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Kellem® is a registered trademark of Hubbell Incorporated.
ATTENTION – READ THIS FIRST!

All personnel involved with the installation, operation, or maintenance of the equipment described in this manual should read and understand the warnings and cautions provided below.

**CAUTION!** This equipment contains devices that are extremely sensitive to static electricity. Therefore, extreme care should be taken when handling them. Normal handling precautions involve the use of anti-static protection materials and grounding straps for personnel.

**WARNING!** High Voltage may be present in all parts of the system. Therefore, use caution when the electronics are removed from their containers for servicing.

**CAUTION!** Operation with improper line voltage may cause serious damage to the equipment. Always ensure that the proper line voltage is used.
HARDWARE VARIATIONS AND COMPATIBILITY

The 4125 Side Scan Sonar System contains both standard and proprietary hardware. At times, EdgeTech may change the standard components due to their availability or performance improvements. Although the component manufacturers—along with their models and styles—may change from unit to unit, replacement parts will generally be interchangeable.

EdgeTech will make every effort to see that replacement components are interchangeable and use the same software drivers (if applicable). At times, however, direct replacements may not exist. When this happens, EdgeTech will provide the necessary drivers with the replacement part, if applicable.

EdgeTech may also change certain hardware per customer requirements. Therefore, portions of this manual, such as parts lists and test features, are subject to change. These sections should be used for reference only. When changes are made that affect system operation, they will be explicitly noted. Also, some options and features may not be active in the customer’s unit at time of delivery. Upgrades will be made available when these features are implemented.

Contact EdgeTech Customer Service with any questions relating to compatibility.
ABOUT THIS DOCUMENT

We, the employees at EdgeTech, would like to thank you for purchasing 4125 Side Scan Sonar System. At EdgeTech, it is our policy to provide high-quality, cost-effective products and support services that meet or exceed your requirements. We also strive to deliver them on-time, and to continuously look for ways to improve them. We take pride in the products we manufacture, and want you to be entirely satisfied with your equipment.

Purpose of this Manual

The purpose of this manual is to provide the user with information on the setup and use of EdgeTech’s 4125. Although this manual encompasses the latest operational features of the 4125, some features may be periodically upgraded. Therefore, the information in this manual is subject to change and should be used for reference only.

Liability

EdgeTech has made every effort to document the 4125 in this manual accurately and completely. However, EdgeTech assumes no liability for errors or for any damages that result from the use of this manual or the equipment it documents. EdgeTech reserves the right to upgrade features of this equipment, and to make changes to this manual, without notice at any time.

Warnings, Cautions, and Notes

Where applicable, warnings, cautions, and notes are provided in this manual as follows:

**WARNING!** Identifies a potential hazard that could cause injury or death.

**CAUTION!** Identifies a potential hazard that could damage equipment or data.

**NOTE:** Recommendations or general information that is particular to the material being presented.
## Revision History

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<td>01/21/2014</td>
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<td>Updated for new tail cone and vertical scan ability</td>
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<td>F</td>
<td>Updated specifications and drawings</td>
<td>10/28/2016</td>
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WARRANTY STATEMENT

All equipment manufactured by EdgeTech is warranted against defective components and workmanship for a period of one year after shipment. Warranty repair will be done by EdgeTech free of charge.

Shipping costs are to be borne by the customer. Malfunction due to improper use is not covered in the warranty, and EdgeTech disclaims any liability for consequential damage resulting from defects in the performance of the equipment. No product is warranted as being fit for a particular purpose, and there is no warranty of merchantability. This warranty applies only if:

i. The items are used solely under the operating conditions and in the manner recommended in Seller's instruction manual, specifications, or other literature.

ii. The items have not been misused or abused in any manner, nor have repairs been attempted thereon without the approval of EdgeTech Customer Service.

iii. Written notice of the failure within the warranty period is forwarded to Seller and the directions received for properly identifying items returned under warranty are followed.

iv. The return notice authorizes Seller to examine and disassemble returned products to the extent Seller deems necessary to ascertain the cause for failure.

The warranties expressed herein are exclusive. There are no other warranties, either expressed or implied, beyond those set forth herein, and Seller does not assume any other obligation or liability in connection with the sale or use of said products. Any product or service repaired under this warranty shall be warranted for the remaining portion of the original warranty period only.

Equipment not manufactured by EdgeTech is supported only to the extent of the original manufacturer's warranties.

CAUTION! If your product is a portable topside, never attempt to ship it in its Storm Case™ alone. Shipping portable topsides without an exterior shipping crate will void the warranty.
SOFTWARE SERVICE OVERVIEW

EdgeTech provides software services free of charge. This software agreement does not address customer-specified modifications or enhancements. These services may be ordered separately. Furthermore, EdgeTech software upgrades are meant for the sole use of EdgeTech customers. Any reproduction of EdgeTech-supplied software or file sharing is strictly prohibited.

Software Updates and Enhancements

EdgeTech customers can download new software releases with all modifications and enhancements from the EdgeTech ftp site. Major software issues, should they occur, will be reported directly to the customer. New software releases consist of the following:

- Software enhancements that are not on the price list
- Software fixes and changes
- Product integration
- Documentation updates to on-line help
- Tests for compatibility with other modules

Software patches consist of software that has undergone the following:

- Minor software enhancements
- Software fixes and changes
- Software Telephone, Facsimile, and E-mail Support

EdgeTech customers are entitled to contact EdgeTech Customer Service by telephone, facsimile, or e-mail to report a difficulty, to discuss a problem or to receive advice on the best way to perform a task. When contacted, EdgeTech Customer Service will do the following:

- Respond within 24 hours
- Immediately attend to serious problems affecting operations
- Attempt to find an immediate work-around
Prior to returning any equipment to EdgeTech, a Returned Material Authorization (RMA) number must be obtained. The RMA will help us identify your equipment when it arrives at our receiving dock and track the equipment while it is at our facility. The material should be shipped to the address provided in the EdgeTech Customer Service section. Please refer to the RMA number on all documents and correspondences as well.

All returned materials must be shipped prepaid. Freight collect shipments will not be accepted. EdgeTech will pay freight charges on materials going back to the customer after they have been evaluated and/or repaired.

**CAUTION!** If your product is a portable topside, never attempt to ship it in its Storm Case™ alone. Although rugged, these cases are not intended to be used as shipping containers, and the delicate internal components could be damaged if used in this manner.

The following steps apply only to material being returned from outside the Continental United States. Follow them carefully to prevent delays and additional costs.

1. All shipments must be accompanied by three copies of your proforma invoice, showing the value of the material and the reason for its return. If the reason is for repair, it must be clearly stated in order to move through customs quickly and without duties being charged. Whenever possible, please send copies of original export shipping documents with the consignment.

2. If the value of the equipment is over $1000, the following Shipper’s oath must be sent with the invoice. This oath can be typed on the invoice, or on a separate letterhead:

   "I, ______________________________, declare that the articles herein specified are the growth, produce, or manufacture of the United States; that they were exported from the United States from the port of _____________________, on or about ______________; that they are returned without having been advanced in value or improved in condition by any process of manufacture or any other means; and that no drawback, or allowance has been paid or admitted hereof."

   Signed ______________________________
3. If there is more than one item per consignment, a packing list must accompany the shipment. It is acceptable to combine the proforma invoice and packing list if the contents of each carton are clearly numbered and identified on the invoice.

4. Small items can be shipped prepaid directly to EdgeTech by FedEx, DHL, UPS, Airborne, etc.

5. If the equipment is the property of EdgeTech (formerly EG&G Marine Instruments Division), please insure for full value.

6. Fax one invoice, packing list, and a copy of the airway bill to EdgeTech upon shipment.
CUSTOMER SERVICE

Customer service personnel at EdgeTech are always eager to hear from users of our products. Your feedback is welcome, and is a valuable source of information which we use to continually improve these products. Therefore, we encourage you to contact EdgeTech Customer Service to offer any suggestions or to request technical support:

**NOTE:** Please have your system Model and Serial Number available when contacting Customer Service.

**E-mail:** service@edgetech.com

**Mail:**
4 Little Brook Road
West Wareham, MA 02576

**Telephone:** (508) 291-0057

**Facsimile:** (508) 291-2491

**24-Hour Emergency Technical Support Line:** (508) 942-8043

For more information please go to [www.Edgetech.com](http://www.Edgetech.com).
COMPANY BACKGROUND

EdgeTech (formerly EG&G Marine Instruments) traces its history in underwater data acquisition and processing back to 1966. EdgeTech has designed, developed, and manufactured products, instruments, and systems—for the acquisition of underwater data, including marine, estuarine, and coastal applications—for over 45 years.

The company has responded to the needs of the scientific, Naval, and offshore communities by providing equipment—such as sub-bottom profilers, side scan sonar, acoustic releases, USBL positioning systems, and bathymetric systems—that have become standards in the industry.

EdgeTech has also consistently anticipated and responded to future needs through an active research and development program. Current efforts are focused on the application of cutting-edge CHIRP and acoustic technology.
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Table 5-3: Part Numbers for Major 4125-P Topside Processor Components .......................5-24
Table 5-4: Part Numbers for Major 4125 Towfish Components ..........................................5-2
1.0 OVERVIEW

The EdgeTech 4125 Series Dual-frequency Side Scan Sonar System is a frequency-modulated (FM), dual-frequency, side scan sonar that uses EdgeTech’s proprietary Full Spectrum “chirp” technology to generate high-resolution, side scan imagery at longer ranges than conventional continuous-wave (CW) systems. The system is designed primarily for search and recovery operations, along with surveys in shallow water.

The 4125 Series is available in two, dual simultaneous frequency configurations depending on the application: 400/900 kHz and 600/1600 kHz. 400/900 is the best choice for general survey work and the 600/1600 for the highest resolution such as search and recovery applications, etc.

In both configurations, the frequencies are transmitted as linearly-swept, wide-band, high energy acoustic pulses, and the received echoes are processed into high signal-to-noise (SNR) images that can be directly displayed as shades of gray or color on a computer monitor. The SNR images can also be printed on a continuous feed thermal printer, or stored in real time onto a large capacity hard drive and archived onto a DVD.

1.1 4125 Series Applications

Applications for the 4125 Series Dual-frequency Side Scan Sonar System are many, including:

- Hydrographic surveys
- Geological surveys
- Search and recovery
- Channel conditioning/clearance surveys
- Bridge, pier, and harbor wall inspections
- Hull inspections
- Port security
- Archaeological surveys

1.2 Main System Components

The 4125 Series Dual-frequency Side Scan Sonar System is composed a 4125-P Portable Topside Processor or 4125 Rack Mount Topside, a 4125 Towfish (commonly called a Towfish), and a tow cable.

1.3 4125-P Portable Topside Processor

The 4125-P Portable Topside Processor is shown in FIGURE 1-1. It provides power and downlink telemetry to the towfish for sonar control and receives uplink side scan data, sensor data, and status information from the towfish for processing, storage, and display.
The topside unit includes a laptop computer with Windows 7 and the EdgeTech DISCOVER 4125 Side Scan Sonar software preinstalled. DISCOVER 4125 provides control, storage, and display of the sonar data. The data can be stored in XTF and JSF formats.

The 4125-P Portable Topside Processor interfaces with the towfish uses very high bit rate digital subscriber line (VDSL) modems. The topside unit also interfaces with a global positioning system (GPS) over a USB to serial or RS-232 serial interface.

The topside processor integrates towfish and DC power supplies, an ETHERNET switch, a wireless router, and a VDSL modem, all housed within a single, compact, rugged, water-tight (when closed) Pelican Storm Case. It runs on either AC or DC power, and interfaces with the laptop computer over a wired or wireless 10/100BaseT ETHERNET connection. The computer can be stored inside the enclosure when not in use.

**CAUTION!** Never attempt to use the portable topside’s Storm Case™ as a shipping container. Doing so will void warranties and may result in system damage.
1.4 4125 Rack Mount Topside

The 4125 system can also be ordered with a 19” 2U rack mount option instead of the portable topside. This version of the processor is intended for permanent mounting in a sheltered section of the survey vessel.

This system configuration includes towfish and DC power supplies, ADSL modem, and an Ethernet switch, all within a single 19-inch 2U rack. The rack mount option interfaces with a user supplied computer over a 10/100BaseT Ethernet connection. The Ethernet cord is included.

1.5 Towfish

The 4125 Towfish is available with a choice of 400/900 kHz or 600/1600 kHz operating frequencies. It contains the sonar transducer arrays and the electronics required to transmit and receive the sonar signals; to receive the downlink commands from the topside processor; and to provide the uplink side scan data, sensor data, and status information to the topside processor.

The electronics are contained inside a single, lightweight stainless steel, 200-meter depth-rated housing, comprising the aft section of the towfish. The forward section is flooded and includes both the port and starboard transducer arrays. A single O-ring sealed end cap is attached to each end of the housing to seal it, and the forward end cap contains bulkhead connectors for connecting to the transducer arrays. An adapter cable for power and communication also connects to this end cap.

The cable snakes through a hole in the transducer array section and includes an inline connector for connecting to the tow cable. The towfish interfaces with the topside over a 10BaseT connection that uses VDSL modems in both the towfish and the topside processor.

The towfish is also equipped a stainless steel nose for hydrodynamic balance and two convenient carrying handles. A towing arm is rigidly mounted to a tow point on the top of the towfish housing adjacent to the tow cable connector. The tow cable attaches to a shackle on the towing arm.

Additional mounting holes are provided on the tow point should it be necessary to reposition the towing arm forward or aft to adjust the balance of the towfish. The towing arm also includes a safety release mechanism, which causes a shear pin to release the tow point should the towfish hit an obstruction or become snagged. If this happens, the towfish will rotate nose down, and a safety cable, which is attached from the tow point to the rear of the towfish, will pull the towfish over the obstruction or through the snag, stern first.
1.6 Tow Cable

The 4125 Series Dual-frequency Side Scan Sonar System includes a 50-meter tow cable, terminated at both ends. The tow cable is used both to connect to the towfish, and to tow it behind the survey vessel. Tow cable is a RG58 coax cable which includes a single conductor and shield.

Up to 600 meters of coax cable can be used. Contact EdgeTech Customer Service for available cable lengths other than the supplied 50-meter cable. A cable grip is also included for attaching the tow cable to a shackle on the towing arm of the towfish.
1.7 Optional Equipment

Optional equipment that can be installed and used with a 4125 Series Dual-frequency Side Scan Sonar System includes:

- Keel Weight Kit (Part Number 0008464)
- Depressor Wing Kit (Part Number 0007860)
- HullScan Kit (Part Number 0008477)
- Marine Magnetics Sea Spy II and Explorer Magnetometer Interface (Part Number 0016344)

1.7.1 Depressor Wing

The Depressor Wing Kit provides a depressor wing (shown in Figure 1-4) that can be attached to the towfish, allowing it to be towed deeper and faster without increasing the length of tow cable in the water. The depressor wing attaches to the top of the towfish and pushes it deeper by exerting a downward force on the towfish as it moves through the water. A safety cable with a shear pin mechanism is attached to prevent loss of the towfish and wing should it become snagged.

Installation of the optional Depressor Wing is described in sub-section 3.9.2: Installing the Depressor Wing, and an ICD drawing is provided in (refer to Figure 2-8).
1.7.2 Keel Weight

The Keel Weight Kit provides an additional 15 lbs. of weight to the towfish or vertical structures such as bulkheads.

1.7.3 HullScan Kit

The HullScan kits enables a towfish to be inverted such that the transducer arrays are angled upward instead of downward, or in the vertical position. In this configuration the towfish can be used to scan the hulls of ships.

Installation of the HullScan Kit option is in sub-section 3.9.1: INSTALLING THE HULL SCAN Kit.
2.0 SPECIFICATIONS

The specifications for the EdgeTech 4125 Series Dual-frequency Side Scan Sonar System include electrical, mechanical, and environmental characteristics for the main system components as follows:

- 4125-P Portable Topside Processor
- 4125 Towfish
- Cables

NOTE: All specifications are subject to change without notice.

2.1 4125 Topside Processor Specs

The specifications for the 4125-P Portable and 4125 Rack Mount Topside Processor are shown below:

<table>
<thead>
<tr>
<th></th>
<th>4125 PORTABLE TOPSIDE</th>
<th>4125 RACK MOUNT TOPSIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size:</strong></td>
<td>19.0 cm (7.3 in.) high</td>
<td>8.3 cm (3.25 in.) high</td>
</tr>
<tr>
<td></td>
<td>49.0 cm (19.2 in.) wide</td>
<td>48.3 cm (19 in.) wide</td>
</tr>
<tr>
<td></td>
<td>39.0 cm (15.2 in.) deep</td>
<td>43.2 cm (17 in.) deep</td>
</tr>
<tr>
<td><strong>Weight:</strong></td>
<td>13.2 kg (29 lbs.)</td>
<td>6.4 kg (14 lb)</td>
</tr>
<tr>
<td></td>
<td>(w/ laptop computer)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 kg (22 lbs.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(w/o laptop computer)</td>
<td></td>
</tr>
<tr>
<td><strong>Case construction:</strong></td>
<td>High-impact structural polypropylene</td>
<td>Aluminum 19-inch rack mount</td>
</tr>
<tr>
<td><strong>Case color:</strong></td>
<td>Black</td>
<td>Black and Gold</td>
</tr>
<tr>
<td><strong>Case sealing method:</strong></td>
<td>Watertight cover with O-ring seal and purge valve</td>
<td>N/A (not water tight)</td>
</tr>
<tr>
<td><strong>Shipping container type:</strong></td>
<td>Carton</td>
<td>Carton</td>
</tr>
<tr>
<td><strong>Shipping container size:</strong></td>
<td>63.5 cm (25 in.) high</td>
<td>61 cm (24 in) high</td>
</tr>
<tr>
<td></td>
<td>53.3 cm (21 in.) wide</td>
<td>61 cm (24 in wide</td>
</tr>
<tr>
<td></td>
<td>53.3 cm (21 in.) deep</td>
<td>30.5 cm (12 in) deep</td>
</tr>
<tr>
<td><strong>Shipping weight:</strong></td>
<td>21.8 kg (48 lbs.)</td>
<td>11.3 Kg (25 lb)</td>
</tr>
<tr>
<td><strong>Operating Temperature:</strong></td>
<td>-0–40°C (32–104°F)</td>
<td>0–40°C (32–104°F)</td>
</tr>
<tr>
<td><strong>Storage temperature:</strong></td>
<td>-20–60°C (-4–140°F)</td>
<td>-20–60°C (-4–140°F)</td>
</tr>
</tbody>
</table>
## 2.0 SPECIFICATIONS

### Table 2-1: 4125-P Portable Topside Processor

<table>
<thead>
<tr>
<th></th>
<th>4125 PORTABLE TOPSIDE</th>
<th>4125 RACK MOUNT TOPSIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating relative humidity:</td>
<td>0–80% (non-condensing)</td>
<td>0–80% (non-condensing)</td>
</tr>
<tr>
<td>Non-operating storage relative humidity:</td>
<td>0–100%</td>
<td>0–100%</td>
</tr>
<tr>
<td>AC input power:</td>
<td>90–260 VAC, 50/60 Hz, 72–110 watts operating, auto switching 0.7 A/1.3 A at 120 VAC idling/operating 0.3 A/0.56 A at 240 VAC idling/operating</td>
<td>90–260 VAC, 50/60 Hz, 72–110 watts operating, auto switching 0.6 A/1.1 A at 120 VAC idling/operating 0.3 A/0.56 A at 240 VAC idling/operating</td>
</tr>
<tr>
<td>DC input power:</td>
<td>12–24 VDC, 72 watts operating 4.3 A/6.0 A at 12 VDC idling/operating 2.4 A/3.3 A at 24 VDC idling/operating</td>
<td>N/A</td>
</tr>
<tr>
<td>Power to towfish:</td>
<td>75 VDC at 1.7 A max</td>
<td>75 VDC at 1.7 A max</td>
</tr>
<tr>
<td>Processor:</td>
<td>Intel Pentium M 730, 2.4 GHz</td>
<td>N/A</td>
</tr>
<tr>
<td>Memory:</td>
<td>2 GB</td>
<td>N/A</td>
</tr>
<tr>
<td>Data storage:</td>
<td>500 GB SATA, 6.0 Gb/s</td>
<td>N/A</td>
</tr>
<tr>
<td>Operating system:</td>
<td>Windows 7</td>
<td>N/A</td>
</tr>
<tr>
<td>Application software:</td>
<td>DISCOVER 4125</td>
<td>DISCOVER 4125 (on user-supplied computer)</td>
</tr>
<tr>
<td>Display:</td>
<td>15.4-inch LCD</td>
<td>N/A</td>
</tr>
<tr>
<td>Keyboard:</td>
<td>Laptop keyboard</td>
<td>N/A</td>
</tr>
<tr>
<td>Pointing device:</td>
<td>Laptop mouse pad</td>
<td>N/A</td>
</tr>
<tr>
<td>Wireless ETHERNET:</td>
<td>Centrino 802.11b</td>
<td>N/A (wired ETHERNET connection only)</td>
</tr>
<tr>
<td>Towfish interface:</td>
<td>VDSL Modem link</td>
<td>VDSL Modem link</td>
</tr>
</tbody>
</table>

### 2.1.1 Technical Descriptions of Internal Components

This section provides an overall general description of the hardware elements comprising the 4125-P Portable and 4125 Rack Mount Topside Processors of the 4125 Series Dual-frequency Side Scan Sonar System. This information, which includes printed circuit board summary descriptions, chassis photos, component call-outs, and a wiring diagram, can be useful for troubleshooting purposes and installing optional equipment. The 4125 Towfish is considered non-user-serviceable and therefore specific
information of this type is not provided for it. However, an overall block diagram of the system is shown in Figure 2-1.

An ICD case drawing and a wiring diagram of the 4125-P Portable Topside Processor are shown in Figure 2-2 and Figure 2-3, respectively. The electronics chassis is shown in Figure 2-4. A wiring diagram and electronics chassis for the 4125 Rack Mount Topside is shown in Figure 2-5 and Figure 2-6, respectively:
Figure 2-1: 4125 Series Dual Frequency Side Scan Sonar System Overall Block Diagram (Wireless for Portable Topside Only)
Figure 2-2: 4125-P Portable Case ICD Drawing
Figure 2-3: 4125-P Portable Topside Processor Wiring Diagram
Figure 2-4: 4125 Portable Topside Processor Chassis

- Power Supply
- AC Line Filter (under panel)
- 15-amp fuse
- Wireless Bridge / ETHERNET Switch board
- Power board (under panel)
- Power Separation board
- VDSL Modem board

Figure 2-4: 4125 Portable Topside Processor Chassis
Figure 2-5: 4125 Rack Mount Topside Processor Wiring Diagram
Figure 2-6: 4125 Rack Mount Processor Chassis
The main hardware elements in the 4125-P Portable and 4125 Rack Mount Topside Processors include the following components and circuit boards:

**Power board.** The Power board inputs +24 VDC on J2 from the 24 VDC Power Supply and generates the 75 VDC towfish power, which is output on J5 to the Power Separation board, and from this board to the towfish.

The Power board also includes +5, +12, and +15 VDC power supplies. The +5 VDC is output on J3 to the Wireless Bridge/ETHERNET Switch board, and the +12 VDC is output on J6 and J8 to the VDSL Modem board and the fans, respectively. For DC operation, 12–24 VDC is input on J1.

**NOTE:** DC operation is for 4125-P portable topside only. The rackmount does not have a DC power input.

**VDSL Modem board.** The VDSL Modem board converts the uplink data VDSL signals received from the towfish and input on P4 from J3 of the Power Separation board into ETHERNET 10/100BaseT signals. These signals are then output on P2 to the Wireless Bridge/ETHERNET Switch board, and from J1 of this board to the laptop computer.

Similarly, the VDSL Modem board converts the downlink ETHERNET 10/100BaseT based command signals from the laptop computer into the VDSL downlink command signals, which are then output on P4 to J3 of the Power Separation board to be combined with 75 VDC towfish power, and transmitted to the towfish.

**24 VDC Power Supply.** The 24 VDC Power Supply inputs AC power from the AC Line Filter to generate +24 VDC, which is output to the Power board.

**AC Line Filter.** The AC Line Filter filters the AC power input and outputs the filtered power to the 24 VDC Power Supply.

**Wireless Bridge/ETHERNET Switch.** The Wireless Bridge/ETHERNET Switch board connects the VDSL Modem board, the towfish, and the laptop computer to the same local area network (LAN). This board also enables a wireless connection to the laptop computer.

**NOTE:** The 4125 Rack Mount Topside does not have a wireless bridge and relies solely on ETHERNET to connect to the topside.

**Power Separation board.** The Power Separation board combines downlink command signals and uplink data that are input on J3 from P4 of the VDSL Modem board with 75 VDC towfish power from J5 of the Power board for transmission to the towfish.
2.2 4125 Towfish

The specifications for the 4125 Towfish are shown below, and an ICD array drawing is provided in Figure 2-7. Also, a drawing of the Towfish connected to an optional Depressor Wing is provided in Figure 2-8:

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size:</td>
<td>114.8 cm (45.2 in.) long; 9.6 cm (3.75 in.) diameter</td>
</tr>
<tr>
<td>Weight in air:</td>
<td>20.4 kg (45.0 lbs.)</td>
</tr>
<tr>
<td>Weight in salt water:</td>
<td>14.4 kg (31.6 lbs.)</td>
</tr>
<tr>
<td>Construction:</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Depth rating:</td>
<td>200 m (656 ft.)</td>
</tr>
<tr>
<td>Maximum tow cable length:</td>
<td>600 m (loop resistance cannot exceed 14 ohms). Contact EdgeTech Customer Service for the specific cable types.</td>
</tr>
<tr>
<td>Tow cable conductors:</td>
<td>RG-58 coax</td>
</tr>
<tr>
<td>Kevlar tow cable breaking load:</td>
<td>545 kg (1200 lbs.)</td>
</tr>
<tr>
<td>Input power:</td>
<td>75 VDC, 50 watts maximum</td>
</tr>
<tr>
<td>Towing speed</td>
<td>1–8 knots</td>
</tr>
<tr>
<td>Shear force:</td>
<td>420 kg (930 lbs.)</td>
</tr>
<tr>
<td>Frequencies:</td>
<td>400/900 kHz or 600/1600 kHz</td>
</tr>
<tr>
<td>Pulse type:</td>
<td>CHIRP</td>
</tr>
<tr>
<td>Data interface:</td>
<td>VDSL</td>
</tr>
</tbody>
</table>
| Operating range:                  | 150 m (400 kHz)  
75 m (900 kHz)  
120 m (600 kHz)  
35 m (1600 kHz) |
| Across track resolution:          | 2.3 cm (400 kHz)  
1.0 cm (900 kHz)  
1.5 cm (600 kHz)  
0.6 cm (1600 kHz) |
### Table 2-2: Towfish Specifications

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Along track resolution:</strong></td>
<td>80 cm @ 100 m (400 kHz)</td>
</tr>
<tr>
<td></td>
<td>58 cm @ 100 m (600 kHz)</td>
</tr>
<tr>
<td></td>
<td>40 cm @ 50 m (400 kHz)</td>
</tr>
<tr>
<td></td>
<td>29 cm @ 50 m (600 kHz)</td>
</tr>
<tr>
<td></td>
<td>24 cm @ 50 m (900 kHz)</td>
</tr>
<tr>
<td></td>
<td>20 cm @ 25 m (400 kHz)</td>
</tr>
<tr>
<td></td>
<td>14 cm @ 25 m (600 kHz)</td>
</tr>
<tr>
<td></td>
<td>12 cm @ 25 m (900 kHz)</td>
</tr>
<tr>
<td></td>
<td>9 cm @ 25 m (1600 kHz)</td>
</tr>
<tr>
<td><strong>Horizontal beam width:</strong></td>
<td>0.46° (400 kHz)</td>
</tr>
<tr>
<td></td>
<td>0.28° (900 kHz)</td>
</tr>
<tr>
<td></td>
<td>0.33° (600 kHz)</td>
</tr>
<tr>
<td></td>
<td>0.20° (1600 kHz)</td>
</tr>
<tr>
<td><strong>Vertical beam width:</strong></td>
<td>50°</td>
</tr>
<tr>
<td><strong>Side lobes:</strong></td>
<td>&lt; -36 dB</td>
</tr>
<tr>
<td><strong>Transducer array depression angle:</strong></td>
<td>Factory set at 33°, adjustable to 25°</td>
</tr>
<tr>
<td><strong>Operating temperature:</strong></td>
<td>0–45°C (32–113°F)</td>
</tr>
<tr>
<td><strong>Heading accuracy:</strong></td>
<td>1.0° RMS</td>
</tr>
<tr>
<td><strong>Heading resolution:</strong></td>
<td>0.1°</td>
</tr>
<tr>
<td><strong>Pitch and roll accuracy:</strong></td>
<td>0.1°</td>
</tr>
<tr>
<td><strong>Pitch and roll resolution:</strong></td>
<td>0.1°</td>
</tr>
<tr>
<td><strong>Pressure sensor accuracy:</strong></td>
<td>0.5% of depth when calibrated for 0 m</td>
</tr>
<tr>
<td><strong>Pressure sensor working depth:</strong></td>
<td>0–200 m</td>
</tr>
<tr>
<td><strong>Pressure sensor tolerance:</strong></td>
<td>&gt;200 m</td>
</tr>
<tr>
<td><strong>Navigation interfaces:</strong></td>
<td>RS-232, NMEA0183</td>
</tr>
<tr>
<td><strong>Options:</strong></td>
<td>Keel Weight Kit</td>
</tr>
<tr>
<td></td>
<td>Depressor Wing Kit</td>
</tr>
<tr>
<td></td>
<td>HullScan Kit</td>
</tr>
<tr>
<td></td>
<td>VerticalScan Kit</td>
</tr>
<tr>
<td></td>
<td>Magnetometer Interface</td>
</tr>
</tbody>
</table>
Figure 2-7: 0010482, DOC Drawing ICD SS Array 4125
Figure 2-8: Depressor Wing ICD Drawing
2.3 Cables

Outline drawings of the supplied cables are listed below along with their corresponding figure numbers.

- **Figure 2-9**: KEVLAR REINFORCED TOW CABLE, TELEMETRY
- **Figure 2-10**: AC POWER CABLE
- **Figure 2-11**: DC POWER CABLE
- **Figure 2-12**: ETHERNET CABLE
Figure 2-9: Kevlar Reinforced Tow Cable, Telemetry
Figure 2-10: AC Power Cable

NOTES:
1) USE P2 AT LENGTH SUPPLIED BY VENDOR.
2) CHECK P2 WIRE COLORS AGAINST DRAWING. VENDORS MAY CHANGE WIRE COLORS WITHOUT NOTICE.
Figure 2-11: DC Power Cable for Portable Topside
Figure 2-12: ETHERNET Cable
3.0 SETUP AND ACTIVATION

Setup and test of the EdgeTech 4125 Series Dual-frequency Side Scan Sonar System encompasses unpacking, inspecting, and connecting the system components (including an optional printer); connecting a navigation system if required; activating the system; and verifying operation using the EdgeTech DISCOVER 4125 Side Scan Sonar software. This section provides instructions on how to perform these tasks, along with how to deploy, tow, and recover the towfish.

3.1 Unpacking and Inspection

The towfish is shipped in a foam-lined Pelican Storm Case. The 4125-P Portable Topside Processor is shipped in a cardboard box with its associated cables, including the tow cable, depending on its length. Before unpacking the system components, inspect the shipping containers for any damage. Report any damage to the carrier and to EdgeTech.

If the shipping containers appear free of damage, carefully unpack the components and inspect them for damage as well. Also check the packing list, verifying that all the items on the list are included. Again, if any damage is found, report it to the carrier and to EdgeTech. If any items are missing, immediately contact EdgeTech Customer Service. Do not install or operate any equipment that appears to be damaged. Although the items shipped will vary, depending on the customer requirements, the 4125 Series Dual-frequency Side Scan Sonar System typically includes the items listed below.

- 4125-P Portable Topside Processor
- 4125 Towfish
- Laptop computer
- Laptop computer power supply
- 50-meter tow cable
- AC power cable
- DC power cable
- ETHERNET cable
- Software CDs
- Spares kit

After unpacking the system components, store the shipping containers, including any packing materials, in a safe place for later use. When transporting or storing the system, pack all items in their original shipping containers in the same manner in which they were originally shipped. Store the system in a dry environment when not in use.
3.2 Power Requirements

The power requirements for the 4125-P Portable Topside Processor are 90–260 VAC, 50/60 Hz or 12–24 VDC.

3.2.1 Use of an Uninterrupted Power Supply

The AC power source should be continuously free of high-amplitude, high-frequency transients, as this type of interference could cause degraded performance or damage to the equipment. An uninterruptable power supply (UPS) with power surge protection is recommended for powering the equipment.

However, whether or not a UPS is used, never use an AC power source that also powers electric motors on the survey vessel, such as pumps and winches. In addition, do not use switching type battery chargers or DC to AC converters with square wave outputs.

3.2.2 Changing a Non-US Power Plug

An AC power cord is provided for connecting the Deck Unit to a standard U.S. 3-pronged outlet. For non-U.S. power outlets, modify this cord by cutting off the 3-pronged plug and attaching the appropriate plug. Refer to Table 3-1 for connection information.

<table>
<thead>
<tr>
<th>AC POWER CORD WIRE COLOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>AC line</td>
</tr>
<tr>
<td>White</td>
<td>AC neutral</td>
</tr>
<tr>
<td>Green</td>
<td>Earth ground</td>
</tr>
</tbody>
</table>

*Table 3-1: AC Power Cord Wiring*

**NOTE:** The 4125-P Portable Topside Processor is shipped configured for the end user’s country voltage requirements.

3.3 Navigation Interface

The 4125 Series Dual-frequency Side Scan Sonar System accepts all standard National Marine Electronics Association (NEMA) 0183 message sentence formats from a connected global positioning system (GPS) or integrated navigation system.
3.4 Placement of the Topside Processor

The two topside options for the 4125 system have different placement requirements within a vessel, and these are detailed below:

3.4.1 4125-P Portable Topside Processor Placement

The 4125-P Portable Topside Processor can be located in a wet environment if the cover is kept closed. Otherwise it should be located and set up in a dry, sheltered area that is protected from weather and water spray, and where the temperature is consistently between 0°C and 40°C (32°F and 104°F). However, avoid areas of direct sunlight, especially in tropical environments, as heat build-up could occur.

The location should also enable direct communications with the deck crew that is handling the towfish. Secure the topside processor in place, using tie downs if necessary, near the required AC power source.

3.4.2 4125 Rack Mount Topside Processor

The 4125 Rack Mount Topside Processor should be installed in a sheltered 19” rack where it will not be exposed to precipitation, sea spray, or extreme temperatures. It is also important that the unit be located in a place where direct communication with the deck crew operating the towfish is possible.

3.5 Topside Controls and Indicators

Controls and indicators for the two topside processor options are in the following sub-sections.

3.5.1 4125-P Portable Topside Processor Controls and Indicators

The 4125-P Portable Topside Processor includes controls and indicators on the side panel as shown in Figure 3-1.
Figure 3-1: 4125-P Portable Topside Processor Side Panel

- POWER switch
- 5A/250V fuse
- TOWCABLE connector
- ETHERNET connector
- AC INPUT connector
- DC INPUT connector
- POWER indicator
- FISH POWER indicator
- CM indicator
- LINK indicator
The 4125-P Portable Topside Processor controls and indicators are the following:

**POWER (Switch)**
Toggle switch. Turns on the 4125-P Portable Topside Processor.

**POWER (Indicator)**
Red indicator. Illuminated when the 4125-P Portable Topside Processor is on.

**FISH POWER:**
Red indicator. Illuminated when the 4125-P Portable Topside Processor is on and the towfish is properly connected to it. The indicator is off if no power is being drawn by the towfish.

**NOTE:** The 4125-P Portable Topside Processor will automatically switch off power to the towfish should the processor be disconnected from the towfish for an extended period. The power will also be turned off if an over current or under current condition exists. To reactivate the power to the towfish, turn the POWER switch off and then on again.

**LINK:**
Green indicator. Flashes while a reliable communications link with the towfish is being established and then illuminates continuously when the link is found.

**CM (Current Monitor)**
Red indicator. Flashes at 1 HZ if an undercurrent condition exist and 2 HZ if an over current condition exist between the topside and tow fish. If flashing, check the tow cable for shorts or for non-continuity on pins 1 and 2.

### 3.5.2 4125 Rack Mount Topside Controls and Indicators

The controls and indicators for the rack mount option are shown in Figure 3-2 and are described below:

**POWER (Switch)**
Toggle switch. Turns on the 4125-RM Topside.

**POWER (Indicator)**
Red indicator. Illuminated when the 4125-RM Topside is on.

**FISH POWER:**
Red indicator. Illuminated when the 4125-RM Topside is on and the towfish is properly connected to it. The indicator is off if no power is being drawn by the towfish.

**LINK:**
Green indicator. Flashes while a reliable communications link with the towfish is being established and then illuminates continuously when the link is found.
Figure 3-2: 4125 Rack Mount Front Panel—Controls and Indicators

Figure 3-3: 4125 Rack Mount Back Panel—Controls and Connections
Red indicator Flashes at 1 HZ is an undercurrent condition exist and 2 HZ if an over current condition exist between the topside and tow fish. If flashing, check the tow cable for shorts or for non-continuity on pins 1 and 2.

3.6 Topside Processor Connections

The connections for the two topside options are described in the following sub-sections.

3.6.1 4125-P Portable Topside Processor Connections

The 4125-P Portable Topside Processor connections are made using connectors on the side panel as shown in FIGURE 3-1. The 4125-P Portable Topside Processor connections are the following:

- **TOWCABLE**: 6-pin female bulkhead connector. Connects to the tow cable.
- **DATA**: ETHERNET LAN connector. Connects user-supplied PC running DISCOVER 4125 software to the 4125-RM topside.
- **DC INPUT**: 4-pin male bulkhead connector. Connects to 12–24 VDC power.
- **AC INPUT**: 3-pin male bulkhead connector. Connects to 90–260 VAC, 50/60 Hz power.
- **POWER**: Toggle switch that turns the topside on and off. Can be left in the ON position all the time, and then the front POWER switch can be used.

3.6.2 4125 Rack Mount Topside Processor Connections

The 4125-RM Topside connections are made using connectors on the side panel as shown in FIGURE 3-3. The 4125-RM Topside connections are the following:

- **SEA CABLE**: 6-pin female bulkhead connector. Connects to the tow cable.
- **ETHERNET**: Standard RJ45 bulkhead connector.

3.7 TCP/IP Address Settings

The 4125 Series Dual-frequency Side Scan Sonar System includes a number of ETHERNET devices connected on a common local area network (LAN), and each of these devices has a factory set TCP/IP address which under normal circumstances does not require changing.

However, should any of these devices be replaced, or if upgrades are later installed, it may be required that the TCP/IP addresses be reconfigured. In addition, any computer that is to be connected to the 4125-
P Portable Topside Processor must have its IP address set to 192.9.0.nnn, where nnn is any integer from 1 to 100, except for the following reserved addresses:

- 192.9.0.225
- 192.9.0.101

The factory IP address setting of the wired ETHERNET connection for the laptop computer included with the 4125-P Portable Topside Processor is 192.9.0.99, and for the wireless ETHERNET connection, the factory setting is 192.9.0.100. For a list of the topside processor ETHERNET devices and their TCP/IP addresses, along with that of the Towfish CPU, refer to Table 3-2.

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>TCP/IP ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless bridge</td>
<td>192.9.0.225</td>
</tr>
<tr>
<td>CPU board</td>
<td>192.9.0.101</td>
</tr>
</tbody>
</table>

Table 3-2: ETHERNET Devices TCP/IP Addresses

3.8 Assembling the 4125 Towfish

To assemble the tow 4125 Towfish, first refer Figure 3-4 for the tail cone assembly, and then follow the instructions in the subsections to follow in order to properly connect the rest of the equipment to the towfish.

![Figure 3-4: Tail Assembly Drawing](image)
3.9 Installing Optional Equipment

This sub section describes how to install some of the 4125 optional equipment. Users that do not have these options, or do not wish to configure their towfish with them at this time, can proceed to sub-section 3.10: CONNECTING THE SYSTEM COMPONENTS.

3.9.1 Installing the Hull Scan Kit

The following subsections describe how to install the inverted horizontal and vertical hull scan brackets for the 4125 towfish as described in sub-section 1.7.3):

1. Remove existing tow arm and recovery cable.
2. Attach bracket to tapped holes on bottom of towfish for horizontal (inverted) hull scanning (Figure 3-5), or to the holes above the transducer for vertical hull scanning (Figure 3-6). The bracket is engraved with the words “tail and nose” to indicate how the bracket should be oriented.

Figure 3-5: Horizontal (Inverted) Hull Scan Bracket Attached
3. Attach Tow arm to Hull scan bracket.

4. Attach Hull scan recovery cable to Hull scan bracket and Tow arm as pictured in FIGURE 3-7.

5. Tighten and seize shackles with wire ties or seizing wire.

Figure 3-6: Vertical HullScan Bracket Attached
Figure 3-7: Connected Towfish (Horizontal Hull Scan Shown)

**NOTE:** Because the Tow fish is now inverted the Starboard and Port will be reversed in the waterfall display. If desired the tow fish forward and aft housings can be disassembled and the port and starboard array connectors reversed so that the Hull scan data appears on the correct side.

The Towfish pitch can be observed in the DISCOVER software. If the pitch is off be more than 5 degrees, there are 4 holes (1 extra) on the bottom of the Tow fish so the bracket can be adjusted fore and aft if needed to correct for pitch.

### 3.9.2 Installing the Depressor Wing

To install the depressor wing, and connect and attach the tow cable to the towfish:

1. Detach the safety cable from the towfish rear handle.
2. Remove the shear pin.
3. Install the depressor wing into the tow bracket/handle where the tow arm was mounted and secure it with the two bolts, nuts and washers.
4. Secure depressor recovery cable to the rear handle of the towfish and secure with seizing wire or tie-wrap.

5. Verify that the tow cable connector on the towfish and the mating female connector on the tow cable are free of corrosion or dirt.

6. Apply a thin film of silicone grease to the pins of the tow cable connector on the towfish.
7. Pass the tow cable through the hole on the top of the depressor wing from the top as shown.

![Figure 3-10: Tow cable shown Routed through Depressor Wing Top Hole.](image)

8. Connect the tow cable connector to the tow fish connector and secure the connector locking sleeve. Secure pigtail connectors to center post with a Tie-wrap.

![Figure 3-11: Tow cable and Tow Fish Pigtail Connectors.](image)
9. Attach the loop of the safety grip to the forward shackle on the tow key and secure the shackle bolt with seizing wire or a tie-wrap. Ensure that the safety grip is taking the strain and not the tow cable pigtail.

![Figure 3-12: Cable grip attached to Depressor Wing Mounting Point.](image)

3.10 Connecting the System Components

Most of the system components connect to the 4125-P Portable or 4125-RM Topsides directly. Optional components, such as a printer, navigation system, and cable counters connect to the supplied laptop.

**WARNING!** Do not connect the tow cable to the topside processor before connecting it to the towfish, otherwise injury or death can occur if the exposed connector on the tow cable is energized. Always connect the tow cable to the towfish first.

When connecting the system components, refer to sub-sections 3.6: **TOPSIDE PROCESSOR CONNECTIONS** for the location and description of the connectors.

3.10.1 Connecting and Attaching the Tow Cable to the Towfish

A tow cable is shown connected and attached to a towfish in **FIGURE 3-13.**
To connect and attach the tow cable to the towfish:

1. Verify that the tow cable is not connected to the 4125 Portable Topside Processor.

2. Verify that the tow cable connector on the towfish and the mating female connector on the tow cable are free of corrosion or dirt. If dirty, clean them with contact cleaner.

3. Apply a thin film of silicone grease to the pins of the tow cable connector on the towfish.

4. Mate the connectors by pressing them firmly together. Do not wiggle the connectors.

5. Secure the locking sleeve.

6. Attach the loop of the Kellems grip to the shackle on the towing arm and secure the shackle bolt with seizing wire or a tie wrap. Ensure that the safety grip is taking the strain and not the tow cable pigtail.
3.10.2 Connecting the Topside

Follow the instructions in sub-sections 3.10.2.1: Connecting the 4125-P Portable Topside Processor or 3.10.2.2: Connecting the 4125-RM Rack Mount Topside depending on the topside option you have:

3.10.2.1 Connecting the 4125-P Portable Topside Processor

To connect the 4125-P Portable Topside Processor:

1. Verify that the 4125-P Portable Topside Processor is not connected to AC power.
2. Verify that the tow cable is properly connected and attached to the towfish, and then connect the tow cable to the TOW CABLE connector.
3. If using the wired ETHERNET connection, connect the ETHERNET cable to the ETHERNET connector of the laptop computer. The ETHERNET cable may be extended up to 100 feet using a Category 5 ETHERNET crossover or straight patch cable.
4. Do not make this connection if the wireless ETHERNET connection will be used, as only one ETHERNET connection can be connected or enabled at the same time.
5. If a printer will be used, connect the printer to the laptop computer through a USB ETHERNET adapter.
6. If a navigation system will be used, connect the navigation system serial output to COM 1 or a USB port of the laptop computer.
7. Do one of the following to connect power:
   - Connect the AC power cable to the AC INPUT connector and to the AC power source.
   - Connect the red clamp of the DC power/ETHERNET cable to the positive terminal of the DC power source, and connect the black clamp to the negative terminal.
   - Connect both the AC and DC power sources as described above.
8. Connect the laptop computer power supply to the computer and to the AC power source.

3.10.2.2 Connecting the 4125-RM Rack Mount Topside

To connect the 4125-RM Rack Mount Topside:

1. Verify that the 4125-RM Rack Mount Topside is turned OFF.
2. Verify that the tow cable is properly connected and attached to the towfish, and then connect the tow cable to the SEA CABLE connector.
3. Connect the ETHERNET cable to the user-supplied computer and the DATA connector of topside. The ETHERNET cable may be extended up to 100 feet using a Category 5 ETHERNET crossover or straight patch cable.
4. If a printer will be used, connect the printer to the user-supplied computer through a USB ETHERNET adapter.

3.11 System Activation and Test

After the connections to the topside processor have been completed, the 4125 Series Dual-frequency Side Scan Sonar System can be activated and some pre-deployment checks performed prior to deployment of the towfish as a test to verify that the system is operating properly.

When performing the system activation and test, refer to sub-section 3.5 TOPSIDE CONTROLS AND INDICATORS for the location and description of the controls and indicators on the topside processor. In addition, should the system not activate properly or the pre-deployment checks fail, refer to 5.0 TROUBLESHOOTING for assistance on how to isolate and correct the problem.

3.11.1 Preparing a Wired ETHERNET LAN Connection

The wired ETHERNET LAN connection is made by connecting the supplied ETHERNET cable from the 4125-P Portable Topside Processor to the laptop computer. If an ETHERNET Category 5 cable greater than 10 meters is connected instead, the Network Adapter on the laptop computer should be set to 10 Mbit/s, Full Duplex.

In addition, the 4125-P Portable Topside Processor auto senses straight and crossover ETHERNET cables, along with 10 or 100-Mbit/s connections. Therefore the laptop computer’s LAN adapter can be set to AutoSense for LAN speed and duplex settings.

1. To prepare the laptop computer to use the wired ETHERNET connection:

2. Turn on the laptop computer and the 4125-P Portable Topside Processor.

3. Click the Wireless Networking icon on the Windows Desktop or on the System Tray, and then disable it. Or, if there is a switch on the laptop computer, turn it off.

4. Verify that the ETHERNET cable is connected to the ETHERNET connector of the 4125-P Portable Topside Processor and to the ETHERNET connector of the laptop computer.

5. Click the ETHERNET LAN icon on the Windows Desktop or the System Tray, and then enable it.

The ETHERNET LAN should indicate "Connected" in the Local Area Network Properties Box. If not, check all the connections and verify that the TCP/IP address setting is correct as described in sub-section 3.7: TCP/IP ADDRESS SETTINGS. Also verify that the ETHERNET LAN is enabled and that the topside processor is turned on.
3.11.2 Preparing a Wireless ETHERNET LAN Connection (4125-P Only)

The Wireless Networking connection is made using the wireless networking capability of the laptop computer. It is not applicable to the Rack Mount processor option.

To prepare the laptop computer to use the wired ETHERNET connection:

1. Turn on the laptop computer and the 4125-P Portable Topside Processor.
2. Click the ETHERNET LAN icon on the Windows Desktop or on the System Tray, and then disable it. Alternatively, unplug the ETHERNET cable from the laptop computer.
3. Click the Wireless Networking icon on the Windows Desktop or on the System Tray, and then enable it, and if there is a switch on the laptop computer, turn it on.
4. The Wireless Networking should indicate "sonarlink" within 30 seconds. If not, verify that the ETHERNET LAN is disabled, that the Wireless Networking is enabled, and that the topside processor is turned on.

3.11.3 Activating the 4125 Series System

To activate the 4125 Series Dual-frequency Side Scan Sonar System:

1. Start the DISCOVER 4125 Side Scan Sonar software on the laptop computer.
2. If using the wired ETHERNET connection, verify that the wireless network switch is disabled and the ETHERNET LAN is enabled. If the wireless ETHERNET connection is being used, verify that the wireless network switch is on and Wireless Networking is enabled.
3. Turn on the POWER switch on the side panel of the 4125-P Portable Topside Processor or the front of the 4125-RM Topside (ensure the rear toggle switch is also on).

The POWER and FISH POWER indicators should illuminate, and the CM indicator will initially illuminate for about 5 seconds and then go out once the connection is found.

The LINK indicator should flash while a reliable communications link with the towfish is being established, and then illuminate continuously when the link is found.

**NOTE:** This may take 1-2 minutes while the CPU in the tow fish boots and the modems establish a link.

In addition, the NET indicator on the Status bar at the bottom of the DISCOVER 4125 Main window should indicate as follows:
3.12 Performing Pre-deployment Checks

The pre-deployment checks should be performed after the system is activated and before the towfish is deployed. These checks verify navigation, and Heading, Pitch Role depth sensor data is correct and is being displayed in DISCOVER status tabs and recorded correctly:

1. Activate the system as described above.

   **CAUTION!** Do not allow the transducer arrays on the towfish to continuously transmit in air for an extended period as damage to the transducer arrays could occur.

2. In the DISCOVER 4125 Main window, click the Towfish Control tab on the Lower Control panel. This tab is shown in **Figure 3-14**.

   ![Figure 3-14: DISCOVER 4125 Towfish Control Tab](image)


   The transducer arrays on the towfish should begin transmitting and data should begin scrolling on the Sonar display in the DISCOVER 4125 Main window.

4. Start recording a file while performing the pre-deployment test below, and then play back the file to verify that the SS data and navigation information is present.

5. Rub the port and starboard transducer arrays (as seen in **Figure 3-15**) while observing the Sonar display in the DISCOVER 4125 Main window.
6. You should observe streaks or noise spikes in the waterfall display, as seen in **Figure 3-16**.

7. Verify that the heading, pitch, and roll sensors are working correctly by rotating, tilting, and rolling the towfish while observing the Heading, Pitch, and Roll displays in the Lower Indicator bar in the DISCOVER 4125 Main window.

8. Verify that the Pressure display indication is at or nearly zero. The pressure sensor can be zeroed on deck in DISCOVER 4125 software under External Device Controls.
3.13 Towfish Deployment

The 4125 Towfish can be towed at speeds of up to 4.8 knots while still meeting NOAA and IHO-44S specifications of 3 pings on a 1-meter cubed target at 100 meters. Shown in Figure 3-15 is a 4125 Towfish being deployed.

**CAUTION!** The deployment instructions below are only meant as a general guide. Due to varying conditions, exact deployment methods will change and it is up to the end user to modify their deployment procedure to match the conditions they are working under.

**CAUTION!** When lowering the towfish in an area where the bottom topography is not known, be careful not to strike the bottom or a submerged object. Otherwise, damage to the towfish may occur. In addition, at all times during the survey, carefully monitor towfish altitude, as failure to do so may result in the towfish hitting the bottom or becoming snagged.

**CAUTION!** Do not tow the towfish too close to the survey vessel. Towing in this manner can cause the towfish to be pulled in against the hull of the ship due to the low pressure of the propeller wash and the effect of the water flowing by the hull. In addition, sonar reflections from the hull may be evident in the records.

**CAUTION!** Do not tow the towfish with the nose angled up or down. Doing so can degrade the sonar imagery. Verify that the towfish is as level as possible when towing it. Adjust the position of the tow arm so the towfish is as level as possible (+5° is optimal).
Figure 3-17: 4125 Towfish being Deployed

NOTE 1: For detailed towing characteristics for several tow cable lengths and towfish speeds, refer to C.0 TOWING CHARACTERISTICS.

NOTE 2: For detailed information about the EdgeTech DISCOVER 4125 Side Scan Sonar software, including how to record data, refer to the DISCOVER 4125 Side Scan Processor Software User’s Manual.

NOTE 3: This deployment instructions to follow assume that the system pre-deployment test have been successfully completed and the tow fish is on and transmitting.

To deploy the towfish:

1. With the survey vessel stopped or under way at up to two knots, slowly and carefully lower the towfish into the water, well away from the propeller. Do not let the towfish strike the hull of the survey vessel.

2. Lower the towfish to a depth of about three meters, or just below the propeller wash.
3. Click the Towfish Control tab and select the range for each frequency. This tab is shown in Figure 3-14.

4. Click the Bottom Track tab on the Lower Control panel. This tab is shown in Figure 3-18.

5. On the Bottom Track tab make the required settings to track the bottom (check the TrackBottom and Tracking Indicator boxes) and note the towfish altitude in the Altitude display. Refer to the DISCOVER software manual for details on setting up bottom tracking.

6. Lower the towfish such that its altitude is 10–15% of the range selection.

7. Increase the survey vessel speed to the desired survey speed and adjust the amount of cable out such that the altitude of the towfish remains at 10–15% of the range selection.

8. If a pressure sensor is installed, verify that the Pressure display indication is correct.

9. Secure the tow cable to the survey vessel.

10. Begin recording data.

3.14 Towfish Recovery

**CAUTION!** The following procedure is only meant as a general guide. Due to varying condition, exact recovery methods will change and it is up to the end user to modify their procedure to match the conditions they are working under.

1. To recover the towfish:

2. Slowly pull in the tow cable until the towfish is just below the surface.

3. Slow the survey vessel speed to under two knots, or, if practical, put the survey vessel in neutral while the towfish is brought on board.

4. Retrieve the towfish from the water and carefully lower it on deck.

5. Set the Power switch to the OFF position.
6. Disconnect the tow cable from the tow cable connector.

7. Install the dummy plug on the tow cable connector.

Refer to 4.0 MAINTENANCE on for instructions on how to clean and inspect the towfish, tow cable, and the underwater connectors after use.
4.0 MAINTENANCE

The 4125 Series Dual-frequency Side Scan Sonar System is ruggedly designed and built, and therefore requires little maintenance. However, to ensure long-lasting, reliable service, some periodic maintenance is recommended.

Maintenance on the 4125 Series Dual-frequency Side Scan Sonar System should be performed on a regular basis, or as often as necessary, depending on use. However, most of the maintenance is performed after each deployment and recovery cycle of the towfish.

4.1 Cleaning the 4125 System

The 4125-P Portable and 4125-RM Rack Mount Topsides require minimal maintenance. However, the TOWCABLE / SEA CABLE connector should be periodically lubricated, and the other connectors should be inspected regularly.

To inspect and clean the towfish and the tow cable after use:

1. Wash down the towfish and the tow cable with clean, fresh water. Be sure to remove any debris on the towfish body and tail fins.
2. Inspect the port and starboard transducer arrays, and thoroughly spray them to remove any buildup of debris. If they exhibit any oily residue, clean them using a soft cloth, along with a mild, non-abrasive detergent and water.

**CAUTION!** Do not use harsh chemical detergents on the transducer arrays.

3. Inspect the tail fins for warping and replace them where necessary.
4. Inspect the shear pin and replace it if it is worn or damaged.
5. Dry the towfish in shade, and when dry, store it in its case.

4.1.1 Inspecting and Cleaning the Connections

Regularly inspect the contacts on the male pins of each underwater connector in the towfish and on the tow cable for corrosion or oxidation. To remove any oxidation, rub the contacts lightly with 800 grit emery cloth cut into strips equal to or less than the width of a contact. A pencil eraser can also be used for this purpose. Clean the female sockets using a cotton swab and rubbing alcohol. A brush with only nylon bristles can be used to remove light oxidation.
To extend the life and increase the reliability of the connectors, apply a thin film of silicone dielectric grease, such as Novagard G624 general purpose silicone grease or an equivalent, to the entire surface of each male pin. A small amount of grease should also be applied to the opening of each female socket. Use only a small amount, as packing too much grease will cause a hydraulic lock, preventing the connectors from being properly mated.

**NOTE:** Remember to always install dummy connectors on the connectors of the tow cable and the towfish tow cable connector.

### 4.2 Re-arming the Towfish

Should the shear pin snap, the towfish must be rearmed with a new one. Spare shear pins and retaining clips are in the spares kit. Be sure to use a plastic shear pin from the spares kit. Use of a metal shear pin is not recommended unless it is the only available option. A metal pin may not shear if the towfish hits an obstruction or becomes snagged, resulting in the loss of the towfish should the tow cable break.

In addition, when the tow cable connector on the towfish pulls out during recovery from a snag, it exposes the live tow cable contacts to seawater. Immediately deactivate the system if this happens to prevent electrolysis on the connector pins. Always check the female tow cable connector and tow fish connector for any evidence of damage prior to rearming the towfish. If any oxidation is present, the tow cable may have to be re-terminated.
5.0 TROUBLESHOOTING

This section includes instructions on how to disassemble and reassemble a towfish should internal components need replacing. In addition, some troubleshooting procedures are included to assist in identifying and correcting possible setup or operational problems should they occur.

5.1 Restoring the Operating System to the Hard Drive

A USB drive is provided in order to back up the system, and then restore it to its factory state in the unlikely event of its failure. For instructions on how to perform both of these procedures, refer to A.0 SYSTEM RESTORE.

5.2 Disassembling and Reassembling the Towfish

The procedures below describe how to disassemble and reassemble a towfish to access and remove the electronics chassis. The tools required are a 1/8-inch Allen wrench and a Phillips screw driver.

**WARNING!** High voltages that can cause injury or death are present in the towfish. Turn off the topside processor and disconnect the tow cable before disassembling the towfish.

**CAUTION!** Opening the electronics chassis may void the user’s warranty unless preapproved by EdgeTech. Contact EdgeTech Customer Service before opening the chassis.

5.2.1 Disassembly

To disassemble the towfish:

1. Place the towfish on a clean, dry, flat surface.

2. Remove the eight screws that secure the electronics bottle section to the transducer array section of the towfish.
3. Pull the two sections apart far enough to be able to access the connectors inside.

**NOTE:** Separating the two halves further than needed will make re-assembly difficult.
4. Disconnect the three cables from the electronics bottle.

![Figure 5-3: Cables Disconnected from the Electronics Bottle]

5. Remove the two Phillips head screws from the electronics bottle. These screws are located under the “Void if Removed” labels.
Figure 5-4: Removing the Phillips Head Screws from the Electronics Bottle

6. Remove the electronics chassis from the electronics bottle by pulling the electronics bottle connector end cap straight out as shown in Figure 5-4.

**NOTE:** The use of locking sleeves attached to the connectors will aid in removal. For bottles which are difficult to remove, contact Edgetech Customer Service.

7. Lay the electronics chassis on a clean, flat surface.

8. If it is desired to reconnect the tow cable connector for troubleshooting and test purposes, place the electronics chassis alongside the transducer array of the towfish and reconnect the connectors.
5.2.2 Reassembly

Before reassembling the towfish, replace O-Rings with new ones from the accessories kit.

When installing a new O-ring, first clean the O-ring surfaces on both the housing and the end cap with a paper towel, and then apply a light coating of silicone lubricant to the new O-ring around its entire surface before installing it. If no scratches, nicks, or dirt are found when cleaning the O-ring, leave it installed and apply a light coat of silicone grease only.

To reassemble the towfish, reverse the disassembly procedure.

5.3 Calibrating the Compass

The compass is calibrated at the EdgeTech manufacturing facility. Should the compass in the towfish lose its calibration for any reason in the field, it may be necessary to recalibrate it. This is accomplished by
accessing the embedded Windows installation in the towfish itself via a remote desktop application on the topside computer.

Furthermore, it is necessary to physically move the towfish around in different positions for the compass within it to establish the necessary reference points. The support of at least two survey technicians, and a rotating table (as shown in the procedure to follow) or winch for hoisting and rotating the towfish are essential:

1. Power up the topside and computer with towfish connected.
2. Click on the Remote Desktop icon (Figure 5-6) and click Connect on the splash screen (Figure 5-7).

![Figure 5-6: Remote Desktop Icon](image)

![Figure 5-7: Remote Desktop Splash Screen](image)
3. If a warning pops up as shown in Figure 5-8, click Yes before proceeding.

![Remote Desktop Connection]

*Figure 5-8: Remote Desktop Warning Screen*

4. In the remote desktop program, the embedded Windows installation in the towfish will become accessible. Shut down the Sonar.exe application running (see Figure 5-9 below):
5. On this desktop, click on the Tera Term command console icon (FIGURE 5-10). At the splash screen (FIGURE 5-11), click OK.
Figure 5-11: Tera Term Splash Screen
6. Establish communications with the SSAHRS and verify via a serial console.
7. Stop the device and retrieve the current level 2 (factory) calibration using the following two commands.

```
stop <CR>
getLevel2CompassCalibration <CR>
```

8. Ensure that the points are 0, the error percentage is 100.0%, the hard iron values are all 0.0, and that the soft iron values are an identity matrix (see Figure 5-14).

![Figure 5-14. Motion Sensor Calibration Result](image)

If for some reason they are not; reset SSAHRS with the following command and then cycle power.

```
setLevel2CompassCalibration, factory2015, 0, 100.0, 50.0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1 <CR>
```
9. Restart the SSAHRS by issuing the following command, to start compass data:

   start <cr>

   Heading, Pitch, Roll, and Temperature should begin to scroll.

   ![Motion Sensor Serial Output](image)

   **Figure 5-15. Motion Sensor Serial Output**

10. Slowly move the vehicle around in such a fashion as to position the compass in as many possible orientations as possible for pitch, roll and heading directions.

   a. UUT in neutral position: Pitch/Roll ~0 degrees, rotate device thru 360 degrees of heading (10 times)

   ![Tilt 0 degrees](image)

   **Figure 5-16: Tilt 0 degrees**
b. UUT in Pitch/Roll ~-90 degrees, rotate device thru 360 degrees of heading (10 times)

![Figure 5-17: Tilt -90 degrees](image)

![Figure 5-18: Tilt +90 degrees](image)

c. UUT in Pitch/Roll ~+90 degrees, rotate device thru 360 degrees of heading (10 times)

11. At the serial console, execute the following commands.

```
stop <CR>
getCurrentCompassCalibration <CR>
```

12. The compass solution will be displayed to the user as well as the number of points, magnitude of the magnetic field at this location, and the fit error. If the solution is not viable the device should be returned to streaming with the `start <CR>` command and steps 8 through 10 should be repeated until the fit error is ≤ 1.0% and Points is > 100.
5.0 TROUBLESHOOTING

5.3.1 Changing the Angle of Declination

The compass' angle of declination is set to true north at the EdgeTech facility. However, to provide a more accurate target location, it is necessary to enter the known magnetic declination for the survey location into the compass as follows:

1. Repeat steps 1 through 6 in Calibration procedure in section.
2. Verify current Declination Angle of Deviation using the following command:

```
getDeclination <CR>
```

![Figure 5-20](image)

3. Enter the set declination command to get help for command:

```
setdeclination <CR>
```

![Figure 5-21](image)
setDeclination <CR>

Help for command:

setDeclination, [D]

[D]: Declination angle (degrees), which is the correction between magnetic north and true north. This value depends on geographic location.

Declination for your location can be found by going to the following website:

http://www.ngdc.noaa.gov/geomag-web/#declination

Here is an example of how using this website can help you to determine your angle of deviation:

- Zipcode 02360 was inserted, then "Get & Add Lat/Lon" was selected:

![Figure 5-22: Magnetic Declination Estimated Value Screen](image)
• "Calculate" is then selected:

![Image of Declination Calculation](image)

*Figure 5-23: Angle of Declination Calculated*

• The Declination Angle received was 14.47 degrees. This is the angle that will be entered into the TeraTerm command screen.

4. Enter the Declination Angle using the command:

   setDeclination, 14.47 <CR>
5. Verify entry of declination Angle using the command:

```
getDeclination <CR>
```

![Figure 5-24](image)

### 5.4 General Troubleshooting

Should some operational or performance problems occur with the 4125 Series Dual-frequency Side Scan Sonar System, it may be possible to correct them using the troubleshooting guides in the following pages. For the 4125-P Portable Topside Processor, a tabular troubleshooting guide is provided in **TABLE 5-1**, and **TABLE 5-2** for the towfish.

These troubleshooting guides identify some symptoms that could occur, and present one or more possible causes, along with the recommended corrective action for each. Perform the corrective action for any given symptom in the order of probable causes, which generally corresponds to the degree of troubleshooting difficulty, from the simple to the more complex.

Before proceeding with any corrective action, verify that the topside processor is plugged into an appropriate AC or DC power source and that the processor is switched on.
NOTE: Verify that all the cables on the topside processor and the towfish are mated and are not loose or damaged. Most causes of operational or performance problems are a result of poor connections.

5.5 4125-P Portable Topside Processor Troubleshooting

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No power and the POWER indicator is off.</td>
<td>The POWER switch is not turned on.</td>
<td>Verify that the POWER switch is turned on.</td>
</tr>
<tr>
<td></td>
<td>No AC power.</td>
<td>Verify that the topside processor is connected to 90–260 VAC, 50/60 Hz power. Check the AC power source. Test interconnect cables against wiring diagrams in section 2.0. Check the 5-amp fuse on the side panel of the topside processor for continuity. Replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>No DC power.</td>
<td>Verify that the topside processor is connected to 12–24 VDC power. Check internal DC fuse Test interconnect cables against wiring diagrams in section 2.0.</td>
</tr>
</tbody>
</table>

Table 5-1: Topside Processor System Troubleshooting Guide

5.6 4125 Towfish Troubleshooting

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tow Fish Power Light off</td>
<td>Faulty Topside</td>
<td>Verify with other Topside. Check voltage at pins 1, 2 at Tow Cable connector on Topside. It should measure +75vdc for approximately 10 seconds. Check that Power Separation board’s D2 is on. If not replace Power Separation board or Power board. To replace, Contact EdgeTech Customer Service</td>
</tr>
<tr>
<td>2. Tow Fish Power Light fades out</td>
<td>Faulty Tow Cable Faulty Topside</td>
<td>Test cable continuity. Repair or replace cable Verify with other Topside. To replace Power Separation or Power board, Contact EdgeTech Customer Service.</td>
</tr>
<tr>
<td></td>
<td>Faulty Tow Fish</td>
<td>Verify with other Tow Fish. To replace Power Separation or CSMB board, Contact EdgeTech Customer Service.</td>
</tr>
<tr>
<td>3. CM Light Flashes Slow</td>
<td>Open circuit. Same as in 2</td>
<td>Typically Tow cable fault. Proceed as in step 2.</td>
</tr>
<tr>
<td>SYMPTOM</td>
<td>PROBABLE CAUSE</td>
<td>CORRECTIVE ACTION</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>5. Link Light Flashes</td>
<td>Faulty Tow Cable</td>
<td>Perform Meg-ohm check to cable or replace cable</td>
</tr>
<tr>
<td></td>
<td>Faulty Topside Modem</td>
<td>To check Modem settings or re-configure or replace, Contact EdgeTech Customer Service.</td>
</tr>
<tr>
<td></td>
<td>Faulty Tow Fish VDSL assembly</td>
<td>To replace assembly, Contact EdgeTech Customer Service.</td>
</tr>
<tr>
<td></td>
<td>Topside PC's Lan not set correctly</td>
<td>Check Lan setting is enabled and set to 192.9.0.XXX</td>
</tr>
<tr>
<td></td>
<td>Discover IP and Port set incorrectly</td>
<td>Configure Discover Network to 192.9.0.101, port 1700.</td>
</tr>
<tr>
<td></td>
<td>Incorrect Discover last used .jni file</td>
<td>Delete file and re-open and re-configure Discover.</td>
</tr>
<tr>
<td>6. NET OFF in Discover</td>
<td>Faulty Topside Ethernet cable</td>
<td>Remove Topside’s top plate and bypass connector panel E-net connector to verify. Repair or replace cable.</td>
</tr>
<tr>
<td></td>
<td>Faulty Topside Modem or Isolators</td>
<td>To replace modem or bypass Isolators, Contact EdgeTech Customer Service.</td>
</tr>
<tr>
<td></td>
<td>Sonar not running in the Tow Fish</td>
<td>Check using Remote Desktop. If Sonar not running, Contact EdgeTech Customer Service.</td>
</tr>
<tr>
<td></td>
<td>Faulty Tow Fish CPU</td>
<td>If unable to connect remotely, open tow fish and connect monitor to CPU to confirm. Contact EdgeTech Customer Service.</td>
</tr>
<tr>
<td>7. Distortion or noise in the data</td>
<td>Interference from ship’s echo sounder</td>
<td>Turn off echo sounder.</td>
</tr>
<tr>
<td></td>
<td>Other sources of noise</td>
<td>Check for other sources of noise. Try alternate survey area.</td>
</tr>
<tr>
<td></td>
<td>Tow fins are damaged or missing</td>
<td>Inspect and replace if needed.</td>
</tr>
<tr>
<td></td>
<td>Excess strumming of tow cable</td>
<td>Inspect and remove slack from cable.</td>
</tr>
<tr>
<td>8. Weak or Missing SS Data</td>
<td>Faulty Tow Fish</td>
<td>Swap arrays port to starboard to confirm array or electronics issue.</td>
</tr>
<tr>
<td>9. Poor Data Quality</td>
<td>Incorrect Tow Fish height</td>
<td>Check and adjust.</td>
</tr>
<tr>
<td></td>
<td>Environmental Issues</td>
<td>Try alternate survey area.</td>
</tr>
<tr>
<td></td>
<td>Faulty Tow Fish</td>
<td>Verify with other Tow Fish.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check using terminal emulator.</td>
</tr>
</tbody>
</table>
### Table 5-2: 4125 Towfish Troubleshooting Guide

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Discover not displaying GPS</td>
<td>Incorrect GPS settings</td>
<td>Check for obstructions on antennae.</td>
</tr>
<tr>
<td></td>
<td>Discover’s com port not selected</td>
<td>Check Configuration, Serial Ports in Discover, and correct or enable port.</td>
</tr>
<tr>
<td></td>
<td>Topside PC’s com port faulty</td>
<td>Use other com port.</td>
</tr>
<tr>
<td>12. Missing Compass Data</td>
<td>Incorrect Discover last used .ini file</td>
<td>Delete file and re-open and re-configure Discover.</td>
</tr>
<tr>
<td></td>
<td>Incorrect Tow Fish sonarserial.ini file</td>
<td>Contact <a href="#">EdgeTech Customer Service</a></td>
</tr>
<tr>
<td></td>
<td>Incorrect or faulty Tow Fish CPU com port</td>
<td>Contact <a href="#">EdgeTech Customer Service</a></td>
</tr>
<tr>
<td></td>
<td>Faulty Compass</td>
<td>To replace compass and re-calibrate, Contact <a href="#">EdgeTech Customer Service</a></td>
</tr>
<tr>
<td>13. Variation in Compass Heading</td>
<td>Compass in need of calibration</td>
<td>Perform compass calibration.</td>
</tr>
<tr>
<td>14. No Depth Display</td>
<td>Incorrect Discover last used .ini file</td>
<td>Delete file and re-open and re-configure Discover.</td>
</tr>
<tr>
<td></td>
<td>Clogged or faulty depth sensor</td>
<td>Clean depth sensor port with low pressure air.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To replace sensor, Contact <a href="#">EdgeTech Customer Service</a></td>
</tr>
</tbody>
</table>

#### 5.7 Tow Cable Inspection

If you think cable or connector has malfunctioned, perform the following three simple cable inspections:

- Check for cable twisting.
- Check the external jacket.
- Perform a point to point continuity test of the conductors.

Inspect whether any part of cable was bent beyond the allowable radius. The minimum bending radius of tow cable used with the 4125 Series Dual-frequency Side Scan Sonar System is 6 inches. The cable may suffer damage when the cable is wound or twisted with less than this radius.

Also, do not severely twist the cable, as this may cause damage to the molded section of the cable and connector. If the towfish becomes snagged during towing and is rotated excessively, damage to the connector may have resulted. Test the cable before using to prevent additional damage.
5.7.1  Locating a Shorted Conductor

The presence of a shorted or open conductor in a tow cable can be determined by using a multimeter.

To locate a shorted or open conductor:

1. Disconnect both cable ends.
2. Short the two connector pins (or conductors if un-terminated) of the shorted pair at both ends and measure the total resistance between the ends.
   \[ R_1 + R_2 = \] 
3. Remove the shorts.
4. Measure the resistance between a shorted pair on one end with an ohmmeter on the Rx1 scale.
   \[ R_1 + R_s = \] 
5. Measure the resistance from the other end.
   \[ R_2 + R_s = \] 
6. Add the measurements in Step 4 and 5 above, subtract the measurement in Step 2, and divide the result by 2.
   \[ R_s = \] 
7. Subtract the value in Step 6 from the measurements in Step 4 and 5.
   \[ R_1 = \] 
   \[ R_2 = \] 

The distance to the short from end #1 is the ratio of \( R_1/(R_1+R_2) \) times the total cable length. Recheck from end #2 which is \( R_2/(R_1+R_2) \) times the cable length.

5.7.2  Locating an Open Conductor

An open conductor in a tow cable is much more difficult to locate than a short. Therefore a capacitance bridge is recommended to diagnose this problem. Measuring the capacitance from the open conductor to the shield on both ends allows two different capacitance readings to be recorded. This represents a direct ratio related to cable length and distance of break from each end.

Before cutting the cable, double-check the same ratio of capacitance using an adjacent good conductor in a multi-conductor cable. Capacitance may vary from conductor to conductor, depending on their separation.

Most breaks occur around the tow cable termination, or where a previous repair has been made. A cable break may be found or confirmed by laying out the cable and then attaching an ohmmeter across each
end of the open conductor. Flex the cable first near the termination or repaired section, and then along its entire length until the break is reached. When flexing, the ends of the broken conductor may touch, giving a continuity reading on the meter.

5.7.3  **Locating a Resistance Breakdown**

Insulation breakdown is the most difficult fault to locate. Cable leakage is not necessarily located near the end terminations. However, the area near each termination receives the most abuse and is, therefore, subject to suspicion. Cutting the cable end until leakage disappears will prove successful in many cases.

**CAUTION!** Prior to cutting the cable for any of the above reasons, a careful visual examination should be made for any signs of physical damage.

With both ends disconnected, the tow cables should measure between 100 Mega-ohms and infinity between conductors with a 500 VDC Meg ohmmeter. When using a Simpson 260 Multi-meter, all cables, conductor-to-conductor or conductor-to-shield, should measure infinity. Any leakage on the multi-meter indicates cable leakage.

5.7.4  **Damaged Tow Cable Connector**

The towfish includes a safety release mechanism which prevents the vehicle from being snagged. When the release trips, the tow cable connection to the fish disconnects, exposing the high-voltage pins to seawater. Pin corrosion will start to occur as long as power is still applied. If the power is not immediately removed, there may be permanent damage to the connector. Should this happen, the tow cable will require re-termination.

5.8  **Part Numbers for Major Topside Components**

The major 4125-P Portable Topside Processor components and their part numbers are listed below:

<table>
<thead>
<tr>
<th>DESCRIPTION, PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSY POWER BOARD 4125 MOD MODEM, 0009300</td>
</tr>
<tr>
<td>PCB ASSY TOP POWER BOARD 4125 W/ CONTROLLER, 0009676</td>
</tr>
<tr>
<td>POWER SUPPLY CHASSIS SW AC-DC 88-264 INPUT 24 OUTPUT 13A 312W, 0007469</td>
</tr>
<tr>
<td>ASSY SUB ROUTER PROGRAMMED NO DHCP, 0016488</td>
</tr>
<tr>
<td>CIRCUIT PROTECT HOLDER FUSE 5X20MM 5A 250V, 0003728</td>
</tr>
<tr>
<td>CIRCUIT PROTECT HOLDER FUSE BLADE 15A 32V FAST, 0009587</td>
</tr>
</tbody>
</table>
### Table 5-3: Part Numbers for Major 4125-P Topside Processor Components

#### 5.9 Part Numbers for Major Towfish Components

The major 4125 Towfish components and their part numbers are listed below:

<table>
<thead>
<tr>
<th>DESCRIPTION, PART NUMBER</th>
<th>400/900 KHZ</th>
<th>600/1600 KHZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOSE END CAP 4125 LT SS, 0008546</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>NOSE 4125 SS, 0008546</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TUBE FRONT 4125 GEN2 SS, 0007540</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>TAIL CONE ONE PIECE 4125, 0009334</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>THUMBSCREW 4125 TAIL END CAP 316 SS, 0007545</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>HARDWARE WASHER STD 0.562 INCH ID 1.375 INCH OD RUBBER, 0007197</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RAIL TOW LONG 4125 SHORT CABLE 316 SS, 0008370</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RAIL TOW SHORT 4125 SHORT CABLE 316 SS, 0008371</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PIN SHEAR 4125 TOW FISH 0.25 INCH DIA DELRIN, 0007538</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RETAINING CLIP, 00008528</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>HARDWARE SHACKLE BOW 5/16 SB 216 316 SS, 0006635</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DUCER SIDE SCAN RX-SP 400-850 KHZ 4125 SP 300M, 0008529</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DUCER SIDE SCAN RX-SP 540-1600 KHZ 4125 SP 300M, 0007559</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ASSY CABLE 4125 EXTENSION POWER/TELEMETRY, 0008531</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ASSY KIT ACCESSORY 4125, 0007606</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ASSY SUB CABLE RECOVERY 4125 LT 23 INCH, 0007696</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>GROMMET,PUSH-IN,.5&quot;ID,1-1/16OD, 0007728</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ASSY SONARPRO 4125 LT 400-900 KHZ, 0007831</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ASSY SONARPRO 4125 LT 600-1600 KHZ, 0007832</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ASSY SONARPRO 4125 400-900 KHZ, 0007580</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ASSY SONARPRO 4125 600-1600 KHZ, 0007691</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CONN DUMMY PLUG WETMATE 06 POS FEMALE, 0003869</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CONN LOCKING SLEEVE CIRC FEMALE BLACK MCDLS-FMCDLS-F, 0004065</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>HARDWARE SHACKLE ANCHOR 4125 316 SS, 0006633</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KONTRON CPU MBT10 E3815 PASSIVE HEAT SINK, 0016958</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Table 5-4: Part Numbers for Major 4125 Towfish Components
The following section outlines the procedures for backing up and restoring the system drive.

**CAUTION!** All data will be lost upon restoring the system to factory settings. Be sure to backup all data before performing the procedure below.

1. Ensure that topside is off.
2. Insert USB3 flash drive in blue USB3 port.
3. Start topside and be prepared to press F** key when prompted:
   a. If the topside is rack mount, press F11.
   b. If the topside is a laptop, press F12.
4. Under Please select boot device: By using up/down arrow keys, select EUFI: Corsair Voyager 3.0 000A, then press Enter.
5. Wait for Paragon Backup & Recovery 14 Home screen to appear, then click Restore icon.
6. On Welcome to the Restore Wizard screen click Next.
7. Browse for Archive and click specific image (the file ending with the extension “.pbf”). When Archive File Details window appears, click Next.
8. At What to restore window, click Basic MBR Hard Disk 0, click Next.
9. At Where to restore window, ensure that Basic MBR Hard Disk 0 is already selected (brown box around it). If it is not, use up/down arrow keys to select. Click Next.
10. At Restore results window, make no selection and click Next.
11. At the Ready to restore from the archive window, select O Yes, apply the changes physically. Click Next. *Restoring will begin.*
12. At completing the restore wizard, click Finish. Click Shutdown.
13. Remove USB3 flash drive and restart topside.
Printers connect to the 4125 Rack Mount Topside Processor and 4125-P Portable Topside Processor via an ETHERNET cable. The user-supplied computer connects to the printer via ETHERNET.

The following ETHERNET-only printers work well with the 4125 Series system:

- EPC HSP 100
- EPC 1086-NT
- EPC 9206
- iSys V8.5
- iSys v12
- Ultra 200
- Ultra 120
- Ultra 120-HD
- Ultra 200 HD
- EPC 1086
- EPC 1086 Old
- Geoprinter 975
- TDU 850

**NOTE:** EdgeTech Topsides support the ETHERNET-only Printers listed above. Consult manufacturer’s operating manual for printer requirements and set up.
C.0 TOWING CHARACTERISTICS

This section includes graphical plots representing the towing characteristics of the 4125 Towfish for various cable lengths, towfish speeds, and towfish depths. These plots are available for equipment selection purposes only. In addition, when selecting a particular plot, it should be verified prior to being used for detailed survey planning.

C.1 4125 Towfish Cable Layback Plots

The plots contained within this document have been generated under the following conditions/assumptions:

- Sea State = 0 (no vessel heave motion)
- Ocean current = 0
- Solutions are for steady state Tow Vessel Speeds (2 to 8 knots, 1 kt increments)
- Cables Examined: .375” Soft Tow Kevlar (23080), .25” Double Armored (A304874), .32” Double Armored (A320327), .45” Double Armored (A302799)
- Cable lengths 50m to 600m

Ocean currents will be a factor for virtually all cases in which the system is used. By following the simple procedure below the existing plots can be used for predicting the tow fish depth when ocean currents are present (assuming the ocean current is uniform with depth).

**Tow Vessel moving into the current:**

Tow Fish Relative Speed = Tow Vessel Speed + Ocean Current

Ex: Tow Vessel Speed - 5kts, Ocean Current 1 kt, Tow Fish Relative Speed = 6 kts; Use the 6 kts data curve in the graphs listed within

**Tow Vessel moving with the current:**

Tow Fish Relative Speed = Tow Vessel Speed - Ocean Current

Ex: Tow Vessel Speed - 5kts, Ocean Current 1 kt, Tow Fish Relative Speed = 4 kts; Use the 4 kts data curve in the graphs listed within.
### Tow Vessel Direction vs. Ocean Current

#### Figure C-1: Tow Vessel Direction vs. Ocean Current

<table>
<thead>
<tr>
<th>CONFIGURATION #</th>
<th>TOWFISH</th>
<th>CABLE TYPE</th>
<th>LENGTH (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4125</td>
<td>23080 (.375” Kevlar)</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>4125</td>
<td>23080</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>4125</td>
<td>23080</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>4125</td>
<td>23080</td>
<td>300</td>
</tr>
<tr>
<td>5</td>
<td>4125 + 15 lb. Keel Weight</td>
<td>23080</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>4125 + 15 lb. Keel Weight</td>
<td>23080</td>
<td>100</td>
</tr>
<tr>
<td>7</td>
<td>4125 + 15 lb. Keel Weight</td>
<td>23080</td>
<td>200</td>
</tr>
<tr>
<td>8</td>
<td>4125 + 15 lb. Keel Weight</td>
<td>23080</td>
<td>300</td>
</tr>
<tr>
<td>9</td>
<td>4125 + Depressor Wing</td>
<td>23080</td>
<td>50</td>
</tr>
<tr>
<td>10</td>
<td>4125 + Depressor Wing</td>
<td>23080</td>
<td>100</td>
</tr>
<tr>
<td>11</td>
<td>4125 + Depressor Wing</td>
<td>23080</td>
<td>200</td>
</tr>
<tr>
<td>12</td>
<td>4125 + Depressor Wing</td>
<td>23080</td>
<td>300</td>
</tr>
<tr>
<td>13</td>
<td>4125 + 15 lb. Keel Weight + Depressor Wing</td>
<td>23080</td>
<td>50</td>
</tr>
<tr>
<td>14</td>
<td>4125 + 15 lb. Keel Weight + Depressor Wing</td>
<td>23080</td>
<td>100</td>
</tr>
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*Table C-1: Towfish vs. Cable Length*
C.1.1 Config. 2: 4125, 23080 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

- Depth (m)
- Position Aft of Tow Vessel (m)

- Kevlar Tow Cable - p/n 23080, Length - 100m
- Tow Fish - 4125 Telemetry

Tow Cable Length vs Depth

- Depth (m)
- Cable Length (m)

- Kevlar Tow Cable - p/n 23080, Length - 100m
- Tow Fish - 4125 Telemetry
C.1.2 Config. 4: 4125, 23080 Cable - 300m Long

Tow Cable Shape & Tow Fish Position

- Position Aft of Tow Vessel (m)
- Depth (m)

Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry

Tow Cable Length vs Depth

- Cable Length (m)
- Depth (m)

Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry
C.1.3 Config. 6: 4125 + 15 lb. Keel Weight, 23080 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.4  Config. 8: 4125 + 15 lb. Keel Weight, 23080 Cable - 300m Long

Tow Cable Shape & Tow Fish Position

Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry + 15 lbf Wt.

Tow Cable Length vs Depth

Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry + 15 lbf Wt.
C.1.5 Config. 10: 4125 + Depressor Wing, 23080 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.6 Config. 12: 4125 + Depressor Wing, 23080 Cable - 300m Long

Tow Cable Shape & Tow Fish Position

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<tr>
<th>Position Aft of Tow Vessel (m)</th>
<th>Depth (m)</th>
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<td>6 kts</td>
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<tr>
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<tr>
<td>4 kts</td>
<td>-20</td>
</tr>
<tr>
<td>3 kts</td>
<td>-30</td>
</tr>
<tr>
<td>2 kts</td>
<td>-40</td>
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Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry + Depressor

Tow Cable Length vs Depth

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<th>Depth (m)</th>
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<tr>
<td>6 kts</td>
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<td>5 kts</td>
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<td>4 kts</td>
</tr>
<tr>
<td>3 kts</td>
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<td>2 kts</td>
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Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry + Depressor
C.1.7 Config. 14: 4125 + 15 lb. Keel Wt. + Depressor Wing, 23080 Cable – 100m

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.8 Config. 16: 4125 + 15 lb. Keel Wt. + Depressor Wing, 23080 Cable – 300m

Tow Cable Shape & Tow Fish Position

Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry + 15 lbf Wt. + Depressor

Tow Cable Length vs Depth

Kevlar Tow Cable - p/n 23080, Length - 300m
Tow Fish - 4125 Telemetry + 15 lbf Wt. + Depressor
C.1.9  Config. 18: 4125, A304874 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.10  Config. 20: 4125, A304874 Cable - 300m* Long

*Tow Cable Shape & Tow Fish Position

*Tow Cable Length vs Depth

*The maximum length for this type of cable that can be used with the 4125 telemetry system is 250m.
C.1.11 Config. 22: 4125 + 15 lb. Keel Weight, A304874 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable - p/n A304874, Length - 100m
Tow Fish - 4125 Telemetry + 15 lbf Wt.

Tow Cable Length vs Depth

Tow Cable - p/n A304874, Length - 100m
Tow Fish - 4125 Telemetry + 15 lbf Wt.
C.1.12 Config. 24: 4125 + 15 lb. Keel Weight, A304874 Cable - 300m* Long

*Tow Cable Shape & Tow Fish Position

*Tow Cable Length vs Depth

*The maximum length for this type of cable that can be used with the 4125 telemetry system is 250m.
C.1.13 Config. 26: 4125 + Depressor Wing, A304874 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.14  Config. 28: 4125 + Depressor Wing, A304874 Cable - 300m* Long

*The maximum length for this type of cable that can be used with the 4125 telemetry system is 250m.
C.1.15 Config. 30: 4125 + 15 lb. Keel Wt. + Dep. Wing, A304874 Cable - 100m

**Tow Cable Shape & Tow Fish Position**

- Tow Cable - p/n A304874,
- Length - 100m
- Tow Fish - 4125 Telemetry + Depressor + 15 lbf Wt.

**Tow Cable Length vs Depth**

- Tow Cable - p/n A304874,
- Length - 100m
- Tow Fish - 4125 Telemetry + Depressor + 15 lbf Wt.
C.1.16 Config. 32: 4125 + 15 lb. Keel Weight + Dep. Wing, A304874 Cable - 300m*

*Tow Cable Length vs Depth

*The maximum length for this type of cable that can be used with the 4125 telemetry system is 250m.*
C.1.17  Config. 34: 4125, A320327 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.18 Config. 37: 4125, A320327 Cable - 400m Long

Tow Cable Shape & Tow Fish Position

Position Aft of Tow Vessel (m)

Depth (m)

6 kts
5 kts
4 kts
3 kts
2 kts

Tow Cable - p/n A320327,
Length - 400m
Tow Fish - 4125 Telemetry

Tow Cable Length vs Depth

Cable Length (m)

Depth (m)

6 kts
5 kts
4 kts
3 kts
2 kts

Tow Cable - p/n A320327,
Length - 400m
Tow Fish - 4125 Telemetry
C.1.19  Config. 39: 4125 + 15 lb. Keel Weight, A320327 Cable - 100m Long

**Tow Cable Shape & Tow Fish Position**

**Tow Cable Length vs Depth**

- Tow Cable - p/n A320327, Length - 100m
- Tow Fish - 4125 Telemetry + 15 lbf Wt.
C.1.20 Config. 42: 4125 + 15 lb. Keel Weight, A320327 Cable - 400m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.21  Config. 44: 4125 + Depressor Wing, A320327 Cable - 100m Long

**Tow Cable Shape & Tow Fish Position**

Position Aft of Tow Vessel (m) vs Depth (m) for different speeds:
- 2 kts
- 3 kts
- 4 kts
- 5 kts
- 6 kts

**Tow Cable Length vs Depth**

Cable Length (m) vs Depth (m) for different speeds:
- 2 kts
- 3 kts
- 4 kts
- 5 kts
- 6 kts
C.1.22  Config. 47: 4125 + Depressor Wing, A320327 Cable - 400m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.23 Config. 49: 4125 + 15 lb. Keel Wt. + Dep. Wing, A320327 Cable – 100m

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth

Tow Cable - p/n A320327, Length - 100m
Tow Fish - 4125 Telemetry + Depressor + 15lb Wt.
C.1.24  Config. 52: 4125 + 15 lb. Keel Wt. + Dep. Wing, A320327 Cable - 400m

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.25  Config. 54: 4125, A302799 Cable - 100m Long

![Tow Cable Shape & Tow Fish Position](image1)

![Tow Cable Length vs Depth](image2)

Tow Cable - p/n A302799, Length - 100m
Tow Fish - 4125 Telemetry
C.1.26 Config. 57: 4125, A302799 Cable - 400m Long

Tow Cable Shape & Tow Fish Position

Position Aft of Tow Vessel (m)

Depth (m)

Tow Cable - p/n A302799,
Length - 400m
Tow Fish - 4125 Telemetry

Tow Cable Length vs Depth

Cable Length (m)

Depth (m)

Tow Cable - p/n A302799,
Length - 400m
Tow Fish - 4125 Telemetry
C.0 TOWING CHARACTERISTICS

C.1.27 Config. 59: 4125, A302799 Cable - 600m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.28 Config. 61: 4125 + 15 lb. Keel Weight, A302799 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.0 TOWING CHARACTERISTICS

C.1.29  Config. 64: 4125 + 15 lb. Keel Weight, A302799 Cable - 400m Long

Tow Cable Shape & Tow Fish Position

Tow Cable - p/n A302799, Length - 400m
Tow Fish - 4125 Telemetry + 15 lbf Wt.

Tow Cable Length vs Depth

Tow Cable - p/n A302799, Length - 400m
Tow Fish - 4125 Telemetry + 15 lbf Wt.
C.1.30  Config. 66: 4125 + 15 lb. Keel Weight, A302799 Cable - 600m Long

Tow Cable Shape & Tow Fish Position

Depth (m)

Position Aft of Tow Vessel (m)

Tow Cable Length vs Depth

Depth (m)

Cable Length (m)
C.1.31 Config. 68: 4125 + Depressor Wing, A302799 Cable - 100m Long

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth
C.1.32  Config. 71: 4125 + Depressor Wing, A302799 Cable - 400m Long

Tow Cable Shape & Tow Fish Position

Position Aft of Tow Vessel (m)

Depth (m)

2 kts

Tow Cable - p/n A302799,
Length - 400m
Tow Fish - 4125 Telemetry + Depressor

3 kts

4 kts

5 kts

6 kts

Tow Cable Length vs Depth

Cable Length (m)

Depth (m)

2 kts

3 kts

4 kts

5 kts

6 kts

Tow Cable - p/n A302799,
Length - 400m
Tow Fish - 4125 Telemetry + Depressor
C.1.33 Config. 73: 4125 + Depressor Wing, A302799 Cable - 600m Long

Tow Cable Shape & Tow Fish Position

Tow Cable - p/n A302799, Length - 600m
Tow Fish - 4125 Telemetry + Depressor

Tow Cable Length vs Depth

Tow Cable - p/n A302799, Length - 600m
Tow Fish - 4125 Telemetry + Depressor
C.1.34  Config. 75: 4125 + 15 lb. Keel Wt. + Dep. Wing, A302799 Cable – 100m

Tow Cable Shape & Tow Fish Position

Position Aft of Tow Vessel (m)

Depth (m)

Tow Cable - p/n A302799,
Length - 100m
Tow Fish - 4125 Telemetry + Depressor 
+ 15 lbf Wt.

Tow Cable Length vs Depth

Cable Length (m)

Depth (m)

Tow Cable - p/n A302799,
Length - 100m
Tow Fish - 4125 Telemetry + Depressor 
+ 15 lbf Wt.
C.0 TOWING CHARACTERISTICS

C.1.35 Config. 78: 4125 + 15 lb. Keel Wt. + Dep. Wing, A302799 Cable - 400m

Tow Cable Shape & Tow Fish Position

Position Aft of Tow Vessel (m)

Depth (m)

Tow Cable - p/n A302799, Length - 400m
Tow Fish - 4125 Telemetry + Depressor + 15 lbf Wt.

Tow Cable Length vs Depth

Cable Length (m)

Depth (m)

Tow Cable - p/n A302799, Length - 400m
Tow Fish - 4125 Telemetry + Depressor + 15 lbf Wt.
C.1.36  Config. 80: 4125 + 15 lb. Keel Weight + Dep. Wing, A302799 Cable - 600m

Tow Cable Shape & Tow Fish Position

Tow Cable Length vs Depth