

CalAmp TTU 700 - INSTALLATION MANUAL



May 2010

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ABOUT THIS MANUAL

The About This Manual chapter contains:

- .. [Manual and Product Overview](#)
- .. [Manual Conventions](#)
- ..

Before You Begin

To use this document effectively, you should:

- .. Have been trained and certified by Field Services to perform this installation
- .. Be an experienced technician
- .. Have a general understanding of the different types of trailers and intermodal equipment
- .. Have all necessary tools available to perform the installation
- .. Follow all standard safety precautions
- .. Be familiar with site operating procedures

Before installing any CalAmp TTU 700 components, you must:

- .. Read this document thoroughly
- .. Collect all required materials and tools

Manual and Product Overview

These installation instructions guide qualified technicians through the process to install the CalAmp TTU 700 Cellular tracking system on trailers. Tracking devices collect critical asset location and operational data and transmit that data to the CalAmp TTU 700 web interface, where users can review the data in selected reports.

Clarification of Terminology

A single trailer is referred to as an asset. Assets are trailers tracked at the web interface.

Manual Conventions

This manual contains notices and text conventions. It also contains information about the illustrations used throughout the guide.

SAFETY

The Safety chapter contains safety information related to the CalAmp TTU 700 system.

This chapter includes the following topics:

- .. [General Guidelines](#)
- .. [Personal Protective Equipment](#)
- .. [Working on Elevated Surfaces](#)
- .. [Secure/ Stabilize Equipment](#)
- .. [Handling Adhesives](#)
- .. [Handling Silicone](#)
- .. [Handling Threadlock](#)
- .. [Handling Isopropyl Alcohol \(IPA\)](#)
- .. [Handling Lithium Batteries](#)
- .. [Waste Management](#)

Personal Protective Equipment

and federal regulations require wearing appropriate Personal Protective Equipment (PPE). Adherence to this requirement is monitored and mandated by 's Environmental Health and Safety (EHS) personnel and regulated and mandated by the U.S. Department of Labor Occupational Safety and Health Administration (OSHA). PPE at a minimum, consists of:

- .. Safety glasses with side shield, meeting the ANSI Z87.1 standards
- .. Safety shoes, meeting ASTM F2413-05 and ANSI Z41/C75 standards
- .. Mechanics type work gloves (that is, gloves that are appropriate for the task to be completed)
- .. Hard hat, meeting ANSI Z89.1 - Class A, B, and C standards
- .. High visibility vest, meeting ANSI 107 standards
- .. Work uniform

Refer to specific instructions within procedures and all applicable MSDS for additional safety precautions. Check with customers or third-parties to verify whether they have additional PPE requirements such as fall protection (full-body harnesses, anchorage point and lanyard), hearing protection, escape oxygen masks, respiratory protection, flame resistant coveralls, etc.

Secure/ Stabilize Equipment

installers and contractors must follow OSHA regulatory requirements for working on equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks.

Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.

Equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks shall be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them.

Working on Elevated Surfaces

installers and contractors must follow OSHA regulatory requirements for working on elevated surfaces. When installers are on the tops or roofs of equipment, they must employ a fall protection system consistent with OSHA regulations.

Installers must also check with the customer or third-party persons, who are in charge of safety at the installation site, for any further requirements.

Precautions

Proper safety precautions must be followed. Because Loctite Threadlock 242 is a solvent, read the MSDS sheet and wear the proper PPE as specified in the MSDS. The MSDS sheet is available from the website:

[<http://www.henkelcamsds.com//>](http://www.henkelcamsds.com//).

Handling Isopropyl Alcohol (IPA)

Precautions

Proper safety precautions must be followed. Because Isopropyl Alcohol is a solvent, read the MSDS sheet and wear the proper PPE as specified in the MSDS.

CAUTION: All solvents must be used in a well-ventilated area. Avoid open flames and other ignition sources.

Handling Lithium Batteries

CalAmp TTU 700 System Battery

The CALAMP TTU 700 uses a lithium battery.

Storage

CalAmp TTU 700 batteries not installed within a 4-week period from the time of delivery must be stored in a cool, dry place. Store in a cool (below 30° C (86° F)), dry and ventilated area, which is subject to little temperature change. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in shortened battery life and degrade performance.

CAUTION: Failure to properly store batteries will void the warranty.

Disposal/Recycling Batteries

All lithium batteries whether recycled or disposed must be done in accordance with applicable local, State and Federal regulations.

NOTE: Battery must be removed from the CALAMP TTU 700 before return shipment.

Continued on the next page.

Waste Management

Any solid or hazardous waste or refuse generated as a result of the installation process shall be managed, stored, transported, and disposed of in accordance with any and all applicable federal, state, and local regulations. In addition, please check with the customer or third-party responsible for the site about any processes or procedures used to handle, store, transport and dispose of any generated waste.

The following waste may be generated after an installation:

- .. Cloths or Paper Towels
- .. Cloths or Paper Towels with Adhesive or Degreaser
- .. Empty Adhesive and Degreaser Containers
- .. Batteries
- .. Cardboard
- .. Metal Shavings
- .. General Waste or Garbage

1

GETTING STARTED

Overview

These installation instructions guide qualified technicians through the steps required to install CALAMP TTU 700 Track & Trace devices. Devices collect critical asset location and operational data and transmit that data to the CalAmp TTU 700 web site, where users can review the data in selected reports.

This document provides the installation steps for the following asset configurations:

- .. [Chapter 2, Dry Van and Reefer Nose Mount Installation](#)
- .. [Chapter 3, Dry Van and Reefer Under Trailer Installation](#)
- .. [Chapter 4, Chassis Screw Mount Installation](#)
- .. [Chapter 5, Chassis Magnetic Mount Installation](#)
- .. [Chapter 6, Intermodal Container Door Screw Mount Installation](#)
- .. [Chapter 7, Intermodal Container Door Magnetic Mount Installation](#)

2

DRY VAN AND REEFER NOSE MOUNT INSTALLATION

Tools and Materials

- .. Cordless Drill
- .. 9/64" Drill Bit
- .. Magnetic Apex Driver Bit - 5/16"
- .. Scratch Awl

Safety

Follow all safety procedures as listed in the [Safety](#) chapter.

Procedures

- 1 Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.

- 2 Set the parking brake.
- 3 If the equipment is parked on an incline chock the wheels.
- 4 Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.

NOTE If reefer follow steps 5 through 8; otherwise skip to step 9.

- 5 If reefer: Verify that the Main Power Switch is set to the **OFF** position.
- 6 If reefer: Set the Disconnect Switch to the **OFF** position.
- 7 If reefer: Turn the Main Power Switch to the **ON** position to verify that the LOTO was successful.
- 8 If reefer: Return the Main Power Switch to the **OFF** position.
- 9 Record the Module Serial Number (MSN) located on the device label and the trailer number.

Figure 2-1: Device Label



- 10 Select a center, or roadside, device mounting location on the trailer top rail.

Figure 2-2: Nose Mount



- 11 Place the mounting flanges against the trailer's top rail so that round battery access panel is on the left.
- 12 Using the device mounting flanges as a template, mark the location for each of the mounting screws (4) onto the trailer's top rail.
- 13 At each marked location, drill a 9/64" hole.
- 14 Install the four (4) mounting screws through the mounting flanges and into the trailer's top rail.
- 15 Tighten the screws.
- 16 Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

NOTE: Retain the activation magnet - in order to disable reporting upon deinstallation of device.
- 17 Contact Customer Support (888-855-0913). Provide the Customer Support Representative with customer name, device MSN, trailer number, and trailer VIN. Request that the device be associated to the trailer number on the VIP website.

NOTE If reefer follow step 18; otherwise end of procedure.

- 18 If reefer: Set the Disconnect Switch to the **ON** position.

- End of Procedure -

3

DRY VAN AND REEFER UNDER TRAILER INSTALLATION

Tools and Materials

The following tools and materials are needed to perform this installation:

- .. Cordless Drill
- .. 3/16" Drill Bit
- .. 3/8" Open-End Wrench
- .. 5/16" Socket - 1/4" drive
- .. Ratchet - 1/4" drive
- .. Scratch Awl
- .. Rust Preventative Spray Paint (black or primer color)

Safety

Follow all safety procedures as listed in the [Safety](#) chapter.

Procedures

- 1 Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.

- 2 Set the parking brake.
- 3 If the equipment is parked on an incline chock the wheels.
- 4 Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.
- 5 Record Module Serial Number (MSN) from device label and customer's trailer number.

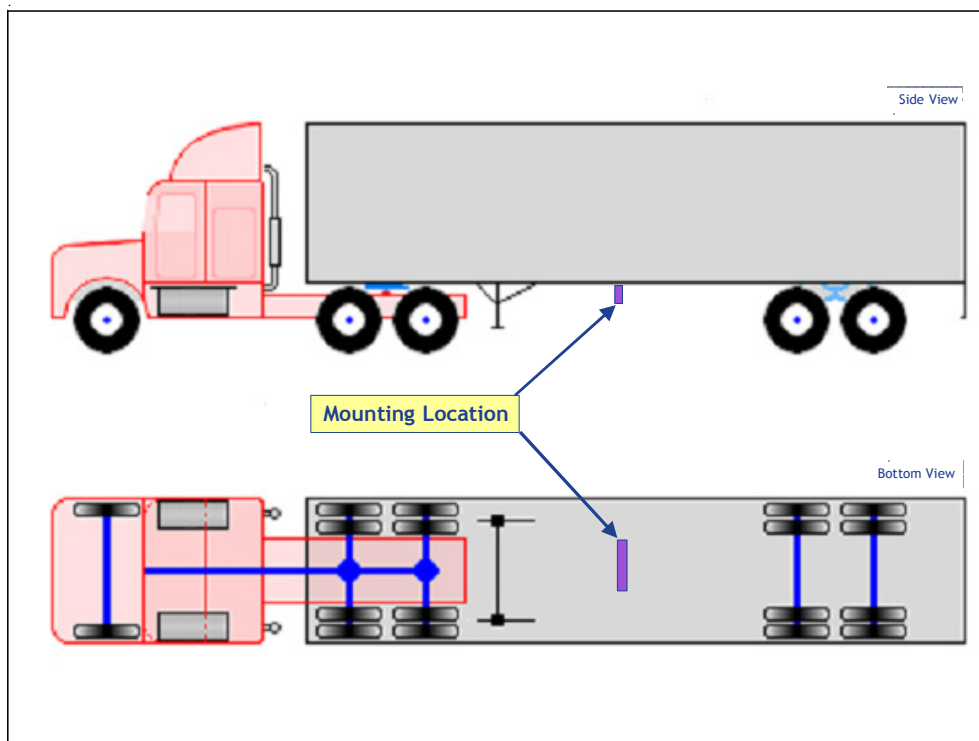
Continued on the next page.

Figure 3-1: Device Label



- 6 Select a cross member located approximately half way between front and rear of trailer. Cross member must be in front of and clear of tandem axle slide rails.

Figure 3-2: Mounting Location - Center Mount



- 7 At center of selected cross member, choose mounting location for device.

Figure 3-3: Cross Member - Center Mount



- 8 Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer cross member.
- 9 At each marked location, drill a 3/16" hole.

Continued on the next page.

Figure 3-4: Drill at Marked Locations



- 10 Deburr hole and remove metal shavings from cross member surfaces.
- 11 Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.
- 12 Mount device on cross member using screws (4), flat washers (4) and self-locking nuts (4). Ensure flat washer is between screw head and plastic device housing.
- 13 Tighten each screw using 5/16" socket, ratchet and 3/8" open-end wrench.

Continued on the next page.

Figure 3-5: Tighten Screws

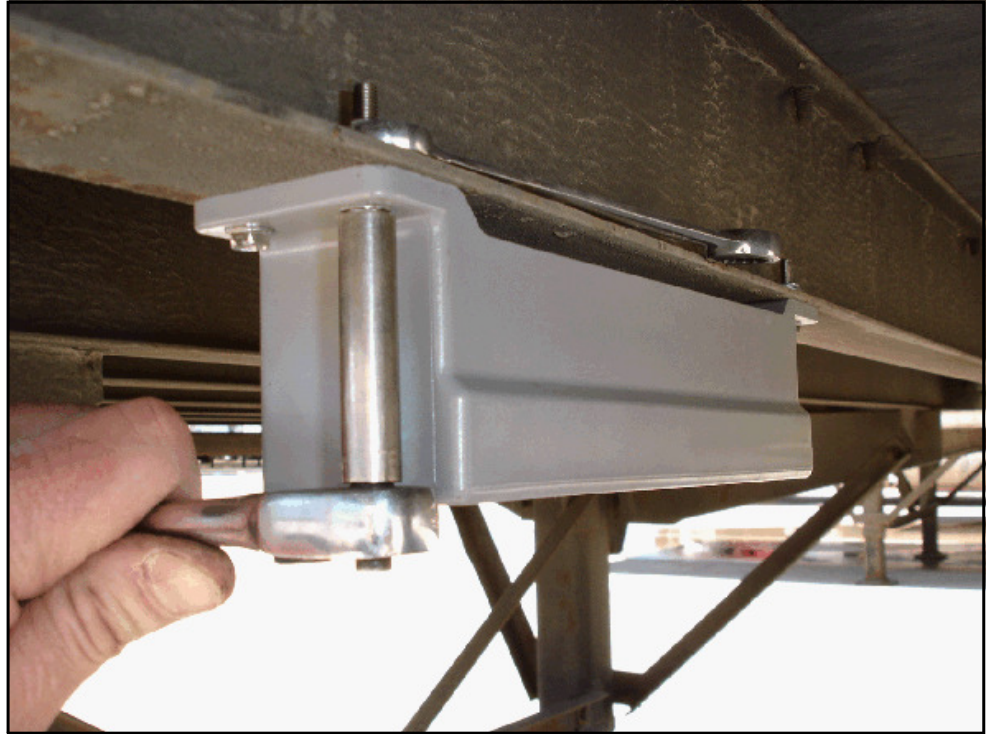


Figure 3-6: Device Mounted



- 14 Remove magnet from front of device enclosure to activate device reporting.

NOTE: Retain the activation magnet - in order to disable reporting upon deinstallation of device.

- 15 Contact Customer Support (888-855-0913). Provide customer name, device MSN, trailer number, and trailer VIN to Customer Support representative. Request that device be associated to trailer number on VIP website.

- End of Procedure -

4

CHASSIS SCREW MOUNT INSTALLATION

Tools and Materials

The following tools and materials are needed to perform this installation:

- .. Cordless Drill
- .. 3/16" Drill Bit
- .. 3/8" Open-End Wrench
- .. 5/16" Socket - 1/4" drive
- .. Ratchet - 1/4" drive
- .. Scratch Awl
- .. Rust Preventative Spray Paint (black or primer color)

Safety

Follow all safety procedures as listed in the [Safety](#) chapter.

Procedures

- 1 Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.

- 2 Set the parking brake.
- 3 If the equipment is parked on an incline chock the wheels.
- 4 Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.
- 5 Record Module Serial Number (MSN) from device label and customer's trailer number.

Figure 4-1: Device Label



6 Identify Mounting Location

- Facing Up, or
- Facing Down
- .. Ensure no damage when stacking or operating chassis.

CAUTION: *Device must be mounted facing up or down for optimum GPS reception and accuracy*

Continued on the next page.

Figure 4-2: Chassis Mount (Device facing up)



Figure 4-3: Chassis Mount (Device facing down)



- 7 Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer cross member.
- 8 At each marked location, drill a 3/16" hole.
- 9 Deburr hole and remove metal shavings from cross member surfaces.
- 10 Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.
- 11 Mount device using screws (4), flat washers (4) and self-locking nuts (4). Ensure flat washer is between screw head and plastic device housing.
- 12 Tighten each screw using 5/16" socket, ratchet and 3/8" open-end wrench.
- 13 Remove magnet from front of device enclosure to activate device in Sky View.

NOTE: Retain the activation magnet - in order to disable reporting upon deinstallation of device.
- 14 Contact Customer Support (888-855-0913). Provide customer name, device MSN, trailer number, and trailer VIN to Customer Support representative. Request that device be associated to trailer number on VIP website.
- 15 Process Installation Worksheet.

- End of Procedure -

5

CHASSIS MAGNETIC MOUNT INSTALLATION

Tools and Materials

The following tools and materials are needed to perform this installation:

- .. Two (2) 10" Adjustable Crescent® Wrenches
- .. Wire Brush or Scuff Pad
- .. Acetone
- .. Loctite Threadlocker Blue 242
- .. Rust Preventative Spray Paint (black or primer color)

Safety

Follow all safety procedures as listed in the [Safety](#) chapter.

Procedures

- 1 Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.

- 2 Set the parking brake.
- 3 If the equipment is parked on an incline chock the wheels.
- 4 Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.
- 5 Record the Module Serial Number (MSN) located on the device label and the trailer number.

Continued on the next page.

Figure 5-1: Device Label



6 Identify Mounting Location

- .. Middle of chassis centered front-to-back
- .. Chassis cross member facing down, or
- .. Chassis cross member facing up
- .. Ensure mounting surface is rust free and level
- .. Ensure lanyard can wrap around or through cross member
- .. Ensure no damage when stacking or operating chassis

CAUTION: *Device must be mounted facing up or down for optimum GPS reception and accuracy*

Figure 5-2: Device Tethered (Frontal View)

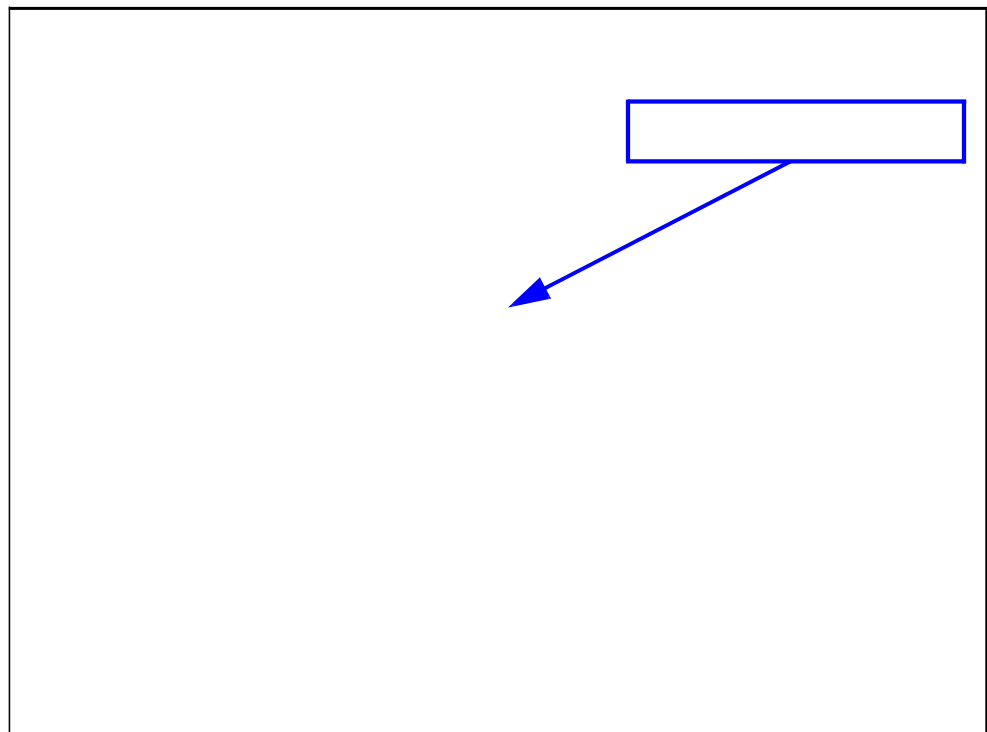


Figure 5-3: Center Device Side-to-Side and Front-to-Back



- 7 Clean mounting surface where magnets will contact frame member.
 - .. For dirt and grease use acetone
 - .. For rust or loose paint use a wire brush and acetone
- 8 Mount device and ensure all four (4) magnets are engaged.
- 9 If required, drill 1/4" hole in frame member and pass lanyard through; otherwise, loop lanyard around the frame member.
- 10 If required, deburr hole and remove metal shavings from cross member surfaces.
- 11 Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.
- 12 Feed threaded link through lanyard loops and lanyard clip.

Figure 5-4: Feed threaded link through lanyard loops and tab (Loctite applied to threads)



- 13 Apply blue Loctite to threaded link threads.
- 14 Tighten threaded link with two Crescent wrenches.

Figure 5-5: Tighten Threaded Link with Two Crescent Wrenches



Figure 5-6: Lanyard connected



- 15 Remove the activation magnet from the front of the device enclosure in order to activate device reporting.
- 16 Contact Customer Support (888-855-0913). Provide customer name, device MSN, trailer number, and trailer VIN to Customer Support representative. Request that device be associated to trailer number on VIP website.
- 17 Process Installation Worksheet.

- End of Procedure -

6

INTERMODAL CONTAINER DOOR SCREW MOUNT INSTALLATION

Tools and Materials

The following tools and materials are needed to perform this installation:

- .. Cordless Drill
- .. 3/16" Drill Bit
- .. 3/8" Open-End Wrench
- .. Cross Tip Drill Attachment (or 1/8" Hex Allen Wrench)
- .. Scratch Awl
- .. RTV Sealant

Safety

Follow all safety procedures as listed in the [Safety](#) chapter.

Procedures

- 1 Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.

- 2 Set the parking brake.
- 3 If the equipment is parked on an incline chock the wheels.
- 4 Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.
- 5 Record the Module Serial Number (MSN) located on the device label and the trailer number.

Continued on the next page.

Figure 6-1: Device Label



6 Identify mounting location

- „ Top of the left or right door
- „ Between locking rods
- „ In the bottom of corrugation well
- „ Ensure mounting surface is level and rust free

Figure 6-2: Top Left Container Door
(Device mounted in corrugation well between locking rods)



- 7 Level device in mounting area with label facing down
- 8 Mark all four (4) mounting holes with scratch awl
- 9 Drill all four (4) mounting holes
- 10 Apply RTV sealant inside the mounting holes

Figure 6-3: Sealant Applied to Backside



11 Feed mounting screws from inside container door

12 Mount device on screws and tighten nuts

CAUTION: *Drive screws at low speed to avoid seizing*

Figure 6-4: Final Installation with Label Facing Down



- 13 Remove the activation magnet from the front of the device enclosure in order to activate device reporting.
- 14 Contact Customer Support (888-855-0913). Provide customer name, device MSN, trailer number, and trailer VIN to Customer Support representative. Request that device be associated to trailer number on VIP website.
- 15 Complete Installation Worksheet

- End of Procedure -

7

INTERMODAL CONTAINER DOOR MAGNETIC MOUNT INSTALLATION

Tools and Materials

The following tools and materials are needed to perform this installation:

- .. Two (2) 10" Adjustable Crescent® Wrenches
- .. Wire Brush or Scuff Pad
- .. Acetone
- .. Rags
- .. Loctite Threadlocker Blue 242

Safety

Follow all safety procedures as listed in the [Safety](#) chapter.

Procedures

- 1 Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.

- 2 Set the parking brake.
- 3 If the equipment is parked on an incline chock the wheels.
- 4 Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.
- 5 Record the Module Serial Number (MSN) located on the device label and the trailer number.

Continued on the next page.

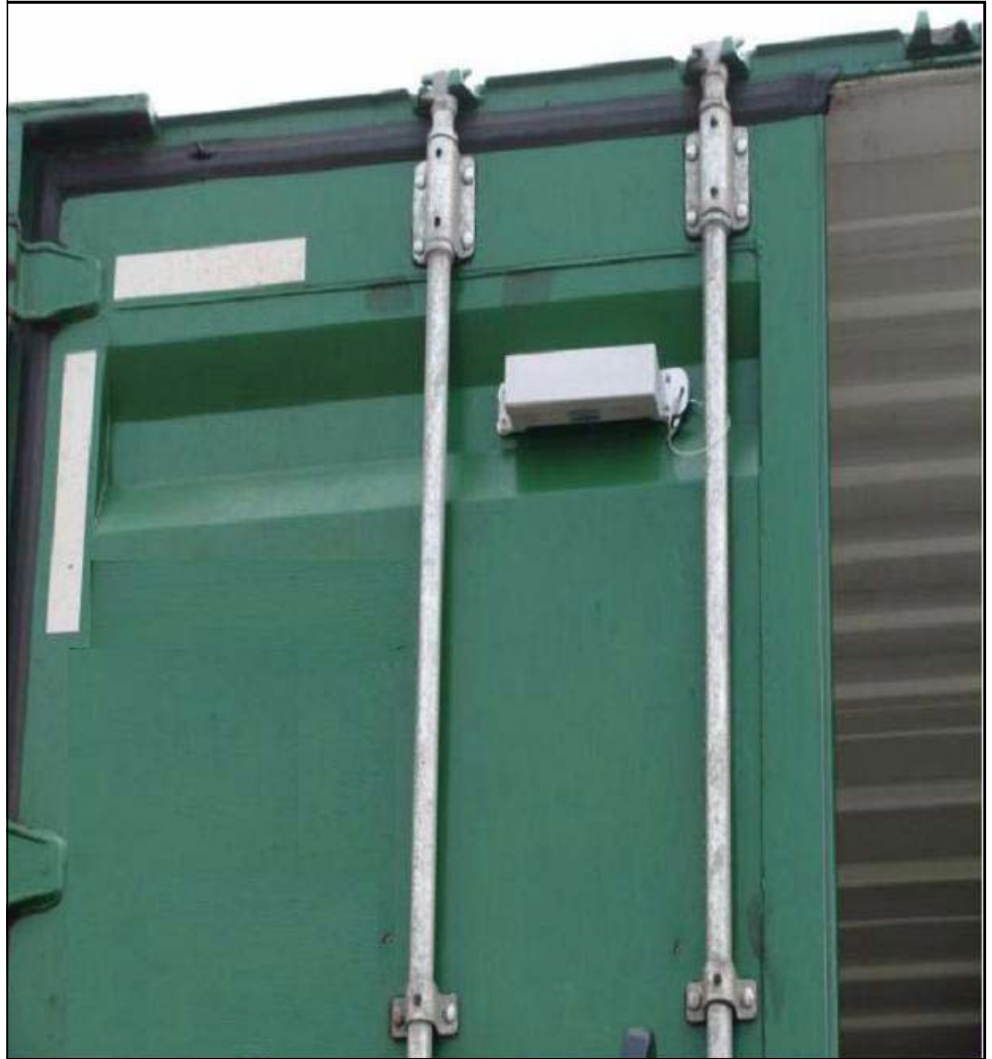
Figure 7-1: Device Label



6 Identify Mounting Location

- .. Top of left or right door
- .. Between locking rods
- .. In the bottom of corrugation well
- .. Ensure mounting surface is level and rust free

Figure 7-2: Device Mounted at Top of Left Door Between Locking Rods



- 7 Clean mounting surface where magnets will contact door.
 - „ For dirt and grease use acetone
 - „ For rust or loose paint use a wire brush and acetone
- 8 Mount device within 8" of locking rod and ensure all four magnets Are engaged
- 9 Route lanyard around locking rod
- 10 Feed threaded link through lanyard loops and lanyard clip.
- 11 Apply blue Loctite to threaded link threads.

Figure 7-3: Wrap Lanyard Around Locking Rod and Secure with Threaded Link



12 Tighten threaded link with two Crescent wrenches.

Figure 7-4: Tighten Threaded Link with Two Crescent Wrenches



- 13 Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

- End of Procedure -

8

FLATBED SCREW MOUNT INSTALLATION

Tools and Materials

The following tools and materials are needed to perform this installation:

- .. Cordless Drill
- .. 3/16" Drill Bit
- .. 3/8" Open-End Wrench
- .. 5/16" Socket - 1/4" drive
- .. Ratchet - 1/4" drive
- .. Scratch Awl
- .. Rust Preventative Spray Paint (black or primer color)

Safety

Follow all safety procedures as listed in the [Safety](#) chapter.

Procedures

- 1 Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.

- 2 Set the parking brake.
- 3 If the equipment is parked on an incline chock the wheels.
- 4 Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.
- 5 Record Module Serial Number (MSN) from device label and customer's trailer number.

Continued on the next page.

Figure 8-1: Device Label



6 Select a mounting location:

.. [Under Trailer Screw Mount](#)

OR

.. [Nose Rail Screw Mount](#)

Under Trailer Screw Mount

- 1 Mount on cross member located approximately half way between front and rear of trailer. Cross member must be in front of and clear of tandem axel slide and rails. Identify Mounting Location
 - Facing Up, or
 - Facing Down
- .. Ensure no damage when stacking or operating trailer.

Continued on the next page.

Figure 8-2: Under Trailer Screw Mount (Graphic Illustration)

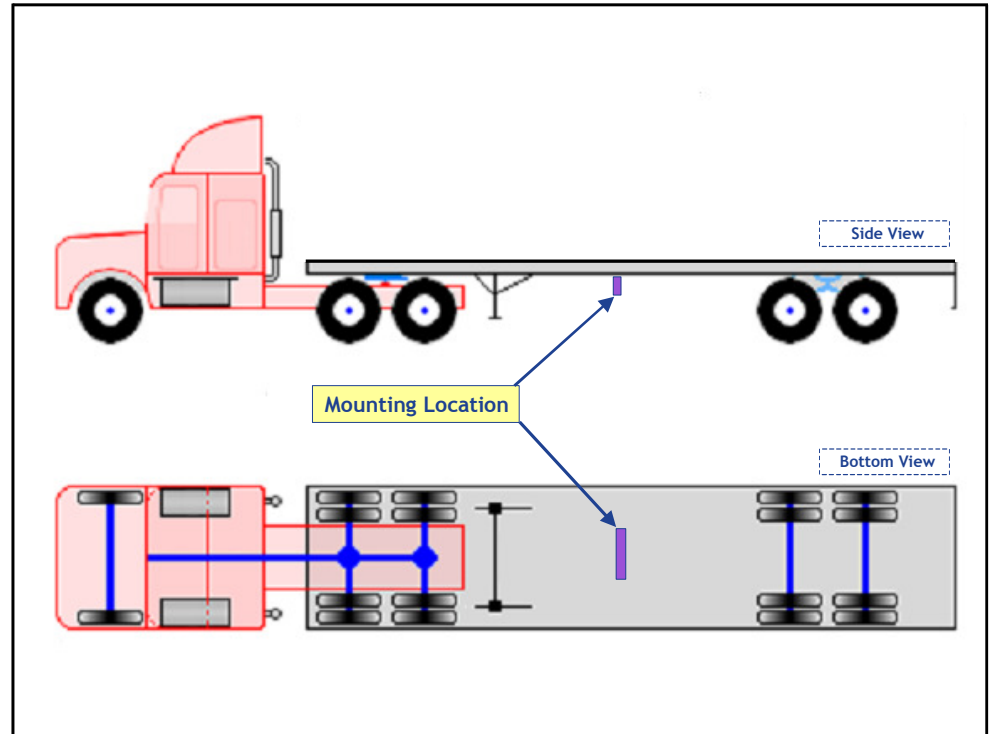


Figure 8-3: Under Trailer Screw Mount (Pictorial Illustration)



- 2 Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer cross member.
- 3 At each marked location, drill a 3/16" hole.

- 4 Deburr hole and remove metal shavings from cross member surfaces.
- 5 Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.
- 6 Mount device using screws (4), flat washers (4) and self-locking nuts (4). Ensure flat washer is between screw head and plastic device housing.
- 7 Tighten each screw using 5/16" socket, ratchet and 3/8" open-end wrench.
- 8 Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

NOTE: Retain the activation magnet - in order to disable reporting upon deinstallation of device.

Nose Rail Screw Mount

- 1 Select a mounting location on the nose rail centered from side-to-side where device will not be damaged.

Figure 8-4: Flatbed Nose Rail Device Mount



Figure 8-5: Mount Device Where It Will Not Be Damaged



- 2 Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer nose rail.
- 3 At each marked location, drill a 9/64" hole.
- 4 Install the mounting screws (4) through the mounting flanges and into the trailer's top rail.
- 5 Tighten screws (4).
- 6 Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

NOTE: Retain the activation magnet - in order to disable reporting upon deinstallation of device.

- End of Procedure -

9

TRACK & TRACE BATTERY REPLACEMENT PROCEDURE

The following procedure describes steps to remove and replace the CALAMP TTU 700 battery pack.

Procedures

- 1 Remove Battery Cap:
 - .. Insert Phillips head screw driver and remove the four screws (see Figure 1). Remove the end cap and set aside.



Figure 9-1: Remove Battery Cap

Continued on the next page.

- 2 Disconnect Power Cable-First, Remove the rubber gasket and set aside.
 - .. Disconnect the red and black power cable by pulling two connector halves apart.
 - .. Do not pull on the power wires.

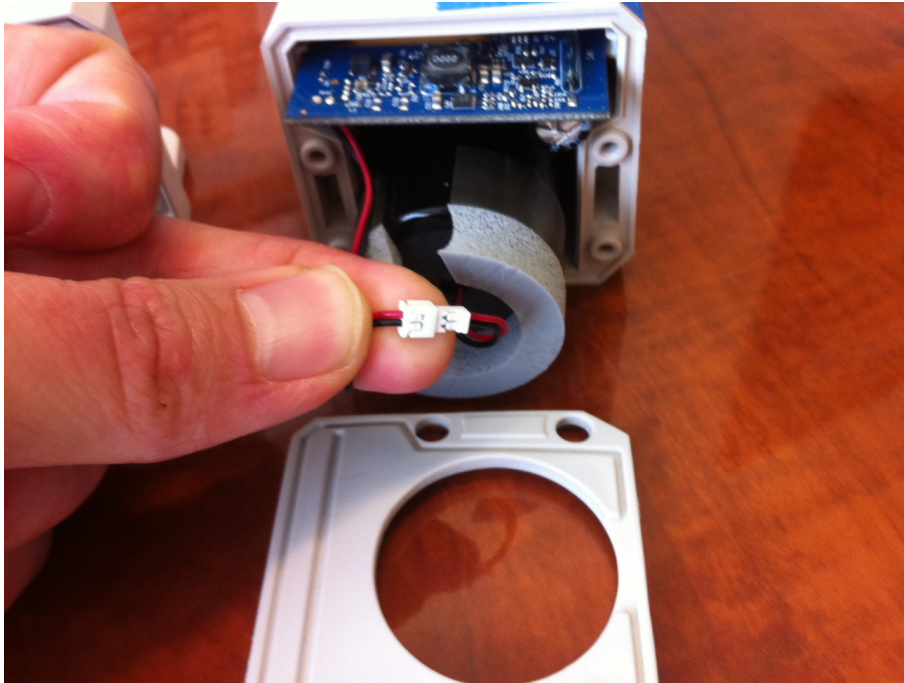


Figure 9-2 disconnecting the battery connector

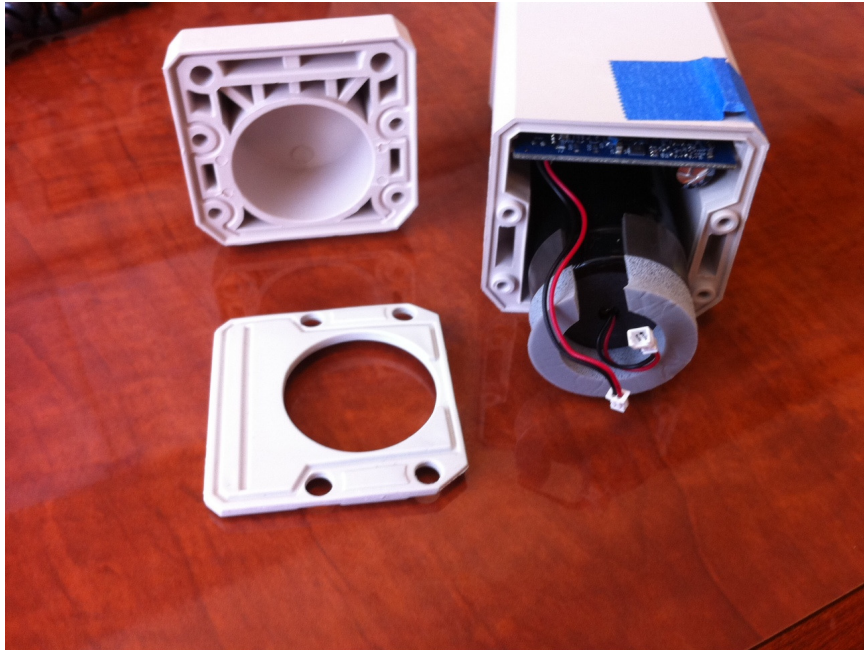


Figure 9-3: Power Disconnected

3 Remove Battery Pack

- .. Ensure gap in battery pack foam is aligned with device power cable.
Slide the battery pack out of the enclosure (Figure 6).



Figure 9-6: Slide Battery Pack Out of Enclosure

4 Replace Battery Pack



Figure 9-7: Slide Replacement Pack Into Enclosure

5 Reconnect Power Cables

- .. Slide replacement battery pack into the enclosure and replace gasket and reconnect the white connectors (Figure 8).

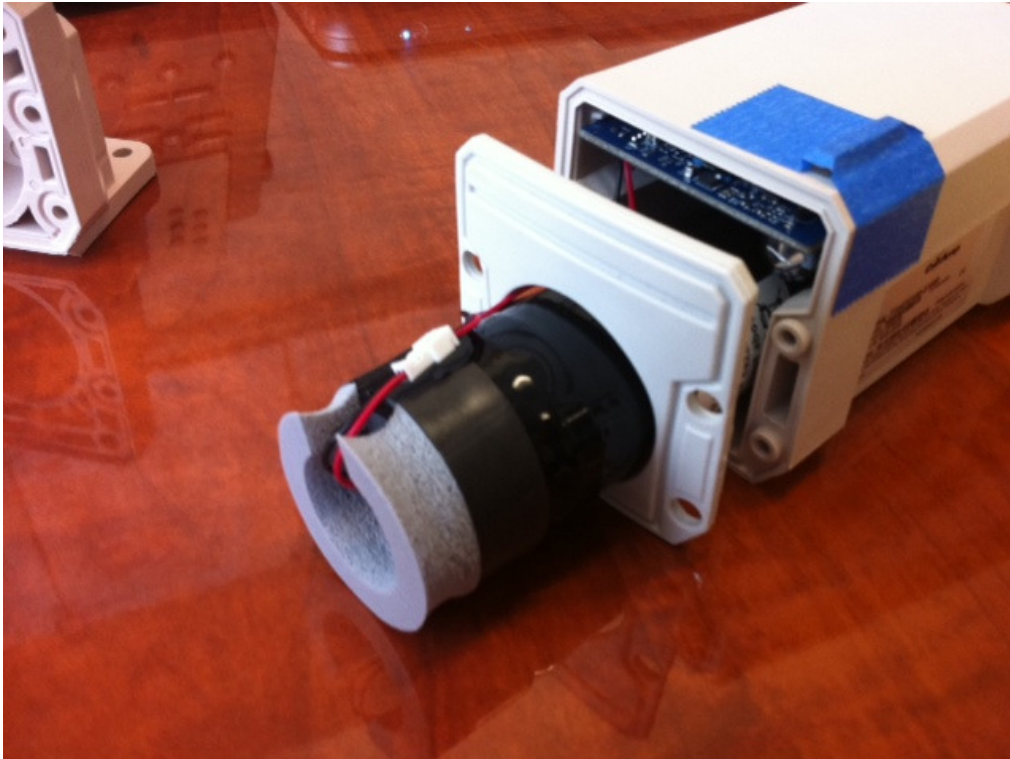


Figure 9-8: Reconnect Power Cables

6 Replace Battery Cap

- ” Seat the cap housing to the gasket to ensure a tight fit. Inset the screws use a Phillips head screw driver and turn clockwise until hand tight.



Figure 9-10: Tighten Battery Cap

