

HDR 650 Installation and Operations Manual



 **HUMMINBIRD**[®]

**Accessory
Manual**

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Your Humminbird is designed for trouble-free use in even the harshest marine environment. In the unlikely event that your Humminbird does require repairs, we offer an exclusive Service Policy. For complete details, see the separate warranty card included with your unit.

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! *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.*

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.*

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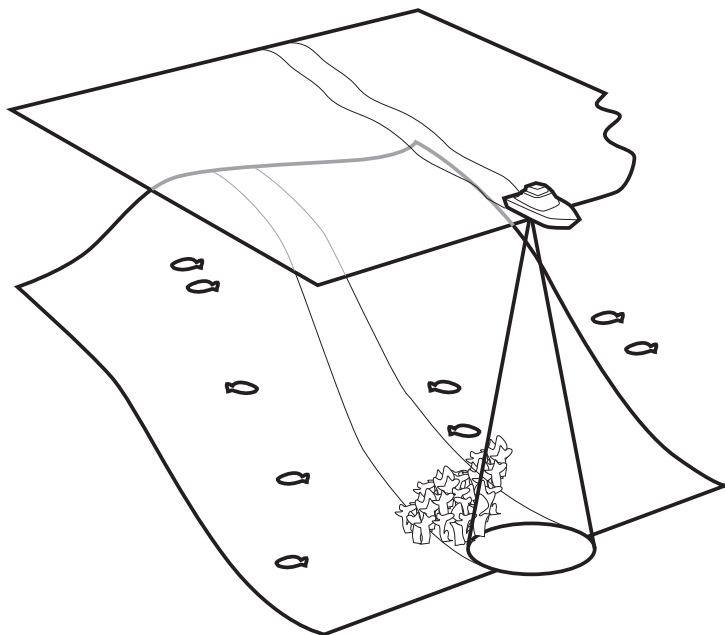
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How Sonar Works

Sonar technology is based on sound waves. The HDR 650 Digital Depth Sounder uses sonar to determine depth directly below the transducer. Your HDR 650 Digital Depth Sounder consists of two components: the HDR 650 sonar unit and the transducer. The sonar unit contains the transmitter and receiver, as well as the user controls and display. The transducer is mounted beneath the water surface and converts electrical energy from the transmitter into mechanical pulses or sound waves. The transducer also receives the reflected sound waves and converts them back into electrical signals for display on the sonar unit.



Sonar is very fast. A sound wave can travel from the surface to a depth of 240 ft (70 m) and back again in less than 1/4 of a second. It is unlikely that your boat can "outrun" this sonar signal.

Installation Overview

Before you start installation, we encourage you to read these instructions carefully in order to get the full benefit from your HDR 650 Digital Depth Sounder.

In addition to the hardware included in the installation kit, you will also need the following supplies:

- powered hand drill and various drill bits, including a 2 1/8" hole saw if your boat does not have an existing gauge hole
- Phillips-head and flat-head screwdrivers
- ruler or measuring tape
- pen or pencil
- 12 Volt power source (your boat's battery)
- marine-grade silicone sealant (for sealing drilled holes)

NOTE: *If you are wiring directly to the boat's battery, you will also need a 1 Amp fuse and a fuse holder.*

Installing the HDR 650

You will install your HDR 650 depth sounder first, then your transducer. When you are done with both of these installation tasks, you should perform a final installation test before operating your HDR 650. Perform the following high-level steps by following the instructions in each numbered section to install the depth sounder:

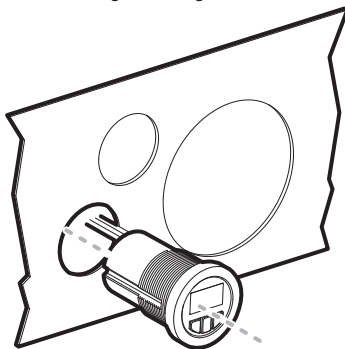
1. Locating the HRD 650 mounting position
2. Cutting the mounting hole
3. Customizing and assembling the HDR 650
4. Installing the HDR 650
5. Installing the buzzer
6. Connecting to the power supply
7. Installing the transducer: See the transducer installation guide included with your product.
8. Connecting the transducer cable
9. Testing and finishing the installation

1. Locating the HDR 650 Mounting Position

You must select an appropriate mounting location for the HDR 650. Consider different positions on the console or deck of the boat, and note the following:

- The cables for the transducer and power must reach the mounting location. Extension cables are available.
- The mounting surface should be visible to the boat operator and adequately supported to protect the HDR 650 from excessive wave shock and vibration.
- Allow at least 2" clearance at the back, sides, and top of the unit for connection, air flow, and ease of installation and removal.

Choosing Mounting Hole Location



2. Cutting the Mounting Hole

Once you have selected your mounting location, perform the following steps:

1. Mark the desired mounting location, then drill a pilot hole.
2. Drill a 2 1/8" diameter hole using a hole saw and hand drill. This is a standard hole saw readily available for rental or purchase. If you prefer, any marine service shop can perform this task.

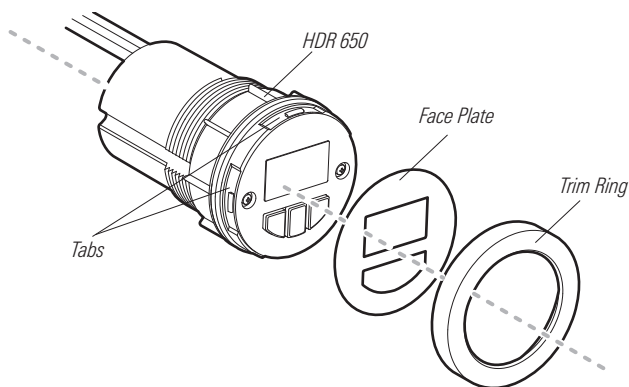
3. Customizing and Assembling the HDR 650

Your HDR 650 includes a variety of face plates and trim rings so you can customize the appearance.

1. Select one face plate and one trim ring.
2. Peel off the protective backing from the face plate. Be careful not to let the adhesive touch anything prematurely.

CAUTION: *In order to provide a lasting, waterproof bond, the face plate adhesive is extremely sticky, and you will NOT be able to re-position it once you have stuck it onto the face of the HDR 650.*

3. Carefully line up the face plate with the face of the HDR 650. Press the face plate into place so that all keys are accessible and the display is visible (see illustration).
4. Align the inside tabs of the trim ring with the HDR 650 tabs, and snap the trim ring onto the front of the HDR 650 (see illustration).

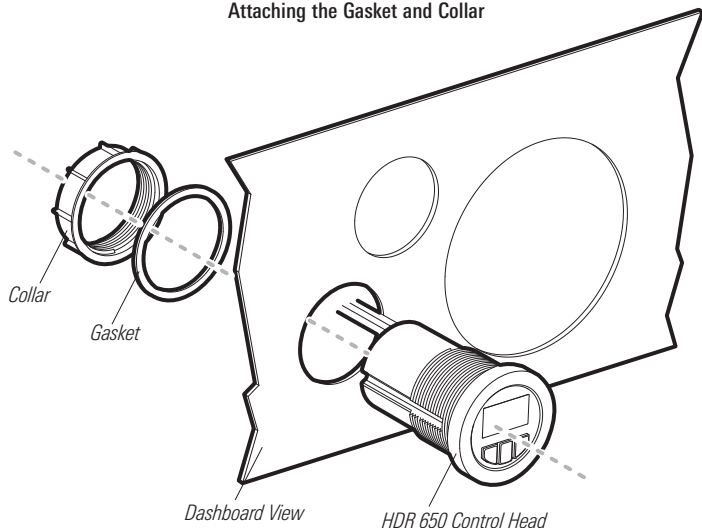


4. Installing the HDR 650

After the mounting hole has been cut (see section 2), continue the installation as follows:

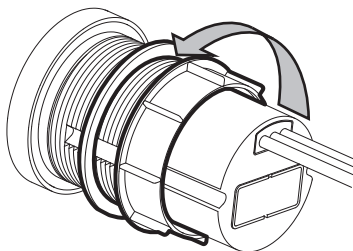
1. Remove the gasket and collar by unscrewing them from the HDR.
2. Insert the HDR through the front hole of the dashboard.
3. From the rear of the dashboard, install the gasket and collar onto the HDR.

Attaching the Gasket and Collar



4. Hand-tighten the collar until the HDR is securely mounted in the dashboard. Make sure that the face of the HDR stays oriented upright.

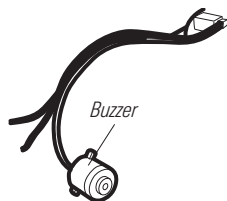
Hand-tightening the Collar



5. Installing the Buzzer

1. Secure the buzzer to a nearby wire bundle using the cable ties (included).

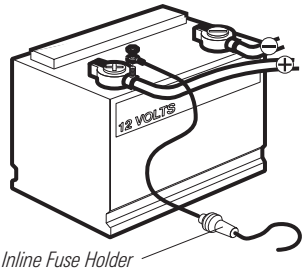
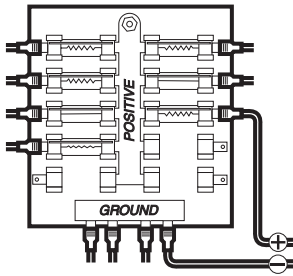
Securing the Buzzer



6. Connecting to the Power Supply

Use the following information to connect your HDR 650 to an appropriate power supply:

- If your boat has an electrical system, there is probably a fuse panel in the console area that can be used to attach the HDR 650 power cable.
- If a fuse terminal is available, 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 12 VDC power. You must use a 1-Amp fuse in the connection.
- 36" of power cable is included; you may shorten or lengthen this cable using 18-gauge, multi-strand copper wire.



CAUTION: Some boats have 24 or 36 Volt electrical systems. Make sure that your HDR 650 is connected to a 12 VDC power supply. Use a voltage conditioner for variable inputs.

NOTE: Humminbird is not responsible for over-voltage or over-current failures. The control head must have adequate protection through the proper selection and installation of a 1 amp fuse.

- 1a. If a fuse terminal is available, 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 power. Install a 1 amp fuse (not included) for protection of the unit. Humminbird is not responsible for over-voltage or over-current failures.

or...

- 1b. If you need to wire the HDR 650 directly to a battery, obtain and install an inline fuse holder and a 1 amp fuse (not included) for the protection of the unit. Humminbird is not responsible for overvoltage or overcurrent failures.

7. Installing the Transducer

Proceed to the transducer installation guide (included with your product) to install the transducer.

Before you start installation, we encourage you to read the instructions carefully so that you may understand the installation requirements.

8. Connecting the Transducer Cable

1. Plug the transducer cable into the matching connector cable on the HDR.

***NOTE:** The connector is keyed to prevent reverse installation, so be careful not to force the plug into the connector the wrong way.*

9. Testing and Finishing the Installation

Once you have installed both the HDR 650 and the transom transducer, and have routed all the cables, you must perform a final test before locking the transducer in place.

1. Turn on the power source to power on the HDR. If the unit does not power up, make sure the connector is secure and that power is available.
2. The HDR will start normal operation. If the digital depth readout displays on the screen, the unit is working properly.
3. **Test and Finalize the Installation:** Follow the instructions in the *Transducer Installation Guide: Testing and Finishing the Installation*. You will test the transducer at high speeds, make adjustments, and secure the installation.

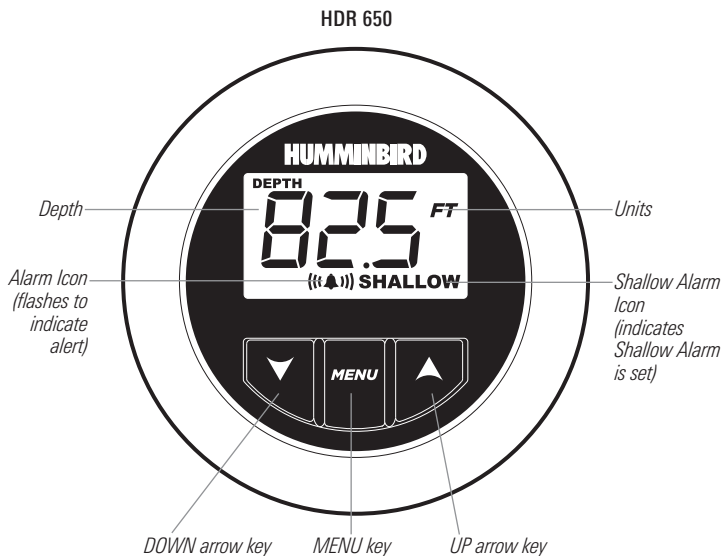
Operating the HDR 650

Your HDR 650 Digital Depth Sounder sends a sound wave signal and determines distance by measuring the time between the transmission of the sound wave and when the sound wave is reflected off of an object. As your HDR 650 transducer receives sonar signals, it converts them to a digital depth that is shown on the HDR 650 display. The depth reading is continuously updated as you travel across the water. The liquid crystal display (LCD) offers sharp viewing, even in bright, direct sunlight, and is continuously lit for nighttime operation.

***NOTE:** Actual depth capability depends on such factors as bottom hardness, water conditions, and transducer installation. Units will typically read to deeper depths in freshwater than in saltwater.*

The HDR 650 Control Head

The HDR 650 uses a backlit display, together with a 3-button keypad, to control all user functions. The illustration below shows an example of the digital display.



Power On/Off

The power is controlled by the power source connected to the HDR 650. When the power source is turned on, the HDR 650 is powered on. When the power source is turned off, the HDR 650 is powered off.

Key Functions Overview

1. **Select a Function:** Press the MENU key repeatedly until you reach the appropriate menu.
2. **Adjust the Setting:** Press the UP or DOWN arrow key to adjust the setting. Press and hold either key to scroll through the range of settings quickly.
3. **Save:** After your selection is made, wait 5 seconds for the unit to return to normal operation. Your settings are saved automatically even after the unit is powered off.

Units

The Units control function selects the units of measure for depth readout and alarm functions. You can set the units of measurement to feet, meters, or fathoms.

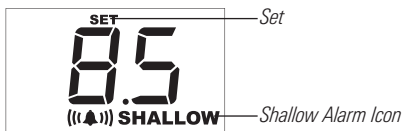


1. Press the MENU key until the Units icon is displayed and flashing on the screen.
2. Press the UP or DOWN arrow key to scroll through the available units. (FT = feet, M = meters, FA = fathoms).
3. After your selection is made, wait 5 seconds for the unit to return to normal operation. Your settings are saved automatically.

Shallow Alarm

The Shallow Alarm will sound when the measured depth is less than the setting.

1. Press the MENU key until the Shallow Alarm icon is displayed and flashing on the screen.



2. Press the UP or DOWN arrow key to change the setting.
(Off, 1 - 20 feet, .1 - 6 meters, or .1 - 3.2 fathoms; Default = Off)

NOTE: The maximum Shallow Alarm setting cannot meet or exceed the current Deep Alarm setting (see the **Deep Alarm** section).

3. After your selection is made, wait 5 seconds for the unit to return to normal operation. Your settings are saved automatically, and the Shallow icon will be visible on the display.
4. **Alarm:** If the depth of the water is less than the saved setting, the alarm will sound and the alarm icon will flash on the screen.

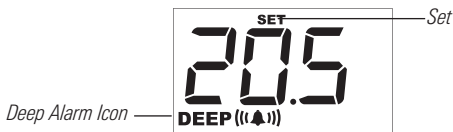
Mute: Press any key to mute the alarm.

Adjust: Press the MENU key and follow the instructions in step 2 to adjust the alarm setting.

Deep Alarm

The Deep Alarm will sound when the measured depth is greater than the setting.

1. Press the MENU key until the Deep Alarm icon is displayed and flashing on the screen.



2. Press the UP or DOWN arrow key to change the setting. (Off, 20 - 99 feet, 6 - 30 meters, or 3.3 - 16 fathoms; Default = Off)

NOTE: The minimum Deep Alarm setting cannot meet or drop below the current Shallow Alarm setting (see the **Shallow Alarm** section).

3. After your selection is made, wait 5 seconds for the unit to return to normal operation. Your settings are saved automatically, and the Deep icon will be visible on the display.
4. **Alarm:** If the depth of the water is greater than the saved setting, the alarm will sound and the alarm icon will flash on the screen.

Mute: Press any key to mute the alarm.

Adjust: Press the MENU key and follow the instructions in step 2 to adjust the alarm setting.

Set Offset (waterline or keel)

The Set Offset function adjusts the digital depth readout to display depth readings from the waterline or the keel (lowest point of the boat) instead of the transducer location.

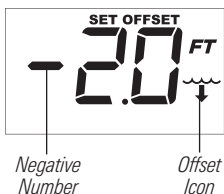
1. Choose to measure the depth from the **keel** or **waterline**.

Keel: Measure the vertical distance between the face of the transducer and the keel of the boat.

Waterline: Measure the vertical distance between the face of the transducer and the waterline of the boat.

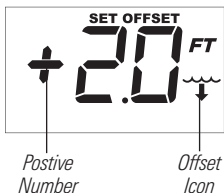
2. Press the MENU key until Set Offset is displayed and flashing on the screen.
3. Enter your chosen offset measurement as follows:

Keel Offset (Set a Negative Number)



Keel: Press the DOWN arrow key to enter the measurement from step 1 as a negative (-) number. (-1 to -10 feet, -.1 to -3.0 meters, or -.1 to -1.6 fathoms; Default = 0)

Waterline Offset (Set a Positive Number)



Waterline: Press the UP arrow key to enter the measurement from step 1 as a positive (+) number. (+1 to +10 feet, +.1 to +3.0 meters, or +.1 to +1.6 fathoms; Default = 0)

4. After your selection is made, wait 5 seconds for the unit to return to normal operation. Your settings are saved automatically, and the offset icon will be visible on the display.

Maintenance

To keep both your HDR 650 and your transducer working properly, perform the following maintenance tasks as needed.

HDR 650 Maintenance

If your HDR 650 unit comes into contact with salt spray, simply wipe the affected surfaces with a cloth dampened in fresh water. Do not use a chemical glass cleaner on the lens, as chemicals in the solution may cause cracking in the lens. When cleaning the LCD protective lens, use a chamois and non-abrasive, mild cleaner. Do not wipe while dirt or grease is on the lens. Be careful to avoid scratching the lens.

***WARNING:** Never leave your HDR 650 in a closed car or trunk; the extremely high temperatures generated in hot weather can damage the electronics.*

Transducer Maintenance

If your boat remains in the water for long periods of time, algae and other marine growth can reduce the effectiveness of the transducer. Periodically clean the face of the transducer with hot water. Pivoting the transducer up in the bracket may allow better access for inspection or cleaning.

If your boat remains out of the water for a long period of time, it may take some time to wet the transducer after it is returned to the water. Small air bubbles can cling to the surface of the transducer and interfere with proper operation. These bubbles will dissipate with time, or you may wipe the face of the transducer with your fingers after the transducer is in the water.

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.

NOTE: *Do not attempt to repair the HDR 650 yourself, as there are no user-serviceable parts inside, and special tools and techniques are required for reassembly in order to maintain the waterproof integrity of the housing. Repairs should be performed only by authorized Humminbird technicians.*

HDR 650 Doesn't Power Up

If your HDR 650 doesn't power up, refer to the Installation section, and make sure that:

- the power cable is properly connected to the HDR 650;
- the power cable is wired correctly, with red to positive battery terminal and black to negative terminal or ground;
- the fuse is operational; a fuse can often appear to be good when in fact it is not; check the fuse with a tester or replace it with a known good fuse;
- if the unit is wired through a fuse panel, make sure that the panel is powered, as accessory fuse panels are often controlled by a separate switch, or even the ignition switch of the boat;
- the battery voltage of the power connector is between 10 and 20 VDC.

Correct any known problems, including removing corrosion from the battery terminals or wiring, or actually replacing the battery if necessary.

No Bottom Reading on the Display

If there is no bottom reading visible on the display, there are a number of possible causes for this condition, including:

- if the loss of bottom information occurs only at high boat speeds, then a transducer adjustment may be needed (refer to the *Transducer Installation Guide*);
- check the transducer cable connection on the back of the HDR 650 and make sure that the cable to the transducer has not been cut or pinched, as even a small abrasion in the cable can affect performance significantly.

Correct any known problems, including adjusting the transducer, or actually replacing the transducer cable if necessary.

No Continuous Depth Display in Very Shallow Water

Losing continuous depth when the boat is in very shallow water is normal, because the automatic range control cannot lock onto the bottom in depths of one foot or less.

Screen Fades, Images are not Sharp

If the screen begins to fade, and images are not as sharp as normal, check the input voltage. The HDR 650 will not operate on input voltages below 10 VDC.

Bottom Reading Disappears During a Hard Turn

Losing the bottom reading temporarily when the boat is executing a hard turn is normal, as the transducer emerges from the water during such a turn; this condition should correct itself once the turn is completed.

Specifications

Depth Capability	.600 ft (180 m)
Power Cable Length	.36" (91 cm)
Operating Frequency	.200 kHz
Area of Coverage	.28° @ -10 dB in 200 kHz
Power Output	.250 Watts (RMS), 2000 Watts (Peak to Peak)
Current Draw	.60 mA
Power Requirement	.10 - 20 VDC
Display	Liquid Crystal Diode (LCD)
Mounting	In-Dash 2 1/8" hole
Unit Housing	High-Impact Plastic
Transducer	.XNT 9 28
Transducer Cable Length	.20 ft (6 m)
IPX Rating	.IPX7 Waterproof/Submersible @ 1 m for 30 minutes and dust tight

NOTE: Humminbird verifies maximum stated depth in saltwater conditions, but actual depth performance may vary due to transducer installation, water type, thermal layers, bottom composition and slope.

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

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 wheelee 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.*