Trailer Tracks 150

Installation and Troubleshooting Guide

80-J7616-1 Rev. A

July 2016

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80-J7616-1 Rev. A
July 2016

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How the Trailer Tracks Service Works

Introduction

The Trailer Tracks service is the Omnitracs wireless system for identifying and locating trailers for the trucking industry. This service provides cost-effective status monitoring and management of trailers.

The TT150 system sends status information over-the-air (OTA) to the customer using cellular functionality. The Trailer Tracks service is a comprehensive, end-to-end trailer identification and location system, consisting of rugged mobile hardware, reliable network services, robust host software, and extensive data integration capabilities.

Note

Trailer Tracks service *refers to the wireless service that locates trailers.*

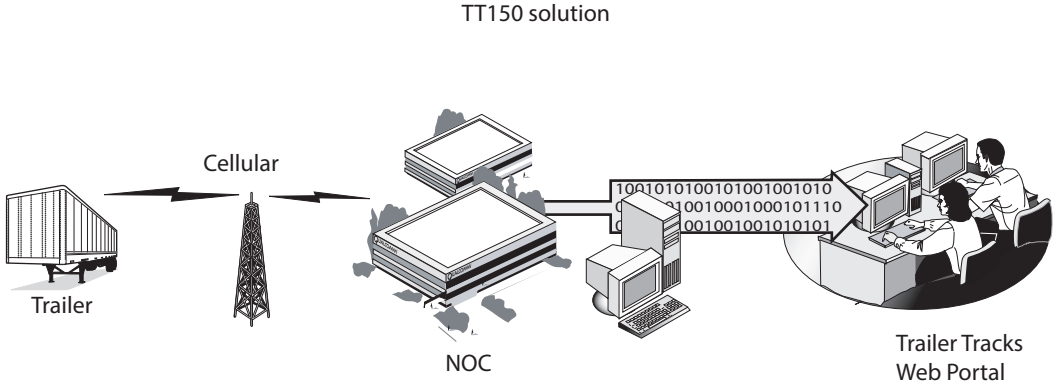
TT150 system *refers to the complete hardware system for the Omnitracs Trailer Tracks 150 service.*

Trailer Tracks Service Network Description

The Trailer Tracks service consists of these network components:

Component	***Description***
Network Operations Center (NOC)	This facility is responsible for processing and managing the data traffic between the customer and the trailer. The NOC is located in Las Vegas, NV.
Customer	The customer's computer connects with the NOC in order to receive information from the TT150 system.
Global Positioning System (GPS)	GPS is a constellation of 24 strategically placed satellites. Signals from the satellites determine the trailer's location, which is then reported to the NOC by the TT150 system.
Cellular Network	The TT150 system uses an existing cellular network to connect.
Trailer Tracks Web Portal	This allows customers to receive information, request trailer location information, and perform other functions. The user interface can be accessed through the Omnitracs Services Portal or for machine to machine interface, the data can be accessed via web services integration.

The following illustration shows the interaction between the TT150 system network components. The TT150 system sends information to the Omnitracs NOC through the cellular network provider's gateway. The gateway center sends the information via secure data lines to the NOC. After the NOC receives the information, it sends the information to the Trailer Tracks Web Portal. The GPS satellite constellation is used for location determination.



What is the Trailer Tracks Service?

The Trailer Tracks service is networking technology *and* hardware components installed on a customer's trailer. The hardware works to send information to customers over a cellular network and also computes trailer location information using GPS technology.

The GPS and Cellular Network Systems

The TT150 system uses GPS to locate the trailer and a cellular network to deliver information about the trailer to the customer.

The Global Positioning System

The Global Positioning System (GPS) is a worldwide radio-navigation system formed from a constellation of satellites and ground stations. GPS uses the satellites as reference points to calculate positions accurate within a few meters.

How the TT150 System Uses GPS

Signals received from at least four GPS satellites determine the TT150 system terminal's (i.e., trailer's) location. The GPS receiver resides inside the TT150 system terminal to determine the trailer's position. The GPS receiver calculates the trailer's location based on the time that signals are received from the various satellites. The trailer's location is sent each time it communicates and is then available on the Trailer Tracks Web Portal.

The location data is retrieved automatically at regular intervals or can be requested at any time.

The Terrestrial Wireless Network

The TT150 system uses digital technology to track customers' trailers over a cellular network. The TT150 terminal consist of a microprocessor, a wireless modem module, data storage, antenna, and rechargeable battery.

2
TT150 System Component Overview

TT150 Components

TT150 Terminal

TT150 terminal with microprocessor, cellular modem, rechargeable internal battery pack, cellular antenna, and GPS antenna. Attached to the terminal is a cable for recharging the TT150 battery pack when the trailer is connected to a tractor.

The terminal is designed according to industry environmental specifications. The system allows over-the-air (OTA) reprogramming of the terminal's on-board firmware.

The TT150 terminal also has two LEDs for verifying cellular coverage and a GPS fix when active.

The trailer operator (truck driver, loader, or unloader) does not need to access the terminal. It should be mounted in a safe and secure place on the trailer.

Internal TT150 Battery

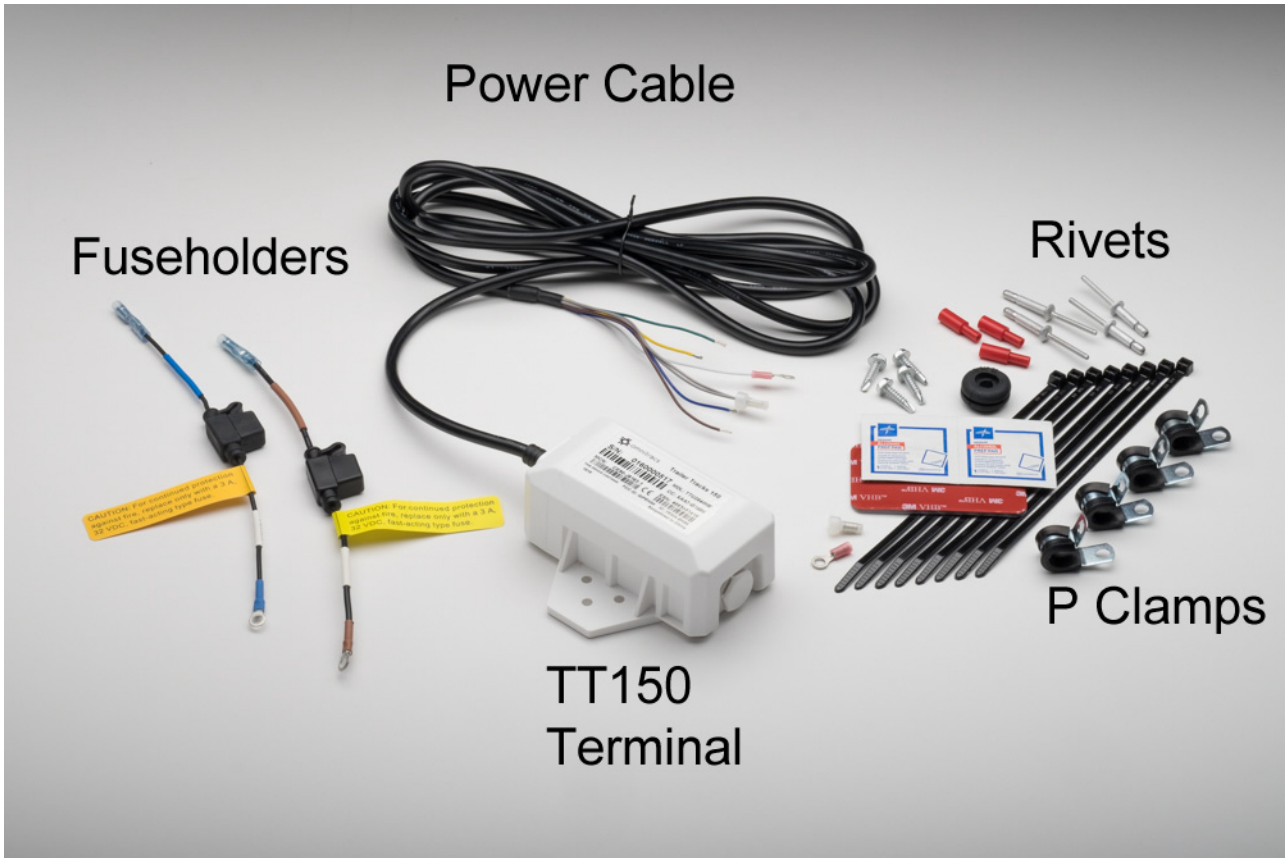
Internal to the TT150 terminal housing is a lithium ion rechargeable battery that is used when the trailer is not connected to external power (i.e. not connected to a tractor). A fully charged terminal will work for 90 days sending one message/position a day when not powered. The battery will recharge when power is applied to the 7-way. The battery is not serviceable.

Note

The TT150 does not ship fully charged. It is recommended that the battery be fully charged immediately after it is installed to provide the best messaging experience.

TT150 Power Cable Assembly

The TT150 power cable assembly is permanently attached to the TT150 terminal enclosure. The power cable assembly contains fuse holders, which are separate from the power cable assembly to ease routing of the cable assembly and make installation of the TT150 terminal easier.



TT150 Installation Kit

The TT150 installation kit contains an assortment of items that can be used for a myriad of installation configurations based on your needs.

- 2 non-duraplate rivets, used for securing the TT150 terminal on most dry-van trailers
- 2 duraplate rivets, used for securing the TT150 terminal on thicker walled trailers
- 1 VHB tape pad, typically used for securing the TT150 on tanker and flatbed trailers
- 1 terminal ring connector for white ground wire if cable needs to be cut
- 3 terminal bullet connectors for trailers with 7-way using this type of connectors
- 1 closed-end splice for connecting tamper wires if cable needs to be cut
- 2 pre-moistened alcohol pads for cleaning surfaces when VHB tape is used
- 8 cable ties
- 4 P clamps
- 4 self-drilling screws
- 1 7/8 inch grommet
- 1 fuse holder for connection to blue wire
- 1 fuse holder for connection to brown wire

3
General Wiring Guidelines

Making Electrical Connections

Approved Omnitracs Electrical Connectors

The only Omnitracs-approved electrical connectors are crimp butt splices and crimp ring terminals. Omnitracs recommends Nylon insulated, seamless butt connectors with inspection windows. Heat-shrinkable butt connectors are preferred. When butt splicing multiple wires on one end of a butt splice and a different number of wires on the other end, step-down butt splices are recommended.

WARNING

Not following proper wiring guidelines and using improper crimps and butt splices may cause intermittent connections and may result in unexpected truck down time or system failure.

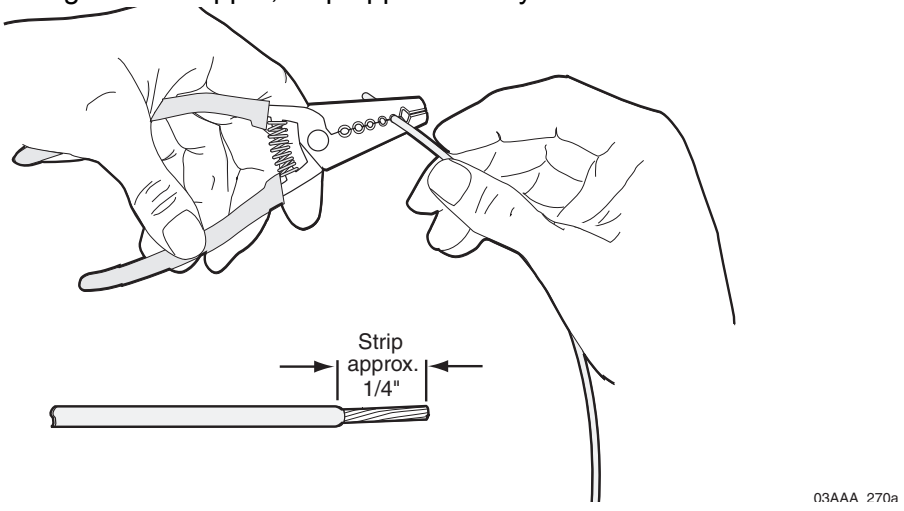
Wire Stripping

Caution

Use care in stripping wires. Vibration can cause nicked wires to fail. Using wire cutters, knives, or other tools can damage the conductor wire and/or insulation.

Knowing and following proper wire stripping techniques is essential for performing successful and safe electrical connections of all system components.

1. Using a wire stripper, strip approximately 1/4" off the end of an insulated wire.



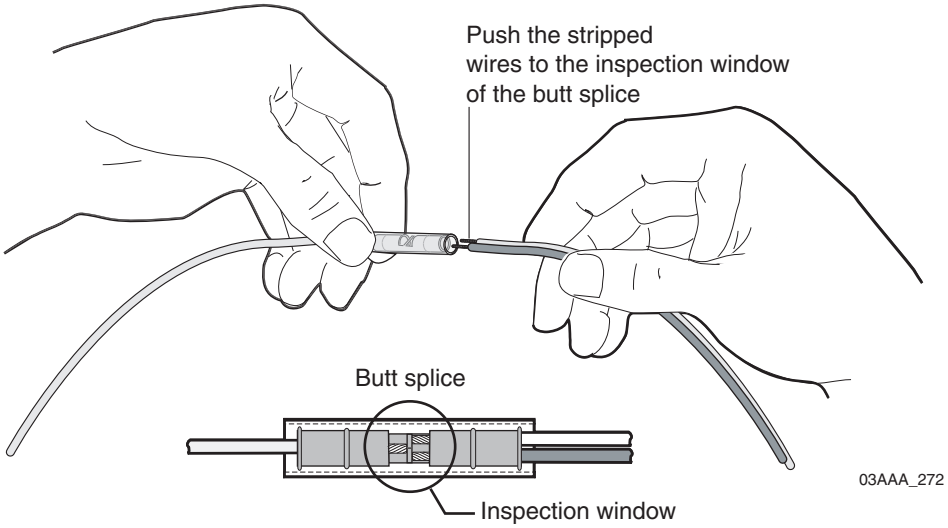
2. After stripping the wire, verify that the wire is not severed, nicked, or damaged by the stripping tool. If the wire has been properly stripped, it is ready to be butt spliced. If the wire has been damaged, restrip the wire (see step 1.).

Butt Splicing

Make sure the size of the butt splice is appropriate for the job. A good butt splice has these characteristics:

- The ends of the bare wires are visible through an inspection window.
- The ends of the wires “butt” up against the stop.
- The wires are not exposed beyond splice shielding.
- Crimping does not sever or damage the wires or insulation.

1. Insert the stripped wires approximately half way into a butt splice, preferably one with an inspection window for verifying the wire is in the correct position.



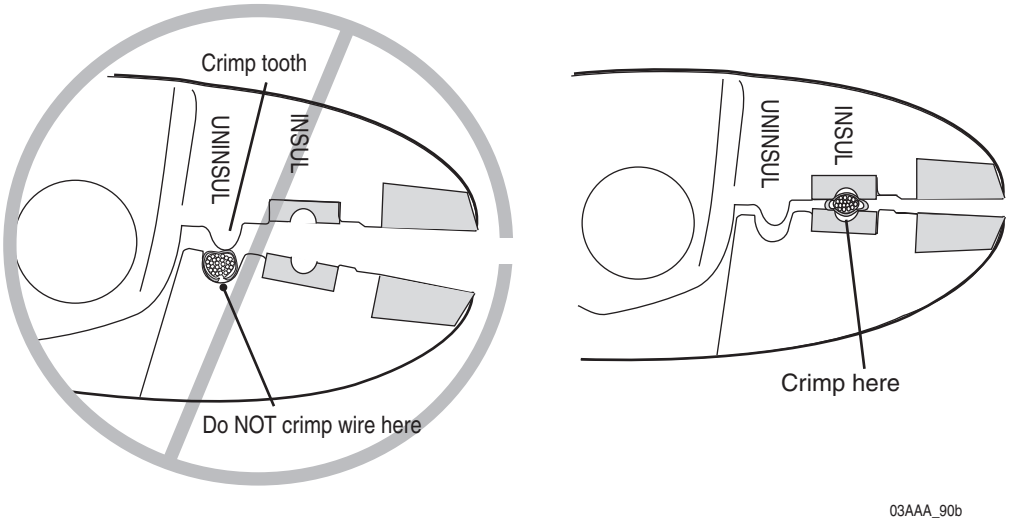
2. Repeat this process for the wire on the opposite end of the butt splice. Once a proper butt splice is confirmed, it is important to properly crimp the butt splice to hold the connection.

Crimping

- When crimping a butt-spliced wire or cable, be sure the insulated butt splice is crimped using the insulated position on the crimp tool and not the crimping “tooth” of the tool.
- Crimping butt splices incorrectly can result in a severed wire and a failed wire connection.

Caution

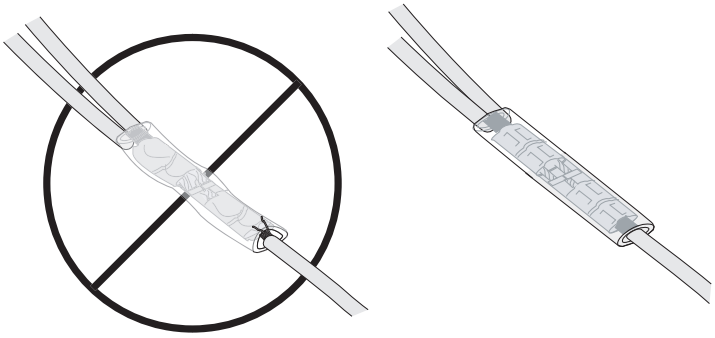
DO NOT crimp on the crimp “tooth.”



1. Using a crimping tool, crimp the butt splice one end at a time. **First**, crimp the inside crimp area where the wire has been stripped. Apply necessary pressure to this inside area.

Note

The objective is to apply only the necessary pressure to crimp the butt splice closed and hold the wire connections together. ***Do not*** *apply so much pressure as to crush the butt splice and sever the wire or the insulation on the wire.*



WRONG
Butt splice is visibly crushed, possibly damaging the wire and the wire connection.

Some wires are exposed.

CORRECT
Crimping is done properly, protecting the wire and the wire connection.

No exposed wires.

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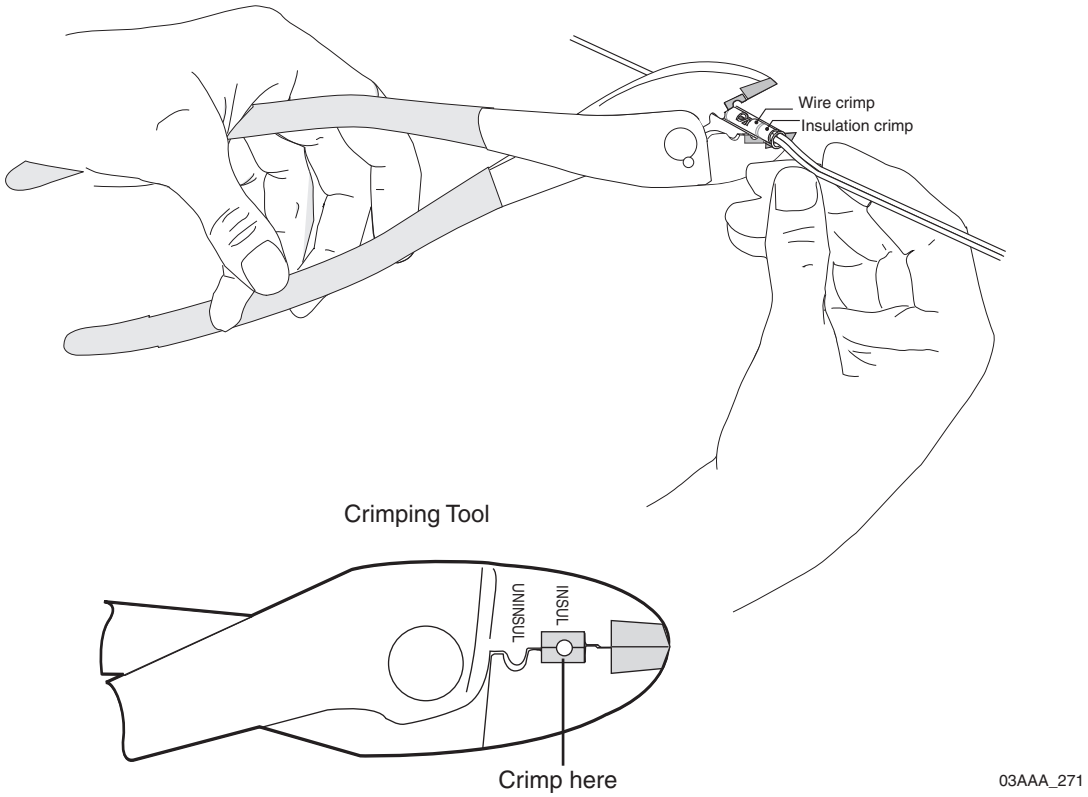
2. After crimping the inside of both ends of the butt splice on the “insulated” area of the crimping tool, next crimp the outside of both ends of the butt splice.



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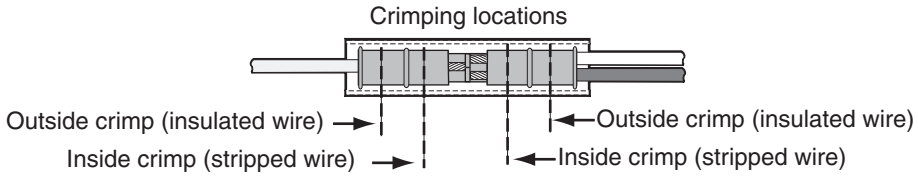
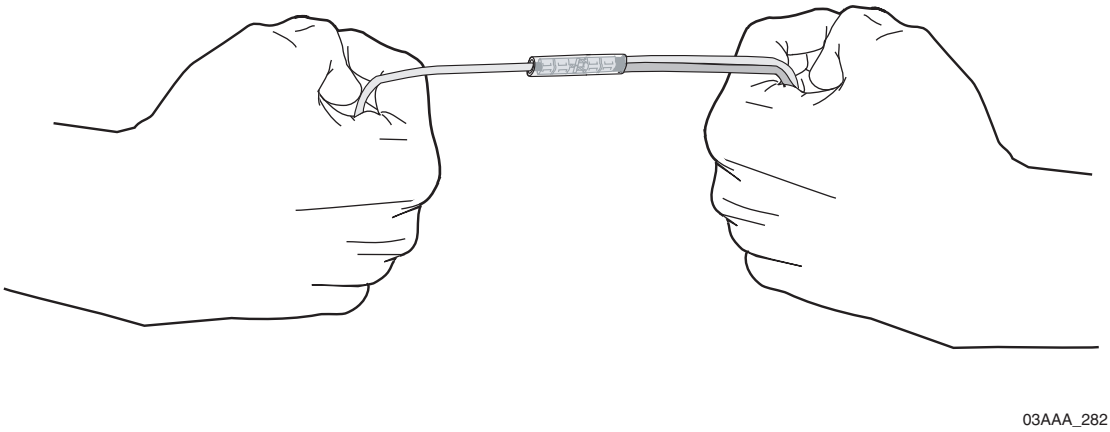


3. Verify that the crimps are good and the wires have not been damaged.

4. Do a pull test. Pull on both ends of the wires to ensure a solid butt-spliced connection exists. The crimped butt splice securely grips the insulated wires.



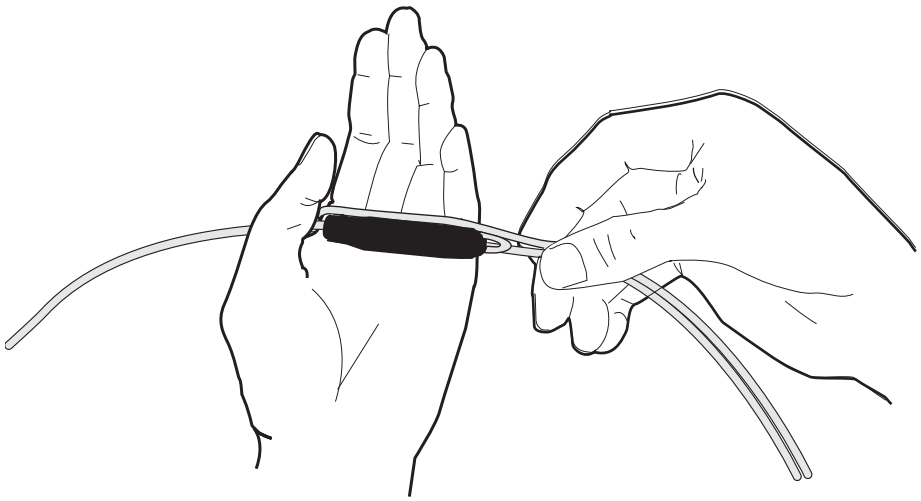
WARNING

If using heat shrinkable crimps, DO NOT use a heat gun or open flame near combustible materials. Use a heat gun only *when it is safe and appropriate to do so. Protect surrounding wiring and other components when using a heat gun.*

Strain Relief

If there is sufficient wire available for the Four-Finger Wrap Method:

1. Wrap a wire around four fingers of a hand, one full loop, so that the wire loop is longer than the wrapped butt splice.
2. Pinch the loop tightly and center it against the wrapped butt splice.



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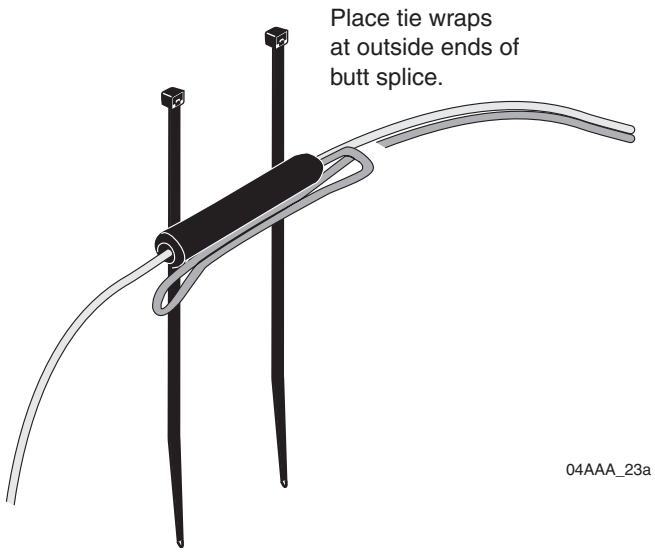
3. Secure the wires together and place 4" tie wraps at the outside ends of the butt splice.



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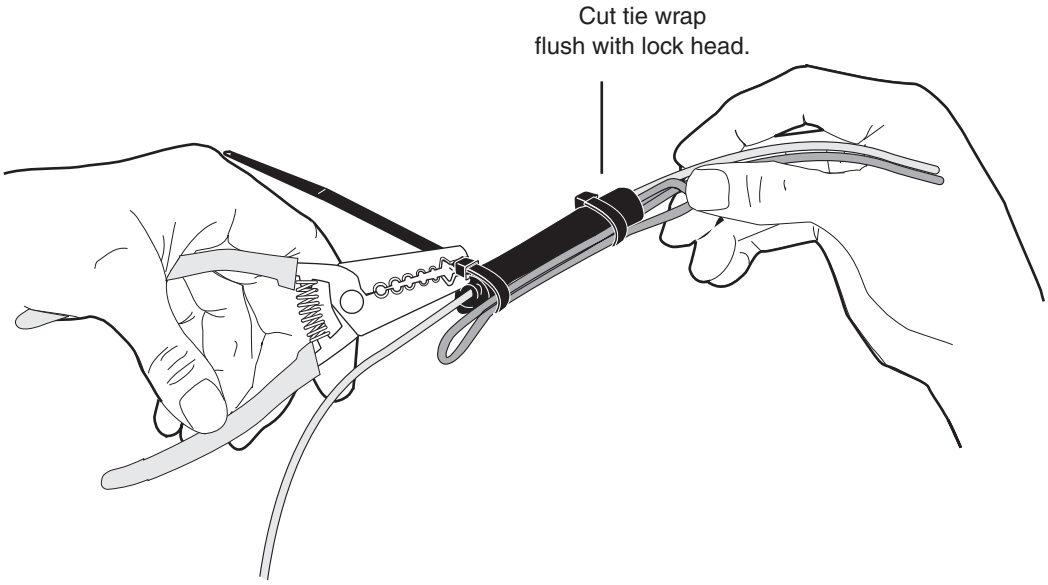
4. Cinch the tie wraps tight and cut them *flush* to the lock head.

Caution

Failure to cut the tie wraps flush to the lock head can result in minor injury.



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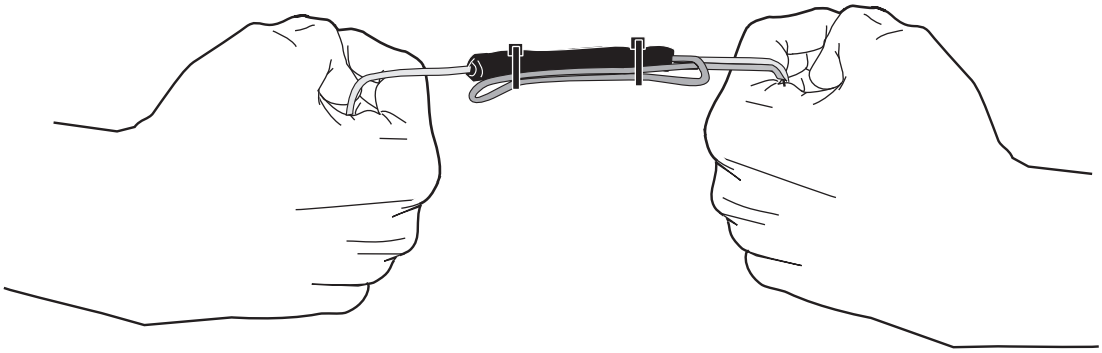
5. Firmly tug on the butt-spliced wire connection to make sure the tie wraps do not pull loose.



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If there is NOT sufficient wire available for the Four-Finger Wrap Method:

1. Securely tie wrap the butt spliced wires to existing wires or harnesses in the nearby vicinity.

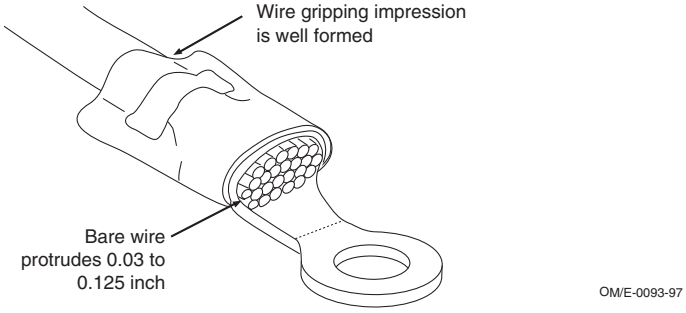
Note

It is good practice to tie wrap the newly installed wires to existing wires approximately every 15"–18".

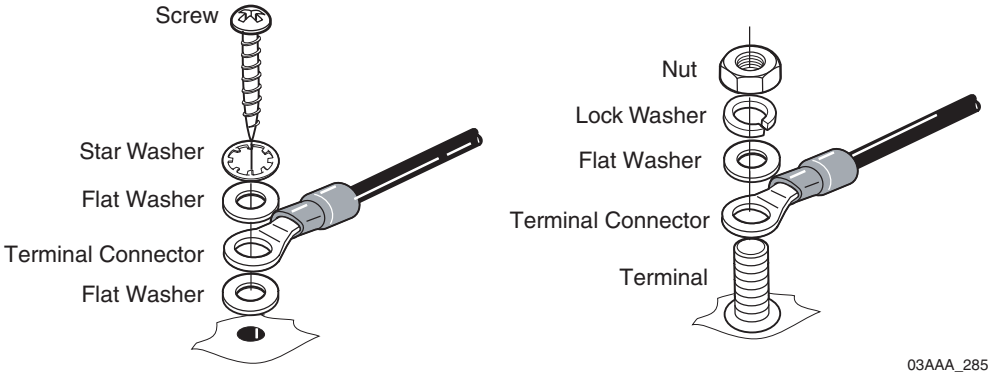
Ring Terminals

When making electrical connections, crimp ring terminals onto the ends of the wires to ensure good contacts. A properly crimped ring terminal has these characteristics:

- The barrel crimping indent is well-formed and properly positioned.
- The insulated wire's grip impression is well-formed and provides proper support without crushing the insulation.
- The wire does not move independently of the lug. Firmly tug on the ring terminal to ensure it does not pull loose.
- The end of the bare wire protrudes through the crimp barrel approximately 0.03 to 0.125" depending on the lug size and crimp tool.



Install the ring terminal on the ground connection using one of the following options:



Grounding Guidelines

Caution

When establishing a good chassis ground, avoid areas that can be potentially isolated from ground by a hinge or some welds.

It is extremely important that you create clean, secure, tight, metal-to-metal grounds.

If grounding terminals are not available, remove the paint from the surface of the metal connected to the chassis to make the ground. Make sure the wires are not strained or vulnerable to damage.

Cable Basics

Note

Vibration can cause nicked wires to fail. Use care in stripping and crimping wires. Using wire cutters, crimpers, knives, or other tools can damage the conductor wire.

- Use only wire strippers for stripping wires.
- Use existing holes for cable routing if possible.

Routing and Protecting Cables

Cable Routing Guidelines

- When routing outside of the vehicle or around sharp edges always use protective sheathing, such as convoluted tubing or wire loom to protect the cables.
- Use P-clamps and tie-wraps to secure cables and wires.
- If drilling penetrates into an enclosed area, seal all holes to keep moisture out.
- Whenever possible, route cables with any existing vehicle cables.
- When reinstalling plywood sheets, be careful that screws do not penetrate cables.
- Use rubber grommets when cables are routed through holes with sharp edges.
- Use silicone sealant (RTV) around the 7-way where cables enter to prevent water intrusion.

4
TT150 Installation Planning

Important Notes

Note

Refer to Chapter 3: General Wiring Guidelines, while planning your installation. The cable chapter provides specific information on cables and wiring and should be considered during the installation planning stage.

Note

Installers should be familiar with basic automotive wiring.

Regulatory Compliance Information

FCC/IC Compliance Statement

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.

Caution

The TT150 is not certified as being intrinsically safe (IS). Do not install or operate in areas where IS certified devices are required.

This equipment should be installed and operated with minimum 20 cm between the radiator and body. This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC/IC.

General Installation Information

Verify the Trailer Is in Good Condition

Before beginning an installation:

- Thoroughly evaluate the area *prior* to installation to ensure the area where the installation will take place is in good condition. Determine if the TT150 system can be installed on the trailer.
- Verify there is no obvious or extreme damage to the trailer nose at the TT150 system installation area.
- The trailer top rail above the 7-way should be flat and free of bends or deep dents.
- The 7-way connection points should be inspected for general cleanliness and corrosion.
- Verify that there is voltage on pin 7 and at all 7-way connection points when external power is applied.

Survey the Trailer

Survey the trailer and decide where *exactly* to install the hardware. Ensure the TT150 terminal and cable are not in a location where they are prone to be bumped or damaged by normal gladhand/connection coupler operation.

Terminal and Cables

Make sure that the TT150 system terminal and cable locations do not hinder normal operation or maintenance of the trailer. Also if cables are routed internally, make sure the TT150 system terminal and cables are installed and/or stored safely out of the way of possible damage by cargo or other factors.

What to Consider Before Installing the System

- Drill holes only when necessary.
- Omnitracs recommends you use existing holes on the trailer for cable routing whenever possible.
- Use silicone (RTV) sealant when necessary to prevent leakage.

Installation Guidelines

When making installation decisions, consider safety, security, quality and reliability, and accessibility.

Safety, Reliability, and Accessibility

- Use eye protection when using a drill or performing work that poses any hazard to the eyes.
- Use ear protection in a noisy working area.
- Wear appropriate clothing or uniforms and safety shoes.
- Make sure you know what is behind the area before you drill.
- Make sure ladders and portable scaffolding are in good condition.
- Place ladders in safe positions.
- Install equipment so it will not cause damage to the trailer or hardware over time or will work loose over time.
- Make sure there are no loose components/cables and no unsecured components.
- Use solid mounting surfaces.
- Install all components in a location where they will not be abused.
- Route all cables away from sharp or abrasive areas where they might become damaged.
- Choose a location where components are safe from tampering.
- Choose a location where future maintenance can be easily serviced.

Typical TT150 Installation Sequence

Trailers and flatbeds often differ from manufacturer to manufacturer. The TT150 system was designed to work with a variety of trailer types; however, every installation is unique and should be thoroughly planned out before implementation.

1. Identify the installation location.
2. Mount the unit.
3. Route the power cable and cut as needed to the appropriate length
4. Connect wires to the 7-way.
5. Use the TT150 Field Service Tool (FST) to configure the TT150 and to perform system verification. The FST is also used to diagnose any problems with the system.

Tools and Supplies Needed for Installation

The following tools and supplies are recommended for performing installations.

- Mobile device with internet access to the TT150 Field Service Tool
- Pop-rivet gun (suitable for use with 3/16" rivets)
- Crimper
- Wire stripper
- Felt-tip pen (or grease pencil, or scratch awl)
- 3/8" nut driver or socket and ratchet
- Assorted 7-way receptacle tools
- Drill
- 7/8" drill bit
- 3/16" drill bit
- Rubbing alcohol and a towel

5
Installing the TT150 Terminal

Dry Van Trailers

Overview

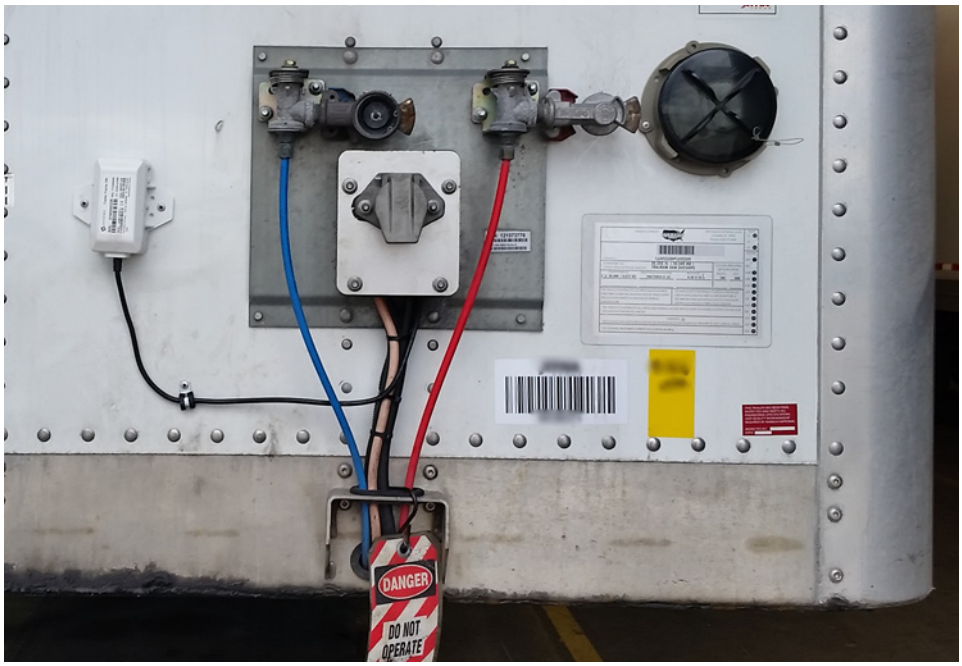
The TT150 terminal installs outside the trailer. For dry van trailers, the TT150 terminal is installed on the trailer's nose surface. The attached TT150 power cable runs from the TT150 terminal to the 7-way receptacle, which recharges the internal battery when a truck is connected to the trailer.

Thoroughly evaluate the trailer nose area to determine if the TT150 system can be installed on the trailer. Determine if rivets or VHB tape will be used to secure the TT150 terminal to the trailer. Typically, rivets are used for installations on dry van trailers. The trailer should be free of extensive damage in all installation areas. For specific tools required, refer to *Tools and Supplies Needed for Installation* *on page 4-4*.

The TT150 terminal can be installed high up on the nose of the dry van trailer to reduce the likelihood of tampering and lessen GPS signal obstruction or it can be installed lower on the trailer, near the 7-way when not enclosed by metal and does not interfere with gladhand/hose coupler connection operation. It is recommended to install one terminal in the desired location and verify operation for both GPS and cellular signal reception before installing additional units.

Installation

Typically, two rivets are used to secure a TT150 terminal to a dry van trailer. The power cable connects the TT150 system terminal to the trailer's electrical power source at the 7-way receptacle. The power cable is 10 feet long and can be cut as needed depending on where the TT150 terminal is installed. It may be necessary to drill a hole through the 7-way housing to provide a route for the cable.



1. On the outside of the trailer, select the location where the TT150 terminal will be installed/mounted.
2. Use the TT150 terminal as a template for marking the two holes needed for the rivets to mount the device. Use the holes on the outside of the mounting ears to allow access for a rivet gun. If rivets are used, the VHB tape should not be used for the installation.
3. Drill the two holes where marked using a 3/16” drill bit.
4. Place a dab of silicone sealant around each hole.
5. Using the appropriate supplied rivets, rivet the TT150 terminal to the trailer.

Note

Non-duraplate rivets are used for trailer walls with a thickness of .214 to .437 inch, which is typical dry van panel thickness. Duraplate rivets are used for trailer walls with a thickness of .35 to .625 inch, which is less common.

6. Check to make sure the TT150 terminal is riveted tightly against the trailer skin and there is no gap between the back of the terminal and the trailer surface.
7. Route the cable to the 7-way and refer to Chapter 6: Connecting the TT150 to the 7-Way.

Tanker Trailers

Overview

The TT150 terminal installs outside the trailer. For tanker trailers, the TT150 terminal is usually installed on the tank's nose surface, near the 7-way. The attached TT150 power cable runs from the TT150 terminal to the 7-way receptacle, which recharges the internal battery when a truck is connected to the trailer.

Typically VHB (Very High Bond) tape will be used to secure the TT150 terminal to the trailer. The trailer should be free of extensive damage in all installation areas. For specific tools required, refer to *Tools and Supplies Needed for Installation* *on page 4-4*.

The TT150 terminal can be installed high to reduce the likelihood of tampering and lessen GPS signal obstruction or it can be installed lower on the trailer, near the 7-way when not enclosed by metal and does not interfere with gladhand/hose coupler connection operation. It is recommended to install one terminal in the desired location and verify operation for both GPS and cellular signal reception before installing additional units.

Caution

The TT150 is not certified as being intrinsically safe (IS). Do not install or operate in areas where IS certified devices are required.

Installation

Typically, VHB tape is used to secure the TT150 terminal to the tanker trailer. The power cable connects the TT150 system terminal to the trailer's electrical power source at the 7-way receptacle. The power cable is 10 feet long and can be cut as needed depending on where the TT150 terminal is installed. It may be necessary to drill a hole through the 7-way housing to provide a route for the cable.

1. On the outside of the trailer, select the location where the TT150 terminal will be installed/mounted.
2. Clean the backside of the TT150 terminal thoroughly with the included alcohol wipe and let dry.
3. Peel off one side of the backing from the VHB tape pad and adhere to the TT150 terminal. Apply firm pressure for 20 seconds to ensure the VHB tape is fully bonded to the terminal.
4. Thoroughly clean the location on the tanker where the TT150 will be installed with the other included alcohol wipe and let dry.

5. Peel off the backing from the VHB tape and firmly press the TT150 terminal to the tanker trailer for 20 seconds to ensure the TT150 terminal is fully bonded to the tanker trailer.

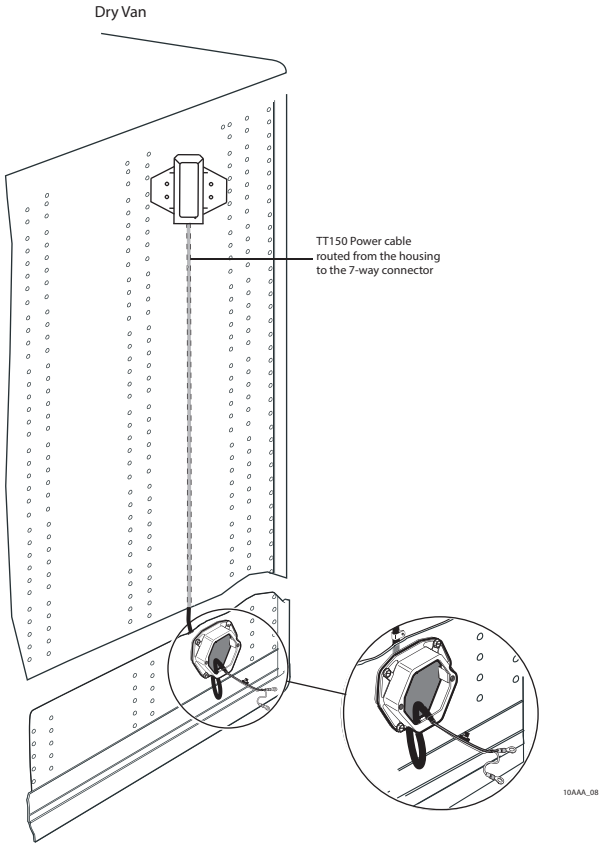
6. Route the cable to the 7-way and refer to Chapter 6: Connecting the TT150 to the 7-Way.

6
Connecting the TT150 to the 7-Way

Overview

The power cable is 10 feet long and can be cut as needed depending on the where the TT150 terminal is installed. Whenever possible, use existing holes to route cable into the 7-way. It may be necessary to drill a hole through the 7-way housing to provide a route for the cable.

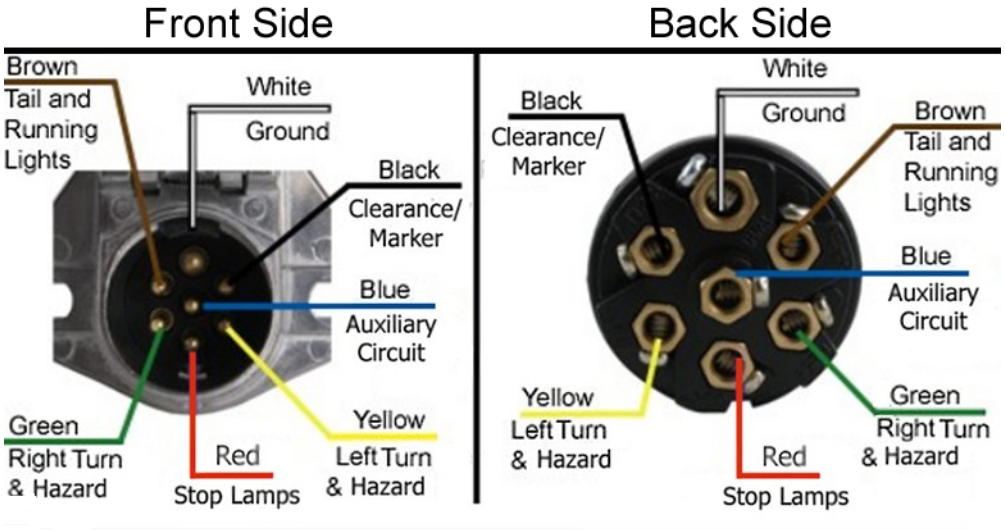
Two 3 amp fuses are included for use on the TT150 system power cable blue POWER wire and brown LIGHTS wire.



Preparing for Connection to the 7-Way

1. Remove the 7-way receptacle cover from outside the trailer.
2. If necessary, drill a 7/8" hole into the bottom side of the 7-way box.
3. As needed, cut the TT150 power cable to an appropriate length, leaving some slack for making 7-way connections later and securing away from the trailer gladhand/hose coupler connections.
4. If a 7/8” hole was drilled into the 7-way box, install the supplied grommet over the cable and secure into the hole.
5. Route the power cable into the 7-way box and out the receptacle opening.
6. Strip 4” from the cable shielding and 1/4” from the wire insulation on the blue, white, brown, and two gray wires. Do not strip insulation from the green or yellow wires.

Wire Connections at the 7-Way Receptacle



1. Attach a fuse holder with a 3 amp fuse (provided) to the blue POWER wire on the TT150 system power cable using the attached butt splice. (Fuse holder supplied in the installation kit, marked with blue tape.)

    a. Connect the blue wire with the fuse holder to pin 7 (Auxiliary Circuit) in the 7-way receptacle using a ring terminal.

Note

If the 7-way receptacle has circuit breakers, be sure to connect on the unprotected (truck) side of the circuit breakers.

    b. If the 7-way uses push-on type connectors, you will need to cut the ring terminal off of the blue fuse holder wire and crimp on the push-on connectors (provided).

2. Attach a fuse holder with a 3 amp fuse (provided) to the brown wire on the TT150 power cable using the attached butt splice. (Fuse holder provided in installation kit, marked with brown tape.)

    a. Connect the brown wire with the fuse holder to pin 6 (Lights) in the 7-way receptacle using a ring terminal.

Note

If the 7-way receptacle has circuit breakers, be sure to connect on the unprotected (truck) side of the circuit breakers.

    b. If the 7-way uses push-on type connectors, you will need to cut the ring terminal off of the brown fuse holder wire and crimp on the push-on connectors (provided).

3. Connect the white GROUND wire to pin 1 in the 7-way receptacle using a ring terminal (or push-on).
4. Connect both gray wires together with the supplied closed end insulated splice.
5. Verify all mechanical and electrical components are properly connected.
6. Secure the power cable to the trailer using the supplied P clamps and tie wrap wires in and around the 7-way.
7. Re-attach the 7-way receptacle cover.
8. Use silicone (RTV) around the 7-way to prevent water intrusion.
9. Perform system verification and configure the TT150 using the Field Service Tool. See Chapter 7: System Verification.

7
System Verification

TT150 Initial Installation System Verification

Checking the TT150 Terminal LEDs

1. Apply power to the trailer's 7-way. When the TT150 terminal gets power it will wake up and attempt to get GPS and cellular signals. In most cases, a truck with its key in the ON position and the pig tail connected to the trailer will supply 12 volts of power to the 7-way.

Note

When powering up a TT150 terminal for the first time, it is important that the TT150 terminal gets steady power for more than three minutes for it to establish a connection to the Omnitracs network.

2. Check the Communication and GPS LEDs to confirm the device is able to communicate and get a GPS fix. Both the green GPS and orange communication LEDs should be solid when the trailer's 7-way is receiving power.
   - If both LEDs are solid, proceed to the next section, *Using the TT150 FST*.
   - If both LEDs are off, refer to Chapter 8: TT150 Status LEDs are Off.
   - If the green GPS LED is blinking, refer to Chapter 9: GPS Status LED Blinking.
   - If the orange communication LED is blinking, refer to Chapter 10: Communication Status LED Blinking.

GPS LED (Green)

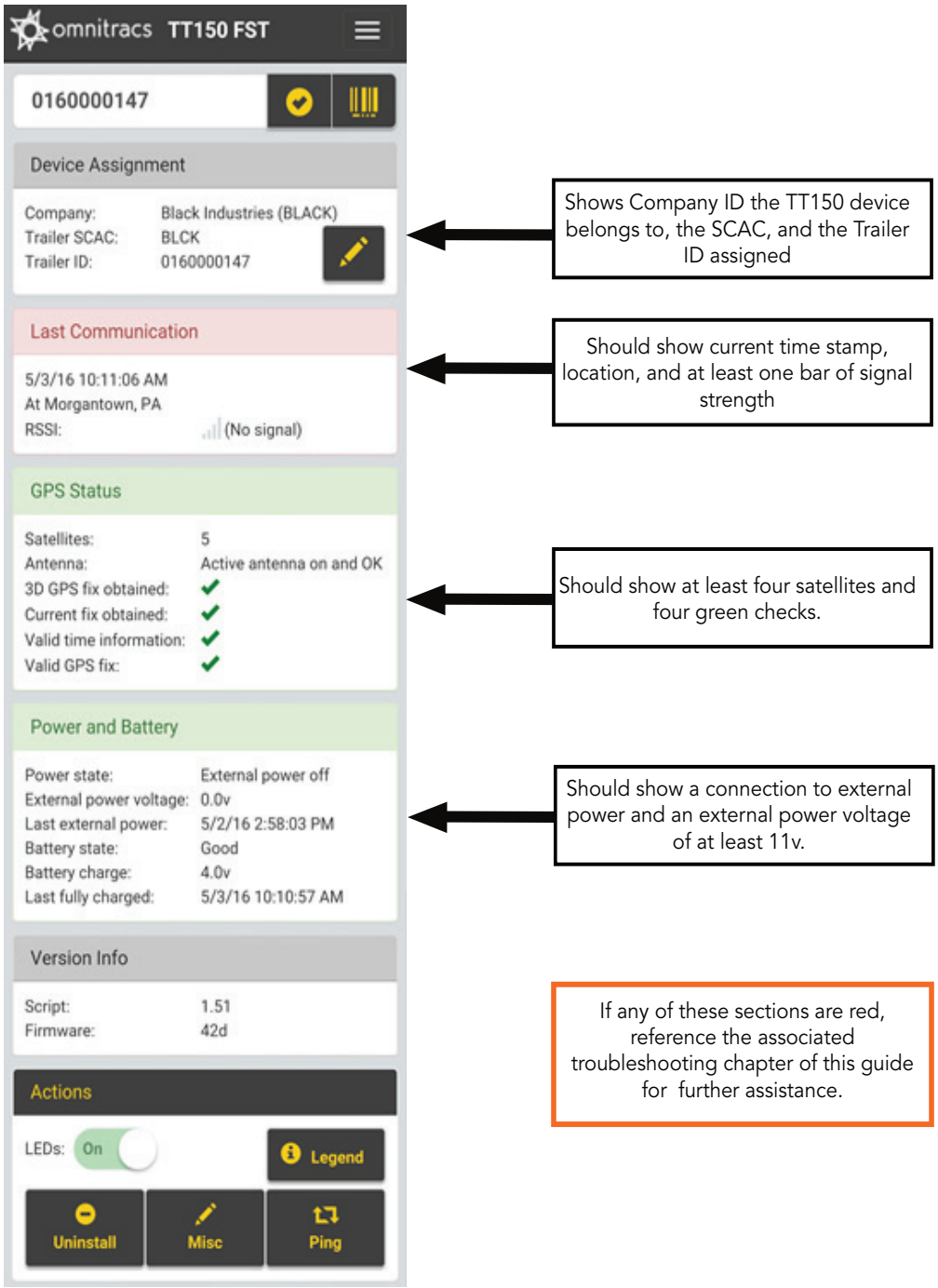
Status	LED Lighting
GPS Off	Off
GPS On	Slow blinking
GPS Time Sync	Fast blinking
GPS Fix	Alternates from solid to fast blink

Communication LED (Orange)

Status	LED Lighting
Modem Off	Off
Searching	Slow blinking
Network Available	Fast blinking
Registered but no inbound acknowledgment	Alternates from solid to fast blink
Registered and received inbound acknowledgment	Solid

Using the TT150 FST

1. Log into the TT150 FST at https://services.omnitracs.com
2. Enter the TT150 device's serial number manually or by scanning the serial number on the TT150's label.



3. Ensure all sections in the FST are green to confirm the TT150 is functioning properly.

TT150 Configuration

1. Tap the pencil icon in **Device Assignment**.
   a. Enter the new Trailer ID
   b. Confirm the trailer is assigned to the correct SCAC
   c. Tap **Initial Installation** as the reason
   d. Tap **Save**.
2. **Optional** - Tap the Misc button in **Actions**.
   a. Enter the trailer's current mileage if your company uses Trailer Mileage Reporting.
   b. Enter any notes about the trailer or installation in the installation notes.
   c. Tap **Save.**
3. **Optional** - In **Actions**, Set the LEDs to off to avoid drawing unwanted attention to the TT150.

System Verification Form

On the following page is the TT150 System Verification Form. You can make copies of this form and record important information concerning the trailer and the TT150 system.

Note

To access the information for the TT150 System Verification Form, *you must use the TT150 Field Service Tool.*

TT150 SYSTEM VERIFICATION FORM

Installer(s):	Date:

Trailer Information

Trailer ID:	Customer:
Make:	Location:
Model:	Terminal ID:
Year:	

System Verification

Enter Trailer ID:	
GPS Fix:	
Battery Voltage:_____	**Note**: TT150 will hibernate if there is no external power and the battery voltage is below 3.5 Volts.
7-Way Power On: ❒ Yes ❒ No Record Voltage: _____	
Phone Signal Strength: Number of Bars:_____	

Notes

Checkout Completed

Signature:	Date:	Time:

If you have any questions, contact Omnitracs Customer Support at 800-541-7490.

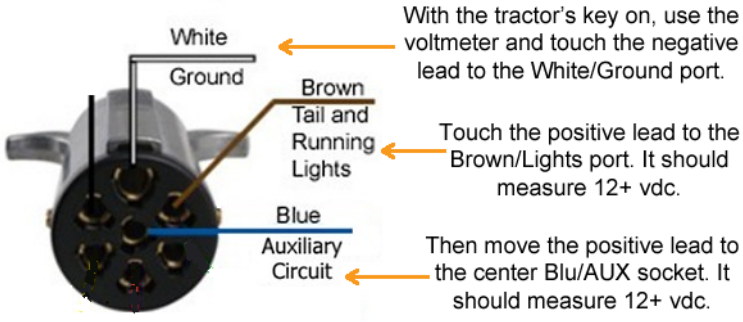
8
TT150 Status LEDs are Off

Problem: TT150 Status LEDs are Off

Both LEDs should be lit and solid when the trailer's 7-way is receiving power. If both LEDs are off, this indicates one of two possible conditions:

- The LEDs have been disabled via the Trailer Tracks Portal or the TT150 FST. Change the setting if needed.
- The TT150 terminal is not currently detecting power via the trailer's 7-way connector and the TT150 terminal is asleep.

1. Check that power is being supplied by the tractor to the trailer's 7-way connector by measuring voltage on the pig tail from the truck.



2. If power is confirmed to be provided by the 7-way connection, confirm the fuses on the TT150 blue and brown wires are good.

3. If the fuses are good, verify each of the TT150 power cable connections at the trailer's 7-way (white ground lead, blue fused power lead, and brown fused lights lead).

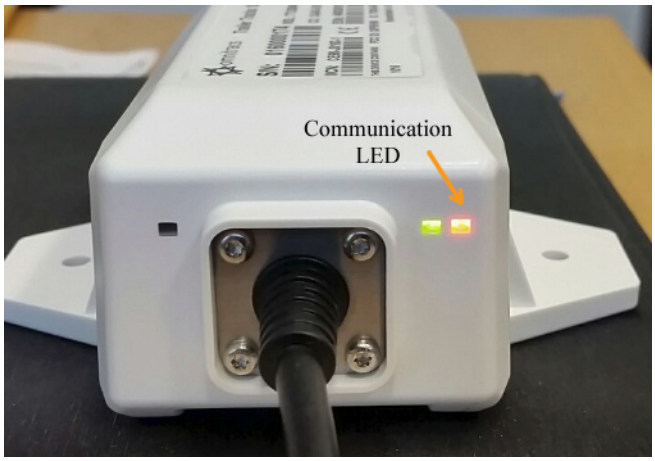
9
GPS Status LED Blinking

Problem: Green GPS LED Blinking

If the Green GPS LED continues to blink (slow or fast), the TT150 terminal is not able to receive signals from GPS satellites. If this condition persists, it's likely there is a metal obstruction blocking the GPS signals. Remove metal obstructions or relocate the TT150 terminal on the trailer so it has a good, unobstructed view of the sky.

10
Communication Status LED Blinking

Problem: Orange Communication LED Blinking



If the Orange COMM LED continues to blink slow (1 blink every 2 seconds), this indicates one of two possible conditions:

- The location of the trailer is not within cellular coverage. All TT150 messages will be queued and then transmitted once the trailer is relocated to an area where cellular coverage is available.
- The TT150 terminal is not properly provisioned for the cellular network, contact the Omnitracs Hotline at 800-541-7490 to check the provisioning of the terminal.

If the Orange COMM LED continues to blink fast (1 blink per second), this indicates the trailer is in cellular coverage but the Omnitracs network server is not responding. This could be a temporary condition – possibly during a system maintenance window. If the condition persists, call the Omnitracs Hotline at 800-541-7490 to check the terminal's provisioning status and TT150 system availability.

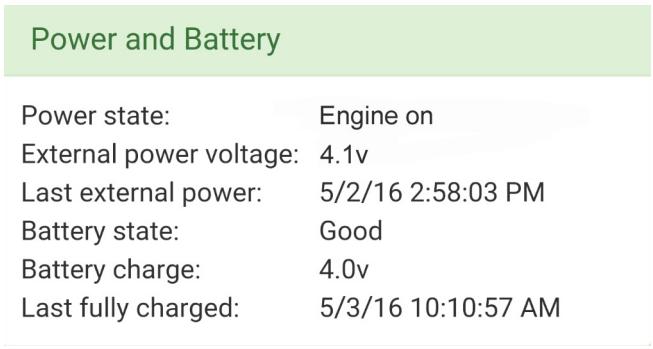
If the Orange COMM LED alternates from solid to blinking fast, this indicates one of two possible conditions:

- The TT150 was recently installed and did not receive power long enough to get fully registered. Reapply power to the 7-way connector for five minutes. If the condition persists, check the fuses and the white, blue, and brown wire connections at the trailer's 7-way connector and reapply power to the 7-way connector for five minutes.
- The Omnitracs network server is not responding. This could be a temporary condition, possibly during a system maintenance window. If the condition persists, call the Omnitracs Hotline at 800-541-7490 to check the terminal's provisioning status and TT150 system availability.

11
Battery Problem

Problem: Low Battery Message

The FST and the Trailer Tracks Portal display the internal lithium ion battery voltage each time the TT150 communicates.



When a TT150 terminal is shipped from the factory, the battery is charged to roughly 3.8 volts, which is the optimum level for shelf storage. If a TT150 terminal is configured to communicate once a day, it is expected to be able to provide daily status reports for 60+ days without external power.

A fully charged battery will register 4.1 to 4.2 volts.

When the battery reaches a threshold of 3.55 volts, it will send a low battery message.

At 3.5 volts or less, the TT150 system will go into hibernation and will require external power to wake up.

If a TT150 terminal's battery is not getting recharged when connected to external power:

- Confirm the tractor is supplying power to the trailer's 7-way.
- Confirm the fuses on the TT150's blue and brown wires are good.
- Confirm the TT150's power connections are good at the trailer's 7-way.

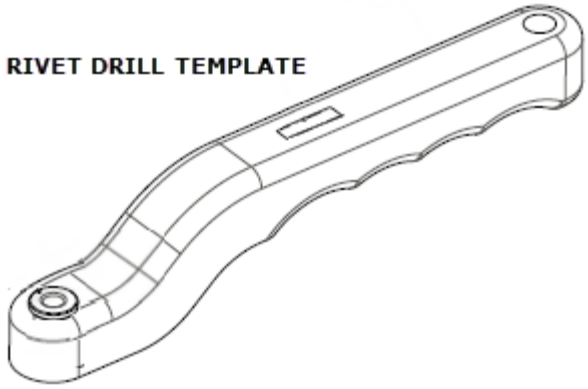
12
TT150 System Uninstallation

Before Uninstall

If you intend to reinstall the TT150 on a different trailer later (instead of a scrap or RMA) and the terminal is in good shape, then refer to *Appendix C: Component Information* to order the appropriate rivets or VHB tape.

TT150 System Removal

1. Disconnect the 2 power wires and the ground wire in the 7-way connector.
2. Cut the fuse holder from the power wire. Salvage the fuse and fuse holder.
3. If the power cable is not secured behind the trailer wall, pull the cable up from the 7-way.
4. Carefully drill out the rivets attaching the terminal to the trailer using a 1/4” drill and a rivet drill template. Ensure the plastic housing is not damaged.



5. Remove the TT150 unit assembly.

13
Periodic System Maintenance

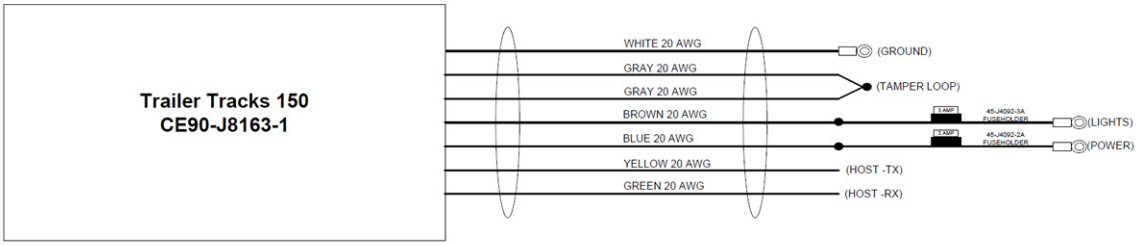
Important

TT150 system maintenance should be done at least once a year. Preferably, each time preventative maintenance is done, the following should also occur:

- Inspect all mounts to ensure fasteners are in place
- Inspect the trailer 7-way harness to ensure that the TT150 connection is solid and the fuses are not burnt out
- Inspect all cables for damage and/or deterioration
- Inspect the 7-way
  - Clean the 7-way pins, especially the center Pin 7 (AUX) and the top Pin 1 (Ground)

A
TT150 Power Cable

This illustrations shows the various cable assemblies.



Note

The yellow and green are used for engineering purposes only, they should be taped apart from each other when installation is performed.

B
TT150 System Specifications

TT150 System Terminal Parameters

TT150 System Terminal Parameter	Signal Type	Specifications	Input/Output Characteristics
Input voltage	DC	9 VDC to 18 VDC	Meets SAE-J1113-11 for 12 VDC systems
Current draw from tractor power (12 VDC)			
ON—Receive mode	Current	<100mA	
ON—Transmit mode	Current	<800mA (peak currents during transmit when in GSM mode)	

TT150 System Environmental Requirements

Condition	Requirement
Operating temperature	-30° C to +70° C (-22° F to +158° F)
Storage temperature	-40° C to +85° C (-40° F to +185° F)

C
Component Information

This appendix provides material control numbers (MCNs) for the different TT150 system components referred to in this guide or considered additional useful information.

TT150 System Component Material Control Numbers

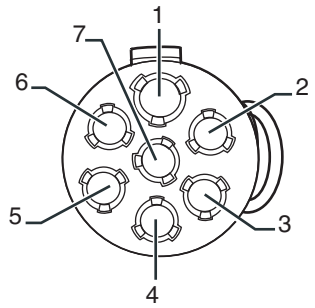
System Component	*Latest MCN*
TT150 System Terminal Master Packs	
7-way power master pack	65-J8163-1
TT150 Install Kit	
TT150 install kit	65-J8164-1
TT150 System Miscellaneous Components	
Telematics assembly w/ embedded cable, HSPA, dual band, GPS, TT150	CE90-J8163-1
Cable assembly, fuse holder, power, 3 amps	45-J4092-2A
Cable assembly, fuse holder, lights, 3 amps	45-J4092-3A
Grommet, cable, .875 hole, .050 PNL, non-slit	50-J7646-3
Tape, modified, VHB, TT150	50-J8163-1
Kit, rivet, duraplate, TT150	65-J8165-1
Kit, rivet, non-duraplate, TT150	65-J8166-1
TT150 System Documentation	
TT150 Getting started guide	80-J7617-1

D
Trailer 7-way Configurations

This appendix describes four different trailer 7-way configurations that may be encountered.

- Slip-on with circuit breaker
- Terminal lug with circuit breaker
- Slip-on without circuit breaker
- Terminal lug without circuit breaker

7-way Conductor Electrical Connector Overview



05AAA_284a

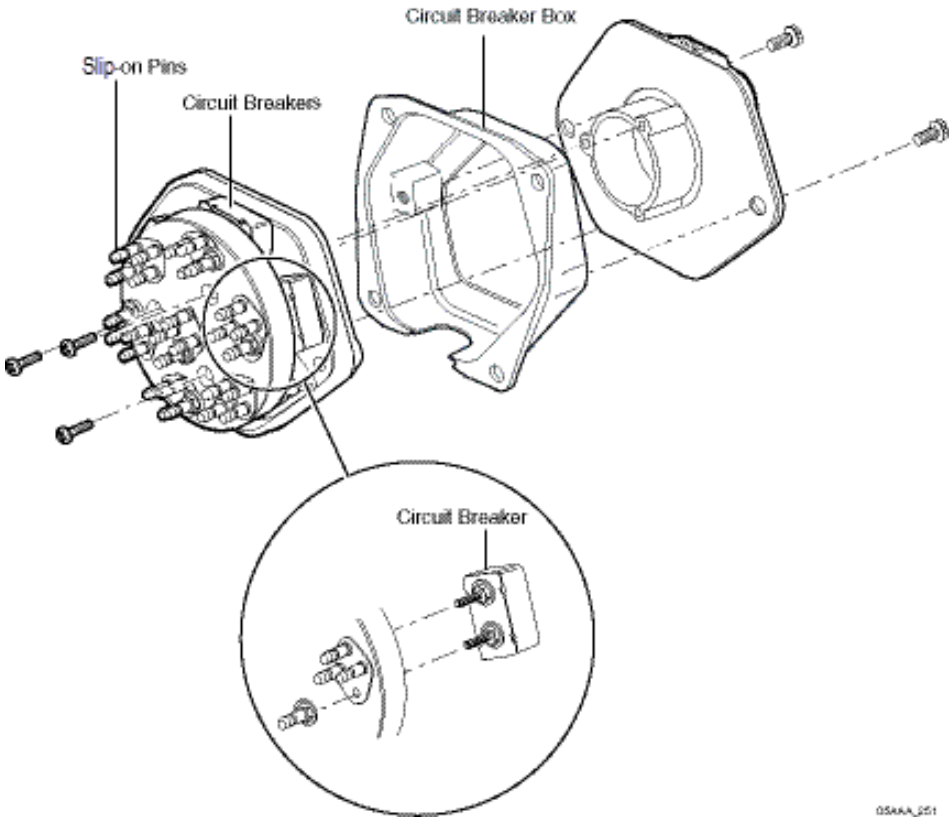
SAE J560 Seven Conductor Electrical Connector		
Conductor Identification Terminal Number	**Conductor Identification Wire Number**	**Conductor Identification Wire Number**
1	White	Ground return to towing vehicle
2	Black	Clearance, side marker, and identification lamps
3	Yellow	Left turn signal and hazard lamp
4	Red	Stop lamps and anti-lock devices
5	Green	Right turn signal and hazard lamps
6	Brown	Tail and license plate lamps
7	Blue	Auxiliary/ABS

7-ways with Circuit Breakers

Connect to the unprotected (truck) side of the 7-way circuit breaker which can be verified by doing a visual inspection. The unprotected side is the side of the breaker without the blue wire connected.

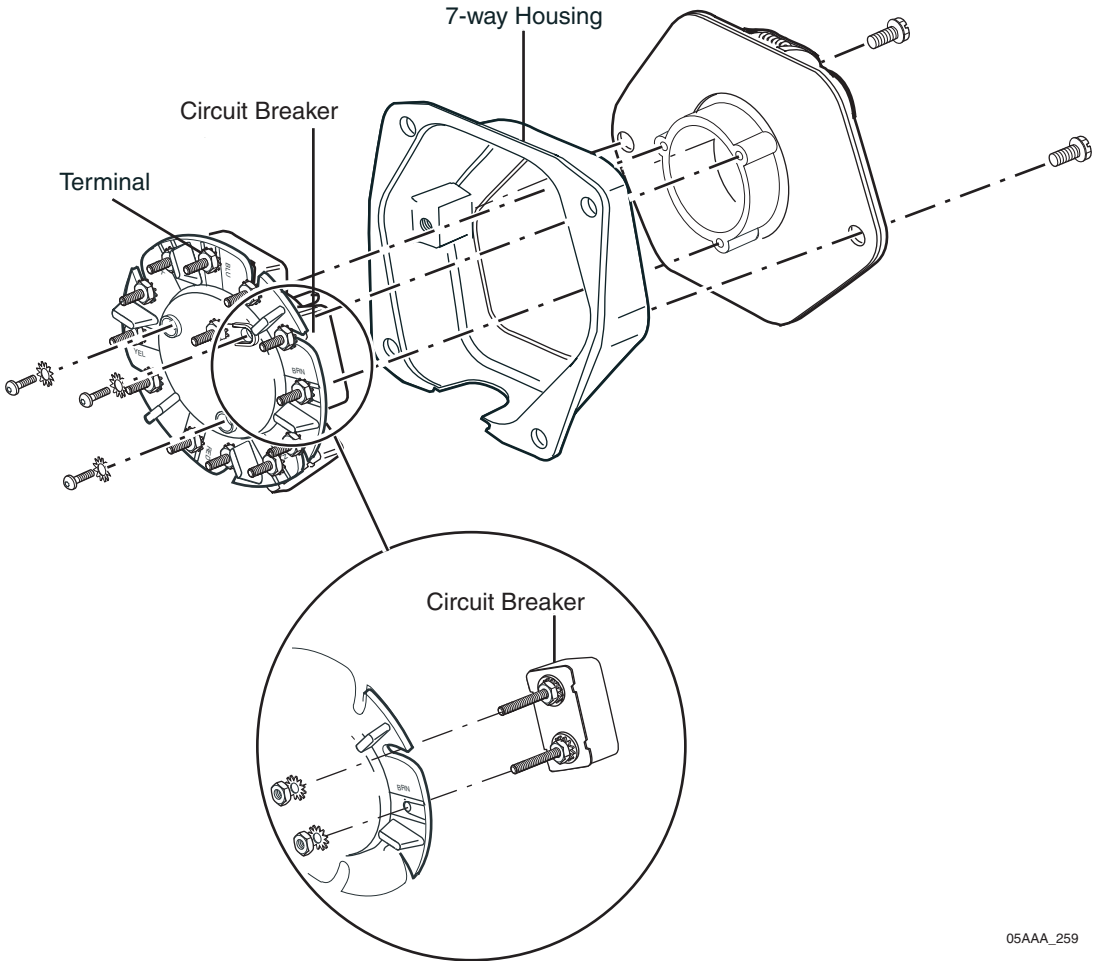
Alert!

When working with a slip-on 7-way, always install the TT150 system on the unprotected (truck) side of the trailer. All four pins are protected. To access the unprotected (truck) side of the circuit breaker, disassemble the 7-way. When reassembling the 7-way, do not rotate the housing. Ensure correct color coding.



The following 7-way has circuit breaker protection. The TT150 system must be connected to the unprotected (truck) side of the circuit breaker.

Terminal Lugs with Circuit Breaker



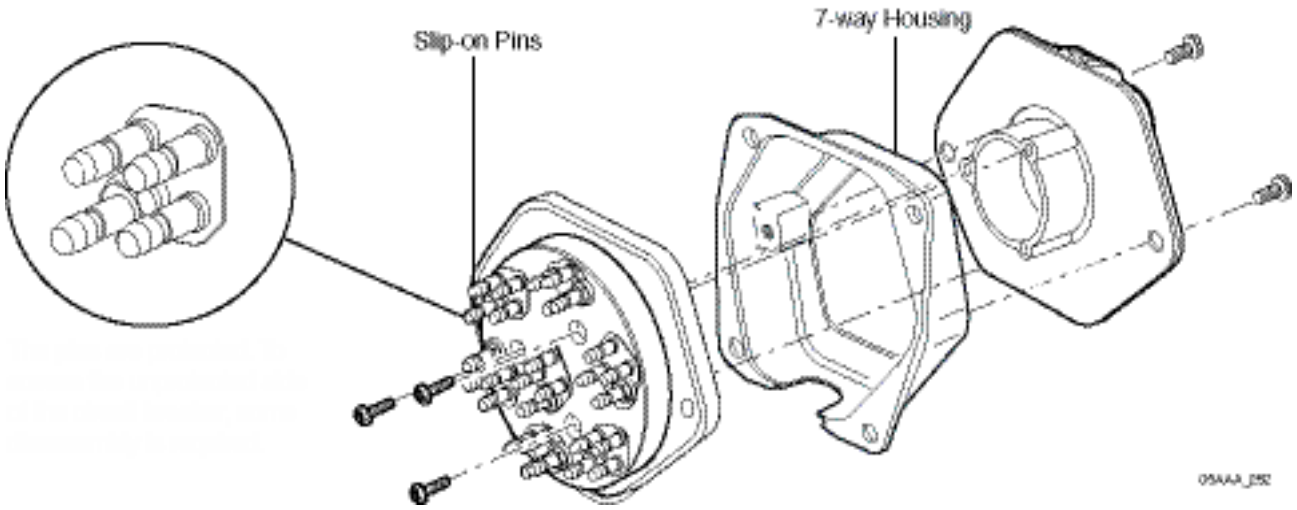
7-ways Without Circuit Breakers

Note

7-ways without circuit breakers do not have any special wiring requirements because there is no protected side.

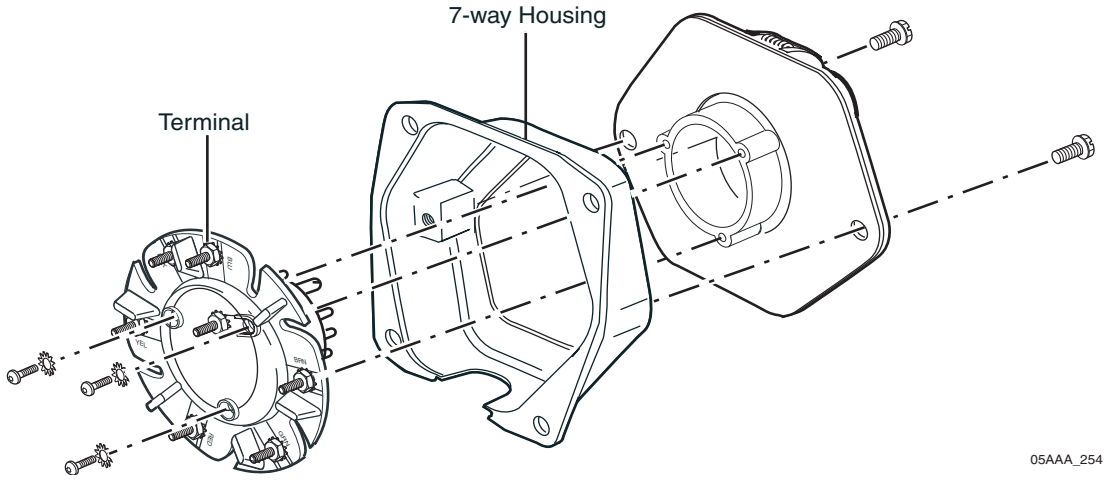
The following 7-way does not have circuit breaker protection. The TT150 system can be connected to the appropriate 7-way slip-on connector.

Slip-on without Circuit Breaker



The following 7-way does not have circuit breaker protection. The TT150 system can be connected to the appropriate 7-way terminal studs.

Terminal Lugs without Circuit Breaker



E
TT150 Field Service Tool

What Is the TT150 Field Service Tool?

The TT150 Field Service Tool (FST) is a mobile friendly web application that is used for system verification. System Verification is a functional system check that should be performed during installation of the TT150 system and after service to verify the TT150 system is operating properly.

The TT150 FST is accessible on Android devices using the Chrome browser and Apple devices using the Safari browser. The FST can be accessed from a smart phone, tablet, laptop, or pc as long as it has internet connectivity.

The trailer ID may be assigned or changed from the Trailer Tracks Web Portal or the TT150 FST. In addition, some operating parameters may be checked. It is not recommended to use the Portal for system verification because not all of the items that should be checked are available for viewing.

Note

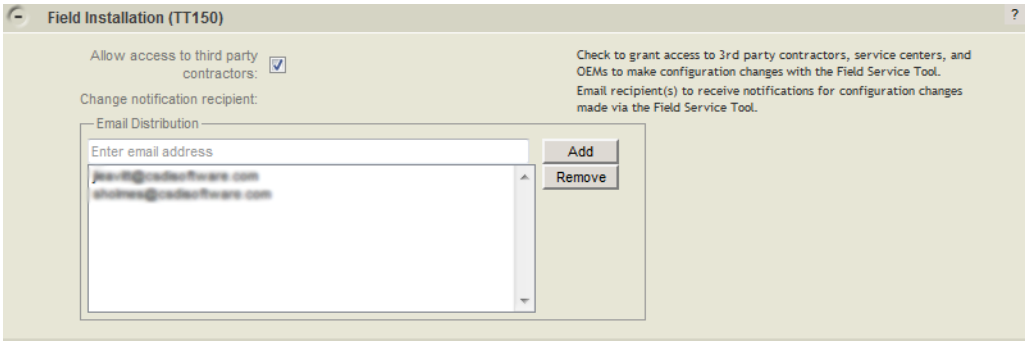
To use the TT150 FST scanner you must have the bridgeit application installed. This is a free application and you will be prompted to download and install it when you tap the bar code icon to use the scanner.

Using the Field Service Tool

Accessing the FST

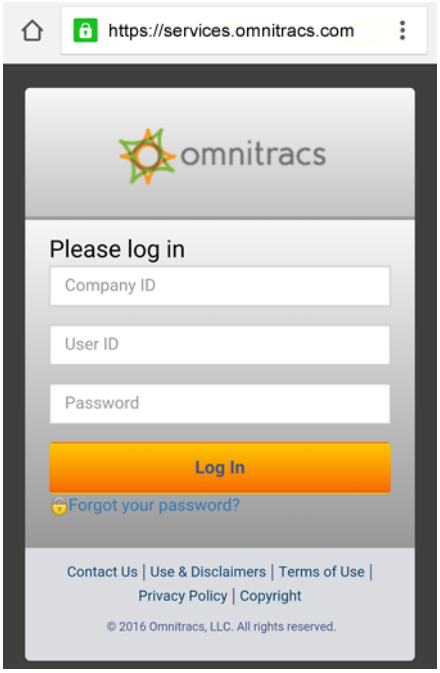
Before a user can log into the FST, he first needs to be established as an installer in the Trailer Tracks portal. Please see the Trailer Tracks portal help system for information about creating users and assigning roles. Once the user has been assigned the installer role they can access the FST to view their company's devices or, if a 3rd party installer, the devices of the company they are installing for.

Companies that use 3rd party installers such as Omnitracs licensed Service Centers or OEM installers must have access enabled for 3rd party installers. If this access is not enabled, only installers in the company's account can access its devices in the FST. If enabled, 3rd party installers have FST access only to devices by scanning the devices bar code or entering its serial number. Third party access is enabled or disabled through the Company Settings page on the Trailer Tracks portal. In addition, customers can enter email addresses of personnel they want notified any time any change is made to its devices through the FST.



Accessing the FST from a Mobile Device

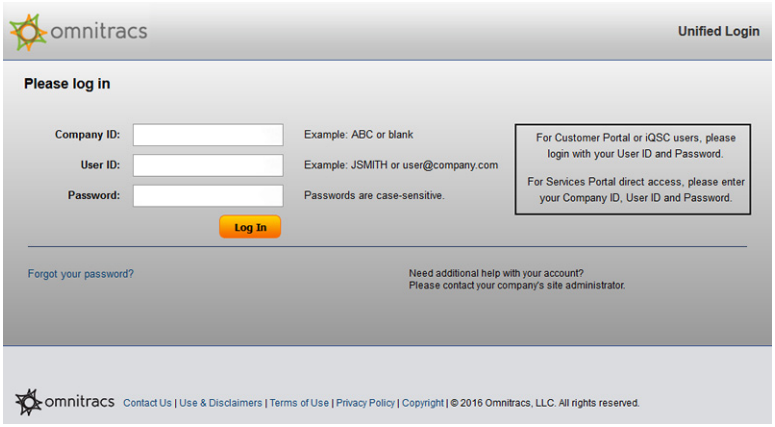
1. Using an Android or Apple mobile device with internet connectivity, open https://services.omnitracs.com in a Google Chrome or Apple Safari web browser.



2. Enter your Company ID.
3. Enter your User ID.
4. Enter you Password.
5. Tap **Log In**.

Accessing the FST from a PC or Laptop

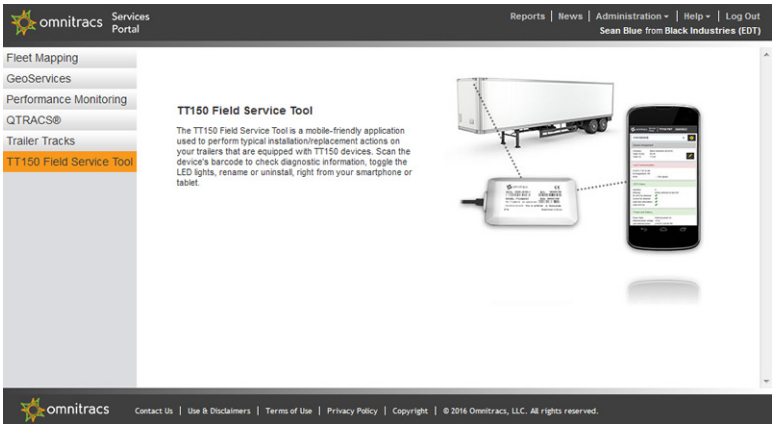
1. Using a pc or laptop with internet connectivity, open https://services.omnitracs.com in a Firefox, Google Chrome, Apple Safari, Microsoft Edge, or Internet Explorer 10 or 11 web browser.



2. Enter your Company ID.
3. Enter your User ID.
4. Enter you Password.
5. Tap **Log In**.

Note

Depending on your role, you may also need to select the TT150 Field Service Tool from the menu on the left.



TT150 Device Diagnostics

Once logged into the FST users can scan a TT150 device's serial number or manually enter it into the FST to pull up diagnistics information about the device. The diagnostics information is divided into several sections: Device Assignment, Last Communication, GPS Status, Power and Battery, Version Info, and Actions. All of the sections except Device Assignment, Version Info, and Actions will be color coded either green or red. Green indicates a good status and red indicates there is a problem.

Device Assignment shows the company the TT150 device belongs to, the Trailer SCAC, and the Trailer ID the TT150 device is assigned to. This section also contains the pencil icon button, which is used to edit the Trailer ID and SCAC.

Last Communication shows the time stamp and location of the TT150 device's last communication with the NOC and shows the RSSI.

GPS Status shows how many satellites the TT150 device is in sight of, the antenna status, and the GPS fix statuses. The TT150 device needs to be in sight of a minimum of 4 satellites to provide accurate positioning.

Power and Battery shows if the TT150 is connected to external power, the voltage of the external power, and the TT150 device's battery information and state, as well as the last time the TT150 device's battery was fully charged.

Version information shows the current script and firmware on the TT150 device. This information may be needed by Omnitracs support personnel for troubleshooting purposes.

Actions allows a user to turn the TT150 device's LED lights on or off, pull up a legend of what the LED light statuses indicate, ping a device to refresh the diagnostic information, uninstall a device from a trailer, or use the Misc button to set the Trailer Mileage or enter installation or maintenance notes.

Set the Trailer ID and SCAC

When the TT150 device is first connected to external power it communicates with the NOC and an entity for the device is created on the customer's Trailer Tracks account. The TT150 device's Trailer ID is initially set to the TT150 device's serial number and the SCAC is set to the company's default SCAC. It is recommended that the Trailer ID be changed during installation to the name or ID of the trailer the TT150 device is being installed on.

1. Tap the pencil icon in **Device Assignment**.
2. Enter the Trailer ID in the box

Note

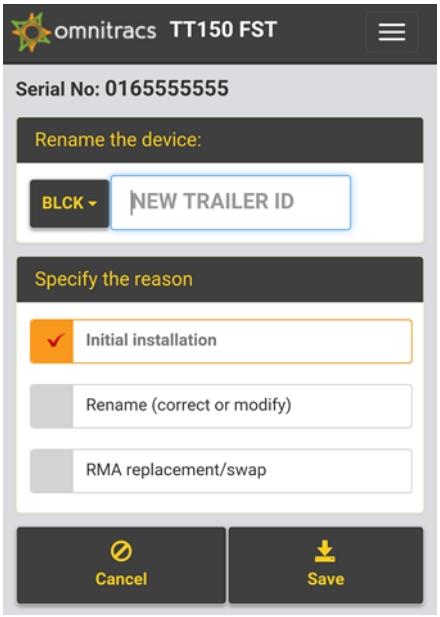
When entering the new trailer ID number, avoid entering an erroneous character or blank space in the first digit as this will create an invalid trailer record. The first digit of the trailer ID number must contain a valid character.

3. Tap the SCAC box to the left of the Trailer ID field.
4. Choose the correct SCAC from the drop down list of options.

Note

SCACs must first be created and added to the customer account on the Trailer Tracks portal to appear in the drop down list on the FST. If the desired SCAC does not appear in the drop down list, have an administrator create the desired SCAC then ping the device in the FST to refresh the content and add the newly created SCAC to the drop down list.

5. Choose a reason for changing the trailer ID and/or SCAC.
6. Tap **Save**.



Uninstall a Device from a Trailer

When removing a TT150 device from a trailer the device must also be unassigned from the trailer in the customer's account. This process is called uninstalling in the FST. This is not necessary when RMAing a device, see the next section if you need information about facilitating an RMA.

1. Log into the FST.
2. Scan or manually enter the TT150 device's serial number.
3. Tap the Uninstall button in the **Actions** section.
4. Enter a reason for uninstalling the device in the installation notes field.
5. Tap **Uninstall**.

Facilitate an RMA

If you must RMA a TT150 device, you will need to assign the new device to the trailer when you receive it. Instead of having to first unassign a TT150 device then assign the replacement device, the process is simplified for RMAs. When you receive the replacement TT150 device, follow the normal installation steps. When entering the Trailer ID for the trailer the device will be assigned to, select RMA Replacement/Swap instead of Initial Installation as the reason for change. This will unassign the defective TT150 device and assign the replacement TT150 device to the trailer.

Set Trailer Mileage

If your company uses the Trailer Mileage Reporting feature in Trailer Tracks, the trailer's mileage can be set or changed in the FST. For more information about Trailer Mileage Reporting, see the Trailer Tracks portal help system.

1. Log into the FST.
2. Scan or manually enter the TT150 device's serial number.
3. Tap the Misc button in the **Actions** section.
4. Enter the trailer mileage.
5. Enter a reason for the change in the installation notes field.
6. Tap **Save**.