KVH Industries, Inc.

TracPhone® V3

Installation Guide

This addendum applies to products with antenna serial number 110601833 or later.

PLEASE READ!
Important Addendum to Your Product Manual

A small packet of silicone grease is supplied in the kitpack. Apply this grease to the inner body of all RF cable connectors that you connect to the KVH antenna and any inline feed-thru adapters above deck. This grease will help prevent moisture from seeping into or forming inside the connector and protect the center conductor from corrosion.

Figure 1 Silicone Grease

Directions for Use

When connecting RF cables above deck to the KVH antenna, as well as to any inline feed-thru adapters, follow the steps below to protect and seal each connection:

1. Clean and dry the male connector on the RF cable and the female connector on the antenna or feed-thru adapter.
2. Fill half of the inner body of the RF cable's connector with silicone grease. *Connecting the cable in the next step will displace the grease to fill the entire space within the connector.*
3. Connect and **SLOWLY** hand-tighten the RF cable to the antenna or feed-thru adapter, allowing the grease to diffuse and settle into the entire connector body.
4. Make sure the RF cable's connector is tightened all the way into the female connector of the antenna or feed-thru adapter. Then tighten the connection with a 7/16" torque wrench set to 15 in.-lbs.
5. Wipe off any excess grease from the outside of the connector.
6. Seal the connection with silicone sealant, self-vulcanizing tape, or equivalent. If using self-vulcanizing tape, be sure to wrap the tape **CLOCKWISE** around the connector *(the same direction in which you tightened the connector)*. Wrapping the tape in the opposite direction will result in tension that might loosen the connector over time.

The procedure is complete.

TracPhone V3 Installation Guide

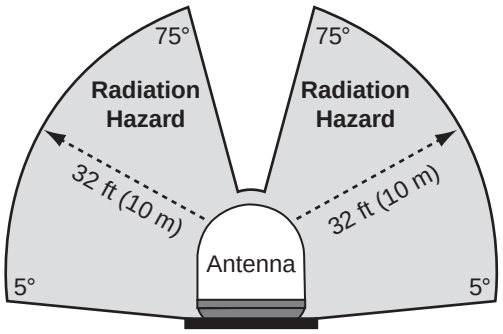
KVH's Compact mini-VSAT Broadband[sm] System

These instructions explain how to install the TracPhone V3 mini-VSAT Broadband satellite communications system. Instructions on how to use the system are provided in the *User's Guide*.

Installation Steps

CAUTION - RF Radiation Hazard

The antenna transmits radio frequency (RF) energy that is potentially harmful. Whenever the system is powered on, make sure everyone stays more than 32 ft (10 m) away from the antenna within its 5-75° elevation range. No hazard exists directly above the antenna and anywhere below the antenna's mounting plane.



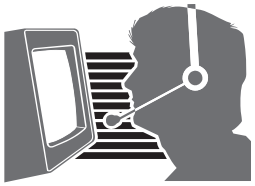
Who Should Install the System?

To ensure a safe and effective installation, only a KVH-certified technician should install the TracPhone system. To find a technician near you, visit **www.kvh.com/wheretogetservice**.

Technical Support

North/South America, Australia:
Phone: +1 401 851-3806
E-mail: mvbsupport@kvh.com

Europe, Middle East, Asia, Africa:
Phone: +45 45 160 180
E-mail: support@kvh.dk



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1 Inspect Parts and Get Tools

Before you begin, follow these steps to make sure you have everything you need to complete the installation.

a. Unpack the box and ensure it contains everything shown in Figure 1 and on the *Kitpack Content Lists*. Save the packaging for future use.

IMPORTANT!

Always lift the antenna by the baseplate and never by the radome or any portion of the internal antenna assembly (see Figure 1).

b. Carefully examine all of the supplied parts to ensure nothing was damaged in shipment.

c. Gather all of the following tools and materials that you will need:

- Flat-head and Phillips-head screwdrivers
- Electric drill and 5/16" (8 mm) bit
- 3.5" (89 mm) hole saw
- 1/2" socket and 7/16" socket
- 7/16" open-end wrench and 7/16" torque wrench set to 15 in.-lbs
- Light hammer and center punch
- Adhesive tape and scriber or pencil
- Silicone sealant or self-vulcanizing tape
- Wire strippers and terminal lug crimper
- Two 75Ω RF coax cables, "F" connectors, and associated installation tools (see page 11)
- Windows® 7, Vista™, or XP laptop with the latest version of TracPhone V-series Flash Wizard installed (software available to technicians on the KVH Partner Portal)
- Isolation transformer, if required (see page 16)

Figure 1: TracPhone V3 System Components

Antenna
(KVH part #02-1861-01)

Control Unit
(KVH part #02-1601-02)

Modem
(KVH part #19-0487)

Ethernet Switch
(KVH part #19-0536)

Multimedia Terminal Adapter (MTA)
(KVH part #19-0504)

2 Plan the Antenna Installation

Before you begin, consider the following antenna installation guidelines:

- Minimize blockage. The antenna requires a clear view of the sky to transmit and receive satellite signals (see Figure 2). The fewer obstructions, the better the system will perform.
- Make sure the mounting surface is wide enough to accommodate the antenna's base (see Figure 3). Also make sure it is flat, level, strong enough to support the antenna's weight (25 lbs, 11.3 kg), and rigid enough to withstand heavy vibration.
- Select a location that is as close as possible to the intersection of the vessel's centerline and midships.
- Select a location that is well above any areas accessible to passengers and crew to reduce the risk of RF radiation exposure.
- Avoid placing the antenna near any magnetic compasses or other onboard antennas to prevent potential interference.

IMPORTANT!

Do not mount the antenna at the same level as the radar because the radar's energy can overload the antenna and damage its internal components. Ideally, you should mount the antenna 4 ft (1.2 m) above the radar, outside the beam path of the radar.

Figure 2: Blockage from Obstruction

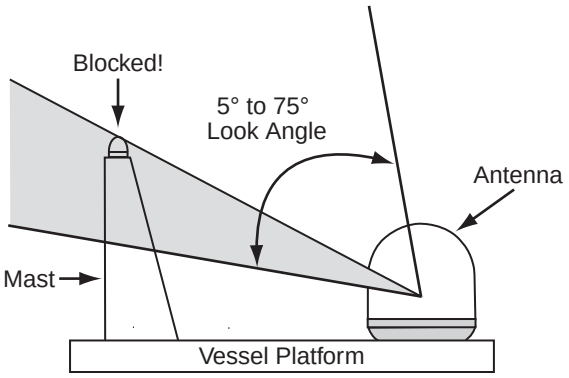
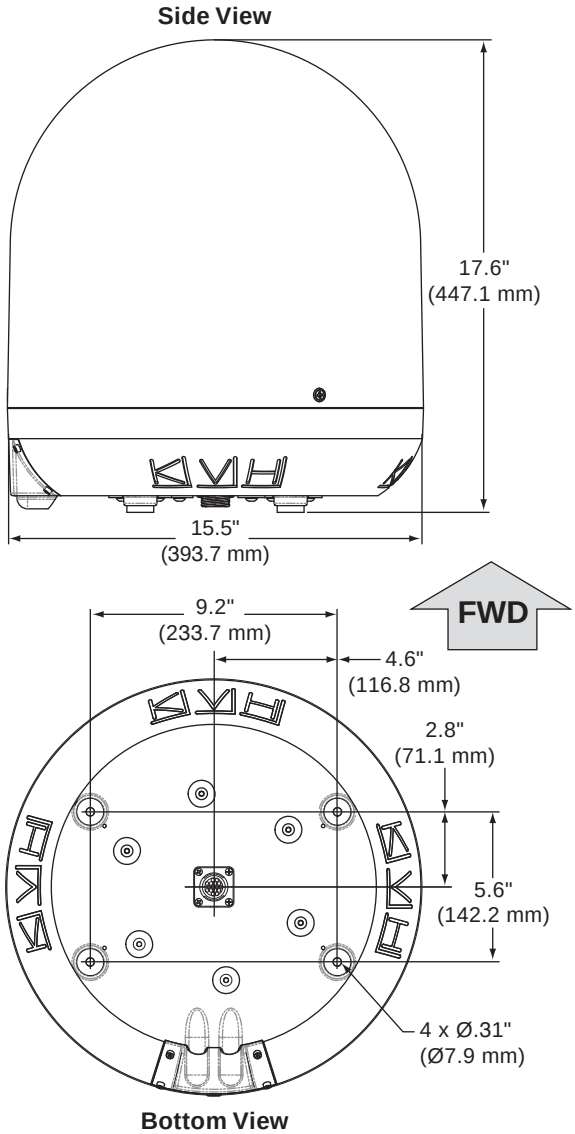


Figure 3: Antenna Dimensions



3 Plan the Belowdecks Installation

Before you begin, consider the following installation guidelines for the belowdecks units.

Control Unit and Modem

- Select a mounting location in a dry, well-ventilated area belowdecks away from any heat sources or salt spray.
- Be sure the front panels will be easily accessible to the user.
- Leave enough room at the rear panel to accommodate the connecting cables.
- You have several options for mounting the control unit and modem:

  Option 1 - Inside the optional case

  Option 2 - To a horizontal surface together using two L-brackets

  Option 3 - To a horizontal surface separately using four L-brackets

  NOTE: *The control unit and modem are sized to fit a standard 19" (48.26 cm) equipment rack.*

- To use the supplied power / data cable, the control unit must be located within 100 ft (30 m) of the antenna. However, you can order a 150 ft (45 m) cable if a longer cable run is necessary (KVH part #32-1031-0150).

Switch and MTA

- To use the supplied Ethernet cable, select a mounting location within 25 ft (7.5 m) of the modem (maximum length = 200 ft (60 m)).
- If you install a wireless access point *(supplied by customer)*, be sure the location provides adequate WiFi reception. Do not install it in an area surrounded by metal or near any electrical devices that emit RF noise.

Figure 4: Control Unit or Modem Dimensions (Identical)

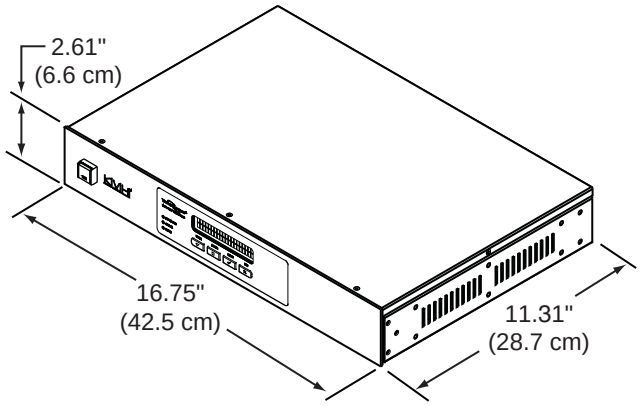


Figure 5: Case Dimensions

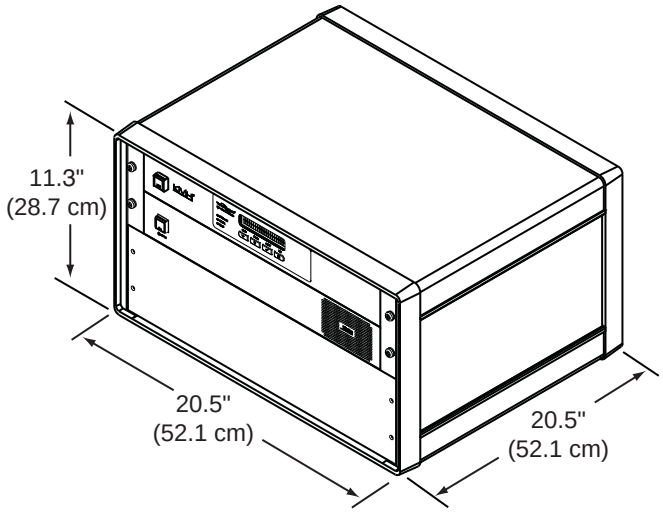


Figure 6: Dimensions of Ancillary Components

Component	Dimensions (W x D x H)
Switch	6.7" x 3.9" x 1.1" (17 cm x 9.9 cm x 2.8 cm)
MTA	4.6" x 5.12" x 1.18" (11.7 cm x 13 cm x 3 cm)

4 Prepare the Belowdecks Units

Mounting in the Case

If you plan to mount the control unit and modem inside the optional 19" (48.26 cm) case, follow these steps to assemble the case.

a. Remove the four M4 screws securing the rear cover to the case. Discard the rear cover.

b. Attach the top cover to the case using four M4 x 12 mm screws (see Figure 7). Attach the bottom cover and the two mounting brackets using four M4 x 16 mm screws.

c. Attach the four plastic feet to the bottom cover (see Figure 7).

d. At the front of the case, insert eight cage nuts into the following locations on the frame (four on each side) (see Figure 7): #2, #5, #8, and #11.

e. At the back of the case, insert four cage nuts into the following locations on the frame (two on each side): #1 and #3.

f. Remove the four #6-32 screws and washers securing the two retaining straps to the rear panel of the control unit. *Do not remove the bottom screws securing the straps to the modem.*

g. Attach the strain-relief bracket to the retaining straps and control unit using the screws and washers you removed in Step f (see Figure 8).

h. At the top 3U section of the case, insert the control unit / modem assembly and secure the front mounting brackets to the case using four M6 screws and washers (see Figure 9).

i. At the bottom 3U section of the case, attach the supplied blank panel using four M6 screws and washers (see Figure 9).

j. Secure the back of the control unit to the back of the case using the two supplied "Z" brackets. Attach the brackets to the case frame using four M6 screws and washers. Attach the brackets to the rear panel of the control unit using four #6-32 screws and washers (see Figure 9).

k. Once you have completed all system wiring, mount the case to the vessel using fasteners appropriate for the mounting surface.

Figure 7: Assembling the Case

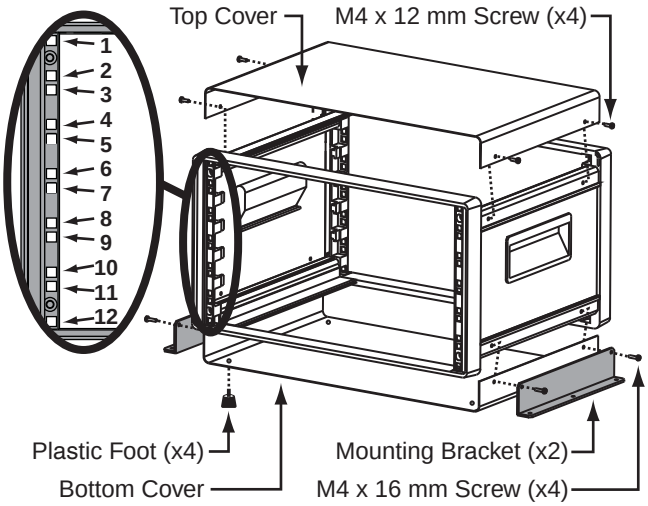


Figure 8: Attaching the Strain-Relief Bracket

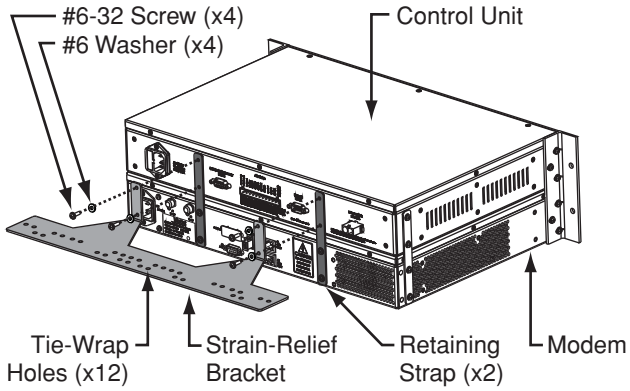
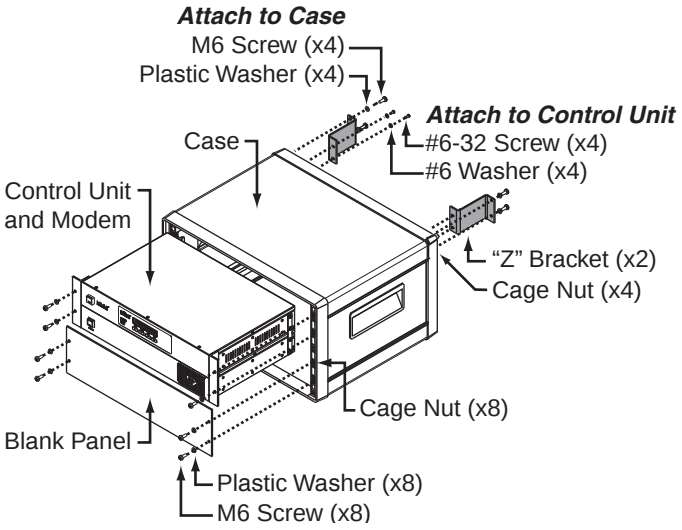


Figure 9: Securing the Control Unit/Modem in the Case



4 Prepare the Belowdecks Units

Mounting Units Together

If you plan to mount the control unit and modem together as an assembly, without using the optional case or an equipment rack, follow these steps to attach the strain-relief bracket and "L" mounting brackets.

a. Remove the four #6-32 screws and washers securing the two retaining straps to the rear panel of the control unit. *Do not remove the bottom screws securing the straps to the modem.*

b. Attach the strain-relief bracket to the retaining straps and control unit using the screws and washers you removed in Step a (see Figure 10).

c. Attach two of the supplied "L" mounting brackets to the sides of the control unit or modem using four #6-32 screws and washers (see Figure 11). You can attach the brackets to either the top of the control unit or the bottom of the modem, depending on your desired mounting location.

d. Once you have completed all system wiring, mount the modem / control unit assembly to the vessel using fasteners appropriate for the mounting surface.

Figure 10: Attaching the Strain-Relief Bracket

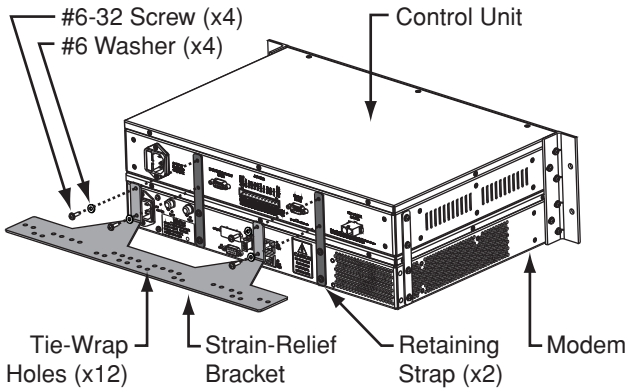
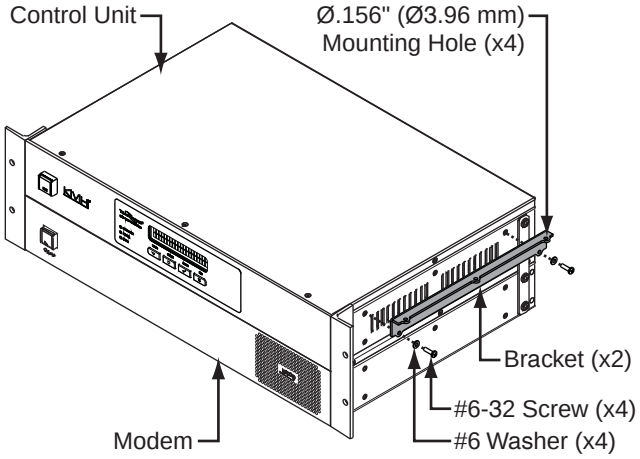


Figure 11: Attaching the Mounting Brackets



4 Prepare the Belowdecks Units

Mounting Units Separately

If you plan to mount the control unit and modem separately, follow these steps to detach the control unit from the modem, attach the strain-relief brackets, and attach the "L" mounting brackets.

a. Remove the 28 #6-32 screws and washers securing the two rack-mount brackets and four metal retaining straps to the control unit and modem (see Figure 12). Remove the brackets and straps.

b. Attach a strain-relief bracket to the back of the control unit using four of the screws and washers you removed in Step a (see Figure 13).

c. Attach a second strain-relief bracket to the back of the modem using four of the screws and washers you removed in Step a (see Figure 14).

d. Attach two of the supplied "L" brackets to the sides of the control unit using four #6-32 screws and washers (see Figure 11 on page 7). You can attach the brackets at either the top or bottom of the control unit, depending on your desired mounting location.

e. Attach the two other supplied "L" brackets to the sides of the modem using four #6-32 screws and washers (see Figure 11 on page 7). You can attach the brackets at either the top or bottom of the modem, depending on your desired mounting location.

f. Once you have completed all system wiring, mount the control unit and modem to the vessel using fasteners appropriate for the mounting surface.

Figure 12: Detaching the Control Unit from the Modem

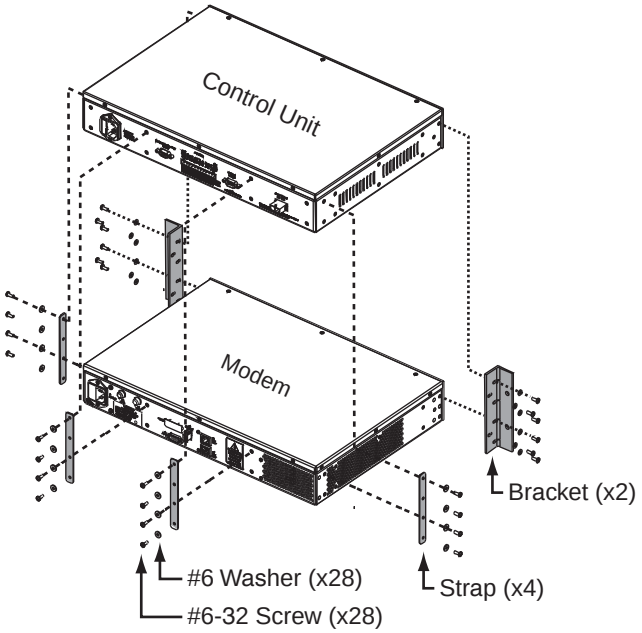


Figure 13: Attaching the Bracket to the Control Unit

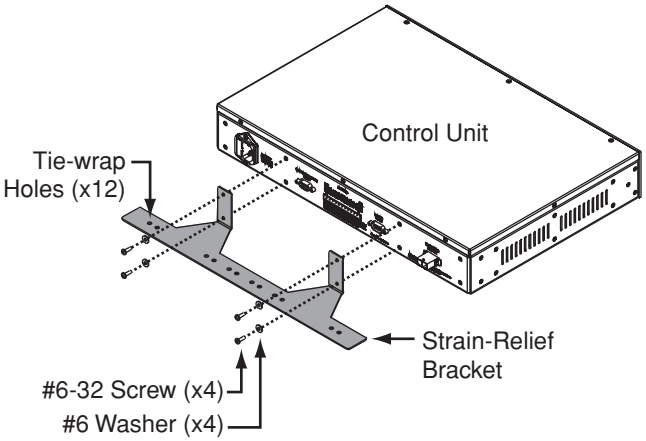
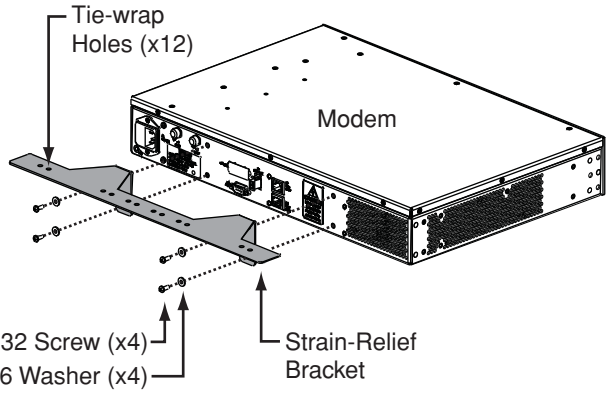


Figure 14: Attaching the Bracket to the Modem



5 Prepare the Antenna Site

Once you have identified a suitable antenna mounting site, according to the guidelines provided in Step 2, follow these steps to drill the mounting holes and cable access hole to prepare the site for installation.

a. Unfold the antenna mounting template (supplied in the Customer Welcome Kit) and place it onto the mounting surface. Make sure the "FWD" (forward) arrow points toward the bow and is parallel to the vessel's centerline (see Figure 15).

NOTE: *You don't need to mount the antenna exactly on the vessel's centerline, but the antenna's forward arrow must be parallel to it.*

b. Using a light hammer and center punch, mark the locations for the four mounting holes and cable access hole on the mounting surface in the locations indicated on the template.

c. Drill a 5/16" (8 mm) hole at the four mounting hole locations you marked in Step b. Later, you will insert four 1/4"-20 bolts through these holes to secure the antenna to the mounting surface.

d. Cut out the 3.5" (89 mm) cable access hole in the location you marked in Step b. Smooth the edges of the hole to protect the cables. (You may also apply anti-chafe material around the cables to protect them from abrasion.) Later, you will route the power/data and RF cables through this hole and into the vessel.

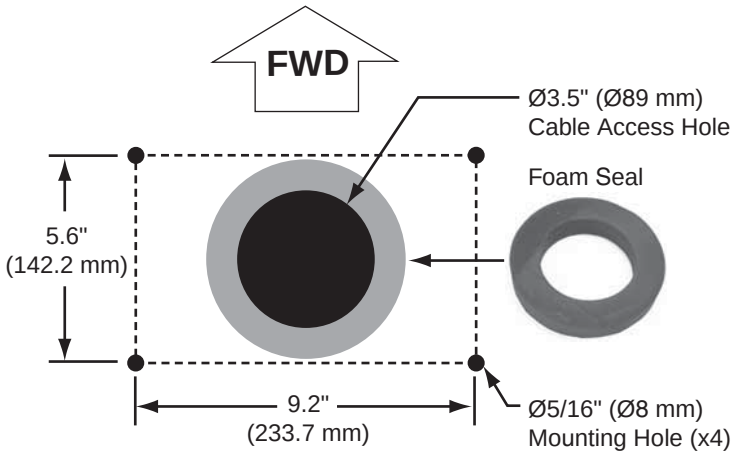
e. Clean and dry the antenna mounting surface.

f. Peel off the paper backing from the supplied foam seal to expose the adhesive. Then press the foam seal down firmly onto the mounting surface, ensuring the hole in the foam seal aligns with the cable access hole in the mounting surface (see Figure 15).

NOTE: *Apply the foam seal to the vessel mounting surface, not to the antenna's baseplate.*

g. Transport the antenna to the mounting site.

Figure 15: Antenna Mounting Holes Layout



6 Remove the Shipping Restraints

Inside the antenna, two shipping restraints prevent the antenna assembly from moving during shipment. Follow these steps to remove these restraints.

a. Remove the three #10-32 Phillips screws securing the radome to the baseplate (see Figure 16). Carefully lift the radome straight up until clear of the antenna assembly and set it aside in a safe place.

NOTE: *Due to the snug fit, some contact between the radome's sealing gasket and the antenna mechanism is normal.*

b. Remove the two #10-32 Phillips shipping restraint screws (see Figure 17). Save the restraints for future use.

IMPORTANT!

Once you have removed the restraints, handle the antenna carefully. With the restraint removed, the internal antenna assembly rotates freely and, if not handled properly, can damage the limit switch.

Figure 16: Removing the Radome

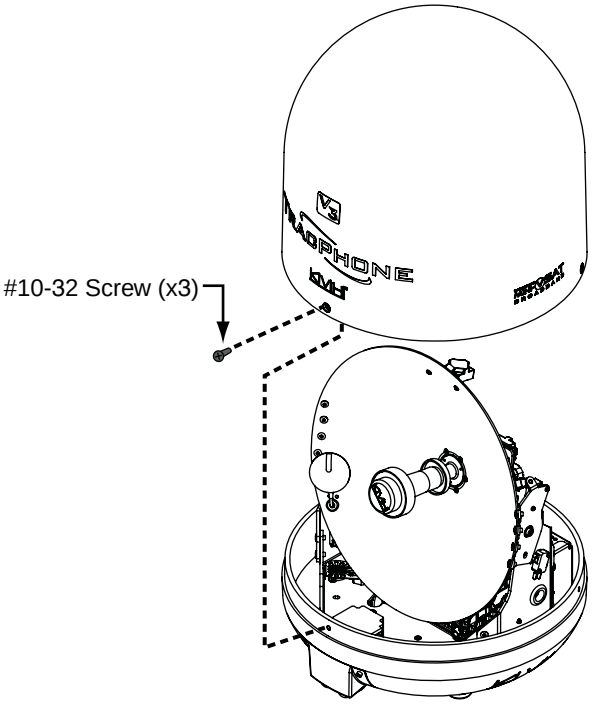
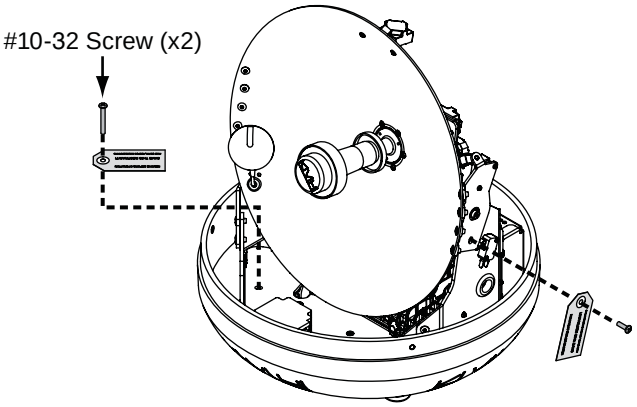


Figure 17: Shipping Restraints



7 Prepare the RF Cables

You need to connect two **75**Ω RF coax cables from the antenna to the belowdecks equipment. Refer to Figure 18 to determine the type of cables and connectors required for your cable run. Then prepare both of them as described below.

IMPORTANT!

- RF cables must be rated for **75**Ω, not 50Ω.
- Low-quality, poorly terminated, or improperly installed RF cables are the most common cause of system problems. Terminate all RF cables with high-quality "F" connectors using the proper stripping / crimping tools, exactly to the manufacturer's specifications.
- Make sure the center conductor pin at each end of the finished cables is 1 / 4" (0.20"-0.28") (5-7 mm) in length, measured from inside the nut to the tip, to ensure proper engagement. The pin should extend 1 / 16" (1-2 mm) past the end of the connector body (see Figure 19). *Instructions for terminating LMR-400-75 cable are provided in Appendix B on page 30.*
- Each RF cable run must not exceed 6.5 dB of insertion loss. Keep in mind that an in-line connector adds at least 0.2 dB of loss.

a. Terminate both ends of the cable with the proper "F" connectors (see Figure 18 for connector and tool part numbers). If you only need to run an RG-11 RF cable, you may terminate one end with a right-angle connector, or use a pre-terminated 50 ft (15 m) RG-11 cable from KVH (KVH part #32-1087-50), and omit the pigtail cable.

IMPORTANT!

Do not connect LMR-400-75 or LMR-600-75 cables directly to the antenna's RF connectors.

b. Connect the antenna end of the cable to the supplied RG-11 pigtail cable with feed thru adapter (see Figure 20 on page 12) and hand-tighten. Then tighten both cable connections at the feed thru adapter with a 7 / 16" torque wrench set to 15 in.-lbs.

c. **Label both ends** of the two RF cables. Label one cable "TX," and label the other "RX."

Figure 18: RF Cable Requirements

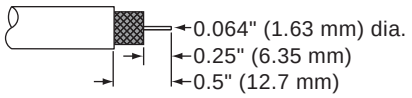
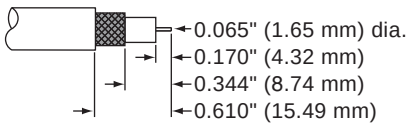
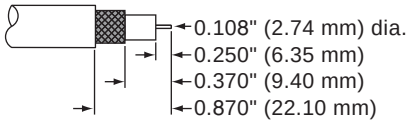
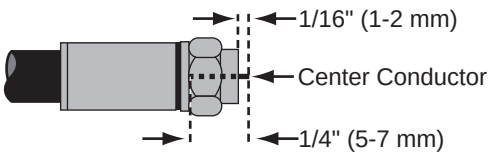
15-50 ft (5-15 m) Cable Run	
Cable	RG-11 *Loss: 0.084 dB/ft (0.276 dB/m)*
Connector	**Right-angle:** ICM FS11RA **Straight:** Thomas & Betts SNS11AS
Tools	**Right-angle:** Cable Pro PS11 and CPLCCT-SS59 / 11 **Straight:** Thomas & Betts CST596711 and L3011B
Strip Lengths	
51-100 ft (16-30 m) Cable Run	
Cable	LMR-400-75 *Loss: 0.06 dB/ft (0.195 dB/m)*
Connector	Times Microwave EZ-400-FMH-75
Tools	Times Microwave TK-400EZ-75
Strip Lengths	
101-150 ft (31-45 m) Cable Run	
Cable	LMR-600-75 *Loss: 0.04 dB/ft (0.13 dB/m)*
Connector	Times Microwave EZ-600-FMH-75
Tools	Times Microwave TK-600EZ
Strip Lengths	

Figure 19: Proper Center Conductor Pin Length



8 Wire the Antenna

Follow these steps to connect the power / data and RF cables to the antenna.

NOTE: *An optional 150 ft (45 m) power/data cable is available from KVH (KVH part #32-1031-0150).*

a. Route the power / data and RF cables belowdecks through the 3.5" (89 mm) cable access hole. Leave an adequate service loop, approximately 8" (20 cm) of slack, in the cables for easy serviceability. Also be sure to always maintain the minimum bend radius in the RF cables (see Figure 21).

b. Connect the power / data cable to the "Power / Data" jack on the bottom of the antenna (see Figure 22). Hand-tighten until the connector locks in place; do not use excessive force.

c. Using the supplied 3 mm Allen hex key, remove the connector cover from the antenna's baseplate. Save the cover and the four M4 cap screws for later use.

d. Connect the RG-11 RF cable labeled "TX" to the "MTX" jack on the bottom of the antenna. Hand-tighten, then tighten with a 7 / 16" torque wrench set to 15 in.-lbs.

e. Connect the RG-11 RF cable labeled "RX" to the "MRX" jack on the bottom of the antenna. Hand-tighten, then tighten with a 7 / 16" torque wrench set to 15 in.-lbs.

f. Seal all RF cable connections with silicone sealant, self-vulcanizing tape, or equivalent.

g. Reattach the cover over the connectors and secure in place with the M4 cap screws.

h. Secure the cables near the antenna connectors to prevent stress, then weatherproof and seal the cable access hole as required.

IMPORTANT!

The integrity and reliability of the RF cables and their connections are critically important. Make certain that these cables are properly terminated, sealed against seawater and corrosion, strain-relieved, protected from abrasion, and free of stress.

Figure 20: Connecting RF Cables to the Antenna

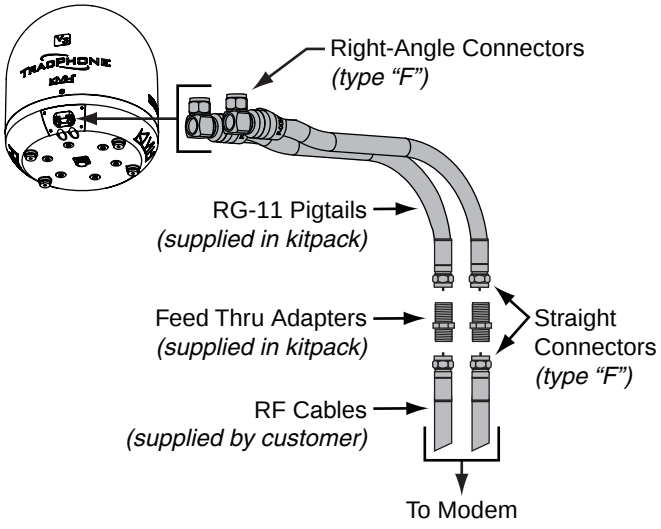
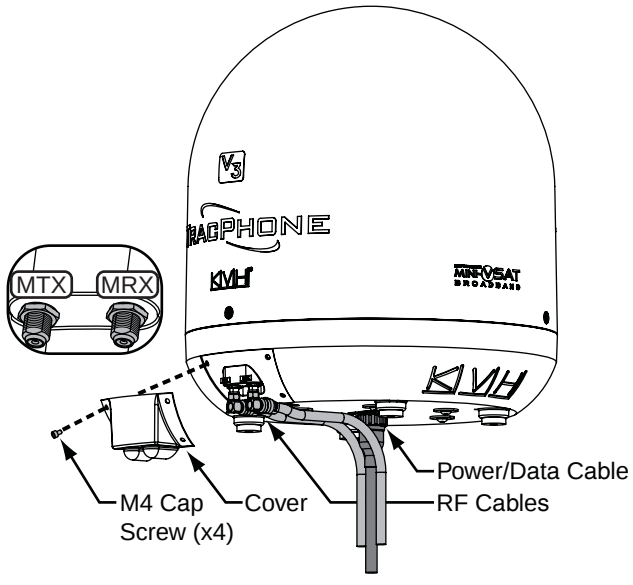


Figure 21: Minimum Bend Radius of RF Cables

Cable Type	Minimum Bend Radius
RG-11	4.5" (11.5 cm)
LMR-400-75	4.5" (11.5 cm)
LMR-600-75	6" (15.3 cm)

Figure 22: Antenna Cable Connections



9 Mount the Antenna

Follow these steps to mount the antenna to the mounting surface.

a. Place the antenna over the holes drilled in the mounting surface and make sure the forward arrow inside the baseplate points toward the bow and is parallel to the vessel's centerline (see Figure 23). The antenna's baseplate should rest squarely atop the foam seal.

> **CAUTION**
>
> Observe the safety warnings printed on the tube of Loctite® anti-seize lubricant: "Contains mineral oil, calcium hydroxide, and copper. May cause skin, eye, and respiratory irritation. Wear eye protection and gloves. **First aid:** In case of eye or skin contact, flush with water. Obtain medical attention for any eye or internal contact."

b. Apply a thin layer of the supplied anti-seize lubricant to the threads of the four 1/4"-20 bolts to prevent galling.

> ***IMPORTANT!***
>
> Be sure to insert the mounting bolts from above and use the supplied hardware for a secure connection.

c. At each of the four baseplate mounting holes, place a 5/8" diameter flat washer on a 1/4"-20 bolt and insert the bolt into the hole from above (see Figure 24).

> ***IMPORTANT!***
>
> Use caution if you're using power tools. High installation speeds can damage the threads.

d. Secure each mounting bolt to the mounting surface using a 1" diameter flat washer and a 1/4"-20 lock nut from below. Tighten all four bolts until the four rubber feet on the baseplate are bottomed against the mounting surface and the foam seal is fully compressed.

e. Reinstall the radome onto the antenna. Secure in place with the three #10-32 screws you removed earlier (see Figure 16 on page 10).

f. Install a protective plastic cap (supplied in the kitpack) over each radome screw.

Figure 23: Forward Arrow in Antenna Baseplate

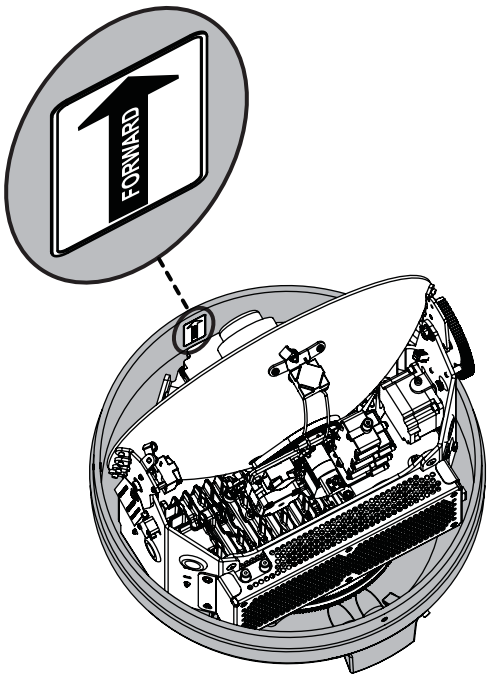
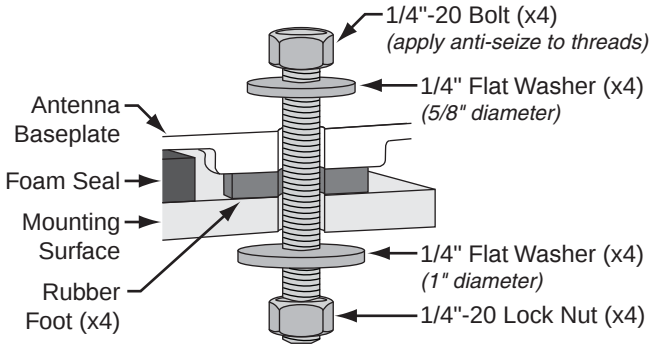


Figure 24: Mounting the Antenna (Side View)



10 Wire the Belowdecks Units

Wire the Antenna Cables

Follow these steps to connect the antenna to the belowdecks equipment (see page 29 for a complete system wiring diagram).

a. First dress the power / data cable from the antenna. Strip back the insulation of each wire approximately 1 / 4" (6 mm) and gently twist each wire to ensure a good electrical connection.

b. Connect the antenna power / data cable to the supplied terminal strip connector as shown in Figure 25.

> ***IMPORTANT!***
>
> The diagram refers to wires by **body color/ stripe color**. For example, "Brown / White" means the brown wire with the white stripe.

c. Plug the terminal strip connector into the rear panel of the control unit.

d. Connect the RF coax cable labeled "RX" (connected to the antenna's MRX jack) to the "Rx RF" jack on the back of the modem (see Figure 26). Hand-tighten, then tighten with a 7 / 16" torque wrench set to 15 in.-lbs.

e. Connect the RF coax cable labeled "TX" (connected to the antenna's MTX jack) to the "Tx RF" jack on the back of the modem. Hand-tighten, then tighten with a 7 / 16" torque wrench set to 15 in.-lbs.

> ***IMPORTANT!***
>
> Be sure the RF cables are terminated properly with type "F" connectors.

Wire the Control Unit to the Modem

Follow these steps to connect the control unit to the modem.

a. Connect a serial data cable from the "Modem" jack on the control unit to the "ACU" jack on the modem (see Figure 27).

b. Connect the BUC power cable from the "BUC Power" jack on the control unit to the "BUC Pwr" jack on the modem.

Figure 25: Antenna Power/Data Wiring

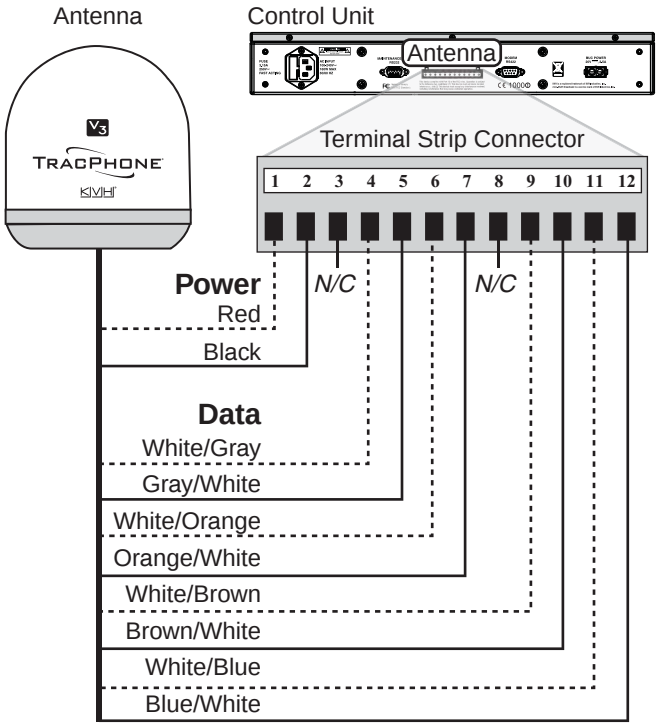


Figure 26: Antenna RF Transmit and Receive Wiring

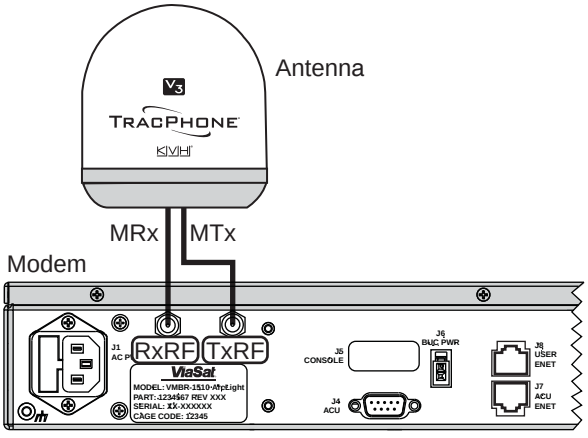
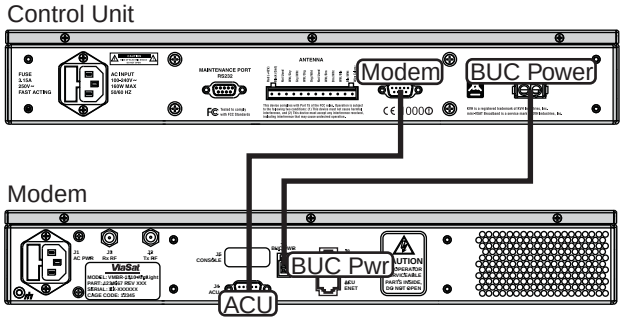


Figure 27: Modem Data and BUC Power Wiring



10 Continued Wire the Belowdecks Units

Wire the Switch and MTA

Follow these steps to connect all LAN devices.

a. Connect the supplied straight-through Ethernet cable from the "User ENet" jack on the modem to any non-PoE port on the switch (see Figure 28).

b. Connect a second straight-through Ethernet cable from any non-PoE port on the switch to the "WAN" jack on the MTA.

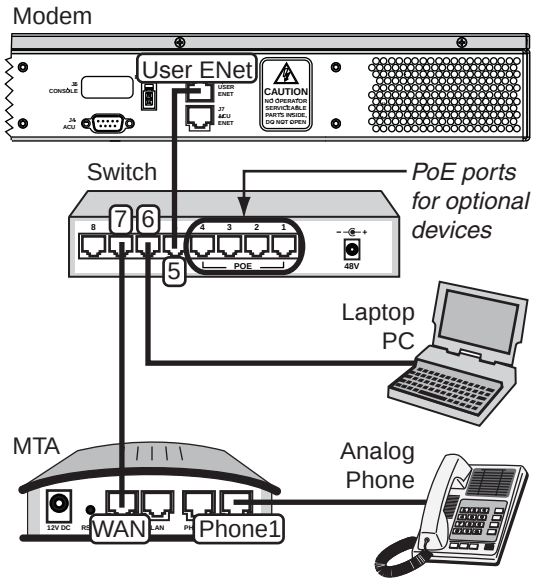
c. Connect the customer's analog (not digital) phone or PABX to the "Phone 1" jack on the MTA. This jack is linked to a unique phone line.

IMPORTANT!

Be sure to connect the customer's phone to the "Phone 1" jack on the MTA, and not to the "Phone 2" jack. Only the "Phone 1" jack is enabled for use.

d. For a wired Ethernet network, connect the customer's computer(s) to any non-PoE port(s) on the switch. For a wireless network, connect an access point (customer-supplied) to the switch *(ports 1-4 support IEEE 802.3af devices)*.

Figure 28: Switch and MTA Wiring



NOTE: *The Ethernet and VoIP equipment supplied with the system might differ from those shown in this diagram.*

Wiring Optional Accessories

KVH offers optional accessories that extend the capabilities of the TracPhone system. For example, the UCH-250 Fax Server (KVH part #19-0520) is an enterprise-grade fax solution that provides a dedicated fax line using a fully managed, store-and-forward fax service.

Before you install any accessory, complete the basic system installation as described in the rest of this manual. After you have tested the system and verified proper operation, refer to the separate instructions provided with the accessory to connect the device to the system.

11 Connect Power

Follow these steps to connect power to the TracPhone system.

WARNING

The TracPhone system requires 3-wire single-phase AC power (hot, neutral, and ground). Voltage between hot-neutral and hot-ground should each measure between 100-240 VAC.

Some large ships use two-phase, split-phase, or delta power instead (3 wires: hot, hot, and ground; no neutral). In this case, voltage between hot-hot measures the proper voltage (100-240 VAC), while hot-ground measures only half the voltage (50-120 VAC). The TracPhone system cannot operate on this type of power. **Attempting to run the system directly on two-phase, split-phase, or delta power will cause an unsafe floating ground condition, risking damage to the antenna and electric shock, potentially resulting in DEATH.** In a floating ground condition, the difference between the equipment's chassis ground and the ship's ground can measure well over 100 volts, when it normally should not exceed 25 volts.

Therefore, if the vessel is limited to two-phase, split-phase, or delta AC power, or if there is a floating ground condition, you **MUST** use a suitable isolation transformer to supply single-phase power to the TracPhone system (see Figure 29).

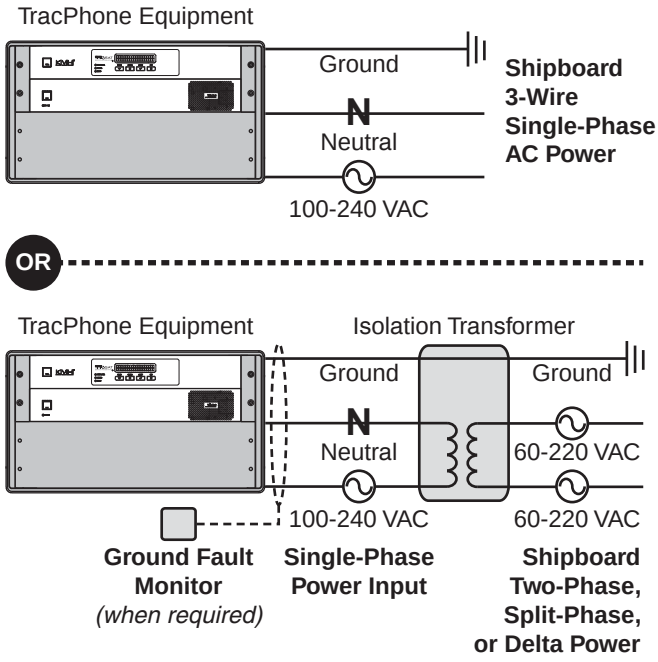
a. Before you begin, disconnect vessel power and be sure the vessel is properly grounded in accordance with marine standards.

b. Connect the control unit and modem to the supplied AC power strip using the adapter cables provided in the kitpack (see Figure 30).

c. Strain-relieve all wires at the back of the control unit and modem by securing them to the attached strain-relief bracket(s) using tie-wraps. Leave enough slack for serviceability.

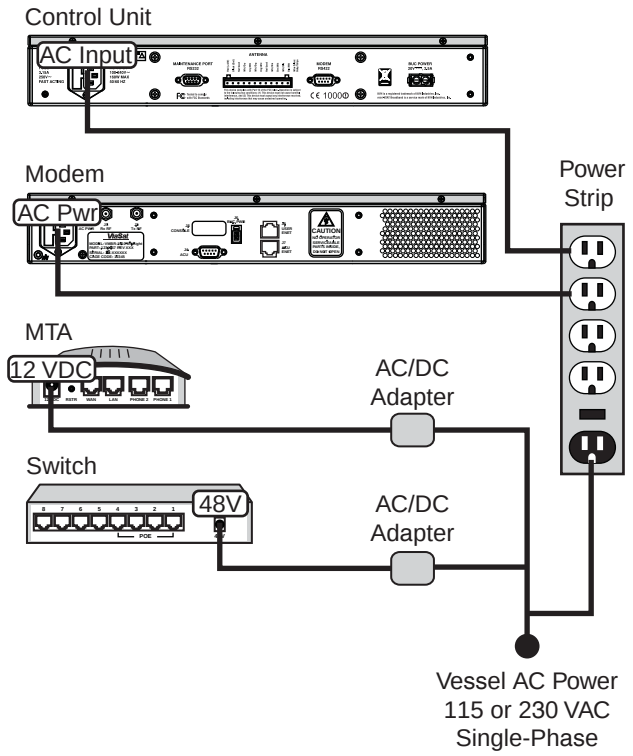
d. Connect the appropriate power cord (US or European) to the power strip. Then plug it into the vessel's 115 or 230 VAC supply. Also connect the MTA and switch to AC power via their AC/DC adapters (see Figure 30).

Figure 29: Single-Phase AC Power Input



NOTE: *Since ground fault protection devices cannot detect faults behind a transformer, install a ground fault monitoring device between the isolation transformer and the TracPhone system if ground fault protection is required on the vessel.*

Figure 30: Power Wiring



12 Configure the Computer(s)

Follow these steps to configure the user's computer(s) for a wired connection to the TracPhone V3. Once you have set up and tested a wired connection, you can configure a wireless connection *(wireless access point (WAP) not supplied).*

IMPORTANT!

Establishing a wireless connection onboard a steel vessel might require a special WAP and advanced networking expertise.

IMPORTANT!

When setting up a wireless network, apply security settings, such as encryption, to protect the network from outside intrusion.

NOTE: *The computer must have a network interface card installed and all cabling must be 100 Mbps fast Ethernet UTP CAT-5 with RJ45 connectors.*

Windows 7 or Vista

a. Turn on the networked computer.

b. From the Windows Control Panel, navigate to the **Network and Sharing Center**. *You can find the control panel either through the Start menu or "My Computer."*

c. At the Network and Sharing Center window, double-click the **Local Area Connection** link (Windows 7) or **View Status** link (Windows Vista) for the Ethernet connection you are using for TracPhone V3.

d. At the Local Area Connection Status window, click **Properties**. *This screen only displays if the computer is currently connected to a network.*

e. At the Local Area Connection Properties window, select the **Networking** tab. Then select **Internet Protocol Version 4** and click **Properties** (see Figure 31).

f. At the Internet Protocol Properties window, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 32). Then click **OK**.

g. At the Local Area Connection Properties window, click **OK**.

Figure 31: Windows 7/Vista - Local Area Connection Properties

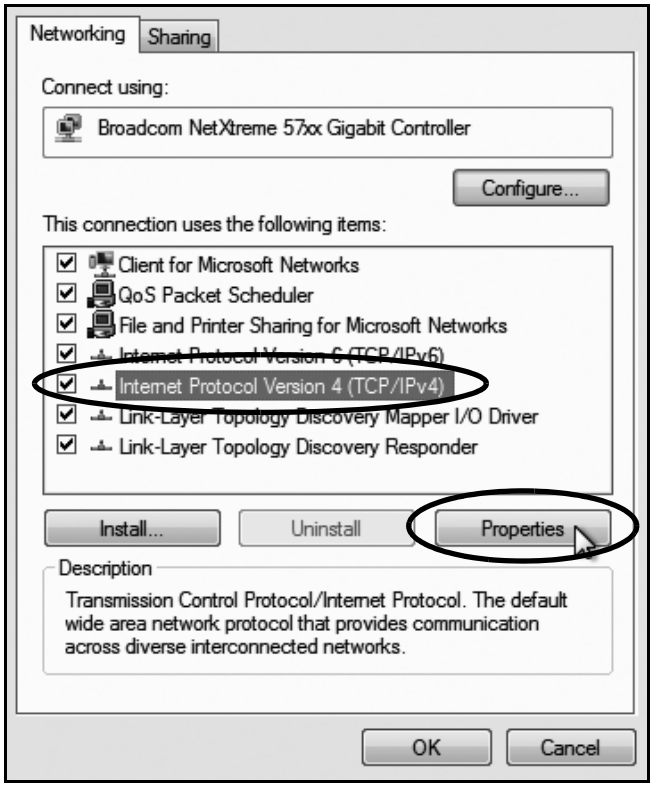
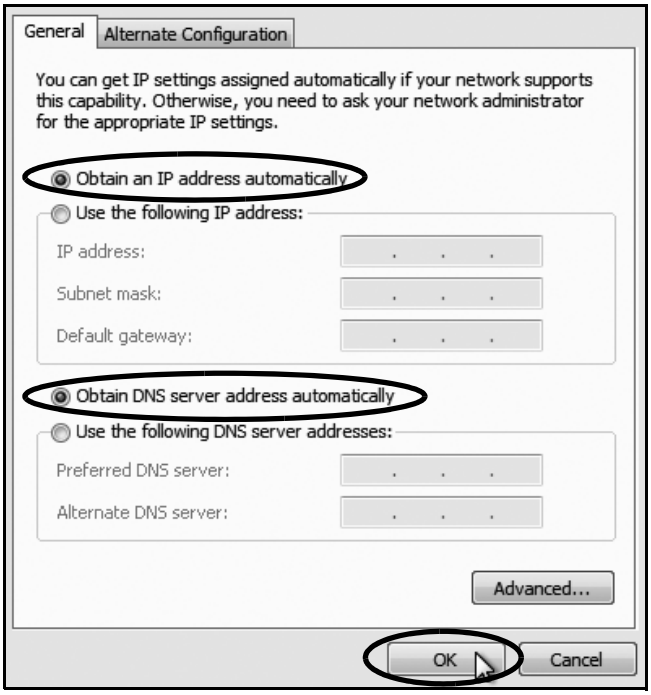


Figure 32: Windows 7/Vista - Internet Protocol Properties



12 Continued Configure the Computer(s)

Windows XP

a. Turn on the networked computer.

b. At the Windows Control Panel, double-click **Network Connections**. *You can find the control panel either through the Start menu or "My Computer."*

c. At the Network Connections window, double-click the **Local Area Connection** icon for the Ethernet connection you are using for TracPhone V3.

d. At the Local Area Connection Status window, select the **General** tab. Then click **Properties**. *This screen only displays if the computer is currently connected to a network.*

e. At the Local Area Connection Properties window, select the **General** tab. Then select **Internet Protocol (TCP/IP)** and click **Properties** (see Figure 33).

f. At the Internet Protocol (TCP/IP) Properties window, select the **General** tab. Then select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 34). Then click **OK**.

g. At the Local Area Connection Properties window, click **OK**.

h. Restart the computer.

Figure 33: Windows XP - Local Area Connection Properties

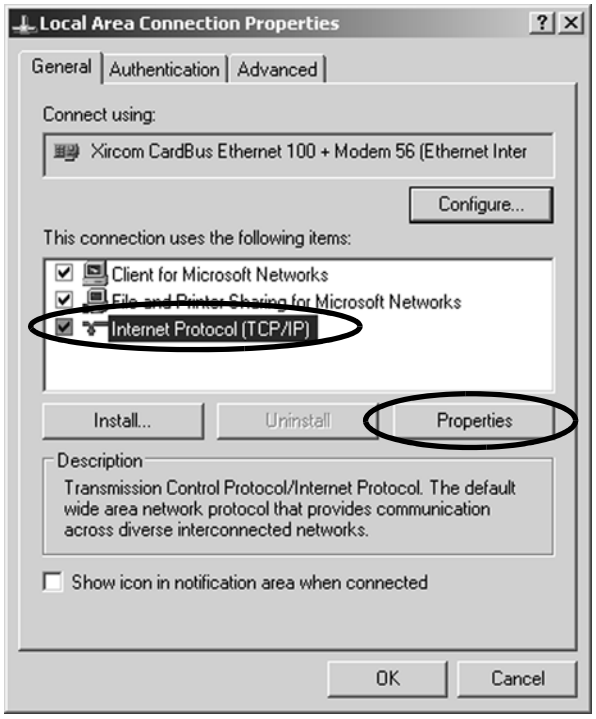
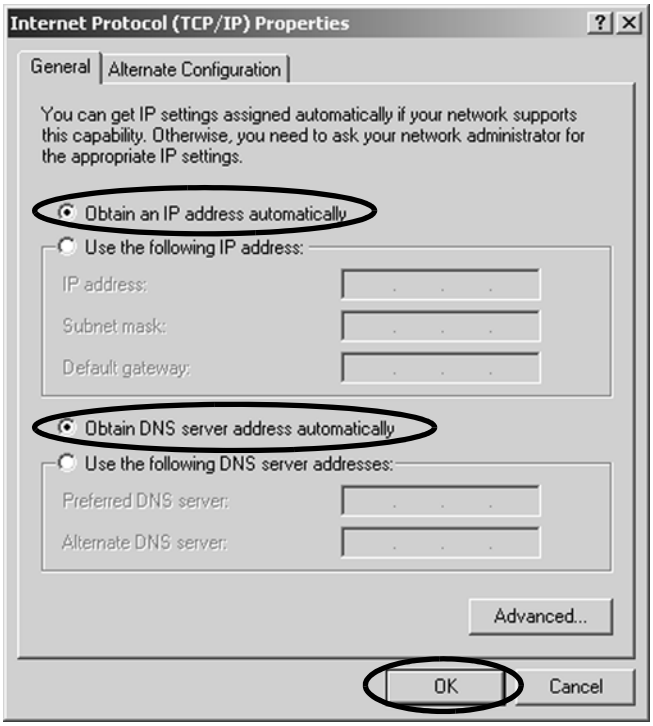


Figure 34: Windows XP - Internet Protocol (TCP/IP) Properties



12 Continued Configure the Computer(s)

Macintosh OS X

a. Turn on the networked computer.

b. At System Preferences, click the **Network** icon.

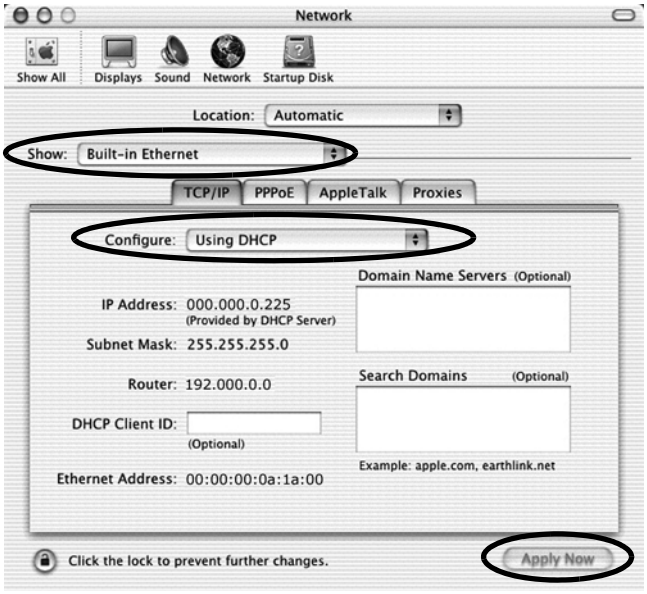
c. At the Network window (see Figure 35), select the following:

- Show: **Built-in Ethernet**
- Configure: **Using DHCP**
- Leave all text boxes blank

d. Network: Click **Apply Now**.

e. Restart the computer.

Figure 35: Macintosh OS X - Network Preferences



13 Turn On the System

Follow these steps to turn on the TracPhone V3 system for the first time.

IMPORTANT!

Double-check all of your wiring before continuing. If wiring is incomplete or incorrect, electronics may become damaged when you apply power.

a. Ensure the antenna has a clear, unobstructed view of the sky.

b. Apply vessel power to the TracPhone system, including the switch and MTA.

c. Turn on the power switch on the front of the modem (see Figure 36). The button's light should illuminate green.

d. Turn on the power switch on the front of the control unit (see Figure 36). The button's light should illuminate green.

e. Wait 5 minutes for system startup.

f. Verify that the status lights on the control unit and modem (see Figure 37) exhibit the following conditions:

- **Control Unit**: Lit green
- **Antenna**: Lit or flashing green
- **Modem**: Lit or flashing green
- **Status**: Any condition except off

If any of these lights exhibit a different condition, refer to the Troubleshooting section of the *User's Guide.*

g. Verify that the status lights on the MTA and switch indicate a normal condition. Refer to the MTA and switch manuals for details.

Figure 36: Power Switches

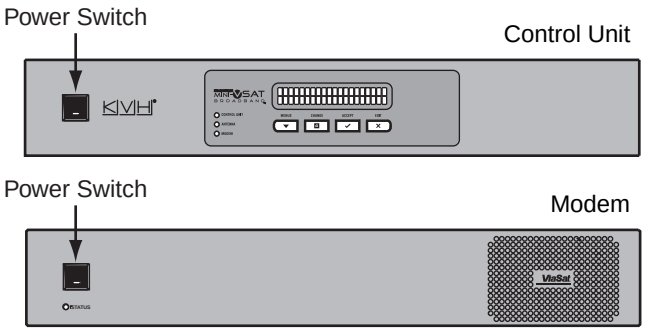
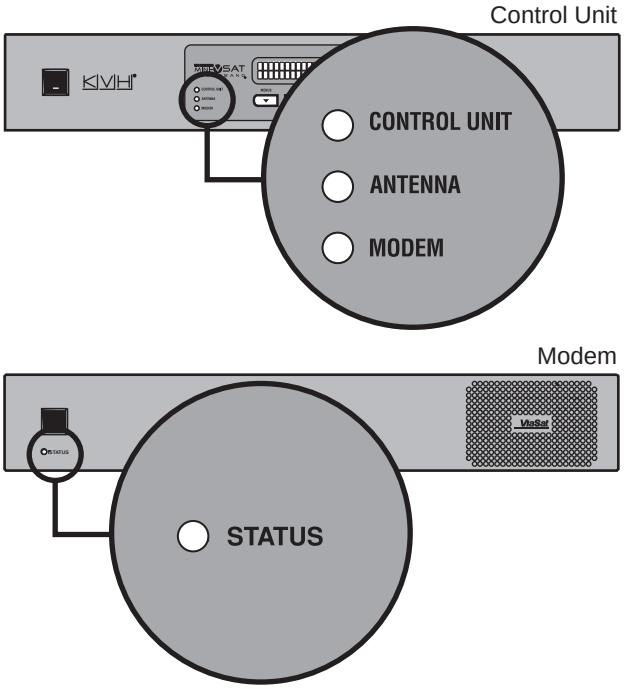


Figure 37: Status Lights



14 Update the System Software

If Necessary

Follow these steps to ensure the latest software is installed in the TracPhone system.

a. At the control unit, press MENUS until the display shows "ANTENNA STATUS" (see Figure 38). Then press ACCEPT.

b. Press MENUS until the display shows "ANTENNA MAIN BOARD." Note the reported software (SW) version.

c. Press MENUS to view the software versions for the RF board, AZ/EL motor, skew motor, and control unit. Note all of these versions.

d. Compare the software versions you just noted on the control unit with the latest versions listed in the TracPhone V-series Flash Wizard's Release Notes.

NOTE: *Before using the TracPhone V-series Flash Wizard, be sure to check for updates to ensure it has all of the latest software files (Internet access required). If you don't yet have the Wizard installed on your PC, download it from the KVH Partner Portal (KVH-certified technicians only).*

e. Use the TracPhone V-series Flash Wizard to update any older versions of software in the TracPhone system. Refer to the Wizard's Help menu for complete details (see Figure 39).

Figure 38: Software Versions Displayed on the Control Unit

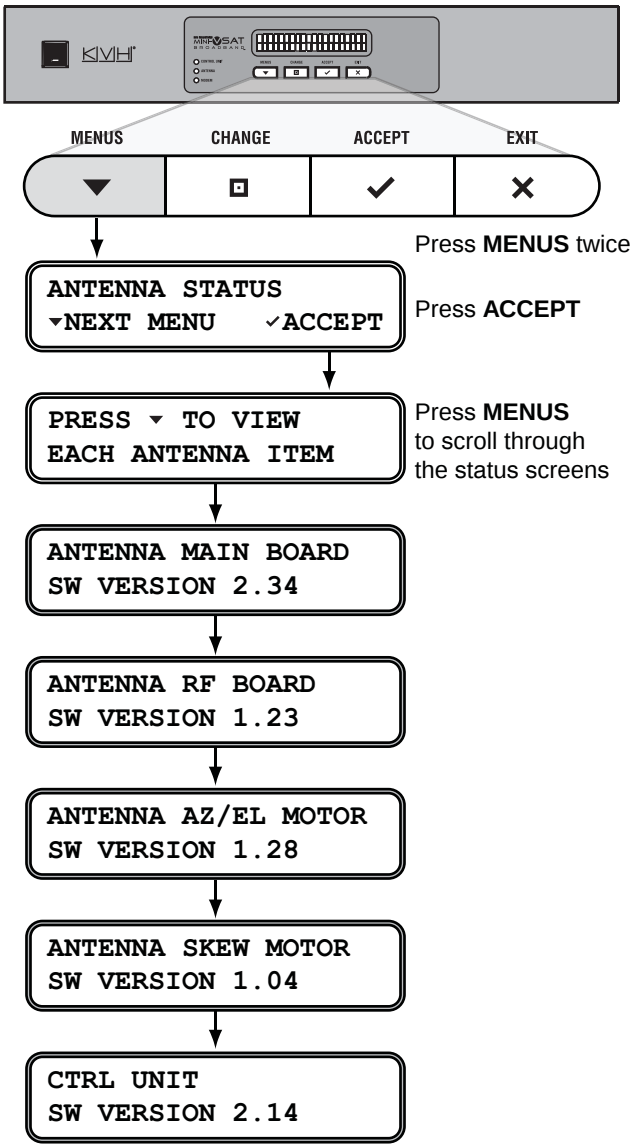


Figure 39: TracPhone V-series Flash Wizard Help Menu

15 Set Up RF Hazard Zones

Optional

To prevent exposure to RF energy, which may be harmful to people who stand within 32 ft (10 m) of the antenna within its 5-75° elevation range (see Figure 48 on page 25), you can configure up to two RF radiation hazard zones for areas where crew and / or passengers frequent. The system will disable the transmitter when the antenna is pointing within one of these zones.

Follow these steps to set up an RF hazard zone.

a. Determine the necessary azimuth range for the RF hazard zone(s). You will need to enter, in clockwise order, beginning and ending azimuths (>4° apart) **relative to the antenna's forward arrow**, which should be pointing toward the bow (see Figure 40 and Figure 41).

b. At the control unit, press MENUS until the display shows "CONFIGURATION." Then press ACCEPT.

c. Press MENUS until the display shows "SET HAZARD ZONE."

d. Press CHANGE until the display shows "SET HAZARD ZONE = YES." Then press ACCEPT.

e. At "ZONE 1," press CHANGE. A cursor appears under the first number in the azimuth range for RF hazard zone #1.

f. Press CHANGE until the number is set to the first digit of the beginning azimuth for the first hazard zone. *Enter a zero if the azimuth value is less than 100°.*

g. Press ACCEPT. The cursor moves to the next number.

h. Repeat steps f and g to set the remaining digits of the desired RF radiation hazard zone. Then press ACCEPT.

i. At "Zone 2," repeat steps e-h to set the range for the second RF hazard zone, if desired.

j. At "XMT IN ZONES," verify that the display shows "XMT IN ZONES = NO." Then press MENUS.

k. Press EXIT to exit the menu.

Figure 40: Example of an RF Radiation Hazard Zone

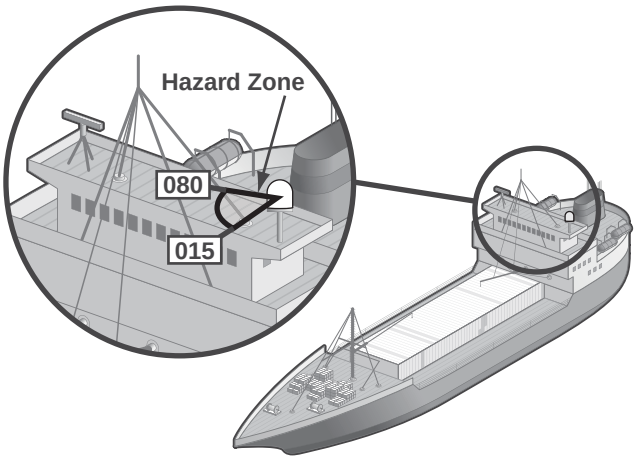


Figure 41: Azimuths Relative to Antenna's Forward Arrow

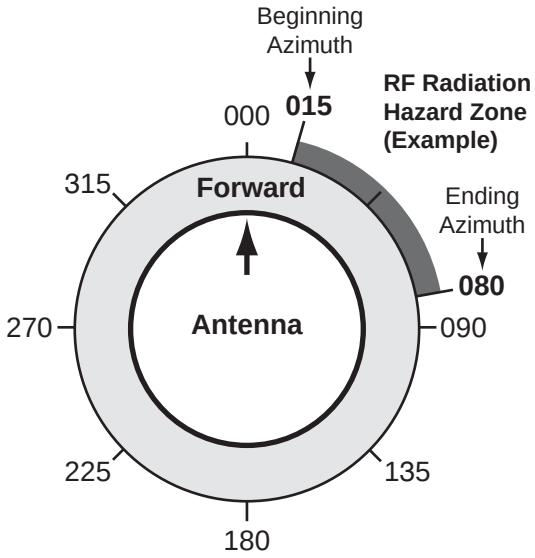
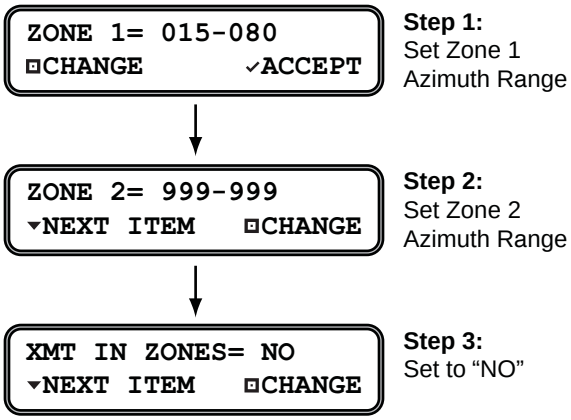


Figure 42: Setup Process for RF Hazard Zones



16 Test the System

Now that you have installed the system, you can test the system to verify it is ready for customer delivery. Follow these steps to test the system for proper operation.

a. Ensure the antenna has a clear, unobstructed view of the sky.

b. With the TracPhone system powered on, restart the networked computer(s).

c. Verify that the antenna is tracking the service satellite and the modem is connected to the mini-VSAT Broadband service, as indicated by the control unit screen shown in Figure 43. If an error appears, refer to the Troubleshooting section of the *User's Guide*.

IMPORTANT!

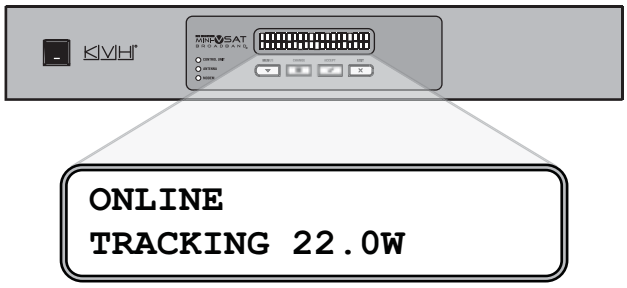
Once the system is online, do not turn it off for 30 minutes to allow the modem to download the latest configuration files via the satellite. If the modem is unable to connect, you may upload the files manually via the modem's web interface. Details are available to technicians on the KVH Partner Portal.

d. If the customer has activated the TracPhone system for mini-VSAT Broadband service, verify that the system can access the Internet by entering any common website address (URL) into the browser.

e. If the customer has activated the TracPhone system, also verify that you can place a voice call. First make sure the MTA's "VOIP" light is lit green (see Figure 44). Then, using a telephone connected to the MTA, place a call to someone on a terrestrial or cellular network and ask that person to call you back at the customer's number.

f. Even if the customer has not yet activated the TracPhone system for mini-VSAT Broadband service, you can still check the modem's communications to the land-based hub. Open the web browser on any networked computer and enter the following address to access the Welcome page: **http://208.83.165.11/mbbtest**. Verify that the Welcome page appears in the browser (see Figure 45).

Figure 43: Good Service Connection Indicated on Control Unit LCD



NOTE: *Satellites will vary depending on your location.*

Figure 44: MTA Status Lights

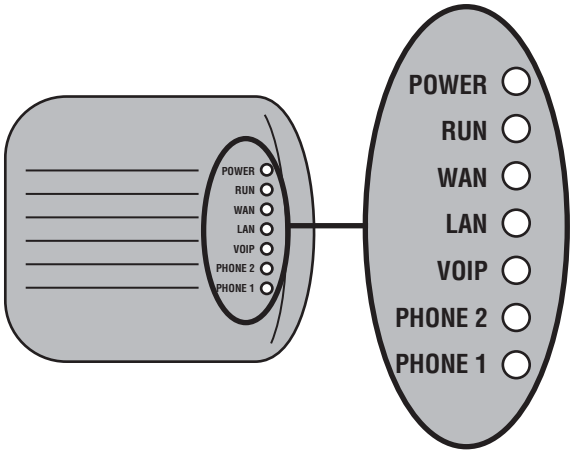
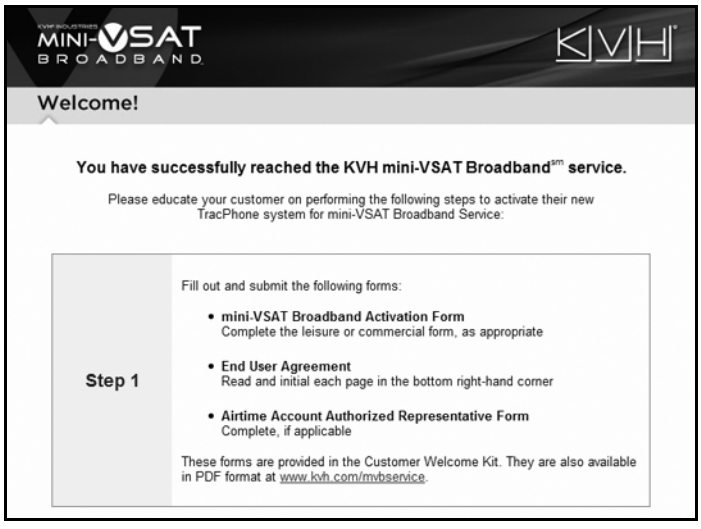


Figure 45: Welcome Page for Testing



16 Continued Test the System

g. Open the web browser on any wired (not wireless) networked computer and enter the following address to access the modem's web interface: **http://192.168.0.1**

h. Under "Forward Link" on the General Status page, make sure **Eb/No is at least 2 dB** (see Figure 46).

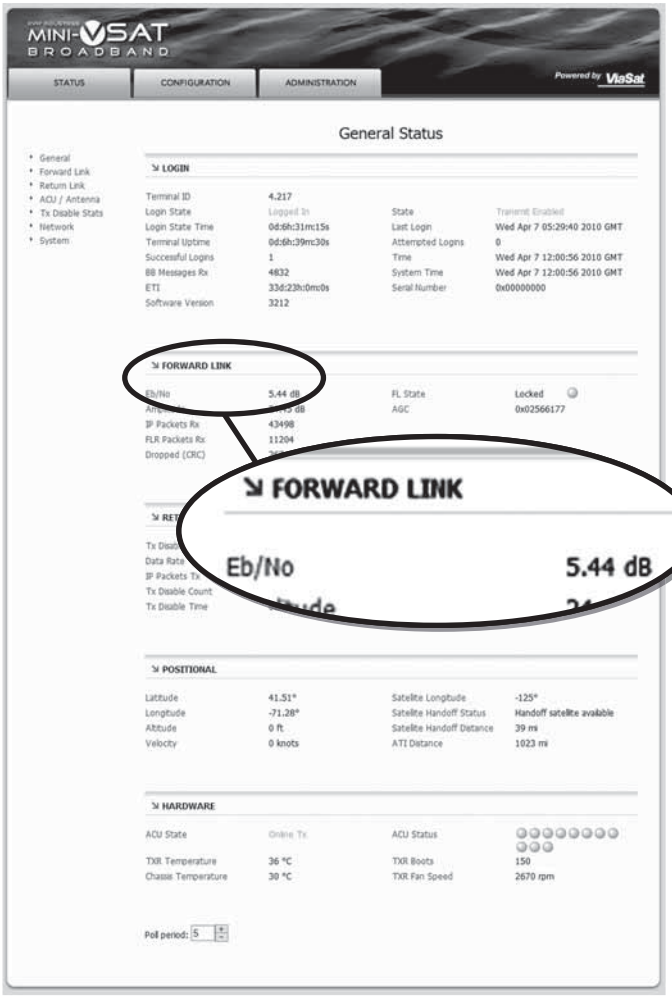
NOTE: *Refer to the User's Guide for details about the other status information that is available on this web page.*

i. Fill out the Installation Checklist (provided in the Customer Welcome Kit) and return it to KVH. Refer to the instructions on the form.

IMPORTANT!

Submission of the Installation Checklist is **required** to certify the quality of your installation.

Figure 46: General Status Page Via Modem Web Interface



17 Educate the Customer

The installation is complete! Before you leave the vessel, enter the system serial numbers on the first page of the *User's Guide*, give the Welcome Kit to the customer, and explain how to use the system. Be sure the customer understands the following:

- **The antenna transmits RF energy that is potentially harmful.** Whenever the system is powered on, make sure everyone stays more than 32 ft (10 m) away from the antenna within its 5-75° elevation range (see Figure 48). No hazard exists directly above the antenna and anywhere below the antenna's mounting plane.
- Keep the radome installed on the antenna at all times. The radome protects the antenna's moving parts from wind, rain, and debris.
- The antenna must have a clear view of the sky to communicate via satellite. Common causes of blockage include masts, trees, buildings, and bridges (see Figure 49).
- Clean the antenna regularly. Dirt buildup on the radome can affect communications. Heavy rain or snow may also temporarily interrupt communications.
- The vessel must be located within the coverage area of the satellite. To view a coverage map, visit ***www.kvh.com/minivsatmap***.
- The system must be activated for mini-VSAT Broadband service. For activation details, visit ***www.kvh.com/mvbservice***.

Figure 47: Customer Welcome Kit

Figure 48: Safe Distance to Avoid Risk of RF Radiation Exposure

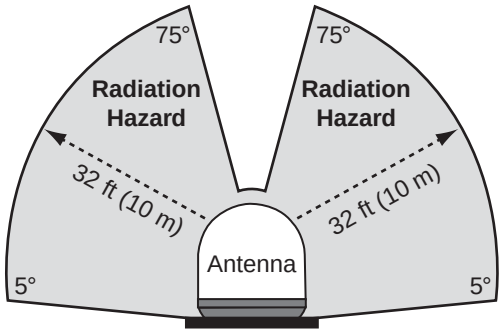
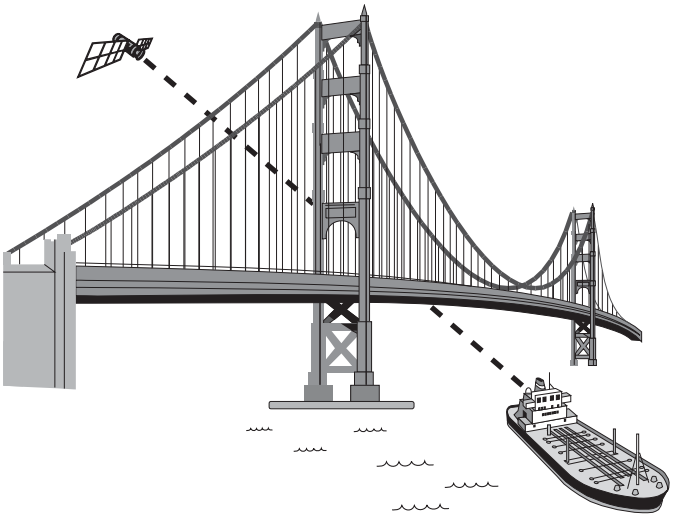


Figure 49: Example of Satellite Blockage

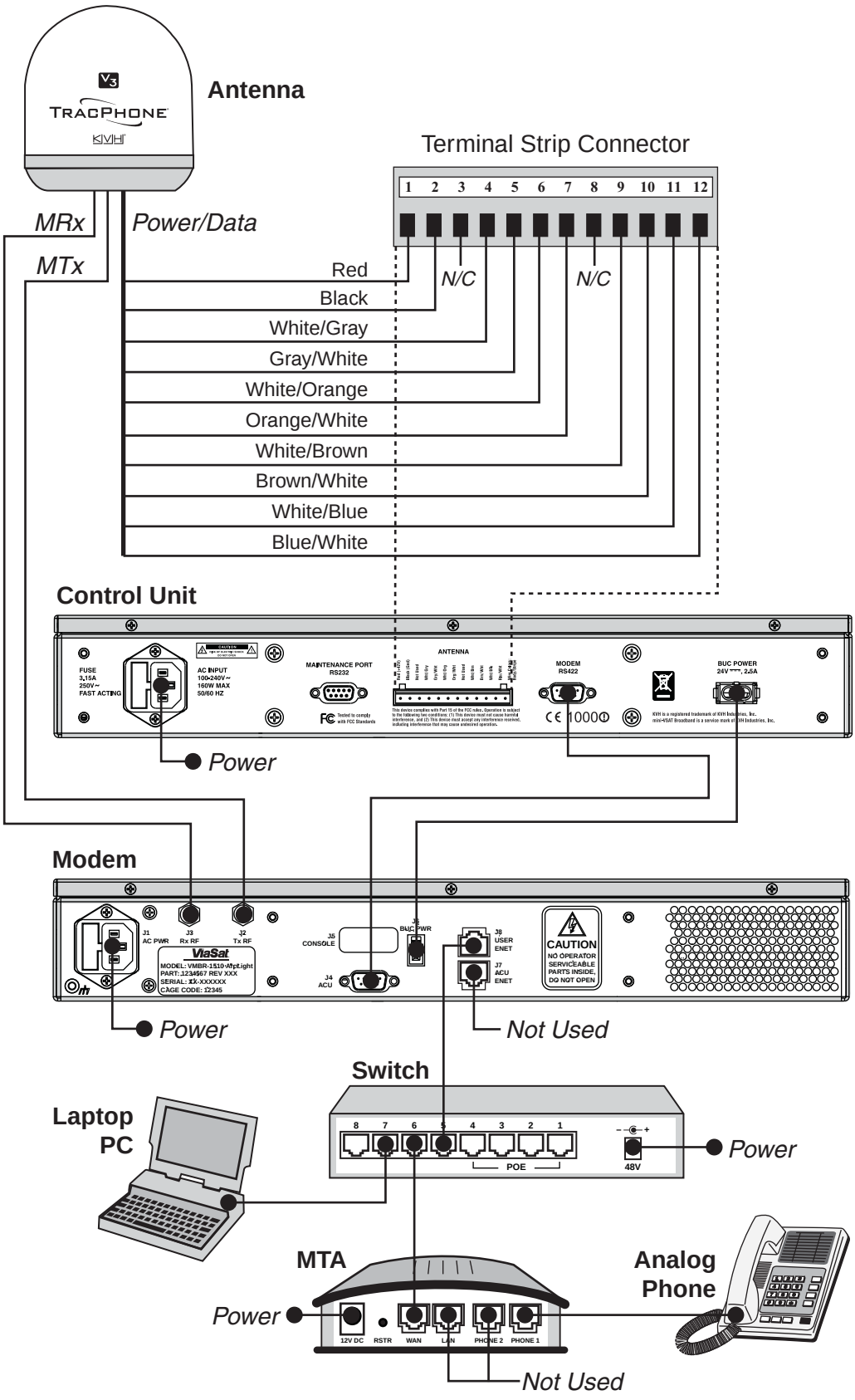


Appendices

This section provides a system wiring diagram and supplemental instructions for terminating an LMR-400-75 cable.

Contents

A Wiring Diagram



B Terminating LMR-400-75 Cable

These instructions explain how to terminate an LMR-400-75 RF cable with an EZ-400-FMH-75 "F" connector using the tools from the TK-400EZ-75 tool kit. For more detailed instructions, refer to the Times Microwave website (***www.timesmicrowave.com***).

1. Using the CCT-01 cutting tool, cut the cable evenly (see Figure 50).
2. Since cutting the cable can deform the end, gently round the end of the cable using a pair of needle-nose pliers (see Figure 51). Also make sure the center conductor is centered within the cable.
3. Place the heat shrink sleeve and metal ferrule onto the cable (see Figure 52).
4. Insert the end of the cable into the #1 end of the ST-400EZ stripping tool (see Figure 53). Then rotate the tool clockwise around the cable until the tool turns easily. The end of the cable should now be stripped to expose the center conductor.

Figure 50: Cutting the Cable

Figure 51: Reshaping the Cable

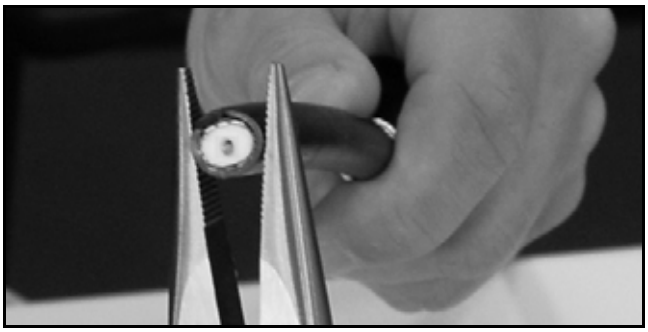


Figure 52: Placing the Heat Shrink Tubing and Ferrule

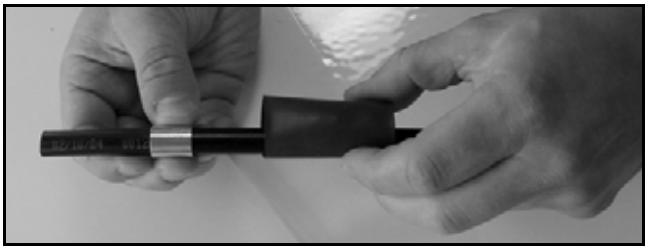
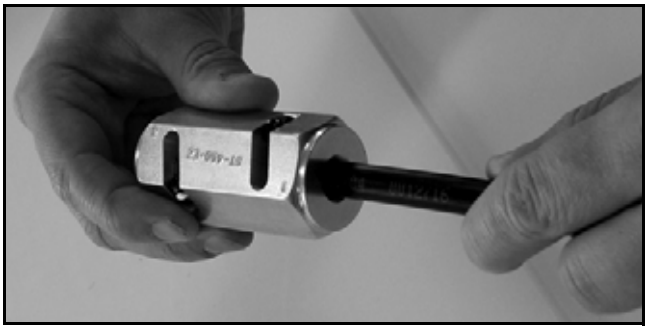


Figure 53: Stripping the End to Expose the Center Conductor



B Continued Terminating LMR-400-75 Cable

5. Using a utility knife, carefully remove any residual plastic from the center conductor, if necessary (see Figure 54).

6. Insert the end of the cable into the #2 end of the ST-400EZ stripping tool (see Figure 55). Then rotate the tool clockwise around the cable until the tool turns easily. This removes the cable jacket from the end of the cable, exposing the braid and dielectric (see Figure 56).

7. Using the DBT-02 tool, deburr and chamfer the center conductor (see Figure 57). Avoid nicking the aluminum tape covering the dielectric.

Figure 54: Removing Plastic Residue

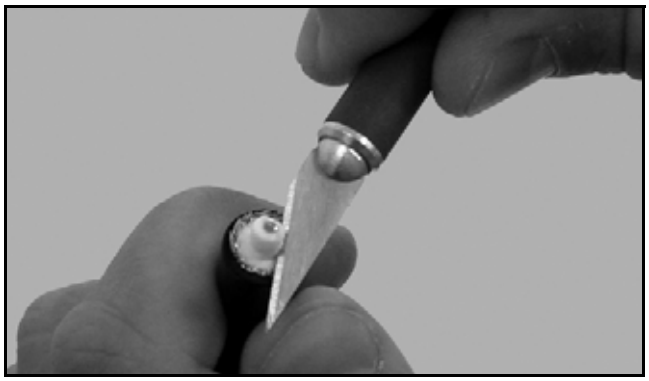


Figure 55: Stripping the Cable Jacket

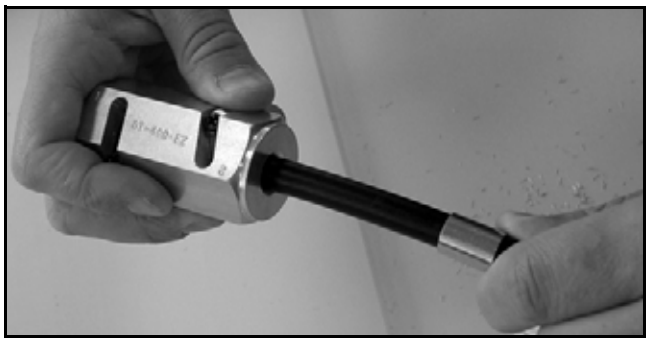
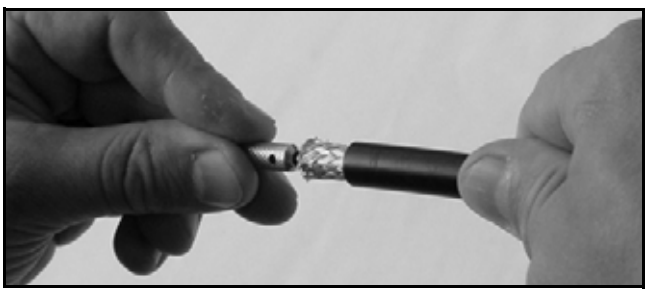


Figure 56: Cable Stripped, Exposing Dielectric

Figure 57: Deburring the Center Conductor



B Continued Terminating LMR-400-75 Cable

8. Gently flare the braid with your fingers (see Figure 58).

9. Insert the end of the cable into the connector body until the dielectric is firmly seated inside the connector (see Figure 59). Be sure all braid wires remain on the outside of the connector.

10. Trim any excess braid (see Figure 60), if necessary. The braid should assemble flush to within 1/16" (1.6 mm) of the connector shoulder.

11. Slide the ferrule over the braid until it is flush against the connector shoulder (see Figure 61).

Figure 58: Flaring the Braid

Figure 59: Pushing On the Connector

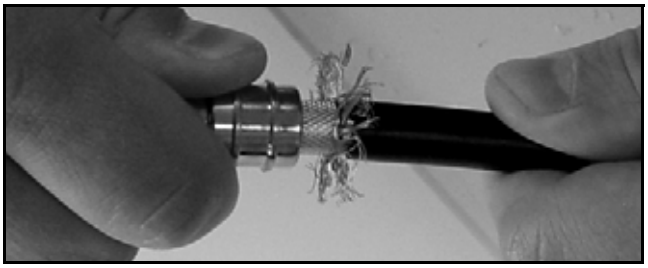


Figure 60: Trimming the Braid

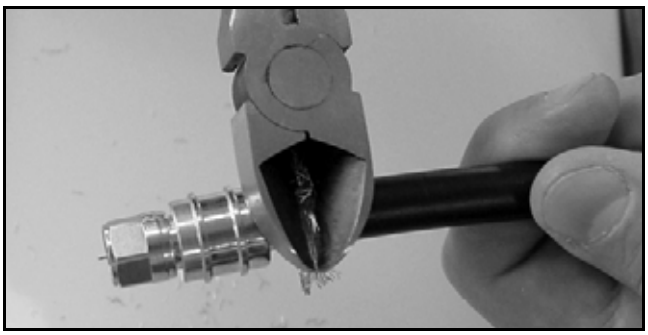
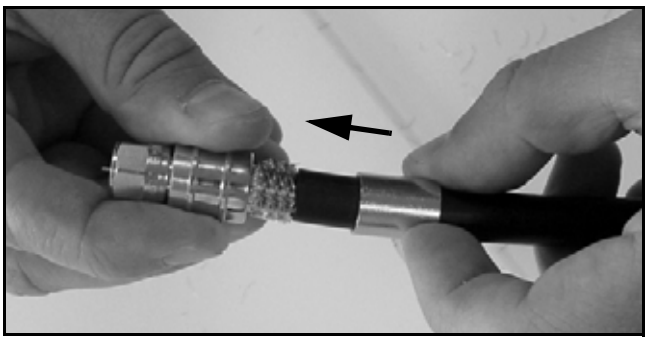


Figure 61: Sliding the Ferrule Over the Braid



B Continued Terminating LMR-400-75 Cable

12. Using an appropriate crimp tool (either the CT-400/300 or the HX-4 with Y1719 dies), crimp the ferrule in place (see Figure 62). Crimp as close to the connector body as possible.

13. Crimp the ferrule again, but further back from the connector. However, be careful not to crimp the cable jacket.

14. Slide the heat shrink sleeve over the connector body and heat it to compress it into place (see Figure 63). When you are done, the heat shrink should extend from the rear of the connector to the cable jacket. This forms a weather-tight seal.

15. Using a multimeter or similar device, check the continuity of the cable.

16. Ensure the center conductor pin measures between 0.20" and 0.28" in length, to ensure proper engagement with the mating connector.

Figure 62: Crimping the Ferrule onto the Cable

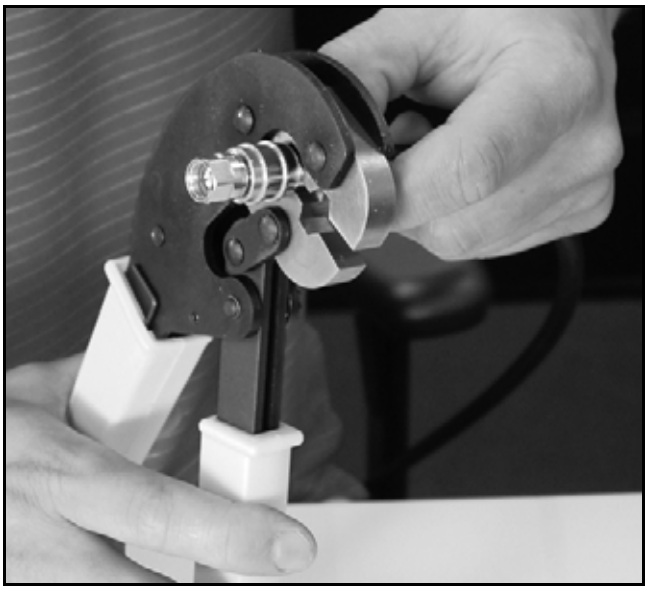


Figure 63: Applying the Heat Shrink Tubing

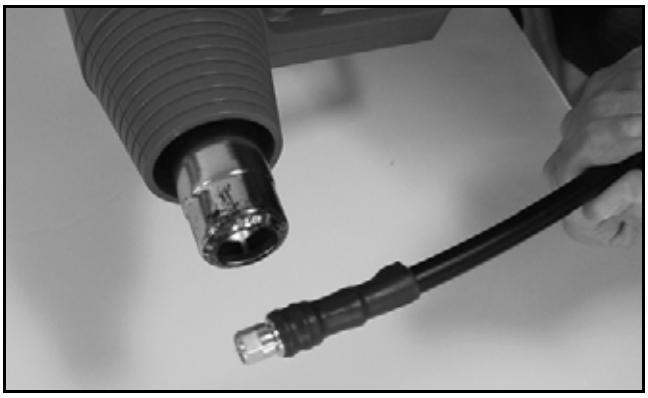


Figure 64: Finished Connector

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