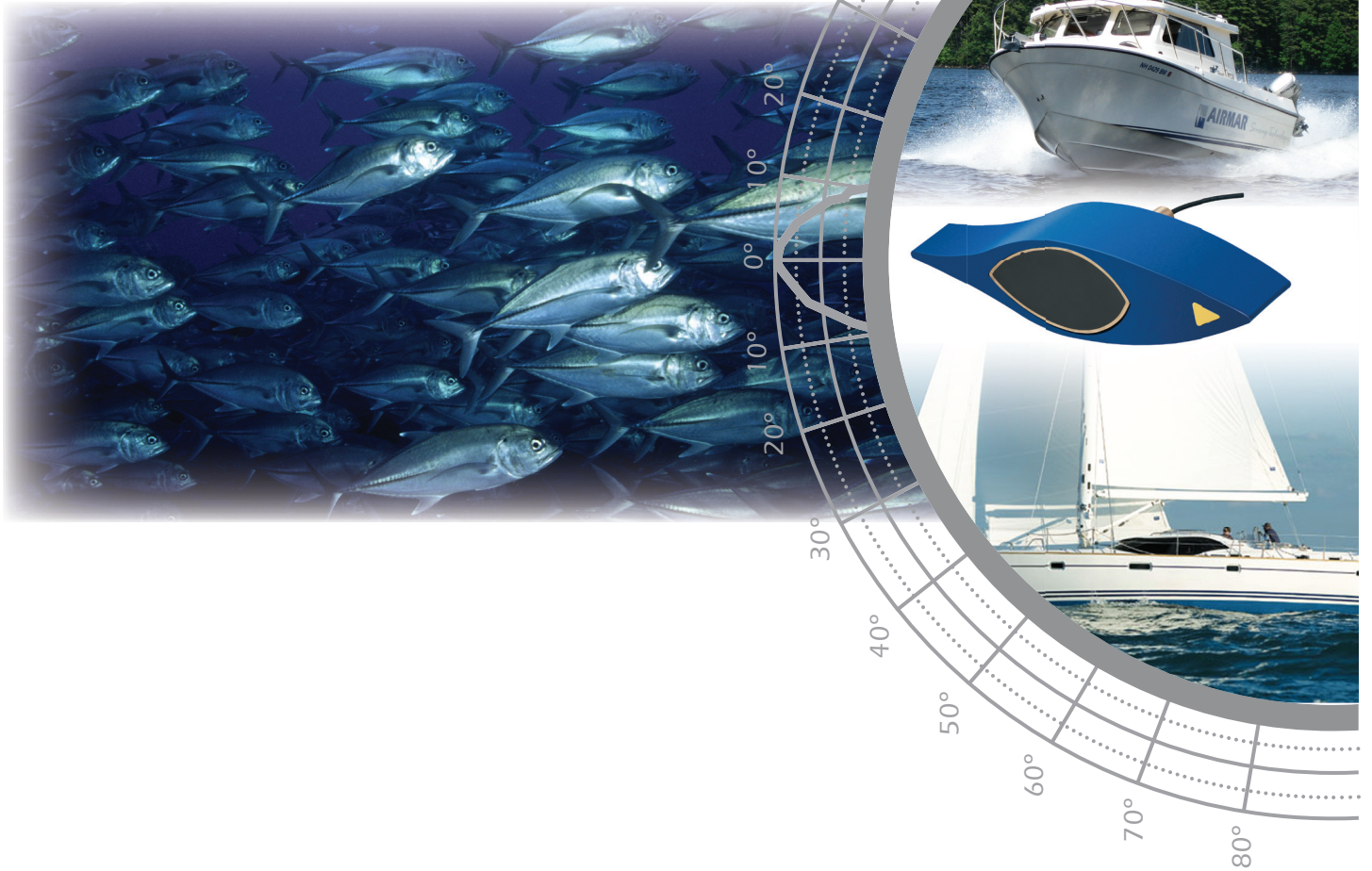


Guide to Transducer Technology



Sensing Technology

How a Transducer Works

What is a Transducer?

A good fishfinder depends on an efficient transducer to send and receive signals. The transducer is the heart of an echosounder system. It is the device that changes electrical pulses into sound waves or acoustic energy and back again. In other words, it is the device that sends out the sound waves and then receives the echoes, so the echosounder can interpret or "detect" what is below the surface of the water.



Echosounder

B744V transducer

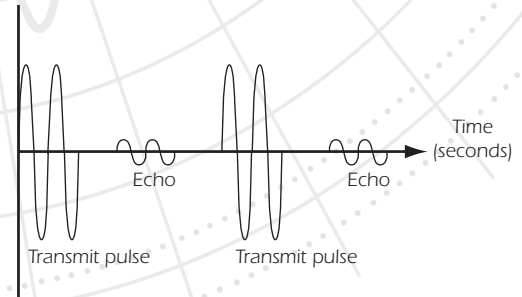
How Does a Transducer Work?

The easiest way to understand how a transducer functions is to think of it as a speaker and a microphone built into one unit. A transducer receives sequences of high-voltage electrical pulses called transmit pulses from the echosounder. Just like the stereo speakers at home, the transducer then converts the transmit pulses into sound. The sound travels through the water as pressure waves. When a wave strikes an object like a weed, a rock, a fish, or the bottom, the wave is reflected. The wave is said to echo—just as your voice will echo off a canyon wall. When the reflected sound wave returns the transducer acts as a microphone. It receives the sound wave during the time between each transmit pulse and converts it back into electrical energy. A transducer will spend about 1% of its time transmitting and 99% of its time quietly listening for echoes. Remember, however, that these periods of time are measured in microseconds, so the time between pulses is very short. The echosounder can calculate the time difference between a transmit pulse and the return echo and then display this information on the screen in a way that can be easily understood by the user.



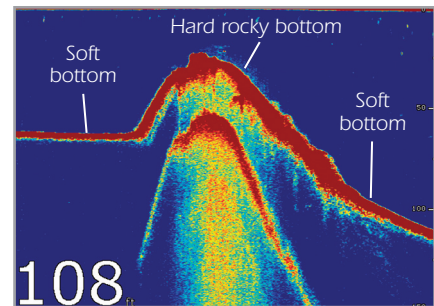
How Does a Transducer Know How Deep the Water is?

The echosounder measures the time between transmitting the sound and receiving its echo. Sound travels through the water at about 1,463 m/s (4,800 ft/s), just less than a mile per second. To calculate the distance to the object, the echosounder multiplies the time elapsed between the sound transmission and the received echo by the speed of sound through water. The echosounder system interprets the result and displays the depth of the water for the user.



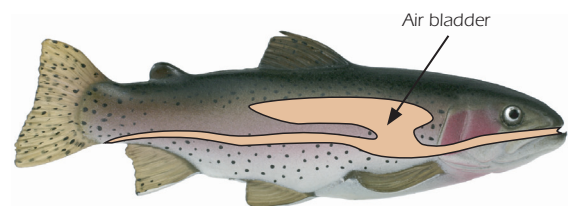
How Does a Transducer Know What the Bottom Looks Like?

As the boat moves through the water, the echoes of some sound waves return more quickly than others. We know that all sound waves travel at the same speed. When a sound wave in one section of the sound field returns more quickly than another, it is because the wave has bounced off something closer to the transducer. These early returning sound waves reveal all the humps and bumps in the underwater surface. Echosounders are able to detect whether a bottom is soft or hard and even distinguish between a clump of weeds and a rock, because the sound waves will echo off of these surfaces in a slightly different manner.



How Does a Transducer Detect Fish?

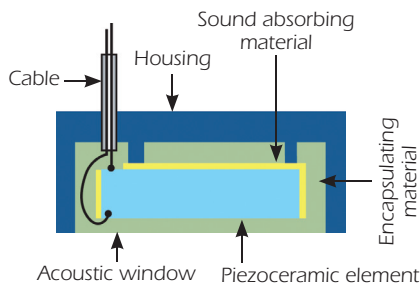
The transducer can detect fish, because it senses the air bladder. Almost every fish has an organ called an air bladder filled with gas that allows the fish to easily adjust to the water pressure at different depths. The amount of gas in the air bladder can be increased or decreased to regulate the buoyancy of the fish. Because the air bladder contains gas, it is a drastically different density than the flesh and bone of the fish as well as the water that surrounds it. This difference in density causes the sound waves from the echosounder to bounce off the fish distinctively. The transducer receives the echoes and the echosounder is able to recognize these differences. The echosounder then displays it as a fish.



What Goes into the Making of a Transducer?

The main component of a depth transducer is the piezoceramic element. It is the part that converts electrical pulses into sound waves, and when the echoes return, the piezoceramic element converts the sound waves back into electrical energy. Piezoceramic elements are most often in a disk form, but they may also be in the shape of a bar or a ring. A transducer may contain one element or a series of elements linked together called an array. A transducer is made up of six separate components:

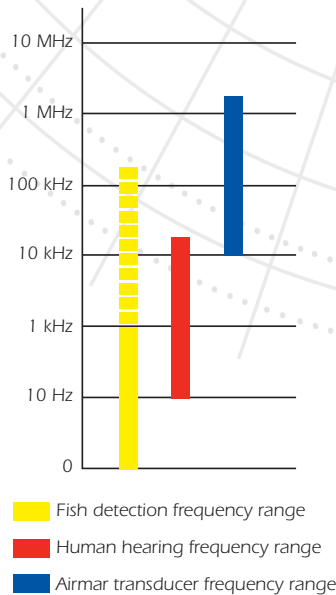
- Piezoceramic element or an array of elements
- Housing
- Acoustic window
- Encapsulating material
- Sound absorbing material
- Cable



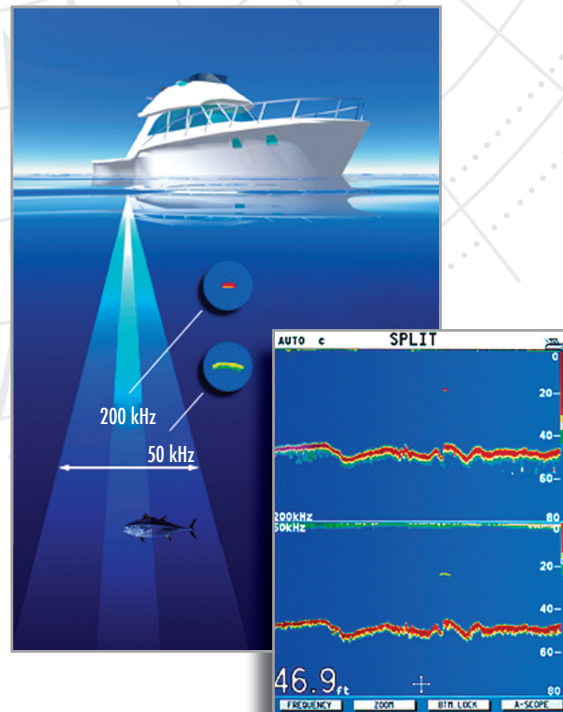
Selecting Frequencies

Can Fish Hear the Sound Waves Produced by a Transducer?

Sound waves are ultrasonic. Most fish are unable to hear frequencies higher than about 500 Hz to 1 kHz. The ultrasonic sound waves sent out by Airmar transducers have frequencies ranging from 10 kHz to 2 MHz (10,000 Hz to 2,000,000 Hz), clearly beyond the hearing of fish. They are also above (ultra) the sound (sonic) that human ears are able to hear. Humans can hear sound waves from 10 Hz to 20 kHz. However, most people can hear the transmit pulses of our 10 kHz transducers; they sound like a series of clicks.



low-frequency waves are so large, they wash right over small obstacles. Low-frequency sound waves are not as sensitive in detecting small fish or other small obstacles as are high-frequency waves, and although they can see to greater depths, they will not send back detailed information or clear crisp pictures.



What is Frequency?

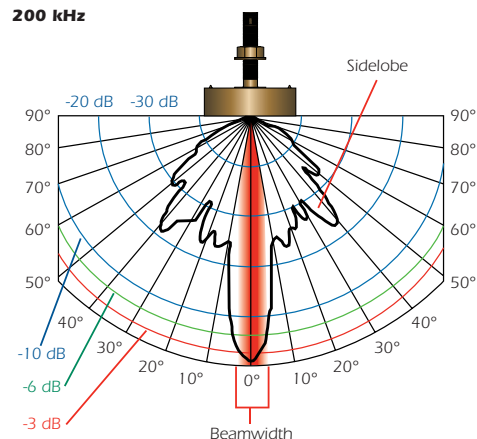
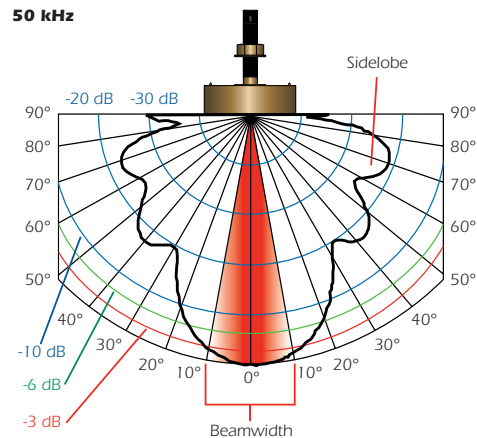
Frequency is the number of complete cycles or vibrations that occur within a certain period of time, typically one second. Sound waves can vibrate at any one of a wide number of frequencies. The easiest way to understand frequency is to think of it in terms of sounds that are familiar. For example, a kettle drum produces a low-pitched sound (low-frequency). That is, it vibrates relatively few times per second. Whereas, a flute produces a high-pitched sound (high-frequency). It vibrates many more times per second than a kettle drum. The frequency of sound waves is measured in a unit called a Hertz. A Hertz is one cycle per second. For example: a 150 kHz transducer operates at 150,000 cycles per second.

How Does a Customer Decide What Frequency is Needed?

Airmar transducers are often designed for 50 kHz (50,000 cycles per second) or 200 kHz (200,000 cycles per second). Transducers can be designed to operate efficiently at any number of specific frequencies depending upon the application and performance requirements of the customer. A higher-frequency sound wave will give the user a higher-resolution picture of what is present under the water, but the range will be short. Fishermen in more shallow lakes, who want a crisp clear picture of the bottom need a higher-frequency transducer. Low-frequency sound waves will not give the user as clear a picture of the bottom, but they have greater range for very deep areas where high-frequency sound waves cannot reach. A low-frequency unit will work well in the depths of Lake Michigan or the ocean.

A higher-frequency transducer will put out quicker, shorter, and more frequent sound waves. Like the ripples made when a small pebble is thrown into still water, small waves of sound move evenly out and away from the source. Because they are just small waves, they will not travel far, and small obstacles will cause them to bounce back. Higher frequencies are more sensitive to small objects and will send back detailed information which will show as crisp high-resolution pictures on the echosounder screen. The range of high-frequency sound waves, however, is short. In fact, sound waves emitted by a 200 kHz transducer have a limited range of about 200 m (600'). Now, think of the large waves created by a large boulder thrown into still water. Low-frequency sound waves are like these large waves; they travel much farther than high-frequency waves. But because

This illustration shows the differences in beamwidth of a transducer operating at both 50 kHz and 200 kHz. Notice the different way the fish appear as "marks" at each frequency.



Transducer Style and Screen Images

In-Hull Transducers



P79



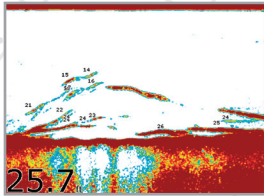
M260



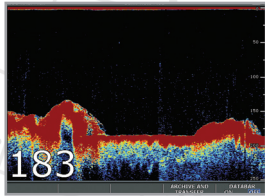
R199 / R299 / R399



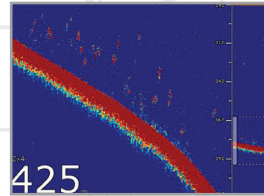
In-Hull Screen Images



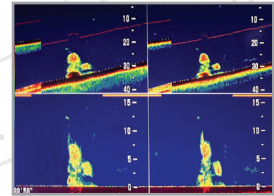
600 W



1 kW



2 kW

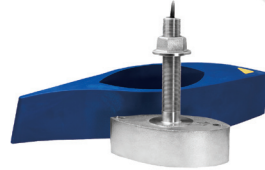


3 kW

Thru-Hull / External-Mount Transducers



B744V



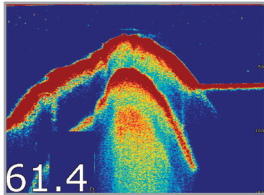
SS260



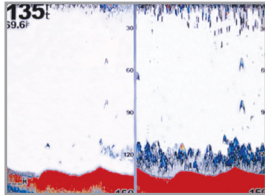
R99 / R209 / R309



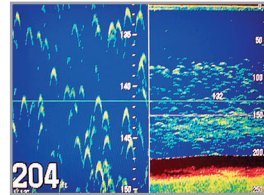
Thru-Hull / External-Mount Screen Images



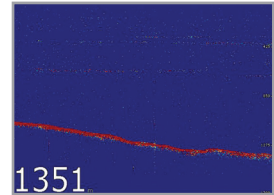
600 W



1 kW



2 kW



3 kW

Transom-Mount Transducers



P39



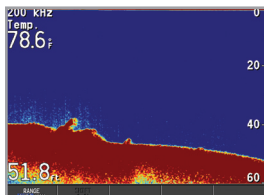
P66



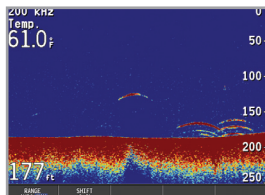
TM260 / TM270W



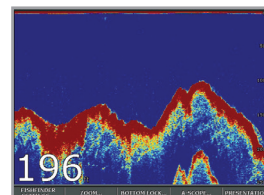
Transom-Mount Screen Images



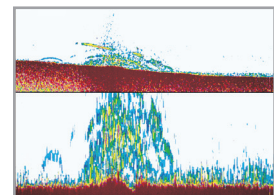
600 W



600 W



1 kW



1 kW

Transducer Styles, Mounting & Installation Tips

Transducer Mounting Styles

Transducers are typically mounted in one of three ways: through the hull, inside the hull, or on the transom.

Thru-Hull—Through the Hull

The transducers in this mounting style fall into two categories. There are “flush” thru-hull sensors that sit flush or nearly flush with the boat hull. They are recommended for smaller boats with a minimum deadrise angle. And they are often installed on sailing vessels, because they produce minimal drag.

External thru-hull transducers extend beyond the hull’s surface and usually require a fairing to aim the sound beam vertically. They are designed for larger untrailered vessels. When external-mounts are installed with a High-Performance Fairing, the transducer face is flush with the surface of the fairing and parallel to the waterline, resulting in a truly vertical beam, putting maximum energy on the target. This installation, when mounted in “clean water” forward of propellers and running gear, produces the most effective signal return, since nothing on the vessel interferes with the transducer’s active face.

Thru-Hull Applications

Thru-hull transducers will work with any engine type: inboard, outboard, or I/O. And these transducers are right for power and sailboats alike. There are thru-hull units for every hull material.

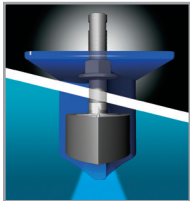
Thru-hull units are not recommended in two situations:

- Plastic thru-hull housings cannot be used in a wooden boat. Wood swells as it absorbs water, so it may crack the housing.
- Bronze thru-hull housings cannot be used in aluminum and stainless steel boats. The interaction between the metal hull and the bronze transducer, especially in the presence of salt water, will eat away the metal hull and/or the bronze housing.

Thru-Hull Mounting Tips

Mount a thru-hull where the transducer will be under the water at all times.

- Mount where the water flowing across the transducer face is smoothest with a minimum of bubbles and turbulence (especially at high speeds).
- Be sure transducer beam will not be blocked by the keel or propeller shaft(s).
- Do not mount the transducer near water intake or discharge openings; or behind strakes, fittings, or hull irregularities.
- **Displacement Hull Powerboat**—Locate 1/3 aft LWL and 150 mm to 300 mm (6” to 12”) off the center-line. The starboard side of the hull where the propeller blades are moving downward is preferred.
- **Planing Hull Powerboat**—Mount well aft near the center-line and well in-board of the first set of lifting strakes to insure that the transducer is in contact with the water at high-speeds. The starboard side of the hull where the propeller blades are moving downward is preferred.
- **Outboard and I/O**—Mount just forward and to the side of the engine(s).
- **In-board**—Mount well ahead of the propeller(s) and shaft(s).
- **Stepped Hull**—Mount just ahead of the first step.
- **Boats Capable of Speeds Above 25 knots (29 MPH)**—Review transducer location and operating results of similar boats before proceeding.
- **Fin-Keel Sailboat**—Mount to the side of the center-line and forward of the fin keel 300 mm to 600 mm (1’ to 2’).
- **Full-Keel Sailboat**—Locate amidships and away from the keel



Plastic



Bronze

In-Hull—Inside the Hull

An in-hull transducer is installed inside a boat hull against the bottom and sends its signal through the hull. Some people prefer this mounting style, because it is not necessary to drill through the vessel. A unit cannot be damaged when a boat is trailered, the transducer is not exposed to marine growth, and there is no drag. Additionally, a transducer can be installed and serviced while the vessel is in the water. Most in-hull transducers are mounted inside a liquid filled tank that is first adhered in place. As long as the water flow below the transducer is “clean”, it will give great high-speed performance.

In-Hull Applications

In-hull transducers installed over solid fiberglass, will work with any engine type: inboard, outboard, and I/O. These transducers perform well on both power and sailboats.

Metal, wood, and cored fiberglass hulls are not recommended for in-hull installations, because there is too much signal loss transmitting through the hull.

In-Hull Mounting Tips

- Mount and In Hull where the hull below the transducer will be in contact with the water at all times.
- Mount where the water flowing across the hull is smoothest with a minimum of bubbles and turbulence (especially at high speeds).
- Be sure transducer beam will not be blocked by the keel or propeller shaft(s).
- Do not mount the transducer near water intake or discharge openings; or behind strakes, fittings, or hull irregularities.
- Use non-toxic anti-freeze (propylene glycol) to fill the tank.
- **Displacement Hull Powerboats**—Locate amidships near the center-line. The starboard side of the hull where the propeller blades are moving downward is preferred.
- **Planing Hull Powerboats**—Mount well aft, on or near the center-line, and well inboard of the first set of lifting strakes to insure that the transducer will be in contact with the water at high speeds. The starboard side of the hull where the propeller blades are moving downward is preferred.
- **Outboard and I/O**—Mount just forward of the engine(s).
- **Inboard**—Mount well ahead of the propeller(s) and shaft(s).
- **Stepped hull**—Mount just ahead of the first step.



P79

Transom-Mount—On the Transom

Transom-mounts are attached to the back (transom) of a boat hull. Trailered boats typically use this mounting style, since it is out of the way of the rollers. Some people prefer a transom-mount, because it is easy-to-install and remove a unit—especially if a kick-up bracket is used. A transom-mount installation gives good performance at boat speeds below 30 knots (34 MPH).

Transom-Mount Applications

Transom-mount transducers can be used with any hull material. However, they will not work on a vessel with an inboard engine due to the turbulence forward of the sensor. And because of excessive heeling, transom-mounts are not recommended for sailboats.

Transom-Mount Mounting Tips

To ensure the best performance, the sensor must be in contact with aeration-free and turbulence-free water. Mount the sensor on the transom as close to the center-line (keel) of the boat as possible. On slower heavier displacement hulls, positioning it farther from the center-line is acceptable.

- Do not mount the transducer near water intake or discharge openings; or behind strakes, fittings, or hull irregularities.
- Avoid mounting the sensor where the boat may be supported during trailering, launching, hauling, or storage.
- **Single Engine Boat**—Mount on the starboard side at least 75 mm (3”) beyond the swing radius of the propeller to avoid propeller turbulence.
- **Twin Engine Boat**—Mount the sensor between the drives to avoid propeller turbulence.



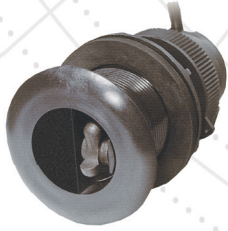
P66

Transducer Styles & Mounting Methods

Application or Expectation for the Transducer

Cruising and Sailing

If time on the water is spent sailing or cruising, a high-power transducer is not needed. Single-frequency 200 kHz transducers or a 235 kHz Smart™ Sensor is adequate. Accurate depth readings will be achieved up to 152 m (500') depending on the depth instrument.



DST800



Recreational Fishing

If the application is recreational fishing, a 600 W transducer will do the job. These transducers have enough power to read bottom in over 305 m (1,000') of water and have 50 kHz and 200 kHz dual-frequency capability. Typically matched with small to mid-size fishfinders, a 600 W transducer is perfect for bottom fishing, marking bait, and marking game fish.



B744V



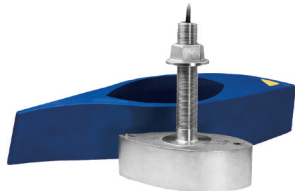
P66



Tournament Sport Fishing

A 1 kW to 2 kW transducer is a must for tournament sport fishing. These powerhouses will give the user a crystal clear screen on medium to large fishfinders. The multiple elements that make up the transducer can distinguish schools of fish as closely-spaced individual targets and can distinguish fish close to the bottom. These transducers are so precise; fish are no longer concealed by their surroundings.

Many of the 1 kW and 2 kW transducers have Airmar's exclusive Broadband Ceramic Technology. The 200 kHz element produces the highest resolution available today without sacrificing sensitivity.



SS260



R199



Commercial Fishing

These transducers are available in frequencies from 24 kHz to 210 kHz and power from 1 kW to 4 kW. Units feature high-efficiency designs, producing superior fishfinding and clear and distinct images of both the bottom and closely-spaced fish.



R99

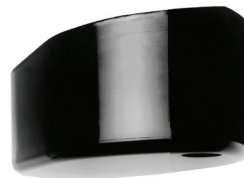


Navigation/Ocean Survey/Custom

Airmar offers custom engineered transducers for consumer, commercial, and scientific applications. Airmar designs and manufactures transducers ranging in frequency from 10 kHz to 2 MHz and power outputs ranging from 100 Watts to 10,000 Watts depending on the specific application. Typical applications vary from portable units for harbor survey to custom fishfinder transducers to multi-frequency arrays used in deep-sea sounding. Transducer arrays of more than 100 piezoceramic elements have been designed and manufactured. Airmar can produce dual-beam and split-beam transducers, phased-array transducers, SWATH and Forward Looking Sonar Transducers—all built to the customer's specifications. Airmar also can supply a wide range of flow sensing transducers.



CS229

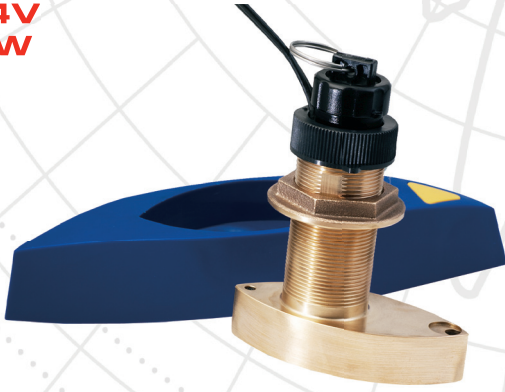


M42

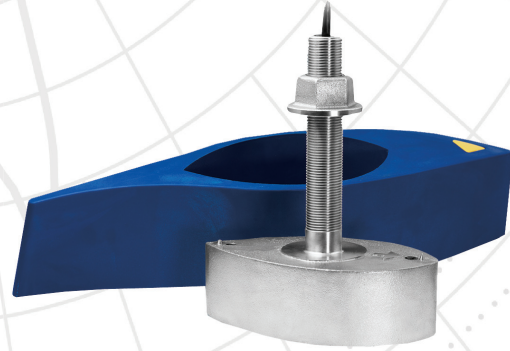


600 W vs 1,000 W High-Performance Units

B744V
600 W



SS260
1 kW

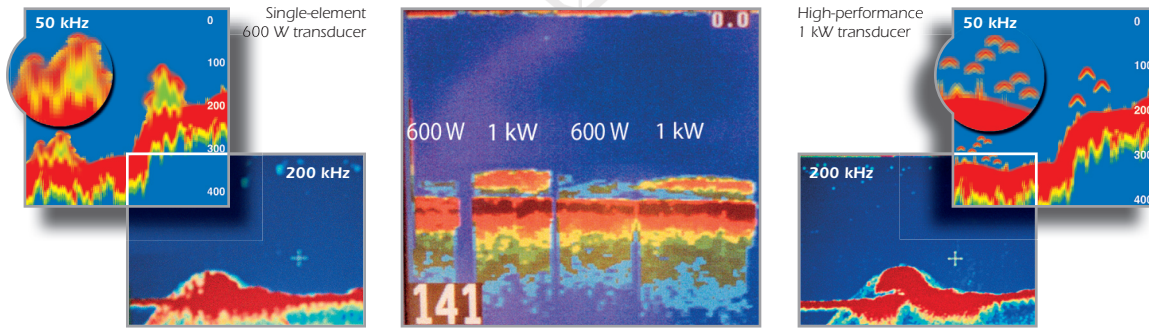


50/200 kHz-A		
Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	45°	12°
RMS Power (W)	600 W	600 W

50 kHz-AE / 200 kHz-BH		
Number of Elements and Configuration	⊗	○
Beamwidth (@-3 dB)	19°	6°
RMS Power (W)	1 kW	1 kW

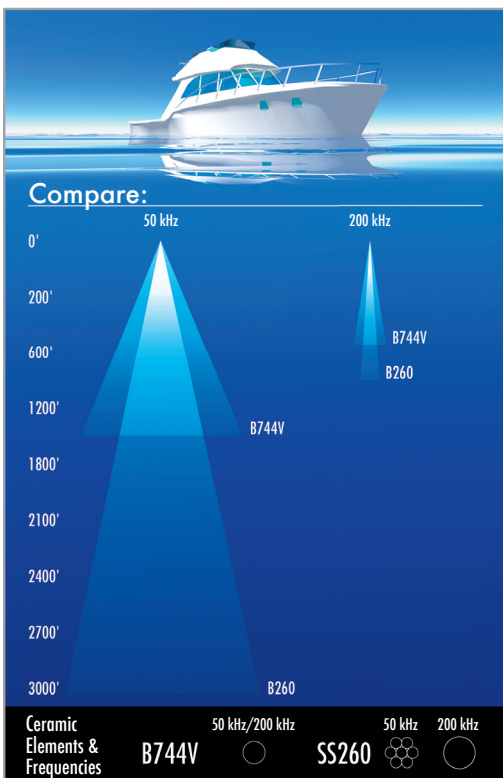
Transducer Comparison: 600 W versus 1 kW

The photos below clearly show the screen resolution differences between a single-element 600 W transducer and a multiple-element 1 kW transducer.



600 W vs 1,000 W Performance

Transducer ID®



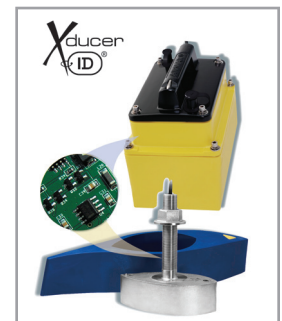
The image to the left shows the depth and beamwidth differences between the single-element, 600 W, B744V and the multiple-element, 1 kW, SS260.

Transducer ID® Feature

Airmax's exclusive Transducer ID feature allows echosounders to query the connected transducer, gathering important operating characteristics. With this data, the echosounder and transducer function as a precisely-tuned system. A Transducer ID enabled sensor contains an embedded micro-controller that communicates with the connected echosounder via a single conductor in the transducer cable. The principal data transmitted is intended to identify the type and configuration of the transducer. Then the echosounder can alter its parameters of operation to optimize performance and to protect the transducer from overdrive. The Transducer ID feature also provides important information to installers and technicians such as serial number and housing style. Listed below is a summary of the information that the Transducer ID feature can provide to future fishfinders.



- Airmax part number
- Housing style
- Serial number
- Ceramic element configuration
- Date of manufacture
- Acoustic window
- Impedance matching configuration
- Nominal frequency(s)
- Best transmit frequency(s)
- Power rating
- Beam pattern



Advantages of High-Performance Fairings

Without High-Performance Fairing



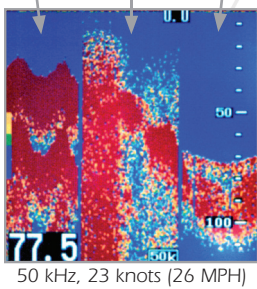
With High-Performance Fairing



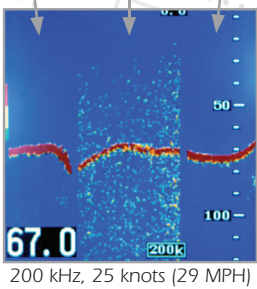
High-Performance Fairing

Achieve maximum fishfinder performance by installing an Airmar transducer with a High-Performance Fairing. Each High-Performance Fairing is custom designed to match its transducer model. The fairing assures a vertical beam which results in strong return echoes. Additionally, the streamlined shape reduces drag and minimizes turbulence over the face of the transducer. At speeds above 30 knots (34 MPH), screens continue to display clear images and solid bottom tracking.

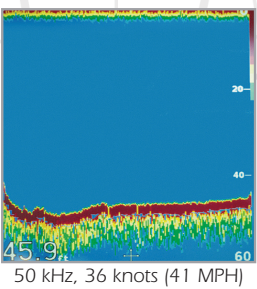
High-Performance Fairing
Standard Fairing



High-Performance Fairing
Standard Fairing



High-Performance Fairing
Only



Without a fairing, the beam is angled improperly.



With a fairing, the beam is aimed straight down.

The photos above show a boat-test comparison of a transducer installed with a High-Performance Fairing versus a standard fairing. The same transducer model was used. One transducer was installed on the port side of the boat with a High-Performance Fairing, and the other was installed on the starboard side with a standard fairing. Using a switchbox, we were able to toggle from one transducer to the other. At speed, the significant resolution and clarity on the fishfinder screen when using the transducer with a High-Performance Fairing is clearly depicted.

Benefits of Broadband Transducer Technology

Airmar achieves superior results by using a unique ceramic material. Its lets transducers operate over a broad range of frequencies while maintaining sensitivity. These Broadband Transducers are, by definition, low-Q devices (refer to "Q" paragraph). In other words, they exhibit very low ringing. There is little variation from transducer to transducer. Additionally, Broadband Transducers are relatively immune to the effects of aging, so their frequency range remains stable over time.

Airmar is the first to introduce affordable Broadband Transducers. This is an enabling technology that provides better fish detection today and will lead to dramatic advances in echosounder performance in the future. While these transducers are more costly to manufacture, the present and future benefits are huge.

Broadband Transducers enhance fish detection on virtually all of today's fishfinders. They give better definition; it is far easier to distinguish among individual fish and between fish and the bottom.

Benefits of Today

Manufacturers now market echosounders that can adjust operating frequency and power output. While these are premium products, the designs are a precursor of things to come. With the ability to adjust frequency, an echosounder can operate Airmar's broadband ceramics anywhere in the frequency band. By selecting different operating frequencies, two or more sounders can work simultaneously without interference. The frequency can also be adjusted to the mission. Lowering the operations frequency increases the beamwidth and depth capability; raising the frequency narrows the beamwidth, increases echo definition, and improves high-speed performance.

Future Benefits

Here is where it gets really exciting. In today's fishfinders, good fish detection is obtained by transmitting a long pulse. This puts more energy on the target. With a long pulse, closely-spaced fish cannot be separated—you get a big blob. Fish close to the bottom appear attached to the bottom and are difficult or impossible to detect.

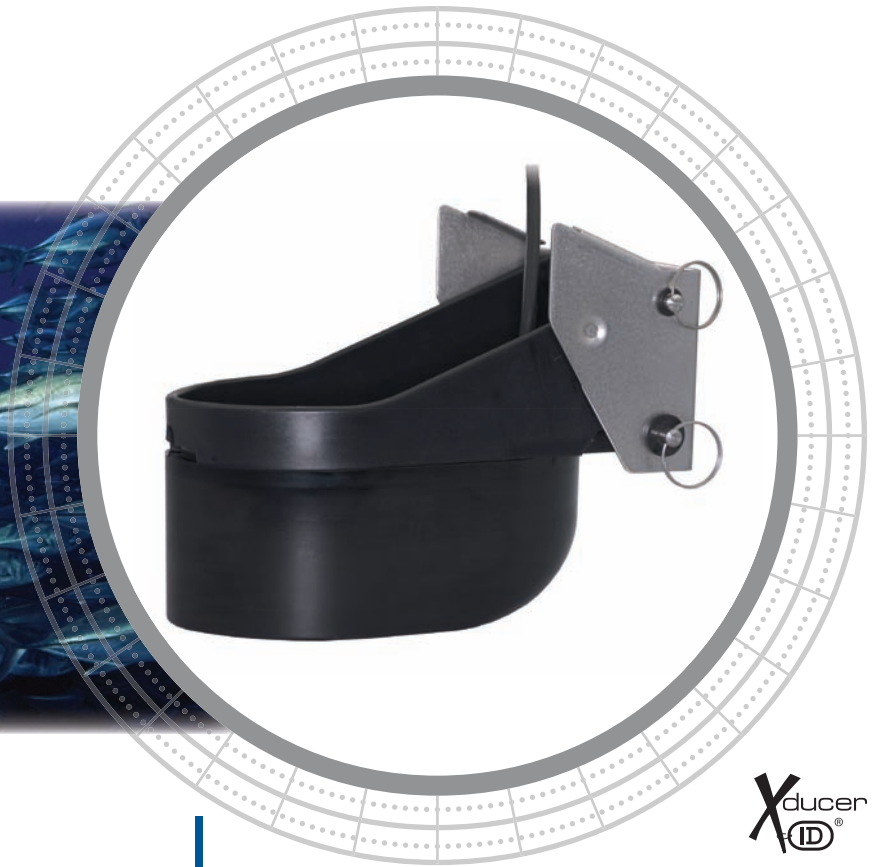
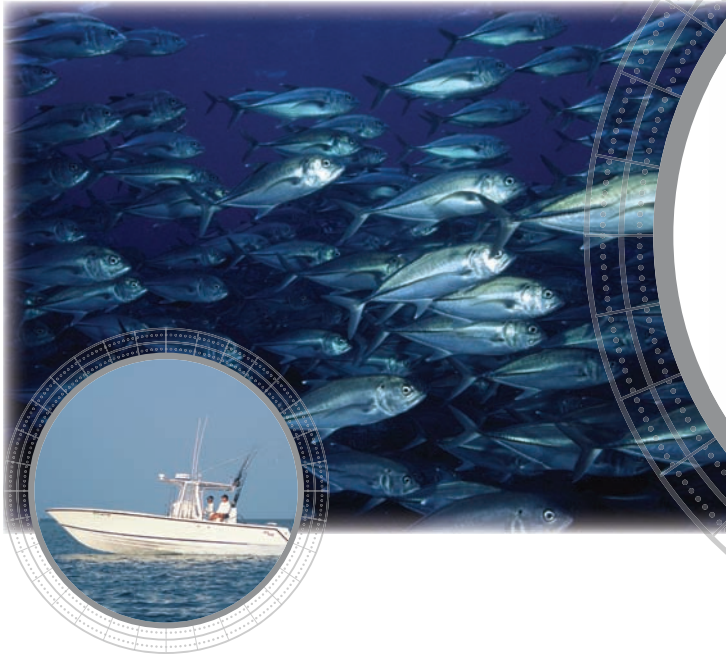
Airmar's broadband transducers enable frequency modulated (FM) transmissions; a.k.a. CHIRP or coded transmissions. Using FM transmissions, you can achieve both the benefits of long pulse, more energy on target, and short pulse, segregation of closely-spaced fish and identification of fish on or close to the bottom. This is because the coding of the transmission is known and the return echoes are similarly coded. The technique is also known as pulse compression. In summary, fishfinders of the future with FM transmissions will have dramatically improved target resolution and signal-to-noise ratio. Airmar's broadband transducer technology will enable this to happen.



A Transducer's quality factor, or "Q" describes the amount of ringing the ceramic element or elements undergo when power is applied to the transducer. Think of a church bell analogy—as the bell is struck it vibrates rapidly and then the vibration will eventually stop until the bell is struck again. Most competitor's recreational transducers have an average Q between 25 and 35. Airmar Q values range from 1 to 30, depending on models. The lower the "Q" number the less ringing in the transducer and the better the performance. Less ringing greatly improves individual fish separation along with bottom imaging in rapidly changing water depths such as ledges and offshore canyons.

	10 kHz to 15 kHz	15 kHz to 20 kHz	20 kHz to 25 kHz	25 kHz to 30 kHz	30 kHz to 35 kHz	35 kHz to 40 kHz	40 kHz to 45 kHz	45 kHz to 50 kHz	50 kHz to 55 kHz	55 kHz to 60 kHz	60 kHz to 65 kHz	65 kHz to 70 kHz	70 kHz to 75 kHz	75 kHz to 80 kHz	80 kHz to 85 kHz	85 kHz to 90 kHz	90 kHz to 95 kHz	95 kHz to 100 kHz
4 kW Assemblies	100 kHz to 150 kHz	150 kHz to 200 kHz	200 kHz to 250 kHz	250 kHz to 300 kHz	300 kHz to 350 kHz	350 kHz to 400 kHz	400 kHz to 450 kHz	450 kHz to 500 kHz	500 kHz to 550 kHz	550 kHz to 600 kHz	600 kHz to 650 kHz	650 kHz to 700 kHz	700 kHz to 750 kHz	750 kHz to 800 kHz	800 kHz to 850 kHz	850 kHz to 900 kHz	900 kHz to 950 kHz	950 kHz to 1000 kHz
3 kW Assemblies	100 kHz to 150 kHz	150 kHz to 200 kHz	200 kHz to 250 kHz	250 kHz to 300 kHz	300 kHz to 350 kHz	350 kHz to 400 kHz	400 kHz to 450 kHz	450 kHz to 500 kHz	500 kHz to 550 kHz	550 kHz to 600 kHz	600 kHz to 650 kHz	650 kHz to 700 kHz	700 kHz to 750 kHz	750 kHz to 800 kHz	800 kHz to 850 kHz	850 kHz to 900 kHz	900 kHz to 950 kHz	950 kHz to 1000 kHz
2 kW Assemblies	100 kHz to 150 kHz	150 kHz to 200 kHz	200 kHz to 250 kHz	250 kHz to 300 kHz	300 kHz to 350 kHz	350 kHz to 400 kHz	400 kHz to 450 kHz	450 kHz to 500 kHz	500 kHz to 550 kHz	550 kHz to 600 kHz	600 kHz to 650 kHz	650 kHz to 700 kHz	700 kHz to 750 kHz	750 kHz to 800 kHz	800 kHz to 850 kHz	850 kHz to 900 kHz	900 kHz to 950 kHz	950 kHz to 1000 kHz
1 kW Assemblies	100 kHz to 150 kHz	150 kHz to 200 kHz	200 kHz to 250 kHz	250 kHz to 300 kHz	300 kHz to 350 kHz	350 kHz to 400 kHz	400 kHz to 450 kHz	450 kHz to 500 kHz	500 kHz to 550 kHz	550 kHz to 600 kHz	600 kHz to 650 kHz	650 kHz to 700 kHz	700 kHz to 750 kHz	750 kHz to 800 kHz	800 kHz to 850 kHz	850 kHz to 900 kHz	900 kHz to 950 kHz	950 kHz to 1000 kHz
500 W to 600 W Assemblies	100 kHz to 150 kHz	150 kHz to 200 kHz	200 kHz to 250 kHz	250 kHz to 300 kHz	300 kHz to 350 kHz	350 kHz to 400 kHz	400 kHz to 450 kHz	450 kHz to 500 kHz	500 kHz to 550 kHz	550 kHz to 600 kHz	600 kHz to 650 kHz	650 kHz to 700 kHz	700 kHz to 750 kHz	750 kHz to 800 kHz	800 kHz to 850 kHz	850 kHz to 900 kHz	900 kHz to 950 kHz	950 kHz to 1000 kHz
250 W Assemblies	100 kHz to 150 kHz	150 kHz to 200 kHz	200 kHz to 250 kHz	250 kHz to 300 kHz	300 kHz to 350 kHz	350 kHz to 400 kHz	400 kHz to 450 kHz	450 kHz to 500 kHz	500 kHz to 550 kHz	550 kHz to 600 kHz	600 kHz to 650 kHz	650 kHz to 700 kHz	700 kHz to 750 kHz	750 kHz to 800 kHz	800 kHz to 850 kHz	850 kHz to 900 kHz	900 kHz to 950 kHz	950 kHz to 1000 kHz

TM270W



Wide-Beam Performance on Your Transom

The SS270W, 1 kW, twin, wide-beam is now available as a transom-mount for larger trailered boats with outboards and I/O's. The TM270W's high-performance mounting bracket is easy-to-install and has a streamlined shape that delivers high-speed performance up to 30 knots (35 MPH).

See the Wider Picture

The TM270W gives you four times the beamwidth at 200 kHz than other high-performance transducers. Since the width of the beams are the same at both frequencies, a split-screen fishfinder display will clearly show the same water column and bottom coverage. Fish may also appear as arches. More fish will be marked while cruising, trolling, drifting, or at anchor. Get the wider picture on your sounder with the TM270W.

- **Tuna/Marlin Fishermen**—Detect bait and gamefish in the upper water column that would go unseen with a traditional narrow-beam transducer.
- **Downrigger Fishermen**—Have the ability to see your downrigger ball and the lines attached to it. Get a closer look at a fish strike on your echosounder screen.
- **Jig Fishermen**—Seeing your jigs on the echosounder screen while bottom fishing can help avoid bottom hang-ups. Seeing a tuna attack your jigs on the echosounder display lets you reel up loose lines before it is too late.

Transom-Mount Wide-Beam 1 kW HD Digital

Fishing Applications

- Blue-water trolling using both 50 kHz and 200 kHz
- Bait and game fish marking in shallow to mid-water
- Wreck and structure finding on the continental shelf
- Vertical deep jigging
- Downrigger fishing in saltwater or deep-water lakes

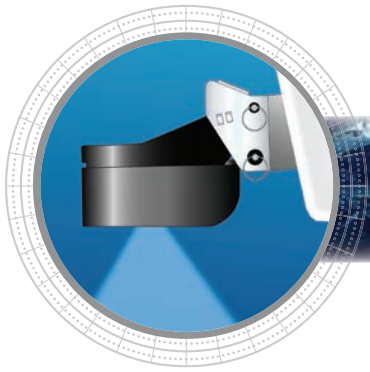
Features

- Top-of-the-line wide-beam transom-mount
- Designed for tuna or marlin fishing
- Identical wide 25° beams at 50 kHz and 200 kHz
- For larger trailered boats 8 m to 12 m (25' to 40') with outboards and I/O's
- Interfaces to any 600 W or 1 kW sounder
- Depth and fast-response water-temperature sensor
- Kick-up assembly locks in the "up" position and will not damage the transom
- Accommodates transom angles between 3° and 21°
- Urethane housing



Sensing Technology

www.airmar.com





TM270W



Technical Information

50 kHz-AWIq / 200 kHz-BM

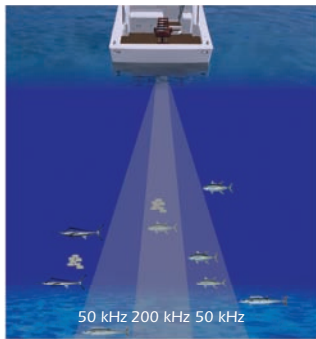
Number of Elements and Configuration		
Beamwidth (@-3 dB)	25°	25°
RMS Power (W)	1 kW	1 kW
TVR	161 dB	167 dB
RVR	-175 dB	-194 dB
FOM	-19 dB	-27 dB
Q	4	15
Impedance	200 Ω	90 Ω

MAXIMUM DEPTH RANGE

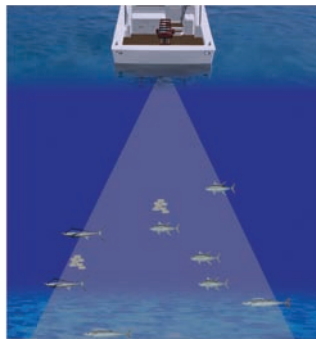
50 kHz	200 kHz
400 m to 610 m (1,350' to 2,000')	100 m to 180 m (330' to 600')

BEAM DIAMETER VS DEPTH

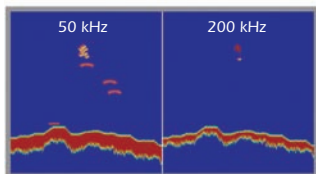
Depth	50 kHz	200 kHz
9 m (30')	4 m (13')	4 m (13')
30 m (100')	14 m (45')	14 m (45')
122 m (400')	55 m (180')	55 m (180')
305 m (1,000')	137 m (450')	137 m (450')



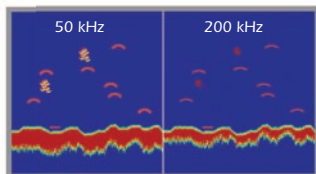
Standard 1 kW transducer
19° at 50 kHz, 6° at 200 kHz



TM270W twin wide-beam transducer
Identical 25° beamwidths at 50 kHz and 200 kHz



Different number of fish detected—
fish and bottom do not appear the same



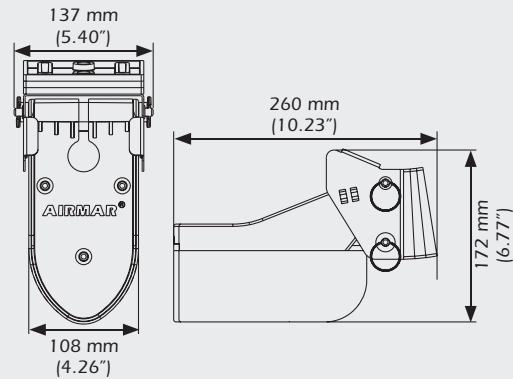
See the same targets at both frequencies—
allows for easier species and bottom identification

SPECIFICATIONS

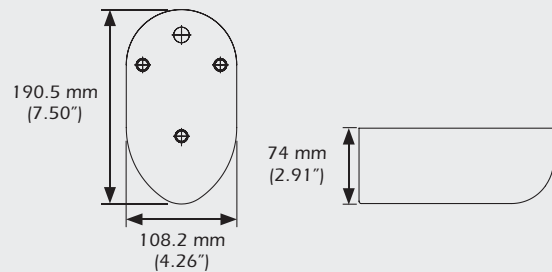
Weight: 4 kg (8.9 lb)
Hull Deadrise: Up to 28°
Acoustic Window: Urethane

DIMENSIONS

TM270W Housing



TM270W Transducer



TM260



Powerful, Yet Sensitive!

The new TM260 takes the legendary performance of the B260 to your vessel's transom. This top-of-the-line broadband transom-mount brings crystal clear imaging to any of today's fishfinders. The large 200 kHz element and the seven-element 50 kHz array are excellent for bait and game fish separation along with detecting ground fish holding tight to the bottom. The TM260's high-performance mounting bracket is easy-to-install and has a streamlined shape that delivers high-speed performance up to 30 knots (35 MPH).

Transom-Mount 1 kW HD Digital

Fishing Applications

- Blue-water trolling using 50 kHz
- Deep-water bottom and wreck fishing up to 800 m (2,625')

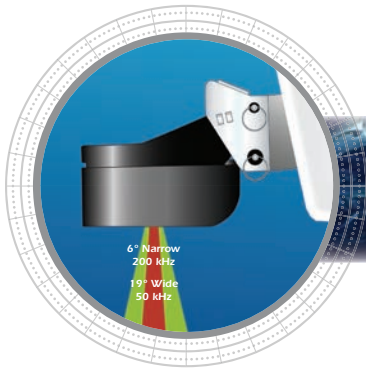
Features

- Top-of-the-line narrow-beam transom-mount
- Designed for bottom fishing
- Wide 19° beam at 50 kHz
- Narrow 6° beam at 200 kHz
- For larger trailered boats 8 m to 12 m (25' to 40') with outboards and I/O's
- Interfaces to any 600 W or 1 kW sounder
- Depth and fast-response water-temperature sensor
- Kick-up assembly locks in the "up" position and will not damage the transom
- Accommodates transom angles between 3° and 21°
- Urethane housing





Sensing Technology

www.airmar.com



Technical Information

50 kHz-AE / 200 kHz-BH		
Number of Elements and Configuration		
Beamwidth (@-3 dB)	19°	6°
RMS Power (W)	1 kW	1 kW
TVR	162 dB	175 dB
RVR	-173 dB	-183 dB
FOM	-14 dB	-10 dB
Q	8	8
Impedance	250 Ω	90 Ω

MAXIMUM DEPTH RANGE	
50 kHz	200 kHz
529 m to 735 m (1,800' to 2,500')	206 m to 294 m (700' to 1,000')

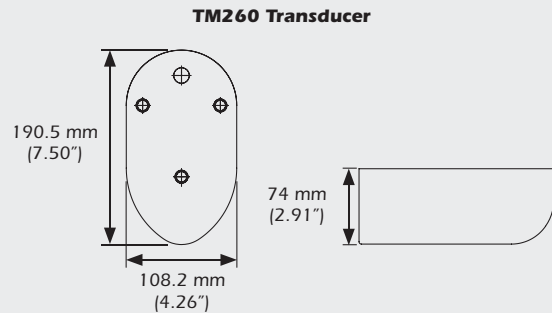
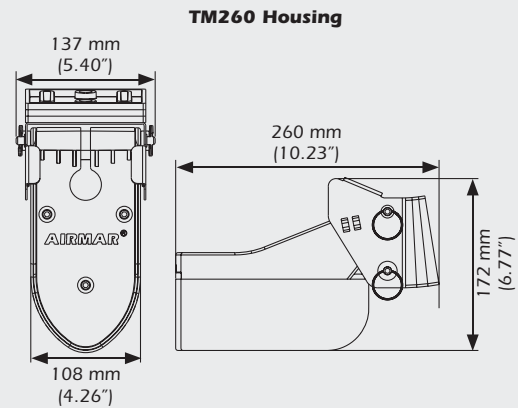
BEAM DIAMETER VS DEPTH		
Depth	50 kHz	200 kHz
9 m (30')	3 m (10')	0.9 m (3')
30 m (100')	10 m (34')	3.3 m (11')
122 m (400')	41 m (134')	13 m (42')
305 m (1,000')	102 m (335')	32 m (105')

TRANSDUCER COMPARISON			
Model	Power	Rating	Performance Increase
P66	600 W	Good	Benchmark model for comparison
TM258	1 KW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
TM260	1 KW	Superb	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz

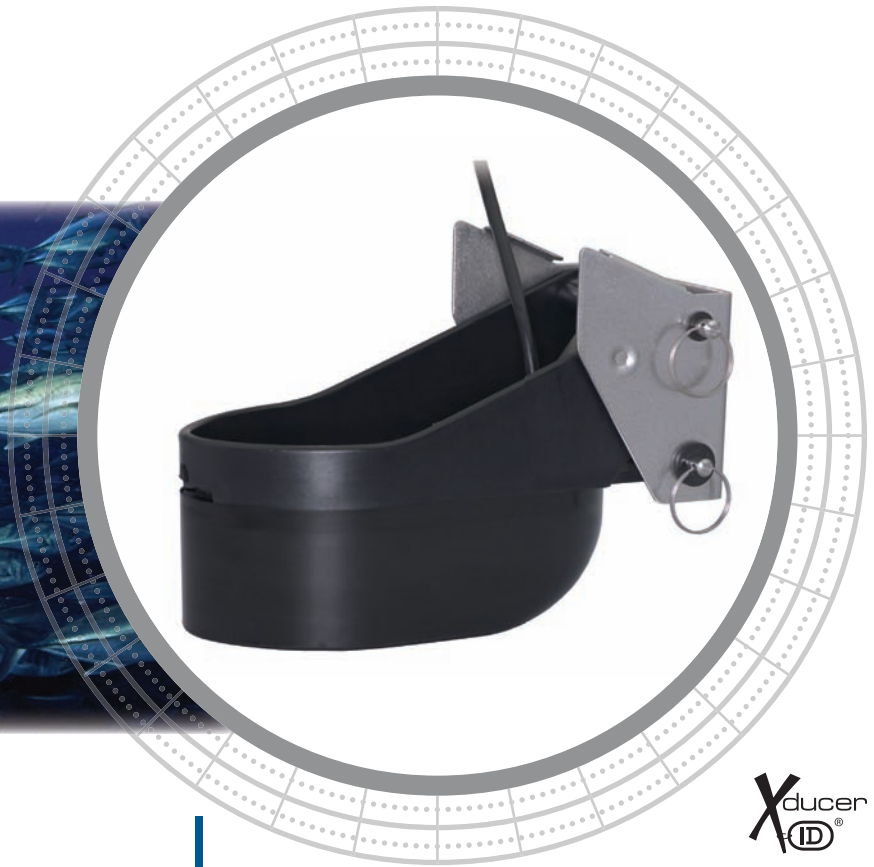
Due to the wide beams of the P48W and TM270W, they have been omitted from the table.

SPECIFICATIONS
Weight: 4 kg (8.9 lb)
Hull Deadrise: Up to 28°
Acoustic Window: Urethane

DIMENSIONS



TM258



New Look and Better High-Speed Performance

The industry's first 1 kW transom-mount transducer has a new high-performance mounting bracket. The sleek, new bracket makes the TM258 easier to install. Additionally, its streamlined shape will give you improved high-speed performance up to 30 knots (35 MPH).

The TM258 will make 600 W sounders respond like a more powerful model. Get 16 times the sensitivity compared with a standard transom-mounted transducer. The TM258 packs four 50 kHz/200 kHz elements to focus narrow beams at both frequencies, so you'll see crisp targets and clear bottom definition.

Transom-Mount 1 kW Entry-Level

Fishing Applications

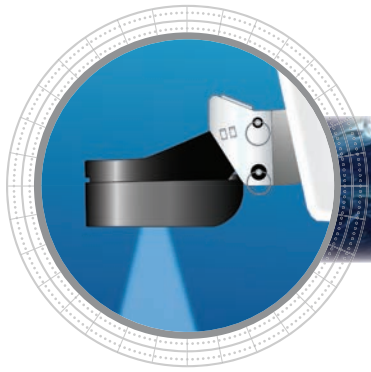
- Inshore and blue-water trolling
- Deep-water bottom and structure fishing up to 500 m (1,640')
- The versatile 1 kW transducer for all types of fishing

Features

- Depth and fast-response water-temperature sensor
- Elliptical beam covers larger bottom area
- Fits existing TM256 and TM258 models
- Bracket kick-up assembly locks in the "up" position and will not damage the transom
- Accommodates transom angles between 3° and 21°
- Urethane housing
- Boat Size: 8 m to 12 m (25' to 40')



Sensing Technology



Technical Information

50/200 kHz-BIq		
Number of Elements and Configuration		
Beamwidth (@-3 dB)	15° x 21°	3° x 5°
RMS Power (W)	1 kW	1 kW
TVR	161 dB	173 dB
RVR	-174 dB	-183 dB
FOM	-17 dB	-9 dB
Q	9	15
Impedance	225 Ω	200 Ω

MAXIMUM DEPTH RANGE	
50 kHz	200 kHz
441 m to 647 m (1,500' to 2,200')	206 m to 294 m (700' to 1,000')

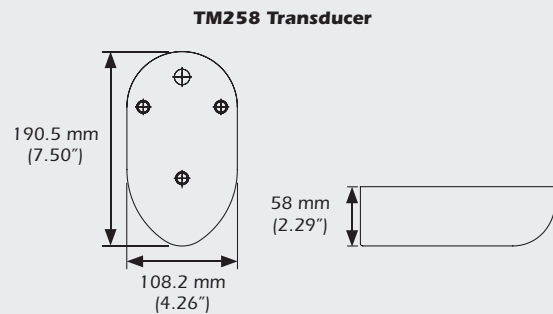
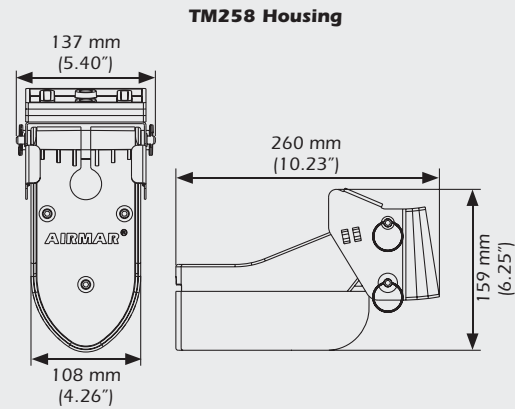
BEAM DIAMETER VS DEPTH		
Depth	50 kHz	200 kHz
9 m (30')	2.4 m x 3.3 m (8' x 11')	0.6 m x 0.9 m (2' x 3')
30 m (100')	8 m x 12 m (25' x 40')	1 m x 2.7 m (5' x 9')
122 m (400')	30 m x 50 m (98' x 163')	6 m x 11 m (20' x 35')
305 m (1,000')	74 m x 124 m (245' x 407')	16 m x 26 m (52' x 87')

TRANSDUCER COMPARISON			
Model	Power	Rating	Performance Increase
P66	600 W	Good	Benchmark model for comparison
TM258	1 KW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
TM260	1 KW	Superb	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz

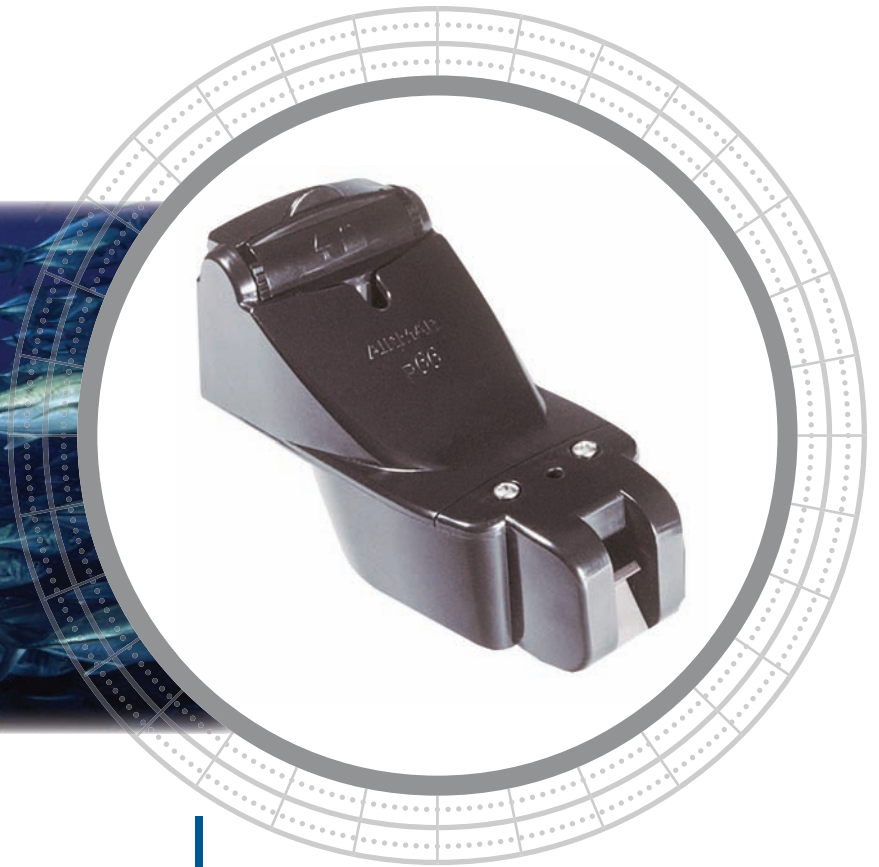
Due to the wide beams of the P48W and TM270W, they have been omitted from the table.

SPECIFICATIONS
Weight: 3.6 kg (7.9 lb)
Hull Deadrise: Up to 25°
Acoustic Window: Urethane

DIMENSIONS



P66



Best of a New Generation!

The P66 is the best performing and most popular, transom-mount, TRIDUCER® Multisensor in the market for many reasons. Foremost, the 50 kHz and 200 kHz, oversized, ceramic element produces focused beams, highlighting detail in the water column and in the bottom structure.

Setting the Industry Standard!

Because of its hydrodynamic shape, water coming off the transom flows smoothly under the transducer face. This results in accurate, high-speed, depth readings and clear display images. Going a step further, the P66 TRIDUCER Multisensor also incorporates a patented noise-suppression system. The result is a 5 to 8 knot (6 to 9 MPH) improvement over standard construction through improved shielding from noise and vibration. And the plastic release bracket lets the P66 rotate up to protect the housing if struck from the front.

Transom-Mount TRIDUCER® Multisensor 600 W

Fishing Applications

- Lake and inshore all-around saltwater fishing for small to mid-size outboard boats

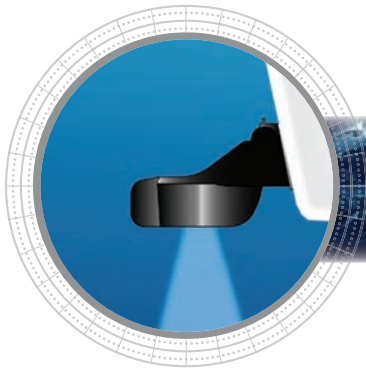
Features

- Depth, speed, and temperature in one housing
- Plastic kick-up bracket
- Accommodates transom angles between 2° and 20°
- Recessed waterflow channel protects paddlewheel
- Transducer can be removed from bracket without the use of tools for easy service and storage
- Boat Size: 5 m to 8 m (18' to 25')



Sensing Technology

www.airmar.com



Technical Information

50/200 kHz-A

Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	45°	11°
RMS Power (W)	600 W	600 W
TVR	153 dB	173 dB
RVR	-164 dB	-182 dB
FOM	-33 dB	-20 dB
Q	24	30
Impedance	200 Ω	375 Ω

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
235 m to 353 m (800' to 1,200')	118 m to 206 m (400' to 700')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	8 m (25')	2 m (6')
30 m (100')	25 m (83')	6 m (21')
122 m (400')	101 m (331')	26 m (84')
305 m (1,000')	252 m (828')	64 m (210')

TRANSDUCER COMPARISON

Model	Power	Rating	Performance Increase
P66	600 W	Good	Benchmark model for comparison
TM258	1 KW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
TM260	1 KW	Superb	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz

Due to the wide beams of the P48W and TM270W, they have been omitted from the table.

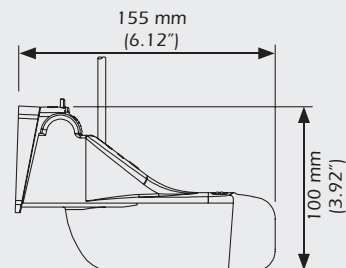
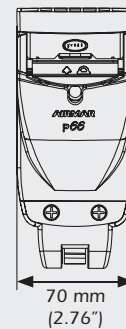
SPECIFICATIONS

Weight: 0.5 kg (1.1 lb)

Hull Deadrise: 2° to 20°

Acoustic Window: Layered plastic urethane

DIMENSIONS



P48W



Looking to Catch More Fish?

The new P48W transom-mount is designed for tournament-circuit freshwater bass fishermen. The ultra-wide 38° wide-beam will mark more fish, giving you that tournament winning edge. See things in wide-screen on your fishfinder like a bass attacking your spinner bait as you quickly reel it back to the boat. The highly sensitive ceramic—the heart of the P48 can easily show changes in bottom composition which can help locate spawning beds where defensive bass might be lurking. The P48's innovative design allows you to change the transducer beam direction on the fly based on specific fishing conditions. When the beam is in the default port-starboard position, a wide 38° x 12° beam will mark more fish and bait to the port and starboard of the boat. Turn the beam to the bow-stern position, and the 12° x 38° beam will detect changes in bottom composition as you search along rocky bottom, sandy bottom, or weed beds in search for that ten pounder. Widen the possibilities of both your fishfinder and a tournament win with the P48W.

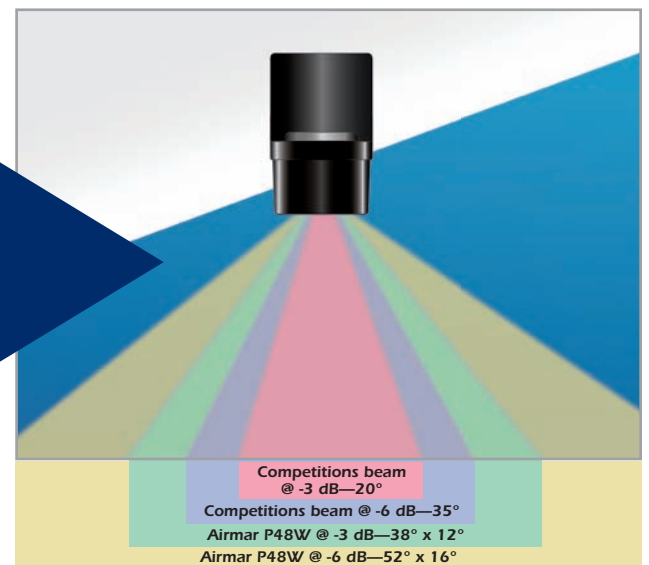
Wider Than The Competition

No matter how you measure transducer beamwidth, the P48 is wider than the competition. Airmar measures transducer beamwidth at -3 dB. Other transducer manufacturers measure their beams at -6 dB and -10 dB, giving the false impression of a wider beam.

Transom-Mount Adjustable Wide-Beam

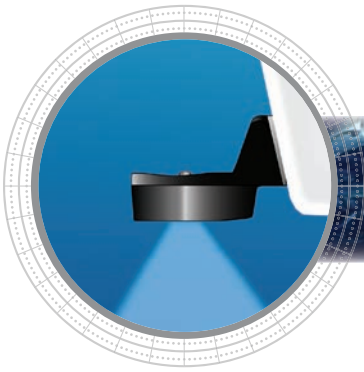
Features

- The widest transom-mount transducer on the market
- True 38° x 12° beam that is measured at -3 dB
- Depth and temperature, 200 kHz operation
- Compatible with mid-range, 200 kHz models from Lowrance, Raymarine, Garmin, and Humminbird
- Maximum Depth: 122 m (400')
- Transom or trolling-motor mounting options
- Boat Size: 5 m to 8 m (18' to 25')



Sensing Technology

www.airmar.com



Technical Information

200 kHz	
Number of Elements and Configuration	
Beamwidth (@-3 dB)	38° x 12°
RMS Power (W)	100 W (800 W Peak-to-Peak)
TVR	153 dB
RVR	-192 dB
FOM	-39 dB
Q	6
Impedance	1,100 Ω

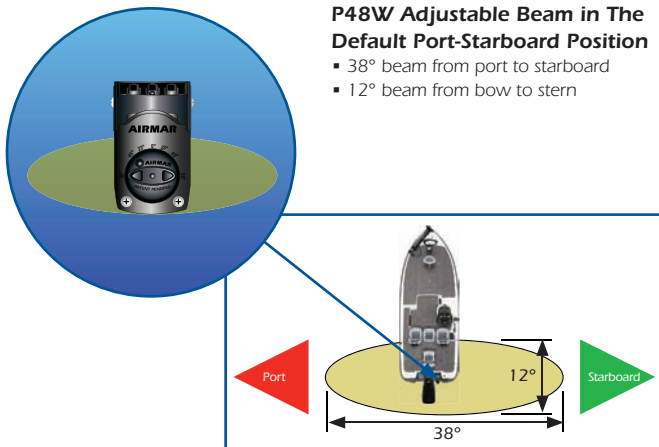
MAXIMUM DEPTH RANGE	
200 kHz	
	122 m
	(400')

BEAM DIAMETER VS DEPTH	
Depth	200 kHz
9 m (30')	2 m x 6 m (6' x 21')
30 m (100')	6 m x 21 m (21' x 69')
122 m (400')	26 m x 84 m (84' x 276')

TRANSDUCER COMPARISON			
Model	Power	Rating	Performance Increase
P48W	100 W	Good	Benchmark model for comparison
P66	600 W	Good	6 times more sensitive at 50 kHz 2 times more sensitive at 200 kHz

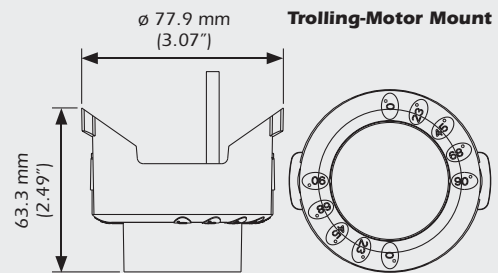
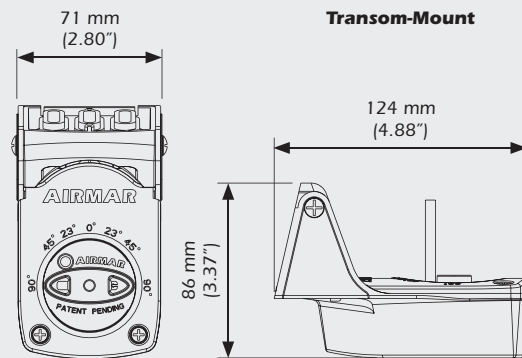
P48W Adjustable Beam in The Default Port-Starboard Position

- 38° beam from port to starboard
- 12° beam from bow to stern



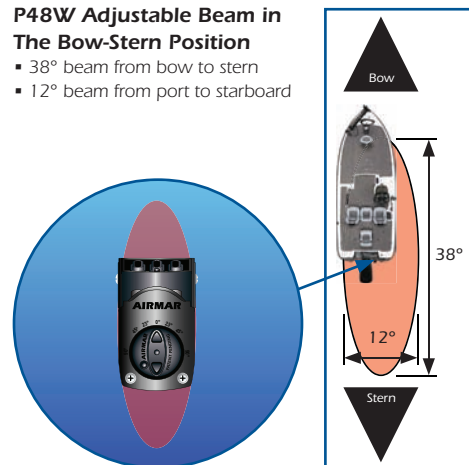
SPECIFICATIONS
Weight: 0.45 kg (1 lb)
Hull Deadrise: 2° to 20°
Acoustic Window: Urethane

DIMENSIONS

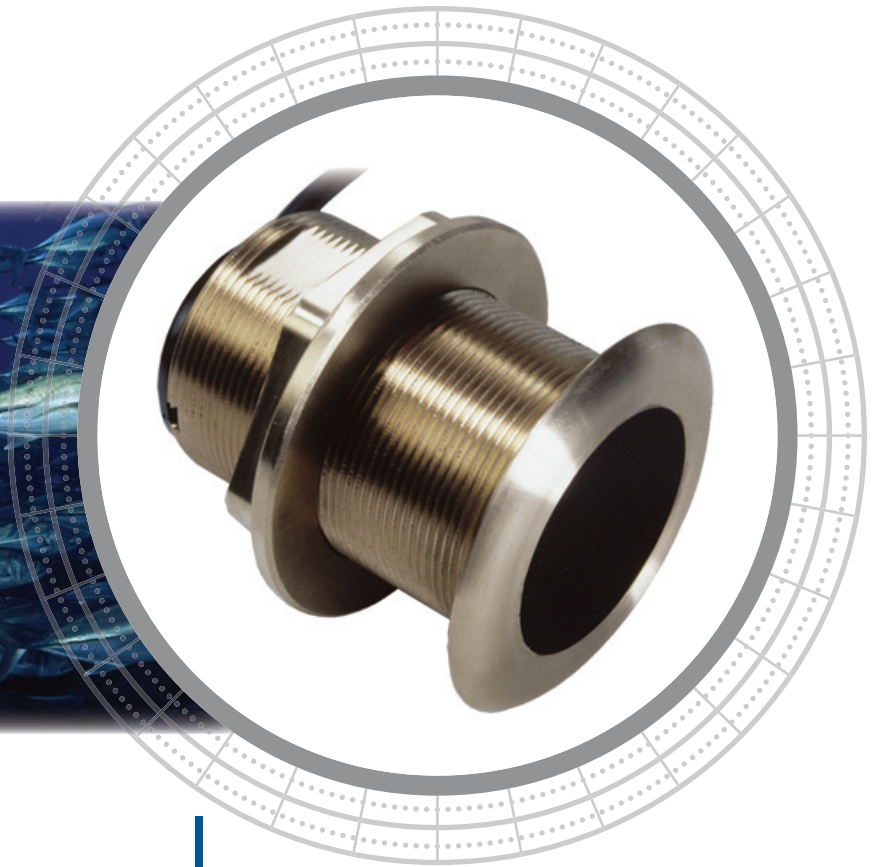


P48W Adjustable Beam in The Bow-Stern Position

- 38° beam from bow to stern
- 12° beam from port to starboard



B60 SS60



Coming to You at a New Angle!

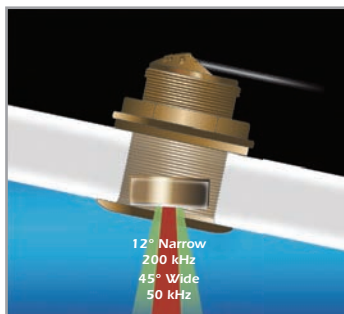
The dual-frequency, 50/200 kHz, B60 and SS60, Tilted Element™ transducers are low-profile housings that compensate for hull deadrise. The innovative design tilts the ceramic element inside the transducer housing—a first in the industry!

Flush With Results

With built-in deadrise compensation, performance is never compromised. This unique design offers professional and recreational boaters advantages similar to using a fairing block—but is installed nearly flush to the hull. On steep-deadrise hulls up to 24°, the beam is aimed straight down, resulting in strong echo returns and accurate depth readings.



Stainless steel housing—SS60



The ceramic element is tilted inside the housing, which compensates for your boat's deadrise. This aims the beam straight toward the bottom, resulting in stronger echo returns and more accurate depth readings.

Tilted Element™ Thru-Hull 600 W

Fishing Applications

- Inshore or coastal fishing in shallow to medium depths
- Slow trolling, structure fishing, and drifting
- Deep-water lake fishing

Features

- Fixed 20° tilted version for 16° to 24° hull deadrise
- Fixed 12° tilted version for 8° to 15° hull deadrise
- Fixed 0° tilted version for 0° to 7° hull deadrise (P319 plastic, B117 bronze, and SS555 stainless steel)
- Engineered for center-console and trailered boats
- Low-profile protrusion below the hull
- No affect on your boat's running performance
- Bronze or stainless steel housings available
- Arrow on cap points toward keel when installed
- Built-in temperature sensor
- Boat Size: Up to 8 m (25')

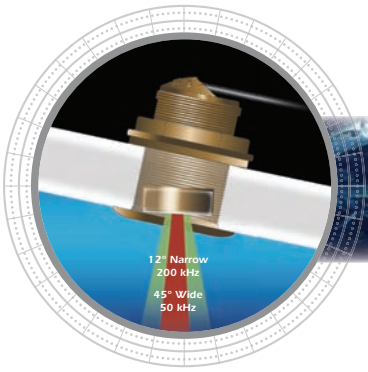


Sensing Technology



www.airmar.com

B60, SS60



Technical Information

50/200 kHz-A

Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	45°	12°
RMS Power (W)	600 W	600 W
TVR	155 dB	164 dB
RVR	-174 dB	-184 dB
FOM	-31 dB	-21 dB
Q	28	31
Impedance	200 Ω	375 Ω

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
235 m to 353 m (800' to 1,200')	118 m to 206 m (400' to 700')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	8 m (25')	2 m (6')
30 m (100')	25 m (83')	6 m (21')
122 m (400')	101 m (331')	26 m (84')
305 m (1,000')	252 m (828')	64 m (210')

TRANSDUCER COMPARISON

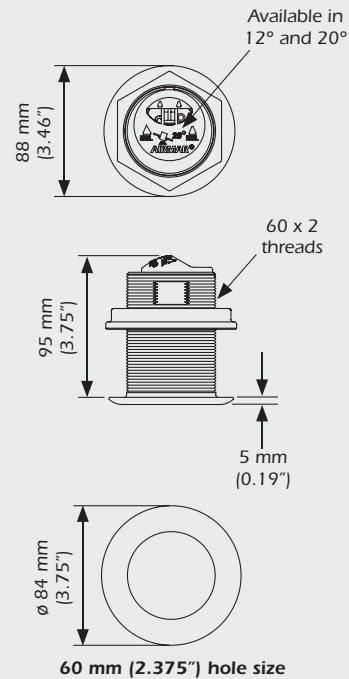
Model	Power	Rating	Performance Increase
B60 SS60	600 W	Good	Benchmark model for comparison
B164 SS164	1 kW	Better	6 times more sensitive at 50 kHz 2 times more sensitive at 200 kHz
SS264N	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz

Due to the wide beam of the SS264W, it has been omitted from the table.

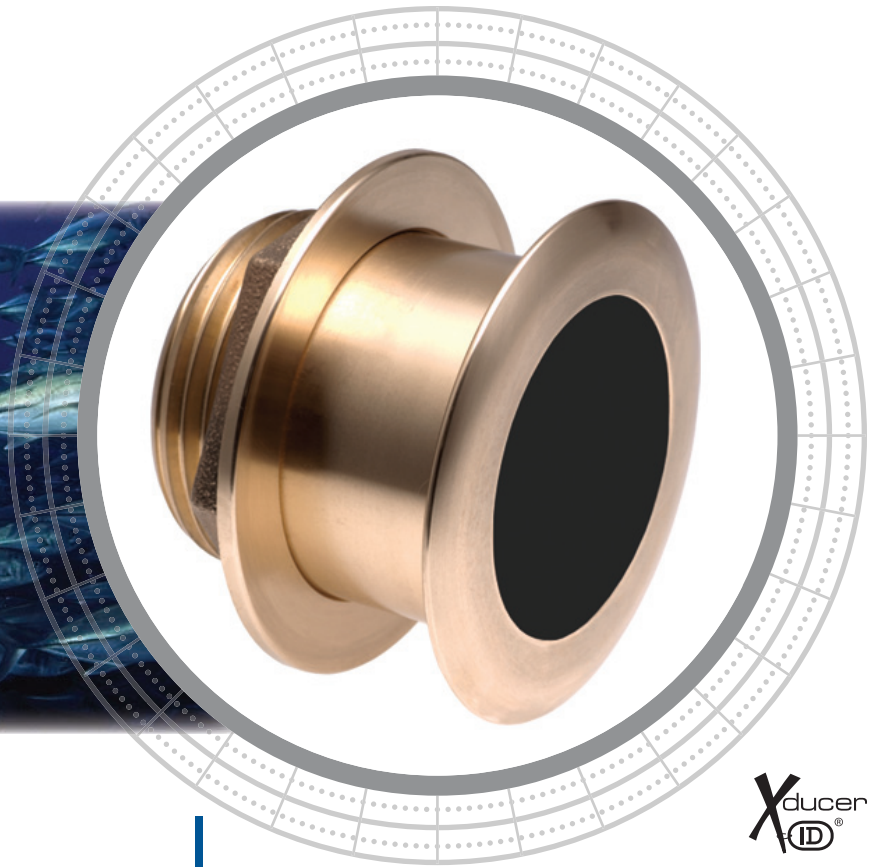
SPECIFICATIONS

Weight: 1.4 kg (3 lb)
Hull Deadrise: Up to 24°
Acoustic Window: Urethane

DIMENSIONS



B164 SS164



Aim in the Right Direction

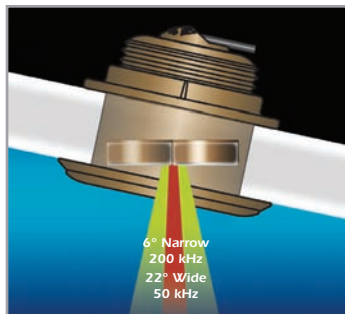
Airmar has taken our innovative Tilted Element™ technology to a higher power. The 1kW, B164 transducer is perfect for fast, trailered, tournament, sportfishing vessels that cannot install a thru-hull with a High-Performance Fairing. The low-profile bronze housing protrudes less than 6.35 mm (0.25") outside your hull, which results in excellent performance at speeds up to 30 knots (34 MPH).

Fine Tune Your Fishing

The ceramic arrays are tilted inside the housing giving you a perfect vertical beam with maximum energy on what is directly below your boat. Take your fishfinder to the next power with Airmar's 1kW Tilted Element Transducers.



Stainless steel housing—SS164



The ceramic elements are tilted inside the housing, which compensates for your boat's deadrise. This aims the beam straight toward the bottom, resulting in stronger echo returns and more accurate depth readings.

Tilted Element™ Thru-Hull 1 kW

Fishing Applications

- Inshore and blue-water trolling
- Deep-water bottom and structure fishing up to 500 m (1,640')
- The versatile 1 kW transducer for all types of fishing

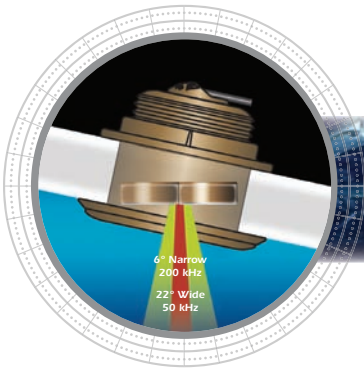
Features

- Fixed 20° tilted version for 16° to 24° hull deadrise
- Fixed 12° tilted version for 8° to 15° hull deadrise
- Fixed 0° tilted version for 0° to 7° hull deadrise
- 1 kW power, 50/200 kHz multiple-ceramics
- Engineered for center-console and trailered boats
- Low-profile protrusion below the hull
- No affect on your boats running performance
- Interfaces to any 600 W or 1 kW echosounder
- Bronze or stainless steel housings available
- Depth and fast-response water-temperature sensor
- Boat Size: 8 m to 11 m (25' to 35')




Sensing Technology

B164, SS164



Technical Information

50/200 kHz-Glq

Number of Elements and Configuration		
Beamwidth (@-3 dB)	22° x 20°	6° x 6°
RMS Power (W)	1 kW	1 kW
TVR	158 dB	168 dB
RVR	-177 dB	-189 dB
FOM	-23 dB	-19 dB
Q	7	17
Impedance	240 Ω	180 Ω

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
353 m to 529 m (1,200' to 1,800')	152 m to 235 m (500' to 800')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	4 m x 3 m (12' x 10')	0.9 m x 0.9 m (3' x 3')
31 m (100')	11 m x 10.6 m (38' x 35')	3.3 m x 3.3 m (11' x 11')
122 m (400')	47 m x 43 m (156' x 141')	13 m x 13 m (42' x 42')
305 m (1,000')	118 m x 107 m (389' x 353')	32 m x 32 m (105' x 105')

TRANSDUCER COMPARISON

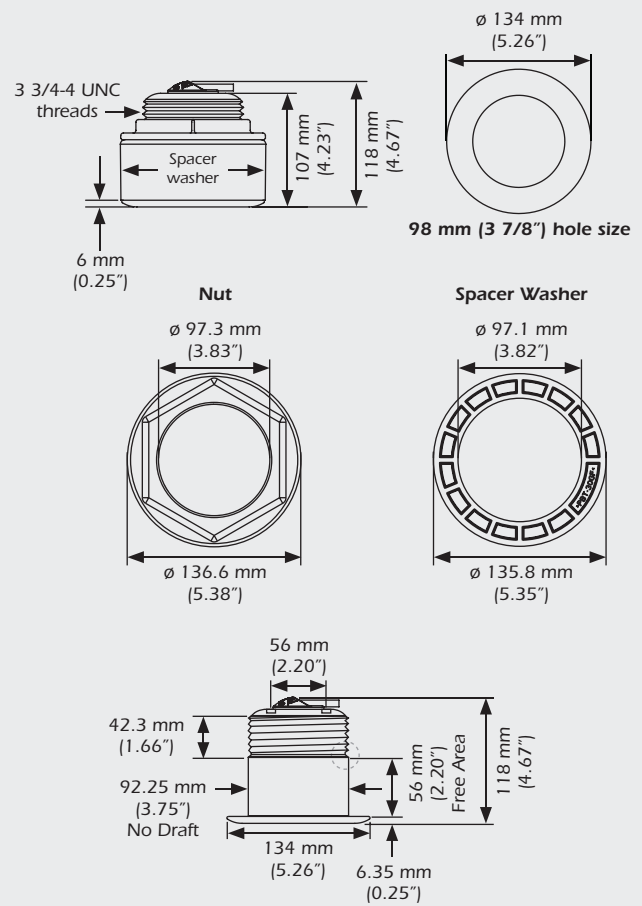
Model	Power	Rating	Performance Increase
B60 SS60	600 W	Good	Benchmark model for comparison
B164 SS164	1 kW	Better	6 times more sensitive at 50 kHz 2 times more sensitive at 200 kHz
SS264N	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz

Due to the wide beam of the SS264W, it has been omitted from the table.

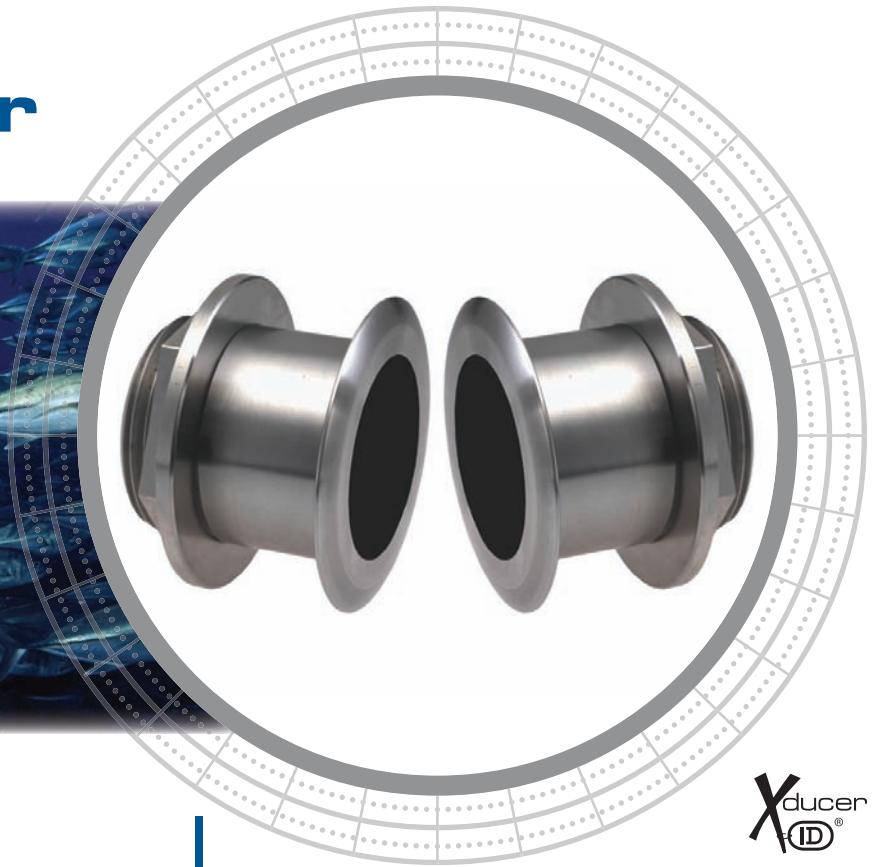
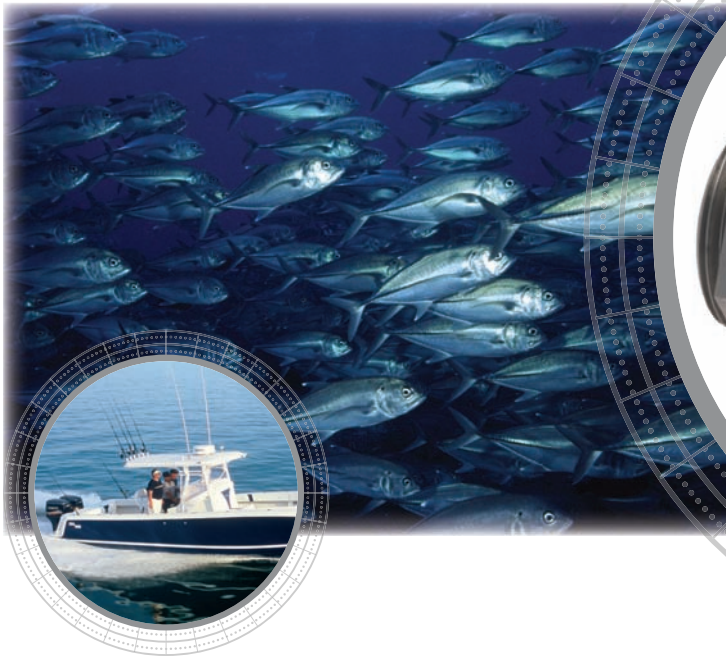
SPECIFICATIONS

Weight: 2.7 kg (6 lb)
Hull Deadrise: Up to 28°
Acoustic Window: Urethane

DIMENSIONS



SS264W Pair



2 Low-Profile Housings for Center-Consoles

Airmar has taken the SS270W wide-beam thru-hull and split it into a pair of Tilted Element™ transducers. One transducer handles 50 kHz while the other operates at 200 kHz. Now you can get all of the performance of the SS270W without a fairing. The low-profile design is perfect for fast, trailered, tournament, and sportfishing boats—especially center consoles.

See the Wider Picture

This transducer pair gives you four times the beamwidth at 200 kHz than other high-performance transducers. Since the width of the beams are the same at both frequencies, a split-screen fishfinder display will clearly show the same water column and bottom coverage. Fish may also appear as arches. More fish will be marked while cruising, trolling, drifting, or at anchor. Get the wider picture on your sounder with the SS264W pair.

- **Tuna/Marlin Fishermen**—Detect bait and gamefish in the upper water column that would go unseen with a traditional narrow-beam transducer.
- **Downrigger Fishermen**—Have the ability to see your downrigger ball and the lines attached to it. Get a closer look at a fish strike on your echosounder screen.
- **Jig Fishermen**—Seeing your jigs on the echosounder screen while bottom fishing can help avoid bottom hang-ups. Seeing a tuna attack your jigs on the echosounder display lets you reel up loose lines before it is too late.



Sensing Technology

Tilted Element™ Pair Thru-Hull Wide-Beam 1 kW HD Digital

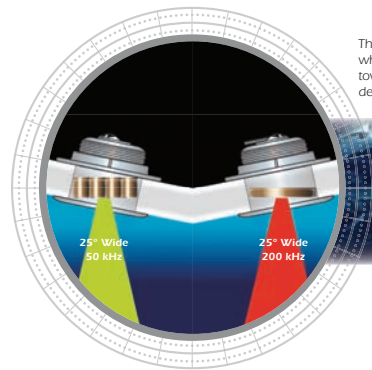
Fishing Applications

- Blue-water trolling using both 50 kHz and 200 kHz
- Bait and game fish marking in shallow to mid-water
- Wreck and structure finding on the continental shelf
- Vertical deep jigging
- Downrigger fishing in saltwater or deep-water lakes

Features

- Consists of two transducers (purchased separately):
 - SS264 50 kHz wide-beam
 - SS264 200 kHz **wide-beam**
- Transducers must be purchased separately for dual-frequency operation or individually as a single-frequency unit
- Fixed 20° tilted version for 16° to 24° hull deadrise
- Fixed 12° tilted version for 8° to 15° hull deadrise
- Fixed 0° tilted version for 0° to 7° hull deadrise
- Provides 4 times the beamwidth at 200 kHz than other high-performance transducers
- Identical wide 25° beamwidths at 50 kHz and 200 kHz
- No affect on your boats running performance
- Low-profile protrusion below the hull
- Depth and fast-response water-temperature sensor
- Boat Size: 8 m to 11 m (25' to 35')

www.airmar.com



The high-performance ceramic elements are tilted inside the housing, which compensates for your boat's deadrise. This aims the beams straight toward the bottom, resulting in stronger echo returns and more accurate depth readings.

SS264W Pair



Technical Information

50 kHz-AWIq / 200 kHz-BM

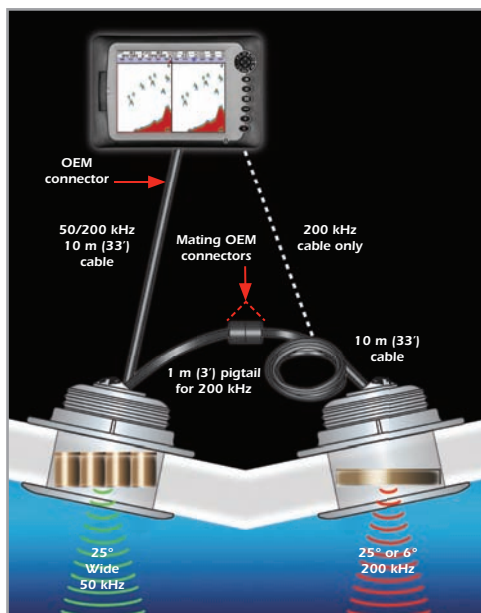
Number of Elements and Configuration		
Beamwidth (@-3 dB)	25°	25°
RMS Power (W)	1 kW	1 kW
TVR	161 dB	167 dB
RVR	-175 dB	-194 dB
FOM	-19 dB	-27 dB
Q	4	15
Impedance	200 Ω	90 Ω

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
400 m to 610 m (1,350' to 2,000')	100 m to 180 m (330' to 600')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	4 m (13')	4 m (13')
30 m (100')	14 m (45')	14 m (45')
122 m (400')	55 m (180')	55 m (180')
305 m (1,000')	137 m (450')	137 m (450')

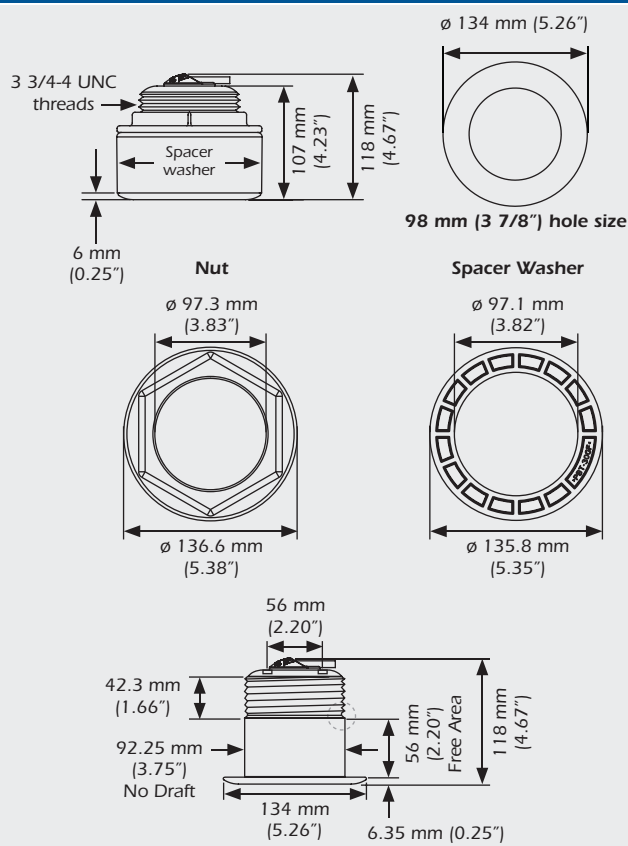


SS264W Pair wiring installation

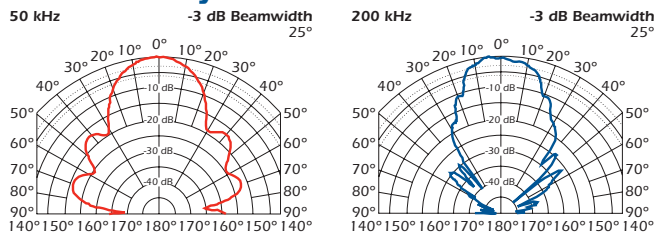
SPECIFICATIONS

Weight: 2.7 kg (6 lb)
Hull Deadrise: Up to 24°
Acoustic Window: Urethane

DIMENSIONS



Directivity Patterns



The 200 kHz transducer can be added to existing B260 or M260 installations (switchbox is needed) for the ultimate 200 kHz wide and narrow-beam combination. This gives you the ability to switch 200 kHz transducers based on the type of fishing on a given day.

SS264N Pair

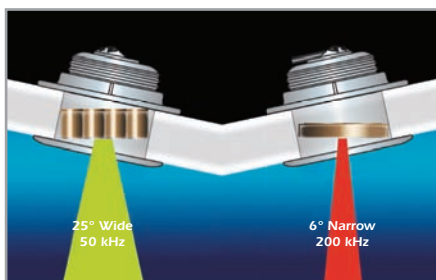


Two Eyes for Your Fishing

Legendary B260 1 kW performance is now available for fast sportfishing boats. No fairing required! Airmar has taken the proven B260 thru-hull and split it apart into a pair of tilted-element transducers. The ceramic elements have been tilted to offset for the deadrise of your boat's hull. Called the SS264N Pair, these transducers are perfect for fast, center-console, and trailered sportfishing boats, or any vessel that cannot have a thru-hull with a High-Performance Fairing.

Narrow and Wide

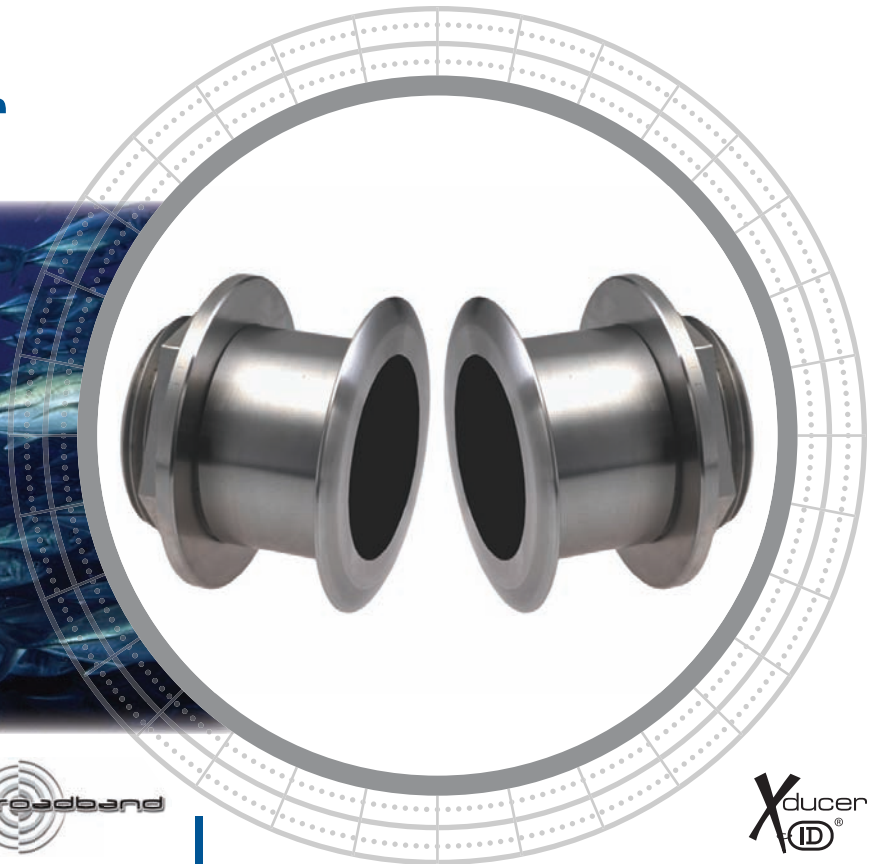
The narrow-beam broadband 200 kHz transducer will give you excellent resolution and crisp image detail needed for bottom fishing. The low ringing of this transducer is perfect for finding fish holding tight to the bottom and other structure. The seven-element 50 kHz transducer is the same as in the SS264W and is best for deep-water sounding down to 914 m (3,000').



The high-performance ceramic elements are tilted inside the housing, which compensates for your boat's deadrise. This aims the beams straight toward the bottom, resulting in stronger echo returns and more accurate depth readings.



Sensing Technology



Tilted Element™ Pair Thru-Hull Narrow-Beam 1 kW HD Digital

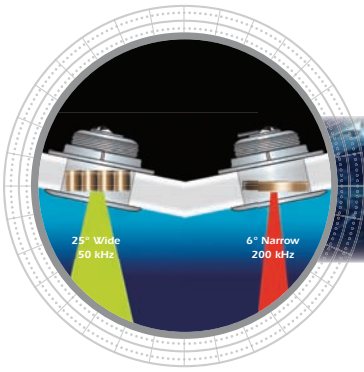
Fishing Applications

- Blue-water trolling using 50 kHz
- Deep-water bottom and wreck fishing up to 800 m (2,625')

Features

- Consists of two transducers (purchased separately):
 - SS264 50 kHz wide-beam 25°
 - SS264 200 kHz narrow-beam 6°
- Transducers must be purchased separately for dual-frequency operation or individually as a single-frequency unit
- Fixed 20° tilted version for 16° to 24° hull deadrise
- Fixed 12° tilted version for 8° to 15° hull deadrise
- Fixed 0° tilted version for 0° to 7° hull deadrise
- Low-profile protrusion below the hull
- No affect on your boats running performance
- Depth and fast-response water-temperature sensor
- Boat Size: 8 m to 11 m (25' to 35')

SS264N Pair



Technical Information

50 kHz-AWlq / 200 kHz-BH

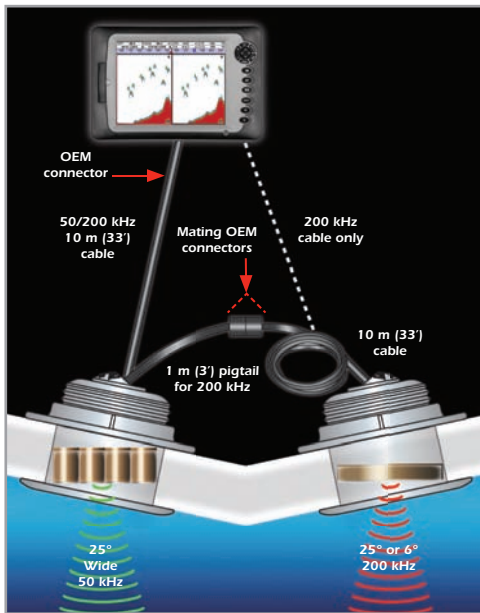
Number of Elements and Configuration		
Beamwidth (@-3 dB)	25°	6°
RMS Power (W)	1 kW	1 kW
TVR	161 dB	175 dB
RVR	-175 dB	-183 dB
FOM	-19 dB	-10 dB
Q	4	8
Impedance	250 Ω	90 Ω

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
400 m to 610 m (1,350' to 2,000')	206 m to 294 m (700' to 1,000')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	3 m (10')	0.9 m (3')
30 m (100')	14 m (45')	3.3 m (11')
122 m (400')	55 m (180')	13 m (42')
305 m (1,000')	137 m (450')	32 m (105')

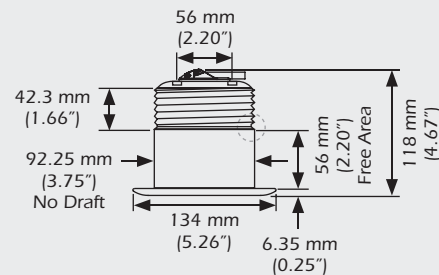
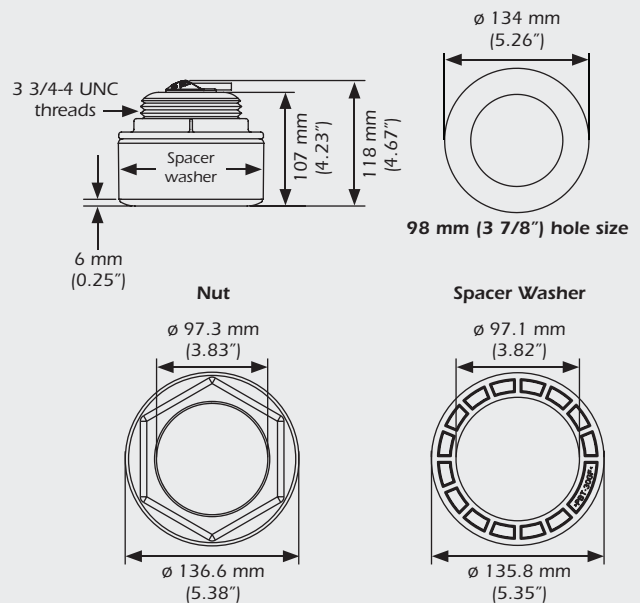


SS264N Pair wiring installation

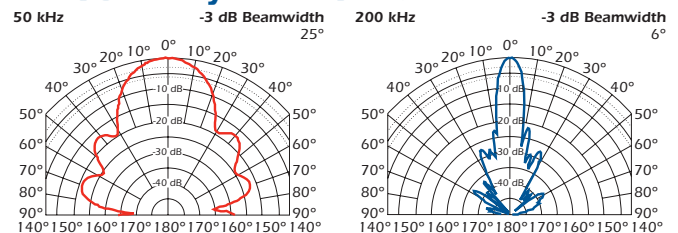
SPECIFICATIONS

Weight: 2.7 kg (6 lb)
Hull Deadrise: Up to 24°
Acoustic Window: Urethane

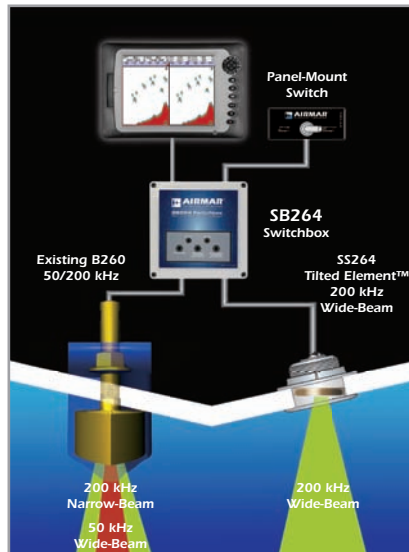
DIMENSIONS



Directivity Patterns



SB264

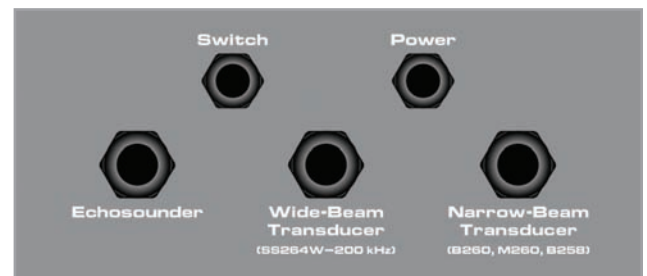
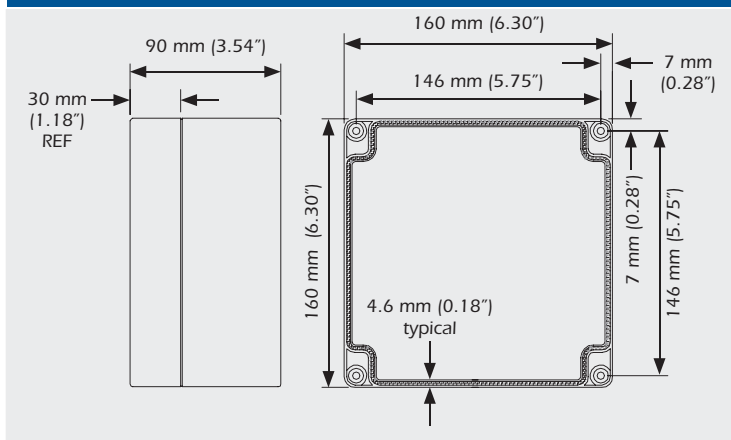


1 kW Switchbox

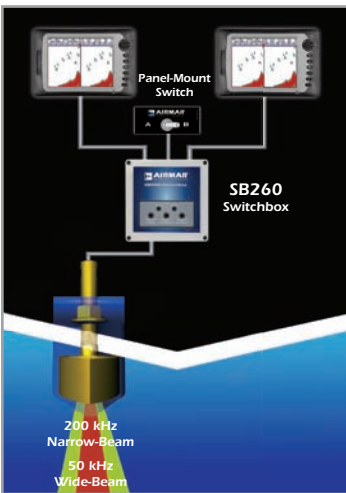
Features

- Use when adding the SS264 200 kHz wide-beam with an existing 1 kW transducer
- Allows you to switch between narrow or wide-beam 200 kHz frequencies
- Panel-mount waterproof switch
- For use with all 1 kW fishfinders
- Operating Voltage: 9 VDC to 30 VDC

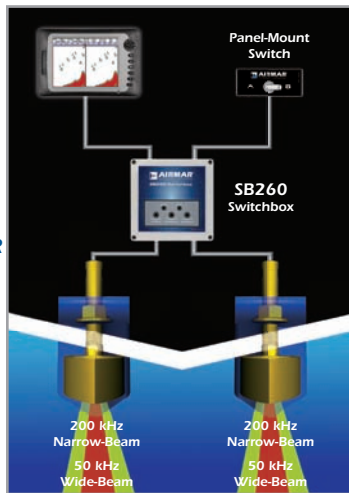
DIMENSIONS



SB260



OR

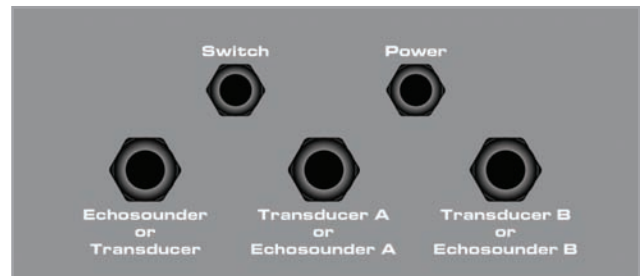
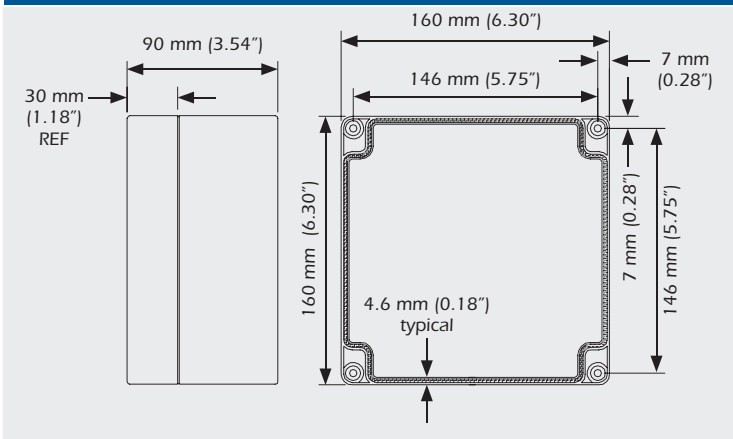


1 kW Switchbox

Features

- Multi-functional switchbox:
 - Switches 2 transducers with 1 fishfinder or
 - Switches 2 fishfinders with 1 transducer
- Panel-mount waterproof switch
- For use with all 1 kW fishfinders
- Operating Voltage: 9 VDC to 30 VDC

DIMENSIONS



PB200



Integrated Sensors Provide a Mini-Network

The PB200 WeatherStation® Instrument informs you of instantaneous changes in the weather. Wind, Speed, and Direction are measured using four ultrasonic transducers. No moving parts results in better durability and reliability. The internal WAAS/EGNOS GPS engine and three-axis solid-state compass make it possible for the PB200 to provide both Apparent and True Wind Speed and Direction without the need to add additional sensors. The WAAS/EGNOS GPS provides navigation data as well as magnetic variation and is suitable as your primary GPS source. The internal temperature and barometric pressure sensors help predict changing weather patterns. Combined with the internal heading sensor, most of your navigation needs are provided! No other sensor on the market incorporates all of these features in one compact housing.

Unsurpassed Heading

What sets us apart from the competition and the original PB100 is the ability to provide 2° heading accuracy under dynamic conditions, such as rough seas. Airmar's unique dynamic motion correction software is the key difference. The PB200's heading is highly accurate and stable under most sea conditions—even if the vessel is pitching and rolling up to 30° in rough seas. Also unique to the PB200 is that the 3D accelerometer and rate gyro are temperature compensated, resulting in precise tilt and rate of turn data. This allows the PB200 to accurately measure True Wind Speed and Direction even when tilted up to 30°.

Ultrasonic WeatherStation® Instrument

Features

- True wind speed and direction
- Apparent wind speed and direction
- Barometric pressure
- Air temperature
- Wind chill temperature
- Measures wind speed and direction ultrasonically
- Internal WAAS/EGNOS GPS
- Three-axis solid-state compass
- Three-axis accelerometer provides stabilized pitch and roll information in dynamic conditions
- Better than 1° static compass accuracy
- Best-in-class 2° dynamic compass accuracy
- Yaw rate gyro provides rate of turn data
- Outputs both NMEA 0183 and NMEA 2000® data
- Plastic housing is less prone to lightning strikes
- WeatherCaster™ Software
- 360° calibration results in precise wind direction accuracy
- Very easy installation and two-year warranty
- Maintenance-free operation—no moving parts
- Recommended for large powerboats and commercial vessels



Sensing Technology

www.airmar.com

PB200 Ultrasonic WeatherStation® Instrument

How the WeatherStation® Instrument Works

The Airmar WeatherStation Instrument is the only all-in-one weather sensor that calculates apparent wind speed and direction, barometric pressure, air temperature, and wind chill temperature. With the internal compass and WAAS/EGNOS GPS, true wind speed and direction can also be calculated. The UV stabilized, compact housing is fully waterproof and resistant to sunlight and chemicals.

The ultrasonic wind sensor (an ultrasonic anemometer) measures apparent wind speed and direction. The WeatherStation Instrument contains four ultrasonic transducers, visible through the four holes in the top of the sensor's wind channel (see figure 1). These transducers operate in pairs—one transducer injects a pulse into the air. The pulse bounces off the metal plate at the bottom of the wind channel and is carried by the wind to arrive at the listening transducer a short time later.

When there is no wind, the pulse travels at the speed of sound from the sender to the receiver. Whenever the wind is blowing in that direction, the pulse will arrive sooner than if the air is still. Similarly, whenever the wind is blowing in the opposite direction, the pulse will arrive later than if the air is still. The four transducers take turns in sending and receiving pulses.

A microprocessor within the WeatherStation Instrument then combines the measurements from all four transducers to calculate the resultant wind speed and direction. Throughout this process, the sensor monitors the air temperature, to compensate for the fact that the speed of sound in air changes with temperature.



Figure 1

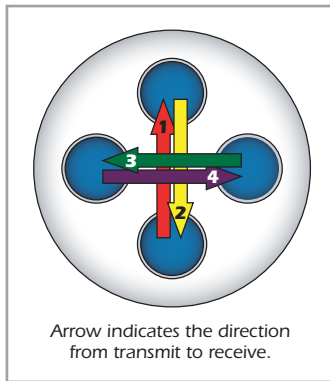


Figure 2

Understanding True and Apparent Wind

The WeatherStation Instrument has the unique ability to display both true and apparent wind. True wind is the actual motion of the air relative to the earth. Apparent wind is the wind which an observer experiences while moving or on board a boat. It is the result of two motions—the actual motion of the air (the true wind) and the motion of the boat. If the vessel is not moving, then the true and apparent wind will be the same.

Enhanced Performance

The Airmar PB200 WeatherStation Instrument offers enhanced performance over the PB100 and the competition. Advanced features such as a three-axis solid-state compass, three axis accelerometer, yaw rate gyro and WAAS/EGNOS GPS result in unsurpassed performance under all sea conditions. The sensor can also be fully integrated with your existing NMEA 0183 electronics or NMEA 2000 network. Unique to the sensor is its ability to output both NMEA 0183 and NMEA 2000 simultaneously to various devices on-board. Coupled with Airmar's intuitive WeatherCaster PC software, the PB200 is also a powerful stand alone solution.

The WeatherStation Instrument comes with our intuitive WeatherCaster™ Software. Data can be viewed in both digital and analog format and can be saved for a set period of time. The log time can be adjusted in intervals from 6 to 72 hours. Standard NMEA sentences and an RS485 interface allows for the flexibility of designing your own software program to fit your specific application. Our comprehensive technical manual makes the job easy!

Airmar's WeatherStation Instrument includes a standard 1-14" UNS marine thread connections to accommodate standard mounting hardware. The waterproof base connector assures trouble-free installation and servicing, while a quick disconnect feature allows for installations on vessels of all types and sizes.

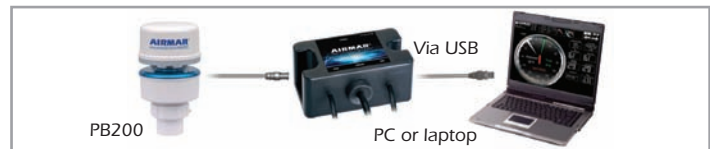
Connecting the PB200 to a NMEA 2000® Network

When connecting the PB200 WeatherStation® Instrument to a NMEA 2000 network backbone, a devicenet cable is needed.



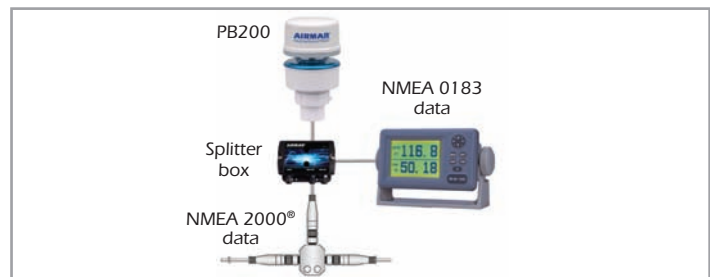
Connecting the PB200 to a PC—

When connecting the PB200 to a PC only, a USB Converter is required to use the WeatherCaster™ PC Software.

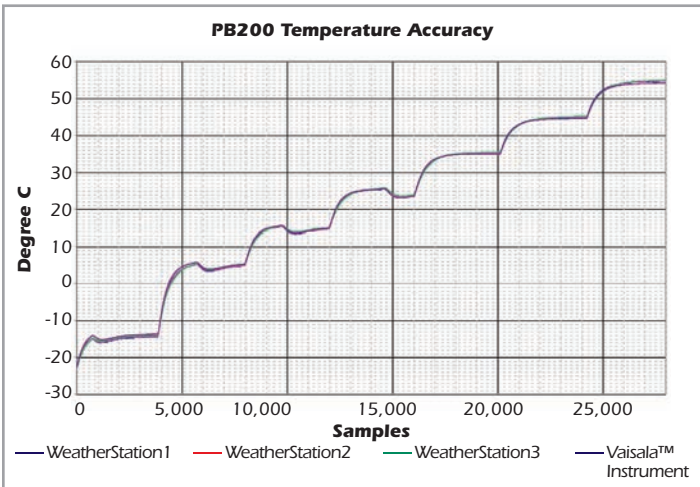
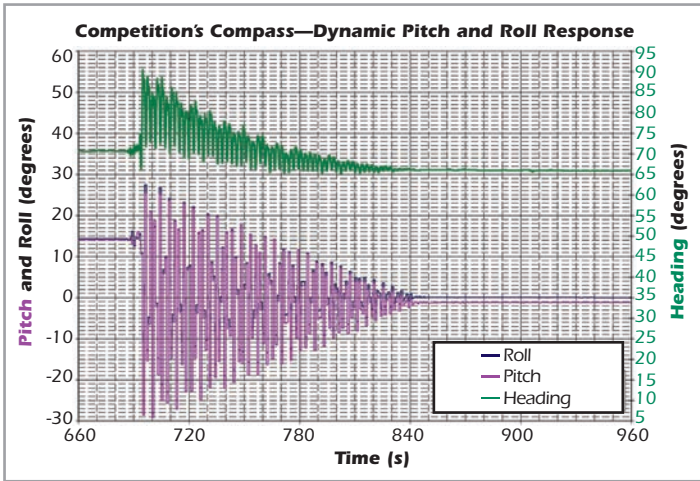
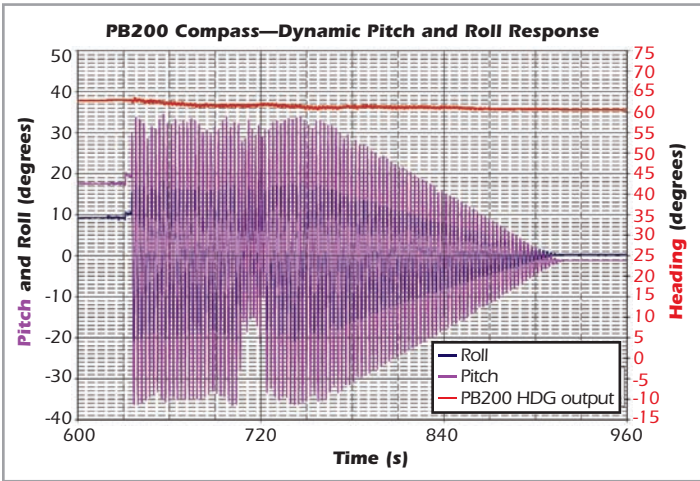
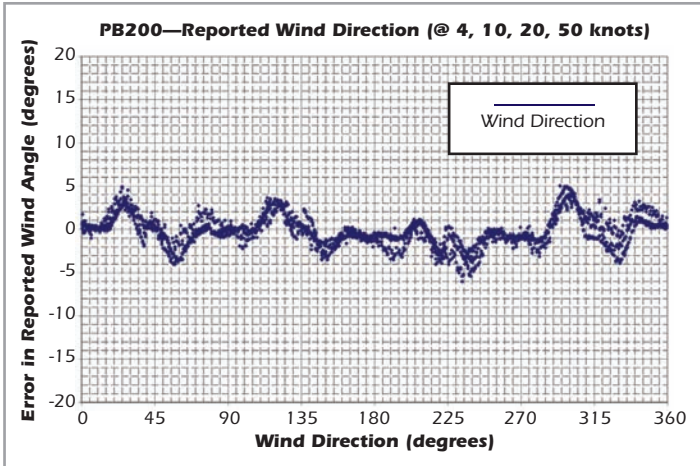
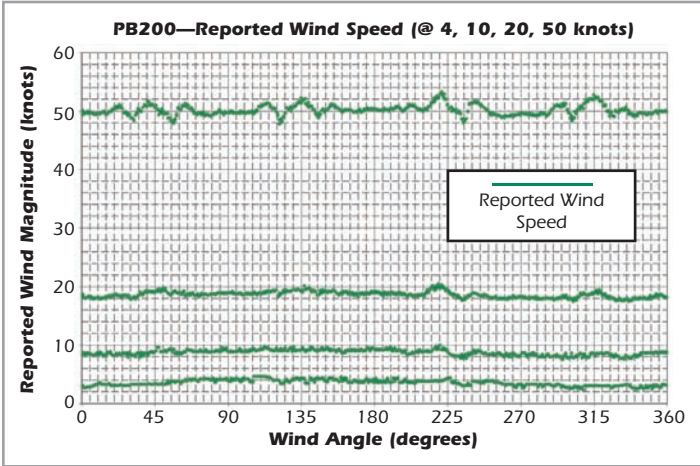


Connecting the PB200 to a NMEA 0183 and NMEA 2000® Networks

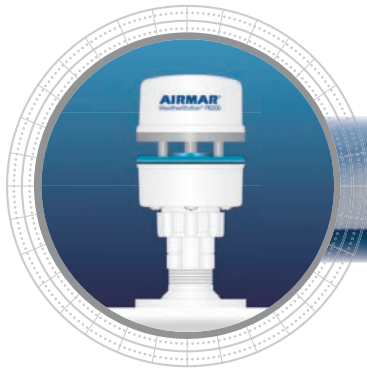
When simultaneously connecting the PB200 to both NMEA 0183 and NMEA 2000 networks, a combination cable kit is required. This kit contains either a 15 m (50') or 30 m (100') combination cable, splitter box, 3M connectors, and a 6 m (20') devicenet cable for connecting to the NMEA 2000 network.



PB200 Performance Accuracy and Graphs



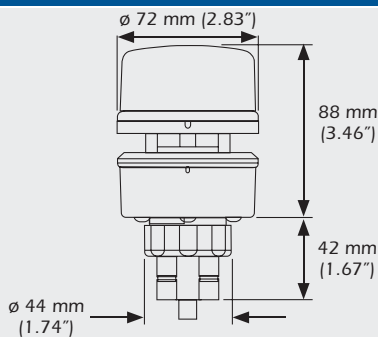
State-of-the-Art Wind Tunnel
 Airmar's on-site wind tunnel is calibrated with a pitot tube, which in turn was calibrated with a National Institute of Standards and Technology (NIST) traceable pitot tube.



PB200

Technical Information

DIMENSIONS



- Standard 1"-14 standard marine mount connection accommodates existing mounting hardware.

- NMEA 2000® cables longer than 6 m (20') have a molded in terminating resistor

SPECIFICATIONS

Wind Speed Range: 0 knots to 80 knots (0 MPH to 92 MPH)

Wind Speed Resolution: 0.1 knots (0.1 MPH)

Wind Speed Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:

- Low Wind Speeds: 0 knots to 10 knots (0 MPH to 11.5 MPH); RMS error of 1 knot (1.1 MPH) +10% of reading
- High Wind Speeds: 10 knots to 80 knots (11.5 MPH to 92 MPH); RMS error of 2 knots (2.3 MPH) or 5% RMS, whichever is greater

Wind Speed Accuracy in wet conditions:** 5 knots (5.7 MPH) RMS

Wind Direction Range: 0° to 360°

Wind Direction Resolution: 0.1°

Wind Direction Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:

- Low Wind Speeds: 4 knots to 10 knots (4.6 MPH to 11.5 MPH)—5° RMS typical
- High Wind Speeds: >10 knots (>11.5 MPH)—2° RMS typical

Wind Direction Accuracy in wet conditions:**

>8 knots (9.2 MPH)—8° RMS typical

Compass Accuracy:

- 1° static heading accuracy
- 2° dynamic heading accuracy

Rate-of-Turn: 0° to 70° per second

Rate-of-Turn Accuracy: 1° per second

Rate-of-Turn Data Output Update Rate:

- 2 Hz—NMEA 0183 (Adjustable up to 10 Hz)
- Adjustable up to 20 Hz—NMEA 2000

Pitch and Roll Range/Accuracy: ±50° / <1°

Air Temperature Range: -25°C to 55°C (-13°F to 131°F)

Air Temperature Resolution: 0.1°C (0.1°F)

Air Temperature Accuracy: ±1°C (±1.8°F)* @ >4 knots (>4.6 MPH) wind

Barometric Pressure Range:

850 mbar to 1150 mbar (25 inHg to 34 inHg, 850 hPa to 1150 hPa)

Barometric Pressure Resolution: 0.1 mbar (0.029 inHg, 0.1 hPa)

Barometric Pressure Accuracy:

±2 mbar (±0.059 inHg, ±2 hPa) when altitude correction is available

GPS Position Accuracy: 3 m (10') with WAAS/EGNOS (95% of the time, SA off)

Operating Temperature Range: -25°C to 55°C (-13°F to 131°F)

Supply Voltage: 9 VDC to 16 VDC

Supply Current: <220 mA

Weight: 285 grams (0.7 lb)

Sensor Baud Rate (NMEA 0183 Interface Only):

4,800 bps (can be increased to 38,400 bps with a command)

NMEA 2000® Load Equivalency Number (LEN): 5

Thread Sizes on Base: 1"-14 UNS standard marine mount

Certifications and Standards: CE, IPX6, RoHS, NMEA 2000®, IEC61000-4-2, IEC60945

DATA OUTPUT PROTOCOL

NMEA 0183 Sentence Structure

\$GPDTMDatum Reference
 \$GPGGAGPS Fix Data
 \$GPGLL Geographic Position—Latitude and Longitude
 \$GPGSAGNSS DOP and Active Satellite
 \$GPGSVSatellites in View
 \$GPRMCRecommended Minimum GNSS
 \$GPVTGCOG and SOG
 \$GPZDATime and Date
 \$HCHDGHeading, Deviation, and Variation
 \$HCHDTTrue Heading
 \$TIROTRate of Turn
 \$WIMDAMeteorological Composite
 \$WIMWD ...Wind Direction and Speed
 \$WIMWV ...Wind Speed and Angle
 \$WIMWRRelative Wind Direction and Speed
 \$WIMWT ...True Wind Direction and Speed
 \$YXXDRTransducer Measurements

NMEA 2000® Supported PGNs

59392 ISO Acknowledgement
 060928 ISO Address Claim
 126208Acknowledge Group Function
 126464 PGN List
 126992 System Time
 126996 Product Information
 126998 Configuration Information
 127250 Vessel Heading
 127251 Rate of Turn
 127257 Attitude
 127258 Magnetic Variation
 129025 Position and Rapid Update
 129026 COG and SOG, Rapid Update
 129029 GNSS Position Data
 129033 Time and Date
 129044 Datum
 129538 GNSS Control Status
 129539 GNSS DOPs
 129540 GNSS Sats in View
 130306 Wind Data
 130310 Environmental Parameters
 130311 Environmental Parameters
 130323 Meteorological Station Data

RMS—Root Mean Square, LEN—Load Equivalency Number

*When the wind speed is less than 4 knots (4.6 MPH) and/or air temperature is below 0°C (32°F), wind and temperature readings will be less accurate.

**Wet conditions include moisture, rain, frost, dew, snow, ice and/or sea spray in the wind channel.

AIRMAR®
TECHNOLOGY CORPORATION

Sensing Technology

RoHS
COMPLIANT

REGISTERED TO
ISO
9001:2008

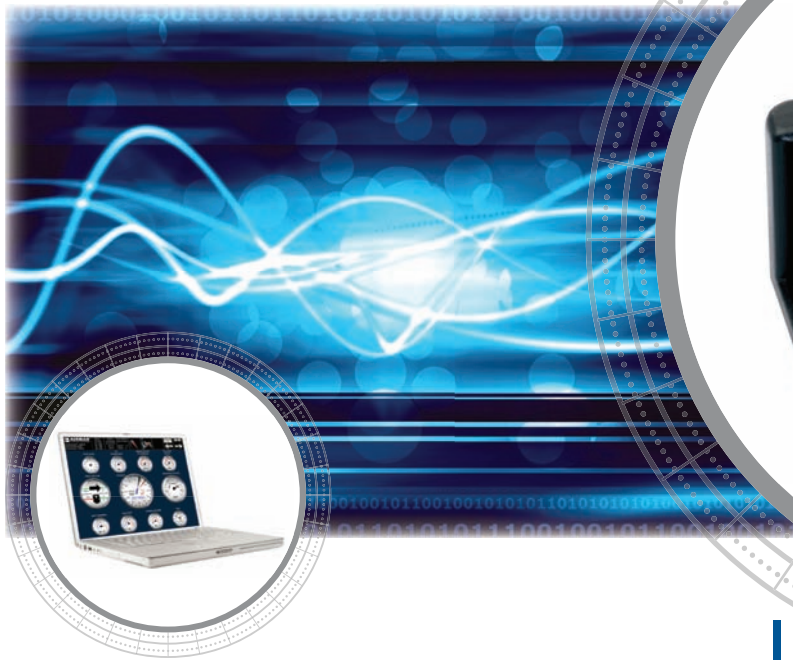
CE

©Airmar Technology Corporation

PB200_rU 08/19/10

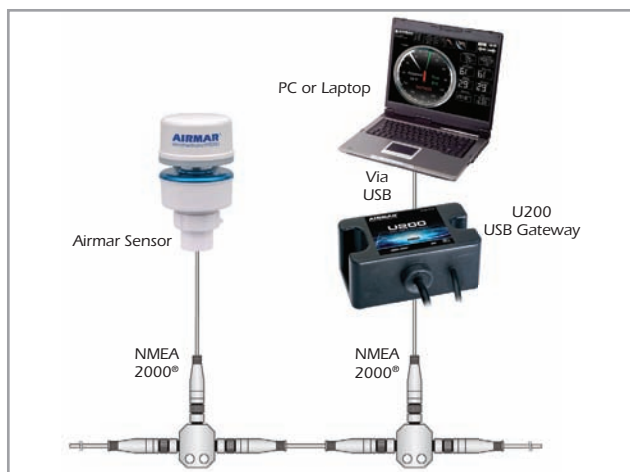
As Airmar constantly improves its products, all specifications are subject to change without notice. All Airmar products are designed to provide high levels of accuracy and reliability, however they should only be used as aids to navigation and not as a replacement for traditional navigation aids and techniques. WeatherStation® and WeatherCaster™ are registered trademarks and trademarks of Airmar Technology Corporation. Other company or product names mentioned in this document may be trademarks or registered trademarks of their respective companies, which are not affiliated with Airmar.

U200



Plug-and-Play Interface

The U200 Gateway provides the ability to interface with NMEA 2000® devices on a NMEA 2000 bus using a Personal Computer (PC). A simple plug-and-play installation allows GPS data, Speed-Over-Ground (SOG), Course-Over-Ground (COG), vessel heading, depth, speed, water temperature, weather data, and more to be displayed on your PC. Airmar's WeatherCaster PC software comes standard with the U200 and acts as both a user interface to display the network data and also as a network analyzer tool. All NMEA 2000 network activity on the bus can be viewed and logged as needed.



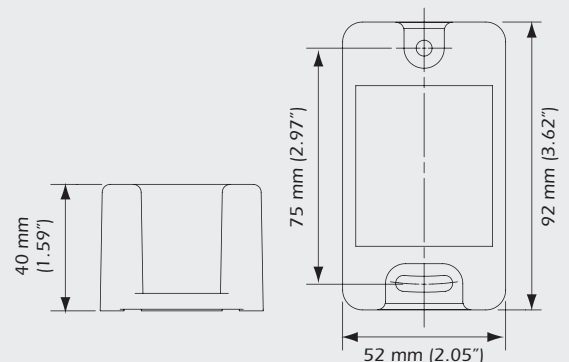
USB Gateway

NMEA 2000® to USB

Features

- Converts listed NMEA 2000® PGNs to USB format
- Plug-and-play connectivity from a NMEA 2000 network backbone to a PC
- For Airmar NMEA 2000 Sensors and other Certified NMEA 2000 Sensors: GPS Receivers, Heading Sensors, and Smart™, Depth, Speed, and Temperature Sensors
- Airmar WeatherCaster™ Software included
- Baud Rate: 115,200
- Voltage: Powered by USB connection (5 V)

DIMENSIONS



Sensing Technology



Technical Information

DATA OUTPUT PROTOCOL

NMEA 2000® Supported PGNs

059392.....	ISO Acknowledgment
059904.....	ISO Request
060160.....	ISO Transport Protocol, Data Transfer
060416.....	Transport Protocol, Connection Management
060928.....	ISO Address Claim
065240.....	ISO Commanded Address
126208.....	Acknowledge Group Function
126208.....	NMEA Complex Command Group Function
126464.....	PGN List—Transmit and Receive PGNs Group
126992.....	System Time
126996.....	Product Information
126998.....	Configuration Information
127250.....	Vessel Heading
127251.....	Rate of Turn
127257.....	Attitude
127258.....	Magnetic Variation
128259.....	Speed
128267.....	Water Depth
128275.....	Distance Log
129025.....	Position, Rapid Update
129026.....	COG and SOG, Rapid Update
129029.....	GPS Position Data
129033.....	Time and Date
129044.....	Datum
129538.....	GNSS Control Status
129539.....	GNSS DOPs
129540.....	GNSS Sats in View
129541.....	GPS Almanac Data
130306.....	Wind Data
130310.....	Environmental Parameters
130311.....	Environmental Parameters
130323.....	Meteorological Station Data

WEATHERCASTER™ SOFTWARE

```

NMEA 2000® Run
List by NMEA 2000® Class/Function Code
List by Manufacturer
List by WeatherCaster Relevance
Weather
  Airmar PB200 WeatherStation S/N RTV2
  Information
    Product Information
      Product Code: 8827
    Model
      Model ID: PB200 WeatherStation
      Version: 44-802-2-01,HW5,OEMO
      Serial Code: RTV2
      Software Version: 1.009,1.036,1.001,1.029,000
    NMEA 2000®
      Database: 1.210
      Certification: B
      Load Equivalency: 13
    Configuration Information
      Installation Description 1:
      Installation Description 2:
      Manufacturer: Airmar 1-603-673-9570 www.airmar.com
    Address Claim Information
      Unique (ISO Identity) Number: 200 (0x0000c8)
      Manufacturer Code: 135
      Instance: 0x00
      Device Function: 180
      Device Class: 80
      System Instance: 0
      Industry Group: 4
  PGN List - Received PGNs
    059392
    059904
    060928
    126208
    126259
  PGN List - Transmit PGNs
    059392
    060928
    126208
    126464
    126992: 99000ms 00F01023 A9 00 00 00 00 FF FF FF
    126996
    126998
    127250: 93ms 09F11223 7D 5B 3D 00 00 08 F5 FD
    127251: 94ms 09F11323 83 C1 FD 75 FF 7F F0 03
    127257: 26000ms 00F11923 10 00 00 00 00 FF FF FF
    127258: 2000ms 10DF11A23 1A 9A 56 FE FF FF FF
    129025
    129026: 10000ms 09F80223 A0 5B 3D 00 00 08 F5 FD
    129029: 1000ms 00F80523 68 4D 38 E0 1E FB 23 00 A0 01 E2
    129033: 17984ms 00F80923 4D 38 80 56 F3 23 FF 7F
    129044: 10000ms 19F81423 57 38 34 FF 00 00 00 00 00 00
    129538
    129539: 57000ms 19FA0323 48 5B 3D 00 00 08 F5 FD
    129540: 1000ms 19FA0423 68 FF 0A 01 16 22 7E 43 00 00 FF
    130306: 234ms 09FD0223 A7 29 00 4F 5F F8 FF FF
    130310
    130311: 484ms 15FD0723 D3 C1 FD 75 FF 7F F0 03
    130323: 1000ms 19FD1323 F0 4D 38 E0 1E FB 23 90 60 88 19
  
```

Advanced Setup

Sensor Hardware | Communications/Diagnostics | Names | Update Flash

Select Interface

Using NMEA 2000® (ex: PB200)

Using NMEA 0183 (ex: PB150)

Select NMEA 2000® Device

COM07 U200 NMEA 2000 to USB Gateway S/N: 99695 Refresh

NMEA 2000® Diagnostic View NMEA 2000® Device View

Select Sources

Altitude:	PB200 WeatherStation	P/N: 44-802-2-01	S/N: 5066906	
Compass:	PB200 WeatherStation	P/N: 44-802-2-01	S/N: 5066906	
GPS:	G2183	P/N: 44-710-1-01	S/N: 5066966	
Weather:	PB200 WeatherStation	P/N: 44-802-2-01	S/N: 5066906	Refresh Sensors
Water Depth:	DST2000	P/N: D235-S1-TS-A-02/06	S/N ID: 50669	
Water Speed:	DST2000	P/N: D235-S1-TS-A-02/06	S/N ID: 50669	
Water Temp:	DST2000	P/N: D235-S1-TS-A-02/06	S/N ID: 50669	
Wind:	PB200 WeatherStation	P/N: 44-802-2-01	S/N: 5066906	

Log Raw Data to C:\Documents and Settings\robb\My Documents\PB200 Logs Select Path

Cancel Apply Close

PB150



Sensing a Change in Your Weather

The enhanced PB150 Ultrasonic WeatherStation® Instrument features higher-accuracy temperature readings and improved wind speed and direction accuracy. WeatherCaster™ PC Software version 2.0 puts your own personal weatherman on-board the boat, 24 hours a day. The easy-to-use program has multiple screen views and advanced setup features to customize what you want to see. No Computer on board—no problem, just connect the PB150 to a NMEA 0183 display* for up-to-the-minute weather information.

Before Leaving the Dock—Decide if you want to spend your day on the water. Anticipate weather fronts by checking the wind speed and direction, temperature, and barometric pressure. Check the weather history graphs, as the WeatherCaster™ Software can store readings for up to 72 hours.

Underway—Monitor up-to-the-minute weather conditions at your location. See where and when the fish will bite best based on wind conditions and a rising or falling barometer.

Docking—The on-board PC or chart plotter can display true wind data to make docking a vessel in high wind a breeze.

Sense a change in your weather with the PB150 Ultrasonic WeatherStation® Instrument.

*NMEA 0183 display must be able to read the specific WeatherStation data sentences.

Ultrasonic WeatherStation® Instrument

Features

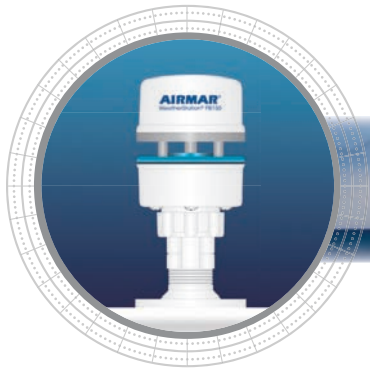
- True wind speed and direction
- Apparent wind speed and direction
- Barometric pressure
- Air temperature
- Wind chill temperature
- Measures wind speed and direction ultrasonically
- Internal WAAS/EGNOS GPS
- Two-axis solid-state compass
- Three-axis accelerometer provides pitch and roll
- Plastic housing is less prone to lightning strikes
- NMEA 0183 output
- WeatherCaster™ Software
- 360° calibration results in precise wind direction accuracy
- Very easy installation and two-year warranty
- Maintenance-free operation—no moving parts
- Recommended for recreational powerboats



Sensing Technology



www.airmar.com



Technical Information

SPECIFICATIONS

- Wind Speed Range:** 0 knots to 80 knots (0 MPH to 92 MPH)
- Wind Speed Resolution:** 0.1 knots (0.1 MPH)
- Wind Speed Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:**
 - Low Wind Speeds: 0 knots to 10 knots (0 MPH to 11.5 MPH); RMS error of 1 knot (± 1.1 MPH) +10% of reading
 - High Wind Speeds: 10 knots to 80 knots (11.5 MPH to 92 MPH); RMS error of 2 knots (± 2.3 MPH) or 5% RMS, whichever is greater
- Wind Speed Accuracy in wet conditions**:** 5 knots (5.7 MPH) RMS
- Wind Direction Range:** 0° to 360°
- Wind Direction Resolution:** 0.1°
- Wind Direction Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:**
 - Low Wind Speeds: 4 knots to 10 knots (4.6 MPH to 11.5 MPH)—5° RMS typical
 - High Wind Speeds: >10 knots (>11.5 MPH)—2° RMS typical
- Wind Direction Accuracy in wet conditions**:** >8 knots (>9.2 MPH)—8° RMS typical
- Compass Accuracy:** 1° RMS when level
- Pitch and Roll Range / Accuracy:** $\pm 50^\circ$ / $< 1^\circ$ static tested @ 25°C (77°F)
- Air Temperature Range:** -25°C to 55°C (-13°F to 131°F)
- Air Temperature Resolution:** 0.1°C (0.1°F)
- Air Temperature Accuracy:** $\pm 1^\circ\text{C}$ ($\pm 1.8^\circ\text{F}$) * @ >4 knots (>4.6 MPH) wind
- Barometric Pressure Range:** 850 mbar to 1150 mbar (25 inHg to 34 inHg, 850 hPa to 1150 hPa)
- Barometric Pressure Resolution:** 0.1 mbar (0.029 inHg, 0.1 hPa)
- Barometric Pressure Accuracy:** ± 2 mbar (± 0.059 inHg, ± 2 hPa) when altitude correction is available
- GPS Position Accuracy:** 3 m (10') with WAAS/EGNOS (95% of the time, SA off)
- Operating Temperature Range:** -25°C to 55°C (-13°F to 131°F)
- Supply Voltage:** 9 VDC to 16 VDC
- Supply Current:** <150 mA
- Weight:** 285 grams (0.7 lb)
- Sensor Baud Rate (NMEA 0183 Interface Only):** 4,800 bps (can be increased to 38,400 bps with a command)
- Thread Sizes on Base:** 1"-14 UNS standard marine mount
- Certifications and Standards:** CE, RoHS

RMS—Root Mean Square

*When the wind speed is less than 4 knots (4.6 MPH) and/or air temperature is below 0°C (32°F), wind and temperature readings will be less accurate.

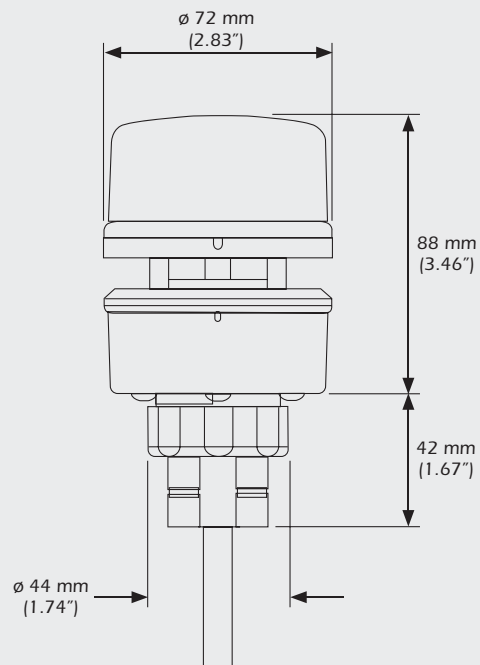
**Wet conditions include moisture, rain, frost, dew, snow, ice and/or sea spray in the wind channel.

State-of-the-Art Wind Tunnel—Airmar's on-site wind tunnel is calibrated with a pitot tube, which in turn was calibrated with a National Institute of Standards and Technology (NIST) traceable pitot tube.

DATA OUTPUT PROTOCOL

- NMEA 0183 Sentence Structure**
- \$GPDTM**Datum Reference
- \$GPGGA**GPS Fix Data
- \$GPGLL** Geographic Position—Latitude and Longitude
- \$GPGSA**GNSS DOP and Active Satellite
- \$GPGSV**Satellites in View
- \$GPRMC**Recommended Minimum GNSS
- \$GPVTG**COG and SOG
- \$GPZDA**Time and Date
- \$HCHDG**Heading, Deviation, and Variation
- \$WIMDA**Meteorological Composite
- \$WIMWD** ...Wind Direction and Speed
- \$WIMWV** ...Wind Speed and Angle
- \$WIMWR** ...Relative Wind Direction and Speed
- \$WIMWT** ...True Wind Direction and Speed
- \$YXXDR**Transducer Measurements

DIMENSIONS



- Standard 1"-14 standard marine mount connection accommodates existing mounting hardware.

LB150 Ultrasonic WeatherStation® Instrument



Actual
Size

Real-Time, Site-Specific Weather Information

The LB150 Ultrasonic WeatherStation® Instrument meets a growing need for real-time, site-specific weather information. Accurate data helps organizations monitor weather conditions on-site or in remote locations.

The Airmar WeatherStation Instrument is the only all-in-one weather sensor that calculates apparent wind speed and direction, barometric pressure, air temperature, relative humidity, dew point and wind chill temperature. With the internal compass and GPS, true wind speed and direction can also be calculated. The UV stabilized, compact housing is fully waterproof and resistant to chemicals.

- The only WeatherStation that combines seven sensors, all with no moving parts, in one compact unit.
- No moving parts will improve reliability for superior accuracy and longevity in the field.
- The perfect site-specific weather monitoring solution for any application.
- Other weather stations would take at least three separate sensors to achieve all of the weather readings in the LB150.
- Low-cost and easy-to-install either permanently, or as a portable system.
- Installs on a standard pole with 1"-14 UNS or 3/4" NPT threads.
- Wind readings are not affected by the common problems in mechanical wind and weather measuring devices like bearing wear, salt and dirt build-up, or birds, which can all result in failure or data inaccuracy.
- A single cable (various lengths available) provides power and a standard RS422 data interface.
- WeatherCaster PC software and USB Converter gives you a complete solution to plug directly into a PC.

Features

- No moving parts—maintenance-free operation
- True and apparent wind speed and direction
- Barometric pressure
- Air and wind chill temperature
- Heat index temperature
- Relative humidity
- Dew point temperature
- Internal GPS provides position (latitude and longitude), speed over ground (SOG), course over ground (COG), and time
- Two-axis solid-state compass provides heading
- Three-axis accelerometer provides pitch and roll
- Plastic housing is less prone to lightning strikes
- RS232 or RS422 output
- WeatherCaster™ PC Software included



Tan housing optional



Sensing Technology

www.airmar.com

Applications



Agriculture

- Use wind speed and direction data to accurately spray crops when the conditions are right.
- Record important weather conditions while fertilizing.
- Control Greenhouse panels and irrigation systems based on Humidity and Wind speed.



Airports

- On-site wind and weather data for airports, helicopter pads, and smaller scale landing strips.
- The LB150 can assist air traffic controllers and pilots with landing information.



Environmental Monitoring / Meteorology

- The only all-in-one weather sensor that calculates wind speed and direction, barometric pressure, air temperature, relative humidity, dew point, wind chill, and heat index.



Fire & Hazardous Response

- Easily mounts on a tripod, or on top of a vehicle to give emergency responders live weather information at a disaster site.
- Wind and weather information can help protect the surrounding area and the emergency responders working the site.



Highway / Road Conditions

- Monitor weather conditions at met towers set-up along side highways and roads to ensure safe travel for vehicles.



Marine

- Get 24-hour shipboard weather observations on vessels ranging in size from commercial ships to pleasure crafts.



Military

- Weather monitoring for field operations, surveillance, satellite communications and naval vessels.



Offshore Platforms & Docks

- Get wind and weather information for safe working and helicopter landing conditions on offshore oil rigs.



Power Lines

- Mounting WeatherStations on wire towers can help monitor wind conditions and temperature.
- The LB150 can help prevent power outages due to wire sag and high winds.



Renewable Energy

- The LB150 can measure wind and weather conditions for wind turbine control and solar panel control.



Structural Monitoring

- Cranes, buildings, and bridges get exposed to more wind and weather than structures at the earth's surface.
- The LB150 can monitor weather conditions that can affect safety and operations.



Weather Buoys

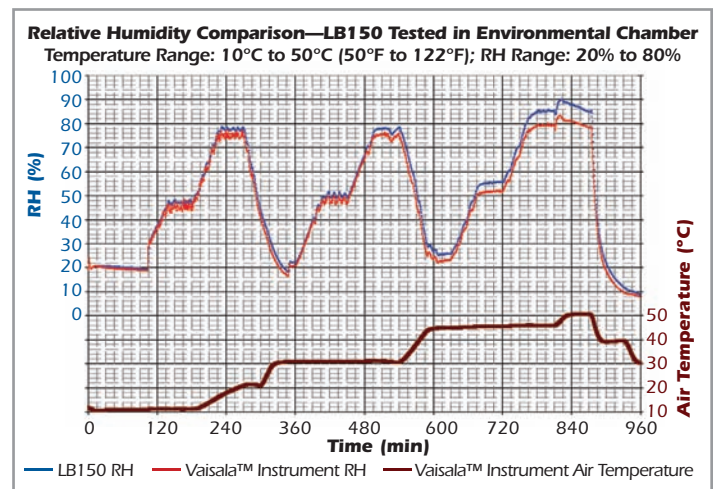
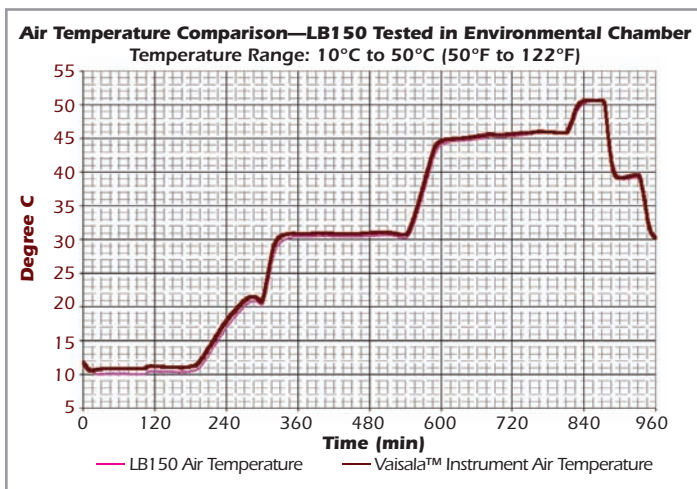
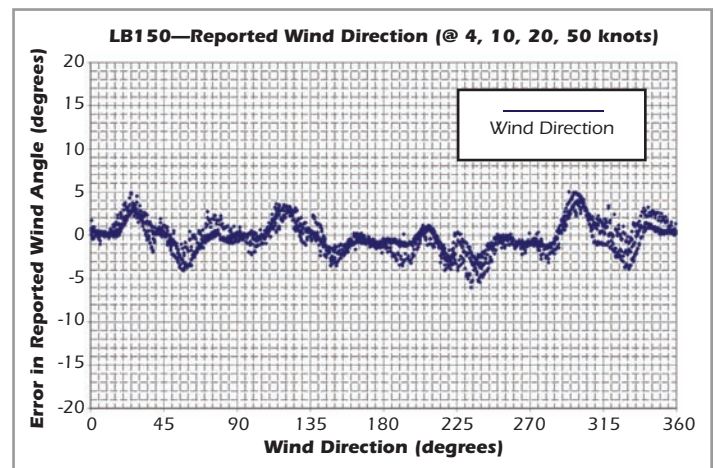
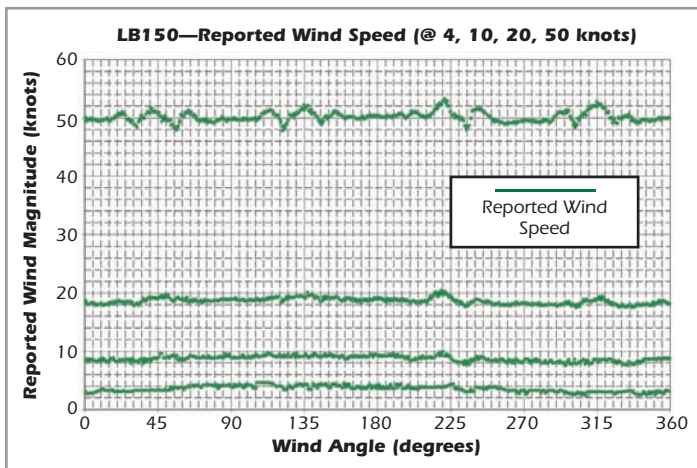
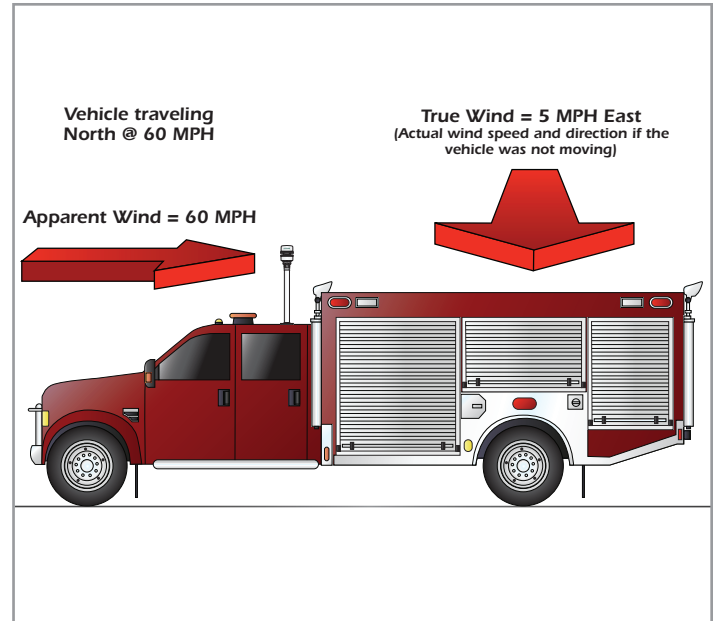
- Mounted on offshore buoys, the WeatherStation can send data to meteorologists as they predict ocean forecasting.
- The WeatherStation can report highly accurate wind and weather information even while pitching and rolling in heavy seas.

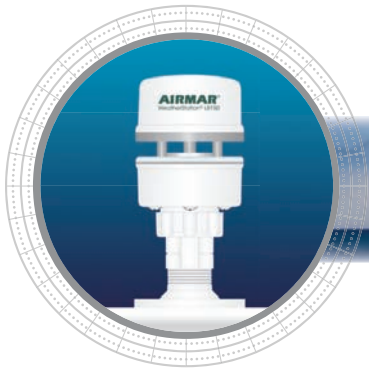
Performance Graphs Compared to Vaisala Instruments

Understanding True and Apparent Wind

Virtually all mechanical and ultrasonic anemometers report apparent wind speed and direction. The Airmar LB150 is unique because it calculates both true and apparent wind speed & direction. These wind readings are the same if the unit is mounted in a fixed location. However, if the LB150 is mounted on a moving vehicle, the apparent wind is the wind you would feel on your hand if you held it out the window while going down the highway. Since the LB150 has a built in GPS and compass, it calculates the true wind based upon the apparent wind, speed of the vehicle, and compass heading.

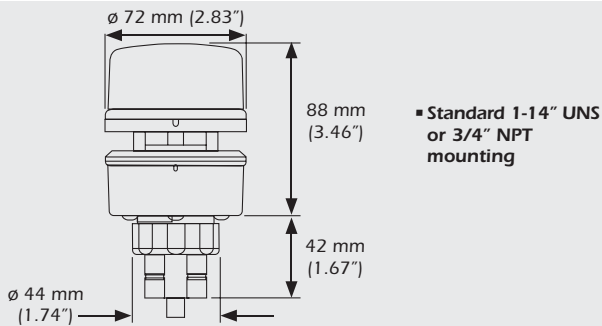
True wind information on hazardous response vehicles can prove to be valuable. When enroute to an emergency situation, responders can use the true wind readings to predict wind conditions at the disaster site before they even arrive, giving vital information for planning operations and staging apparatus.





Technical Information

DIMENSIONS



SPECIFICATIONS

Wind Speed Range: 0 m/s to 40 m/s (0 MPH to 92 MPH)
Wind Speed Resolution: 0.1 m/s (0.1 MPH)
Wind Speed Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:
 — Low Wind Speeds: 0 m/s to 5 m/s (0 MPH to 11.5 MPH); RMS error of 0.5 m/s (1.1 MPH) +10% of reading
 — High Wind Speeds: 5 m/s to 40 m/s (11.5 MPH to 92 MPH); RMS error of 1 m/s (2.3 MPH) or 5% RMS, whichever is greater
Wind Speed Accuracy in wet conditions:** 2.5 m/s (5.7 MPH) RMS
Wind Direction Range: 0° to 360°
Wind Direction Resolution: 0.1°
Wind Direction Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:
 — Low Wind Speeds: 2 m/s to 5 m/s (4.6 MPH to 11.5 MPH)—5° RMS typical
 — High Wind Speeds: >5 m/s (>11.5 MPH)—2° RMS typical
Wind Direction Accuracy in wet conditions:**
 >4 m/s (9.2 MPH)—8° RMS typical
Compass Accuracy: 1° RMS when level
Pitch and Roll Range / Accuracy: ±50° / <1° static tested @ 25°C (77°F)
Air Temperature Range: -25°C to 55°C (-13°F to 131°F)
Air Temperature Resolution: 0.1°C (0.1°F)
Air Temperature Accuracy: ±1°C (±1.8°F)* @ >4 knots (>4.6 MPH) wind
Barometric Pressure Range: 300 mbar to 1100 mbar (8.86 inHg to 32.48 inHg, 300 hPa to 1100 hPa)
Barometric Pressure Resolution: 0.1 mbar (0.029 inHg, 0.1 hPa)
Barometric Pressure Accuracy: ±2 mbar (±0.059 inHg, ±2 hPa) when altitude correction is available
Relative Humidity Range: 10% to 95% RH
Relative Humidity Accuracy*: ±4% units RH
GPS Position Accuracy: 3 m (10') with WAAS/EGNOS (95% of the time, SA off)
Operating Temperature Range: -25°C to 55°C (-13°F to 131°F)
Supply Voltage: 9 VDC to 16 VDC
Supply Current: <150 mA
Weight: 285 grams (0.7 lb)
Sensor Baud Rate (RS422 with NMEA 0183 Interface Only): 4,800 bps (can be increased to 38,400 bps with a command)
Thread Sizes on Base: 1-14" UNS or 3/4" NPT
Certifications and Standards: CE, RoHS

DATA OUTPUT PROTOCOL

RS422/NMEA 0183 Sentence Structure*
\$GPDTMDatum Reference
\$GPGGAGPS Fix Data
\$GPGLL Geographic Position—Latitude and Longitude
\$GPGSAGNSS DOP and Active Satellite
\$GPGSVSatellites in View
\$GPRMCRecommended Minimum GNSS
\$GPVTGCOG and SOG
\$GPZDATime and Date
\$HCHDGHeading, Deviation, and Variation
\$WIMDAMeteorological Composite
\$WIMWD ...Wind Direction and Speed
\$WIMWV ...Wind Speed and Angle
\$WIMWR ...Relative Wind Direction and Speed
\$WIMWT ...True Wind Direction and Speed
\$YXXDRTransducer Measurements

*Additional data available from the WeatherStation® Instrument

SENSOR PROVIDES

Apparent and True Wind Speed and Direction
 Readings come from the ultrasonic anemometer

Air Temperature
 Based on a negative temperature coefficient thermistor that measures the ambient air temperature

Relative Humidity
 Measured with a capacitive cell humidity sensor

Barometric Pressure
 Measured using a temperature-compensated silicon piezoresistive pressure sensor corrected to equivalent sea level pressure based on attitude named by GPS

Heat Index
 Based on air temperature and relative humidity

Wind Chill
 Based on wind speed and air temperature

Magnetic Compass Heading
 Two-axis magneto-inductive sensors

Pitch and Roll Angles
 Three-axis MEMS accelerometer

Position, Speed, Time, and Course Over Ground
 Global Positioning System (GPS) receiver

MATERIALS

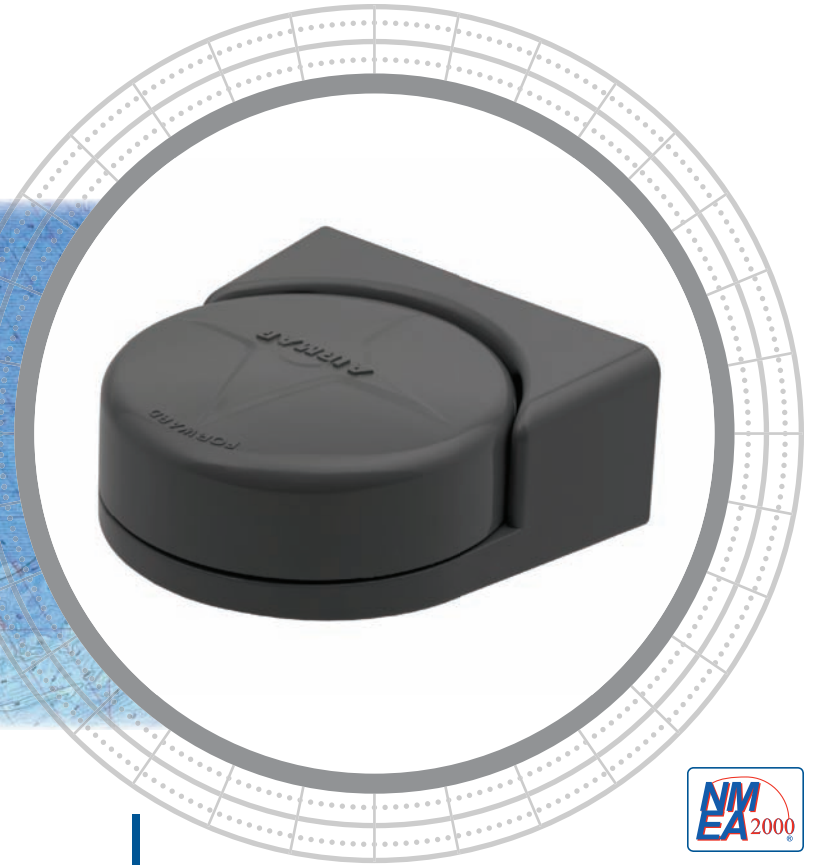
White Housing..... GE® Geloy®

Metal Plate Anodized Aluminum

Wind Channel..... Dupont® Delrin™

RMS—Root Mean Square, LEN—Load Equivalency Number
 Humidity and temperature readings compared to Vaisala® Instruments
 *When the wind speed is less than 2 m/s (4.6 MPH) and/or air temperature is below 0°C (32°F), wind, temperature, and relative humidity readings will be less accurate.
 **Wet conditions include moisture, rain, frost, dew, snow, ice and/or sea spray in the wind channel.

H2183



The Advantage is the Accuracy

Whether you are offshore fishing or just enjoying family time on the water, feel confident and comfortable that the H2183 is your reliable source for heading information. The solid-state three-axis compass, combined with Airmar's additional advanced sensors and software provide unparalleled performance. What sets the H2183 apart from the competition is its ability to maintain 2° of heading accuracy under dynamic motion conditions, such as steep heeling, hard turns, and rough seas. Heading integrated with the three-axis rate gyro and three-axis accelerometer data allows the H2183 to maintain 2° of accuracy even if the vessel is pitching and rolling up to 30°. This level of accuracy is perfect for interfacing with autopilots, chart plotters, and radar systems.

The H2183's innovative circular design easily mounts and aligns on ANY angled bulkhead. Designed for simultaneous use with NMEA 0183 and NMEA 2000® devices, the waterproof, easy-to-install sensor comes with a single cable which can be wired into both NMEA 0183 and NMEA 2000 networks on the vessel.

Customer Testimonials

"Our aluminum mussel dredge vessel has the new Airmar H2183 connected to a Simrad AP35 autopilot. It is installed below deck. The dredge runs off of the port side of the vessel which causes it to pull to port, thus counter-steering and autopilot precision are a must, especially since we dredge at 1 to 2 knots in 8 to 10 foot seas. The H2183 delivered stable and accurate heading to the Simrad AP35 autopilot over the manufacturer's compass. We are very impressed by the steering improvement of our autopilot at slow speeds when dredging over mussel beds. We couldn't get the same constant and stable heading using the existing autopilot's gyrocompass at slow speeds."
ASES Commercial Fisheries, France

Heading Sensor

Features

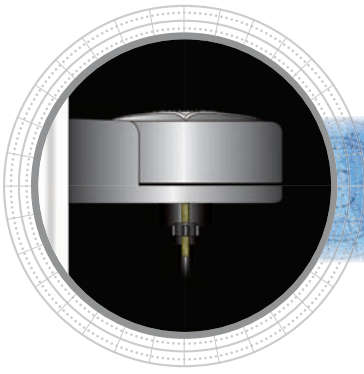
- Better than 1° heading accuracy in static conditions
- Best-in-class 2° heading accuracy in dynamic conditions
- Three-axis solid-state compass provides heading data
- Three-axis accelerometer provides pitch and roll data
- Three-axis rate gyro provides rate-of-turn data
- Only recreational heading sensor that uses a three-axis rate gyro
- Compass calibration can be easily done on any display or PC
- Easily mounts on any angled bulkhead
- IPX6 waterproof enclosure
- Default 10 Hz update rate for heading (HDG)
- Outputs NMEA 0183 and NMEA 2000 data simultaneously
- C2183 low-cost version available with 1° static and 5° dynamic heading accuracy

"As most of my days fishing for Cod and Tuna are 40 mile round-trip days off Gloucester, my autopilot is a necessity. The boat has a Simrad AP35 autopilot, a very popular commercial grade model. I replaced the manufacturer's heading sensor with the new Airmar H2183 and saw immediate steering improvement. The pilot steers straighter than ever, even when we are fishing in 6 to 8 foot seas. We especially use the pilot when we are trolling for tuna or cleaning cod and haddock while steaming home as we are not at the wheel 100% of the time."
Capt. Kevin Twombly, Kayman Charters, Gloucester, MA



Sensing Technology

www.airmar.com



Technical Information

SPECIFICATIONS

- Static Compass Accuracy:** 1° RMS when level
- Dynamic Compass Accuracy:** 2° RMS (Best-in-Class)
- Heading Display Resolution:** 0.1°
- Settling Time:** 1 second (adjustable)
- Heading Data Output Update Rate:**
—10 Hz—NMEA 0183
—Adjustable up to 20 Hz—NMEA 2000®
- Rate-of-Turn Range:** 0° to 70° per second
- Rate-of-Turn Accuracy:** 1° per second
- Rate-of-Turn Data Output Update Rate:**
—2 Hz—NMEA 0183 (Adjustable up to 10 Hz)
—Adjustable up to 20 Hz—NMEA 2000®
- Pitch and Roll Range:** ±50°
- Static Pitch and Roll Accuracy:** <1°
- Dynamic Pitch and Roll Accuracy:** <3°
- Pitch and Roll Display Resolution:** 0.1°
- Pitch and Roll Boat Alignment:** Yes with software
- Pitch and Roll Data Output Update Rate:**
—2 Hz—NMEA 0183 (Adjustable up to 10 Hz)
—Adjustable up to 20 Hz—NMEA 2000®
- Supply Voltage:** 9 VDC to 16 VDC
- Supply Current:** <140 mA
- NMEA 2000® Load Equivalency Number (LEN):** 3
- Certifications and Standards:** CE, IPX6, RoHS, IEC60945

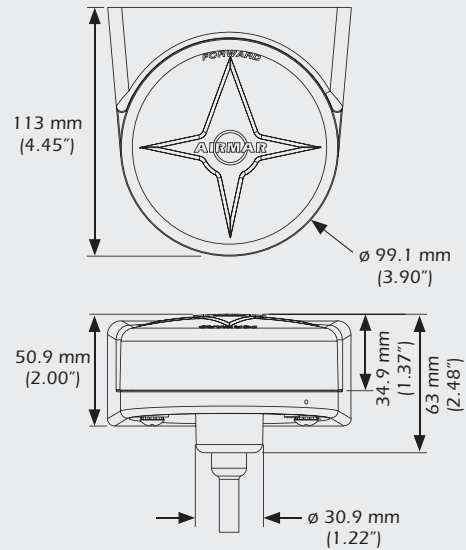
DATA OUTPUT PROTOCOL

- NMEA 0183 Sentence Structure**
- \$HCHDG Heading (Magnetic)
 - \$HCHDT Heading Relative to True North
(Needs External GPS Input)
 - \$TIROT Rate of Turn
 - \$YXXDR Transducer Measurements: Vessel Attitude

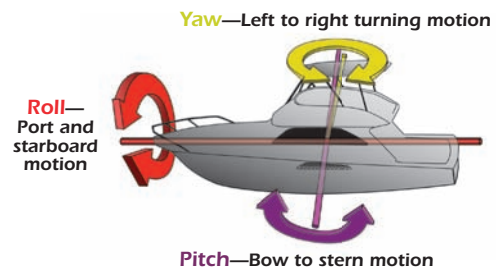
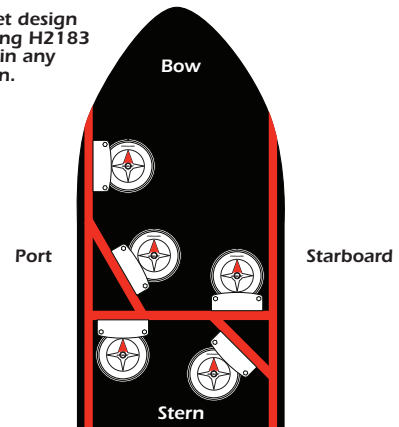
NMEA 2000® Supported PGNs

- 127250 Vessel Heading
- 127251 Rate of Turn
- 127257 Attitude

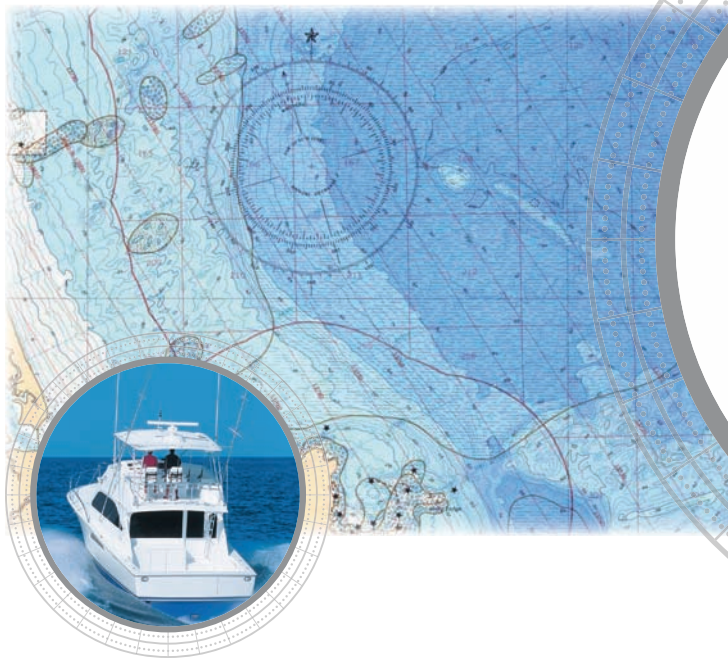
DIMENSIONS



Adjustable bracket design allows for adjusting H2183 toward the Bow, in any mounting location.



GH2183



A First in the Leisure Marine Industry

The Airmar GH2183 combines GPS positioning and highly accurate heading information in one compact antenna. The GH2183 eliminates the need to install a GPS antenna above deck and a heading sensor below deck. Only one installation above the deck is required, saving installation time and money. The waterproof housing protects the internal components—all of which are solid-state (no moving parts). This means the GH2183 can withstand almost any condition that exists in the marine environment.

The Best Performance in ANY Sea Condition

What sets the GH2183 above the competition is our 2° heading accuracy in dynamically changing conditions including rough seas, hard turns, and steep heeling. Airmar's unique dynamic motion correction software is the key difference, allowing the GH2183 to maintain 2° of accuracy even if the vessel is pitching and rolling up to 30°. Also unique to the GH2183 is that the three-axis accelerometer and three-axis rate gyro are temperature compensated across the entire operating range, resulting in precise tilt and rate of turn data. The fast 10 Hz update rate, along with best-in-class heading and GPS data, make it the best choice for interfacing with autopilots, chartplotters, navigation software, and radar systems.

Heading Sensor With GPS

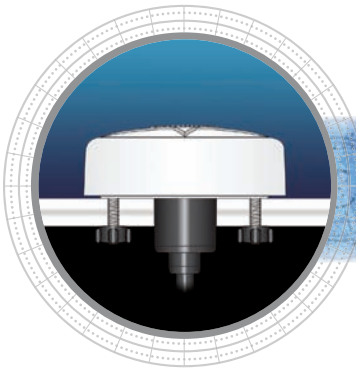
Features

- GPS and heading combined into one housing
 - Saves installation time and money
- Better than 1° heading accuracy in static conditions
- Best-in-class 2° heading accuracy in dynamic conditions
- Three-axis solid-state compass provides heading data
- Three-axis accelerometer provides pitch and roll data
- Three-axis rate gyro provides rate-of-turn data
- Only recreational heading sensor that uses a three-axis rate gyro
- Compass calibration can be easily done on any display or PC
- Perfect product for metal hulled boats
- WAAS GPS provides latitude, longitude, COG, SOG, time and date, and magnetic variation
- Optionally available as GPS only (G2183)
- IPX6 waterproof enclosure
- Outputs NMEA 0183 and NMEA 2000® data simultaneously



Sensing Technology

www.airmar.com

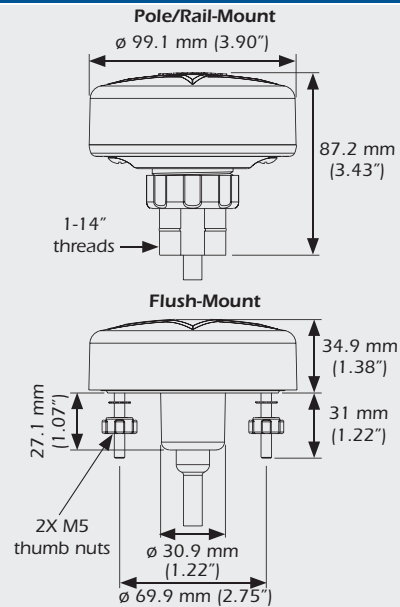


Technical Information

SPECIFICATIONS

- Static Compass Accuracy:** 1° RMS when level
- Dynamic Compass Accuracy:** 2° RMS (Best-in-Class)
- Heading Display Resolution:** 0.1°
- Settling Time:** 1 second (adjustable)
- Heading Data Output Update Rate:**
—10 Hz—NMEA 0183
—Adjustable up to 20 Hz—NMEA 2000®
- Heading Variation:** Yes
- Rate-of-Turn Range:** 0° to 70° per second
- Rate-of-Turn Accuracy:** 1° per second
- Rate-of-Turn Data Output Update Rate:**
—2 Hz—NMEA 0183 (Adjustable up to 10 Hz)
—Adjustable up to 20 Hz—NMEA 2000®
- Pitch and Roll Range:** ±50°
- Static Pitch and Roll Accuracy:** <1°
- Dynamic Pitch and Roll Accuracy:** <3°
- Pitch and Roll Display Resolution:** 0.1°
- Pitch and Roll Boat Alignment:** Yes (with software)
- Pitch and Roll Data Output Update Rate:**
—2 Hz—NMEA 0183 (Adjustable up to 10 Hz)
—Adjustable up to 20 Hz—NMEA 2000®
- Supply Voltage:** 9 VDC to 60 VDC
- Supply Current:** <90 mA
- Power:** 1,100 mW
- GPS Satellite Tracked:** 12-channel (maximum)
- WAAS/EGNOS Satellites Tracked:** 2-channel (maximum)
- GPS Position Accuracy:** 3 m (10') with WAAS (95% of the time, SA off)
- GPS-Fix Update Rate:** 1 x per second
- Cold Start Acquisition:** 52 seconds
- Warm Start Acquisition:** 37 seconds
- NMEA 2000® Load Equivalency Number (LEN):** 2
- Certifications and Standards:** CE, IPX6, RoHS, IEC60945

DIMENSIONS



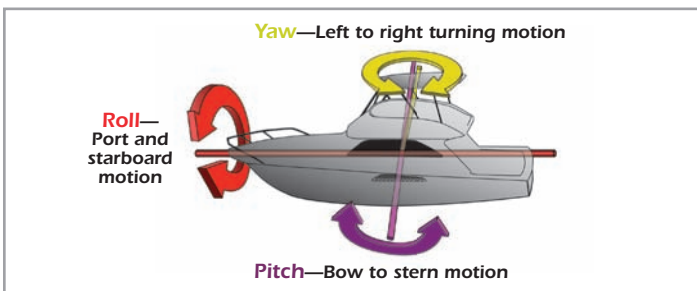
DATA OUTPUT PROTOCOL

NMEA 0183 Sentence Structure

- \$GPDTM** Datum Reference
- \$GPGGA** GPS Fix Data
- \$GPGLL** Geographic Position—Latitude and Longitude
- \$GPGSA** GNSS DOP and Active Satellites
- \$GSGSV** GNSS Satellites in View
- \$GPRMC** Recommended Minimum Specific GNSS Data
- \$GPVTG** Course Over Ground and Ground Speed
- \$GPZDA** Time and Date
- \$HCHDG** Heading, Deviation, and Variation
- \$HCHDT** Heading Relative to True North
- \$TIROT** Rate of Turn
- \$YXXDR** Transducer Measurements: Vessel Attitude

NMEA 2000® Supported PGNs

- 127250** Vessel Heading
- 127251** Rate of Turn
- 127257** Attitude
- 127258** Magnetic Variation
- 129025** Position and Rapid Update
- 129026** COG and SOG, Rapid Update
- 129029** GPS Position Data
- 129033** Time and Date
- 129044** Datum
- 129538** GNSS Control Status
- 129539** GNSS DOPs
- 129540** GNSS Sats in View
- 129541** GPS Almanac Data



G2183



Reliable Position Accuracy

The G2183 is a high-accuracy, NMEA, WAAS/EGNOS, GPS antenna. It scores high in superior sensitivity for quick signal acquisition, reliable position accuracy, and accurate speed and course-over-ground readings. The G2183 can connect to both NMEA 0183 and NMEA 2000® networks that may be installed on the vessel, as the unit outputs both protocols simultaneously. It features a compact size that is easy to flush-mount, pole-mount, or rail-mount. The G2183 is designed for all marine environments, as the IPX6 waterproof housing can withstand virtually any condition Mother Nature throws at it.

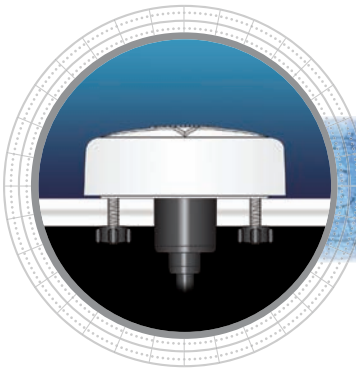
GPS Sensor

Features

- WAAS/EGNOS GPS with 3 m (10') accuracy
- Provides:
 - Latitude and Longitude
 - Course Over Ground (COG)
 - Speed Over Ground (SOG)
 - Time and Date
 - Magnetic Variation
- Outputs NMEA 0183 and NMEA 2000® data simultaneously
- IPX6 waterproof enclosure
- Available as a combination GPS/Heading Sensor (GH2183)



Sensing Technology



Technical Information

SPECIFICATIONS

- Supply Voltage:** 9 VDC to 16 VDC
- Supply Current:** <190 mA
- GPS Satellite Tracked:** 12-channel (maximum)
- WAAS/EGNOS Satellites Tracked:** 2-channel (maximum)
- GPS Position Accuracy:** 3 m (10') with WAAS (95% of the time, SA off)
- GPS-Fix Update Rate:** 1 x per second
- Cold Start Acquisition:** 52 seconds
- Warm Start Acquisition:** 37 seconds
- NMEA 2000® Load Equivalency Number (LEN):** 5
- Certifications and Standards:** CE, IPX6, RoHS, IEC60945

DATA OUTPUT PROTOCOL

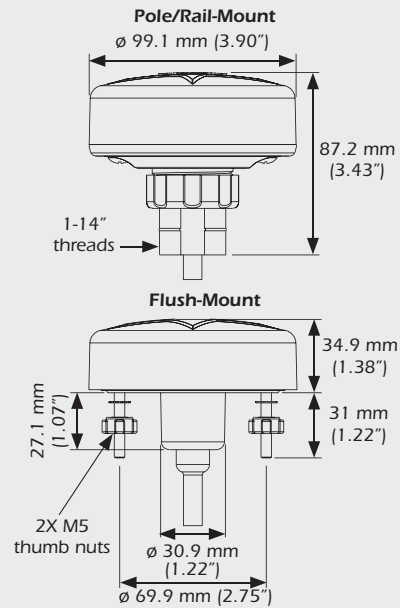
NMEA 0183 Sentence Structure

- \$GPDTM Datum Reference
- \$GPGGA GPS Fix Data
- \$GPGLL Geographic Position—Latitude and Longitude
- \$GPGSA GNSS DOP and Active Satellites
- \$GSGSV GNSS Satellites in View
- \$GPRMC Recommended Minimum Specific GNSS Data
- \$GPVTG Course Over Ground and Ground Speed
- \$GPZDA Time and Date

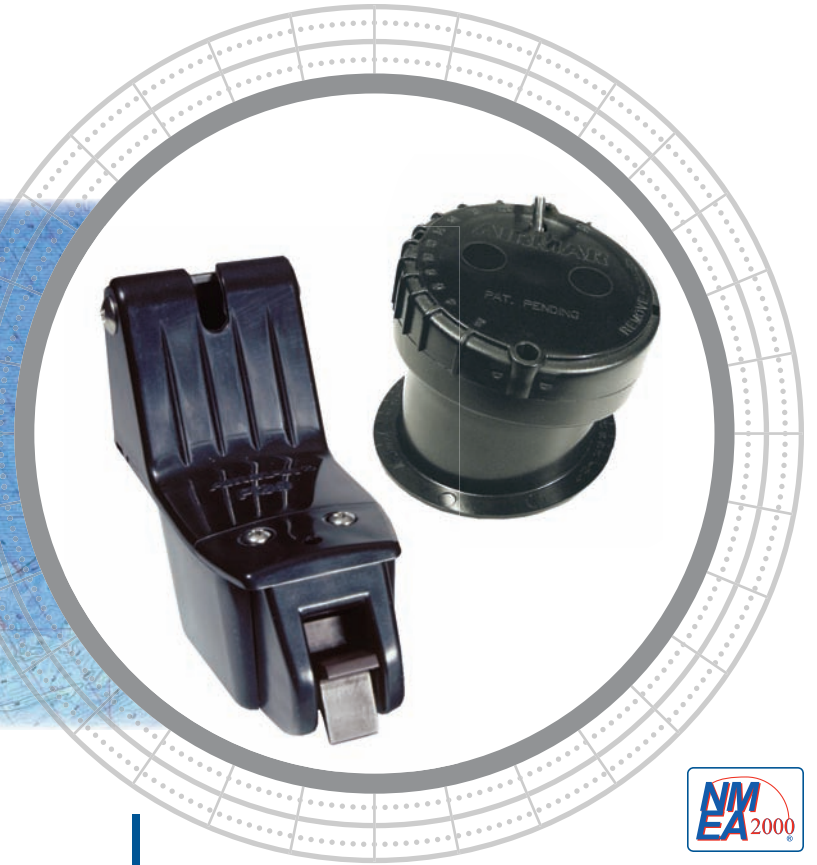
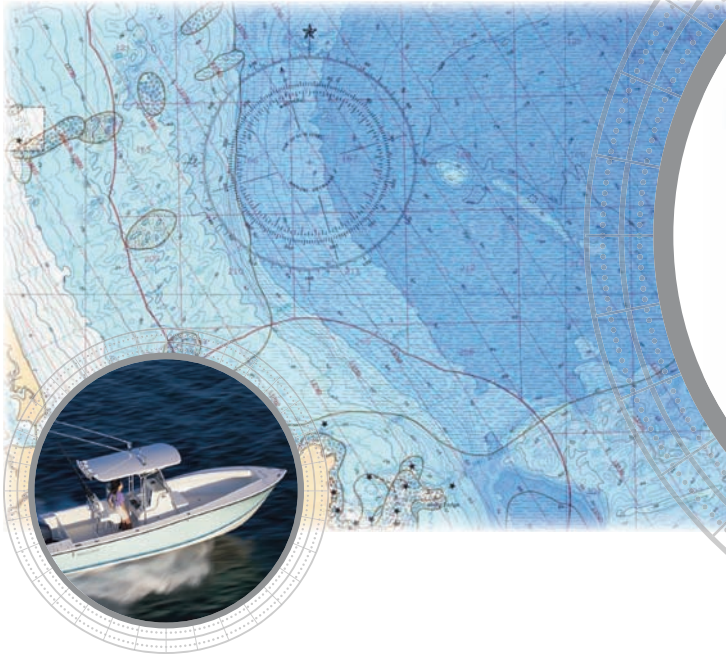
NMEA 2000® Supported PGNs

- 127258 Magnetic Variation
- 129025 Position and Rapid Update
- 129026 COG and SOG, Rapid Update
- 129029 GPS Position Data
- 129033 Time and Date
- 129044 Datum
- 129538 GNSS Control Status
- 129539 GNSS DOPs
- 129540 GNSS Sats in View
- 129541 GPS Almanac Data

DIMENSIONS



P39 P79



The Smart Alternative!

Airmar's P39 and P79 Smart™ Sensors feature embedded micro-electronics. Depth, speed, and temperature signals are processed inside the sensor and can be displayed on any radar, chart plotter, or device that accepts NMEA 0183 or NMEA 2000® data. The 235 kHz frequency prevents mutual interference with other echosounders on the vessel.

P39— Smart Depth, Speed, and Temperature

The P39 transom-mount incorporates innovative features such as a recessed waterflow channel for improved paddlewheel accuracy. Few parts make the installation simple, and its compact size is favorable to owners of smaller outboard and inboard/outboard boats.

P79— Simple! Convenient!! Adjustable!!!

The P79 is easy-to-install, accommodating hull deadrise angles up to 22°.

1. Mount the base flange inside the hull
2. Adjust the locking ring for the correct hull deadrise angle
3. Fill the base with non-toxic anti-freeze (propylene glycol)
4. Turn and lock the transducer into the base

P39—Transom-Mount TRIDUCER® Multisensor

P79—In-Hull Adjustable Smart™ Sensors

Features

- 235 kHz frequency prevents mutual interference with other echosounders on the vessel
- 6 m (20') NMEA 2000 cable
- Devicenet connector

P39—Transom-Mount

- Plastic kick-up bracket
- Accommodates transom angles between 2° and 22°
- Recessed waterflow channel protects paddlewheel

P79—In-Hull

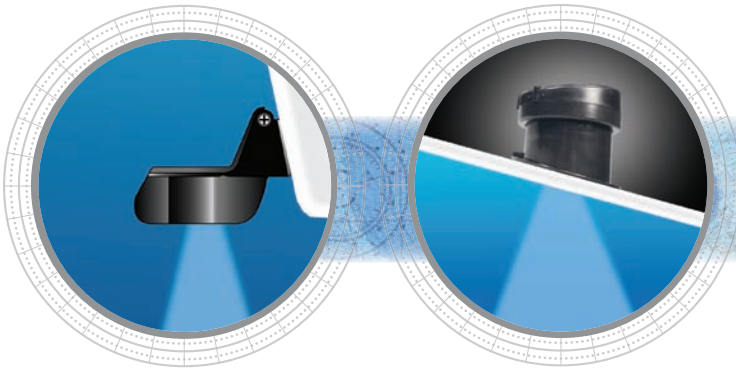
- No holes to drill
- Installation can be done while the boat is in the water
- Recommended for solid fiberglass hulls
- Epoxies to aluminum hulls under 0.38 mm (0.150") thick
- Easily adapts to deadrise angles up to 22°



Sensing Technology

www.airmar.com

P39, P79



Technical Information

P39—235 kHz-A NMEA 0183 / NMEA 2000®

Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	11°	
RMS Power (W)	60 W	100 W

P79—235 kHz-A NMEA 0183 / NMEA 2000®

Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	7°	
RMS Power (W)	60 W	100 W

SPECIFICATIONS

Weight:

—0.5 kg (1.1 lb)—P39
—0.9 kg (2 lb)—P79

Acoustic Window: Layered plastic urethane

Transom Angle: 0° to 22°—P39 only

Hull Deadrise: 0° to 22°—P79 only

Data Update Rate: 1 per second

Minimum Depth Range: 0.5 m (1.6')

Maximum Depth Range:

—Up to 100 m (330')—NMEA 0183

—Up to 150 m (500')—NMEA 2000

Pressure Rating: 3 m (10')

Pulse Rate: 20,000 p/nm* (5.6 Hz per knot)—*p/nm = pulses per nautical mile

Supply Voltage:

—10 VDC to 28 VDC—NMEA 0183

—9 VDC to 16 VDC—NMEA 2000

Supply Current:

—<40 mA—NMEA 0183

—<200 mA—NMEA 2000

Standard Cable Length:

—10 m (33')—NMEA 0183

—6 m (20') devicenet—NMEA 2000

Temperature Sensor Accuracy: ±0.5°C (±1.8°F)—P39 only

Temperature Sensor Range: -10°C to 40°C (14°F to 104°F)—P39 only

NMEA 2000® Load Equivalency Number (LEN): 4

CE Regulation: Complies to IERC60945

DATA OUTPUT PROTOCOL

NMEA 0183 Sentence Structure

\$SDDBT, DDPT.....Depth
\$VWVHW.....Speed—P39 Only
\$VWLW.....Distance—P39 Only
\$YXMTW.....Water Temperature—P39 Only

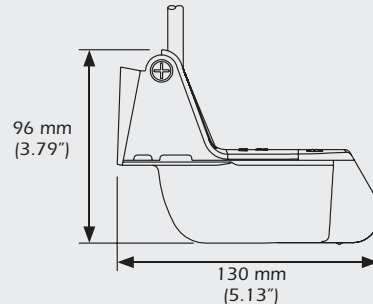
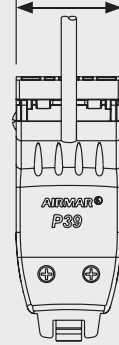
NMEA 2000® Supported PGNs

59392.....ISO Acknowledgement
060928.....ISO Address Claim
126208.....Acknowledge Group Function
126464.....Transmit PGN List Group Function
126464.....Received PGN List Group Function
126996.....Product Information
128259.....Speed (Speed Water Reference)—P39 Only
128267.....Water Depth (With Transducer Offset)
128275.....Distance Log—P39 Only
130310.....Environmental Parameters (Water Temperature)—P39 Only
130311.....Environmental Parameters (Water Temperature)—P39 Only
130312.....Environmental Parameters (Water Temperature)—P39 Only

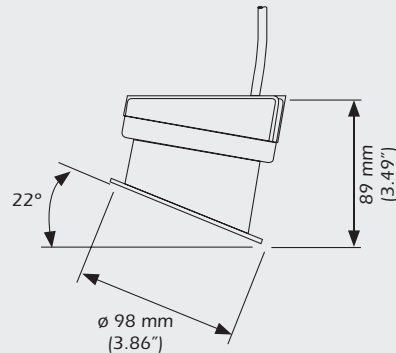
DIMENSIONS

P39 Transducer

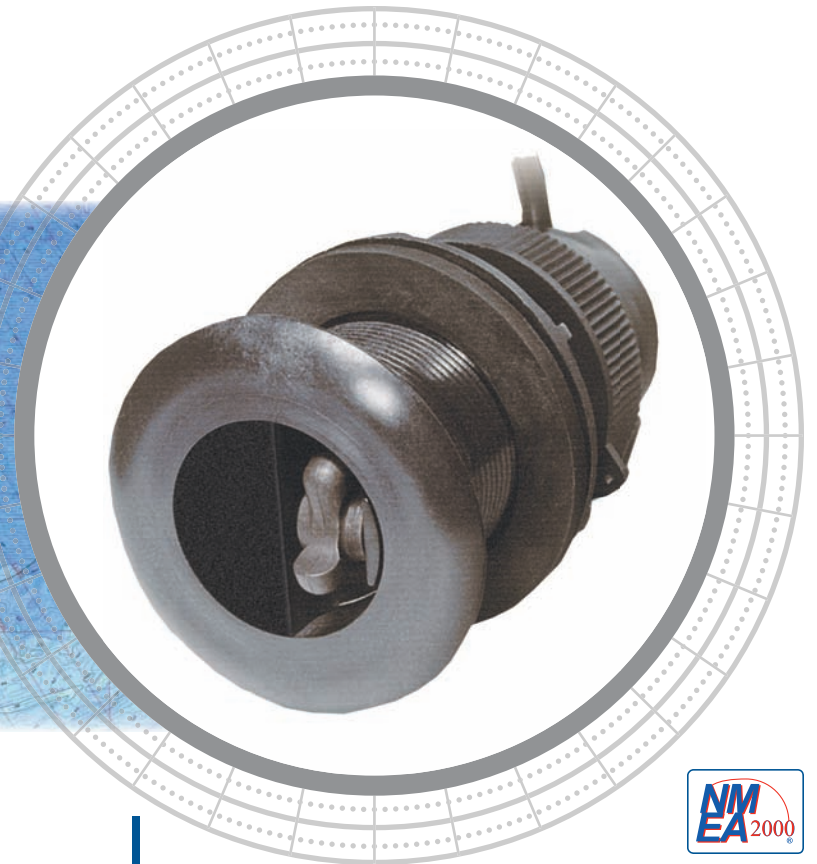
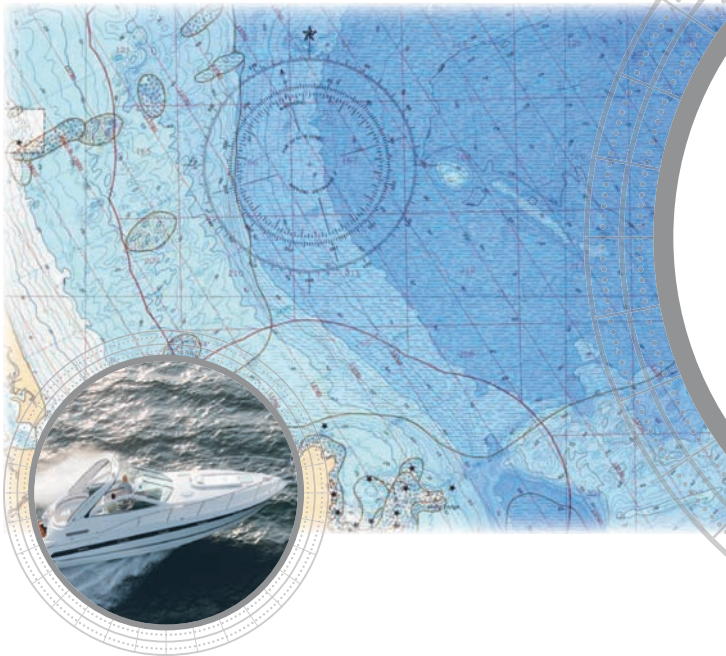
52 mm
(2.06")



P79 Transducer



DST800



The Smart Alternative!

Airmer's DST800 Smart™ Sensor features embedded micro-electronics. Depth, speed, and temperature signals are processed inside the sensor and can be displayed on any radar, chart plotter, or device that accepts NMEA 0183 or NMEA 2000® data. The 235 kHz frequency prevents mutual interference with other echosounders on the vessel.

Single Choice for Depth, Speed, and Temperature!

The DST800 is the market's first Retractable TRIDUCER® Multisensor offering depth, speed, and temperature in a single, 51 mm (2") fitting. Only one hole through the hull simplifies the installation—an attractive feature for boat builders and boat owners alike.

Three-In-One

Patented, speed-signal-processing enhancements provide excellent paddlewheel accuracy below 5 knots (6 MPH) and smooth linear output at all vessel speeds. The transducer's wide, fan-shaped, fore-aft beam is able to find bottom even when installed on steep deadrise hulls or heeling sailboats. You also get true water-temperature readings with the DST800's reliable temperature sensor.

Valve Closes the Gap!

Airmer's innovative housing design incorporates the popular self-closing valve. When a transducer insert is removed, the valve minimizes water flow into the boat.

Thru-Hull TRIDUCER® Multisensor Smart™ Sensor

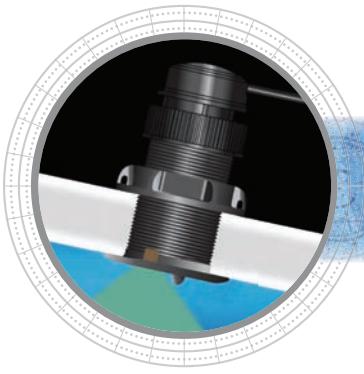
Features

- The all-in-one Smart Sensor
- Depth, speed, and temperature in one compact housing
- Available in NMEA 0183 and NMEA 2000® versions
- 235 kHz frequency prevents mutual interference with other echosounders on the vessel
- Plastic, bronze, or stainless steel housings available
- Fast-response temperature sensor provides $\pm 0.2^{\circ}\text{C}$ ($\pm 0.1^{\circ}\text{F}$) accuracy
- Available as a Smart Sensor at 235 kHz or an analog output sensor operating at either 200 kHz or 235 kHz
- Available in low-profile, countersunk, or beveled-edge housings



Sensing Technology

www.airmar.com



Technical Information

235 kHz-F NMEA 0183 / NMEA 2000®

Number of Elements and Configuration	□	
Beamwidth (@-3 dB)	10° x 44°	
RMS Power (W)	60 W	100 W

SPECIFICATIONS

Weight:
 —0.9 kg (2.0 lb)—Plastic
 —1.6 kg (3.5 lb)—Bronze
 —1.9 kg (4.2 lb)—Stainless Steel

Acoustic Window: Urethane

Hull Deadrise: Up to 22°

Data Update Rate: 1 per second

Minimum Depth Range: 0.5 m (1.6')

Maximum Depth Range:
 —Up to 70 m (30')—NMEA 0183
 —Up to 100 m (330')—NMEA 2000

Pressure Rating: 3 m (10')

Pulse Rate: 20,000 p/nm* (5.6 Hz per knot)—*p/nm = pulses per nautical mile

Supply Voltage:
 —10 VDC to 25 VDC—NMEA 0183
 —9 VDC to 16 VDC—NMEA 2000

Supply Current:
 —<40 mA—NMEA 0183
 —<200 mA—NMEA 2000

Standard Cable Length:
 —10 m (33')—NMEA 0183
 —6 m (20') devicenet—NMEA 2000

Temperature Sensor Accuracy: ±0.5°C (±1.8°F)

Temperature Sensor Range: -10°C to 40°C (14°F to 104°F)

NMEA 2000® Load Equivalency Number (LEN): 4

CE Regulation: Complies to IERC60945

DATA OUTPUT PROTOCOL

NMEA 0183 Sentence Structure

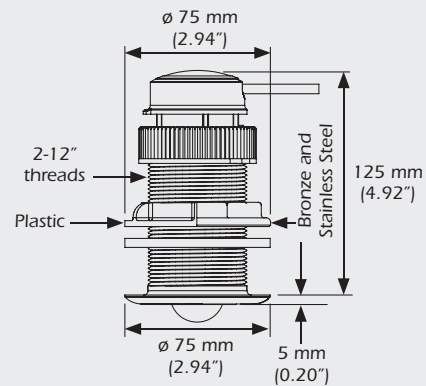
\$SDBT, DDPT... Depth
 \$VWVHW..... Speed
 \$VWVLW..... Distance
 \$YXMTW..... Water Temperature

NMEA 2000® Supported PGNs

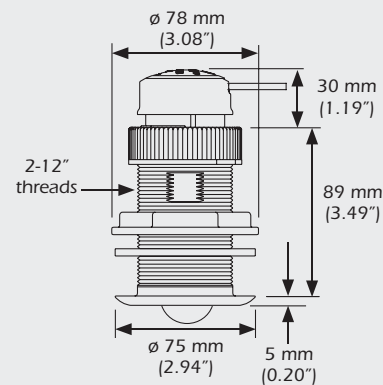
59392..... ISO Acknowledgement
 600928..... ISO Address Claim
 126208..... Acknowledge Group Function
 126464..... Transmit PGN List Group Function
 126464..... Received PGN List Group Function
 126996..... Product Information
 128259..... Speed (Speed Water Reference)
 128267..... Water Depth (With Transducer Offset)
 128275..... Distance Log
 130310..... Environmental Parameters (Water Temperature)
 130311..... Environmental Parameters (Water Temperature)
 130312..... Environmental Parameters (Water Temperature)

DIMENSIONS

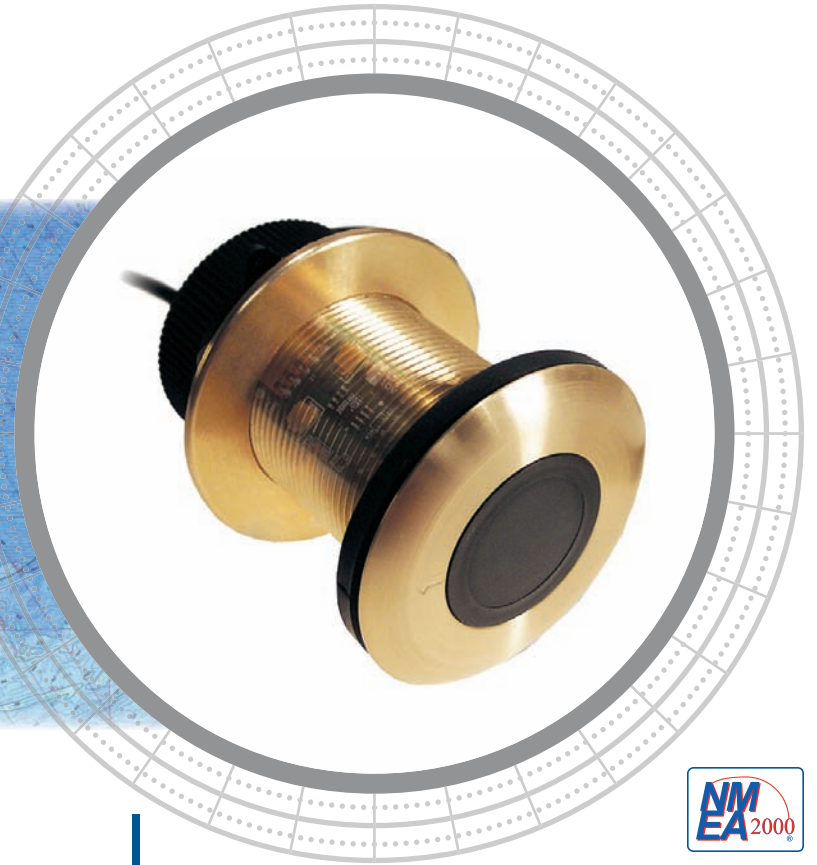
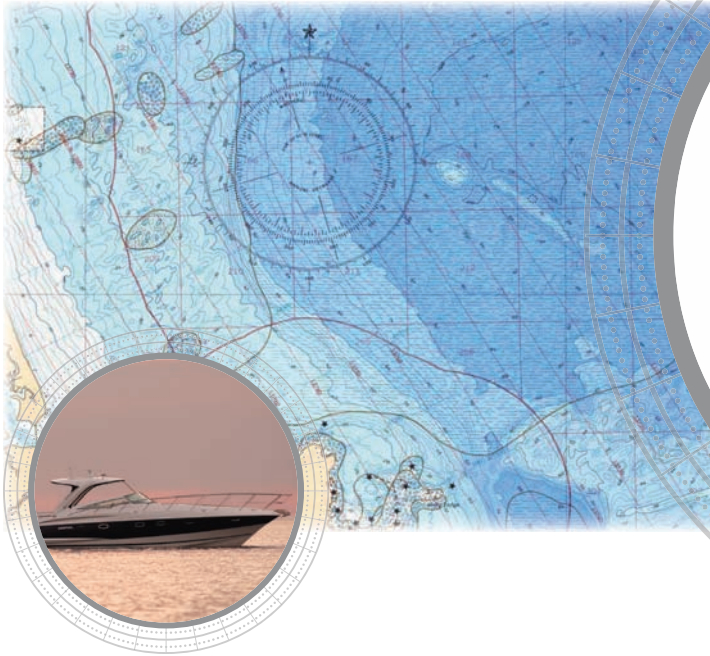
P617V Plastic, B617V Bronze, and SS617V Stainless Steel



B17V Bronze



D800 DT800



The Smart Alternative!

AirMar's D800 and DT800 Smart™ Sensors feature embedded micro-electronics. Depth and temperature signals are processed inside the sensor and can be displayed on any radar, chart plotter, or device that accepts NMEA 0183 or NMEA 2000® data. The 235 kHz frequency prevents mutual interference with other echosounders on the vessel.

Angle for Results

The DT800 Tilted Element Transducer's low-profile housing compensates for hull deadrise. The unique design tilts the ceramic element inside the transducer housing—giving all the advantages of a fairing block without a hull protrusion. Designed with AirMar's exclusive Broadband Ceramic Technology, the 235 kHz element improves resolution without sacrificing sensitivity. The higher power rating 100 W RMS provides spot-on depth readings in as little as 0.5 m (1.6') of water and can reach depths up to 180 m (600').

Tilted Element™ Thru-Hull Smart™ Sensors

Features

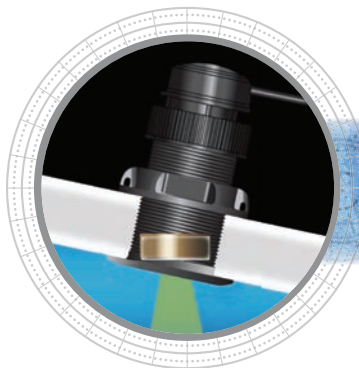
- Tilted-Element Broadband-Ceramic versions available in a 0° or 12° or 20° tilt
- Available in NMEA 0183 and NMEA 2000® versions
- 235 kHz frequency prevents mutual interference with other echosounders on the vessel
- Temperature sensor in DT800 models
- Cable lengths up to 100 m (330') are possible with no loss of performance—NMEA 0183 only
- Plastic, bronze, or stainless steel housings available
- Retractable housing with water valve
- Available in low-profile, countersunk, or beveled-edge housings



Sensing Technology

www.airmar.com

D800, DT800



Technical Information

235 kHz Non-Broadband / Broadband

Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	12°	
RMS Power (W)	60 W	100 W

SPECIFICATIONS

Weight:

- 0.9 kg (2 lb)—Plastic
- 1.5 kg (3.4 lb)—Bronze
- 1.6 kg (3.6 lb)—Stainless Steel

Acoustic Window: Urethane

Data Update Rate: 1 per second

Minimum Depth Range: 0.5 m (1.6')

Maximum Depth Range:

- Up to 100 m (330')—Non-Broadband
- Up to 180 m (590')—Broadband

Pressure Rating: 3 m (10')

Supply Voltage:

- 10 VDC to 25 VDC—NMEA 0183
- 9 VDC to 16 VDC—NMEA 2000

Supply Current:

- <40 mA—NMEA 0183
- <200 mA—NMEA 2000

Standard Cable Length:

- 10 m (33')—NMEA 0183
- 6 m (20') devicenet—NMEA 2000

Temperature Accuracy: ±0.5°C (±1.8°F)

Temperature Sensor Range: -10°C to 40°C (14°F to 104°F)

NMEA 2000® Load Equivalency Number (LEN): 4

CE Regulation: Complies to IERC60945

DATA OUTPUT PROTOCOL

NMEA 0183 Sentence Structure

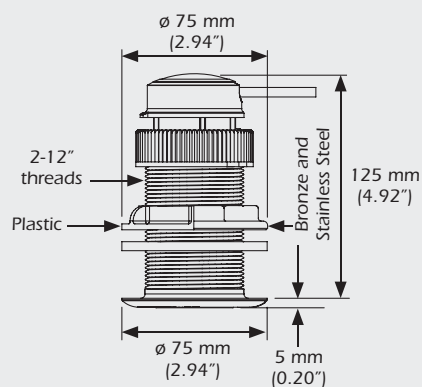
- \$SDBT, DDPT... Depth
- \$YXMTW..... Water Temperature

NMEA 2000® Supported PGNs

- 59392..... ISO Acknowledgement
- 600928..... ISO Address Claim
- 126208..... Acknowledge Group Function
- 126464..... Transmit PGN List Group Function
- 126464..... Received PGN List Group Function
- 126996..... Product Information
- 128267..... Water Depth (With Transducer Offset)
- 130310..... Environmental Parameters (Water Temperature)
- 130311..... Environmental Parameters (Water Temperature)
- 130312..... Environmental Parameters (Water Temperature)

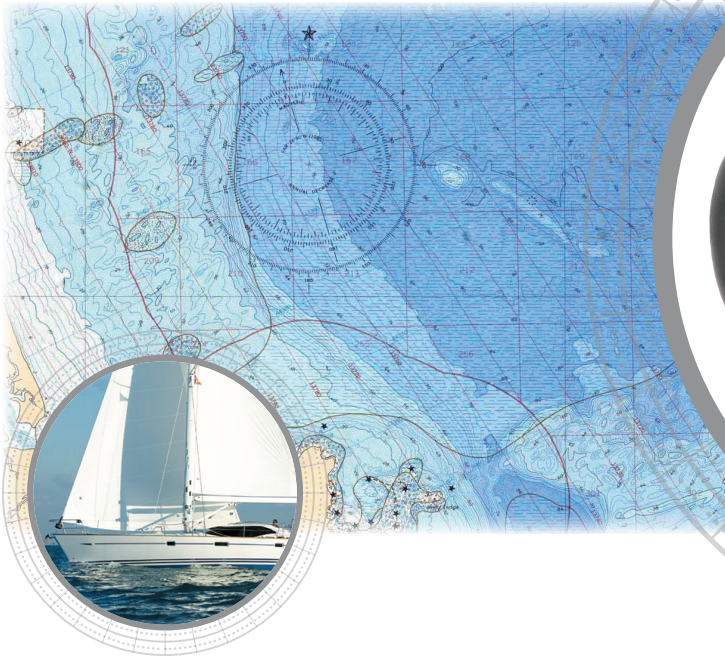
DIMENSIONS

P617V Plastic, B617V Bronze, and SS617V Stainless Steel



- Also compatible with B17 and SS577 housings

CS4500



High-Precision, Low Maintenance

Innovation at its finest! If one consistently demands the best, Airmar's CS4500 Ultrasonic Speed Sensor delivers.

Ultra-accuracy is foremost! With no moving parts, the ultrasonic sensor is capable of speed reading accuracy as low as 0.1 knots (0.1 MPH). By eliminating the traditional paddlewheel, there is no fouling, and drag is reduced to a minimum. Unlike paddlewheels, the CS4500 is engineered to measure water speed below the turbulent boundary layer of the hull, resulting in accurate clean-water readings.

Tried and True Technology

The innovation doesn't stop here. Ultrasonic sensing is a proven technology that has been used on ships for nearly 20 years. Building on this technology, Airmar developed an advanced design which operates at a higher-frequency, enabling reliable operation in both salt and fresh water. The state-of-the-art processor in the CS4500 calculates speed every half second, so it can respond to rapid changes in vessel speed. This translates into the most reliable and accurate ultrasonic speed sensor on the market—at a very competitive price.



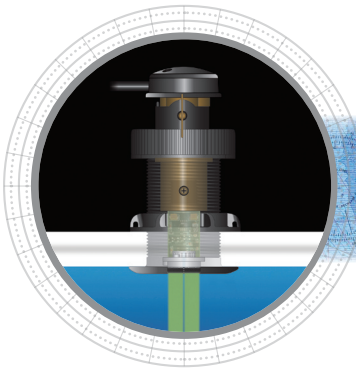
Bronze housing—CS4500

Speed Sensor

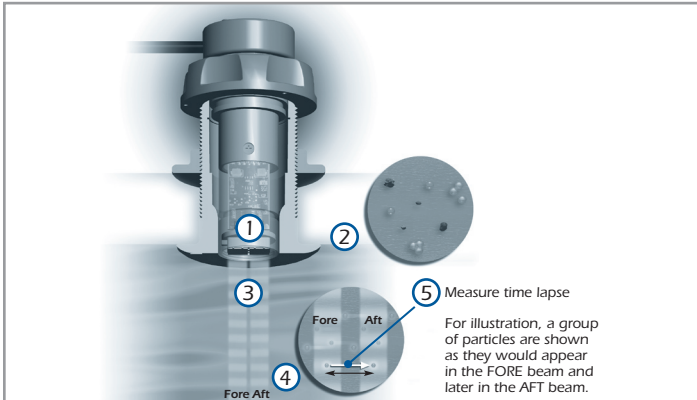
Ultrasonic—No Moving Parts
Thru-Hull Transducer

Features

- Unparalleled accuracy as low as 0.1 knots (0.1 MPH)
- Designed for use with all types and sizes of sailboats and powerboats
- No moving parts
- Makes retrofitting a breeze—the retractable insert fits most Airmar 51 mm (2") housings
- Low-profile, plastic, or bronze housings available
- Built-in temperature sensor
- Optional Data Converter charges analog signal to NMEA 0183 data stream



Technical Information



How the CS4500 Works

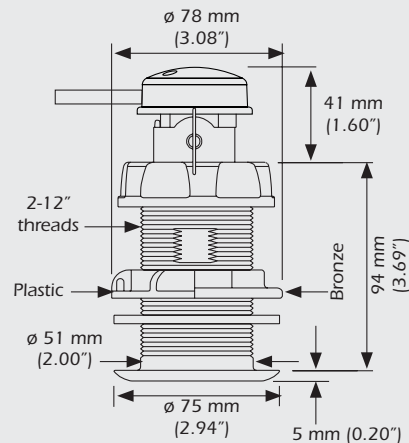
- 1** In the CS4500, two transducers are incorporated in a single housing.
- 2** Small particles present in the water pass through the beams.
- 3** The speed sensor uses ultrasonic pulses to collect echoes from the small particles in the water as they pass under two ceramics embedded in the sensor.
- 4** As the boat travels through the water, both ceramics “view” the same stream of particles.
Because it takes time for particles to travel between the two ceramics, the aft ceramic detects the particles later than does the fore ceramic.
- 5** By measuring this time lapse, the instrument is able to calculate the boat speed.

SPECIFICATIONS

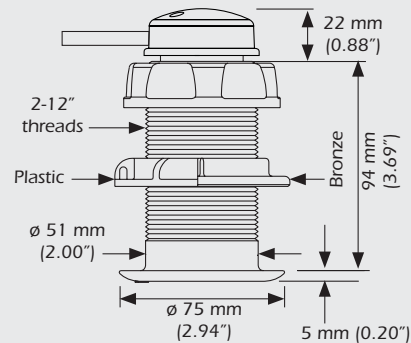
Transmit Frequency: 4.5 MHz
Pulse Repetition Frequency: 5.5 kHz
Sampling Distance Below The Sensor: 77 mm to 127 mm (3" to 5")—outside the boundary layer
Data Update Rate: 2 seconds
Signal Output: Airmar paddlewheel format
 —5.5 Hz per knot
 —20,000 pulses per nautical mile
Speed Range: 0.1 knot to 40 knots (0.1 MPH to 46 MPH)
Operating Temperature Range: 0°C to 40°C (32°F to 104°F)
Sensor Cable Type: Airmar C190
Sensor Cable Length: 10 m (33') standard
Instrument Cable Length: 3 m (10') standard, up to 30 m (10') possible
Supply Voltage: 10 VDC to 15 VDC
Supply Current: 155 mA at 12 VDC
Hole Diameter: 51 mm (2")
Sensor Insert Material: Bronze
Thru-Hull Housing Material: Plastic or bronze
Blanking Plug: Yes
Weight:
 —1.4 kg (3 lb)—Plastic
 —1.8 kg (4 lb)—Bronze
CE Compliant: Yes

DIMENSIONS

P17 Plastic and B17 Bronze

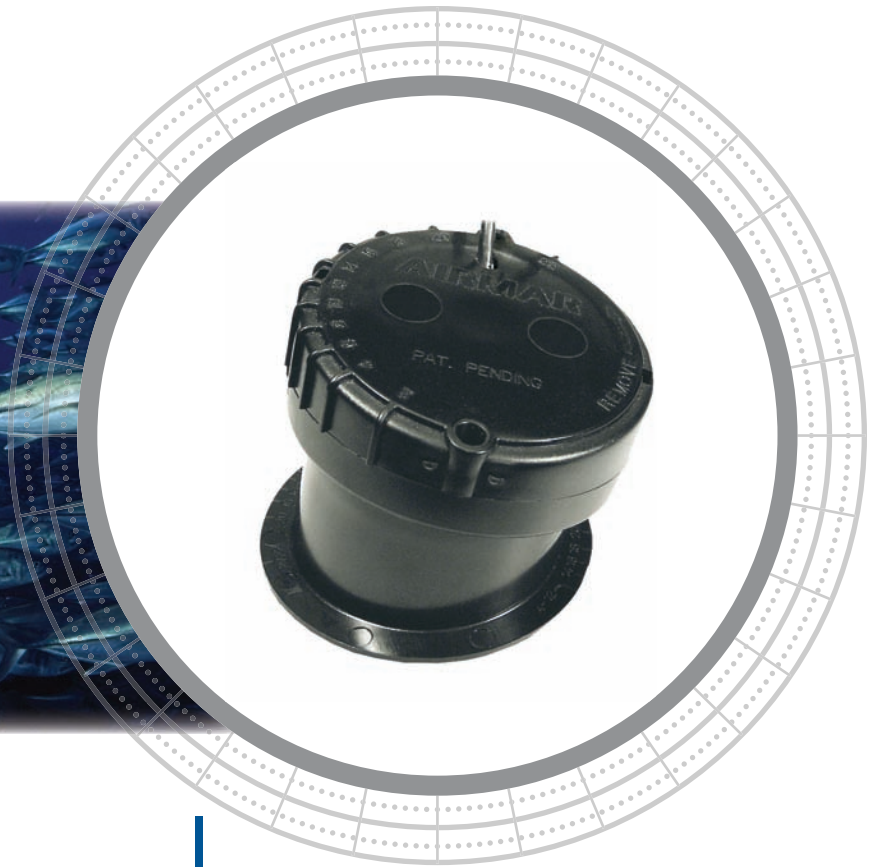
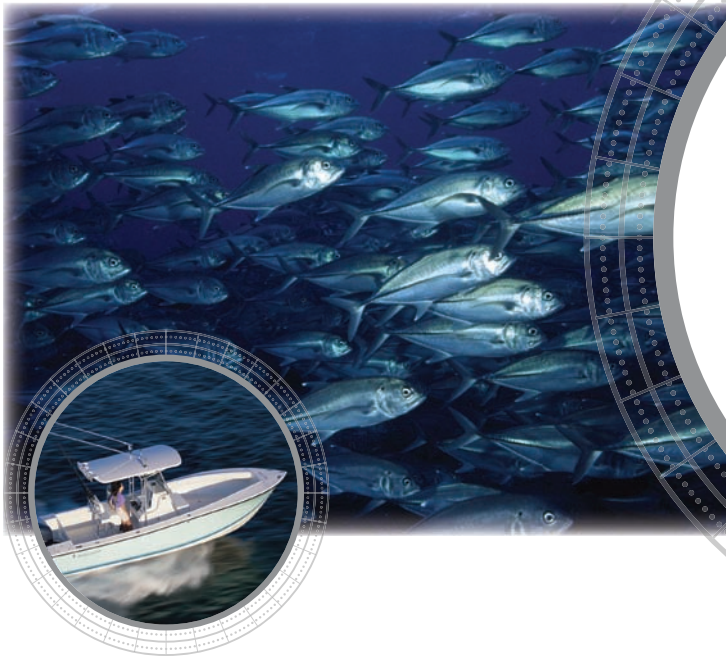


P120 Plastic and B120 Bronze



▪ Also available in P314/B21 and P217/B119 housings

P79



Simple! Convenient!! Adjustable!!!

The P79 is easy-to-install, accommodating hull deadrise angles up to 22°.

1. Mount the base flange inside the hull
2. Adjust the locking ring for the correct hull deadrise angle
3. Fill the base with non-toxic anti-freeze (propylene glycol)
4. Turn and lock the transducer into the base

Deadrise Intuitive!

The unique adjustable-angle design ensures the beam is vertically oriented for maximum echo returns and the best possible performance. Because the transducer is mounted inside the hull, it is the perfect solution for rigid inflatable boats (RIBS) and racing sailboats.



The innovative mounting base allows the P79 to adjust to hull deadrise angles between 2° and 22°

22°
16°
12°
8°
2°

In-Hull 600 W Adjustable

Fishing Applications

- Lake and inshore all-around saltwater fishing for small to mid-size outboard boats

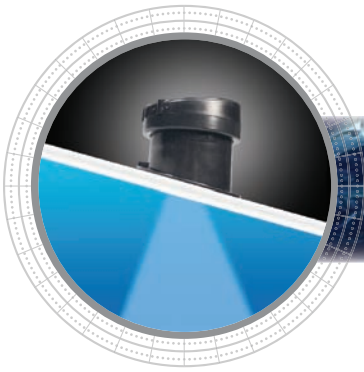
Features

- Adjusts to hull deadrise angles from 2° to 22°
- No holes to drill
- Depth only
- Recommended for solid fiberglass hulls
- Epoxies to aluminum hulls under 3.8 mm (0.125") thick
- Recommended for planing-hull power boats, trailered boats, rigid inflatable boats (RIBS), and racing sailboats
- No hull protrusions
- Boat Size: Up to 8 m (25')



Sensing Technology

www.airmar.com



Technical Information

50/200 kHz-A

Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	45°	12°
RMS Power (W)	600 W	600 W
TVR	155 dB	164 dB
RVR	-174 dB	-184 dB
FOM*	-31 dB	-21 dB
Q	28	31
Impedance	200 Ω	375 Ω

*Does not calculate losses through the hull.

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
206 m to 294 m (700' to 1,000')	118 m to 180 m (400' to 600')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	8 m (25')	2 m (6')
30 m (100')	25 m (83')	6 m (21')
122 m (400')	101 m (331')	26 m (84')
305 m (1,000')	252 m (828')	64 m (210')

TRANSDUCER COMPARISON

Model	Power	Rating	Performance Increase
P79	600 W	Good	Benchmark model for comparison
M260	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz
R199	2 kW	Superb	200 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz
R299 R399	3 kW	Ultimate	400 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz

SPECIFICATIONS

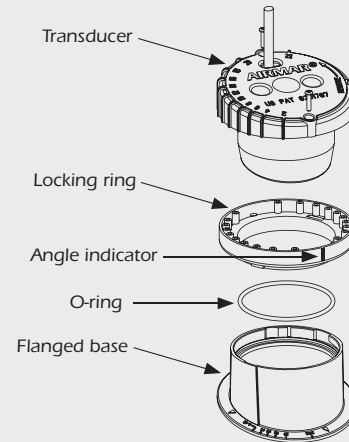
Weight: 2.3 kg (5 lb)

Hull Deadrise: 0° to 22°

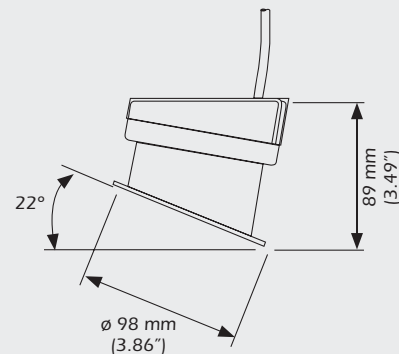
Acoustic Window: Layered plastic urethane

DIMENSIONS

P79 Transducer



Dimensions at Maximum Installation Angle



M260



Setting the In-Hull Standard

It's true! Excellent performance can be achieved from an in-hull mounted transducer. The M260, Airmar's 1 kW in-hull, is designed with Airmar's exclusive Broadband Ceramic Technology. The 200 kHz element provides broadband performance resulting in higher-resolution without sacrificing sensitivity. Combined with a seven-element 50 kHz array, this in-hull has excellent deep-water detection. Because the M260 has narrow beams at both frequencies, separation of individual targets and the ability to distinguish between fish and the bottom makes finding fish easy.

All-Out Fishfinding Performance!

Optimal fishfinder performance no longer requires drilling a hole in the hull! The M260 is able to transmit and receive through solid fiberglass, displaying sharp detailed images. Track the bottom at speeds exceeding 30 knots (34 MPH)! Installation simply requires adhering the tank to the inside of the vessel, leaving a clean and smooth hull exterior!

In-Hull 1 kW HD Digital

Fishing Applications

- Blue-water trolling using 50 kHz
- Deep-water bottom and wreck fishing up to 800 m (2,625')

Features

- Top-of-the-line broadband, in-hull transducer
- Recommended for solid fiberglass hulls
- Depth only
- Innovative tank design allows for bow-stern or port-starboard mounting
- Non-toxic anti-freeze (propylene glycol) is used to fill the tank
- Fiberglass resin is used to adhere tank to the hull
- Interfaces to any 600 W or 1 kW echosounder
- Boat Size: 8 m (25') and up





Sensing Technology

www.airmar.com



Technical Information

50 kHz-AE / 200 kHz-BH

Number of Elements and Configuration		
Beamwidth (@-3 dB)	19°	6°
RMS Power (W)	1 kW	1 kW
TVR	162 dB	175 dB
RVR	-173 dB	-183 dB
FOM*	-14 dB	-10 dB
Q	8	8
Impedance	250 Ω	90 Ω

*Does not calculate losses through the hull.

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
529 m to 735 m (1,800' to 2,500')	206 m to 294 m (700' to 1,000')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	3 m (10')	0.9 m (3')
30 m (100')	10 m (34')	3.3 m (11')
122 m (400')	41 m (134')	13 m (42')
305 m (1,000')	102 m (335')	32 m (105')

TRANSDUCER COMPARISON

Model	Power	Rating	Performance Increase
P79	600 W	Good	Benchmark model for comparison
M260	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz
R199	2 kW	Superb	200 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz
R299 R399	3 kW	Ultimate	400 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz

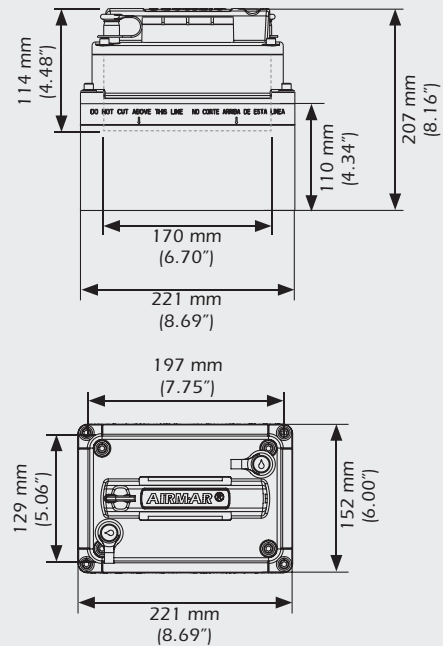
SPECIFICATIONS

Weight: 6.2 kg (13.5 lb)

Hull Deadrise: 0° to 30°

Acoustic Window: Layered plastic urethane

DIMENSIONS



R99



Raising the Bar

Airmar's R99 is a fish's worst enemy. Why? The R99 is so precise; fish are no longer concealed by their surroundings. Fish swimming near the bottom cannot hide. In mid-water depths—fish don't have a fighting chance. Designed with Airmar's exclusive Broadband Ceramic Technology, the 200 kHz element produces high-resolution targets without sacrificing its ability to see deep into the water. The R99 puts the find in fishfinder.

The Benchmark

A 2 kW powerhouse packed with an array of fifteen 50 kHz elements. And its 200 kHz, Broadband ceramic is a huge 88 mm (3.5"). With such a large active area, the R99's concentrated sound beams have four times the sensitivity of a 1 kW transducer. And the R99's streamlined shape maintains noise-free accurate readings at speeds over 30 knots (34 MPH). With its new exposed high-precision temperature sensor, and the R99 has rewritten the record book.

Thru-Hull External-Mount 2 kW HD Digital

Fishing Applications

- Blue-water bill fish and pelagic trolling
- Deep-dropping with electric reels past the continental shelf
- Commercial fishing

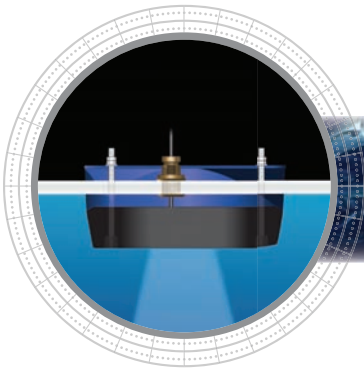
Features

- The top performer in Airmar's professional line of fishfinder transducers for vessels 12 m (40') and up
- Streamlined shape with fairing provides excellent performance at speeds over 30 knots (34 MPH)
- Depth and fast-response water-temperature sensor
- Interfaces to all 1 kW and 2 kW echosounders
- Available with a diplexer for single-transmission-line fishfinders and without a diplexer for dual-transmission-line fishfinders
- New urethane housing





Sensing Technology

www.airmar.com



Technical Information

50 kHz-AFlq / 200 kHz-BFlq

Number of Elements and Configuration		
Beamwidth (@-3 dB)	8° x 17°	5°
RMS Power (W)	2 kW	2 kW
TVR	167 dB	177 dB
RVR	-174 dB	-182 dB
FOM	-8 dB	-6 dB
Q	3	2
Impedance	100 Ω	100 Ω

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
735 m to 1,176 m (2,500' to 4,000')	235 m to 353 m (800' to 1,200')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
30 m (100')	4 m x 9 m (14' x 30')	2.7 m (9')
122 m (400')	17 m x 36 m (56' x 120')	11 m (35')
245 m (800')	34 m x 73 m (112' x 240')	21 m (70')
305 m (1,000')	43 m x 91 m (140' x 300')	27 m (88')

TRANSDUCER COMPARISON

Model	Power	Rating	Performance Increase
B45 B744V B744VL	600 W	Good	Benchmark model for comparison
B258	1 kW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
B260 SS260	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz
R99	2 kW	Superb	200 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz
R209 R309	3 kW	Ultimate	400 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz

Due to the wide beam of the SS270W, it has been omitted from the table.

SPECIFICATIONS

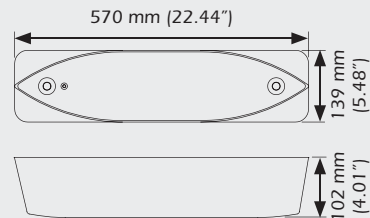
Weight: 15.1 kg (33.3 lb)

Hull Deadrise: 0° to 25°

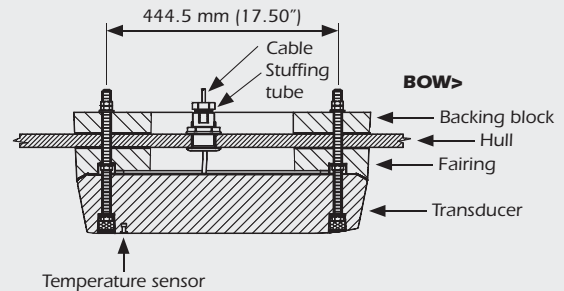
Acoustic Window: Epoxy/urethane

DIMENSIONS

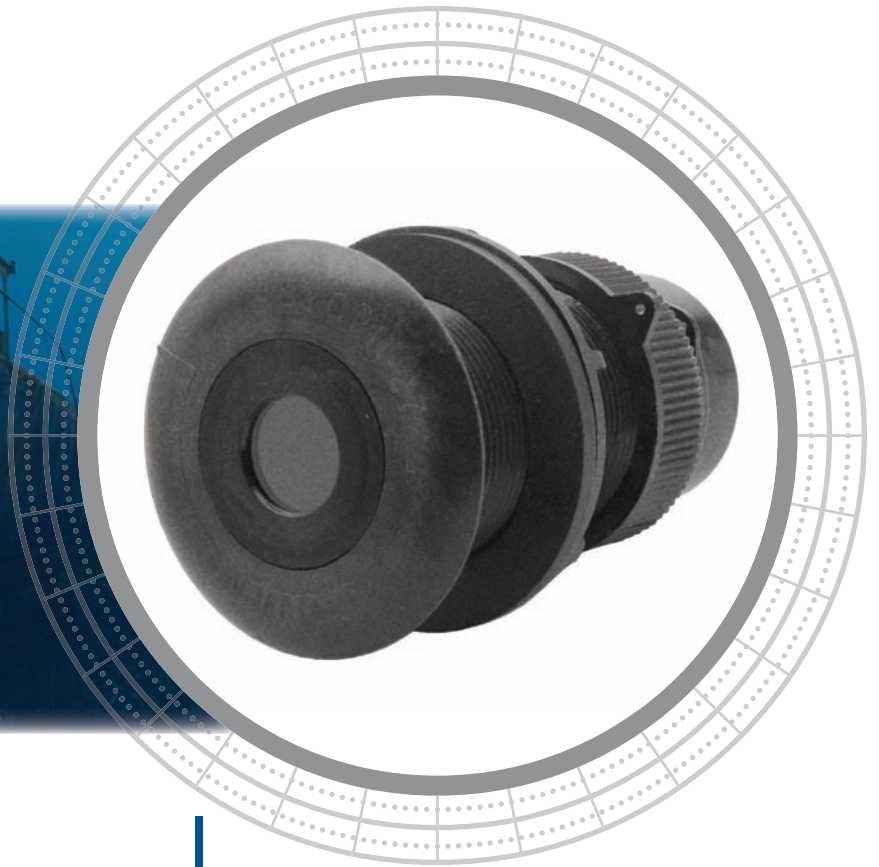
Transducer



Installing the Transducer



CA500



Underwater Viewing Power

Combine the fish-finding power of an Airmar transducer with the viewing capability of the Airmar CA500 Camera and get the ultimate underwater observation system. This thru-hull camera will display what is directly below the boat, making it an ideal underwater fishing camera or underwater video surveillance/safety system. Simply connect the single cable to any display with a PAL or NTSC input and spy on the underwater world.

Rugged and Serviceable

We have combined the industry renowned Airmar housings with one of the lowest Lux (0.01) cameras available today—all protected by a sapphire viewing window that resists scratching or cracking. The retractable housing with valve is available in plastic, bronze, or stainless steel and allows for easy servicing and cleaning of the camera while the boat is in the water. See what you have been missing with the Airmar CA500 Underwater Camera.

Thru-Hull Underwater Camera

Features

- Low lux (0.01) for day or night viewing
- PAL or NTSC output versions available
- Available in plastic, bronze, or stainless steel housings
- Waterproof
- Sapphire viewing window
- Retractable insert
- Self-closing water valve
- Patent pending

Applications

- Sportfishing
- Research and survey
- Scuba diving
- Search and recovery
- Commercial fishing
- Surveillance and safety

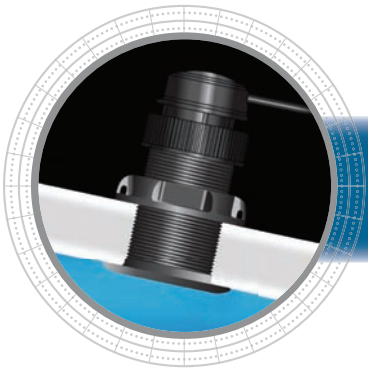


2006
DAME
DESIGN AWARD MERIT

 **AIRMAR**[®]
TECHNOLOGY CORPORATION

Sensing Technology

www.airmar.com



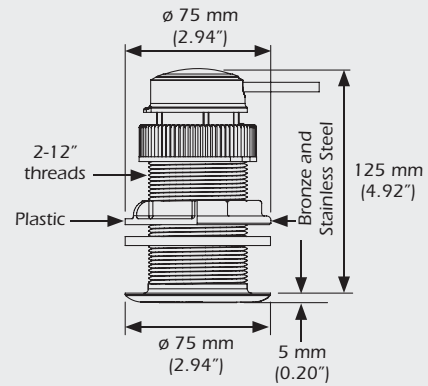
Technical Information

SPECIFICATIONS

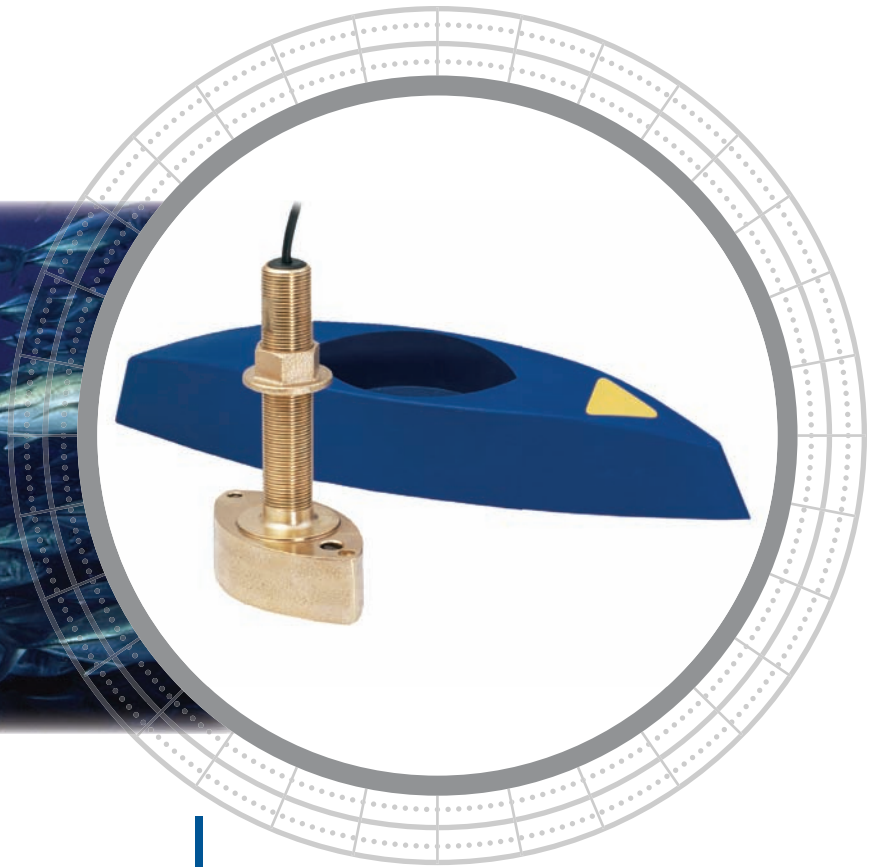
- Camera:** 1/3" Sony CCD
- PAL (H x V):** 500 x 582, 625 lines, 50 field per second
- NTSC (H x V):** 510 x 492, 525 lines, 60 field per second
- Operating Temperature:** -10°C to 50°C (14°F to 122°F)
- Storage Temperature:** -20°C to 60°C (-4°F to 140°F)
- Sync System:** Internal synchronization
- Minimum Illumination:** 0.5 day or 0.01 night lux
- Resolution:** 420 TV lines
- Angle of View in Water:** 92° diagonal
- Focal Length:** 3.6 mm (0.14")
- Aperture:** F 2.0
- Built-In Lens:** 4.3 mm (0.17") cone pinhole lens
- S/N Ratio:** >46 dB
- White Balance:** 1 Vp-p 75 ohms negative
- Supply Voltage:** 10 VDC to 15 VDC
- Supply Current:** 100 mA
- Standard Cable Length:** 20 m (66')
- Weight:**
 —0.9 kg (2.0 lb)—Plastic
 —1.9 kg (4.2 lb)—Bronze and Stainless Steel
- CE Regulations:** Complies to IERC945

DIMENSIONS

P617V Plastic, B617V Bronze, and SS617V Stainless Steel



B45



Compact and Budget-Minded!

The B45 is Airmar's smallest, bronze, thru-hull stem, offering quality design at an economical price. The classic housing is streamlined to deflect aerated water from the transducer's face, providing solid echo returns.

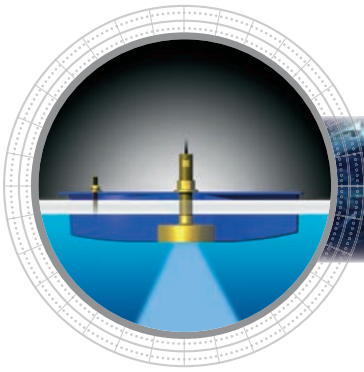
Quality Performance Results

Get the most out of a transducer installation. See defined return echoes and clean crisp images. Utilizing Airmar's High-Performance Fairing will boost echosounder performance and provide optimal results for all installations.

Thru-Hull 600 W

Features

- Recommended for planing-hull powerboats and cruising sailboats up to 9 m (30')
- Good sensitivity in a compact housing
- Fast-response water-temperature sensor provides $\pm 0.2^{\circ}\text{C}$ ($\pm 0.1^{\circ}\text{F}$) accuracy



Technical Information

50/200 kHz-A		
Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	45°	12°
RMS Power (W)	600 W	600 W
TVR	155 dB	164 dB
RVR	-174 dB	-184 dB
FOM	-31 dB	-21 dB
Q	28	31
Impedance	200 Ω	375 Ω

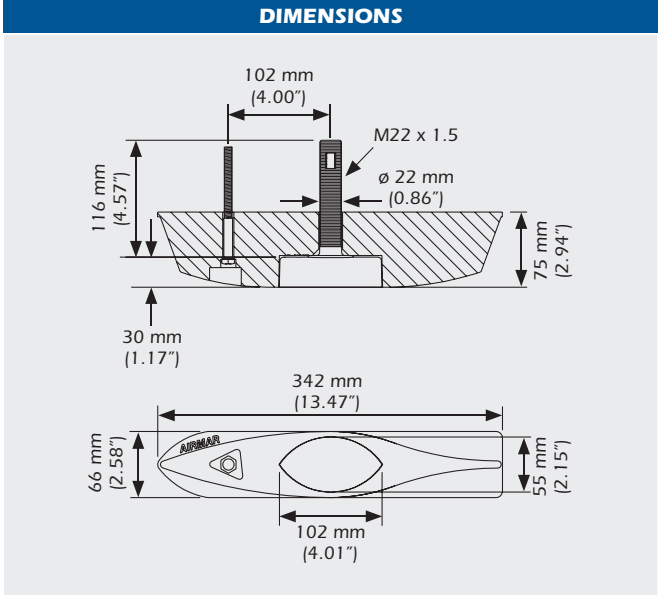
MAXIMUM DEPTH RANGE	
50 kHz	200 kHz
235 m to 353 m (800' to 1,200')	118 m to 206 m (400' to 700')

BEAM DIAMETER VS DEPTH		
Depth	50 kHz	200 kHz
9 m (30')	8 m (25')	2 m (6')
30 m (100')	25 m (83')	6 m (21')
122 m (400')	101 m (331')	26 m (84')
305 m (1,000')	252 m (828')	64 m (210')

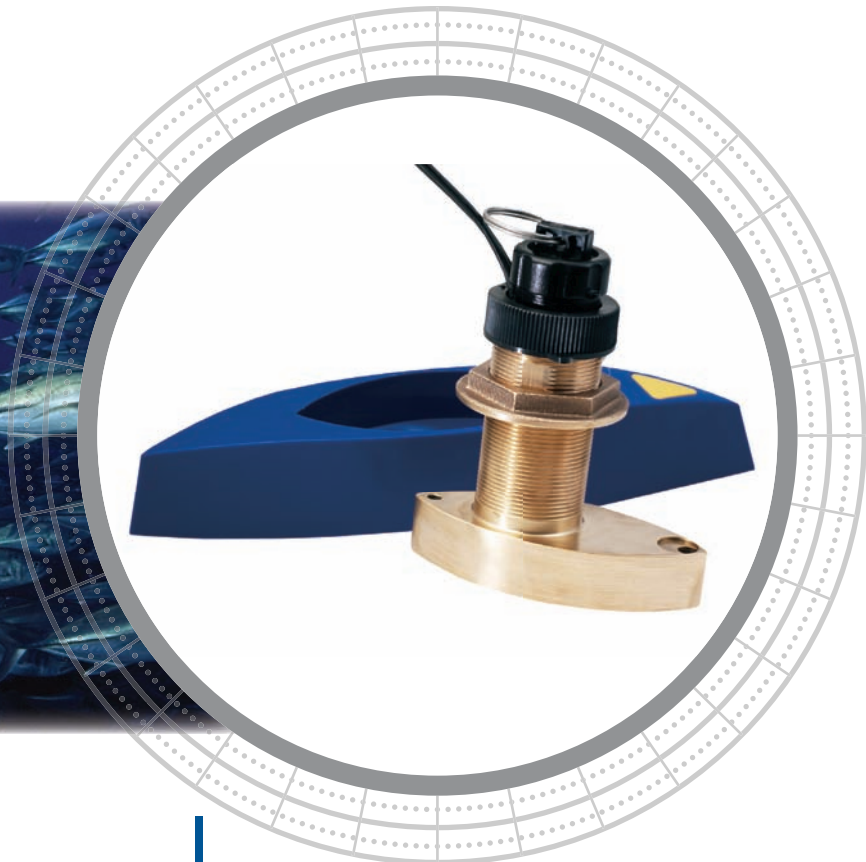
TRANSDUCER COMPARISON			
Model	Power	Rating	Performance Increase
B45 B744V B744VL	600 W	Good	Benchmark model for comparison
B258	1 kW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
B260 SS260	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz
R99	2 kW	Superb	200 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz
R209 R309	3 kW	Ultimate	400 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz

Due to the wide beam of the SS270W, it has been omitted from the table.

SPECIFICATIONS
Weight: 2.5 kg (5.5 lb)
Hull Deadrise: Up to 26° with fairing
Acoustic Window: Urethane



B744V B744VL



TRIDUCER® Multisensor

The B744V TRIDUCER Multisensor provides you with depth, speed, and temperature in one thru-hull housing. This unit is ideal for all 600 W fishfinders and requires only a single hole in the hull.

Continuing Innovation

The B744V's patented valve assembly prevents water from rushing into the hull when the insert is removed for cleaning or storage. The innovative housing design allows the TRIDUCER Multisensor to be fully recessed into its custom High-Performance Fairing. The end result is a streamlined installation. At speeds above 30 knots (34 MPH), the B744V will produce clear images and solid bottom tracking!



B744VL

Thru-Hull TRIDUCER® Multisensor 600 W

Fishing Applications

- Inshore or coastal fishing in shallow to medium depths
- Slow trolling, structure fishing and drifting
- Deep-water lake fishing

Features

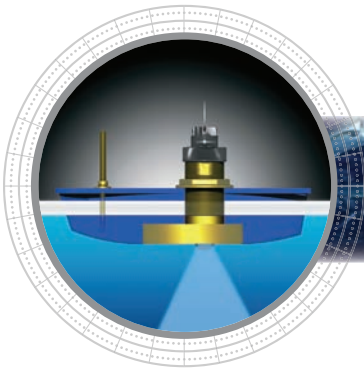
- Depth, speed, and temperature in one housing
- Greatly improved high-speed performance at both 50 kHz and 200 kHz when installed with a high-performance fairing
- Patented self-closing sea valve reduces water flow into the hull when paddlewheel insert is removed
- Speed Operating Range:
1 knot to 45 knots (1 MPH to 52 MPH)
- Fins on sides of paddlewheel cavity provide improved accuracy in cross flow conditions
- The extra length of the B744VL allows mounting into thicker and/or high deadrise hulls
- Boat Size: Up to 9 m (30')



Sensing Technology

www.airmar.com

B744V, B744VL



Technical Information

50/200 kHz-A		
Number of Elements and Configuration	○	
Beamwidth (@-3 dB)	45°	12°
RMS Power (W)	600 W	600 W
TVR	155 dB	164 dB
RVR	-174 dB	-184 dB
FOM	-31 dB	-21 dB
Q	28	31
Impedance	200 Ω	375 Ω

MAXIMUM DEPTH RANGE	
50 kHz	200 kHz
235 m to 353 m (800' to 1,200')	118 m to 206 m (400' to 700')

BEAM DIAMETER VS DEPTH		
Depth	50 kHz	200 kHz
9 m (30')	8 m (25')	2 m (6')
30 m (100')	25 m (83')	6 m (21')
122 m (400')	101 m (331')	26 m (84')
305 m (1,000')	252 m (828')	64 m (210')

TRANSDUCER COMPARISON			
Model	Power	Rating	Performance Increase
B45 B744V B744VL	600 W	Good	Benchmark model for comparison
B258	1 kW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
B260 SS260	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz
R99	2 kW	Superb	200 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz
R209 R309	3 kW	Ultimate	400 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz

Due to the wide beam of the SS270W, it has been omitted from the table.

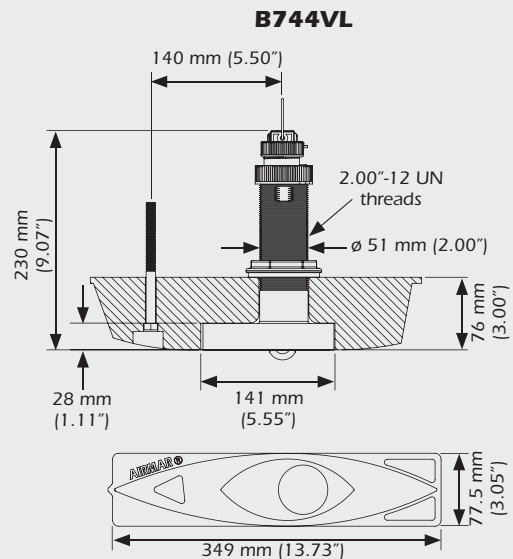
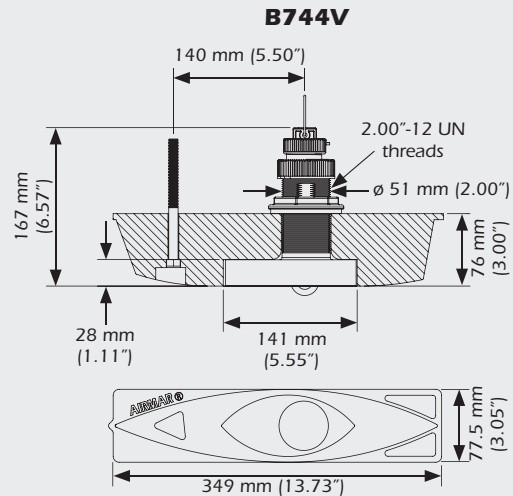
SPECIFICATIONS

Weight: 2.5 kg (5.5 lb)

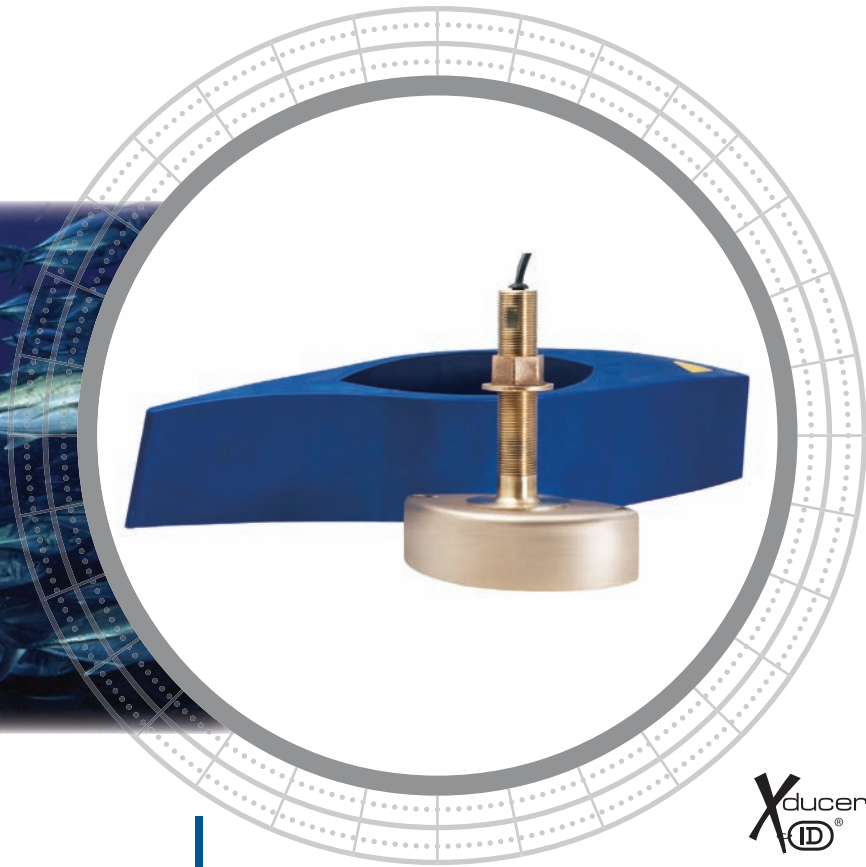
Hull Deadrise: Up to 24° with fairing

Acoustic Window: Urethane

DIMENSIONS



B258



The Cost Effective Choice

The B258 is 25 times more sensitive than a single-element 50/200 kHz transducer. This innovative 1 kW transducer makes 600 W fishfinders perform like their more powerful big brothers—especially at 50 kHz. How does it do it? The B258 uses Airmar's new and unique ceramic-element construction. The resulting narrow beams will clearly distinguish individual fish and bottom fish from their habitat at depths down to 670 m (2,200').

Streamlined Performance

Maximize performance by installing the B258 with Airmar's custom fit High-Performance Fairing. At speeds over 30 knots (34 MPH), screen displays show clear images and a clean bottom trace.

Thru-Hull 1 kW Entry-Level

Fishing Applications

- The versatile 1 kW transducer for all types of fishing
- Inshore and blue-water trolling
- Deep-water bottom and structure fishing up to 500 m (1,640')

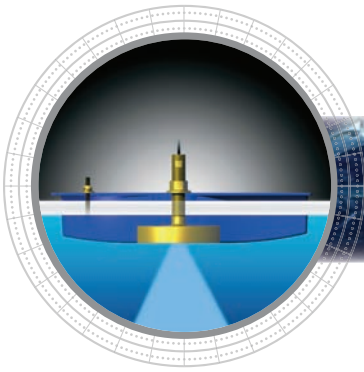
Features

- Elliptical beam covers more bottom area thus increasing your catch at all depths
- Depth and fast-response water-temperature sensor
- Recommended for sportfishing boats above 9 m (30') and small to mid-size commercial fishing boats
- Four 50/200 kHz ceramics as compared to one ceramic in 600 W units
- Provides greater surface area resulting in better sensitivity



Sensing Technology

www.airmar.com



Technical Information

50/200 kHz-BIq		
Number of Elements and Configuration		
Beamwidth (@-3 dB)	15° x 21°	3° x 5°
RMS Power (W)	1 kW	1 kW
TVR	161 dB	173 dB
RVR	-174 dB	-183 dB
FOM	-17 dB	-9 dB
Q	9	15
Impedance	225 Ω	200 Ω

MAXIMUM DEPTH RANGE	
50 kHz	200 kHz
441 m to 647 m (1,500' to 2,200')	206 m to 294 m (700' to 1,000')

BEAM DIAMETER VS DEPTH		
Depth	50 kHz	200 kHz
9 m (30')	2.4 m x 3.3 m (8' x 11')	0.6 m x 0.9 m (2' x 3')
30 m (100')	8 m x 12 m (25' x 40')	1 m x 2.7 m (5' x 9')
122 m (400')	30 m x 50 m (98' x 163')	6 m x 11 m (20' x 35')
305 m (1,000')	74 m x 124 m (245' x 407')	16 m x 26 m (52' x 87')

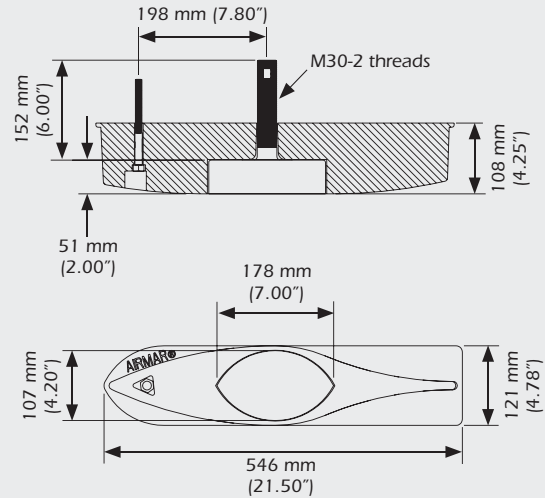
TRANSDUCER COMPARISON			
Model	Power	Rating	Performance Increase
B45 B744V B744VL	600 W	Good	Benchmark model for comparison
B258	1 kW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
B260 SS260	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz
R99	2 kW	Superb	200 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz
R209 R309	3 kW	Ultimate	400 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz

Due to the wide beam of the SS270W, it has been omitted from the table.

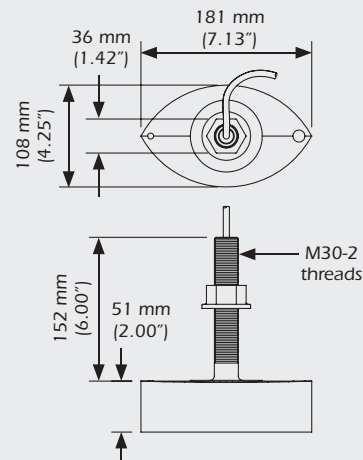
SPECIFICATIONS
Weight: 3.6 kg (7.9 lb)
Hull Deadrise: Up to 26° with fairing
Acoustic Window: Epoxy/urethane

DIMENSIONS

Transducer and High-Performance Fairing



B258 Transducer



B260 SS260

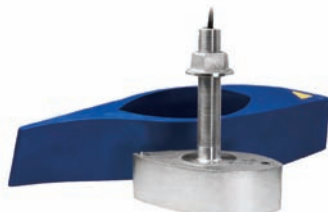


Powerful, Yet Sensitive!

The B260 will enhance fish detection on virtually all of today's fish finders. High-performance has been redefined with its Broadband Ceramic Technology. The narrow, 6° beam 200 kHz ceramic will give you excellent resolution and crisp image detail needed for bottom fishing. The B260's low ringing is perfect for finding fish holding tight to the bottom and other structure. The seven-element 50 kHz array has a wider 19° beam for deeper blue-water fishing. The outcome at both frequencies is excellent resolution and crisp image detail where it's needed most.

Streamlined Performance

This best seller is offered in both bronze and stainless steel housings. Get maximum results, on any hull material, when installed with a custom-fitting High-Performance Fairing. At speeds over 30 knots (34 MPH), screens continue to display clear images and solid bottom tracking.



Stainless steel housing—SS260

Thru-Hull 1 kW HD Digital

Fishing Applications

- Blue-water trolling using 50 kHz
- Deep-water bottom and wreck fishing up to 800 m (2,625')

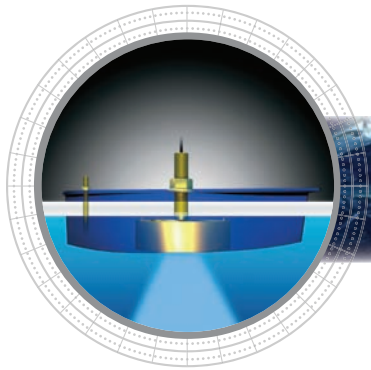
Features

- Top-of-the-line 1 kW thru-hull model
- Depth and fast-response water-temperature sensor
- Recommended for sportfishing boats above 9 m (30') and small to mid-size commercial fishing boats
- Available with a diplexer for single-transmission-line fishfinders and without a diplexer for dual-transmission-line fishfinders
- Bronze or stainless steel housings available
- Interfaces to any 600 W or 1 kW echosounder



Sensing Technology

www.airmar.com



B260, SS260

Technical Information

50 kHz-AE / 200 kHz-BH		
Number of Elements and Configuration		
Beamwidth (@-3 dB)	19°	6°
RMS Power (W)	1 kW	1 kW
TVR	162 dB	175 dB
RVR	-173 dB	-183 dB
FOM	-14 dB	-10 dB
Q	8	8
Impedance	250 Ω	90 Ω

MAXIMUM DEPTH RANGE	
50 kHz	200 kHz
529 m to 735 m (1,800' to 2,500')	206 m to 294 m (700' to 1,000')

BEAM DIAMETER VS DEPTH		
Depth	50 kHz	200 kHz
9 m (30')	3 m (10')	0.9 m (3')
30 m (100')	10 m (34')	3.3 m (11')
122 m (400')	41 m (134')	13 m (42')
305 m (1,000')	102 m (335')	32 m (105')

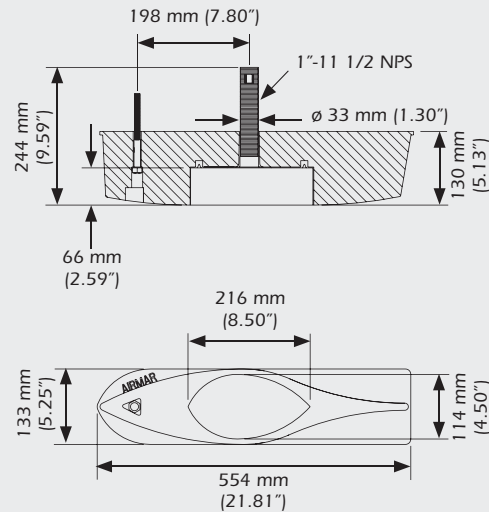
TRANSDUCER COMPARISON			
Model	Power	Rating	Performance Increase
B45 B744V B744VL	600 W	Good	Benchmark model for comparison
B258	1 kW	Better	25 times more sensitive at 50 kHz 16 times more sensitive at 200 kHz
B260 SS260	1 kW	Best	50 times more sensitive at 50 kHz 13 times more sensitive at 200 kHz
R99	2 kW	Superb	200 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz
R209 R309	3 kW	Ultimate	400 times more sensitive at 50 kHz 32 times more sensitive at 200 kHz

Due to the wide beam of the SS270W, it has been omitted from the table.

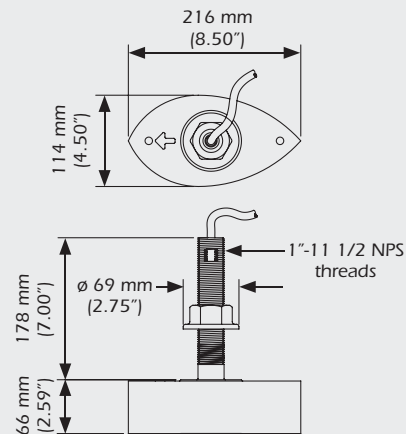
SPECIFICATIONS
Weight: 7.3 kg (16 lb)
Hull Deadrise: Up to 20° with fairing
Acoustic Window: Urethane

DIMENSIONS

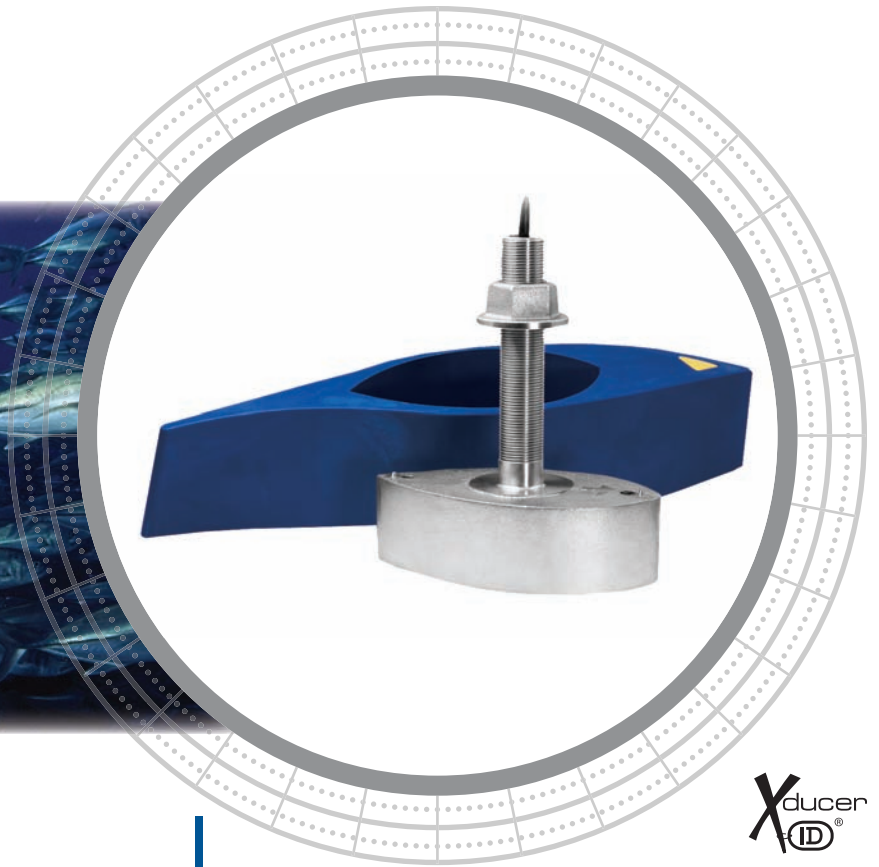
Transducer and High-Performance Fairing



B260, SS260 Transducer



SS270W



Get the WIDER View

The SS270W's extra wide coverage delivered to a dual-frequency, split-screen sounder gives fishermen a wider view of what is going on under the boat. The SS270W gives you four times the beamwidth at 200 kHz than other 1 kW, high-performance transducers. Since the beams are the same at both frequencies, a split-screen fishfinder display will clearly show the same water column and bottom coverage. Fish may also appear as arches. More fish will be marked while cruising, trolling, drifting, or at anchor.

- **Tuna/Marlin Fishermen**—Detect bait and gamefish in the upper-water column that would go unseen with a traditional narrow-beam transducer.
- **Downrigger Fishermen**—Track your downrigger balls and lures on the screen at both frequencies. This allows you to adjust the downrigger settings to maximize the lure or bait presentation at a desired depth.
- **Jig Fishermen**—Seeing your jigs descend on the echosounder screen while bottom fishing can help avoid bottom hang-ups when fishing in heavy currents. Seeing a tuna attack your jigs on the echosounder display lets you reel up other loose lines before tangles can occur.

The SS270W's custom-fit High-Performance Fairing will give crystal-clear imaging at speeds up to 30 knots (34 MPH). And since the SS270W fits into the popular B260 fairing pocket, it's easy to upgrade existing installations. Possibilities expand with the SS270W Transducer.



Sensing Technology

Thru-Hull Wide-Beam 1 kW HD Digital

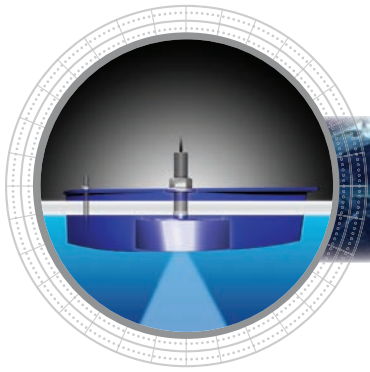
Fishing Applications

- Blue-water trolling using both 50 kHz and 200 kHz
- Bait and game fish marking in shallow to mid-water
- Wreck and structure finding on the continental shelf
- Vertical deep jigging
- Downrigger fishing in saltwater or deep-water lakes

Features



- Identical wide 25° beamwidths at 50 kHz and 200 kHz
- Provides 4 times the beamwidth at 200 kHz than other high-performance transducers
- Wide-beam is ideal for marking bait fish and game fish
- Vast bottom coverage in shallow-water
- Same targets appear at both frequencies
- Excellent fish detection in shallow to mid-water depths
- Retrofits into existing B260 fairing pocket
- Depth and fast-response water-temperature sensor
- Boat Size: 9 m (30') and up

www.airmar.com



Technical Information

50 kHz-AWIq / 200 kHz-BM

Number of Elements and Configuration		
Beamwidth (@-3 dB)	25°	25°
RMS Power (W)	1 kW	1 kW
TVR	161 dB	165 dB
RVR	-175 dB	-194 dB
FOM	-19 dB	-30 dB
Q	4	7
Impedance	200 Ω	90 Ω

MAXIMUM DEPTH RANGE

50 kHz	200 kHz
400 m to 610 m (1,350' to 2,000')	100 m to 180 m (330' to 600')

BEAM DIAMETER VS DEPTH

Depth	50 kHz	200 kHz
9 m (30')	4 m (13')	4 m (13')
30 m (100')	14 m (45')	14 m (45')
122 m (400')	55 m (180')	55 m (180')
305 m (1,000')	137 m (450')	137 m (450')

SPECIFICATIONS

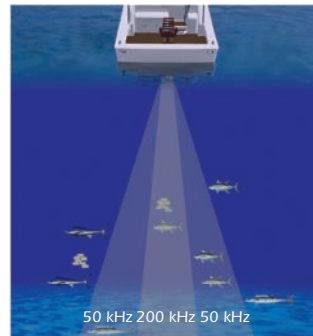
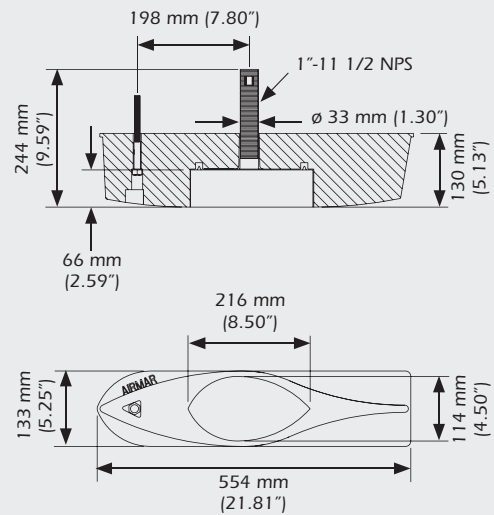
Weight: 7.3 kg (16 lb)

Hull Deadrise: Up to 20° with fairing

Acoustic Window: Urethane

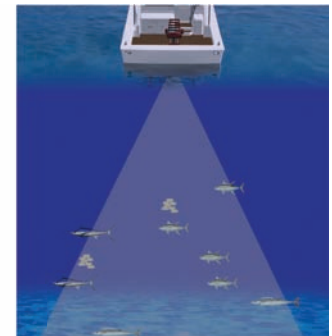
DIMENSIONS

Transducer and High-Performance Fairing

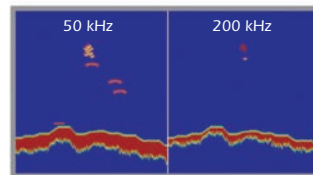


50 kHz 200 kHz 50 kHz

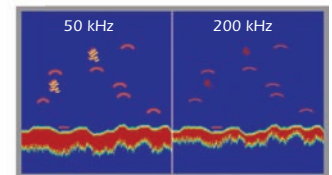
Standard 1 kW transducer
19° at 50 kHz, 6° at 200 kHz



SS270W twin wide-beam transducer
Identical 25° beamwidths at 50 kHz and 200 kHz



Different number of fish detected—
fish and bottom do not appear the same



See the same targets at both frequencies—
allows for easier species and bottom identification

B122



The Smart Alternative!

Airmar's B122 Smart™ Sensor features embedded micro-electronics. Depth and temperature signals are processed inside the sensor and can be displayed on any radar, chart plotter, or device that accepts NMEA 0183 or NMEA 2000® data. The 235 kHz frequency prevents mutual interference with other echosounders on the vessel.

Stronger Echo Returns

The B122 retractable, long-stem, bronze transducer is designed for use in thick hulled wooden boats or vessels with steep deadrise. The included high-performance fairing vertically orients the sound beam for stronger return echoes resulting in optimal sounder performance. The B122 can also be installed as a low-profile mount with an adaptor ring.

Thru-Hull Retractable, Long-Stem Smart™ Sensor

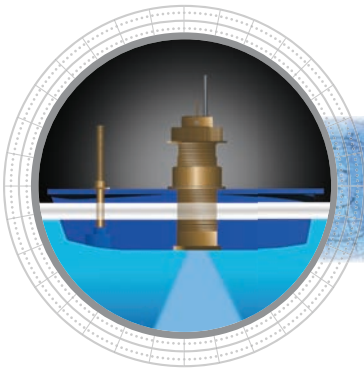
Features

- Long-stem, depth and temperature with a High-Performance Fairing
- Can install as a low-profile with adaptor ring
- 235 kHz frequency prevents mutual interference with other echosounders on the vessel
- For thick hulled or steep deadrise vessels
- Retractable, Bronze housing only
- Available in NMEA 0183 or NMEA 2000® versions
- 6 m (20') NMEA 2000 cable or 10 m (33') NMEA 0183 cable



Sensing Technology

www.airmar.com



Technical Information

235 kHz Broadband

Number of Elements and Configuration	○
Beamwidth (@-3 dB)	12°
RMS Power (W)	100 W

SPECIFICATIONS

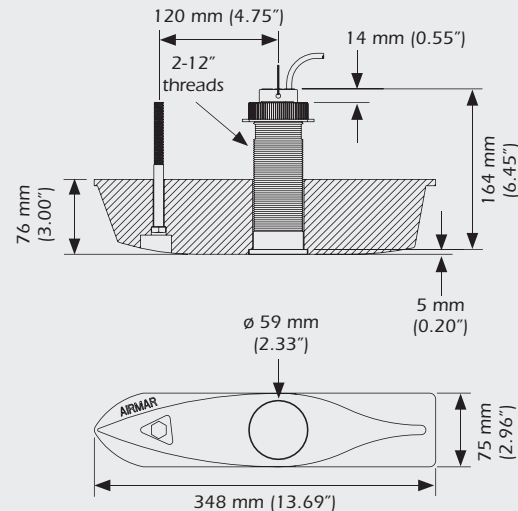
Weight: 3.9 kg (8.7 lb)
Acoustic Window: Urethane
Hull Deadrise: Up to 28° with fairing
Hole Diameter: 51 mm (2")
Data Update Rate: 1 per second
Minimum Depth Range: 0.5 m (1.6')
Maximum Depth Range: Up to 180 m (590')—Broadband
Pressure Rating: 3 m (10')
Pulse Rate: 20,000 p/nm* (5.6 Hz per knot)—*p/nm = pulses per nautical mile
Supply Voltage: 9 VDC to 16 VDC
Supply Current: <200 mA
Standard Cable Length:
 —10 m (33') NMEA 0183 cable
 —6 m (20') NMEA 2000 cable
Temperature Sensor Accuracy: ±0.5°C (±1.8°F)
Temperature Sensor Range: -10°C to 40°C (14°F to 104°F)
NMEA 2000® Load Equivalency Number (LEN): 4
CE Regulation: Complies to IERC60945

DATA OUTPUT PROTOCOL

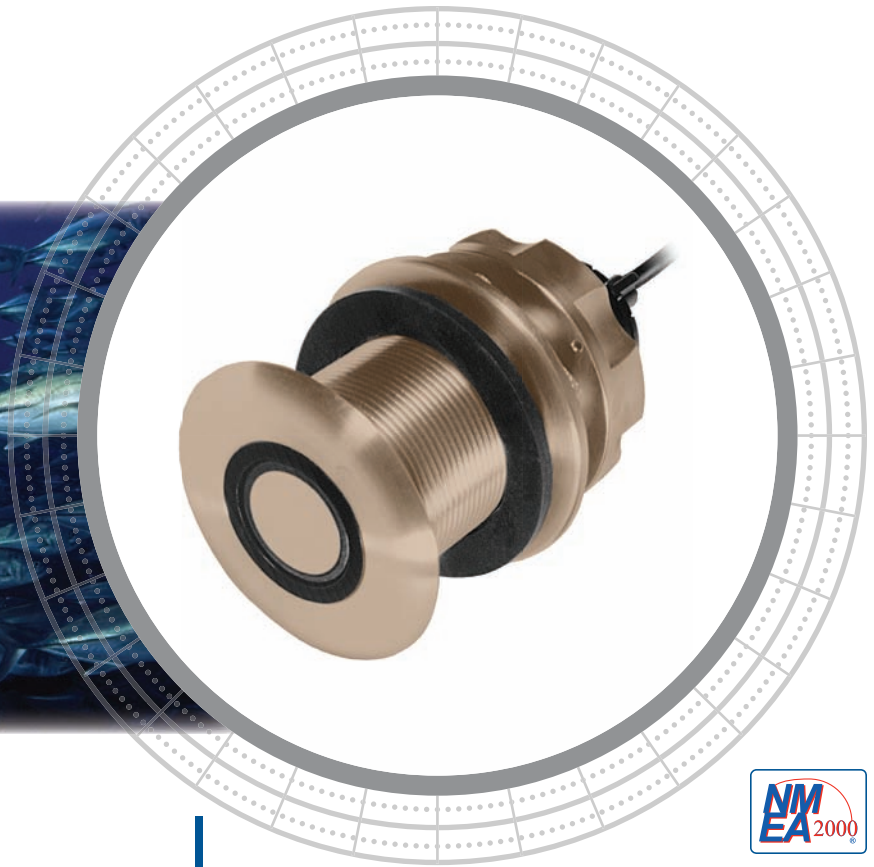
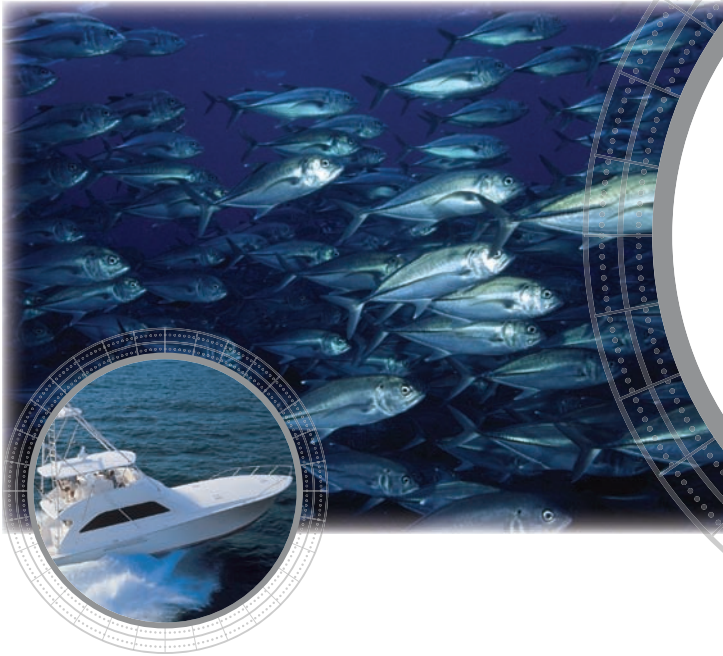
NMEA 0183 Sentence Structure
 \$SDBT, DDPT... Depth
 \$YXMTW..... Water Temperature

NMEA 2000® Supported PGNs
 59392..... ISO Acknowledgement
 600928..... ISO Address Claim
 126208..... Acknowledge Group Function
 126464..... Transmit PGN List Group Function
 126464..... Received PGN List Group Function
 126996..... Product Information
 128267..... Water Depth (With Transducer Offset)
 130310..... Environmental Parameters (Water Temperature)
 130311..... Environmental Parameters (Water Temperature)
 130312..... Environmental Parameters (Water Temperature)

DIMENSIONS



B17-HP



High-Precision Temperature

The B17 High-Precision Temperature Sensor provides fast-response to temperature changes with higher accuracy. The 25.4 mm (1") bronze button on the sensor face and the specialized fast-response thermistor provide a super fast 5 second time constant and $\pm 0.3^{\circ}\text{C}$ (0.17°F) accuracy. Precision temperature data is output to a chart plotter, radar screen, digital display, or computer. Separate interface boxes are available for NMEA 0183 or NMEA 2000[®] protocols. The units are ideal for fishing as they can detect thermal boundaries such as the edges of currents, which tend to concentrate bait and game fish.

Thru-Hull Low-Profile Temperature Sensor

High-Precision Smart[™]

Applications

- Sportfishing
- Commercial fishing

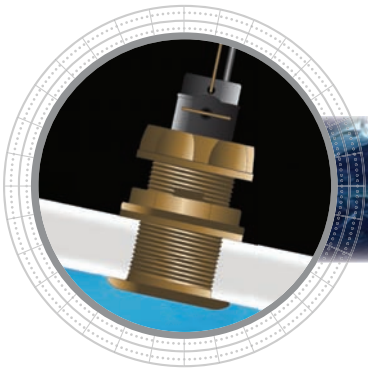
Features

- High-precision temperature with $\pm 0.3^{\circ}\text{C}$ (0.17°F) accuracy
- NMEA 0183 and NMEA 2000[®] versions available
- Temperature insert easily fits into any existing 51 mm (2") retractable Airmar housing
- Available in plastic, bronze, or stainless steel housings
- These low-profile housings are nearly flush and minimize drag with only 5 mm ($3/16$ ") extending outside the hull



Sensing Technology

www.airmar.com



Technical Information

SPECIFICATIONS

Weight:

- 0.6 kg (1.3 lb)—Plastic
- 1.3 kg (2.8 lb)—Bronze
- 1.6 kg (3.5 lb)—Stainless Steel

Temperature Accuracy: ±0.3°C (±0.17°F)

Temperature Resolution: 0.01°C (0.2°F)

Data Update Rate: 1 per second

Data Output Protocol: NMEA 0183 or NMEA 2000®

NMEA Data Sentence: YXMTW, PGN130310

Supply Voltage: 6 VDC to 28 VDC

Supply Current: 30 mA maximum

Maximum Extension Cable Length: 100 m (330')

Hole Diameter: 51 mm (2")

Temperature Range: 0°C to 30°C (32°F to 86°F)

DATA OUTPUT PROTOCOL

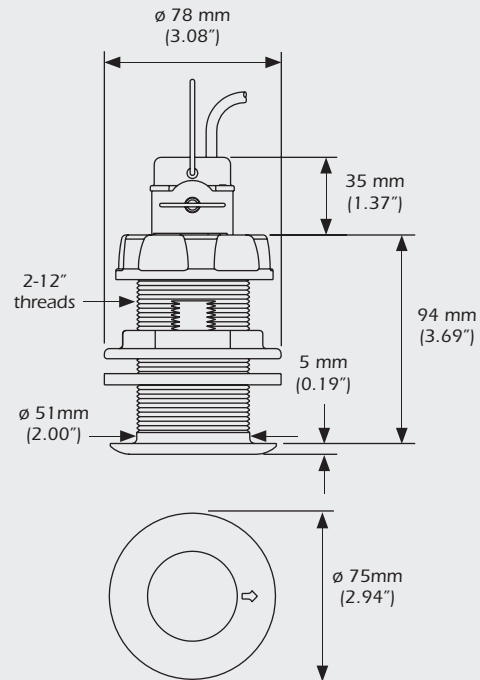
Analog Paddlewheel Format

OR

NMEA 2000® Supported PGNs

- 59392..... ISO Acknowledgement
- 600928..... ISO Address Claim
- 126208..... Acknowledge Group Function
- 126464..... Transmit PGN List Group Function
- 126464..... Received PGN List Group Function
- 126996..... Product Information
- 130310..... Environmental Parameters (Water Temperature)
- 130311..... Environmental Parameters (Water Temperature)
- 130312..... Environmental Parameters (Water Temperature)

DIMENSIONS



T42



High-Precision Temperature Sensing

Airmar's T42 is a high-precision temperature sensor that has a bronze button on the face for a quick, 15 second thermal time constant and is accurate to $\pm 0.3^{\circ}\text{C}$ ($\pm 0.17^{\circ}\text{F}$). Precision temperature data is output to a chart plotter, radar screen, digital display or computer. A separate interface box is available for NMEA 0183 output. The T42 is ideal for fishing as it can detect thermal boundaries such as the edges of currents.



T42 high-precision temperature sensor with interface box

Thru-Hull Temperature Sensor

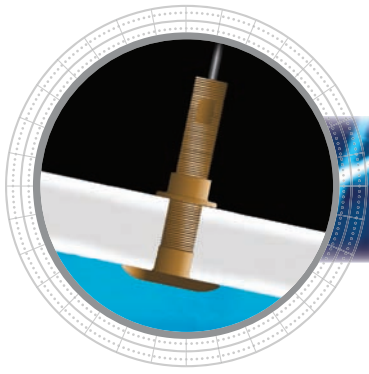
High-Precision Smart™

Applications

- Water temperature for sport and commercial fishing

Features

- Temperature only
- Senses temperature in water and is mounted in fiberglass or wooden boats
- Durable bronze housing
- Temperature sensors have a 3 m (10') cable to the interface box
- Interface box has a 10 m (33') cable leading to the instrument

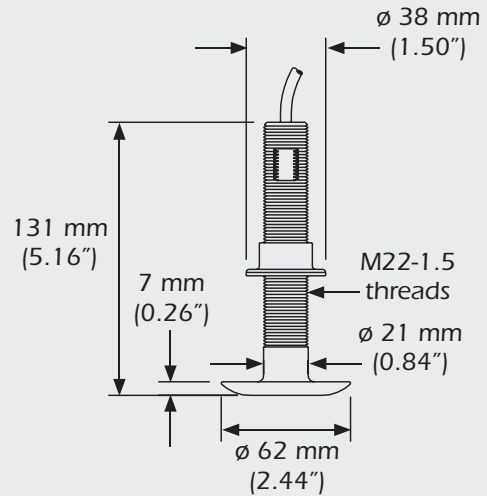


Technical Information

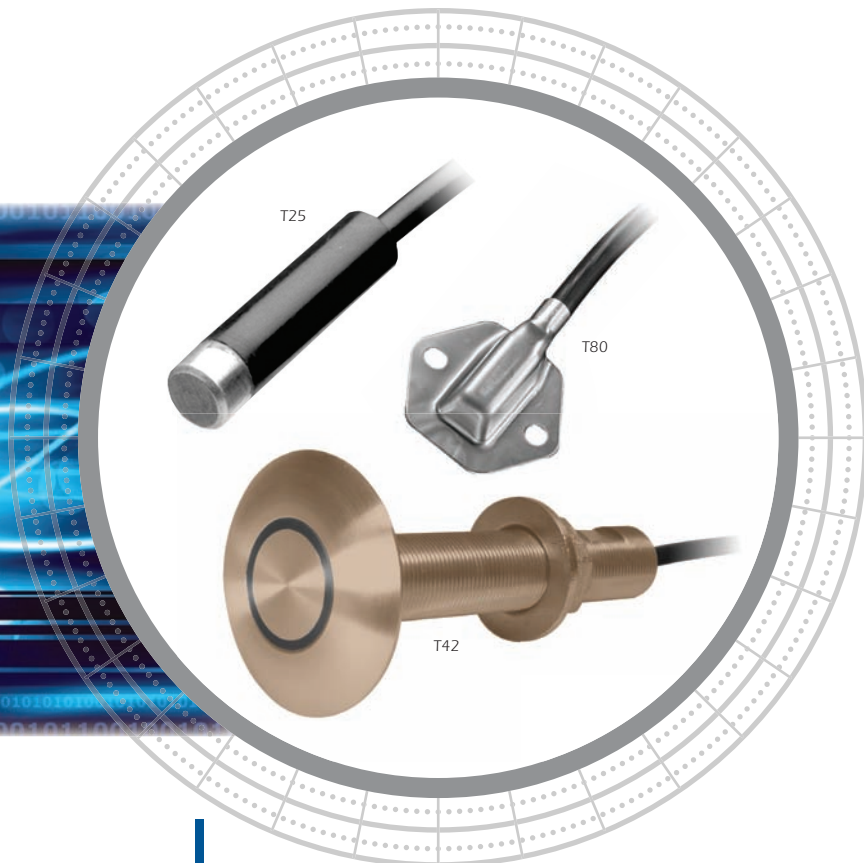
SPECIFICATIONS

Weight: 0.6 kg (1.3 lb)
Temperature Accuracy: $\pm 0.3^{\circ}\text{C}$ ($\pm 0.17^{\circ}\text{F}$)
Resolution: 0.01°C (0.2°F)
Data Update Rate: 1 per second
Data Output Protocol: NMEA 0183
NMEA Data Sentence: YXMTW
Supply Voltage: 6 VDC to 28 VDC
Supply Current: 30 mA maximum
Maximum Extension Cable Length: 100 m (330')
Hole Diameter: 22 mm (7/8")
Temperature Range: 0°C to 30°C (32°F to 86°F)

DIMENSIONS



T25 T80, T42



Airmar offers three styles of fully waterproof, stand-alone, temperature sensors to meet your demanding and rugged temperature sensing applications.

Temperature on Equipment

The T25 has a very fast thermal response time in air and is well suited for sensing temperature on all types of industrial equipment.

Liquid or Air Temperature

The T80 stainless steel model can be surface-mounted virtually anywhere to measure liquid or air temperature.

Temperature in Water

The T42 bronze thru-hull senses temperature in water and can be mounted in vessels with fiberglass or wood hulls.

Temperature Sensors

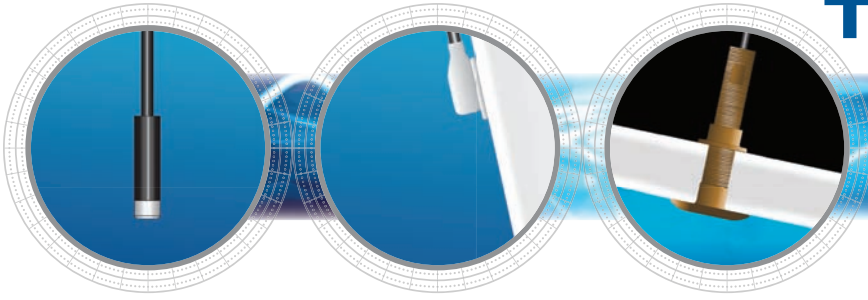
Applications

- T25—Air temperature sensing
- T80—Liquid or air temperature measurement
- T42—Water temperature, thru-hull mounting on all fiberglass and wood boat hulls

Features

- All units have a thermistor with 10,000 ohms nominal resistance at 25°C (77°F)
- Temperature only
- T25 plastic housing
- T80 stainless steel housing
- T42 bronze housing

T25, T80, T42



Technical Information

SPECIFICATIONS

Weight:

—0.2 kg (0.5 lb)—T25
—0.2 kg (0.5 lb)—T80
—0.6 kg (1.3 lb)—T42

Thermal Constant: 15 seconds—T42

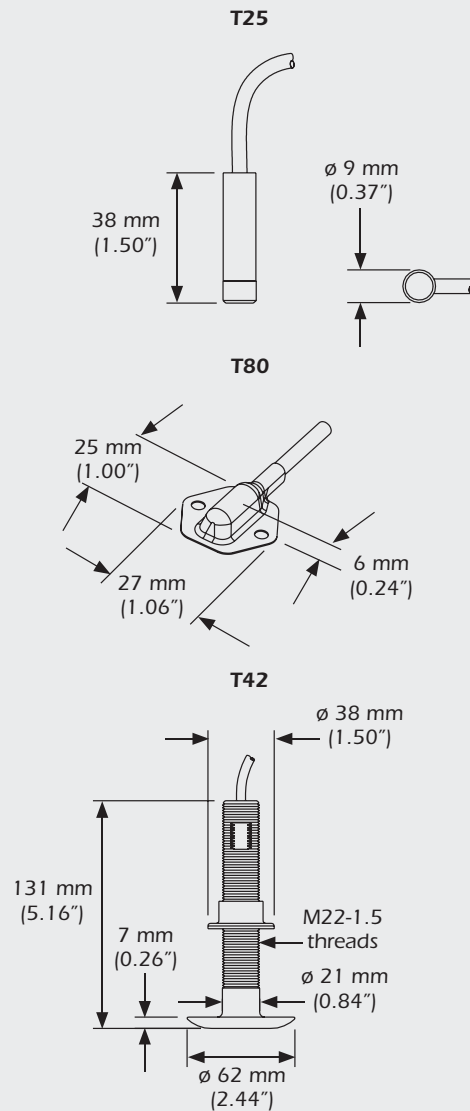
Temperature Accuracy: $\pm 2^\circ$

Unicurve® Type Thermistor: 10,000 ohms

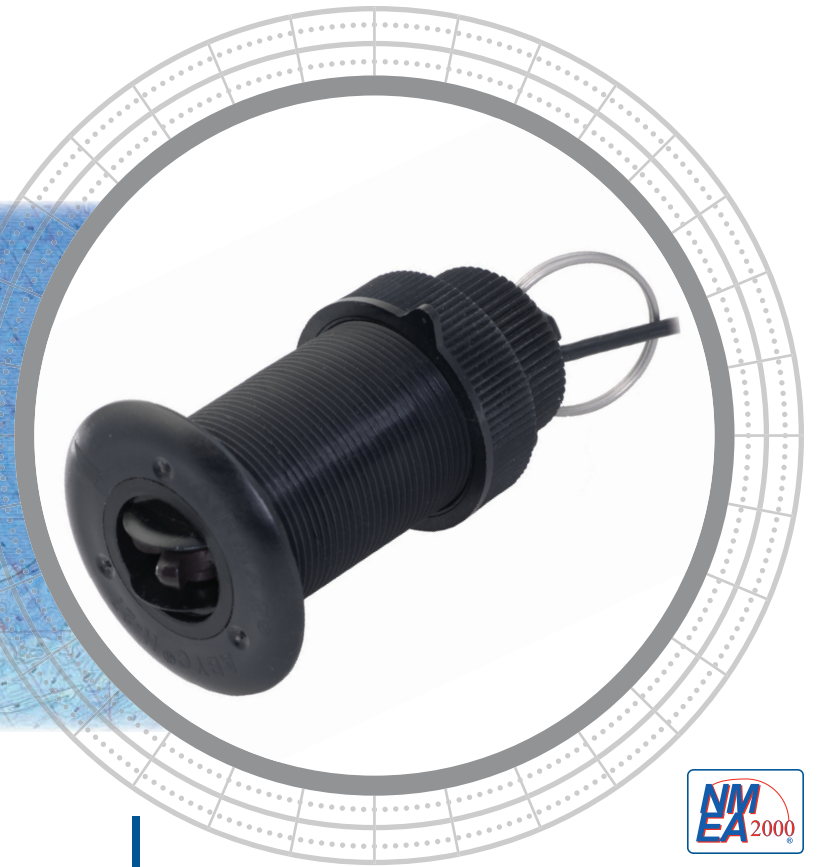
Hole Diameter for Installation: 22 mm (7/8")—T42

Temperature Range: 0°C to 30°C (32°F to 86°F)

DIMENSIONS



ST800 ST850



The Smart Alternative!

Airmar's New ST800 and ST850 Smart™ Sensors feature embedded micro-electronics. Speed and temperature signals are processed inside the sensor and can be displayed on any radar, chart plotter, or device that accepts NMEA 2000® data.

Minimize Your Drag

The ST850 is Airmar's standard, thru-hull, speed and temperature sensor. The plastic, bronze, and stainless steel outer housing options are available to meet all hull requirements. These low-profile housings are nearly flush and minimize drag with only 5 mm (3/16") extending outside the hull.

Eliminate Turbulence

The plastic P217 and bronze B119 countersunk flush outer housings are easy-to-install. The plastic P314 and bronze B21 outer housing options have a traditional beveled-edge for flush mounting. Flush-mount housings eliminate turbulence for accurate readings at high-speeds. They are the optimal choice for installation in racing sailboats and high-speed powerboats.

Thru-Hull Speed & Temperature Smart™ Sensors

Features

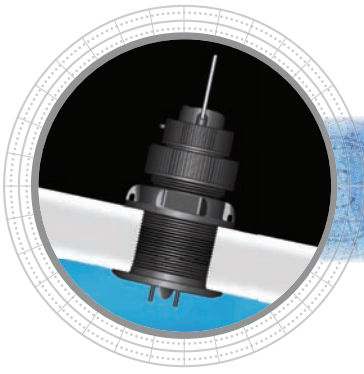
- Speed and temperature
- NMEA 2000® or Analog output options
- Retractable plastic, bronze, or stainless steel housings with valve sleeve
- ST800—Retrofits into Airmar P120 and B120 housings
- ST850—Retrofits into Airmar P17 and B17 housings
- 6 m (20') NMEA 2000 cable, 9 m (30') Analog cable
- Devicenet connector or NMEA 2000 version
- Speed Range: 2 knots to 45 knots (2 MPH to 52 MPH)



Sensing Technology

www.airmar.com

ST800, ST850



Technical Information

SPECIFICATIONS

Weight:
 —0.7 kg (1.4 lb)—Plastic
 —1.3 kg (2.8 lb)—Bronze
 —1.6 kg (3.5 lb)—Stainless Steel

Speed Range: 2 knots to 45 knots (2 MPH to 52 MPH)

Acoustic Window: Urethane

Hull Deadrise: Up to 22°

Data Update Rate: 1 per second

Pressure Rating: 3 m (10')

Pulse Rate: 20,000 p/nm* (5.6 Hz per knot)—*p/nm = pulses per nautical mile

Supply Voltage: 9 VDC to 16 VDC

Supply Current: <200 mA

Standard Cable Length: 6 m (20') NMEA 2000 cable, 9 m (30') Analog

Temperature Sensor Accuracy: ±0.5°C (±1.8°F)

Temperature Sensor Range: -10°C to 40°C (14°F to 104°F)

NMEA 2000® Load Equivalency Number (LEN): 2

CE Regulation: Complies to IERC60945

DATA OUTPUT PROTOCOL

Analog Paddlewheel Format

OR

NMEA 2000® Supported PGNs

59392..... ISO Acknowledgement

600928..... ISO Address Claim

126208..... Acknowledge Group Function

126464..... Transmit PGN List Group Function

126464..... Received PGN List Group Function

126996..... Product Information

128259..... Speed (Speed Water Reference)

128275..... Distance Log

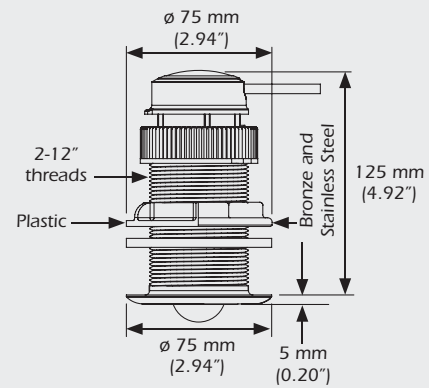
130310..... Environmental Parameters (Water Temperature)

130311..... Environmental Parameters (Water Temperature)

130312..... Environmental Parameters (Water Temperature)

DIMENSIONS

ST800 P120 Plastic, B120 Bronze



ST850 P17 Plastic, B17 Bronze, and SS577 Stainless Steel

