GARMIN TRANSDUCER PLACEMENT GUIDE

Important Safety Information

WARNING

See the *Important Safety and Product Information* guide in the chartplotter or fishfinder product box for product warnings and other important information.

NOTICE

Mount the transducer away from the propeller to avoid damage to the transducer, its mount, and the propeller.

Read all installation instructions for your transducer before proceeding with the installation. If you experience difficulty during the installation, go to support.garmin.com for more information.

Introduction

Getting optimal performance from your marine transducer depends on its optimal placement on your boat. This document provides assistance when selecting the optimal mounting location for Garmin[®] transom-mount, thru-hull, and in-hull transducers.

Transducer Types

Before you can select the best mounting location for a transducer, you must identify its type.

TIP: When choosing a transducer, you should check the transducer model for compatibility with your boat.



Item	Transducer Type	Description
1	Transom mount (TM)	Mounts on the exterior of the transom at the stern of the boat. See <i>Transom-Mount Transducers</i> , page 8.
2	Thru-hull single (TH) or thru-hull pair (THP)	Mounts in a hole through the hull. See <i>Placement Considerations for Thru-Hull Transducers</i> , page 11.
3	In-hull (IH)	Attaches on the interior hull of the boat. See <i>In-Hull Transducers</i> , page 14.

Transom-Mount Transducers Overview

These transducers attach to the back of the transom for user-friendly installation and removal.

The following list describes transom-mount transducers.

- Attach to the transom with a bracket and screws
- Require constant contact with the water
- Work with any hull material
- · Yield the best results below 34 mph and installed away from turbulence
- · May require later adjustment to maintain optimal performance
- Suitable for trailered boats, especially when used with a folding bracket¹
- · Vulnerable to external damage from trailers or underwater obstructions
- Not recommended for use with sailboats due to excessive heeling •
- Not recommended for use with vessels with stepped hulls .

Thru-Hull Transducers Overview

These transducers require installation through a hole in the hull. Garmin thru-hull transducers include the following:

- Traditional sonar models
- GT-TH models with ClearVü and SideVü sonar
- LVS-TH models with LiveScope[™] forward view and down view sonar
- PS51 multibeam forward view sonar

The following list describes thru-hull transducers.

- Work with any engine type
- Provide excellent overall signal guality, even at higher speeds and greater depths
- Require a professional installer for best • results
- Require two thru-hull transducers for a hull deadrise angle of more than 5 degrees² •
- May require a fairing block depending on the deadrise angle •





¹ Before ordering a folding bracket, verify compatibility with your transducer model. ² You must select the appropriate transducer for your hull deadrise angle so the sonar beam sits at a 90-degree angle to the waterline (*Deadrise Angle*, page 5)

In-Hull Transducers Overview

These transducers attach to the inside floor of the hull.

The following list describes in-hull transducers.

- Do not require a hole through the hull
- Send the signal from within the vessel which reduces signal strength
- Perform well at high speeds, if installed away from turbulence
- Less likely to sustain external damage (ideal for trailered boats)
- May require a professional installer for best results
- · May require maintenance to refill the tank or chamber
- · Can be installed while the vessel is in the water
- · Recommended for solid fiberglass hulls only, up to 0.75 in. thickness
- Recommended for hulls with a deadrise angle of 0 to 25 degrees (models vary) (Deadrise Angle, page 5)
- · Not recommended for metal, wood, or cored-hull boats
- Do not create drag or turbulence
- · Typically do not include a temperature or speed sensor

General Location Considerations

Your should mount the transducer away from anything that obstructs or interferes with the sonar signal. When selecting a mounting location, observe these considerations.

- Transducer type and model (*Transducer Types*, page 1)
- Your vessel's waterline (Vessel Waterline and Your Transom-Mount Transducer, page 9)
- Direction of propeller rotation (Direction of Propeller Rotation, page 4)
- Potential sources of signal interference (Transducer Signal Interference, page 6)
- Hull features (SideVü Sonar Signals and Hull Type, page 5)
- · Contact with underwater objects, trailers, hoists, and storage areas



Direction of Propeller Rotation

NOTICE

Mount the transducer away from the propeller to avoid damage to the transducer, its mounting, and the propeller.

As the propeller rotates, it pushes water forcefully in the direction of its rotation, creating a current called the prop wash. The prop wash can interfere with the transducer's sonar signal and can damage the transducer and propeller. You should observe the direction of propeller rotation and mount the transducer away from the prop wash. You can best observe the direction of rotation and areas affected by the prop wash while the vessel is moving.

Clockwise rotation ① generates turbulence on the port side, the left side of the boat when you face the front of the boat. In this case, you should mount the transducer on the starboard side, the right side when you face the front.

Counter-clockwise rotation 2 generates turbulence on the starboard side. In this case, you should mount the transducer on the port side.

Transducer Beam Angle

Your transducer sends a sonar signal outward through the water. When the signal hits a fish or an object, the signal bounces back to the transducer 1. Your transducer works with your chartplotter to interpret the signal and display an image.

If the transducer is not parallel to the water's surface, the transducer signal or beam can bounce away from the transducer 2. Without a consistent signal, the transducer and chartplotter cannot provide you with clear and correct images.

If your transducer is not yielding satisfactory results, you should check your installation instructions for more information about aiming the transducer beam and troubleshooting transducer placement. Even a slight adjustment to the beam angle can strengthen the signal to provide better images.



Deadrise Angle

The deadrise angle (1) is the measurement of the angle between a horizontal line and the outer hull at a single point.

The deadrise angle is an important factor in choosing a transducer type, transducer placement, and whether to use fairing blocks (*Transducer Fairing Blocks*, page 16).

You can measure the deadrise angle with a smartphone application, an angle finder, a protractor, or a digital level. You can also ask your boat manufacturer for the deadrise of a specific point on your boat hull.

NOTE: Your vessel's hull may have several deadrise angles (2) depending on the hull shape. You should measure the deadrise angle at the installation location.



SideVü Sonar Signals and Hull Type

Parts of the hull or equipment attached to the outer hull can block the SideVü sonar signal.

If you use a transom-mount transducer, for optimal results you should mount it at least 38 cm (15 in.) from the propeller and on the downside of the prop wash (*Direction of Propeller Rotation*, page 4).

If you use a thru-hull or in-hull transducer, you should consider the hull deadrise angle (Deadrise Angle, page 5).

 If your outer hull has a deadrise angle greater than 25 degrees and no flat center area, using a single transducer allows the keel to obstruct a side beam 1.

Instead, you should use a pair of transducers, mounting one on each side of the keel 2.

- If your outer hull has a deadrise angle greater than 25 degrees with a flat center area near the transom, you can use a single transducer mounted in the flat area (3).
- If your hull has a deadrise angle of less than 5 degrees, you can mount a single transducer on the keel (4).

On a stepped-hull vessel, you should mount the transducer at the lowest point before the first step and away from other hull features that generate turbulence.





Transducer Signal Interference

Signal interference detracts from your transducer's performance. You can reduce signal interference by mounting the transducer away from common sources of interference.

	Type of interference	Source/Example
	Electromagnetic interference (EMI)	Electronic devices • Audio equipment • Motors • Radar
000	Interference from turbulence	Hull features • Steps • Strakes • Ribs
	Acoustic interference	Sound waves • Another transducer • Machinery on the vessel • Wind, waves, rain

Electromagnetic Signal Interference

Electromagnetic interference (EMI) is created by a device and transmitted in the form of an electrical current through a power cord or emitted as an electromagnetic field. Sources can include trolling motors, power cables, bilge pumps, magnetic sources, stereos, radar, and VHF radios.

Widely spaced vertical lines on the chartplotter sonar view may indicate acoustic or electromagnetic interference.

You can reduce electromagnetic interference by ensuring proper grounding of the sonar device and other equipment. Motors are a common source of electromagnetic interference.

TIP: If you want to see the highest intensity signal returns on the screen, you can lower the gain or brightness on your chartplotter screen to remove lower intensity returns and noise.

TIP: To lessen electromagnetic interference with your transducer signal, you can try these methods.

- You can install a ferrite bead (1) on the transducer cable (2).
- You can route the transducer cable away from other powered cables.
- If the transducer cable must cross a power cable, you can orient the cables at 90 degrees.
- You can apply EMI tape to insulate the cables.

2

Signal Interference from Turbulence

Your transducer sends a sonar signal through the water. Submerged equipment and hull features can generate turbulence that interferes with the sonar signal. You should install your transducer as far as possible from any equipment or hull features that can agitate the water to the degree that the sonar signal is lost or degraded.

Typically turbulence forms in the direction of the prop rotation (*Direction of Propeller Rotation*, page 4). Unavoidably vessels create turbulence while running, and knowing where turbulence tends to form can help you choose the best available mounting location for your transducer.

TIP: Areas of eroding paint on the hull often indicate areas affected by turbulence, so you should avoid those areas when considering transducer placement.

Acoustic Signal Interference

Acoustic interference reduces the performance of your transducer. While you cannot control noise from agitated water, waves, fish, rain, and other vessels, you can minimize acoustic interference by installing your transducer away from propellers, shafts, cables, and other machinery.

You should also avoid mounting the transducer aft of thru-hull fittings, water intake or discharge ports, or hull irregularities.

NOTE: If you use multiple transducers, you should mount them at least 60 cm (24 in.) apart. Running two transducers of the same frequency simultaneously causes the transducers to interfere with each other. You may run two transducers of different frequencies simultaneously.

Location Considerations by Transducer Type

Location considerations vary by specific transducer type and model (*Transducer Types*, page 1).

Transom-Mount Transducers

Transom-mount transducers skim just below the surface of the water at the stern of the vessel. The screws for the mounting bracket must be drilled into the transom.

Your transom-mount transducer must be in direct, unobstructed contact with smooth water for optimal performance. Locating the transducer away from turbulence and potential causes of damage are important considerations for transom-mount transducers.

Placement Considerations for Transom-Mount Transducers

You should consider the placement of your transommount transducer with regard to the waterline, engines, propeller, and hull.





Vessel Waterline and Your Transom-Mount Transducer

The vessel's waterline is an important placement consideration for a transom-mount transducer.

The vessel's waterline \bigcirc is the level at which the vessel sits in the water.

The hull below the waterline ② is submerged when the vessel is loaded with a typical combined weight of passengers, fuel, and equipment. The vessel's waterline can vary based on these factors.

- Adding, removing, or redistributing weight on the vessel
- · Water depth
- · Whether the vessel is moving or stationary

You can use a grease marker or waterproof tape to mark a potential mounting location on the hull, then observe waterline fluctuations when the boat is loaded and moving. Remember these recommendations.



- You should mount your transom-mount transducer parallel to the waterline.
- While the vessel is moving, the device should extend into the water 3.5 mm (0.125 in.) below a fiberglass hull or 10 mm (0.375 in.) below an aluminum hull.

Propulsion and Your Transom-Mount Transducer

Typically the engine and propeller generate turbulence at the stern near your transom-mount transducer. These placement recommendations can help avoid interference from turbulence.

- On boats with outboard or inboard/outboard motors, you should mount the transducer as close to the centerline of the transom as possible, but at least 38 cm (15 in.) from the propeller (5).
- If the propeller rotates in a clockwise direction, mounting the transducer on the starboard side typically yields the best results (*Direction of Propeller Rotation*, page 4).
- If the propeller rotates in a counter-clockwise direction, you should mount the transducer on the port side.
- On single-drive boats, you should not mount the transducer in the path of the propeller because the resulting turbulence and cavitation can damage the propeller.
- On twin-drive boats, you should mount the transducer between the drives, if possible.

Hull Features and Your Transom-Mount Transducer

Hull features that generate turbulence can affect your transducer's performance and cause it to wear prematurely. In general, if you use your transom-mount transducer while operating at higher speeds, you should mount the transducer close to the keel (centerline of the boat).



Item	Boat Feature
1	Transom
2	Hull
3	Propeller
4	Strakes
5	Rivets
6	Steps
7	Ribs

You should avoid mounting the device on the transom 1 aft of or near parts of the hull 2 that agitate the water. For example, the propeller 3, strakes 4, rivets 5, steps 6, and ribs 7 agitate the water and create air and bubbles.

Fittings and water intake or discharge ports also generate turbulence. If you must install the transducer directly aft of a thru-hull fitting, you should mount the transducer at least 1.2 m (4 ft.) aft of the fitting.

If air and bubbles affect your transducer's performance, you should check the installation instructions and verify that the transducer is mounted and adjusted properly. You should also check the hardware to verify it is not bent.

NOTE: For vessels with stepped hulls, you should consider an in-hull or thru-hull transducer instead of a transom-mount transducer.

TIP: You should select a mounting location that allows space for servicing the transducer after installation.

TIP: Garmin transducer accessories can help reduce interference from turbulence.

- For vessels with a jack plate, Garmin offers a jack plate mount to enable you to mount the transom-mount transducer on the jack plate (*Transducer Jack Plate Mount*, page 16).
- For transducers that generate excessive spray, a spray shield can reduce the excessive spray or "rooster tail" generated by the transducer. Garmin offers spray shields for compatible models (*Transducer Water Spray Shield*, page 16).

Physical Damage and Transom-Mount Transducers

NOTICE

Transom-mount transducers and mounts are vulnerable to physical impacts from submerged rocks and other obstructions or from loading and unloading from a trailer. Impacts can fracture the transducer's inner elements, damage the mount, and degrade or prevent sonar performance. Careful placement of the mounting bracket and regular inspection for damage can protect your investment in your equipment.

- Continual physical impact from turbulence can damage your transducer, so you should not mount it near or aft of areas of the boat that agitate the water (*Hull Features and Your Transom-Mount Transducer*, page 9).
- If you trailer your boat or lift it with a hoist, you should select the mounting location to avoid damage to the device while launching, hauling or storing the vessel.
- Check your transducer mounting hardware periodically for bent or missing screws or other parts. A missing mounting screw can allow water to seep into the hull or transom unnoticed and cause core damage.

Thru-Hull Transducers

NOTICE

Check the installation instructions for your thru-hull transducer to learn whether you must install it with an anti-rotation bolt. Failure to do so could result in the device rotating while the boat is moving and could cause damage to your vessel.

Install the transducer away from potential damage from rocks, other underwater objects, launching, loading, or hauling.

Placement Considerations for Thru-Hull Transducers

Your thru-hull transducer must be in direct, unobstructed contact with smooth water for optimal performance. For a thru-hull transducer, you should consider the placement with regard to the engine(s) and propeller, the hull, and physical damage.

Thru-hull transducers are the type least affected by damage from turbulence, but turbulence beneath the hull can still affect the signal. Optimal placement is in the bilge near the keel and transom where the water under the hull is smoothest while the boat is moving.

Garmin offers thru-hull transducers in two types, external and flush.

External Thru-Hull Type

An external thru-hull type extends beyond the outer surface of the hull.



Optimal placement is parallel with the waterline.

When mounted on a flatter area of the hull, this type does not require a fairing block ①. When mounted on an area of the hull with a greater deadrise angle (*Deadrise Angle*, page 5), a fairing block enables you to position the device parallel with the waterline ② (*Transducer Fairing Blocks*, page 16).

Flush Thru-Hull Type

A flush thru-hull type sits flat against the hull and produces less drag than external types.

You can install a tilt flush thru-hull type on an angled area without a fairing block.



Propulsion and Your Thru-Hull Transducer

Your boat's propulsion system generates turbulence when the boat is moving, and turbulence can affect your thru-hull transducer's performance. These placement recommendations help keep your thru-hull transducer away from turbulence from the propulsion system.

In general, optimal placement for your thru-hull transducer is in the bilge near the keel and transom where the water under the hull is smoothest while the boat is moving.



- On outboard and sterndrive vessels (1), you should mount the transducer in front of and close to the engine or engines.
- On inboard vessels ②, you should mount the transducer in front of and far away from the engine propeller and shaft.
- On single-drive boats, you should not mount the transducer in the path of the propeller.
- On twin-drive boats, you should mount the transducer between the drives, if possible.

Hull Features and Your Thru-Hull Transducer

NOTE: For optimal performance, mount the transducer parallel to the bow-stern axis of the vessel and avoid locations aft of hull features that agitate the water, such as strakes (the lengthwise molded strips on the hull bottom), struts, fittings, or water intake or discharge ports.

- On stepped hull vessels (1), you can mount the transducer in front of the first step.
- On full-keel vessels 2, you can mount the transducer at a slight angle aimed at the bow, not parallel to the centerline.
- On fin-keel vessels ③, you can mount the transducer from 25 cm to 75 cm (10 to 30 in.) in front of the keel, and maximum 10 cm (4 in.) to the side of the centerline.
- On vessels with displacement hulls ④, you can mount the transducer approximately ¹/₃ aft of the waterline length of the vessel from the bow, and from 15 to 30 cm (6 to 12 in.) to the side of the centerline.
- Hulls with a deadrise of more than 5 degrees require a pair of thru-hull transducers ⑦, with one mounted on each side of the keel ⑧.

You must select the appropriate transducer for your hull deadrise angle so that the sonar beam sits at a 90-degree angle to the bottom.

• If the deadrise angle of your mounting location exceeds 5 degrees, you can use fairing blocks to position the transducers parallel to the water line (*Transducer Fairing Blocks*, page 16).



Ensuring Optimal Performance from Your Thru-Hull Transducer

To avoid possible personal injury, always wear safety goggles, ear protection, and a dust mask when drilling through the hull of the vessel.

You should remember these tips for optimal results from your thru-hull transducer.

- Since this transducer type requires a hole drilled through the hull, give careful consideration to placement and select the best location before drilling.
- Your thru-hull transducer can be damaged by overheating if left operating while the vessel is trailered or stored. You should only operate the transducer while the vessel is in the water.
- Loading and unloading the vessel from a trailer or navigating around rocks and other obstructions can damage the external part of the transducer. You should check the area around the transducer regularly and make repairs promptly.
- The exterior part of your thru-hull transducer is vulnerable to marine growth. For the best results, you should keep the transducer clean (*Cleaning and Maintaining the Transducer*, page 15).
- With any transducer, check the cables and connections if you are not getting clear images.

In-Hull Transducers

In-hull transducers attach to the interior floor of the hull without drilling any holes. In-hull transducers work with solid fiberglass hulls and are not recommended for metal, wood, or cored fiberglass hulls.

In general, your in-hull transducer must be mounted over a part of the hull that is in constant contact with smooth water. Sending the sonar signal through the hull can reduce the transducer's depth capability, so mounting it over the smoothest water helps optimize the transducer's performance. Garmin offers in-hull models that are optimized for higher speeds and greater depths and for hull deadrise angles of 0 to 25 degrees (*Deadrise Angle*, page 5).



Placement Considerations for In-Hull Transducers

NOTICE

To provide an optimal seal, read the instructions from the manufacturer of the mounting adhesive before using it. For secure adhesion, do not allow bubbles or voids to form in the mounting adhesive under the device. Since moisture can prevent the adhesive from curing, install the transducer during dry weather.

An in-hull transducer does not create drag or generate turbulence but is subject to interference from turbulence from other sources. You should test potential locations before mounting. Hull features are an important factor with this transducer type (*Hull Features and Your In-Hull Transducer*, page 15). General considerations include the following.

- If installed over solid fiberglass with smooth water beneath the mounting area, the in-hull transducer type works well with any engine type.
- An in-hull transducer can be installed while the boat is in the water.
- Since air interferes with the transducer signal, do not allow bubbles or voids to form in the mounting adhesive under the device.
- You should test possible placement locations while the boat is moving at low and high speeds, while checking depth readings, and use tape or a grease pencil to mark locations with the strongest signal.
 For information on how to test placement before mounting, check your transducer installation instructions or go to support.garmin.com.

Hull Features and Your In-Hull Transducer

An in-hull transducer bounces its sonar signal through a solid fiberglass hull. This is possible because fiberglass has sonar properties similar to water. For optimal results, you should observe the following recommendations with regard to your vessel's hull.

- On single thickness fiberglass hulls (up to 0.75 in. thick), you can mount an in-hull transducer as flat as possible in the bilge (lowest area inside of the hull) near the transom.
- You must mount the in-hull transducer over solid fiberglass ①, with no dead (hollow) space or core in the boat hull ②. In-hull transducers are not for use with metal, wood, or cored fiberglass hulls.
 You can mount the in-hull transducer near the keel (centerline) if you ensure the keel does not block the signal or cause an echo.
- You should not mount in-hull transducers over hull features that increase hull thickness beneath the device or over fittings, water intake or discharge ports that agitate the water.
- An in-hull transducer performs well on power boats and sailboats when it is properly placed and installed.
- You should verify the maximum deadrise angle for the transducer, which varies by model.

TIP: Some in-hull transducers include several mounting pieces to allow for different deadrise angles.

Cleaning and Maintaining the Transducer

NOTICE

Clean your transducer periodically for easier cleaning and check it for damage. Aquatic fouling accumulates quickly, especially in salt water, and can interfere with the sonar signal. Cleaning the transducer incorrectly can damage its face or mounting.

NOTICE

Clean your transducer with a water-dampened cloth and mild detergent. Chemical cleaners may weaken the plastic and damage the transducer.

- Check your transducer's installation instructions for cleaning tips.
- Do not use sharp tools or scrapers that can scratch the face of the transducer or cause the transducer mounting to leak.
- To clean off severe fouling, use a scratch-free pad with mild detergent and water to avoid scratching the face of the transducer.

If applicable for your model, apply a water-based, anti-fouling coating to the external parts of the transducer to help keep it clean and ensure optimal performance. See your transducer installation instructions for more information.

If your in-hull transducer is not performing as expected, you may need to refill its tank or chamber using non-toxic RV/marine antifreeze or mineral oil³.

Garmin Transducer Accessories

Garmin transducer accessories can provide extra placement options and optimize your transducer's performance. For more information, go to garmin.com/transducers about Garmin accessories.

- Extension cables
- Spray shields
- Jack plate mounts
- Fairing blocks
- Additional sensors

³ Using any other fluid type is not recommended and could void the warranty of the transducer.

Transducer Extension Cables

If your transducer cable is not long enough to reach the chartplotter, you can add an extension cable. To avoid signal degradation, do not extend the cable more than 9 m (30 ft.).

To select a compatible extension cable, you should know your transducer type and model and verify the number of connector pins at both ends of the transducer cable connection.

Transducer Water Spray Shield

A Garmin transducer water spray shield (1) can deflect excessive water spray from your transom-mount transducer (2) when your boat is running at high speeds.

The Garmin stainless steel spray shield is for Garmin transom-mount transducers with compatible stainless steel mounts only.

Some Garmin transducers have built-in spray shields.Garmin also offers mounting brackets for compatible transducers that allow adjustment to reduce excessive spray.

A jack plate mount is another option to reduce water spray (*Transducer Jack Plate Mount*, page 16)

Transducer Jack Plate Mount

If your boat has a jack plate on the transom for an outboard motor, a Garmin transducer jack plate mount enables you to install a transducer on the jack plate. Mounting on the jack plate helps to protect the transducer from most underwater obstructions. The jackplate mounting can help with positioning the transducer to be parallel with the water surface for optimal sonar returns.

Transducer Fairing Blocks

If the deadrise angle of your mounting location exceeds 5 degrees, you should use a fairing block to mount the device. A fairing

block enables you to compensate for the hull deadrise angle to keep your compatible thru-hull transducer parallel to the waterline for increased sonar accuracy.

Before ordering, you should know the following and determine whether a Garmin fairing block will fit your need.

- Transducer model
- Hull type, material, and thickness
- Deadrise angle of the mounting location⁴
- · Inner and outer hull dimensions of the mounting area
- Inner and outer hull features relative to the fit of the fairing block and hardware

If a premade fairing block is not available, it may need to be fabricated.







⁴ A hull deadrise angle exceeding 5 degrees may require a pair of transducers (one on each side of the keel) mounted with fairing blocks.

Additional Sensors

To read water speed, water temperature, water depth, wind speed, and more, Garmin offers accessory sensors, sensor adapters, sensor/transducer combinations, and wired or wireless sail packs. Before ordering, check connector ends and compatibility with your sounder.

- GST[™] 43 Thru-hull Speed/Temperature Transducer (010-04284-00)
- GNX[™] Wired Sail Pack 43 (010-01248-60)
- GNX[™] Wireless Sail Pack 43 (010-01616-30)
- GTEMP10-TH Thru-hull Temp Sensor (010-11413-10)
- Speed Sensor (7-pin) (010-10279-02)
- GST[™] 10 Water Speed and Temperature Analog Adapter (010-11328-00)
- DST 810 Smart Transducer

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