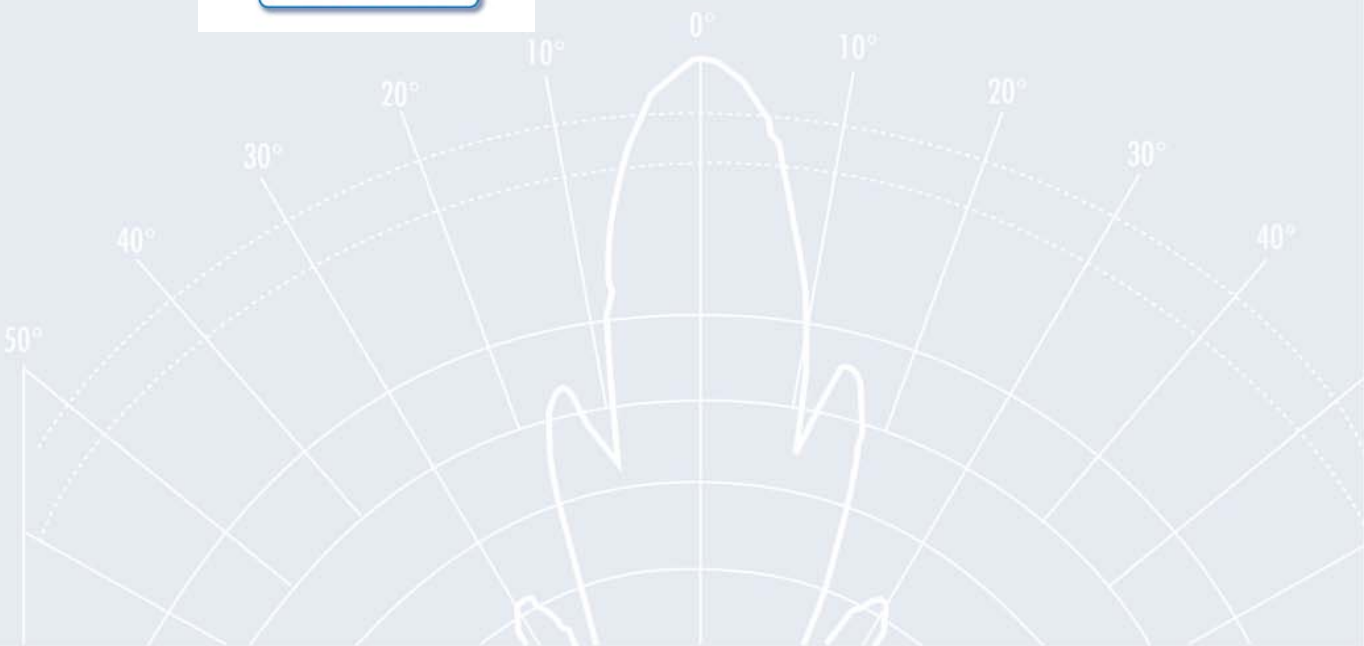
Seminar Agenda

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

1. NMEA 2000® Products
2. Response to Customer Feedback
3. Airmar Transducer Models
4. Installation-Specific Products
5. Converting Transducers
6. Installation & Troubleshooting
7. In-Hull Transducers
8. Broadband Transducers
9. Transom-Mount Installation & Troubleshooting

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

NMEA 2000® Sensors



NMEA 0183 & 2000® Smart Sensors

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- All signal processing is done inside the transducer
- Operates at 235kHz
- No interference with on-board 50/200 kHz sounder
- Provides digital depth, speed, and temperature
- Separate models for 0183 and 2000

NMEA 0183 Smart Sensors are compatible with all NMEA 0183 displays that can read the following sentences:

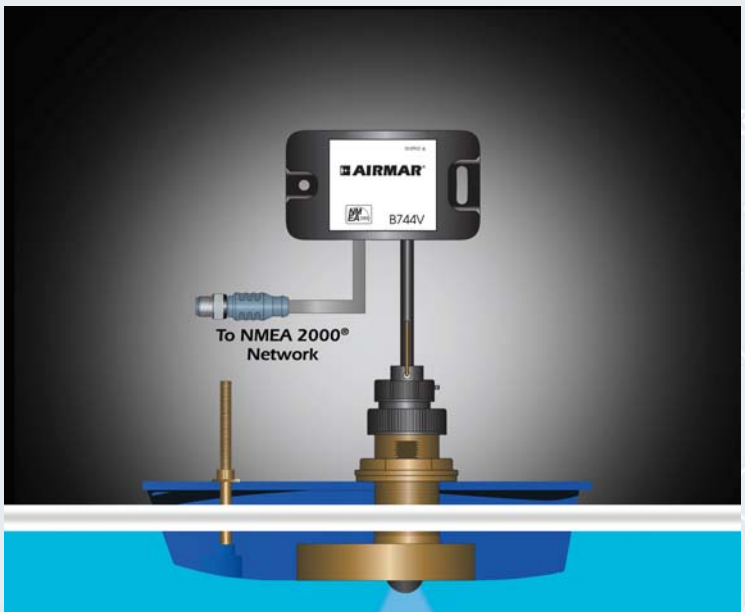
$SDDBT, DDPT....Depth
$VWVHW..... Speed
$VWVLW..... Distance
$YXMTW.....Water Temperature

NMEA 2000 Smart Sensors are compatible with all NMEA 2000 displays
that can read the following PGN's:

128259..... Speed Water Reference
128267.....Water Depth and Transducer
128275..... Distance Log
130310..... Water Temperature

NEW NMEA 2000 B744V

- Depth, speed, and temperature
- 235 kHz
- 100 Watts Power with broadband ceramic
- Minimum Depth Range: 0.5 m (1.6’)
- Maximum Depth Range: Up to 180 m (590’)
- Bronze housing
- For installations requiring a High-Performance Fairing



NEW NMEA 2000 ST850 & ST800

- Speed and temperature
- 6 m (20’) NMEA 2000 cable
- Devicenet connector
- ST850 retrofits into existing Airmar P17 & B17 2” housings
- ST800 retrofits into existing Airmar P120 & B120 2” housings
- Retractable housing with water valve
- Plastic, bronze, or stainless steel housings

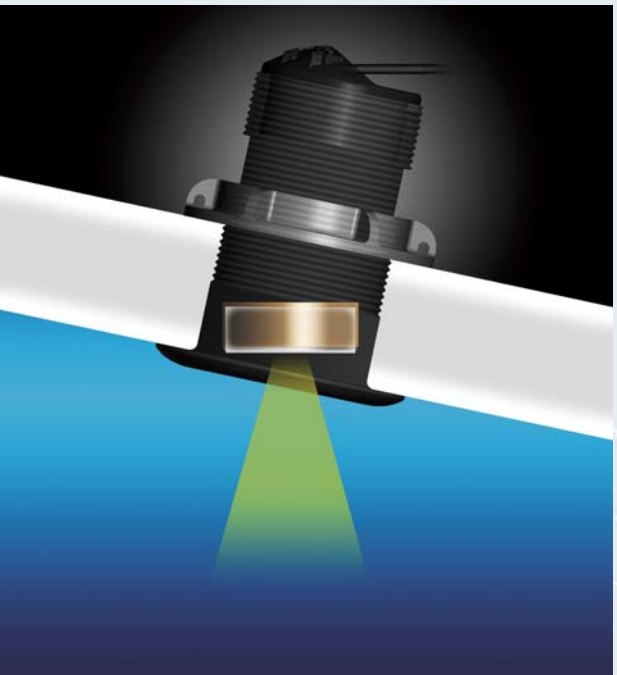
NEW NMEA 2000 B122 Long-Stem

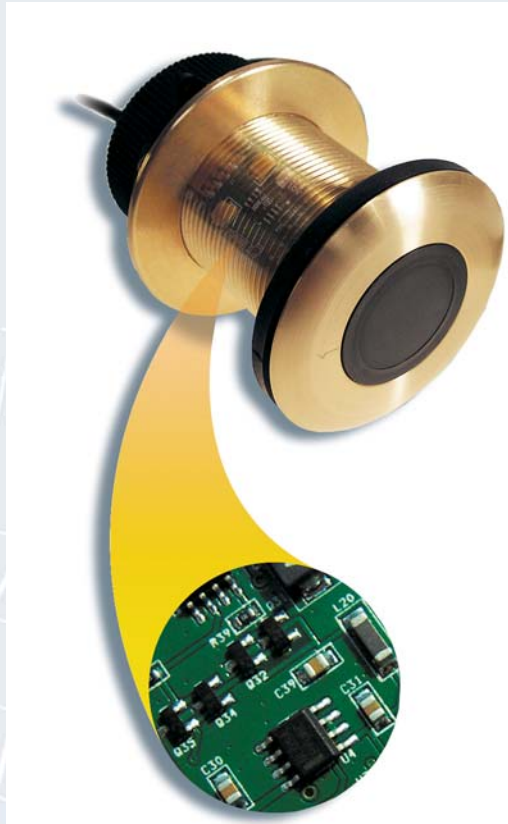
- Depth and temperature
- 235 kHz
- 100 Watts Power with broadband ceramic
- Minimum Depth Range: 0.5 m (1.6’)
- Maximum Depth Range: Up to 180 m (590’)
- Bronze, long-stem housing
- For steep deadrise and thick hull vessels

DT800 Tilted Element™ Smart Sensors

New design incorporates:

- Broadband 235kHz Ceramic
  - Higher power rating (100W)
  - Increased depth capability down to 600ft
  - Better shallow water performance(<1.6 ft)

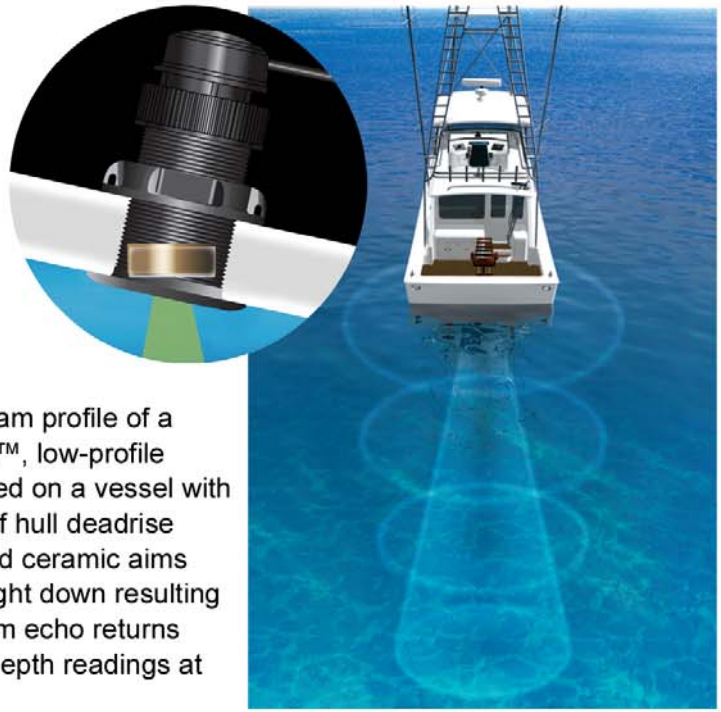




DT800 Tilted Element™ Benefits

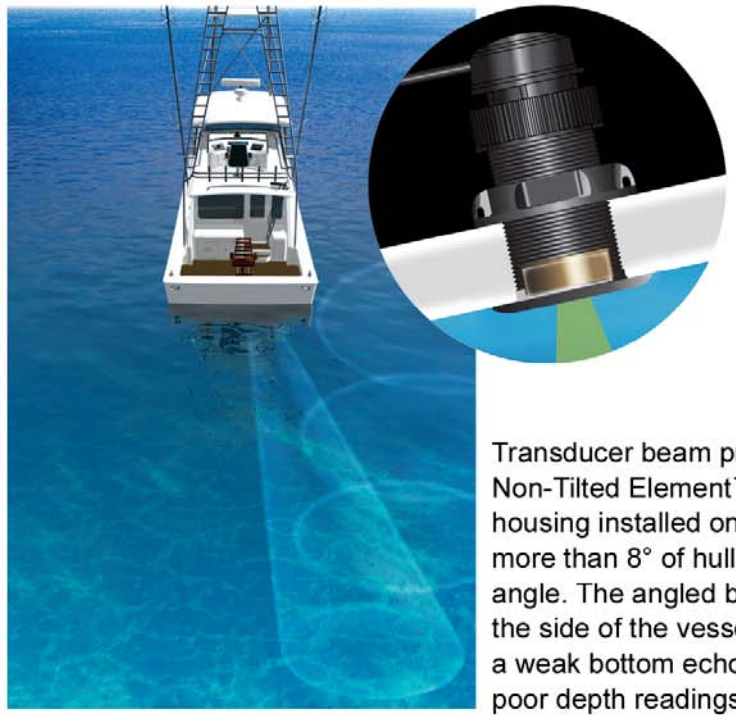
- Available in 0°, 12°, or 20° Tilts

With Tilt



Transducer beam profile of a Tilted Element™, low-profile housing installed on a vessel with more than 8° of hull deadrise angle. The tilted ceramic aims the beam straight down resulting in strong bottom echo returns and accurate depth readings at any speed.

Without Tilt

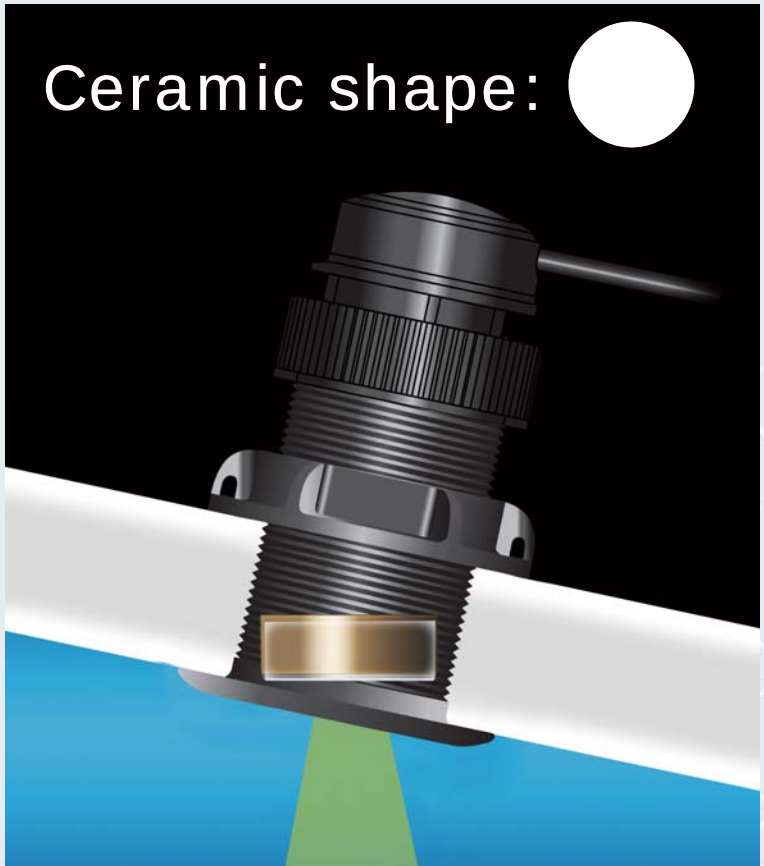


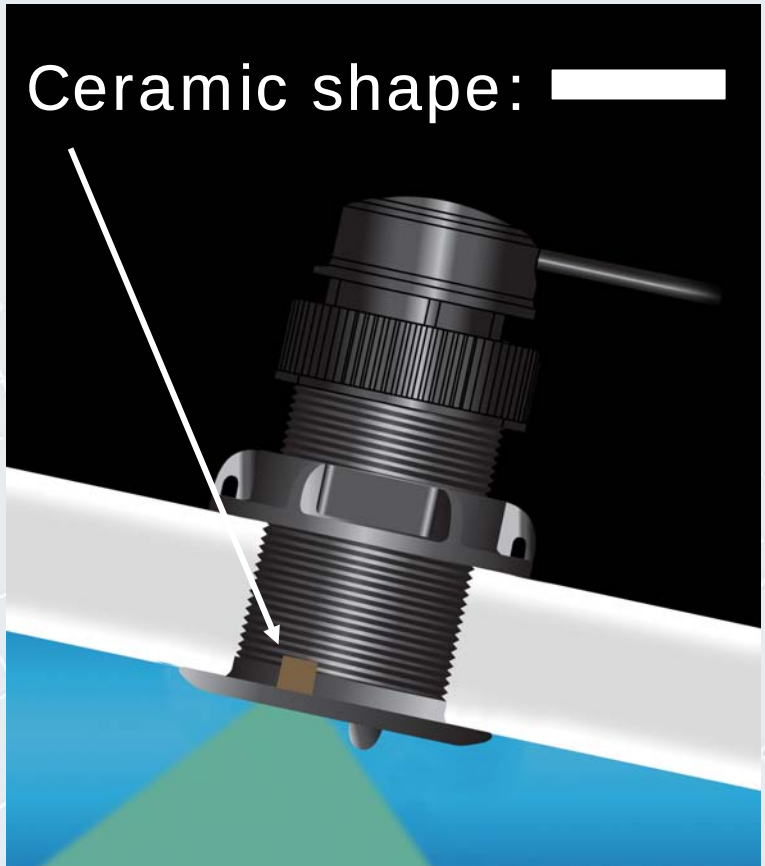
Transducer beam profile of a Non-Tilted Element™, low-profile housing installed on a vessel with more than 8° of hull deadrise angle. The angled beam out to the side of the vessel will return a weak bottom echo resulting in poor depth readings.

DT800 vs. DST800

- Broadband, round ceramic
- Better sensitivity vs. DST800
- 12° beam, 590’ max depth
- Fixed 0°, 12°, or 20° tilt

- Rectangular bar ceramic
- Three sensors in one housing
- 10° x 44° beam, 330’ max depth
- Works with all deadrise angles





Smart™ Sensor Family

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

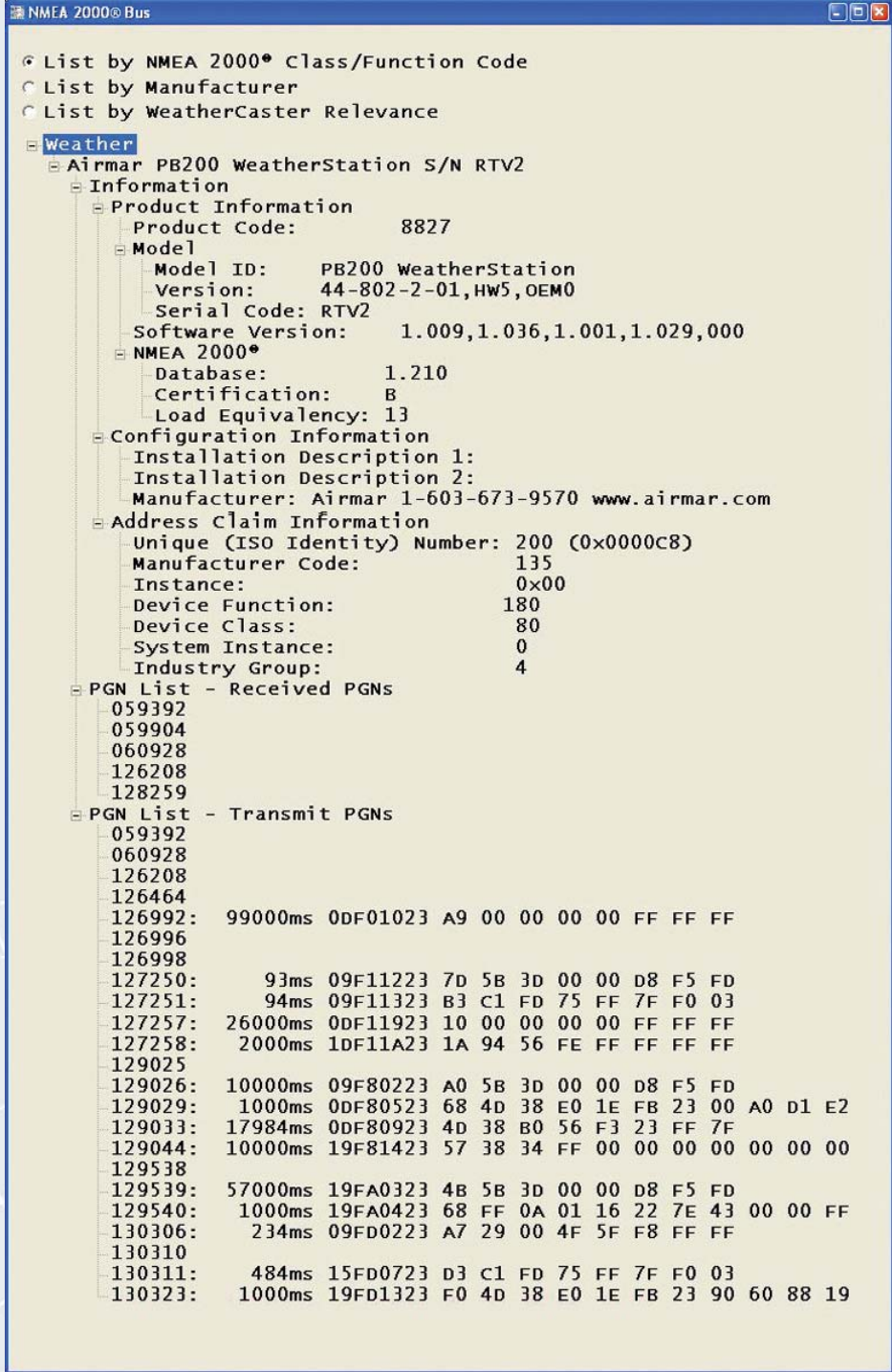
- **Converts NMEA 2000® PGNs to USB format**
- **Plug-and-play connectivity from a NMEA 2000 network backbone to a PC**
- **For Airmar NMEA 2000 Sensors and other Certified NMEA 2000 Sensors: GPS Receivers, Heading Sensors, and Smart™, Depth, Speed, and Temperature Sensors**
- **Airmar WeatherCaster™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

U200 Supported PGN's

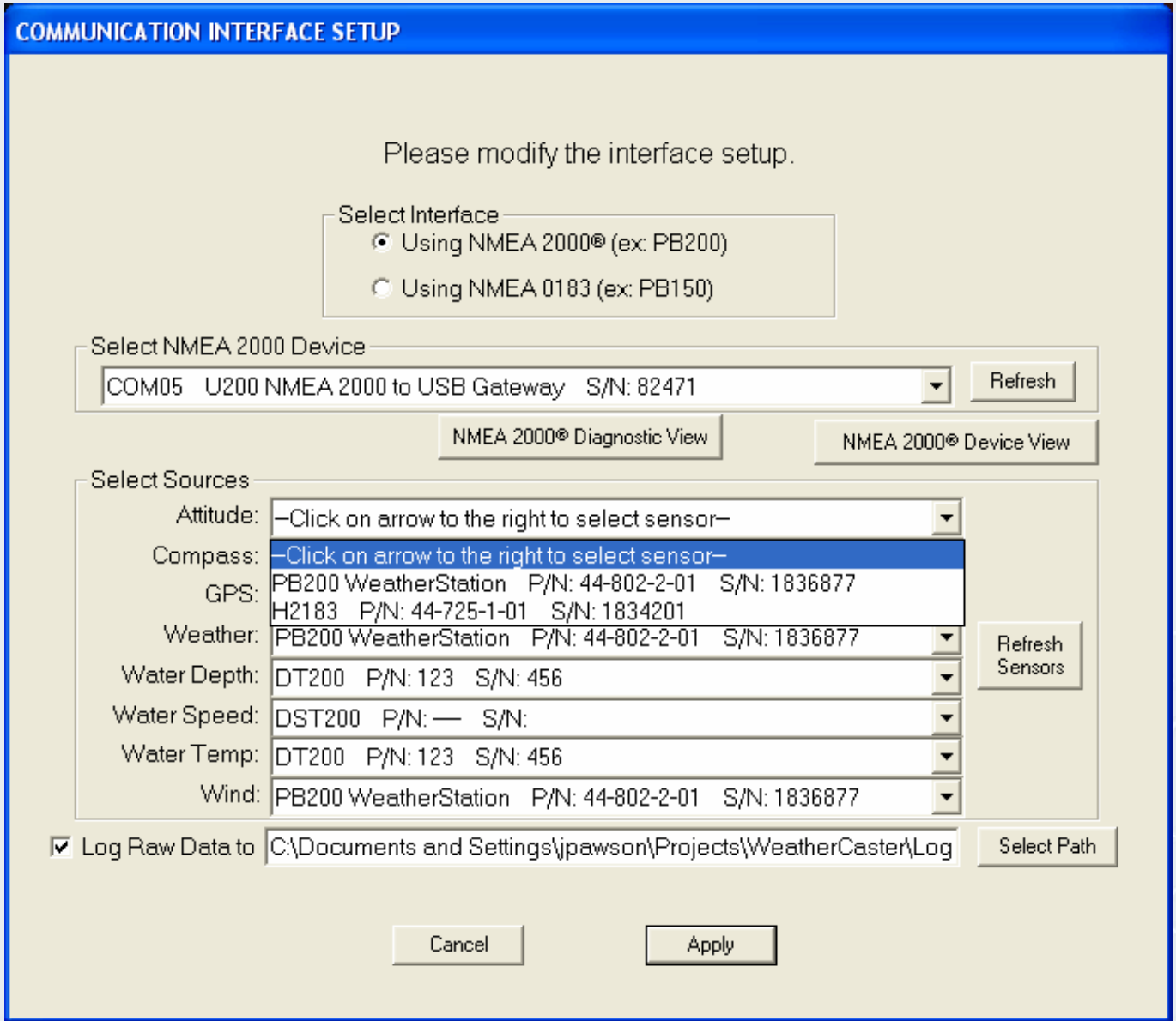
- 059392..... ISO Acknowledgment
- 059904..... ISO Request
- 060160..... ISO Transport Protocol, Data Transfer
- 060416..... Transport Protocol, Connection Management
- 060928..... ISO Address Claim
- 065240..... ISO Commanded Address
- 126208..... Acknowledge Group Function
- 126208.....NMEA Complex 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

U200 Diagnostics

- View all connected devices
- Troubleshoot the network
- Select priority of devices
- Calibrate Airmar products
- Flash update Airmar products



U200 Device Selection



U200 & Weathercaster Logging

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- Raw data can be exported and plotted in MS Excel

Sep_24_2009WEATHERSTATION_2000.LOG - Notepad

File Edit Format View Help

```
15:27:17.836: -> 127250 09F11223 989A870000FF7FFD
15:27:17.836: -> 130306 09FD0204 880F00790FFAFFFF
15:27:17.852: -> 127251 09F11304 44C14F0D00FFFFFF
15:27:17.852: -> 127250 09F11204 F8C1A90000D8F5FD
15:27:17.852: -> 130323 19FD1304 F0AF3890C2B02966808819CAB942D50F00790FFAFFFFEB03FF7302010201
15:27:17.852: -> 127251 09F11323 F01F5DFEFFFFFFFF
15:27:17.852: -> 127250 09F11223 999A870000FF7FFD
15:27:17.867: -> 129033 0DF80904 AF3890C2B029FF7F
15:27:17.867: -> 127251 09F11304 45C14F0D00FFFFFF
15:27:17.867: -> 127250 09F11204 F9C1A90000D8F5FD
15:27:17.867: -> 127251 09F11323 F11F5DFEFFFFFFFF
15:27:17.883: -> 127250 09F11223 9A9A870000FF7FFD
15:27:17.883: -> 126992 0DF01004 16F0AF3890C2B029
15:27:17.883: -> 127258 1DF11A04 21F5AF38D8F5FFFF
15:27:17.883: -> 127257 0DF11904 29FF7F57064CF5FF
15:27:17.883: -> 127251 09F11304 46C14F0D00FFFFFF
15:27:17.899: -> 129025 09F80104 66808819CAB942D5
15:27:17.899: -> 129026 09F80204 17FCEFD20500FFFF
15:27:17.899: -> 129539 19FA0304 17CBC800FF7FFF7F
15:27:17.899: -> 130311 15FD0704 49C1FF73FF7FEB03
15:27:17.899: -> 127250 09F11204 FAC1A90000D8F5FD
15:27:17.914: -> 130306 09FD0204 890A009FA3F8FFFF
15:27:17.914: -> 127251 09F11323 F239DAFDFFFFFFFF
15:27:17.914: -> 127250 09F11223 9B9A870000FF7FFD
15:27:17.914: -> 129540 19FA0404 17FF08070B11C27C540BFFFFFF7FF20822244E95B80BFFFFFF7FF20B5C2E5B3DB80BFFFFFF7FF2117F16F0B1F00AFFFFFF7FF113450CF32A0000FFFFFF7F
15:27:17.914: -> 127251 09F11304 478E250E00FFFFFF
15:27:17.930: -> 127250 09F11204 00C1A90000D8F5FD
15:27:17.930: -> 127251 09F11323 F31F5DFEFFFFFFFF
15:27:17.930: -> 127250 09F11223 9C9A870000FF7FFD
15:27:17.930: -> 130311 15FD0726 77C06374FF7FFFFF
15:27:17.930: -> 127251 09F11304 488E250E00FFFFFF
15:27:17.946: -> 127250 09F11204 01C1A90000D8F5FD
15:27:17.946: -> 127251 09F11323 F439DAFDFFFFFFFF
15:27:17.946: -> 127250 09F11223 9D9A870000FF7FFD
15:27:17.946: -> 130306 09FD0204 8A0F005111FAFFFF
15:27:17.961: -> 127251 09F11304 498E250E00FFFFFF
15:27:17.961: -> 127250 09F11204 02B0A90000D8F5FD
15:27:17.961: -> 127251 09F11323 F5AF8BFDFFFFFFFF
15:27:17.961: -> 127250 09F11223 9E9A870000FF7FFD
15:27:17.961: -> 127251 09F11304 4AC14F0D00FFFFFF
15:27:17.977: -> 127250 09F11204 03B0A90000D8F5FD
15:27:17.977: -> 127251 09F11323 F6E285FCFFFFFFFF
15:27:17.977: -> 127250 09F11223 9F9A870000FF7FFD
15:27:17.977: -> 130306 09FD0204 8B0A007C97F8FFFF
15:27:17.977: -> 127251 09F11304 4B8E250E00FFFFFF
15:27:17.992: -> 130311 15FD0704 4AC1FF73FF7FEB03
15:27:17.992: -> 127250 09F11204 04B0A90000D8F5FD
15:27:17.992: -> 127257 0DF11923 20FF7FC504A207FF
15:27:17.992: -> 127251 09F11323 F7AF8BFDFFFFFFFF
15:27:18.008: -> 127250 09F11223 A09A870000FF7FFD
15:27:18.008: -> 129029 0DF80504 17AF38A0E9B0290068C416CBE5F1050042A0914B890CF6FFFFFFFFFFFFFF7F13FC08FA00FF7FFFFFFF7F00
15:27:18.008: -> 127250 09F11204 05C1A90000D8F5FD
15:27:18.008: -> 127251 09F11304 4C8E250E00FFFFFF
15:27:18.008: -> 127251 09F11323 F8C908FDFFFFFFFF
15:27:18.024: -> 127250 09F11223 A19A870000FF7FFD
15:27:18.024: -> 128267 0DF50B26 FFFFFFFFFF0000FF
15:27:18.024: -> 130311 15FD0726 78C06374FF7FFFFF
15:27:18.024: -> 127250 09F11204 06C1A90000D8F5FD
15:27:18.024: -> 127251 09F11304 4DC14F0D00FFFFFF
15:27:18.024: -> 127251 09F11323 F9AF8BFDFFFFFFFF
15:27:18.039: -> 127250 09F11223 A29A870000FF7FFD
15:27:18.039: -> 130306 09FD0204 8C0F006214FAFFFF
15:27:18.039: -> 127251 09F11304 4EC14F0D00FFFFFF
15:27:18.039: -> 127250 09F11204 07C1A90000D8F5FD
```

Ln 1, Col 1

start | C:\Documents and Se... | u200 drop.bmp - Paint | C:\Projects\Weather... | Sep_24_2009WEATH... | EN | 3:29 PM

PB200 WeatherStation® Instrument

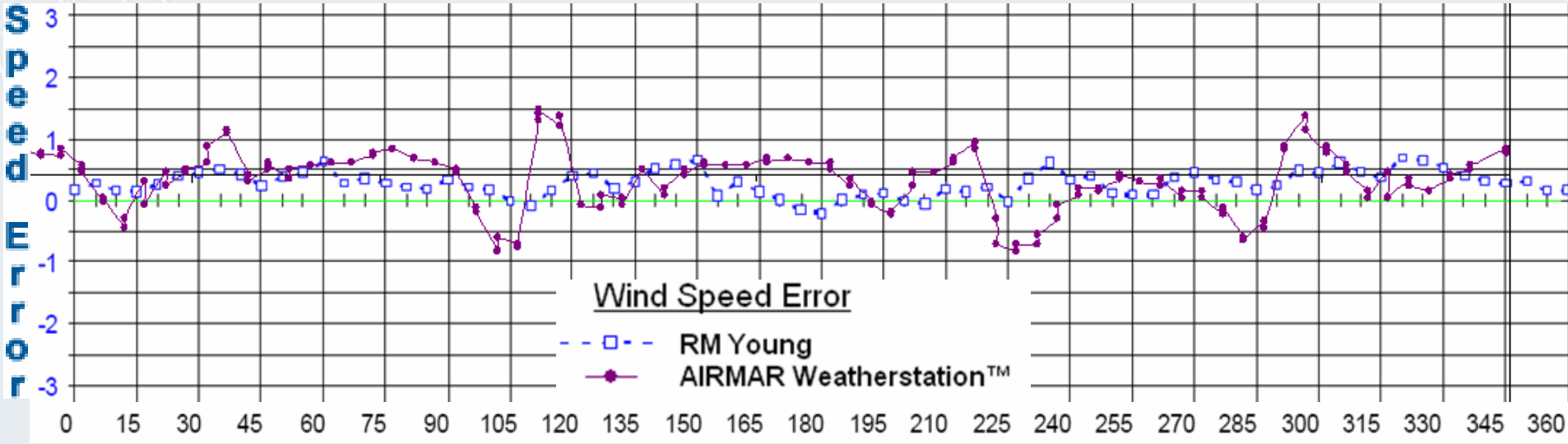
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- NEW 360° calibration results in:
- Improved wind direction accuracy
  - 5° RMS at wind speeds from 4 to 10 knots
  - 2° RMS at wind speeds from 10 to 80 knots

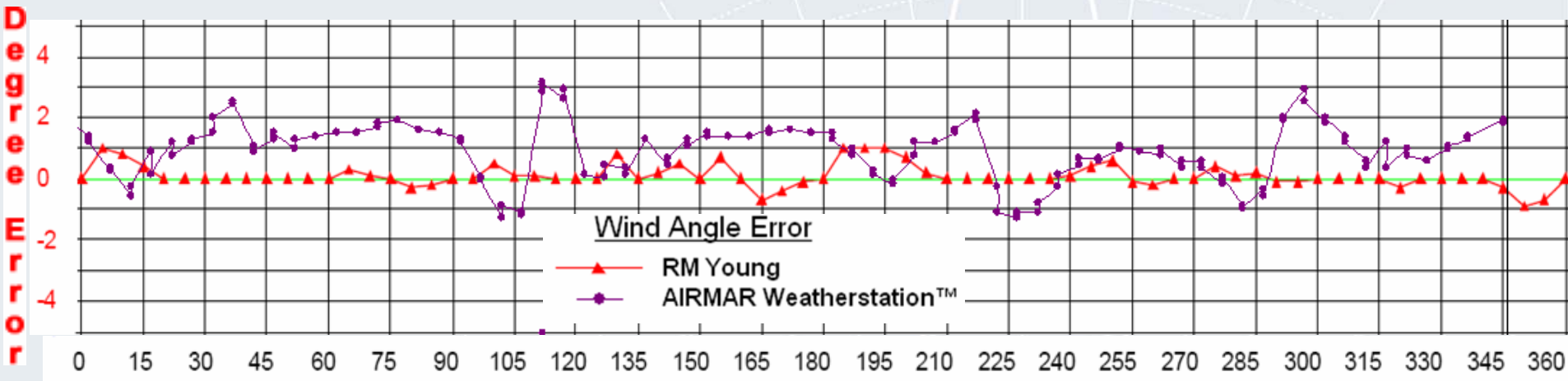
- Improved barometer accuracy +/- 2 mbar
- Exposed Air temperature button improves accuracy to +/- 1°C (1.8° F)
- Built-in terminating resistor on NMEA 2000 cables over 6 meters.

PB200 Wind Speed Accuracy vs RM Young Meteorological Wind Only Instrument

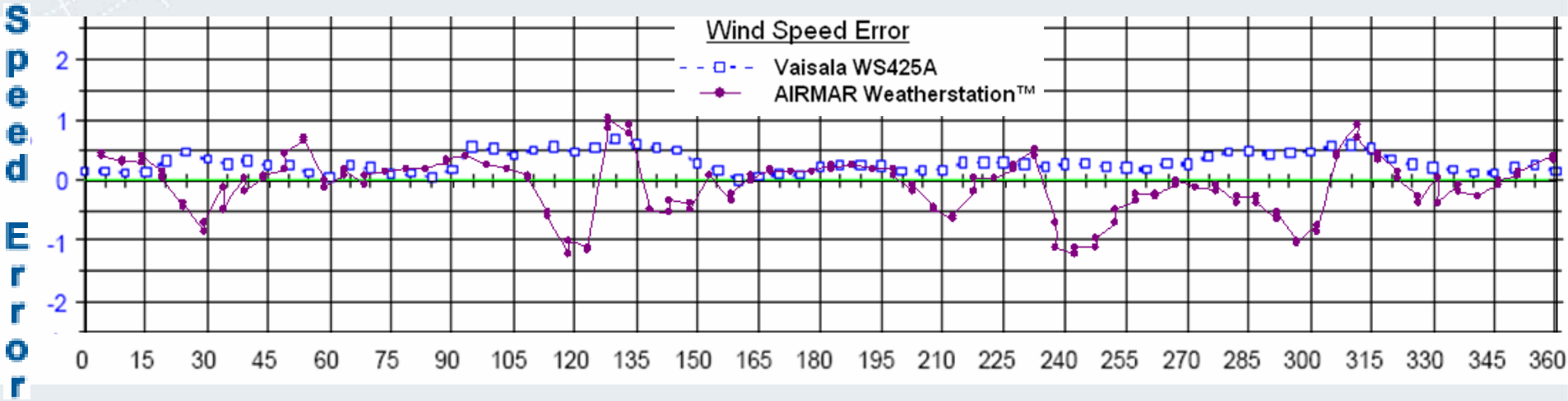
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology



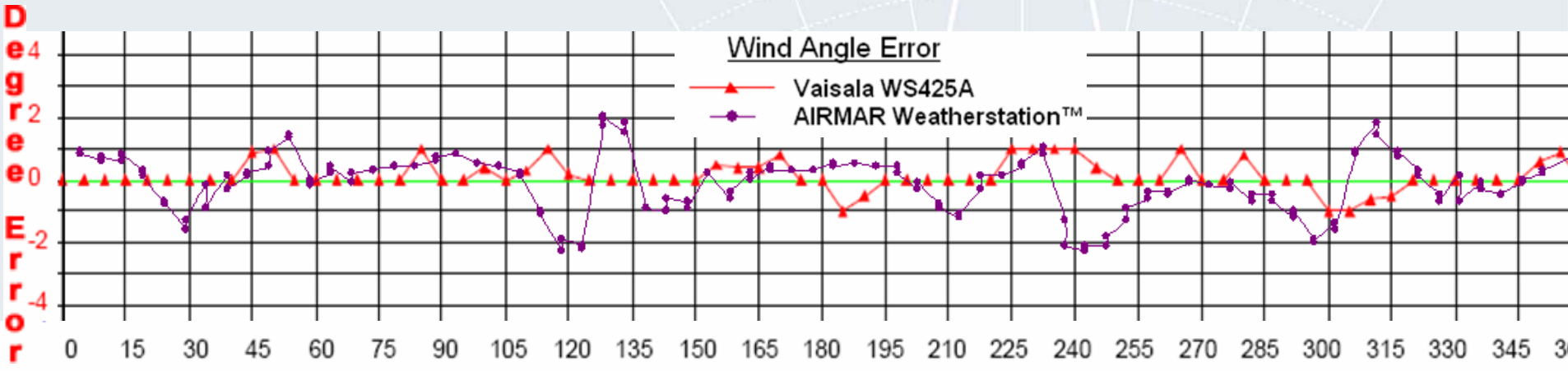
PB200 Wind Direction Accuracy vs RM Young ($1,700)



PB200 Wind Speed Accuracy vs Vaisala Meteorological Wind Only Instrument

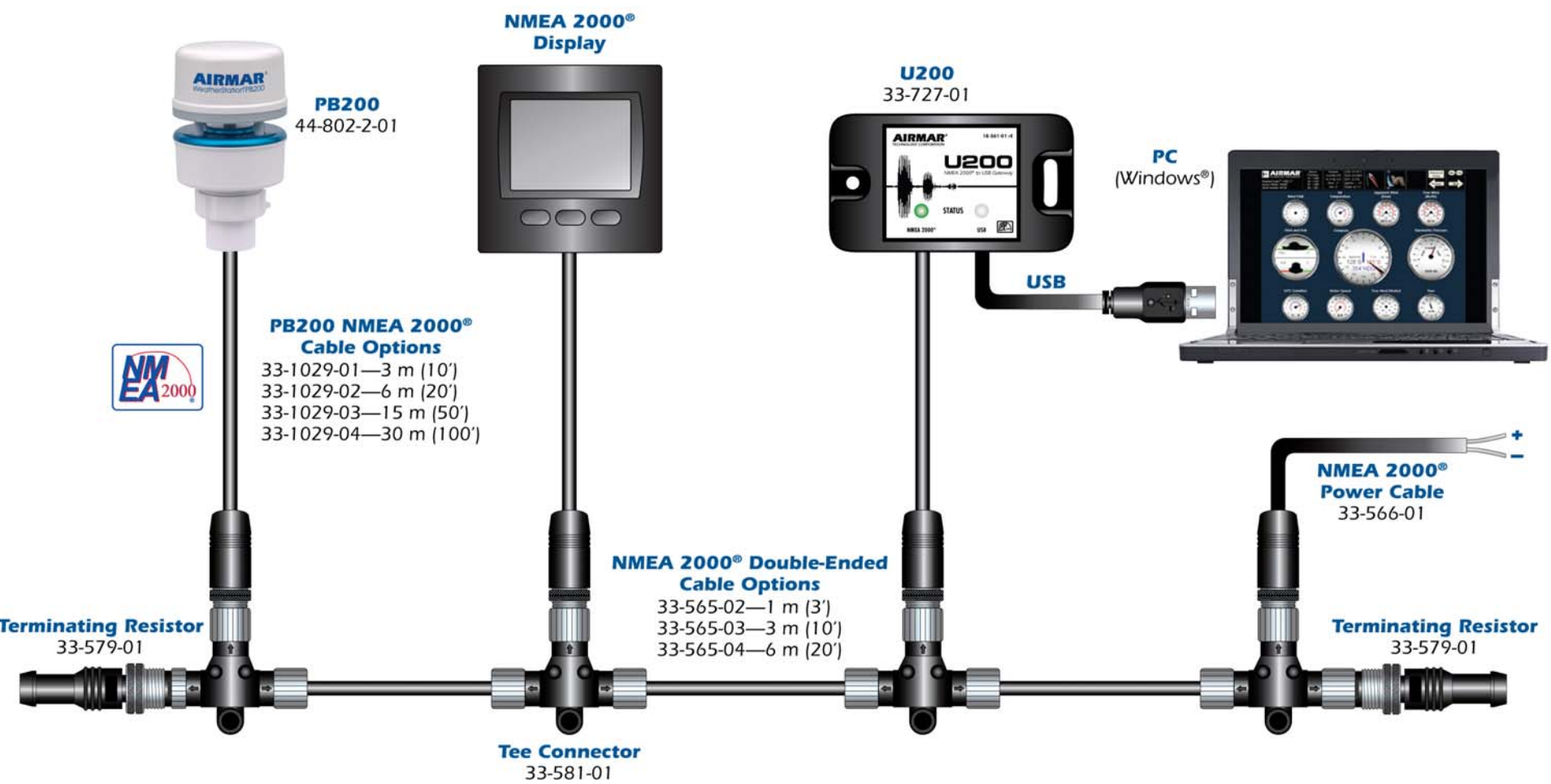


PB200 Wind Direction Accuracy vs Vaisala ($2,050)



AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

AIRMAR® PB200 TO A NMEA 2000® DISPLAY AND PC



H2183 Heading Sensor

-Better than 1° heading accuracy in static conditions
-Best-in-class 2° heading accuracy in dynamic conditions
Patent Pending Dynamic tilt correction
-Only recreational heading sensor that uses a three-axis rate gyro and a three axis accelerometer
-Easily mounts on any angled bulkhead
-IPX6 waterproof enclosure
-Default 10 Hz update rate for heading
-Outputs NMEA 0183 and NMEA 2000 data simultaneously

H2183 Heading Sensor

-Easy Auto calibration feature on ANY display

Cycling power then begin a circle within 2 minutes will trigger auto-calibration on any NMEA display. Within 2-4 minutes of circling, heading will stop outputting while in calibration mode and come back when calibration is complete.

Calibration can also be done with WeatherCaster PC Software

NMEA 0183 Default Outputs(Limited Bandwidth)

ON $HCHDG...10Hz Heading, Deviation, and Variation
ON $TIROT.....1.6Hz Rate of Turn
ON $YXXDR....2.5Hz Transducer Measurements: Vessel Attitude
OFF $HCHDT..... Heading Relative to True North

NMEA 2000® Default Outputs

ON 127250....10Hz ..Vessel Heading
ON 127251....10Hz .. Rate of Turn
ON 127257....2Hz... Attitude

GH2183 Heading Sensor with GPS

- **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**
- **Only recreational heading sensor that uses a three-axis rate gyro and a three axis accelerometer**
- **Perfect product for metal hulled boats because the heading sensor is mounted above the deck**
- **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**

NMEA Compatibility Chart

NMEA 2000	NMEA 2000
Product	**Product**
DT800, DST800, P39, P79 Smart™ Transducers	**C, E, G-Series, ST60, ST70**- All Data
G, H, GH2183 GPS & Heading Sensors	**C, E, G-Series, ST60, ST70**- All Data
PB200 WeatherStation® Instrument	**ST-70-**All Data **C,E,G-Series-** Displays Apparent Wind, Air Temp, Barometer, Heading , GPS
NMEA 0183	**NMEA 0183**
DT800, DST800, P39, P79 Smart™ Transducers	**C, E, G-Series, ST60,** - All Data
G, H, GH2183 GPS & Heading Sensors	**C, E, G-Series, ST60,** - All Data
PB200 WeatherStation® Instrument	**C,E,G-Series-** Displays Apparent Wind, Air Temp, Barometer, Heading , GPS

NMEA Compatibility Chart

NMEA 2000	NMEA 2000
Product	
DT800, DST800, P39, P79 Smart™ Transducers	**GMI 10, 4200, 5200 Series Displays-** All Data
G, H, GH2183 GPS & Heading Sensors	**GMI 10, 4200, 5200 Series Displays-** All Data
PB200 WeatherStation® Instrument	**GMI-10-Displays** All Data except wind chill **4200, 5200** Displays Apparent wind, True wind, Heading, GPS
NMEA 0183	**NMEA 0183**
DT800, DST800, P39, P79 Smart™ Transducers	**GMI 10, 4200, 5200 Series Displays**
G, H, GH2183 GPS & Heading Sensors	**GMI 10, 4200, 5200 Series Displays**
PB200 WeatherStation® Instrument	**GMI-10-All Data** **4200, 5200** Displays Apparent wind, True wind, Heading, GPS

NMEA Compatibility Chart

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

AIRMAR TECHNOLOGY CORPORATION

NMEA 2000
Product
DT800, DST800, P39, P79 Smart™ Transducers
G, H, GH2183 GPS & Heading Sensors
PB200 WeatherStation® Instrument
NMEA 0183
DT800, DST800, P39, P79 Smart™ Transducers
G, H, GH2183 GPS & Heading Sensors
PB200 WeatherStation® Instrument

FURUNO

NMEA 2000
FI Instruments, Navnet 3-- All Data
FI Instruments, Navnet 3-- All Data
FI Instruments, Navnet 3-- All Data
NMEA 0183
RD-30, Navnet 1,2,3 All Data
RD-30, Navnet 1,2,3 All Data
RD-30, Navnet 1,2,3 All Data except wind chill

NMEA Compatibility Chart

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

AIRMAR TECHNOLOGY CORPORATION

NMEA 2000 Products
DT800, DST800, P39, P79 Smart™ Transducers
G, H, GH2183 GPS & Heading Sensors
PB200 WeatherStation® Instrument

SIMRAD

NMEA 2000 Products
IS20 Instruments-All Data
IS20 Instruments-All Data
IS20 Instruments-All Data except wind chill

NMEA Compatibility Chart

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

AIRMAR TECHNOLOGY CORPORATION

Maretron

NMEA 2000 Product	NMEA 2000 Product
DT800, DST800, P39, P79 Smart™ Transducers	DSM 250, 350 Displays- All Data
G, H, GH2183 GPS & Heading Sensors	DSM 250, 350 Displays- All Data
PB200 WeatherStation® Instrument	DSM 250, 350 Displays- All Data

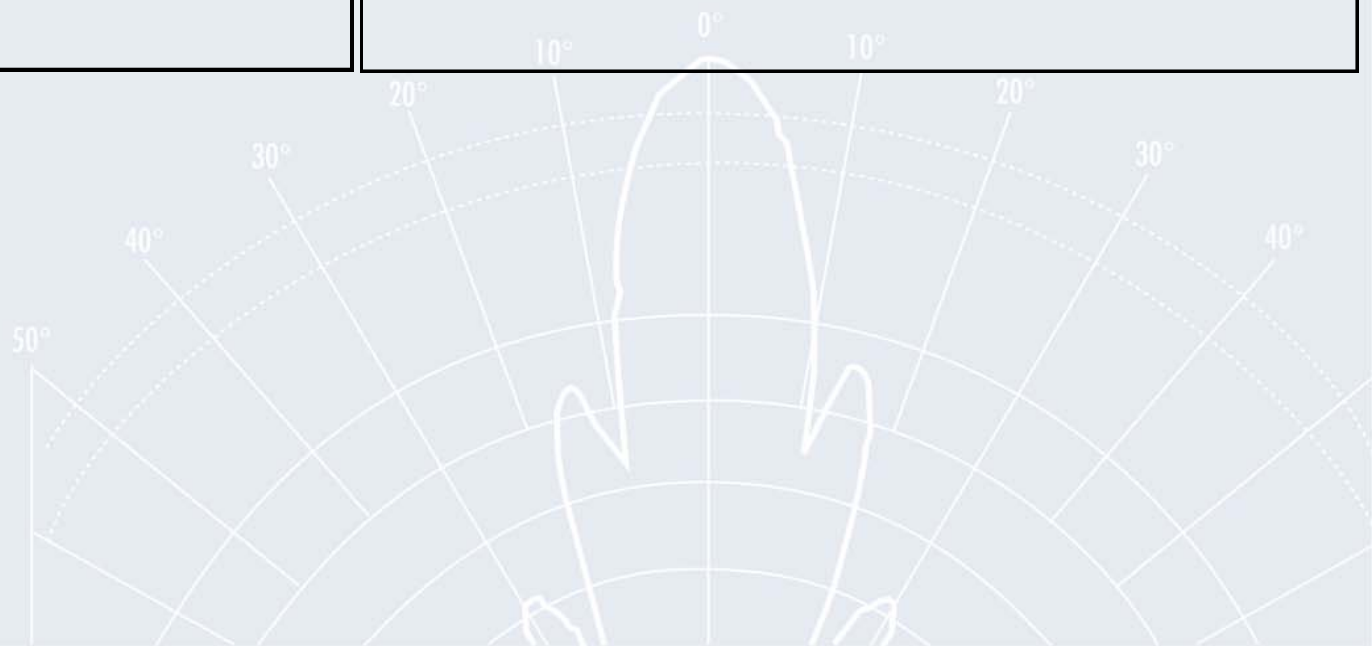
NMEA Compatibility Chart

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

AIRMAR TECHNOLOGY CORPORATION

LOWRANCE

NMEA 2000 Product	NMEA 2000 Product
DT800, DST800, P39, P79 Smart™ Transducers	**LCX & HDS Dispalys-** All Data
G, H, GH2183 GPS & Heading Sensors	**LCX & HDS Dispalys-** All Data
PB200 WeatherStation® Instrument	**LCX & HDS Dispalys-** All Data

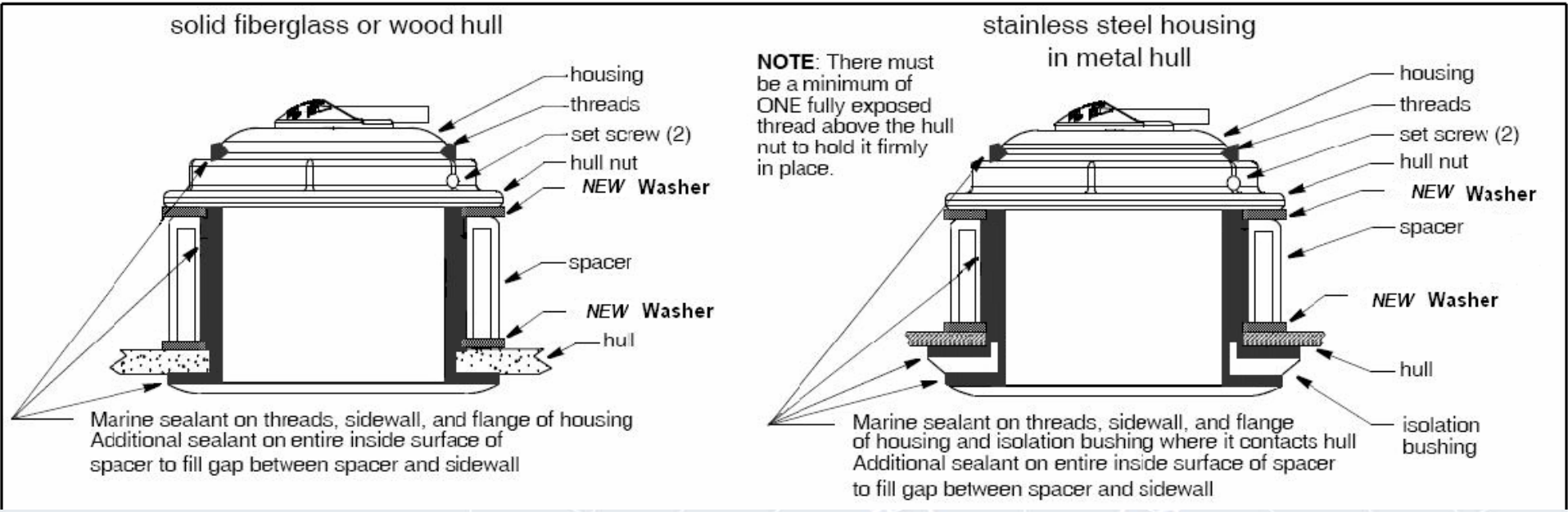


Response to Customer Feedback

B164, SS164 Enhancements

- Issue: 50kHz horizontal banding on Furuno digital fishfinders

- Resolution: Addition of two rubber insulating washers on either side of the plastic spacer and two set screws for the hull nut.



R99 Enhancements

- Issue: Housings cracking due to stress or improper installation
- Resolution: Added thickness to epoxy housing resulting in almost double the strength.

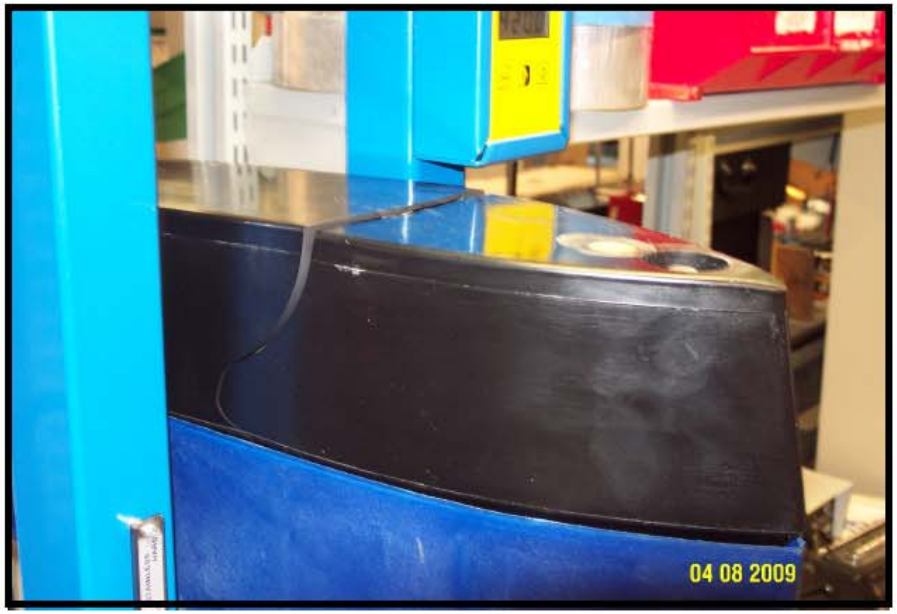


Figure 3: New R99 transducer failure at 4200 lbs (deflection 0.233")
Failed with impact load from hammer

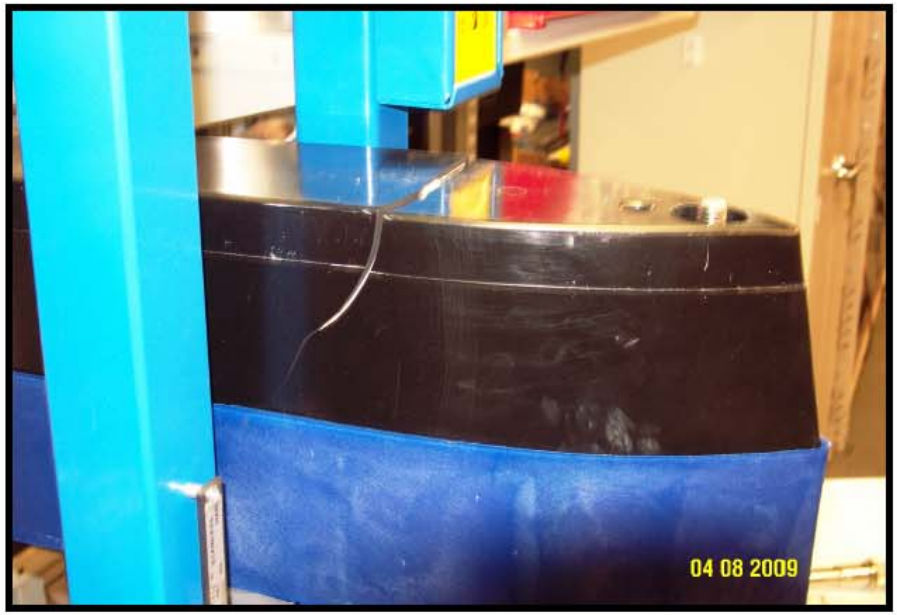


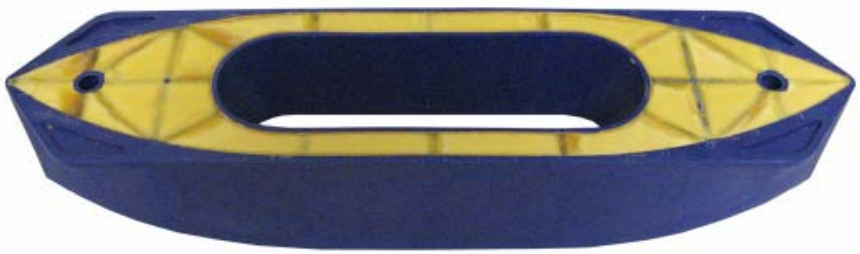
Figure 4: Original R99 transducer failure at 2263 lbs (deflection 0.200")
Failed as jack load pressure increased

R99, R209, R309 Fairings

- Issue: Fairings cracking due to stress or improper installation

- Resolution: New solid blue fairings that are not foam-injected. These are 2 times stronger than the foam injected fairings.

Existing Fairing (foam-filled)



New Fairing (solid)

R99, R209, & R309 Installations

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- It is *Critical* that the fairing be bolted and secured to the hull before the transducer is installed.
- Be sure the fairing is *100% flush to the hull and does not rock front to back or side to side*. This rocking could cause the final installation to crack the fairing or transducer.

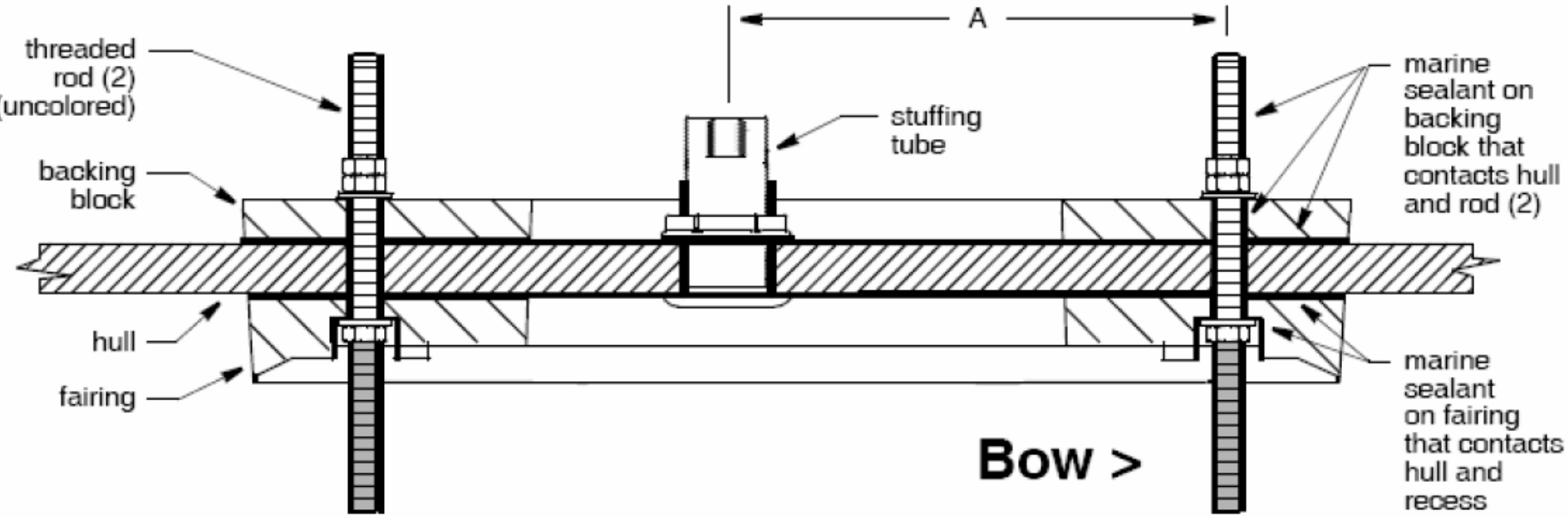


Figure 2. Bedding and installing the fairing and backing block (non-metal hull shown)

R99, R209, & R309 Installations

- After the fairing is bolted to the hull, slide the transducer onto the threaded rods *being sure the rounded bottom is facing forward toward the bow and the temperature sensor is aft*.
- Be sure the rods extend a minimum of 3 threads beyond the nut after being tightened to *20ft.-lb of torque*.

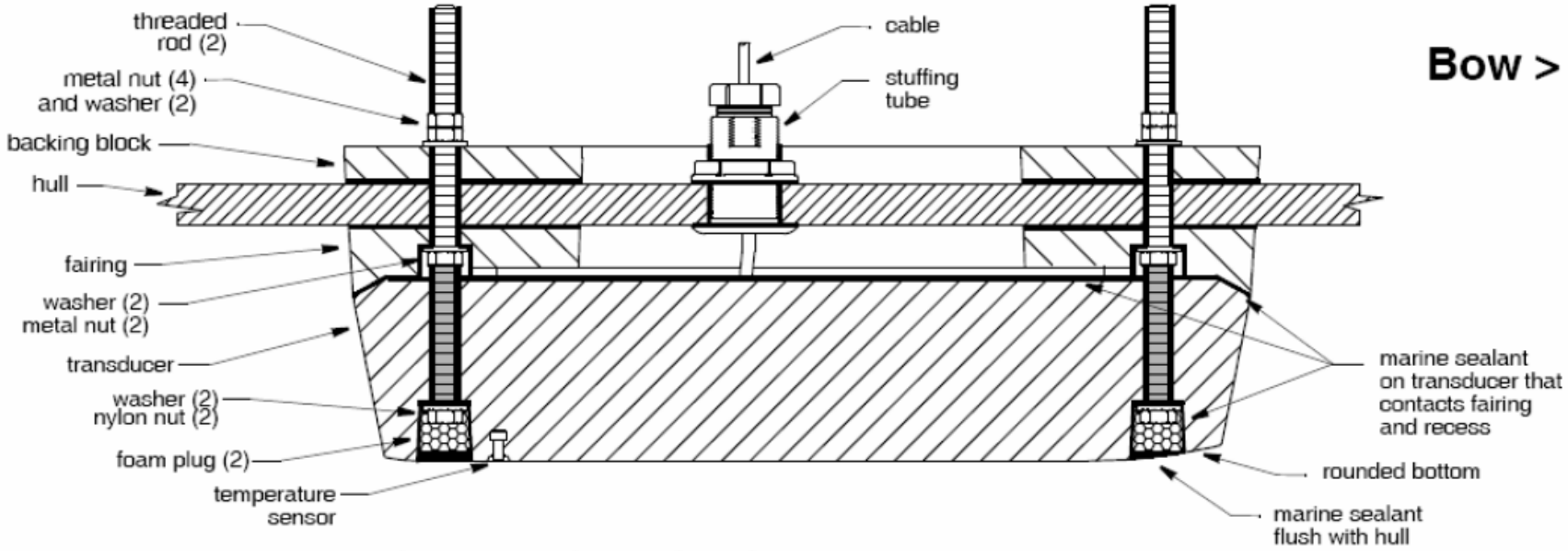
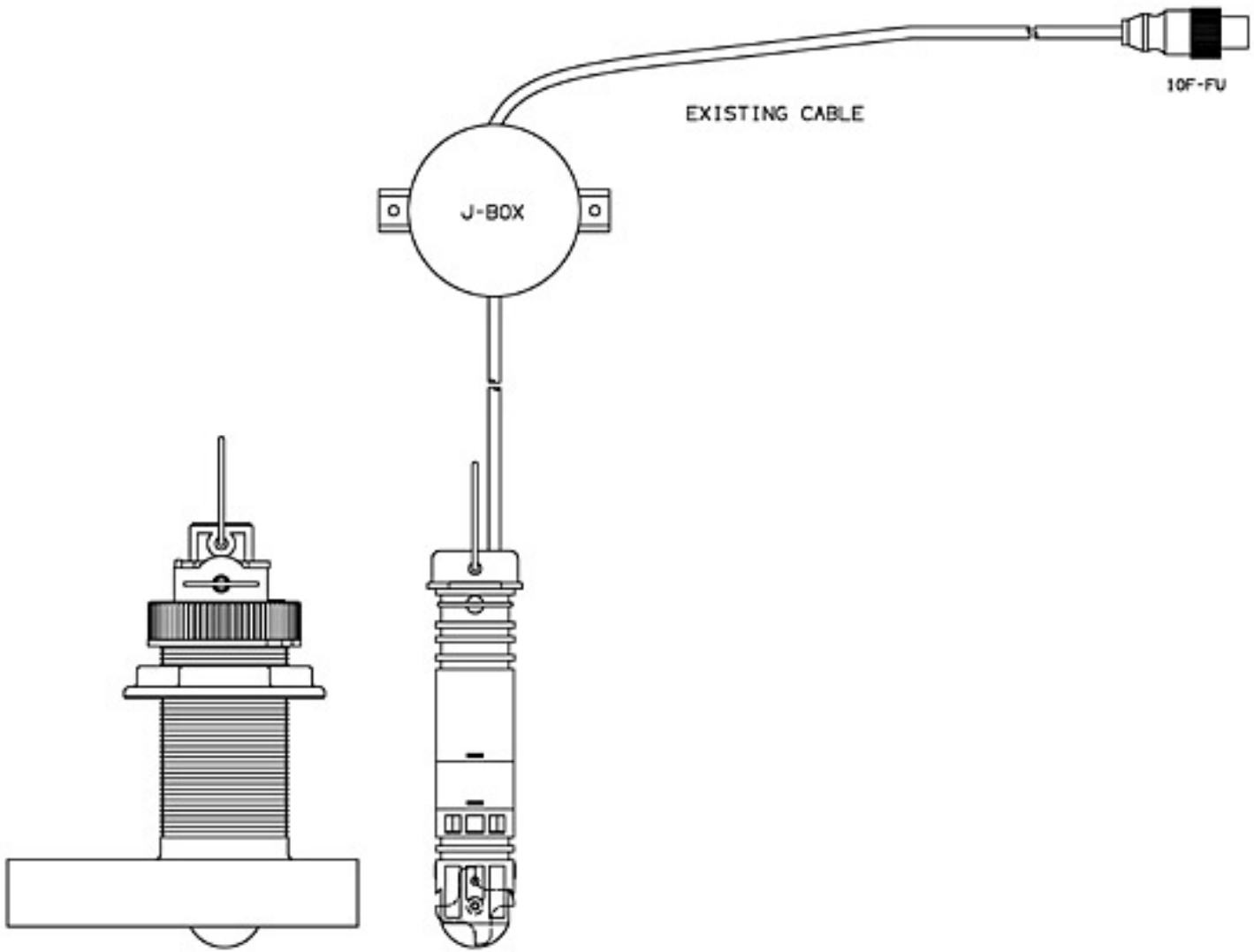


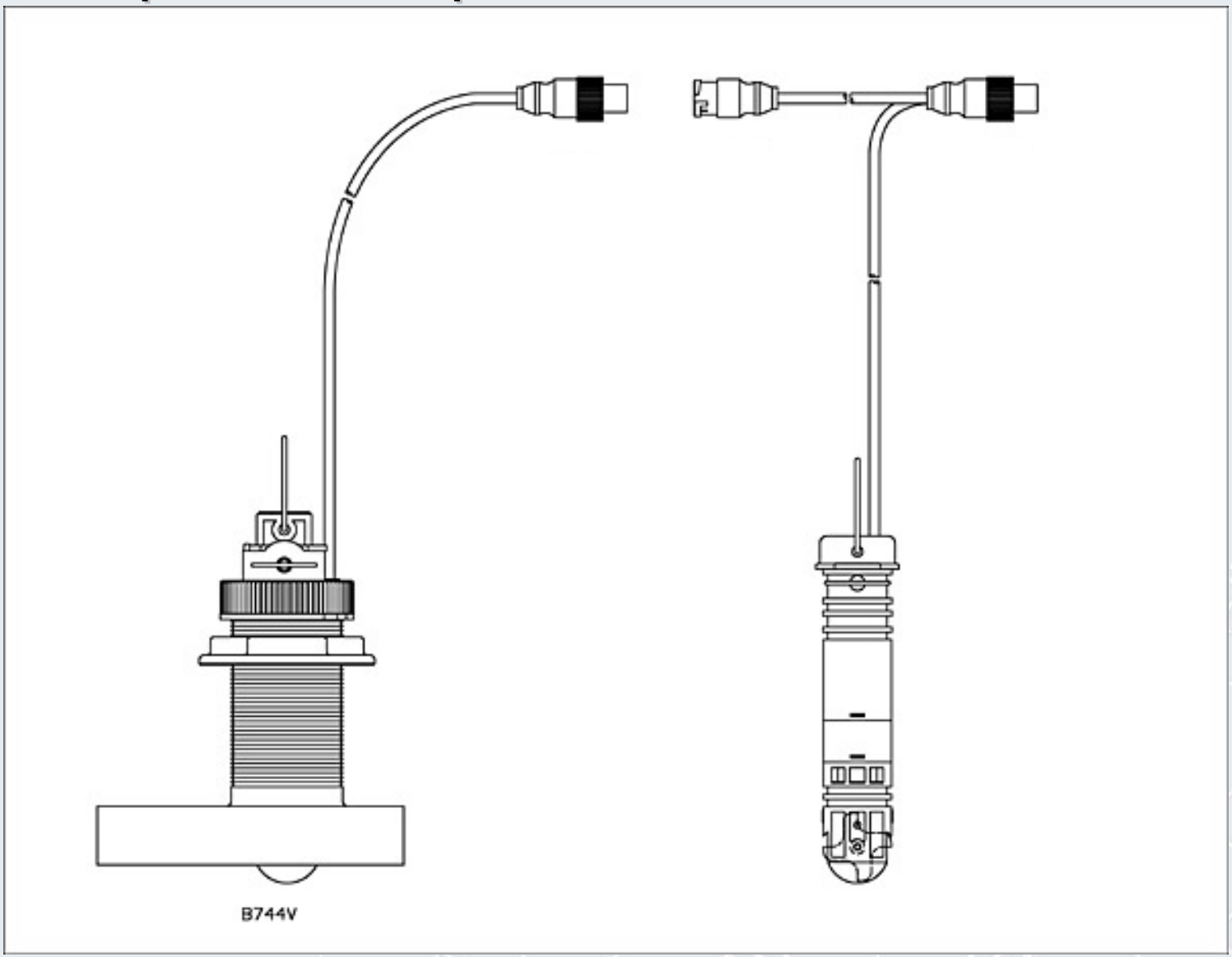
Figure 3. Bedding and installing the transducer (non-metal hull shown)

B744V Speed/ Temp Replacement



B744V Speed/ Temp Replacement

Active Speed/Temp Insert



Smart Sensor Enhancements:
DT800, DST800, P39, P79

- Airmar has developed new firmware for Smart Sensors that improves depth tracking ability at all depths from shallow to deep.

- This firmware addresses the following customer reported issues:

- DT800 depth readings in shallow, sandy bottom (<3ft) occasionally locking in on second or third echoes. The sensor could occasionally report depths 2x,3x, or 4x greater than the actual depth.

- DST800 sensors mounted on steep dead rise angles occasionally locking in on the boats own bow wake or surface waves. The sensor would then report a very shallow depth <3 ft. This was reported more when the vessel is in very deep water beyond the sensors maximum depth capability.

How Smart Sensors track the bottom
Firmware Version: 1.011

- Before an Airmar Smart Sensor reports a depth as valid, it must have confidence that the integrity of the target being tracked is truly the bottom and not a fish, bubbles, or debris in the water.

- The confidence increases each time a potential target is seen at the same approximate depth. This helps eliminate a smart sensor reporting on targets that are not persistent over time (fish, debris, etc).

- Once the confidence in a potential target increases to a predetermined level, the sensor starts tracking the target, and reports its depth as valid. It will take at least 3 seconds for a target to enter depth tracking mode.

How Smart Sensors track the bottom
Firmware Version: 1.011

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

•If the sensor loses track of a target at the same depth, the confidence in its depth decreases, but it will keep repeating the last good depth.

•Once the confidence decreases to a predetermined level, the sensor abandons the lock on the bottom and declares the depth as data not available, and starts looking for new potential targets that it can report on with confidence.

•The time for a high confidence locked target to be abandoned depends on the depth, it is between 4 seconds in shallow water and 8 seconds in deep water (>250ft).

How Smart Sensors track the bottom
Firmware Version: 1.011

- *Shallow water operation:* The sensor can track bottom into as little as 1.5' of water before it loses its lock, but it will not be able to regain a lock until about 3' of water is seen.

- *Deep-water operation:* When the sensor gets beyond its depth capability, our new firmware minimizes the possibility of locking on surface waves or clutter. Depth is reported as data not available vs. reporting random shallow readings even though the vessel is in very deep water.

- Airmar Smart Sensors can provide a proprietary Depth Quality Factor PGN that reports a value from 1-10 based on depth confidence level.

New Fast-Response Temperature Thermistor on 1kW Models

- New, exposed bronze button is 6.5X faster in thermal response as compared to the old thermistor encapsulated within the housing.
- Exposed copper button is on all 1kW+ models.
- Products Include: B258, TM258, B260, TM260, SS270W, TM270W, B164, SS264 W & N Pairs, R99, R209, R309

Temperature Time Constants

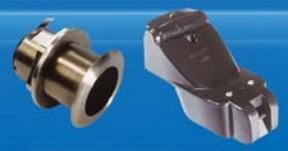
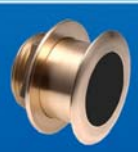
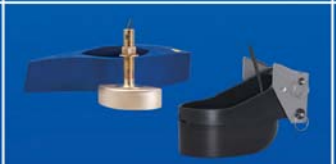
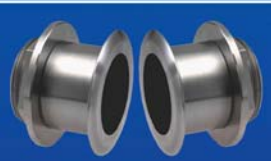
Housing	Old Design	Current Design
B260	1:30	25 seconds
B258	2:00	25 seconds
TM258	2:30	25 seconds

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

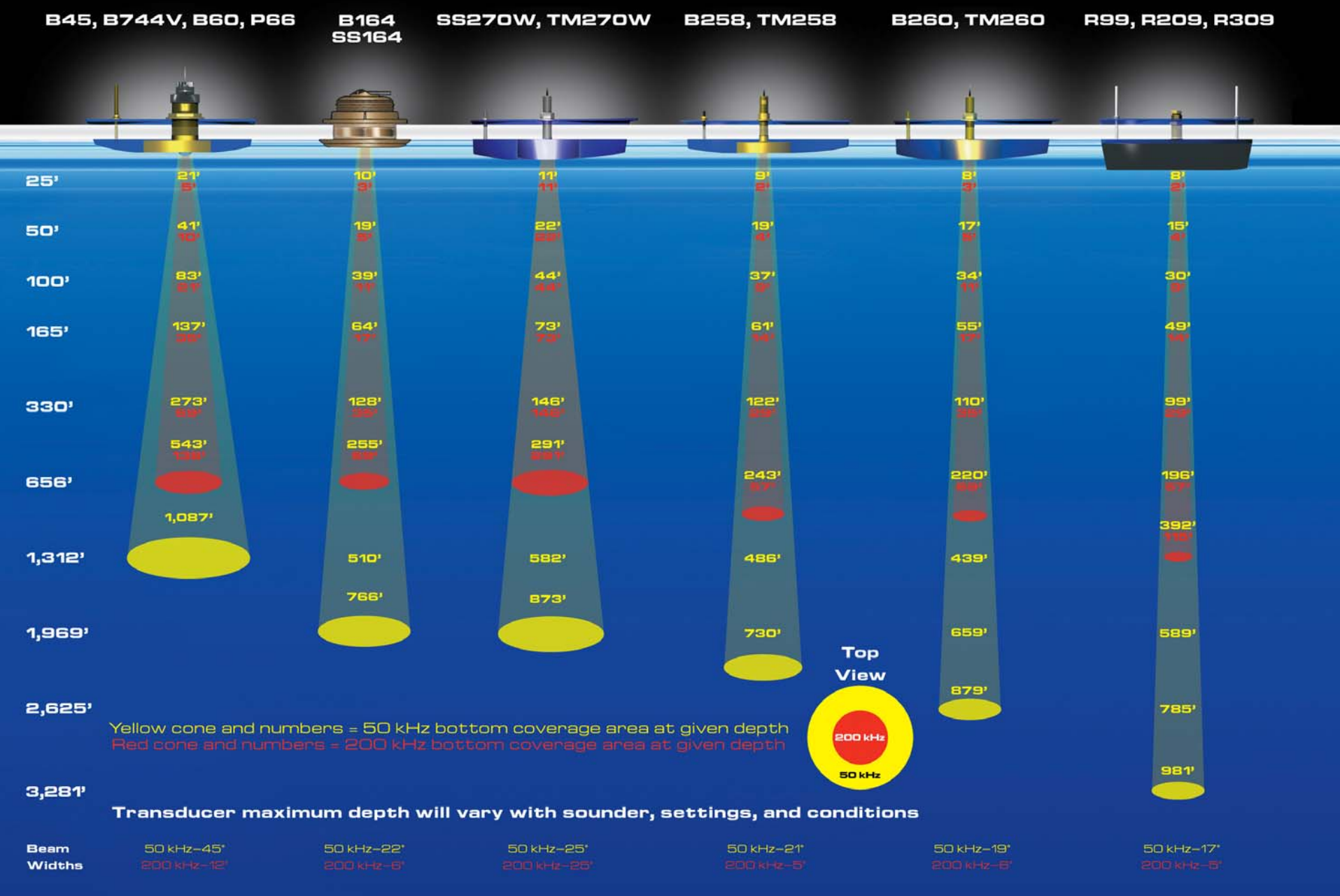
Airmar Transducer Models

What's inside popular models?

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

MODEL	PHOTO	POWER	CERAMIC ARRAY
P319, B117, B60, B45, B744V, P66, P79		600 W	 50/200 kHz
B164		1 kW	 50/200 kHz
B258, TM258		1 kW	 50/200 kHz
SS264W Pair, SS270W, TM270W		1 kW Wide-Beam	 50 kHz  200 kHz
SS264N Pair, M260, B260, M265, B265, TM260		1 kW Broadband	 50 kHz  200 kHz
R99, R109, R209, R309, R199, R299, R399		2 to 3 kW Broadband	 Low-Frequency  High-Frequency

AIRMAR® TECHNOLOGY CORPORATION Bottom Coverage at Depth

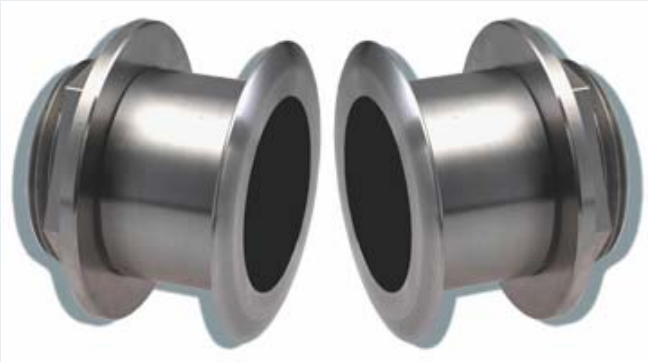


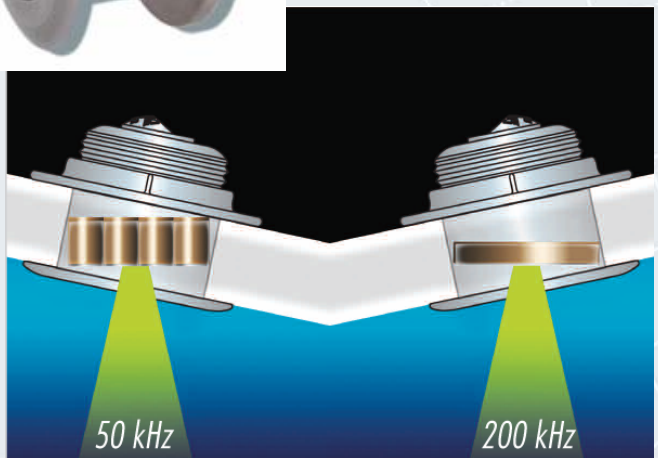
AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

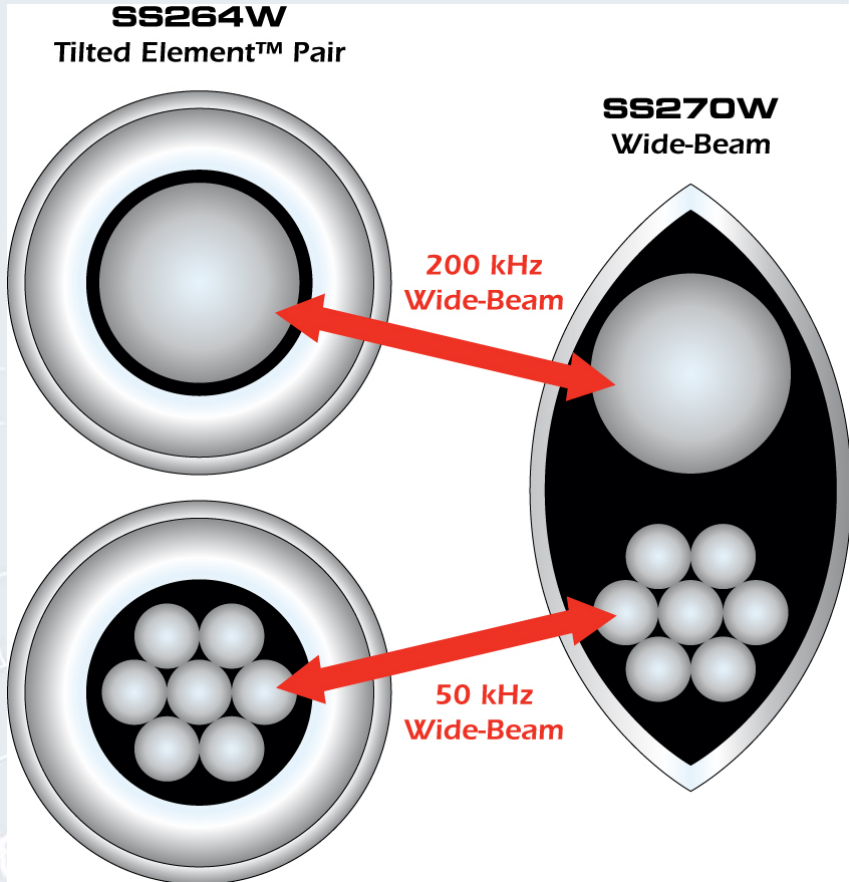
Tilted Element™ Family

SS264W Wide Beam Tilted Pair

- SS270W elements split apart into two tilted element™ transducers
- Same ceramics and performance as the SS270W
- Separate transducers for 50 kHz and 200 kHz
- Engineered for Center console and trailered boats up to 40ft
- Transducers sold separately
- No High Performance Fairing needed
- Fast Response temperature sensor

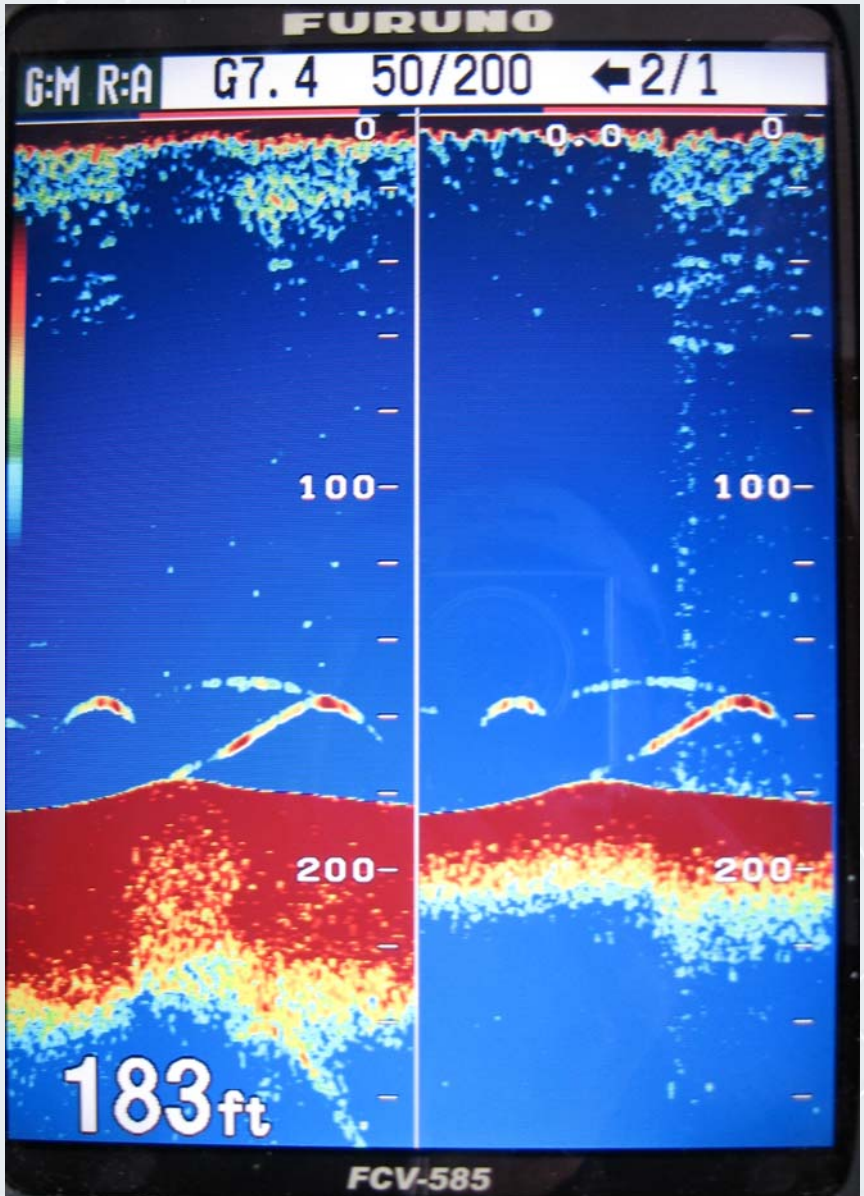


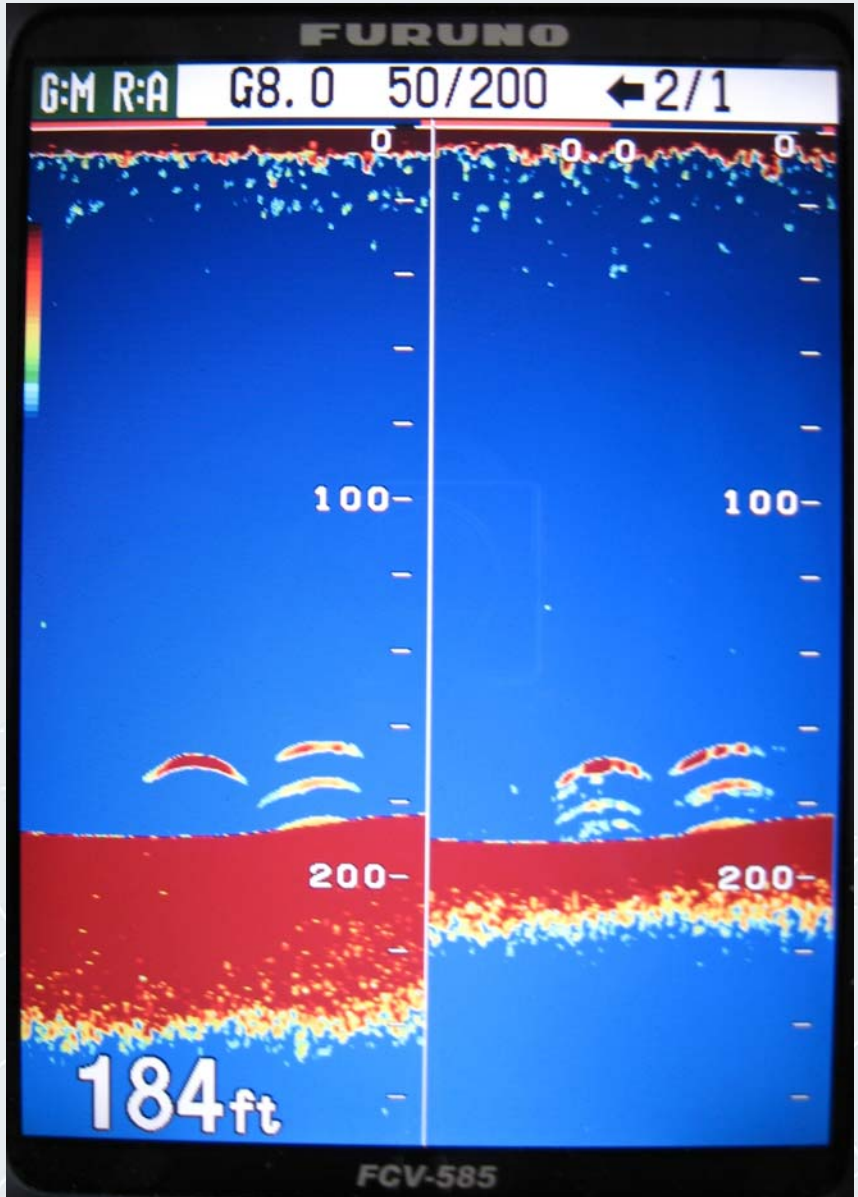




SS270W & SS264W Screen Images

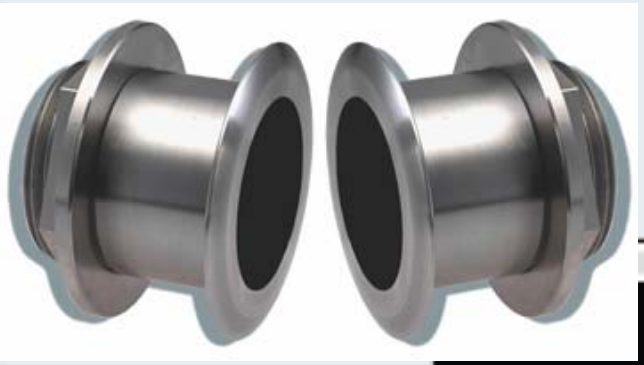
AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

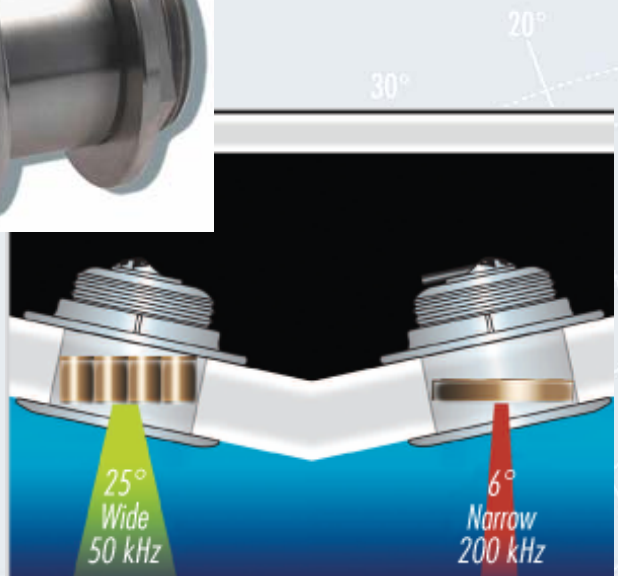


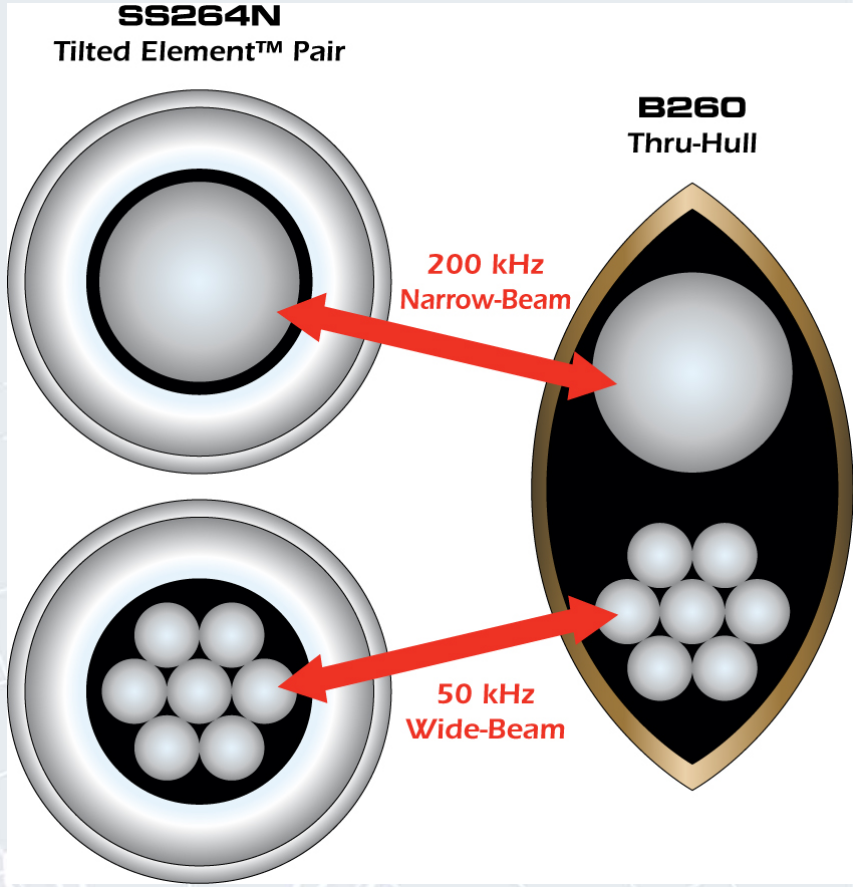


SS264N Narrow Beam Tilted Pair

- B260 elements split apart into two tilted element™ transducers
- Same ceramics & performance as the B260 at 200 kHz
- Separate transducers for 50 kHz and 200 kHz
- Top of the line 1kW tilted element™
- Engineered for Center console and trailered boats up to 40 feet
- Transducers sold separately
- No High Performance Fairing needed
- Fast Response temperature sensor

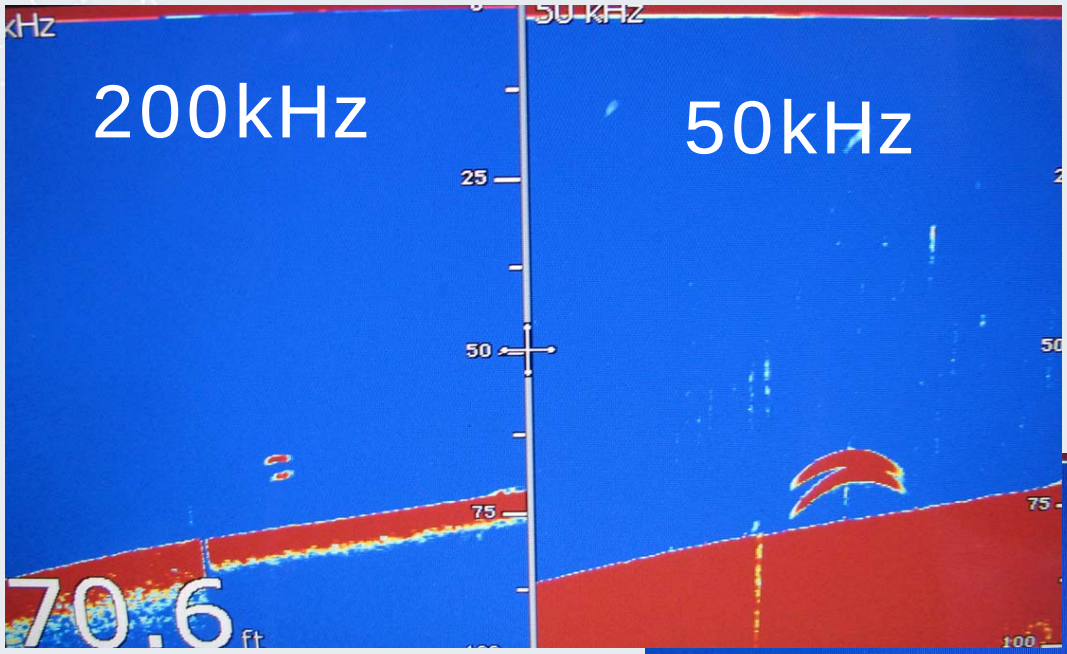


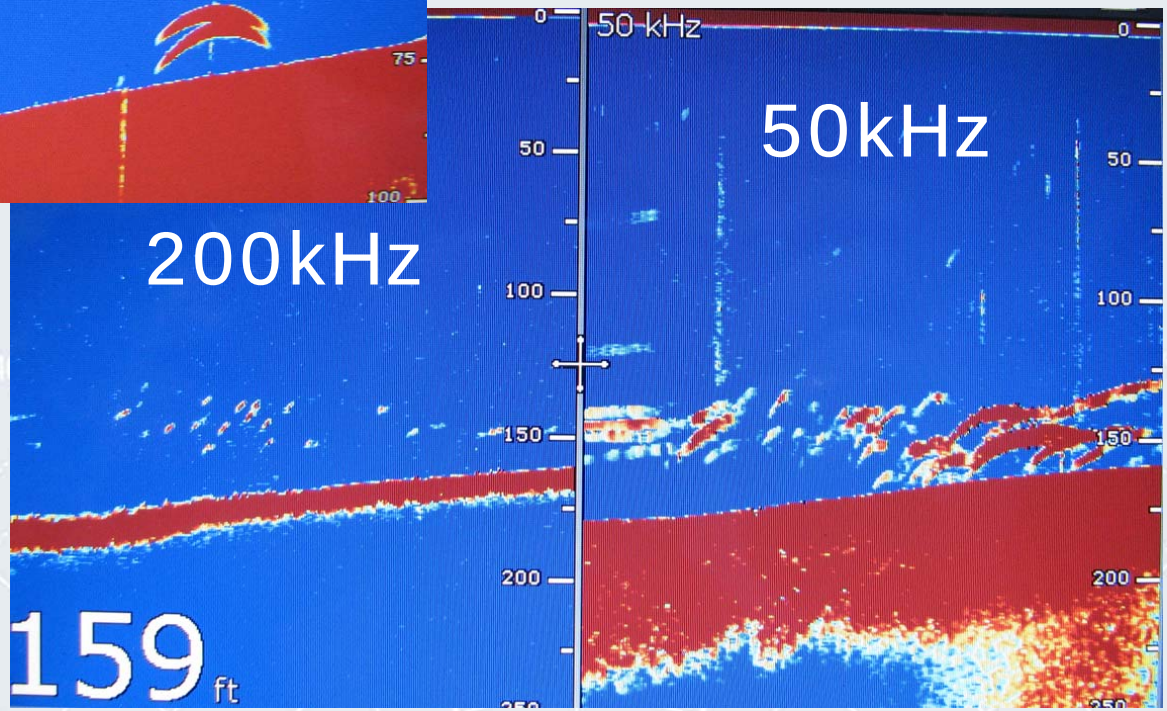


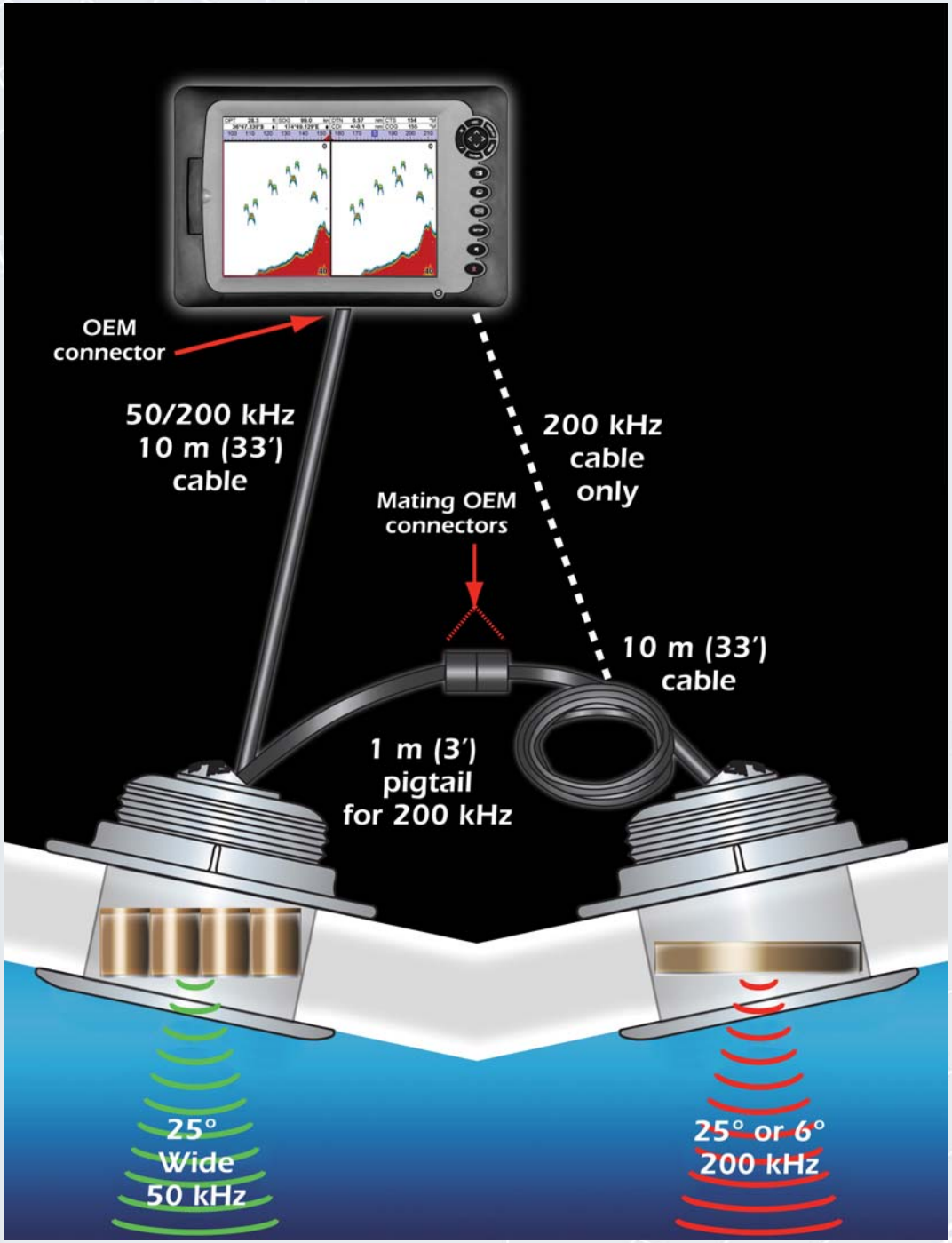


SS264N & B260 Screen Images

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology







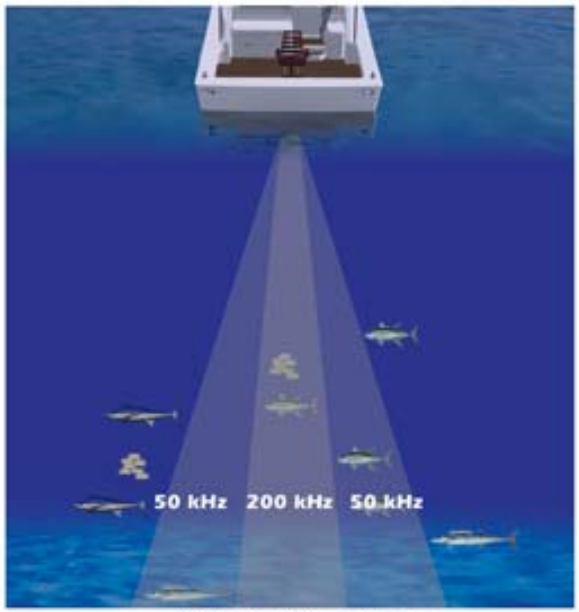
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

SS264W & SS264N Tilted Element™ Pair

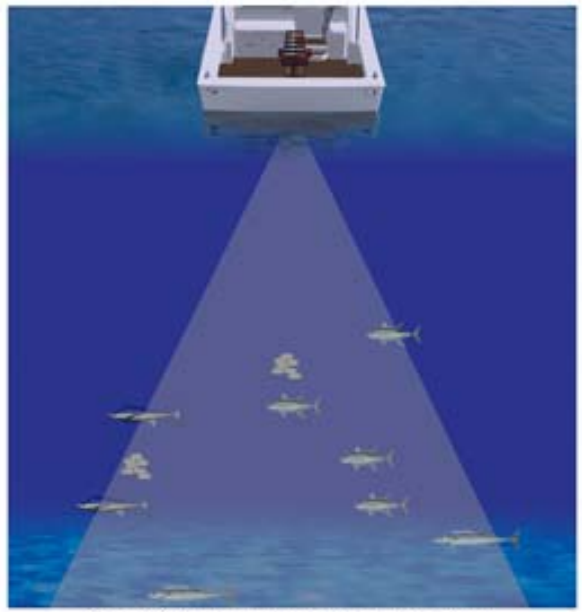
- FOR: Garmin, Navico, Raymarine DSM300 Furuno FCV585, BBFF1, DFF1
- Once the transducers are connected, a single cable is routed to the display.
- Each transducer has an internal diplexer with XID feature, and comes with OEM connectors

SS270W Fishing Applications

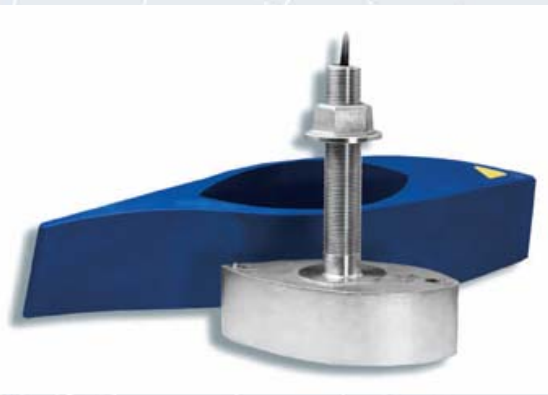
- Wide 25° beams at 50kHz & 200kHz marks more on the fishfinder
- Tuna, Marlin fishing—mark more bait
- Wreck fishing—see more of the wreck
  - See jigs and lures on the screen and avoid wreck hang-ups
- Commercial Salmon Trolling—see stabilizers and trolling gear
- SKA King fishing & Lake fishing—see downriggers & trolling gear



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



NEW High Performance 1kW Transom Mount Transducer Line

- Exposed temperature button with improved thermal time constant: from 2:30 (old) to 25 seconds (new)
- New bracket design
- Heavy Gauge plastic bracket with 316 Stainless mounting plate (0.90” thick)
- Kicks up and locks in place without damaging the transom
- Easy to install
- Retrofits to TM258 and TM260’s in the field
- High speed performance over 30 Knots

High Performance 1kW Transom Bracket

- Heavy Gauge plastic bracket with 316 Stainless mounting plate (0.90” thick)
- Allows for 2 new products- TM260(narrow), & TM270W(wide)
- Kicks up and locks in place without damaging the transom
- Easy to install
- Retrofits to TM258 and TM260’s in the field

3 New 1kW Transom Models:

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

Same Ceramics as:	Same Ceramics as:	Same Ceramics as:

P48W Adjustable-Beam Transom Mount

- The widest transom-mount transducer on the market
- True 38° x 12° beam that is measured at -3 dB
- Depth and temperature, 200 kHz Only
- 100 Watts RMS power (800 Watts Peak-to-Peak)
- Maximum Depth: 122 m (400’)
- Transom or trolling-motor mounting options
- For 18’ to 25’ Inshore saltwater & freshwater boats

P48W Adjustable Beam

- User can manually change the beam direction

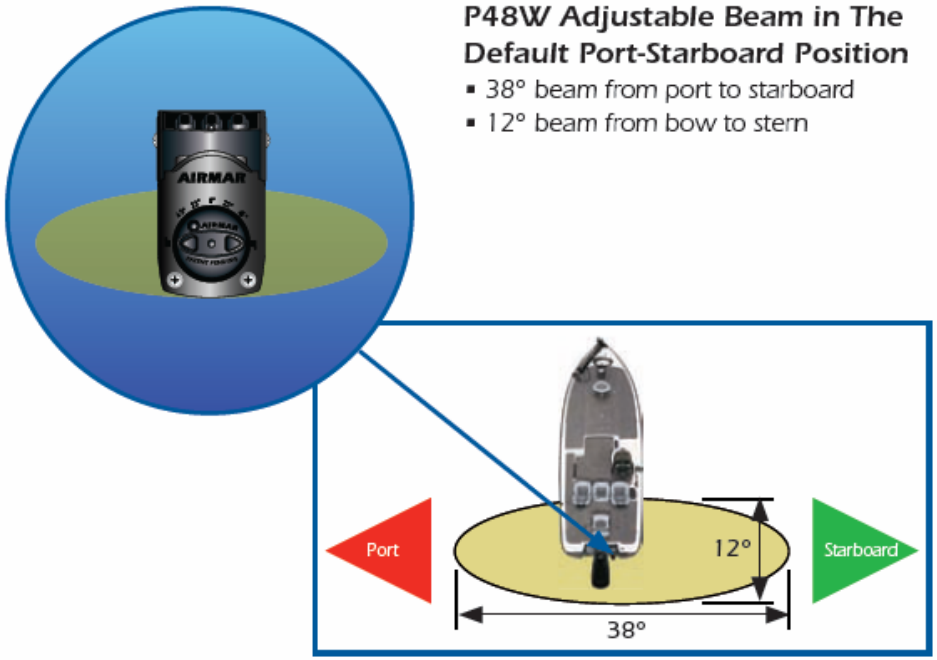
–Pressing and twisting the knob on top changes beam

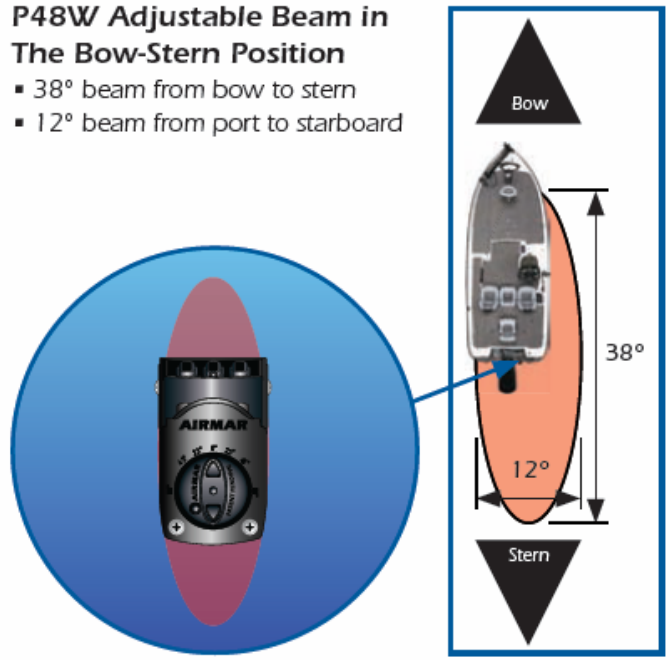
–Port-Starboard beam is 38°wide x 12° bow-stern

  –Marks more fish side to side

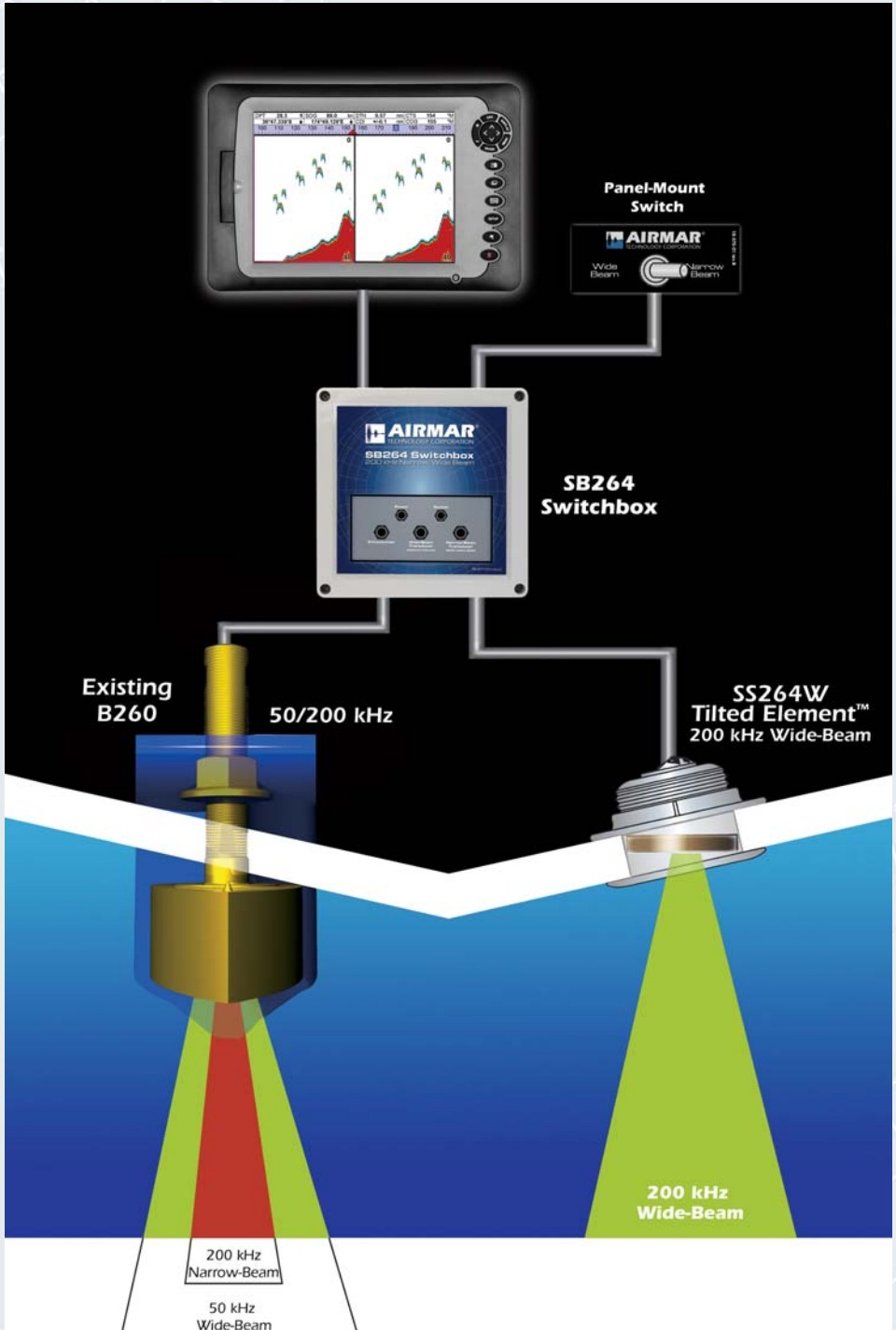
–Bow-Stern beam is 12° wide x 38° bow-stern

  –Looks forward and aft to help detect bottom changes





Installation-Specific Products



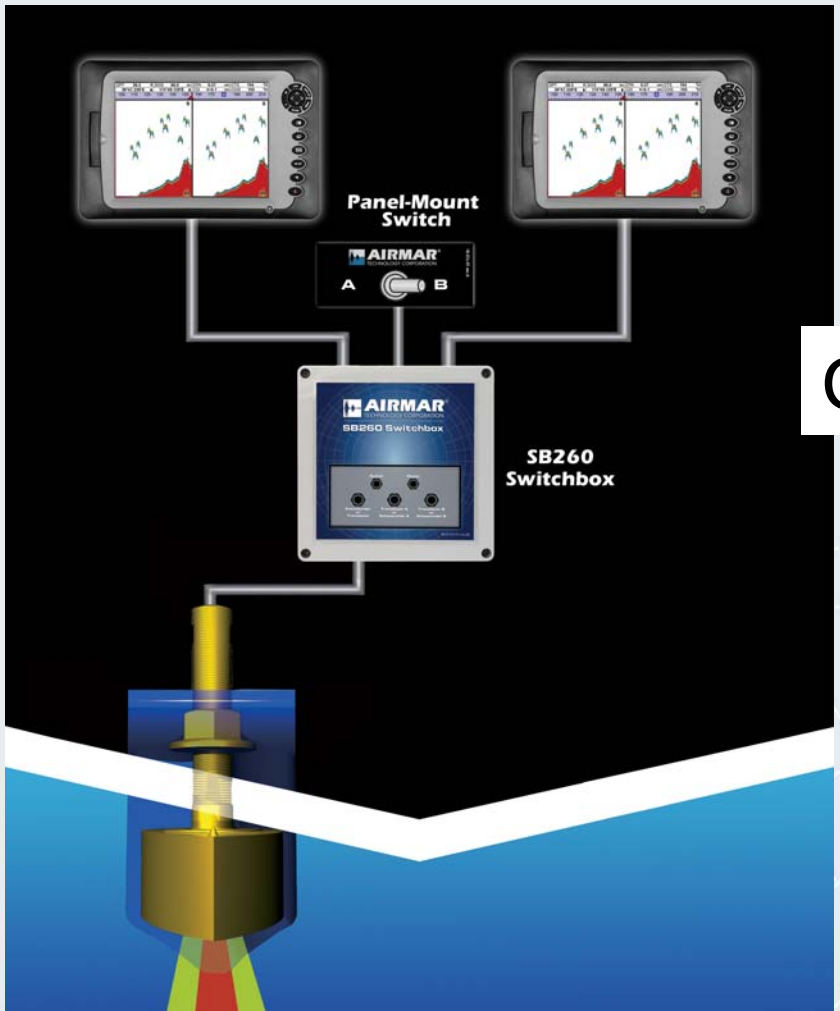
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

SB264 200kHz Wide/Narrow-Beam Switch box

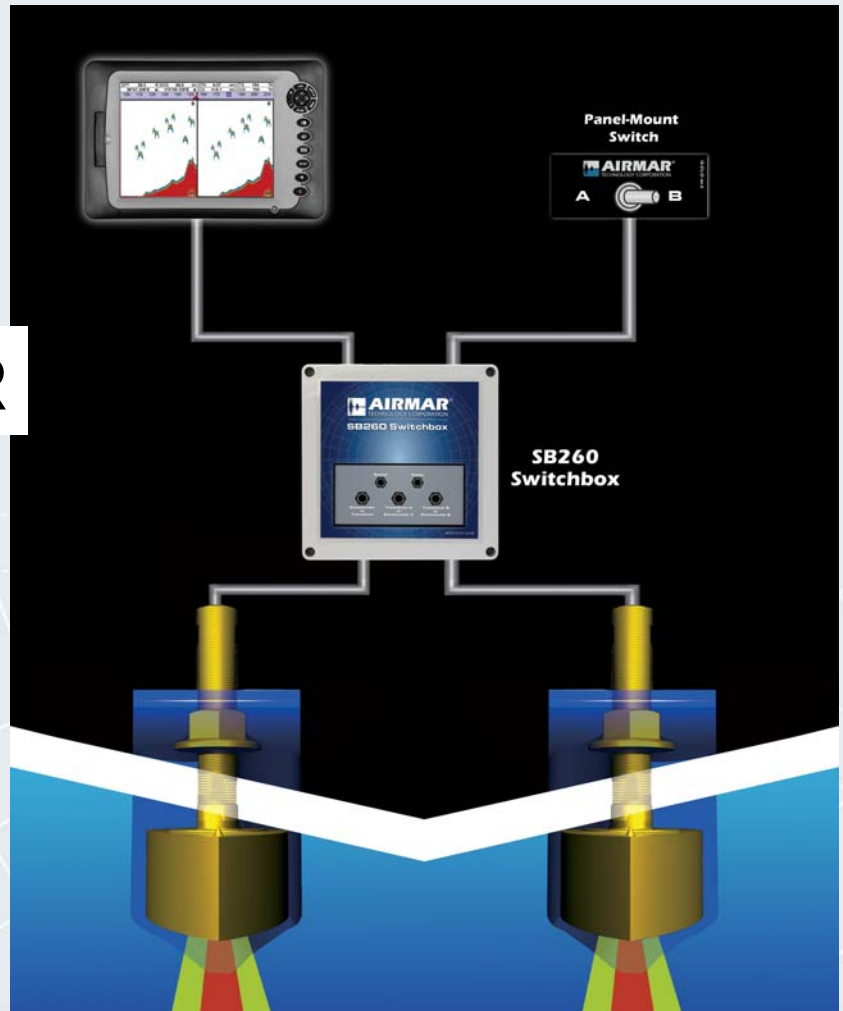
- Allows SS270W or SS264W 200 kHz to work with existing B260, M260, & B258 installations.
- User now has a switchable 200 kHz wide or narrow beam for the specific type of fishing.
- For single transmission line transducers only

SB260 1kW Switch box

- Switches 2 fish finders with one transducer
- Switches 2 transducers with one fish finder
- For single transmission line transducers only
- Not for use with transducers of different power ratings



OR

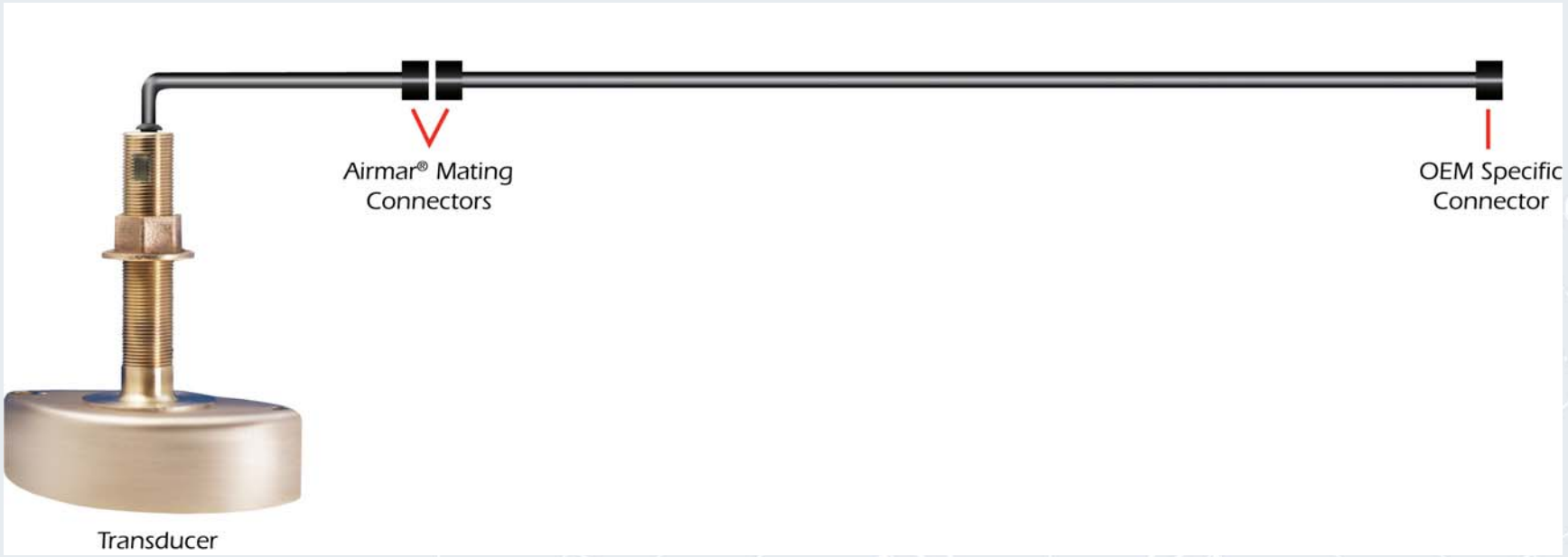


External Diplexer Box

- Converts dual-transmission-line transducers to a single-transmission-line (4 wires for depth down to 2 wires)
- For use with 1 kW sounders only
- Good option for future upgrades to next generation Chirp & FM sounders as most of these will require 4 wires for depth

1kW Mix & Match Transducers

- 600W and 1kW Airmar transducers with a mix and match cable.
- This allows you to stock a common transducer (B258) and then either stock or order the specific OEM connector cable (Furuno, Raymarine, Garmin, Lowrance, Simrad, Northstar)



Converting Transducers to Different Manufacturer's Equipment

Converting Transducers

FURUNO®

Transducers

	Transducer Wiring	Furuno 10-Pin
Furuno 10-Pin		
B744V, P66	91-412 91-827	
B164, B258, TM258	91-843 91-883	
B260*, SS270W**, SS264***	91-793 91-832	
Raymarine DSM300		
B744V, P66	91-605 91-854	No - speed not compatible
B164, B258, TM258	91-761 91-882	Yes - must hardwire to 33-333 cable
B260*, SS270W**, SS264***	91-744 91-782	Yes - must hardwire to 33-333 cable
Garmin		
B744V, P66	91-231 91-604	Yes - must hardwire to 33-333 cable
B164, B258, TM258	91-720 91-881	Yes - must hardwire to 33-333 cable
B260*, SS270W**, SS264***	91-721 91-805	Yes - must hardwire to 33-333 cable
Lowrance Blue		
B744V, P66	91-659 91-849	No - temp not compatible
B164, B258, TM258	91-773 91-905	Yes - depth only hardwire to 33-333
B260*, SS270W**, SS264***	91-656 91-804	Yes - depth only hardwire to 33-333
Simrad 7-Pin		
B744V, P66	91-386 91-608	Yes - must hardwire to 33-333 cable
B164, B258, TM258	91-389 91-765	Yes - must hardwire to 33-333 cable
B260*, SS270W**, SS264***	91-734 91-798	No - dual line & Impedance too low
Northstar 10-Pin		
B744V, P66	91-688 91-856	Yes - must hardwire to 33-333 cable
B164, B258, TM258	91-712	Yes - must hardwire to 33-333 cable
B260*, SS270W**, SS264***	91-687 91-794	No - frequency dual line
Northstar / Navman 6-Pin		
B744V, P66	91-850	No - speed not compatible
B164, B258, TM258	91-801 91-806	Yes - must hardwire to 33-333 cable
B260*, SS270W**, SS264***	91-705 91-795	Yes - must hardwire to 33-333 cable

Furuno Sounder TAP Settings for Airmar Transducers

M260/B260/SS260/SS560	FCV-292	BBFF3	FCV-1100	FCV-1200 FCV-1500	DFF3 FCV-295 FCV-1150
50 kHz	Tap B	Tap A	Tap B	51 Volts	Tap B
200 kHz	Tap B	Tap B	Tap B	54 Volts	Tap A

SS270W	FCV-292	BBFF3	FCV-1100	FCV-1200 FCV-1500	DFF3 FCV-295 FCV-1150
50 kHz	Tap B	Tap A	Tap B	51 Volts	Tap B
200 kHz	Tap A	Tap A	Tap A	51 Volts	Tap A

R99/R199	FCV-292	BBFF3	FCV-1100	FCV-1200 FCV-1500	DFF3 FCV-295 FCV-1150
50 kHz	Tap B	Tap B	Tap B	62 Volts	Tap C
200 kHz	Tap C	Tap D	Tap D	82 Volts	Tap B

R209/R299	FCV-292	BBFF3	FCV-1100	FCV-1200 FCV-1500	DFF3 FCV-295 FCV-1150
38 kHz	-	Tap C	Tap D	90 Volts	Tap C
50 kHz	Tap D	Tap D	Tap D	90 Volts	Tap C
150 kHz	-	-	-	-	Tap D
200 kHz	Tap C	Tap B	Tap D	88V	Tap A

R309/R399	FCV-292	BBFF3	FCV-1100	FCV-1200 FCV-1500	DFF3 FCV-295 FCV-1150
28 kHz	-	Tap C	Tap D	90 Volts	Tap D
38 kHz	-	Tap C	Tap D	90 Volts	Tap C
150 kHz	-	-	-	-	Tap D
200 kHz	Tap C	Tap B	Tap D	88V	Tap A

*TAP settings allow the sounder to apply the correct voltage/power levels to the transducer based upon transducer impedance

** Failure to set the correct TAP settings may result in damage to the sounder and/or the transducer

*** If your sounder and/or transducer are not listed, do not assume TAP settings. Contact Furuno or Airmar for verification if TAP settings are unknown

AIRMAR® TECHNOLOGY CORPORATION

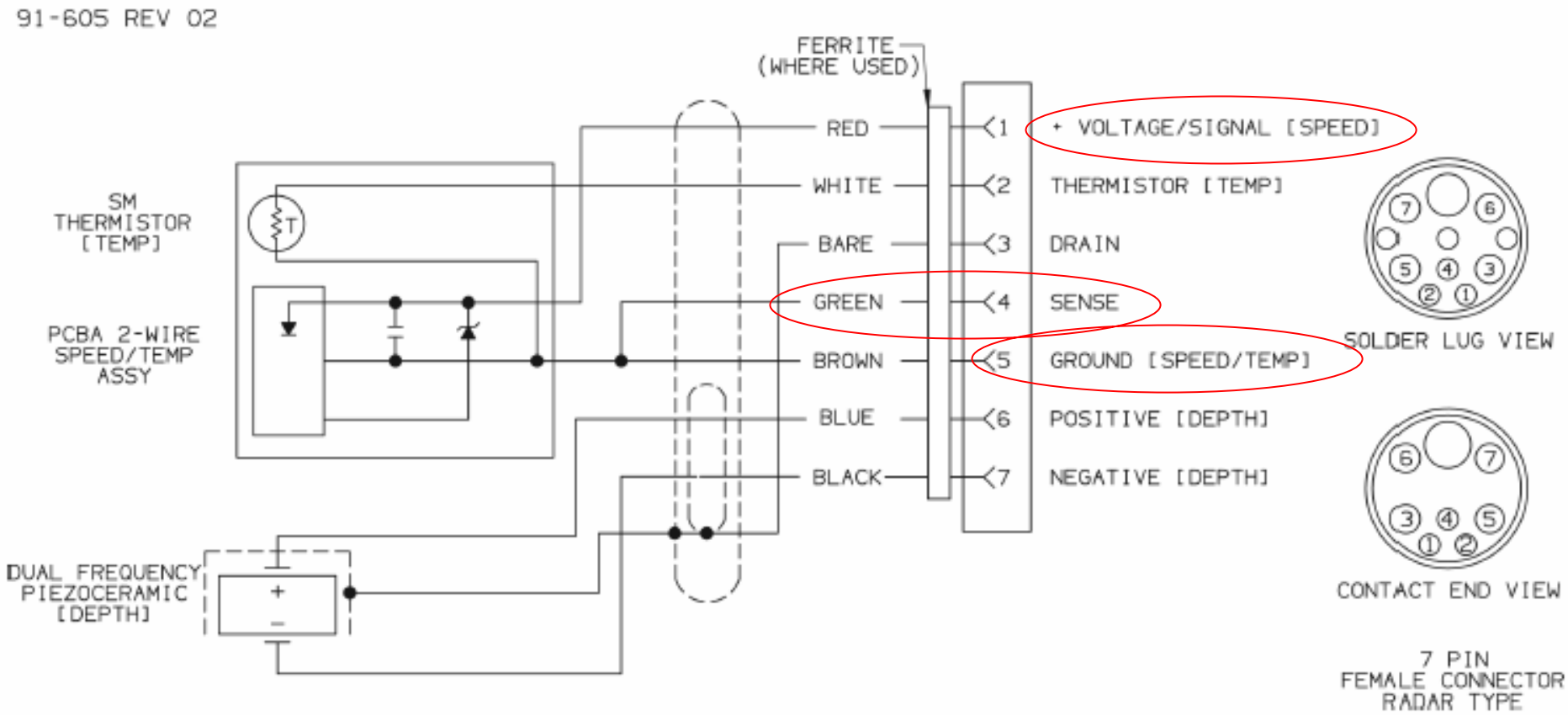
Sensing Technology

Converting Transducers

Raymarine®

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- Sense wire (green) determines if transducer is present and how much power to apply. This is short on 600W transducers (see wiring)
- Unique 2-wire speed – Most OEM's use 3 wire speed. Navman is the only other exception

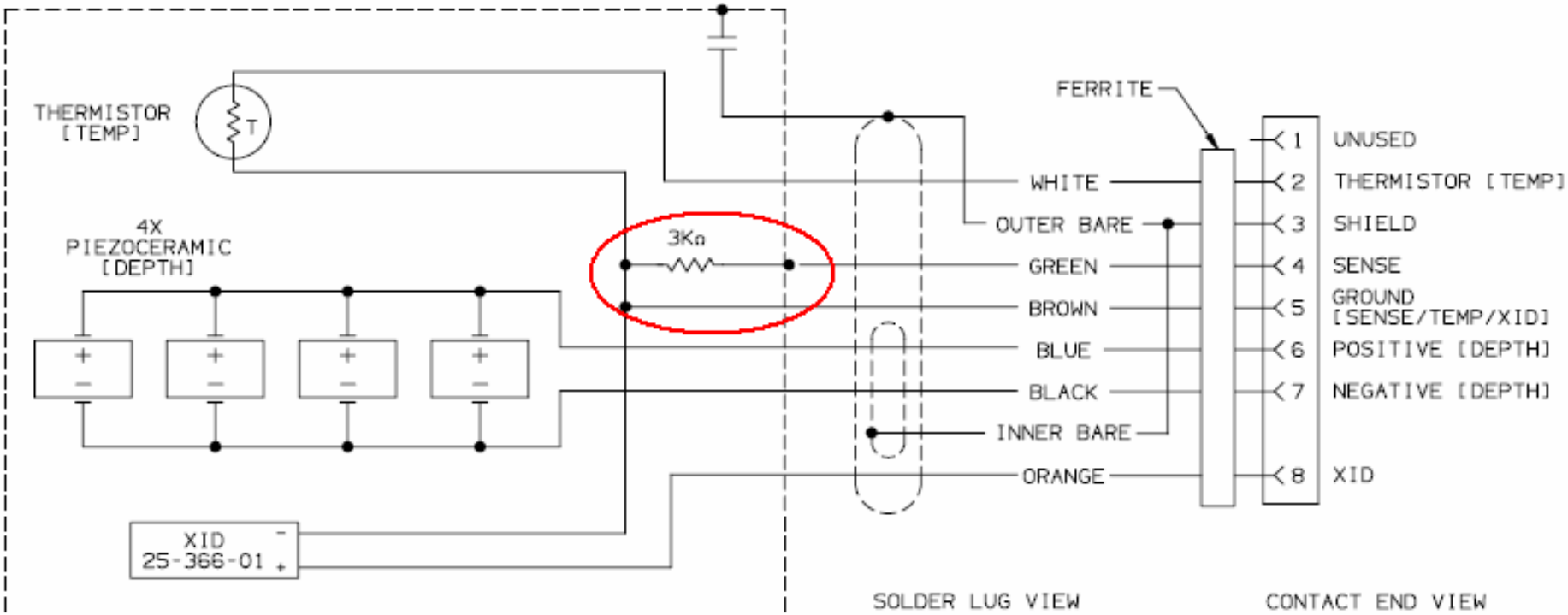


Converting Transducers

Raymarine®

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- Sense wire (green) determines if transducer is present and how much power to apply. (see wiring)



91-761 REV 02

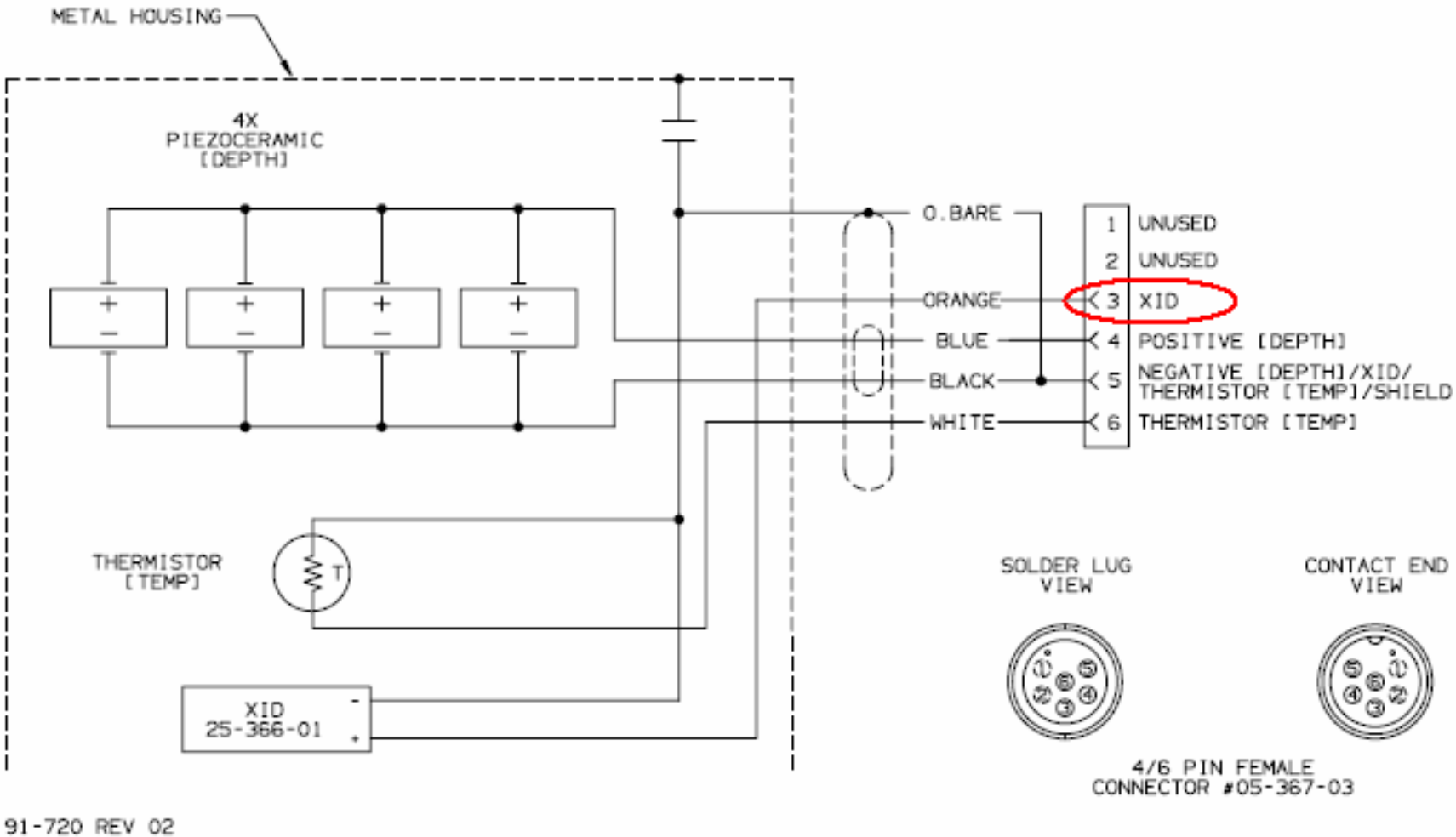
- The Raymarine sense line is a short in 600W transducers

- The sense line is a 3k ohm resistor in 1kW or higher transducers

8 PIN FEMALE CONNECTOR

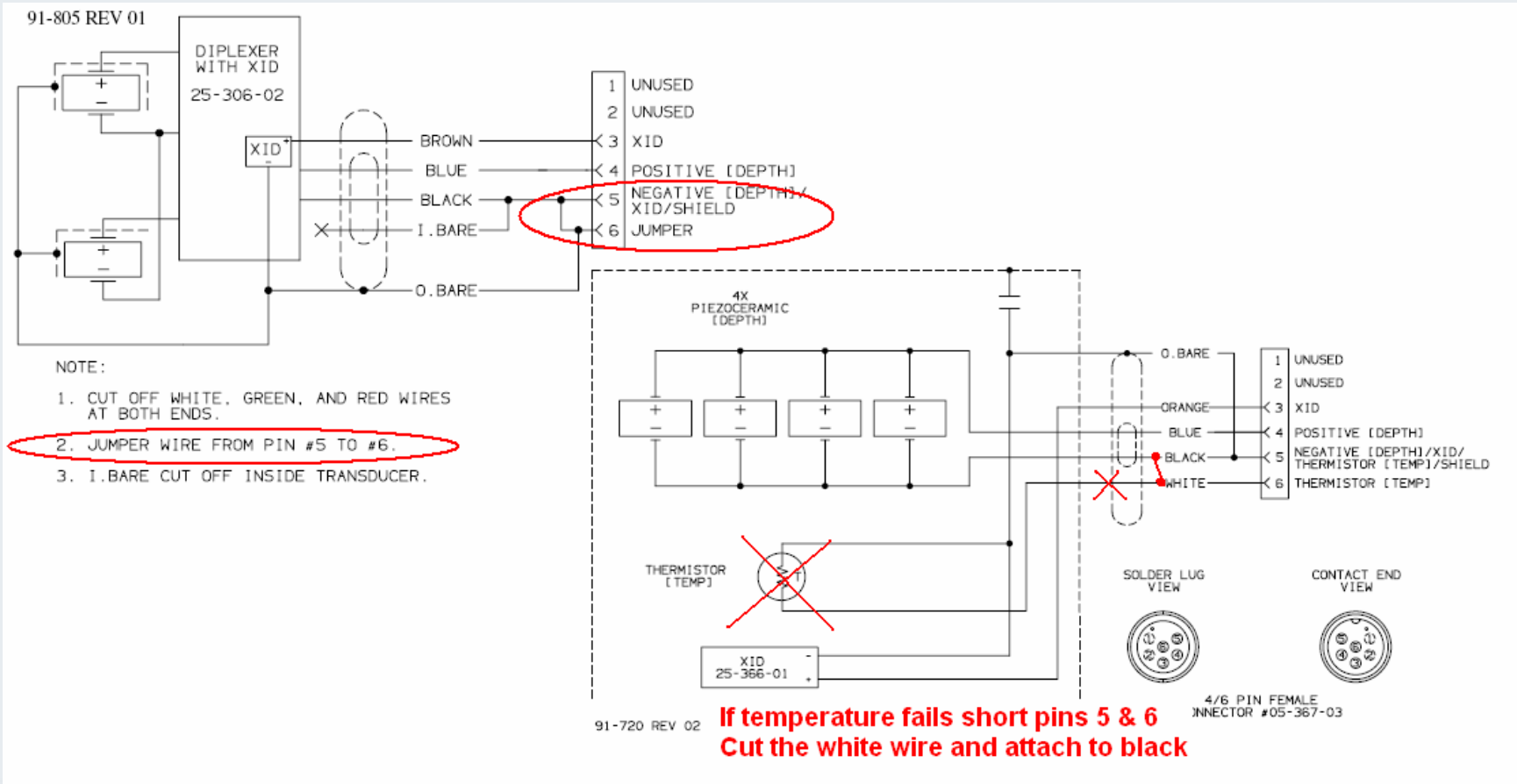
Converting Transducers

- Uses Transducer ID wire (pin 3) to set power at 1kW+ (See wiring)
- If the transducer does not have XID, the sounder will default to 500watts



Converting Transducers

- Uses the temperature to sense that a transducer is connected to the sounder. If temperature fails, the transducer is not recognized.
  - To fix this, short pins 5 & 6 to get depth
  - If adapting a depth only transducer from another OEM, these pins must be shorted.



Converting Transducers

GARMIN *to*

Transducers

	Transducer Wiring	Garmin
Furuno 10-Pin		
B744V, P66	91-412 91-827	**Yes** - use cable adaptor 33-569-01
B164, B258, TM258	91-843 91-883	**Yes** - use cable adaptor 33-569-01
B260*, SS270W**, SS264***	91-793 91-832	**Yes** - adaptor 33-569-01 M260 must be hardwired
Raymarine DSM300		
B744V, P66	91-605 91-854	**No** - speed not compatible
B164, B258, TM258	91-761 91-882	**Yes** - must be hardwired to field connector CX-106
B260*, SS270W**, SS264***	91-744 91-782	**Yes** - must be hardwired to field connector CX-106
Garmin		
B744V, P66	91-231 91-604	
B164, B258, TM258	91-720 91-881	
B260*, SS270W**, SS264***	91-721 91-805	
Lowrance Blue		
B744V, P66	91-659 91-849	**No** - temp not compatible
B164, B258, TM258	91-773 91-905	**No** - temp not compatible and no XID on some
B260*, SS270W**, SS264***	91-656 91-804	**No** - temp not compatible and no XID on some
Simrad 7-Pin		
B744V, P66	91-386 91-608	**Yes** - must be hardwired to field connector CX-106
B164, B258, TM258	91-389 91-765	**Maybe** - must have XID & be hardwired to CX-106
B260*, SS270W**, SS264***	91-734 91-798	**No** - dual line & Impedance too low
Northstar 10-Pin		
B744V, P66	91-688 91-856	**Yes** - must be hardwired to field connector CX-106
B164, B258, TM258	91-712	**Maybe** - must have XID & be hardwired to CX-106
B260*, SS270W**, SS264***	91-687 91-794	**No** - frequency dual line
Northstar / Navman 6-Pin		
B744V, P66	91-850	**No** - speed not compatible
B164, B258, TM258	91-801 91-806	**Maybe** - must have XID & be hardwired to CX-106
B260*, SS270W**, SS264***	91-705 91-795	**Maybe** - must have XID & be hardwired to CX-106

Converting Transducers

LOWRANCE

- Unique temperature 5k Ohm
- All others use 10k Ohm
- Depth is compatible
- Temperature NOT Compatible
- B260, M260 from Furuno, Garmin, and Raymarine is NOT compatible. These use broadband 200 kHz ceramics with low impedance(90 Ohms)
- New Navico Broadband box requires 200 ohms at 200kHz
- Specific B260 & M260 for Lowrance

Transducers

	Transducer Wiring	Lowrance Blue
Furuno 10-Pin		
B744V, P66	91-412 91-827	No - temp not compatibl
B164, B258, TM258	91-843 91-883	Yes - depth only hardwire with 33-561-01
B260*, SS270W**, SS264***	91-793 91-832	No - impedance too low
Raymarine DSM300		
B744V, P66	91-605 91-854	No - speed/temp not compatible
B164, B258, TM258	91-761 91-882	Yes - depth only hardwire with 33-561-01
B260*, SS270W**, SS264***	91-744 91-782	No - impedance too low
Garmin		
B744V, P66	91-231 91-604	No - temp not compatibl
B164, B258, TM258	91-720 91-881	Yes - depth only hardwire with 33-561-01
B260*, SS270W**, SS264***	91-721 91-805	No - impedance too low
Lowrance Blue		
B744V, P66	91-659 91-849	
B164, B258, TM258	91-773 91-905	
B260*, SS270W**, SS264***	91-656 91-804	
Simrad 7-Pin		
B744V, P66	91-386 91-608	No - temp not compatibl
B164, B258, TM258	91-389 91-765	Yes - depth only hardwire with 33-561-01
B260*, SS270W**, SS264***	91-734 91-798	No - dual line & Impedance too low
Northstar 10-Pin		
B744V, P66	91-688 91-856	No - temp not compatibl
B164, B258, TM258	91-712	Yes - depth only hardwire with 33-561-01
B260*, SS270W**, SS264***	91-687 91-794	No - frequency dual line
Northstar / Navman 6-Pin		
B744V, P66	91-850	No - speed/temp not compatible
B164, B258, TM258	91-801 91-806	Yes - depth only hardwire with 33-561-01
B260*, SS270W**, SS264***	91-705 91-795	Yes - depth only hardwire with 33-561-01

Converting Transducers

Older Models

Simrad 7-pin
Northstar 10-pin
Navman 6-pin

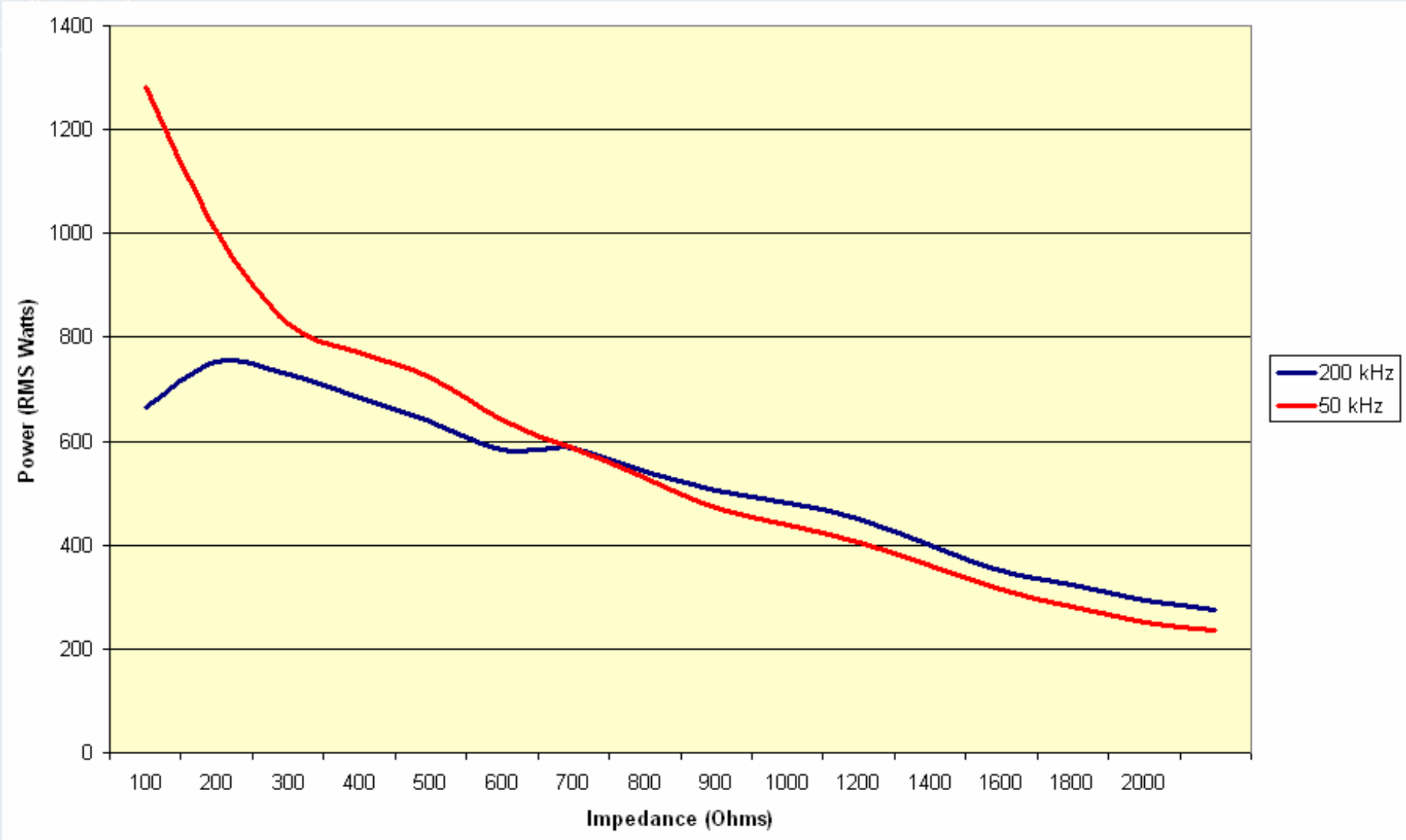
Transducers

	Transducer Wiring	Simrad 7-Pin	Northstar 10-Pin	Northstar Navman 6-Pin
Furuno 10-Pin				
B744V, P66	91-412 91-827	**Yes** - use cable adaptor 33-455-01	**Yes** - use cable adaptor 33-903-01	**No** - speed not compatible
B164, B258, TM258	91-843 91-883	**Yes** - use cable adaptor 33-455-01	**Yes** - 600W only use cable adaptor 33-903-01	**Yes** - must be hardwired to CX-106
B260*, SS270W**, SS264***	91-793 91-832	**No** - Simrad requires low impedance dual line	**No** - must be dual line to obtain 1kW power	**Yes** - must be hardwired to CX-106
Raymarine DSM300				
B744V, P66	91-605 91-854	**No** - speed not compatible	**No** - speed not compatible	**Yes** - must be hardwired to CX-106
B164, B258, TM258	91-761 91-882	**Yes** - must be hardwired to CX-107	**Yes** - 600W only must be hardwired to CX-1010	**Yes** - must be hardwired to CX-106
B260*, SS270W**, SS264***	91-744 91-782	**No** - Simrad requires low impedance dual line	**No** - must be dual line to obtain 1kW power	**No** - impedance too low
Garmin				
B744V, P66	91-231 91-604	**Yes** - must be hardwired to CX-107	**Yes** - must be hardwired to CX-1010	**No** - speed not compatible
B164, B258, TM258	91-720 91-881	**Yes** - must be hardwired to CX-107	**Yes** - 600W only must be hardwired to CX-1010	**Yes** - must be hardwired to CX-106
B260*, SS270W**, SS264***	91-721 91-805	**No** - Simrad requires low impedance dual line	**No** - must be dual line to obtain 1kW power	**No** - impedance too low
Lowrance Blue				
B744V, P66	91-659 91-849	**No** - temp not compatible	**No** - temp not compatible	**No** - speed/temp not compatible
B164, B258, TM258	91-773 91-905	**Yes** - depth only hardwire to CX-107	**Yes** - 600W depth only hardwire to CX-1010	**Yes** - depth only hardwire to CX-106
B260*, SS270W**, SS264***	91-656 91-804	**No** - Simrad requires low impedance dual line	**No** - must be dual line to obtain 1kW power	**No** - impedance too low
Simrad 7-Pin				
B744V, P66	91-386 91-608		**Yes** - must be hardwired to CX-1010	**No** - speed not compatible
B164, B258, TM258	91-389 91-765		**Yes** - 600W only must be hardwired to CX-1010	**Yes** - must be hardwired to CX-106
B260*, SS270W**, SS264***	91-734 91-798		**No** - impedance too low	**No** - dual line & impedance too low
Northstar 10-Pin				
B744V, P66	91-688 91-856	**Yes** - must be hardwired to CX-107		**No** - speed not compatible
B164, B258, TM258	91-712	**Yes** - must be hardwired to CX-107		**Yes** - must be hardwired to CX-106
B260*, SS270W**, SS264***	91-687 91-794	**No** - impedance too high		**No** - frequency dual line
Northstar / Navman 6-Pin				
B744V, P66	91-850	**No** - speed not compatible	**No** - speed not compatible	
B164, B258, TM258	91-801 91-806	**Yes** - must be hardwired to CX-107	**Yes** - 600W only must be hardwired to CX-1010	
B260*, SS270W**, SS264***	91-705 91-795	**No** - Simrad requires low impedance dual line	**No** - must be dual line to obtain 1kW power	

General Notes on Impedance when converting manufacturer's transducers

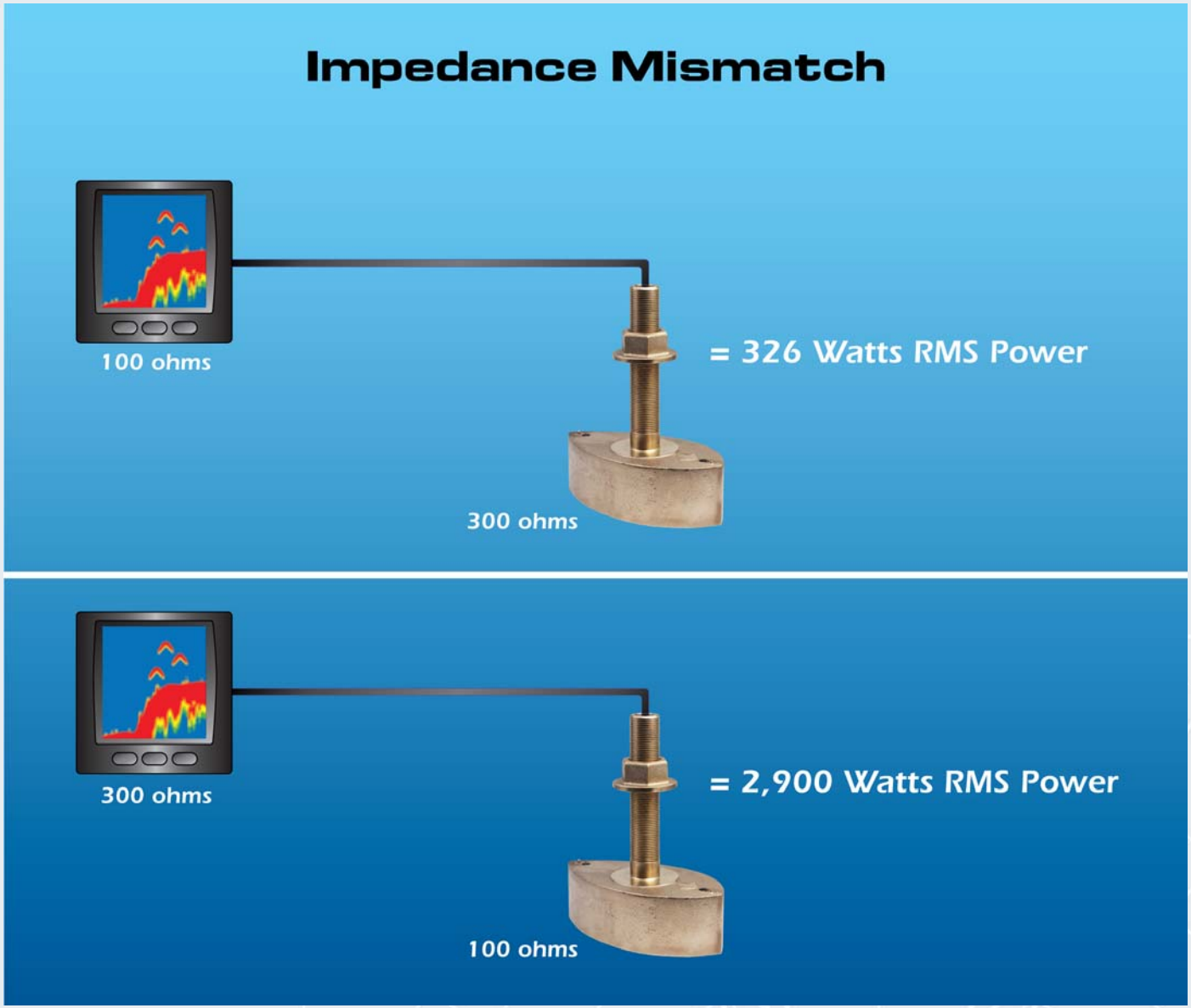
- The impedance (ohms) at each frequency both in the transducer and in the fishfinder should match
- As impedance gets lower, power increases (see chart)
- As impedance gets higher, power decreases (see chart)
- It is OK to have a transducer with higher impedance connected to a fishfinder with lower impedance
- It is NOT OK to have a transducer with lower impedance connected to a fishfinder with higher impedance. This will overdrive the transducer

Impedance Chart- Power Curve



Impedance in relation to RMS Power

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

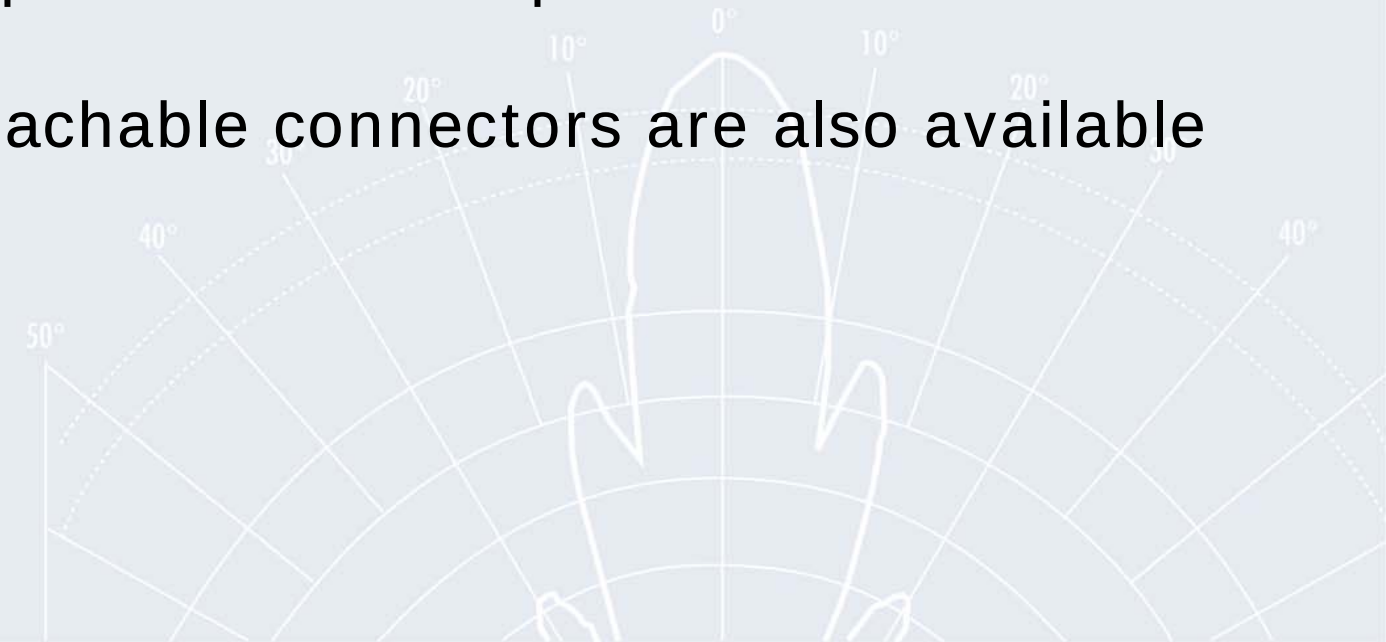


Transducer Adaptor Cables

Converts the following:

- Furuno 10-pin to Garmin
- Raymarine “A” to DSM
- Furuno 10-pin to Northstar 10-pin
- Furuno 8-pin to Furuno 10-pin
- Furuno 10-pin to Simrad 7-pin

OEM Field-attachable connectors are also available

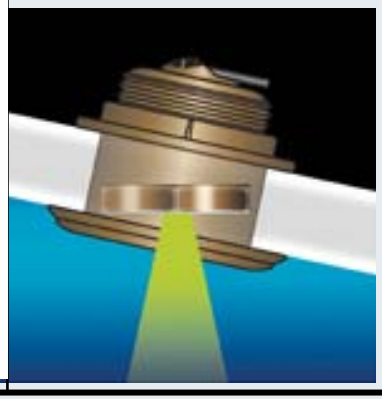


AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

Installation & Troubleshooting

Four Transducer Categories

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

Thru-Hull	Tilted Element™	In-Hull	Transom
			
+ Best overall performance -Fairing needs to be cut & installed	+ No fairing, low profile -Requires larger hole	+ No Hull protrusions - No integrated temperature	+ Low Cost -Moderate performance at speed

Thru-Hull models

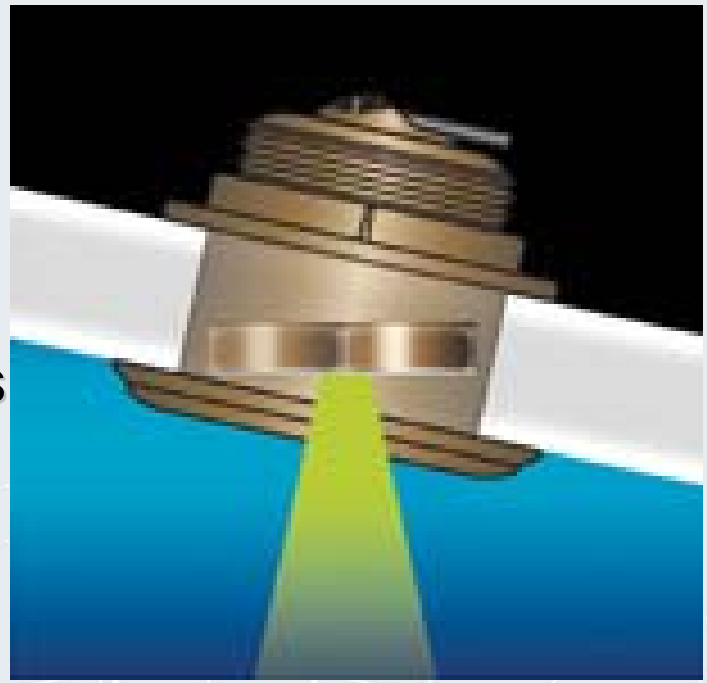
AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

- Delivers the best performance because the transducer face is in contact with the water.
- For stepped, planing or displacement hulls.
- Models available for wood, fiberglass, aluminum or steel hulls.
- Can be used with inboard, I/O, OB and jet drive propulsion systems.
- Excellent high speed results with use of high-performance fairings.
- For hull dead rise angles up to 25°

Thru-Hull Tilted Element™ Models

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

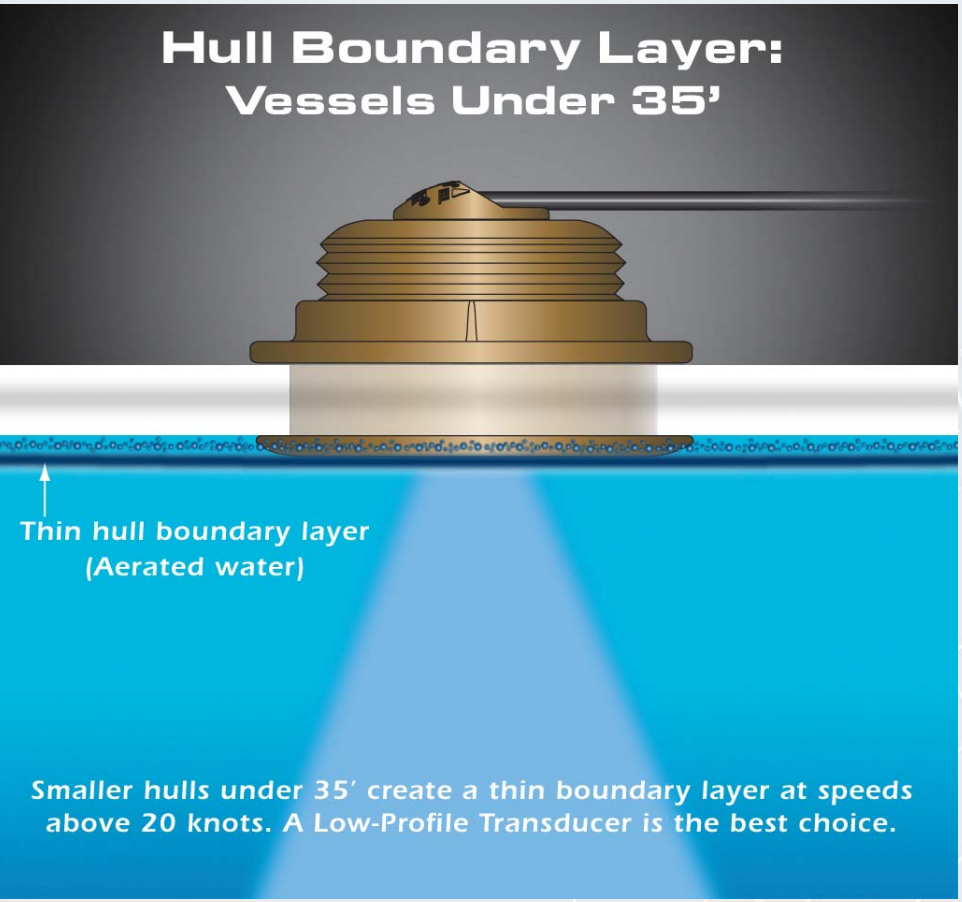
- For large, trailered center console and walk-arounds that can not accommodate a thru-hull with fairing
- Virtually flush installation to the hull
- Models available for wood, fiberglass, aluminum or steel hulls
- Can be used with inboard, I/O, OB and jet drive systems
- Gives excellent high speed results over 30 knots
- For hull dead rise angles up to 25 degrees.

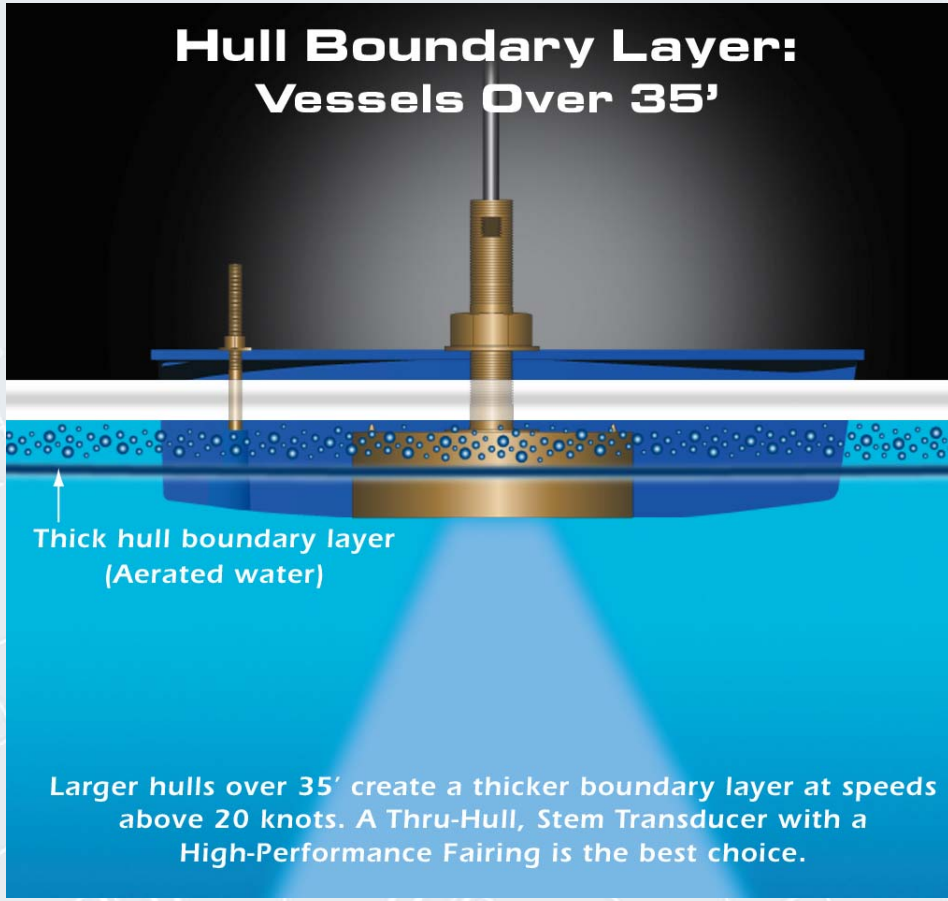


What is the hull boundary layer?

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

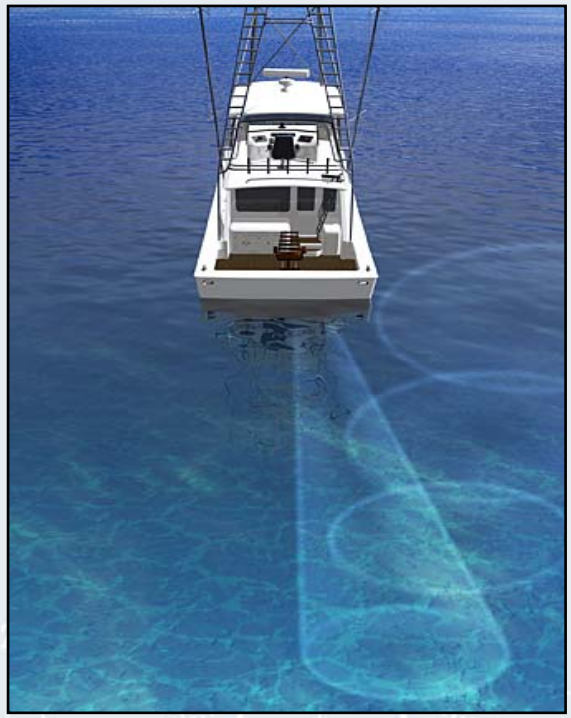
- Aerated water flow along the boat hull at cruising speeds
- Boundary layers get thicker as vessel size increases





Importance of a vertical beam

Good



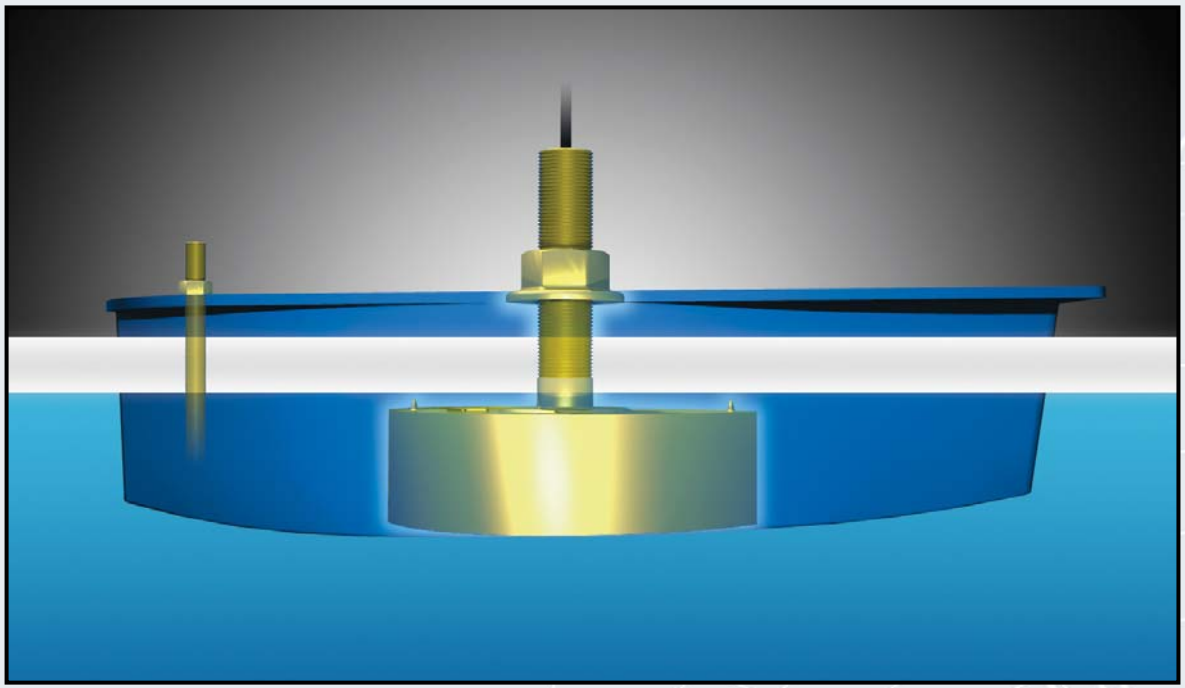
Bad

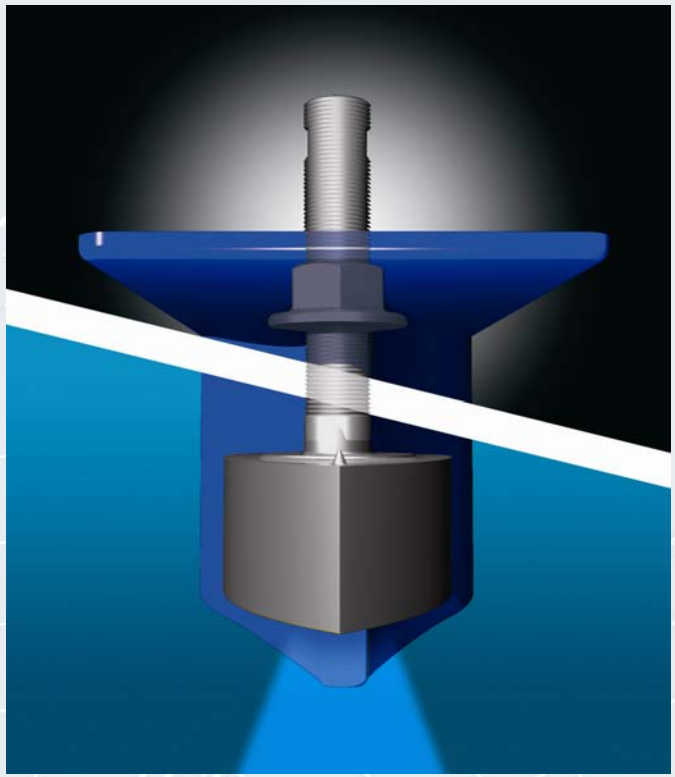
Regardless of mounting style, a properly installed transducer delivers a vertical beam that aims straight down toward the bottom, resulting in strong echo returns and accurate depth readings.

High Performance Fairings

The face of the transducer extends off of the hull surface, placing the active surface outside of the boundary layer.

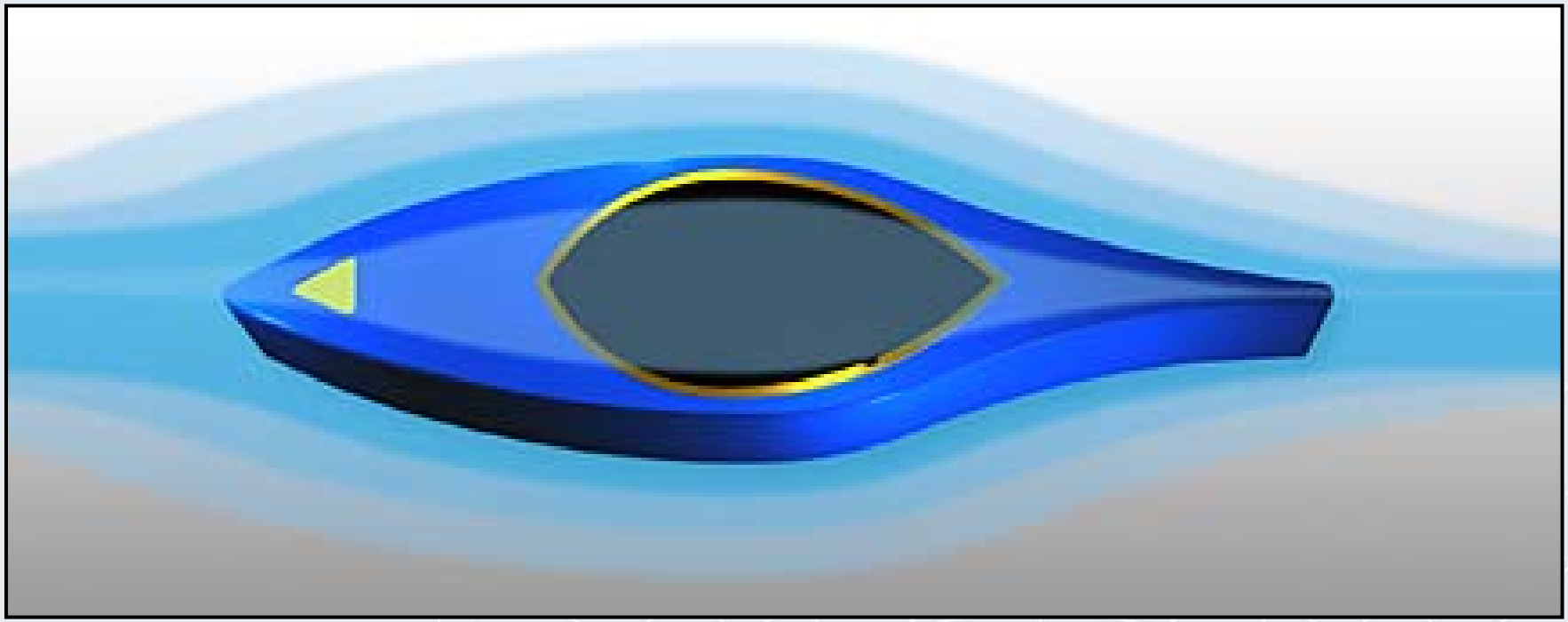
The transducer delivers a vertical beam that aims straight down toward the bottom.





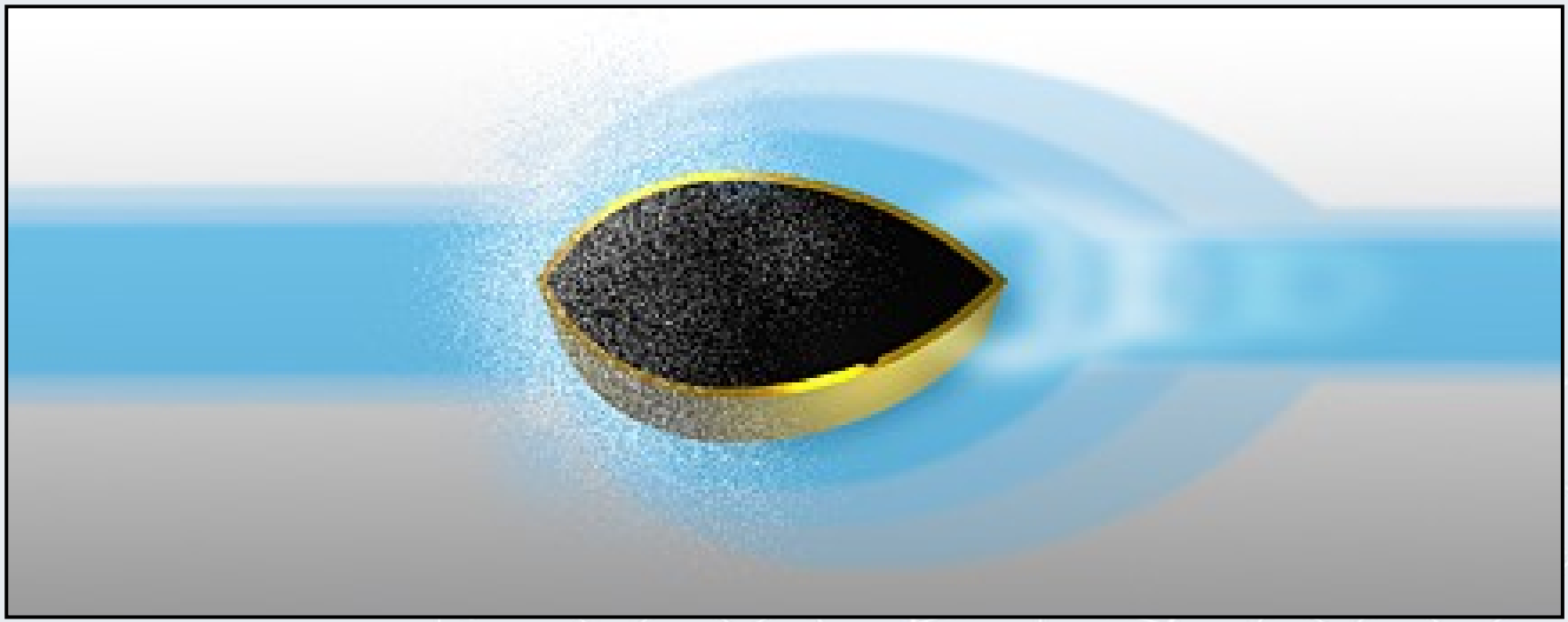
High Performance Fairings

Maintain smooth flow, significantly reducing drag on the hull and lessening the chance of intake and prop cavitation. This installation works great over 30 kts.



Without a High-Performance Fairing

The transducer face is exposed to aeration and turbulence as the flow makes an abrupt change in direction. This installation will work poorly above 10 kts.



Installation & Troubleshooting

Basics: ***Mounting Location***

• The water flowing across the hull *must* be smooth with a minimum of bubbles and turbulence (especially at high speeds).
•DO NOT MOUNT near water intake or discharge openings or behind strakes, fittings, or hull irregularities.
• The transducer *must* be continuously immersed in water.
• The transducer beam *must* be unobstructed by the keel or propeller shaft(s).
• Choose a location away from interference caused by power and radiation sources such as: the propeller(s) and shaft(s), other machinery, other echosounders, and other cables. The lower the noise level, the higher the echosounder gain setting that can be used.
• Choose a location with a minimum deadrise angle.
• Choose an accessible spot inside the vessel with adequate headroom for the height of the housing, tightening the nuts, and removing the insert.

Avoiding Interference

- Always choose a location away from interference caused by sources such as propeller shafts, satellite or radar equipment, other machinery and cable runs.

- The lower the overall noise level around the transducer and cable, the higher the gain setting that can be used, resulting in more screen detail.

- If screen interference appears at a specific rpm or when the boat is put in and out of gear, this could be a sign of electrical interference on the sounder's power line. Try powering the sounder directly from a stand-alone battery.

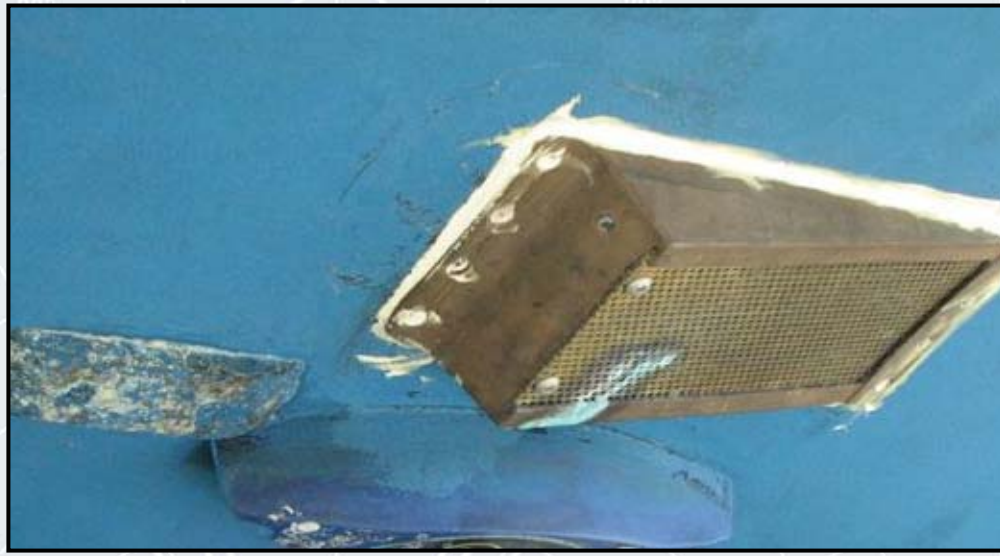
- If the screen interference increases proportional to vessel speed this usually indicates that the transducer face is exposed to aerated water.

Installation Guidelines

- Bow thrusters, live well or cooling intakes as well as chines, steps and strakes can all introduce aerated water into the path of the transducer.

- Remember to always look forward all the way to the bow of the vessel to see if there will be any interference in front of the transducer's mounting location.

- If there is an intake 50 feet ahead, in line with the transducer, it ***will*** effect performance at high speeds.



Bad Installation

This installation of a B164 looks good, however notice the strake 10 feet directly in front of the transducer. This causes turbulence and air bubbles making the transducer stop reading bottom at 12 knots.

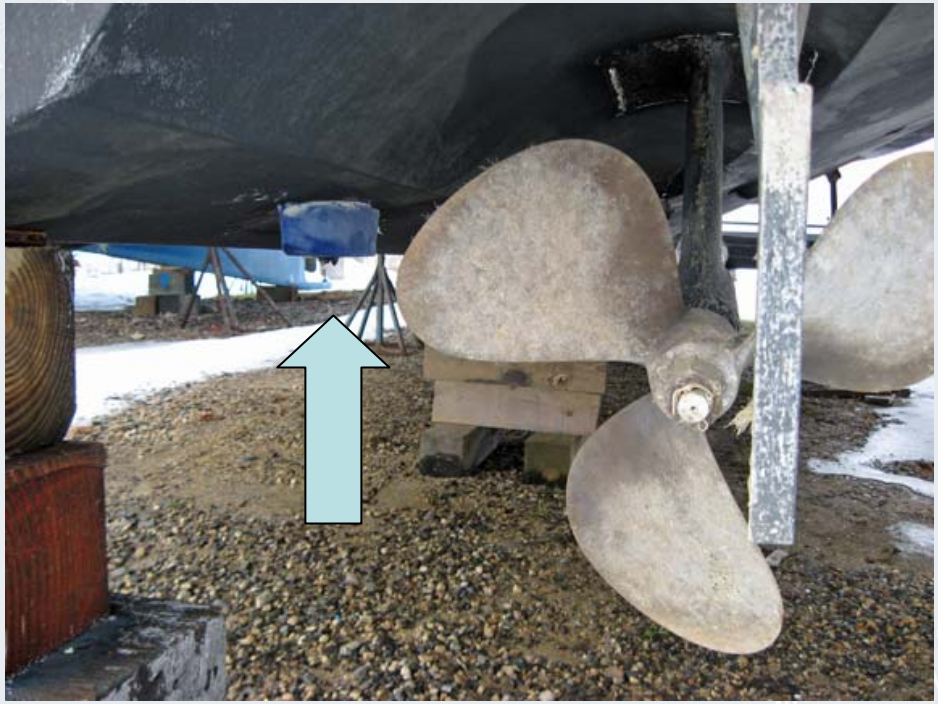
Bad Installation

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

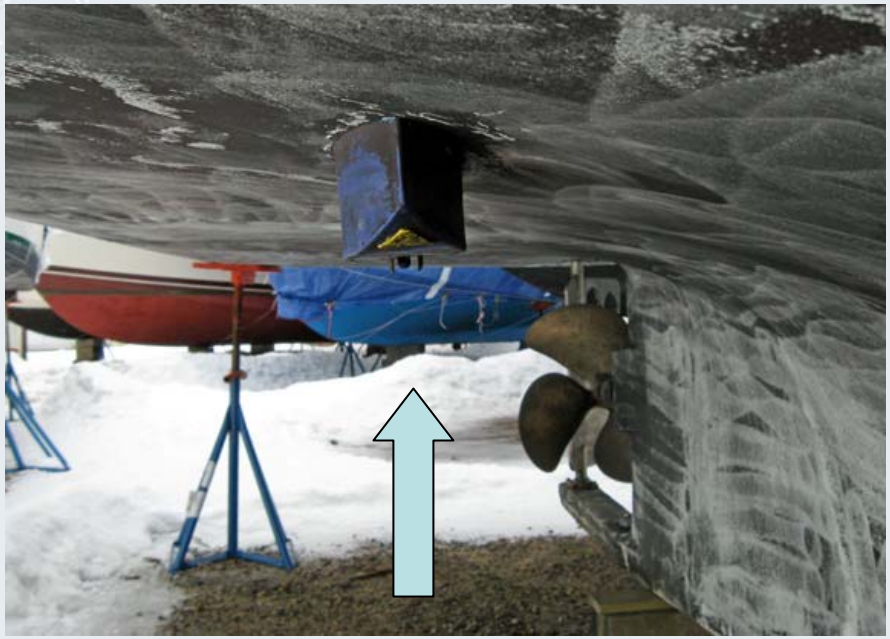


Forward View

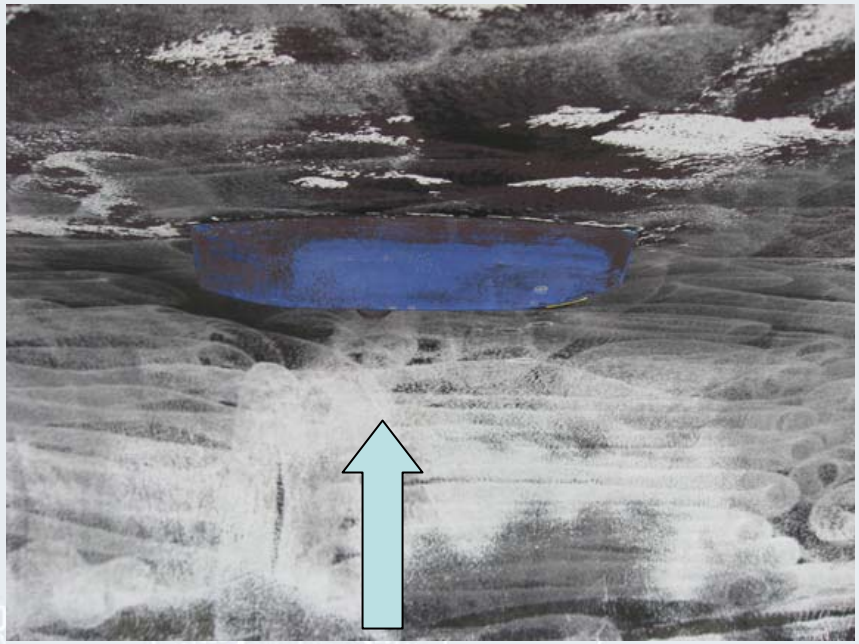
Side View

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

Good Installation



Aft View

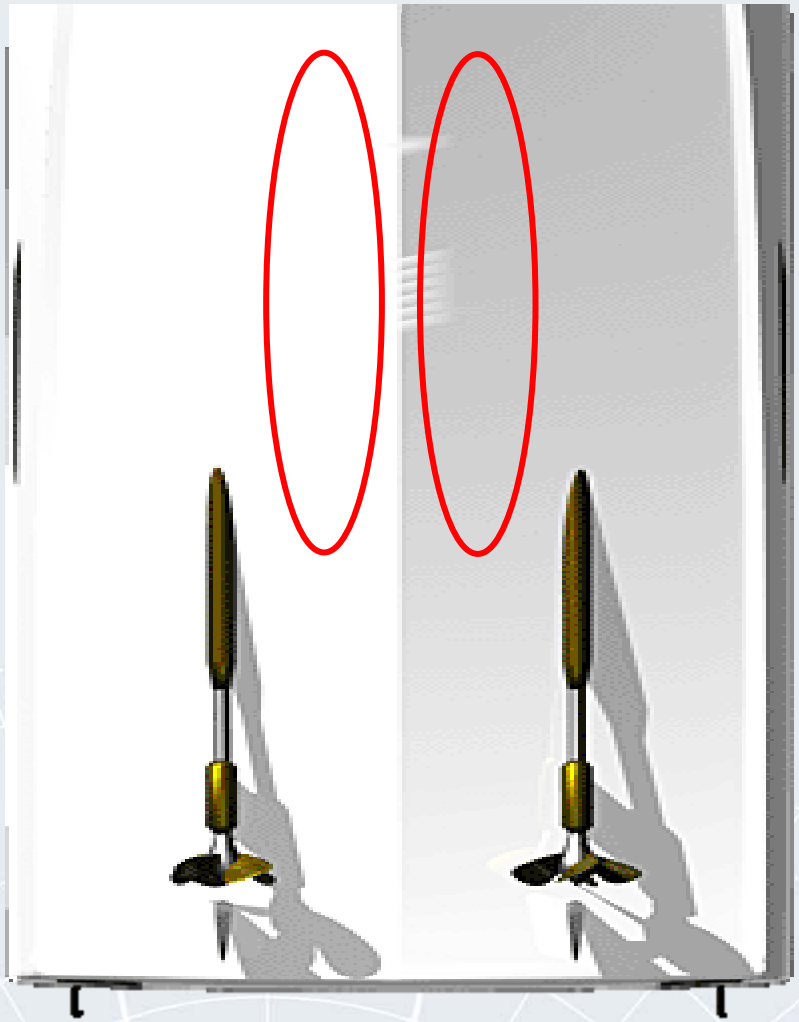


Side View

This is a 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.

Location selection

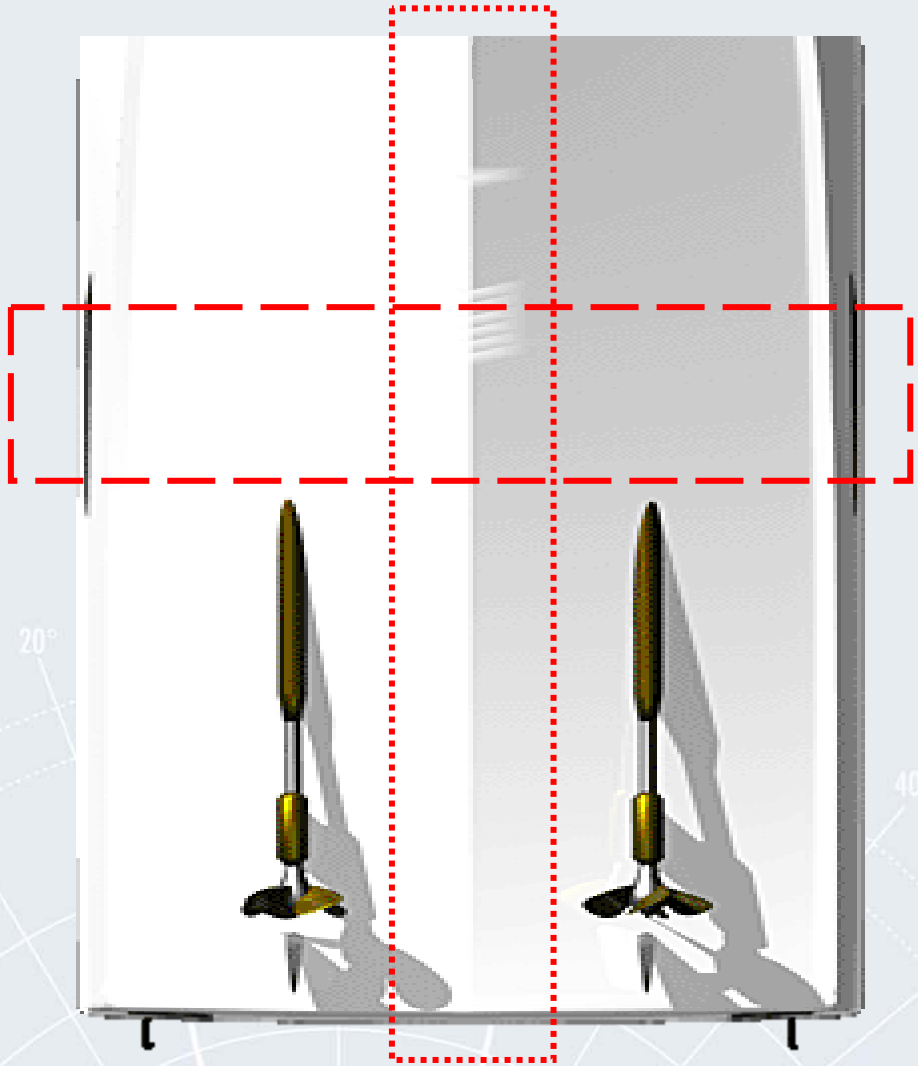
Transducer placement should be aft and close to the centerline. It needs to be located low enough that the transducer is in the water at all times.



Thru-hull location selection

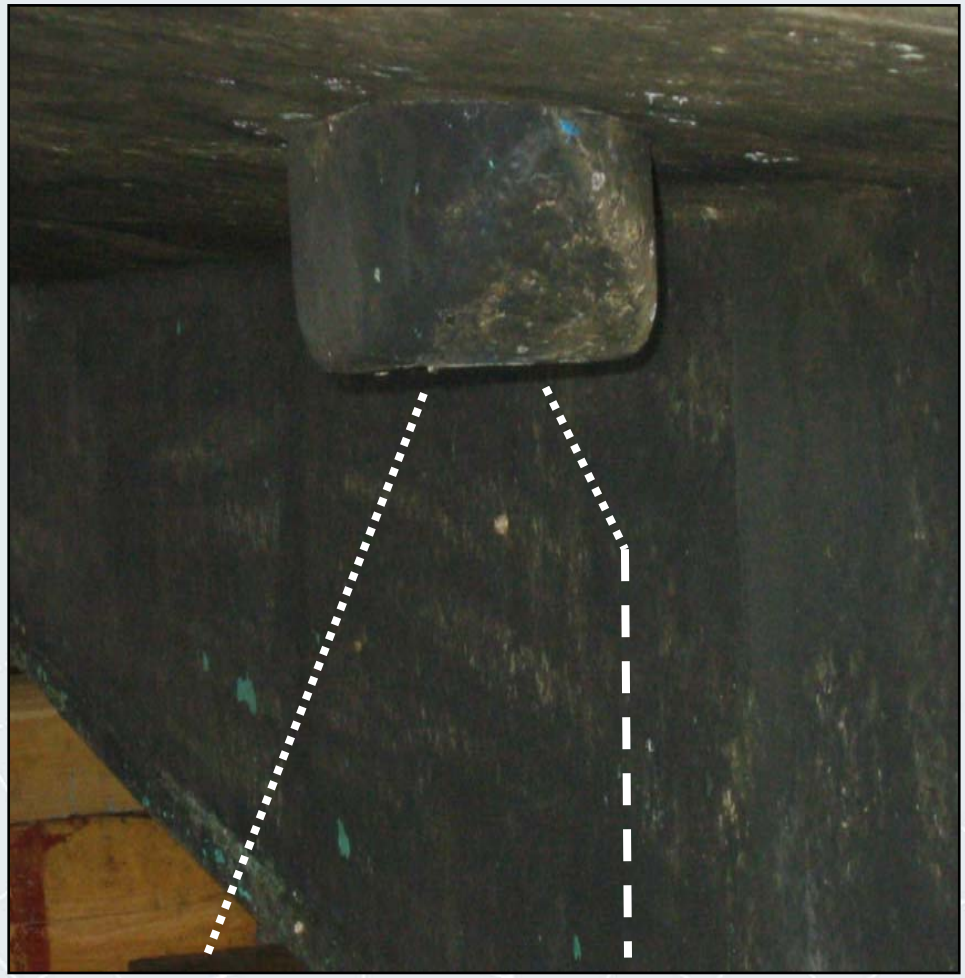
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

Consider items such as the lifting strap placement into the location as well as trailer bunks and rollers if it is a trailered vessel.



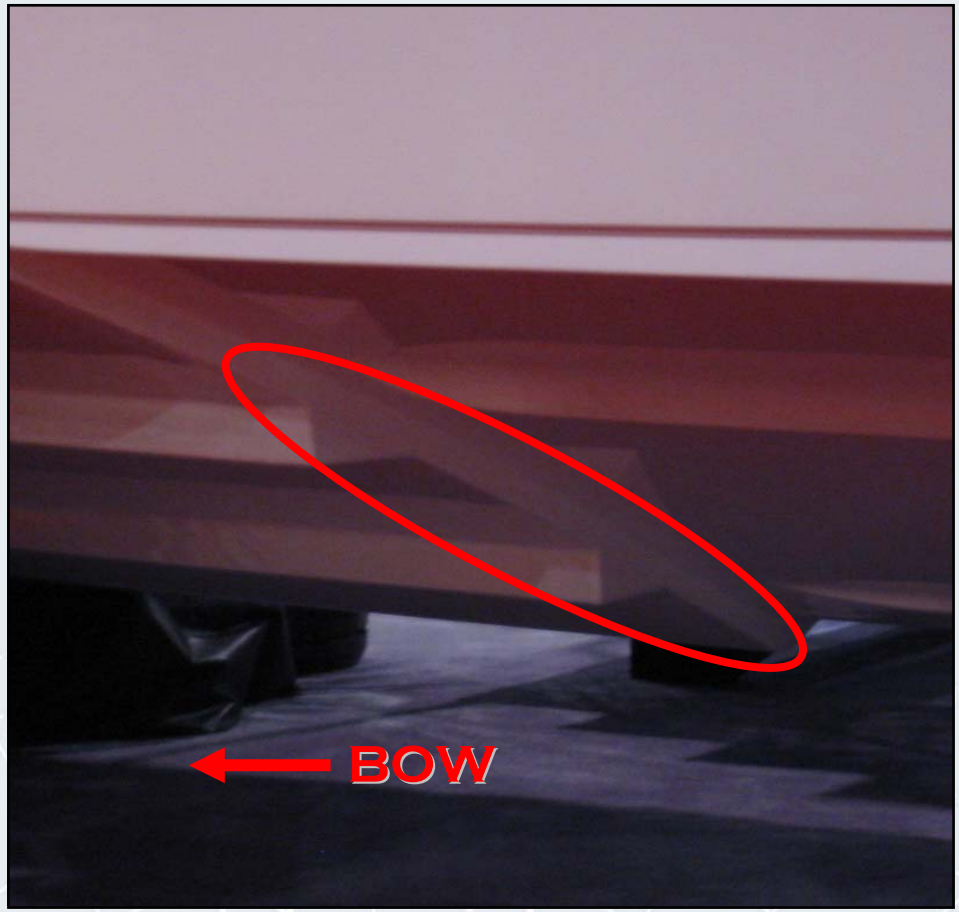
Location selection

Be sure that the transducer signal will not intersect the prop shaft(s), keel or any other hull projections, and that it is not directly in-line with the prop(s)



Thru-hull location selection

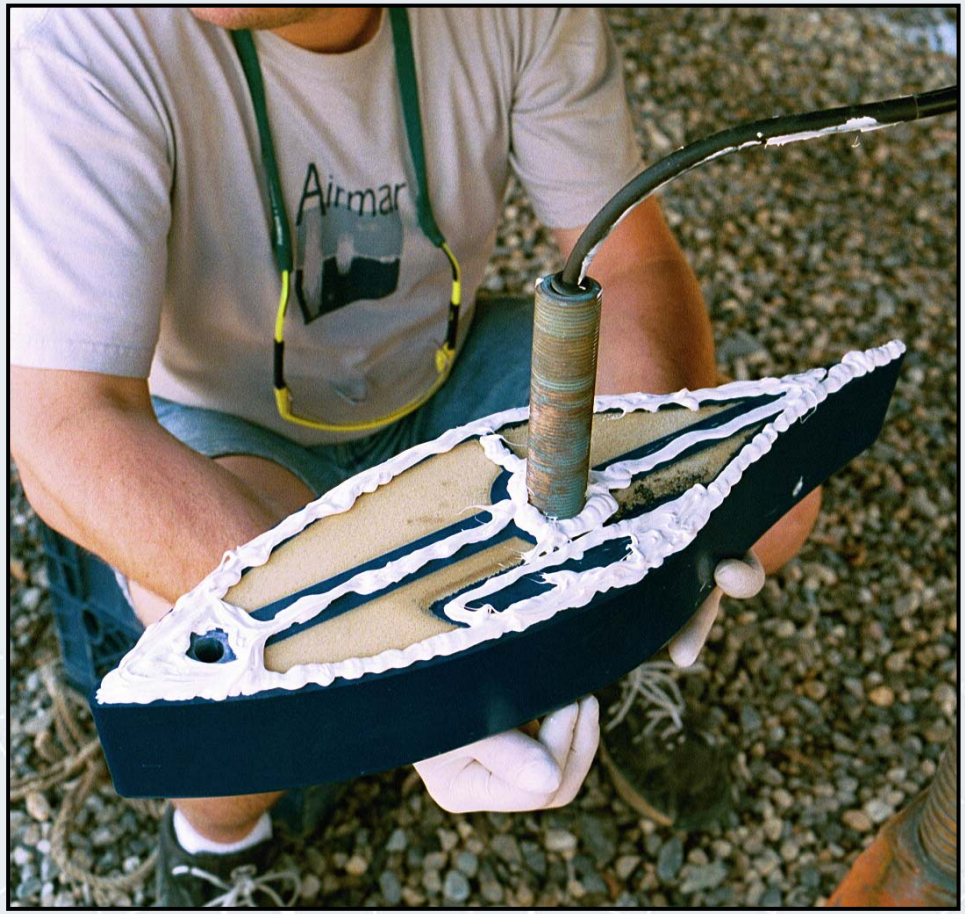
Thru hulls can be used on stepped hull vessels, but they **must** be located in front of the first step and low to the keel to operate affectively



Thru-hull Installation

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

3M 4200 or 5200 is the common sealant used. Be sure to apply enough to allow it to fully seal the stem hole.



In-hull models

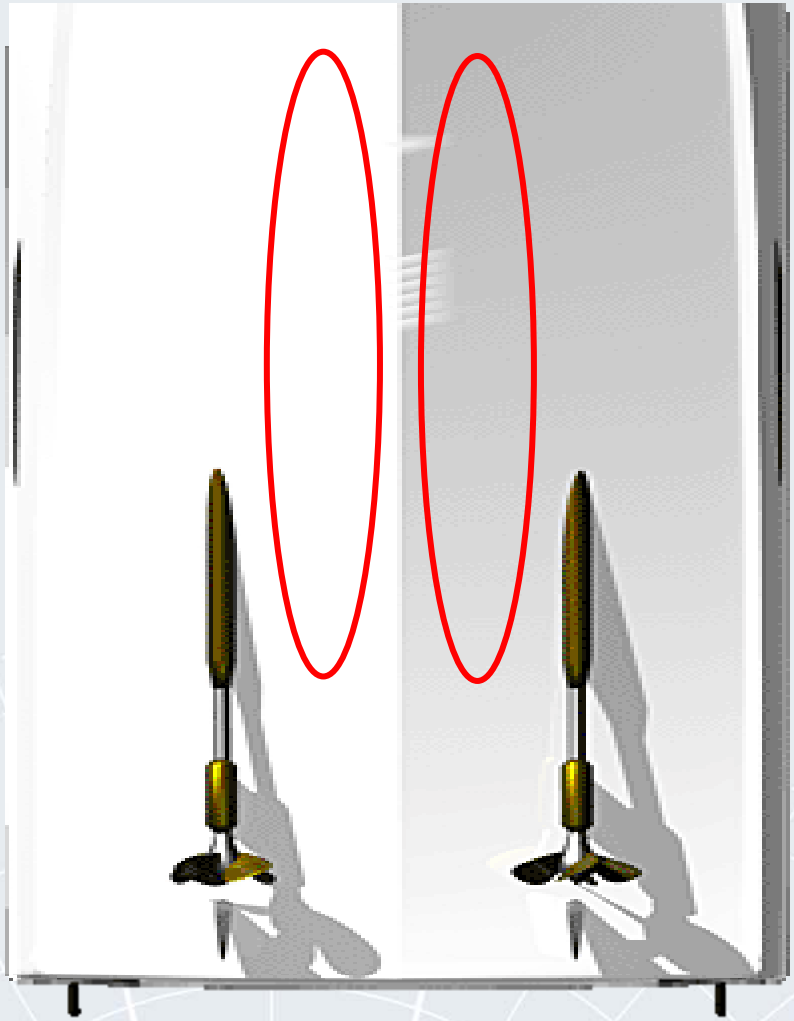
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- For solid fiberglass stepped, planing or displacement type hulls
- No hull penetration. Entire installation is done from inside the hull
- Can be installed while boat is in the water.
- Can be used with single or twin inboard, I/O, OB and jet drive propulsion
- For deadrise angles up to 30 degrees
- Can now be mounted port/ starboard or bow/stern

In-hull location selection

The same installation placement guidelines for Thru-Hulls apply for In-Hulls.

The selected location should be aft and close to the centerline so that the transducer is in the water at all times.



Testing an In-Hull Mounting Location

Before installing the transducer tank, perform one of the 3 methods below in as deep of water as possible. Connect the transducer cable to the fishfinder to verify strong bottom readings.

A. Flood the area with bilge water.
B. Place the transducer in a garbage bag and fill with water
C. Apply a water based lubricant to the transducer face and press against the hull

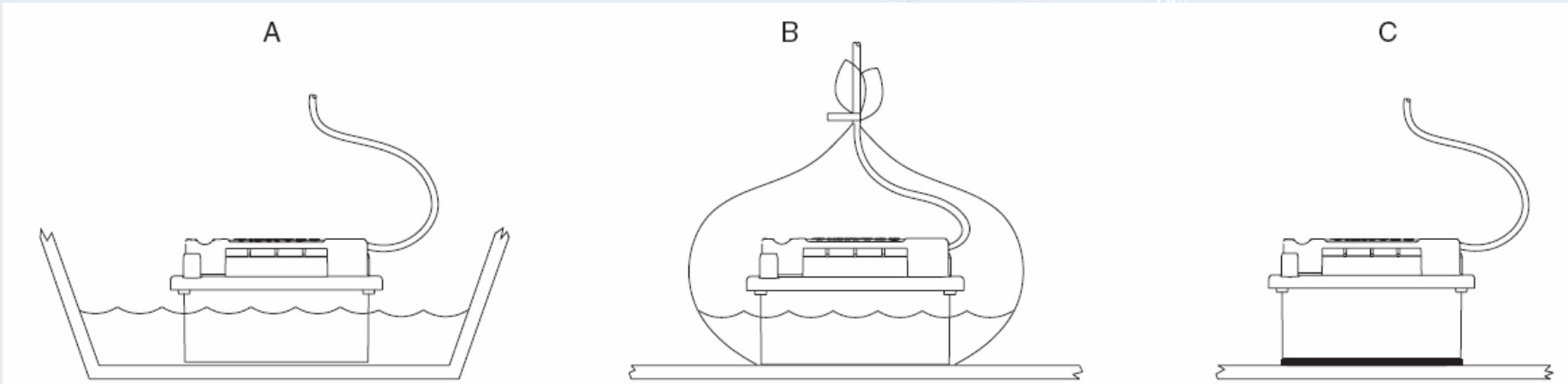


Figure 4. Testing the transducer at the selected location

Testing for *depth*
EDI transducer testers

Using an EDI transducer test box you can determine the resonant frequency of a transducer and confirm that all of it's functions are operating properly.

Gemeco offers adaptor cables that plug directly into popular transducer connectors

Testing for *temp* function

With meter set to OHMS the reading should be in the 10,000 ohm range at 77 degrees F.

The resistance increases as the temp decreases.

The sensor will read correctly in or out of water.

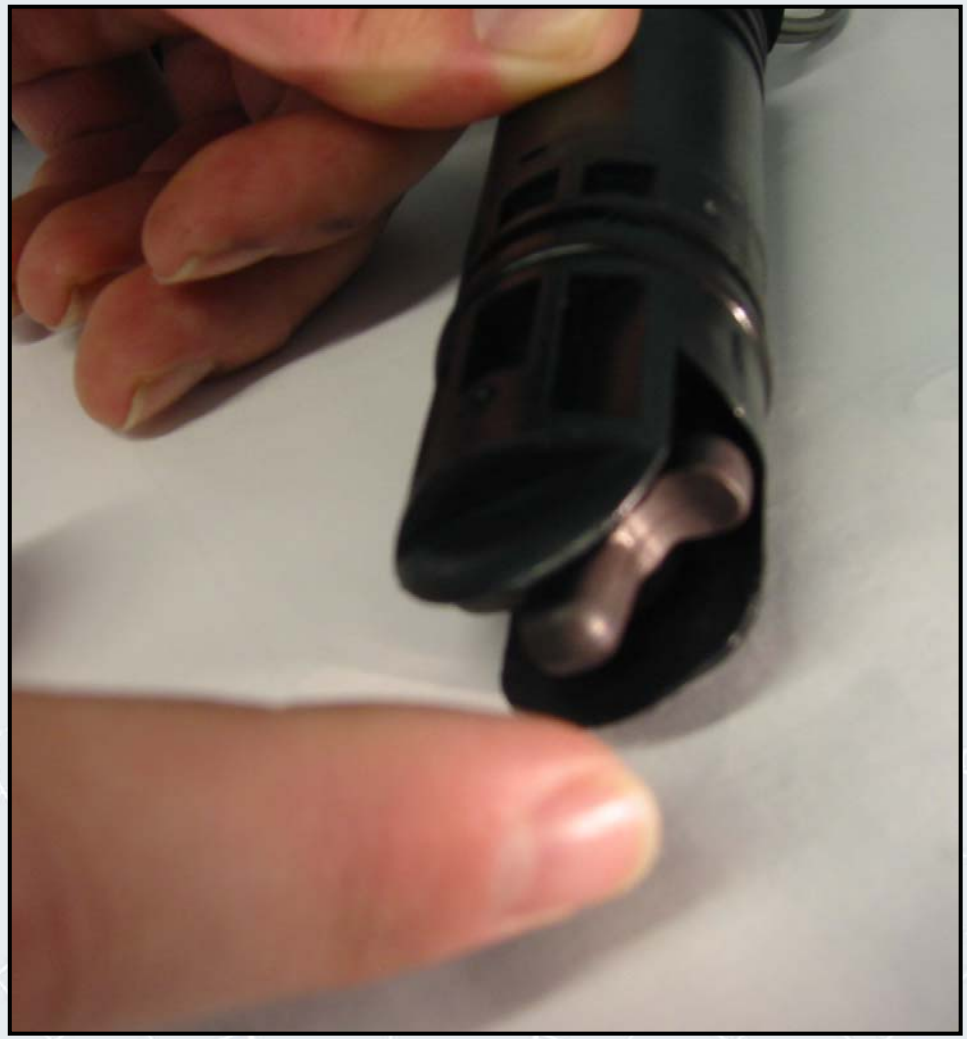
Testing for *speed* function

Use a 9 volt or 12 volt cordless drill battery to apply battery voltage to red and bare wires.

Attach meter test leads between the green and bare wires.

Testing for *speed* function

Turn the paddlewheel slowly by hand. The volt meter should toggle between zero volts and the input voltage with each 90 degrees of rotation.



In Hull Transducers

In-Hull Transducers for Fiberglass Hulls

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

Mounting:
Sand/grind the fiberglass until rough. Clean the fiberglass, then mount with:
1. Fiberglass Resin (best choice for long-tern adhesion)
2. Fusor® 100EZ / T10.
3. 3M 5200,

Filling the tank:
Use non-toxic Marine & RV red/pink anti-freeze

In-Hull Transducers:
Depth Performance vs. Hull Thickness

The following graphs show the loss and frequency shift when a M260 in-hull transducer is transmitting through:

- No Fiberglass
- 3/8” Fiberglass
- 1/2” Fiberglass
- 3/4” Fiberglass
- 1” Fiberglass

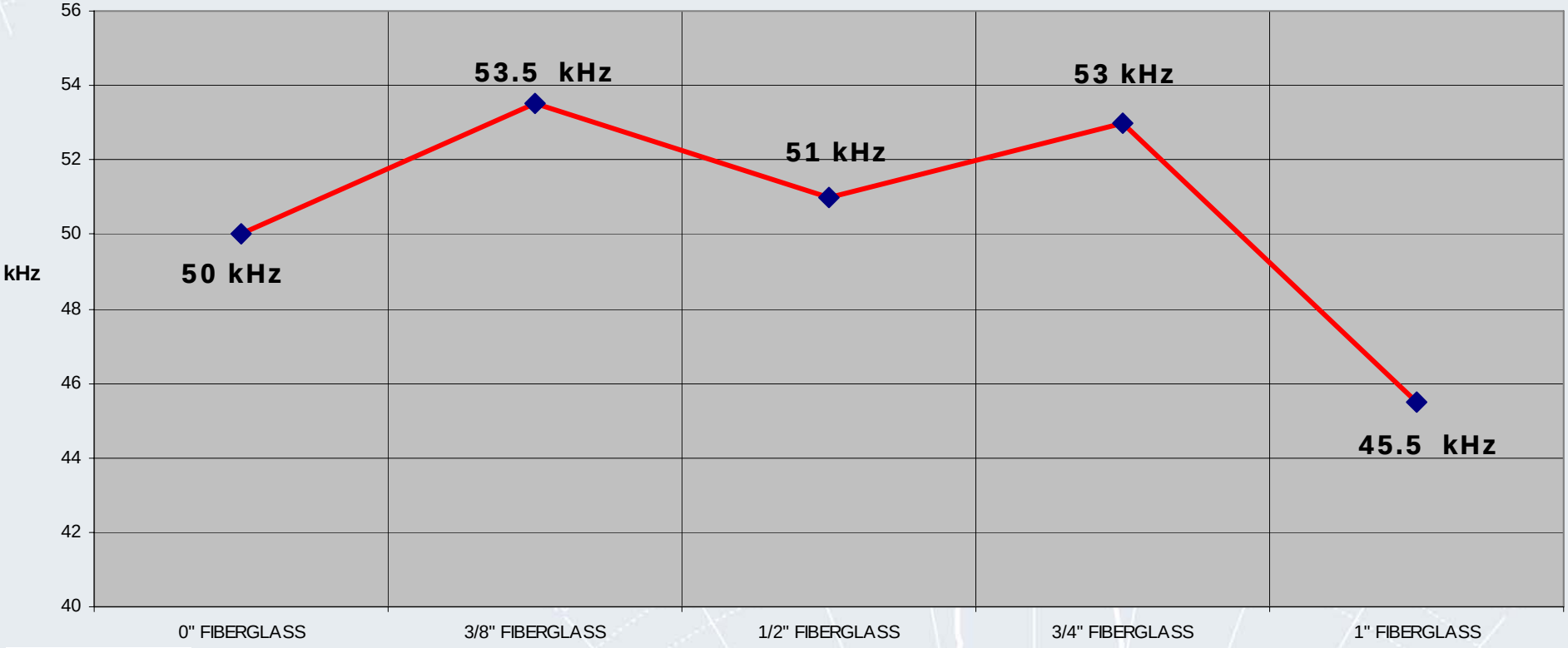
- Broadband transducers can compensate for frequency shift if connected to a tunable echosounder

- Note: In Hull transducers will not work with cored fiberglass, wood, or aluminum hulls due to excessive signal loss.

M260 ***50 kHz*** TVR CHANGE(RANGE LOSS) vs. HULL THICKNESS

M260 ***50 kHz*** FREQUENCY SHIFT vs. HULL THICKNESS

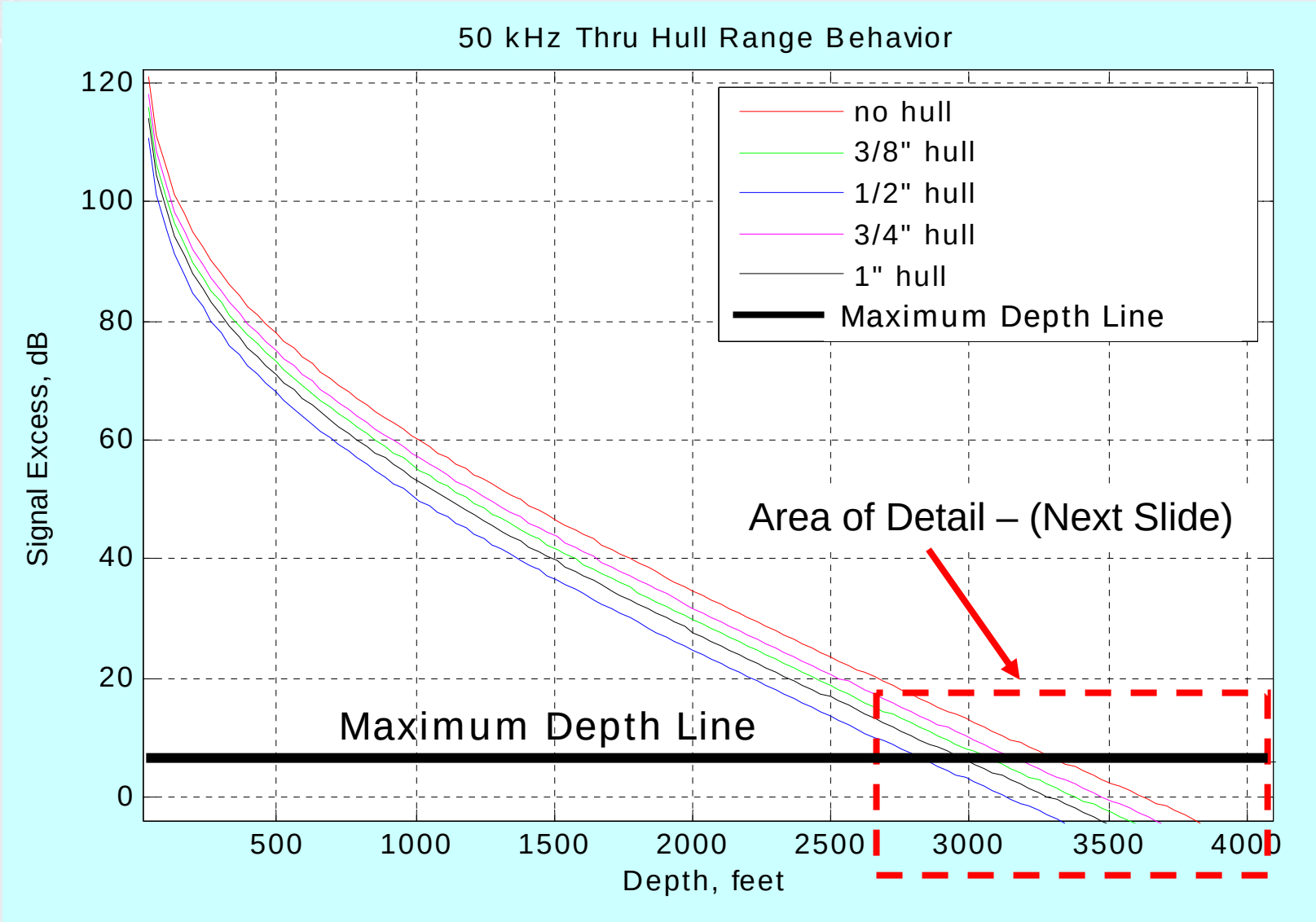
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology



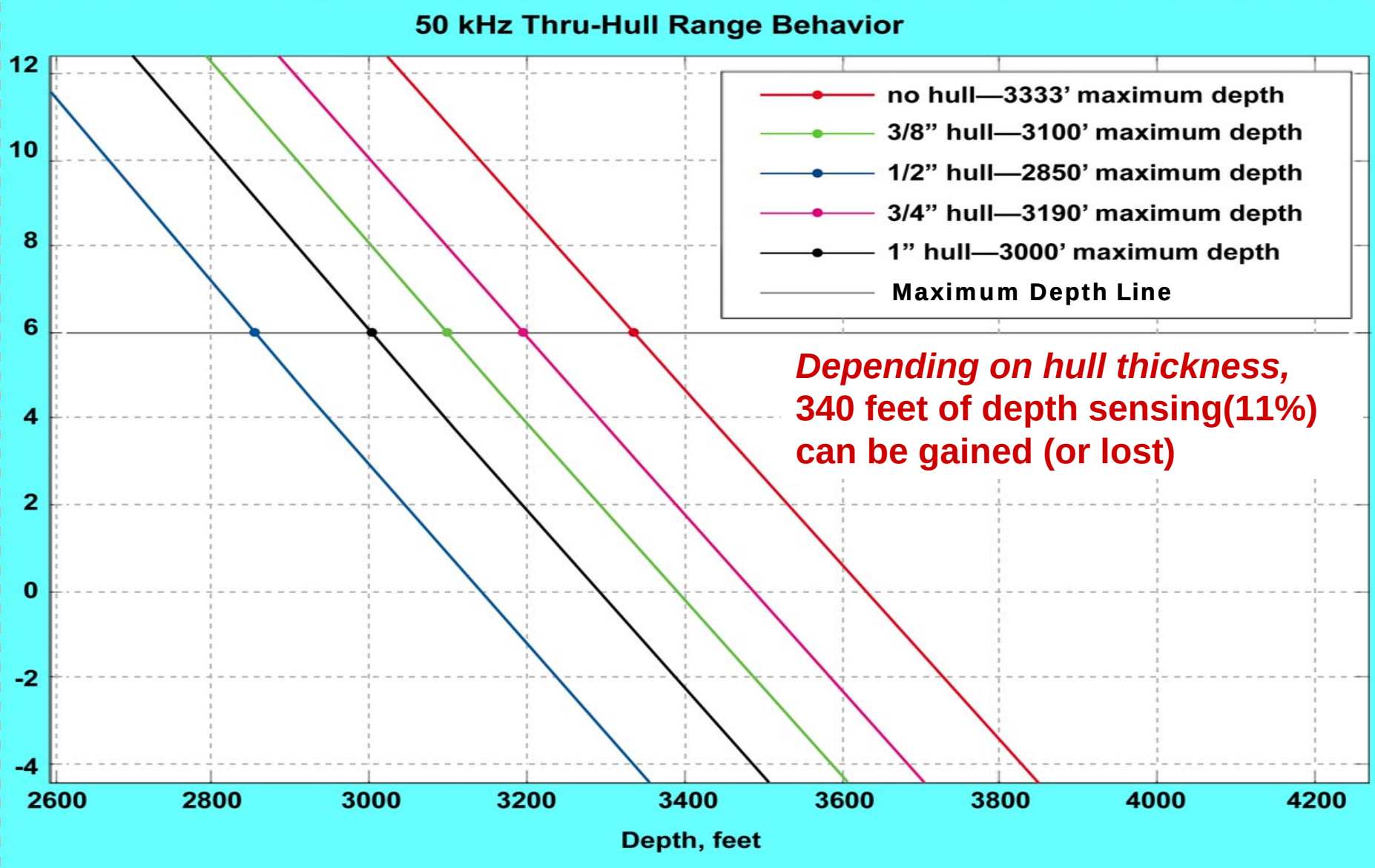
M260 Max depth @ 50 kHz with 1kW Input power

- No fiberglass- 3333’ (1015m)
- 3/8” fiberglass- 3100’ (944m)
- ½” fiberglass- 2850’ (868m)
- ¾” fiberglass- 3190’ (972m)
- 1” fiberglass- 3000’ (914m)

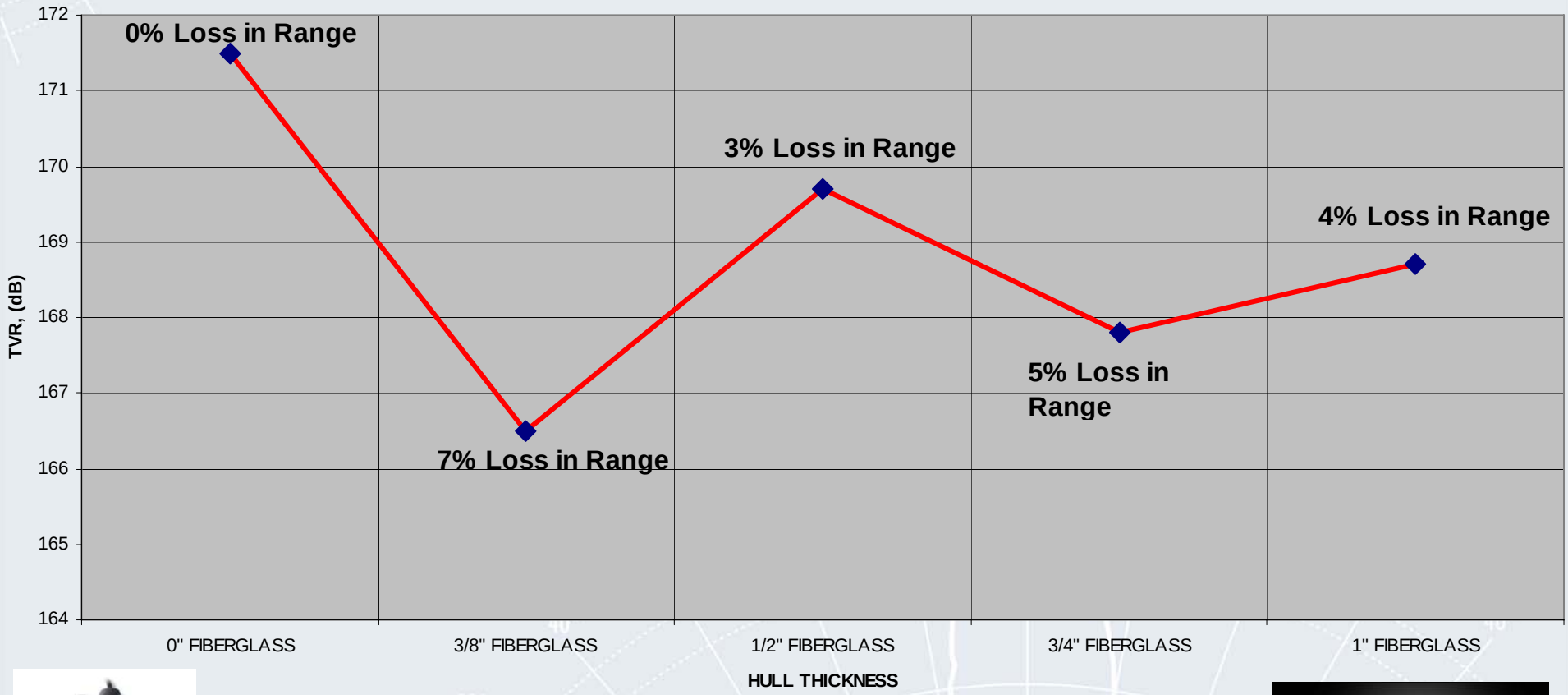
50kHz Maximum Depth Range
M260 In-Hull - 1kW Input Power



50 kHz Maximum Depth Range
M260 In-Hull - 1kW Input Power

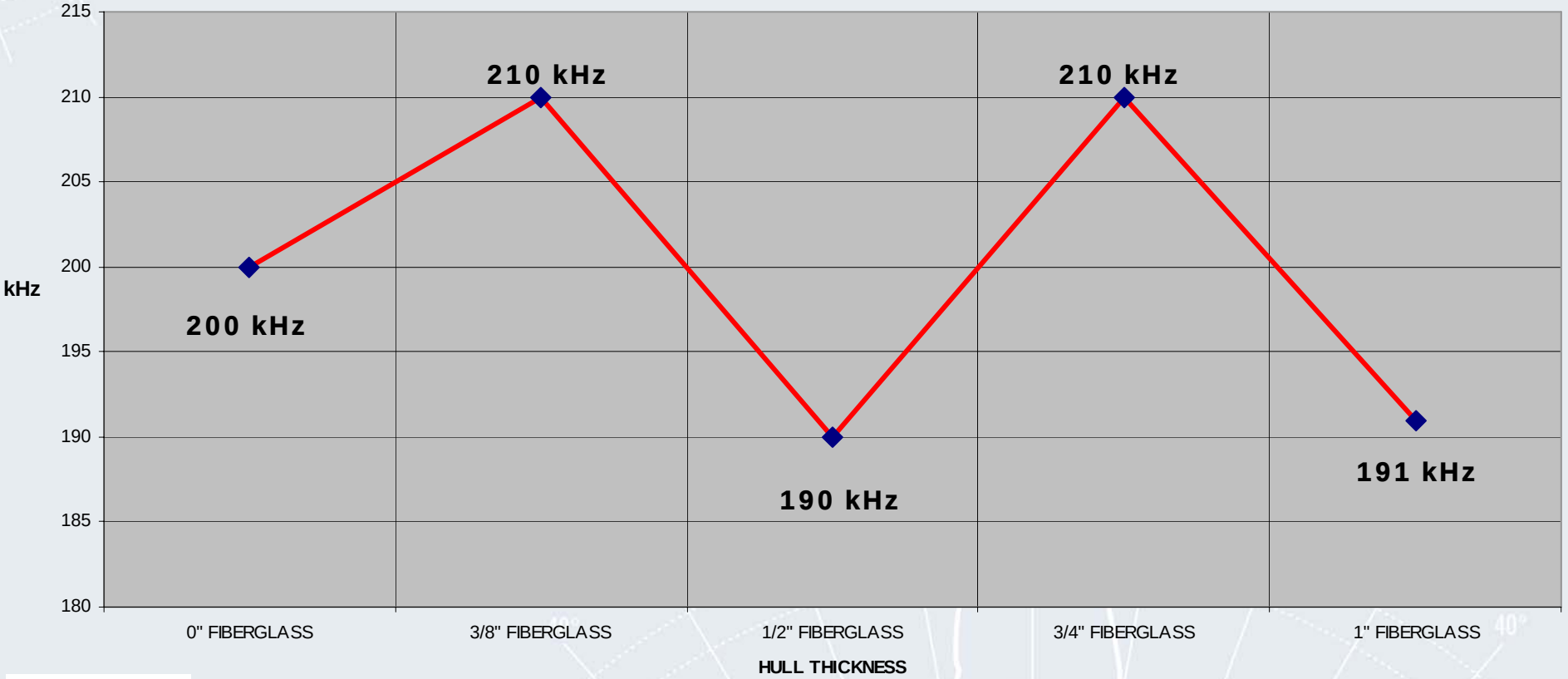


M260 ***200 kHz*** TVR CHANGE & RANGE LOSS vs. HULL THICKNESS



M260 ***200 kHz*** FREQUENCY SHIFT vs. HULL THICKNESS

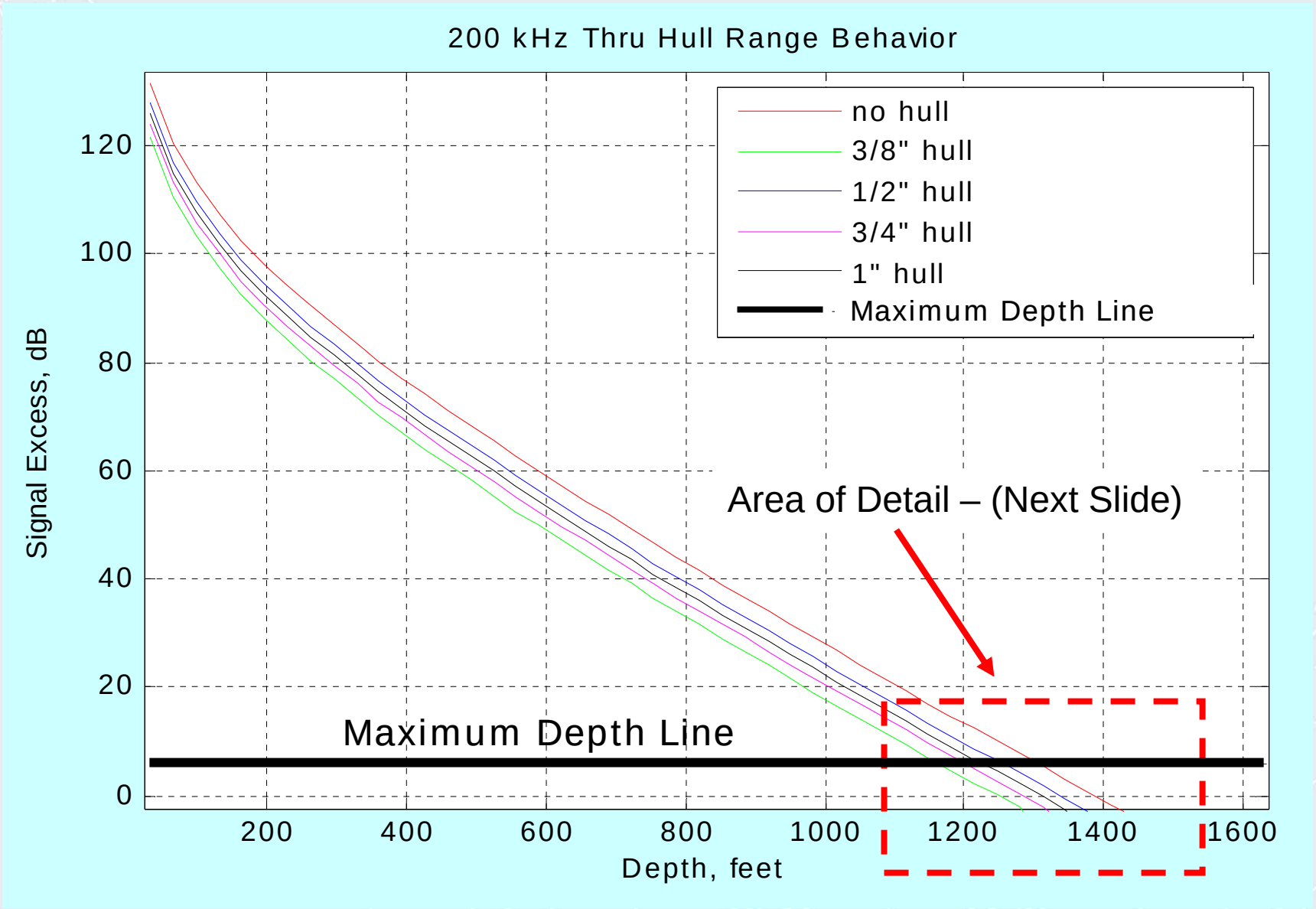
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology



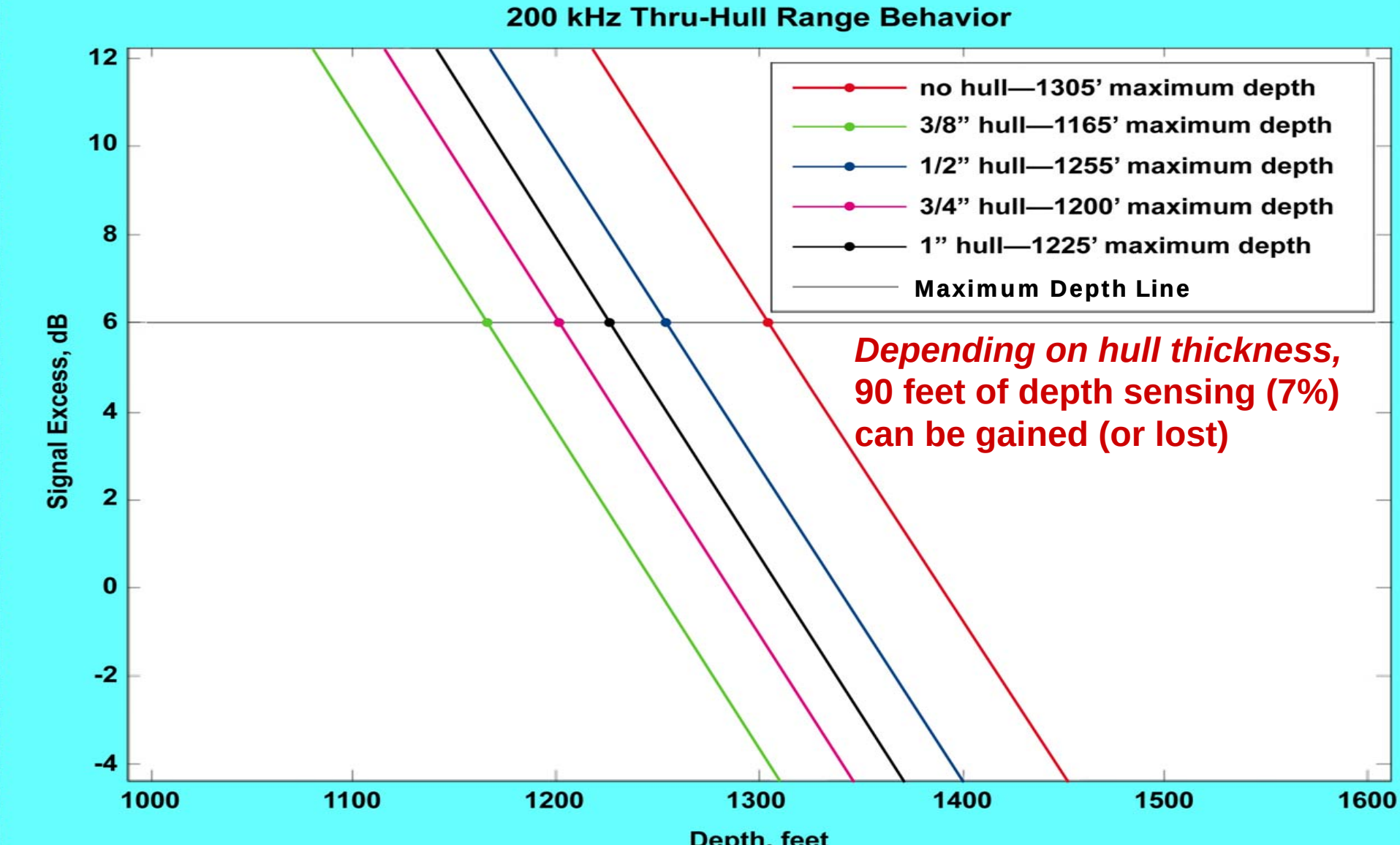
M260 Max depth @ 200 kHz with 1kW Input Power

- No fiberglass- 1305’ (397m)
- 3/8” fiberglass-1165’(355m)
- ½” fiberglass- 1255’ (382m)
- ¾” fiberglass- 1200’ (365m)
- 1” fiberglass- 1225’ (373m)

200 kHz Maximum Depth Range
M260 In-Hull - 1kW Input Power



200 kHz Maximum Depth Range
M260 In-Hull - 1kW Input Power



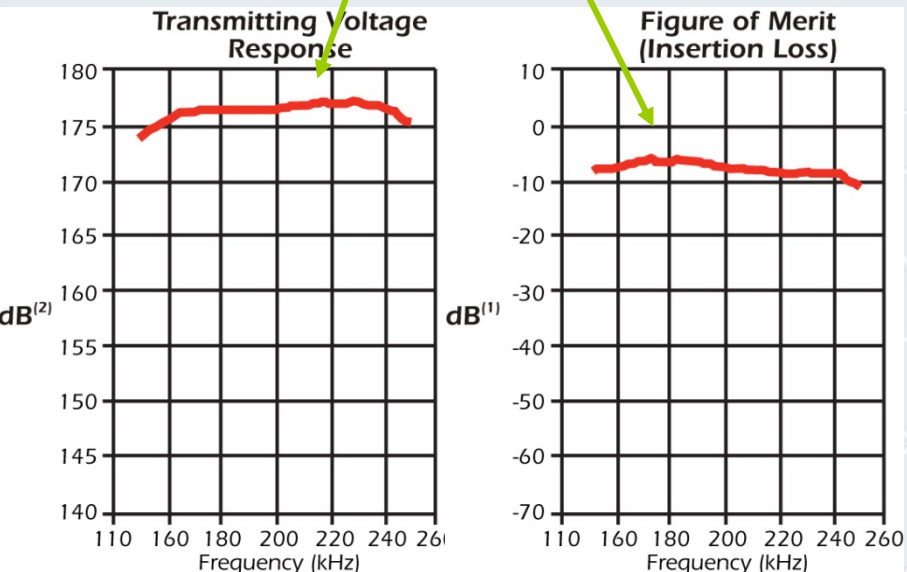
R199 2kW @ 200 kHz

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

No Fiberglass

200kHz Q = 2

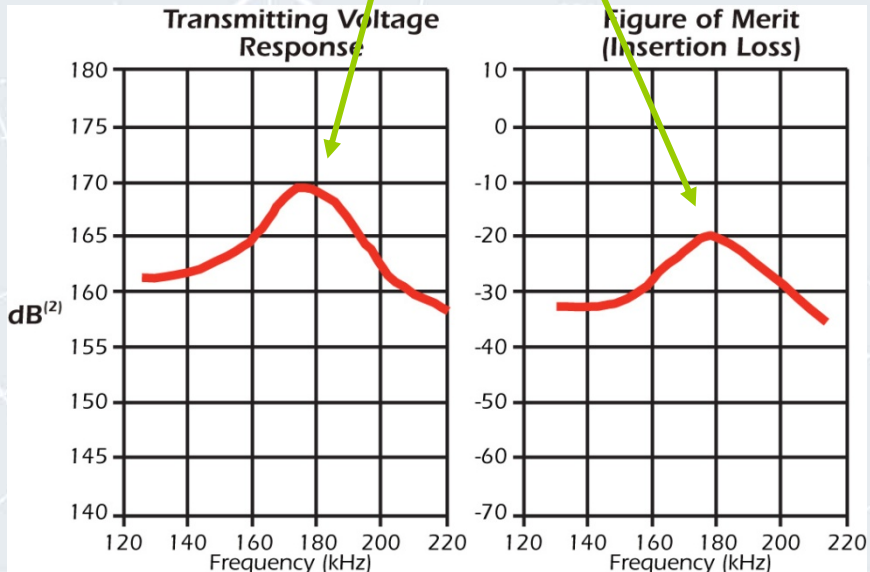
Flat response: any frequency between 160 to 240 kHz is an efficient operating frequency



¾” Fiberglass

200kHz Q = 4.5

Transmitting through the hull reduces bandwidth and shifts frequency - 180 kHz is now the best operating frequency



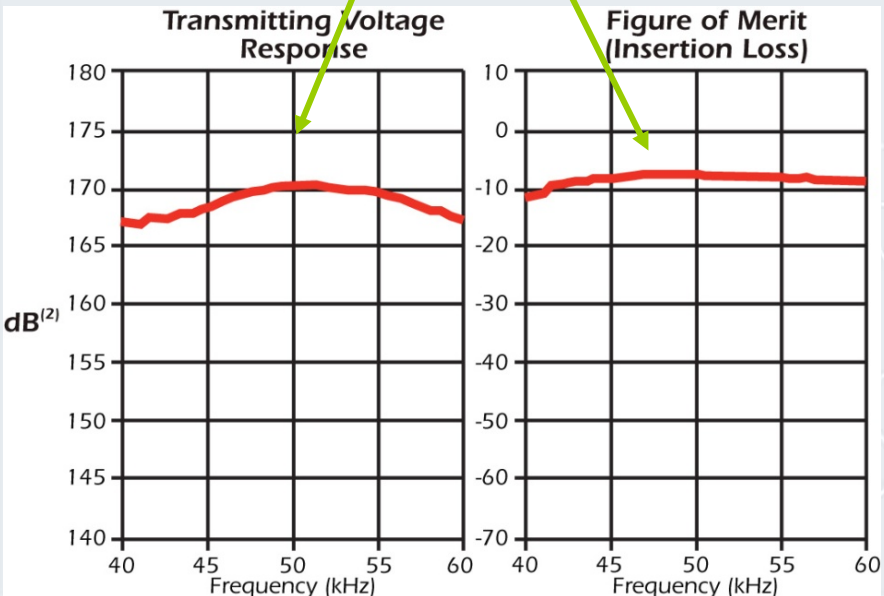
R199 2kW @ 50 kHz

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

No Fiberglass

50kHz Q = 3

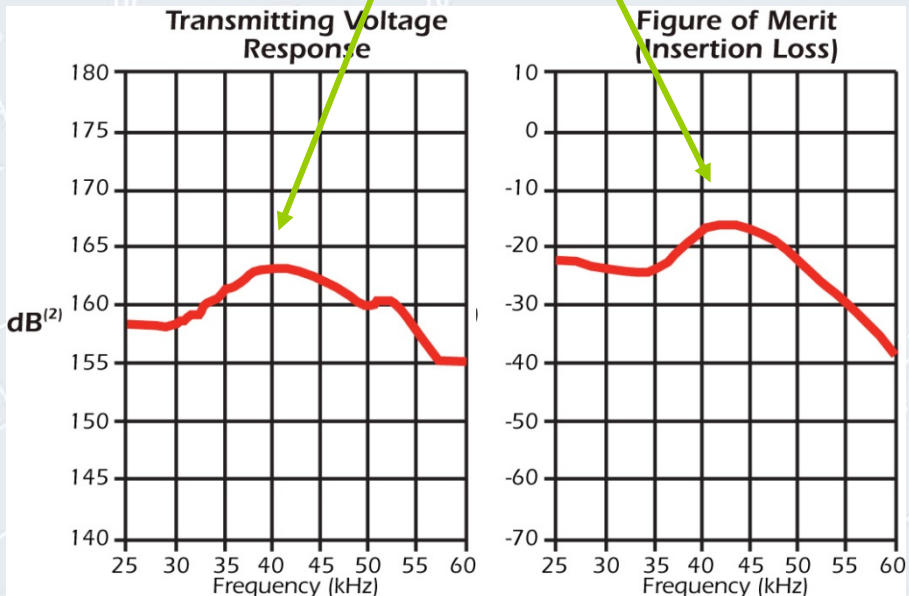
Flat response: any frequency between 46 to 55 kHz is an efficient operating frequency



¾” Fiberglass

50kHz Q = 4.1

Transmitting through the hull reduces bandwidth and shifts frequency - 43 kHz is now the best operating frequency



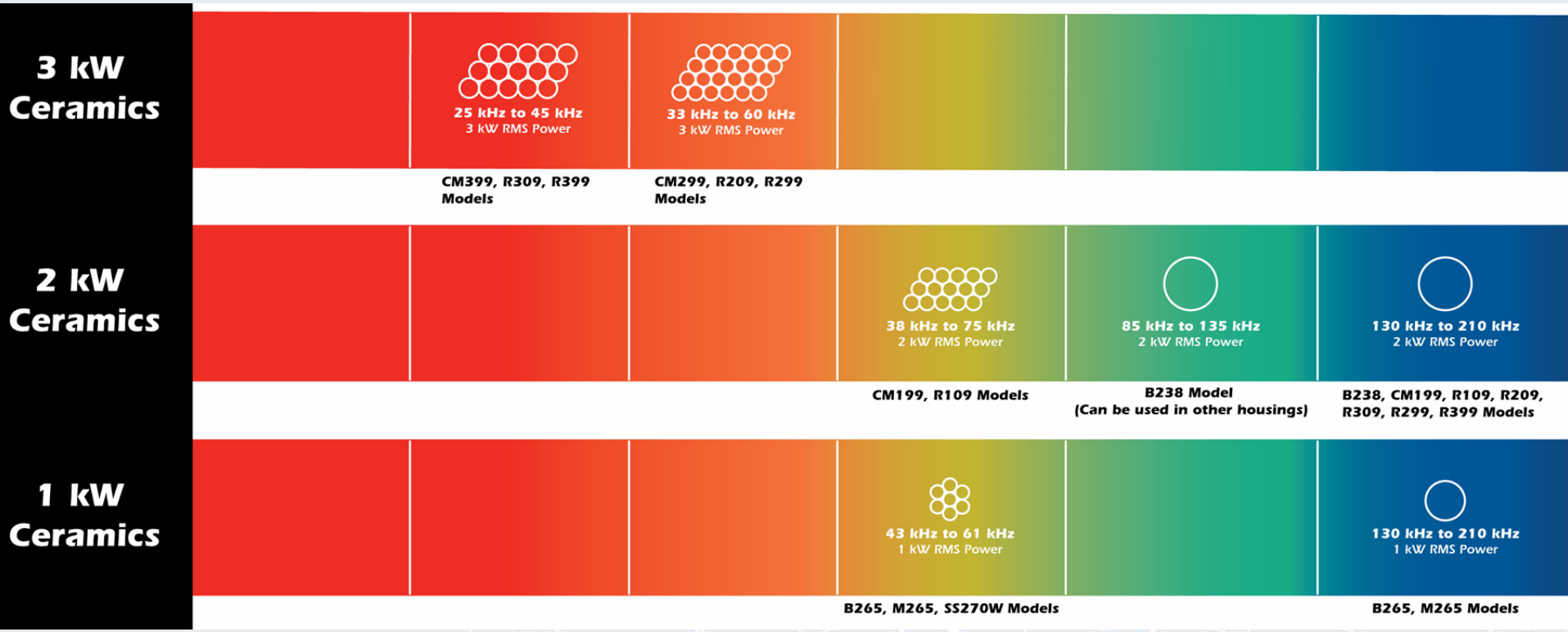
AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

Broadband Transducers

broadband

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

Transducer options

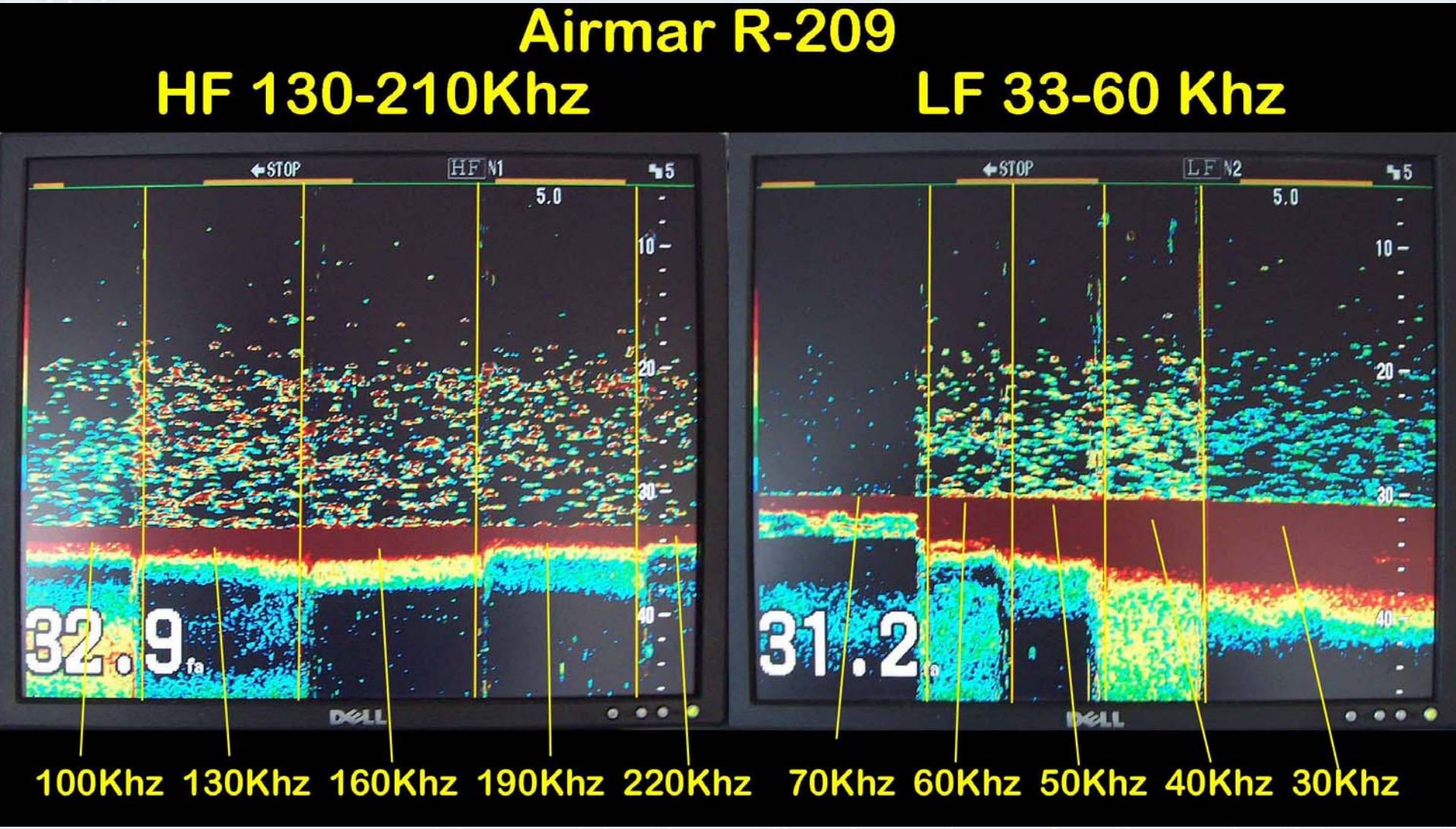


Benefits of Tunable Fishfinders with Broadband Transducers

- 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).

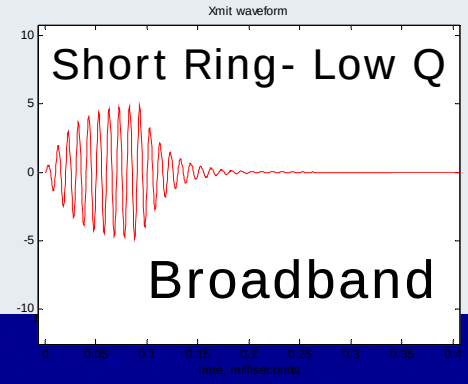
Imaging at various frequencies

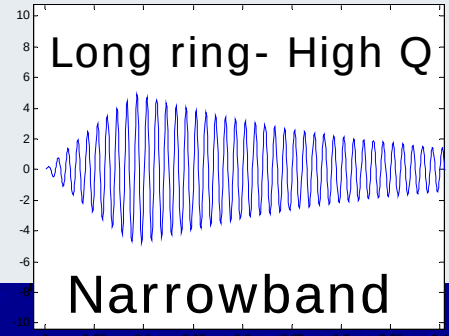
AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

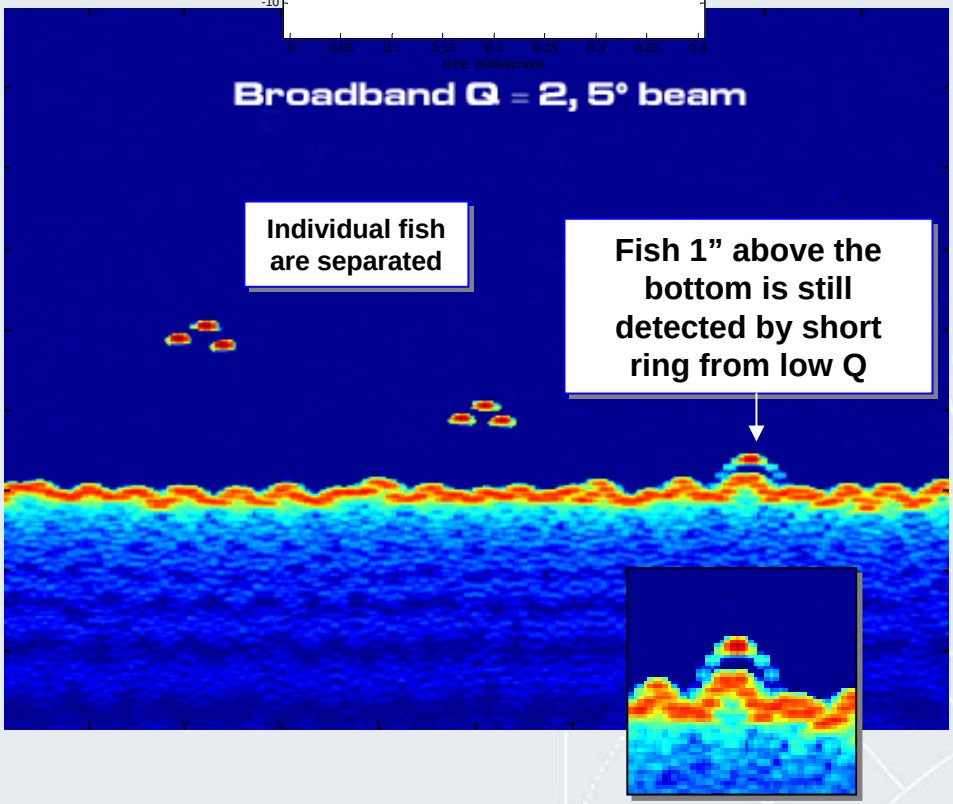


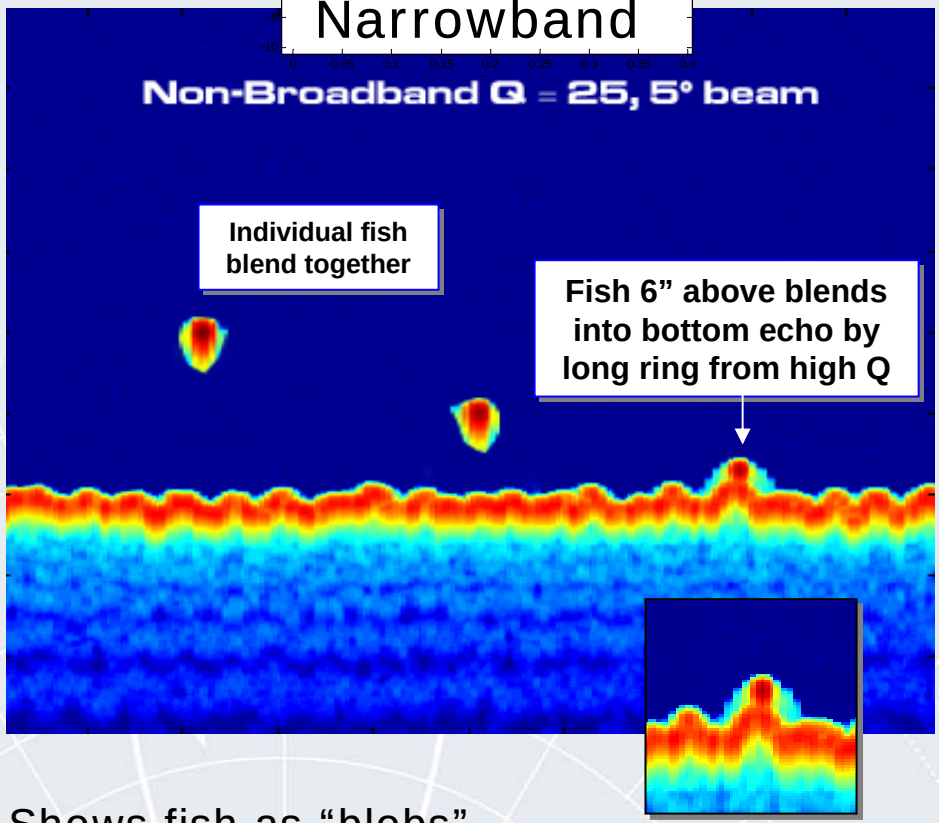
Broadband vs. Narrowband
(no signal processing)

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology





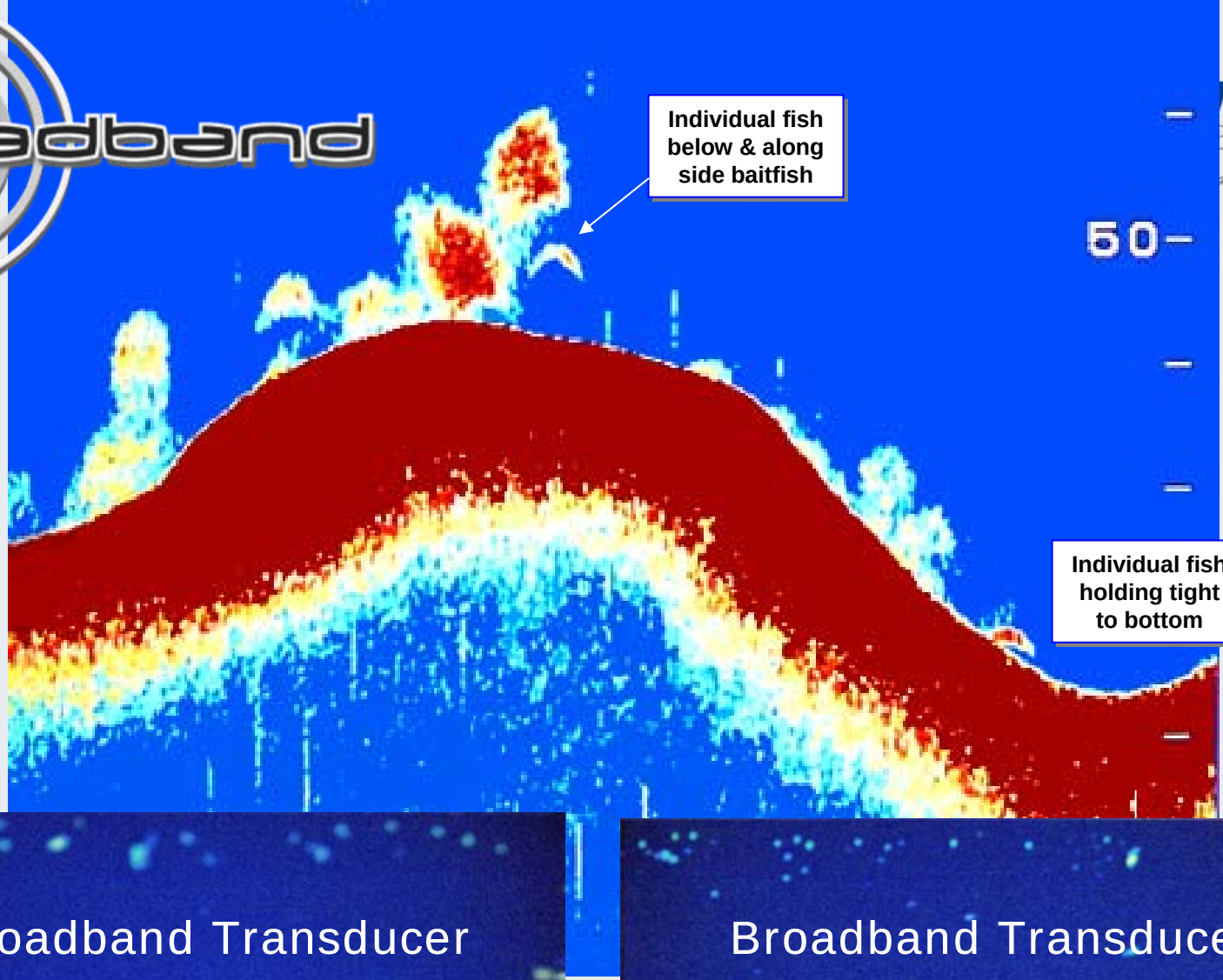


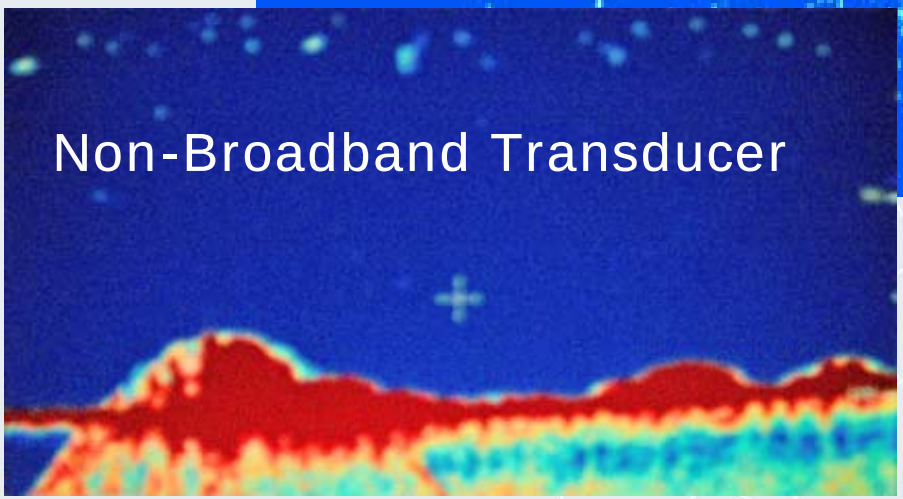


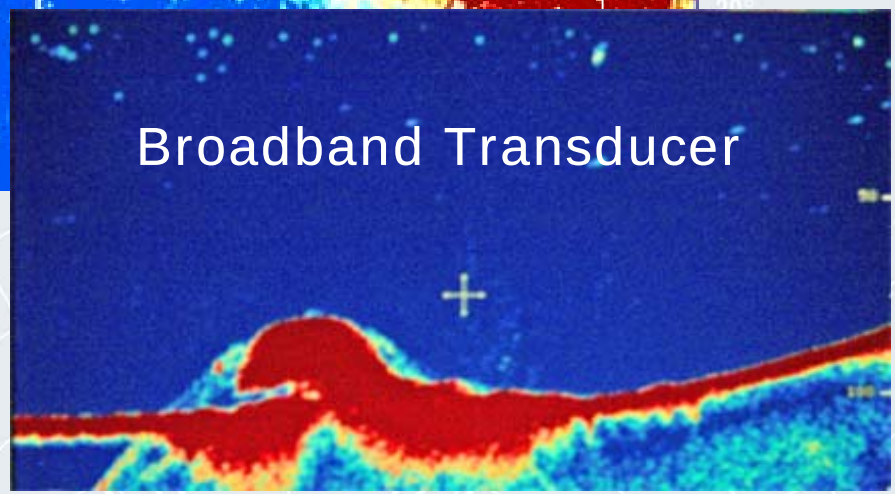
Individual fish are detected
Fish are detected 1” above the bottom

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

broadband


Individual fish below & along side baitfish
50
Individual fish holding tight to bottom


Non-Broadband Transducer


Broadband Transducer

Broadband and the future: CHIRP
-Frequency Modulated Transmissions

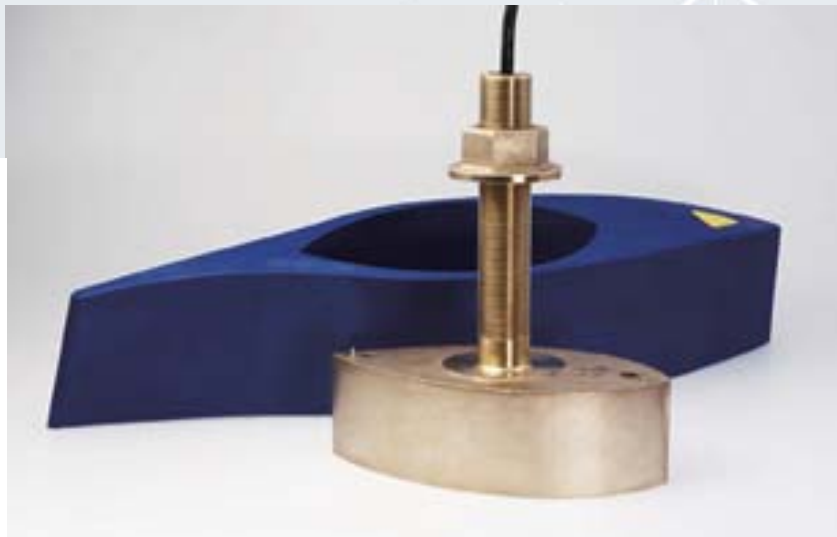
- Improved signal-to-noise ratio
- Very good performance from shallow to deep
- Better target definition
- Better performance at speed
- Variable beamwidths
- Better rejection of noise sources

New B265,M265, & CM265(Commercial tank Mount)

- 1kW Broadband / Chirp versions of the B260 Thru-Hull & M260 In-Hull
- Dual Transmission lines-(separate wires for LF and HF depth)
- Active Temperature Control monitoring of internal ceramics

❑Better Deep-water, High-Frequency Depth Performance at 130kHz

❑Adjustable frequency can compensate for frequency shift when shooting through solid fiberglass (M265 model)



R109 External Thru-Hull

- 2kW Broadband / Chirp version of the R99
- Operates anywhere between 38kHz to 75kHz & 130kHz to 210kHz
- Active Temperature Control monitoring of internal ceramics
- Better Deep-water, High-Frequency Depth Performance at 130kHz
- Very deep sounding capability at 38kHz

B238 Middle Frequency

- Operates anywhere between 85kHz to 135kHz
- Single 3” ceramic handles 2kW Power
- Completes broadband line by filling the mid-frequency gap.
- Active Temperature Control monitoring of internal ceramics

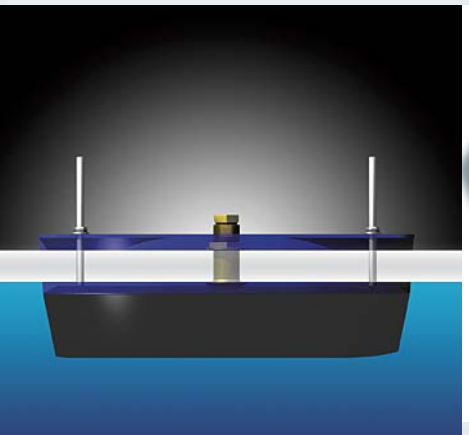
- Popular 88kHz & 107kHz Commercial fishing Frequencies

2-3kW R209 & R299

- Broadband on both low and high frequencies.
- Dual Transmission line-(separate wires for LF and HF depth)
- Active Temperature Control monitoring of internal ceramics
- 24 element low-frequency array that operate between 33kHz to 60kHz and handle up to 3 kW of input power.
- High-frequency 3.5" Broadband ceramic can operate between 130kHz to 210 kHz and can handle up to 2 kW of input power.

❑ Superb Deep-water, High-Frequency Depth Performance at 130kHz

❑ Adjustable frequency can compensate for frequency shift when shooting through solid fiberglass (R299 model)



2-3kW R309 & R399

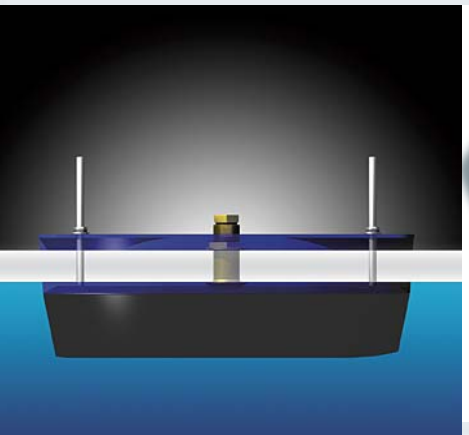
AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

- Very low frequency operation between 25kHz to 45kHz
- Dual Transmission line-(separate wires for LF and HF depth)
- Active Temperature Control monitoring of internal ceramics
- 15 element low-frequency array that operate between 25kHz to 45kHz and handle up to 3 kW of input power.
- High-frequency 3.5" Broadband ceramic can operate between 130kHz to 210 kHz and can handle up to 2 kW of input power.

❑ Superb Deep-water, High-Frequency Depth Performance at 130kHz

❑ Adjustable frequency can compensate for frequency shift when shooting through solid fiberglass (R399 model)

broadband



Installing & Troubleshooting Transom-Mount Models

Transom Mount Models

AIRMAR TECHNOLOGY CORPORATION
Sensing Technology

For displacement or planing hulls only

Can be used on wood, fiberglass, aluminum or steel hulls

Can be used with single or twin I/O, OB and jet drive propulsion systems

Good high speed performance can be achieved with careful installation

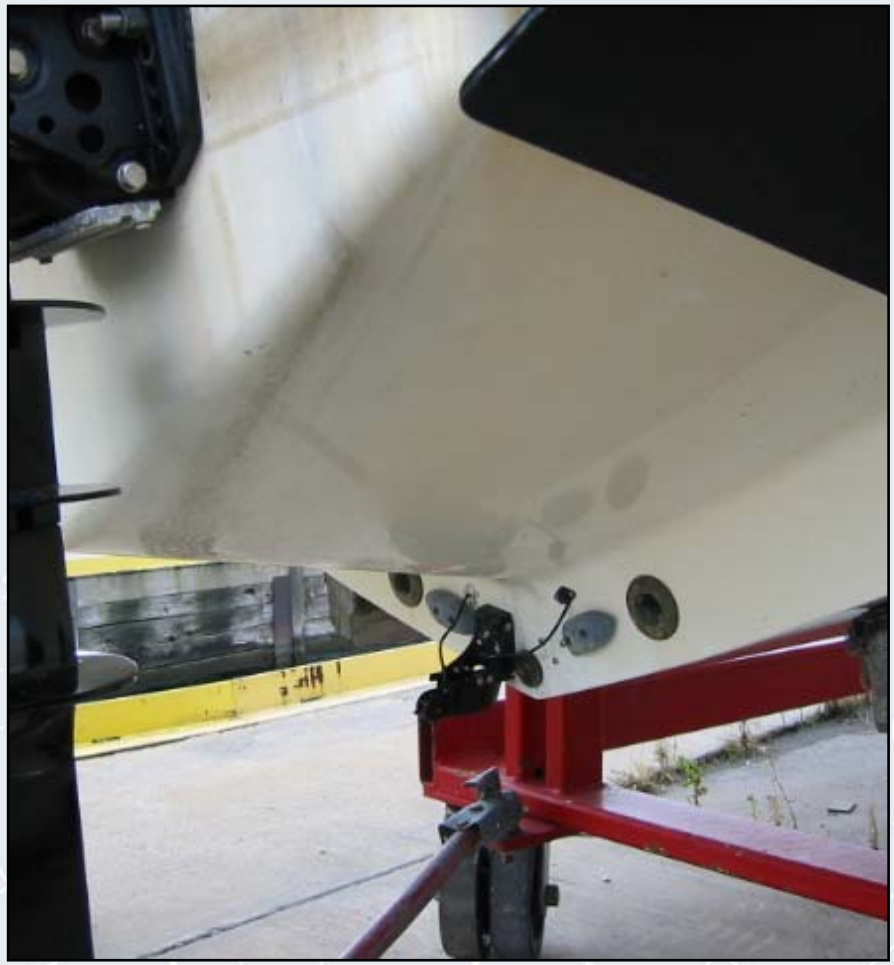
Easy maintenance designs

Transom location selection

Transom models are best suited for small and trailered vessels where a thru-hull is not practical. They are not for use on stepped hull boats or with inboard power.

Transom location selection

Transom models can be used on ***stepped transom*** boats that have sufficient headroom for release. They should be mounted on the lower surface.



Transom location selection

Select a mounting location that is not directly behind any strakes, hull fittings or sources of turbulence.

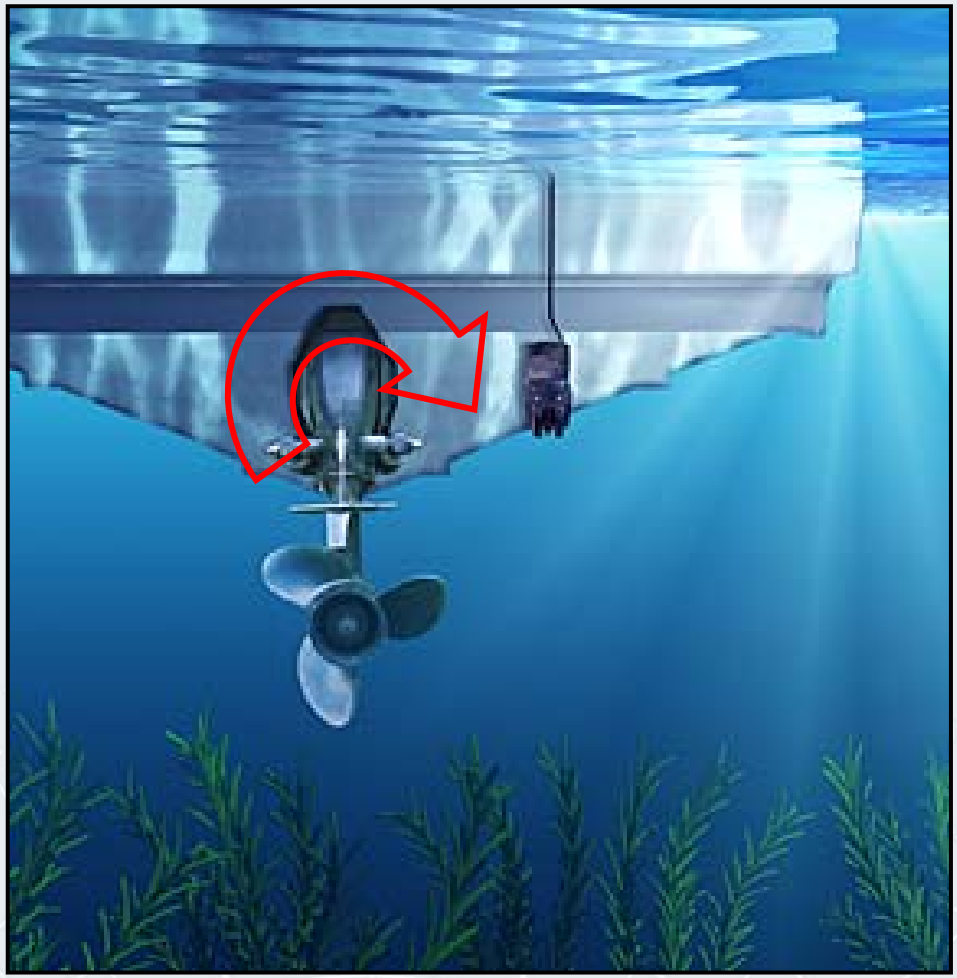
The water flowing over the face of the transducer must be turbulent free.

Transom location selection

Before installation, run the boat at speed and watch the water flow over the back of the transom. Locate the transducer in an area which you observed clean flow.

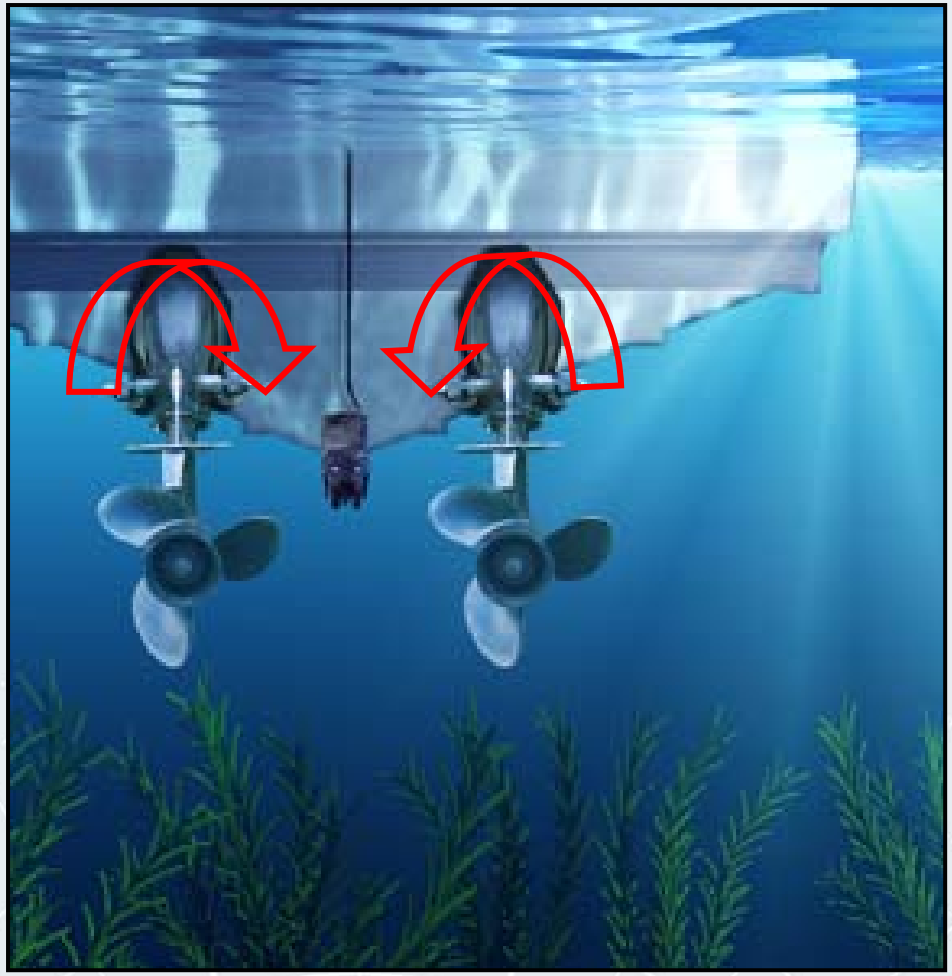
Transom location selection

Best results are achieved when the flow from the prop comes over the top of the transducer. Typically this is on the starboard side of the transom.



Transom location selection

For twin OB or I/O applications best results are achieved by mounting the transducer between the two drives, either on or just off of the centerline.



Transom Mount Guidelines

Mount so that the bow of the sensor is slightly higher than the stern of the sensor and the sensor projects below the hull, otherwise aeration will occur.

Sea trial the vessel and adjust the transducer mounting height to achieve clear screen images at speed.

Transom Mount Flow Noise

If experiencing interference with a transom mounted transducer you must test drive the vessel to determine what speed the image is lost at.

Move the transducer to it's lowest position and retest.

If screen image is improved repeat until you are satisfied with results.

If screen image gets worse, move transducer up and re-test until improvement is seen.

Transom Mount 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.