TT210 Hardware Installation and Diagnostic Guide

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1
How the Trailer Tracks Service Works

Introduction

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

The TT210 system sends status information over-the-air (OTA) to the customer using dual-mode cellular functionality. The Trailer Tracks service is a comprehensive, end-to-end trailer/container identification and location system, consisting of rugged mobile hardware, reliable network services, robust host software, and extensive data integration capabilities.

This chapter provides information about the Trailer Tracks service and how the various components interact to send information to the customer.

Topics in this chapter include:

If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

Note

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

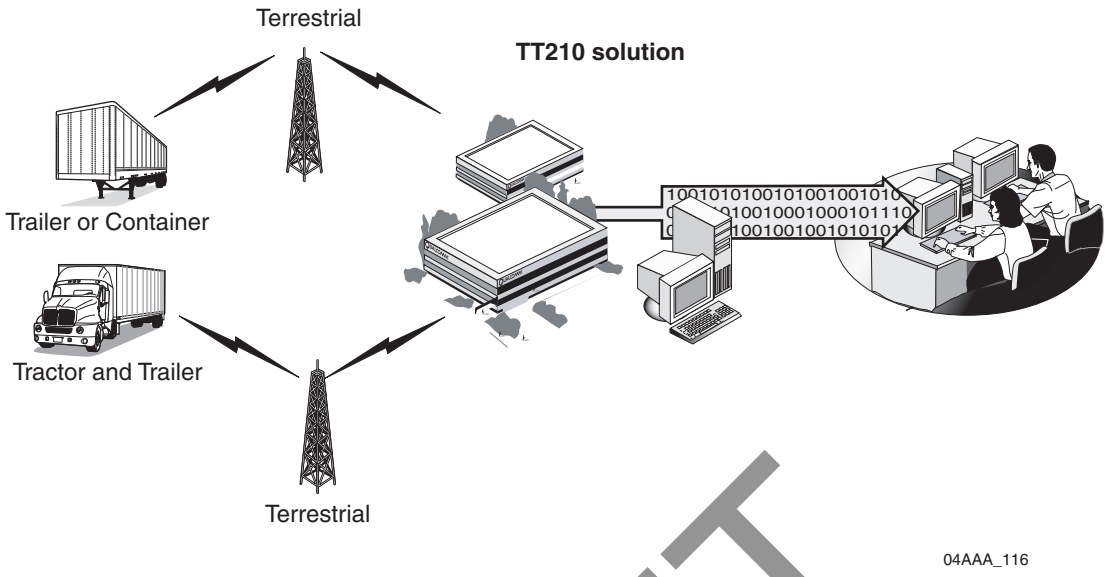
TT210 system *refers to the complete hardware system for the Qualcomm Trailer Tracks service.*

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 message traffic between the customer and the trailer/container. Within the NOC is the Network Management Computer (NMC), which actually receives and handles the message traffic. The NOC is located at QUALCOMM, Inc. in San Diego, CA. A fully redundant backup facility exists in Las Vegas, NV.
Customer	The customer's computer communicates with the NMC in order to receive information from the TT210 system.
Trailer Tracks software	Qualcomm's Trailer Tracks software is used by the customer. This is the customer's interface with the TT210 system. It allows customers to receive information, request trailer/container location information, and perform other functions. The customer's computer communicates with the NMC via secure data lines.
Global Positioning System (GPS)	GPS is a constellation of 24 strategically placed satellites. Signals from the satellites determine the trailer's/container's location, which is then reported to the NMC by the TT210 system.
Wireless Communication Network	The TT210 system uses an existing wireless communication network to communicate.
TT210 Web Portal	This is the customer's Web interface with the TT210 system. It allows customers to receive information, request trailer/container location information, and perform other functions.

The following illustration shows the interaction between the TT210 system network components. The TT210 system sends information to the NMC through the wireless communication network provider's gateway. The gateway center sends the information via secure data lines to the NMC. After the NMC receives the information, it sends the information to the customer. The Customer can also request information from the TT210 system by sending a message to the NMC, which goes out over the wireless communication network to the TT210 system terminal. 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/container. The hardware works to send information to customers over a terrestrial network and also computes vehicle location information using GPS technology.

The GPS and Terrestrial Wireless Network Systems

The TT210 system uses GPS to locate the trailer/container and a wireless communication network to communicate information about the trailer/container to the customer.

The Global Positioning System

Originally created for and used by the military, 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. Essentially, GPS allows nearly every area of the planet to have a unique address.

How the TT210 System Uses GPS

Signals received from at least three GPS satellites determine the TT210 system terminal's (i.e., trailer's/container's) location. The internal antenna for the TT210 system receives the GPS signals. The GPS receiver resides inside the TT210 system terminal to determine the trailer's/container's position. It can receive information from up to 12 satellites at a time. The GPS receiver calculates the trailer's/container's location based on the time that signals are received from the various satellites. The trailer's/container's location is then available for transfer to the NMC and the customer via the terrestrial wireless network.

Location information can be viewed by a customer using the Trailer Tracks web portal. The NMC retrieves location data automatically at regular intervals and makes data available to the customer. In addition, the customer can request a location report at any time.

The Terrestrial Wireless Communication Network

The TT210 system uses digital technology to track customers' trailers/containers over a cellular network. The TT210 terminal consist of a microprocessor, a wireless modem module, data storage, antenna, and battery.

TT210 Components

The TT210 system includes the following hardware and software components:

- TT210 terminal with integral battery pack and antennas

  The terminal is designed according to industry environmental specifications. It contains a rechargeable battery pack, the TT210 system terminal, and antenna. The system allows OTA reprogramming of the terminal's on-board firmware.

- TT210 power/accessory cable assembly - Optional

  The cable assembly includes all power and ground wiring, and optional sensor wiring.

- Optional Sensor Devices

  A cargo sensor and a door sensor both with cable assembly are available for installation. Third-party auxiliary sensor capability is built into the power/accessory cable assembly on some versions. (??? all versions???)

- TT210 Configuration Tool software

  Windows based software used to configure, verify, and/or diagnose the TT210 system. Please refer to the *TT200/TT210 Configuration Tool Quick Reference* (80-J7595-1???) for more information.

2
TT210 System Component Overview

TT210 Component Introduction

This chapter describes the hardware components that will be installed and provides a wiring overview for a TT210 installation.

Topics in this chapter include:

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The Installation Hardware

The TT210 system installation has three basic configurations:

- Dry van (7-way power, optional cargo and door sensors)
- Reefer (reefer connection, 7-way power, optional battery, optional door sensors)
- Container (solar power only, no 7-way, optional cargo and door sensors)

The TT210 terminal contains an integrated battery pack and antenna. There is an optional TT210 system power/accessory cable assembly. Refer to Chapter 10: Installing the TT210 Cable.

Also available for installation are the following optional sensor-style accessories:

- TT210 system cargo sensor and mount

  If the cargo sensor will be installed in the trailer/container, refer to Chapter 11: Installing the Cargo Sensor.
- TT210 system swing door sensor with cable assembly

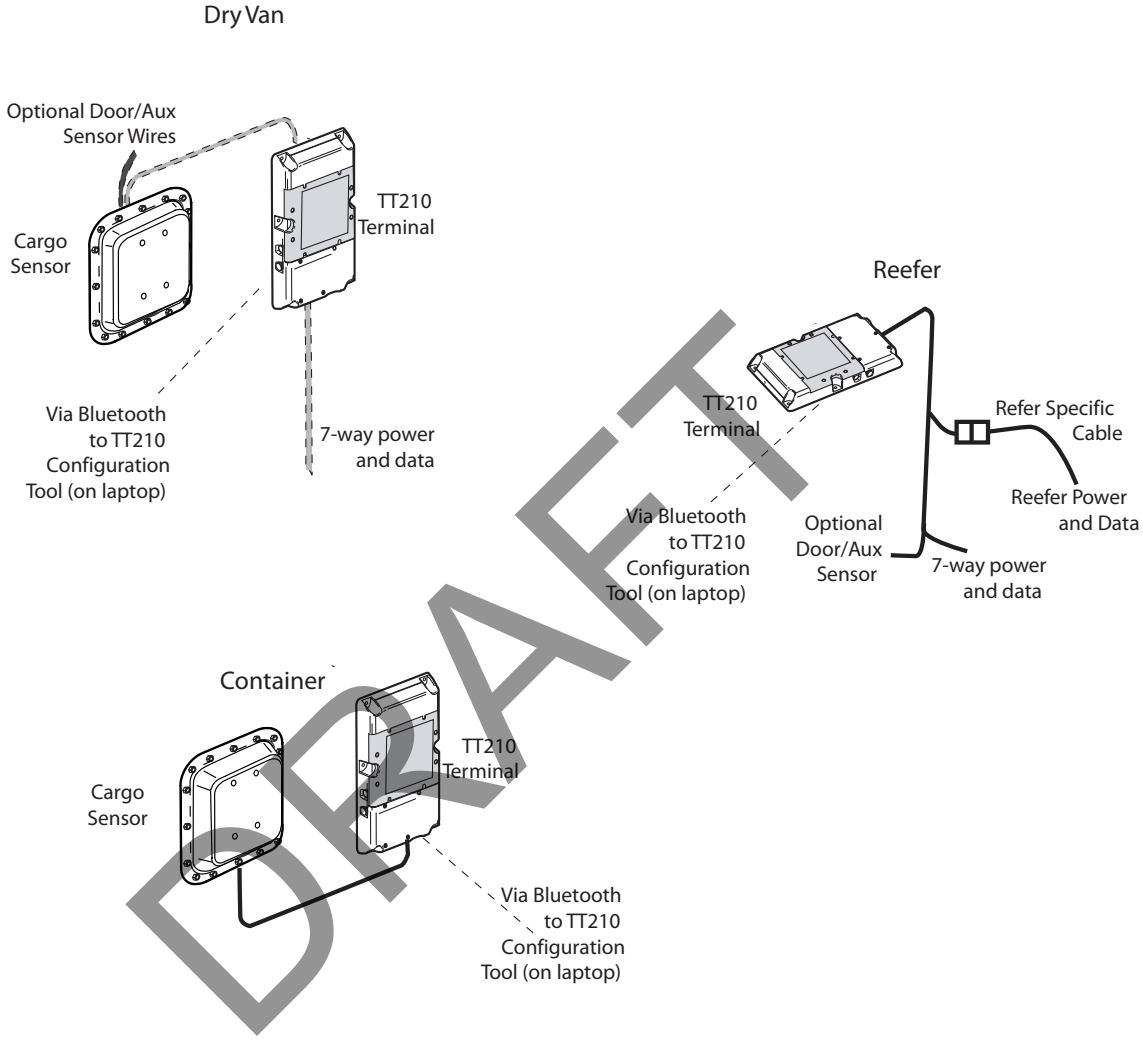
  Refer to Chapter 12: Installing the Swing Door Sensor.
- TT210 system roll door sensor with cable assembly

  Refer to Chapter 13: Installing the Roll Door Sensor.
- Auxiliary sensor

  An auxiliary wire connector on the TT210 system power/accessory cable assembly allows for an optional third-party device. Refer to Chapter 14: Installing the Auxiliary Sensor.

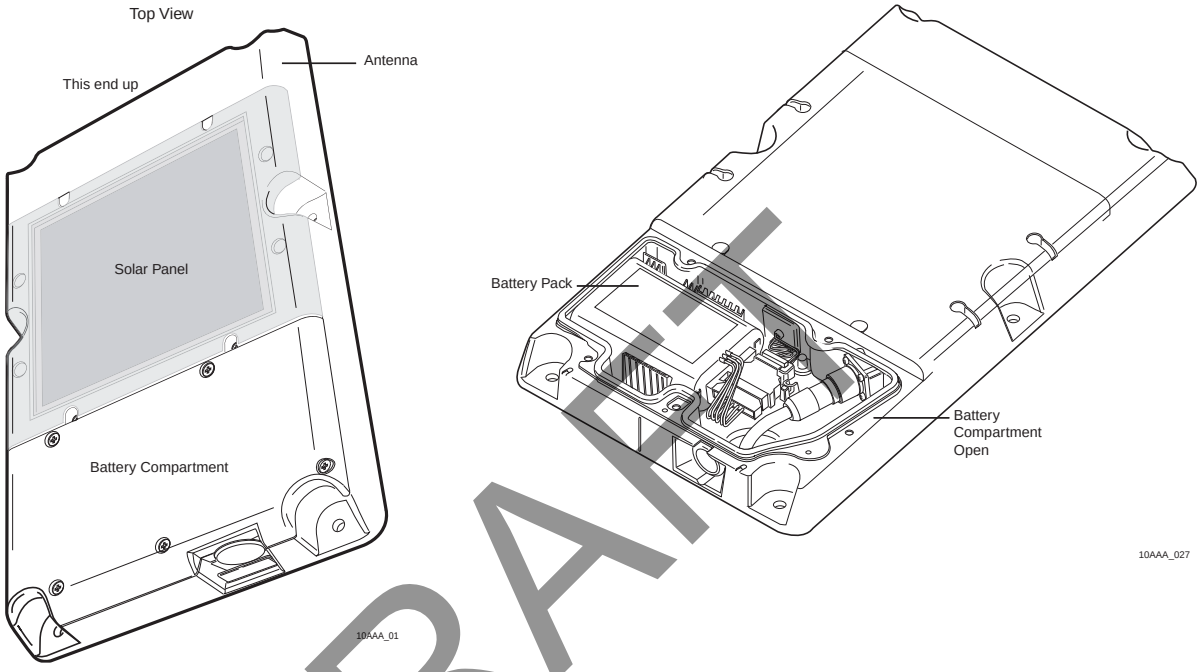
How the Components and Cables Interconnect

The following diagram shows how the TT210 system components and cables typically interconnect. (The laptop is not provided or installed. It contains the Configuration Tool software and is used for system configuration, verification and/or diagnostics only.)



TT210 Terminal

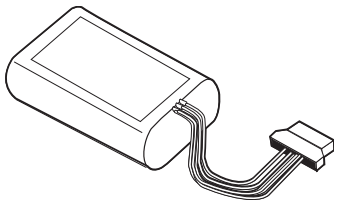
The TT210 terminal contains the electronics module for the TT210 system. The trailer/container operator (truck driver, loader, or unloader) does not need to access the terminal. It should be mounted in a safe and secure place on the trailer/container. Typical dry van installation is on the external skin of the trailer between the post flanges above the 7-way receptacle (does not apply to containers), about an inch below the trailer's top rail. The following illustration shows the TT210 terminal.



For specific TT210 terminal instructions and illustrations, refer to *The Installation Hardware* on page 2-2

TT210 Terminal Battery Pack

The TT210 terminal includes a rechargeable sealed lead-acid battery designed specifically for this product. The TT210 battery pack is inside the TT210 terminal and is shipped partially charged. The battery has a nominal operating life of 3 to 5 years. Under normal operation, a fully charged battery will provide untethered messaging for 30 days before recharging.



ALERT!

Unless specifically requested by a Qualcomm representative, TT210 system lead-acid batteries should NOT be sent back to Qualcomm. Proper disposal of defective or dead lead-acid batteries is the responsibility of the TT210 system owner/customer. Please dispose of defective or dead batteries at a local lead-acid battery recycling center.

Caution

Dange of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

If the TT210 system battery fails, DO NOT return it to Qualcomm unless specifically told to do so. A replacement battery will be shipped upon request without Qualcomm receiving the defective battery. Please see *Appendix A: TT210 System Standard Return Material Authorization Procedure* in this guide for more information on Qualcomm's standard return material authorization (RMA) procedure.

Battery Storage Life

The TT210 system battery pack should be stored at a location with temperatures below 85° F. The following table lists the typical self-discharge rate when stored at locations with temperatures above 85° F.

Percent Capacity	*Time Since Battery Was Charged*
90%	1.5 Months
85%	2.5 Months
78%	3.5 Months
72%	4.5 Months
65%	5.5 Months
Assumes Storage Temperature = 85° F	

ALERT!

Immediately recharge the battery pack if it measures OCV < 3.90V. The terminal will go into hibernate state when it reaches 3.60V.

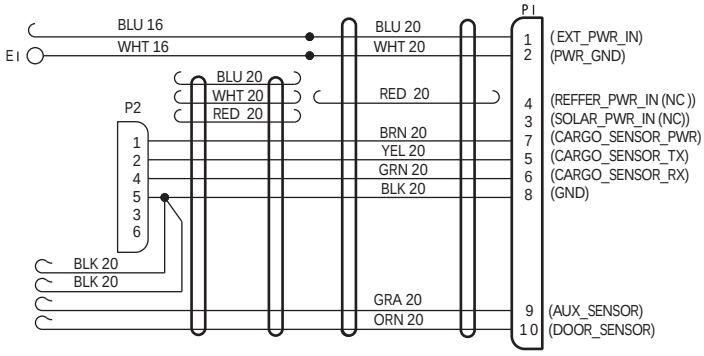
When stored or not installed, Qualcomm recommends auditing the battery pack open circuit voltage (OCV) every six months to ensure that it does not drop below 3.90V. If the storage temperature is greater than 85° F, the audits should take place more frequently. Immediately recharge the battery pack if it measures OCV < 3.90V. Batteries that sit for more than six months must be recharged. You can use a battery charger or run external power to a TT210 unit for a couple of hours for a full charge.

TT210 Power/Accessory Cable - Optional

The TT210 power/accessory cable connects the TT210 system terminal to the trailer's 7-way electrical system. The cable also interconnects any optional accessories to the TT210 system terminal. The three optional accessories allow customers to optimize the system with a cargo sensor, door sensor, and/or an auxiliary sensor.

The blue wire is crimped to a fuse holder that has a 3-amp, fast-acting ATM type automotive fuse and connects to pin 7 of the 7-way. The white wire connects to pin 1 of the 7-way. The following illustration shows the various cable assemblies.

Dry Van Cable Assembly Wiring Diagram



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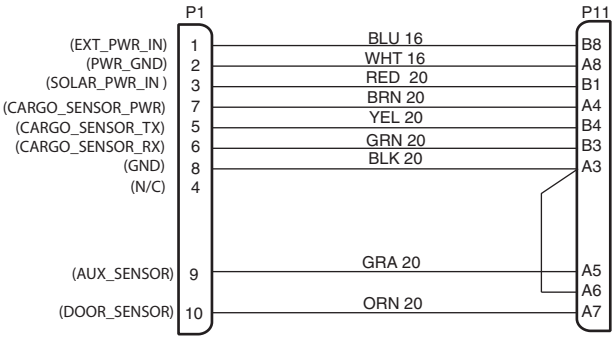
TT210 Retrofit Cable Assembly Wiring Diagram
(for use with existing TT200 installations)



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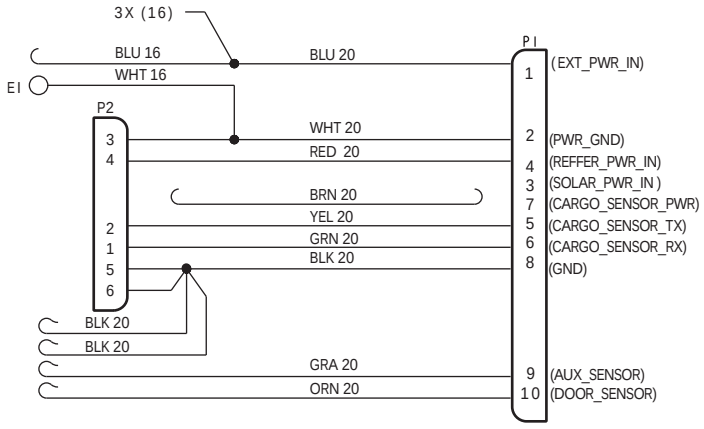
Reefer Cable Assembly Wiring Diagram



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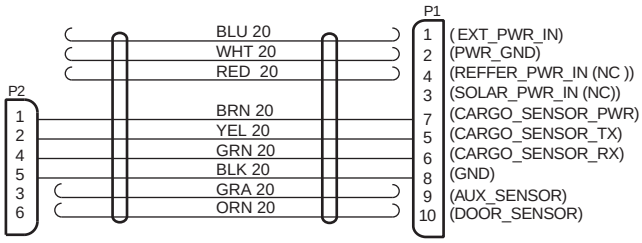
Cargo Only Cable Assembly Wiring Diagram



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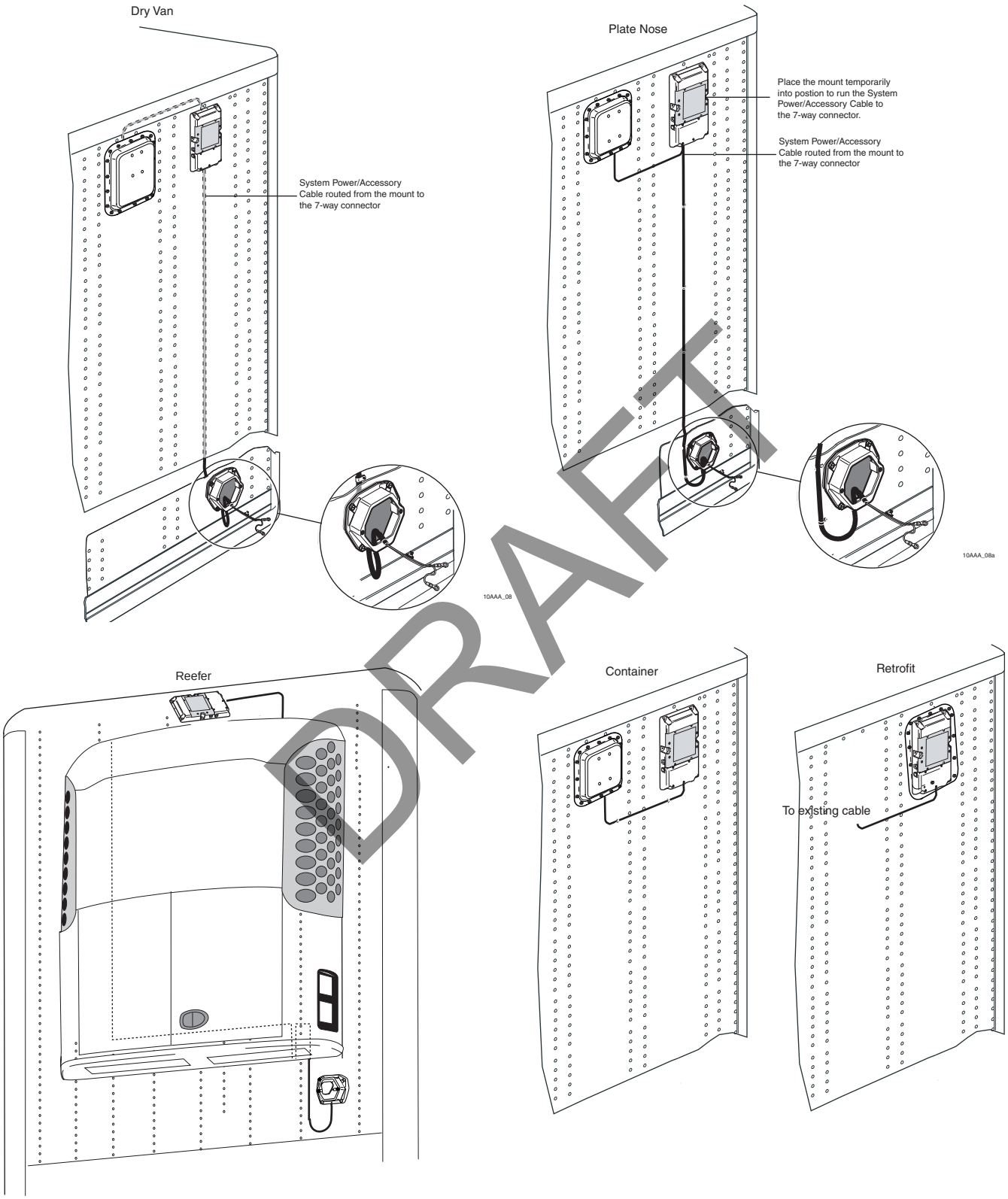
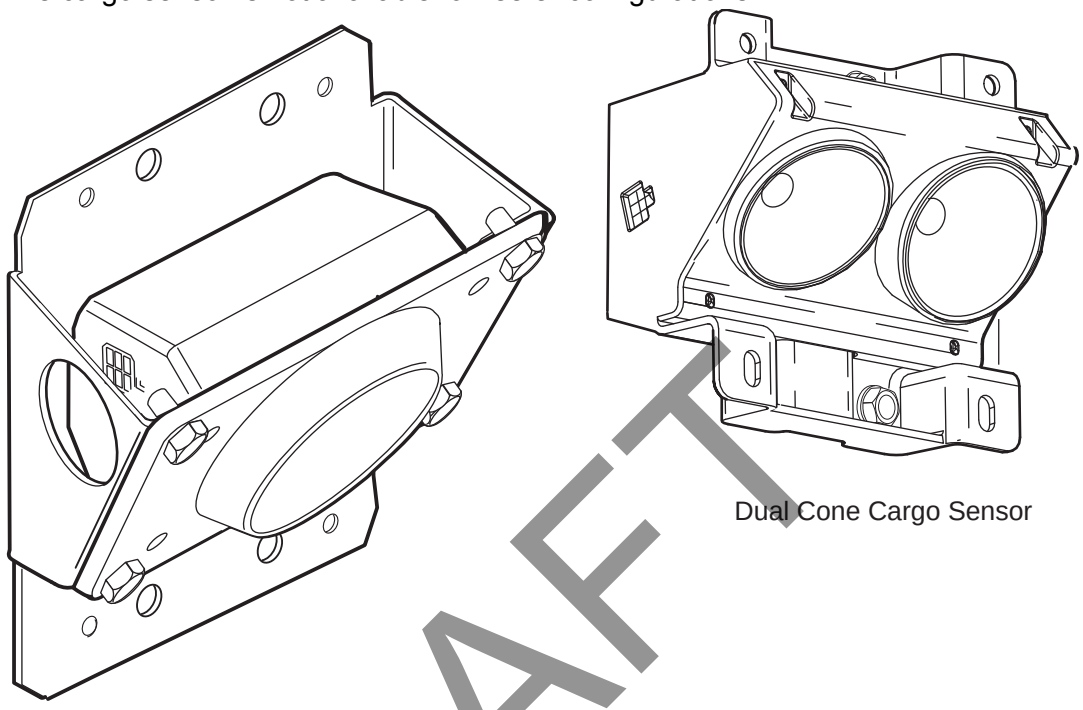
The following illustrations shows the TT210 power/accessory cable connected at the terminal.



TT210 Cargo Sensor

The optional cargo sensor is connected to the TT210 system through the optional power/accessory cable. It optimizes the TT210 system by providing trailer/container cargo status. The cargo sensor is not available for reefer configurations.



Dual Cone Cargo Sensor

Single Cone Cargo Sensor

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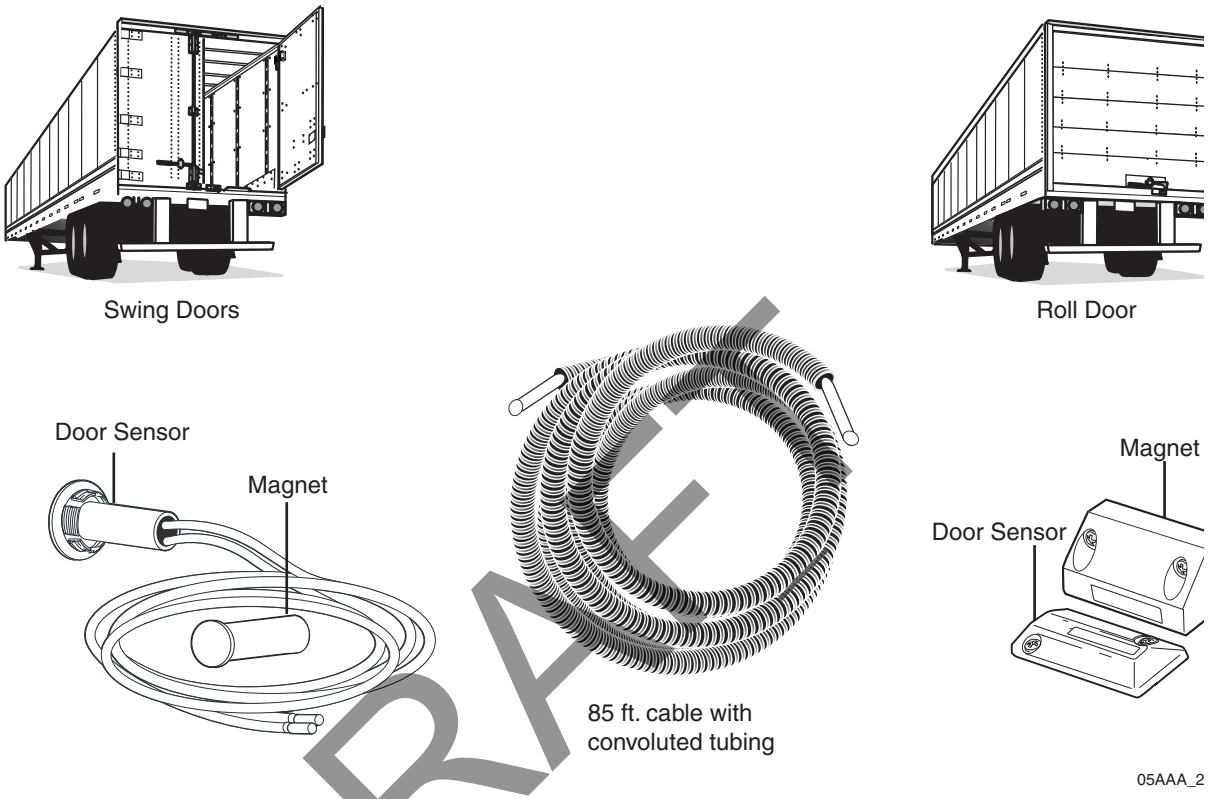
When a cargo sensor is installed, the TT210 system applies power to the sensor. Using advanced ultrasonic technology, the cargo sensor “pings” the space in front of it up to 20 feet. If the sensor detects reflective energy from an object in the area described, it returns a LOADED cargo status to the TT210 system. An EMPTY cargo status is returned to the TT210 system when the cargo sensor does not detect energy from an object in the trailer/container.

The cargo sensor is made of hard plastic and is approximately 4" x 4" x 2" in dimension. Dimensions are larger when the mounting bracket is used. See Chapter 11: Installing the Cargo Sensor.

TT210 Door Sensor

There are two door sensor options: roll door and swing door. The trailer/container door sensor is connected to the TT210 system terminal through the power/accessory cable and optimizes the TT210 system by providing trailer/container door status.



The door sensor is a magnetic switch that monitors a door's "state" (either open or closed). There are multiple modes of operation that door events can be programmed for.

The swing door sensor consists of a switch and a trigger magnet. See Chapter 12: Installing the Swing Door Sensor for installation procedures.

The roll door sensor consists of a much larger magnet and door sensor switch. See Chapter 13: Installing the Roll Door Sensor for installation procedures.

Auxiliary Sensor

The AUX input on the TT210 power/accessory cable can be used for auxiliary third-party accessories. See Chapter 14: Installing the Auxiliary Sensor for more information.

3
General Wiring Guidelines

Topics in this chapter provide the Qualcomm-approved general methods for making connections to cables and wires and the proper connectors to use to avoid potential problems.

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

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In Canada, call 800-863-9191

Making Electrical Connections

Approved Qualcomm Electrical Connectors

The only Qualcomm-approved electrical connectors are crimp butt splices and crimp ring terminals. Qualcomm 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.

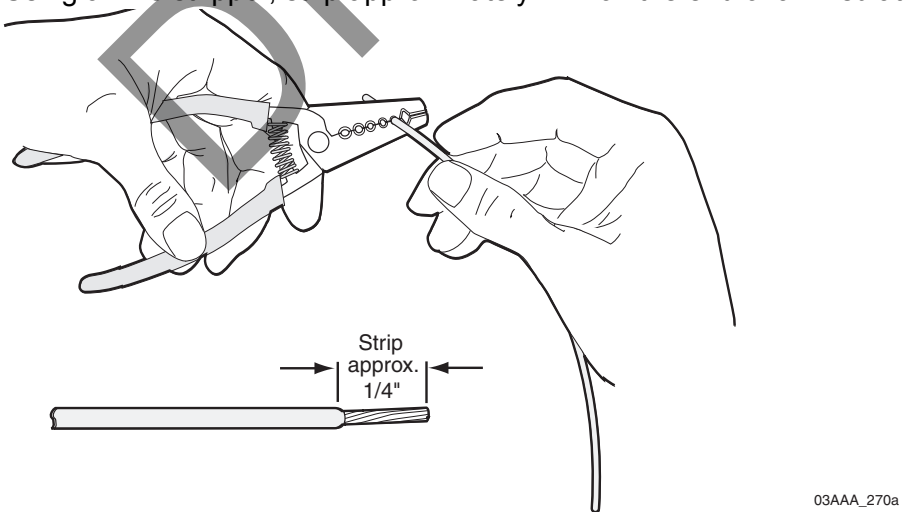
Wire Stripping

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.



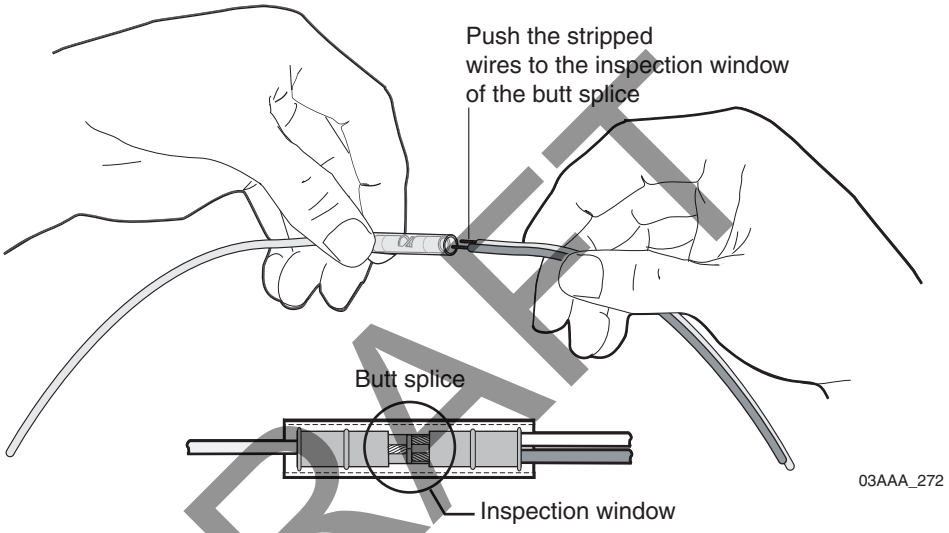
2. After stripping the wire, verify that the wire is not severed, nicked, or damaged by the stripping tool. If the wire has been properly stripped, it is ready to be butt spliced. If the wire has been damaged, restrip the wire (see step 1.).

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.



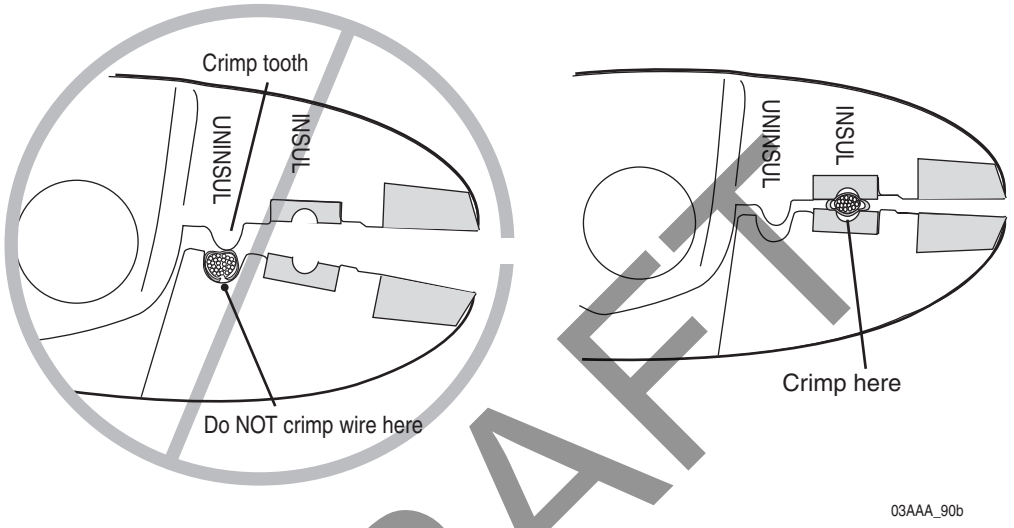
2. Repeat this process for the wire on the opposite end of the butt splice. Once a proper butt splice is confirmed, it is important to properly crimp the butt splice to hold the connection.

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

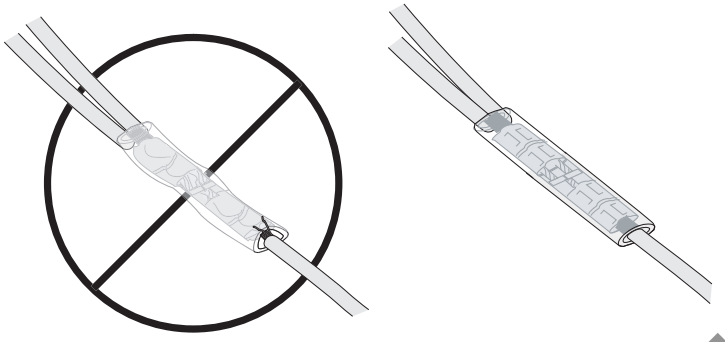
DO NOT crimp on the crimp “tooth.”



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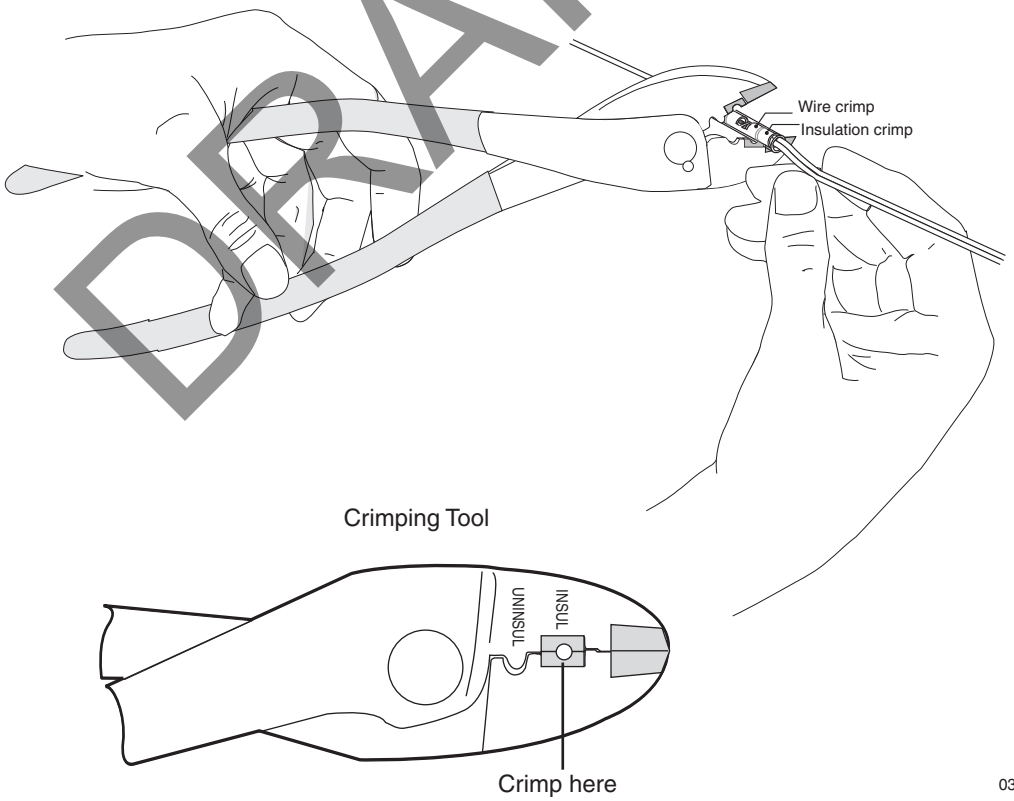
2. After crimping the inside of both ends of the butt splice on the “insulated” area of the crimping tool, next crimp the outside of both ends of the butt splice.



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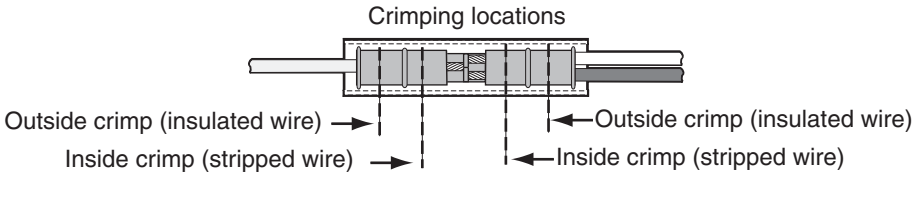
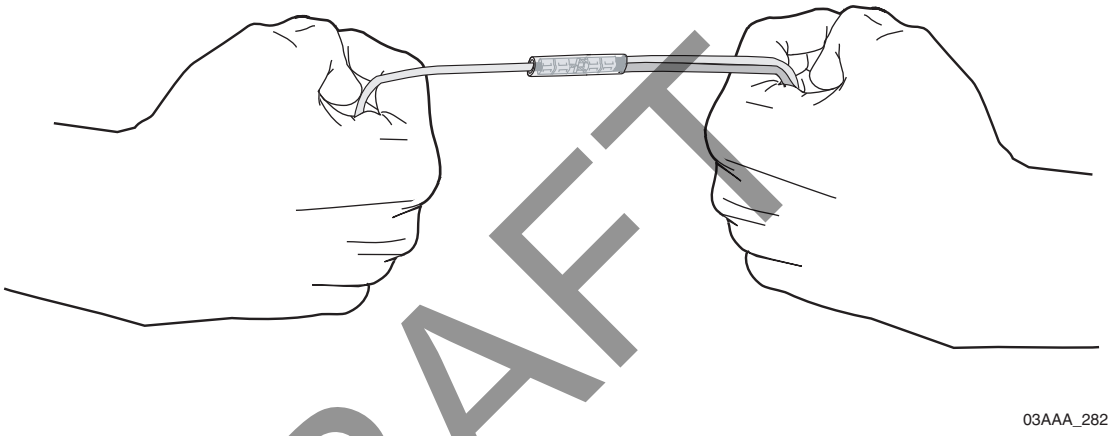


3. Verify that the crimps are good and the wires have not been damaged.

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.



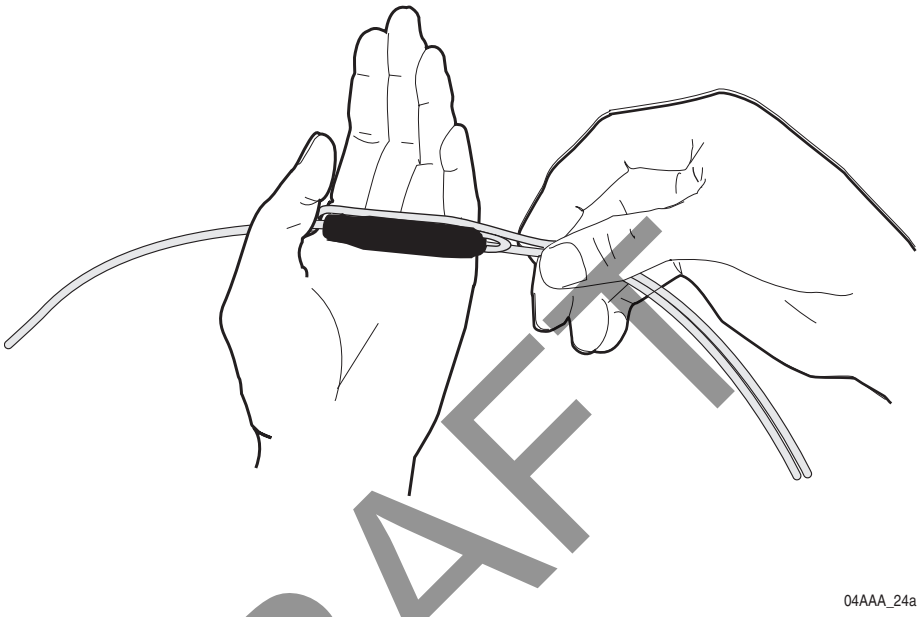
WARNING

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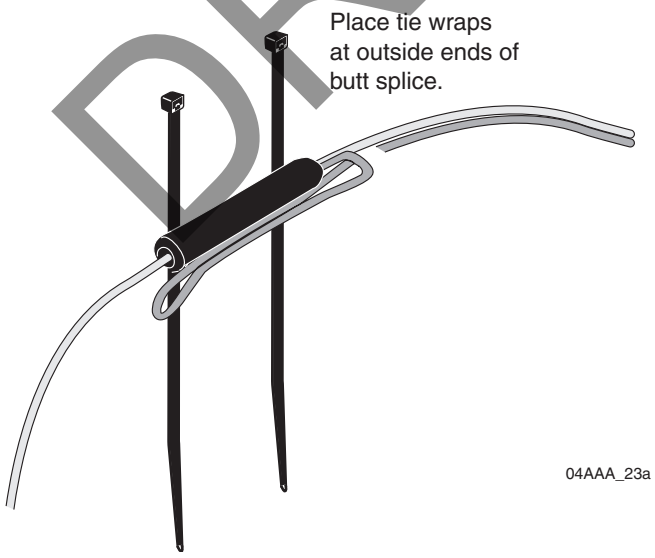
3. Secure the wires together and place 4" tie wraps at the outside ends of the butt splice.



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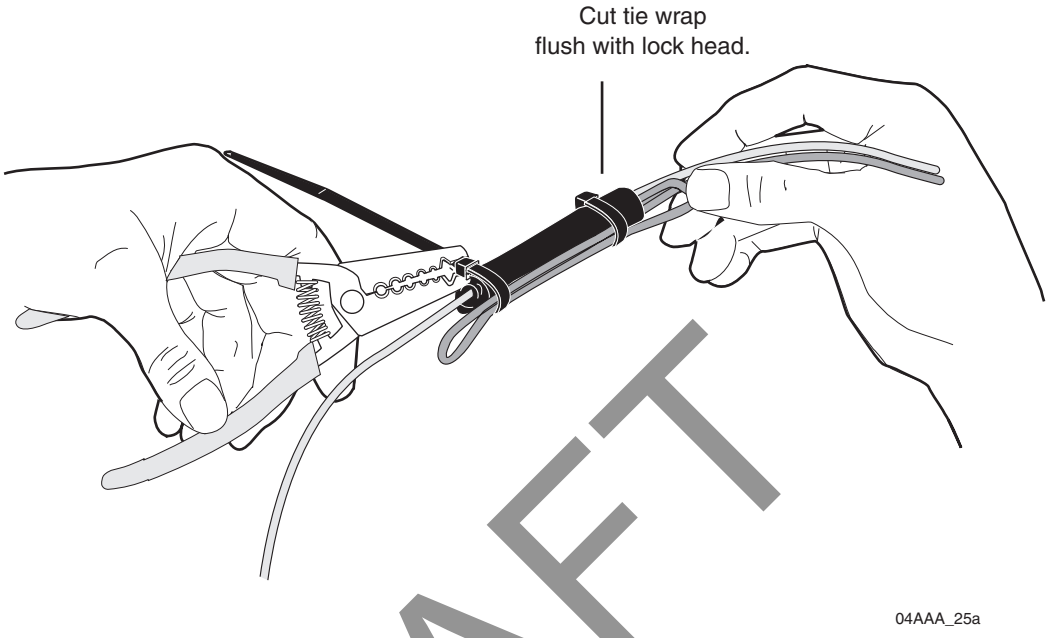
4. Cinch the tie wraps tight and cut them *flush* to the lock head.

Caution

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



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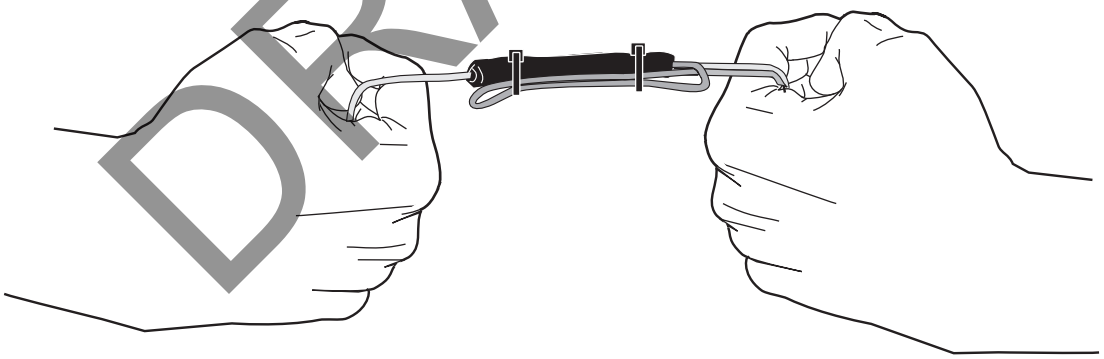
5. Firmly tug on the butt-spliced wire connection to make sure the tie wraps do not pull loose.



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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.

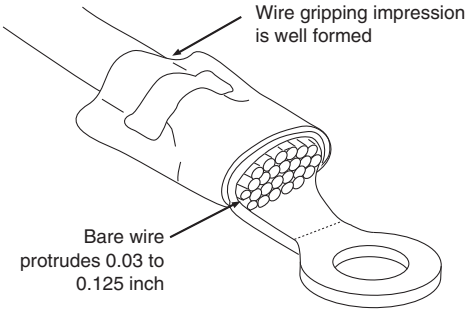
Note

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

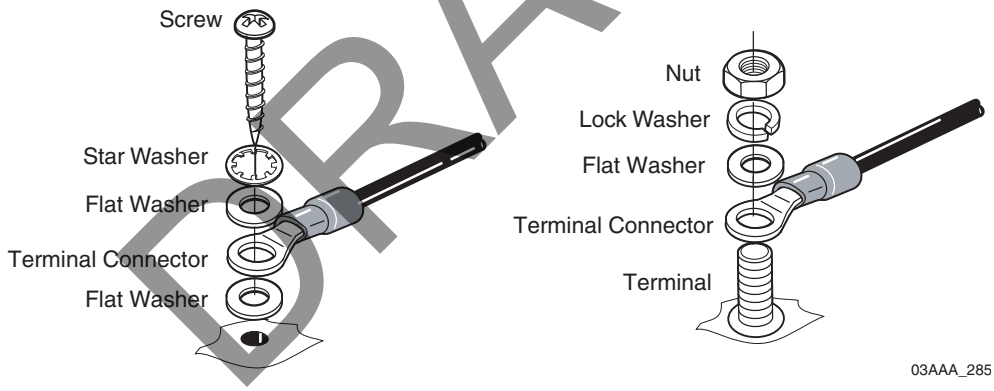
Ring Terminals

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.
- DO NOT cut unused sensor wires. Properly coil and store them for possible future use.

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 tie-wraps to secure cables and wires. It is prudent to use extra tie wraps in case some of them fail.
- Tie wrap all wires and cables to prevent interference with the cargo sensor.
- 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.

Storing Excess Cabling

Secure any excess cabling with tie-wraps in a safe, secure location.

Using Protective Sheathing

If necessary, protect all cables with protective sheathing, such as convoluted tubing or wire loom. If you know the lengths of exposed cables, you can save time by installing protective sheathing on the cables before you route them.

Use silicone sealant (RTV) when convoluted tubing is used through vertical “feed-through” holes to reduce movement.

4
TT210 Installation Planning

Introduction

This chapter describes what to consider before installing the hardware and how to plan a TT210 system installation.

Topics in this chapter include:

If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

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. It is recommended that installation personnel complete the appropriate Qualcomm training courses prior to installing the TT210 system.

FCC Safety Information

FCC regulatory

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE: This equipment has been tested and found to comply with the limits for a Class A 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 the 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 an experienced radio/TV technician for help*

IC statements

This Class A digital apparatus complies with Canadian ICES-003. The term IC before the equipment certification number only signifies that the Industry Canada technical specifications were met. Cet appareil numerique de la classe A est conforme a la norme NMB-003 du Canada. Le terme IC avant le numero d'homologation ne signifie seulement que les normes d'Industrie Canada ont ete respectees."

- This device complies with Industry Canada licence-exempt RSS standard(s).
- Operation is subject to the following two conditions:
- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

RF statement

This equipment should be installed and operated with minimum distance 20 cm between the radiator and body. This transmitter must not be co-located or operating in conjunction with any antenna or transmitter.

General Installation Information

Consider the following information while planning a TT210 system installation.

Any changes or modifications not expressely approved by Qualcomm could void the user's authority to operate this equipment

Verify the Trailer/Container 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 TT210 system can be installed on the trailer/container. The following are some deterrents that can impact an installation or result in additional procedures:
  - The trailer/container-nose plywood goes all the way to the top rail.
  - The vertical support rails are too narrowly placed.
  - There is obvious and extreme damage to the trailer/container nose at the TT210 system installation area.
- The trailer/container top rail above the 7-way should be flat and free of bends or deep dents.
- The trailer skin above the 7-way, about an inch from the top rail, should be sturdy and free of any serious damage.
- 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/Container

Survey the trailer/container and decide where *exactly* to install the hardware. Typically in dry van installations, the terminal is in the 7-way bay and the cargo sensor is in the adjacent bay.

Terminal and Cables

Make sure that the TT210 system terminal and cable locations do not hinder normal operation or maintenance of the trailer/container. Also make sure the TT210 system terminal and cables are installed and/or stored safely out of the way of possible damage by cargo or other factors.

Consult with the Customer Prior to Any Installation

After formulating an installation plan, inform the customer of the plan. Some customers are particular about where parts are going to be installed or where electrical connections will be made. It is always a good idea to have valid reasons for why installing a part in a specific area is necessary.

What to Consider Before Installing the System

- Drill holes only when necessary and in concurrence with the customer.
- Qualcomm recommends you use existing holes on the trailer/container 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/container 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 TT210 Installation Sequence

Trailers, containers, and flatbeds often differ from manufacturer to manufacturer. The TT210 system was designed to work with a variety of trailer/container 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 and connect cables and wires.
4. Identify which cargo sensor mount to use.
   - If 3” from the skin to liner, use internal mount
   - if > 3” from skin to liner, use 1” pan
   - if container or plate note use the 3” pan
5. Install the optional cargo sensor and/or door sensor if desired.
6. Install battery into unit.
7. Close the unit.
8. Use the configuration tool software to configure the TT210 system and to verify the system is working properly. The software is also used to diagnose any problems with the system.
9. Perform system verification.

Tools and Supplies Needed for Installation

The following tools and supplies are recommended for performing installations.

- Laptop with XP or higher for running the Configuration Tool software
- Pop-rivet gun (suitable for use with 1/4" rivets)
- Wire crimper/stripper/cutter
- Felt-tip pen (or grease pencil, or scratch awl)
- 7/16" deep socket and ratchet
- 1/2" deep socket and ratchet
- 3/8" nut driver or socket and ratchet
- Metal cutting shear
- Assorted 7-way receptacle tools
- 20-foot portable scaffold or 20-foot ladder
- Cable anchors/tie wraps
- Drill (battery only recommended)
- 3/8" drill bit
- 3/16" drill bit
- Assorted drill bits

Note

High-torque/low RPM drill motors should be used for all steel drilling.

- 1" hole saw
- Rubbing alcohol and a towel
- Fish tape for routing wires
- Assorted tools for removal of plywood (typically a 1/2" socket and ratchet, 3/8" nutdriver, #2 Phillips screwdriver)

5
Installing the TT210 Terminal on Dry Vans

Introduction

This chapter describes how to install the terminal on Dry Vans.

Topics in this chapter include:

If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

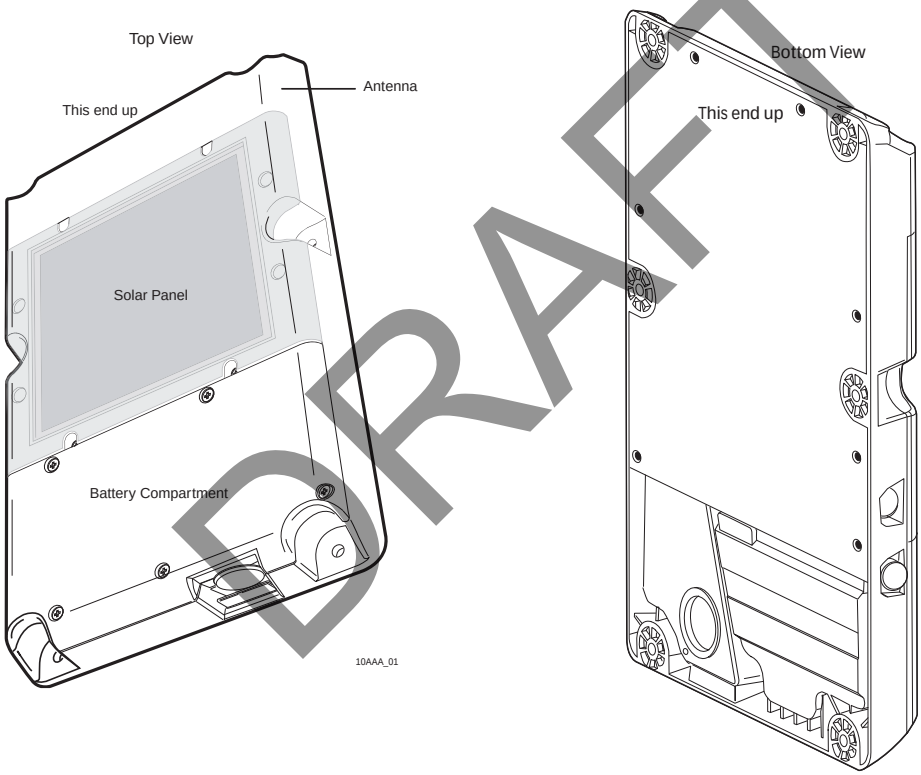
In the United States, call 800-541-7490
In Canada, call 800-863-9191

Terminal with 7-way Power

Overview

The TT210 terminal installs outside the trailer on the trailer nose just below (approximately 1/2") the top rail horizontal rivet line where the trailer skin attaches to the top rail, preferably in the 7-way receptacle vertical bay. Ensure the terminal clears the trailer's top rail internally *and* externally, being aware that the top rail *may* extend below the rivet line. The unit should be positioned as high as possible and located between the post flanges. The TT210 system power/accessory cable runs from the TT210 system terminal down to the 7-way receptacle.

Thoroughly evaluate the trailer nose area (inside and outside) to determine if the TT210 system can be installed on the trailer. The trailer should be free of extensive damage in all installation areas. For specific information on verifying a trailer's condition, refer to *Verify the Trailer/Container Is in Good Condition* on page 4-2. For specific tools required, refer to *Tools and Supplies Needed for Installation* on page 4-4.



Planning for Optional Sensors

Before starting the installation, consider if optional sensors (cargo, door, auxiliary) will be installed. Determining if a sensor will be used *before* beginning the installation, results in better planning and preparation.

- **Cargo Sensor.** The cargo sensor determines whether the trailer is empty or not empty. It is installed inside the trailer near the top of the nose of the trailer. It is necessary to cut a 9.5" x 12" hole in the trailer nose plywood liner to provide the cargo sensor with an unobstructed view of the inside of the trailer. Typically, it is mounted in the bay next to the terminal. Determine which mount to use. Refer to Chapter 11: Installing the Cargo Sensor.
  - If you have 3" from the inside skin to the outside liner, use a flat internal mount.
  - If you have at least 2" but less than 3" from the skin to the outside liner, use a 1" pan.
  - if container or plate nose use the 3" pan
- **Door Sensor.** The door sensor detects whether a trailer door is open or closed. Refer to Chapter 12: Installing the Swing Door Sensor for product and installation instructions for mounting the swing door sensor. Refer to Chapter 13: Installing the Roll Door Sensor for product and installation instructions for mounting the roll door sensor.
- **Auxiliary Sensor.** The AUX wires on the TT210 system power/accessory cable offers the option of using an auxiliary, customer-selected sensor with the TT210 system. Refer to Chapter 14: Installing the Auxiliary Sensor for additional information regarding the auxiliary sensor.

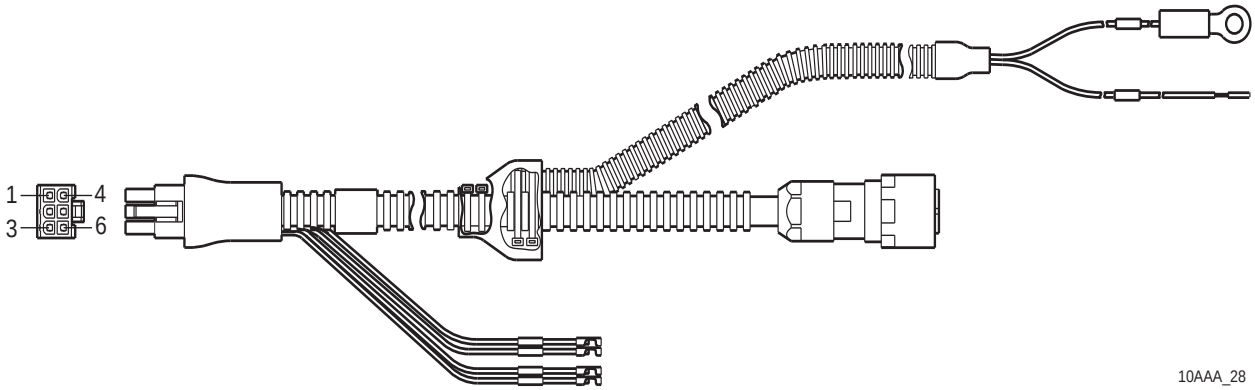
Read this chapter entirely before installing the terminal. The necessary tools, hardware, and components can be positioned on a scaffold for easy access during the installation.

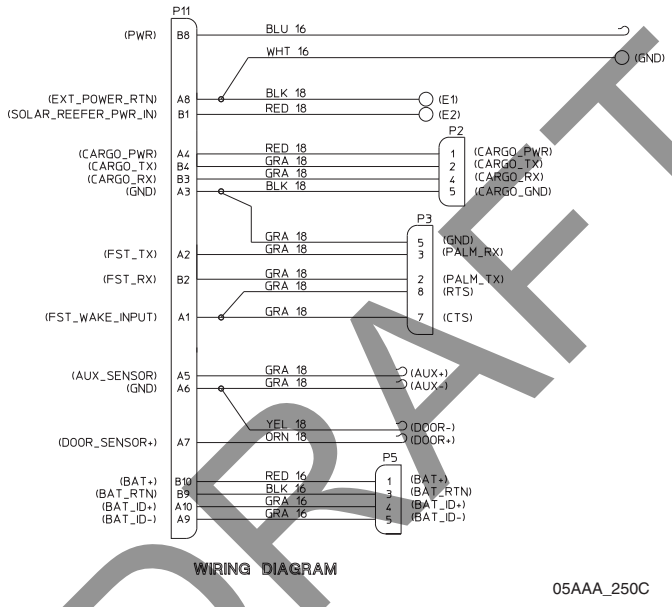
Installation

The power/accessory cable connects the TT210 system terminal to the trailer's electrical power source at the 7-way receptacle. It may be necessary to drill a hole through the 7-way to provide a route from the electrical connections at the 7-way to the TT210 system terminal.

A 7.5 amp fuse is included for use on the TT210 system power/accessory cable blue POWER wire.

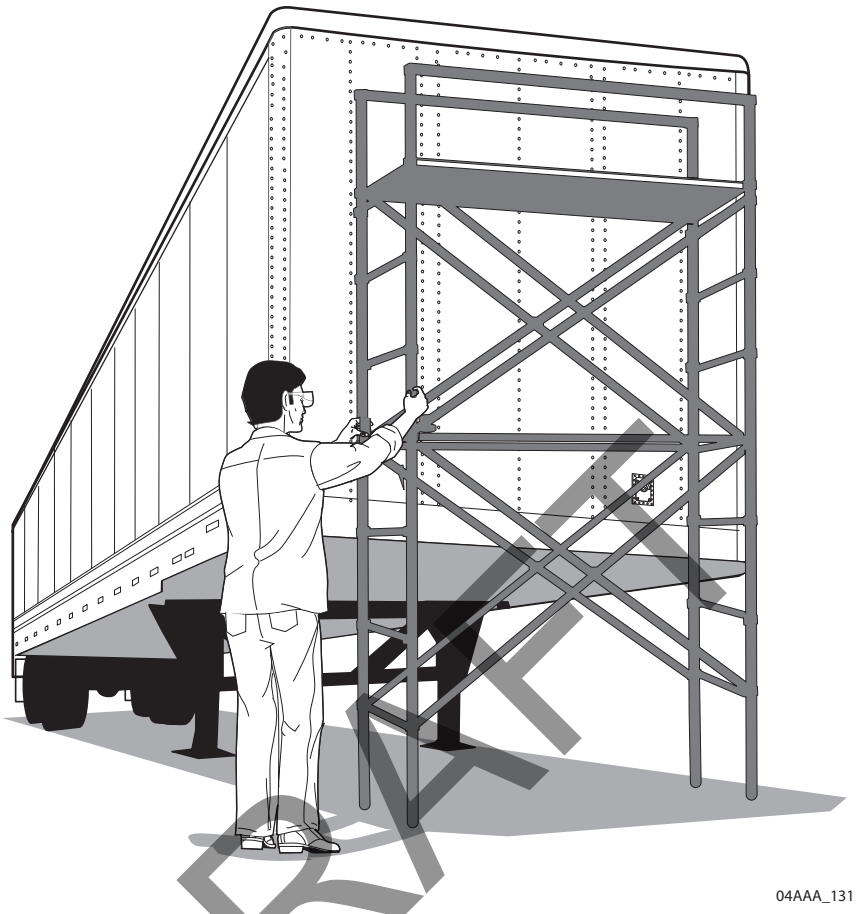
The following illustration shows typical wiring for a dry van. wrong schematic?? need to fix cable drawing???





1. On the outside of the trailer, locate the 7-way receptacle vertical bay. This is where the TT210 terminal will be installed.

2. Position a portable scaffold in front of the trailer nose where the terminal will be installed.



3. Carefully ascend the scaffolding to where the terminal will be installed and place it as high up as is practical between the vertical support rails in the 7-way bay. Make sure it's at least .50 inch from the top rivet line. ???

4. Mark the position of the 7/8" hole for the cable then drill both hole.

5. Remove the top plywood cargo liner on the inside.

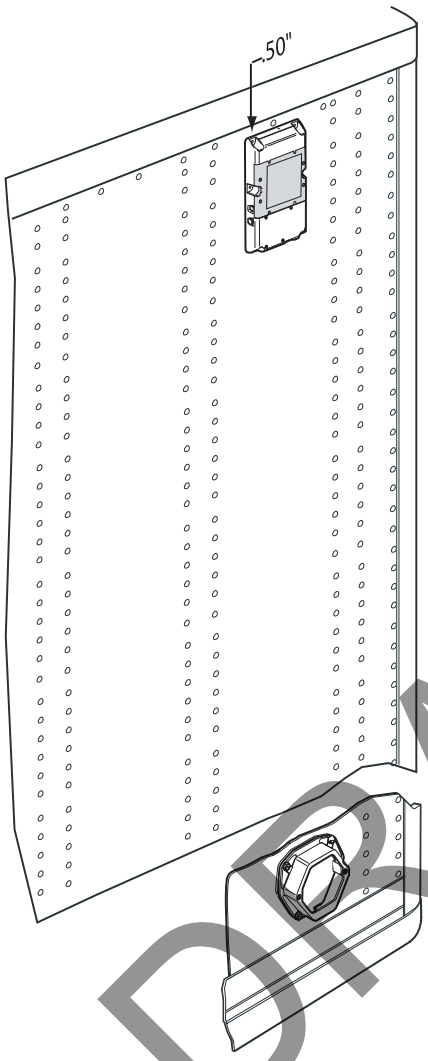
6. Run the cable from inside.

7. Install grommets. Insert the grommet in the 7/8" hole around the cable part where the connector ubing stops.

8. Connect the 7-way cable.

9. drawing showing placing unit over grommet. ??? Make sure the unit is riveted tightly against the trailer skin and there is no gap.

10. drawing shoing white markings on top of connector.??



11. Remove the 7-way receptacle cover from outside the trailer.

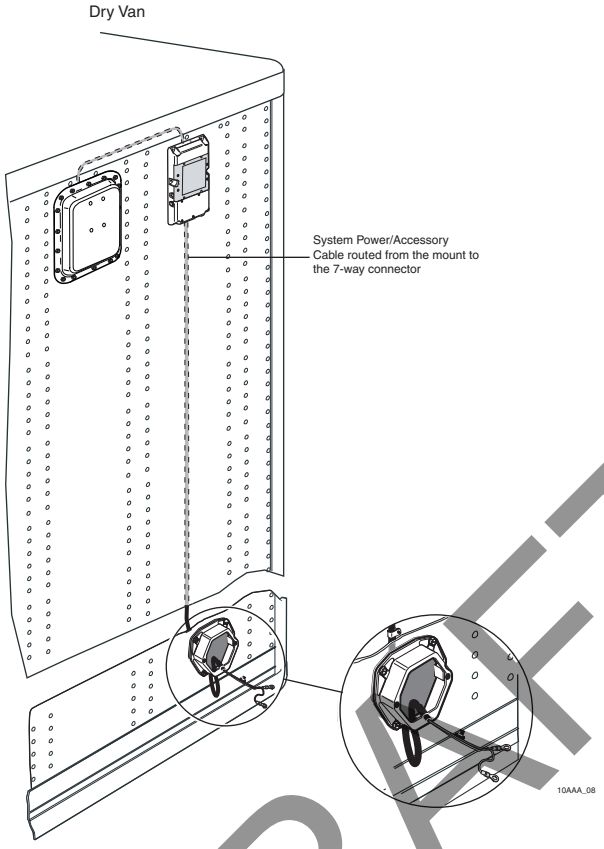
12. Drill a 7/8" hole for the 7-way cable in or by the 7-way.

13. Run the 7-way cable from the 7/8” hole at the TT210 down to the 7-way hole.

a. Fish the cable down to the 7-way from the terminal using a fish tape from below or a hook wire at the 7-way.

b. Install the supplied non-split grommet in the hole.

c. Install the supplied split grommet on the cable going to the TT210 terminal where the cable passes through the trailer skin.



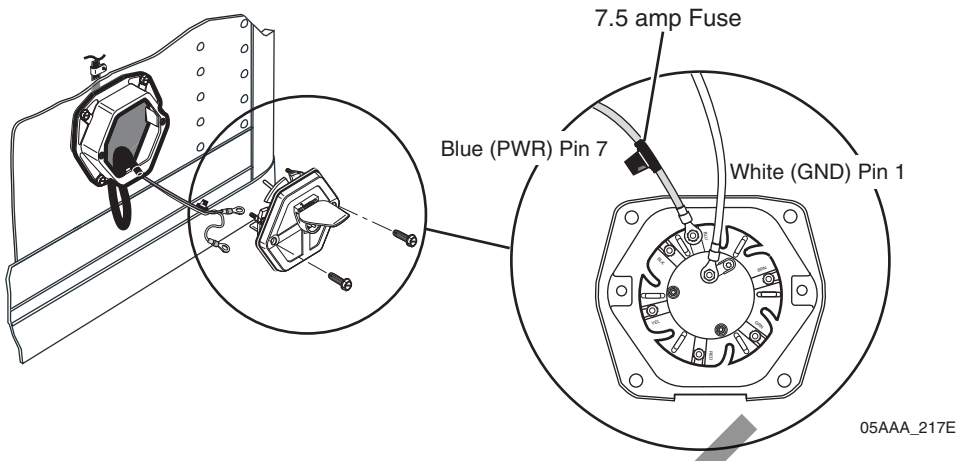
Note

When installed on a plate nose trailer, the TT210 system power/accessory cable routes externally down the outside nose of the trailer.

14. Make wire connections at the 7-way receptacle. Attach the fuse holder with 7.5 amp fuse (provided) to the blue POWER wire on the TT210 system power/accessory cable using a butt splice. (Fuse holder supplied in the power/accessory cable harness kit.)

a. Connect the blue POWER wire with the fuse holder to pin 7 in the 7-way receptacle using a ring terminal.

b. Connect the white GROUND wire to pin 1 in the 7-way receptacle using a ring terminal.



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

15. Mount the unit in the 7-way bay using the six rivets. These should be installed top, top, middle, middle, bottom, bottom.

a. Remove battery/connector cover using a #1 Phillips screwdriver.

b. Put the round Hirose connector through the hole in the rear of the case and align the hole with the grommet in the trailer skin.

c. Drill a 3/16" hole then attach the first rivet.

d. Level by measuring down from the top rail.

e. Drill another hole and attach the second rivet, then do the same for the rest of rivets.

16. Connect the circular connector to the terminal. This connector is “keyed” and will only go on in one position. Do not use excessive force.

17. Verify all mechanical and electrical components (cables, wires, optional sensors) are properly connected.

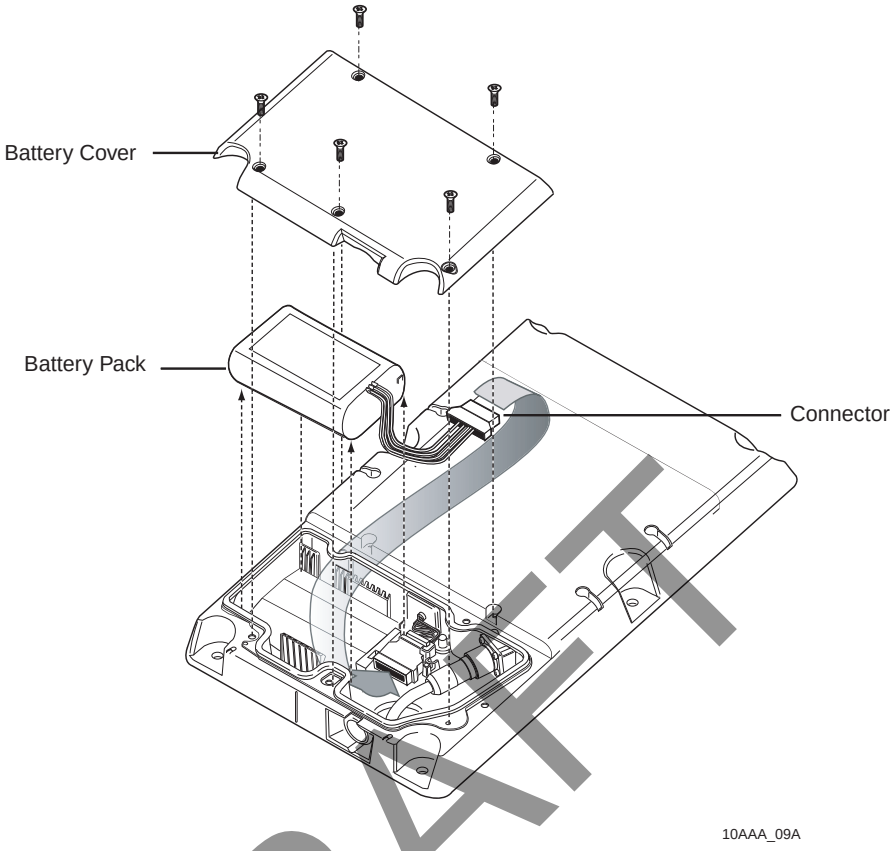
18. Install the optional cargo sensor if used (follow directions in Chapter 11: Installing the Cargo Sensor).

19. Install optional door or auxiliary sensors if used (Chapter 12: Installing the Swing Door Sensor, Chapter 13: Installing the Roll Door Sensor, Chapter 14: Installing the Auxiliary Sensor).

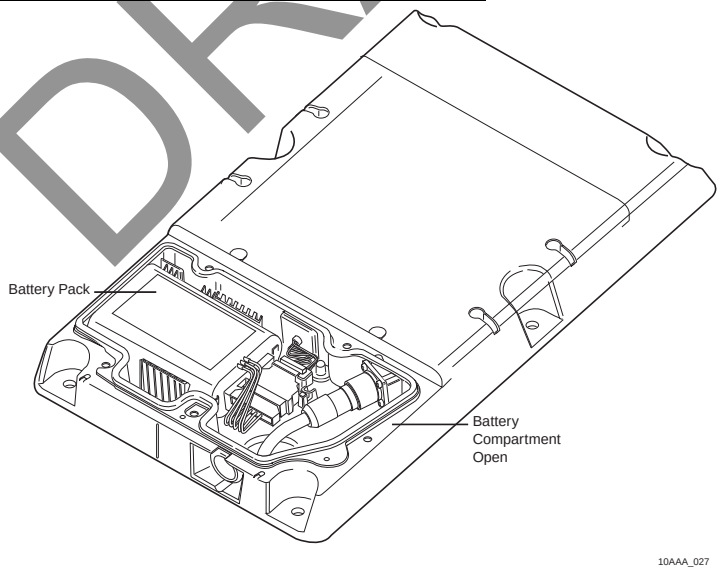
20. Install the battery inside the terminal.

Place the battery into place, use provided zip ties, and attach the battery connector.

ADD: zip tie.



changed connector to deutsch. fix drawing



21. Close the terminal and make sure it is sealed.

a. Ensure gasket is properly seated.

b. Attach the unit cover.

22. Configure or pair the terminal to the proper trailer ID.

a. Wake up the terminal with the key fob or 7-way power.

b. Using the configuration tool, go into the configure screen and enter the trailer ID.

23. Perform system verification. See Chapter 15: Performing System Verification.

6
Installing the TT210 Terminal on Plate Nose Trailers

Introduction

This chapter describes how to install the terminal on Plate Nose Trailers.

Topics in this chapter include:

If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

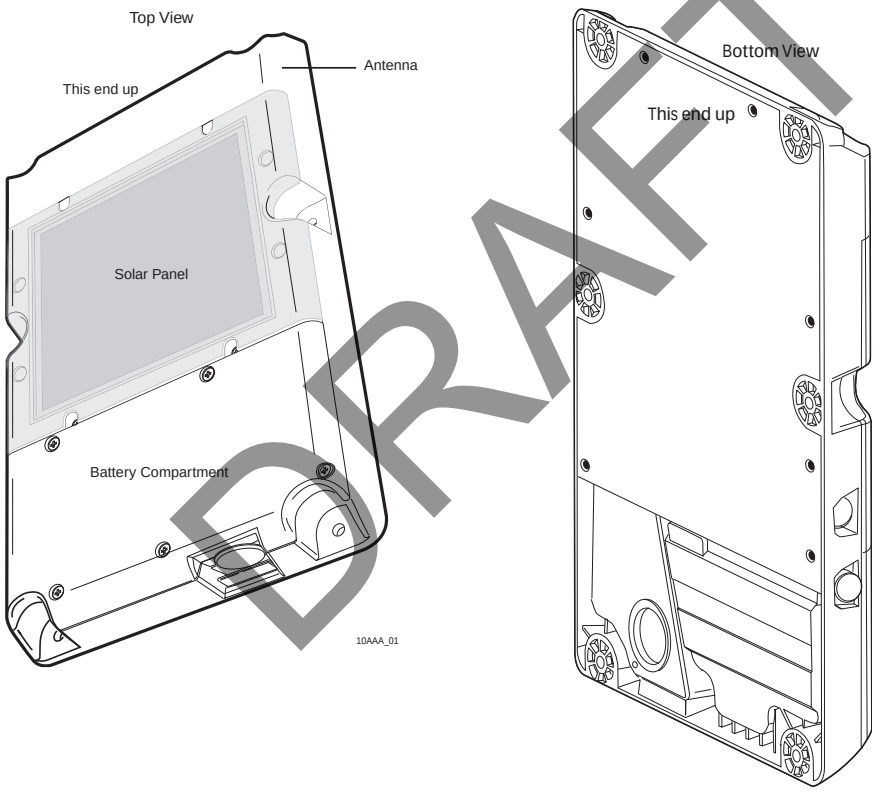
use ch 5 latest changes and update this???

Terminal with 7-way Power

Overview

The TT210 terminal installs outside the trailer on the trailer nose just below (approximately 1/2") the top rail horizontal rivet line where the trailer skin attaches to the top rail, preferably in the 7-way receptacle vertical bay. Ensure the terminal clears the trailer's top rail internally *and* externally, being aware that the top rail *may* extend below the rivet line. The unit should be positioned as high as possible and located between the post flanges. The TT210 system power/accessory cable runs from the TT210 system terminal down to the 7-way receptacle.

Thoroughly evaluate the trailer nose area (inside and outside) to determine if the TT210 system can be installed on the trailer. The trailer should be free of extensive damage in all installation areas. For specific information on verifying a trailer's condition, refer to *Verify the Trailer/Container Is in Good Condition* on page 4-2. For specific tools required, refer to *Tools and Supplies Needed for Installation* on page 4-4.



Planning for Optional Sensors

Before starting the installation, consider if optional sensors (cargo, door, auxiliary) will be installed. Determining if a sensor will be used *before* beginning the installation, results in better planning and preparation.

- **Cargo Sensor.** The cargo sensor determines whether the trailer is empty or not empty. It is installed inside the trailer near the top of the nose of the trailer. It is necessary to cut a 9.5" x 12" hole in the trailer nose plywood liner to provide the cargo sensor with an

unobstructed view of the inside of the trailer. Typically, it is mounted in the bay next to the terminal. Determine which mount to use. Refer to Chapter 11: Installing the Cargo Sensor.

- If you have 3" from the inside skin to the outside liner, use a flat internal mount.
- If you have at least 2" but less than 3" from the skin to the outside liner, use a 1" pan.
- if container or plate nose use the 3" pan

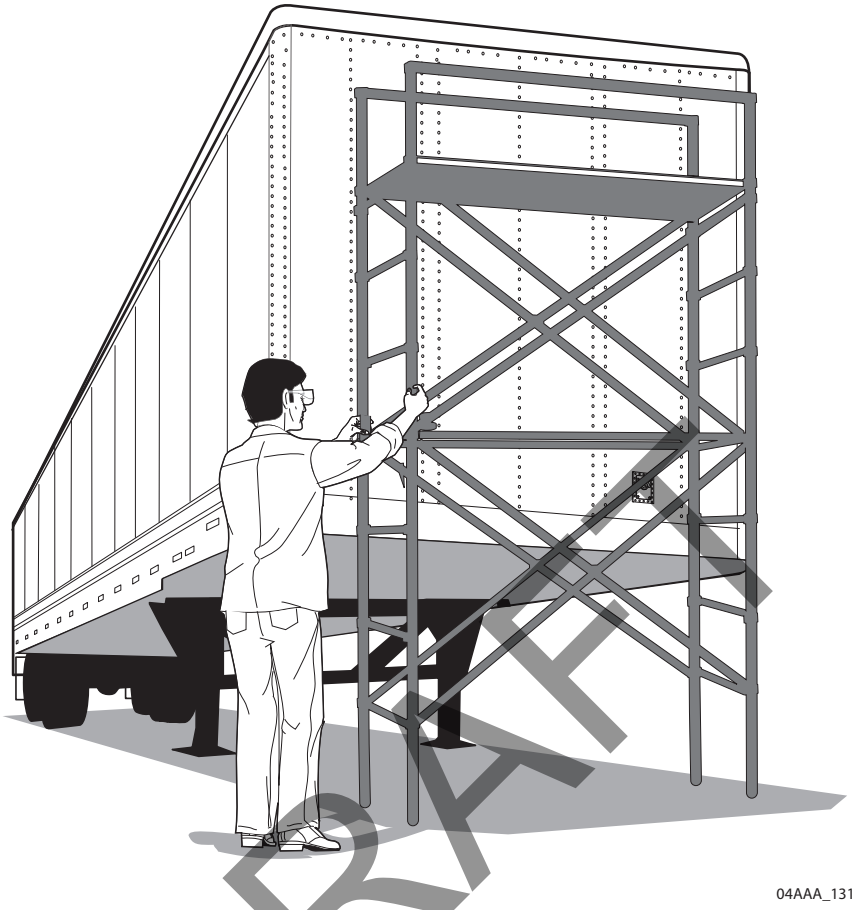
- **Door Sensor.** The door sensor detects whether a trailer door is open or closed. Refer to Chapter 12: Installing the Swing Door Sensor for product and installation instructions for mounting the swing door sensor. Refer to Chapter 13: Installing the Roll Door Sensor for product and installation instructions for mounting the roll door sensor.
- **Auxiliary Sensor.** The AUX wires on the TT210 system power/accessory cable offers the option of using an auxiliary, customer-selected sensor with the TT210 system. Refer to Chapter 14: Installing the Auxiliary Sensor for additional information regarding the auxiliary sensor.

Read this chapter entirely before installing the terminal. The necessary tools, hardware, and components can be positioned on a scaffold for easy access during the installation.

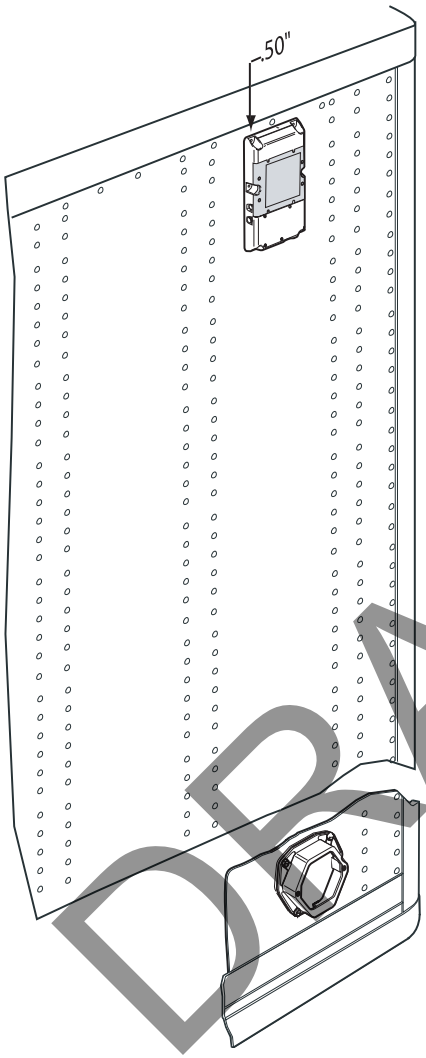
Installation

1. On the outside of the trailer, locate the 7-way receptacle vertical bay where the TT210 terminal will be installed.

2. Position a portable scaffold in front of the trailer nose where the terminal will be installed.



3. Carefully ascend the scaffolding to where the terminal will be installed and place it as high up as is practical between the vertical support rails in the 7-way bay. Make sure it's at least .50 inch from the top rivet line.



4. Mount the unit in the 7-way bay using the six rivets. These should be installed top, top, middle, middle, bottom, bottom.

   a. Drill a 3/16" hole then attach the first rivet.

   b. Level by measuring down from the top rail.

   c. Drill another hole and attach the second rivet, then do the same for the rest of rivets.

   d. Remove battery/connector cover using a #1 Phillips screwdriver.

5. Remove the 7-way receptacle cover from outside the trailer.

6. Drill a 7/8" hole for the 7-way power cable at the rear of the battery compartment being careful not to damage the plastic case around the hole.

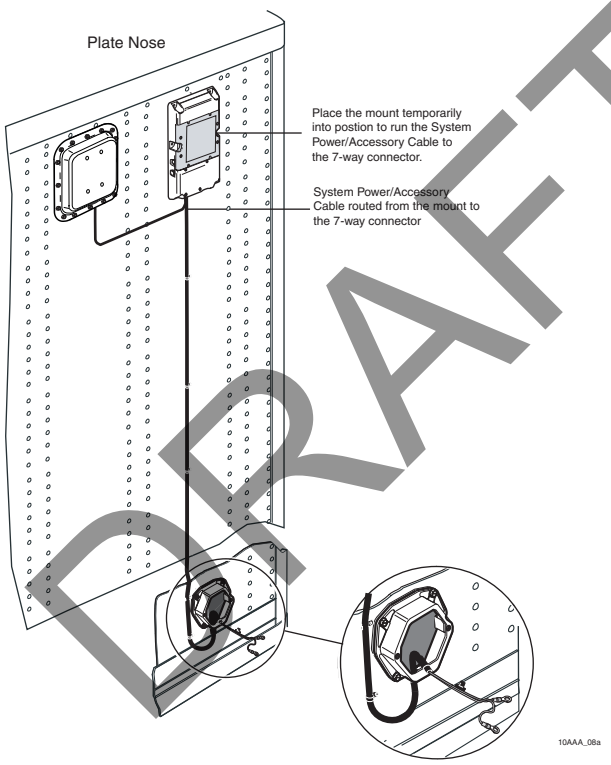
7. Drill a 7/8" hole for the 7-way cable in or by the 7-way.

8. Run the 7-way cable. Typically, this is from the hole at the TT210 down to the 7-way hole.

a. Fish the cable down to the 7-way from the terminal using a fish tape from below or a hook wire at the 7-way.

b. Install the supplied non-split grommet in the hole.

c. Install the supplied split grommet on the cable going to the TT210 terminal where the cable passes through the trailer skin.



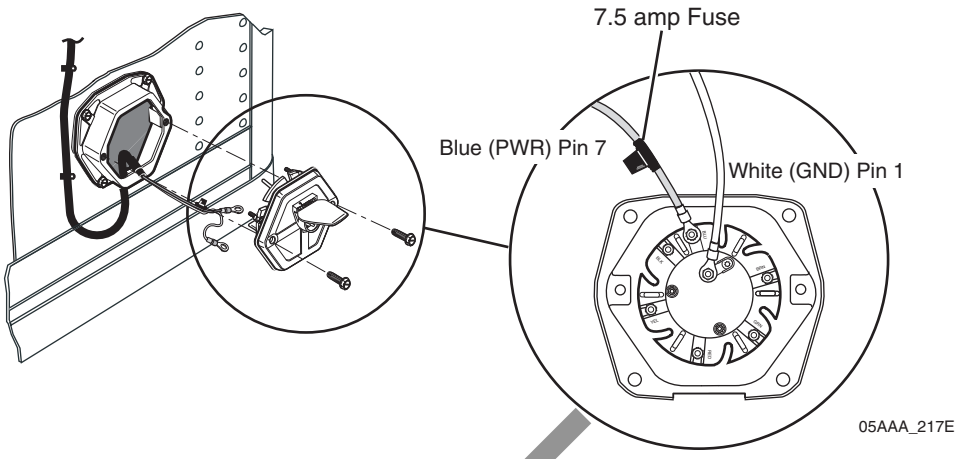
Note

When installed on a plate nose trailer, the TT210 system power/accessory cable routes externally down the outside nose of the trailer.

9. Make wire connections at the 7-way receptacle. Attach the fuse holder with 7.5 amp fuse (provided) to the blue POWER wire on the TT210 system power/accessory cable using a butt splice. (Fuse holder supplied in the power/accessory cable harness kit.)

a. Connect the blue POWER wire with the fuse holder to pin 7 in the 7-way receptacle using a ring terminal.

b. Connect the white GROUND wire to pin 1 in the 7-way receptacle using a ring terminal.



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

10. Connect the circular connector to the terminal. This connector is “keyed” and will only go on in one position. Do not use excessive force.

11. Verify all mechanical and electrical components (cables, wires, optional sensors) are properly connected.

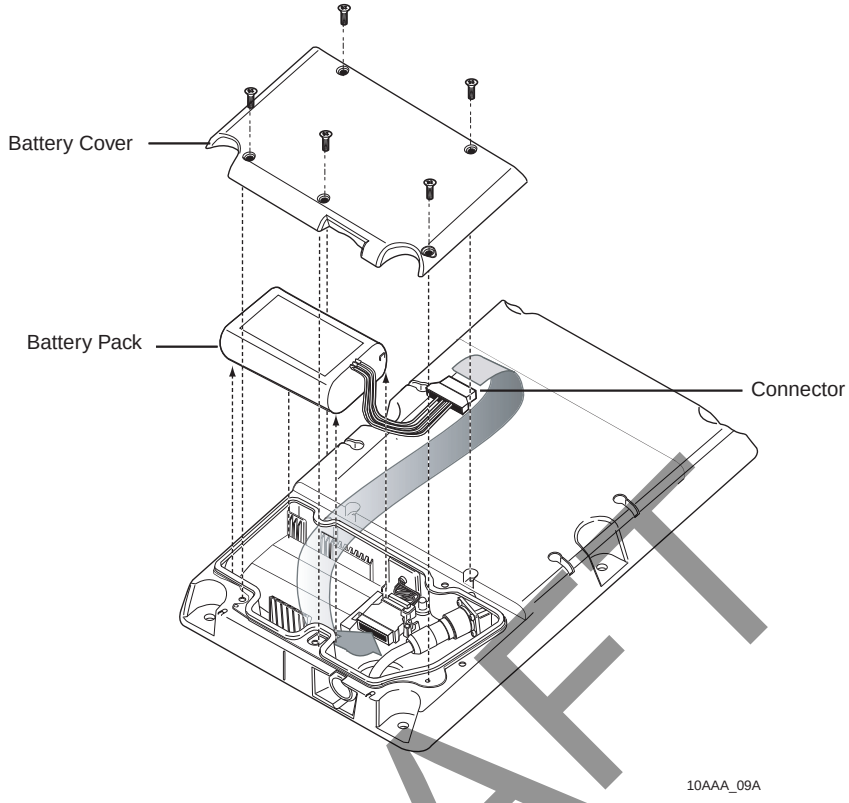
12. Install the optional cargo sensor if used (follow directions in Chapter 11: Installing the Cargo Sensor).

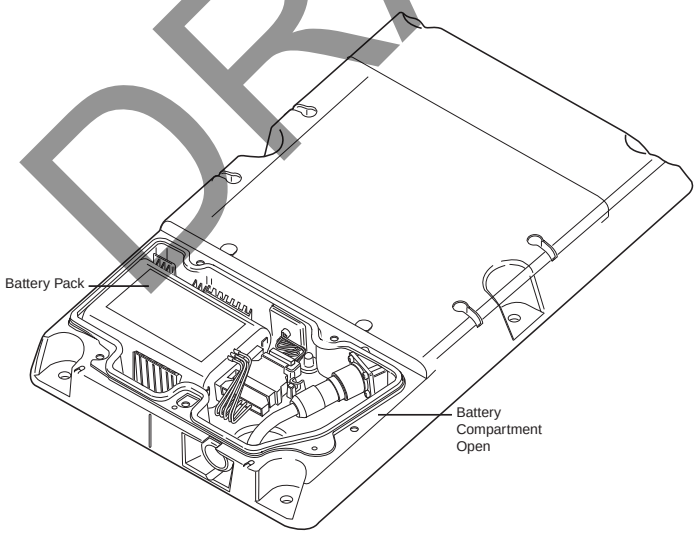
13. Install optional door or auxiliary sensors if used (Chapter 12: Installing the Swing Door Sensor, Chapter 13: Installing the Roll Door Sensor, Chapter 14: Installing the Auxiliary Sensor).

14. Install the battery inside the terminal.

Place the battery into place, use provided zip ties, and attach the battery connector.

ADD: zip tie.





15. Configure or pair the terminal to the proper trailer ID.

a. Wake up the terminal with the key fob or 7-way power.

b. Using the configuration tool, go into the configure screen and enter the trailer ID.

16. Close the terminal and make sure it is sealed.
    a. Ensure gasket is properly seated.
    b. Attach the unit cover.
17. Perform system verification. See Chapter 15: Performing System Verification.

7
Installing the TT210 Terminal on Containers

Introduction

This chapter describes how to install the dryvan terminal.

Topics in this chapter include:

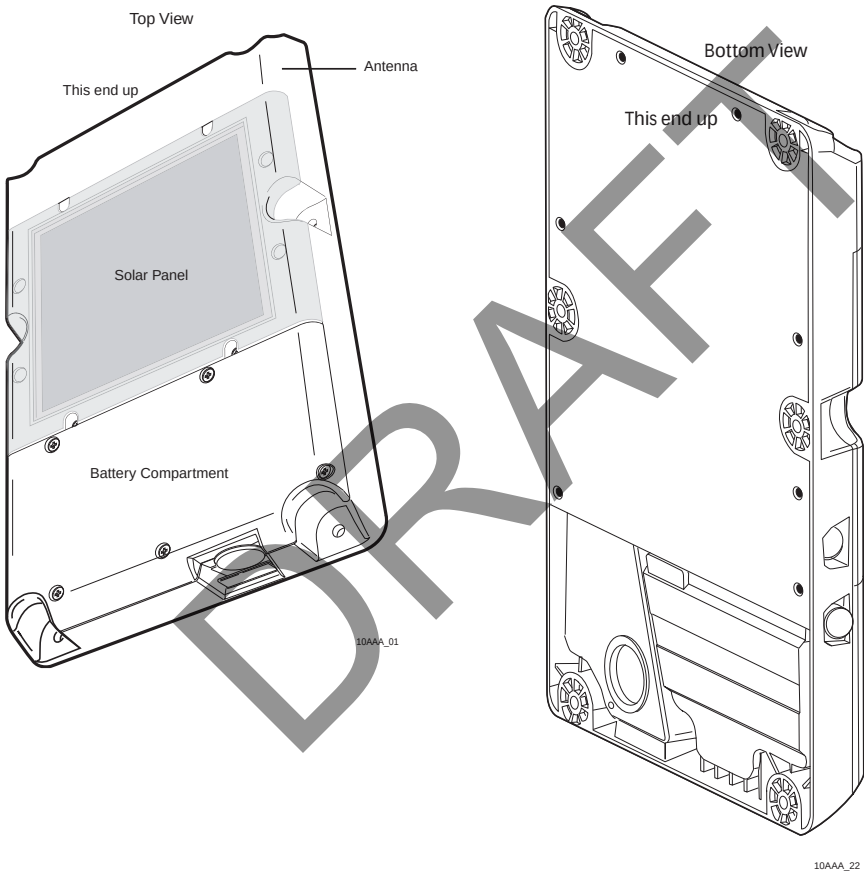
If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

Overview

The TT210 terminal installs outside the container on the container nose just below (approximately 1/2") the top rail horizontal rivet line where the container skin attaches to the top rail. Ensure the terminal clears the container's top rail internally *and* externally, being aware that the top rail *may* extend below the rivet line. The unit should be positioned as high as possible on the driver's side of center.

Thoroughly evaluate the container nose area (inside and outside) to determine if the TT210 system can be installed on the container. The container should be free of extensive damage in all installation areas. For specific information on verifying a container's condition, refer to *Verify the Trailer/Container Is in Good Condition* on page 4-2. For specific tools required, refer to *Tools and Supplies Needed for Installation* on page 4-4.



Planning for Optional Cargo Sensor

Before starting the installation, consider if the optional cargo sensor will be installed. Determining if a sensor will be used *before* beginning the installation, results in better planning and preparation.

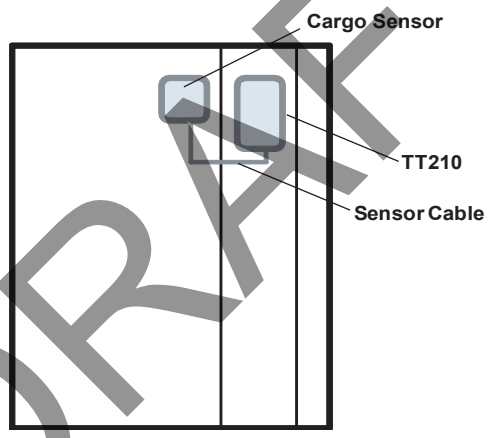
The cargo sensor determines whether the container is empty or not empty. It is necessary to cut a 9.5" x 12" hole in the container nose plywood when a cargo sensor is used. Refer to Chapter 11: Installing the Cargo Sensor. It is recommend to use optional 3” pan. Can be installed on the inside but may get damaged by the cargo inside of the container.

Read this chapter entirely before installing the terminal. The necessary tools, hardware, and components can be positioned on a scaffold for easy access during the installation.

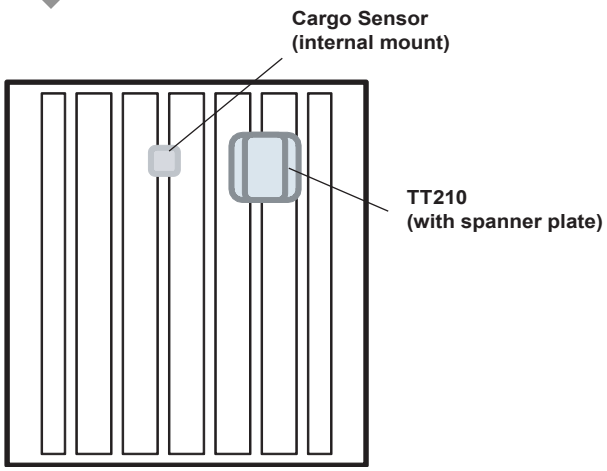
Types of Containers

There are three basic types of containers: smooth sided, corrugated, and CIMC. There are a variety of ways to install on each type of container. Below are some samples.

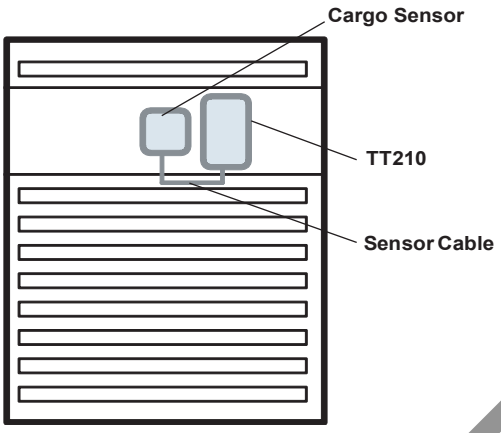
- Smooth-sided



- Corrugated



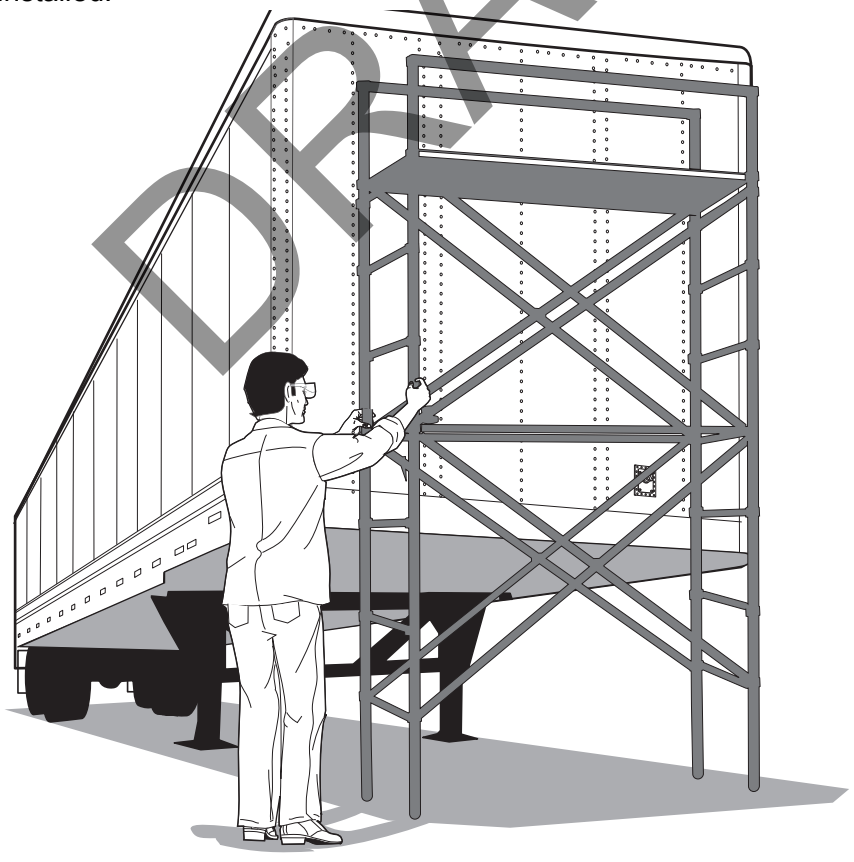
- CIMC



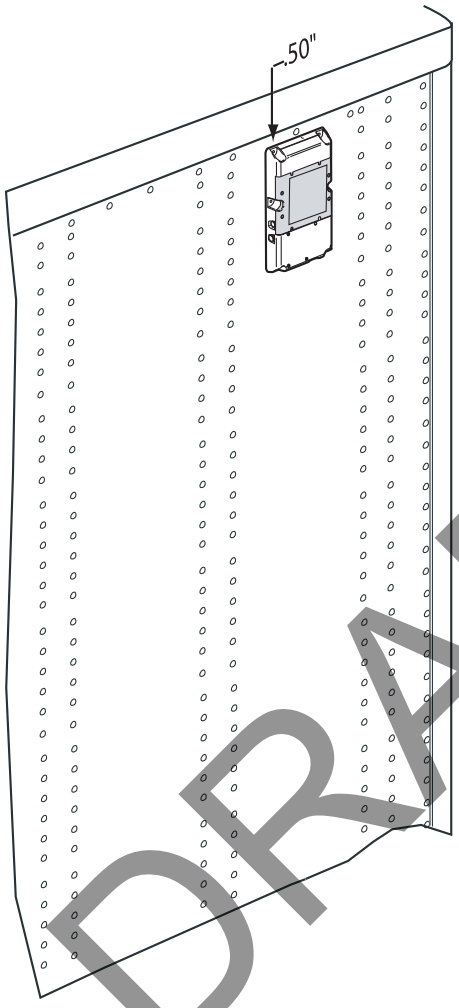
Depending on what type of container you have, the installation may be slightly different.

Installation

1. On the outside of the container, locate where the TT210 terminal will be installed.
2. Position a portable scaffold in front of the container nose where the terminal will be installed.



3. Carefully ascend the scaffolding to where the terminal will be installed and place it as high up as is practical between the vertical support rails in the 7-way bay. Make sure it's at least .50 inch from the top.



4. Mount the unit on the driver side of center using the six rivets. These should be installed top, top, middle, middle, bottom, bottom.

   a. Drill a 3/16" hole then attach the first rivet.

   b. Level by either using a template or by measuring down from the top rail on both sides.

   c. Drill another hole and attach the second rivet, then do the same for the rest of rivets.

5. Determine if installing a cargo sensor.

6. If using a cargo sensor, determine the cargo sensor wiring. It can be wired externally or internally. Internal installation requires a 7/8" hole for the cargo sensor cable.

NEED FIGURE> KEVIN TO GET JERRY DRAWING INFO...gromits etc.

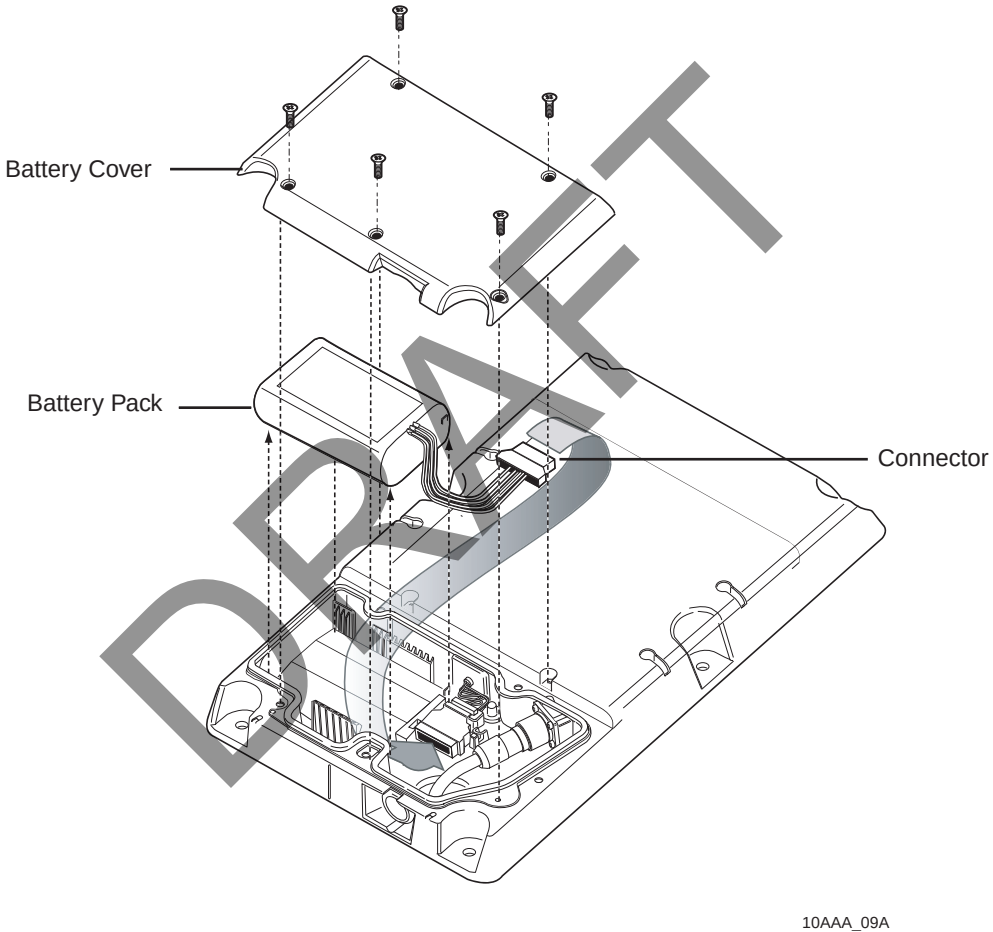
7. Verify all mechanical and electrical components (cables, wires, optional sensors) are properly connected.

8. Install the cargo sensor (follow directions in Chapter 11: Installing the Cargo Sensor)

9. Install the battery inside the terminal.

   Clip the battery into place, use provided zip ties, connect the connector, and install the battery cover with provided screws.

   add zip tie



10. Close the terminal and make sure it is sealed.

    a. Ensure gasket is properly seated. (figure)

    b. Attach the unit cover.

11. Configure or pair the terminal to the proper container ID.

    a. Wake up the terminal with the key fob.

b. Using the configuration tool, go into the configure screen and enter the container ID.

12. Perform system verification. See Chapter 15: Performing System Verification.

8
Installing the TT210 Terminal on Reefers

Introduction

This chapter provides guidelines and instructions for installing the TT210 on a refrigerated trailer.

Topics in this chapter include:

If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

Reefer Minimum Requirements

Tethered and Untethered System Comparison

Unlike the *tethered* system, the *untethere*d system currently does not transfer reefer data to the MCP unit in the tractor. However, it does send trailer ID so that connects and disconnects can be detected by the MCP unit in the tractor.

If you are switching a reefer other than Carrier Standard *from the tethered system to the untethered system*, the communications settings must be changed.

For Carrier Advance units, the Data Trak communications must be set to “Other”; for Thermo King, the i-Box must be set to “Third Party.”

Note

The Thermo King and Carrier “Qualcomm” setting is for tethered system units only.

Cables

Make sure you have the correct cable for the appropriate reefer model.

Make/Model	*Cable*	*Minimum Hardware/ Firmware*	*Communication Settings*
Carrier Standard (with data logger)	45-J7854-6 (5-pin circular Deutsch connector)	3.30 EEPROM	N/A
Carrier Standard (without data logger)	45-J7856-6 (3-pin Packard connector)	3.30 EEPROM	N/A
Carrier Advance	45-J7856-6 (3-pin Packard connector)	DataTrak software installed	Other
Thermo King (pre 2010 i-Box)	45-J7857-6 (6-pin circular Deutsch)	i-Box with minimum 5308 software installed	Third-Party (requires Thermo King technician with service tool)
Thermo King (2010 or later i-Box)	45-JB082-6 (6-pin rectangular Deutsch, 2010 or later)	i-Box with minimum 5308 software installed	Third-Party (requires Thermo King technician with service tool)

Software

Make sure you have the correct software for the appropriate reefer model.

Carrier Advance Controller units must have DataTrak software 04.03.00 or higher installed and SATCOM configured to “Other.”

To check the software version, follow these steps.

1. Turn **ON** power.
2. Wait for self-test to finish.
3. Press **SELECT** until VIEW DATA displays.
4. Press the **DOWN ARROW** to view the data list items. Choose INSTALLED OPTIONS.

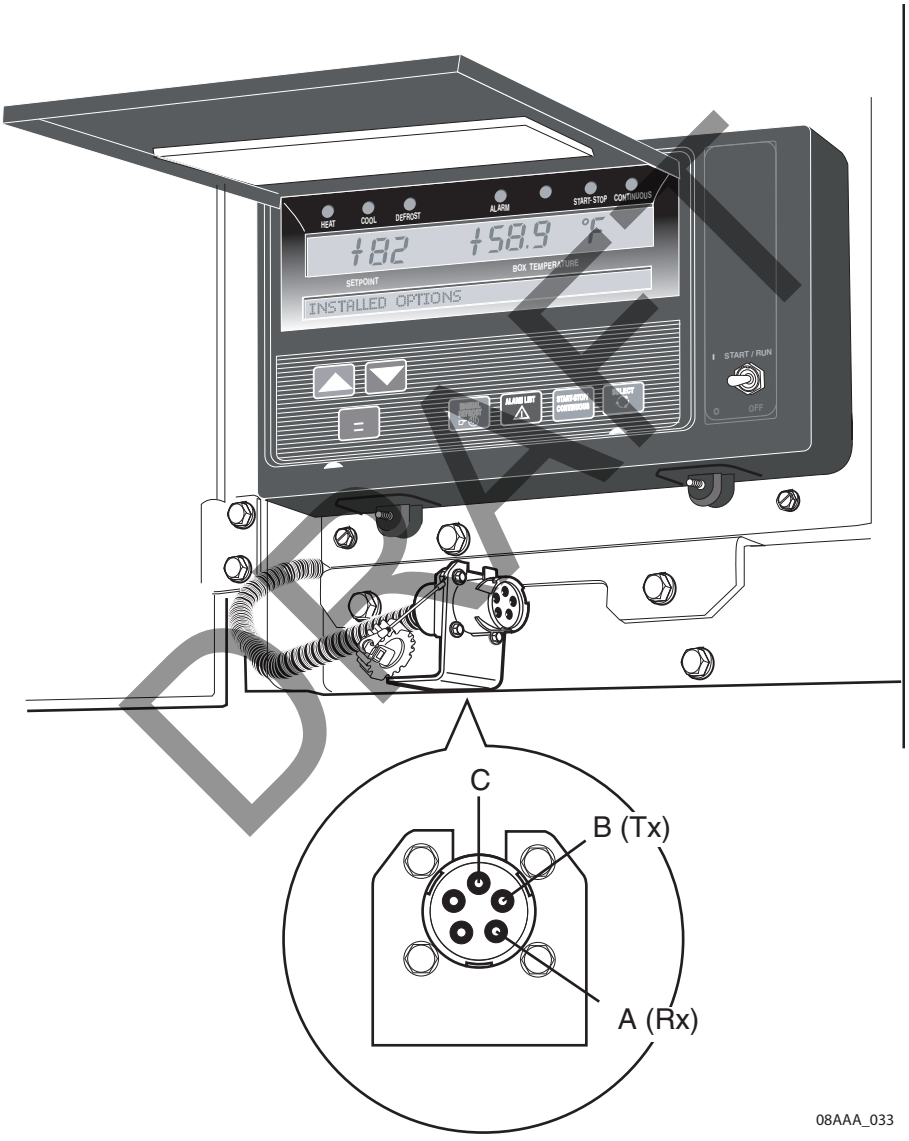
5. Press **=** (equal key) to view Options menu. Check that it shows DATATRAK INSTALLED.

6. Perform the following procedure to check the SATCOM setting.
7. Turn **OFF** the reefer power switch.
8. Short Tx (B) and Rx (A) on the reefer configuration port. A connector (P/N 22-50180-00) designed to short the A and B pins is available from your carrier dealer.)

9. Turn **ON** the reefer power switch.
10. Wait for unit to go to CONFIGURATION MODE.
11. Press **=** (equal key).
12. Press the **DOWN ARROW** to view hidden menu. Check that SATCOM is set to “other.”

Note

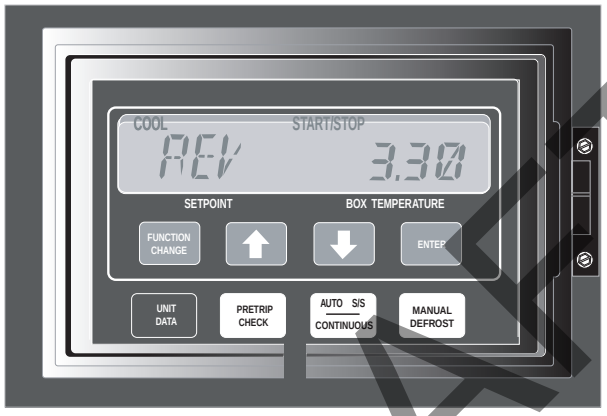
The Carrier “Qualcomm” setting is for tethered system units.



Carrier Standard Controller units must have an EEPROM chip loaded with the DataTRAK software version 3.30 or higher.

To check the software version, follow these steps.

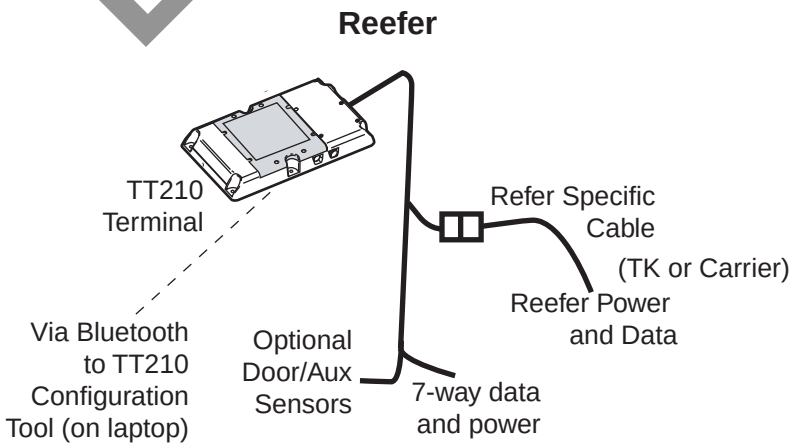
1. Turn **ON** power.
2. Wait for self-test to finish.
3. Press **UNIT DATA.**
4. Press the DOWN ARROW until the software version displays.
5. If the software version is not **3.30 or higher,** change the EEPROM.



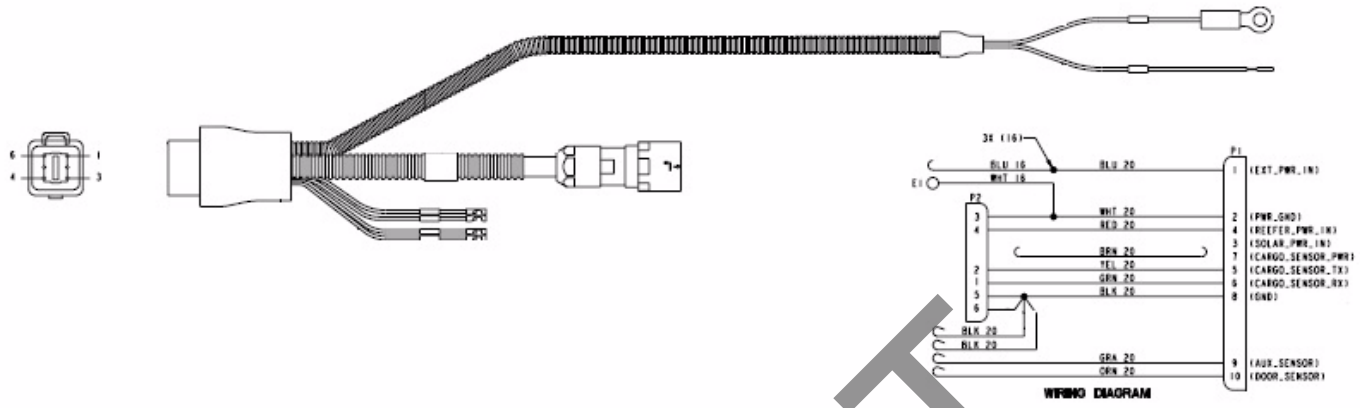
Themo King units must have i-Boxes installed with minimum 5308 software and communication setting set for third-party communications.

TT210 Input Power Options for Refrigerated Trailers

The TT210 power input option for refrigerated trailers is 7-way, reefer, and integrated solar input power.



Cable and Wiring Schematic

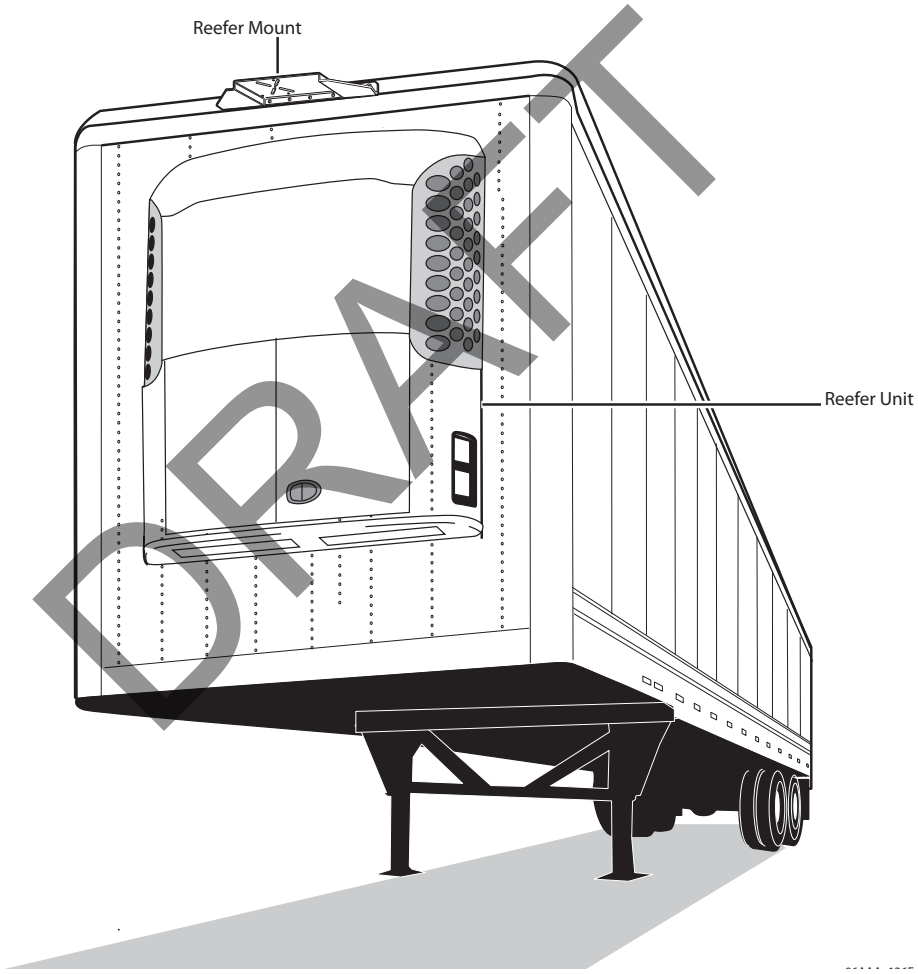


Mount Overview

The TT210 reefer mount attaches to the top rail of the trailer. The TT210 power/accessory cable runs from the TT210 terminal to the 7-way receptacle.

Thoroughly evaluate the trailer area where the mount will be located to determine if the T2 system can be installed on the trailer. The trailer should be free of extensive damage in all installation areas. For specific information on verifying a trailer's condition, refer to *Verify the Trailer/Container Is in Good Condition* on page 4-2. For specific tools required, refer to *Tools and Supplies Needed for Installation* on page 4-4.

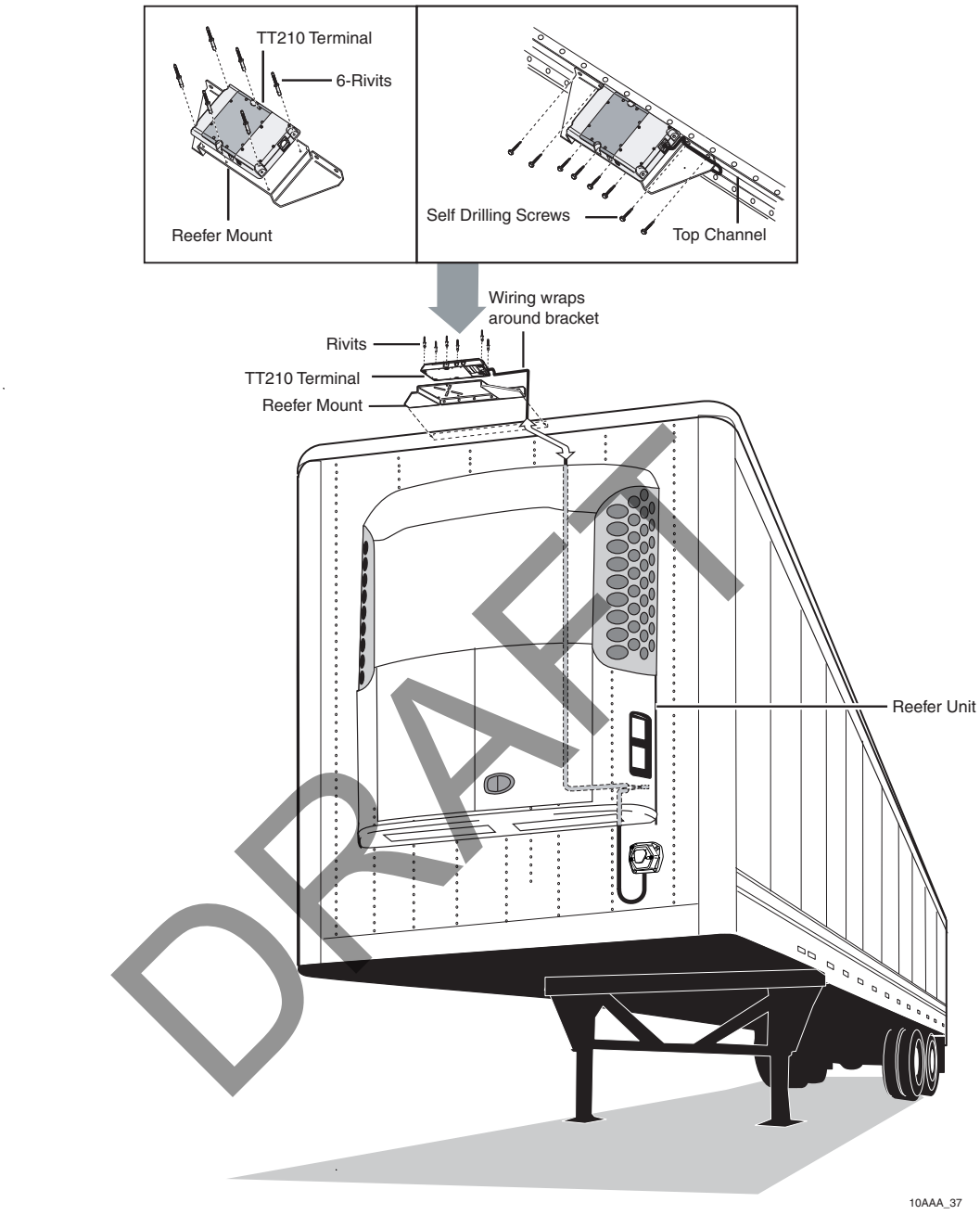
Before installing any T2 system component, refer to General Installation Information on page 4-2.



Mount Installation

1. On the outside of the trailer, locate an appropriate area in the top channel where the TT210 reefer mount will be installed. Make sure it's away from any sources of heat (muffler, exhaust air, etc.)

Note: Avoid installing the TT210 mount near air and/or electrical lines.



2. Position the mount in the top rail channel so that it is level. Hold the mount into the position and drill one of the self-drilling mounting screws. Drill the rest of the self-drilling mounting screws.

3. Attach the unit to the mount with six rivets. Holes are provided in mount.

4. Route the TT210 power/accessory cable from the mount to the inside of the reefer on the right side towards the 7-way receptacle.

5. Excess cable can be coiled and stored in a safe place where it will not interfere with other cables or components.

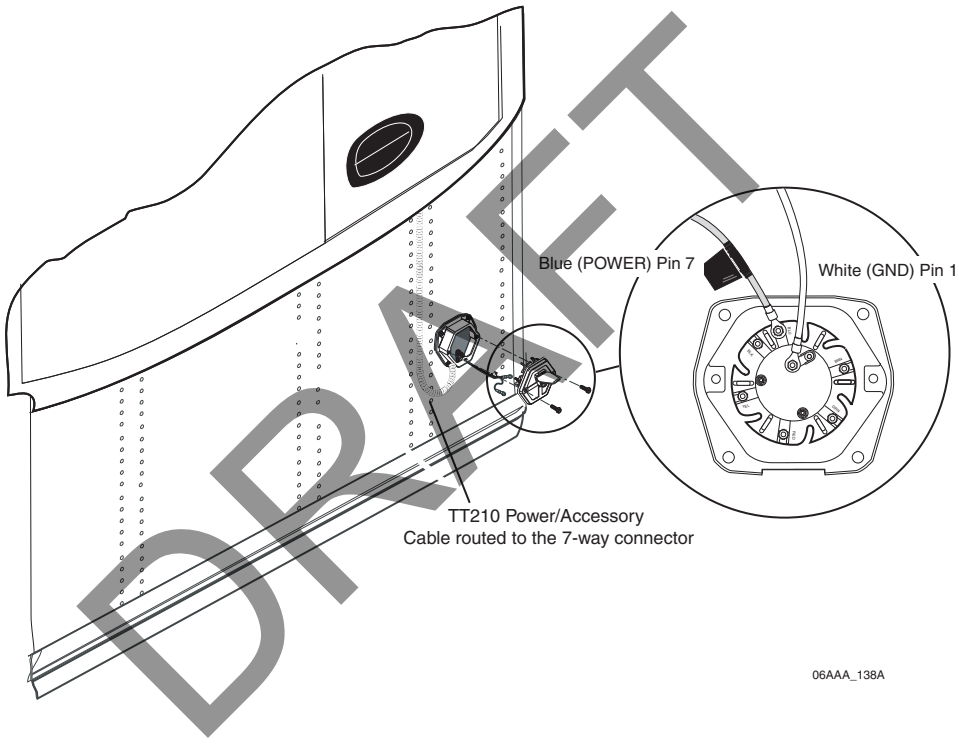
6. At the 7-way receptacle, make all power connections. If the 7-way receptacle has circuit breakers, be sure to connect on the unprotected (truck) side of the circuit breakers.

   a. Attach the 7.5 amp supplied fuse holder to the blue POWER wire on the T2 system power/accessory cable using a butt splice.

   b. Connect the other end of the fuse holder to pin 7 in the 7-way receptacle.

   c. Connect the white GROUND wire to pin 1 in the 7-way receptacle.

Refer to TT210 Power/Accessory Cable Installation on page 10-4 for more information pertaining to cable and wire connections.



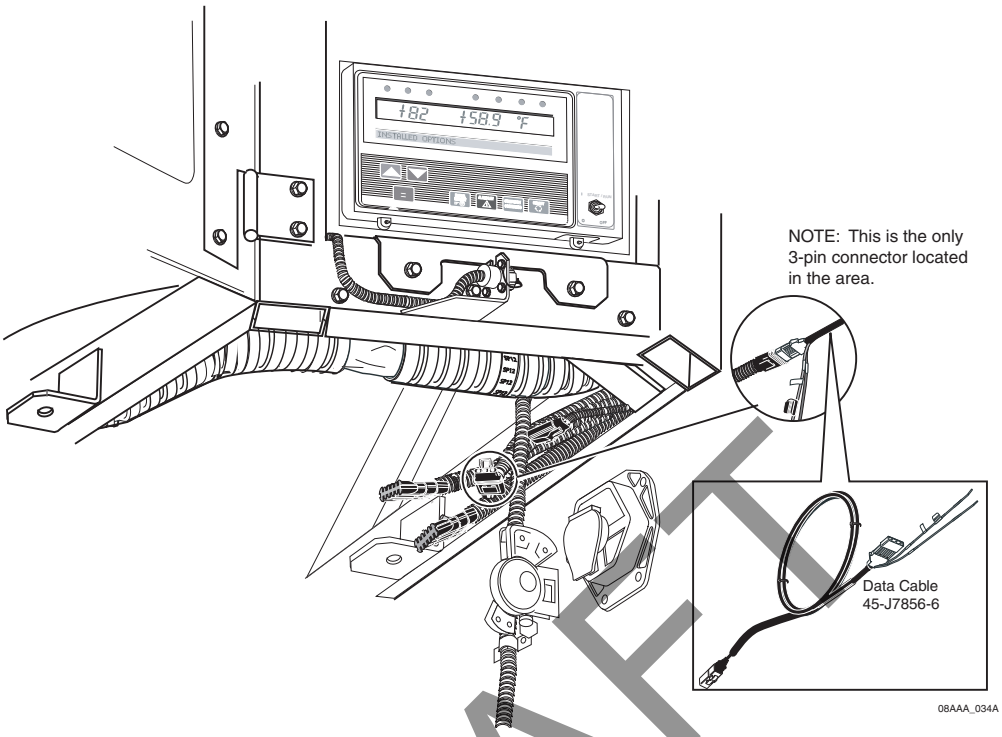
Note

Use extreme caution not to route the cable where it could interfere with service cables, components, or removable parts.

7. Where the cables enter the terminal, install the provided split grommet securely into the cable hole. Ensure the grommet is fully seated.

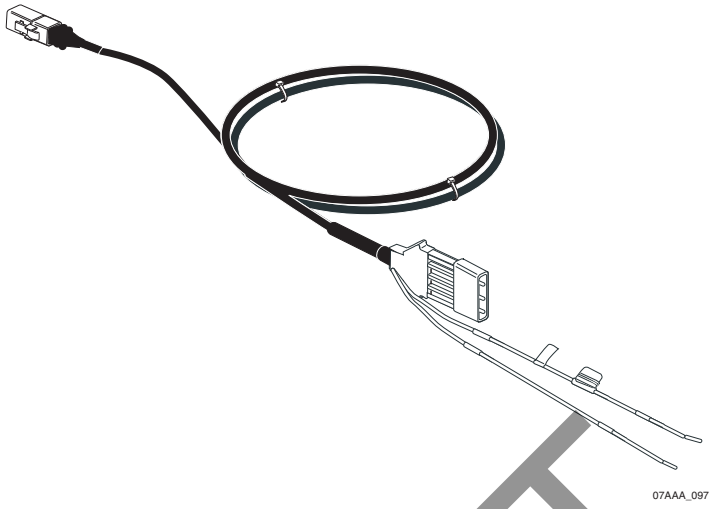
8. Make Reefer connections depending on type of unit. See following sections.

Making Power and Signal Connections for Carrier Units

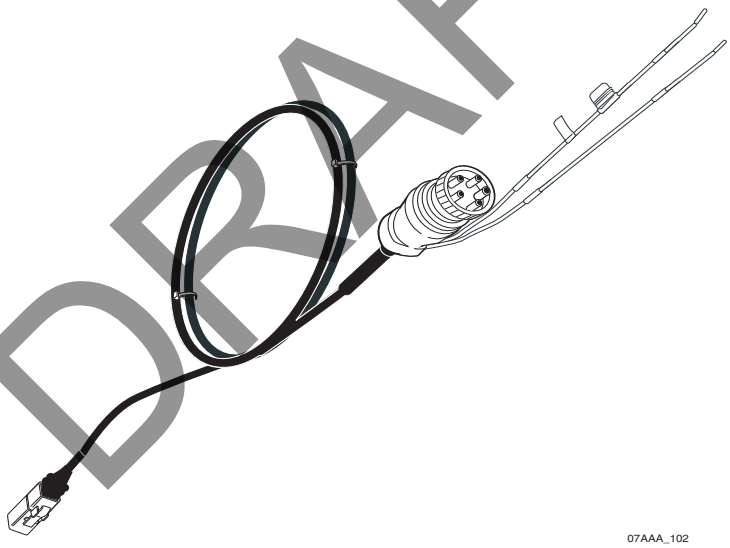


1. Route the reefer/power data cable so it is secured to prevent it from being damaged.
2. Connect the TT210 battery to the mating TT210 terminal connector.
3. Connect to the TT210 unit with the 6-pin square Deutsch connector on the reefer interface cable.
4. Connect the other end of the reefer interface cable to the reefer unit.

a. For newer model Carrier units, use **cable # 45-J7856-6** with the 3-pin Packard connector.



b. For older model Carrier units or units with Data Loggers, use **cable # 45-J7854-**6 with the 5-pin Deutsch connector.



5. Connect the reefer power (ORN) wire with the SPK7-DSA (switched power) wire. ??kevin checking dsa info????

Note

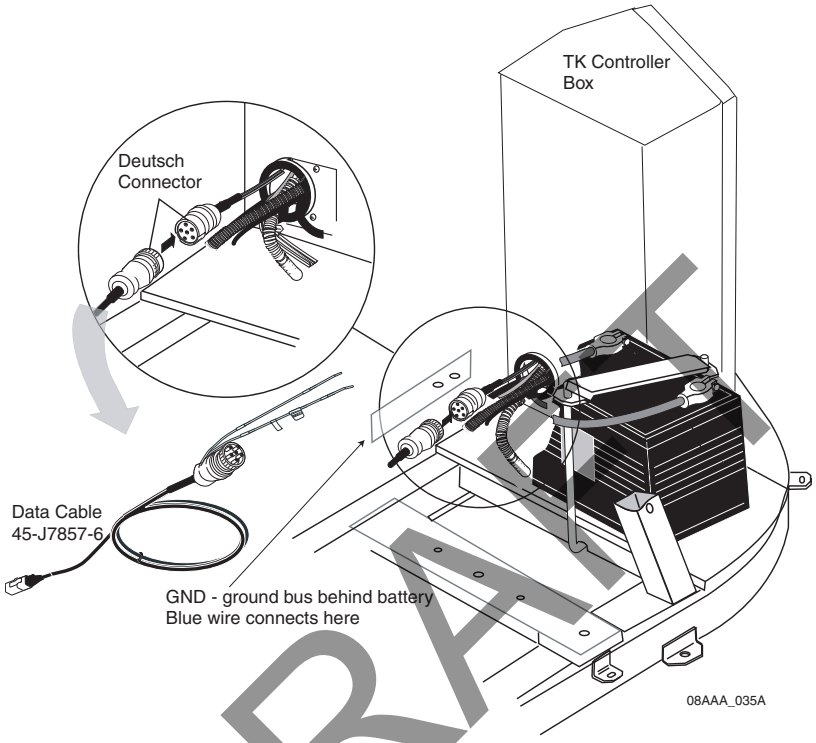
Reefer power must be connected to a circuit that only has voltage when the reefer is turned on. For Carrier reefers, the wire labeled SPK7-DSA is recommended.

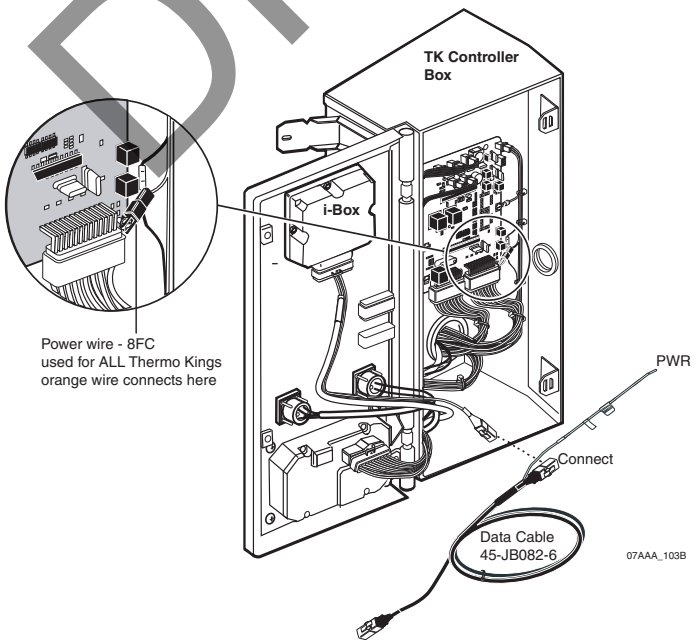
6. Connect the ground (BLU) wire with the SPK23 or 24 wire. These are both ground wires and are located in the same area as the reefer connector and the SPK7-DSA wire.

7. Verify that all mechanical and electrical components are properly connected.

8. Secure the TT210 power/accessory cable and the reefer cable along the respective routes using P clamps. Ensure the cables are held firmly in place.

Making Power and Signal Connections for Thermo King Units



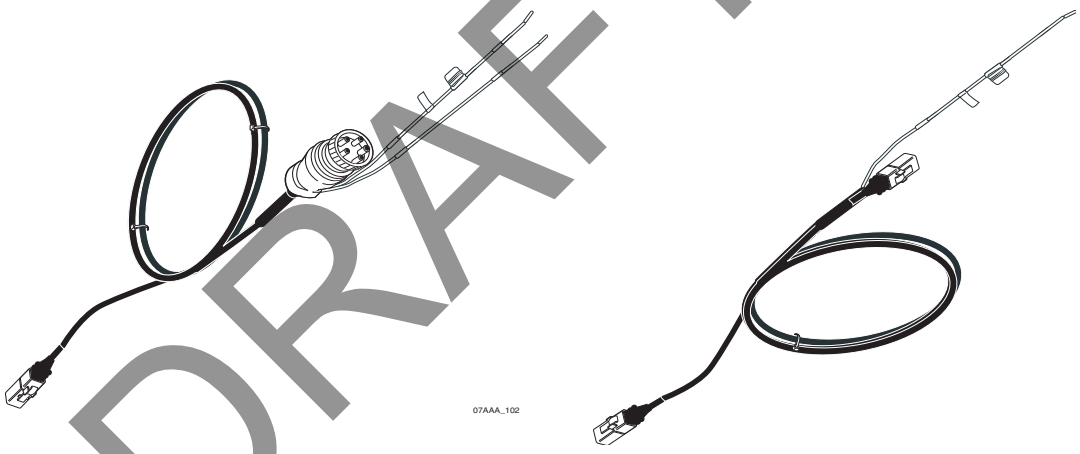


For pre-2010 Thermo King reefers, use **cable # 45-J7857-6**. For 2010 or newer, use **cable # 45-JB082-6**.

9. Route the reefer data cable so it is secure to prevent it from being damaged.
10. Connect the TT210 battery to the mating TT210 terminal connector.
11. Connect to the TT210 unit with the 6-pin square Deutsch connector on the reefer interface cable.
12. Connect to the reefer unit with the 6-pin circular or rectangular Deutsch connector on the reefer interface cable.
13. Connect the reefer power (ORN) wire with the 8FC (switched external lights circuit) wire. This wire can be found in the main wire bundle and has a 1/4" male spade connector. You can either use a female spade or a butt splice.

Note

Reefer power must be connected to a circuit that only has voltage when the reefer is turned on. For Thermo King reefers, the wire labeled 8FC is recommended.



14. For cable 45-J7857-6, connect the ground (BLU) wire to the ground bus bar behind the battery. Cable 45-JB082-6 does not have an external ground connection.
15. Verify all mechanical and electrical components are properly connected.
16. Secure the TT210 power/accessory cable along its route using P clamps. Ensure the cable is held firmly in place.

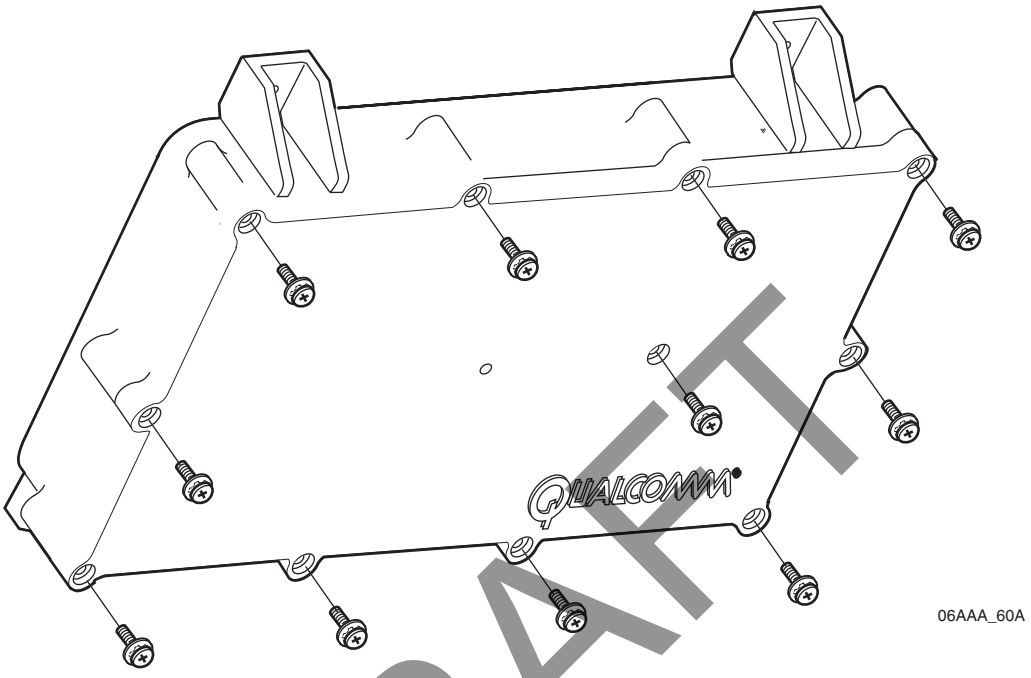
System Verification and Final Steps

1. Use the Configuration Tool software on a laptop/netbook to configure the terminal and perform a system verification.

   The config tool running on a laptop/netbook uses a Bluetooth connection to communicate with the TT210 terminal. Refer to Chapter 15: Performing System Verification for more information. figure like 06aaa_135a

2. Verify the lower cover seal is in place and not damaged.
   figure showing back and gasket???

3. Reinstall the lower cover being careful not to over-tighten.
   need fig like 06aaa-60a below?????????



4. If you are using a battery-powered drill, the drill should NOT be set on “Drill.” The drill should be set on a low torque setting.

9
Retrofitting for TT210

Introduction

This chapter describes how to install the reefer. KEVIN getting together draft.

Topics in this chapter include:

If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

if moving from tt200 to tt210???

11
Installing the Cargo Sensor

Introduction

This chapter provides general information about the TT210 system optional cargo sensor.

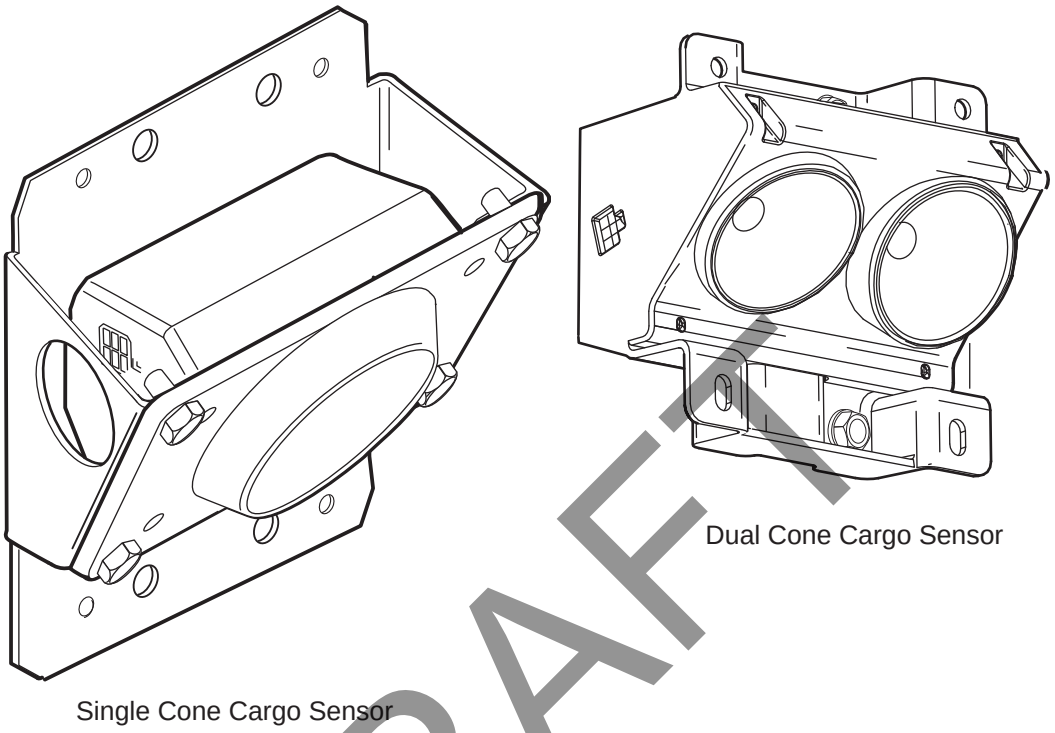
Topics in this chapter include:

If you have technical questions, please contact Qualcomm Enterprise Services (QES) Customer Support. QES Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

TT210 System Cargo Sensor Overview

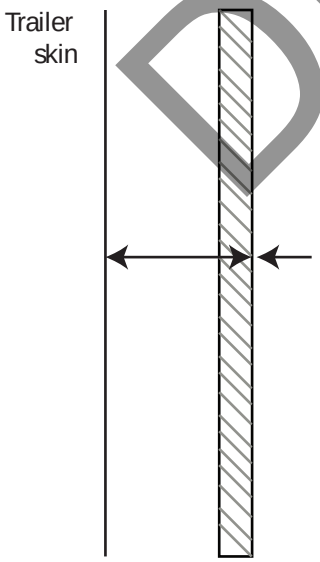
The cargo sensor determines the status of a trailer's cargo load (either empty, loading, or loaded) and provides this information when queried. The cargo sensor cable assembly is part of the TT210 system power/accessory cable assembly.



Dual Cone Cargo Sensor

Single Cone Cargo Sensor

10AAA_34



There are three different options for mounting the cargo sensor: two using external pans and one using a flat internal mount. Both external pan mounts have the same basic installation steps.

- If you have a plate nose trailer or container or a dry van with less than 2", you will need to use a 3" pan mount. See *Installing the Cargo Sensor Using 3" or 1" Pan Mount* on page 11-3.
- If you have a dry van, or at least 2" but less than 3" from the skin to the outside liner, use a 1" pan. See *Installing the Cargo Sensor Using 3" or 1" Pan Mount* on page 11-3.
- If you have 3" from the inside skin to the outside liner, use a flat internal mount. See *Installing the Cargo Sensor Using a Flat Internal Mount* on page 11-9.

Installing the Cargo Sensor Using 3" or 1" Pan Mount

The 3" or 1" external pan mount installs outside on the trailer nose just below (approximately 1/2") the top rail horizontal rivet line where the trailer skin attaches to the top rail, in the adjacent bay to the terminal.

Use a 3" pan mount on: container, plate nose trailer, or dry van trailer with less than 2" space between the trailer skin and the plywood liner.

Container: There is no 7-way power. The container installation uses the cargo sensor only cable.

Plate Nose Trailer: There is 7-way power and all cables are routed externally. Uses the standard dry van “Y” cable.

Dry Van: There is 7-way power and all cables are routed internally. Uses the standard dry van “Y” cable.

The 1" pan is used when there is at least 2" but less than 3" space between the trailer skin and the outside surface (cargo side) of the plywood liner. The 1" pan uses the standard dry van “Y” cable and all cables are routed internally (except possibly at 7-way).