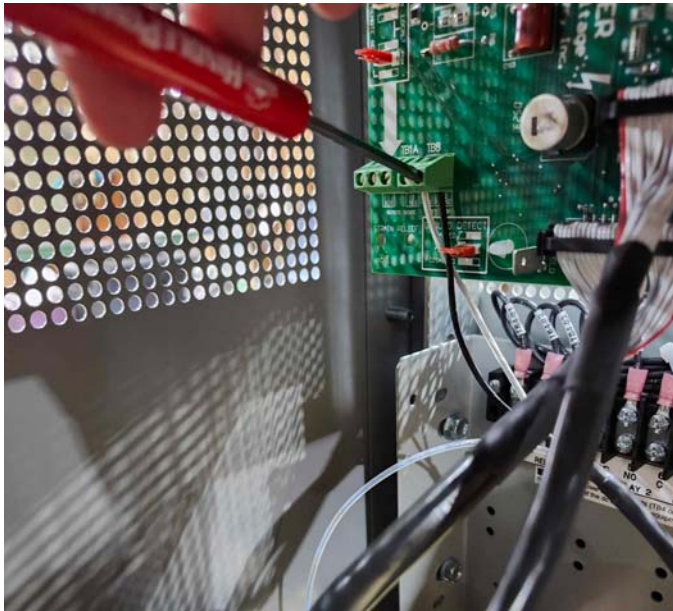
- Refer to the detail image to the right.
- Identify the A2-**TB8** terminal block.
- Identify the SHIELD quick-connect spade terminal.

- Continue on to Step 8 on page 6.
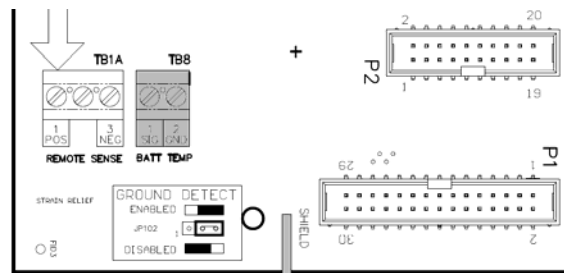
INSTALLATION (*continued*)

8) At *battery* location, insert the **A10** TempCo probe's two (2) <mark>red</mark> quick-connect lugs into the cable's two (2) <mark>pink</mark> quick-connect lugs. Polarity of lugged connections is ***not*** important.
9) Refer to image below.
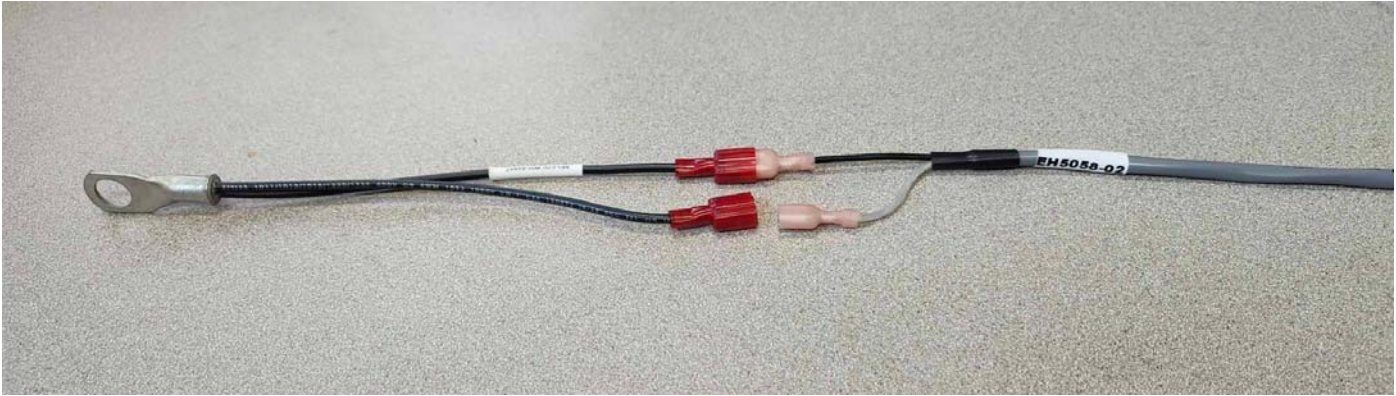
10) Mount connected probe (A10) on, or as close as possible to, the battery.

> **NOTICE** *Consult battery manufacturer documentation for mounting restrictions and material compatibilities.*

11) For most accurate results, the manufacturer of ATevo recommends mounting the TempCo probe to an inter-cell connector, at the middle of the battery string.

> ⚠ **CAUTION** *Dangerous voltages exist at the battery.*

12) Carefully remove hardware on one (1) battery post inter-cell connector.
13) Clean and dry the post, connector, and/or mounting hardware if required.
14) Place the 3/8in hole ring lug on top of one (1) of the open battery posts (pos[+] *or* neg[-]).
15) Replace the inter-cell connector mounting hardware.
16) Tighten hardware, securing TempCo probe in place.
17) Replace any protective coverings.
18) Refer to image to right for *example* of installed TempCo probe. Other installations may differ depending on available battery mounting provisions.
19) Coil up and secure excess cable with a nylon zip tie to prevent damage.
20) Inspect work at battery, and confirm installation.
21) Return to ATevo, check your work, and confirm that:
    - Twisted-pair wires of TempCo cable are connected to 2-pos terminal block (**TB8**).
    - The TempCo shield is connected to EARTH/GROUND.
    - All connections are secure.
22) Replace safety shield, close front panel door, and restart ATevo.

CONFIGURATION

1) Access the front panel display to enable and configure ATevo for battery temperature monitoring.
2) Select the **MENU** button, and use the directional arrow buttons to navigate.
3) From the **Main Menu** screen, select **BATTERY SETTINGS** with the **EDIT/ENTER** button.
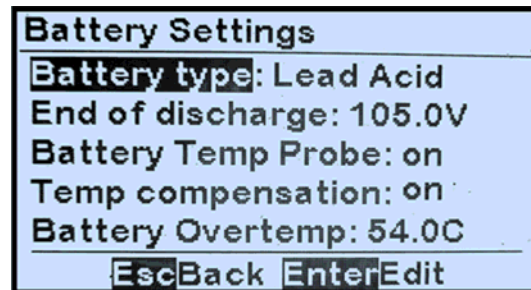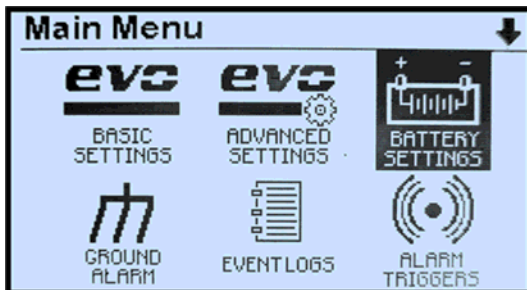
  >   >

4) Use the arrows to scroll *down* to "Battery Temp Probe", and select **EDIT/ENTER**.
5) Use the arrows to select "**on**" (versus "off").
6) "Temp compensation" (and "Battery overtemp") will appear.
7) Scroll to "**Temp compensation**", and select **EDIT/ENTER**.
8) Use the arrows to select "**on**" (versus "off").

> **NOTICE**   Turning on Temperature Compensation *without* a battery probe (A10) connected to ATevo, will generate a temperature probe *failure alarm*.

9) Set the battery *type* for temperature compensation.
10) Go *back* to **BATTERY SETTINGS**, and select **Battery Type**.
11) Select between **NiCd** or **Lead Acid**.
12) This setting is irrelevant unless a TempCo probe is connected to ATevo, and the probe is enabled.

ATevo TempCo

USING TempCo

When equipped (and enabled) with the TempCo option, the ATevo control logic auto-adjusts dc output voltage applied to the battery. This keeps float current constant, and avoids overcharging and undercharging. The probe senses battery temperature variation, and *adjusts* output float & equalize voltages to compensate. If battery temperature increases, ATevo's dc output voltage *decreases*.

NOTICE   If the ATevo experiences any inconsistencies when the probe is installed, temporarily *disable* TempCo per **CONFIGURATION**, listed above. Refer to the following bullets:

- Set Float & Equalize to values recommended by the *battery manufacturer* for 77 °F / 25 °C.
- When Float or Equalize voltages are entered or adjusted, the ATevo front panel meter displays the 77 °F / 25 °C value, even if the battery is warmer or cooler than 77 °F / 25 °C.
- ATevo *actual* dc output voltage may be different from the set point, if the battery is warmer or cooler than 77 °F / 25 °C.
- Use a digital meter to measure actual output voltage.
- Determine temperature at the probe.
- Use the graph on page 9 to verify that output voltage is correct.
- If battery temperature falls below 32 °F / 0 °C, there will be no further increase in ATevo output voltage. Likewise, if battery temperature rises above 122 °F / 50 °C, there will be no further decrease in output voltage.

HOME SCREEN WITH TempCo OPTION

Additional parameters appear on the ATevo front panel display **HOME SCREEN**, when the TempCo option is properly installed and enabled ("Battery Temp Probe" is set to "**on**").
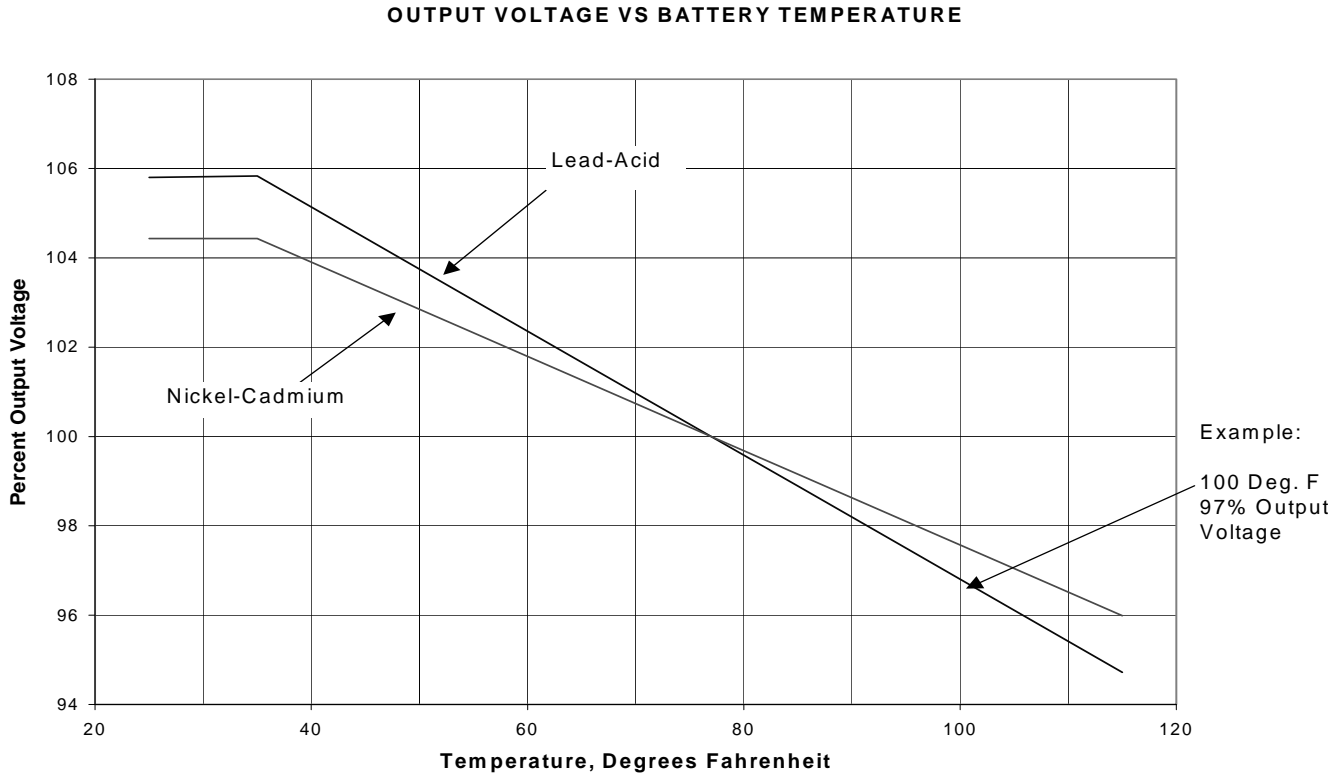
Refer to the example below.

- The **LARGE FONT** voltage value is the *actual* battery charger output voltage, *compensated* for the present battery temperature.

- Present battery temperature (in °C) appears in small font to the *right* of the actual battery charger voltage.

- The charger set point voltage (at 25 °C) appears in small font directly *below* the present battery temperature.

- The *difference* between the two (2) listed voltages is due to compensation, based on battery temperature.

TEMPERATURE COMPENSATION CURVES

The following graph depicts the dc voltage ***correction*** applied to the ATevo output, based on battery temperature sensed by the TempCo probe (A10).

OUTPUT VOLTAGE VS BATTERY TEMPERATURE

Chart labels: Lead-Acid, Nickel-Cadmium, Example: 100 Deg. F 97% Output Voltage. Y-axis: Percent Output Voltage (94 to 108). X-axis: Temperature, Degrees Fahrenheit (20 to 120).

EXAMPLE: *Suppose you are dealing with a lead-acid battery whose temperature is 100 °F / 37.8 °C. As shown on the graph above, the dc output voltage should be approximately 97% of the 77 °F voltage. If the float voltage is set on the front panel display to 132 Vdc, the actual output voltage will be:*

132 x 0.97 = 128 Vdc

BATTERY TEMPERATURE MONITOR

The Battery Temperature Probe (**A10**) can also be installed for *monitoring* temperature, or providing an overtemp *alarm*. When "Battery Temp Probe" is set to "**on**", ATevo will *always* monitor remote battery temperature. This value is visible on the **HOME SCREEN** on page 8, and available via remote communications (if supplied).

The "Battery overtemp" alarm feature was introduced in ATevo firmware V2.4.4. Alarm temperature setpoint was added in V2.6.0, as well as separate setting to enable/disable the battery temperature probe. The battery temperature *alarm* feature can be utilized as a stand-alone feature, or in conjunction with the aforementioned temperature *compensation* (TempCo).

SETUP

To enable and configure ATevo for remote battery temperature monitoring, refer to following images, and follow Steps 1 through 11 listed below.

1) Access the ATevo front panel display, and select the **MENU** button.
2) From the **Main Menu** screen, use the directional arrow buttons to navigate.
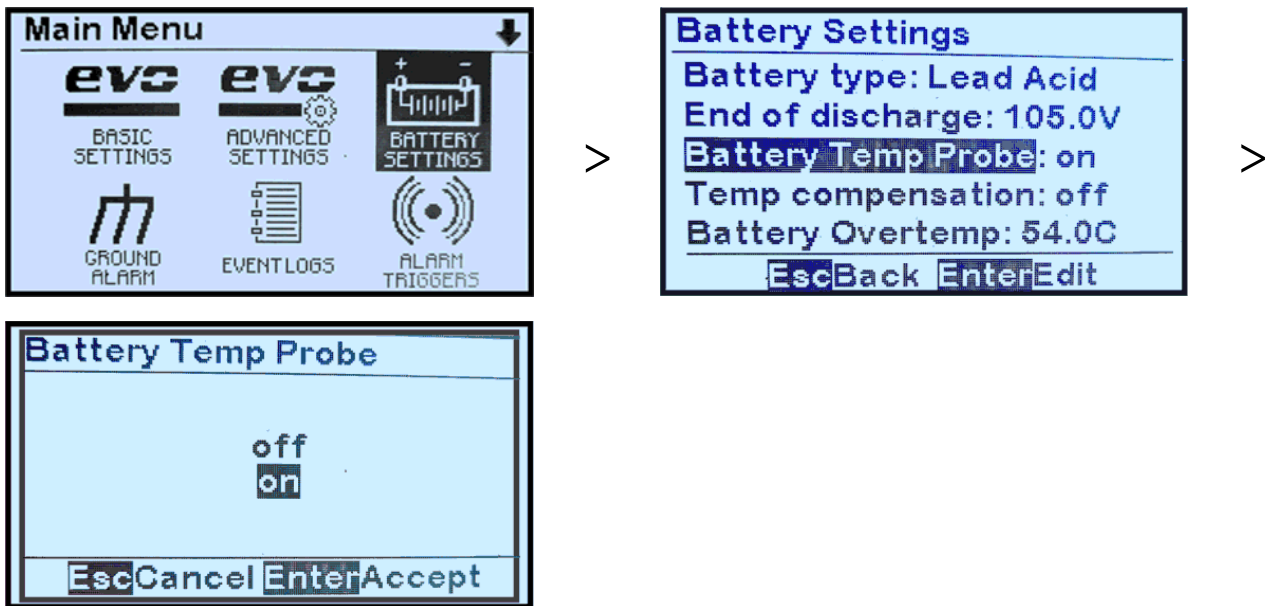
3) Select **BATTERY SETTINGS** with the **EDIT/ENTER** button.
4) Use the arrows to scroll *down* to "Battery Temp Probe", and select **EDIT/ENTER**.
5) Use the arrows to select "**on**" (versus "off").
6) Battery overtemp (and Temp compensation) settings will become visible.

> **NOTICE**   Unlike compensation, the "Battery overtemp" alarm is enabled by default, after "Battery Temp Probe" is set to "**on**". Disabling the overtemp alarm is *not* recommended.
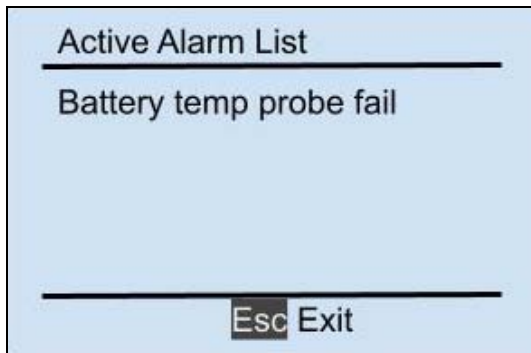
7) The battery overtemp alarm setpoint defaults to 54 °C / 129.2 °F from the factory.
8) To *adjust* the alarm, select "Battery overtemp".
9) Use the up or down arrows to increase or decrease the setpoint temperature.
   - range is 30 °C (86 °F) to 60 °C (140 °F)
10) Select **EDIT/ENTER** to accept setpoint changes, or **ESC** to cancel.
11) Setup of battery temperature monitoring is complete.

OPERATION

When the ATevo Battery Temp Probe setting is on, two (2) different alarms may be reported.

- "Battery temp probe fail" indicates a problem with the temperature *probe* (A10) itself.
- "Battery overtemp" indicates that battery temperature has exceeded the user setpoint.

By default, from the factory, both battery temperature alarms are mapped to the ATevo common alarm relay. If an Aux I/O Board (A4) is supplied, either battery temperature alarm can be configured to one (1) or more relays for local indication. Both alarms can also be transmitted via DNP3 Level 2 and/or Modbus protocols via serial and/or Ethernet communications (if installed). Finally, both battery temperature alarms are data logged. ATevo front panel displays of alarms are depicted below.

Active Alarm List	Active Alarm List
Battery temp probe fail	Battery overtemp
Esc Exit	Esc Exit

"**Battery temp probe fail**" alarm indicates a faulty temperature probe (A10).
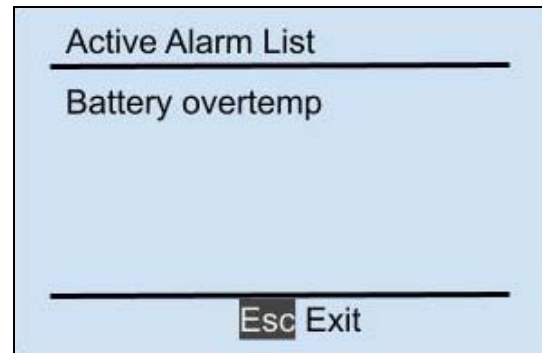
"**Battery overtemp**" alarm indicates a battery temperature reading exceeded the setpoint.

COMBINATIONS

The remote battery probe allows ATevo to monitor battery temperature, perform temperature compensation, and provide a battery overtemp alarm. When "Battery Temp Probe" is set to "**on**", ATevo will *always* monitor battery temperature, visible on the **HOME SCREEN**, and available via remote communications (if supplied). Refer to the following bullets, for combinations of the features.

- Compensation enabled and alarm enabled
  Install probe, set compensation to "**on**", alarm enabled by default at listed setpoint.

- Compensation enabled, alarm *disabled* *(not recommended)*
  Install probe, set compensation to "**on**", adjust *alarm* setpoint to maximum.

- Compensation *disabled*, alarm enabled
  Install probe, set compensation to "**off**", alarm enabled by default at listed setpoint".

- Compensation *disabled* and alarm *disabled*
  n/a - Do not install battery temperature probe (confirm no probe alarm).

ORDERING PARTS

Spare (or replacement) probes, longer signal cables, full field installation kits, and/or replacement boards may be ordered through sales representatives. Please use the part numbers listed in the table below.

ORDERING PART No.	DESCRIPTION
EJ5032-01	one (1) spare battery temperature probe (A10)
EJ5304-01	battery temperature probe (A10) with one (1) 25ft (7.6m) signal cable assembly
EJ5304-02	battery temperature probe (A10) with one (1) 50ft (15.2m) signal cable assembly
EJ5304-03	battery temperature probe (A10) with one (1) 100ft (30.4m) signal cable assembly
EJ5304-04	battery temperature probe (A10) with one (1) 200ft (60.8m) signal cable assembly
EH5058-0# (-01, -02, -03, or -04)	longer or replacement TempCo cable assembly (or use industry standard **Belden** p/n **8760**)
EN5031-00.	spare ATevo Main Control Board (A1)

DOCUMENT INFORMATION

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ON-LINE AVAILABILITY

An electronic copy of these instructions is available at http://www.ATSeries.net/PDFs/JA5015-51.pdf, along with standard drawings for ATevo Series battery chargers. Saved online in Adobe Acrobat Portable Document Format (PDF), they are readily available for downloading and printing.

NOTICE   An *earlier* revision of this document, which was supplied with TempCo kits shipped prior to August 2024, remains archived (JA5015-51.Rev3C.pdf). This document refers to a discontinued version of the "**A10**" TempCo probe, mounted with double-sided tape. All other functionality is the same.