Install the Equipment Asset Tracker (EAT) | guide for pro installer partners

This installation guide provides comprehensive “before you get started” information. **It is intended for Verizon Connect professional installer partners** who are not yet familiar with installing this specific device or may need a review of such knowledge. Installers already well-versed in the installation of this specific device may opt to proceed to the Reveal Hardware Installer app and follow the process outlined there.

In this article:

Product overview

The Equipment Asset Tracker (EAT) is designed by Verizon Connect and replaces the CalAmp TTU-2830. The EAT device offers:

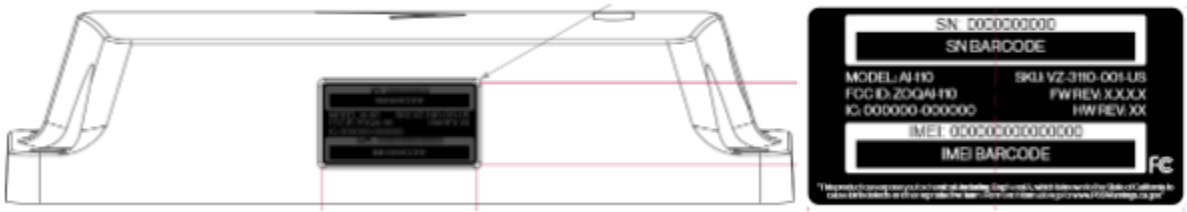
- I/O leads
  - 2 Digital inputs for sensors such as boom and PTO
  - 1 digital output capable of triggering a relay
- Long life, replaceable backup battery pack. How to replace EAT battery pack
- Optimized internal antenna design for improved signal reception
- Status button that wakes the device, initiates the status test and prompts the device to send a report.
- LED status indicators for Battery, Network, and GPS
- 2-wire or 3-wire installation options

Identifying the EAT device

Before getting started, be aware that there are two Verizon Connect devices that look alike, EAT and EAT-B. This installation guide deals with the EAT device.

The EAT device is powered by the equipment, that is, the asset, and therefore has a power cable attached to it. If the device you are installing does not have the cable. then it is the EAT-B device, not the EAT device. If you are installing the EAT-B device, refer instead to the Verizon Connect Equipment Asset Tracker- Battery installation guide

Device label



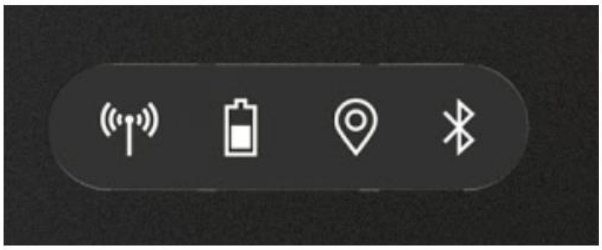
The label with S/N and IMEI barcodes is found on the side of the device, which allows it to be read even after mounting. You will scan the label when instructed in the Reveal Hardware Installer app, or if the scan should fail, enter the IMEI. The text on the device label is small, so if difficult to read, you can refer to the enlarged label found on the box that came with the device. The box label is also scannable.

Status button

- For a new device out of the box or a device that has had the battery replaced, the status button turns the device on. **For a new device, press the button twice: First to power on, then press it again to light the LEDs and connect to network.**
- For a device already in operation, the button wakes up the device.
- Whenever the status button is pressed, the device:
    - Performs status checks for device battery level, network connection and GPS.
    - When connected to both the network and GPS, the device then sends a location update (check-in) to Reveal, in addition to its usual check-in schedule.

The status button **does not** turn the device off, which is why we don't call it a power button. Should there be a reason to take the device out of operation, the device's back cover can be removed, and the battery pack disconnected.

Status LEDs



The device runs a status test for Battery, Network, and GPS whenever the status button is pressed. Status test results are displayed on the status LEDs as described below. The LEDs stay lit only for a brief duration. However, the test can be repeated by pressing the status button again, which is useful for determining the best place on the asset to mount the device.

ICON	NAME	STATUS
	Battery	• 1 flash = 10-25% full • 2 flashes = 25 - 50% full • 3 flashes = 50 - 75% full • 4 flashes = 75 - 100% full
	Network	• Slow flash: device is seeking network. • Solid: network connection acquired • Fast flash: network connection failed.
	GPS	• Slow flash: device is seeking GPS. • Solid: GPS location acquired. • Fast flash: GPS location failed.

ICON	NAME	STATUS
	Bluetooth	At this time, the device does not support any Bluetooth feat further notice.

What to bring

- Cordless drill with metric and standard bits. For mounting hardware sizes, see What's in the box.
- Safety glasses or other eye protection
- Marker for marking where holes will be drilled
- If drilling a pass-through hole, a grommet and silicone to seal the grommet. (Use a polyurethane based silicone instead of those with acid based curing agents to avoid corroding metal surfaces).
- 2mm hex head driver or allen key (to remove device back cover if battery pack needs to be connected)
- Ring terminals
- Butt connectors
- Protective wire loom
- Dielectric grease
- Super 33 or better electrical tape
- 16-18 gauge wire to extend connections, if needed
- Wire ties
- The Reveal Hardware Installer App

What's in the box

- EAT Device with attached 15’ harness
- 4 x self-drilling screws for metal: standard 5/16” hex head, number 12 size, 1 inch long

- 4 x bolts: Serrated-flange 5/16” hex head, 10-32 thread, 1 ¼ inch long, .19 inch screw width

- 4 x locknuts 3/8” head

- 4 x washers, flat type

Depending on where the device is to be mounted, you will use either the screws or the bolts with lock nuts and washers. If using the screws, pre-drilling the holes is recommended.

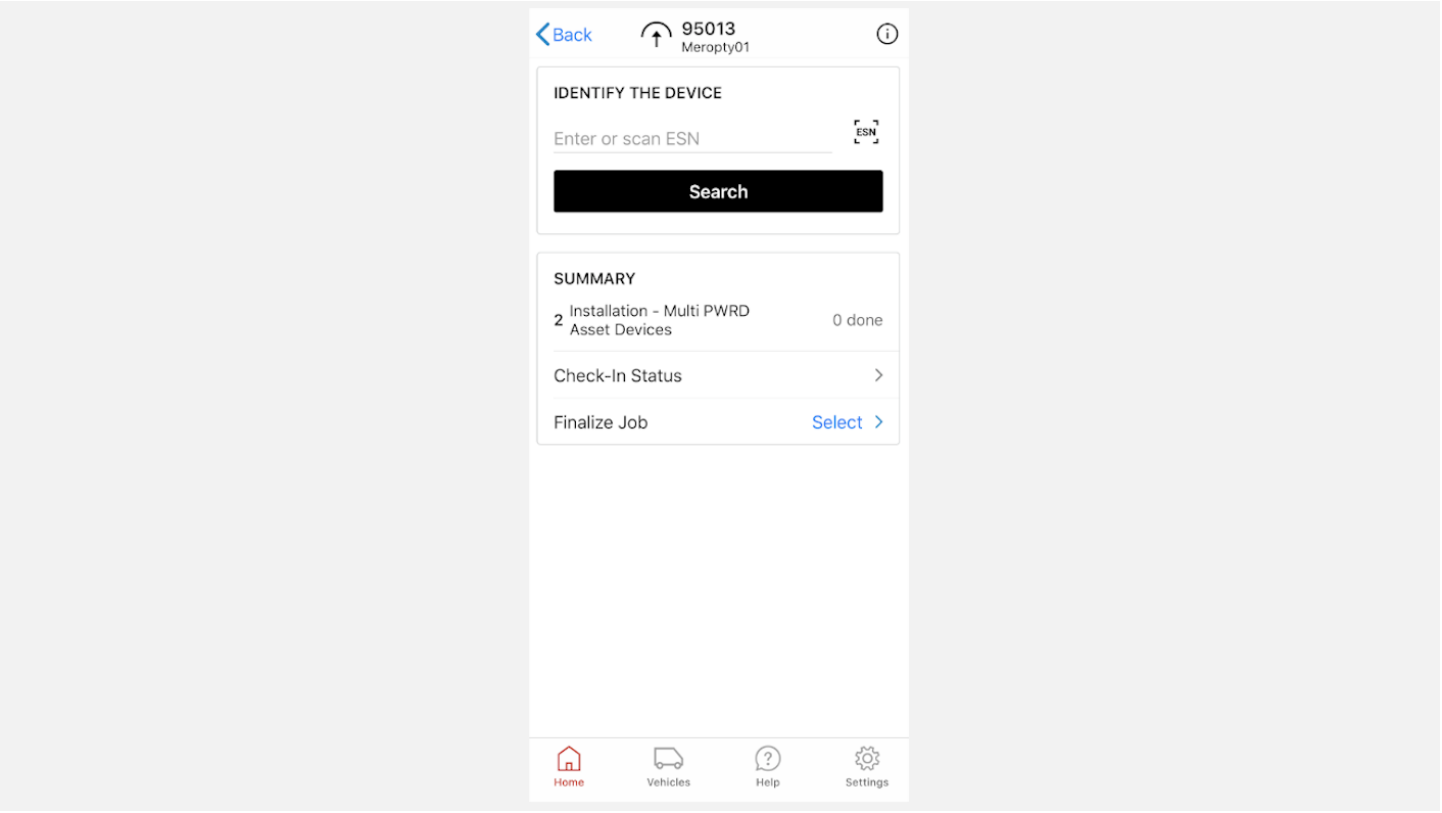
Reveal Hardware Installer App

The Reveal Hardware Installer App replaces the VZ Check App.

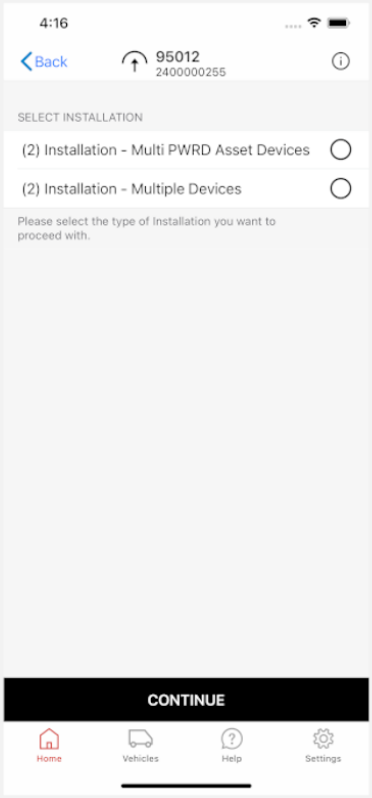
Download the Reveal Hardware Installer app from either Google Play Reveal Hardware Installer for Android or the App Store Reveal Hardware Installer for iOS.

Using the Reveal Hardware Installer App, prior to mounting the device on the asset, you will:

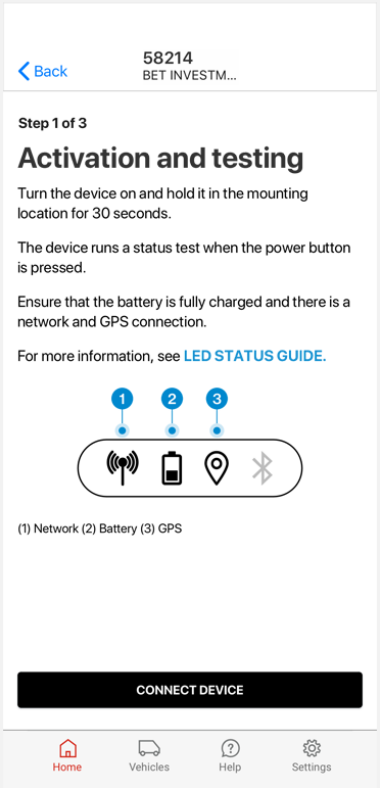
1. Select the work order and then scan the device barcode or enter the device ESN.



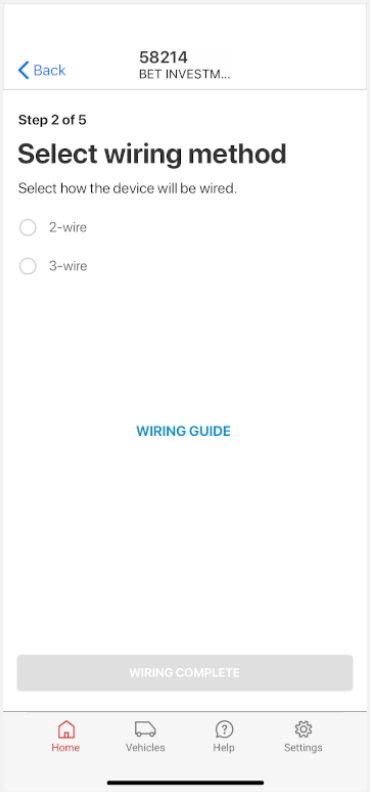
2. Select Multi PWRD Asset Devices from the list. (Note that the selection applies to all asset trackers, for powered or non-powered assets.)



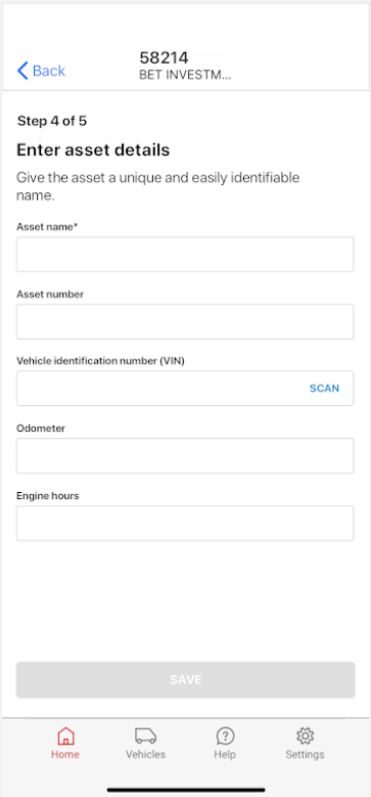
3. Test the device for network connectivity and GPS location fix. (See sections on Status Button and Status LEDs).



4. Select the wiring method (2-wire or 3-wire). (See Wiring the device.)



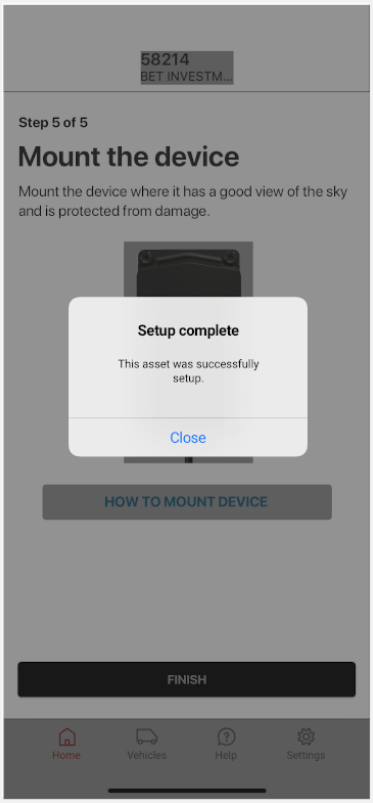
5. Enter the asset information.



6. Wire and mount the device to the asset. (See sections on Wiring the device and Mounting the device.)
   After wiring, but before mounting, press the status button again to confirm the Network and

GPS LEDs light up when the device is wired to the asset.

7. Complete device setup and activation.



Wiring the device

This section covers the following topics:

Device harness wiring layout

The EAT device has a molded 15.4’ long power and I/O harness terminating with these color-coded wires with bare leads:

COLOR	FUNCTION
Red	VDC Battery (power source)
White	Ignition
Black	Ground
Violet	Digital Input 1: High ([+] trigger)
Violet/Black	Digital input 1: Low ([-] trigger)
Blue	Digital input 2: High ([+] trigger)
Blue/Black	Digital Input 2: Low ([-] trigger)
Brown	Digital Output 1 High ([+] output)
Green	Digital Output 1 Low ([-] output)
Gray	One-Wire I/O (not used)*

- One-Wire I/O will not be used at launch but is planned for a later phase.

- The ground wire is actually three ground wires joined together at the exposed end, giving the appearance of being one wire.

About the sensor wiring connections (digital inputs)

The EAT device is capable of sensing **voltage transitions of at least 6 volts** on 12/24 volt systems and requires 3mA current when voltage is present in the on phase.

The device uses a trigger wire/reference wire setup method for each sensor input. As such each input requires two connections to complete each input.

The signal to be monitored should have two voltage states. One with no voltage (i.e. zero volts when referenced to ground) and another that falls in the range from 6 to 24 volts.

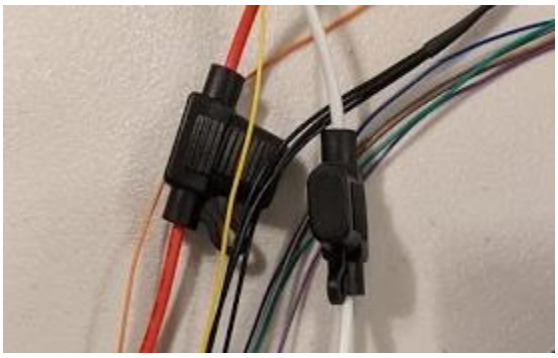
For sensor inputs, use one of the methods below for trigger wire and reference wire color connections.

If you are wiring for a positive trigger...	
Use the solid color input wire for the positive trigger.	Use the striped color input wire for the reference w ground.
If you are wiring for a negative trigger...	
Use the striped color input wire for the negative trigger.	Use the solid color input wire for the reference wire reference voltage.

Note: It is important that the voltage signal be tested to ensure it is continuously providing the necessary voltage and current when in the “on” or “active” position.

The device harness includes two weather-proof fuse holders, each holding a 3A mini-blade replaceable fuse. Therefore, there is no need to splice in any fuses during installation. Replacement fuses, if needed, can be purchased from any auto parts store. The fuses are located on the device’s red VDC power wire and white ignition wire.

Fuses



Wiring Best Practices

To prevent chafing, run the harness cable through a pass-through hole, using existing holes to pass the cable through rather than drilling a new one. If drilling is necessary, always check before you drill to verify you are not drilling into anything unintended behind the drilling surface. Insert a grommet, that is the right size and type for the hole, into the newly drilled hole to protect the wire and seal with all-weather silicone as necessary.

Because the device and its wires will usually be exposed to the elements, heat-shrink butt connectors and ring terminals should be used instead of splicing wires. These connectors are preferred instead of splicing, even when wires will not be exposed to the elements, as being much better at preventing air and moisture from reaching wires and causing corrosion.

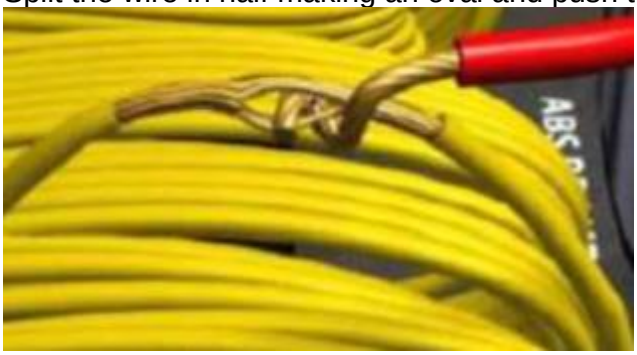
Heat-shrink butt connector:

Heat-shrink ring terminal:

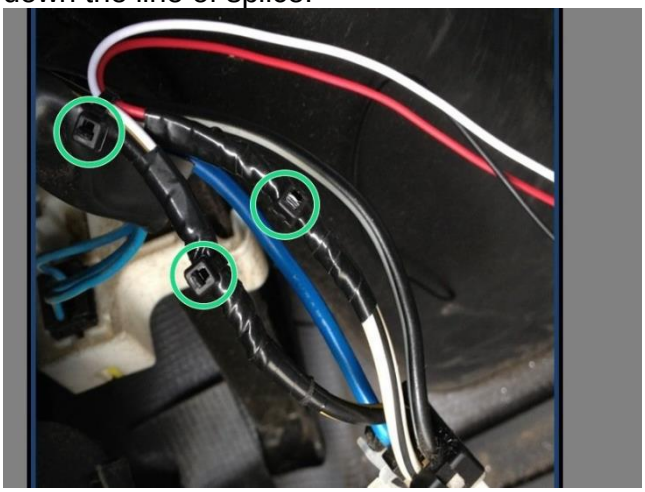
In addition, create a drip loop to prevent moisture from running down the length of the wire toward devices and connections.

Wire splicing

If for some reason using butt connectors and ring connectors is not practical, and if wires will **not** be exposed to the elements (for example, wires lying internally within the asset's cab) any splicing should be done by using the standard "poke and wrap" technique.

1. Remove approximately one inch of wire insulation.
2. Split the wire in half making an oval and push the wire to be terminated through that hole.

3. Press the wire back together then wrap the excess newly inserted wire tightly around it.
4. Wrap the new splice with Super 33 or better electrical tape.

5. Apply two wire ties to the splice. The first goes over the splice and the other approximately one inch down the line of splice.



2-wire versus 3-wire installation

Determine whether you are doing a 2-wire or 3-wire installation. The Reveal Hardware Installer app will ask you to select one or the other. The 2-wire method is typically used on trailers while the 3-wire method is typically used on heavy equipment “yellow iron” assets such as backhoes and bulldozers.

2-Wire installation steps

1. Connect the device’s red wire to the asset’s +12/24V constant power source.
2. Use a ring terminal to connect the device’s **Black Ground** wire to the asset’s negative battery terminal **or** use a self-tapping screw and a ring terminal to connect the device’s black ground wire to a chassis ground.
3. Coil up and zip tie any extra length of the device harness. **Do not cut the harness** to shorten it, as doing so limits the device’s usability if transferred to another asset in the future and also increases the chance of making an error with wiring.

2-Wire installation for nose-mounted semi-trailers using a 7-way connector

1. Remove the 7-pin connector’s mounting plate.
2. Mount the unit to the trailer using provided mounting hardware.
3. Use an existing pass-through hole or, if one is not available to use, drill a new pass-through hole into the trailer skin. If it’s a new hole, pull the harness through a grommet.
4. Push harness end down interior side of trailer wall toward the 7 way connector.
    - If it will be necessary for the harness to pass through, clip off the preinstalled fused links from the device harness.
    - Make a drip loop in the harness to prevent condensation from running towards electrical connections.
    - If a grommet is used, insert it into the pass-through hole. Apply a bead of silicone around the grommet to seal the pass-through.
5. Pull the wiring harness through at the 7 pin connector.
6. Reattach the fused links using heat shrink butt connectors, and verify a 3-5 amp fuse is present.
7. Separate the black and red wires from the harness.
    - Tape any unused harness wires to the harness sheath (do not cut to custom length).
8. Connect the device’s black ground wire to the trailer’s white wire/top pin on the 7-way trailer stud using a heat shrink ring terminal or poke-and-wrap method.

9. Connect the device's red VDC power wire to the trailer's blue "aux" wire/center pin on the 7-way trailer wire stud using a heat shrink ring terminal poke-and-wrap method. Alternatively, the marker or running lights wire can be used instead of the aux wire. Shown below are the typical wiring colors and pin layout for a tractor-trailer 7-way
connector.

10. Coat both newly installed ring terminal connections with dielectric grease or terminal protecting anti corrosion spray as necessary, and use a wire loom to protect any remaining exposed wiring portions not protected by the device's wire harness jacket.
11. Remount the 7-pin cover plate.

3-Wire Installation Steps

1. Connect the device's **Red VDC power** wire to the asset's +12/24 VDC constant battery power source.
2. Connect the device's **Black Ground** wire to the asset's negative battery terminal. If that is not practical, connect instead to a chassis ground on the asset by using a ring terminal and self-tapping screw or factory bolt.
3. Connect the device's white Ignition wire to the asset's +12/24 VDC ignition/switched power. The asset's ignition source will vary depending on the type of asset; it could be located at the asset's ignition switch or at the asset's fuse box.
4. Coil up and zip tie any extra length of the device harness. **Do not cut the harness** to shorten it, as doing so limits the device's usability if transferred to another asset in the future and also increases the chance of making an error with wiring.

3-Wire Installation for Reefer Trailers

While most trailers require 2-wire installation, Reefer trailers are an exception, usually requiring 3-wire installation. In addition to the primary three wires, a digital input wire should be used to enable monitoring the reefer's engine hours via the reefer's ignition circuit.

Connecting to digital input/output sensors

After installing the primary device wiring, you can proceed to the I/O wiring for sensors, if called for in the work order. Sensor functions such as PTO, boom, rear door, or lights are an optional part of the installation. If installation does not include I/O wiring, disregard this section and proceed to completing the installation as instructed in the Reveal Hardware Installer app.

As shown in the device harness wiring layout, the EAT device has these I/O options:

- Two digital inputs. These inputs can switch between either positive or negative polarity, so no relays are required. As shown in the Device Harness Wiring Layout section, each of the two inputs has two wire leads, for high (positive) and low (negative). With each input used, both wires must be connected.
- One digital output. Digital output provides a negative 200 mA output. Digital output is typically used to energize a relay coil, or functions such as a buzzer or an LED.
- One-Wire input and output (one wire for both). One-Wire I/O **is not yet supported by** this device; therefore, the device's grey One-Wire lead is not used at this time, but is planned for a later phase of the product.

The device is capable of sensing **voltage transitions of at least 6 volts** on 12/24 volt systems and requires 3mA current when voltage is present in the on phase.

The device uses a trigger wire/reference wire setup method for each sensor input. As such, remember that each input requires two connections to complete each input.

The signal to be monitored should have two voltage states. One with no voltage (i.e. zero volts when referenced to ground) and another that falls in the range from 6 to 24 volts.

Use the method specified below for trigger and reference wire color connections.

Positive Trigger = Solid wire color input

Reference Wire = Striped wire for ground

Negative Trigger = Striped wire color input

Reference Wire = Solid wire color for +VDC reference voltage

Note: It is important that the voltage signal be tested to ensure it is continuously providing the necessary voltage and current when in the "on" or "active" position.

Mounting the device

This section provides information about where to mount the device and how to mount it.

Where to mount the device

Where the device is mounted depends partly on the type of asset, but the device's long harness enables a variety of options.

The most important thing to remember is to first hold the device where you intend to mount it and test for Network and GPS **before** you start drilling holes. You perform the test by pressing the device's status button and reading the LED status lights. If the LEDs do not indicate successful connection to Network and a GPS location fix, repeat the test elsewhere on the asset until network connection and GPS fix are successful.

- Make sure the asset itself is not located where the network or GPS signals may be diminished during installation, for example, under a metal shed.
- Even though the device is IP67 rated, keep the device clear of moving parts or areas that will expose the device to road debris or high-pressure water spray. Also, do not mount the device next to any heat-generating machinery.
- Good spots for mounting on trailers include on top of the trailer's tongue or the hitch rail, side rails or front bulkhead.
    1. Use the included mounting hardware. **Do not use rivets or countersink screws. Do not over torque.** Over torqueing or using the wrong mounting hardware can cause the plastic surrounding the mounting hole to crack.
- Installation requiring the use of a ladder **is not** advised. However, if working at height, it is your responsibility to ensure use of safety equipment and proper safety procedures are followed.
- The device's omnidirectional antennas allow the device to be mounted facing up or sideways, facing out.
- **Do not** mount the device facing down, underneath the asset because ground reflections will impair signal reception and reporting accuracy.
- Be aware that mounting the device under the floor, especially if it is an enclosed metal trailer or container, as opposed to an open flatbed, can limit connectivity and data. transmission. As already mentioned, always confirm the status of network signal and GPS by using the device's status button and status LEDs at the precise mounting location *before* mounting the device.

How to mount the device

After a successful Network and GPS test, and after completing the device setup and activation in the Reveal Hardware Installer app.

1. Hold the device where it will be mounted mark the positions of the four mounting holes where you will drill.
2. If using the screws, pre-drilling the holes is recommended.
3. Secure the device to the asset using the included screws or bolts. **Do not over torque. Do not use rivets or countersink screws.** Over torqueing or using the wrong mounting hardware can cause the plastic surrounding the mounting hole to crack.

FCC Notes

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the
- receiver is connected.

Consult the dealer or install technician for help.