The Advantage of Furuno’s Digital Filter Technology

Detailed target presentation with FDF

Furuno Digital Filter (FDF) optimizes the gain settings automatically to obtain highly defined images of the underwater conditions. FDF also eliminates noise to deliver sharp, detailed images, allowing for detection of fishing reefs and even individual fish with absolute clarity.

Fine Tuning your Frequency with FFS

Furuno Free Synthesizer (FFS) technology permits a wide selection of operating frequencies from 28 to 200 kHz. If a Furuno transducer is used, operating frequency is automatically set in the menu, and can be shifted manually at any time.

In this blow-up of an actual sounder screen, you can see how the Furuno Digital Filter clearly detects and displays target fish close to the seabed.

General Specs:

<table>
<thead>
<tr>
<th>Display</th>
<th>TZT, TZT2 or 3D</th>
<th>5.6” Color LCD</th>
<th>8.4” Color LCD</th>
<th>10.4” Color LCD</th>
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<td>8/16/64 Colors</td>
<td>8/16/64 Colors</td>
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<td>Output Power (RMS)</td>
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<td>Frequencies (kHz)</td>
<td>CHIRP 50 &amp; 200 kHz</td>
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<td>28 to 200 kHz</td>
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<td>Min. Range</td>
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<td>Max. Range</td>
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<td>Fishing Features:</td>
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<td>A-Scope &amp; VRM</td>
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<td>Fish/Bottom Alarm</td>
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</table>

Model Number:

- DFF1-UHD
- FCV628
- FCV588
- FCV295
- FCV1150
- FCV1900

Complete Angler’s Guide to Marine Transducers
Furuno offers a wide range of matched, high performance transducers for our depth sounders. There are transducers available for virtually every type and size of boat. There are also sensors you can install that will accurately read your boat speed and the surface water temperature. Because there are a number of variables in transducer types that can dramatically affect your fish finder’s performance, understanding these variables is the key to selecting the right transducer. This book will help you learn about what makes a transducer ‘tick.’

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Pro anglers on the SKA and FLW circuits utilize the 50/200 kHz frequencies to find their winning catch.
How it works

There are a wide variety of transducer options available for Furuno fish finders, but all of them operate on the same principle. At its most basic definition, a transducer is a device that takes energy from one source, converts that energy into some other form and then delivers that energy to a target, such as a PA system converting sound from a microphone into electrical signals and then delivering that energy to the speakers. In the case of marine transducers, imagine that the same device can act as both the microphone and the speaker. Electricity from the fish finder is applied to the transducer, which sends out an acoustic signal - sound waves - into the water column. The transducer receives the reflected echoes from objects that these sound waves encounter and they are sent as an electrical signal to your fish finder. It is the fish finder’s job to process this signal into a picture of the underwater world on your screen.

The Essence of a Transducer

The physical device inside a transducer that creates the sound wave is a piezoceramic disc called the element. The element, when voltage is applied, vibrates - it distorts and reforms its shape in very rapid succession. This vibration occurs at a specific frequency and creates compression waves, or acoustic energy - sound waves. These waves travel outward from the element in a vaguely cone-shaped pattern and encounter targets along the way.

As this acoustic energy encounters targets such as fish or bottom structure, some of the beam will be attenuated (absorbed by the target), some will be reflected back at the transducer as an echo and some will be scattered. As the reflected echoes strike the transducer they cause a minute cule distortion in the shape of the crystal. This distortion of the crystal creates a small fluctuation of voltage, which can be detected and processed by the fish finder. The end result is an image on your display.

By measuring the time from when the sound wave is generated to when the return echo is received, we can learn the depth at which a target is encountered. The strength of the reflected echo can tell us about the size and density of the target.

Some transducers are referred to as single-element transducers. This means that they contain a single piezoceramic disc that vibrates alternately at 50kHz and 200kHz, utilizing both operating frequencies. Furuno offers a wide range of single-element transducers that are very popular and carry a low price tag.

When greater performance is desired or required, multiple element transducers are available that can significantly enhance the performance and sensitivity of your fish finder. A multiple-element transducer is one in which separate elements vibrate individually at their respective frequencies. Some high-end models utilize seven, nine or even fifteen 50kHz elements along with a large-diameter 200kHz element. The dedicated 200kHz element offers enhanced sensitivity in shallow water, while the greater surface area of the 50kHz array will receive echoes from deeper water with much more clarity and detail.

Many transducers are available with multiple elements for the 50kHz function and a single, large-diameter 200kHz element, delivering enhanced performance.

*Shown with High Performance Fairing Block
Frequency and Beamwidth

Frequency demystified
Frequency refers to the number of sound waves that radiate from a transducer each second. Sound waves are made up of high pressure and low-pressure pulses traveling through a given medium. The wavelength of sound is defined as the distance between two successive high-pressure pulses or two successive low-pressure pulses. For example, when an electrical pulse is applied to a 200kHz transducer the element vibrates at a frequency of 200,000 cycles per second – that is, 200,000 individual sound waves are transmitted from the element each second. Short-wavelength, high frequency transducers produce sharp, crisp images on the fish finder display.

Why use two frequencies?
For recreational and sportfishing applications, the 50/200kHz pairing of frequencies offers an ideal balance of both shallow- and deep-water performance. The 200kHz frequency produces sharp, crisp images in shallow water while 50kHz allows you to “see” much deeper.

Some frequency pairings are more suited to an individual application than others, and for this reason Furuno has always offered the commercial and serious sport fisherman a choice when it comes to selecting frequency pairs for a commercial fish finder. These include 28, 38, 50, 88, 107 and 200kHz.

Beamwidth
The beamwidth of a transducer is a numeric value that describes the effective angle of the sound wave. This value is defined as the total angle between the points at which the acoustic energy has been reduced to half its peak value, commonly referred to as -3dB down points. This value is important because it determines the area in which your fish finder will be able to “see.”

As the frequency increases the beamwidth will become more narrow, similar to focusing the beam of a flashlight. As you adjust the lens, the beam of light focuses and covers a smaller area, delivering more energy on-target. This is more a function of the design of the transducer rather than an inherent property of frequency.

Remember that the lower frequency wavelengths “see” deeper in the water column than higher frequency wavelengths, and so a boost in power is not always necessary to detect fish in deeper water. The lower in frequency that you go, the deeper the echo sounder will see for the same amount of power. You can also increase the fish finders detection range in all frequencies by using a narrower beam transducer. A narrow beam delivers more energy on-target, resulting in stronger echoes, improved target resolution, and the ability to “see” in deeper water.

On some Furuno Fish Finders, the user can shift the operating frequency at any time from the menu. For example, the FCV1150 using the FURUNO B2B-3G transducer, the operator can select any operating frequency from 65 to 110kHz. This feature is particularly useful for vessels targeting many different species, or when the fish finders of other ships in the area cause interference.
TruEcho CHIRP and Broadband

TruEcho CHIRP combines the benefits of CHIRP broadband with Furuno’s legendary Digital Signal Processing, along with unique Furuno features like Bottom Discrimination and Accu-Fish.

What is CHIRP?

CHIRP, or Compressed High Intensity Radar Pulse, has been used by the military, geologists and oceanographers since the 1950’s. It is only recently that this technology has become available for widespread use on personal vessels, and it’s taken the sport fishing world by storm.

CHIRP transducers employ sinusoidal waveforms whose instantaneous frequency increases or decreases linearly over time.

Wait, what?

In plain language, this means that the transducer elements vibrate across a range of frequencies. With each pulse, the transducer will begin vibrating at a low frequency, modulated upwards to a higher frequency throughout the duration of the pulse. Sonic information is sent and received at each individual frequency in the range, which is represented as a single waveform. These waveforms are commonly referred to as linear chirs or simply chirps. A single CHIRP will transmit and receive information across as many as 90 different frequencies with each pulse.

So, what is the benefit of a CHIRP sounder over a single- or dual-frequency sounder? Let’s take a look at a standard, dual-frequency sounder. A typical non-CHIRP fishfinder operates at discrete frequencies of 50kHz and 200kHz, transmitting only at these discrete frequencies with a maximum duty cycle of 1%. This means they transmit a voltage to the transducer no more than 1% of the time. The rest of the time, they are listening for return echoes. While the transmitted pulse can be high power, it will also be of a very short duration, limiting the total energy that is transmitted into the water column. CHIRP sounders use a precise sweep pattern modulated within a range of frequencies all within a single long-duration transmit pulse. Because the transmission lasts longer, more energy is directed into the water column. The equivalent sound energy transmitted into the water can be up to 1,000 times greater than a conventional fishfinder, resulting in more energy on target. The results are up to 50 greater resolution and depth capability than comparably powered fishfinders.

Broadband Technology

“Broadband” is a term used to describe a method for increasing the available bandwidth (range of frequency) of a transducer element without lessening performance. Increased bandwidth allows for the faster rise and fall times of the acoustic pulse, the byproduct of which is referred to as ring. This decreased ringing presents a much crisper image on the fish finder screen, allowing for better discrimination of individual bait fish as well as an increase in the ability of the fish finder to differentiate between the sea floor and fish suspended very near to the bottom. Broadband technology is available in select transducers.
3D Fish Finders

What is the DFF3D, and how does it work?

The DFF3D is a Multi Beam Sonar designed for NavNet TZtouch and TZtouch3 series MFDs. The DFF3D transmits 41 individual beams, covering a 120° water column between port and starboard. This makes the DFF3D very effective in analyzing a wide area, detecting bottom contours and targets that otherwise might have been missed with a conventional Fish Finder.

The DFF3D offers four unique presentations: Cross Section, Multi-Sounder, 3D Sounder History, and Side Scan.

Cross Section: Conventional Fish Finders show echoes, but you cannot see whether the fish is located on the port side, starboard side, or right below. The Cross Section screen shows the water under the boat in a 120° range. In the example at right, you can easily see a fish school on the port side of the boat. Think of this mode as an extremely wide A-scope. Just like a conventional A-scope, targets are real time, not historical.

Multi-Sounder: The Multi-Sounder screen shows triple beams for port (left), center (down), and starboard. In the following example, the port side has more fish targets than the others. To focus on the center only, the single beam window is also available as a conventional Fish Finder. The beam angle of triple beam and the beam width of triple and single beams can be adjusted.

- Beam Angle: Selectable from 20/30/40° / 50°
- Beam Width: Selectable from 20/30/40°

3D Sounder History: The 3D Sounder History screen shows the bottom shape and fish location in 3D. The view angle can be adjusted by dragging the screen so that you can easily analyze the bottom shape and the location of fish targets. In the 3D Sounder History screen, the bottom image is drawn in a single line at the same picture advance speed regardless of boat heading and speed. When the boat rotates rapidly, the 3D image on the screen may look different from the actual one.

Example – Fish school around a wreck

Side Scan: In the Side Scan screen, the seabed is drawn at both sides of the screen to focus on port and starboard images. This mode is suitable to analyze detailed bottom structures such as a fish reef.
**Bottom Discrimination, Accu-Fish, and RezBoost**

The **Bottom Discrimination** feature enables the fish finder to indicate if the major component of the bottom is rocks, gravel, sand or mud.

The **Bottom Discrimination** Function provides you with valuable information to locate rich fishing grounds, while boosting your catch of the day.

Keep the following in mind when using a **Bottom Discrimination** Sounder:

1. Use at a depth of 10 - 300 feet
2. Use a transom or thru-hull mounted transducer
3. To show a consistent display, set the range of the fish finder to “auto”
4. Enter your ship’s draft value
5. Use a ship speed of 10 knots or less

**RezBoost** is a revolutionary signal processing technology that improves resolution and target separation when using conventional narrowband transducers.

**RezBoost** improves your ability to spot individual game fish surrounding bait balls, as well as fish close to the seabed.

With **RezBoost**, not only can you expect higher resolution and crisper visuals, but also improvements in the **ACCU-FISH** function.

Compared to conventional signal processing techniques, a RezBoost Fish Finder produces an image that is up to 8 times clearer. What can be done with a conventional narrowband transducer, like the one you might have installed on your vessel, is truly impressive.

**ACCU-FISH** is a revolutionary fish size assessment function. In order to assess individual fish size, the echo strength from the fish needs to be computed and turned into fish size display on the screen. It can detect fish size of 4” to 80”, in depths of 6 to 300 feet.

Activating the **ACCU-FISH** from the menu, the display will show fish size on the individual fish echo. When the **ACCU-FISH** is used concurrently with fish marks, it greatly helps anglers to identify fish targets on the display. You may also select and display the target depth instead of fish size, which helps to see how far the fish is from the boat.

The fish mark can be utilized to display on individual fish echoes when detected. It helps beginners to identify the fish targets on the display for a more fun fishing experience. Fish mark is selectable from two types of fish symbols: circle and square. The fish symbol, displayed in two different sizes (Large: over 10", Small: 4” to 9”), is a great help for anglers to identify fish targets. Circle and square marks are used to identify targets without hiding fish echo.
Interference

When two or more echo sounders are operating in close proximity and at the same frequency, it is possible for each to receive false returns from the others’ transducer. In such cases the operator will see noise and clutter, false returns, multiple bottoms or other video anomalies on the screen. This is most common in and around marinas or harbors where there may be multiple fish finders operating at the same frequencies. Furuno fish finders have interference rejection circuitry which should be used in such instances, but use it sparingly to avoid eliminating small targets. Many boaters have found that adding a Furuno Smart Sensor, operating at 235kHz, will ensure a reliable numeric value for depth when their 50/200kHz fish finder suffers from interference.

Sidelobes

The image to the right illustrates a typical beam pattern. It is a graphic representation of the pattern the acoustic energy takes as it radiates from the transducer. The center cone represents the energy within the -3db down points, what is referred to as the Mainlobe, and is the focus of the transducers energy. In this image we can see that not all of the energy is concentrated within the Mainlobe. Some of the acoustic energy spills out to the sides in what are referred to as Sidelobes, areas outside of the main beam in which a small level of energy is radiated. Since this energy is capable of producing return echoes from objects it encounters, it is possible to receive weak returns from the Sidelobes in shallow water.

Target Masking

Target masking is a phenomenon where acoustic energy from the transducer encounters a ledge which is only partially within the beam. This produces an echo which is sent back to the transducer sooner than the echo returned by either the sea bottom or fish targets. The result is that these fish targets will not be discernible on the fish finder screen. This phenomenon can occur with trenches as well as when traveling over sloping ground.

It is also possible to pick up a second echo from the sea bed, which will show as an echo on the screen at a greater depth than that of the ledge.

Transducers - 50kHz or 200kHz

<table>
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<tr>
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<th>Transducer</th>
<th>Rating</th>
<th>Power</th>
<th>Angle</th>
<th>Beam</th>
<th>Housing</th>
<th>Type</th>
<th>Mount</th>
<th>Cable</th>
<th>Temp Speed Compatible Models</th>
<th>Bottom Discrimination Transducer</th>
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</thead>
<tbody>
<tr>
<td>525STID-MSD</td>
<td>★ 600W 45/12 Bronze</td>
<td>3KW</td>
<td>10 Pin</td>
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<td>AIR-033-080</td>
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★ Beam Angle varies with frequency

**Transducer**

- **525STID-MSD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-428, 525STID-MSD
- **525STID-PWD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-080, 525STID-PWD

**Part number**

- **525STID-MSD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-428
- **525STID-PWD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-080

**Rating**

- 600W 45/12 Bronze

**Power**

- 3KW

**Angle**

- 10 Pin

**Beam**

- TH

**Housing**

- 10 M

**Type**

- YES

**Mount**

- YES

**Cable**

- AIR-033-428

**Temp Speed Compatible Models**

- 525STID-MSD, 525STID-PWD

**Bottom Discrimination Transducer**

- 525STID-MSD, 525STID-PWD

**Part number**

- **525STID-MSD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-428
- **525STID-PWD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-080

**Rating**

- 600W 45/12 Bronze

**Power**

- 3KW

**Angle**

- 10 Pin

**Beam**

- TH

**Housing**

- 10 M

**Type**

- YES

**Mount**

- YES

**Cable**

- AIR-033-428

**Temp Speed Compatible Models**

- 525STID-MSD, 525STID-PWD

**Bottom Discrimination Transducer**

- 525STID-MSD, 525STID-PWD

**Part number**

- **525STID-MSD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-428
- **525STID-PWD**: 600W 45/12 Bronze, 10 Pin TH, 10 M, YES, YES, AIR-033-080

**Rating**

- 600W 45/12 Bronze

**Power**

- 3KW

**Angle**

- 10 Pin

**Beam**

- TH

**Housing**

- 10 M

**Type**

- YES

**Mount**

- YES

**Cable**

- AIR-033-428

**Temp Speed Compatible Models**

- 525STID-MSD, 525STID-PWD

**Bottom Discrimination Transducer**

- 525STID-MSD, 525STID-PWD
Getting the most out of your Fish Finder

Standard vs. High Performance
When you purchased your fish finder you made an investment, and to get the most out of that investment you will need to match it with the right transducer. Once you’ve selected your mounting method (In Hull, Through Hull or Transom Mount), you will need to select the right transducer. The best transducer for your needs will depend on a number of variables but there are some constants that should be considered and we’ll go over those now.

Most standard transducers are designed for recreational fish finders and generally have a single element that resonates alternately at 50 and 200 kHz. Although these transducers are effective and inexpensive, greater performance can be had by matching your recreational fish finder with a high-performance transducer. These transducers are rated for a greater power output and contain an array of 50kHz elements along with one or more large-diameter 200kHz elements. An array of 50kHz elements allows for a very tight beam pattern, meaning there will be more energy on-target to produce return echoes. Also, the greater surface area of this array makes the transducer more sensitive to return echoes, enabling greater target resolution on the screen. The same is true of having one large, dedicated 200kHz element - its tighter beamwidth and greater sensitivity create a better performing transducer at all power outputs.

For example, a typical recreational fish finder will output 600 watts of energy and is designed to function with a matching triducer rated at 600 watts. Pairing this fish finder with a high-performance transducer rated at 1,000 watts will drastically improve the performance of your fish finder.

Smart Sensors connect directly to a variety of Furuno equipment, enabling you to upgrade your transducer without sacrificing speed and temperature information.
Mounting Options

Selecting the mounting location
Although it falls outside the scope of this guide to describe all of the details of installation, there are some important points that are true for every transducer installation. Acoustic noise is always present, and these sound waves can interfere with your transducers operation. Ambient (background) noise from sources such as waves, fish and other vessels cannot be controlled. However, carefully selecting your transducers mounting location can minimize the effect of vessel-generated noise from the propeller(s) and shaft(s), other machinery, and other fish finders. The lower the noise level, the higher the gain setting you’ll be able to use effectively on your fish finder.

Always select a location where:
• Water flowing across the hull is smoothest with a minimum of turbulence and bubbles
• The transducer will be continuously immersed in water (not applicable for In-Hull models)
• There is a minimum of deadrise angle
• The transducer beam will not be obstructed by the keel or propeller shaft(s)
• There is adequate headroom inside the vessel for the height of the housing, tightening the nuts, and removing the valve assembly and insert

As a rule, no transducer should be located near a water intake or discharge opening, directly aft of any lifting strakes, steps or other obstructions or irregularities in the hull, or behind eroding paint (an indication of turbulence). The flow of water across the transducer face must be as smooth as possible in order to get the best performance while cruising.

Pairing blocks
The purpose of a fairing block is threefold: to compensate for the deadrise of the hull, to reduce drag, and to create a smooth surface for water to flow cleanly and unaerated across the face of the transducer. When a fairing block is correctly installed, boat drag will be minimized and the flow of water over the transducer face will be free of bubbles and turbulence.

A standard fairing is of a similar shape to its companion transducer. By contrast, a high-speed fairing projects a longer, more streamlined form. This elongated wedge shape cuts the water into two streams which flow along its sides towards the tapered end, where they will smoothly rejoin. The result of a well-installed fairing is excellent fish finder performance above 15 knots.

After the fairing is cut, it must be shaped to the hull as precisely as possible with a rasp or power tool. A tight fit will allow water to flow more smoothly over the transducer. If the transducer is recessed more than 0.5 mm (1/64th inch) inside the fairing, you should either shim the transducer or carefully file or sand the fairing until the two are flush.
Through Hull

Through-hull transducers require that a hole is cut in the hull, so their installation is more involved than a relatively simple transom mount. They are also more difficult to access for periodic cleaning, which they may require more often than a typical transom mount transducer. Owners of trailerable boats with through-hull transducers must be careful not to damage it when launching or loading the boat.

To keep the transducer facing squarely downward into the water column, a fairing block must be used. The fairing block is installed parallel to the flow of water to ensure proper boat handling, and this will not necessarily be the same from hull to hull.

A fair amount of skill is required to achieve a proper through-hull installation. If in doubt, don’t go it alone - consult your local Furuno dealer for assistance.

Transom Mount

Transom mounting is the simplest method of transducer installation and is most common among smaller boats. The transducer is installed on the transom, slightly below the waterline. The transducer face should be at a slight angle forward so as to reduce the effects of turbulence and aerated water.

In-Hull or Shoot-Through

A third option when mounting your transducer is referred to as an in-hull, or shoot-through installation. An in-hull transducer is mounted on the inside of the hull. The transducer signal ‘shoots through’ the fiberglass and so the hull does not require a hole cut in it, although certain hull types may need to be bored out to remove any flotation material. When properly installed the effects of turbulence and aerated water are minimized. Because the transducer face does not touch water, there is no real maintenance involved with an in-hull transducer. These are compelling arguments for shoot-through installations.

These benefits do not come without a price, and that price is performance. The signal will experience loss when shooting through the hull material. This means that the performance of your fish finder will suffer. Most modern in-hull transducers are designed to compensate for this loss.

Boats with wood, aluminum or steel hulls will not be able to use in-hull transducers, as these materials act as a very effective barrier against the acoustic signal. Sound waves simply will not propagate through these materials. Only fiberglass boats, with no flotation core, can utilize an in-hull transducer. fiberglass boats with foam or balsa cores or those with air pockets will need to be ‘dug out’ so that the face of the transducer touches the fiberglass. This can make installing an in-hull transducer a tricky proposition.
## Transducers - 50/200kHz

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Power Rating</th>
<th>Beam Angle</th>
<th>Housing Type</th>
<th>Plugs</th>
<th>Mount Type</th>
<th>Cable Type</th>
<th>Temp</th>
<th>Pairing Block</th>
<th>Compatible Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>520-5MSD</strong></td>
<td>600W</td>
<td>45°</td>
<td>Bronze</td>
<td>10 Pin</td>
<td>TH</td>
<td>10 M</td>
<td>NO</td>
<td>DFF1, BBDS1, FCV16d, FCV135d, GP1871F/GP1971F</td>
<td></td>
</tr>
<tr>
<td><strong>520-5SSD</strong></td>
<td>600W</td>
<td>45°</td>
<td>Plastic</td>
<td>10 Pin</td>
<td>TH</td>
<td>10 M</td>
<td>NO</td>
<td>DFF1, BBDS1, FCV16d, FCV135d, GP1871F/GP1971F</td>
<td></td>
</tr>
<tr>
<td><strong>520-5SSD</strong></td>
<td>600W</td>
<td>45°</td>
<td>Plastic</td>
<td>10 Pin</td>
<td>TM</td>
<td>10 M</td>
<td>NO</td>
<td>DFF1, BBDS1, FCV16d, FCV135d, GP1871F/GP1971F</td>
<td></td>
</tr>
<tr>
<td><strong>520-5TDD</strong></td>
<td>600W</td>
<td>45°</td>
<td>Plastic</td>
<td>10 Pin</td>
<td>TH</td>
<td>10 M</td>
<td>YES</td>
<td>AIR-033-523**</td>
<td>DFF1, BBDS1, FCV628, FCV588, GP1871F/GP1971F</td>
</tr>
<tr>
<td><strong>520-5LD</strong></td>
<td>600W</td>
<td>45°</td>
<td>Plastic</td>
<td>10 Pin</td>
<td>TH-LP</td>
<td>10 M</td>
<td>YES</td>
<td>AIR-033-352**</td>
<td>DFF1, BBDS1, FCV628, FCV588, GP1871F/GP1971F</td>
</tr>
<tr>
<td><strong>520-5LD</strong></td>
<td>600W</td>
<td>45°</td>
<td>Plastic</td>
<td>10 Pin</td>
<td>TH-LP</td>
<td>10 M</td>
<td>NO</td>
<td>DFF1, BBDS1, FCV628, FCV588, GP1871F/GP1971F</td>
<td></td>
</tr>
<tr>
<td><strong>526TID-HDN</strong></td>
<td>556TID-HDD</td>
<td>527ID-IHD*</td>
<td>Stainless Steel</td>
<td>10 Pin</td>
<td>TH-LP</td>
<td>10 M</td>
<td>NO</td>
<td>DFF1, BBDS1, FCV628, FCV588, GP1871F/GP1971F</td>
<td></td>
</tr>
<tr>
<td><strong>526TID-HDN</strong></td>
<td>556TID-HDD</td>
<td>527ID-IHD*</td>
<td>Stainless Steel</td>
<td>10 Pin</td>
<td>TH-LP</td>
<td>10 M</td>
<td>NO</td>
<td>DFF1, BBDS1, FCV628, FCV588, GP1871F/GP1971F</td>
<td></td>
</tr>
</tbody>
</table>

* Must connect to MB-1100 to use with: DFF1, FCV628, FCV588, GP1871F/GP1971F
** Broadband Transducer (200kHz function only); † Includes connector for optional Speed/Temp
*** High Performance Fairing Block included; [719x45] and BB Models

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For example, a typical recreational fish finder will output 600 watts of power. By combining transducers rated between 600-1000 watts will drastically improve the performance of your fish finder. The wider beam pattern, meaning there will be more energy on-target, and the greater surface area and sensitivity create a better performing transducer at all power outputs. An array of 50kHz elements allows for a very tight beam pattern, meaning there will be more energy on-target. Also, the greater surface area and greater sensitivity create a better performing transducer at all power outputs. Most standard transducers are designed for recreational fish finding, but higher performance transducers are effective and inexpensive. Greater performance can be had by matching your recreational fish finder with a high-performance transducer. These transducers are rated above 500 watts. For example, a typical recreational fish finder will output 600 watts of power. By combining transducers rated between 600-1000 watts will drastically improve the performance of your fish finder. The wider beam pattern, meaning there will be more energy on-target, and the greater surface area and sensitivity create a better performing transducer at all power outputs. An array of 50kHz elements allows for a very tight beam pattern, meaning there will be more energy on-target. Also, the greater surface area and greater sensitivity create a better performing transducer at all power outputs. Most standard transducers are designed for recreational fish finding, but higher performance transducers are effective and inexpensive. Greater performance can be had by matching your recreational fish finder with a high-performance transducer. These transducers are rated above 500 watts.

---

**Transducers - 50/200kHz**

- **520-5MSD**: 600W, 45°, Bronze, 10 Pin, TH, 10 M, NO.
- **520-5SSD**: 600W, 45°, Plastic, 10 Pin, TH, 10 M, NO.
- **520-5TDD**: 600W, 45°, Plastic, 10 Pin, TH, 10 M, YES.
- **520-5LD**: 600W, 45°, Plastic, 10 Pin, TH-LP, 10 M, YES.
- **526TID-HDN**: 556TID-HDD, 527ID-IHD*, Stainless Steel, 10 Pin, TH-LP, 10 M, NO.

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**Legend**:
- W = Watts
- KW = Kilowatts
- SS = Stainless Steel
- NC = No Connector
- TH = Thru Hull
- TM = Transom Mount
- IH = In Hull
- LP = Low Profile

**Note**:
- Transducers are available with 10-pin connectors for use with older Furuno CRT model sounders. See your Furuno dealer for availability.
interference. Meric value for depth when their 50/200kHz fish finder suffers from Furuno Smart Sensor, operating at 235kHz, will ensure a reliable nu-
eliminating small targets. Many boaters have found that adding a which should be used in such instances, but use it sparingly to avoid frequencies. Furuno fish finders have interference rejection circuitry
bors where there may be multiple fish finders operating at the same
screen. This is most common in and around marinas or har-
and clutter, false returns, multiple bottoms or other video anomalies from the others transducer. In such cases the operator will see noise at the same frequency, it is possible for each to receive false returns
show as an echo on the screen at a greater depth than that of the ledge. It is also possible to pick up a second echo from the sea bed, which will travel over sloping ground.

Transducers - 50kHz or 200kHz

<table>
<thead>
<tr>
<th>Part number</th>
<th>Power Rating</th>
<th>Beam Angle</th>
<th>Housing Type</th>
<th>Mount Type</th>
<th>Cable Length</th>
<th>Compatible Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA50F-24H</td>
<td>3KW</td>
<td>9 x 13</td>
<td>Rubber</td>
<td>C, H, T</td>
<td>50 Feet</td>
<td>DFF3, FCV295, FCV1200, BB Models</td>
</tr>
<tr>
<td>CA50BL-12</td>
<td>2KW</td>
<td>12 X 12</td>
<td>Rubber</td>
<td>NC</td>
<td>50 Feet</td>
<td>DFF3, FCV295, FCV1200, BB Models</td>
</tr>
<tr>
<td>CA50B-12</td>
<td>2KW</td>
<td>12 X 12</td>
<td>Rubber</td>
<td>NC</td>
<td>50 Feet</td>
<td>DFF3, FCV295, FCV1200, BB Models</td>
</tr>
<tr>
<td>CA200B-82M</td>
<td>2KW</td>
<td>5.5</td>
<td>Bronze</td>
<td>TH</td>
<td>50 Feet</td>
<td>AIR-033-080**</td>
</tr>
<tr>
<td>CA200B-5</td>
<td>1KW</td>
<td>8.5</td>
<td>Bronze</td>
<td>TH</td>
<td>50 Feet</td>
<td>AIR-033-428</td>
</tr>
<tr>
<td>SS264N-200/20</td>
<td>600W</td>
<td>6 SS</td>
<td>NC</td>
<td>LP</td>
<td>10 M</td>
<td>DFF1, BBDS1, FCV628, FCV588, BB Models</td>
</tr>
<tr>
<td>SS264N-200/12</td>
<td>600W</td>
<td>6 SS</td>
<td>NC</td>
<td>LP</td>
<td>10 M</td>
<td>DFF1, BBDS1, FCV628, FCV588, BB Models</td>
</tr>
<tr>
<td>SS264W-200/20</td>
<td>600W</td>
<td>25 SS</td>
<td>NC</td>
<td>LP</td>
<td>10 M</td>
<td>DFF1, BBDS1, FCV628, FCV588, BB Models</td>
</tr>
<tr>
<td>SS264W-200/12</td>
<td>600W</td>
<td>25 SS</td>
<td>NC</td>
<td>LP</td>
<td>10 M</td>
<td>DFF1, BBDS1, FCV628, FCV588, BB Models</td>
</tr>
<tr>
<td>SS264w-50/20</td>
<td>600W</td>
<td>25 SS</td>
<td>NC</td>
<td>LP</td>
<td>10 M</td>
<td>DFF1, BBDS1, FCV628, FCV588, BB Models</td>
</tr>
<tr>
<td>SS264w-50/12</td>
<td>600W</td>
<td>25 SS</td>
<td>NC</td>
<td>LP</td>
<td>10 M</td>
<td>DFF1, BBDS1, FCV628, FCV588, BB Models</td>
</tr>
</tbody>
</table>

Paired Transducers - 50kHz or 200kHz

Because the beamwidths are the same for both 50kHz SS264W-50 and 200kHz SS264W-200, a split-screen Fish Finder display will clearly show the same water column and bottom coverage when these two wide-beam transducers are connected. The narrow-beam, broadband 200kHz SS264W-200 transducer will give you excellent resolution and crisp image detail needed for bottom fishing. The low-profile design of these transducers is perfect for fast, trailed, tournament, sport-fishing vessels that cannot install a thru-hull with a high-performance fairing. High-performance, wide-beam ceramic elements are tilted inside the housings, compensating for your boats deadrise.

Multi Sensors - 50/200kHz

Furuno offers a wide selection of multi sensors for use with our recreational fish finders. Multi sensors, also referred to as triducers, combine standard 50/200kHz transducers with speed and temperature functions into a single package. The benefit of having a multi sensor is ease of installation, since there is only one unit to be installed that provides depth, speed and temperature functions. Furuno offers a variety of multi sensors that are cost-effective and very efficient for most recreational applications.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Power Rating</th>
<th>Beam Angle</th>
<th>Housing Type</th>
<th>Mount Type</th>
<th>Cable Length</th>
<th>Temp Speed Compatible Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>505STID-PWD</td>
<td>600W</td>
<td>9.5/1</td>
<td>Plastic</td>
<td>TM</td>
<td>20 M</td>
<td>YES</td>
</tr>
<tr>
<td>505STID-MSD</td>
<td>600W</td>
<td>9.5/1</td>
<td>Bronze</td>
<td>TM</td>
<td>20 M</td>
<td>YES</td>
</tr>
<tr>
<td>505STID-MSD*</td>
<td>600W</td>
<td>9.5/1</td>
<td>Bronze</td>
<td>TM</td>
<td>20 M</td>
<td>YES</td>
</tr>
</tbody>
</table>

* Beam Angle varies with frequency

** Bottom Discrimination Transducer
**Transducers - Other frequencies**

Commercial transducers such as these are generally mounted in tanks or sea chests that are custom-built into the ship's hull. Some transducers are designed exclusively for use with Net Sounders, while others are used by commercial fishermen or other high seas vessels that require the most reliable depth sounders available.

<table>
<thead>
<tr>
<th>Transducer Part number</th>
<th>Frequency (kHz)</th>
<th>Power (W)</th>
<th>Beam Angle (°)</th>
<th>Housing Type</th>
<th>Plug Type</th>
<th>Mount Type</th>
<th>Cable Length</th>
<th>Compatible Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA100B-10R</td>
<td>107</td>
<td>3kW</td>
<td>8 x 13</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>50 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA88B-8</td>
<td>88</td>
<td>1kW</td>
<td>11</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>50 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA88F-126H</td>
<td>88</td>
<td>5kW</td>
<td>4 x 5</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>30 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA48B-6</td>
<td>38</td>
<td>3kW</td>
<td>12.5</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>30 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA28F-18</td>
<td>28</td>
<td>2kW</td>
<td>17</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>30 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA28BL-6HR</td>
<td>28</td>
<td>2kW</td>
<td>22 x 32</td>
<td>FRP NP Tank</td>
<td>15 Meter</td>
<td>YES NO</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA33B-6</td>
<td>33</td>
<td>2kW</td>
<td>12</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>30 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA38BL-15HR</td>
<td>38</td>
<td>3kW</td>
<td>15.5</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>30 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA28F-18</td>
<td>28</td>
<td>2kW</td>
<td>17</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>30 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
<tr>
<td>CA33B-6</td>
<td>33</td>
<td>2kW</td>
<td>12</td>
<td>Rubber</td>
<td>NP Tank</td>
<td>30 Feet</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
<td></td>
</tr>
</tbody>
</table>

---

**Variable Frequency Transducers**

The variable frequency of these transducers allows you to change the beamwidth and depth capabilities. If you are bottom fishing in 200 feet of water, the narrow high-frequency beam will display extreme bottom detail and fish holding tight to structure. If you are fishing in deep blue water, the wide, low-frequency beam will not only give deep-water bottom detail, but more importantly show you more of what is around your vessel, including bait which may attract game fish. Because the bandwidth covers a continuous frequency spectrum, next generation Fish Finders utilizing Furuno Free Synthesizer (FFS) technology can be made “tunable”, so you can “dial-in” the best frequency for the target fish species or conditions.

<table>
<thead>
<tr>
<th>Transducer Part number</th>
<th>Power (W)</th>
<th>Beam Angle (°)</th>
<th>Housing Type</th>
<th>Plug Type</th>
<th>Mount Type</th>
<th>Cable Length</th>
<th>Compatible Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>R550D-THN</td>
<td>55</td>
<td>8 x 5</td>
<td>Thermo</td>
<td>NP Tank</td>
<td>15 Meter</td>
<td>YES NO</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
</tr>
<tr>
<td>R550D-THN</td>
<td>55</td>
<td>8 x 5</td>
<td>Thermo</td>
<td>NC Tank</td>
<td>30 Feet</td>
<td>YES NO</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
</tr>
<tr>
<td>R550D-THN</td>
<td>55</td>
<td>8 x 5</td>
<td>Thermo</td>
<td>NC Tank</td>
<td>30 Feet</td>
<td>YES NO</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
</tr>
<tr>
<td>R550D-THN</td>
<td>55</td>
<td>8 x 5</td>
<td>Thermo</td>
<td>NC Tank</td>
<td>30 Feet</td>
<td>YES NO</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
</tr>
<tr>
<td>CAX8-9R</td>
<td>9W</td>
<td>8 x 5</td>
<td>FRP</td>
<td>NC Tank</td>
<td>30 Feet</td>
<td>YES NO</td>
<td>DFF3, FCV295, FCV1150, FCV1200 and BB Models</td>
</tr>
</tbody>
</table>

*Beam Angle varies with frequency; higher frequency = narrower beam angle*
### TruEcho CHIRP Transducers

TruEcho CHIRP Transducers are available in either single- or dual- frequency ranges. Single frequency range transducers chirp across a specific range of low, medium or high frequencies, and dual frequency range transducers are able to chirp across both a low and high range of frequencies.

#### Single Frequency Range CHIRP Transducers:

<table>
<thead>
<tr>
<th>Transducer Part number</th>
<th>Housing Type</th>
<th>Mount Type</th>
<th>Temp Sensor</th>
<th>Cable Length</th>
<th>Compatible Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>B265L</td>
<td>Bronze</td>
<td>TH</td>
<td></td>
<td>40-75 kHz</td>
<td></td>
</tr>
<tr>
<td>B265M</td>
<td>Bronze</td>
<td>TH</td>
<td></td>
<td>80-130 kHz</td>
<td></td>
</tr>
<tr>
<td>B265H</td>
<td>Bronze</td>
<td>TH</td>
<td></td>
<td>130-210 kHz</td>
<td></td>
</tr>
<tr>
<td>B265LH</td>
<td>Stainless</td>
<td>TH</td>
<td></td>
<td>40-75 kHz</td>
<td></td>
</tr>
<tr>
<td>B265M</td>
<td>Stainless</td>
<td>TH</td>
<td></td>
<td>80-130 kHz</td>
<td></td>
</tr>
<tr>
<td>B265H</td>
<td>Stainless</td>
<td>TH</td>
<td></td>
<td>130-210 kHz</td>
<td></td>
</tr>
<tr>
<td>B265LHG</td>
<td>Stainless</td>
<td>TH</td>
<td></td>
<td>150-250 kHz</td>
<td></td>
</tr>
<tr>
<td>B275L</td>
<td>Bronze</td>
<td>TH</td>
<td></td>
<td>150-250 kHz</td>
<td></td>
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<tr>
<td>CM265LH</td>
<td>Urethane</td>
<td>TH</td>
<td>Yes</td>
<td>150-200 kHz</td>
<td></td>
</tr>
<tr>
<td>B275LH</td>
<td>Urethane</td>
<td>TH</td>
<td></td>
<td>150-250 kHz</td>
<td></td>
</tr>
<tr>
<td>B275LHW</td>
<td>Urethane</td>
<td>TH</td>
<td></td>
<td>150-250 kHz</td>
<td></td>
</tr>
<tr>
<td>B285L</td>
<td>Bronze</td>
<td>TH</td>
<td></td>
<td>150-250 kHz</td>
<td></td>
</tr>
<tr>
<td>B285HW</td>
<td>Bronze</td>
<td>TH</td>
<td></td>
<td>150-250 kHz</td>
<td></td>
</tr>
</tbody>
</table>

#### Dual Frequency Range CHIRP Transducers:

<table>
<thead>
<tr>
<th>Transducer Part number</th>
<th>Housing Type</th>
<th>Mount Type</th>
<th>Temp Sensor</th>
<th>Cable Length</th>
<th>Low Frequencies</th>
<th>High Frequencies</th>
<th>Fairing Block</th>
<th>Compatible Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>B265LM</td>
<td>Bronze</td>
<td>TH</td>
<td>No</td>
<td>10 M</td>
<td>41-65 kHz</td>
<td>130-200 kHz</td>
<td>Hi-Speed Fairing</td>
<td>DFF1-UHD, GP1871F, GP1971F</td>
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<tr>
<td>CM599LM</td>
<td>Urethane</td>
<td>Tank</td>
<td>No</td>
<td>130-150 kHz</td>
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<td>NA</td>
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<tr>
<td>PM599LGM</td>
<td>Bronze</td>
<td>Pocket</td>
<td>Yes</td>
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<td>80-130 kHz</td>
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<td>B265LHGM</td>
<td>Bronze</td>
<td>TH</td>
<td>No</td>
<td>130-150 kHz</td>
<td></td>
<td></td>
<td>NA</td>
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<tr>
<td>CM599LHGM</td>
<td>Urethane</td>
<td>Tank</td>
<td>No</td>
<td>130-150 kHz</td>
<td></td>
<td></td>
<td>NA</td>
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<tr>
<td>CM265LHGM</td>
<td>Urethane</td>
<td>Tank</td>
<td>Yes</td>
<td></td>
<td>80-130 kHz</td>
<td></td>
<td>NA</td>
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<tr>
<td>CM599LHGM</td>
<td>Urethane</td>
<td>Tank</td>
<td>No</td>
<td>130-150 kHz</td>
<td></td>
<td></td>
<td>NA</td>
<td></td>
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<tr>
<td>CM599LHGM</td>
<td>Urethane</td>
<td>Tank</td>
<td>No</td>
<td>130-150 kHz</td>
<td></td>
<td></td>
<td>NA</td>
<td></td>
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<tr>
<td>CM599LHGM</td>
<td>Urethane</td>
<td>Tank</td>
<td>No</td>
<td>130-150 kHz</td>
<td></td>
<td></td>
<td>NA</td>
<td></td>
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<tr>
<td>CM599LHGM</td>
<td>Urethane</td>
<td>Tank</td>
<td>No</td>
<td>130-150 kHz</td>
<td></td>
<td></td>
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Multibeam 3D Transducers

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Housing Type</th>
<th>Mount Type</th>
<th>Cable Length</th>
<th>Frequency</th>
<th>Fairing Block</th>
<th>Compatible Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>165-T-50000-TH</td>
<td>Bronze</td>
<td>TH</td>
<td>10 M</td>
<td>165 kHz and 50/200 kHz</td>
<td>Hi-Speed</td>
<td>NA</td>
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<tr>
<td>165-T-50000-SH</td>
<td>Stainless</td>
<td>TM</td>
<td>10 M</td>
<td>165 kHz</td>
<td>NA</td>
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<tr>
<td>165-T-225LH-FM488</td>
<td>Urethane</td>
<td>PM</td>
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<td>165-T-824</td>
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<td>TH</td>
<td>10 M</td>
<td>165 kHz</td>
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<td>NA</td>
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<td>165 kHz</td>
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<tr>
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<td>165 kHz</td>
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NMEA0183 Models Functions Housing Style

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Functions</th>
<th>Housing Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>235DHT-SSE</td>
<td>Depth, Speed and Temperature (+/- 1 degree)</td>
<td>B17 Bronze Thru-Hull</td>
</tr>
<tr>
<td>235DST-SSE</td>
<td>Depth, Speed and Temperature (+/- 1 degree)</td>
<td>B17 Bronze Thru-Hull</td>
</tr>
<tr>
<td>235DT-SSE</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>B17 Bronze Thru-Hull</td>
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NMEA2000 Models Functions Housing Style

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Functions</th>
<th>Housing Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>165T-50000-TH</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>P79 Plastic In Hull</td>
</tr>
<tr>
<td>165T-50000-SH</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>B122 Bronze Thru-Hull</td>
</tr>
<tr>
<td>165T-80000-TH</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>P66 Plastic Transom Mount</td>
</tr>
<tr>
<td>165T-80000-SH</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>P17 Plastic Thru-Hull</td>
</tr>
<tr>
<td>165T-225LH-FM488</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>B17 Bronze Thru-Hull</td>
</tr>
<tr>
<td>165T-225LH-FM488</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>P17 Plastic Thru-Hull</td>
</tr>
<tr>
<td>165T-225LH-FM488</td>
<td>Depth and Temperature (+/- 1 degree)</td>
<td>P66 Plastic In Hull</td>
</tr>
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</table>

Speed & Temp Sensors

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Functions</th>
<th>Housing Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST-04MSB</td>
<td>Temperature (+/- 1 degree)</td>
<td>B17 Bronze Thru-Hull</td>
</tr>
<tr>
<td>ST-02MSB</td>
<td>Speed and Temperature (+/- 1 degree)</td>
<td>B17 Bronze Thru-Hull</td>
</tr>
<tr>
<td>ST-01PTB</td>
<td>Speed and Temperature (+/- 1 degree)</td>
<td>S63 Plastic Clip On (requires Transom Mount Bracket, part # AIR-020-058)</td>
</tr>
</tbody>
</table>

Smart Sensors

What is a Smart Sensor?

Furuno Smart Sensors are transducers specifically designed to give an accurate numerical value for depth instead of painting an image on the screen. Smart Sensors are available in a variety of housing styles and can be transom or thru-hull mounted on the vessel. Processing of the return echoes is accomplished by circuitry within the transducer housing and then output as NMEA0183 or NMEA2000 information - electronic text that can be interpreted and displayed by a variety of Furuno electronics such as GPS, chart plotters, NavNet, FI70 Series Instruments, or our popular RD33 NMEA data repeater. Molded, waterproof 7-pin or 10-pin connectors connect directly to these and many other Furuno products.

All Smart Sensors operate at 235 kHz, so they will never interfere with your Fish Finder.
**Transducer FAQ's**

We've gathered a short list of frequently asked questions about transducers and provided the answers in this section. If you have a question that is not answered in this book, you can visit us on the web at www.FurunoUSA.com and click on Support. You can browse through our comprehensive library of answers to questions, or search for your answer by model, topic or keyword. If you can't find the answer you're looking for, you can always send an email directly from our website to our technical support staff. A knowledgeable technician will respond with your answer, generally within 48 hours.

**Q: My transducer needs to be cleaned frequently. Is there any type of paint I can use to prevent barnacles, algae and marine growth from fouling it?**

A: There are several manufacturers of anti-fouling marine paint. These paints are available from marine supply stores. Furuno recommends spray-on Transducer Paint from Pettit Paints (www.PettitPaint.com).

**Q: What type of housing should I choose for my transducer?**

A: The type of housing you select depends on the hull where it will be installed:

- A plastic housing is recommended for fiberglass or metal hulls only. Never install a plastic thru-hull sensor in a wood hull, since swelling of the wood may overstress the plastic and cause a fracture.
- A bronze housing is recommended for fiberglass or wood hulls only. Never install a bronze housing in a metal hull, because electrolytic corrosion will occur.
- A stainless steel housing is recommended for metal hulls to prevent electrolytic corrosion.
- Never install a metal housing in a vessel with a positive ground system.

**Q: Will a fairing affect the performance and top-speed of my boat?**

A: The size of the transducer will have some affect on the top-speed of the boat. However, if you use a high-performance fairing, the loss will be minimal. Some people report a decrease of one or two knots. Generally, a 30 foot (10m) or longer boat will see almost no speed loss.

**Q: Can I cut my transducer cable?**

A: Yes, the transducer cable can be cut. However, if the transducer came with a connector do not cut it off. The molded on connector is waterproof. You need to cut and splice the cable away from the connector using Airmar’s splash-proof Junction Box. The connections will not corrode and the strain relief grommets are water resistant and have excellent cable retention. Please note that cutting the cable or removing the connector, except when using Airmar’s junction box, will void the sensor warranty. You can buy a junction box and splice kit from Gem Electronics.

Gem Electronics
Phone: 843-394-3565 Fax: 843-394-3736.

**Q: Why does my depth sounder fail when I reach moderate speed?**

A: If a sounder works fine at slow speeds but gradually loses the bottom as the vessels speed increases, it is an indication that aerated water is flowing over the transducer. Rather than relocate a thru-hull transducer, try installing it with a high-performance fairing. High-performance fairings are designed to improve a sounder’s performance at speeds above 35MPH (15kn). It is much longer than its companion transducer. The elongated streamlined shape cuts smoothly through the water, so there is less aerated water flowing over the transducer’s face.

**Q: Can I upgrade my CRT Fish Finder display to an LCD display but keep my transducer?**

A: Most Furuno’s LCD Fish Finders use a 10-pin transducer, while our older CRT models use an 8-pin transducer. Use the adapter part # AIR-033-204 to connect your 8-pin transducer to a newer, 10-pin Furuno LCD Fish Finder or combo unit.

For more information, visit our website at www.FurunoUSA.com.
Definitions

Acoustic: Relating to sound and sound waves.
Acoustic Property: The ability of a material to carry sound through it.
Acoustic Window: That part of the transducer through which the ultrasonic vibrations from the piezoceramic assembly travel to water.
Air Bladder: An organ in a fish which allows it to adjust to changes in water pressure at different depths.
Amplitude: The degree of intensity (pressure) of a sound wave. If we could hear the sound wave, amplitude would be its ‘loudness.’
Array: A series of elements in a transducer.
Beamwidth: The diameter of a circle in which 50%-70% of the sound waves emitted by the transducer are concentrated.
CHIRP: Compressed High Intensity Radar Pulse. CHIRP transducers vibrate across a range of frequencies within each ‘pulse.’ Sometimes referred to as ‘Broadband.’
Cone Angle: The measurement of beamwidth in degrees. Indicates how large an area is covered by a transducer’s soundbeam.
dB: Abbreviation for decibel, a unit for measuring the power of a sound wave.
Echosounder: An instrument comprised of a display screen and electronic circuitry used to interpret information from the transducer and display it in a readable format.
Frequency: The number of complete cycles or vibrations that occur within a specific time frame, typically one second. Usually measured in Hertz.
Hertz: A measure of one cycle or complete vibration per second.
In-Hull: The method of installing a transducer by attaching it to the inside of the hull.
Multisensor: A combination of three sensing devices (depth, speed and temperature) in a single housing.
Phased Array: A series of piezoceramic elements in a transducer, typically wired to allow them to fire in time delayed sequence so the echosounder can electronically steer the array.
Piezoceramic Element: A material made of crystals with positive and negative charges.
Resolution: The sounders ability to show fine detail and to discriminate between individual objects.
Sidelobes: Portion of the acoustic image that lies outside of the main sound beam.
Sonar: Derived from the words Sound Navigation and Ranging. An apparatus that uses reflected sound waves to detect and locate objects underwater.
Thru-Hull: A method for installing a transducer through a hole in the hull.
Transducer: A device that changes electrical energy to acoustic energy and back again.
Transom Mount: A method of installing a transducer on the back (transom) of the boat.
Ultrasonic: Sound waves of high frequency (above 20,000 Hertz) that cannot be heard by humans.
Furuno offers a wide range of matched, high performance transducers for our depth sounders. There are transducers available for virtually every type and size of boat. There are also sensors you can install that will accurately read your boat speed and the surface water temperature. Because there are a number of variables in transducer types that can dramatically affect your fish finder's performance, understanding these variables is the key to selecting the right transducer. This book will help you learn about what makes a transducer ‘tick.’

Additional Resources

**www.FurunoUSA.com:**
Visit our all-new web site at www.FurunoUSA.com for the most up-to-date information on the entire line of Furuno products.

Have a question that needs an answer? Visit our Furuno Forum at www.FurunoUSAForum.com to ask questions and get answers from Furuno USA Dealers, our own highly trained Technical Support staff, and end users just like you!

**www.Airmar.com:**
AIRMAR Technology Corporation is the leading manufacturer and OEM supplier of marine transducers, sensors, and instruments for the recreational and professional markets. Visit the Airmar web site at www.Airmar.com if you are looking for technical data or detailed specifications for a wide variety of transducers and smart sensors.

**Authorized Furuno Dealers:**
Your local Furuno dealer is perhaps your most valuable resource when it comes to answering questions about the electronics that are right for you. To find your nearest Furuno dealer, simply go to our web site at www.FurunoUSA.com and click on Where To Buy. Enter in your zip code and you will receive a complete list of Furuno dealers in your area.
Find the fish that others have missed.

The Advantage of Furuno’s Digital Filter Technology

Detailed target presentation with FDF
Furuno Digital Filter (DFD) optimizes the gain settings automatically to obtain highly defined images of the underwater conditions. FDF also eliminates noise to deliver sharp, detailed images, allowing for detection of fishing reefs and even individual fish with absolute clarity.

Fine Tuning your Frequency with FFS
Furuno Free Synthesizer (FFS) technology permits a wide selection of operating frequencies from 28 to 200 kHz. If a Furuno transducer is used, operating frequency is automatically set in the menu, and can be shifted manually at any time.

Complete Angler’s Guide to Marine Transducers

www.FurunoUSA.com