



# Raymarine<sup>®</sup>

## 2008 Transducer Products

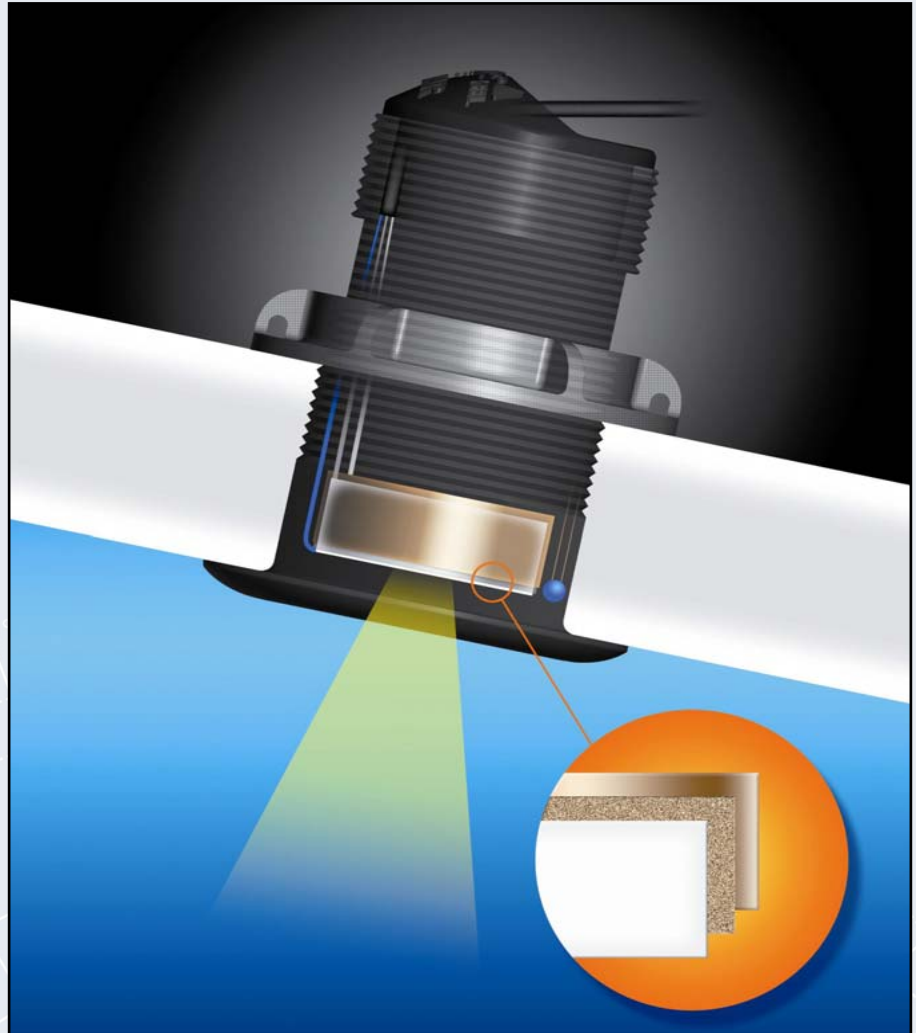


# Transducer Theory

A fishfinder system consists of the sounder and transducer.

Electrical pulses are sent to the ceramic element.

These pulses are converted to acoustic energy—"sound waves"—that travel through the water.



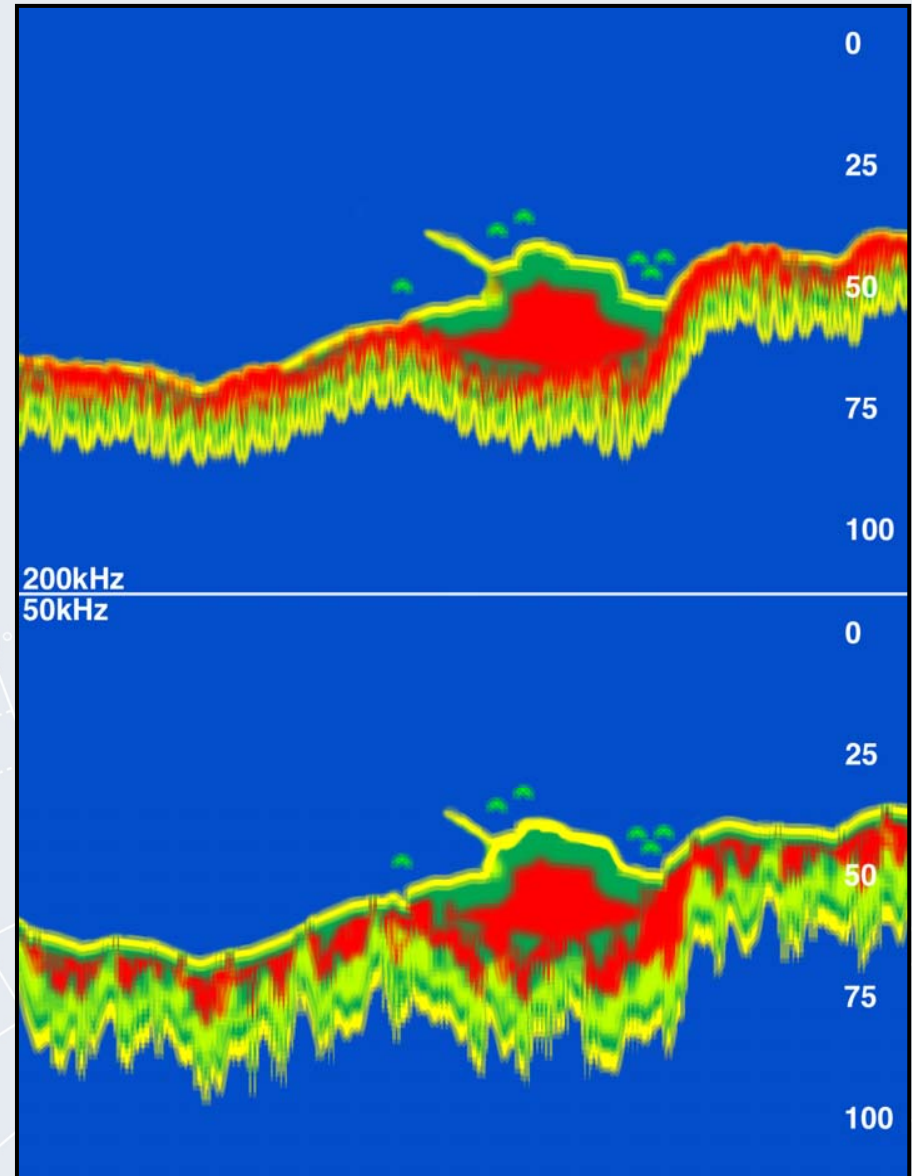
The sound is transmitted through the water and reflects off of objects within the water column, returning the sound back to the face of the transducer.

The air in a fish's bladder is an excellent reflector, making it an easy target for the transducer to detect.



The fishfinder measures the time between transmitting the sound and receiving the echo. Sound travels at 4800'/second.

Distance to the object is calculated by multiplying the time elapsed between the sound transmission and the received echo by the speed of sound through water.





# Transom



# Thru-hull

# In-hull



# P66 Transom TRIDUCER Multisensor



Raymarine models:  
E66028-PZ, E66054,  
(Depth Only E26027-PZ)



- Plastic kick up bracket
- New square blade paddlewheel improves linearity
- Accommodates transom angles between 2° - 20°
- Recessed water flow channel protects paddlewheel
- 600 Watt capable

# B45 Bronze Thru-Hull

Raymarine models:

E26019-PZ

- Recommended for planing hull power boats and cruising sailboats
- Good sensitivity in a compact housing
- Fast response temperature sensor provides  $\pm 0.2^\circ$  accuracy
- 600 Watt capable



# P79 In-hull

Raymarine models:  
E26001-PZ, E66008



- Recommended for solid fiberglass hulls
- Recommended for planing hull powerboats, trailered boats, rigid inflatable boats (RIBS) and racing sailboats
- Easily adapts to deadrise angles up to 22°
- No hull protrusions
- 600 Watt capable



# B744V/B744VL TRIDUCER Multisensor



Raymarine models:

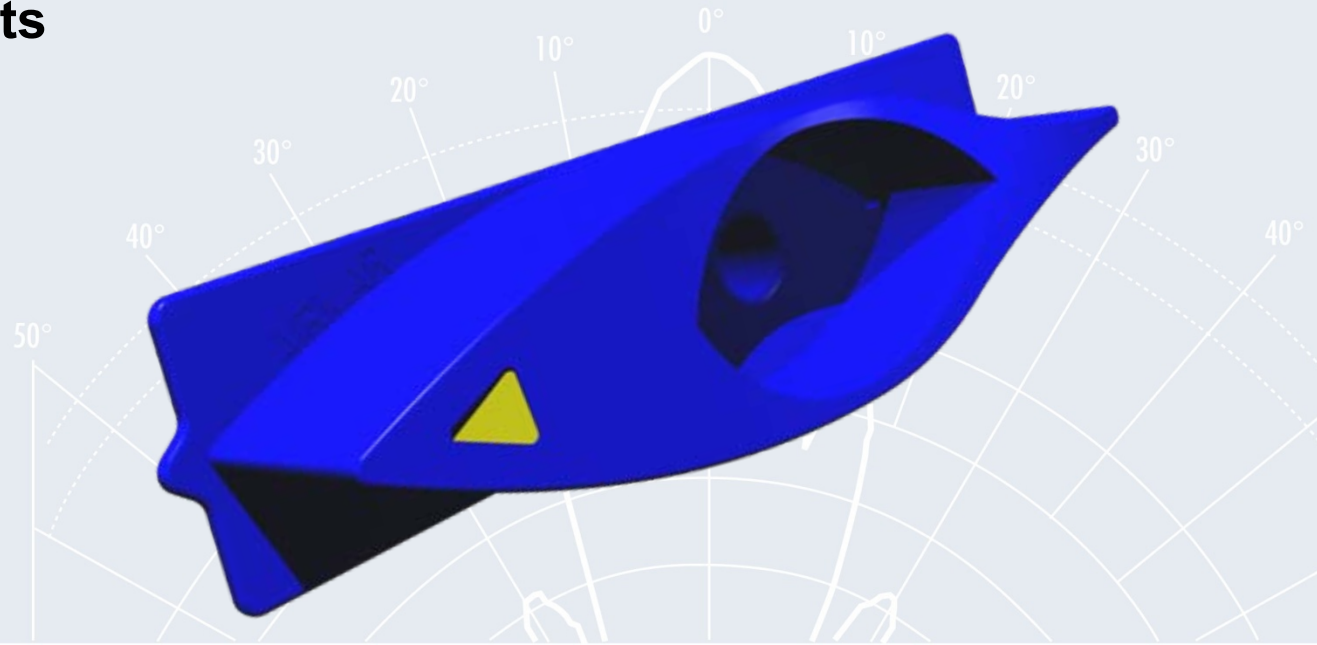
E26011-PZ, E66056,  
E66057, E66061, A26043, A66090,  
A66091

- Depth/Speed/Temp functions
- 600 Watt capable
- Self-closing valve
- Longer stem than B44V
- Removal of wings
- High Performance Fairings included
- Accessories available

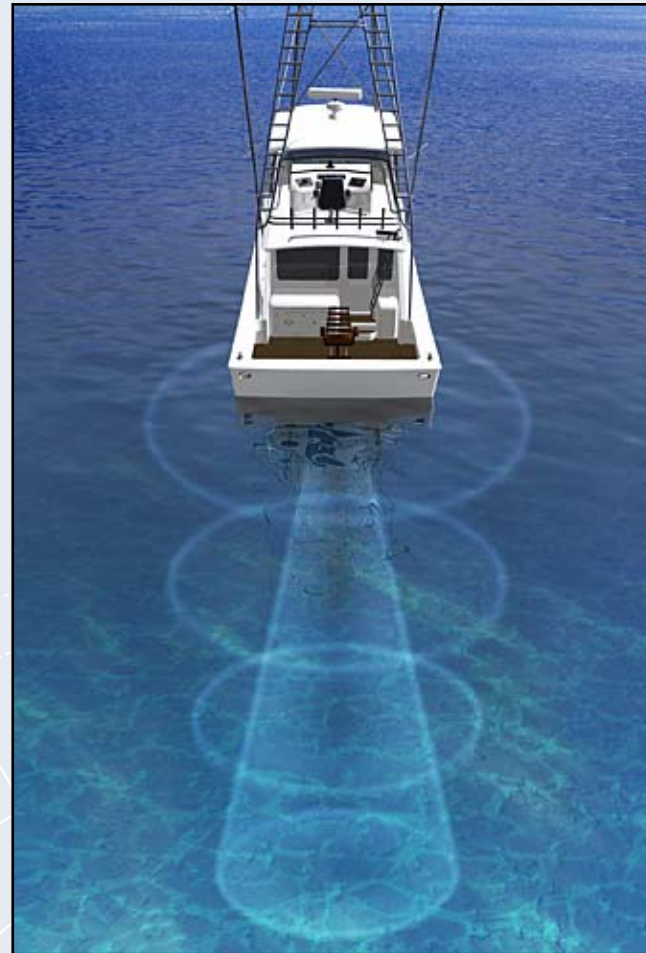
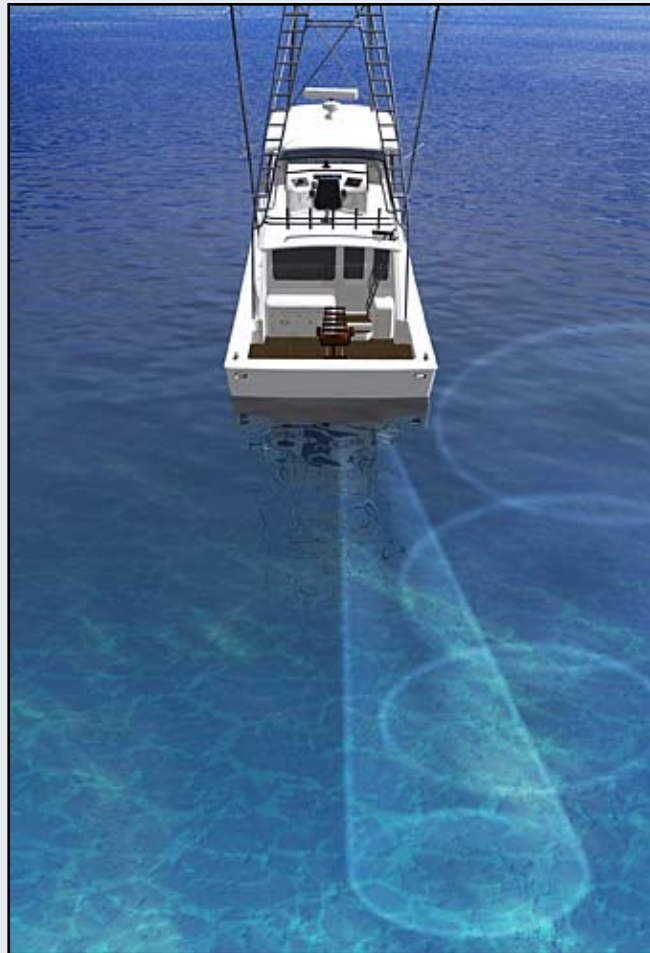


# High Performance Fairings

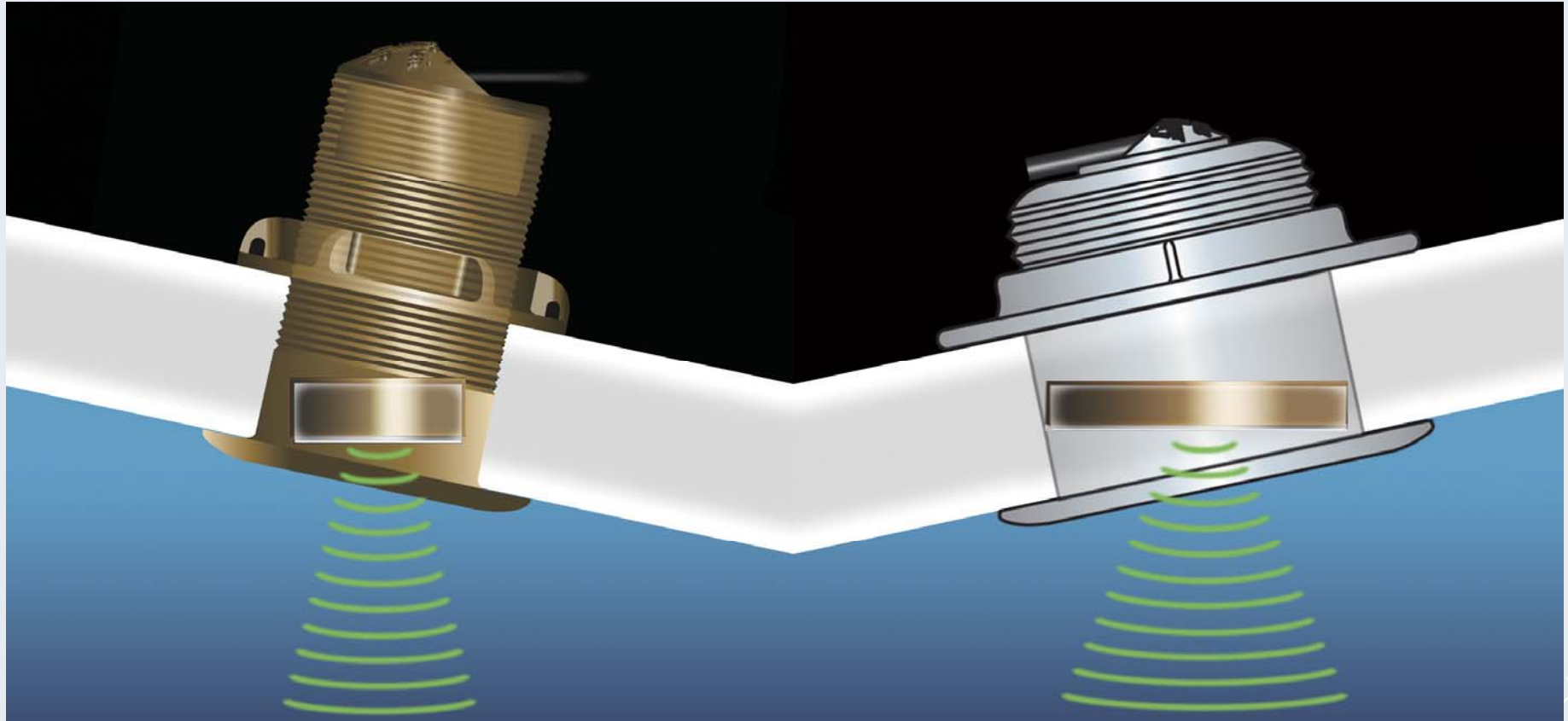
- **Allows Vertical mounting of transducer for proper beam orientation**
- **Straightens water flow / reduces turbulence for less chance of prop and water intake cavitation**
- **Significantly improves the performance of any thru-hull installation**
- **Significant performance improvement at speeds from 10 knots to over 40 knots**



# Importance of Vertical Beam



# Tilted Element™ Transducers





# B60 Tilted Element Bronze Thru-Hull

Raymarine models:

12° - E66086, E66088

20° - E66085, E66087

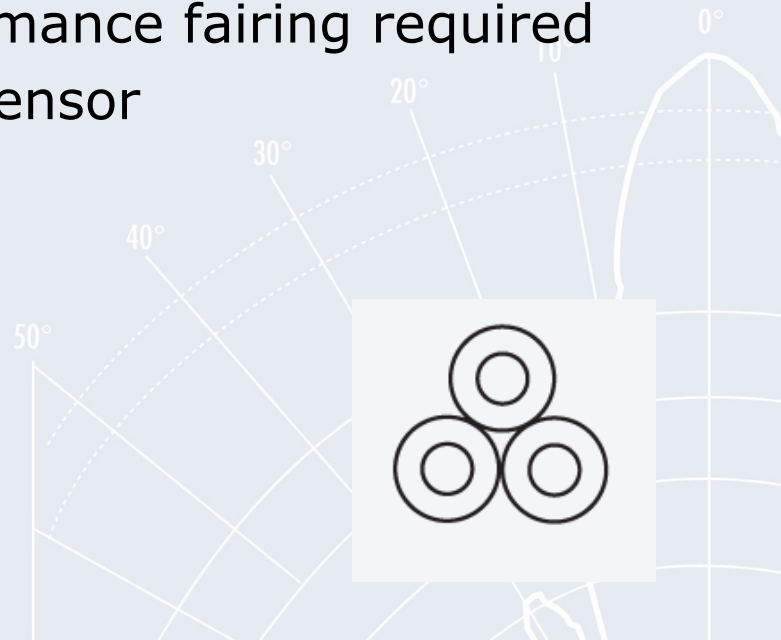
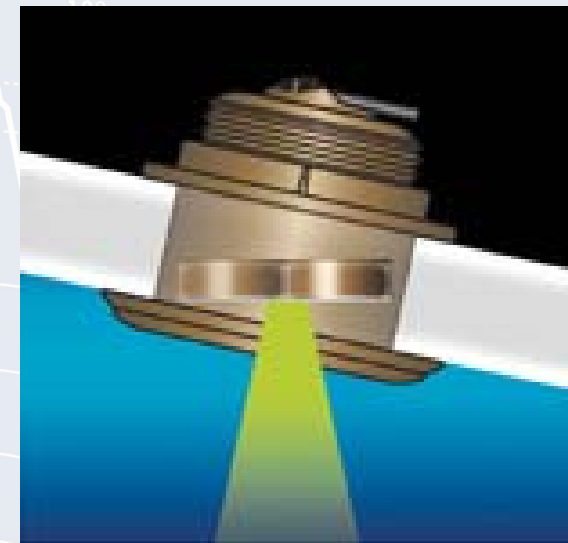
- 12° tilted version for 8°-16° hull deadrise angles
- 20° tilted version for 16°-24° hull deadrise angles
- Arrow on cap points toward keel when installed
- Includes temperature
- 600 Watt capable





# B164 1 kW Tilted Element™

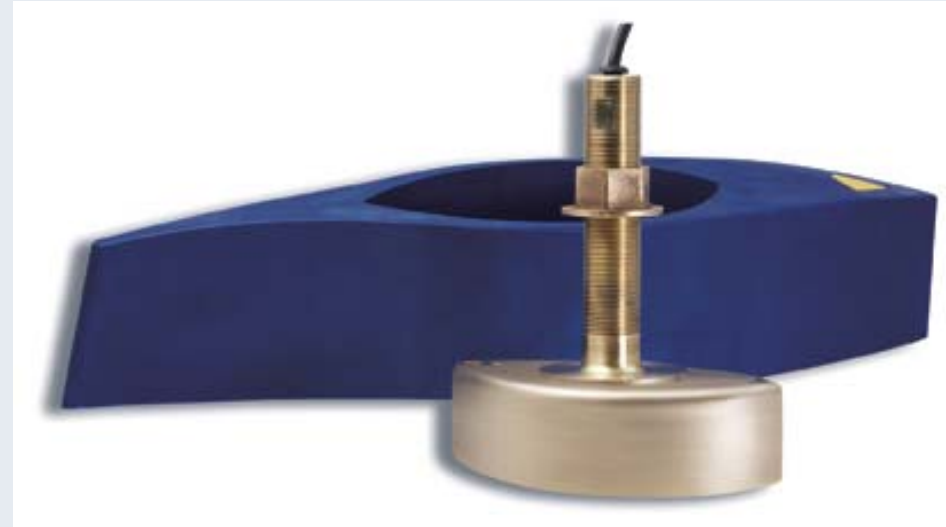
- Engineered for Center console and sport fishing boats
- 50/200kHz :constructed of three dual frequency elements.
- Low-profile design leaves no protrusion below the hull
- No High Performance fairing required
- Built-in temp sensor



# B258 1 kW Bronze Thru-Hull

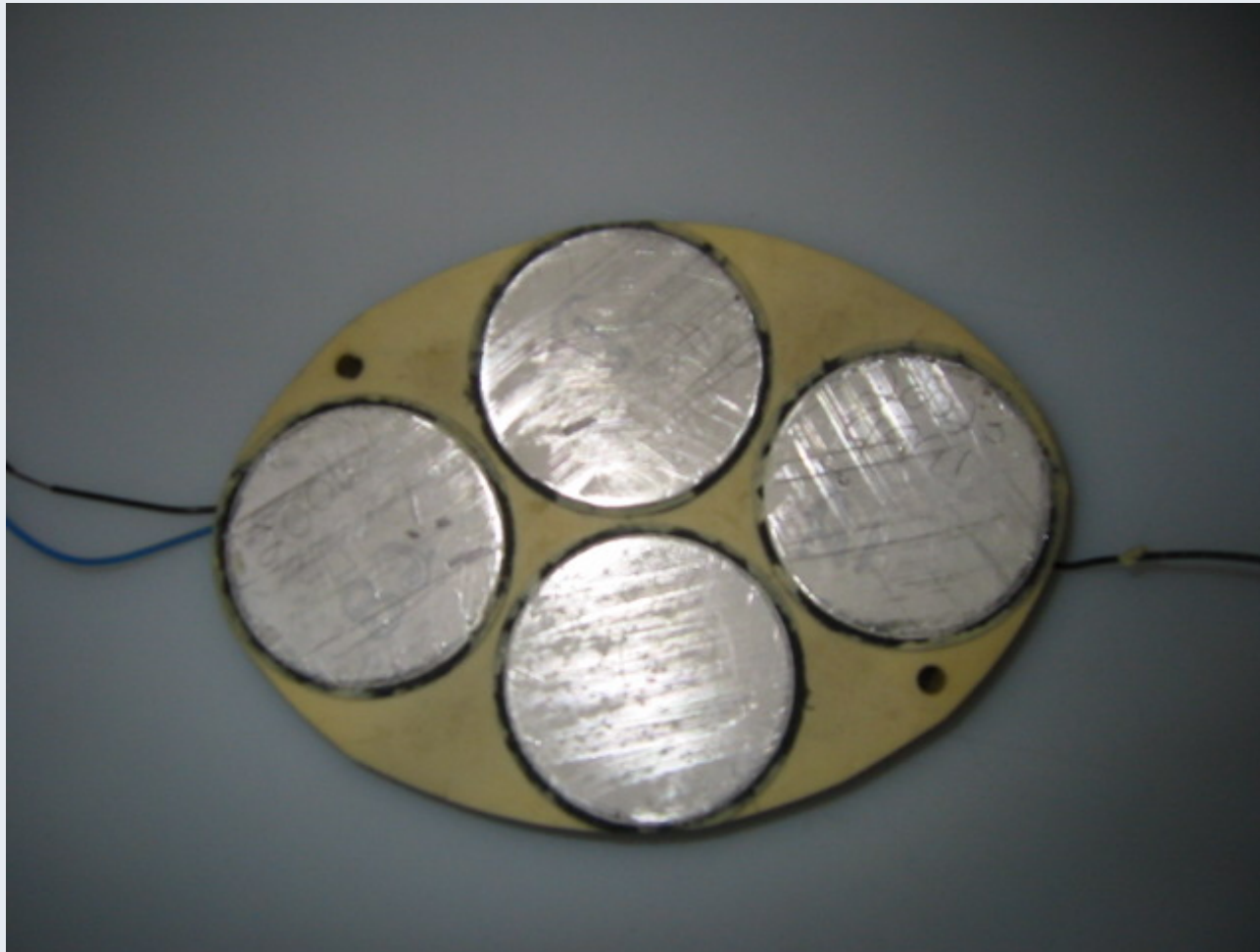


Raymarine model: E66082  
(8 pin plug/DSM300)



- Higher receive sensitivity over B256
- Reduced Q to 9 at 50kHz
- Depth & Temperature functions
- 25x's more sensitive than single element design
- Elliptical Beam  $14^{\circ} \times 23^{\circ} / 3^{\circ} \times 5^{\circ}$
- High Performance Fairing recommended for best results (fairing part # 33-523-01)

# B258 (E66082) Element Array



# M258 1 kW Transom Mount



Raymarine model:

E66084 (8 pin connector/DSM300)

- Depth & Temperature functions
- Same internal construction as E66082
- Simple and inexpensive installation
- Adjustable brackets for multiple running positions
- Tool-Free removal for transport or storage
- Works with all hull materials



# The Broadband Advantage

- Broadband transducers exhibit minimal ringing.
  - This provides crisper imaging and greater definition.
  - These transducers can also echo-range in very shallow water.
- Your Airmar transducer is Broadband Enabled for future advancement.
  - Future Fishfinders may be “tunable” allowing users to “tune” the best frequency for optimum performance.
  - Broadband also allows for advanced chirp transmission technology by extracting information from the chirp echo such as seafloor characteristics, fish type, etc.

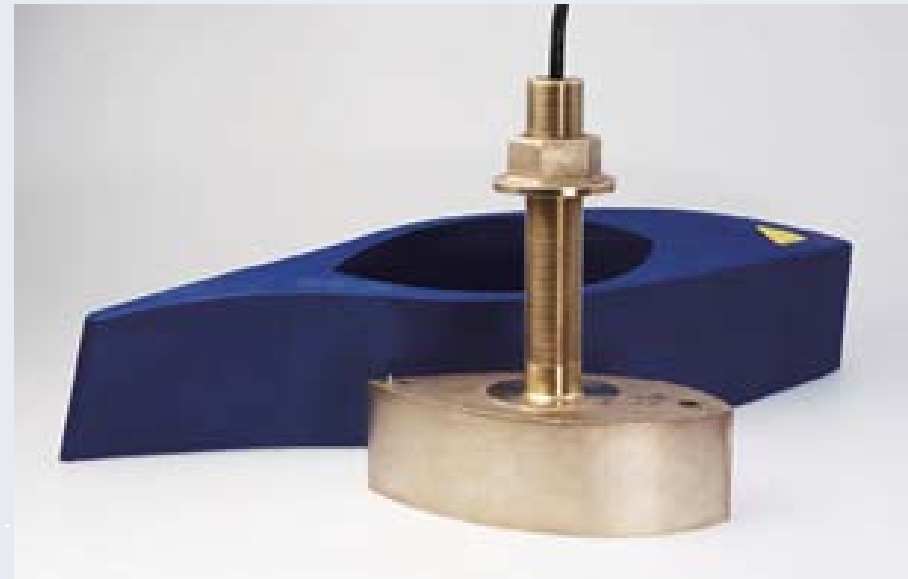


# B260 1kW Bronze Thru-Hull



Raymarine model: E66079 (8 pin connector/DSM300)

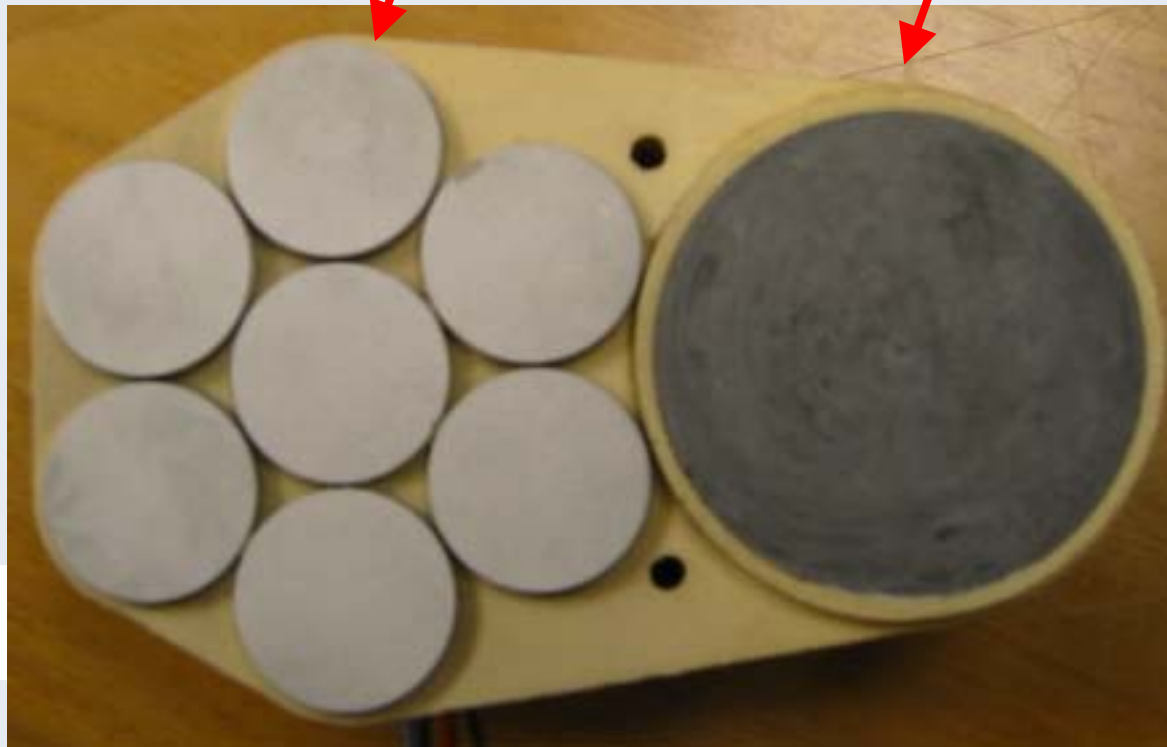
- 50x's more sensitive @ 50 kHz than single element design
- 19 ° beam @ 50 kHz  
6 ° beam @ 200 kHz
- Excellent for bottom fishing and target discrimination
- High Performance Fairing recommended for best results
- Fairing part number E66034



# B260 (E66079) Element Array

50kHz Ceramic  
Array

200kHz  
Broadband  
Ceramic



# M260 1kW In-hull

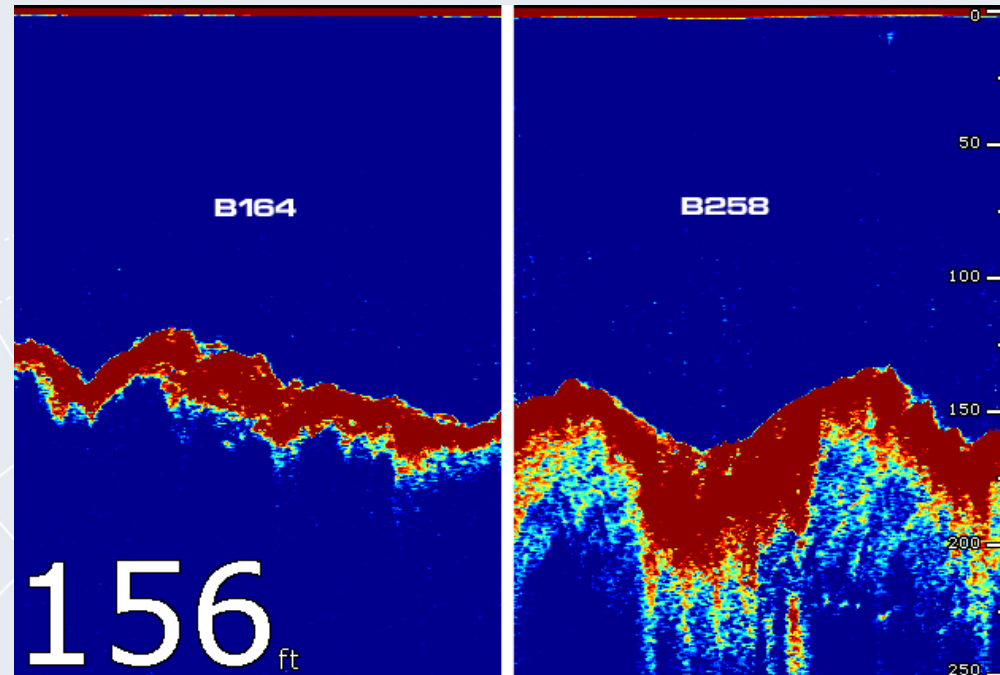
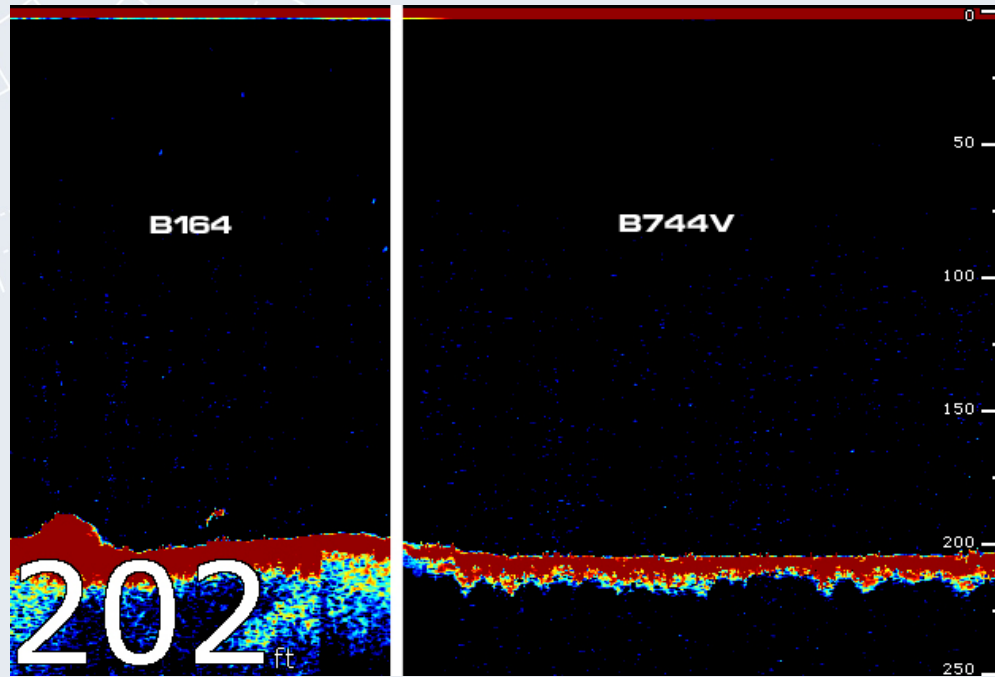


Raymarine model: A66089 with in-hull tank

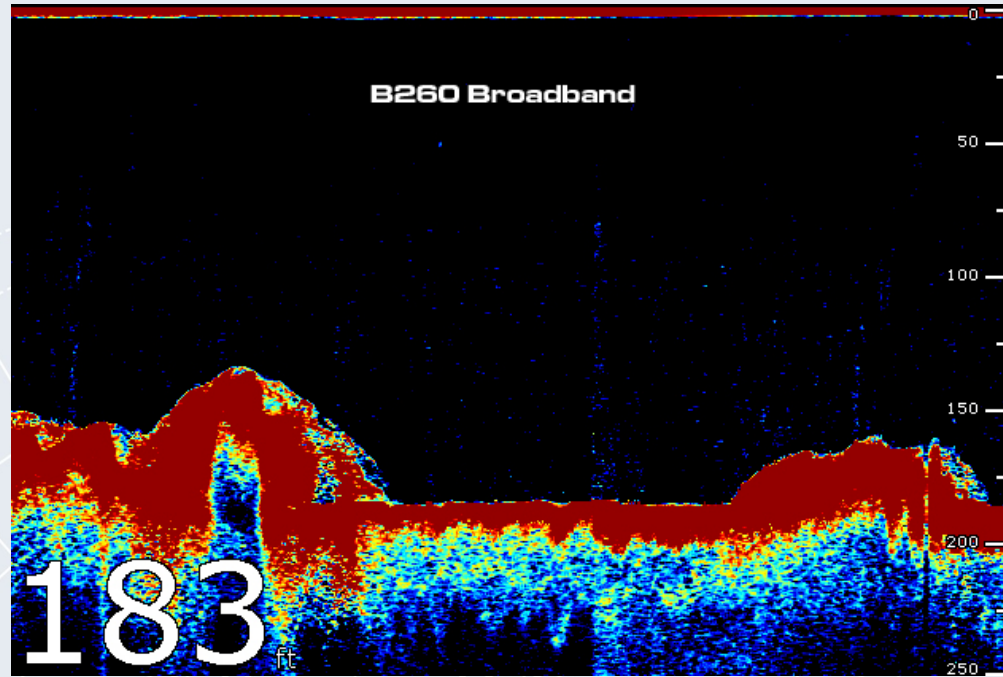
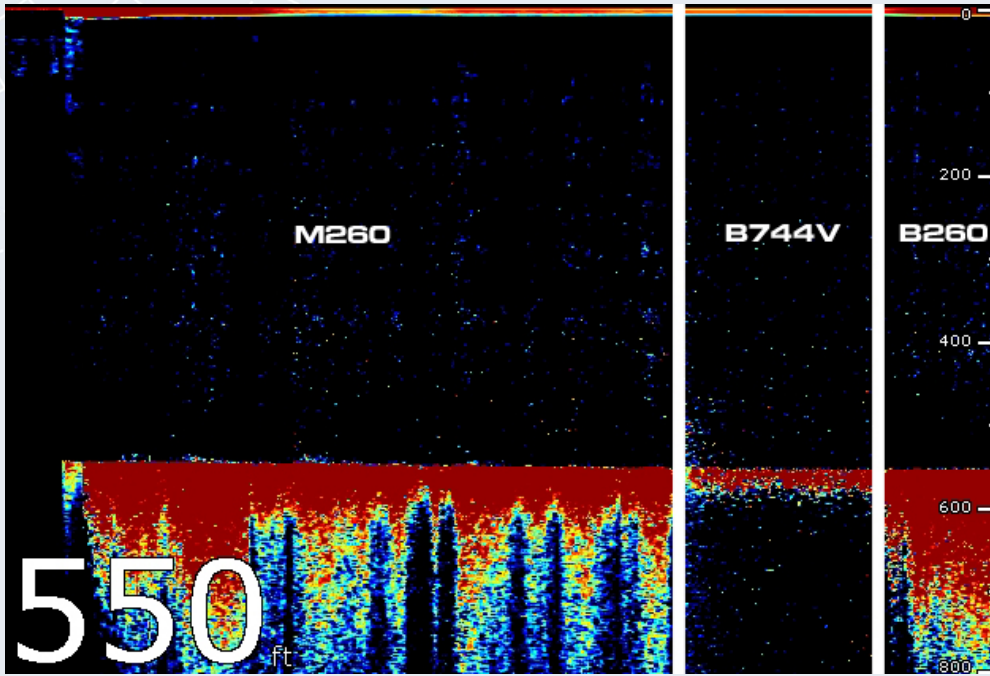
- Depth only
- Innovative tank design allows for bow-stern or port-starboard mounting
- Same internal construction as B260 (E66079)
- Excellent high speed performance
- Solid fiberglass hulls
- Easy to install



# Performance Photos



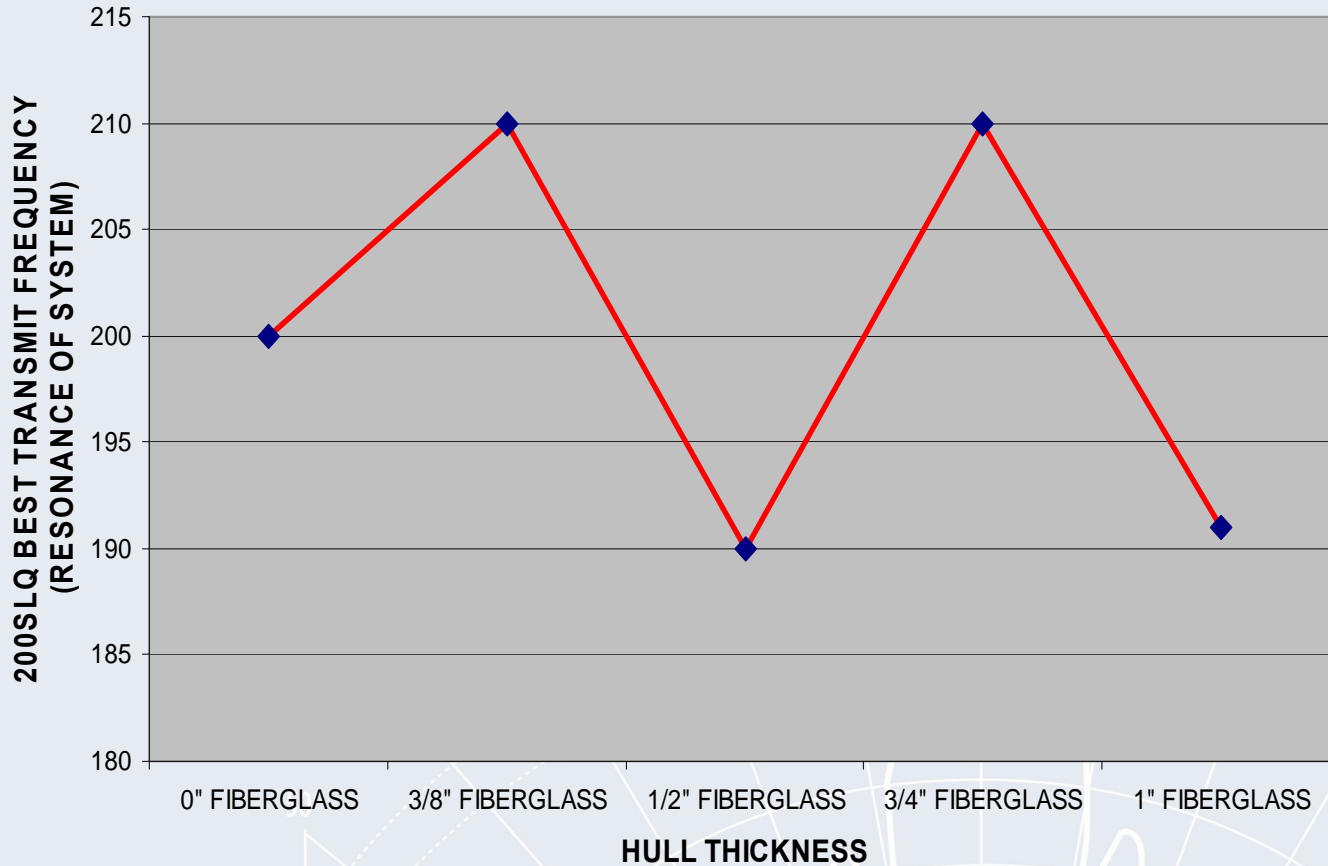
# Performance Photos





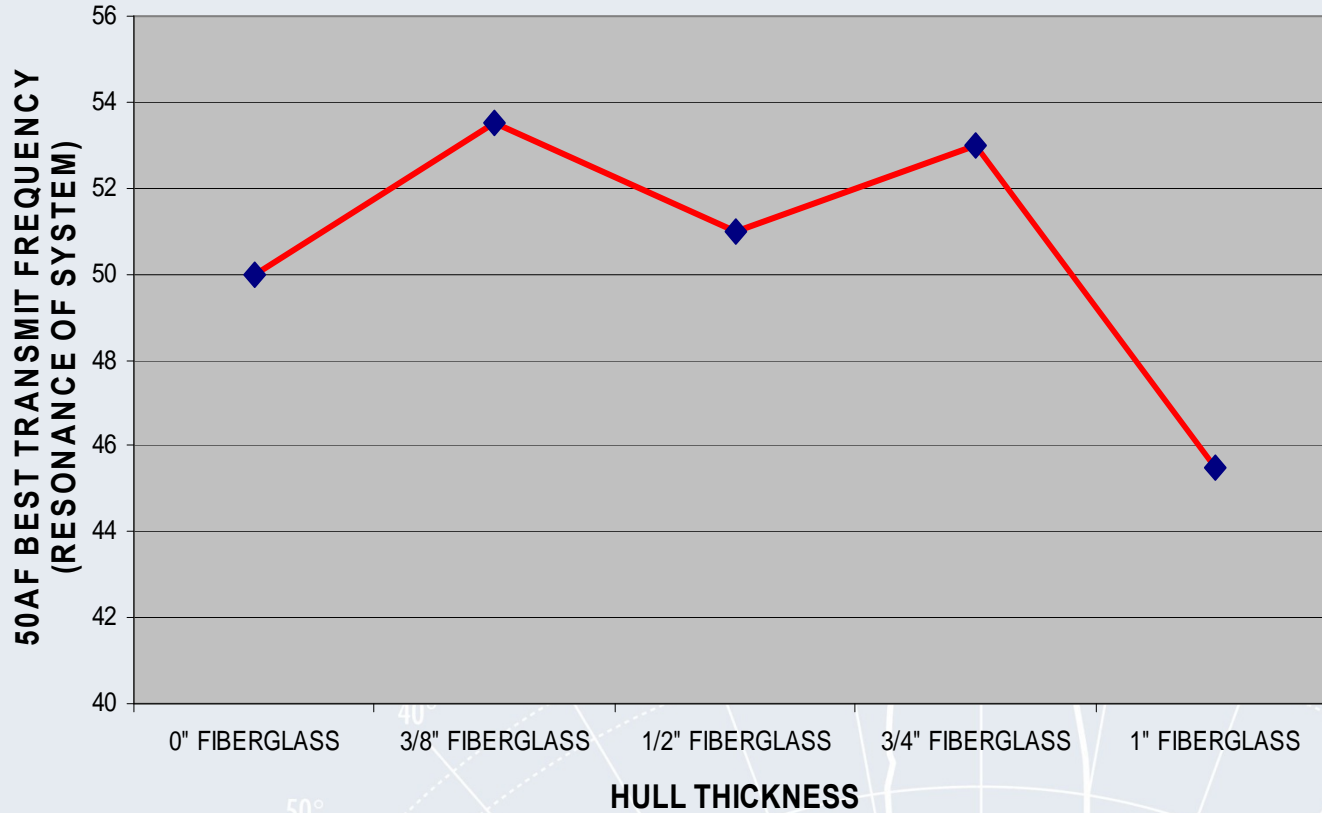
# In-Hull Performance

200SLQ PEAK FREQUENCY vs. HULL THICKNESS



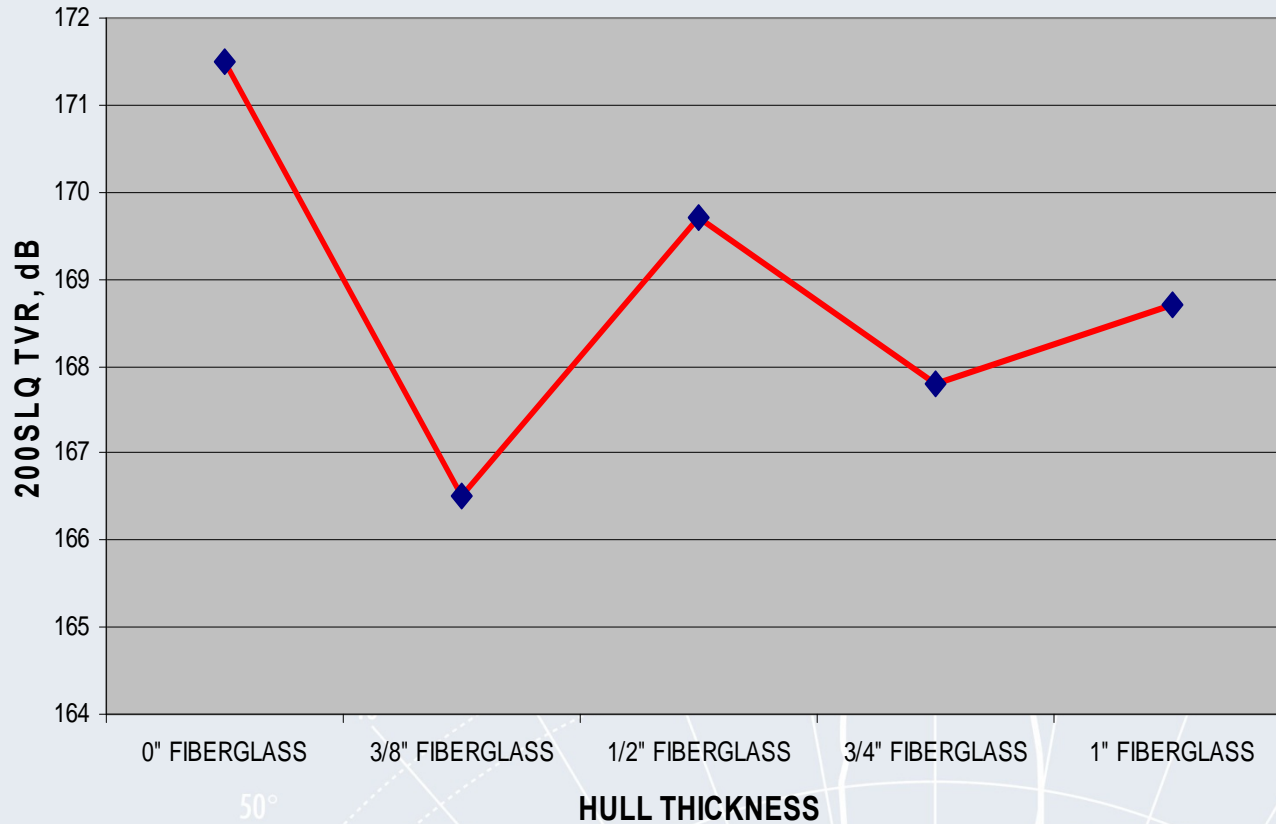
# In-Hull Performance

50AF PEAK FREQUENCY vs. HULL THICKNESS



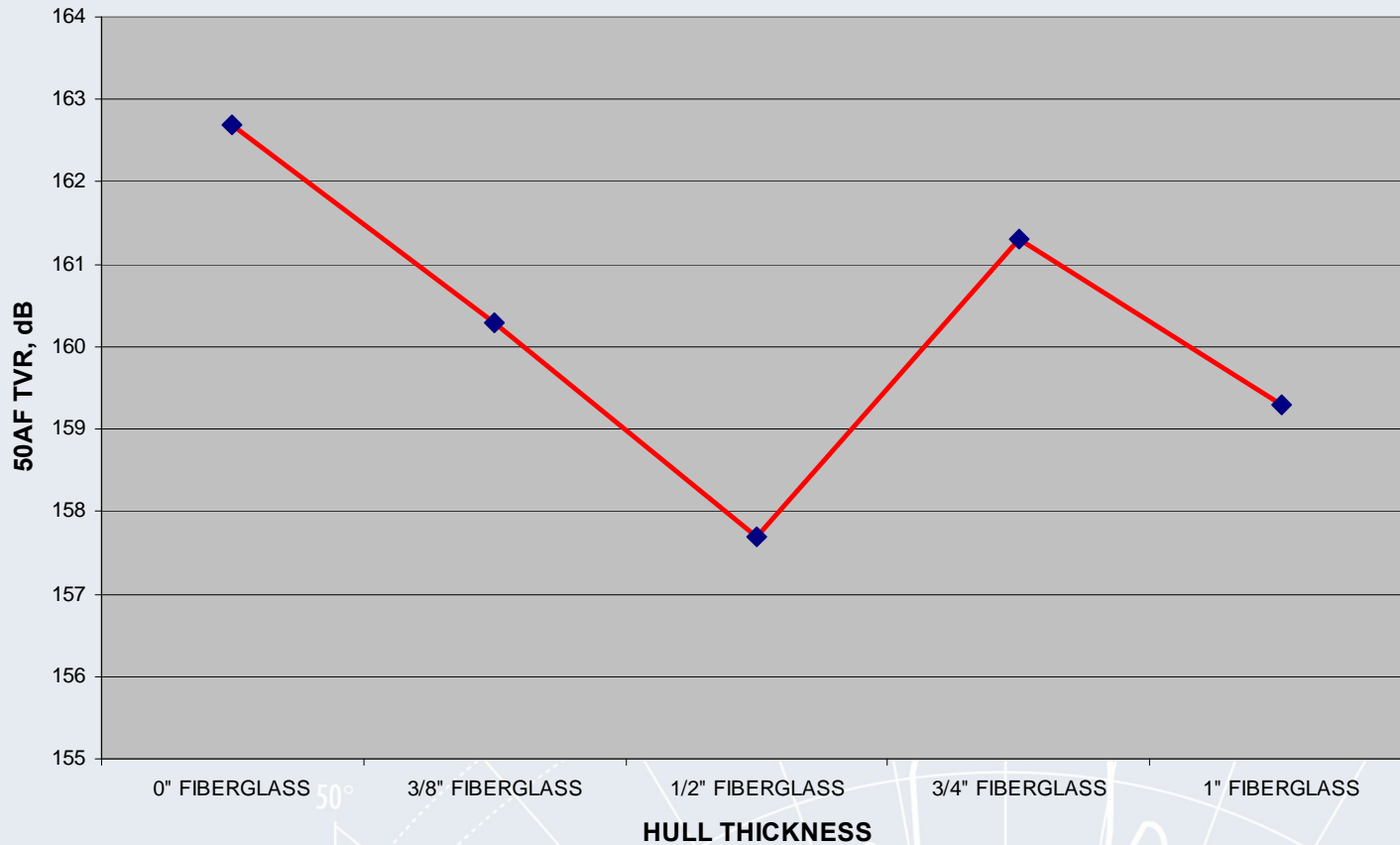
# In-Hull Performance

200SLQ TVR vs. HULL THICKNESS



# In-Hull Performance

50AF TVR vs. HULL THICKNESS

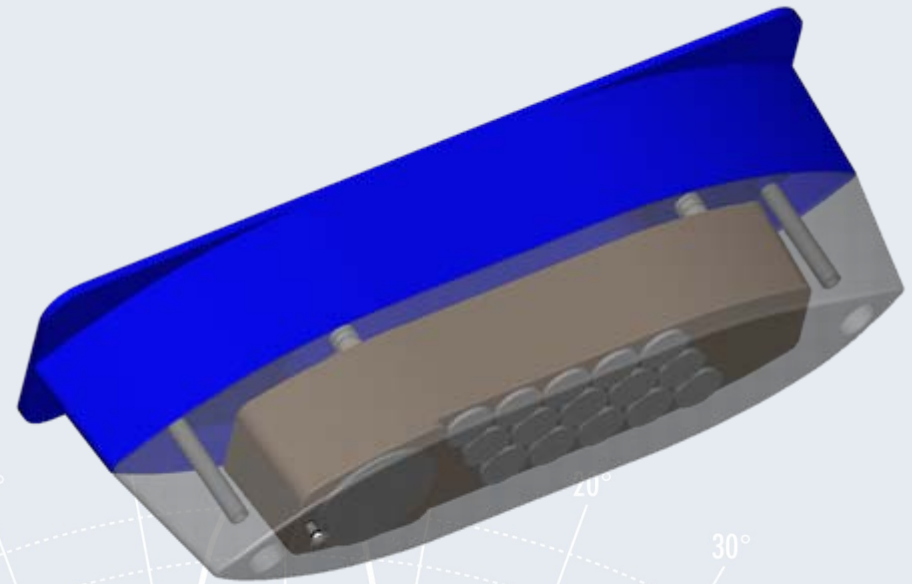


# 2 kW R99 External Mount



RAYMARINE model: E66075 (8 pin connector/DSM300)

- Depth & Temperature functions
- 9 °x 17 ° beam at 50 kHz
- 5 ° beam at 200 kHz
- Exposed temperature sensor provides fast response
- High Performance fairing and bronze stuffing tube included
- Recommended for vessels 30' and up



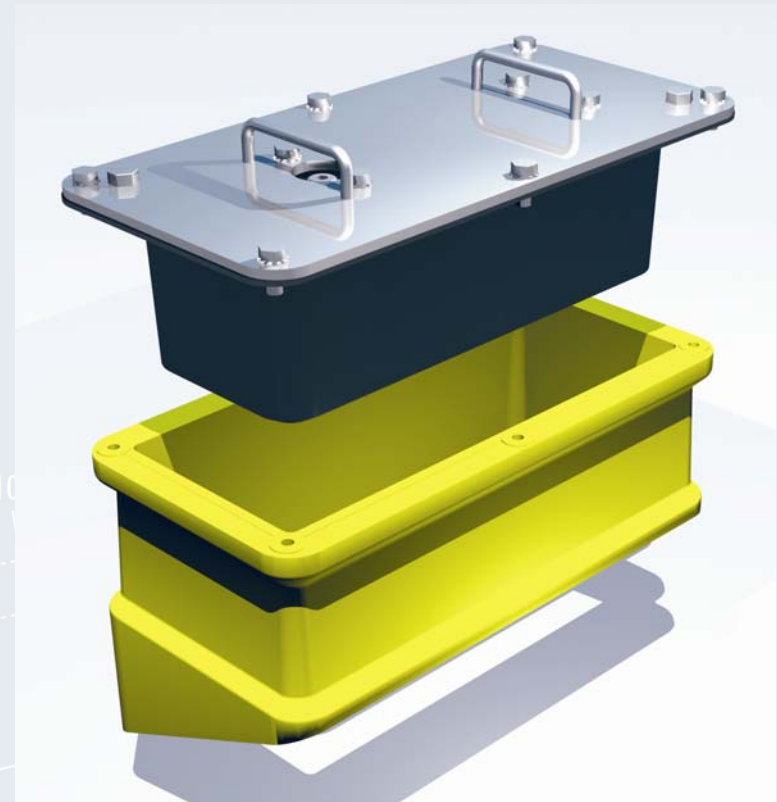


## 2 kW R199 In-hull

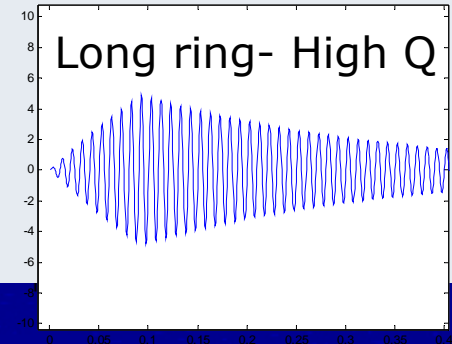
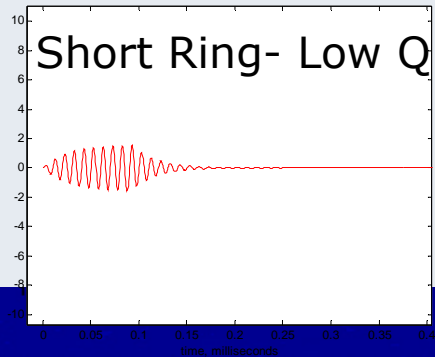


Raymarine model: E66076 (8 pin connector/DSM300)

- Depth functions only
- Same internal construction as R99
- 400 times more sensitive @ 50kHz than single element design
- 9 °x 17 ° beam at 50 kHz  
5 ° beam at 200 kHz
- Solid fiberglass hulls



# Broadband vs.. No Broadband



**Broadband Q = 2, 5° beam**

Individual fish  
are separated

Fish 1" above the  
bottom is still  
detected by short  
ring from low Q

**Non-Broadband Q = 25, 5° beam**

Individual fish  
blend together

Fish 6" above blends  
into bottom echo by  
long ring from high Q

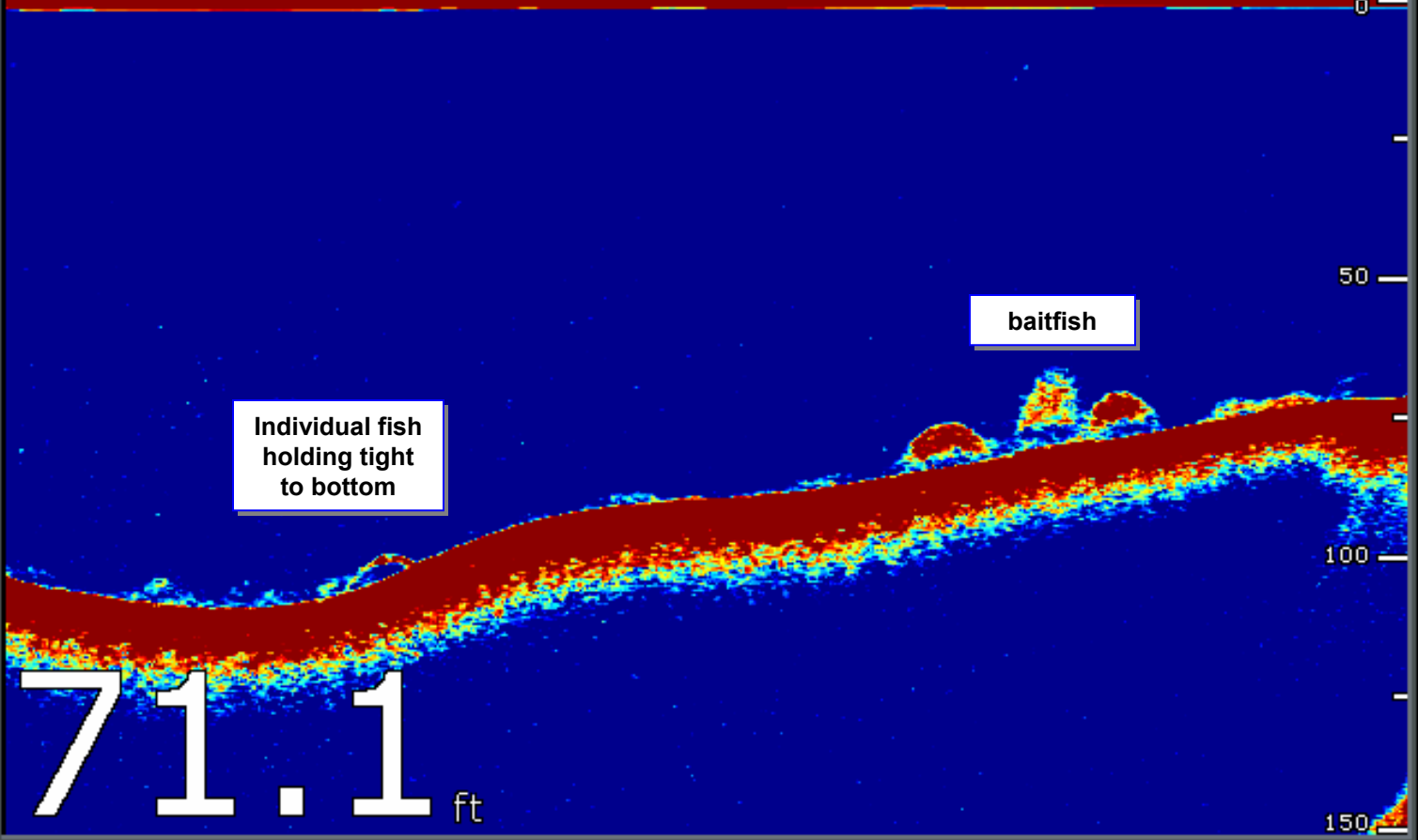
Individual fish are detected  
Fish are detected 1" above the bottom

Shows fish as "blobs"  
Fish less than 6" above bottom will blend in



Ves Pos    --o--',---    ---o--',---    Sea Temp **179.8** °F    Log **0.000** nm    Trip **0.000** nm

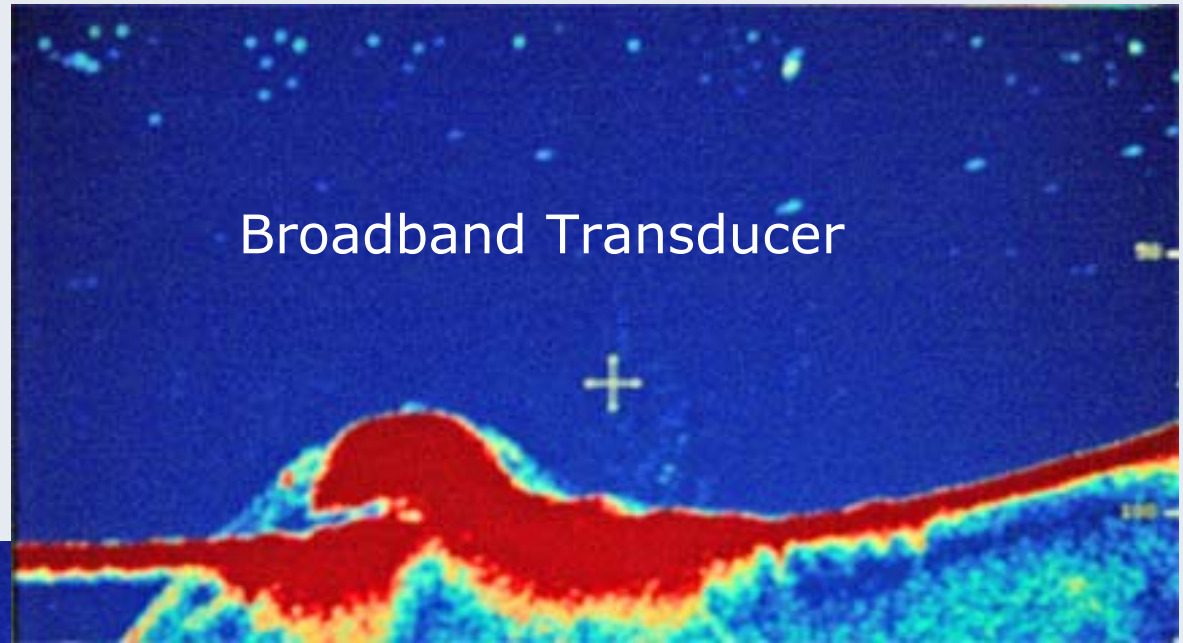
200 kHz: Man    Gain: Auto Med



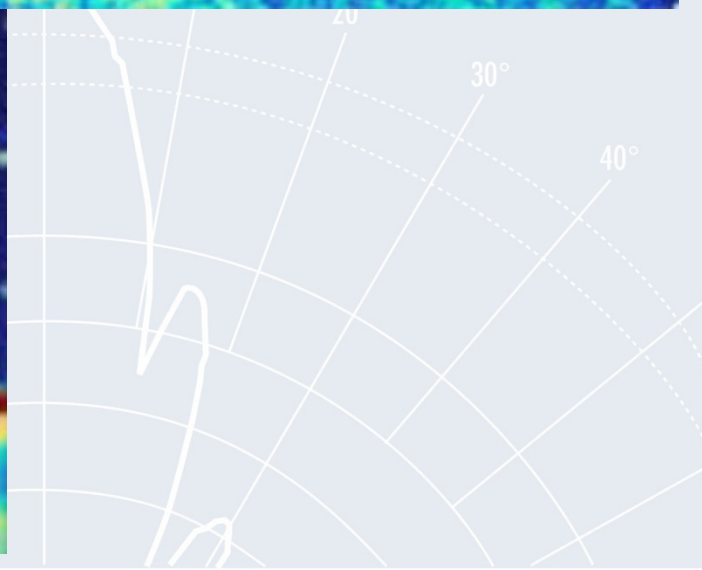
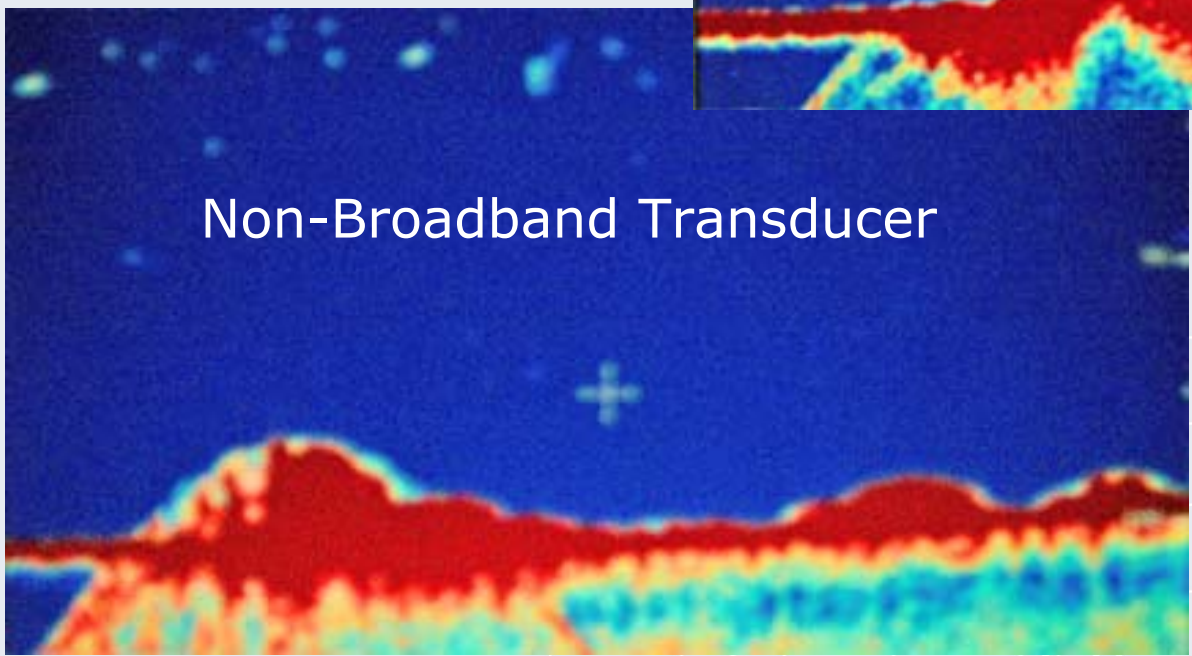
RANGE AUTO **MAN**    RANGE SHIFT 0ft



Broadband Transducer



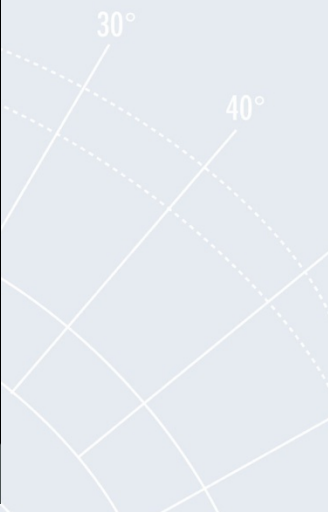
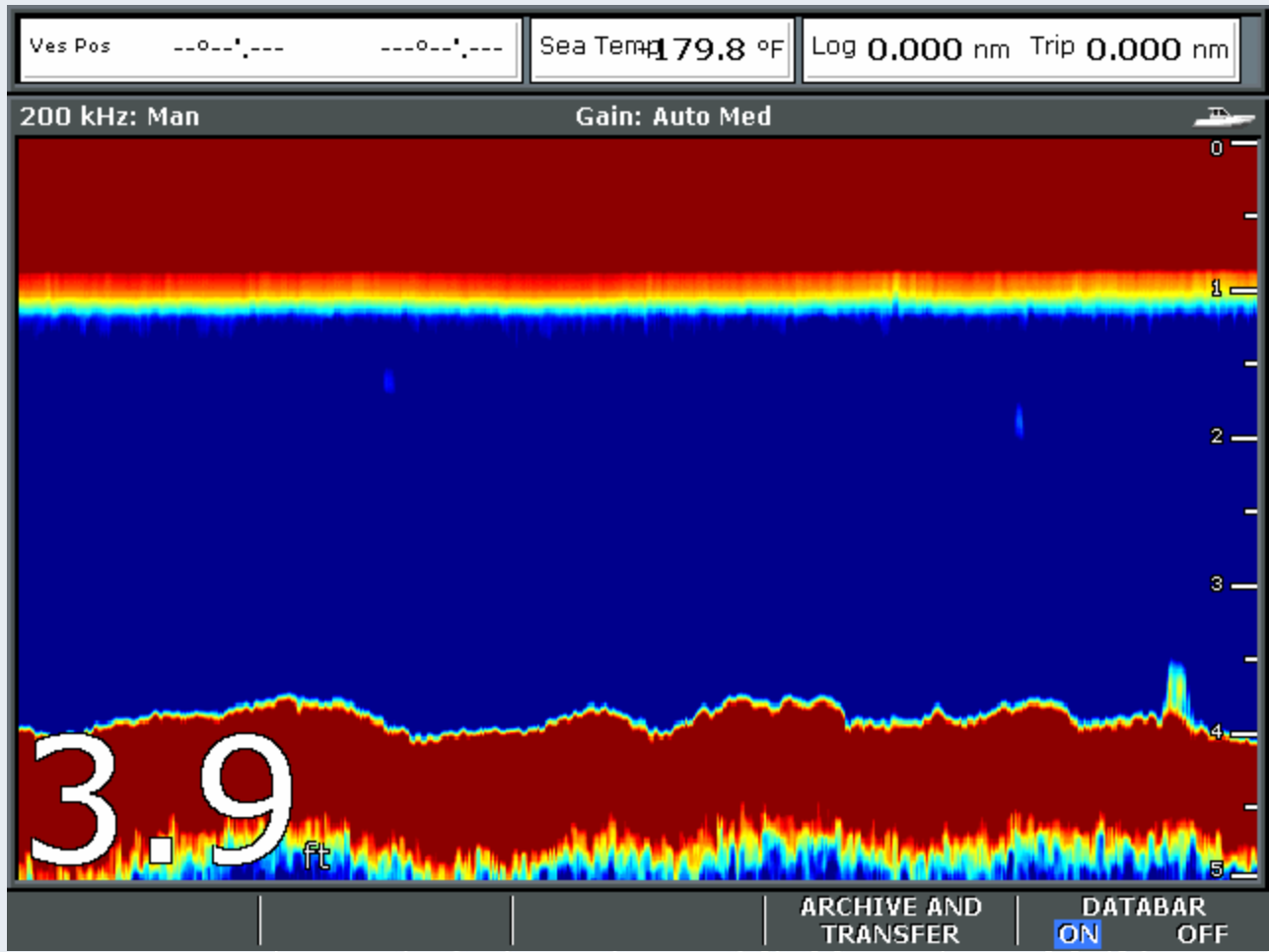
Non-Broadband Transducer







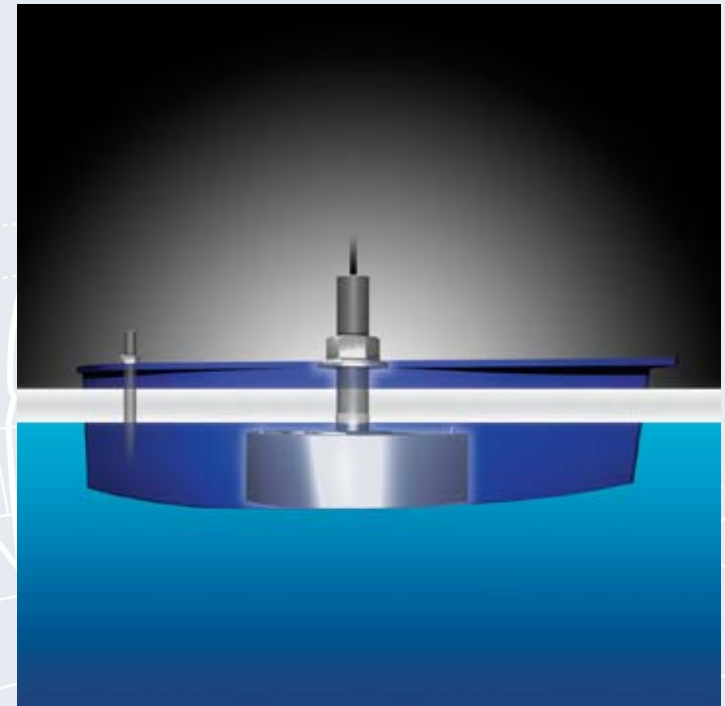
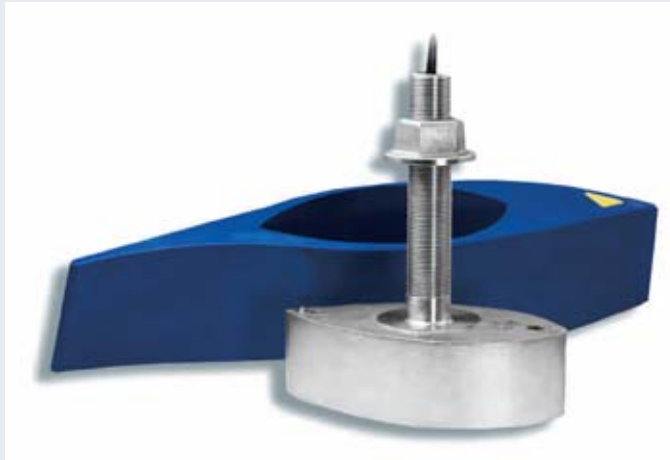
Low ring= Excellent Shallow-water operation





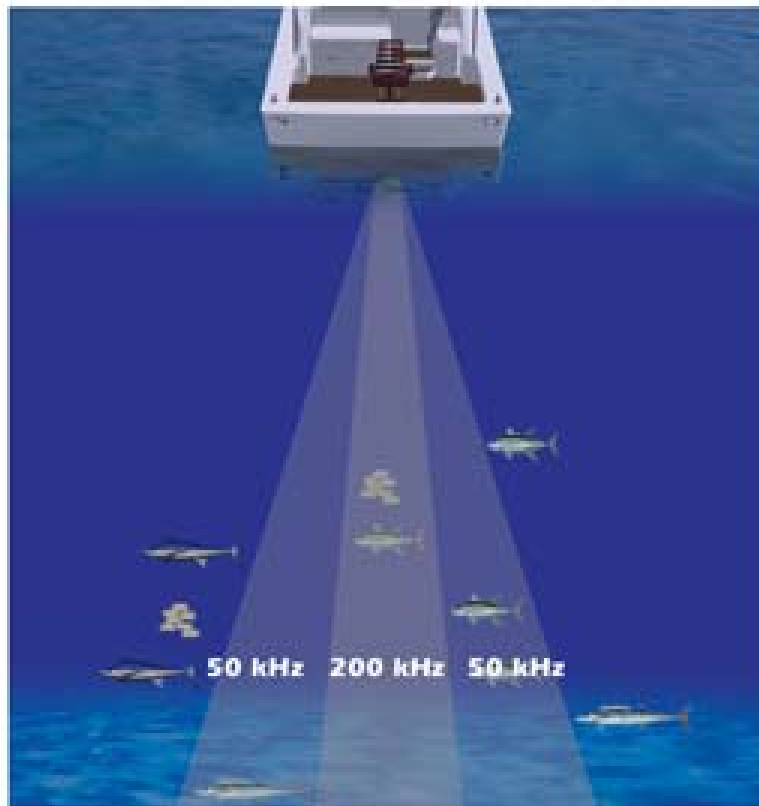
# SS270W Wide Beam

- 25° degree beam at both frequencies
- Provides four times the beam width at 200kHz
- Can retrofit existing B260 installations
- Stainless Steel Housing
- Includes High Performance Fairing
- Built-in Temp sensor

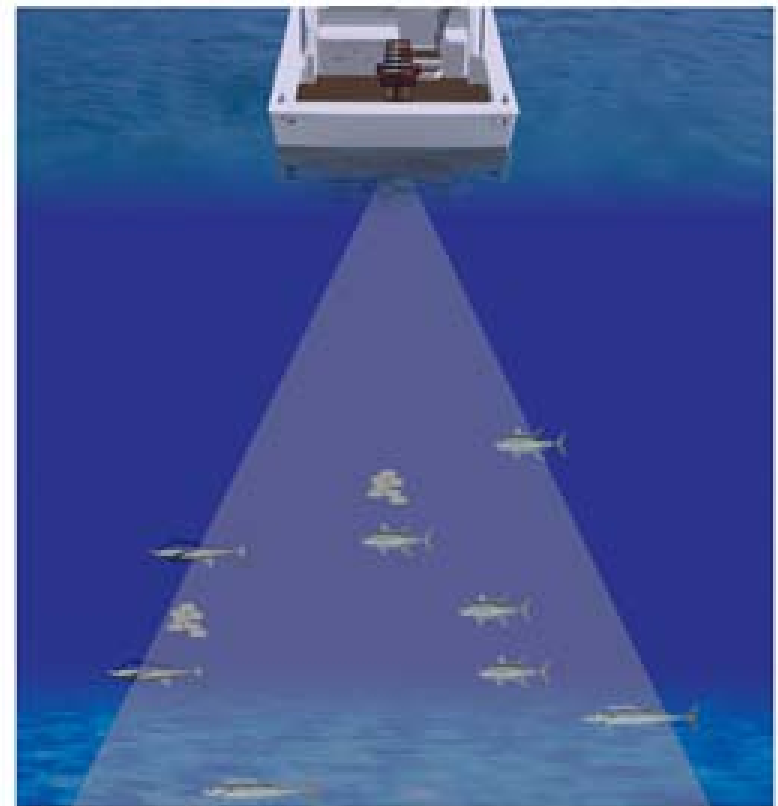


# SS270W

## Twin 25° beams @ 50 and 200kHz



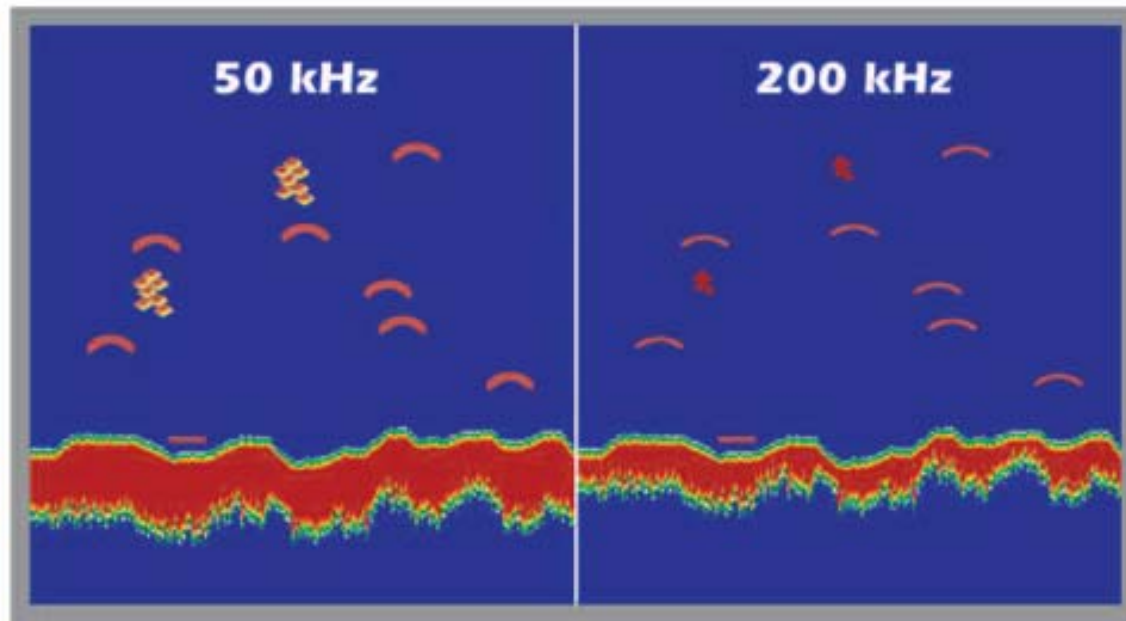
B260 1 kW transducer  
19° at 50 kHz, 6° at 200 kHz



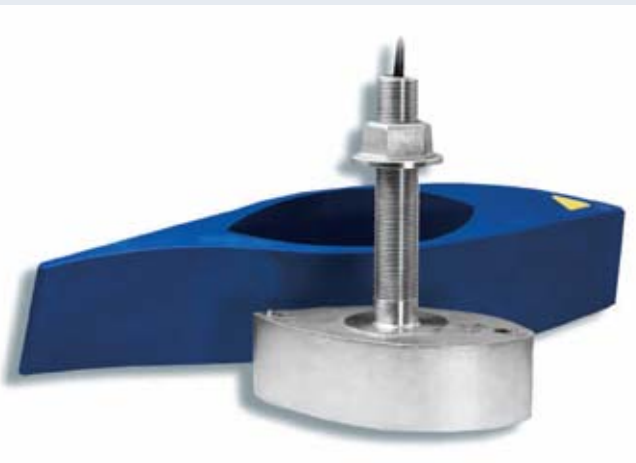
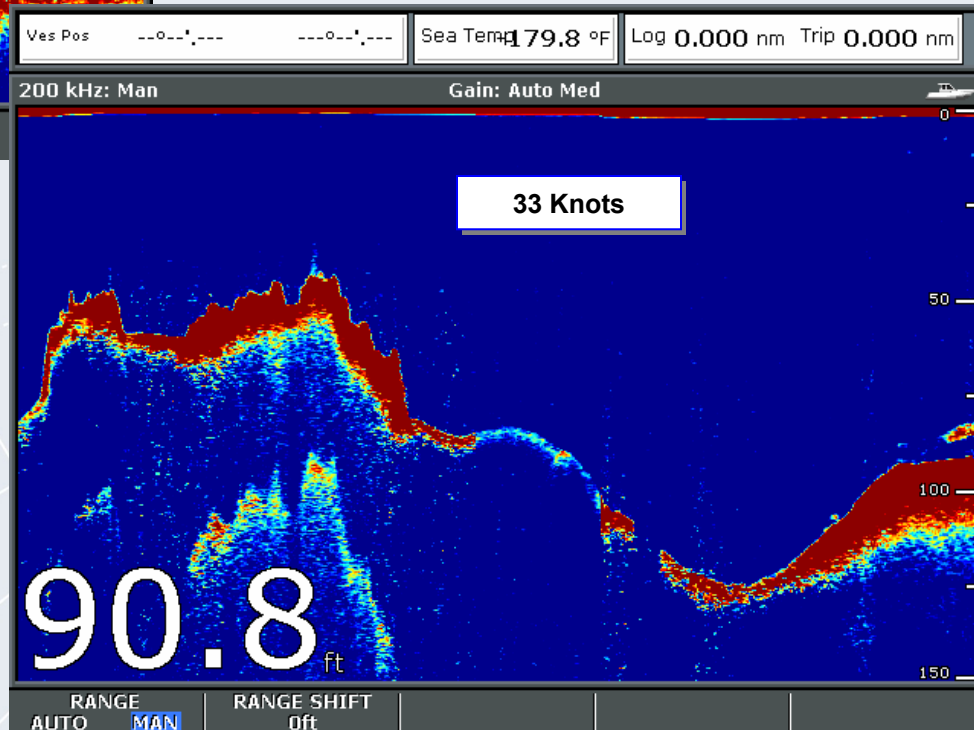
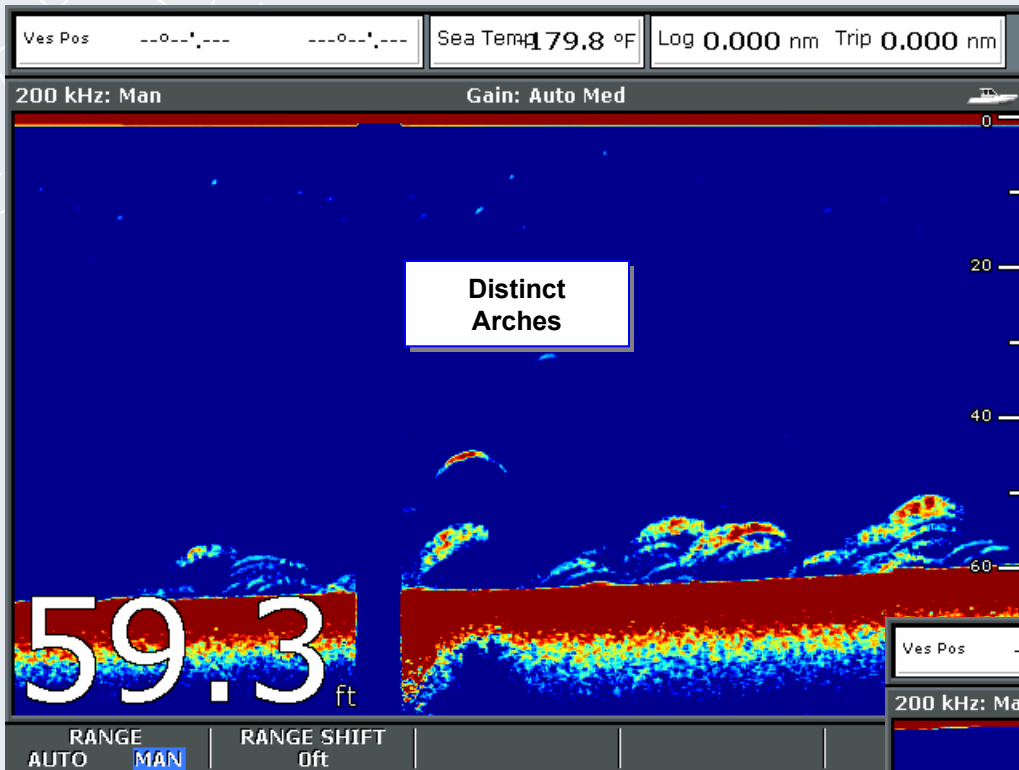
SS270W twin wide-beam transducer  
Identical, 25° beamwidths at 50 kHz and 200 kHz

# User Benefits

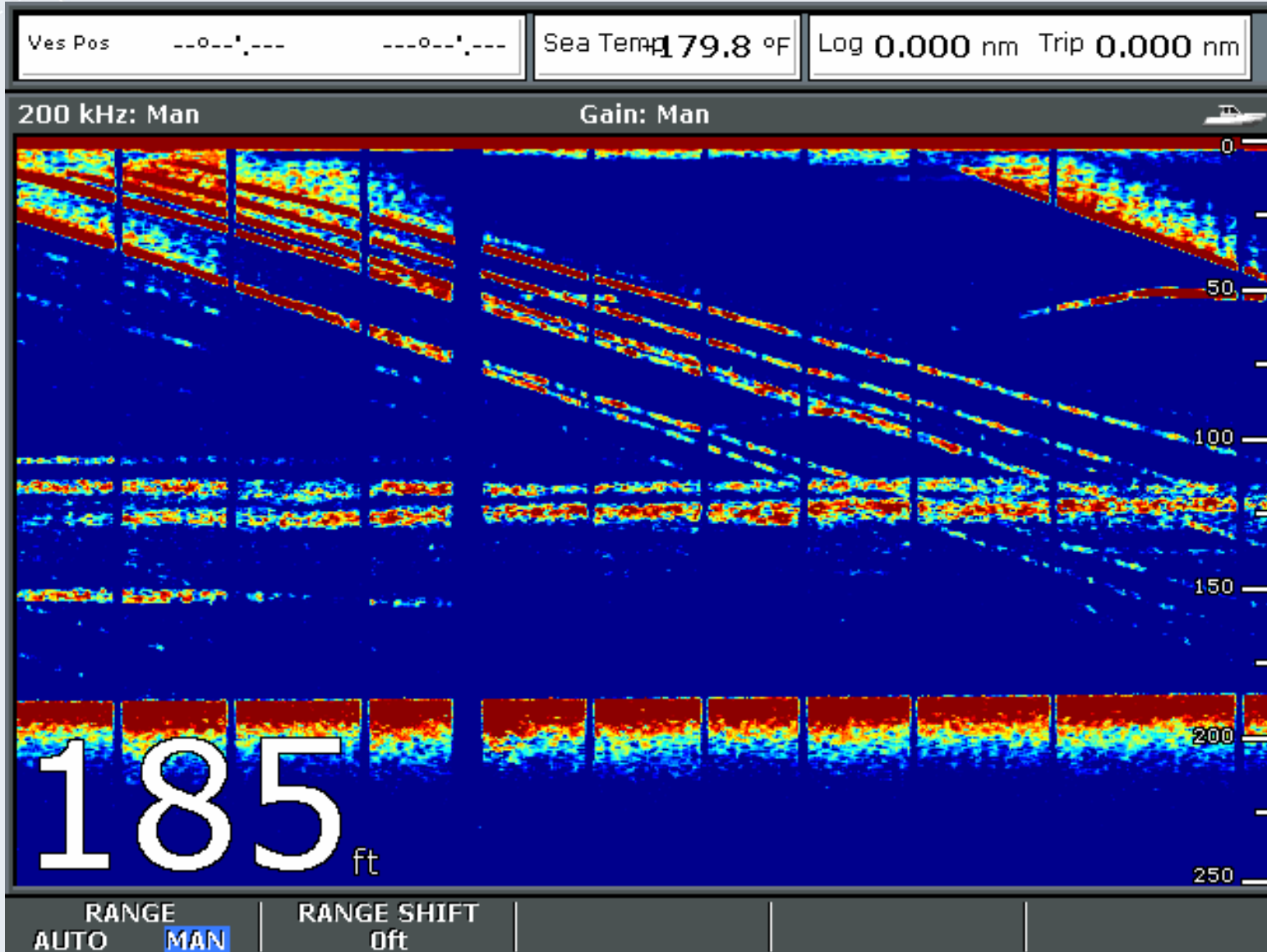
- Excellent at detecting mid to shallow water fish (bait, tuna, marlin etc.)
- Split screen 50/200kHz fishfinder display is more intuitive for novice users
- Same targets appear in both beams
- Advanced users can identify fish species



# SS270W



# SS270W Clam Shells





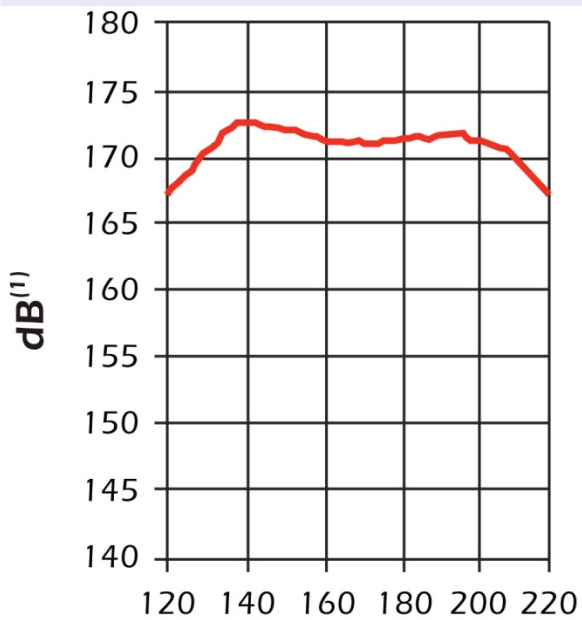
# Benefits of Tunable Fishfinders with Broadband Transducers

- Frequency agility allows the user to adjust the frequency if the connected echosounder is "tunable".
- No loss of sensitivity across the frequency range
- Adjusting the frequency will change the beam width and depth capabilities.
- Certain fish are more detectable at specific frequencies so the fishfinder & transducer can be tuned to get the best echo return for the species being targeted (tuna, marlin, ground fish, bait).

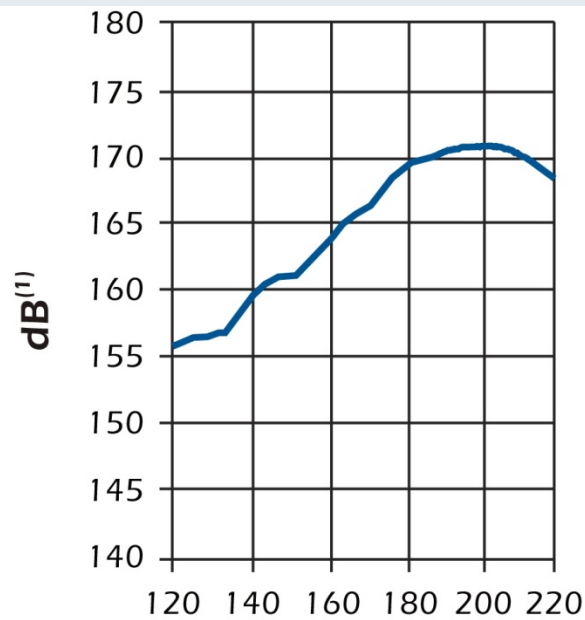




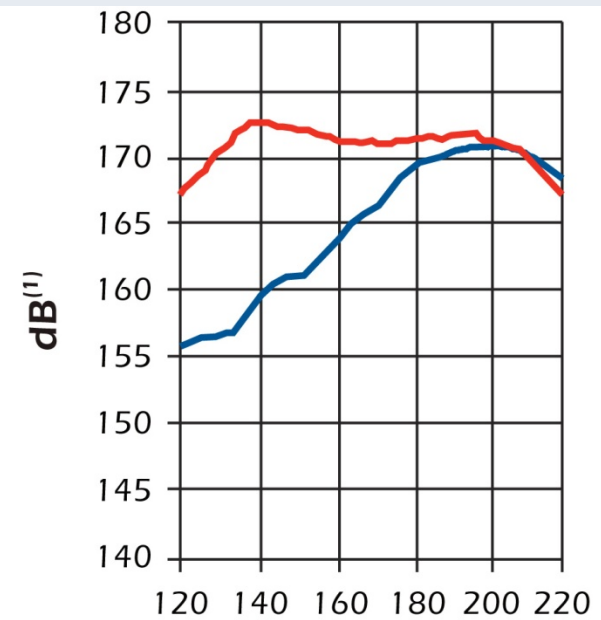
Broadband R209 / R299  
Q=2



Broadband B260  
Q=8



Overlay



Frequency (kHz)  
(Transmit Voltage Response)

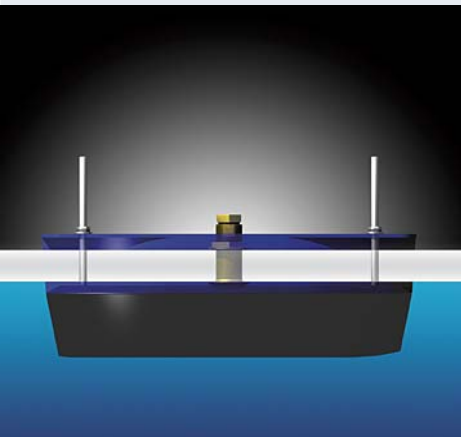
Frequency (kHz)  
(Transmit Voltage Response)

Frequency (kHz)  
(Transmit Voltage Response)

# R209 External Mount / R299 In-Hull



- Broadband on both low and high frequencies.
- 24 low-frequency ceramics that can operate anywhere between 33kHz to 60kHz and can handle up to 3 kW of input power.
- High-frequency 3.5" single-ceramic can operate between 130kHz to 210 kHz and can handle up to 2 kW of input power.
- R309 and R399 units operate between 25kHz to 45kHz and 130kHz to 210 kHz.



# Broadband and the future: CHIRP -Frequency Modulated Transmissions



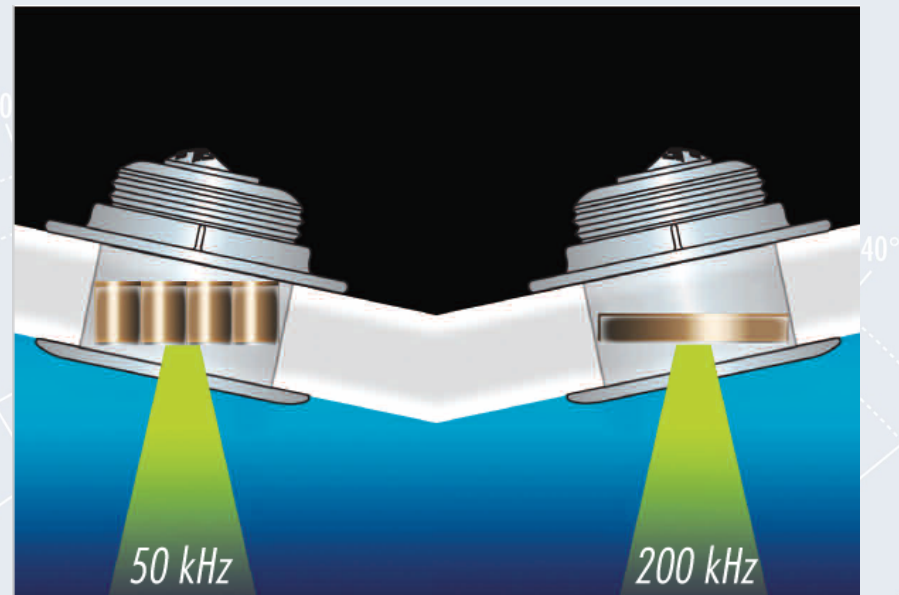
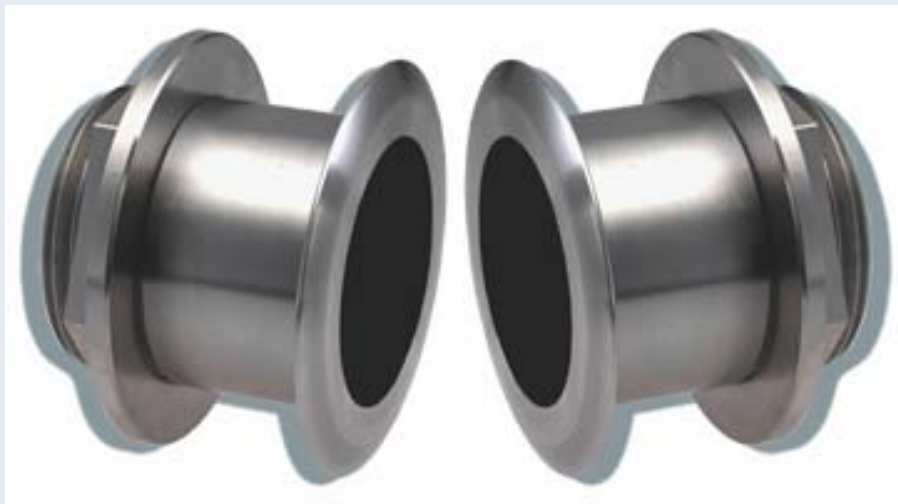
- Improved signal-to-noise ratio
- Very good performance from shallow to deep
- Better target definition
- Better performance at speed
- Variable beamwidths
- Better rejection of noise sources



# SS264W Wide Beam Tilted Element™ Pair

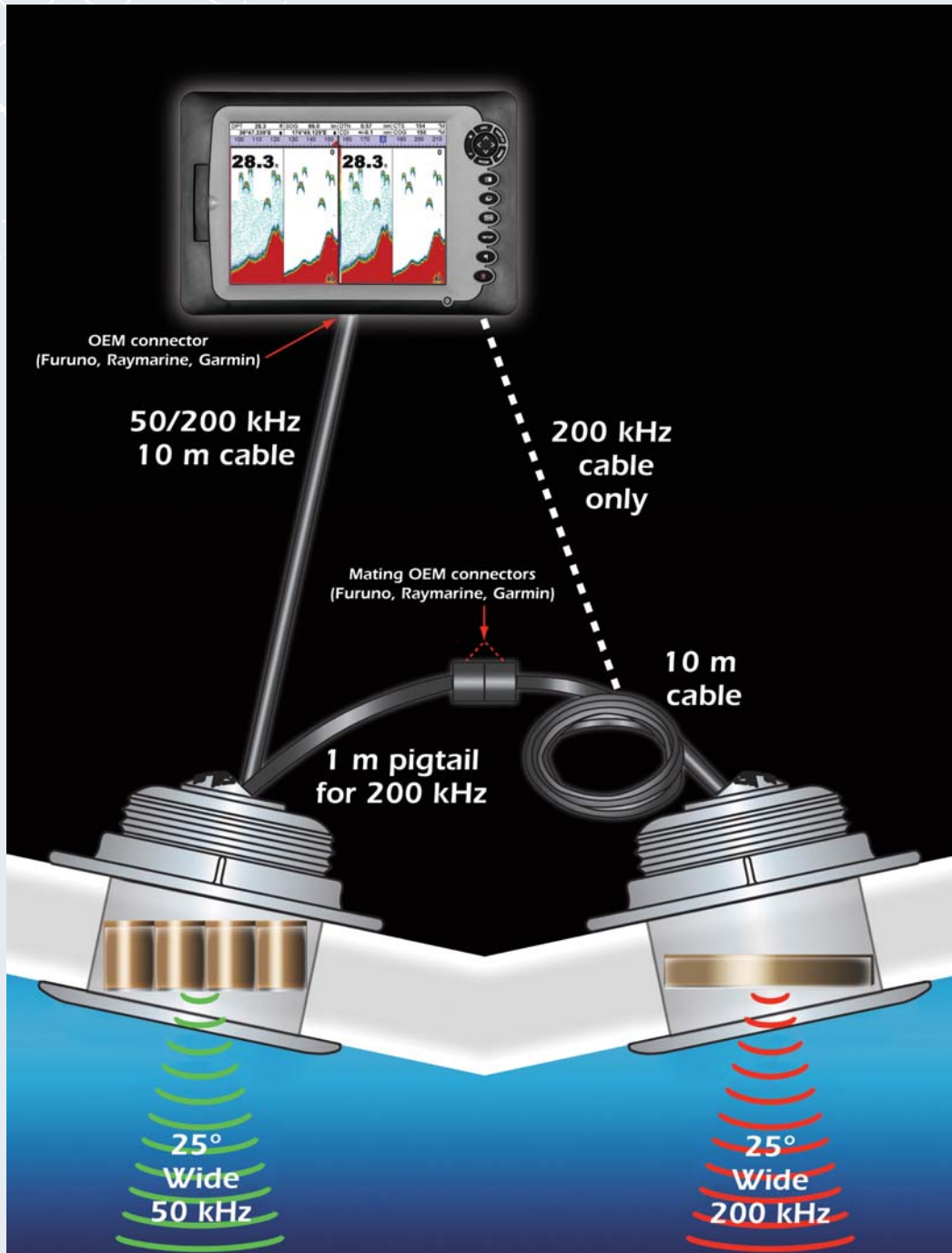


- SS270W split up into 2 transducers
- Same ceramics and performance as the SS270W
- Separate transducers for 50 kHz and 200 kHz
- Top of the line 1kW tilted element™
- Engineered for Center console and trailered boats
- Transducers can be sold separately
- No High Performance Fairing needed
- Built-in temp sensor

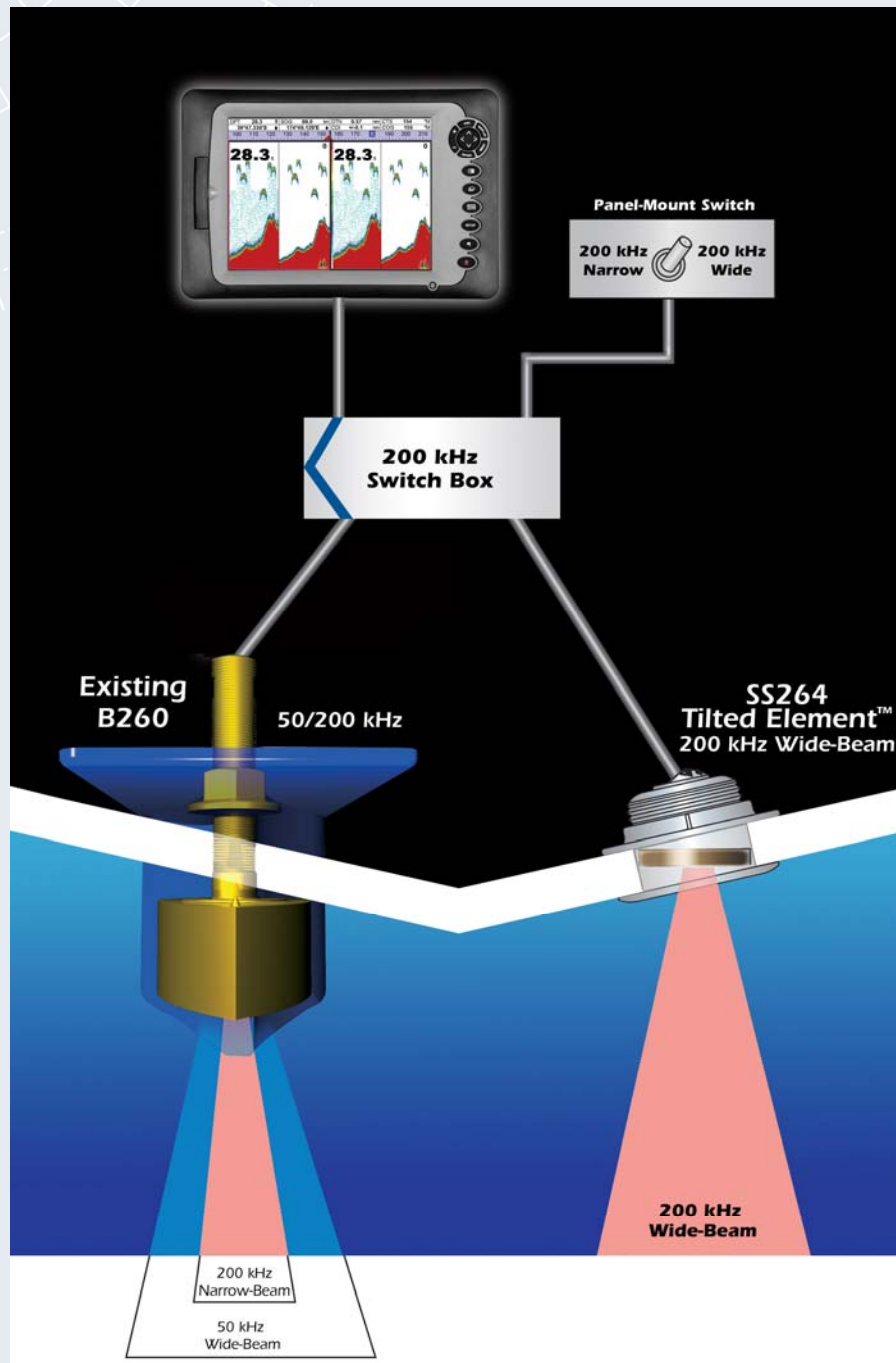




## Tilted Element™ Pair Wiring



## SB264 200kHz Wide / Narrow-beam Switchbox

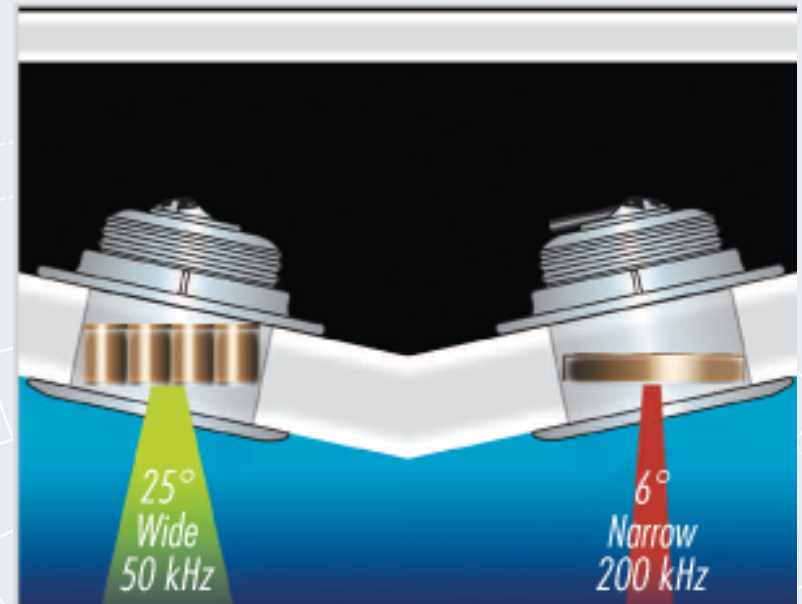
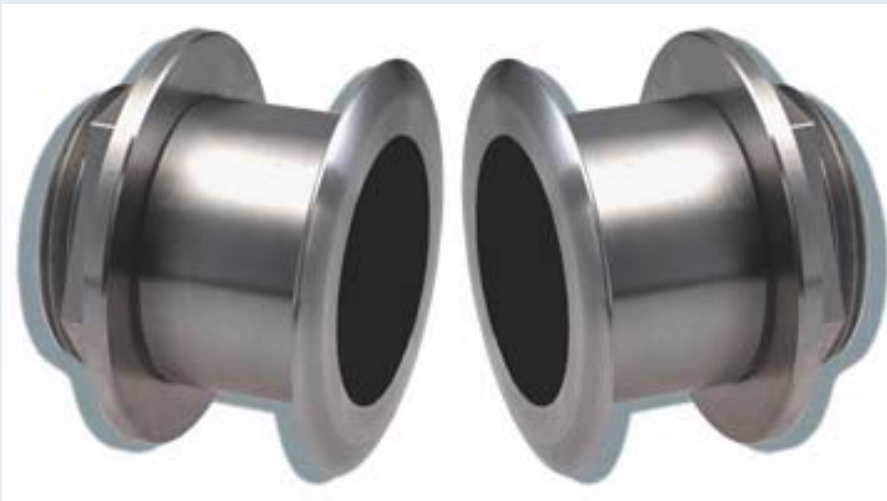


- Allows SS264W 200kHz Tilted Element to work with existing B260, M260, B258, and B256 installations.
- User now has a switchable 200kHz wide or narrow beam for the specific type of fishing.

# SS264N Narrow Beam Tilted Element™ Pair



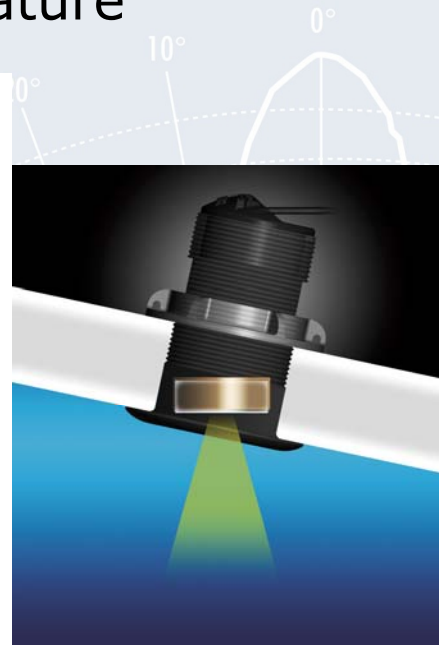
- B260 split up into 2 transducers
- Same ceramics and performance as the B260
- Separate transducers for 50 kHz and 200 kHz
- Top of the line 1kW tilted element™
- Engineered for Center console and trailered boats
- Transducers can be sold separately
- No High Performance Fairing needed
- Built-in temp sensor



# NMEA 0183 and 2000® Smart Transducers



- All processing is done inside the transducer
- Operates at 235kHz
- No interference with on-board sounder
- Perfect for displaying digital depth/speed/temperature
- DT800- Retractable Tilted Element™ Thru-Hull Depth / Temperature
- DST800- Retractable Thru-Hull Depth / Speed /Temperature
- P39- Transom Mount Depth / Speed /Temperature
- P79- In-Hull Depth only
- T42- High performance Temperature





## M260 and R199 In-Hull Tanks

- Now shipped with flat 90° tank bottom which can be easily cut for bow-stern or port-starboard mounting.
- To fill the new tank, we recommend using non-toxic propylene glycol (RV / Marine anti-freeze).
- To mount the tank to the hull, we recommend using fiberglass resin, Marine Tex<sup>®</sup> or Fusor<sup>®</sup> 100EZ / T10.





# PB200



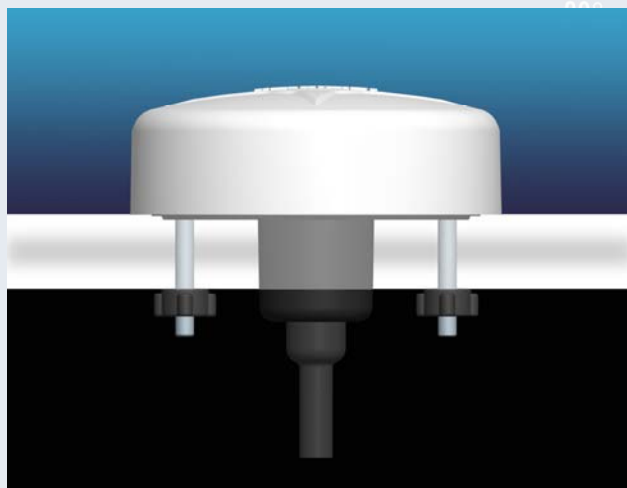
## WeatherStation™ Instrument

- NMEA 0183 & NMEA 2000® OUTPUT
- True and Apparent Wind Speed and Direction
- 3 axis compass with yaw rate gyro
  - +/- 1° for pitch and roll angles  $\leq 5^\circ$
  - +/- 2° for pitch and roll angles  $\leq 30^\circ$
  - +/- 3° for pitch and roll angles  $\geq 30^\circ$ -  
45°
  - Output: 10 Hz
  - User calibration not required
- Three axis accelerometer
- WAAS Enabled GPS
- Barometric pressure
- Air Temperature
- Dew Point Temperature



## [GH2183](#) Solid State Compass with GPS

- NMEA 0183 & NMEA 2000® OUTPUT
- 3 axis solid state compass
  - User calibration not required
- Three axis accelerometer
- Three axis rate gyro
- WAAS / EGNOS Enabled GPS
- Available as GPS only- G2183

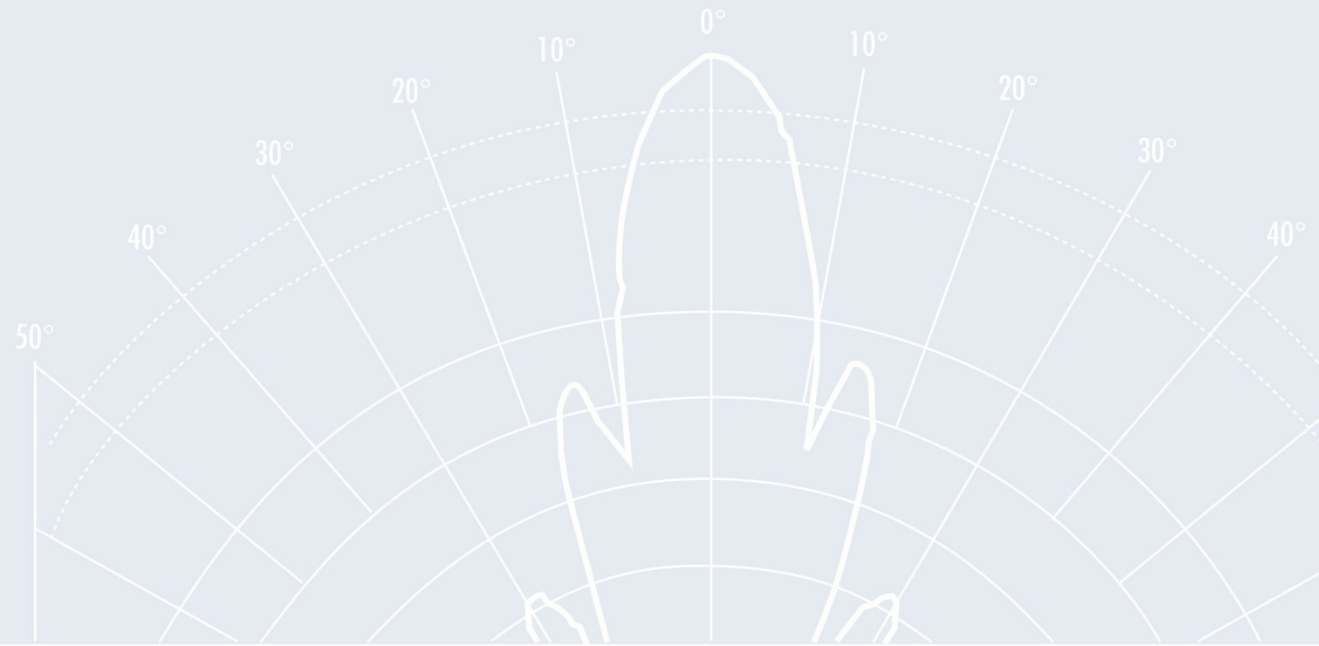


# H2183 Solid State Compass

- NMEA 0183 & NMEA 2000<sup>®</sup> OUTPUT
- 3 axis solid state compass
  - User calibration not required
- Three axis accelerometer
- Three axis rate gyro



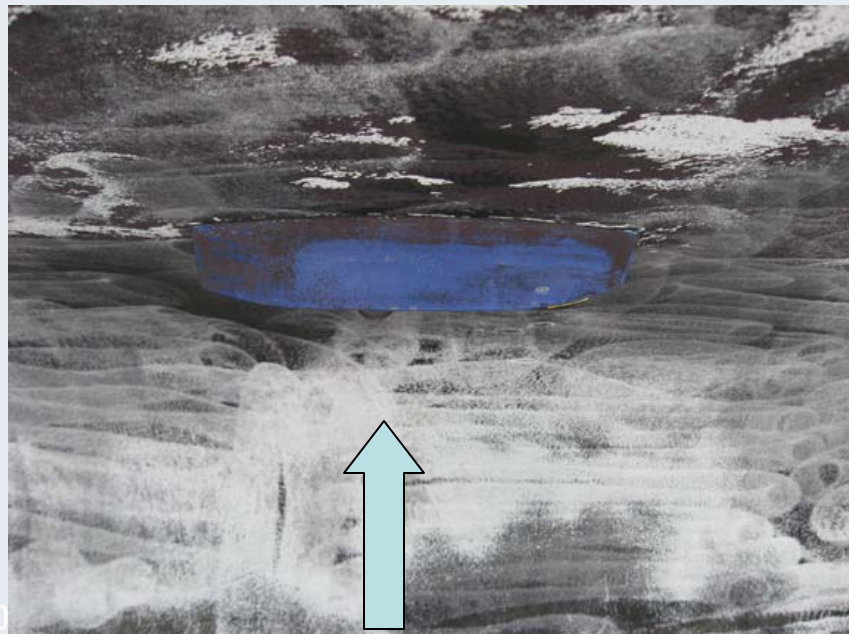
# Installations



# Good Installation



Aft View



Side View

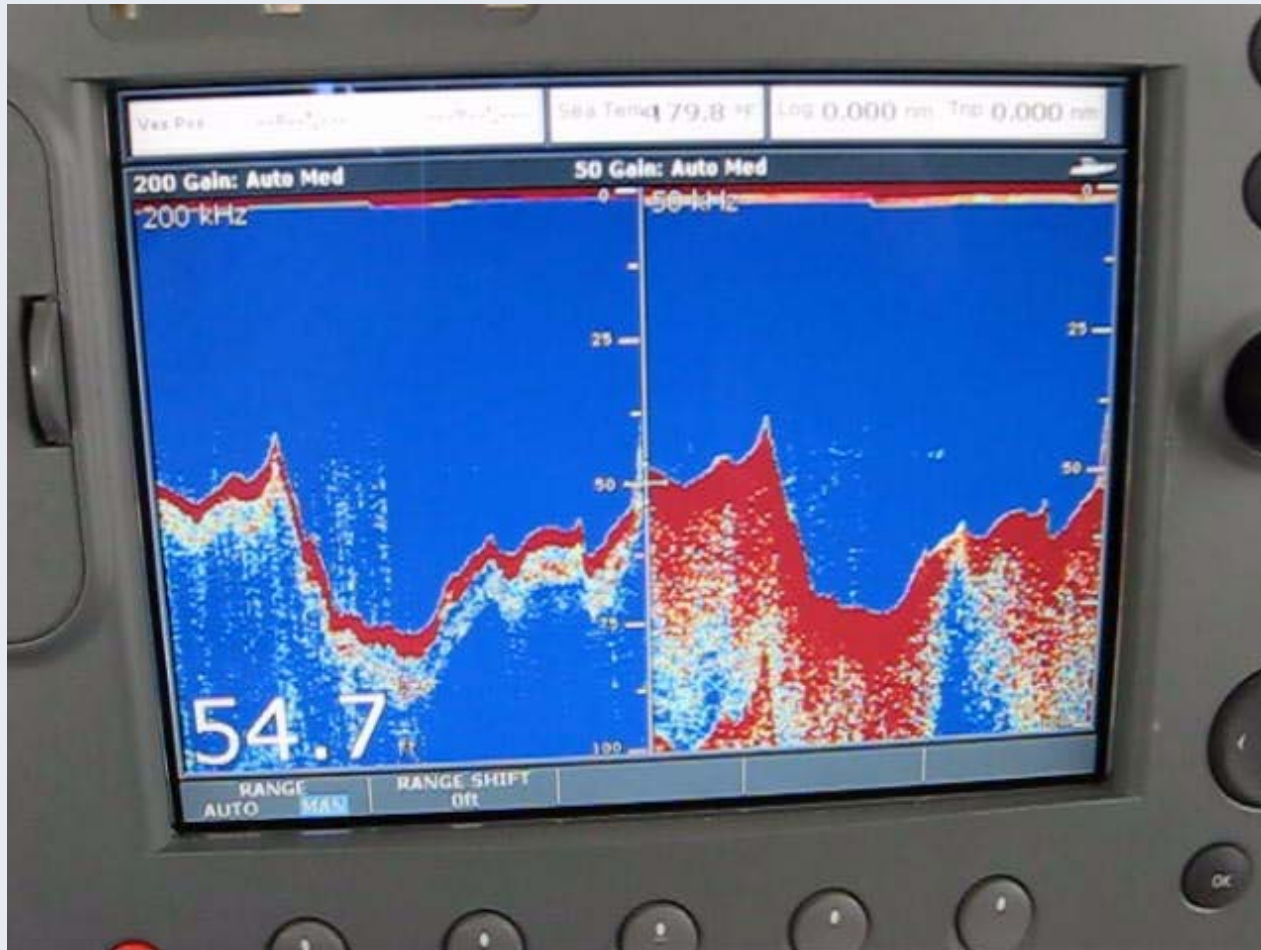
This is an excellent installation of a B744V. There are no hull protrusions in front or alongside the transducer. The transducer is also installed away from the keel so that the beam is not shaded.

An installation like this will give clear bottom readings up and above 30 knots.

***See the video*** on the next slide.



## Good Mounting Location vs. bad @ 30 kts



# Bad Installation

This installation of a B164 looks good, however notice the strake 6 feet directly in front of the transducer. This causes turbulence and air bubbles making the transducer stop reading bottom at 12 knots. **See the video** on the next slide



Bad Installation = This performance @ 10-15 knots





# Bad Installation



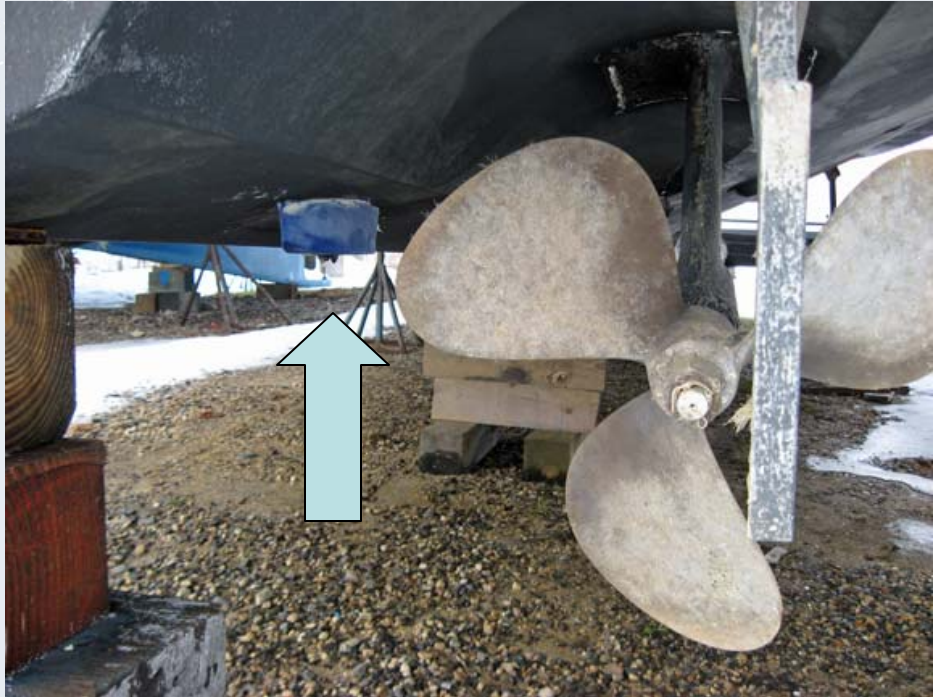
Side View



Aft View

This intake shown in the photos above will cause turbulence and send air bubbles over the transducer face as vessel speed increases. The transducer will work great when the vessel is drifting, but will not work well at speed.

# Bad Installation



Forward View



Side View

This transducer is mounted too far aft and will be affected by the turbulent water that the starboard propeller will create at **ANY** speed.



# Videos



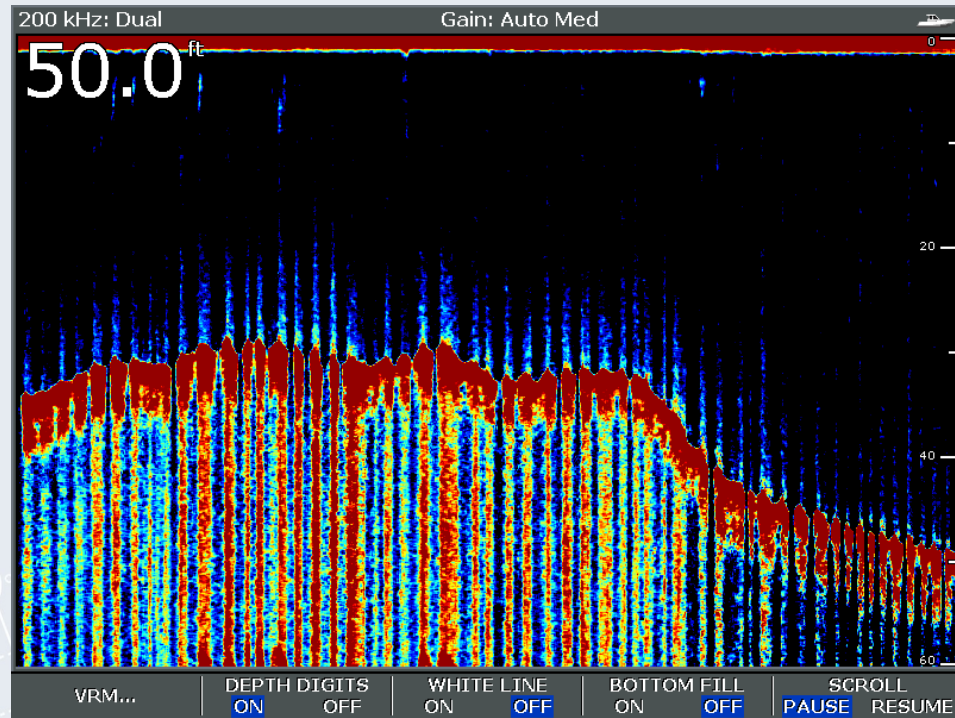
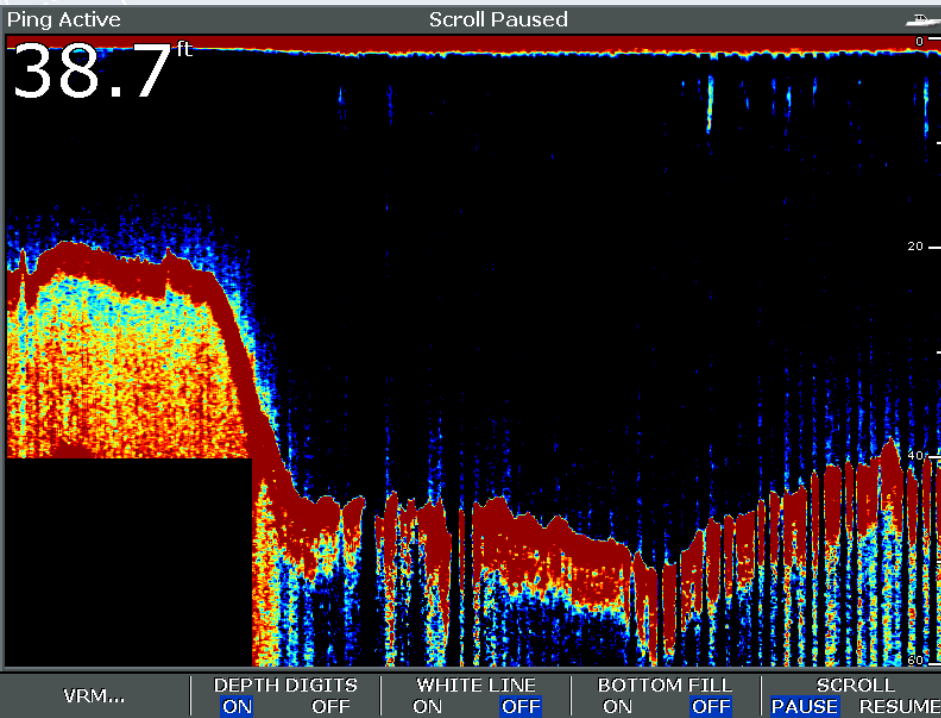
# Bad Installs

## DT800

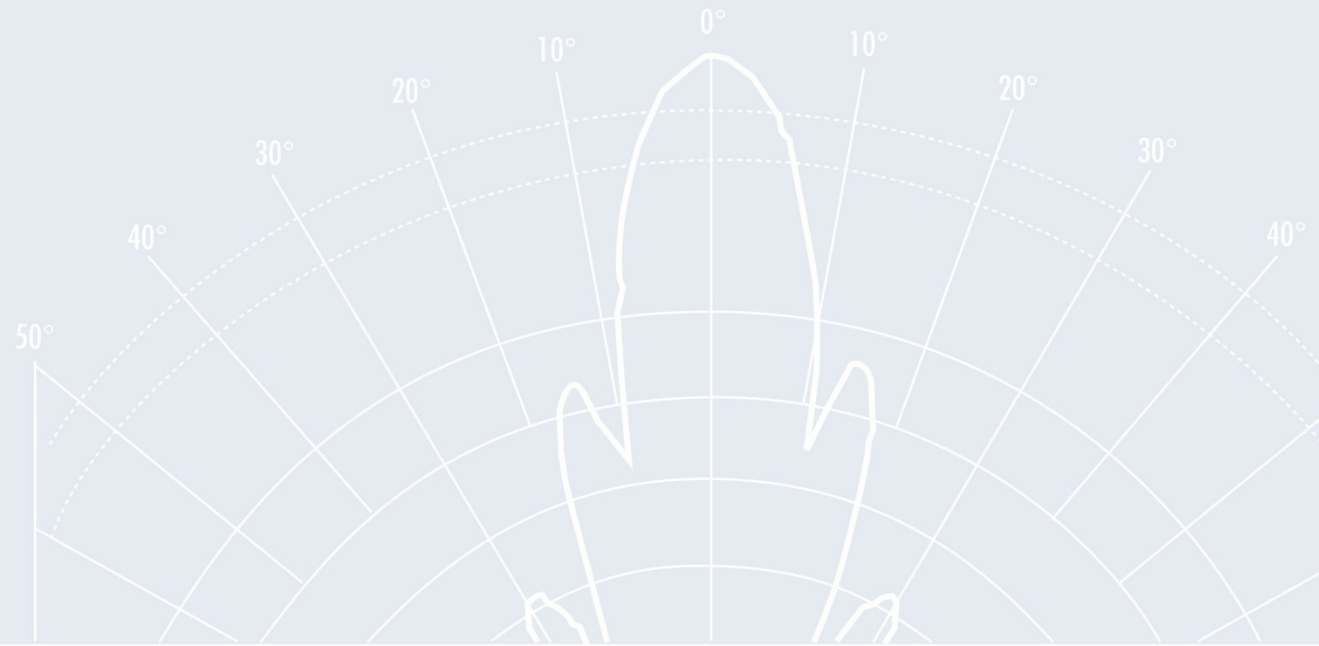
- Inserts must be flush with the thru-hull fitting
- This applies to both retractable depth transducers and speed sensors



# Bad Installs Electrical noise



# Testing Transducer Functions





# Testing for *Depth* Function

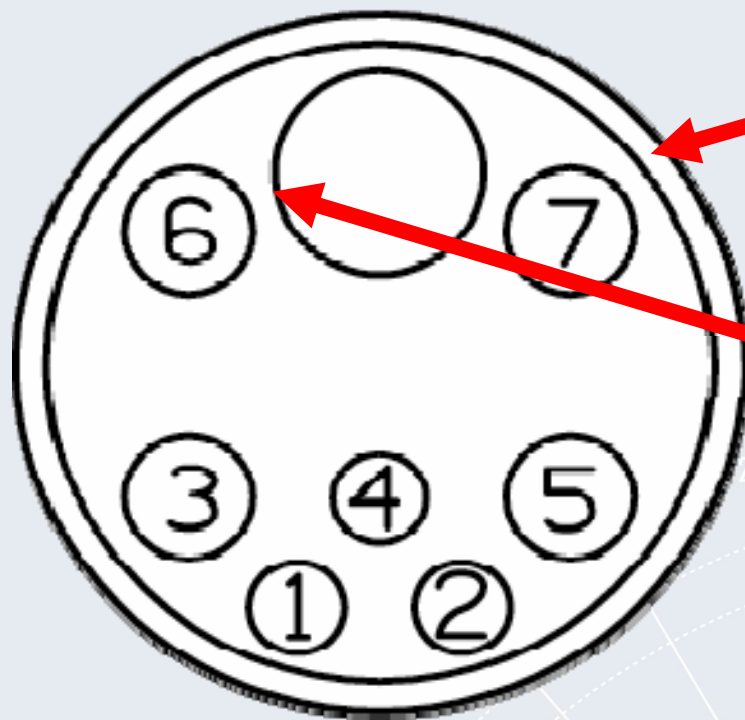
Using an EDI transducer test box you can determine the resonant frequency of a transducer and confirm that it is operating properly

[www.dsts.com](http://www.dsts.com)





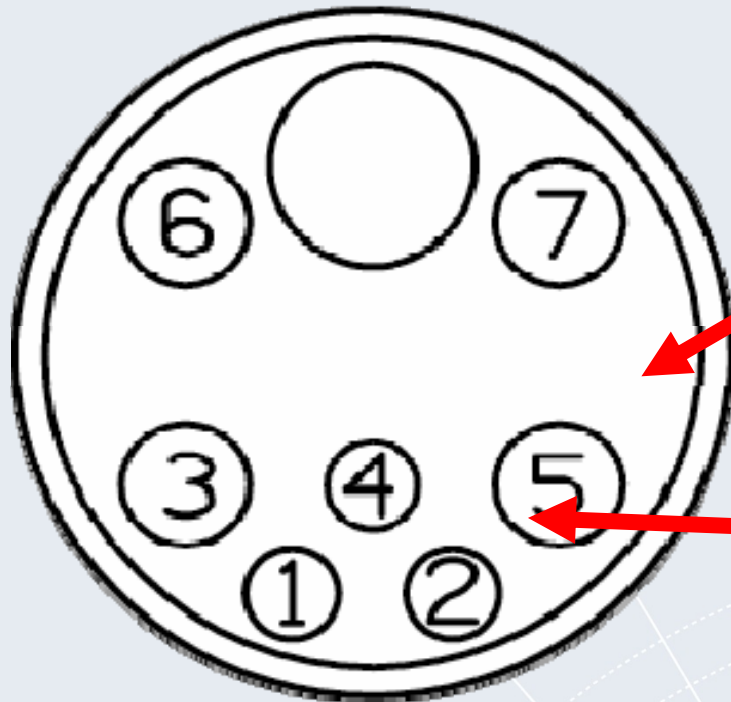
# Testing for *depth* function



**Black lead from transducer tester attaches here**

**Red lead from transducer tester attaches here**

# Testing for *Temperature* Function



**One lead from  
OHM meter  
attaches here**

**Second lead  
from OHM meter  
attaches here**

# Testing for *Temperature* Function



With meter set to OHMS the reading should be in the 10,000  $\Omega$  range at 77° F.

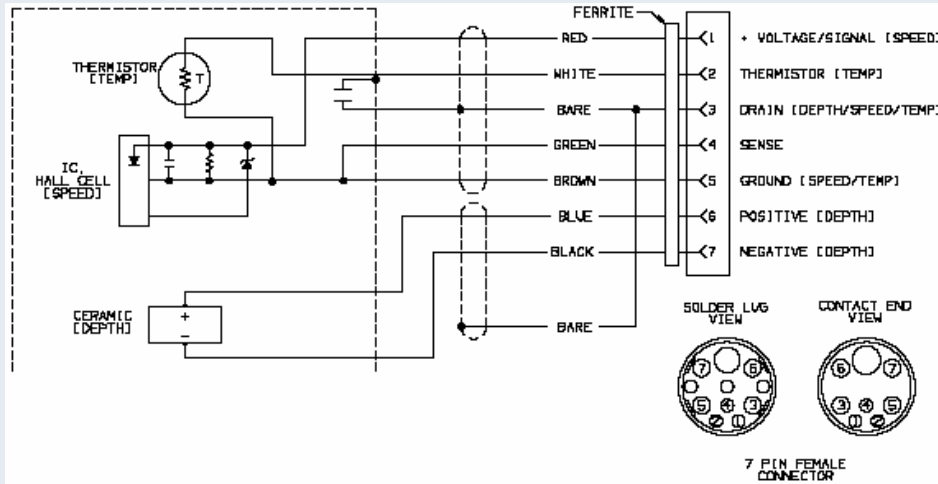
The resistance increases as the temp decreases.

The sensor will read correctly in or out of water.

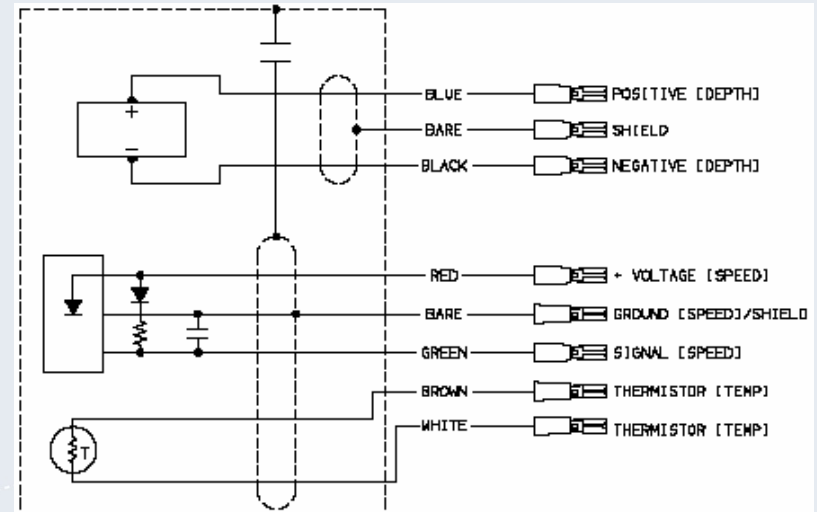


# Testing for *Speed* Function

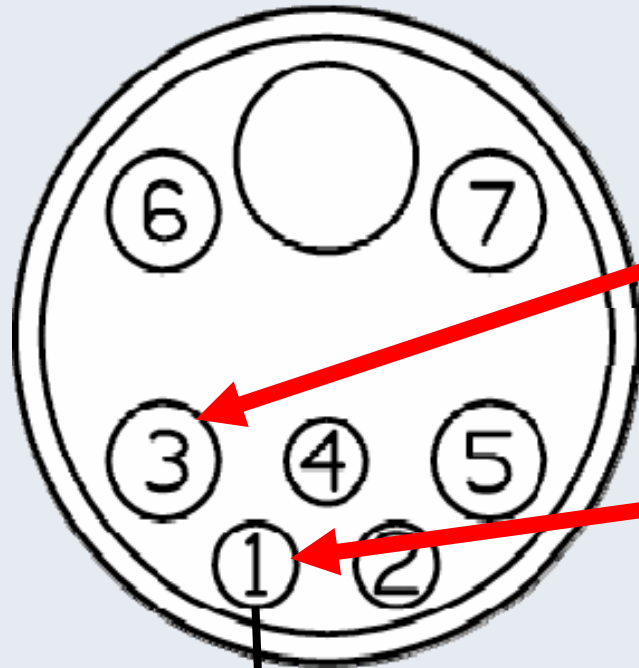
## 2 Wire Speed



## 3 Wire Speed



# Testing for *Speed* Function (2 Wire Speed)



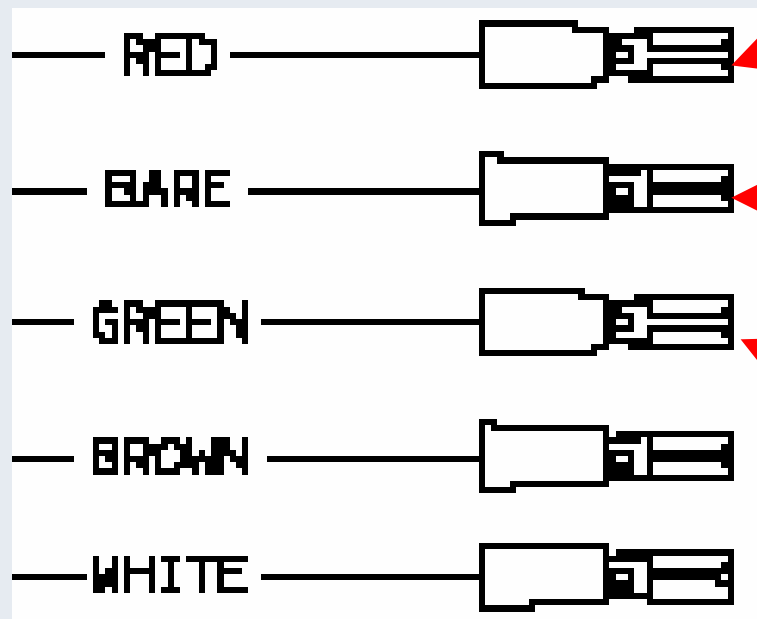
**Apply Negative battery voltage and attach black lead from volt meter**

**Attach red lead from volt meter (install a  $470\ \Omega$  resistor between the pin and the battery connection)**

**Apply positive battery voltage**



# Testing for *Speed* Function (3 Wire Speed)



**Apply positive battery voltage**

**Apply negative battery voltage and attach black lead from volt meter**

**Attach red lead from volt meter**

# Testing for *Speed* Function

Turn the paddlewheel slowly by hand.

The volt meter should toggle between zero volts (5.6V on 2 wire speed) and the input voltage with each ¼ turn.



# Identifying and Troubleshooting Interference Issues

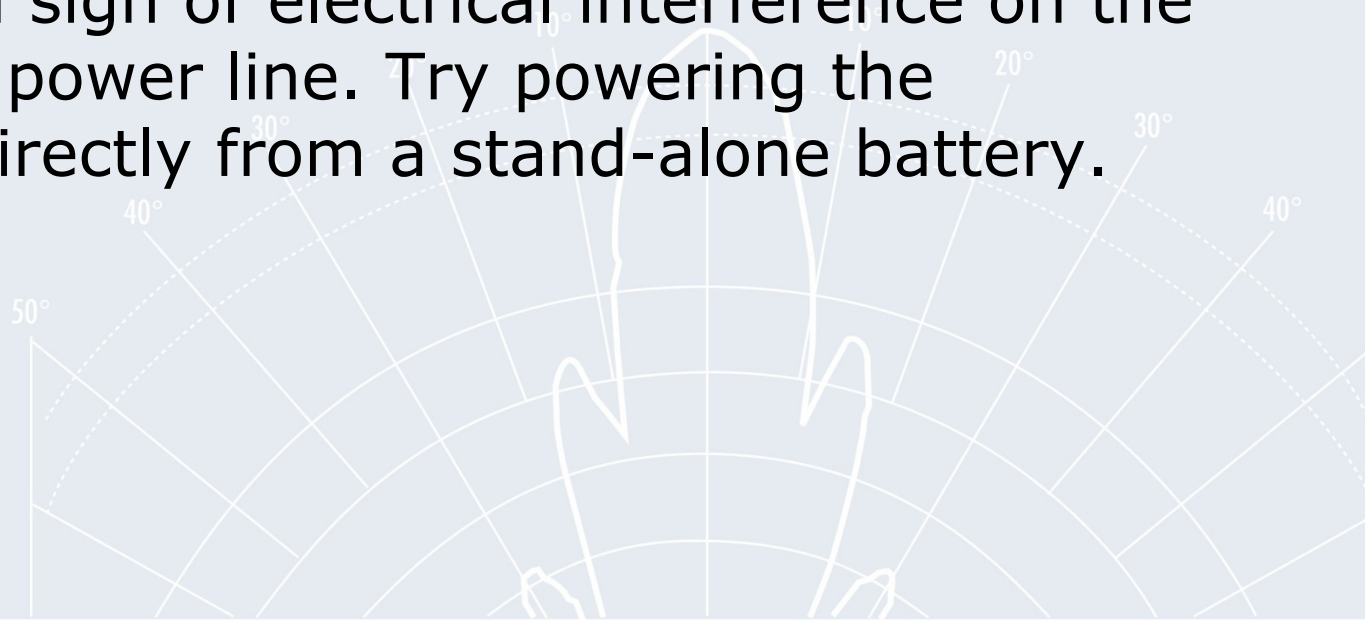


# Identifying Interference



If the screen interference increases proportional to vessel speed this usually indicates that the transducer face is exposed to aerated water

If the interference appears at a specific rpm this could be a sign of electrical interference on the sounder's power line. Try powering the sounder directly from a stand-alone battery.



# Identifying Flow Noise



If experiencing interference with a transom mounted transducer, test drive the vessel to determine the speed at which the image is lost. Move the transducer lower in small 1/8<sup>th</sup> inch increments and retest.

If the screen image improves, repeat until you are satisfied with the results. If the screen image gets worse, move the transducer up and re-test until improvement is seen.



## ...Identifying Flow Noise



Perform a slow but constant turn to the side of the hull that the transom transducer is mounted. Gradually increase rate of turn. If screen image improves the transducer needs to be mounted lower in the water.

If screen image is worse when turning to the same side as the transducer try turning the opposite direction. This would indicate the transducer needs to be mounted higher in the water.

# Questions ?

