

Humminbird® CHIRP Radar Installation Manual

532523-1_B



**Accessory
Manual**


Thank You!


Thank you for choosing Humminbird®, the #1 name in marine electronics. Humminbird has built its reputation by designing and manufacturing top-quality, thoroughly reliable marine equipment. Your Humminbird is designed for trouble-free use in even the harshest marine environment. We encourage you to read this installation manual completely in order to get the full benefit from all the features and applications of your Humminbird product.


Important Information

Review the following important information before proceeding with the installation.


Certified Installation

 **WARNING!** Humminbird recommends certified installation by a Humminbird approved installer. Contact your Humminbird dealer for further details, and refer to the warranty information included at the end of this manual.


 **WARNING!** This product must be installed and operated in accordance with the instructions provided. Failure to do so could result in personal injury, damage to your vessel and/or poor product performance.

 **CAUTION!** Installation and radar tuning should only be performed by a qualified radar service technician.

Potential Ignition Source


 **WARNING!** This product is NOT approved for use in hazardous and/or flammable atmospheres. Do NOT install in a hazardous and/or flammable atmosphere (such as in an engine room or near fuel tanks).


High Voltages


 **HIGH VOLTAGE WARNING!** Dangerously high voltages are present within the scanner unit. There are no internal connections or adjustments necessary for installation. Do NOT remove any covers or otherwise attempt to access internal components, unless specifically instructed in the documentation provided. The cover should be removed only by a qualified radar service technician. Technicians must exercise extreme care when working inside the unit.

 **WARNING!** Connecting this product to a voltage supply greater than the specified maximum rating may cause permanent damage to the unit. Refer to the *Specifications* section for voltage rating.

Radio Frequency and Microwave Radiation

 **DANGER: Microwave Radiation Hazard!** The microwave energy radiated by a radar antenna is harmful to humans, especially to one's eyes. Do NOT look at the scanner from close range. Never look directly into an open waveguide or into the path of radiation from an enclosed antenna. Make sure personnel are clear of the scanner when it is powered on. Turn off the radar whenever it is necessary to work on the antenna unit or on other equipment in the beam of the radar.


 **DANGER!** Radar and other radio frequency radiation can upset cardiac pacemakers. If someone with a cardiac pacemaker suspects abnormal operation, immediately turn off the equipment and move the person away from the antenna.


 **CAUTION!** For safety reasons, the radar must be installed above head height and out of range of personnel.

Positive Ground Systems


 **WARNING!** Do not connect this unit to a system that has positive grounding.


Service and Maintenance

 **WARNING!** Disassembly and repair of this electronic unit should only be performed by authorized service personnel. Any modification of the serial number or attempt to repair the original equipment or accessories by unauthorized individuals will void the warranty.


 **CAUTION!** This product contains no user serviceable components. Please refer all maintenance and repair to authorized Humminbird dealers. Unauthorized repair may affect your warranty.


Compass Safe Distance


 **WARNING!** To prevent potential interference with the vessel's magnetic compasses, ensure an adequate distance is maintained from the product.

 **NOTE:** When choosing a suitable location for the product you should aim to maintain the maximum possible distance from any compasses. Typically this distance should be at least 3 feet (1 m) in all directions. However, for some smaller vessels it may not be possible to locate the product this far away from a compass. In this situation, when choosing the installation location for your product, ensure that the compass is not affected by the product when it is in a powered state.

Additional Warnings and Notes

 **WARNING!** This device should not be used as a navigational aid to prevent collision, grounding, boat damage, or personal injury. When the boat is moving, water depth may change too quickly to allow time for you to react. Always operate the boat at very slow speeds if you suspect shallow water or submerged objects.

 **WARNING!** The electronic chart in your Humminbird unit is an aid to navigation designed to facilitate the use of authorized government charts, not to replace them. Only official government charts and notices to mariners contain all of the current information needed for the safety of navigation, and the captain is responsible for their prudent use and the safety of the vessel and its passengers.

 **NOTE:** This product is specifically designed to be installed on boats and other means of maritime transport. If your country forms part of the EU, please contact your dealer for advice before attempting to install elsewhere.



NOTE: Some features discussed in this manual require a separate purchase, and some features are only available on certain models. Every effort has been made to clearly identify those features. Please read the manual carefully in order to understand the full capabilities of your model.



NOTE: The procedures and features described in this manual are subject to change without notice. This manual was written in English and may have been translated to another language. Humminbird is not responsible for incorrect translations or discrepancies between documents.



NOTE: Humminbird does not warrant that this product is error-free or that it is compatible with products manufactured by any person or entity other than Humminbird.



NOTE: Humminbird is not responsible for damages or injuries caused by your use or inability to use the product, by the interaction of the product with products manufactured by others, or by errors in information utilized by the product supplied by third parties.



NOTE: Although the waterproof rating capacity of this product meets the stated IPX standard (refer to the *Specifications* section), water intrusion and subsequent equipment failure may occur if the product is subjected to commercial high-pressure washing. Humminbird will not warrant products subjected to high-pressure washing.



NOTE: This product is protected by patents, design patents, patents pending, or design patents pending.

ATTENTION INTERNATIONAL CUSTOMERS: Products sold in the U.S. are not intended for use in the international market. Humminbird international units provide international features and are designed to meet country and regional regulations. Languages, maps, time zones, units of measurement, and warranty are examples of features that are customized for Humminbird international units purchased through our authorized international distributors.

Compliance Statements

IEEE STATEMENT: This product complies with the IEEE C95.1 – 2005 – Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

ICNIRP GUIDELINES: When properly installed and operated, the use of this Radar conforms to: ICNIRP Guidelines 1998 - International Commission on Non-Ionising Radiation Protection: Guidelines for limiting exposure to time-varying electric, magnetic and electro-magnetic fields (up to 300 GHz) 1998.

DECLARATION OF CONFORMITY: Johnson Outdoors Marine Electronics, Inc. declares that this product is compliant with the essential requirements of R&TTE directive 1999/5/EC.

IMO AND SOLAS: The equipment described within this document is intended for use on leisure marine boats and workboats NOT covered by International Maritime Organization (IMO) and Safety of Life at Sea (SOLAS) Carriage Regulations.

RADAR LICENSING: Installation and operation of this radar may be subject to individual licensing of the equipment, operator or vessel. You are strongly advised to check with the requirements of the licensing authority of your national administration. In case of any difficulties, contact your local Humminbird dealer.

FCC NOTICE – RADAR: Changes or modifications to this equipment not expressly approved in writing by Johnson Outdoors Marine Electronics, Inc. could violate compliance with FCC rules and void the operator's authority to operate the equipment.

ENVIRONMENTAL COMPLIANCE STATEMENT: It is the intention of Johnson Outdoors Marine Electronics, Inc. to be a responsible corporate citizen, operating in compliance with known and applicable environmental regulations, and a good neighbor in the communities where we make or sell our products.

WEEE DIRECTIVE: EU Directive 2002/96/EC "Waste of Electrical and Electronic Equipment Directive (WEEE)" impacts most distributors, sellers, and manufacturers of consumer electronics in the European Union. The WEEE Directive requires the producer of consumer electronics to take responsibility for the management of waste from their products to achieve environmentally responsible disposal during the product life cycle. WEEE compliance may not be required in your location for electrical & electronic equipment (EEE), nor may it be required for EEE designed and intended as fixed or temporary installation in transportation vehicles such as automobiles, aircraft, and boats. In some European Union member states, these vehicles are considered outside of the scope of the Directive, and EEE for those applications can be considered excluded from the WEEE Directive requirement.



This symbol (WEEE wheeled bin) on product indicates the product must not be disposed of with other household refuse. It must be disposed of and collected for recycling and recovery of waste EEE. Johnson Outdoors Marine Electronics, Inc. will mark all EEE products in accordance with the WEEE Directive. It is our goal to comply in the collection, treatment, recovery, and environmentally sound disposal of those products; however, these requirements do vary within European Union member states. For more information about where you should dispose of your waste equipment for recycling and recovery and/or your European Union member state requirements, please contact your dealer or distributor from which your product was purchased.

ROHS STATEMENT: Product designed and intended as a fixed installation or part of a system in a vessel may be considered beyond the scope of Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

EMC Installation Guidelines

Humminbird equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations, to minimize electromagnetic interference between equipment and minimize the effect such interference could have on the performance of your system.

Correct installation is required to ensure that EMC performance is not compromised.



NOTE: In areas of extreme EMC interference, some slight interference may be noticed on the product. Where this occurs the product and the source of the interference should be separated by a greater distance.

For optimum EMC performance, we recommend that wherever possible:

- Humminbird equipment and cables connected to it are:
 - At least 3 feet (1 m) from any equipment transmitting or cables carrying radio signals (e.g. VHF radios, cables and antennas). In the case of SSB radios, the distance should be increased to 7 feet (2 m).
 - More than 7 feet (2 m) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Humminbird specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.



NOTE: Where constraints on the installation prevent any of the above recommendations, always ensure the maximum possible separation between different items of electrical equipment, to provide the best conditions for EMC performance throughout the installation.

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Introduction

The Humminbird Radar scanner is a compact, solid-state radar that utilizes CHIRP pulse compression for improved range resolution. Connect the Radar scanner to your Humminbird control head to view a map-like representation of the area surrounding your vessel, enabling you to identify other vessels, buoys, and land features such as coastlines and hills.

The Humminbird Radar scanner includes the following features:

- Solid-state technology (no magnetron) for improved efficiency and quick start-up.
- Range performance up to 24 nm (dependent on installation location).
- CHIRP pulse compression for improved target range resolution and reduced background noise.
- Radar image display and control via compatible Humminbird control head.
- 24 RPM scanner rotation.
- Low power consumption.

Installation Overview

This manual will guide you through the following installation requirements for the Humminbird Radar scanner:

- Preparing for Installation
- Selecting the Mounting Location
- Installing the Radar Scanner
- Connecting to Power and Ethernet

Multiple Radar Installation: Only one radar scanner can be used at any one time, per networked system. If you have more than one radar scanner installed on your boat and want to use them at the same time, the control heads to which the scanners are connected must NOT be networked together.





CAUTION! Installation and radar tuning should only be performed by a qualified radar service technician.

1. Installation Preparation

Following are instructions for the installation of this accessory. Before you start installation, we encourage you to read these instructions carefully in order to get the full benefit from your Humminbird accessory.

Supplies: In addition to the hardware included in this box, you will need a separate 12 or 24 VDC power supply from that used for engine start, adhesive tape, a powered hand drill and various drill bits, various hand tools, safety glasses, and a dust mask.


 **NOTE:** It is important that you have read and understood the warnings and cautions provided in the **Important Information** section of this manual before proceeding with the installation.

 **NOTE:** A separate 12/24 VDC power supply is required for the Radar scanner installation to prevent erratic behavior and data loss, which can occur if the engine start does not have a separate power supply.

1. Review the Box Contents

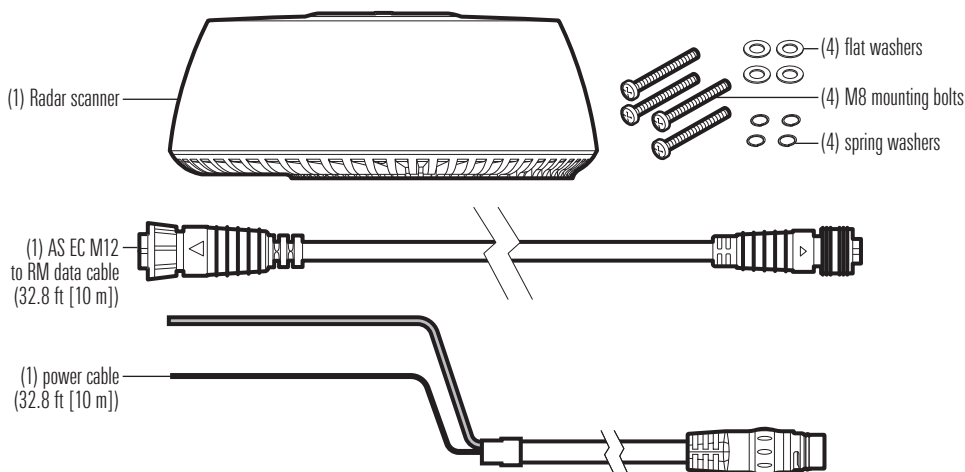
Also, see the **Specifications** section for additional product information.

1. Unpack the box and confirm the contents with the illustration shown below.

 **CAUTION!** Do not remove the cover from the unit. There are no connections or adjustments inside the unit that are needed for installation or operation.

 **NOTE:** Product supplies and features are subject to change without notice.

Parts Supplied



2. Determine the Cable Requirements


Depending on your Humminbird model and network configuration, you may need to purchase additional accessories to connect your Radar scanner to your control head or Ethernet network. Before starting the installation, determine whether you will need to purchase Ethernet Adapter Cables or extension cables. Also, see **Connect to Power and Ethernet** for more information.

Hardware	Cable Requirement to Connect to Radar Scanner	Voltage Requirements
ONIX/SOLIX	No additional cables required.	12 VDC
HELIX	Separate purchase AS EC QDE Ethernet Adapter Cable is required.	12 VDC
Ethernet Switch	No additional cables required.	12 or 24 VDC

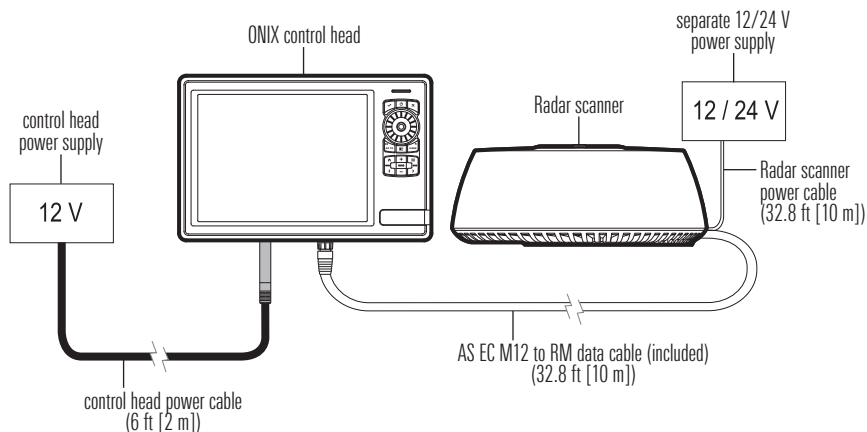
3. Create a Schematic Diagram

A schematic diagram is an essential part of planning any installation. It is also useful for any future additions or maintenance of the system. The diagram should include the following:

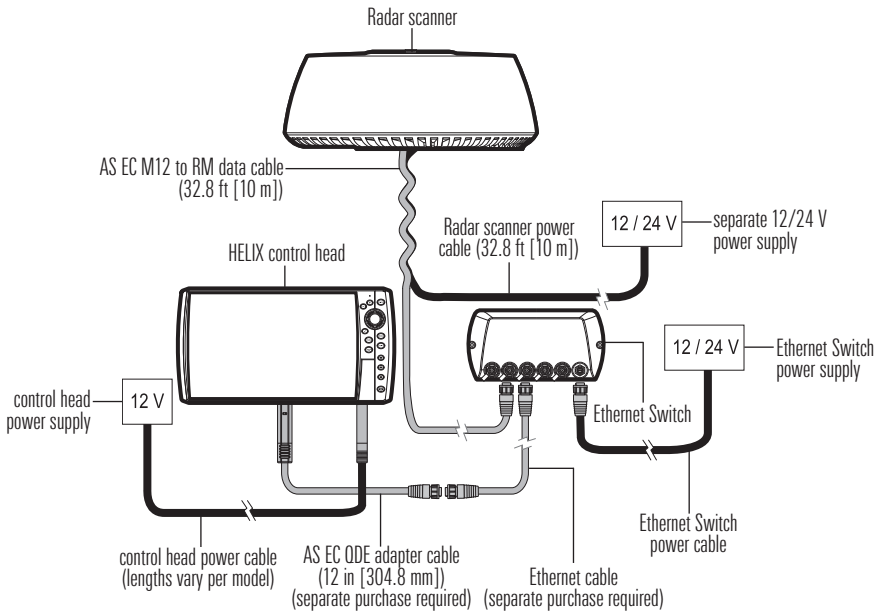
- Location of all components
- Cable types, routes, and lengths.

 **NOTE:** Confirm that you have read and understood the warnings and cautions provided in the **Important Information** section before proceeding with the installation.

Example of a Schematic Diagram with a Direct Connection to the Control Head



Example of a Schematic Diagram with an Ethernet Switch Connection

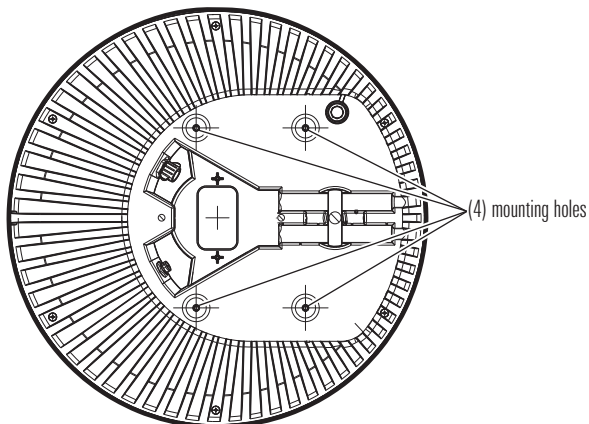


NOTE: Cable lengths and power voltage requirements vary per model. Refer to the installation guides included with your products for additional information.

4. Clear the Mounting Holes

1. Invert the scanner.
2. Confirm the four mounting holes are clear so they can accept the bolts.

Clearing the Mounting Holes

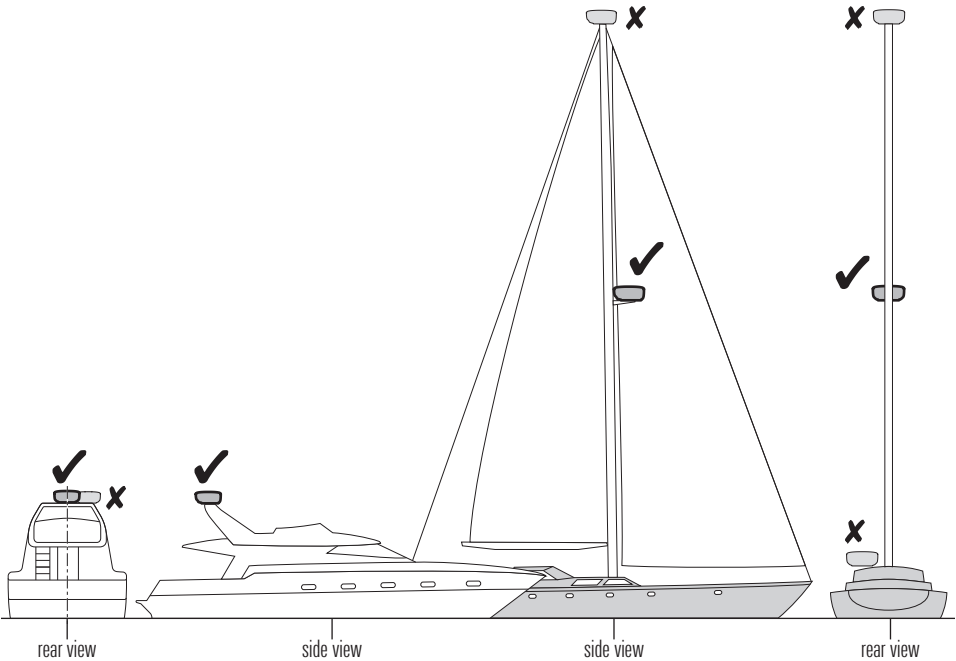


2. Choose the Mounting Location

It is important to consider the following information when installing the Radar scanner on the vessel. **The Radar scanner must be mounted where it is:**

- Near the vessel's centerline
- Above head height
- Clear of large objects such as the flybridge, large engine stacks, searchlights, horns, masts, etc.
- At least 3 feet (1 m) from a magnetic compass or other scanners
- Away from heat and fumes
- On a stable platform that is capable of securely supporting the scanner under seagoing conditions
- Easily accessible

Determining the Mounting Location



WARNING! Do NOT install the radar in a location that exposes passengers and crew to the radar beam. Do NOT mount the radar where it could radiate on any person.



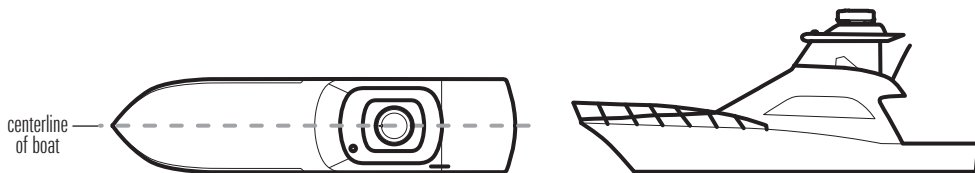
CAUTION! Working at higher elevations may become necessary while installing the scanner unit. Observe safety measures and take sufficient precautions to avoid personal injury or damage to the equipment.



Centerline

The scanner unit should be mounted on the centerline of your boat in a location that has an unobstructed view forward and is as clear as possible the rest of the way around the unit.

Locating the Vessel's Centerline



Height

Choose a location as high as practical to improve maximum range, but not so high as to be adversely affected by the vessel's pitching and rolling. Also, keep in mind that minimum range objects may be overlooked if mounted too high.

Unobstructed View

Position the Radar scanner forward of large structures and exhaust stacks. Contamination from engine exhaust on the scanner housing reduces radar performance.

- Antennas for GPS, radio communication, or other equipment should not be located in the radar beam.
- Use non-metallic extension poles to move the active area of antennas above the radar beam.

Blind Spots, Shadow Areas, and False Echoes: Large structures or stacks may cause blind spots and/or false echoes.

- Wet sails may also cause shadow areas, so Radar performance may be reduced in the rain.
- If you mount the Radar scanner on a mast, echoes from other targets may be reflected from the mast.
- It is particularly important to avoid shadow areas near the bow.
- In shadow areas beyond the obstruction, there will be a reduction of the beam intensity. There may be a blind sector if the beam intensity is not sufficient to obtain an echo from an object. This may occur even at close range. For this reason, the angular width and relative bearing of any shadow area must be determined at installation.
- **Identifying shadow areas and/or false echoes on the control head:** For example, adjust the settings on your control head to view sea clutter. Dark sectors on the Radar display indicate possible shadowed areas. See your control head operations manual for more information.

Potential Interference

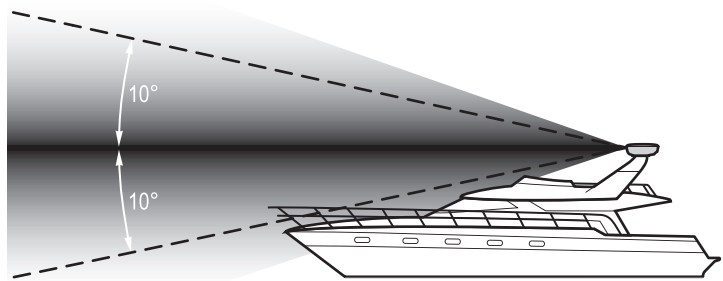
For optimum EMC performance, we recommend that wherever possible:

- Humminbird equipment and cables connected to it are:
 - At least 3 feet (1 m) from any equipment transmitting or cables carrying radio signals (e.g. VHF radios, cables and antennas). In the case of SSB radios, the distance should be increased to 7 feet (2 m).
 - More than 7 feet (2 m) from the path of a radar beam. A radar beam can normally be assumed to spread 20° above and below the radiating element.
- **The Radar scanner must be supplied from a separate power source from that used for engine start.** This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery or fuse panel.

Mounting Surface

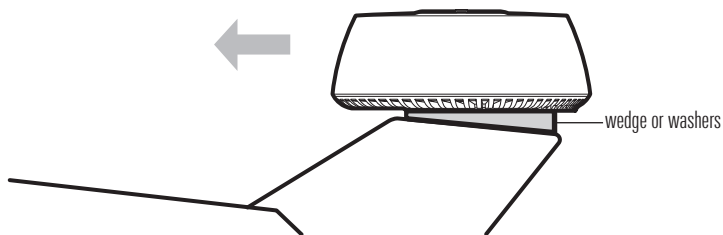
The mounting surface must be flat, stable, and approximately parallel with the boat's waterline.

- **Surface Thickness:** If the mounting surface is thin, a doubler should be added. If the mounting surface is thick, longer bolts must be purchased separately.
- **Surface Angle:** The Radar beam from the Radar scanner is approximately 20° wide in the vertical direction to give good target detection even when your vessel pitches and rolls.




Planing hull vessels, and some displacement hull vessels, adopt a higher bow angle when the vessel is at cruising speed. This may raise the Radar's main radiation angle, and can cause poor detection of nearby targets. It may be necessary to compensate for the bow rise to ensure optimum target detection. This can be achieved by fitting a wedge or washers between the mounting platform and the base of the Radar scanner, so that the Radar beam remains parallel to the water line when the vessel's bow rises at cruising speed.

Compensating for Bow Rise

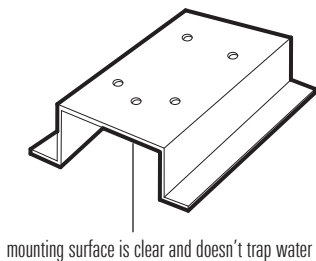


Mounting Base

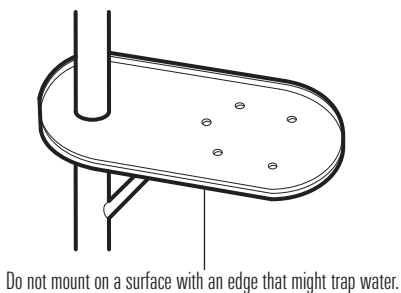
The Radar scanner can be installed directly to a roof or other flat surface. The mounting location must be secure enough to support the Radar scanner under seagoing conditions. You can also use a mounting bracket (separate purchase required). Be certain to keep the water drain tube clear, which is located at the bottom of the scanner unit.

 **NOTE:** If the mounting bracket or surface has a curvature of more than 5/64" (2 mm), use spacers with the mounting bolts to prevent stress on the scanner housing.

Correct Mounting Base



Incorrect Mounting Base



Access

Access to the under side is required for installation of the mounting bolts.

Sailing Vessels

Additional considerations apply when installing the Radar scanner on a sailing vessel. A separate purchase mast mounting bracket is highly recommended.

Review the following important mounting requirements:

- When mounting the Radar scanner onto the mast, check that the unit is not fouled by the sails, especially when tacking.
- Depending on the type of sailing vessel and the design of the sailplan, a Radar scanner guard (separate purchase required) should be attached to the mast if the sails or rigging contact either the Radar scanner unit or the mounting bracket (separate purchase required). See the illustration *Example of a Radar Guard Installation*.



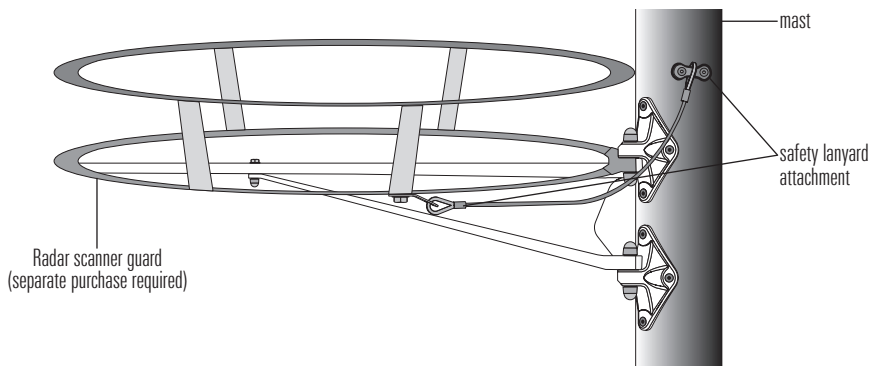
WARNING! Without a proper Radar guard, serious damage can result to the Radar mounting bracket and the Radar scanner itself. In extreme cases, such damage could result in the Radar scanner unit being pulled off the mast. Therefore, it is recommended that a Radar scanner guard should be mounted additionally and separately to the Radar scanner mounting bracket.

- To prevent the risk of the Radar scanner falling after it has been damaged, the security lanyard supplied with the mast bracket (separate purchase required) must be secured properly to the mast and to the Radar scanner, according to the instructions provided with the bracket.

If a safety lanyard is not supplied with the mounting bracket, contact your local dealer for appropriate parts. Do NOT attach other equipment to either the Radar scanner or the bracket.

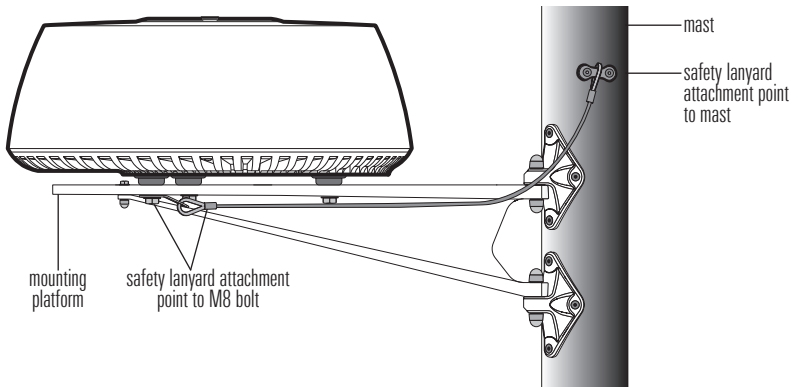
- **Maintenance:** Humminbird strongly recommends that you check the condition and security of the bracket mounting feet, the security lanyard(s), the Radar scanner guard, and the Radar scanner itself, on a yearly basis (or more frequently depending on environmental applications). Any fittings should be replaced as appropriate.

Example of a Radar Guard Installation



NOTE: The Radar guard shown in the illustration above is provided as an example only. The design and positioning of the Radar guard depends on your vessel type, sailplan, and installation environment. Contact your local dealer or qualified marine installer for assistance.

Example of a Mast Platform Mount with a Safety Lanyard



Multiple Radar Installation

It is important to note that multiple radars cannot be connected to the same network. If you are installing more than one radar on the same vessel, review the following important location requirements:

- Scanners should be mounted above each other, and vertically separated by at least 1.6 ft (0.5 m). This applies to all installation locations on the vessel.
- Multiple scanners should be mounted in a way that minimizes interference between the vertical beamwidths of the 2 scanners.
- To minimize any potential interference, mount the scanners with as much physical separation as possible.

3. Test Route the Cables

Using the information in this section, test route the cables from the planned mounting location to the control head or Ethernet Switch location and the power source. Cables must be routed correctly to maximize performance and prolong cable life. See *Connect to Power and Ethernet* for more information.

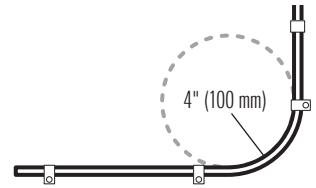
⚠️ CIRCUIT ISOLATION WARNING! Proper circuit isolation is required for installations using both AC and DC current. If you are installing a 3rd party product that utilizes AC current, contact a qualified marine installer for assistance.

⚠️ CAUTION! Do NOT mount the cables where the connectors could be submerged in water or flooded. If cables are installed in a splash-prone area, it may be helpful to apply dielectric grease to the inside of the connectors to prevent corrosion. Dielectric grease can be purchased separately from a general hardware or automotive store.

Avoid Cable Bending

Do NOT bend cables excessively. Wherever possible, ensure a minimum bend radius of 4" (100 mm).

Avoiding Cable Bending



Strain Relief

Ensure adequate strain relief is provided. Protect connectors from strain and ensure they will not pull out under extreme sea conditions.

Cable Protection

Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible.

- Do NOT run cables through bilges or doorways, or close to moving or hot objects.
- Do NOT run cables near to engines or fluorescent lights.
- Where a cable passes through an exposed bulkhead or deckhead, use a suitable watertight feed-through.
- Route data cables away from other equipment and cables, high current carrying AC and DC power lines, and antennae.
- Secure cables in place using cable ties or lacing twine. Coil any extra cable and tie it out of the way.
- **Cable Shielding:** Ensure that all data cables are properly shielded and that the cable shielding is intact (e.g. hasn't been scraped off by being squeezed through a tight area).

4. Install the Scanner

Confirm that you have read and understood the warnings and cautions provided in the *Important Information* section before proceeding with the installation.

WARNING! Confirm the vessel's power supply is switched OFF before starting the installation. Do NOT connect or disconnect equipment with the power switched on.

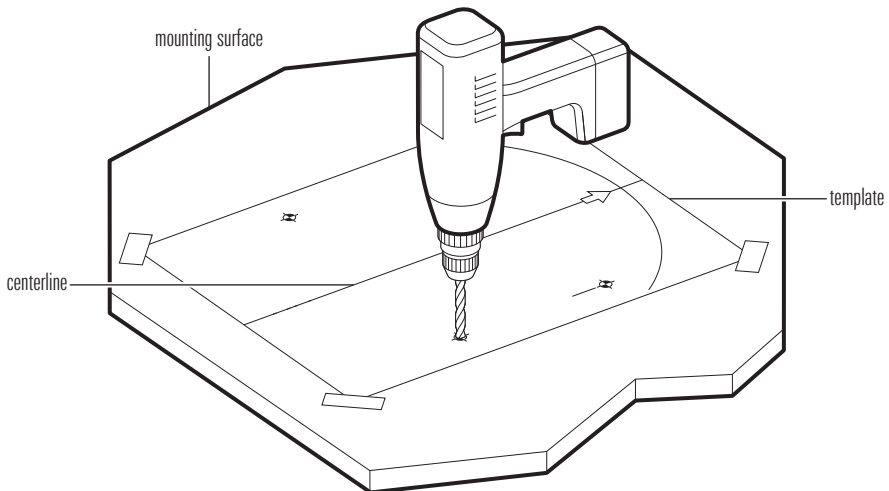
NOTE: Before proceeding with the installation, check the template to confirm that the dimensions match the unit. Reproduction and moisture can affect the size of the template. See the *Specifications* section for product dimensions.

1. Prepare the Mounting Location

1. Confirm that the mounting location meets the requirements described in the section *Choose the Mounting Location*.
2. Clean and dry the mounting surface.
3. Align the included template squarely with the center line of the boat (or chosen mounting location), with the arrow pointing forward (towards the bow of the vessel).
4. Tape the template to the chosen mounting location.
5. Mark the four mounting holes.
6. Drill four 1/8" (3 mm) pilot holes as indicated on the template.
7. Proceed to drill four 23/64" (9 mm) diameter holes through the mounting surface.

NOTE: For a close fit installation, drill 21/64" (8.5 mm) diameter holes. Do not exceed a mounting hole diameter of 25/64" (10 mm).

Drilling the Mounting Holes



8. **Test the hardware:** Check that each bolt (with spring washer and flat washer) protrudes through the mounting surface at least 5/8" (16 mm) but less than 7/8" (22 mm).



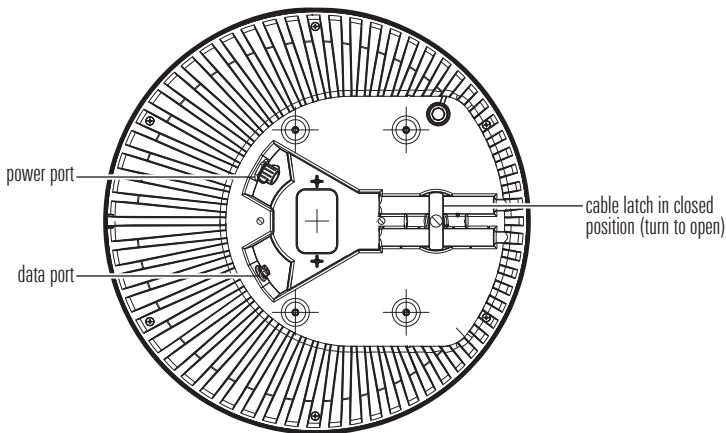
CAUTION! The Radar scanner may be damaged if bolts protrude through the mounting surface more than 7/8" (22 mm).

2. Connect the Power and Data Cables to the Radar Scanner

Before securing the scanner to the mounting surface, connect the power cable and data cable to the Radar scanner. See **Test Route the Cables** for additional information.

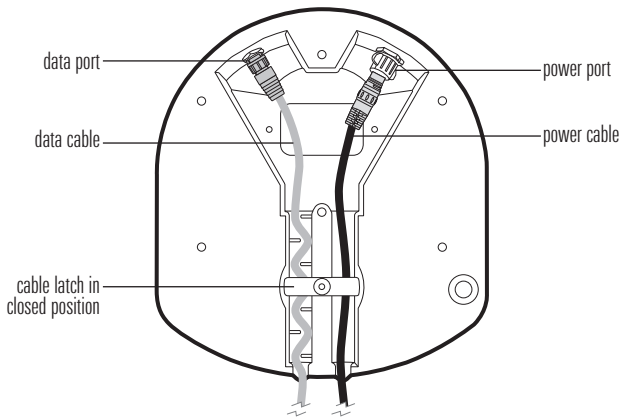
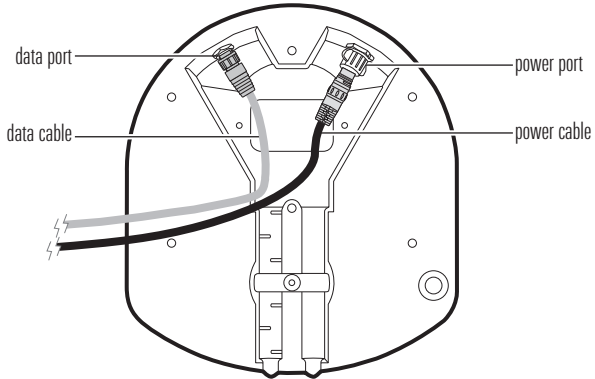
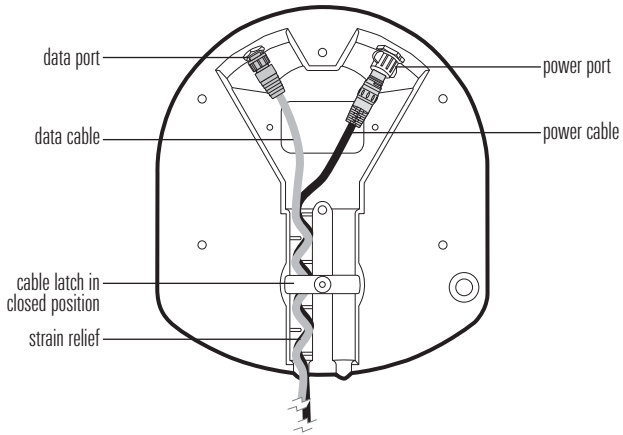
1. Confirm the vessel's power supply is switched off.
2. On the underside of the Radar scanner, turn the cable latch to the open position. See the illustration **Locating the Cable Ports**.
3. Locate the cable ports.
4. Turn the power port locking collar counterclockwise to unlock it.

Locating the Cable Ports



5. Connect the power cable connector to the power port on the Radar scanner, making sure that the notch lines up with the guide in the port.
6. Turn the power port locking collar clockwise (approximately 90 degrees) until you hear two clicks to secure the cable connection. Confirm the cable is securely connected.
7. Connect the data cable connector to the data port on the Radar scanner. Hand-tighten the screw nut on the cable connector to secure the connection.
8. Route the power cable and data cable through the base of the Radar scanner as needed for your installation mount. See the illustrations on the following page for cable routing examples.
9. Turn the cable latch to the closed position to secure the cables in place.

Cable Routing Examples



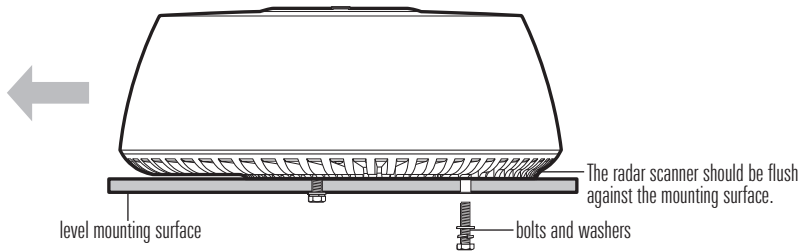
3. Install the Radar Scanner

Use the following instructions to install the Radar scanner on your vessel. Confirm you have read the mounting requirements in the section *Choose the Mounting Location*.

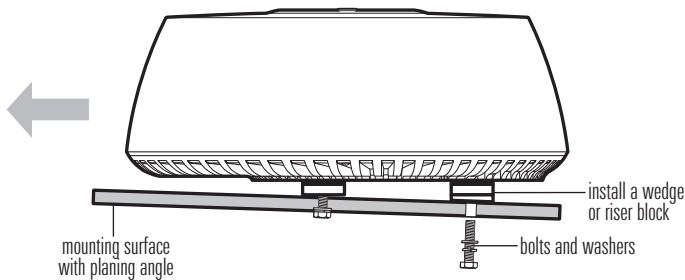
1. Place the Radar scanner on the mounting surface.
2. **Level Mounting Surface:** Confirm the Radar scanner is flush against the mounting surface.

Angled Mounting Surface: If you are installing the Radar on a planing vessel (or other angled surface), place a wedge (shim) under the rear of the Radar scanner so that the beam points slightly down in the forward direction when the boat is at rest. This will compensate for the bow rising at cruising speed.

Mounting on a Level Surface



Mounting on an Angled Surface (or Planing Vessel)



3. Install one spring washer and one flat washer on each bolt as indicated in the illustration *Mounting the Scanner Unit*.
4. Insert each bolt through the drilled bolt holes in the mounting surface and into each threaded bolt hole on the Radar scanner. Hand-tighten only.
5. Confirm the bolts have a minimum insertion in the Radar scanner base of 5/8" (16 mm) and a maximum of 7/8" (22 mm) (allowing for washers).

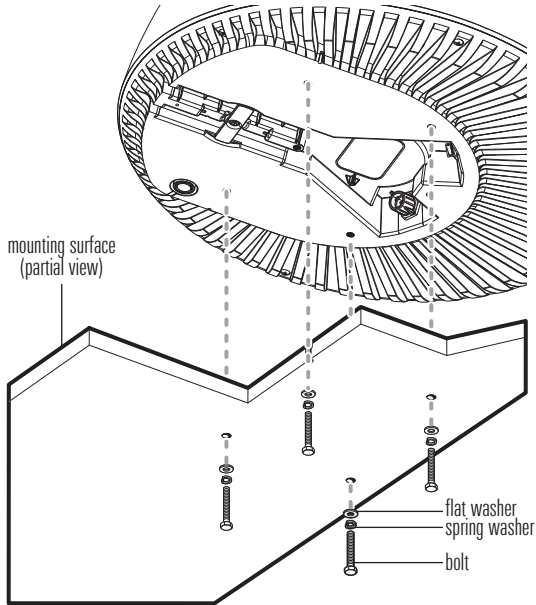


CAUTION! The Radar scanner may be damaged if bolts protrude through the mounting surface more than 7/8" (22 mm).



NOTE: If you need to limit the length of the bolts entering the Radar scanner base, use appropriate risers (shims) or additional washers.

Mounting the Scanner Unit



6. Hand-tighten the bolts to a torque of 11 ft-lbf (15 Nm).



CAUTION! Do not use a high speed driver on this combination of fasteners. Hand-tighten only.

5. Route the Cables

After connecting the power cable and data cable to the Radar scanner unit, you must route the cables to the control head and power source. Cable routing depends on whether you mount the scanner on a platform or pole.



CAUTION! Confirm that the vessel's power supply is switched off before proceeding.



CAUTION! Do NOT mount the cables where the connectors could be submerged in water or flooded. If cables are installed in a splash-prone area, it may be helpful to apply dielectric grease to the inside of the connectors to prevent corrosion. Dielectric grease can be purchased separately from a general hardware or automotive store.

1. Route the Power and Data Cables

Route the power cable to the power source and the data cable to the control head or Ethernet Switch location. You will connect the cables in a later procedure.

1. Confirm the vessel's power supply is switched off.
2. Route the power cable to the fuse panel or battery.
3. Route the data cable to the control head or Ethernet Switch.
4. Secure the cables near the scanner to support the weight of the cables and prevent strain on the watertight cable seals.

If the cable is to pass through tubing or a bulkhead, protect the unfinished end.

Make a drip loop and apply sealant at the entry point of an exterior bulkhead.

5. Proceed to ***Connect to Power and Ethernet.***



CAUTION! Do not use the unfinished wires or fabric braid to pull the cable.

6. Connect to Power and Ethernet

The power cable must be connected to a separate 12 VDC or 24 VDC power source other than that used for engine start. Use the instructions in this section to connect the power cable to a battery or fuse panel, and the data cable to the Humminbird control head or Ethernet Switch.



WARNING: GROUNDING NOT REQUIRED! The Radar scanner power cable is fully insulated and does not require separate grounding.



WARNING! Humminbird is not responsible for over-voltage or over-current failures. The Radar scanner must have adequate protection through the proper selection and installation of circuit protection (i.e. fuse, thermal breaker, etc.).



CAUTION! Only use the power cable supplied with your product. Do not use a power cable designed for, or supplied with, a different product.

1. Determine Your Fuse and Thermal Breaker Requirement

Ideally, all equipment should be wired to individual suitably-rated thermal breakers or fuses to provide appropriate circuit protection. Where this is not possible and more than one (1) product shares a breaker, use individual in-line fuses for each power circuit to provide the necessary protection.

The following in-line fuse and thermal breaker ratings apply to your product:

- **In-line fuse rating:** 5 Amp
- **Thermal breaker rating:** 3 Amp (if only connecting one device)




NOTE: The suitable fuse rating for the thermal breaker is dependent on the number of devices you are connecting.

2. Connect to Power

The power cable can be connected to a fuse panel (usually located near the console) or to a battery. The power cable for each unit in your system should be run as a separate, single length of 2-wire cable from the unit to the vessel's battery or fuse panel. Review the following information before connecting the included power cable to the power supply:

- You may shorten or lengthen the power cable using a minimum wire gauge of 14 AWG (2.08 mm²). You must also ensure there is a continuous suitable operating voltage at the product's power connector.
- The following power density levels do NOT occur at any point: 10 W/m², 100 W/m²

 **NOTE:** The power cable can also be connected to a factory-fitted power distribution point. The distribution point should be fed from the vessel's primary power source by a minimum 8 AWG (8.36 mm²) cable.

1. Route the power cable to the fuse panel or battery (12 VDC or 24 VDC required). Make sure that the data cable connector can reach the control head or Ethernet Switch location.


Fuse Terminal Connection


- 2a. Use crimp-on type electrical connectors (not included) that match the terminal on the fuse panel. Attach the black wire to ground (-), and the red wire to positive (+) 12 VDC or 24 VDC power. Install a 5 Amp fuse (not included) for protection of the unit.

OR

Battery Switch Connection

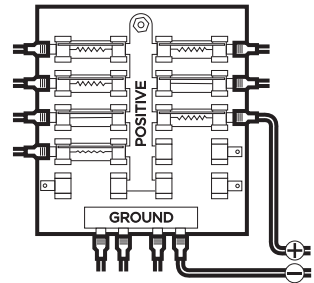
- 2b. Install the battery switch (not included) using the instructions provided with it. You will also need to install an inline fuse holder and a 5 Amp fuse (not included) for protection of the unit. Attach the black wire to (-) ground, and the red wire to (+) 12 VDC or 24 VDC power.

 **NOTE:** The in-line fuse rating for the power cable is 5 Amp. The thermal breaker rating is 3 Amp (if only connecting one device). The suitable fuse rating for the thermal breaker is dependent on the number of devices you connect.

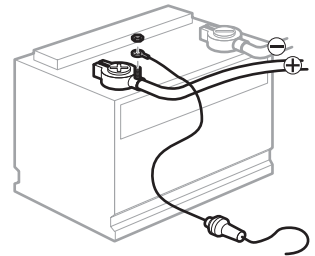
 **NOTE:** Humminbird recommends that best practice is observed in all vessel electrical installations, as detailed in the following standards:

- BMEA Code of Practice for Electrical and Electronic Installations in Boats
- NMEA 0400 Installation Standard
- ABYC E-11 AC & DC Electrical Systems on Boats
- ABYC A-31 Battery chargers and Inverters
- ABYC TE-4 Lightning Protection

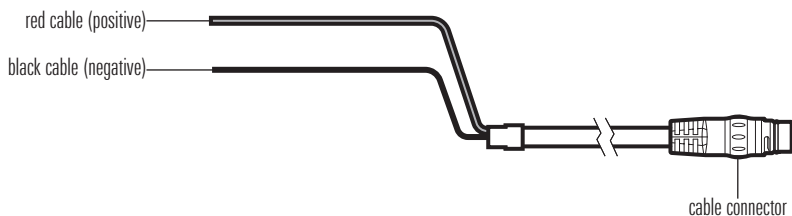
Fuse Terminal Connection



Battery Switch Connection



Radars Scanner Power Cable



3. Connect to the Control Head

Refer to your control head installation guide for additional information and instructions about connecting cables.

Connect to ONIX/SOLIX

1. Insert the data cable connector into the Ethernet port on the control head.
2. Hand-tighten the screw nut on the cable to secure the connection.
3. Confirm there is enough cable slack to allow for the control head to pivot through its full tilt range and for connecting or disconnecting the cables.

Connect to HELIX

To connect the Radar scanner to a HELIX control head, a separate purchase AS EC QDE Ethernet Adapter Cable is required.

1. Connect the data cable connector to the AS EC QDE adapter cable connector. Hand-tighten the screw nut on the cable to secure the connection.
2. Insert the AS EC QDE adapter cable connector into the Ethernet port on the control head.
3. Confirm there is enough cable slack to allow for the control head to pivot through its full tilt range and for connecting or disconnecting the cables.

Connect to an Ethernet Switch

Use the following instructions to connect the data cable to an Ethernet Switch. See the Ethernet Switch installation guide for information about connecting cables.

1. Connect the data cable connector to an available port on the Ethernet Switch. Hand-tighten the screw nut on the cable to secure the connection.
2. Connect an Ethernet cable to an available port on the Ethernet Switch.
3. **ONIX/SOLIX:** Insert the Ethernet cable connector into the Ethernet port on the control head.
HELIX: Connect the Ethernet cable connector to one end of an AS EC QDE adapter cable connector and insert the other end into the Ethernet port on the control head.
4. If the cable connector has a screw nut, hand-tighten the screw nut to secure the connection.
5. Confirm there is enough cable slack to allow for the control head to pivot through its full tilt range and for connecting or disconnecting the cables.

7. Test the Installation

Perform the following tasks before using the product on the water:

- Mechanical checks
- Power on and initial setup

Mechanical Checks

Before powering on the product, perform the following mechanical checks:

1. Confirm that all securing bolts are fully tightened and the appropriate mechanical locking washers are in place.
2. Confirm all connections are secure.
3. Confirm all connecting cables and wires are secured and protected as necessary.

Power On the Control Head

See your Humminbird operations manual to configure the radar and start transmission.

Two Year Limited Warranty & Service Policy

Registering Your Product

As you build your Humminbird network, it is important to register your control heads and accessories and keep the software up to date.

- Select My Humminbird to sign in or set up a new account.
- **Software Updates:** Under each registered product, click Downloads. Review the instructions in your control head operations guide before proceeding with the update.

Humminbird 2 Year Limited Warranty

We warrant the original retail purchaser that products made by Humminbird have been manufactured free from defects in materials and workmanship. This warranty is effective for two years from the date of original retail purchase. Humminbird products found to be defective and covered by this warranty will be repaired or replaced free of charge at Humminbird's option and returned to the customer freight prepaid. Humminbird's sole responsibility under this warranty is limited to the repair or replacement of a product that has been deemed defective by Humminbird. Humminbird is not responsible for charges connected with the removal of such product or reinstallation of replaced or repaired parts.

This warranty does not apply to a product that has been:

- Improperly installed;
- Used in an installation other than that recommended in the product installation and operation instructions;
- Damaged or has failed because of an accident or abnormal operation;
- Repaired or modified by entities other than Humminbird.

Please retain your original receipt as a proof of the purchase date. This will be required for in-warranty service.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES ON THE PART OF HUMMINBIRD AND WILL BE THE CUSTOMER'S EXCLUSIVE REMEDY, EXCEPT FOR ANY APPLICABLE IMPLIED WARRANTIES UNDER STATE LAW WHICH ARE HEREBY LIMITED IN DURATION TO TWO YEARS FROM THE DATE OF ORIGINAL PURCHASE. IN NO EVENT WILL HUMMINBIRD BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE PRODUCTS.

Some states do not allow limitations on an implied warranty, or the exclusion of incidental or consequential damages, so the above exclusions may not apply to you. You may also have other rights, which vary from state to state

Humminbird Service Policy

Even though you'll probably never need to take advantage of our incredible service policy, it's good to know that we back our products this confidently. We do it because you deserve the best. We will make every effort to repair your unit within three business days from the receipt of your unit at our factory. This does not include shipping time to and from our factory. Units received on Friday are typically shipped by the following Wednesday, units received Monday are typically shipped by Thursday, etc.

All repair work is performed by factory-trained technicians to meet exacting factory specifications. Factory-serviced units go through the same rigorous testing and quality control inspections as new production units.

After the original warranty period, a standard flat rate service charge will be assessed for each repair (physical damage and missing parts are not included). Any repairs made after the original warranty will be warranted for an additional 90 days after service has been performed by our factory technicians.

We reserve the right to deem any product unserviceable when replacement parts are no longer available or impossible to obtain. This Service Policy is valid in the United States only. This applies only to Humminbird products returned to our factory in Eufaula, Alabama. This Service Policy is subject to change without notice.

Returning your Unit for Service

Before sending your unit in for repair, please contact the factory, either by phone or by e-mail, to obtain a Repair Authorization Number for your unit.



NOTE: Please do not return your Humminbird to the store for service.

Please have your product model name and serial number available before calling the factory. If you contact the factory by e-mail, please include your product model name and serial number in the e-mail, and use Request for Repair Authorization Number for your e-mail subject header. You should include your Repair Authorization Number in all subsequent communications about your unit.

For IN-WARRANTY service, complete the following steps:

- Obtain a Repair Authorization Number from Humminbird Customer Service.
- Tag product with your name, street address, phone number, and your assigned Repair Authorization Number.
- Include a brief written description of the problem.
- Include a copy of your receipt (to show proof and date of purchase).
- Return product freight prepaid to Humminbird, using an insured carrier with delivery confirmation.

For OUT-OF-WARRANTY service, complete the following steps:

- Obtain a Repair Authorization Number from Humminbird Customer Service.
- Include payment in the form of credit card number and expiration date, or a money order. Please do not send cash.
- Tag product with your name, street address, phone number, and your assigned Repair Authorization Number.
- Include a brief written description of the problem.
- Return product freight prepaid to Humminbird, using an insured carrier with delivery confirmation.

Maintenance

Use the following procedures to ensure your Humminbird product continues to deliver top performance.



HIGH VOLTAGES WARNING! This product may contain high voltages. Do NOT remove any covers or otherwise attempt to access internal components.

Recommended Yearly Maintenance Tasks

Clean the Hardware

1. **Power off the Radar scanner.**
2. Remove one of the bolts and associated washers.
3. Clean the bolt and washers.
4. Replace the bolt and washers.
5. Repeat steps 2 through 4 for all bolts.
6. Tighten all antenna-securing bolts to a torque of 11 ft·lbf (15 Nm).

Check the Cable Connections

1. **Power off the Radar scanner.**
2. Check that all connected cables are in good condition and securely attached.
3. Examine all cables for signs of chafing, cuts or other damage.

Check the Radar Scanner

1. **Power off the Radar scanner.**
2. Ensure the Radar scanner is firmly attached to the mounting surface.

Cleaning the Radar Scanner

The Radar scanner does not require regular cleaning. However, if you find it necessary to clean the unit, please follow the steps below:

1. **Power off the Radar scanner.**
2. Wipe the unit clean with a damp cloth.
3. If necessary, use a mild detergent solution to remove grease marks.

Storage Requirements

Store upright, making sure you do not block the vents on the underside of the Radar scanner.

Troubleshooting

Before contacting Humminbird Customer Service, please read the following section. Taking the time to review these troubleshooting guidelines may allow you to solve a performance problem yourself, and therefore avoid sending your unit back for repair.

No Connection to the Radar Scanner

- Check the cable connections. Confirm the adapter cable (if used) is connected at both ends and is in good condition.
- Ensure the power supply thermal breaker has not tripped or fuse has not blown. If necessary, reset breaker or replace fuse (one time only). If breaker keeps tripping or fuse keeps blowing, contact a Humminbird authorized dealer for assistance.
- Ensure power supply maintains the correct voltage when the system is switched on.
- Ensure all products in the system have the correct software.

- If the Radar scanner is connected to the control head via an Ethernet Switch, ensure that:
 - All relevant equipment is correctly connected to the Ethernet Switch.
 - The Ethernet Switch power supply is satisfactory.
 - The Ethernet Switch is in good condition.
 - Ethernet cables are securely connected and in good condition.
- **Entire System Restart:** Power off the control head and all connected equipment. Wait 10 seconds, and then power on all equipment.

Displayed Bearing is Different to the True Bearing

Refer to the bearing alignment procedure detailed in your control head operations manual.

Noise

If you are experiencing noise or other interference, contact a NMEA approved technician for assistance.

Specifications

Approvals

USA	47CFR FCC Part 2 & Part 80 Certificate of Approval
Canada	RSS238 Iss. 1 Technical Acceptance Certificate
European Union & EFTA	R & TTE Directive 1999/05/EC Certificate of Opinion
Australia & New Zealand	ACMA Declaration of Conformity Compliance level 3

General

Voltage Supply	12 or 24 VDC (minimum: 10.8 VDC, maximum: 31.2 VDC)
Power Consumption	Transmit Mode (maximum): 17 W Standby Mode: 7 W
Operating Temperature Range	14 to 131° F (-10 to + 55° C)
Storage Temperature Range	-13 to 158° F (-25 to + 70° C)
Wind Force	up to 95% at 95° F (35° C) 100 Knots
Range Scales	1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, and 24 nautical miles
Water Resistance	IPX6 (IEC 529)
Weight	12.3 pounds (5.6 kg)
Power Cable Length	32.8 feet (10 m)

Transmitter

Type	X-band solid-state transmitter with pulse compression technology
Transmit Frequency	9354 to 9446 MHz
Peak Power Output	20 W
Duplexer	Circulator
Pulse Widths (3 dB)	40 ns to 14.7 μs
CHIRP Lengths	400 ns to 22 μs
Pulse Repetition Frequency	2083 Hz to 4167 Hz
CHIRP Bandwidth	Up to 32 MHz
Standby Mode	Scanner rotation - OFF Scanner transmission - OFF

Receiver

IF Bandwidth	26 MHz
Noise Figure	4.0 dB or less

Antenna

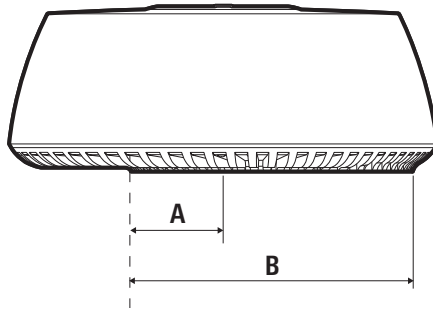
Type	Patch Array
Peak Power Output	20 W
Transmit Frequency	9354 to 9446 MHz
Beamwidth (nominal)	Horizontal: 4.9° Vertical: 20°
Polarization	Horizontal
Rotation Speed	24 rpm nominal



NOTE: Product specifications and features are subject to change without notice.

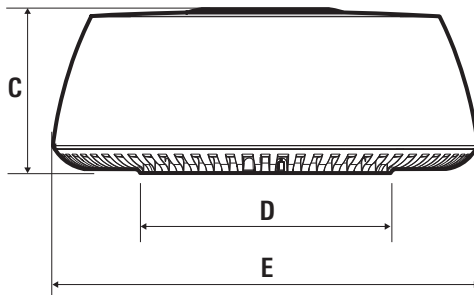
Radar Scanner Dimensions

Radar Scanner Dimensions - Side View



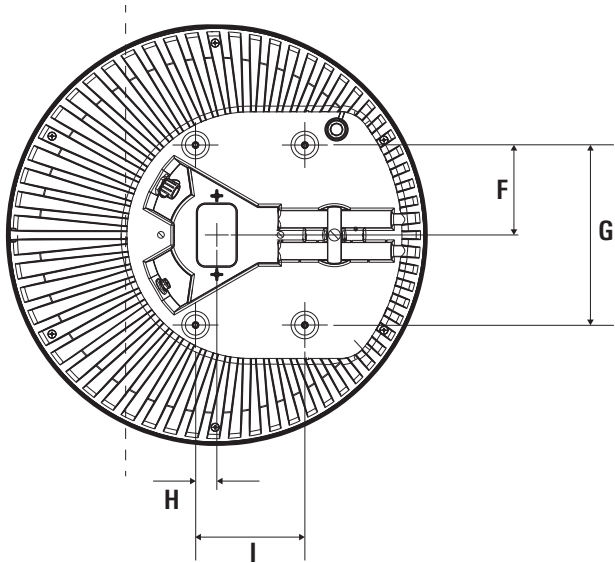
Dimension	Description	Measurement
A	Distance from the centerline of the Radar scanner to the front of the mounting base.	4.57 in (116 mm)
B	Distance from the rear of the mounting base to the front of the mounting base.	13.95 in (355 mm)

Radar Scanner Dimensions - Rear View



Dimension	Description	Measurement
C	Height of Radar scanner.	8.25 in (209.5 mm)
D	Mounting base width (rear of unit).	12.58 in (319.5 mm)
E	Width of Radar scanner.	21.30 in (541 mm)

Radar Scanner Dimensions - Underside View



Dimension	Description	Measurement
F	Distance from the centerline to the rear mounting hole.	4.59 in (116.5 mm)
G	Distance between mounting holes.	9.17 in (233 mm)
H	Distance from the centerline to the front mounting hole.	1.08 in (27.5 mm)
I	Distance between front and rear mounting holes.	5.57 in (141.5 mm)

Radar Scanner Dimensions

