KVH Industries, Inc.

TracPhone® V11IP

V11 IP

TracPhone

KVH

Installation Guide

TracPhone V11-IP Installation Guide

mini-VSAT Broadband℠ System with Integrated CommBox™ Modem

This guide explains how to install the TracPhone V11-IP mini-VSAT Broadband satellite communications system. Operation instructions are provided in the Quick Start Guide.
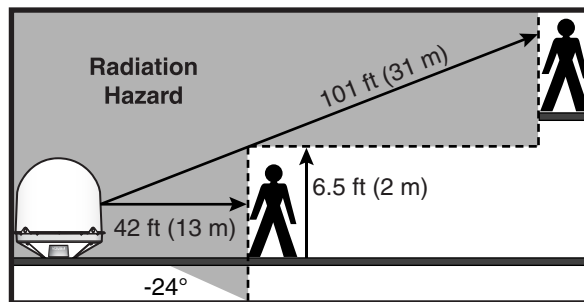
Installation Steps

CAUTION - RF Radiation Hazard

The antenna transmits radio frequency (RF) energy that is potentially harmful. While the system is powered on, make sure everyone stays more than 42 feet (13 m) away from the antenna. As shown in the illustration, this distance increases to 101 feet (31 m) if a person is more than 6.5 ft (2 m) above the plane of the antenna's base.

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, Australasia:
Phone: 1 866 701-7103 *(U.S. only)*
Phone: +1 401 851-3806
Email: mvbsupport@kvh.com

Europe, Middle East, Africa
Asia-Pacific:
Phone: +45 45 160 180
Email: mvbsupport@kvh.com
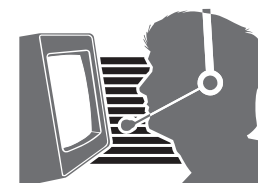
Important Safety Information

⚠️ This icon indicates a danger, warning, or caution notice. Be sure to read these carefully to avoid injury.

⚠️ **WARNING**

Risk of Electric Shock
Potentially lethal voltages are present within the ICM when it is connected to AC power. To avoid electric shock, do not open the chassis enclosure. There are no user-serviceable parts inside.

⚠️ **WARNING**

Risk of Electric Shock
If any component of the TracPhone system becomes damaged and/or no longer functions normally, disconnect it from vessel power, secure it from unintended operation, and contact KVH Technical Support (see "Technical Support" on page 1). All repairs or modifications must be performed by a trained, KVH-certified technician. If you are a KVH-certified technician, you still must contact KVH Technical Support prior to conducting any repairs or modifications to the equipment.

⚠️ **WARNING**

Risk of Explosion
Do not operate the ICM (or any other electrical device) in an environment where flammable gases, vapors, or dusts are present. In addition, do not operate the ICM in an environment with a temperature outside its 5° F to 131° F (-15° C to 55° C) temperature range.

⚠️ **WARNING**

Risk of Electric Shock
Failure to ground the TracPhone system properly to ship's ground will cause an unsafe floating ground condition, risking potentially lethal electric shock. See "Connect Power" on page 25 for details on the proper grounding of the equipment.

⚠️ **CAUTION**

RF Radiation Hazard
The antenna transmits up to 22 watts of radio frequency (RF) energy that is potentially harmful. Whenever the system is powered on, make sure everyone stays more than 42 feet (13 m) away from the antenna. The minimum safe distance increases to 101 feet (31 m) if a person is more than 6.5 feet (2 m) above the plane of the antenna's base. No hazard exists directly below the antenna.

① Inspect Parts and Get Tools

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

a. Unpack the box and ensure it contains everything shown in Figure 1 and on the *Kitpack Contents List*. Save the packaging.

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 5/8" (16 mm) bit

- 3.75" (95 mm) hole saw (for cable access hole, if needed)

- 5/32" hex key

- 7/16" open-end torque wrench set to 20 in.-lbs (2.25 N-m)

- 1/2" open-end wrench

- 3/4" socket/ratchet or wrench

- 1/4" socket/ratchet or nut driver

- 7/16" socket/ratchet or nut driver

- 3/4" socket/torque ratchet capable of settings between 35 and 40 ft-lbs (47 and 54 N-m) of torque

- Light hammer and center punch

- Adhesive tape

- Eye protection

- Shop towels

- Silicone sealant, self-vulcanizing tape, or equivalent

- Two 75Ω RF coax cables, "F" connectors, and termination tools (see page 11)

- Power cable (see page 13)

- Heat gun (for heat shrink)

- Wire stripper/terminal crimper

- Forehead light

Figure 1: TracPhone V11-IP System Components

Antenna
(KVH part no. 02-1982-03)

← Radome

← Baseplate

← Service Hatch (x2)
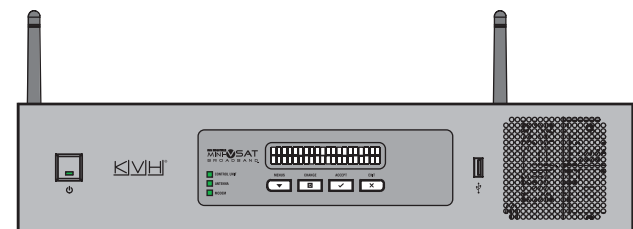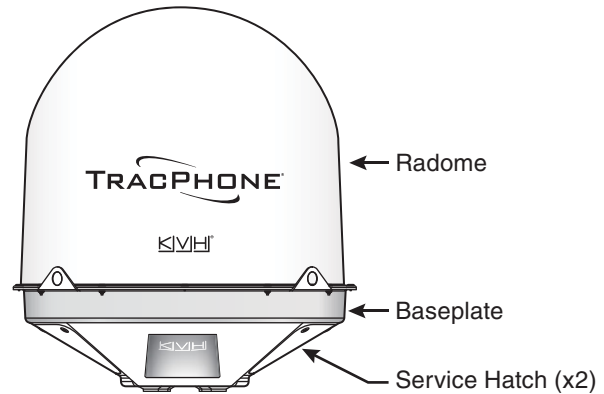
Integrated CommBox Modem (ICM)
(KVH part no. 02-2008-03)

- NMEA 0183 talker and interface cable (see page 24)

- Isolation transformer, if required (see page 25)

- Utility knife

- Flush cutters

- File

- Ruler or tape measure

- Voltmeter

- Laptop PC with the latest TracPhone V11-IP ICM/antenna software (.kvh) and modem configuration files (.sscf/.sed) downloaded from the KVH Partner Portal (www.kvh.com/partners)

② Plan the Antenna Installation

Before you begin, consider the following antenna installation guidelines.

Choose a Suitable Location

- Select a location that is as close as possible to the intersection of the vessel's centerline and midships.

- Both service hatches should be fully accessible for installation and service.

- Temperature must be within the operating range (-30°C to 55°C (-22°F to 131°F)).

- Avoid placing the antenna near any magnetic compasses or other onboard antennas to prevent potential interference.

Meet Mounting Structure Requirements

If available, install the antenna on a platform or pedestal, rather than on a deck, and ensure the diameter of the mounting surface matches the antenna's base (19.01" (48.29 cm)) (see Figure 2).
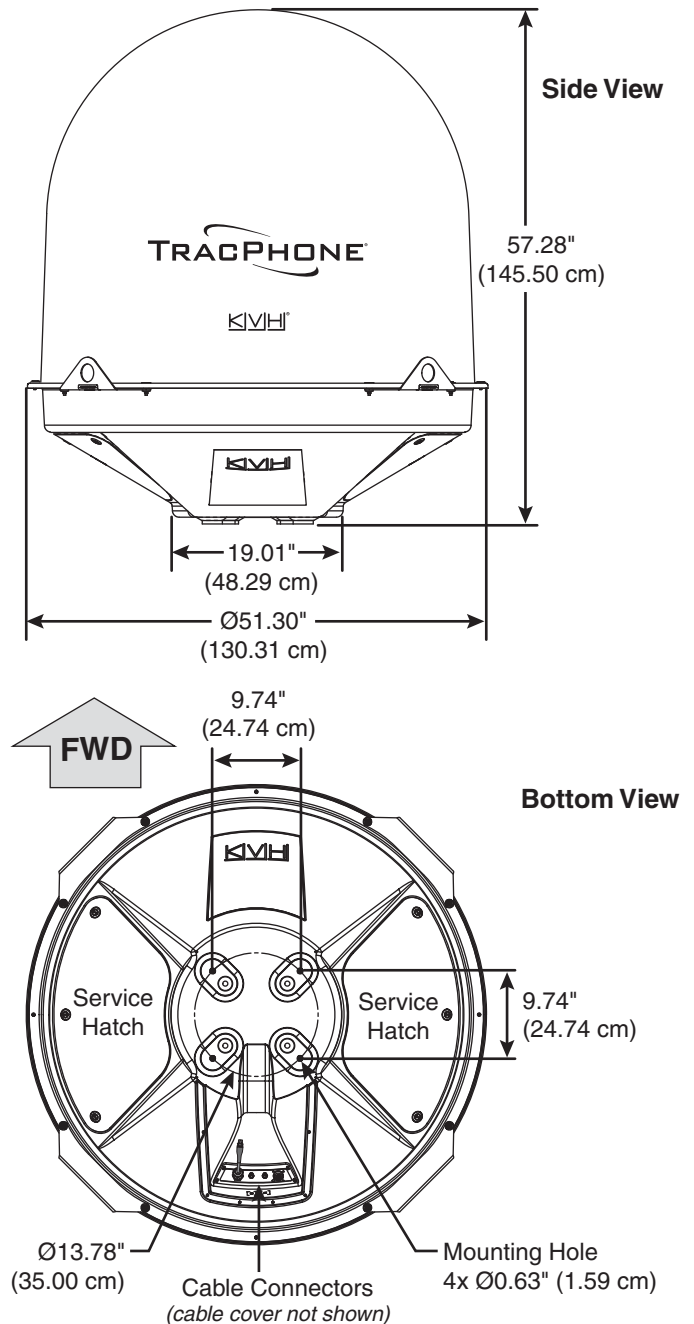
Make sure the mounting surface is flat and level (within ±1°). Also make sure the mounting structure is strong enough to withstand the weight of the antenna (240 lbs (109 kg), excluding cables) as well as other cumulative forces related to expected operating conditions, such as ice, snow, wash down, and maximum expected values of pitch, roll, and wind pressure (including gusts).

Vibration of the mounting surface should measure less than 0.51 gRMS total, and also less than 0.11 gRMS at the following resonant frequencies and axes:

- 14.93 Hz and 60.89 Hz in Horizontal Forward X-Direction

- 16.07 Hz and 71.02 Hz in Horizontal Side Y-Direction

- 37.7 Hz and 79.89 Hz in Vertical Z-Direction

Please consult with your shipyard to assure that the antenna mounting surface vibration never exceeds the above stated conditions at any time during its life.

Figure 2: Antenna Dimensions

Side View

TRACPHONE

KVH

57.28" (145.50 cm)

19.01" (48.29 cm)

Ø51.30" (130.31 cm)

9.74" (24.74 cm)

FWD

Bottom View

KVH

Service Hatch

Service Hatch

9.74" (24.74 cm)

Ø13.78" (35.00 cm)

Cable Connectors
(cable cover not shown)

Mounting Hole
4x Ø0.63" (1.59 cm)

Meet Pedestal Structure Requirements

If a pedestal is going to be used, it must meet the following minimum requirements. Refer to Figure 3.

Pedestal Height (A)	3.28 ft 1 m	6.56 ft 2 m	9.84 ft 3 m
Tube OD (B)	9.0" 230 mm	8.0" 203.2 mm	10.0" 254 mm
Tube Wall Thickness (C)	0.5" 12.7 mm		
Brace Height (D)	N/A	5.56 ft 1.7 m	7.34 ft 2.24 m
Brace OD (E)	N/A	3.0" 76.2 mm	6.0" 152.4 mm
Brace Thickness (F)	N/A	0.25" 6.35 mm	0.5" 12.7 mm
Brace Angle (G)	N/A	30°	25°

NOTE: If the pedestal exceeds 3.28 ft (1 m), braces must be placed at 120° intervals. Sizing is based on Structural Steel Tubing 60,000 psi (415 MPa) minimum yield.

Figure 3: Pedestal and Brace Dimensions
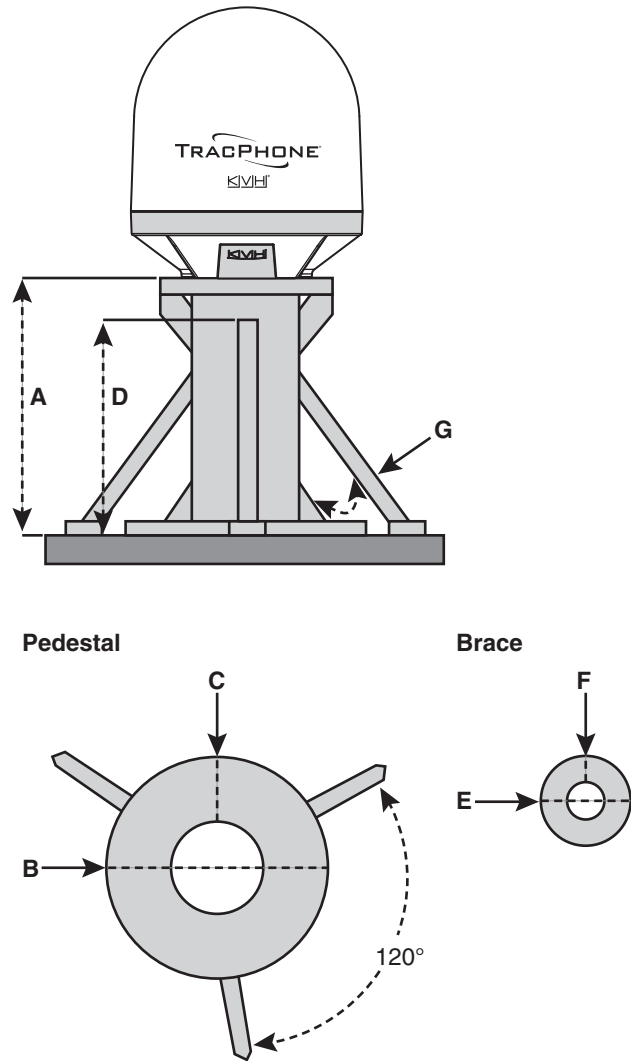
Prevent RF Radiation Exposure

Select a location that is well above any areas accessible to passengers and crew to reduce the risk of RF radiation exposure. (See page 1 for an illustration of the hazard area.)

If mounting the antenna near an accessible area is unavoidable, you may configure one or two no-transmit zones to prevent transmissions in hazardous directions. (See "Set Up No-Transmit Zones" on page 30 for details.)

Minimize Satellite Blockage

The antenna requires a clear view of the sky to transmit and receive satellite signals (see Figure 4). The fewer obstructions, the better the system will perform.

Avoid RF Interference

Although many variables determine the exact distance required between the antenna and radar/high-power radio transmitters, including transmitter beam properties and the reflective properties of nearby surfaces, consider the following general requirements when selecting a safe antenna location:

> **IMPORTANT!**
>
> RF emissions from radars and high-power radio transmitters may damage the antenna or impair its performance if it's improperly positioned within the beam path.

- Mount the antenna as far away as possible from the radar and any high-power radio transmitters.

- The minimum safe distance and vertical separation between the antenna and the radar varies depending on the type and power level of the radar. Using the table in Figure 5, mount the antenna at least the minimum distance away from the radar and maintain at least the minimum vertical separation above/below the radar. **If mounting the antenna directly above or below the radar, minimum distance is 3 ft (0.9 m).**
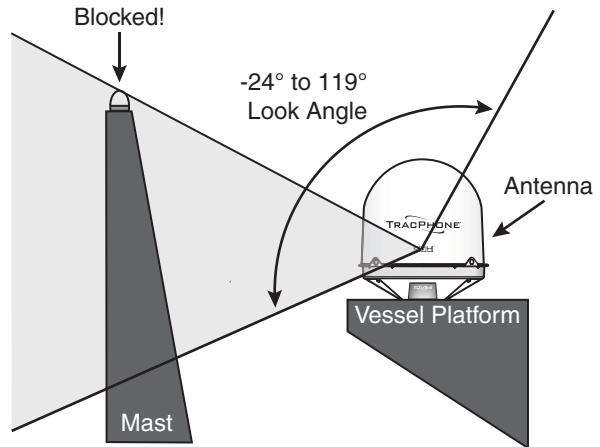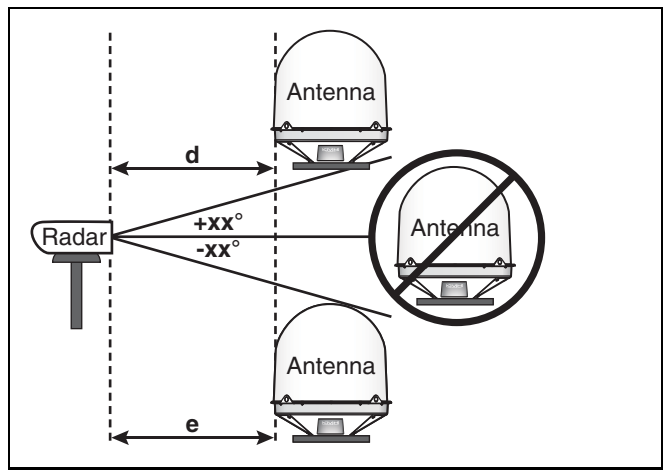
Figure 4: Blockage from Obstruction

Figure 5: Minimum Distances from Radar

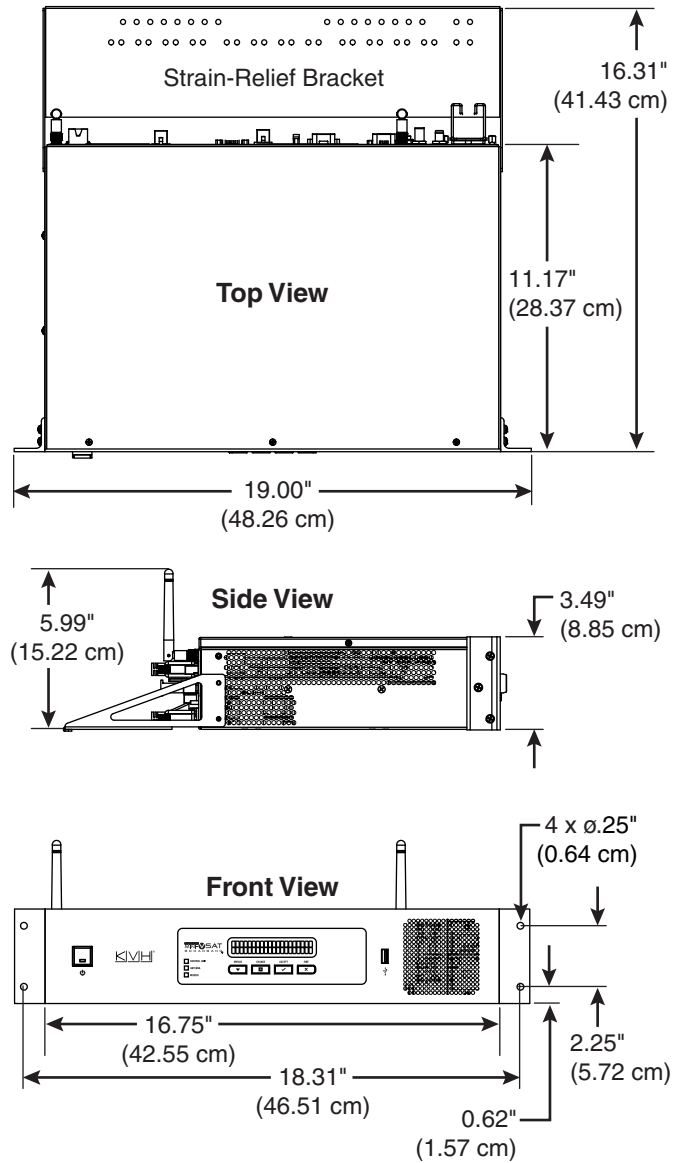| Radar Type	Radar Power	Minimum vertical separation (±xx°)	Minimum distance away (d or e)
X-band	Up to 50 KW	±15°	3 ft (0.9 m)
S-band	Up to 10 KW	±20°	6 ft (2 m)
	30 KW	±30°	9 ft (3 m)
	50 KW	±30°	14 ft (4.5 m)

3 Plan the ICM Installation

Before you begin, consider the following installation guidelines for the ICM.

- Select a mounting location in a dry, well-ventilated area belowdecks away from any heat sources or salt spray.

- Be sure the front panel will be easily accessible to the user.

- Leave enough room at the rear panel to accommodate the connecting cables.

- To use the supplied data cable, the ICM must be located within 100 ft (30 m) of the antenna. However, you can order a longer data cable, if necessary:

  150 ft (45 m): KVH part no. 32-1157-0150

  200 ft (60 m): KVH part no. 32-1157-0200

  300 ft (90 m): KVH part no. 32-1157-0300.

- Be sure the location provides adequate Wi-Fi reception. Do not install it in an area surrounded by metal or near any electrical devices that emit RF noise.

Figure 6: ICM Dimensions

Strain-Relief Bracket

16.31"
(41.43 cm)

11.17"
(28.37 cm)

Top View

19.00"
(48.26 cm)

Side View

5.99"
(15.22 cm)

3.49"
(8.85 cm)

4 x ø.25"
(0.64 cm)

Front View

16.75"
(42.55 cm)

18.31"
(46.51 cm)

2.25"
(5.72 cm)

0.62"
(1.57 cm)

④ Prepare the ICM

Follow these steps to prepare the ICM for installation.

## Connect the ICM Jumper Cables

Connect the two supplied jumper cables to the rear panel of the ICM (see Figure 7).

a. Connect the serial data cable from the "A1" jack to the "A2" jack.

b. Connect the straight-through Ethernet cable from the "B1" jack to the "B2" jack.

Attach the Wi-Fi Antennas

Connect the two supplied Wi-Fi antennas to the rear panel of the ICM (see Figure 7).

Figure 7: Jumper Cables Wiring and Wi-Fi Antennas
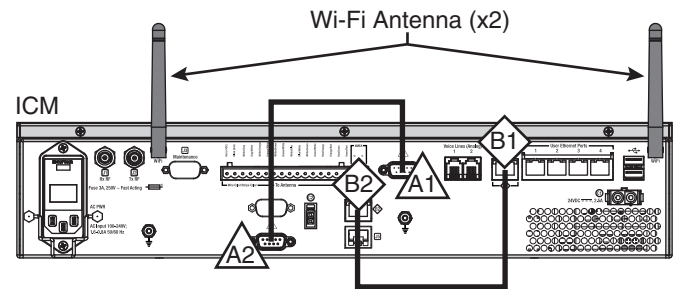
⑤ Mount the ICM

There are two options for mounting the ICM:

Option 1 - Inside an equipment rack

Option 2 - To a horizontal surface

NOTE: You may choose to wait to mount the ICM until after you have completed all system wiring.

Option 1 – Rack Mount

The ICM is sized to fit a standard 19" (48.26 cm) rack, occupying 2U of space. Follow these steps to secure the ICM in an equipment rack.

a. Attach the supplied strain-relief bracket to the back of the ICM using four supplied #6-32 screws and washers (see Figure 8).

b. Insert the ICM into the rack and secure its front mounting brackets to the rack using four M6 screws and washers (see Figure 9).

Option 2 – Horizontal Surface Mount

Follow these steps to mount the ICM to a horizontal surface.

a. Remove the six #6-32 screws and washers securing the two rack-mount brackets to the front of the ICM (see Figure 10). Remove the brackets.

b. Attach the supplied strain-relief bracket to the back of the ICM, and attach the supplied "L" mounting brackets to the sides of the ICM, using six supplied #6-32 screws and washers (see Figure 11).

c. Mount the ICM to the vessel using fasteners appropriate for the mounting surface.
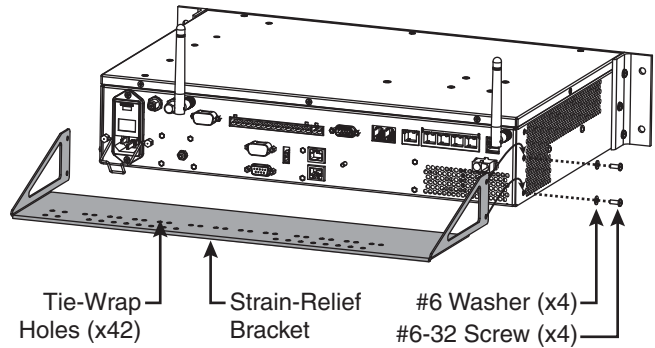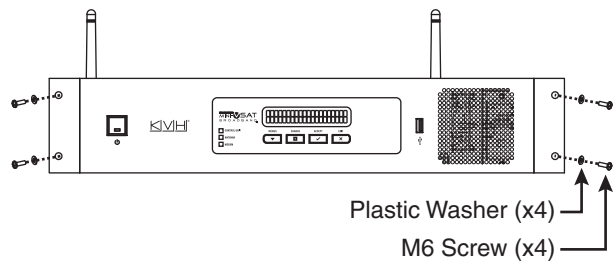
Figure 8: Attaching the Strain-Relief Bracket

Tie-Wrap Holes (x42) — Strain-Relief Bracket — #6 Washer (x4) — #6-32 Screw (x4)

Figure 9: Securing the ICM in the Rack

Plastic Washer (x4) — M6 Screw (x4)

Figure 10: Removing the Rack-Mount Brackets

Bracket (x2) — #6 Washer (x6) — #6-32 Screw (x6)
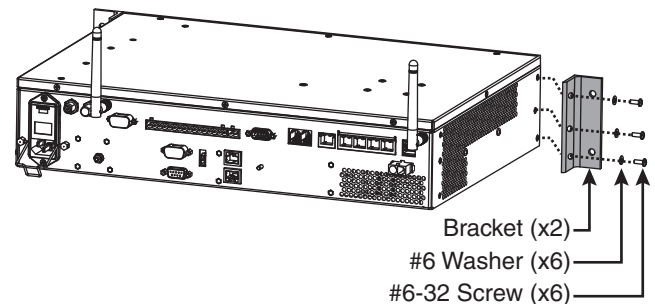
Figure 11: Attaching the Mounting and Strain-Relief Brackets

Strain-Relief Bracket

#6 Washer (x6) — #6-32 Screw (x6) — Mounting Bracket (x2) — Ø.156" (Ø3.96 mm) Mounting Hole (x4)
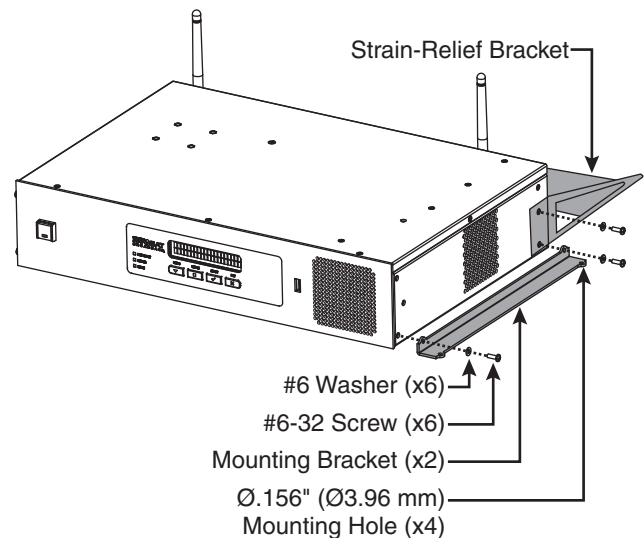
6 Prepare the Antenna Site

Once you have identified a suitable antenna mounting site, follow these steps to prepare the site for installation.

Drill the Mounting Holes

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 12).

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 on the mounting surface in the locations indicated on the template.

c. Drill a 5/8" (16 mm) hole at the four mounting hole locations. Later, you will insert four 1/2"-13 bolts through these holes to mount the antenna.

Cut Out the Cable Access Hole, If Needed

If you plan to route the antenna cables belowdecks through a hole directly underneath the antenna, follow the steps below.

a. Using the supplied template, mark the location of the cable access hole in the center of the mounting hole pattern (see Figure 12).

b. Cut out the 3.75" (95 mm) cable access hole in the location you marked in Step a. Smooth the edges of the hole to protect the cables. (You may also apply anti-chafe material around the cables to prevent abrasion.)

c. Clean and dry the antenna mounting surface.

d. Peel off the paper backing from one of the supplied foam seals 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 12).

Figure 12: Antenna Mounting Holes Layout
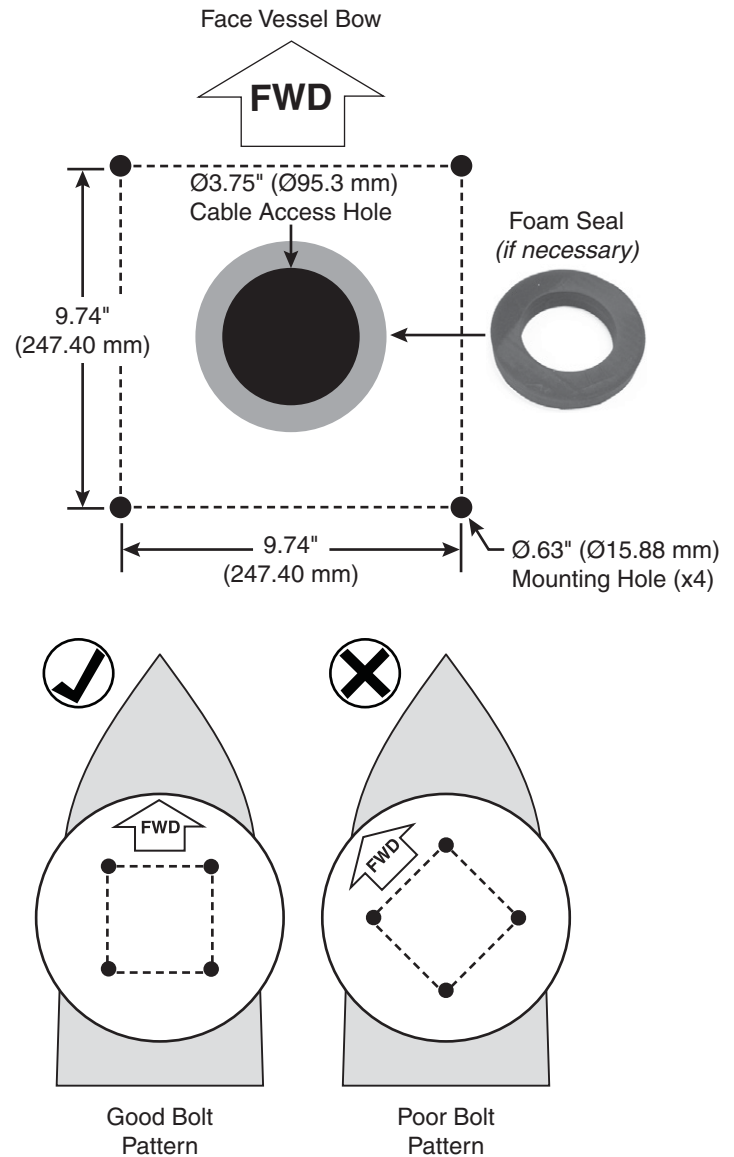
⑦ Prepare the Antenna Cables

Follow these steps to prepare and route the RF, power, and data cables to the antenna location.
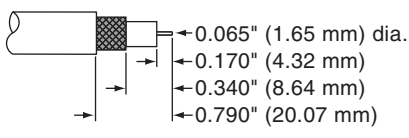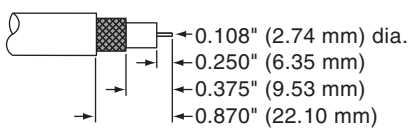
Prepare the Customer's RF Cables

You need to connect two 75Ω RF coax cables from the antenna location to the belowdecks equipment. Refer to Figure 13 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 **75Ω**, not 50Ω.

- Use only LMR-400-75 or LMR-600-75 cables. **Never use RG-6.**

- 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. *See page 43 for instructions on terminating LMR cables.*

- 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.

- Make sure there is no gap between the end of the cable jacket and the start of the connector.

- 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.

- Cables must be at least 25 ft (8 m) in length.

- Call KVH Technical Support if you need to use cables longer than 200 ft (60 m). An antenna setting might need to be adjusted over the air for the longer cable run.

- When determining cable lengths, don't forget to account for service loops, 14" (35 cm) in diameter, at each end.

Figure 13: RF Cable Requirements

25 -100 ft (8-30 m) Cable Run	
Cable	LMR-400-75 (KVH part no. 32-0944-0100, 100 ft (30 m)) *Loss: 0.06 dB/ft (0.195 dB/m)*
Connector	Times Microwave EZ-400-FMH-75*
Tools	Times Microwave TK-400EZ-75 (KVH part no. 72-0374-75**)
Strip Lengths	0.065" (1.65 mm) dia. 0.170" (4.32 mm) 0.340" (8.64 mm) 0.790" (20.07 mm)

101-300 ft (31-90 m) Cable Run Call KVH for lengths over 200 ft (60 m)	
Cable	LMR-600-75 (KVH part no. 32-0945-0200, 200 ft (60 m)) *Loss: 0.04 dB/ft (0.13 dB/m)*
Connector	Times Microwave EZ-600-FMH-75*
Tools	Times Microwave TK-600EZ (KVH part no. 72-0375-75**)
Strip Lengths	0.108" (2.74 mm) dia. 0.250" (6.35 mm) 0.375" (9.53 mm) 0.870" (22.10 mm)

* *Cables from KVH include the proper connectors.*
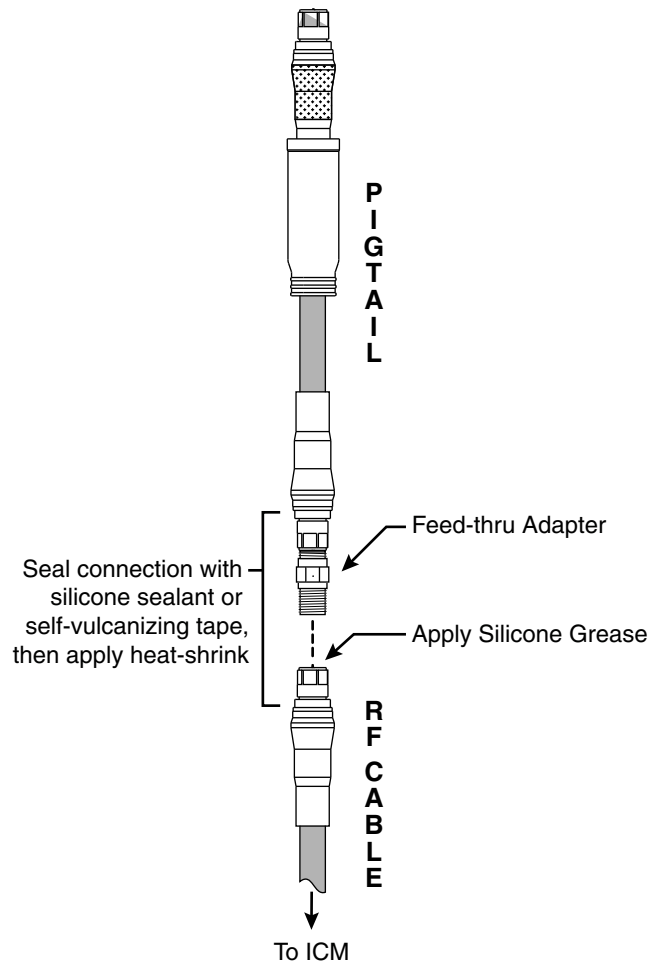 ** *Tool kits from KVH include a torque wrench.*

Connect the Customer's RF Cables to the Supplied Pigtail Cables

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IMPORTANT!

Use of the supplied pigtail cables is **mandatory**. Do not connect the customer's RF cables directly to the antenna.

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a. Clean and dry the RF cables' connectors.

b. **Label both ends** of the customer's RF cables. Label one cable "TX," and label the other "RX."

c. Heat shrink is supplied with each 3 ft (90 cm) pigtail cable to protect the connection between the customer's RF cables and the pigtail cables. Slide a heat shrink sleeve onto the end of each 3 ft (90 cm) pigtail cable (opposite the boot end) for later use.

d. Fill half of the inner body of the customer's "TX" RF cable's connector with the supplied silicone grease to prevent moisture and corrosion.

e. Connect and **SLOWLY** hand-tighten the "TX" RF cable to the feed-thru adapter of one of the supplied LMR-400-75 pigtail cables, allowing the grease to diffuse and settle into the entire space within the connector (see Figure 14).

f. Make sure the RF cable's connector is tightened all the way into the pigtail cable's feed-thru adapter. Then tighten it with a 7/16" torque wrench set to 20 in.-lbs.

g. Seal the RF cable-to-pigtail connection using silicone sealant, self-vulcanizing tape, or equivalent. Then protect the connection with the heat shrink (see step c).

h. Repeat steps d-g to connect the "RX" RF cable to the other pigtail cable.

Figure 14: Connecting the Pigtail Cables to the RF Cables

PIGTAIL

Feed-thru Adapter

Seal connection with silicone sealant or self-vulcanizing tape, then apply heat-shrink

Apply Silicone Grease

RF CABLE

To ICM

Prepare the Customer's Power Cable

You will need to connect a power cable from the antenna to the vessel's 100-240 VAC power supply. The cable must be an above deck, marine-grade, 3-conductor, stranded (*flexible, bend radius of at least 3" (8 cm)*) power cable suitable for carrying 500 watts AC power to the antenna with less than a 5% voltage drop across its length. Refer to Figure 15 for the suggested cable gauge for your cable run.

IMPORTANT!

Be sure to comply with all applicable electrical codes and safety standards for the vessel's country of origin and vessel type.

Follow these steps to attach the supplied AC power connector to the end of your power cable. This female connector mates with the male connector at the antenna.

a. Pass the end of the power cable through the connector's nut and housing as shown in Figure 16.

b. Strip the jacket from the end of the power cable 7/8" (22.2 mm). Then strip back the insulation of all three wires between 1/4" (6 mm) and 5/16" (8 mm).

c. Connect the wires to the connector as shown in Figure 16.

d. Slide the housing over the connector and snap it into place.

e. Tighten the nut onto the end of the housing. Tighten to approximately 3 ft-lbs (4 N-m) of torque.

Figure 15: Power Cable Recommendations

Cable Length	Suggested Gauge
Up to 100 ft (30 m)	14 AWG
101-300 ft (31-90 m)	12 AWG

Figure 16: AC Power Cable Connector

13
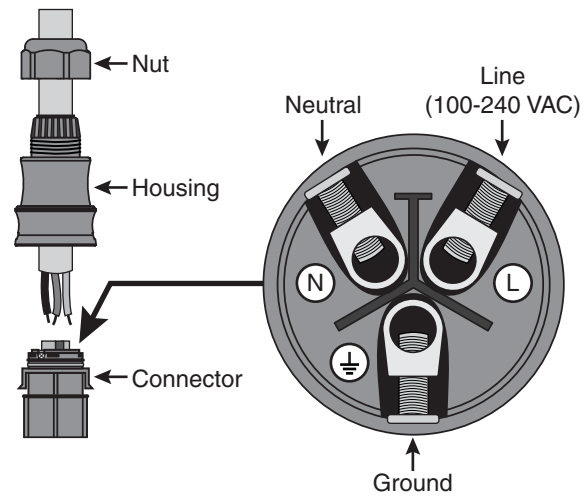
7 Continued Prepare the Antenna Cables

Route the Cables Belowdecks

a. Keep the ends of the data, power, and RF cables shown in Figure 17 at the antenna location.

b. Route the opposite ends of the cables belowdecks through the cable access hole. Leave an adequate service loop, at least 14" (35 cm) in diameter, in all of the cables at the antenna location for easy serviceability. (Total extra length of RF cables should not exceed 6.5 ft (2 m) at each end.)

c. Route the cables to the belowdecks equipment. Be sure to always maintain the minimum bend radius in the RF cables (see Figure 18). Later, you will connect the data and RF cables to the ICM, and the power cable to the vessel's AC power supply.

⚠	WARNING
Do not connect the power cable to vessel AC power yet. You will connect power in Step 13 on page 25.	

Figure 17: Cables Ready to Connect to Antenna
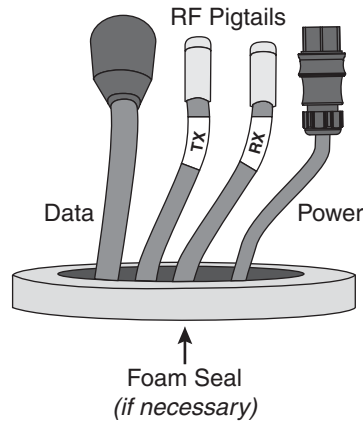
Figure 18: Minimum Bend Radius of RF Cables

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

8 Rig and Hoist the Antenna

Follow these steps to detach the antenna from the pallet and safely rig the antenna for crane hoisting.

IMPORTANT!

Take protective measures to avoid gouging or scratching the radome during the rigging operation.

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a. Using a 7/16" socket/ratchet or nut driver, unlock the three hex latches securing each of the antenna's service hatches (see Figure 19). Then gently lower the hatches. You can now access the four shipping bolts securing the antenna's baseplate to the pallet.

b. Using a 3/4" socket/ratchet or wrench, remove the four outer 1/2"-13 bolts securing the antenna to the pallet (see Figure 20). Do not remove the four inner bolts that secure the internal antenna assembly to the baseplate.

c. Close both antenna service hatches. Secure each hatch using the three hex latches.

d. Secure the crane rigging to the antenna's four lift brackets (see Figure 21). Be sure the rigging and crane are suitably rated to safely lift the 240 lbs (109 kg) antenna.

⚠ **WARNING**

Be sure no personnel stand underneath the antenna at any time while it is suspended in the air.

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e. Carefully hoist the antenna to its mounting location.

Figure 19: Service Hatches

Hatch (x2)

1/4-turn Hex Latch (x6)
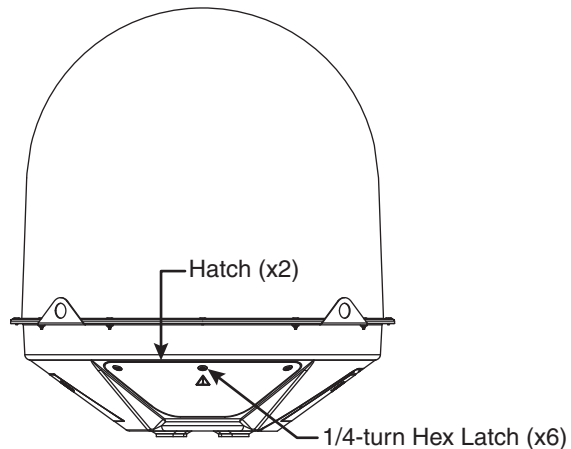
Figure 20: Shipping Bolts (Antenna Bottom View)

Do not remove the 4 inner bolts securing the antenna assembly to the baseplate!

1/2"-13 Shipping Bolt (x4)

Figure 21: Crane Rigging (Example)

Rope

Rope to Prevent Tipping

Center of Gravity

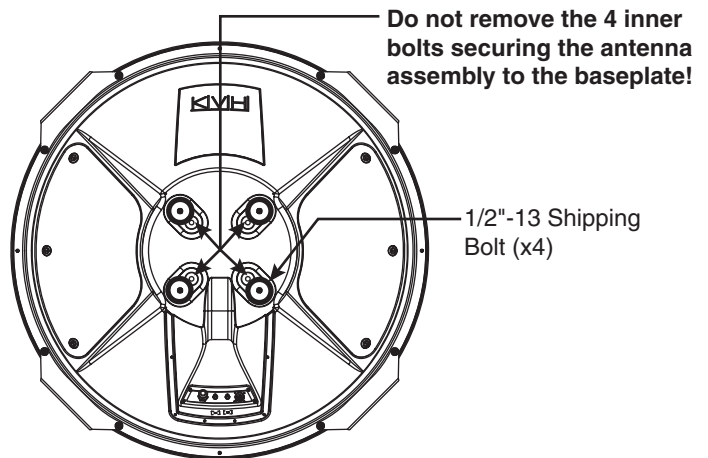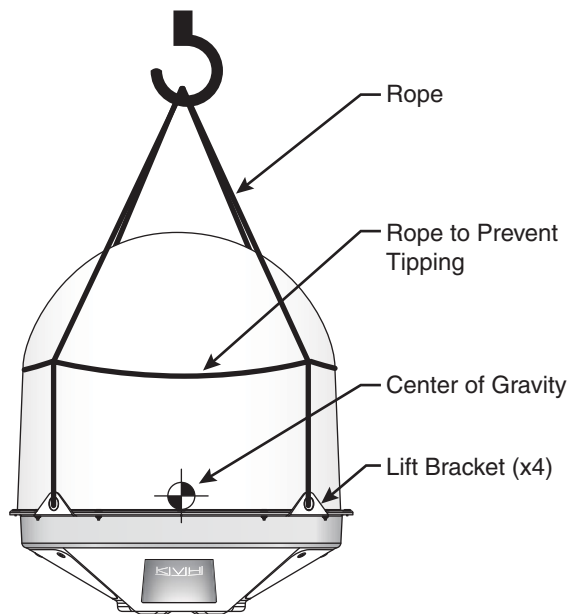Lift Bracket (x4)

9 Wire the Antenna

Follow these steps to connect the antenna cables.

Remove the Cable Cover

To access the antenna's connectors, you first need to detach the cable cover. Loosen the six #6-32 captive screws securing the cable cover to the base (see Figure 22). Then set the cable cover aside in a safe place.

Attach the Second Foam Seal, If Needed

If you routed the cables through a hole directly underneath the antenna (see "Cut Out the Cable Access Hole, If Needed" on page 10), follow these steps to attach the second foam seal to the base of the antenna.

a. Clean and dry the bottom of the antenna.

b. Peel off the paper backing from the second foam seal to expose the adhesive. Align the foam seal so it is centered on the antenna (see Figure 23). Then press the foam seal firmly onto the underside of the antenna.

Figure 22: Cable Cover

#6-32 Captive Screw and Washer (x6)

Cable Cover
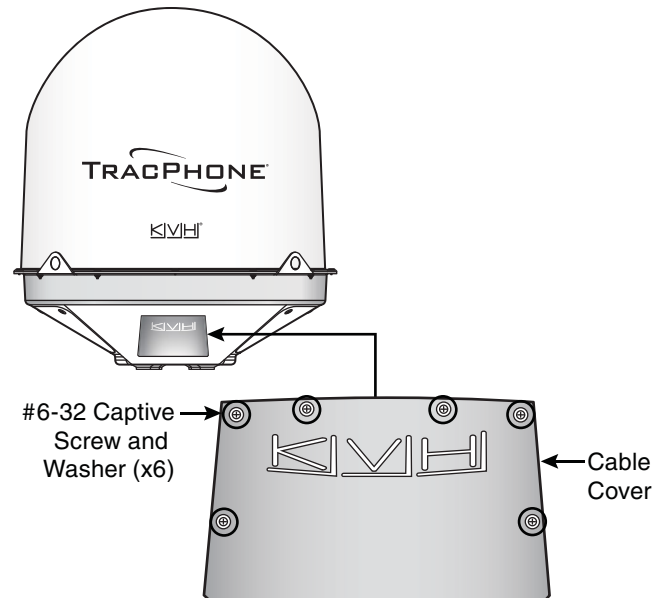
Figure 23: Foam Seal on Base of Antenna

Foam Seal *(if necessary)*
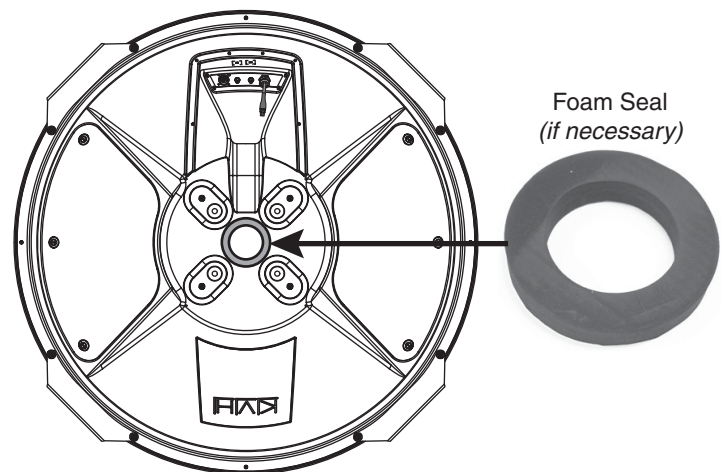
Connect the RF Pigtail Cables

a. Clean and dry the antenna's two RF connectors, labeled "MTX" and "MRX" (see Figure 24).

b. Place one of the supplied rubber connector washers over the "MTX" jack on the bottom of the antenna, as shown in Figure 25.

c. Fill half of the inner body of the "TX" pigtail cable's male connector with silicone grease.

d. Connect and **SLOWLY** hand-tighten the "TX" pigtail cable to the antenna's "MTX" jack, allowing the grease to diffuse and settle into the entire space within the connector.

e. Make sure the "TX" pigtail cable's connector is tightened all the way into the antenna's connector and the rubber washer is compressed against the antenna's base. Then tighten the connector with a 7/16" torque wrench set to 20 in.-lbs.

f. Apply a thin layer of silicone grease to the jacket of the "TX" pigtail cable, along the wider segment at the base of the connector.

g. Slide the rubber boot up the cable until it covers the entire connector and mates with the rubber washer. This will protect the connection from the elements.

h. Wipe off any excess grease from the cable.

i. Repeat steps b-h to connect the "RX" pigtail cable to the antenna.

Connect the Data Cable

Connect the data cable to the "Data" jack on the base of the antenna (see Figure 24). Hand-tighten until the connector locks in place; do not use excessive force.

Connect the Power Cable

Connect the customer's power cable to the AC power pigtail cable on the base of the antenna (see Figure 24). Be sure the connector locks in place.
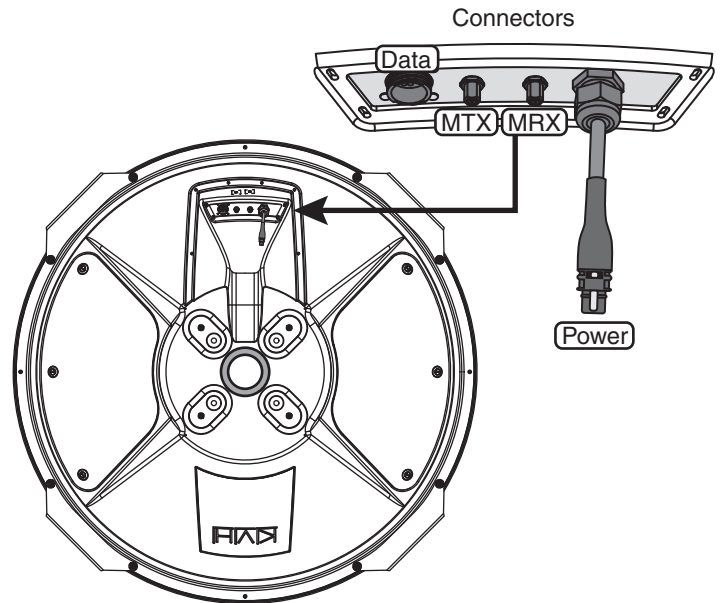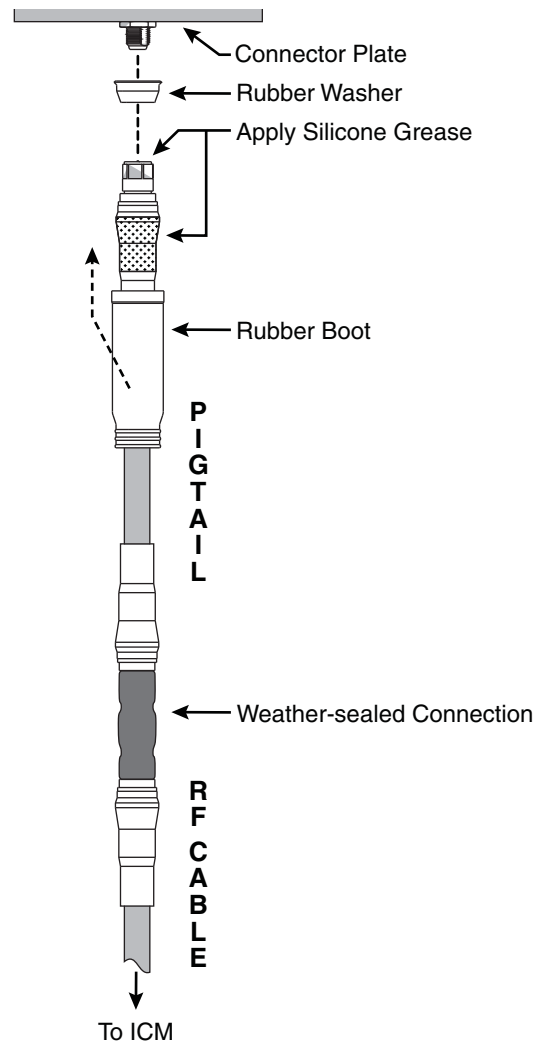
Figure 24: Antenna Connectors

Figure 25: Connecting the RF Pigtail Cables to the Antenna

Protect the Cables

a. Position the cable cover over the antenna's cable connectors and secure in place with the six #6-32 captive screws and washers (see Figure 26).

b. Secure the cables near the antenna connectors to relieve stress (such as the example in Figure 27). The cable cover is designed for aesthetics only – it does not provide any support for the cables and may become damaged if cables are not properly strain-relieved.

c. Weatherproof and seal the cable access hole, as required.

IMPORTANT!

The integrity and reliability of the RF cables is 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 26: Cable Cover
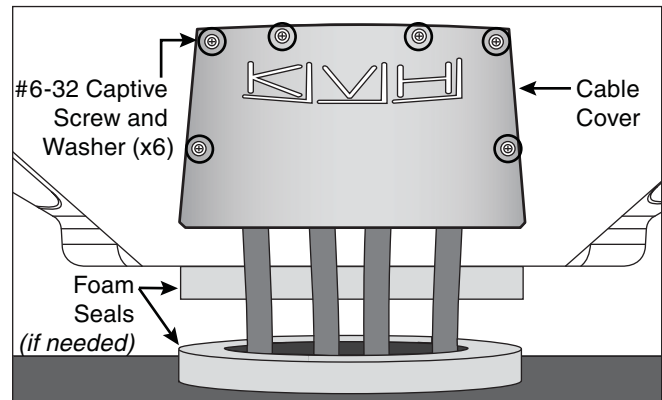
Figure 27: Strain-relief/Service Loops Example
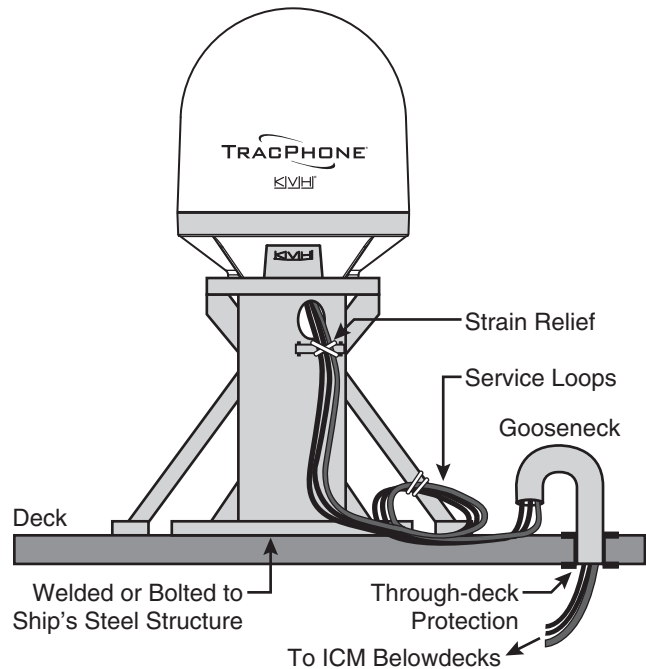
⑩ Mount the Antenna

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

a. Position 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 28).

IMPORTANT!

If the foam seals are used, do not reposition the antenna laterally once the antenna's foam seal has made contact with the foam seal on the mounting surface. If you need to reposition the antenna, lift the antenna first to avoid damage to the foam seals.

---

b. Carefully lower the antenna onto the mounting surface and ensure the mounting holes (and foam seals, if used) are aligned.

c. Using a 7/16" socket/ratchet or nut driver, unlock the three hex latches securing each of the antenna's service hatches (see Figure 19 on page 15). Then gently lower the hatches.

⚠ **CAUTION**

Be sure to observe the safe handling instructions in the Material Safety Data Sheet (MSDS) provided with the anti-seize lubricant.

---

d. Apply a thin layer of the supplied anti-seize lubricant to the threads of the four supplied 1/2"-13 mounting bolts to prevent galling.

e. At each of the four antenna mounting holes, place a 1/2" flat washer on a 1/2"-13 bolt and insert the bolt into the hole from above (see Figure 29).

f. Secure each mounting bolt to the mounting surface using a 1/2" flat washer and a 1/2"-13 lock nut from below (see Figure 29).

g. Tighten the mounting bolts in a cross pattern until the four rubber feet on the baseplate are bottomed against the mounting surface. KVH recommends that you tighten the nuts to between 35 and 40 ft-lbs (47 and 54 N-m) of torque.

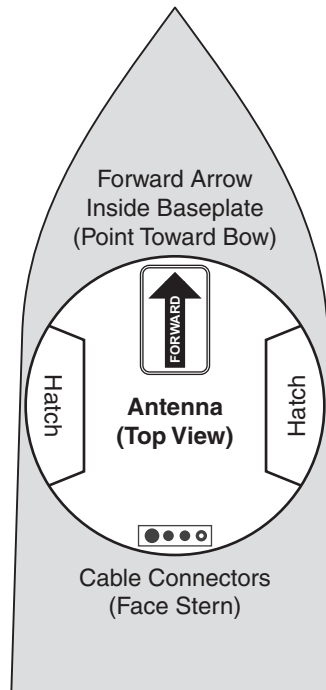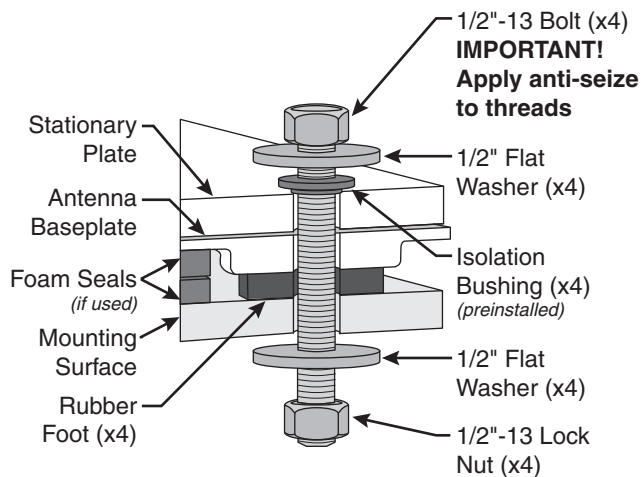Figure 28: Forward Arrow in Antenna Baseplate

Forward Arrow Inside Baseplate (Point Toward Bow)

FORWARD

Hatch

Antenna (Top View)

Hatch

Cable Connectors (Face Stern)

Figure 29: Mounting the Antenna (Side View)

1/2"-13 Bolt (x4)
IMPORTANT! Apply anti-seize to threads

Stationary Plate

1/2" Flat Washer (x4)

Antenna Baseplate

Foam Seals *(if used)*

Isolation Bushing (x4) *(preinstalled)*

Mounting Surface

Rubber Foot (x4)

1/2" Flat Washer (x4)

1/2"-13 Lock Nut (x4)

h. Disconnect the crane rigging.

i. Remove the eight screws, flat washers, and lock nuts securing the four lift brackets to the antenna (see Figure 30). Use a 5/32" hex key to keep the screws from turning, and use a 1/2" open-end wrench to loosen and remove the nuts. Remove the lift brackets and hardware and set them aside.

NOTE: Save the brackets and bracket hardware in case the antenna needs to be moved in the future.

j. Install eight 1/4"-20 screws and washers (supplied in the kitpack) in place of the longer mounting bracket screws you removed in the previous step (see Figure 31).

k. Make sure the power switch inside the antenna is set to the On position (see Figure 32).

l. Close both antenna service hatches. Secure each service hatch using the three hex latches.

Figure 30: Removing the Lift Brackets

1/4"-20 x 1.5" Screw (x8)
Counter-sunk Washer (x8)
Lift Bracket (x4)
1/4"-20 Flat Washer (x8)
1/4"-20 Lock Nut (x8)
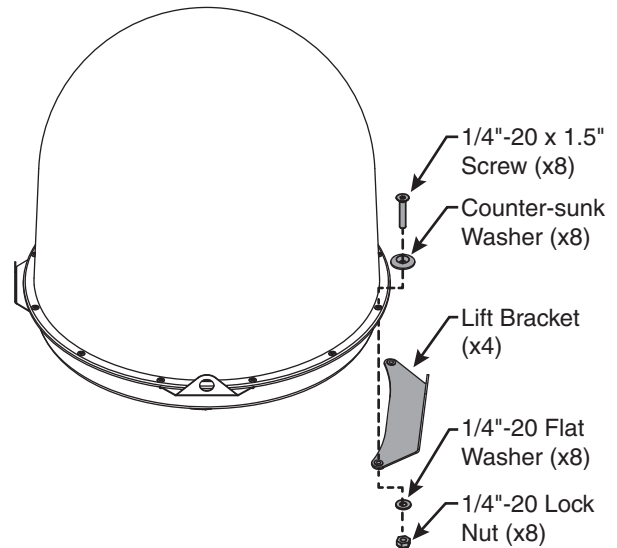
Figure 31: Reinstalling the Radome Hardware

1/4"-20 x 7/8" Screw (x8)
Counter-sunk Washer (x8)
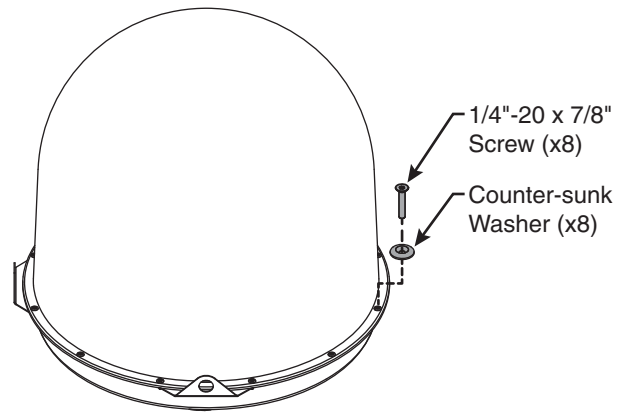
Figure 32: Power Switch Inside Antenna

Power Switch
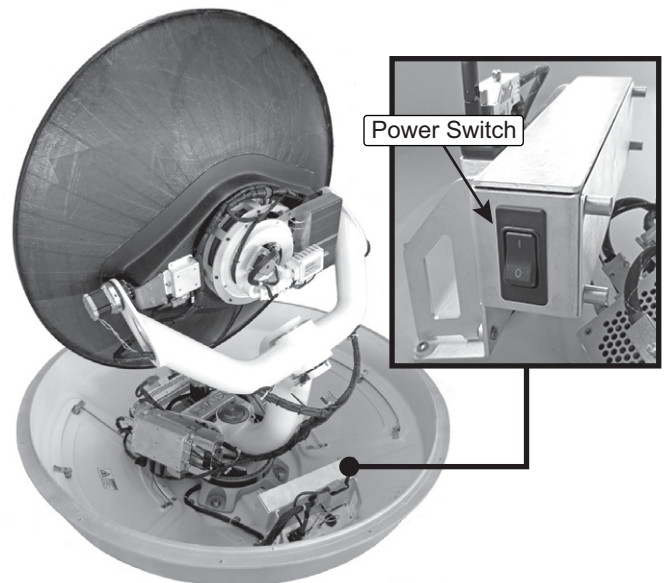
⑪ Prepare the Data Cable

Follow these steps to attach the supplied grounding sleeve to the antenna's data cable.

a. At the ICM location, cut the end of the antenna's data cable to the desired length, being sure to maintain an 8" (20 cm) service loop in the cable for easy serviceability.

b. Using a ruler, measure 7.5" (19 cm) back from the end of the cable. Then, using a utility knife to carefully cut in a rocking motion, sever only the cable's plastic jacket (outer-most layer) (see Figure 33). Then twist off the severed length of the plastic jacket.

c. Measure 6" (15 cm) back from the end of the cable. At that point, carefully pinch the cable braid to create a bulge. Then, using needle-nose cutting pliers, cut the braid along the center of this bulge (see Figure 34).

d. Cut the cable's drain wire, foil insulation, and fiber to the same length so that their ends are flush with the end of the cable braid (see Figure 35).

Figure 33: Removing the Cable Jacket
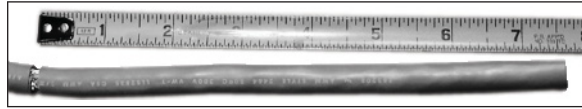
Figure 34: Cutting the Cable Braid Bulge

Figure 35: Cutting the Drain Wire, Foil, and Fiber

Drain Wire

Foil

Fiber
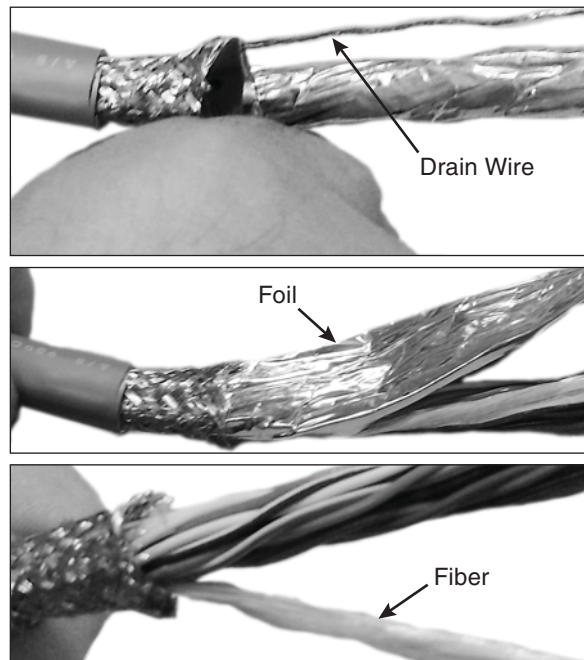
e. Thread the data cable through the supplied grounding sleeve. Position the grounding sleeve by aligning the end of its attached ground wire with the ends of the other wires in the data cable (see Figure 36).

f. Using a heat shrink gun, begin evenly heating the grounding sleeve at the end farthest from the end of the cable to create a seal with the cable's plastic jacket (see Figure 37).

g. Slowly begin applying heat evenly to the grounding sleeve moving toward the far end of the grounding sleeve until you reach the grounding sleeve's solder ring. Continue applying heat evenly to the ring until the ring's solder begins to wick into the cable braid. Then continue applying heat while working toward the grounding sleeve's remaining length (see Figure 38).

h. Thread the data cable through the heat shrink tubing (supplied in the kitpack). Align the tubing so that the grounding sleeve protrudes slightly and is barely visible (see Figure 38).

i. Begin heating the tubing to create a seal by applying heat and working from one end of the tubing, in the same direction you heated the grounding sleeve.

j. Strip a 1/4" (6 mm) length from the end of the grounding sleeve's ground wire. Then insert the wire into the supplied ring terminal and crimp it into place (see Figure 39).

k. Dress all of the data cable's wires. Strip back the insulation of each wire approximately 1/4" (6 mm) and gently twist each wire to ensure a good electrical connection.
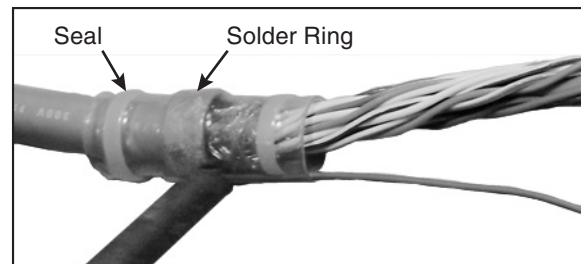
Figure 36: Aligning the Grounding Sleeve
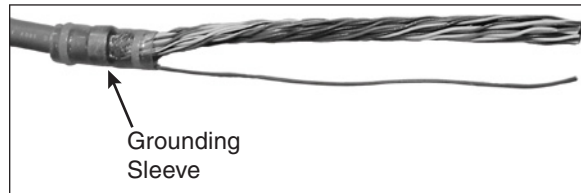
Grounding
Sleeve

Figure 37: Attaching the Grounding Sleeve

Seal   Solder Ring

Figure 38: Heat Shrink Tubing

Grounding   Heat Shrink
Sleeve   Tubing

Figure 39: Ring Terminal
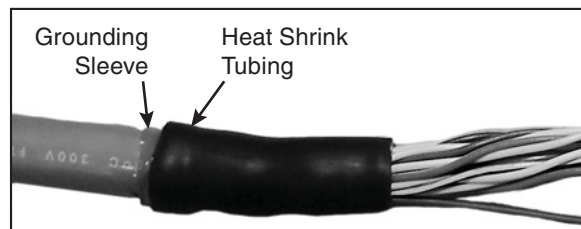
Ring
Terminal

⑫ Wire the ICM

Follow these steps to wire the belowdecks equipment (see page 52 for a complete wiring diagram).

Connect the Antenna Data Cable

a. Connect the antenna data cable to the supplied 16-position terminal strip connector as shown in Figure 40.

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

b. Place the terminal strip connector into the base of the supplied cable shroud as shown in Figure 41.

c. Secure the end of the data cable to the base of the shroud using the supplied clamp. This clamp will help relieve stress on the cable. Secure the clamp in place with the two screws.

d. Carefully fit all of the data cable's wires within the base of the shroud.

e. Snap the shroud's cover onto the base. Be sure not to pinch any wires between the cover and the base.

f. Plug the terminal strip connector into the rear panel of the ICM.

g. Connect the data cable's ground wire (attached to the grounding sleeve) to the ground screw on the rear panel of the ICM (see Figure 40).

Figure 40: Antenna Data Cable Wiring
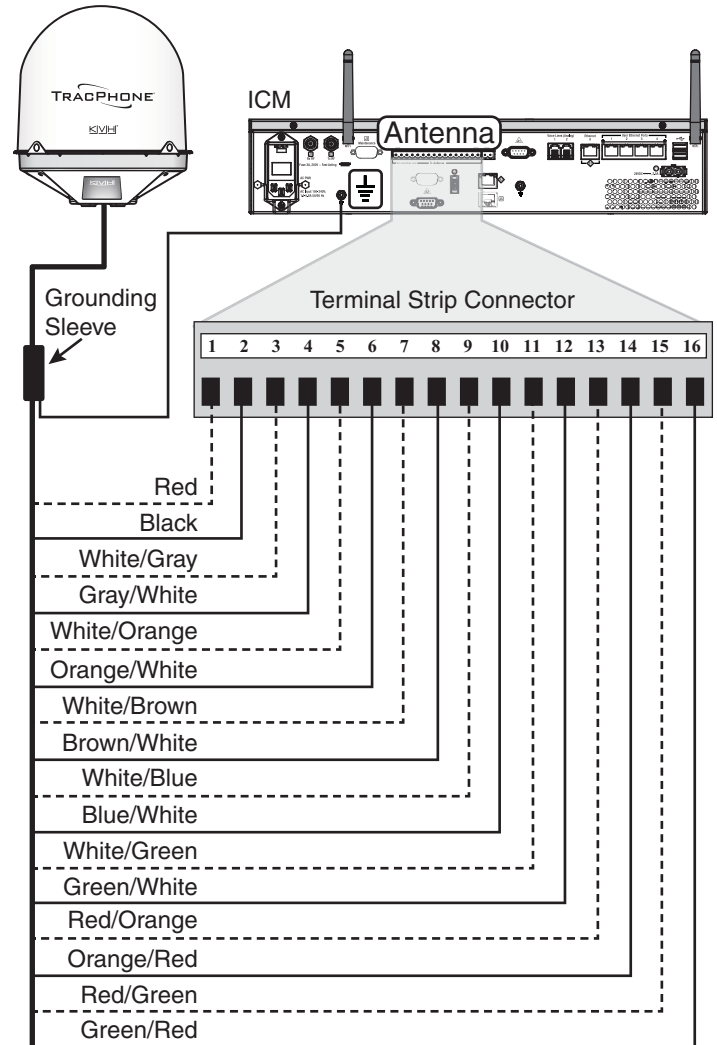
Figure 41: Data Cable Shroud
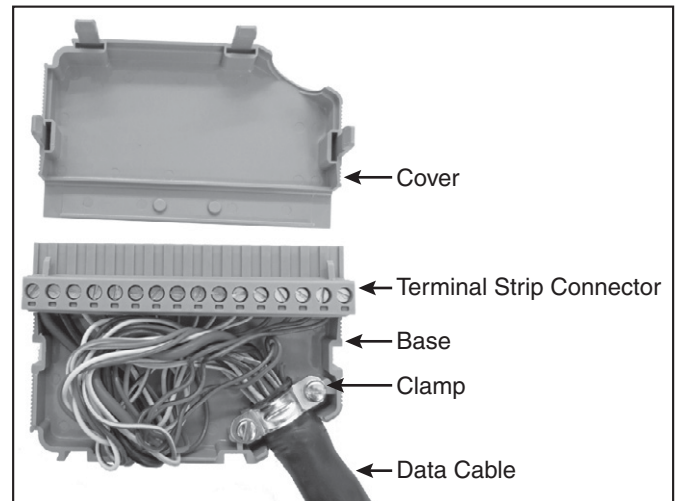
Connect a NMEA 0183 Talker

A vessel heading input is required for the antenna to track satellites above 80° in elevation. You can also provide a vessel position input to serve as a backup to the antenna's internal GPS.

If you want to supply both heading and position to the ICM, you can either connect a NMEA 0183 talker that transmits both messages, or connect two devices using a NMEA data multiplexer, such as Actisense® model NDC-4.

a. Configure the customer's NMEA 0183 talker(s) to transmit a compatible message or messages at 4800 baud (see Figure 42).

NOTE: The system does not accept messages that conform to the NMEA 2000 standard.

b. Make sure the data message(s) includes the checksum, identifiable by a ***xx** field at the end of the data sentence (e.g., $HEHDT,123.4, T***1F**). Do not exceed a 10 Hz input rate.

c. Connect the NMEA 0183 talker or NMEA data multiplexer to the supplied 2-position terminal strip connector as shown in Figure 43.

d. Plug the terminal strip connector into the rear panel of the ICM.

Connect the RF Cables

- **IMPORTANT!** -

If you are using LMR-600-75 RF cables, do not connect them directly to the ICM. Connect the supplied 1 ft (30 cm) LMR-400-75 pigtail cables in-line between the RF cables and the ICM.

a. Connect the RF coax cable labeled "RX" to the "Rx RF" jack on the back of the ICM (see Figure 44). Hand-tighten, then tighten with a 7/16" torque wrench set to 20 in.-lbs.

b. Connect the RF coax cable labeled "TX" to the "Tx RF" jack on the back of the ICM. Hand-tighten, then tighten with a 7/16" torque wrench set to 20 in.-lbs.

24

Figure 42: Compatible NMEA 0183 Inputs

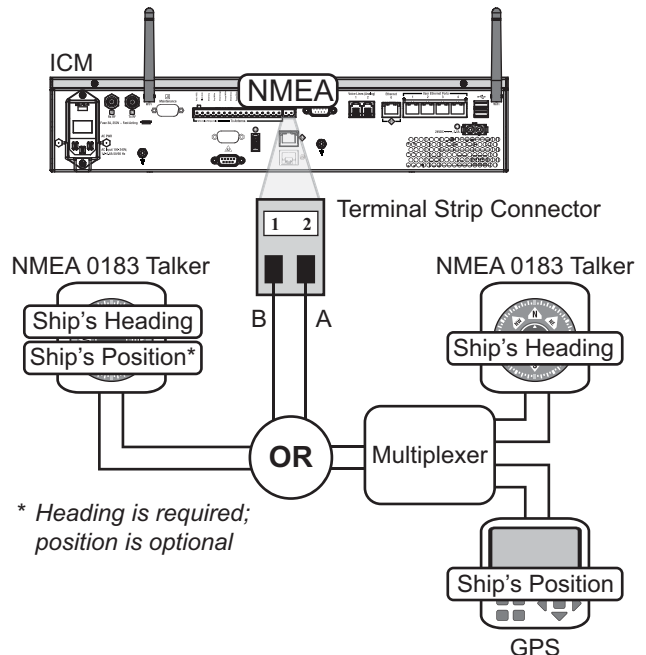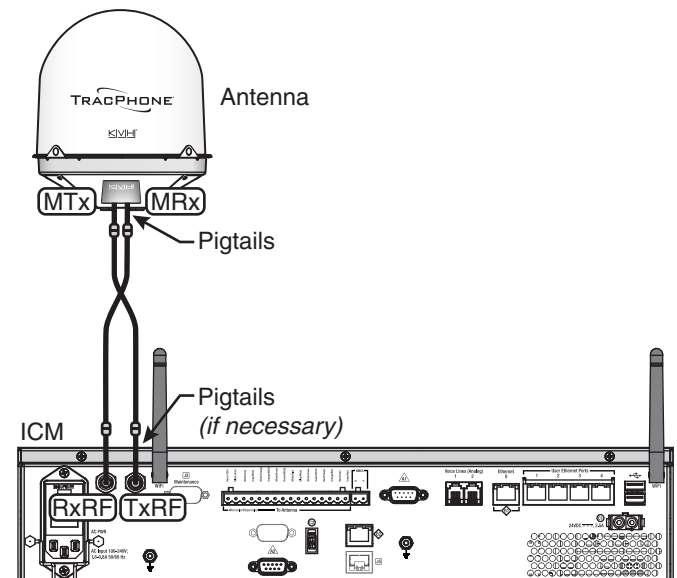| Data Type	Compatible Messages
True or Magnetic Heading	$--HDG $--HDM $--HDT $--OSD $--THS $--VHW
Position	$--RMC

Figure 43: NMEA Wiring

Figure 44: Antenna RF Transmit and Receive Wiring

13 Connect Power

Before you begin, be sure that you understand the following important requirements:

AC Power Requirements

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

Many 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). Although the TracPhone system can operate on this type of power, the excess voltage present on the second phase will cause a small amount of current to leak onto ship's ground. This leakage current might be unacceptable on some vessels. So check with the customer or ship's electrician and get permission before you run the system on two-phase power. Also be sure to ground the system (see below).

If two-phase power is the only available power source onboard, and if leakage current is unacceptable, KVH recommends that you install a suitable isolation transformer to supply single-phase power to the antenna system and run a ground wire from the transformer to ship's ground. In addition, since ground fault protection devices cannot detect faults behind a transformer, you will also need to install a ground fault monitoring device between the isolation transformer and the antenna system if ground fault protection is required on the vessel.

Grounding Requirements

Proper grounding of the TracPhone system to ship's ground is critically important, as it protects the equipment from lightning and electrostatic discharges (ESD). Failure to ground both the chassis of the ICM and the antenna's AC power cable to the ship's common ground risks damage to the antenna and electric shock.

Figure 45: AC Power Options

25
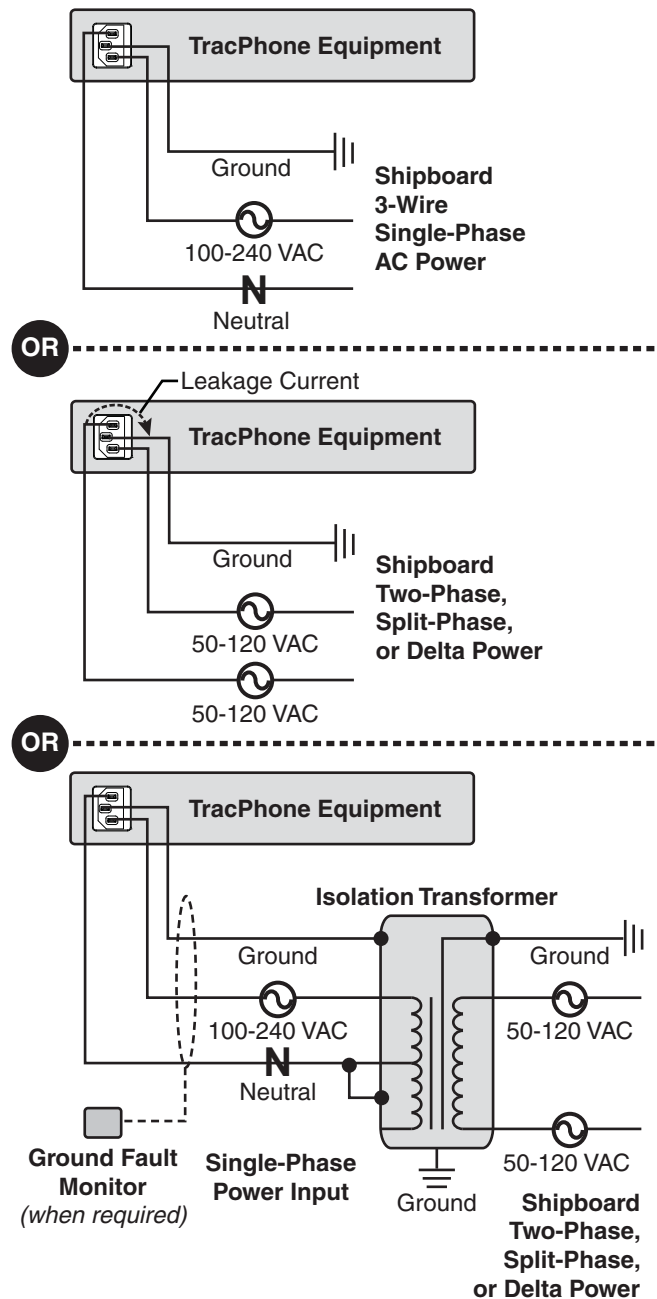
13 Continued Connect Power

Follow these steps to connect power.

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

b. Connect the supplied ground wire from the ground screw on the ICM rear panel to ship's ground (see Figure 46).

c. Connect the supplied AC power cord to the ICM.

⚠ **WARNING**

Failure to ground the TracPhone system properly to ship's ground 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 2 volts. Therefore, always measure the difference in potential between chassis ground and ship's ground to make certain that there is no dangerous floating ground condition, even if the ground pin of the vessel's AC power plug appears to be intact.

---

d. Using tie-wraps, secure all cables to the strain-relief bracket at the back of the ICM (see Figure 47). Leave enough slack for easy serviceability.

e. Plug the ICM power cord into the vessel's 100-240 VAC supply.

f. Connect the antenna's power cable to the vessel's 100-240 VAC supply via a marine-grade circuit breaker (or equivalent) that complies with applicable electrical codes and safety standards. If the breaker is not within sight of the antenna, it must be able to be locked open. **Be sure to connect the cable's ground wire to the ship's common ground.**

NOTE: Consider installing an uninterruptible power supply (UPS) to avoid service interruptions during power outages and transitions to/from shore power.
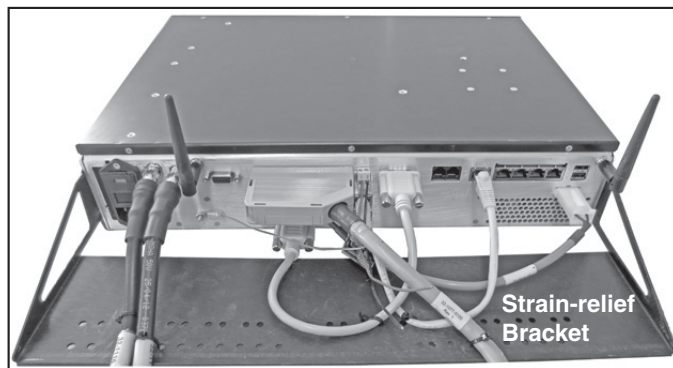
Figure 46: Power Wiring
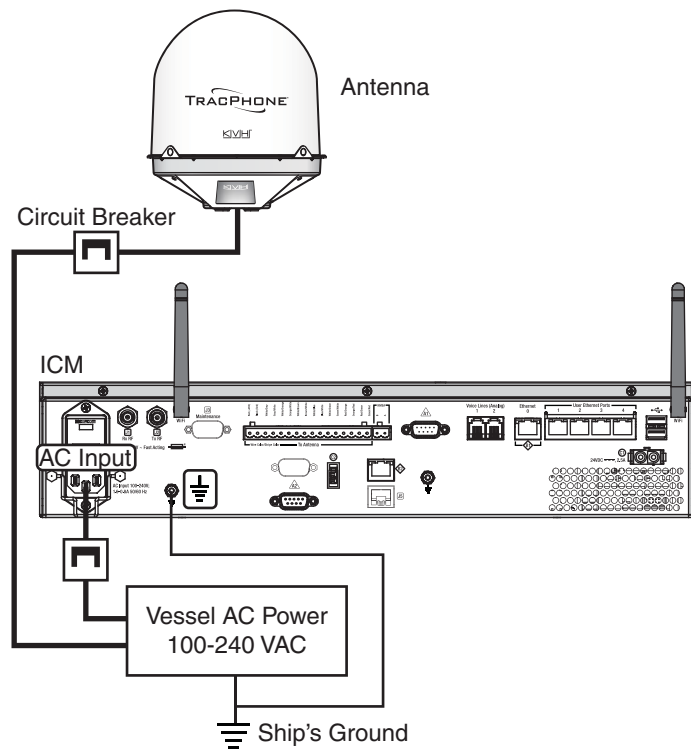
Figure 47: Strain-Relief Bracket

Note: This photo is just an example. Not all of the cables shown here may be required for your system's installation.

⑭ Turn On the System

Follow these steps to turn on the system.

a. Double-check all of your wiring.

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

c. Apply vessel power to the TracPhone system.

d. Press the power button on the front of the ICM (see Figure 48). The button's light should illuminate green.

e. Measure the AC and DC voltages between the ground point on the ICM's rear panel (chassis ground) and ship's ground. Make sure you measure less than 2 VAC/2 VDC.

f. Wait at least 5 minutes for system startup.

IMPORTANT!

Powering down (rebooting) in reaction to a perceived delay can corrupt the ICM's CompactFlash (CF) card.

IMPORTANT!

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

---

g. After the startup sequence is complete, verify that the ICM's Control Unit status light is lit solid green and the Antenna and Modem lights are lit solid or flashing green (see Figure 49).

h. Connect your PC to the "User Ethernet 1" port on the rear panel of the ICM (see Figure 50).

i. Open a web browser on your PC and enter the following address: **http://minivsat.kvh**.

Verify that the web interface appears in your browser. If the web interface is not displayed, enter the ICM's IP address *(you can find this address on the LCD: go to Settings > Network Settings > IP Assignments)* and make sure your PC is configured for DHCP addressing (see page 47).

Figure 48: Power Button
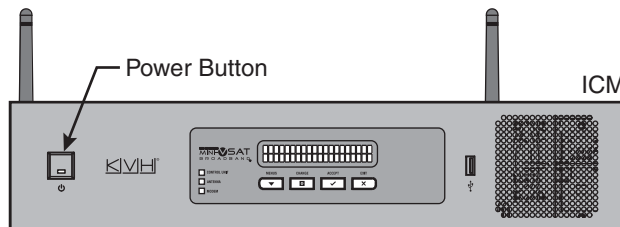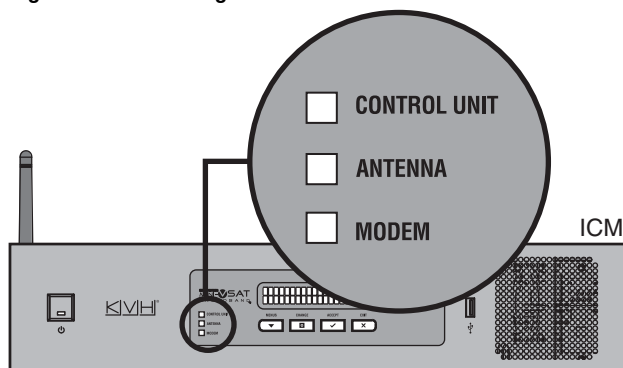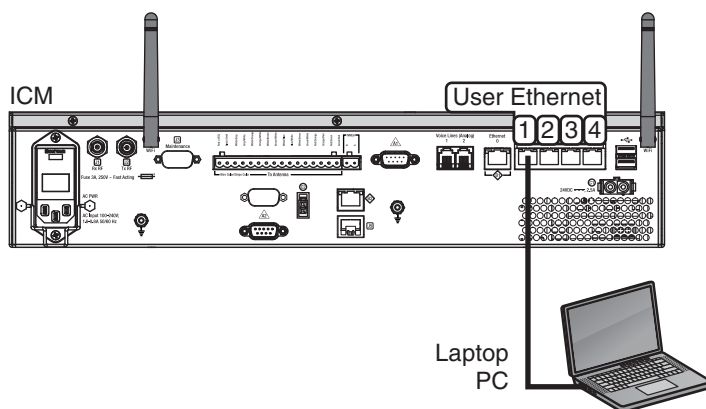

Figure 49: Status Lights

Figure 50: Connecting Your Laptop to the ICM

15 Update the System Software

If Necessary

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

Check the Current Software Version

a. Go to the TracPhone V11-IP web interface and click the **Updates** tab. Note the displayed ICM/Antenna software version (see Figure 51).

b. If the reported software version is earlier than the latest version you downloaded from the KVH Partner Portal, update the system following the steps below.

Update the Software, If Necessary

NOTE: This procedure explains how to update the software using the TracPhone V11-IP web interface. However, you can also update the software using the mini-VSAT iPhone®/iPod Touch® app, a USB drive, or, if the system is activated, via the antenna's Internet connection (airtime charges may apply). Details are available in the Help (www.kvh.com/ v11iphelp).

a. Click **Choose File**.

b. At the Login window, enter the default password: "**password**".

c. Click **Browse** and navigate to the file you saved on your laptop (see Figure 52).

d. Click **Check File**.

e. At the confirmation message, click **Update**.

f. Wait for the software update to complete. It might take up to 40 minutes.

Figure 51: Updates Page on Web Interface
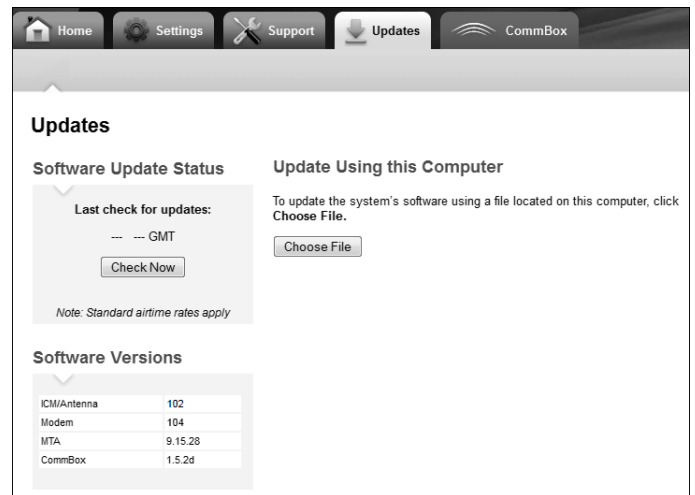
Figure 52: Update File Selected for Upload
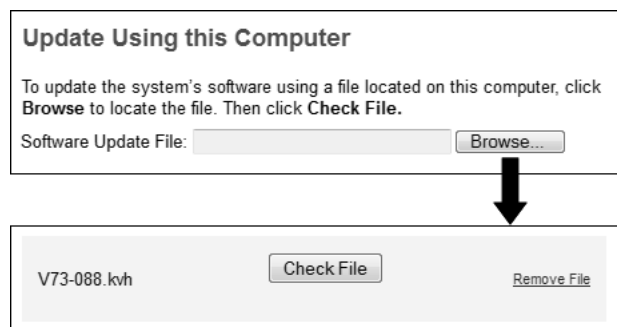
16 Customize the Web Interface

Follow these steps to customize the web interface for the customer's use.

Set the Administrator Password

The user must be logged in as an administrator to make changes to the system's configuration. Follow these steps to change the administrator password to something unique.
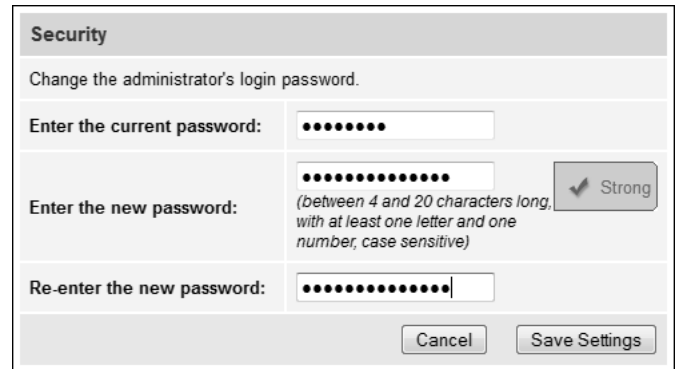
a. At the TracPhone V11-IP web interface, click the **Settings** tab. Then click **Account**.

b. In Security, click **Edit**.

c. For the current password, enter the default password: "**password**" (see Figure 53).

NOTE: The password must be between 4 and 20 characters in length, with at least one letter and one number, case-sensitive.

d. Enter and then re-enter the new password. Then click **Save Settings**.

Enter the Vessel Name

The vessel name is displayed on the home page and in all support communications. Follow these steps to enter the correct vessel name.

a. At the TracPhone V11-IP web interface, click the **Settings** tab. Then click **Account**.

b. In Vessel Name, click **Edit**.

c. Enter the vessel name (see Figure 54). Then click **Save Settings**.

Assign Phone Line Name(s)

The phone line names are displayed on the home page and in all support communications. Follow these steps to assign a name (i.e., location) to each active phone line (second line is optional).
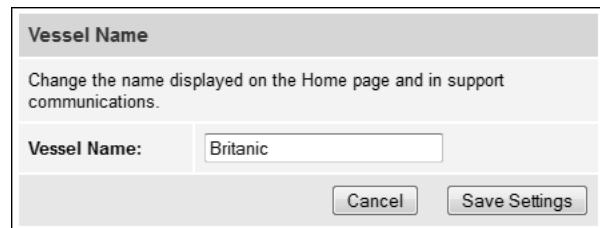
a. At the TracPhone V11-IP web interface, click the **Settings** tab. Then click **Other**.

b. In Phone Line Names, click **Edit**.

c. Enter names for Lines 1 and 2, as needed (see Figure 55). Then click **Save**.
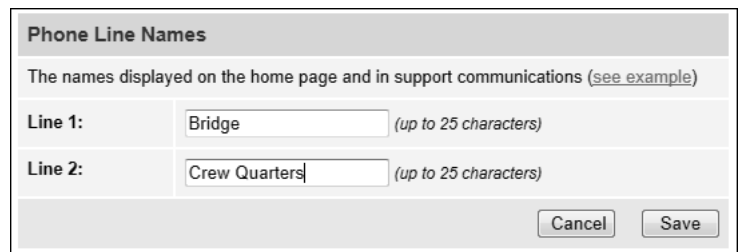
Figure 53: Setting the Administrator Password

Figure 54: Entering the Vessel Name

Figure 55: Assigning Phone Line Names

17 Set Up No-Transmit Zones

To prevent exposure to RF energy (see the hazard area illustration on page 1), you can configure up to two no-transmit zones for areas where crew and/or passengers frequent (see Figure 56). The system will disable the transmitter whenever the antenna is pointing within one of these zones.

Follow these steps to set up a no-transmit zone.

a. Determine the necessary azimuth range for the no-transmit zone(s). You will need to enter, in clockwise order, beginning and ending azimuths that define the outer boundaries of the zone(s) **relative to the antenna's forward arrow**, which should be pointing toward the bow (see Figure 57).

b. Determine the necessary elevation range for each no-transmit zone(s) (see Figure 58).

NOTE: Each no-transmit zone must span at least 5° in both azimuth and elevation.

Optional

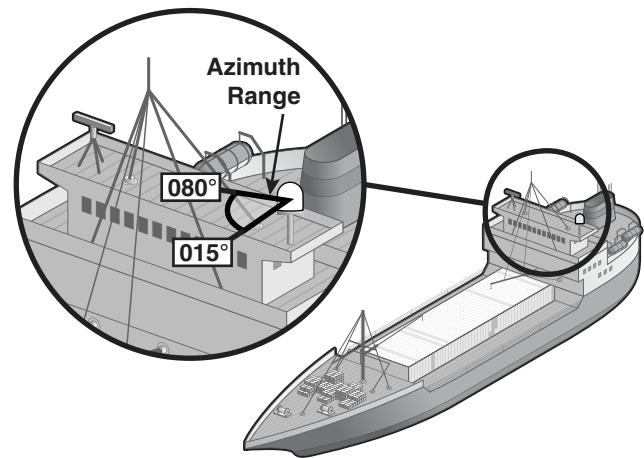Figure 56: Example of No-Transmit Zone Azimuth Range

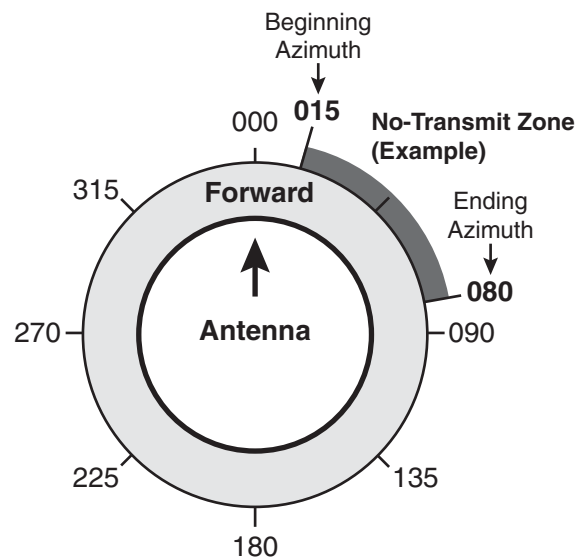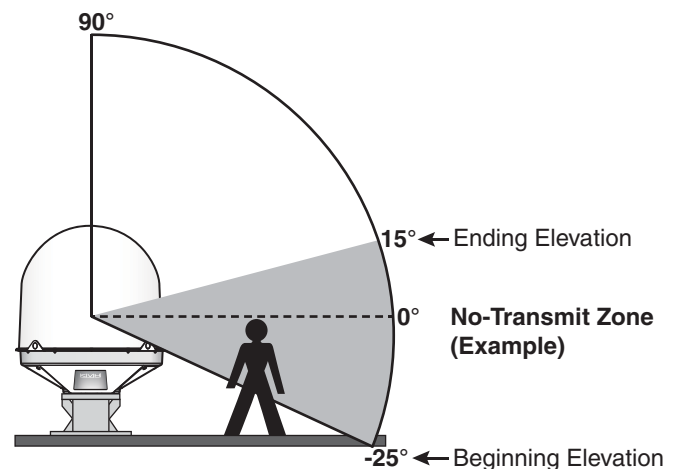Figure 57: Azimuths Relative to Antenna's Forward Arrow

Figure 58: Example of No-Transmit Zone Elevation Range

c. At the TracPhone V11-IP web interface, click the **Settings** tab. Then click **No-Transmit Zones**.

d. Click **Edit**.

e. Make sure **Enforce Zones** is selected (see Figure 59).

f. Enter the azimuth and elevation ranges for Zone 1.

g. If you need to set up a second zone, select Zone 2 from the drop-down menu then enter the azimuth and elevation ranges for Zone 2.

h. Click **Save Settings**.

i. At the confirmation message, click **Save**.

Figure 59: No-Transmit Zones Page of Web Interface

⓲ Set Up Tracking Avoidance Zones

Optional

You can configure up to five tracking avoidance zones for areas where there may be partial blockage or RF interference. Whenever the antenna is tracking a satellite in the direction of a tracking avoidance zone, it will switch to a different satellite if one is available.

Follow these steps to set up a tracking avoidance zone.

a. Determine the necessary azimuth range for the zone(s). You will need to enter, in clockwise order, beginning and ending azimuths that define the outer boundaries of the zone(s) **relative to the antenna's forward arrow**, which should point toward the bow.

b. Determine the necessary elevation range for each zone.

NOTE: Each no-transmit zone must span at least 5° in both azimuth and elevation.

c. At the TracPhone V11-IP web interface, click the **Settings** tab. Then click **Tracking Avoidance Zones**.

d. Click **Edit**.

e. Enter the azimuth and elevation ranges for Zone 1. Then select the **Enabled** check box (see Figure 60).

f. Set up any additional zones by selecting a zone number from the drop-down menu and repeating step e for the selected zone.

g. In the Time in Zone box, enter the maximum number of minutes (between 1 and 60) during which the antenna will be allowed to track within a tracking avoidance zone. This precludes switching satellites in cases when the antenna is simply passing through a zone while the vessel is turning.

h. Click **Save Settings**.

i. At the confirmation message, click **Save**.

Figure 60: Tracking Avoidance Zones Page of Web Interface

⑲ Test the System

Follow these steps to test the system for proper operation.

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

b. Verify that the antenna is tracking the service satellite and the system is online, as indicated by the Home page of the TracPhone V11-IP web interface (see Figure 61).

c. On the Home page, make sure the vessel's heading is displayed in the Real-time Vessel & VSAT Satellite Display (see Figure 62). If it is not shown, check your wiring to the NMEA 0183 talker.

d. Enter the following address in your web browser: **http://test.minivsat.net**.

Verify that the Welcome page appears, indicating good communications between the TracPhone system and the land-based hub (see Figure 63).

e. Turn on all other electronic equipment above deck within the proximity of the antenna. Verify that the system continues to operate without any degradation in performance.

f. 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 61: Good Service Connection Indicated on Home Page

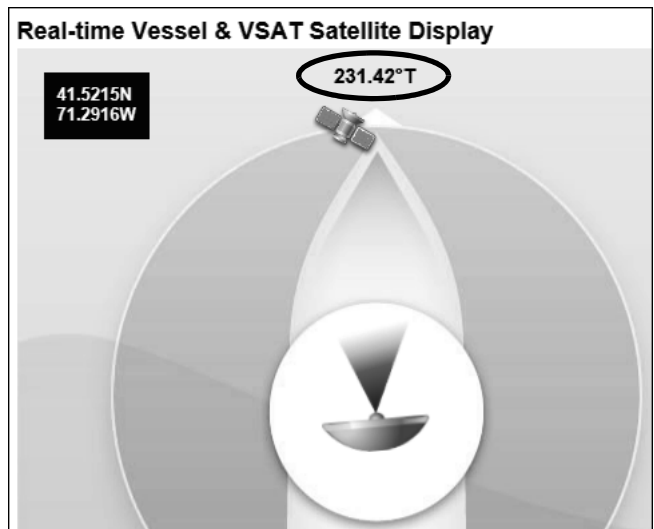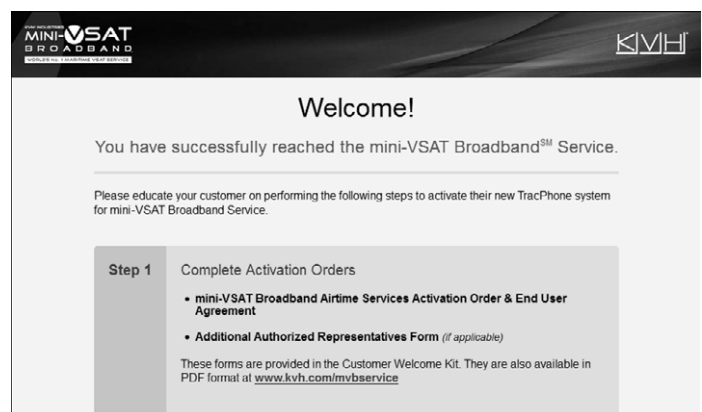Figure 62: Heading Displayed on Home Page

Figure 63: Welcome Page for Testing

20 Configure the Network

The ICM includes four Ethernet ports and a built-in wireless access point (WAP) that can be configured in a variety of ways to meet the customer's needs (see Figure 64). Some of the most common ICM network configurations can be selected directly from the TracPhone V11-IP web interface. Follow these steps to select one of these configurations. If the customer requires a custom configuration, please contact KVH Network Services at networkservices@kvh.com. If you need to connect a Media Server for IP-MobileCast™ service, see "Optional Media Server for IP-MobileCast" on page 40.

NOTE: The customer may also change the ICM's network configuration at the myKVH web portal (www.mykvh.com). To access myKVH, the customer will need to log in with the username and password provided by KVH at the time of activation.

a. At the TracPhone V11-IP web interface, click the **Settings** tab. Then click **Network Settings**.

b. In Network Configuration, click **Edit**.

c. Select an option from the **Configuration** drop-down menu. Then click **Save** (see Figure 65 and Figure 66).

d. At the confirmation message, click **Save**.

e. Follow the additional instructions on the following pages for your chosen configuration.

    Standard: Go to page 35

    Static IP: Go to page 36

    Crew: Go to page 37

    Dual Dome: Go to page 38

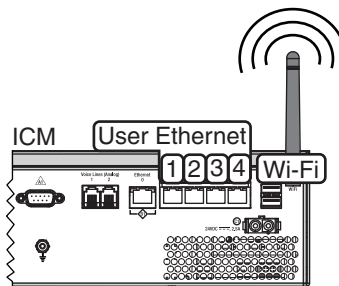Figure 64: ICM Ethernet Ports and Wireless Access Point
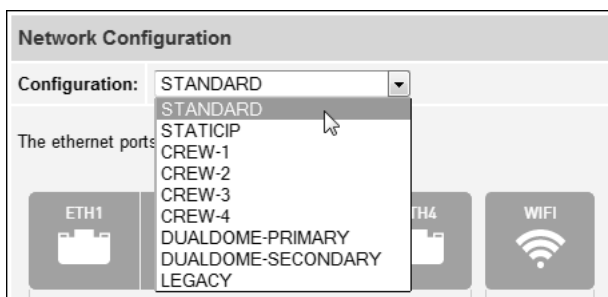

Figure 65: Selecting a Network Configuration

Figure 66: User Selectable Network Configurations

Option	Description
Crew-1	Ports 1-3: Unrestricted access Port 4, Wi-Fi: User login required
Crew-2	Ports 1-2: Unrestricted access Ports 3-4, Wi-Fi: User login required
Crew-3	User login required
Crew-4	Ports 1-2: Unrestricted access Port 3, Wi-Fi: User login required Port 4: Static IP service
Dual Dome - Primary	For dual antenna installation only; Ports 1-3, Wi-Fi: Unrestricted access Port 4: Connect to secondary system
Dual Dome - Secondary	For dual antenna installation only; No user access; connect to primary
Legacy	Not used with TracPhone V11-IP
Standard (default)	Unrestricted access to Internet
Static IP	Ports 1-3, Wi-Fi: Unrestricted access Port 4: Static IP service

Standard Configuration

In a standard configuration, all four User Ethernet ports and the built-in WAP provide direct Internet access without a user login. This is the default configuration. Follow these additional steps to configure the network.

a. To enable the ICM's WAP for wireless access, follow the steps in "ICM Wireless Settings" on page 39.

b. Connect the customer's computers and/or other network devices to the ICM (see Figure 68). For example, you might wish to add an external WAP (or Wi-Fi router configured for bridge mode) to supplement Wi-Fi access.

c. Make sure all computers are configured for DHCP addressing (see page 47). Devices connected to the ICM (via Ethernet cables or Wi-Fi) will receive IP addresses from the ICM via DHCP (see Figure 68). The ICM serves as a router.

NOTE: By default, the ICM has a gateway of 192.168.5.1 and assigns IP addresses in the 192.168.5.100-200 range. If this configuration conflicts with an existing onboard network, you may change the settings at the TracPhone V11-IP web interface (go to Settings > Network Settings).

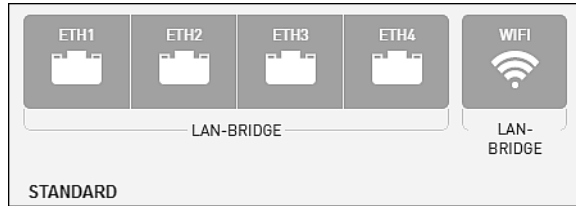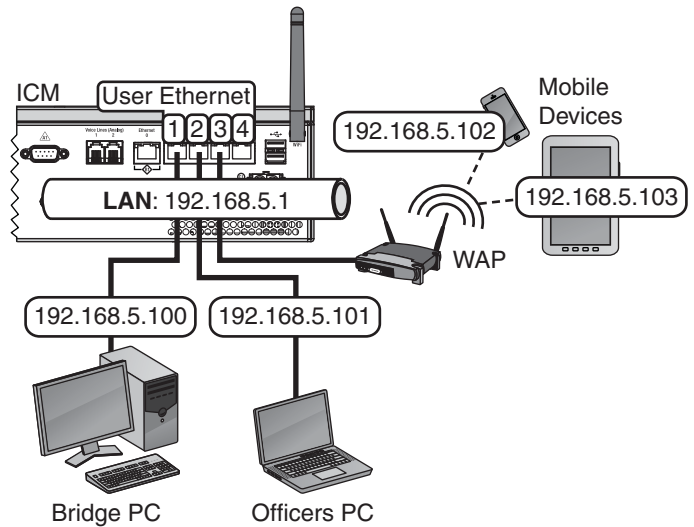Figure 67: Standard Configuration

Figure 68: Standard Configuration Wiring Example

Static IP Configuration

In a static IP configuration, a network device is assigned an IP address that can be accessed directly from the Internet. It does not receive an IP address from the ICM. Follow these additional steps to configure the network.

> **IMPORTANT!**
>
> A static IP address should only be assigned to a secure device, such as a firewall router.

a. Ask the customer to fill out the request form at **www.kvh.com/staticip**. In addition, the system must be activated for mini-VSAT Broadband service, and it must remain online until KVH configures the system over the air.

b. Connect the static IP device to "User Ethernet" port 4 on the ICM.

c. The customer will need to configure the device's TCP/IP properties according to the instructions KVH will provide in an email upon fulfilling the static IP request.

d. Connect all other (non-static IP) computers and/or network devices to "User Ethernet" ports 1-3 and Wi-Fi, as required. These ports and the built-in WAP provide direct Internet access without a user login. Follow the steps in "Standard Configuration" on page 35.
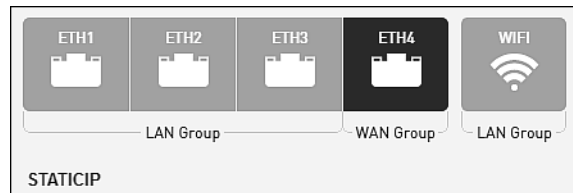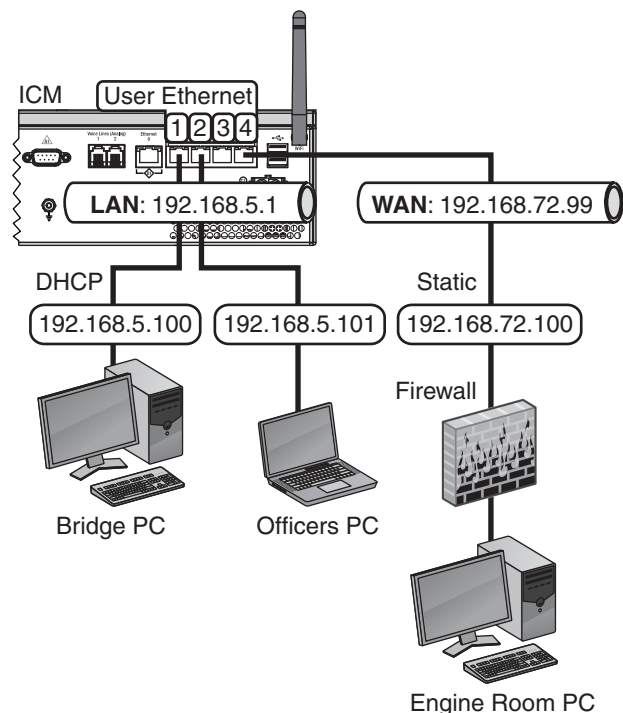
Figure 69: Static IP Configuration

Figure 70: Static IP Configuration Wiring Example

Crew Configurations

The crew configurations allow the customer to control user access to the system's Internet connection. Each crew configuration has certain ports (and Wi-Fi) designated as "Crew LAN." Users who connect to the system via one of these ports (or Wi-Fi) will be required to enter their user name and password to access the Internet. Once a user has consumed his/her data allotment for the current time period (e.g., day, week, or month), access to the system is denied until the next time period begins and the user's full allotment is restored. The "Ops LAN" ports, if any, provide direct Internet access without a user login. Follow these additional steps to configure the network.

a. Connect the Crew computers and/or network devices to the "User Ethernet "ports on the ICM that are designated "Crew LAN." (These ports require a user login.) Follow the steps in "Standard Configuration" on page 35.

b. Connect the Operations computers and/or network devices to the "User Ethernet" ports on the ICM that are designated "Ops LAN," if any. (These ports provide unrestricted access.) Follow the steps in "Standard Configuration" on page 35.

c. Inform the customer that they need to set up all of the user names/passwords and allocate data to each user at the myKVH web portal (**www.mykvh.com**).

Figure 71: Crew Configurations

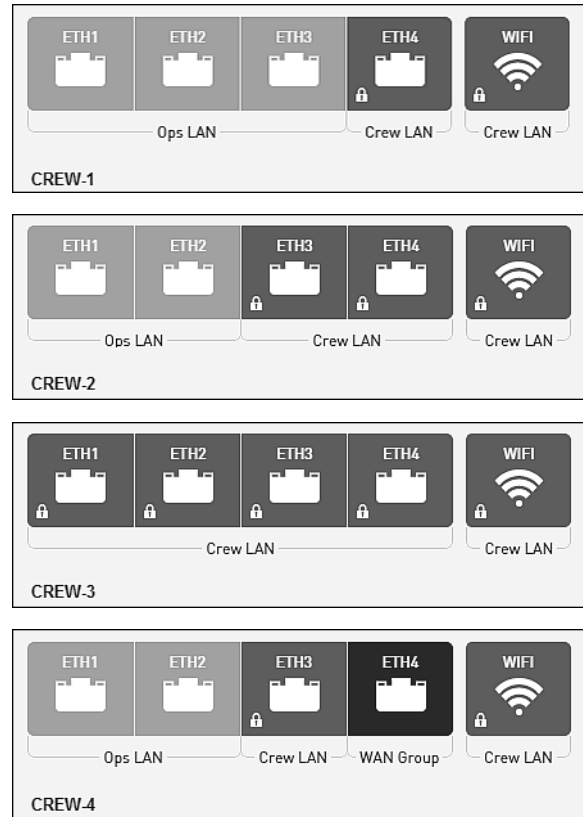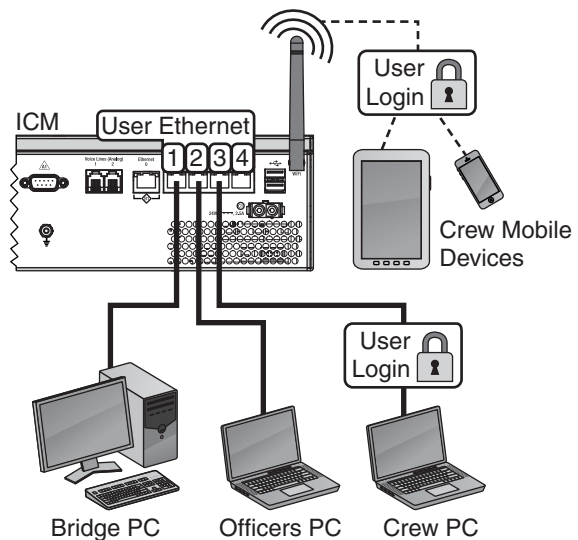Figure 72: Crew-2 Configuration Wiring Example

Dual Dome Configuration

The dual dome configuration allows you to connect a second TracPhone V-IP Series antenna as a backup system. Whenever the primary system loses its connection to the mini-VSAT Broadband service, all voice and data traffic will automatically get routed to the secondary system.

IMPORTANT!

The dual dome configuration only supports a second TracPhone V-IP Series antenna. To use another type of antenna, contact Network Services at networkservices@kvh.com.

---

a. Install the secondary TracPhone system according to the instructions in the Installation Guide.

b. Once the secondary TracPhone system is online, contact KVH Technical Support to request a dual dome configuration on the secondary system's ICM. KVH will need to modify a setting over the air.

c. Connect your laptop to the secondary system. At the web interface, select the **Dual Dome-Secondary** network configuration.

NOTE: Once the secondary system is configured for Dual Dome-Secondary, you will need to enter 192.168.0.10 (and not minivsat.kvh) to access the secondary system's web interface.

d. Connect your laptop to the primary system. At the web interface, select the **Dual Dome-Primary** network configuration.

e. Connect an Ethernet cable from any "User Ethernet" port on the secondary system's ICM to "User Ethernet" port 4 on the primary system's ICM (see Figure 74).

f. Connect the customer's computers and/or network devices to "User Ethernet" ports 1-3 and Wi-Fi on the primary system's ICM. These ports and the built-in WAP provide direct Internet access without a user login. Follow the steps in "Standard Configuration" on page 35.
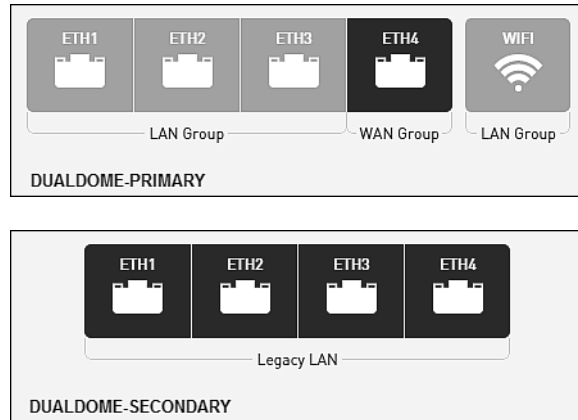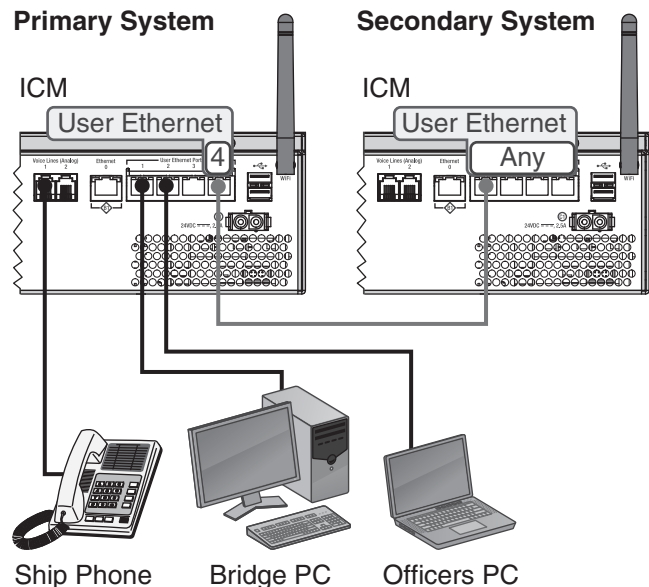
Figure 73: Dual Dome Configurations

Figure 74: Dual Dome Wiring Example

ICM Wireless Settings

With Wi-Fi enabled, vessel devices can connect to the ICM via its built-in wireless access point (WAP) and receive IP addresses from the ICM via DHCP (see Figure 75). Follow these steps to enable and configure the WAP, if desired by the customer.

> **IMPORTANT!**
>
> Establishing a wireless connection onboard a steel vessel might require a special external WAP and advanced networking expertise.

NOTE: The customer may also change the ICM's wireless settings at any time at the myKVH web portal (www.mykvh.com).

a. At the TracPhone V11-IP web interface, click the **Settings** tab. Then click **Network Settings**.

b. In Wi-Fi Settings, click **Edit**.

c. Set the following wireless options, then click **Save** (see Figure 76):

- **State:** Select On.

- **SSID**: Enter a unique name for the vessel network.

- **Protocol**: Select either 802.11b or 802.11g.

- **Security**: Select either security type – WPA2 or WEP (128-bit).

- **Password/Passphrase**: If you selected WPA2, enter a password (between 8-20 characters). If you selected WEP, enter a passphrase (must be 13 characters).

- **Channel**: Keep the default, or select any channel for wireless communications.

> **IMPORTANT!**
>
> Failure to apply security settings will make the vessel's wireless network vulnerable to outside intrusion.

d. At the confirmation message, click **Save**.
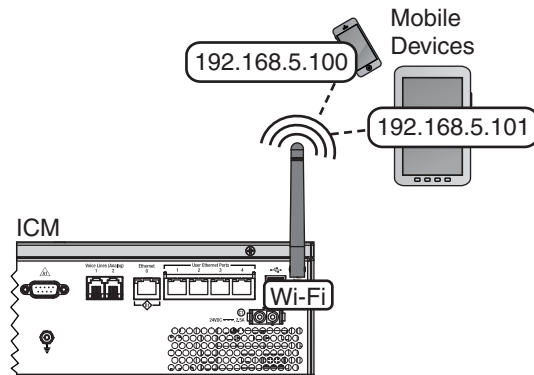
Figure 75: Wireless DHCP (Example)

Figure 76: Wi-Fi Settings on the ICM

Optional Media Server for IP-MobileCast

The IP-MobileCast service delivers licensed entertainment to commercial vessels and superyachts at sea without consuming the vessel's data plan or affecting data speeds. It also offers large file delivery services for critical ship operations, including chart updates, weather data, and crew training.

The optional Media Server (see Figure 78) stores all IP-MobileCast content downloaded from the mini-VSAT Broadband network (via the TracPhone antenna) and streams it locally to connected shipboard devices. If you need to connect a Media Server, the ICM must be set to one of the following network configurations:

- Static IP

- Crew-4

- Dual Dome-Primary/Dual Dome-Secondary

The Media Server requires a connection to the ICM's WAN Group, in addition to a LAN. Refer to the Media Server Installation Guide for complete details about installing and configuring the Media Server.

Optional CommBox Software

CommBox software extends the system's network capabilities. Two options are available:

- **Standard Bundle**: Provides least cost routing, onboard firewall, web caching, web image compression, ad removal, and URL and content filtering

- **Enterprise Bundle**: Adds automated file transfers, differential synchronization, mail relay server, web mail client, anti-spam and anti-virus filters, roaming crew accounts, and prepaid Internet and email services; integration with a CommBox hub is required

KVH will coordinate directly with the customer to select, install, and configure the appropriate bundle to meet their needs.

Figure 77: Available Network Options

Option	KVH Part No.
Media Server, Commercial	02-2103
Media Server, Superyachts	02-2104
CommBox Standard Bundle*	35-0010
CommBox Enterprise Bundle*	35-0011

** If the customer is interested in a CommBox solution, ask them to contact KVH Network Services at **networkservices@kvh.com** for a consultation.*

Figure 78: Media Server

21 Connect Voice Line Equipment

Follow these steps to connect the vessel's phone(s) and any purchased voice line accessories to the system.

Connect Vessel Phone(s)

Using the supplied RJ-11 cables, connect the customer's analog (not digital) phone(s), fax machine, and/or PABX to the desired "Voice Line" jack(s) on the ICM (see Figure 79). Each jack is linked to a phone line.

> **IMPORTANT!**
>
> The second phone line is optional – an additional monthly fee applies. If the customer has not purchased a second line, do not connect anything to "Voice Line 2."

Connect Optional Accessories

KVH offers the following accessories that extend the system's voice/fax service capabilities:

- **UCH-250 Fax Server**: Enterprise-grade fax solution; provides a dedicated fax line using a fully managed, store-and-forward fax service

- **Crew Calling Gateway**: Provides a dedicated phone line for crew members and charter passengers to place ship-to-shore voice calls using prepaid calling cards

Refer to the instructions provided with the accessory to connect it to the TracPhone system.

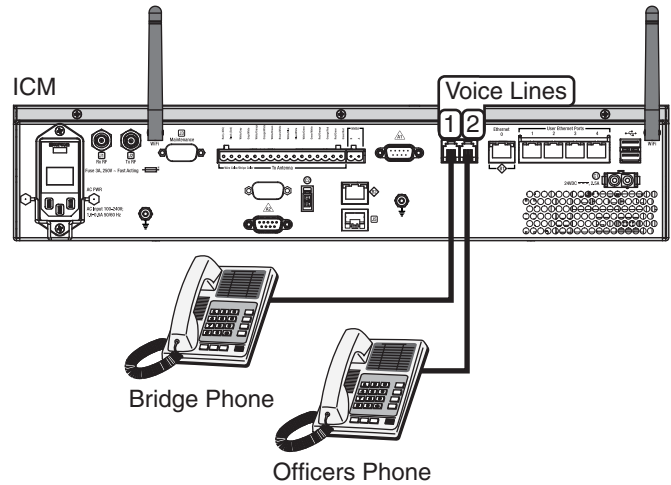Figure 79: Connecting Vessel Phones (Example)

Figure 80: Available Voice Line Accessories

Option	KVH Part No.
UCH-250 Fax Server	19-0520
Crew Calling Gateway*	72-0349

** As an alternative, one of the ICM's voice lines can be configured for Crew Calling functionality (KVH part no. 95-0036-1008). Contact KVH Network Services at **networkservices@kvh.com** for details.*

22 Educate the Customer

Give the Welcome Kit to the customer, make sure they know the administrator and Wi-Fi passwords, and show them how to use the system. Be sure they understand the following:

- **The antenna transmits RF energy that is potentially harmful.** Whenever the system is powered on, make sure everyone stays the minimum safe distance away from the antenna (see illustration on page 1). If no-transmit zones were set up, make sure the customer understands where they are.

- Read the End User Agreement carefully (available at **www.kvh.com/mvbcustomercenter**).

- Keep the radome and service hatches 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 82). Dirt buildup on the radome can also affect communications.

- The vessel must be located within the coverage area of the satellite (see **www.kvh.com/minivsatmap**).

- The system must be activated for mini-VSAT Broadband service (see **www.kvh.com/mvbservice**).

- Data usage and overage alerts via email and text message, as well as user logins and their associated data allocations, can be configured easily over the Internet at the myKVH web portal (see **www.mykvh.com**).

For More Information

Refer to the Help provided on the web interface's Support page (see Figure 83). The Condensed version is text only and resides on the ICM. The Extended version includes images and resides on the KVH website (airtime charges may apply).

NOTE: The Help is compatible with Mozilla Firefox, Internet Explorer, Google Chrome, and Apple Safari.

Figure 81: Customer Welcome Kit

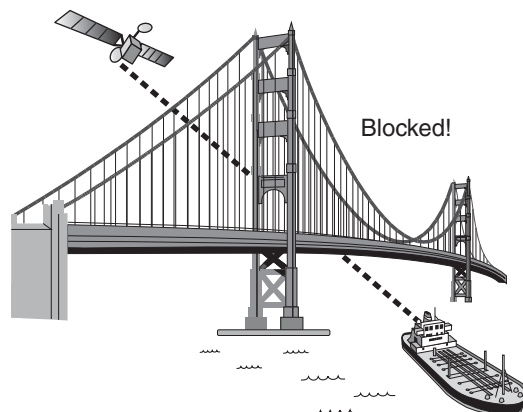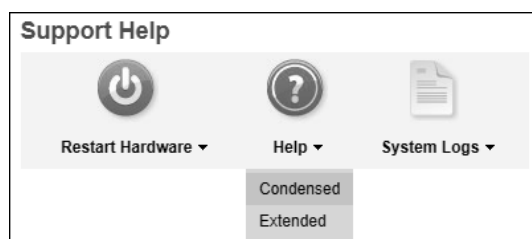Figure 82: Example of Satellite Blockage

Blocked!

Figure 83: Help Options on Support Page

A Terminating LMR RF Cables

Appendix

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. The same steps also apply to an LMR-600-75 cable, with the exception of the tools used.

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 84).

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 85). 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 86).

4. Insert the end of the cable into the #1 end of the ST-400EZ stripping tool (see Figure 87). 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 84: Cutting the Cable
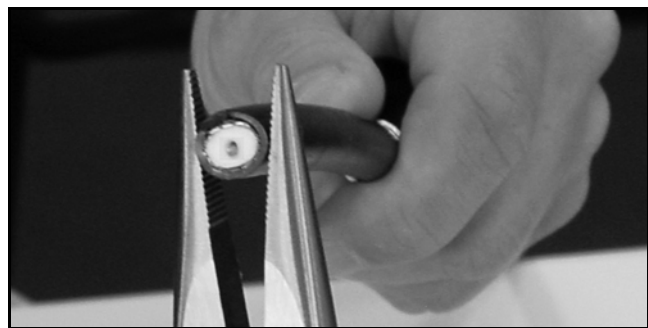
Figure 85: Reshaping the Cable

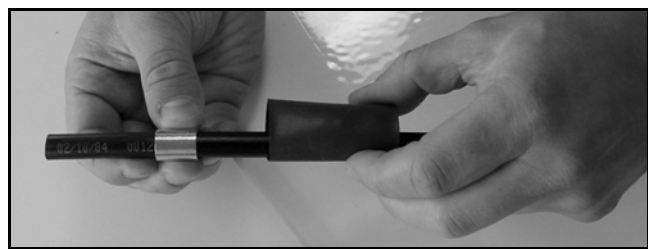Figure 86: Placing the Heat Shrink Tubing and Ferrule

Figure 87: Stripping the End to Expose the Center Conductor

5. Using a utility knife, carefully remove any residual plastic from the center conductor, if necessary (see Figure 88).

6. Insert the end of the cable into the #2 end of the ST-400EZ stripping tool (see Figure 89). 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 90).

7. Using the DBT-02 tool, deburr and chamfer the center conductor (see Figure 91). Avoid nicking the aluminum tape covering the dielectric.
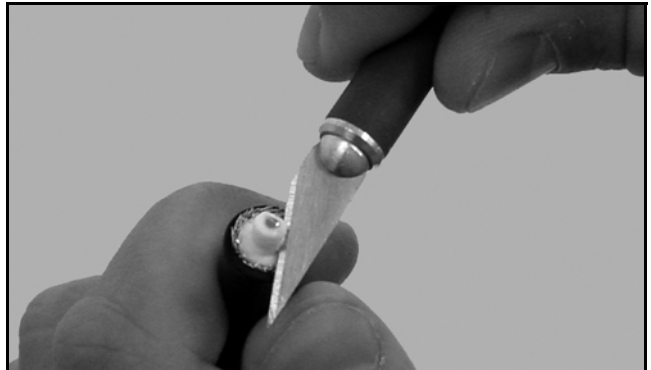
Figure 88: Removing Plastic Residue

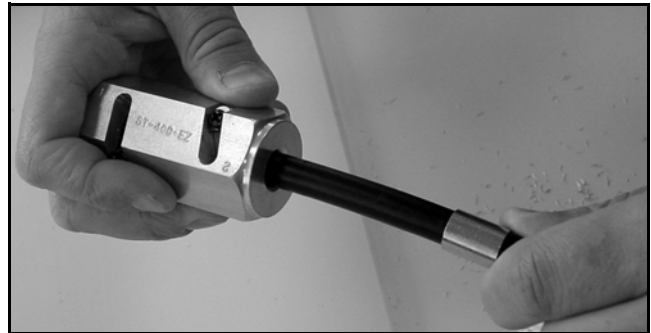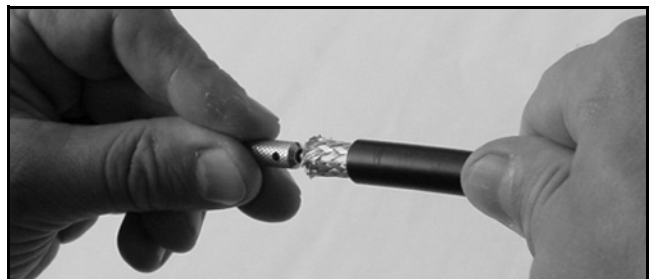Figure 89: Stripping the Cable Jacket

Figure 90: Cable Stripped, Exposing Dielectric

Figure 91: Deburring the Center Conductor

Appendix

8. Gently flare the braid with your fingers (see Figure 92).

9. Insert the end of the cable into the connector body until the dielectric is firmly seated inside the connector (see Figure 93). Make sure there is no gap between the knurled end of the connector and the cable jacket. Also be sure all braid wires remain on the outside of the connector.

IMPORTANT!

A common installation failure occurs when the connector is not seated properly onto the cable. In these cases, the cable's center conductor does not fully engage the electrical contacts inside the connector. To ensure full engagement, make certain that there is no gap between the cable jacket and the knurled end of the connector before you crimp on the ferrule. You may need to deburr and center the end of the conductor to achieve a good fit.

---

10. Trim any excess braid (see Figure 94), 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 95). Make sure there are no exposed strands of braid with the ferrule in place.

Figure 92: Flaring the Braid
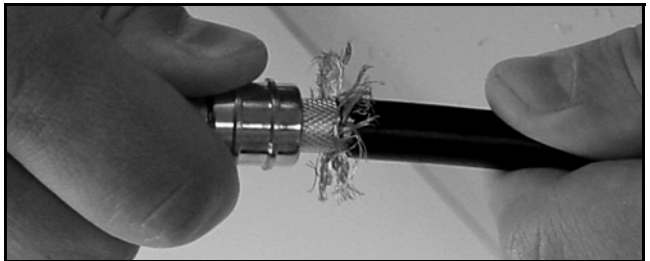

Figure 93: Pushing On the Connector
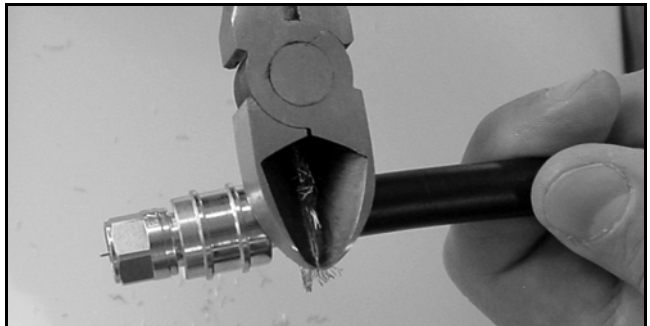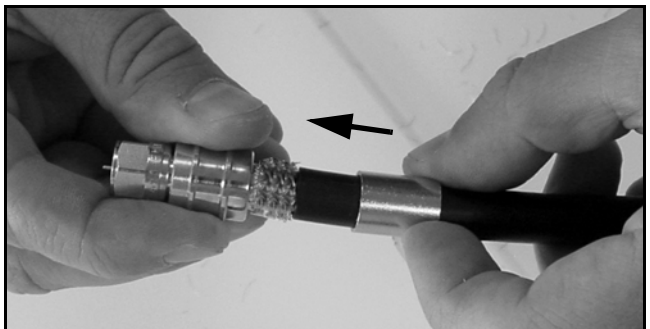

Figure 94: Trimming the Braid

Figure 95: Sliding the Ferrule Over the Braid

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 96). 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 97). 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" (5-7 mm) in length, to ensure proper engagement with the mating connector (see Figure 98).

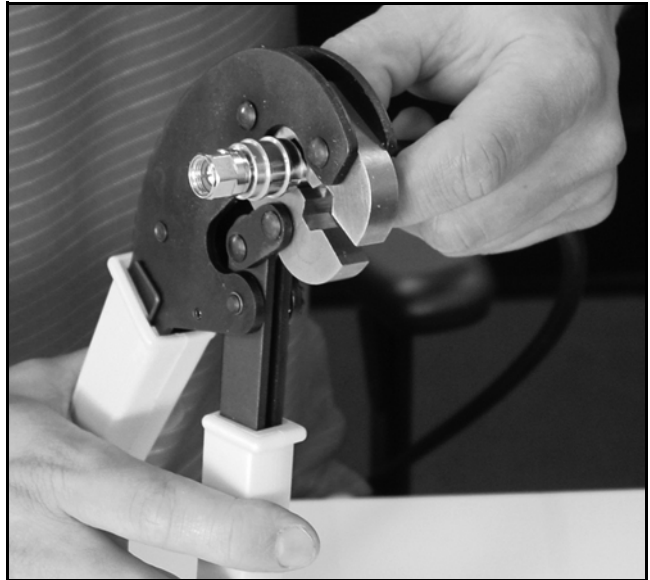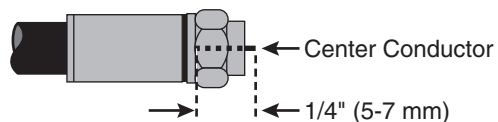**Figure 96: Crimping the Ferrule onto the Cable**

Figure 97: Applying the Heat Shrink Tubing

Figure 98: Proper Center Conductor Pin Length

Center Conductor

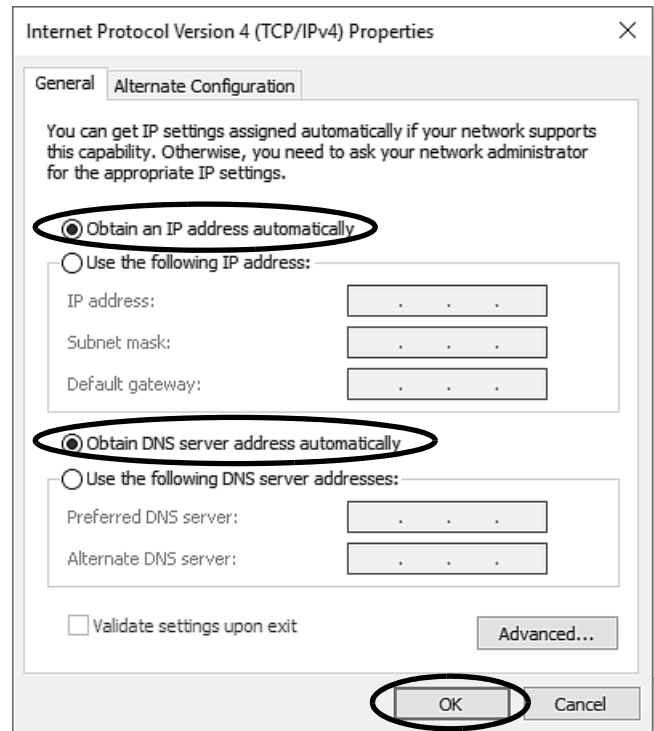1/4" (5-7 mm)

B Configuring Computers for DHCP

Follow these steps to configure your computer for DHCP to allow it to receive an IP address from the ICM. The location of this configuration setting varies slightly by operating system.

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 10

1. Turn on the computer.

2. Open the **Network and Sharing Center**. The easiest way to get there is to simply enter the name in the search box on the taskbar. *You can also navigate to it from the Start menu: Settings > Network & Internet > Ethernet > Network and Sharing Center.*

3. In Network and Sharing Center, click the **Ethernet** link for the Ethernet connection you are using.

4. In the Ethernet Status dialog box, click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Ethernet Properties dialog box, on the **Networking** tab, select **Internet Protocol Version 4**, and then click **Properties**.

6. In the Internet Protocol Properties dialog box, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 99). Then click **OK**.

7. In the Ethernet Properties dialog box, click **Close**. Then click **Close** in the Ethernet Status dialog box.

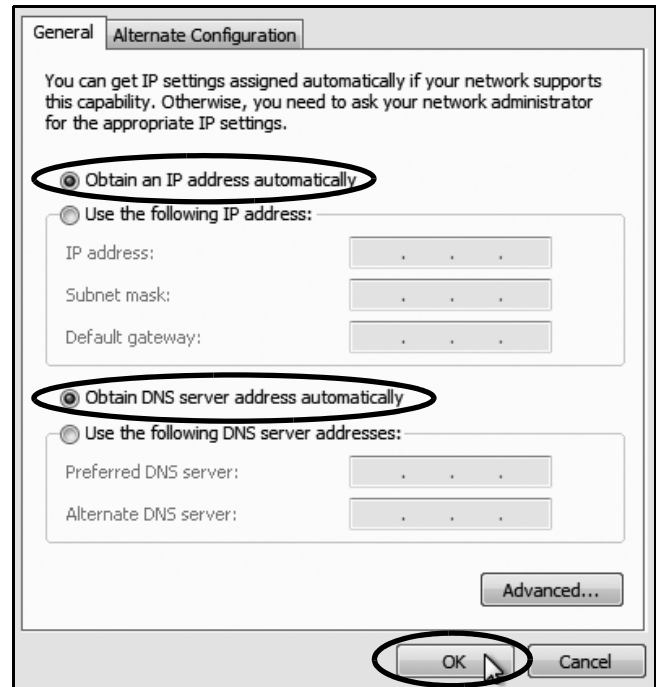Figure 99: Windows 10 - Internet Protocol Properties

Windows 8

1. Turn on the computer.

2. In Control Panel, double-click **Network and Sharing Center**. *To open the Control Panel, go to the desktop, select Settings from the Charms bar, then select Control Panel.*

3. In Network and Sharing Center, double-click the **Ethernet** link for the Ethernet connection you are using.

4. In the Ethernet Status dialog box, click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Ethernet Properties dialog box, on the **Networking** tab, select **Internet Protocol Version 4**, and then click **Properties**.

6. In the Internet Protocol Properties dialog box, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 100). Then click **OK**.

7. In the Ethernet Properties dialog box, click **Close**.

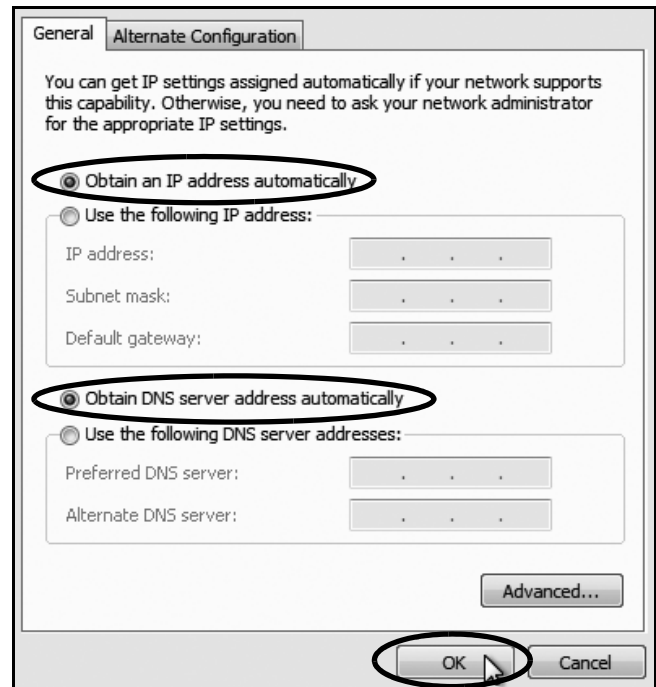Figure 100: Windows 8 - Internet Protocol Properties

B Continued Configuring Computers for DHCP

Windows 7 or Windows Vista

1. Turn on the computer.

2. In Control Panel, double-click **Network and Sharing Center**. (You might need to click **Network and Internet** first.) *You can find the control panel either through the Start menu or "My Computer."*

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

4. In the Local Area Connection Status dialog box, click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Local Area Connection Properties dialog box, click the **Networking** tab, select **Internet Protocol Version 4**, and then click **Properties**.

6. In the Internet Protocol Properties dialog box, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 101). Then click **OK**.

7. In the Local Area Connection Properties dialog box, click **OK**.

Figure 101: Windows 7/Windows Vista- Internet Protocol Properties

Windows XP

1. Turn on the computer.

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

3. In Network Connections, double-click the **Local Area Connection** for the Ethernet connection you are using.

4. In the Local Area Connection Status dialog box, click the **General** tab. Then click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Local Area Connection Properties dialog box, click the **General** tab, select **Internet Protocol (TCP/IP)**, and then click **Properties**.

6. In the Internet Protocol (TCP/IP) Properties dialog box, click the **General** tab. Then select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 102). Then click **OK**.

7. In the Local Area Connection Properties dialog box, click **OK**.

8. Restart the computer.

Figure 102: Windows XP - Internet Protocol (TCP/IP) Properties
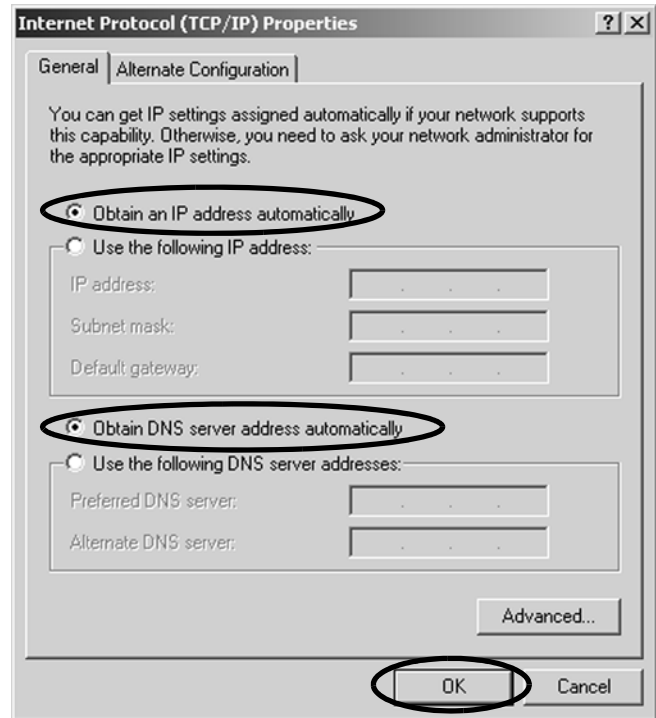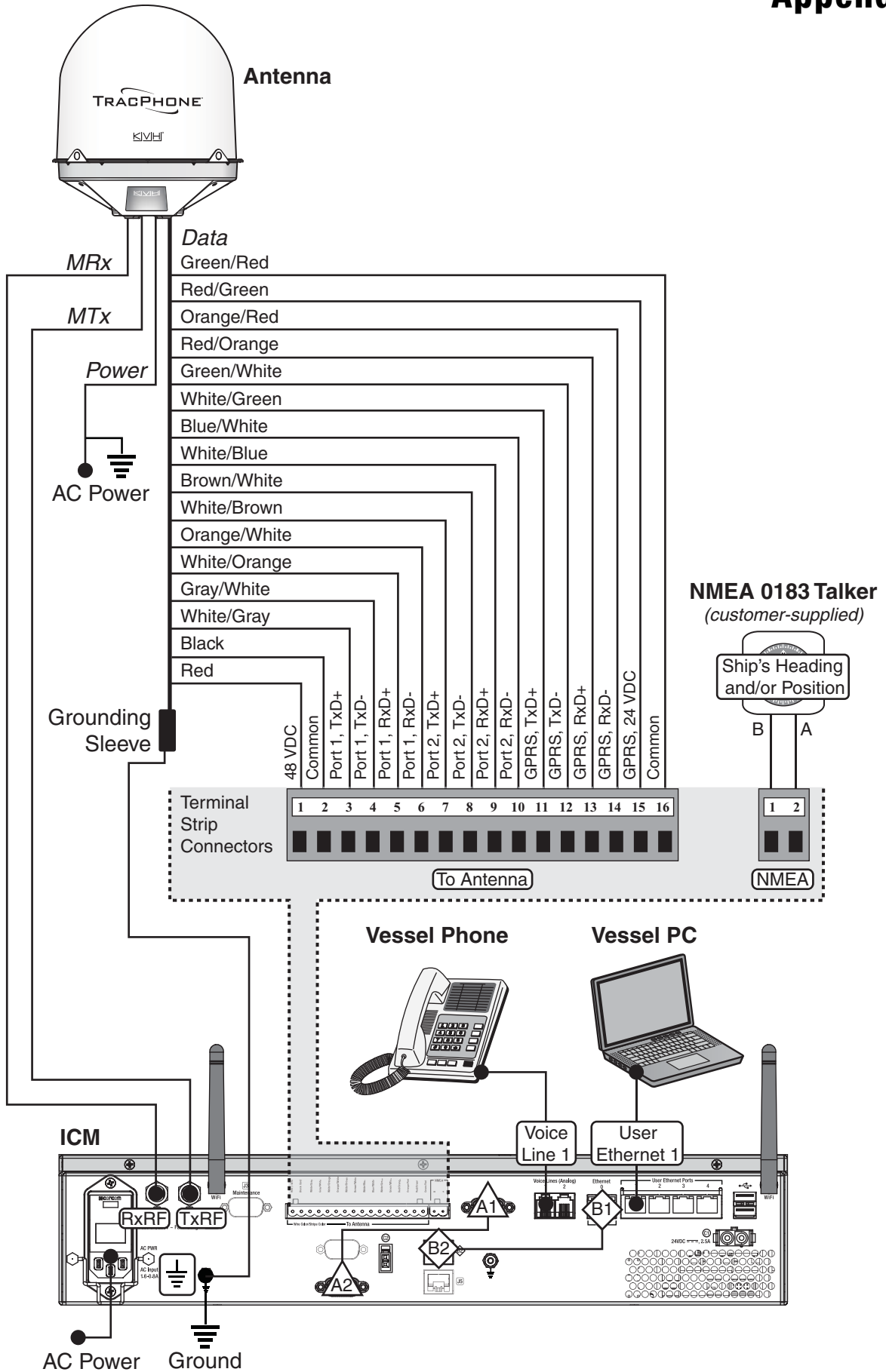
Macintosh OS X

1. Turn on the computer.

2. In System Preferences, click **Network**.

3. In the Network dialog box, select **Ethernet** then set the following:

   • Location: **Automatic**

   • Configure IPv4: **Using DHCP**

4. Click **Apply**.

5. Restart the computer.

Figure 103: Macintosh OS X - Network Preferences

C Wiring Diagram

Antenna

Data

MRx — Green/Red
Red/Green
MTx — Orange/Red
Red/Orange
Power — Green/White
White/Green
Blue/White
White/Blue
AC Power — Brown/White
White/Brown
Orange/White
White/Orange
Gray/White
White/Gray
Black
Red

Grounding Sleeve

48 VDC
Common
Port 1, TxD+
Port 1, TxD-
Port 1, RxD+
Port 1, RxD-
Port 2, TxD+
Port 2, TxD-
Port 2, RxD+
Port 2, RxD-
GPRS, TxD+
GPRS, TxD-
GPRS, RxD+
GPRS, RxD-
GPRS, 24 VDC
Common

NMEA 0183 Talker
(customer-supplied)

Ship's Heading and/or Position

B   A

Terminal Strip Connectors

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

| 1 | 2 |

(To Antenna)   (NMEA)

Vessel Phone   **Vessel PC**

Voice Line 1   User Ethernet 1

ICM

RxRF TxRF

A1   B1

A2   B2

AC Power   Ground

KVH

Regulatory Compliance

European Union Compliance

Hereby, KVH Industries, Inc. declares that the radio equipment type TracPhone V11-IP is in compliance with Directive 2014/53/EU. For the full text of the EU Declaration of Conformity, go to www.kvh.com/euconformity on the KVH website.

Federal Communications Commission Compliance

The TracPhone system complies with Class B of Part 15 of the FCC (Federal Communications Commission) rules for radiated and conducted emissions.

FCC Identifiers: QIP-EHS6 (antenna 3G Modem)
PPD-AR5B97 (ICM WiFi)

Use Conditions:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. To determine if the equipment is interfering with radio or television reception, remove or apply power to the equipment and observe if the interference goes away, or returns, when the unit is off or on. The user is encouraged to try to correct the interference by one 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 KVH for assistance.

IMPORTANT:

- To meet FCC requirements, shielded Ethernet cables are required to connect the ICM to the ship's network.
- This equipment contains no user serviceable parts. Opening this unit will violate the warranty and may result in this equipment no longer complying with FCC requirements for Class B digital devices.