



4125i/4125 SIDE SCAN SONAR SYSTEM

USER HARDWARE MANUAL

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ATTENTION – READ THIS FIRST!

All personnel involved with the equipment installation, operation, or maintenance 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 using 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.

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.

HARDWARE VARIATIONS AND COMPATIBILITY

4125 Series Side Scan Sonar Systems contain both standard and proprietary hardware. The 4125i and the 4125 SAR Side Scan Sonar Systems are the current standard hardware configurations. The 4125 (no i) is a legacy system that was replaced by the 4125i. Each variant in the series has its own set of options.

The 4125i is an improved version of the legacy 4125 system that replaces the obsolete xDSL towfish and topside modems. 4125i and 4125 towfish and topside equipment are incompatible with one another as the chipset used in the obsolete 4125 xDSL modems is incompatible with the new modems used in the 4125i. Both topside and towfish must be purchased or upgraded to the 4125i standard to interface correctly. Contact EdgeTech **CUSTOMER SERVICE** for details and assistance on any upgrade. Full system documentation on this system can be found in this manual and the **4125i SOFTWARE MANUAL** (0016652).

The 4125 SAR Side Scan Sonar System is a variant with configurations and options optimized for search and recovery surveys. These configurations and options may make the 4125 SAR towfish and portable topside not compatible with non-SAR 4125 system components. Contact EdgeTech **CUSTOMER SERVICE** for details and assistance if this is the case. Full system documentation can be found in the **4125-SAR HARDWARE MANUAL** (0019251) and **4125 SOFTWARE MANUAL** (0016652).

EdgeTech may change the standard components due to their availability or performance improvements. Although the component manufacturers and 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 specific 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 the time of delivery. Upgrades will be made available when these features are implemented.

Contact **CUSTOMER SERVICE** with any questions relating to compatibility.

ABOUT THIS DOCUMENT

We, the employees at EdgeTech, would like to thank you for purchasing the 4125i/4125 Side Scan Sonar System. At EdgeTech, our policy is 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 look for ways to improve them continuously. 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 and 4125i systems. The 4125 SAR variant is documented in the [4125-SAR HARDWARE MANUAL \(0019251\)](#). Although this manual encompasses the latest operational features of each, some features may be periodically upgraded. Therefore, the information in this manual is subject to change and should be used for reference only.

Liability

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

Revision History

REVISION	DESCRIPTION	DATE	APPROVAL
B	Update specifications	01/02/2011	RM
C	Updated formatting/specs	01/21/2014	RM
D	Updated specifications	05/03/2016	RM
E	Updated for new tail cone and vertical scanability	07/07/2016	TS
F	Updated specifications and drawings	10/28/2016	TS
G	Added 4125 Info, Specs, and Drawings. Pictures, Tables, and Formatting updated.	08/19/2020	PO
H	Compass Instructions, Content updates	01/07/2021	PO
J	Pressure Sensor and General Updates	4/6/2023	PO

WARRANTY STATEMENT

All equipment manufactured by EdgeTech is warrantied 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 equipment's performance. No product is warranted as being fit for a particular purpose, and there is no warranty of merchantability. This warranty applies only if:

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- ii. The items have not been misused or abused in any manner, nor have repairs been attempted thereon without EdgeTech Customer Service's approval.
- iii. Written notice of the failure within the warranty period is forwarded to the Seller, and the directions received for properly identifying items returned under warranty are followed.
- iv. The return notice authorizes the Seller to examine and disassemble returned products to the extent Seller deems necessary to ascertain the cause for failure.

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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 [EDGE TECH WEBSITE](#). Should major software issues occur, they 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 online 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 [EDGE TECH CUSTOMER SERVICE](#) by telephone, facsimile, or e-mail to report a difficulty, discuss a problem, or receive advice on the best way to perform a task. When contacted, EdgeTech Customer Service will do the following:

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- Immediately attend to serious problems affecting operations
- Attempt to find an immediate workaround

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Before 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 **EDGE TECH 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 the 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 to move through customs quickly and without duties being charged. Whenever possible, please send copies of the original export shipping documents with the consignment.
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"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 a valuable source of information, which we use to improve these products continually. 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

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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 scientific, Naval, and offshore communities' needs 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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1.0 OVERVIEW

The EdgeTech 4125 Series (4125i/4125) Dual-frequency Side Scan Sonar System is a portable system designed for shallow water surveys, detailed object inspection, and search and recovery operations. Standard system components include a lightweight hydrodynamic towfish that mounts a dual 400/900 kHz or 600/1600 kHz side scan sonar subsystem and is delivered with a portable (4125i-P) or rack-mounted (4125i-RM) topside processor, a tow cable, and an EdgeTech or user-provided Windows laptop with EdgeTech's Discover 4125 Software installed on it. Several specialized options can be ordered with the system, including a telemetry configuration, longer cables, a depressor wing kit, a magnetometer interface, a hull-scanning kit, and a keel weight kit.



Figure 1-1: 4125i Side View

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
- SAR (Search and Recovery) Operations

1.2 Main System Components

The 4125 Series Dual-frequency Side Scan Sonar System consists of a 4125i Towfish, 4125i-P (Portable) or 4125i-RM (Rack Mounted) Topside Processor, a tow cable, and an EdgeTech or user-provided computer with EdgeTech's Discover 4125i software installed on it.

1.2.1 4125i Towfish

The 4125i towfish is a lightweight, portable, durable, hydrodynamic vehicle that mounts starboard and port side-scan transducers. The towfish is equipped with a stainless-steel nose and a removable stabilizer tail for hydrodynamic balance. The towfish is 114.8 cm (45.2 in.), weighs 20.4 kg (45.0 lbs.), and includes two handles allowing easy handling on the smallest tow vessels. A towing arm is rigidly mounted to a tow point on the top of the towfish housing adjacent to a 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 the nose down, and a safety cable attached from the tow point to the rear of the towfish will pull the towfish over the obstruction or through the snag, stern first.

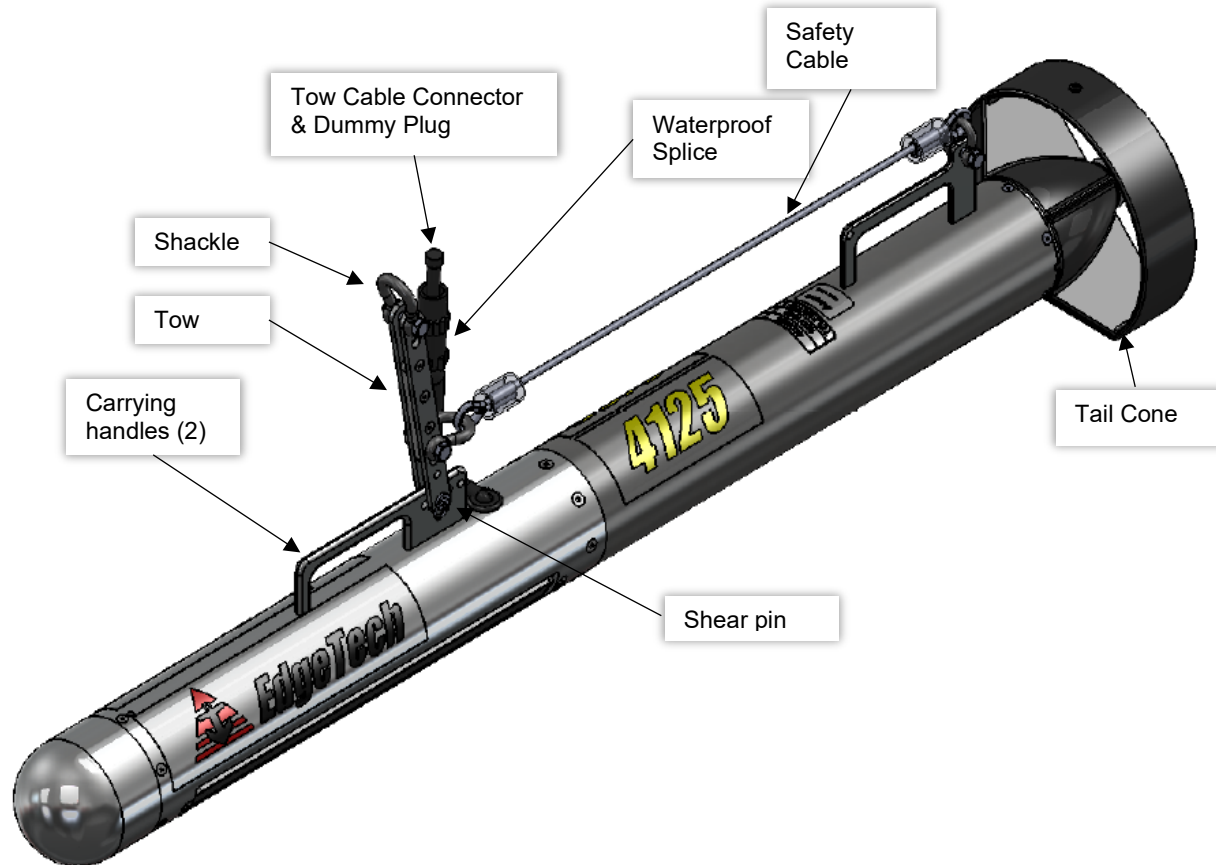


Figure 1-2: 4125 Towfish Diagram

The 4125i electronics and transducer configuration is straightforward and accessible. 4125i electronics are housed inside a stainless steel o-ring-sealed electronics bottle inside the aft section of the towfish. The forward flooded section of the towfish mounts the port and starboard-facing transducers and cable connectors for connecting to the electronics bottle bulkhead connectors. The towfish interfaces with the topside via a 10BaseT connection using VDSL modems in both the towfish and the topside processor.

The 4125i towfish is shipped with a choice of dual side scan sonar subsystems with two frequency configurations, 400/900 kHz or 600/1600 kHz. The 400/900 kHz option is the best choice for general survey work providing good range and resolution. The 600/1600 kHz option is best for detailed object identification as it provides high resolution. An optional hull scanning kit is available to support the angles necessary for detailed hull scans.

The side scan sonar subsystems are frequency-modulated (FM), dual-frequency, 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 frequencies are transmitted as linearly-swept, wide-band, high-energy acoustic pulses. The received echoes are processed into high signal-to-noise (SNR) images that are displayed and recorded by EdgeTech's Discover 4125 software.



Figure 1-3: 4125i Towfish



Figure 1-4: 4125i Imagery

1.2.2 4125i-P Topside Processor

The 4125-P (Portable) Topside Processor (**FIGURE 1-5**) 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 processor integrates towfish and DC power supplies, an Ethernet switch, a wireless router, and a VDSL modem, all housed within a single, compact, rugged, watertight (when closed) Pelican Storm Case. It can run on AC or DC power, and a laptop computer can be stored inside the case when not used.

The processor interfaces with a Windows® laptop computer over a wired or wireless 10/100BaseT Ethernet connection. Edgetech's Discover 4125 software installed on the computer controls and monitors the towfish, sonar subsystems, and displays and records surveys. The data can be stored in XTF and JSF formats. The topside unit also interfaces with a global positioning system (GPS) over a USB to serial or RS-232 serial interface connected to the computer. Customers can purchase a preconfigured Getac laptop with the system or provide their own computer.

The 4125i-P Topside Processor VDSL modem interfaces with the towfish VDSL modem using a high bit-rate digital subscriber line in the tow cable. A variety of cable lengths are available to suit a wide variety of survey types.

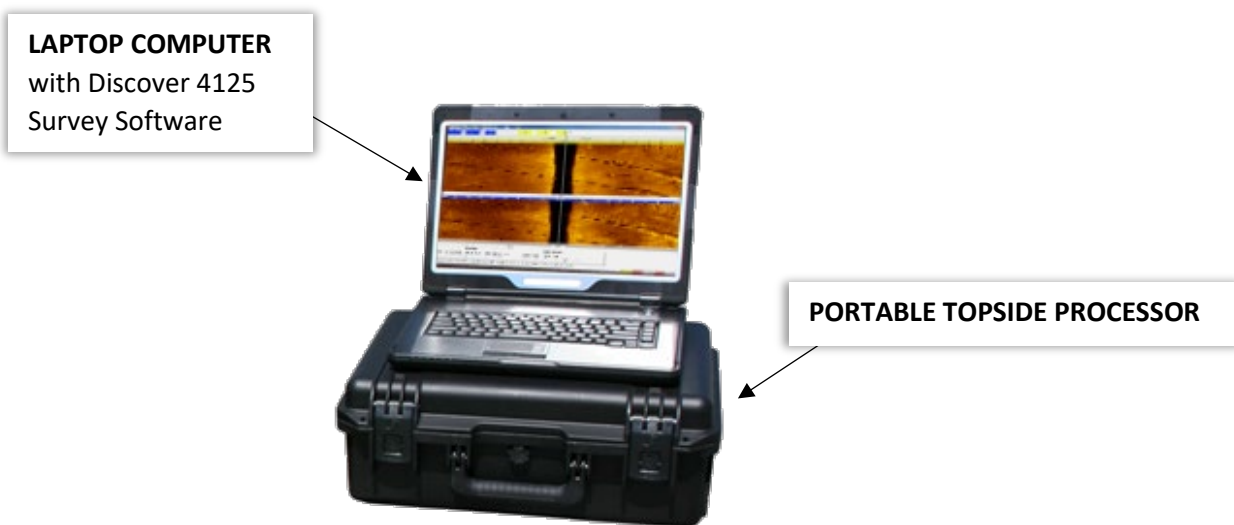


Figure 1-5: 4125 Laptop and Portable Topside Processor

CAUTION! Never use the portable topside Storm Case™ as a shipping container. Doing so will void warranties and may result in system damage.

1.2.3 4125i-RM Topside Processor

The 4125i-RM (Rack-Mounted) Processor is designed to be mounted in a standard 19-inch computer rack mount in a sheltered section of the survey vessel. The processor 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. It operates on AC power and includes rack-mounting hardware.

The processor interfaces with a Windows® laptop computer over a wired 10/100BaseT Ethernet connection. The Edgetech Discover 4125i software installed on the computer controls and monitors the towfish, sonar subsystems, and displays and records surveys. The data can be stored in XTF and JSF formats. The topside unit also interfaces with a global positioning system (GPS) over a USB to serial or RS-232 serial interface connected to the computer. Customers can purchase a preconfigured EdgeTech 2U Computer or Getac laptop with the system or provide their own computer.

The 4125i-RM Topside Processor VDSL modem interfaces with the towfish VDSL modem using a high bit-rate digital subscriber line in the tow cable. A variety of cable lengths are available to suit a wide variety of survey types.

1.2.4 Tow Cable



Figure 1-6: Tow Cable

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

Customers can purchase cables up to up to 600 meters in length. Contact **EDGE TECH CUSTOMER SERVICE** for cable length options. A cable grip is included to attach the tow cable to a shackle on the towing arm of the towfish.

1.2.5 Optional Equipment

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

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



Figure 1-7: 4125 With Depressor Wing and Keel Weight Kits Installed

1.2.5.1 Depressor Wing

The Depressor Wing Kit provides a depressor wing that can be attached to the towfish (see [FIGURE 2-5](#)), allowing it to be towed deeper and faster without increasing the tow cable's length 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. In addition, a safety cable with a shear pin mechanism is attached to prevent the loss of the towfish and wing should it become snagged. Installation of the optional Depressor Wing is described in this manual's [INSTALLING THE DEPRESSOR WING](#) section.



Figure 1-8: Depressor Wing Kit

1.2.5.2 Keel Weight

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

1.2.5.3 HullScan Kit

The HullScan kit 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 instructions are found in the [INSTALLING THE HULL SCAN KIT](#) section of this manual.



Figure 1-9: Optional Inverted HullScan Bracket

2.0 SPECIFICATIONS

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

2.1 4125i Topside Processor Specifications

The specifications for the 4125i-P and 4125i-RM Topside Processors are shown below:

	4125i-P TOPSIDE	4125i-RM TOPSIDE
Size:	19.0 cm (7.3 in.) high 49.0 cm (19.2 in.) wide 39.0 cm (15.2 in.) deep	8.9 cm (3.50 in.) high 48.3 cm (19 in.) wide 50.6 cm (19.9 in.) deep
Weight:	13.2 kg (29 lbs.) (w/ laptop computer) 10 kg (22 lbs.) (w/o laptop computer)	6.4 kg (14 lbs.)
Case construction:	High-impact structural polypropylene	Aluminum 19-inch rack mount
Case color:	Black	Black and Gold
Case sealing method:	Watertight cover with O-ring seal and purge valve	N/A (not watertight)
Shipping container type:	Carton	Carton
Shipping container size:	63.5 cm (25 in.) high 53.3 cm (21 in.) wide 53.3 cm (21 in.) deep	61 cm (24 in) high 61 cm (24 in) wide 30.5 cm (12 in) deep
Shipping weight:	21.8 kg (48 lbs.)	11.3 Kg (25 lbs.)
Operating Temperature:	0–45°C (32–113°F)	0–45°C (32–113°F)
Storage temperature:	-20–60°C (-4–140°F)	-20–60°C (-4–140°F)
Operating relative humidity:	5-90% (non-condensing)	5-90% (non-condensing)
Non-operating storage relative humidity:	5-90%	5-90%
AC input power:	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	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

	4125i-P TOPSIDE	4125i-RM TOPSIDE
DC input power:	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	N/A
Wireless Ethernet:	Intel® Dual Band Wireless-AC 9260, 802.11ac	N/A (wired ETHERNET connection only)
Wired Ethernet	10/100 Mb/s RJ-45 LAN connection	10/100 Mb/s RJ-45 LAN connection
Power to towfish:	75 VDC at 1.7 A max	75 VDC at 1.7 A max
Towfish Interface:	VDSL Modem Link	VDSL Modem Link
Processor:	Intel® Core I7-8550U	N/A
Memory:	8 GB DDR	N/A
Data storage:	512 GB SSD	N/A
Operating system:	Windows 10 64-bit	N/A
Application software:	Discover 4125	Discover 4125 (on a user-supplied computer)
Display:	14-inch LCD	N/A
Keyboard:	Laptop keyboard	N/A
Pointing device:	Laptop mouse pad	N/A

Table 2-1: 4125i-P Topside Processor

2.1.1 4125i Topside Diagrams and Drawings

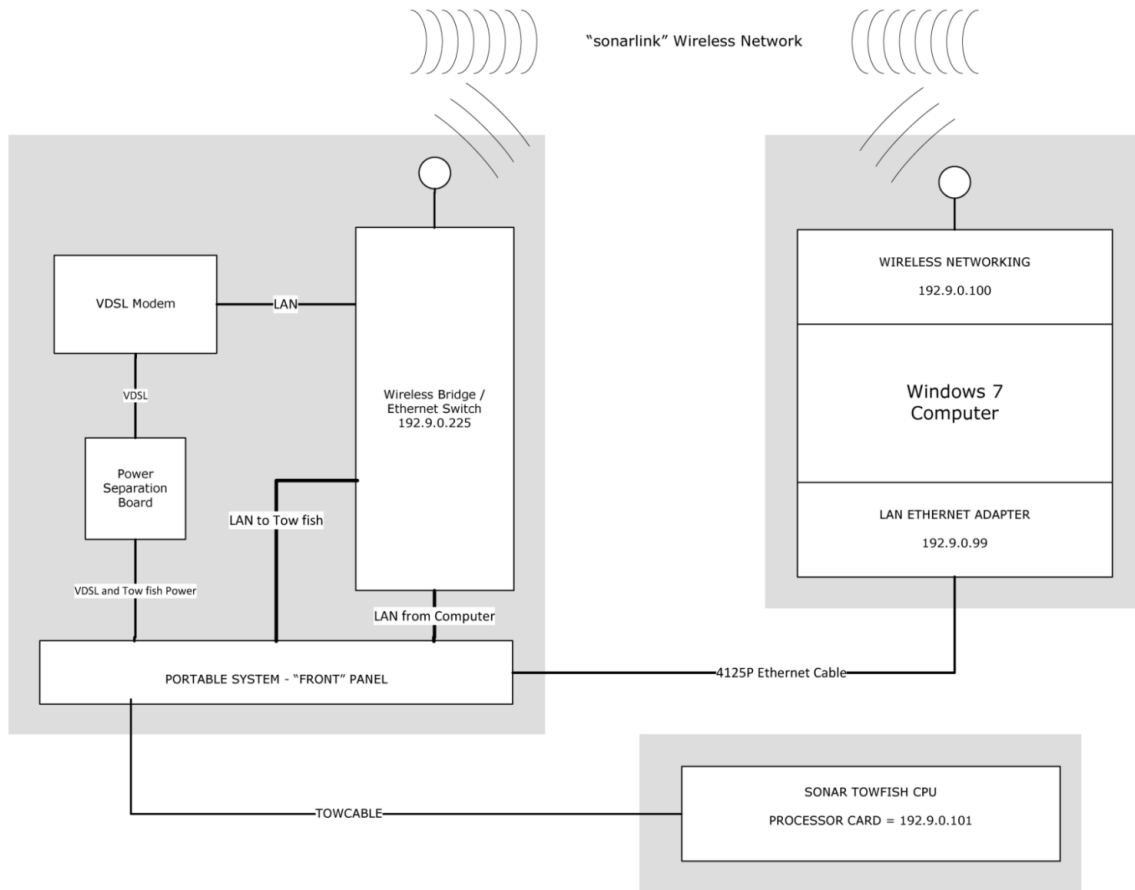


Figure 2-1: 4125i Series Block Diagram (Wireless for Portable Topside Only)

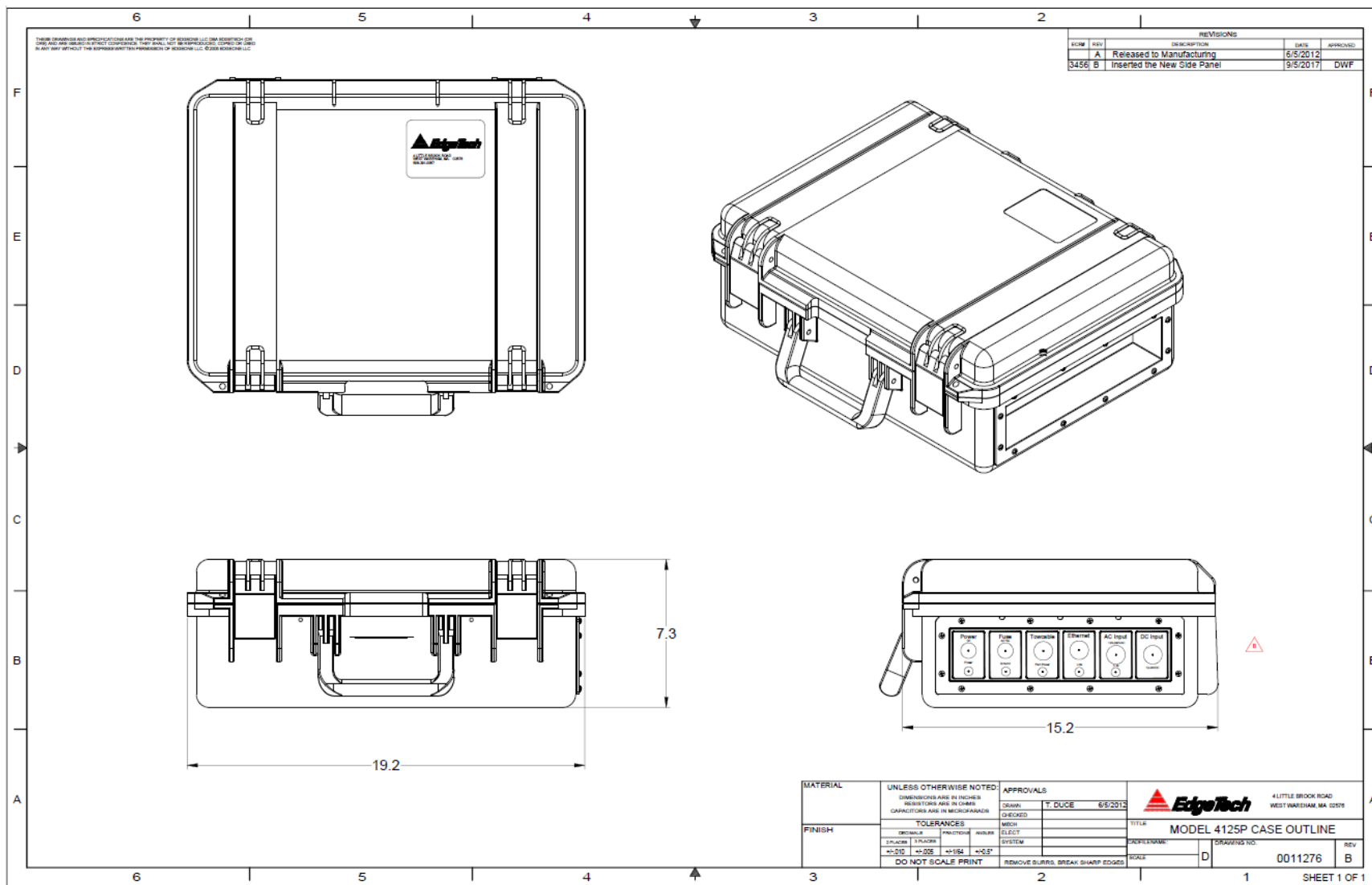


Figure 2-2: 4125i-P Case ICD Drawing

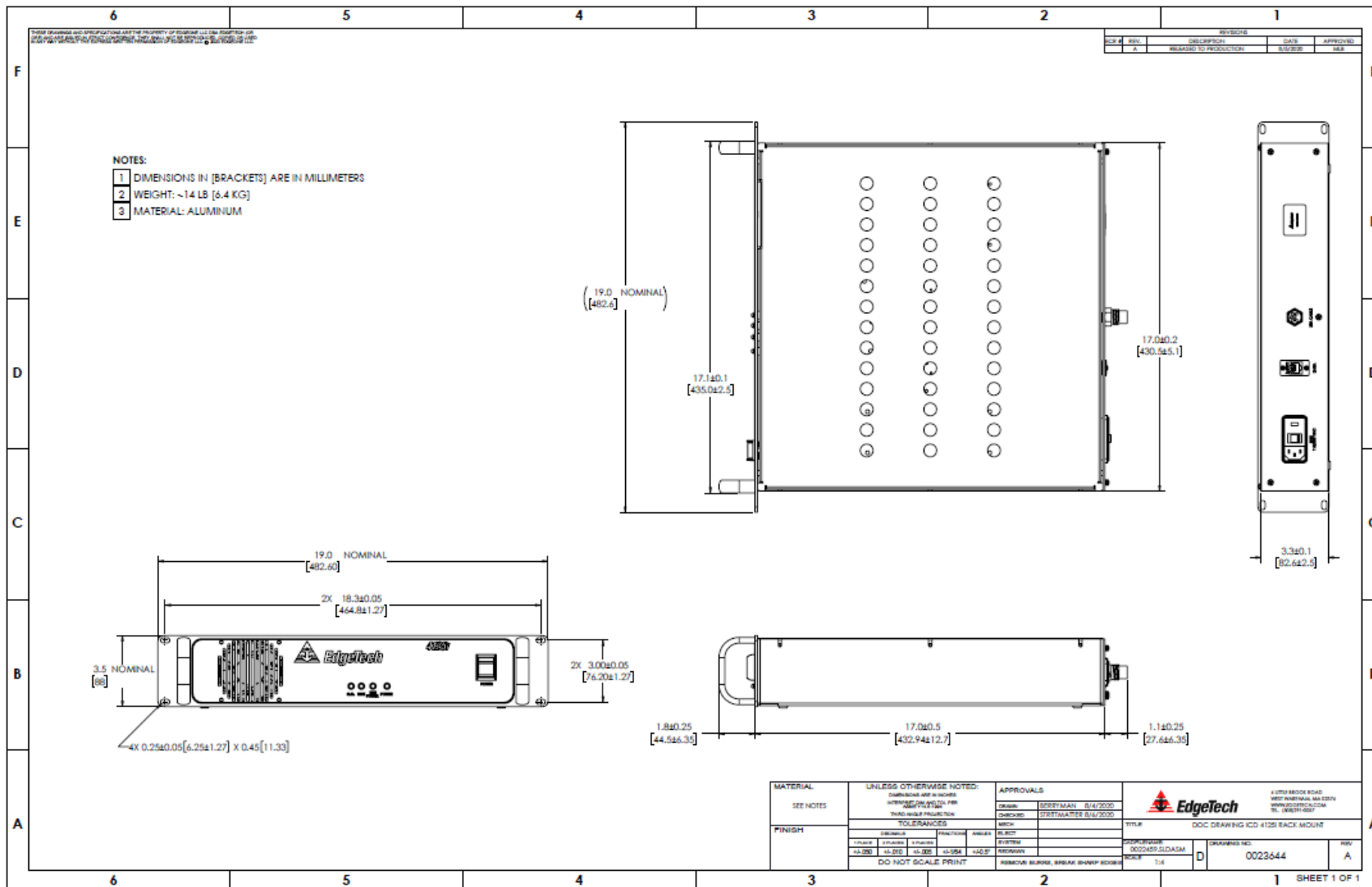


Figure 2-3: 4125i-RM Topside Processor

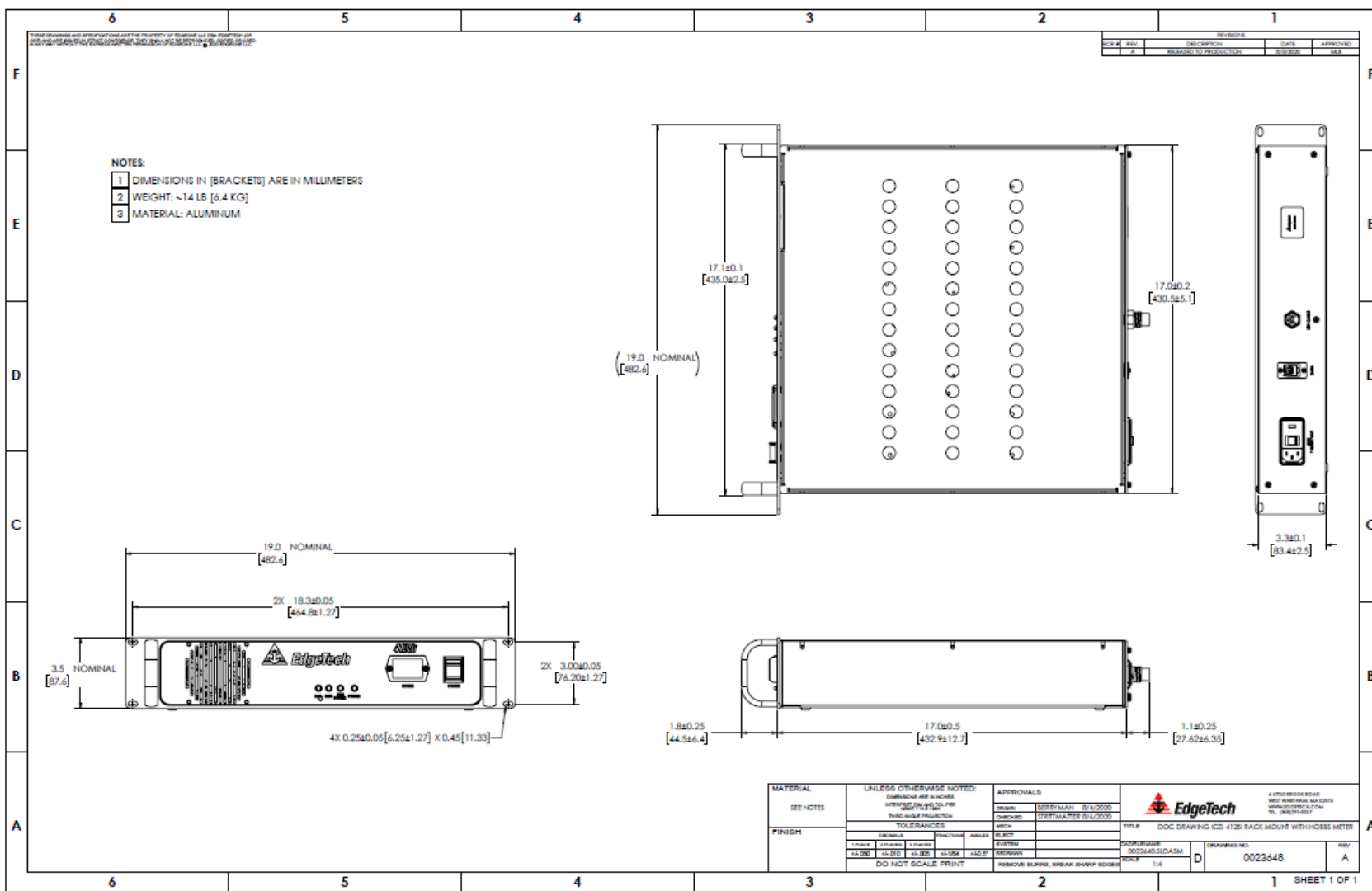


Figure 2-4: 4125i-RM Topside Processor with Hobbs Meter

2.2 4125i Towfish Specifications

The specifications for the 4125i Towfish are shown below.

SPECIFICATION	VALUE
Size:	114.8 cm (45.2 in.) long; 9.6 cm (3.75 in.) diameter
Weight in air:	20.4 kg (45.0 lbs.)
Weight in saltwater:	14.4 kg (31.6 lbs.)
Construction:	Stainless steel
Depth rating:	200 m (656 ft.)
Maximum tow cable length:	600 m (loop resistance cannot exceed 14 ohms). Contact EdgeTech Customer Service for the specific cable types.
Tow cable conductors:	RG-58 coax
Kevlar tow cable breaking load:	545 kg (1200 lbs.)
Input power:	75 VDC, 65 watts typical.
Towing speed	Maximum of 4.8 knots
Shear force:	420 kg (930 lbs.)
Frequencies:	400/900 kHz or 600/1600 kHz
Pulse-type:	CHIRP
Data interface:	VDSL
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)
Along-track resolution:	80 cm @ 100 m (400 kHz) 58 cm @ 100 m (600 kHz) 40 cm @ 50 m (400 kHz) 29 cm @ 50 m (600 kHz) 24 cm @ 50 m (900 kHz) 20 cm @ 25 m (400 kHz) 14 cm @ 25 m (600 kHz) 12 cm @ 25 m (900 kHz) 9 cm @ 25 m (1600 kHz)

SPECIFICATION	VALUE
Horizontal beam width:	0.46° (400 kHz) 0.28° (900 kHz) 0.33° (600 kHz) 0.20° (1600 kHz)
Vertical beam width:	50°
Side lobes:	<-36 dB
Transducer array depression angle:	Factory set at 33°, adjustable to 25°
Operating temperature:	0–45°C (32–113°F)
Heading accuracy:	For Indicative Use Only.
Heading resolution:	0.1°
Pitch and roll accuracy:	For indicative Use Only.
Pressure sensor accuracy:	0.5% of depth when calibrated for 0 m
Pressure sensor working depth:	0–137 m
Navigation interfaces:	RS-232, NMEA0183
Options:	Keel Weight Kit Depressor Wing Kit Hull Scan Kit Magnetometer Interface

Table 2-2: 4205i Towfish Specifications

2.2.1 4125i Towfish Drawings

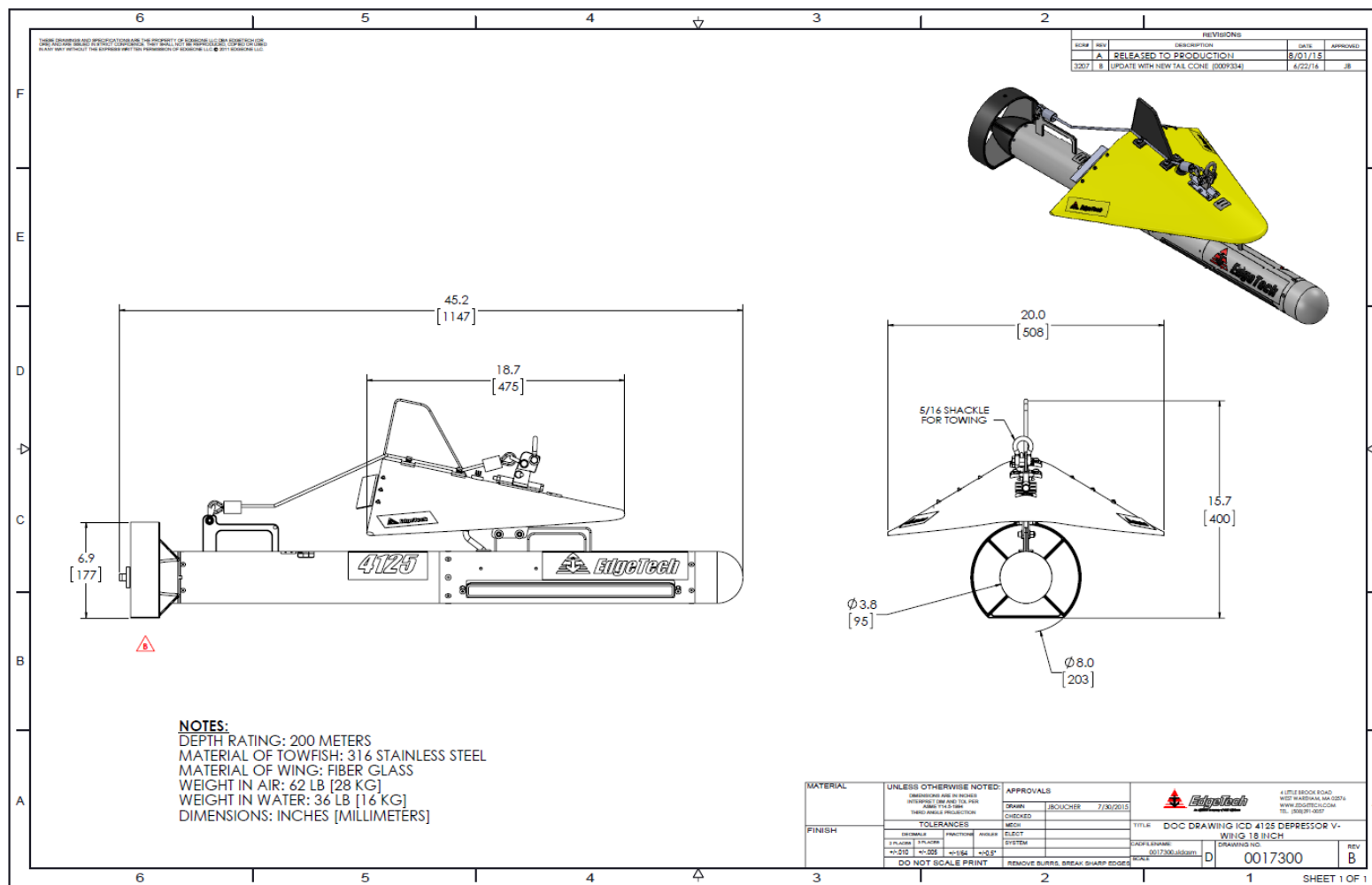


Figure 2-5: 4125i with Depressor Wing ICD Drawing

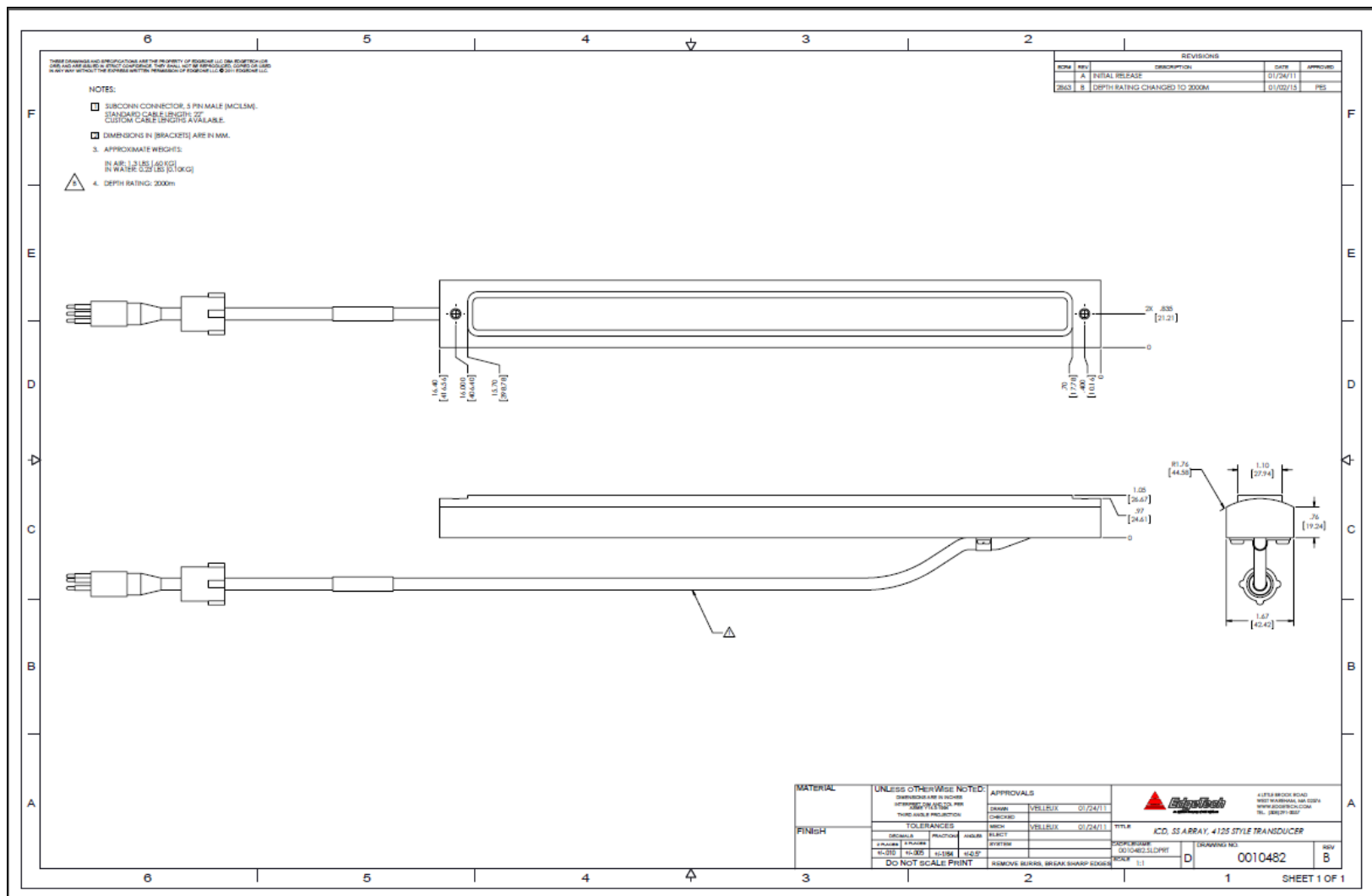


Figure 2-6: 0010482, DOC Drawing ICD SS Array 4125

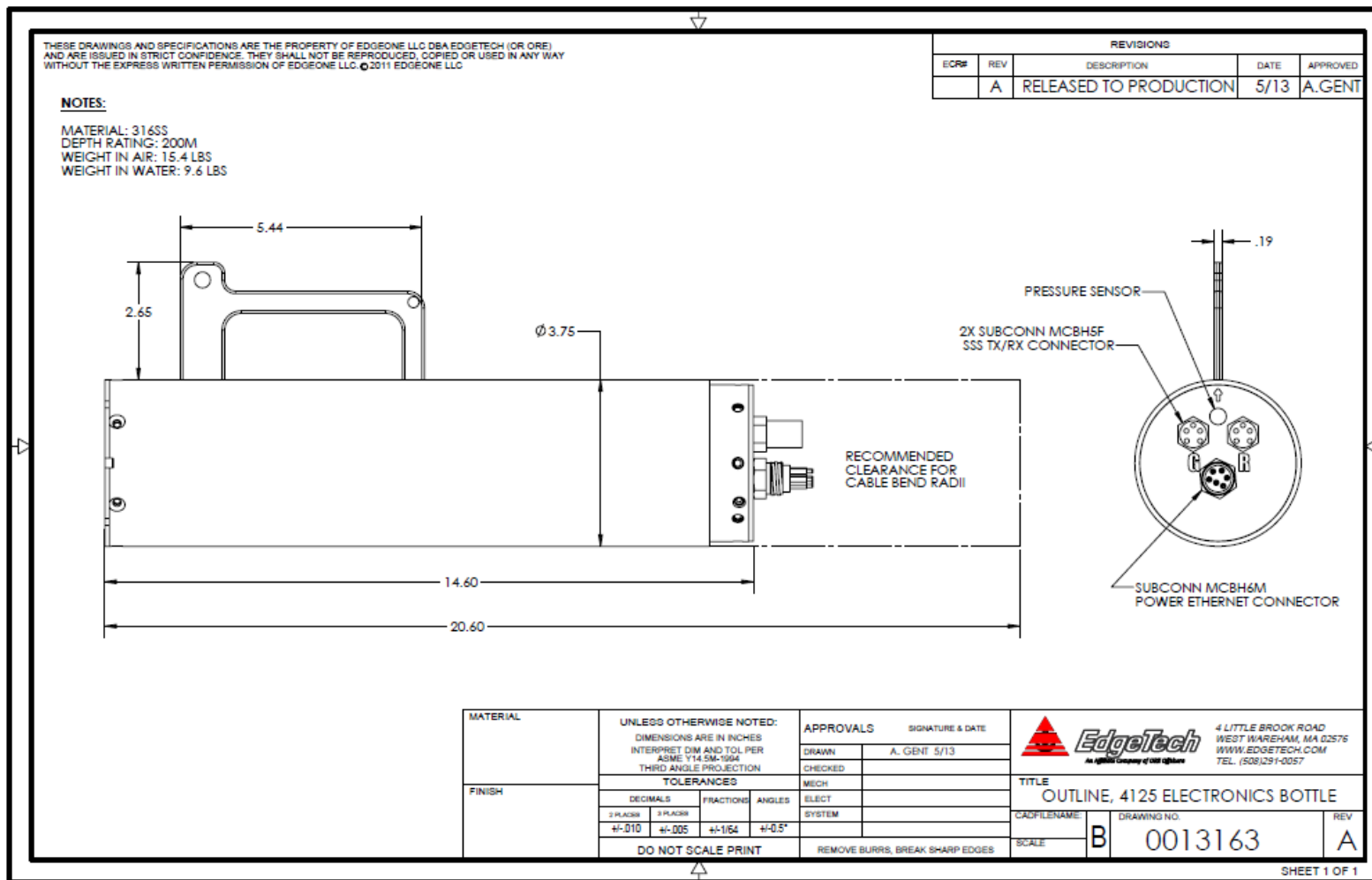


Figure 2-7 4125 Electronics Bottle

2.3 Cable Drawings

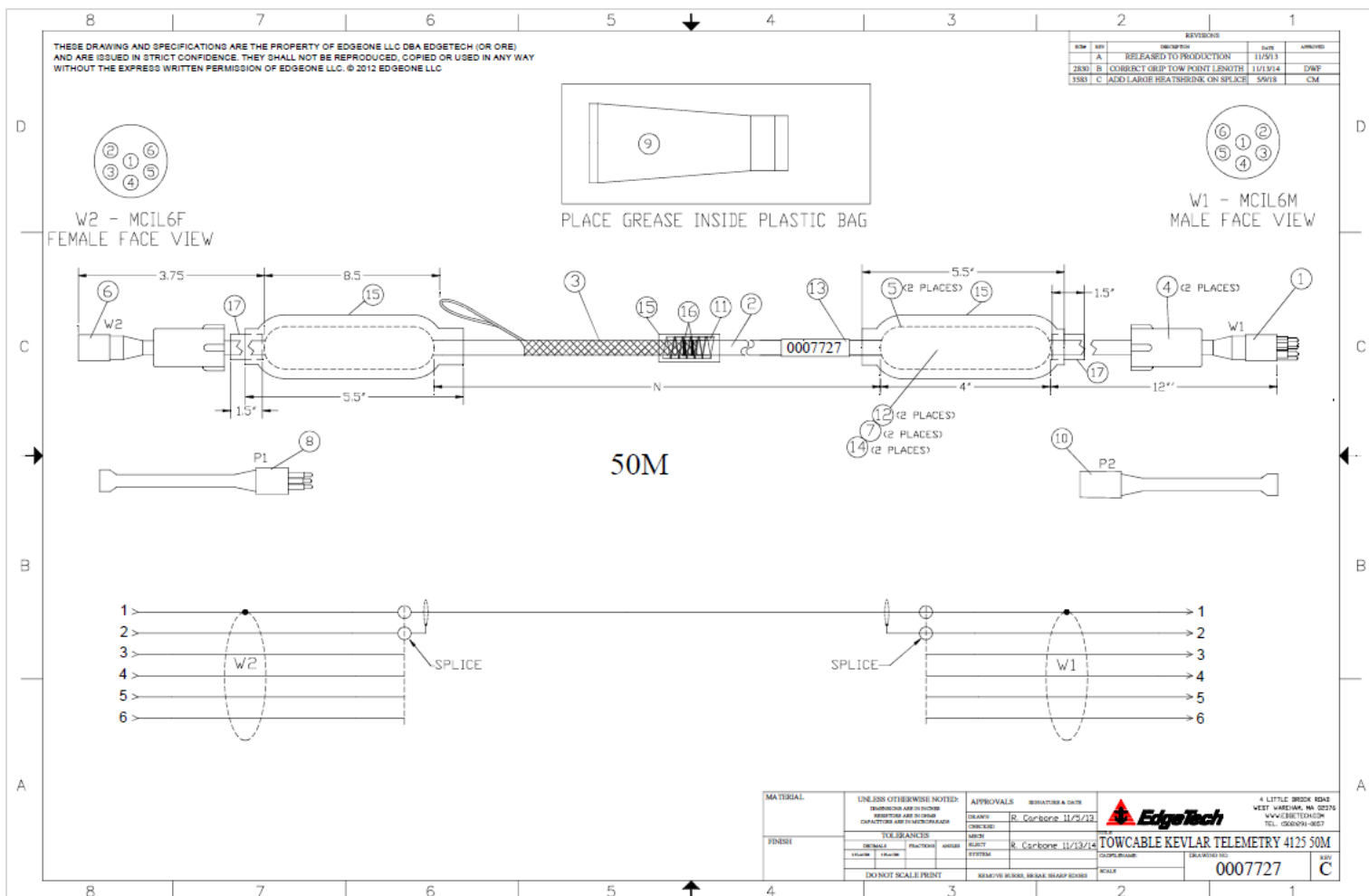


Figure 2-8: Kevlar Reinforced Tow Cable

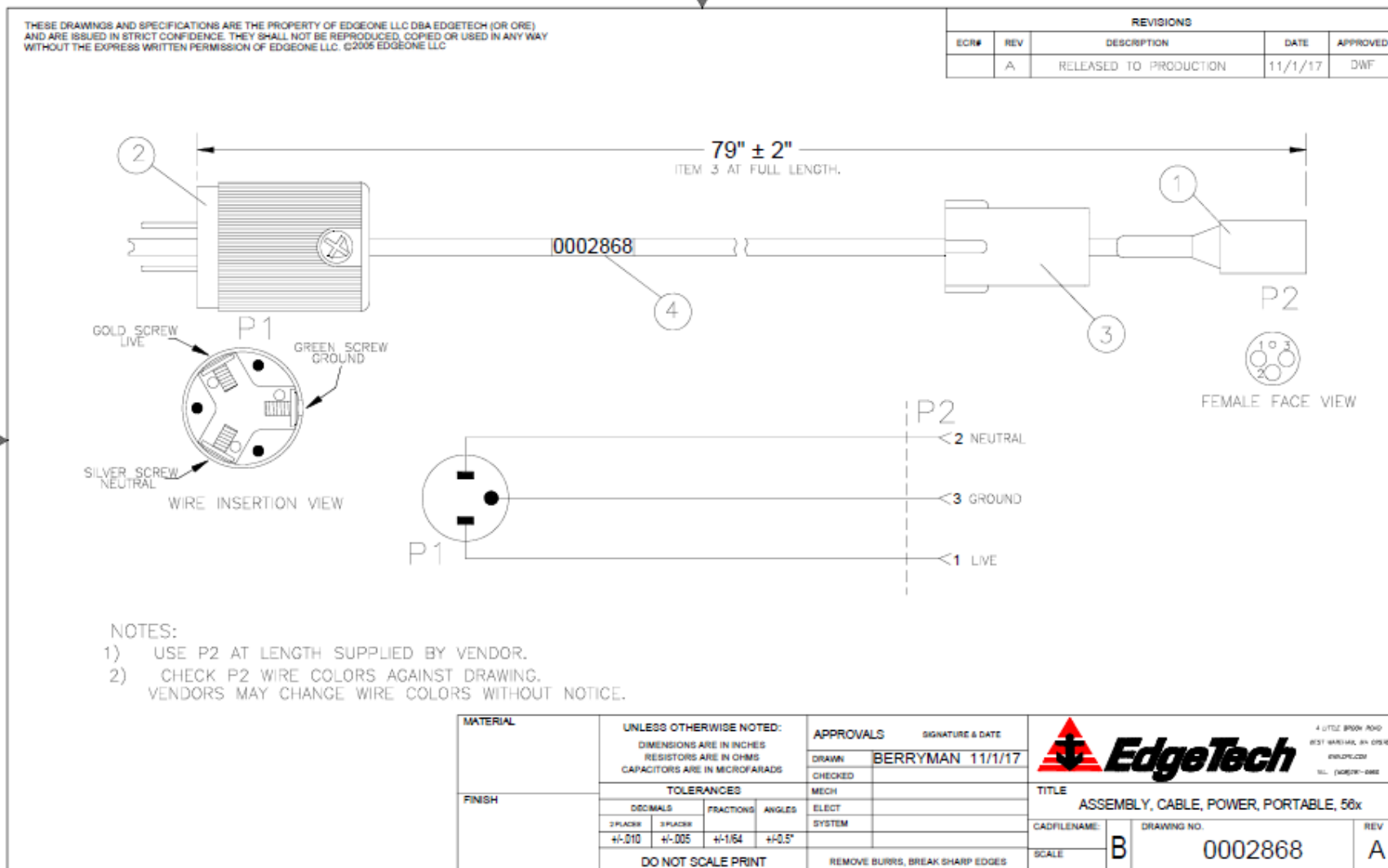
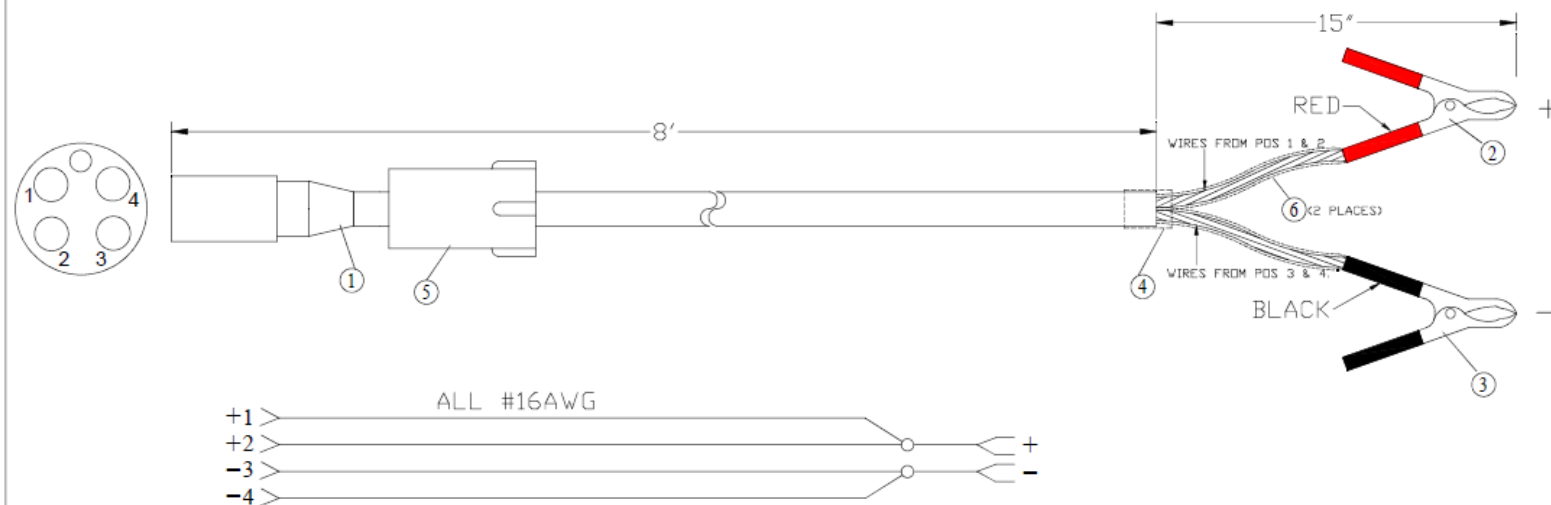


Figure 2-9: AC Power Cable

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REVISIONS				
REV	DATE	DESCRIPTION	APPROVED	DATE
A		RELEASED TO PRODUCTION	DWF	5/27/14
B		ADD EXPANDO TO BOM AND DRAWING	DWF	8/12/14




MATERIAL	APPROVALS	 401 STATE ST. BELLINGHAM MELBORN, MA 01757
	DRAWN: R. Carbone 3/27/14 CHECKED: DWF 3/27/14 REACT SYSTEM	
FINISH	TITLE: ASSY CABLE DC POWER 4125 PORTABLE REV: B SCALE: B	DRAWING NO: 0014945 REV: B
DO NOT SCALE PRINT		

Figure 2-10: DC Power Cable for Portable Topside

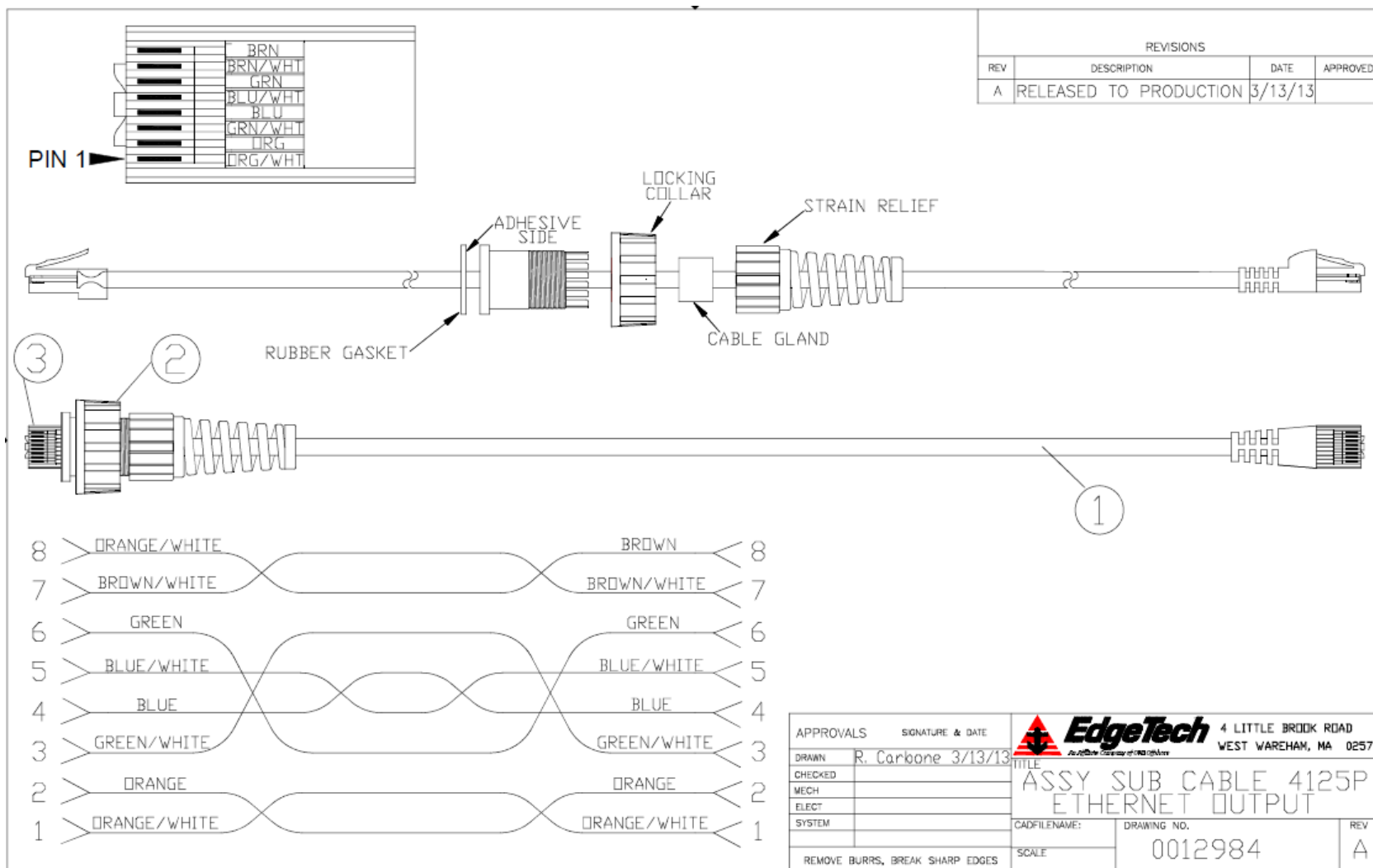



Figure 2-11: Ethernet Cable

APPROVALS	SIGNATURE & DATE	 EdgeTech <small>Advanced Technology for the Edge</small>	4 LITTLE BROOK ROAD	
DRAWN	R. Carbone 3/13/13		WEST WAREHAM, MA 02576	
CHECKED		TITLE		
MECH		ASSY SUB CABLE 4125P		
ELECT		ETHERNET OUTPUT		
SYSTEM		CADFILENAME:	DRAWING NO.	REV
REMOVE BURRS, BREAK SHARP EDGES		SCALE	0012984	A

3.0 SETUP AND ACTIVATION

Setup and test of the EdgeTech 4125i Dual-frequency Side Scan Sonar System encompass unpacking, inspecting, and connecting the system components, connecting a navigation system if required, activating the system, and verifying operation using the EdgeTech Discover 4125i 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 4125i-P 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 **EDGETECH CUSTOMER SERVICE**.



Figure 3-1: 4125i in Case

If the shipping containers appear free of damage, carefully unpack the components and inspect them for damage. 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 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's requirements, the 4125i Dual-frequency Side Scan Sonar System typically includes the items listed below.

- 4125i-P Topside Processor
- 4125i 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 they were originally shipped. Store the system in a dry environment when not in use.

3.2 Power Requirements

The 4125i-P Topside Processor's power requirements 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.

CAUTION: Do not use an AC power source that also powers electric motors on the survey vessel, such as pumps and winches.

CAUTION: 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. The 4125i-P Processor is shipped and configured for the end user's voltage requirements.

AC POWER CORD WIRE COLOR	FUNCTION
Black	AC line
White	AC neutral
Green	Earth ground

Table 3-1: AC Power Cord Wiring

3.3 Navigation Interface

Navigation devices are installed by physically connecting the device to the computer's serial communications port. The port is logically configured using EdgeTech Discover software on the computer. If it is an EdgeTech computer, serial port COM1 has been configured to accept this connection. If this is not an EdgeTech-configured computer, the port can be configured in Discover by going to the Top Menu, selecting *Configuration*, and then *Serial Ports* from the dropdown menu. You then enable the port, specify the port on the computer, and the baud rate. The GPS device's manufacturer will provide the baud-rate in their manual. Refer to the [DISCOVER 4125 SOFTWARE MANUAL](#) for more configuration details.

Figure 3-2: Discover Serial Port Configuration

The 4125i Series Dual-frequency Side Scan Sonar System accepts all standard National Marine Electronics Association (NMEA) 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 4125i system have different placement requirements within a vessel, and these are detailed below:

3.4.1 4125i-P Topside Processor Placement

The 4125i-P Topside Processor is designed to be rugged and can be used in an environment prone to mist and sea spray 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°–45°C (32°–113°F). However, avoid areas of direct sunlight, especially in tropical environments, as heat buildup 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. Sufficient space for cabling should be available with special care not to bend the tow cable excessively.

3.4.2 4125i Rack Mount Topside Processor

The 4125i-RM Rack Mount Topside Processor should be installed in a sheltered 19" rack where it will not be exposed to precipitation or sea spray and where the temperature is consistently between 0°–45°C (32°–113°F). It is also important that the unit is located in a place where direct communication with the deck crew operating the towfish is possible. Sufficient space for wiring should be available with special care not to bend the tow cable excessively.

3.5 Topside Controls, Connectors, and Indicator Lights

Controls, indicators, and connector descriptions for the two topside processor options are found in the subsections below.

3.5.1 4125i-P Topside Processor Controls, Connectors, and Indicator Lights

The controls and indicators for the portable option are shown and described below:

CONTROL OR INDICATOR	DESCRIPTION
Power (Switch)	Toggle switch. Turns on the 4125i-P Topside Processor.
Fuse	5A/250V Fuse (PN #0003728)
Tow Cable Connector	6-pin female bulkhead connector. Connects to the tow cable.
Ethernet Connector	RJ-45 Ethernet LAN connector. Connects to PC using Category-5 Ethernet cable.
AC Power Input Connector	3-pin male bulkhead connector. Connects to 90–260 VAC, 50/60 Hz power.
DC Power Input Connector	4-pin male bulkhead connector. Connects to 12–24 VDC power.
Power Indicator	Red LED indicator. Illuminated when 4125i-P Topside processor is on.
Fish Power Indicator	Red LED indicator. Illuminated when the 4125i-P Topside Processor is on.
Link Indicator	Green LED indicator. Flashes while a reliable communications link with the towfish is being established and then illuminates continuously when the link is found
CM Indicator	The CM (Current Monitor) LED should be off, indicating a good connection. If there is an issue, the CM light will flash at a 1 Hz rate for an open tow cable and 2 Hz for a shorted tow cable.
Grounding Lug	Electrical grounding lug

Table 3-2: 4125i-P Processor Controls, Connectors, and Indicator Lights Descriptions

NOTE: The 4125i-P 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 overcurrent or undercurrent condition exists. To reactivate the power to the towfish, turn the power switch off and then on again.

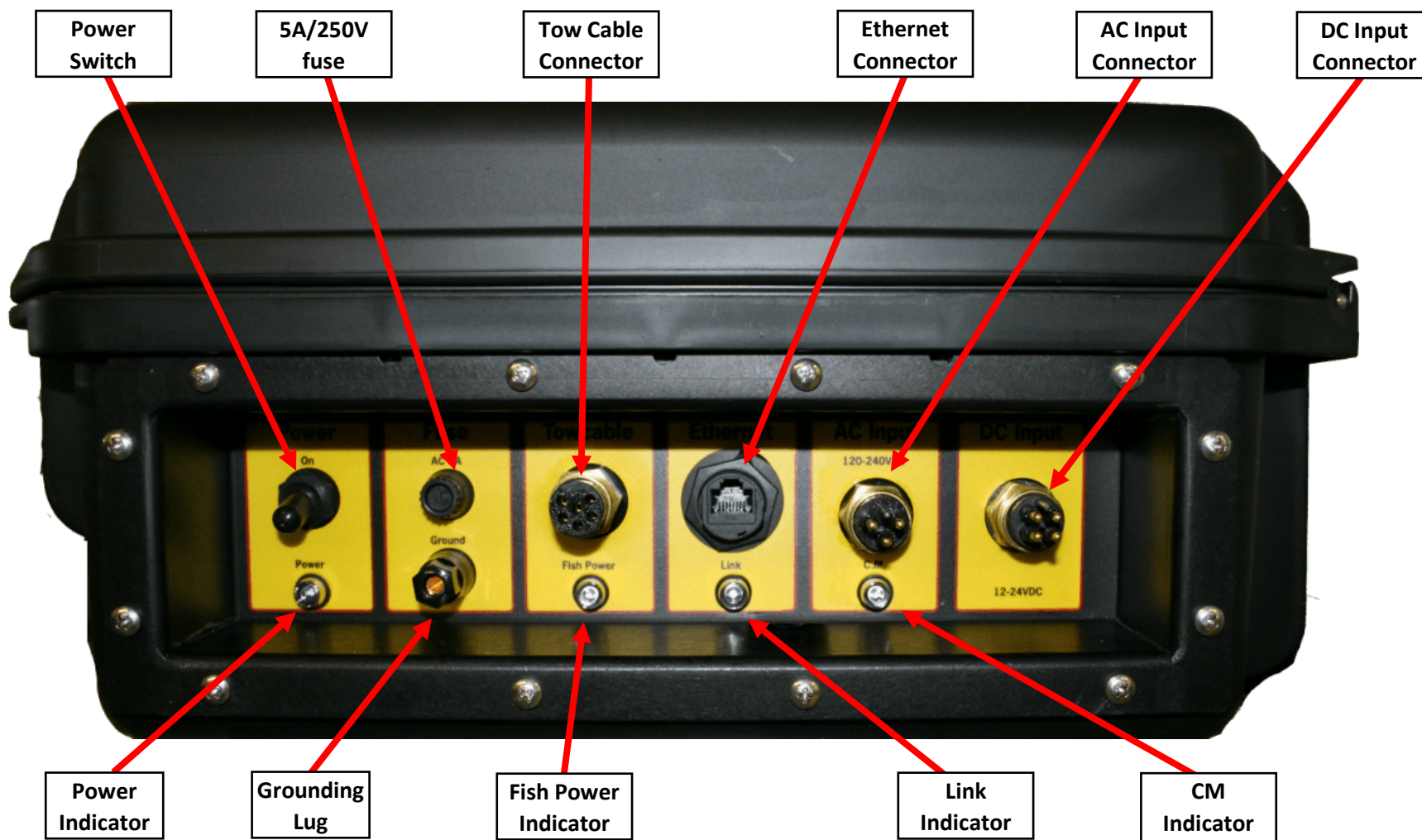


Figure 3-3: 4125i-P Topside Processor Side Panel Controls, Connectors, and Indicator Lights

3.5.2 4125i-RM Topside Controls, Connectors, and Indicator Lights

The controls and indicators for the rack mount option are shown and described below:

CONTROL OR INDICATOR	DESCRIPTION
Front Power Switch	Toggle switch. Turns on the 4125i-RM topside.
Power Indicator	Green Indicator. Illuminated when the 4125i-RM topside is on.
Fish Power Indicator	Red Indicator. Illuminated when the 4125i RM Topside is on.
Link Indicator	Green Indicator. Flashes while a reliable communications link with the towfish is being established and then illuminates continuously when the link is found
CM Indicator	The CM (Current Monitor) light should be off, indicating a good connection. If there is an issue, the CM light will flash at a 1 Hz rate for an open tow cable and 2 Hz for a shorted tow cable.
Rear Power Switch	Toggle Switch. Turns on the 4125-RM Topside. It can be kept in the On position when the Front Power Switch is used.
Rear Power Connector	AC Power Connector
Rear 5A/250V Fuse	5A/250V Fuse (PN#003728)
Rear Data Connector	RJ-45 Ethernet LAN connector. Connects to PC using Category-5 Ethernet cable.
Rear Sea Cable Connector	6-pin female bulkhead connector. Connects to the tow cable.

Table 3-3: 4125i-RM Controls, Connectors, and Indicator Lights Descriptions

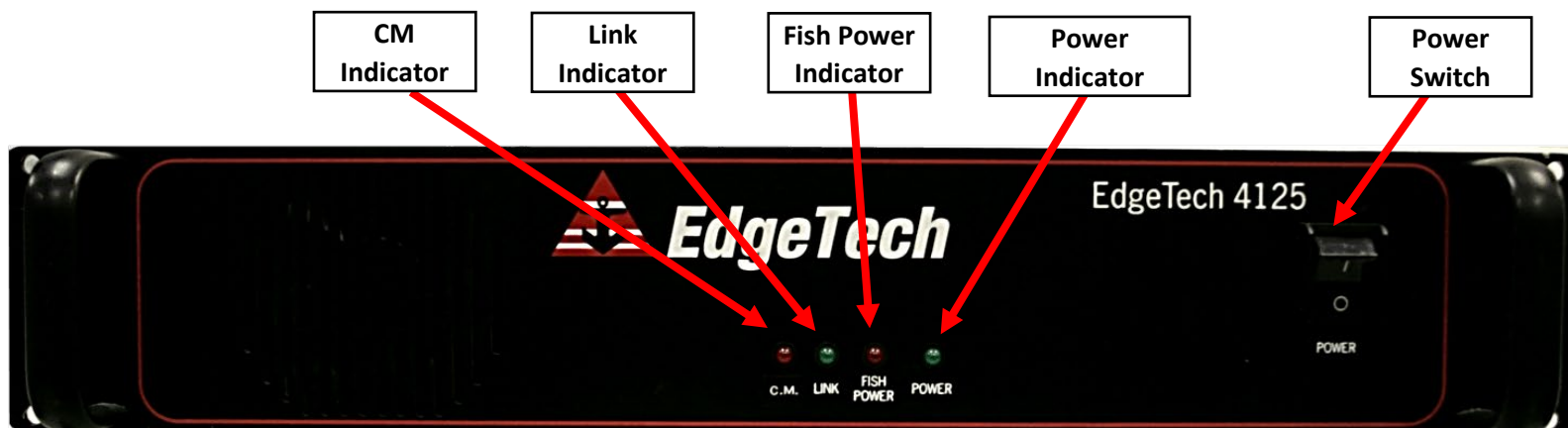


Figure 3-4: 4125i-RM Front Panel—Controls and Indicator Lights

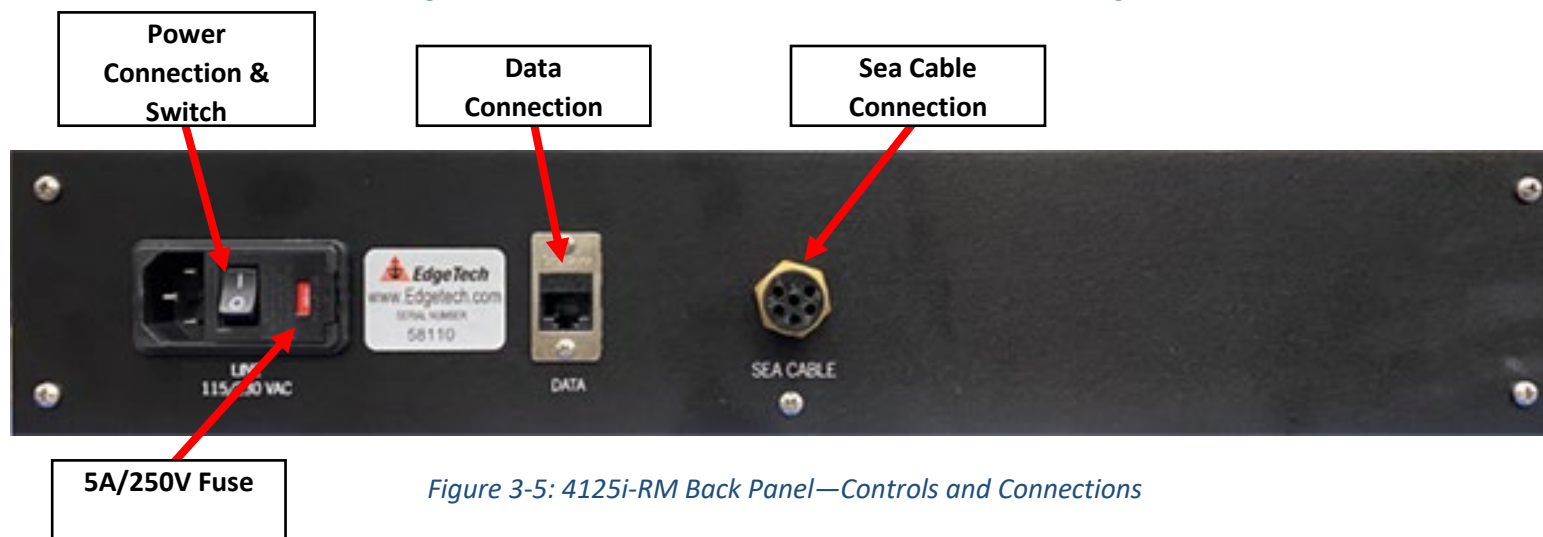


Figure 3-5: 4125i-RM Back Panel—Controls and Connections

3.6 TCP/IP Address Settings

The 4125 Series Dual-frequency Side Scan Sonar System includes many Ethernet devices connected to a common local area network (LAN). Each device has a factory-set TCP/IP address, which does not require changing under normal circumstances. Should any of these devices be replaced or upgrades are later installed, the TCP/IP addresses may need reconfiguring.

A data connection between the computer and the 4125i topside processors is made by configuring the network interface card IPv4 address on the computer. If you have purchased the topside with an EdgeTech computer, this will be preconfigured. If you are connecting a computer not preconfigured by EdgeTech, you must manually set the IPv4 address of your computer to *192.9.0.nnn*, where *nnn* is any integer from 1 to 100, except for the reserved IP numbers of other components listed in the **4125i**

FACTORY INSTALLED COMPONENT IP

ADDRESSES TABLE. The only other field in the Windows Manual IP settings to be populated is the Subnet Mask, which should be set to *255.255.255.0*. You do not need to populate the Default Gateway. The Obtain DNS Server Address Automatically radio button is automatically selected by Windows, so the Preferred DNS Server and Alternative DNS Server fields do not need to be populated.

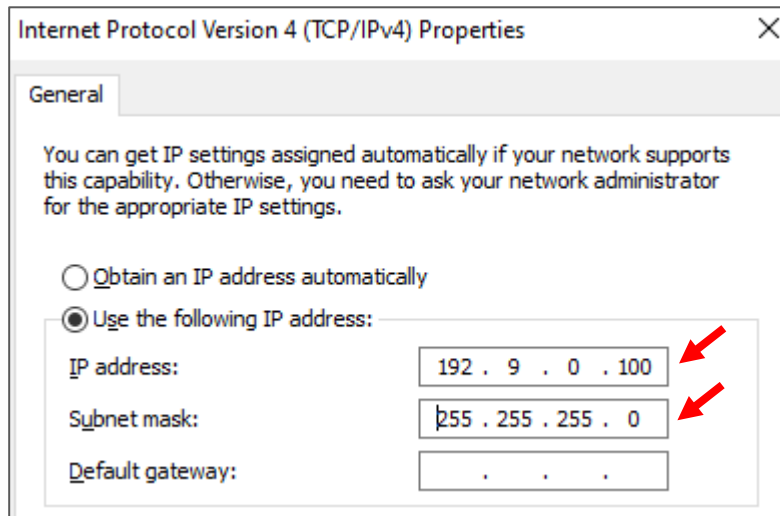


Figure 3-6: Windows Manual IP Properties Window

DEVICE	TCP/IP ADDRESS
Wireless bridge	192.9.0.225
Netburner	192.9.9.102
Towfish CPU	192.9.0.101
EdgeTech Computer with 4125i-P	192.9.0.99
EdgeTech Computer with 4125i-P Wireless	192.9.0.100

Table 3-4: 4125i Factory Installed Component IP Addresses

3.7 Assembling the 4125i Towfish

The towfish is assembled by attaching the tail assembly to the aft endcap of the towfish. To do so:

1. Mate the tail assembly to the back of the towfish. Notches on the towfish endcap match the tail assembly, ensuring proper alignment.

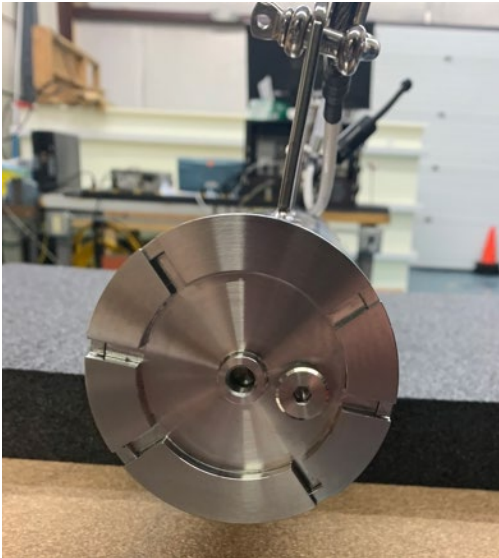


Figure 3-7: 4125i Endcap Notches



Figure 3-8: 4125i Tail Assembly Seating

2. Thread the securing bolt through the provided washer into the tail assembly and towfish completely. The bolt can be hand tightened.

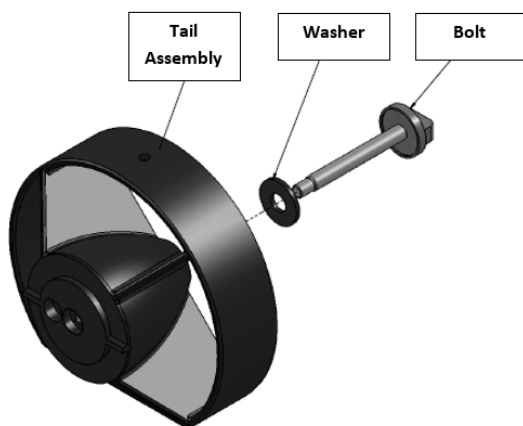


Figure 3-9: Tail Assembly Bolt Assembly



Figure 3-10: Tail Assembly Bolt Installation

3.8 Installing Optional Equipment

This subsection describes how to install some of the 4125i 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 the subsection [CONNECTING THE SYSTEM COMPONENTS](#).

3.8.1 Installing the Hull Scan Kit

To install the inverted horizontal and vertical hull scan brackets included with the [4125 HULL SCAN KIT](#).

1. Remove the standard tow arm and recovery cable.
2. Attach the bracket to tapped holes on the bottom of the towfish for horizontal (inverted) hull scanning ([FIGURE 3-11](#)) or the holes above the transducer for vertical hull scanning ([FIGURE 3-12](#)). The bracket is engraved with the words “tail and nose” to indicate how the bracket should be oriented.

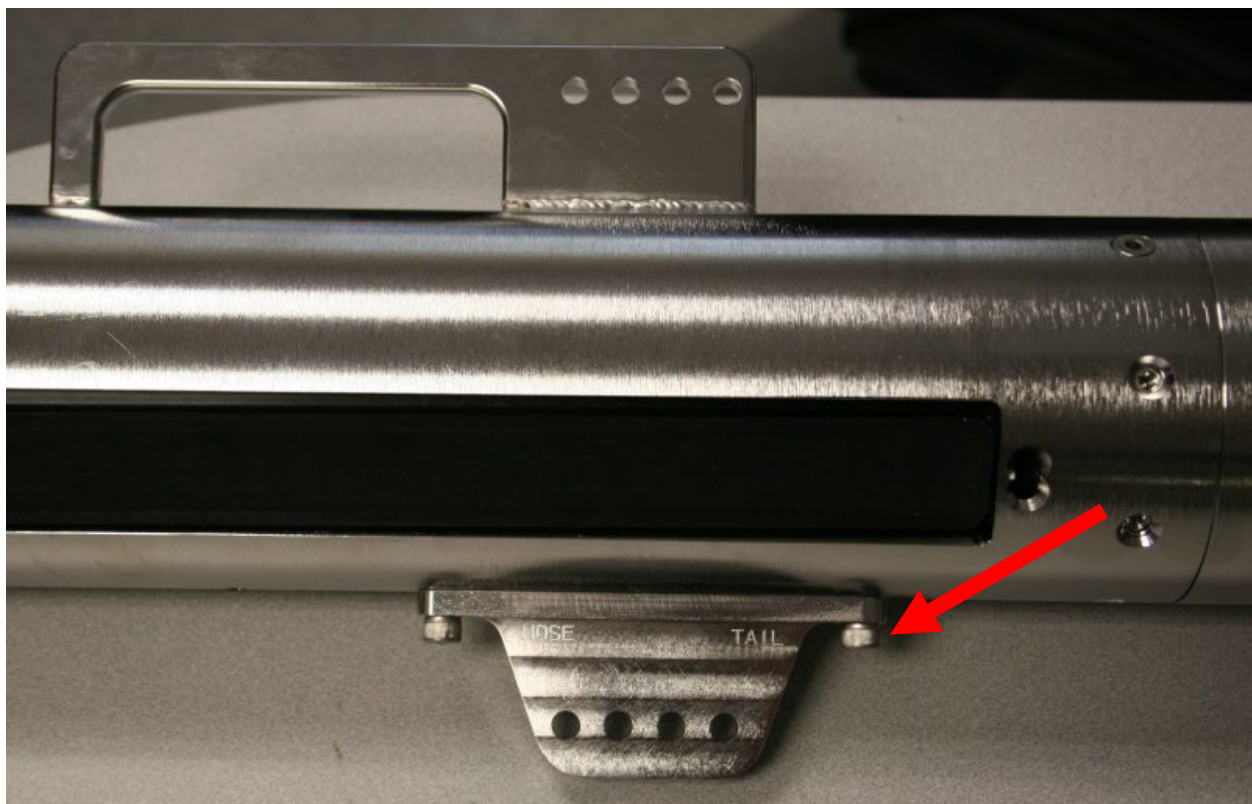


Figure 3-11: Horizontal (Inverted) Hull-Scan Bracket Attached



Figure 3-12: Vertical Hull-Scan Bracket Attached

3. Attach the tow arm to the hull-scan bracket.
4. Attach hull scan recovery cable to hull-scan bracket and tow arm as pictured in **FIGURE 3-13**.
5. Tighten and seize shackles with wire ties or seizing wire.

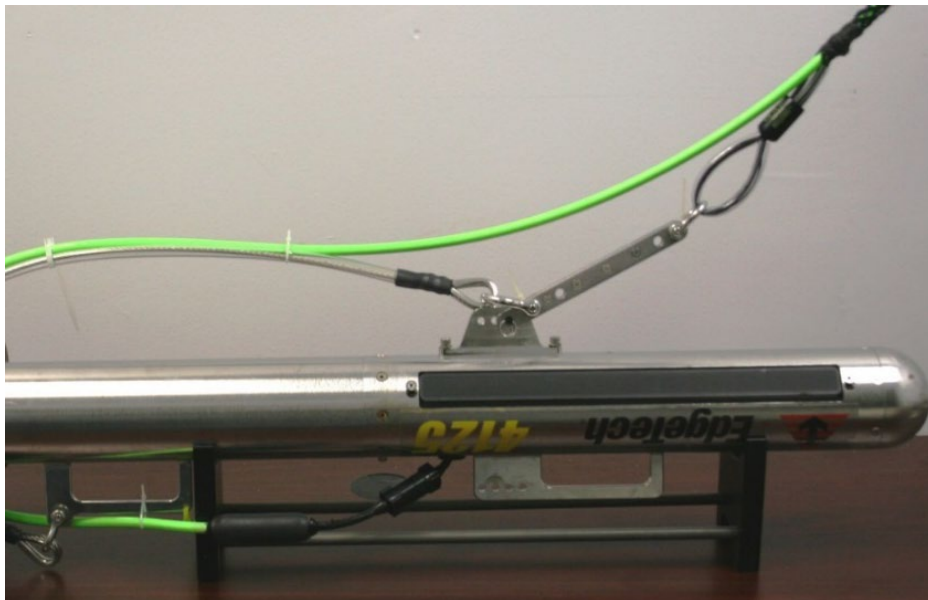


Figure 3-13: Connected Towfish (Horizontal Hull-Scan Shown)

NOTE: Because the towfish 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 by 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.

3.8.2 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.



Figure 3-14: Depressor Wing bracket shown attached to tow fish bracket

4. Secure the depressor recovery cable to the rear handle of the towfish and secure it with seizing wire or tie-wrap.

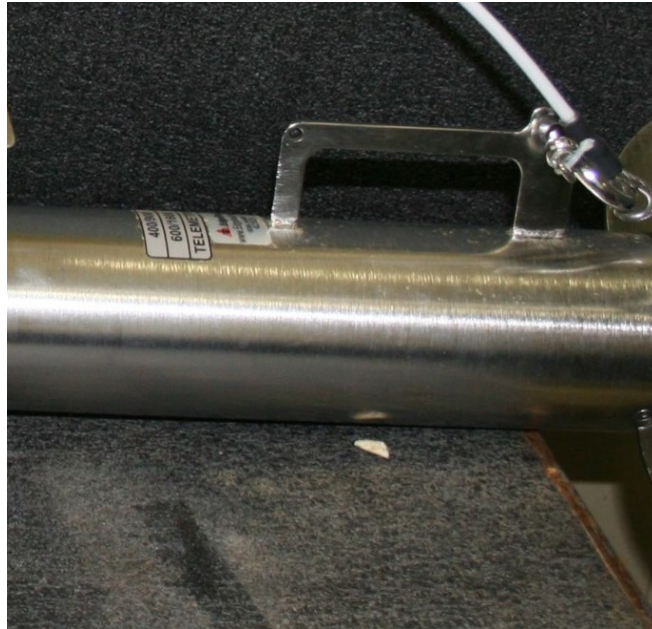


Figure 3-15: Depressor Wing Recovery Cable Attached to Towfish Rear Handle.

5. Verify that the tow cable connector on the towfish and the 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 3-16: Tow cable shown Routed through Depressor Wing Top Hole.

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



Figure 3-17: Tow cable and Tow Fish Pigtail Connectors.

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 takes the strain, not the tow cable pigtail.



Figure 3-18: Cable grip attached to Depressor Wing Mounting Point.

3.9 Connecting the System Components

Most of the system components connect to the 4125i-P or 4125i-RM topsides directly. Optional components, such as a printer, navigation system, and cable counters, connect to the computer.

WARNING! Do not connect the tow cable to the topside processor before connecting it to the towfish. 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 the sub-section **TOPSIDE CONTROLS, CONNECTORS, AND INDICATOR LIGHTS** for the connectors' location and description.

3.9.1 Connecting and Attaching the Tow Cable to the Towfish

A tow cable is shown connected and attached to a towfish in **FIGURE 3-19**.

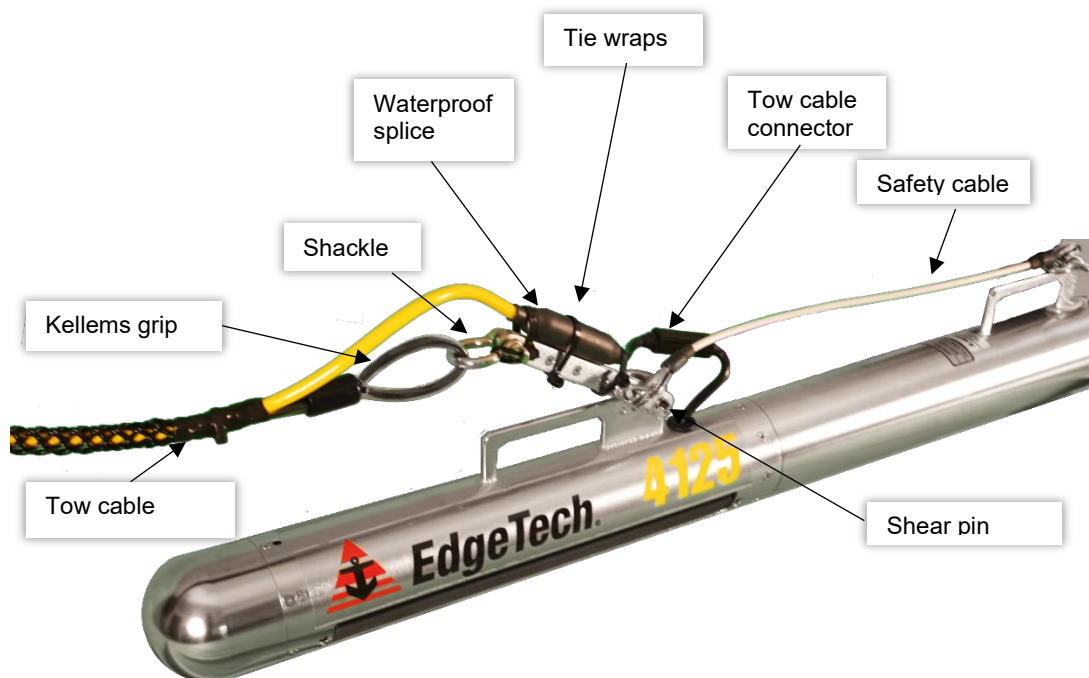


Figure 3-19: Towfish with Tow Cable Connected and Attached

To connect and attach the tow cable to the towfish:

1. Verify that the tow cable is not connected to the 4125i Topside Processor.
2. Verify that the tow cable connector on the towfish and the connector on the tow cable are free of corrosion or dirt. If dirty, clean them with a 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 takes the strain, not the tow cable pigtail.

3.9.2 Connecting the Topside

Follow the instructions in sub-sections [CONNECTING THE 4125i-P TOPSIDE PROCESSOR](#) or [CONNECTING THE 4125i-RM TOPSIDE](#), depending on the topside option you have.

3.9.2.1 Connecting the 4125i-P Topside Processor

To connect the 4125i-P (Portable) Topside Processor, follow the instructions below and refer to the [4125i-P TOPSIDE PROCESSOR CONTROLS, CONNECTORS, AND INDICATOR LIGHTS](#) section of this manual for component locations.

1. Verify that the 4125i-P Topside Processor is not connected to 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 laptop computer's Ethernet connector. The Ethernet cable may be extended up to 100 feet using a Category 5 Ethernet patch cable. Do not make this connection if the wireless Ethernet connection will be used, as only one Ethernet connection can be connected or enabled simultaneously.
4. If a printer is used, connect the printer to the laptop computer through a USB Ethernet adapter.
5. If a navigation system is used, connect the navigation system serial output to COM 1 or a USB port of the laptop computer.
6. Do one of the following to connect power:
 - Connect the AC power cable to the AC Input connector and the AC power source.

- Connect the red clamp of the DC power/ Ethernet cable to the DC power source's positive terminal and connect the black clamp to the negative terminal.
 - Connect both the AC and DC power sources, as described above.
7. Connect the laptop's power supply to the computer and the AC power source.

3.9.2.2 Connecting the 4125i-RM Topside Processor

To connect the 4125i-RM (Rack-Mounted) Topside, follow the instructions below and refer to the **4125i-RM TOPSIDE CONTROLS, CONNECTORS, AND INDICATOR LIGHTS** section of this manual for component locations.

1. Verify that the 4125i-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 topside data connector. The Ethernet cable may be extended up to 100 feet using a Category 5 Ethernet crossover or straight patch cable.
4. If a printer is used, connect the printer to the user-supplied computer through a USB Ethernet adapter.

3.10 System Activation

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

When performing the system activation and test, refer to the sub-section **TOPSIDE CONTROLS, CONNECTORS, AND INDICATOR LIGHTS**, for the location and description of the topside processor's controls and indicators. In addition, should the system not activate properly or the pre-deployment checks fail, refer to **5.0 TROUBLESHOOTING** for assistance in isolating and correcting any problems.

3.10.1 Preparing a Wired Ethernet LAN Connection

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

In addition, the 4125i-P 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 auto-sense 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 4125i-P Portable Topside Processor.
3. Click the Wireless Networking icon on the Windows Desktop or the Task Bar, then disable it.
4. Verify that the Ethernet cable is connected to the Ethernet connector of the 4125i-P Topside Processor and the computer's Ethernet connector.
5. Click the Ethernet LAN icon on the Windows® Desktop or Task Bar, and 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 **3.6: TCP/IP ADDRESS SETTINGS**. Also, verify that the Ethernet LAN is enabled and that the topside processor is turned on.

3.10.2 Preparing a Wireless Ethernet LAN Connection (4125i-P Only)

The Wireless Networking connection is made using the wireless networking capability of the laptop computer. The Rack Mount processor option does not support this option.

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

1. Turn on the laptop computer and the 4125i-P Topside Processor.
2. Click the Ethernet LAN icon on the Windows Desktop or System Tray, and disable it. Alternatively, unplug the Ethernet cable from the laptop computer.
3. Click the Wireless Networking icon on the Windows Desktop or in the System Tray, 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.

3.10.3 Activating the 4125i Series System

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

1. Start the Discover 4125i 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 4125i-P Topside or the front of the 4125i-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 in the Radio Indicator Tabs at the bottom of the Discover 4125 Main window should indicate as **NET: ON**.

3.11 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 that the heading, pitch, and roll sensor data are correct in Discover's Main Status Line Display and are correctly recorded.

1. Activate the system as described in the **ACTIVATING THE 4125i SERIES SYSTEM** section of the manual above.

CAUTION! Do not allow the transducer arrays on the towfish to continuously transmit in the 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 3-20**.

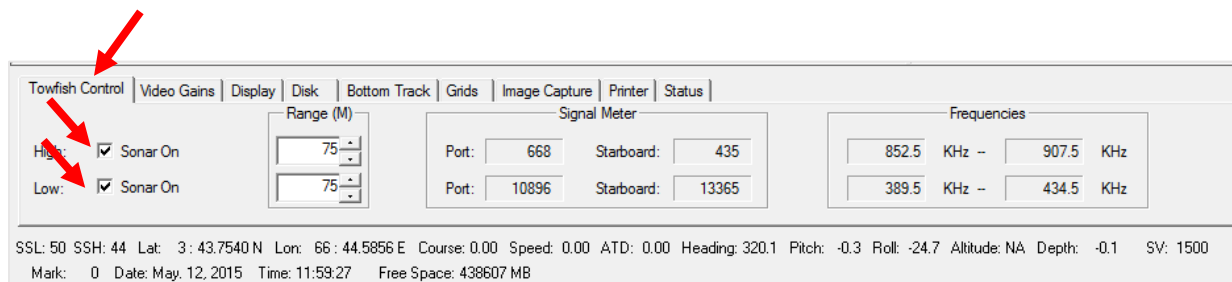


Figure 3-20: Discover 4125 Towfish Control Tab

3. Select the High and Low Sonar On checkboxes. The transducer arrays on the towfish should begin transmitting, and data should begin scrolling on the Sonar Waterfall Displays in the Discover 4125 main window.
4. Start recording a file while performing the pre-deployment test below, and then playback the file to verify that the SS data and navigation information is present
5. Rub the port and starboard transducers briskly, one at a time. as seen in **FIGURE 3-21**.



Figure 3-21: Performing a Rub Test

6. You should observe streaks or noise spikes in the waterfall display, as seen in **FIGURE 3-22**.

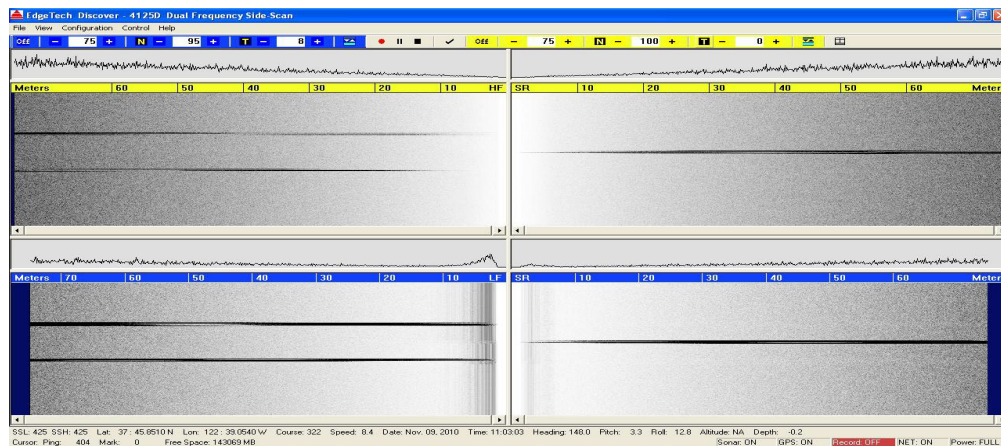


Figure 3-22: Rub Test Screenshot

7. Test that the vehicle's compass works properly by moving the towfish and checking that the heading, pitch, and roll are reported correctly in Discover's Main Status Line Display.
 - Verify that the starboard roll is correct by rotating the fish's tow arm towards its starboard direction around 20 degrees. The Roll value should be positive in this direction. (max is +180 degrees).
 - Verify that the port roll is correct by rotating the fish's tow arm towards its port direction around 20 degrees. The Roll value should be negative in this direction. (max is -180 degrees).
 - Verify that the pitch is working properly by lifting the nose of the fish. The pitch value should read positive and reach a max of +90 degrees.
 - Verify that the pitch is working properly by lifting the tail of the fish. The pitch value should read negative and reach a max of -90 degrees.
 - Verify that the heading is working properly by rotating the fish clockwise along the horizontal plane. The heading should increase in value and reach a max of +359.9 degrees. Rotating the fish counterclockwise should decrease the heading value.
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.

3.12 Compass Usage

4125i Towfish compasses have pure magnetic field measuring devices that provide a heading relative to magnetic North. The intent is to provide the operator with real-time towfish heading, pitch, and roll data to know how the towfish's motion impacts data collection quality. This helps the operator make informed decisions for the best survey results.

The standard magnetic compass data is not suitable for processing raw data. This is due to the inaccuracies caused by local magnetic declination and the variable magnetic influences of materials in the towfish, towfish equipment, tow vessel hull construction, the environment, and targets. Our suggestion to overcome these issues is to use *course-made-good* to process and mosaic side scan data and accurately position targets.

The factory acceptance and verification tests for these magnetic field measurement devices include running hard iron and soft iron compensations at a magnetically quiet site once the sensor is installed in the towfish, and again at a magnetically quiet site, a verification to check the output relative to magnetic north.

If compass calibration is needed, please contact [EDGE TECH CUSTOMER SERVICE](#) for assistance.

3.13 Towfish Deployment

The 4125i 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.

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 unknown, be careful not to strike the bottom or a submerged object. Otherwise, damage to the towfish may occur. In addition, carefully monitor towfish altitude at all times, as failure to do so may result in the towfish hitting 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 tow arm's position so the towfish is as level as possible (+5° is optimal).



Figure 3-23: 4125 Towfish Being Deployed

NOTE: For detailed towing characteristics for several tow cable lengths and towfish speeds, refer to the **TOWING CHARACTERISTICS** section of the manual.

NOTE: For detailed information about the EdgeTech Discover 4125i Side Scan Sonar software, including recording data, refer to the **DISCOVER 4125 SOFTWARE MANUAL**.

NOTE: The deployment instructions below assume the deployment testing has been completed and the towfish is on and transmitting.

To deploy the towfish:

1. With the survey vessel stopped or underway 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.

- Click the Towfish Control tab and select the range for each frequency. This tab is shown in [FIGURE 3-20](#).
- Click the Bottom Track tab on the Lower Control panel. This tab is shown in [FIGURE 3-24](#).

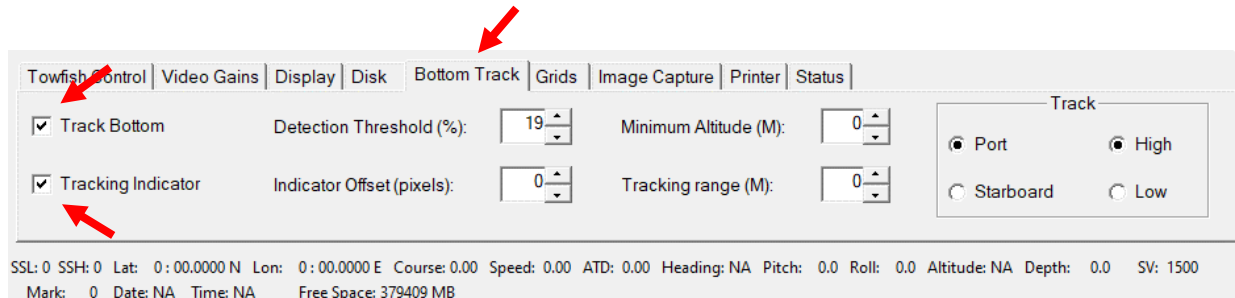


Figure 3-24: Bottom Track Tab

- Use the Bottom Track Tab to make the required settings to track the bottom (check the Track Bottom and Tracking Indicator checkboxes) and note the towfish altitude in the Altitude display. Refer to the Discover software manual for details on setting up bottom tracking.
- Lower the towfish such that its altitude is 10–15% of the range selection.
- 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.
- If a pressure sensor is installed, verify that the Pressure display indication is correct.
- Secure the tow cable to the survey vessel.
- Begin recording data.

3.14 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 before being used for detailed survey planning.

3.14.1 4125i Towfish Cable Layback Plots

The following towfish layback charts are provided to assist in towing. Please consider the following points if they are used:

- The standard 4125i towfish currently supports a depth no greater than 200 meters. The pressure sensor installed by EdgeTech supports a depth of no greater than 137 meters. The sensor may

stop reading at 137 meters but can survive when exposed to pressures up to 200 meters. The sensor will maintain accuracy and output correct readings once its depth is less than 137 meters.

- The results listed in these tables are calculated using the Woods Hole WHOI cable program with best-estimated parameters for vehicle weight, drag, lift, and buoyancy, as well as cable weight and stiffness. EdgeTech disclaims any liability for consequential damage resulting from using the data in the tables.
- The values contained in these charts are subject to change and have been assigned an error of +/- 10%. Keep this in mind, especially if within 10% of the endpoint of any parameter.

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 towfish 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.

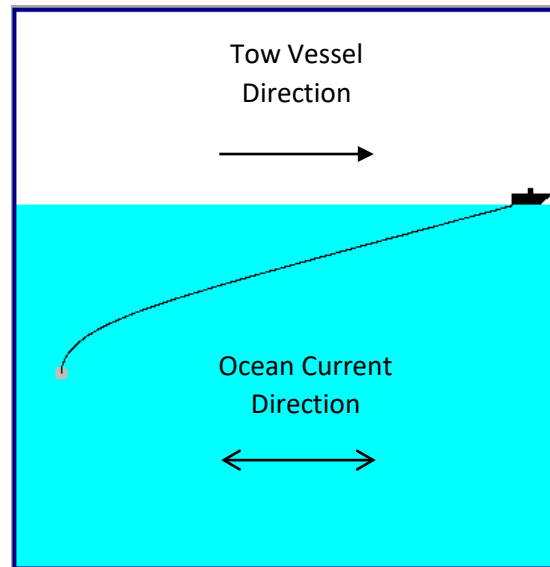


Figure 3-25: Tow Vessel Direction vs. Ocean Current

CONFIGURATION #	TOWFISH	CABLE TYPE	LENGTH (M)
1	4125	23080 (.375" Kevlar)	50
2	4125	23080	100
3	4125	23080	200
4	4125	23080	300
5	4125 + 15 lb. Keel Weight	23080	50
6	4125 + 15 lb. Keel Weight	23080	100
7	4125 + 15 lb. Keel Weight	23080	200
8	4125 + 15 lb. Keel Weight	23080	300
9	4125 + Depressor Wing	23080	50
10	4125 + Depressor Wing	23080	100
11	4125 + Depressor Wing	23080	200
12	4125 + Depressor Wing	23080	300
13	4125 + 15 lb. Keel Weight + Depressor Wing	23080	50
14	4125 + 15 lb. Keel Weight + Depressor Wing	23080	100

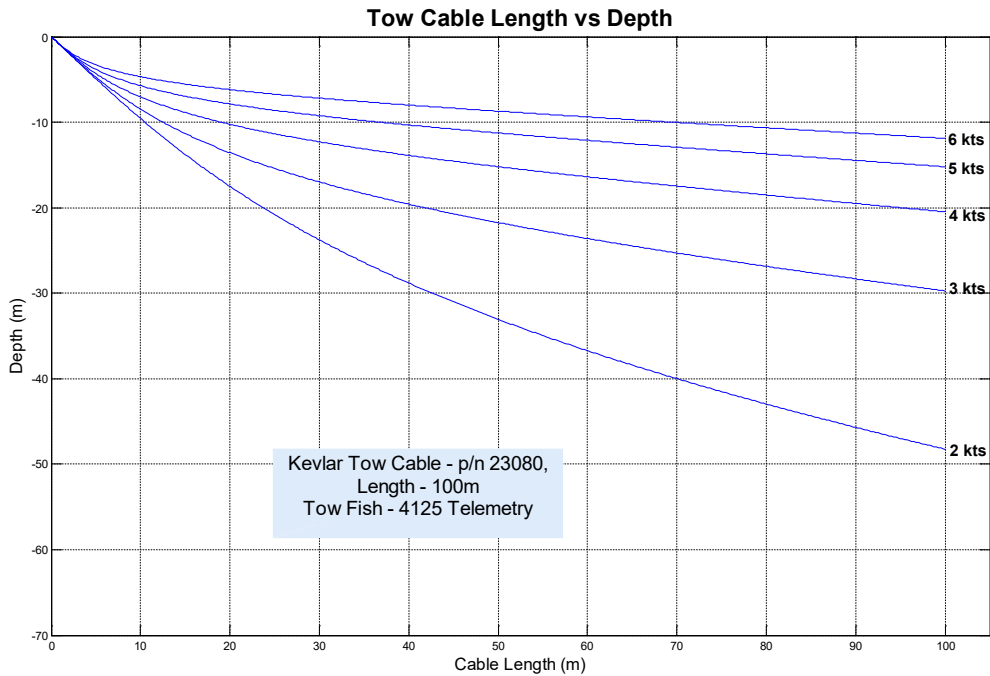
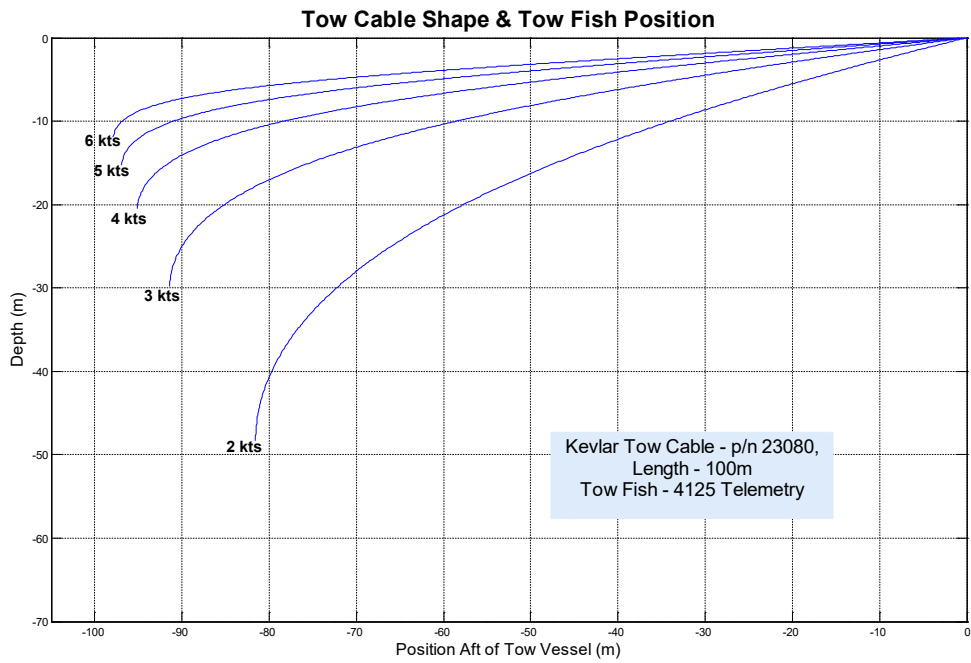
CONFIGURATION #	TOWFISH	CABLE TYPE	LENGTH (M)
15	4125 + 15 lb. Keel Weight + Depressor Wing	23080	200
16	4125 + 15 lb. Keel Weight + Depressor Wing	23080	300
17	4125	A304874 (.25" Armored)	50
18	4125	A304874	100
19	4125	A304874	200
20	4125	A304874	300
21	4125 + 15 lb. Keel Weight	A304874	50
22	4125 + 15 lb. Keel Weight	A304874	100
23	4125 + 15 lb. Keel Weight	A304874	200
24	4125 + 15 lb. Keel Weight	A304874	300
25	4125 + Depressor Wing	A304874	50
26	4125 + Depressor Wing	A304874	100
27	4125 + Depressor Wing	A304874	200
28	4125 + Depressor Wing	A304874	300
29	4125 + 15 lb. Keel Weight + Depressor Wing	A304874	50
30	4125 + 15 lb. Keel Weight + Depressor Wing	A304874	100
31	4125 + 15 lb. Keel Weight + Depressor Wing	A304874	200
32	4125 + 15 lb. Keel Weight + Depressor Wing	A304874	300
33	4125	A320327 (.32" Armored)	50
34	4125	A320327	100
35	4125	A320327	200
36	4125	A320327	300
37	4125	A320327	400
38	4125 + 15 lb. Keel Weight	A320327	50
39	4125 + 15 lb. Keel Weight	A320327	100

CONFIGURATION #	TOWFISH	CABLE TYPE	LENGTH (M)
40	4125 + 15 lb. Keel Weight	A320327	200
41	4125 + 15 lb. Keel Weight	A320327	300
42	4125 + 15 lb. Keel Weight	A320327	400
43	4125 + Depressor Wing	A320327	50
44	4125 + Depressor Wing	A320327	100
45	4125 + Depressor Wing	A320327	200
46	4125 + Depressor Wing	A320327	300
47	4125 + Depressor Wing	A320327	400
48	4125 + 15 lb. Keel Weight + Depressor Wing	A320327	50
49	4125 + 15 lb. Keel Weight + Depressor Wing	A320327	100
50	4125 + 15 lb. Keel Weight + Depressor Wing	A320327	200
51	4125 + 15 lb. Keel Weight + Depressor Wing	A320327	300
52	4125 + 15 lb. Keel Weight + Depressor Wing	A320327	400
53	4125	A302799 (.45" Armored)	50
54	4125	A302799	100
55	4125	A302799	200
56	4125	A302799	300
57	4125	A302799	400
58	4125	A302799	500
59	4125	A302799	600
60	4125 + 15 lb. Keel Weight	A302799	50
61	4125 + 15 lb. Keel Weight	A302799	100
62	4125 + 15 lb. Keel Weight	A302799	200
63	4125 + 15 lb. Keel Weight	A302799	300
64	4125 + 15 lb. Keel Weight	A302799	400

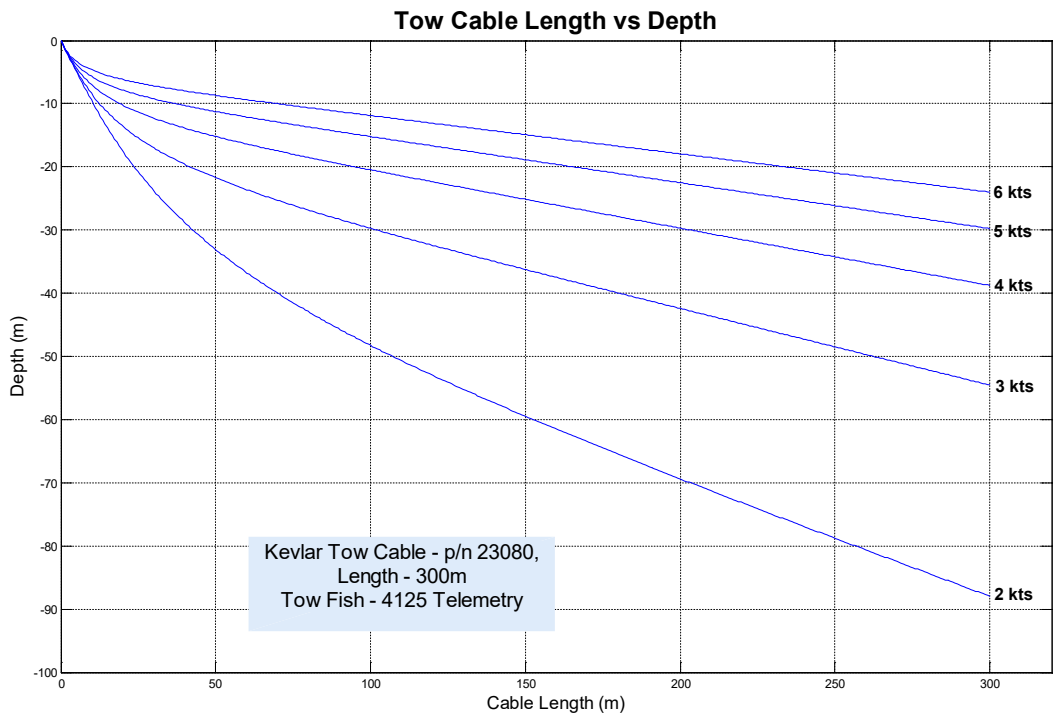
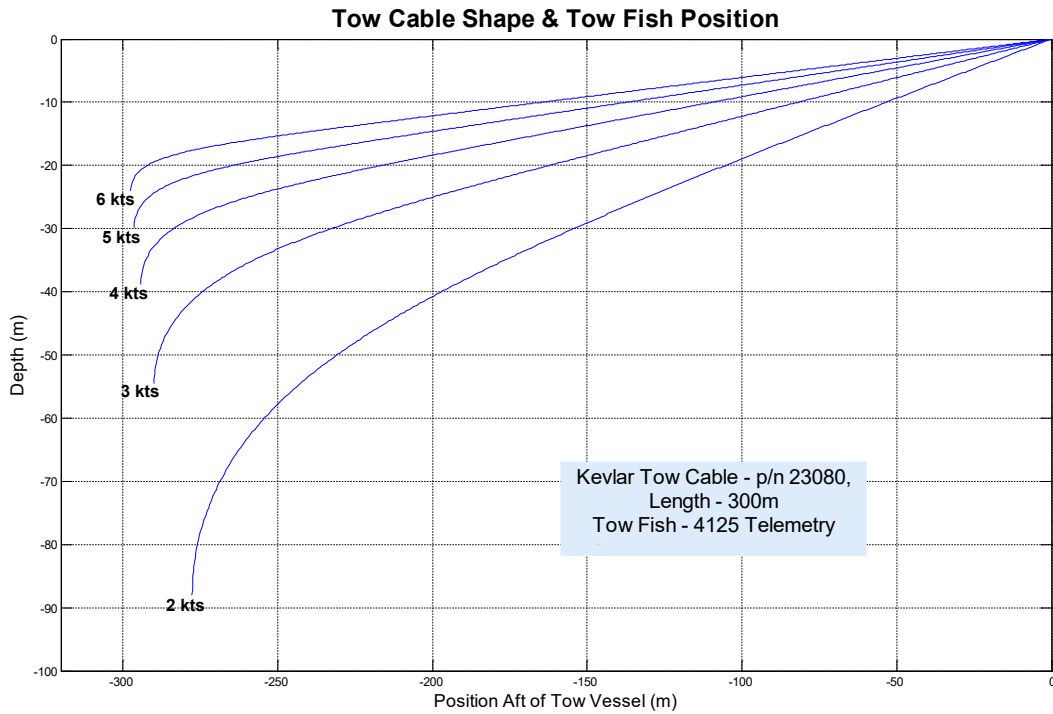
CONFIGURATION #	TOWFISH	CABLE TYPE	LENGTH (M)
65	4125 + 15 lb. Keel Weight	A302799	500
66	4125 + 15 lb. Keel Weight	A302799	600
67	4125 + Depressor Wing	A302799	50
68	4125 + Depressor Wing	A302799	100
69	4125 + Depressor Wing	A302799	200
70	4125 + Depressor Wing	A302799	300
71	4125 + Depressor Wing	A302799	400
72	4125 + Depressor Wing	A302799	500
73	4125 + Depressor Wing	A302799	600
74	4125 + 15 lb. Keel Weight + Depressor Wing	A302799	50
75	4125 + 15 lb. Keel Weight + Depressor Wing	A302799	100
76	4125 + 15 lb. Keel Weight + Depressor Wing	A302799	200
77	4125 + 15 lb. Keel Weight + Depressor Wing	A302799	300
78	4125 + 15 lb. Keel Weight + Depressor Wing	A302799	400
79	4125 + 15 lb. Keel Weight + Depressor Wing	A302799	500
80	4125 + 15 lb. Keel Weight + Depressor Wing	A302799	600

Table 3-5: Towfish vs. Cable Length Laybacks

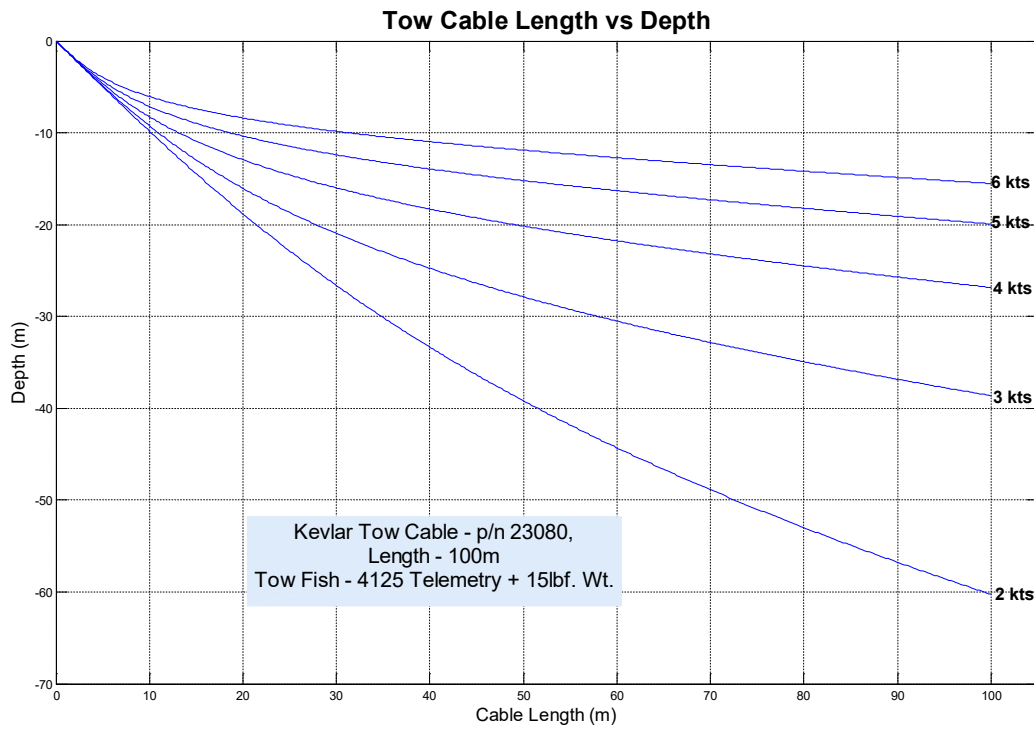
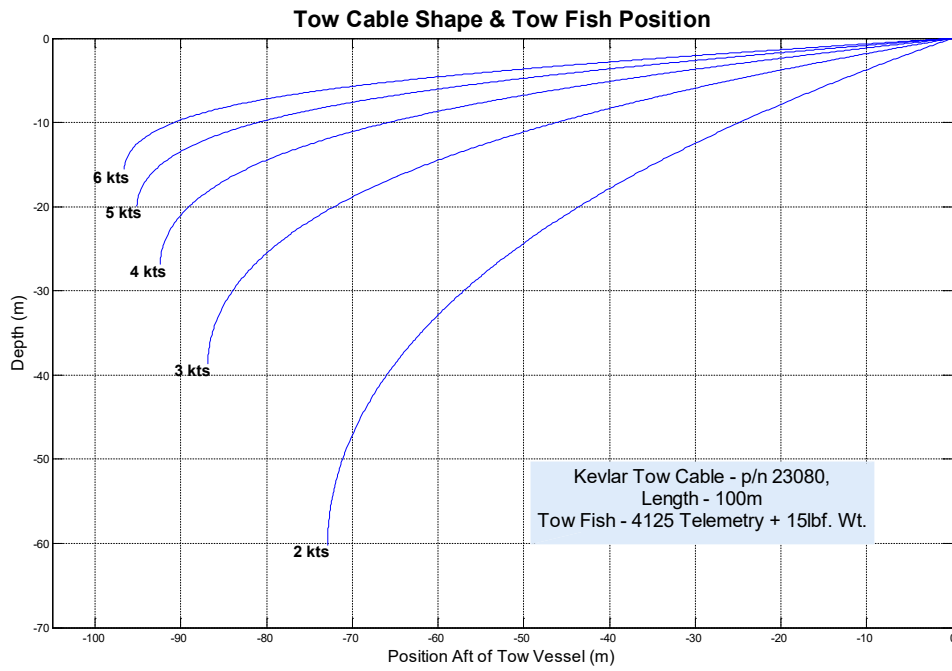
3.14.1.1 Config. 2: 4125i, 23080 Cable - 100m Long



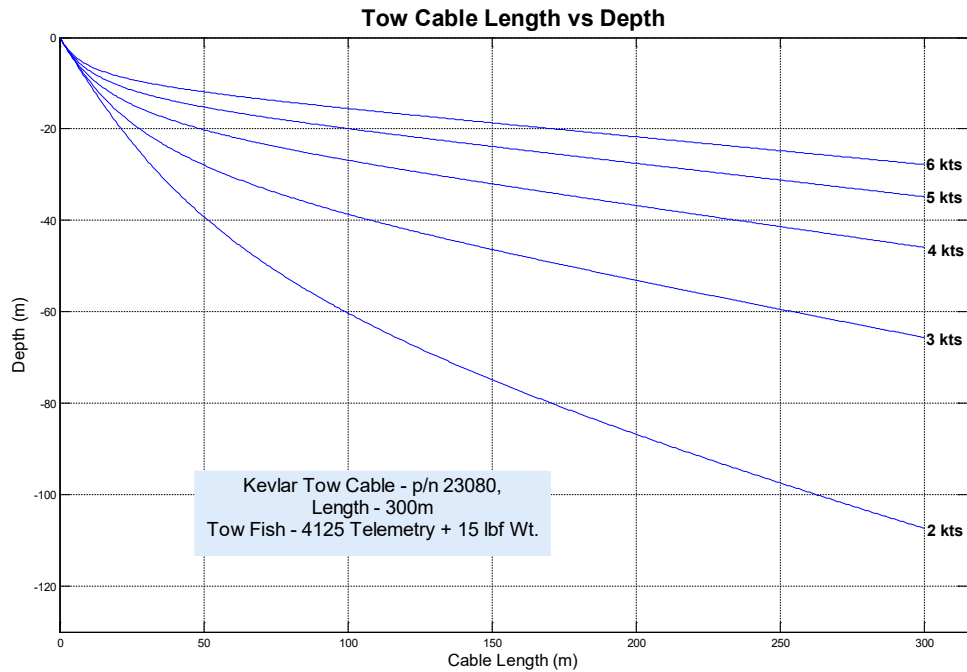
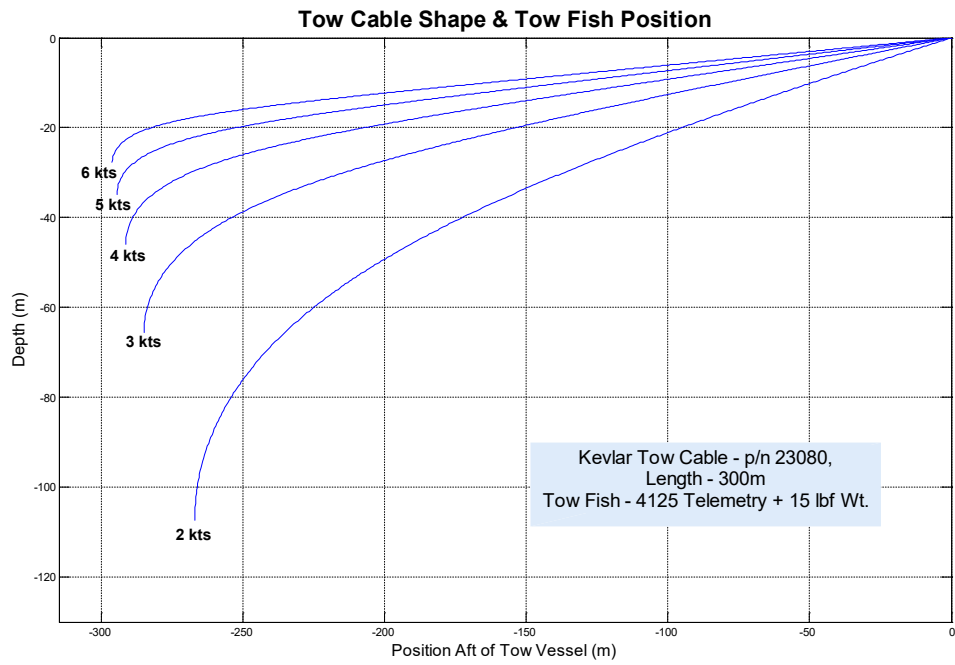
3.14.1.2 Config. 4: 4125i, 23080 Cable - 300m Long



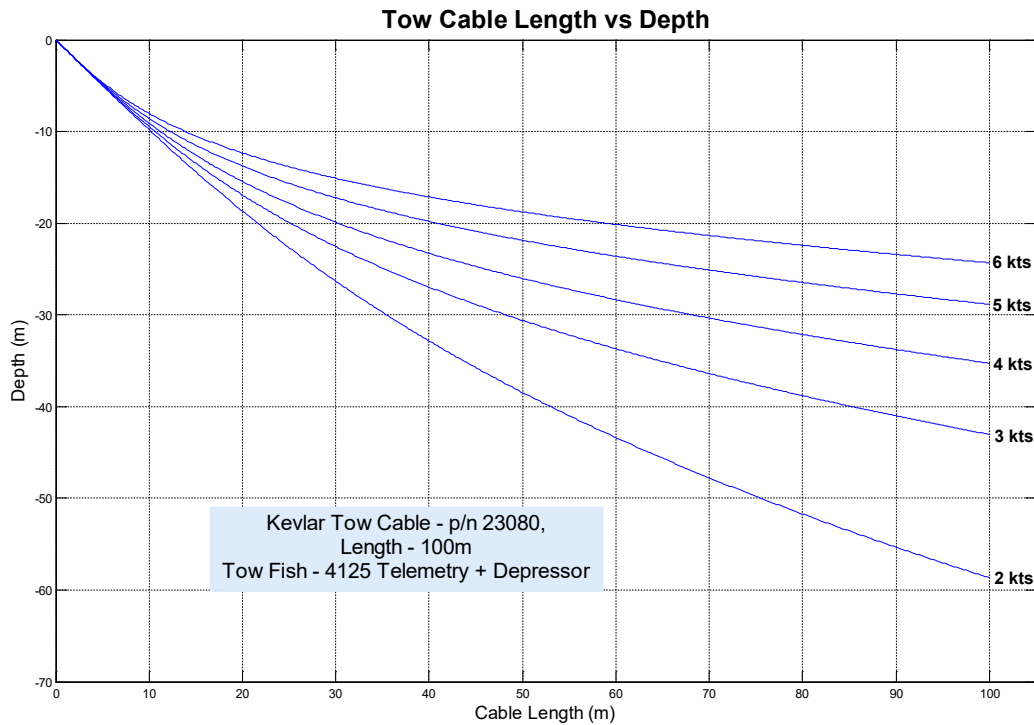
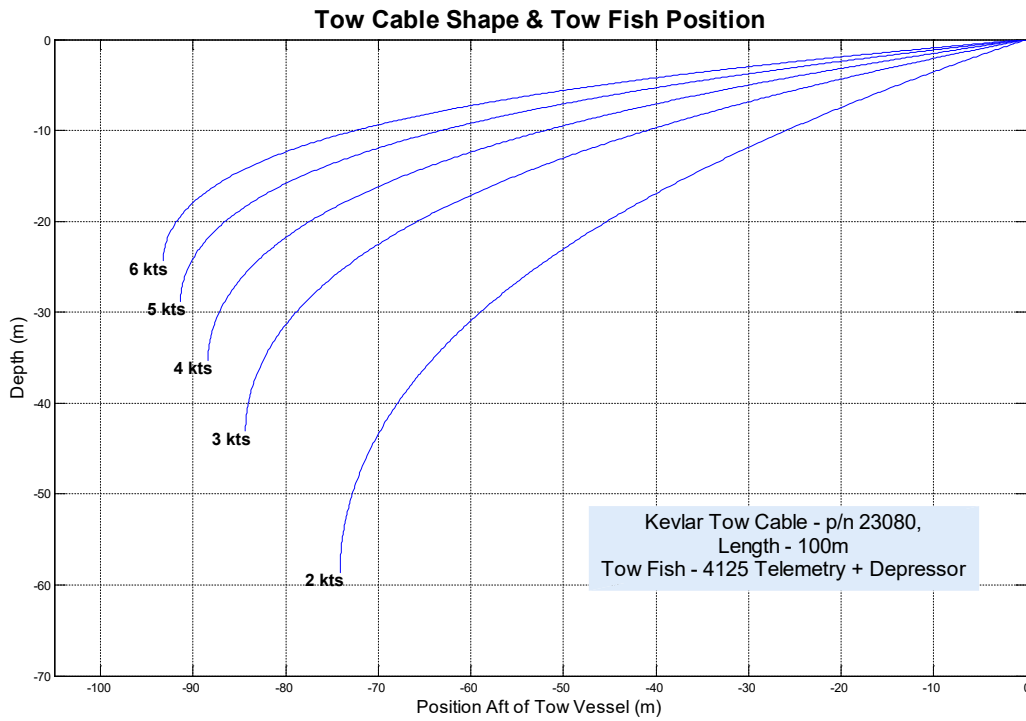
3.14.1.3 Config. 6: 4125i + 15 lb. Keel Weight, 23080 Cable - 100m Long



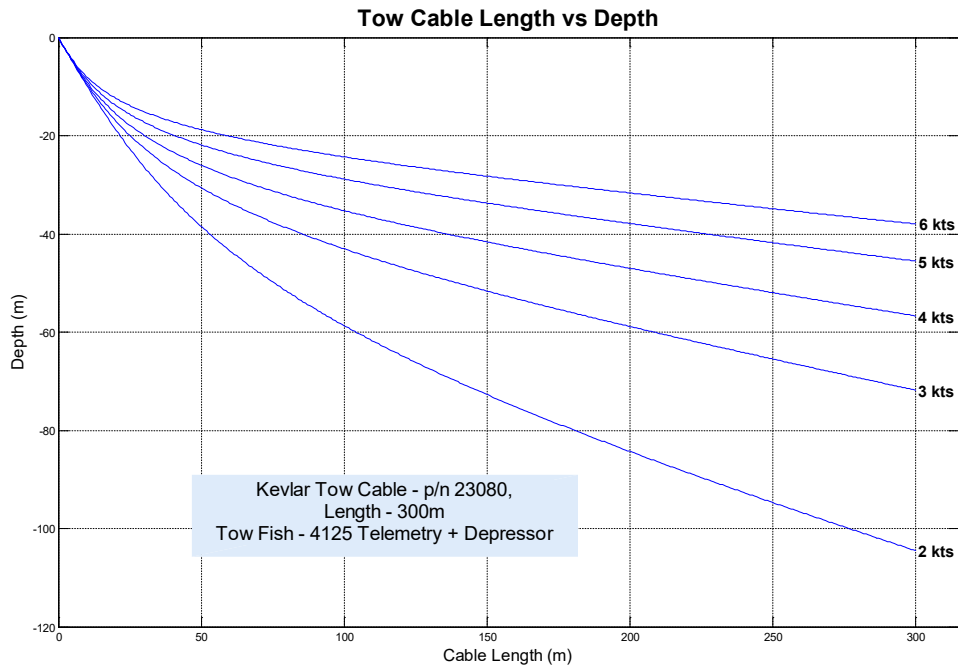
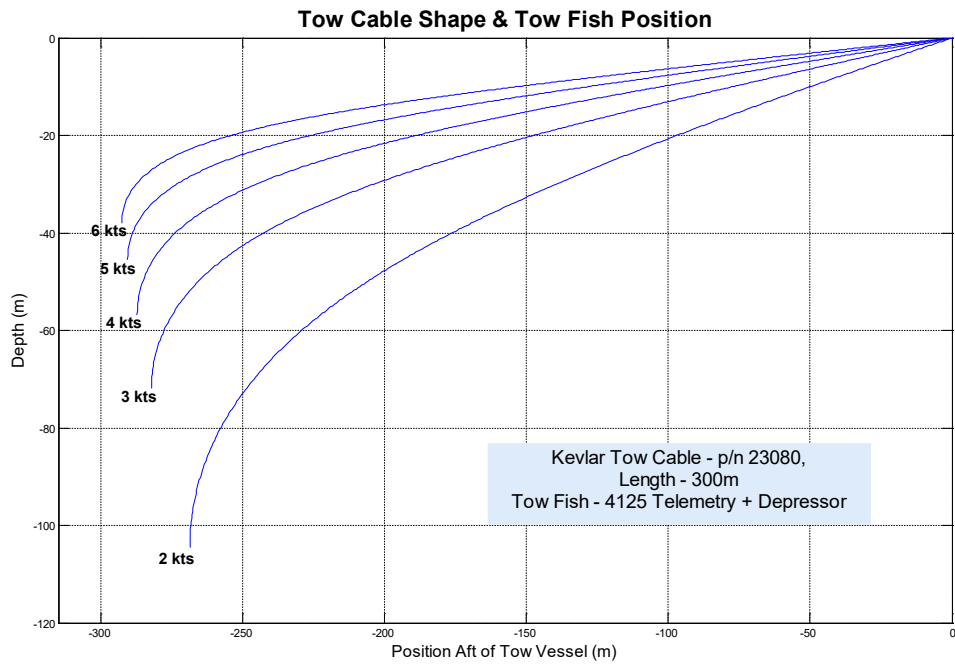
3.14.1.4 Config. 8: 4125i + 15 lb. Keel Weight, 23080 Cable - 300m Long



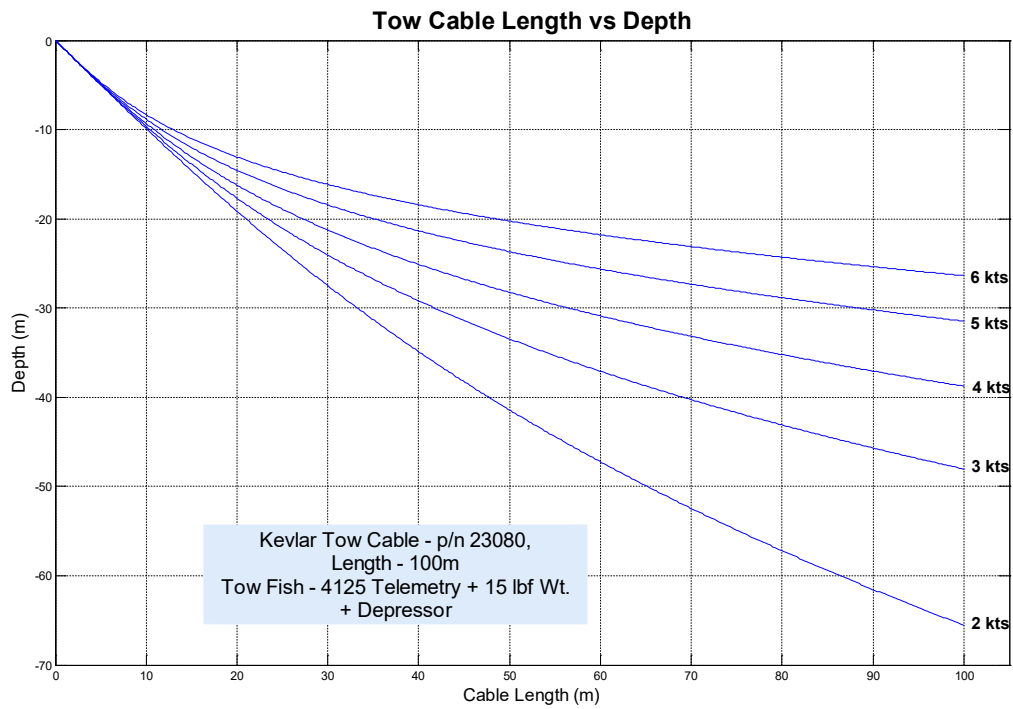
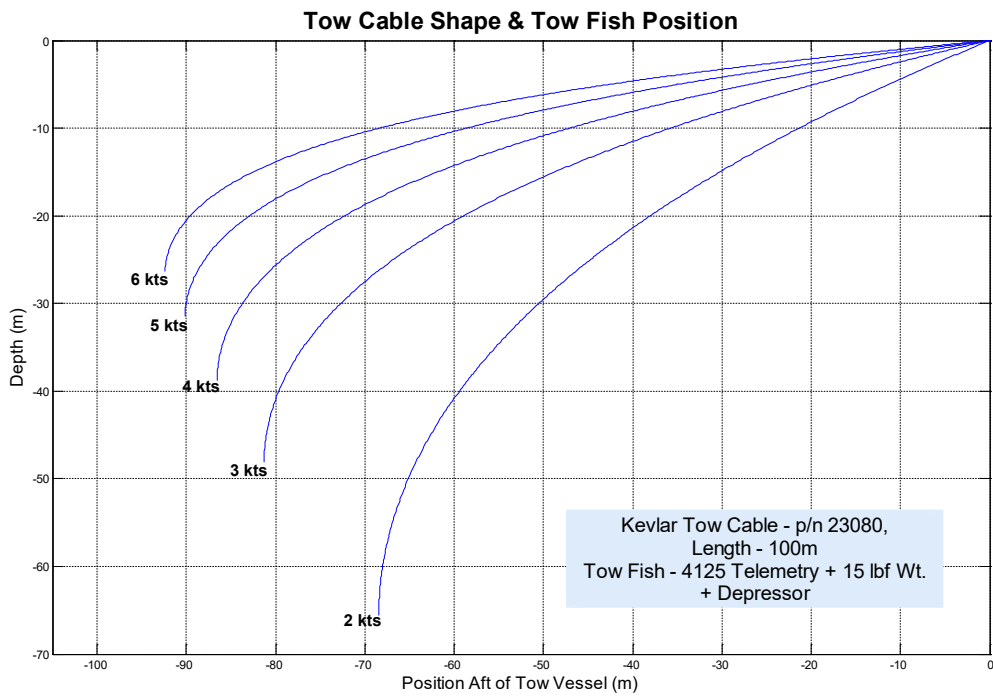
3.14.1.5 Config. 10: 4125i + Depressor Wing, 23080 Cable - 100m Long



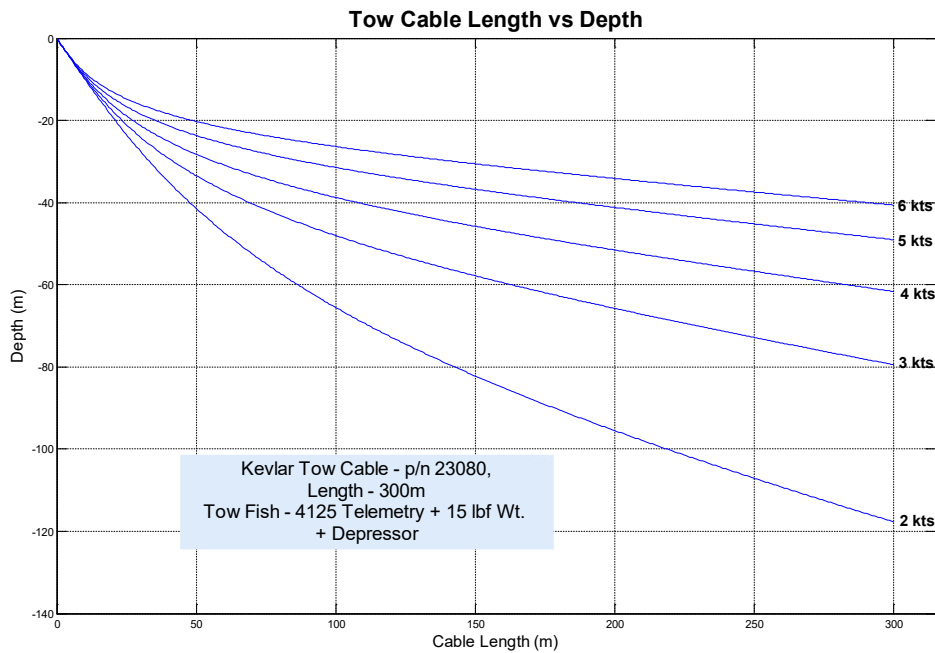
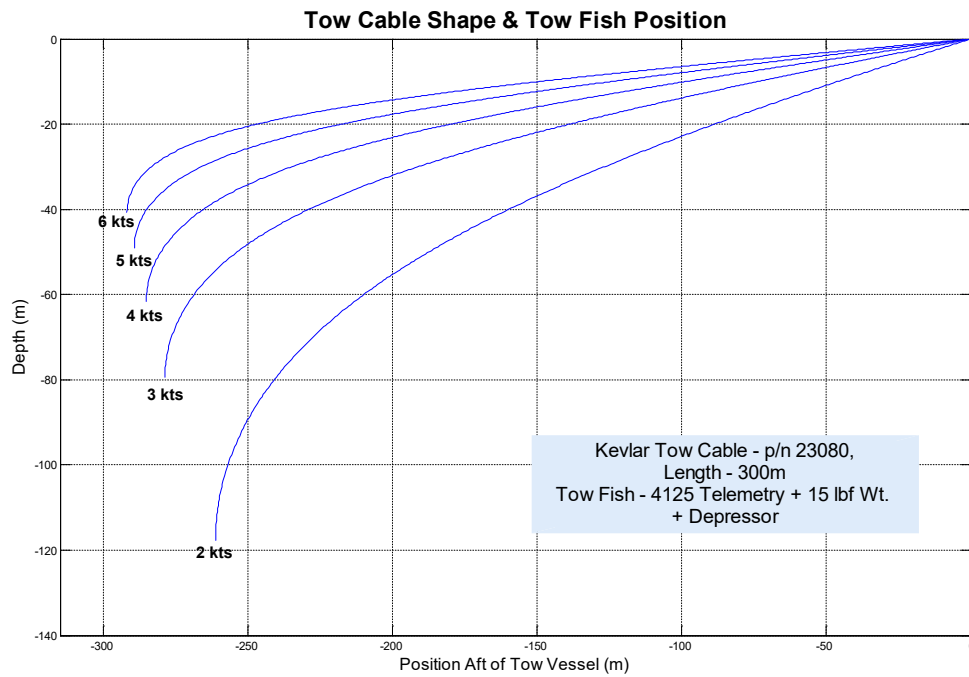
3.14.1.6 Config. 12: 4125i + Depressor Wing, 23080 Cable - 300m Long



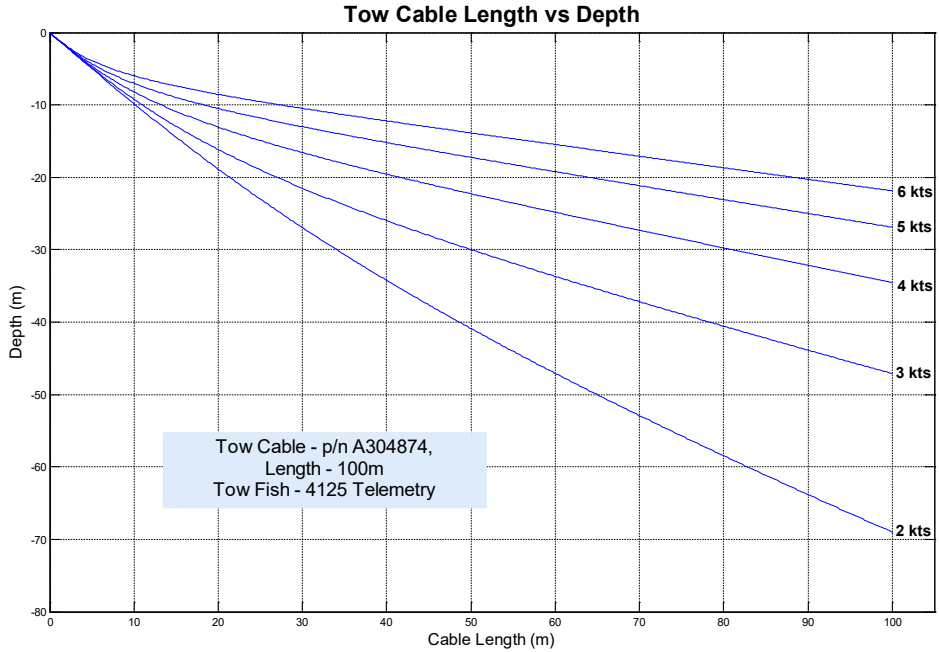
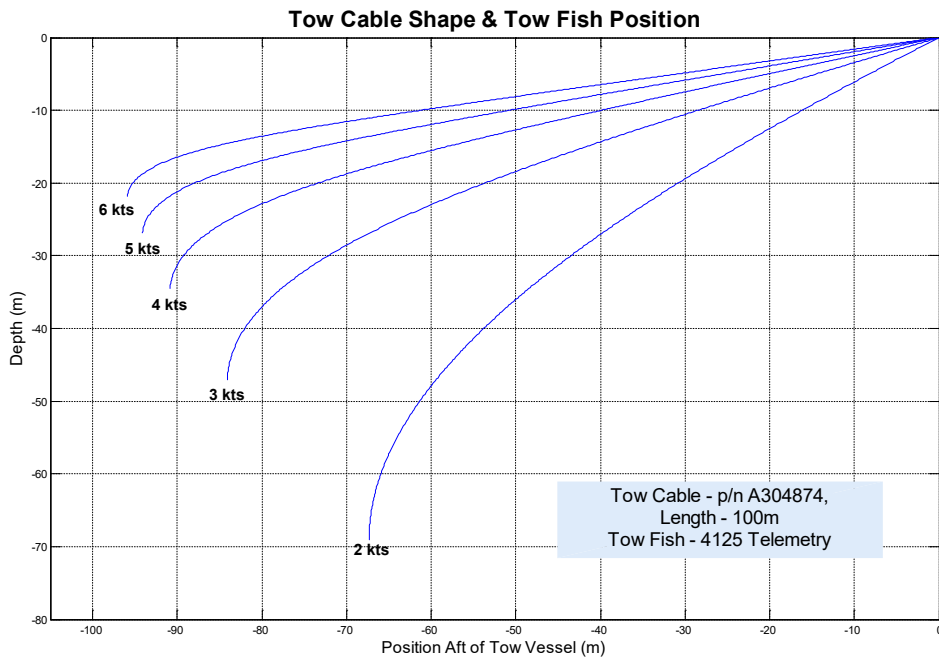
3.14.1.7 Config. 14: 4125i + 15 lb. Keel Wt. + Depressor Wing, 23080 Cable – 100m



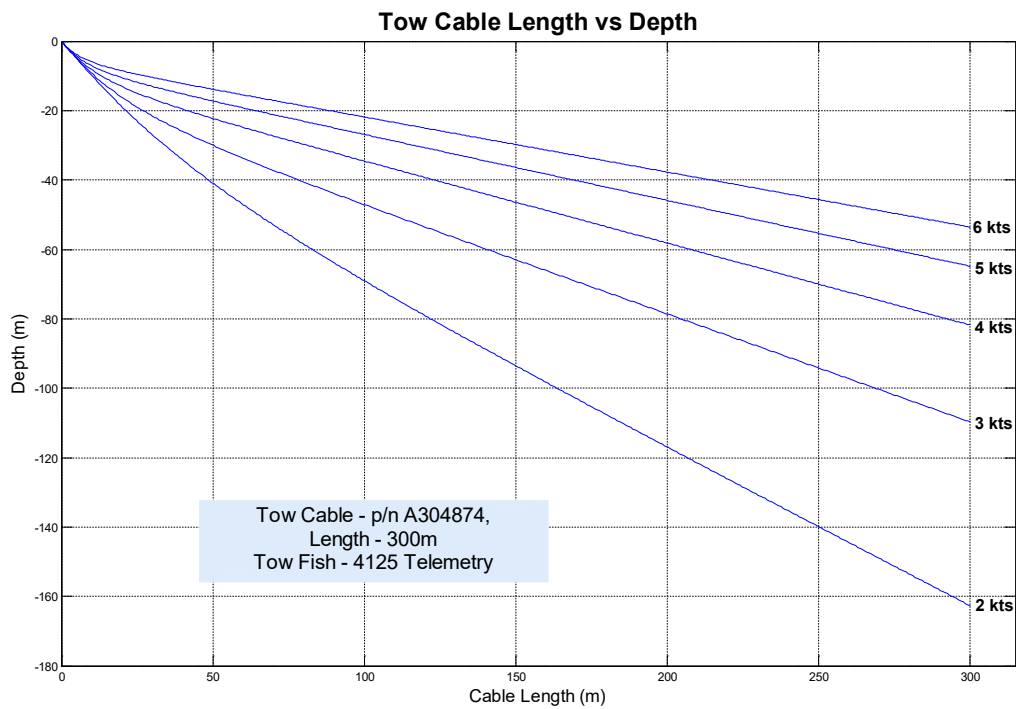
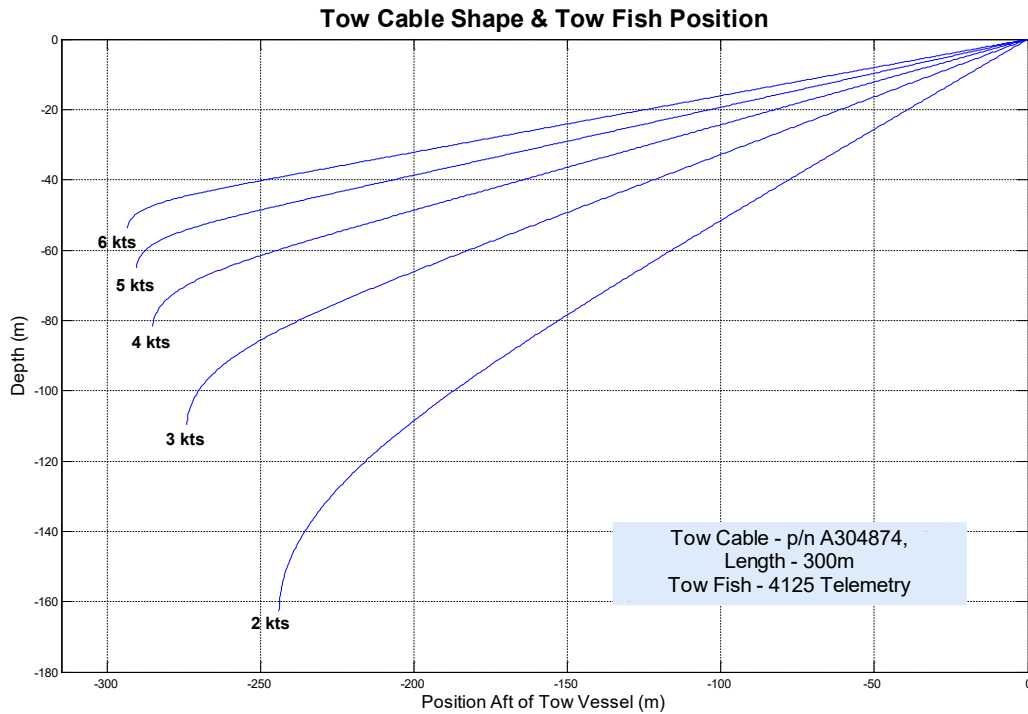
3.14.1.8 Config. 16: 4125i + 15 lb. Keel Wt. + Depressor Wing, 23080 Cable – 300m



3.14.1.9 Config. 18: 4125i, A304874 Cable - 100m Long

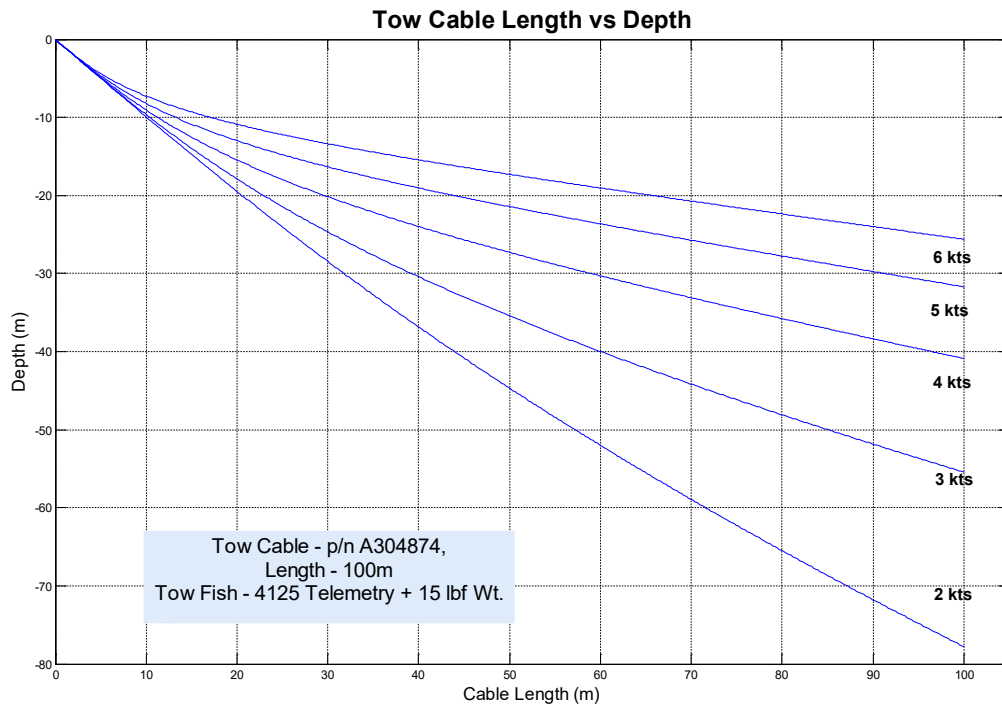
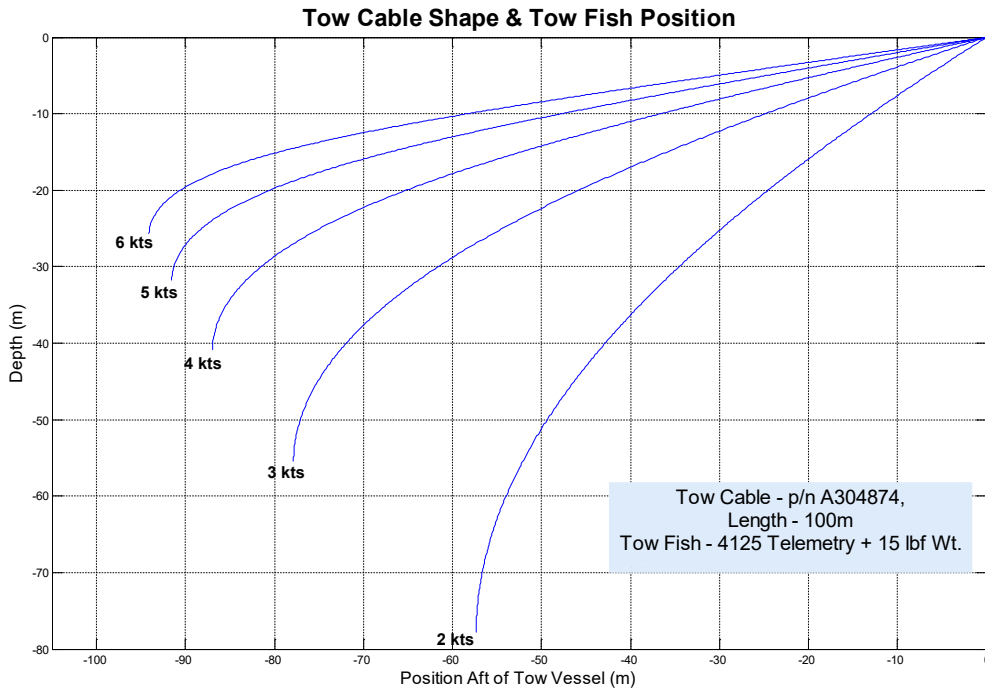


3.14.1.10 Config. 20: 4125i, A304874 Cable - 300m* Long

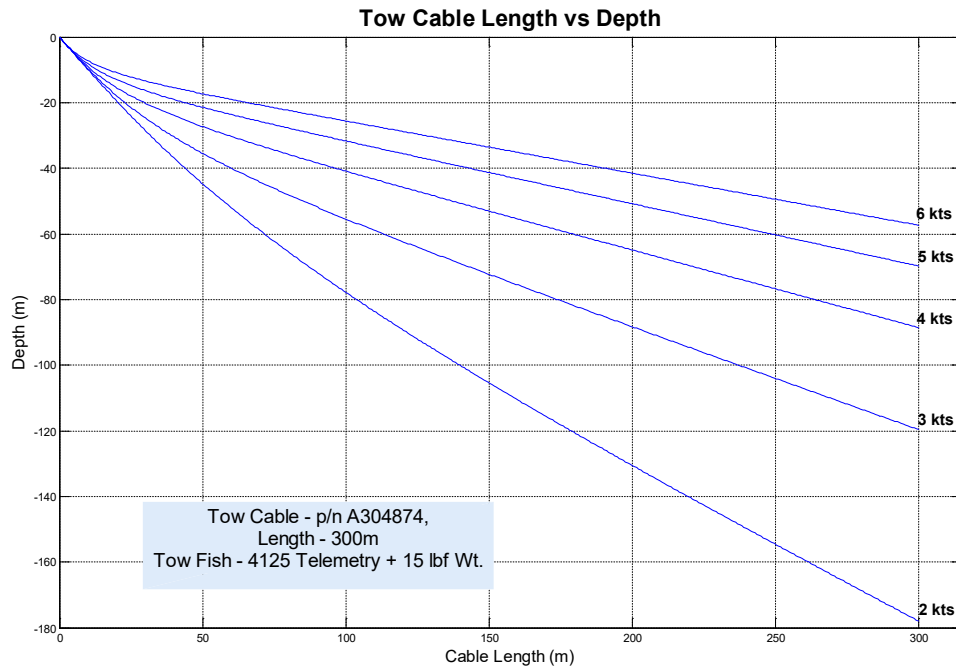
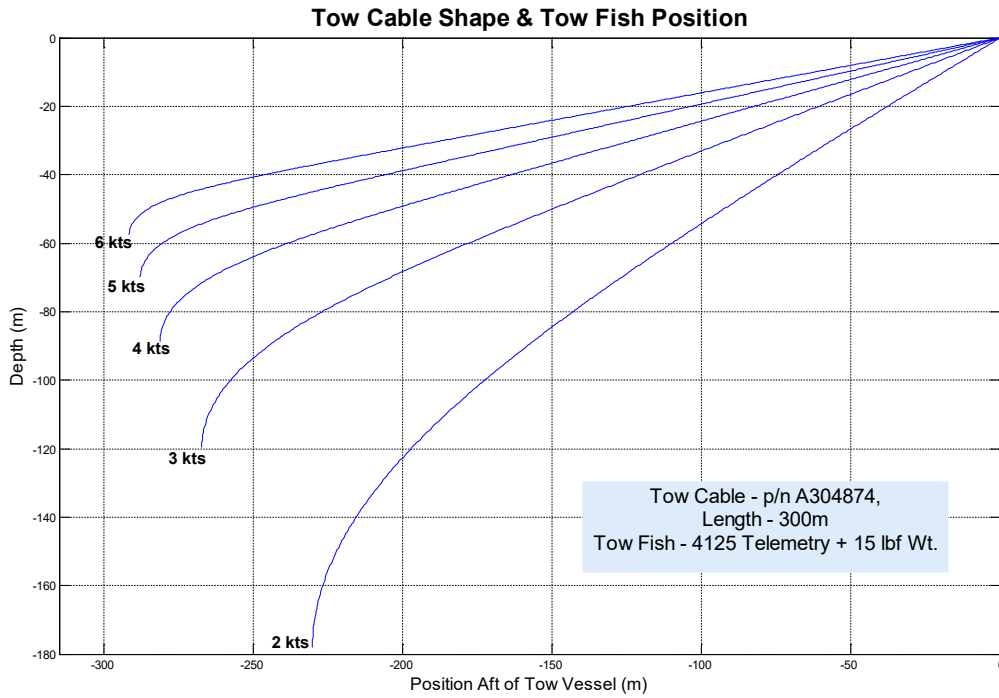


*The maximum length for this type of cable that can be used with the 4125 telemetry system is 250m.

3.14.1.11 Config. 22: 4125i + 15 lb. Keel Weight, A304874 Cable - 100m Long

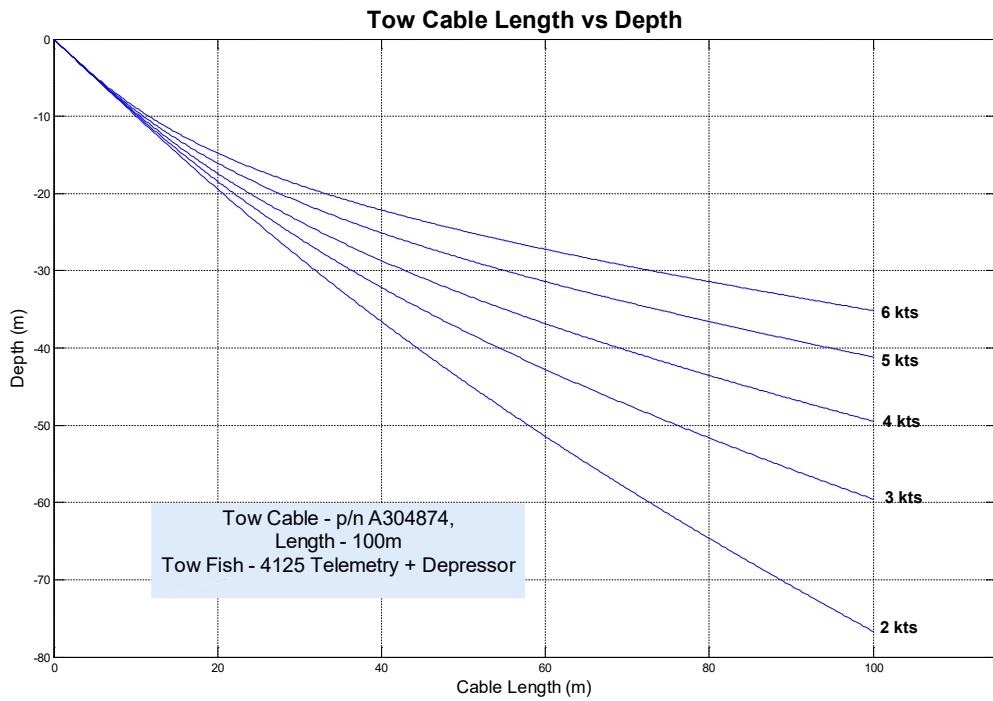
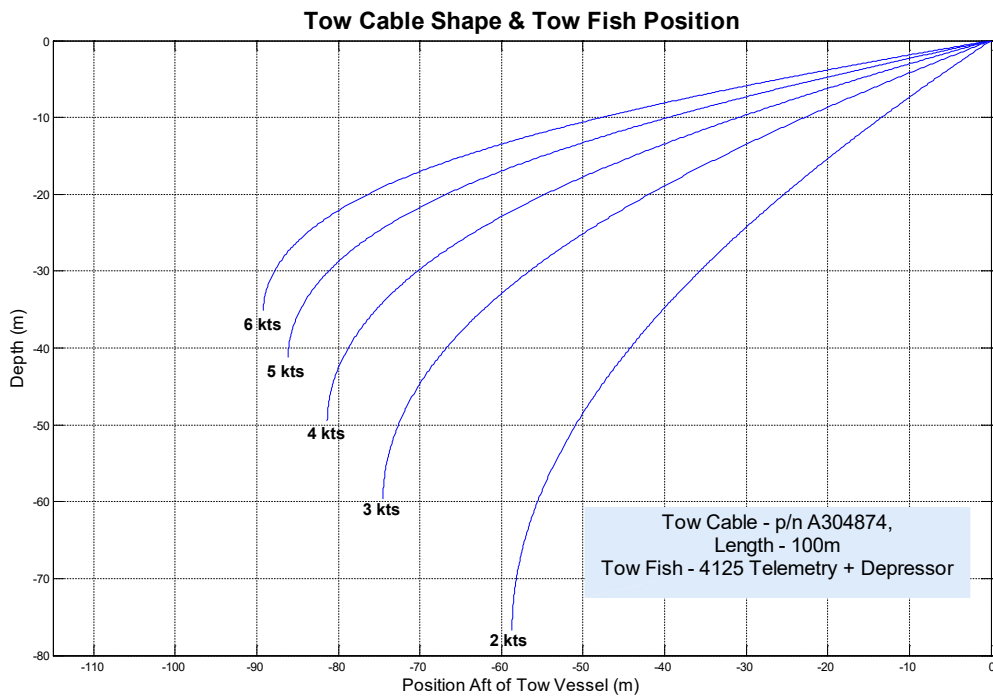


3.14.1.12 Config. 24: 4125i + 15 lb. Keel Weight, A304874 Cable - 300m* Long

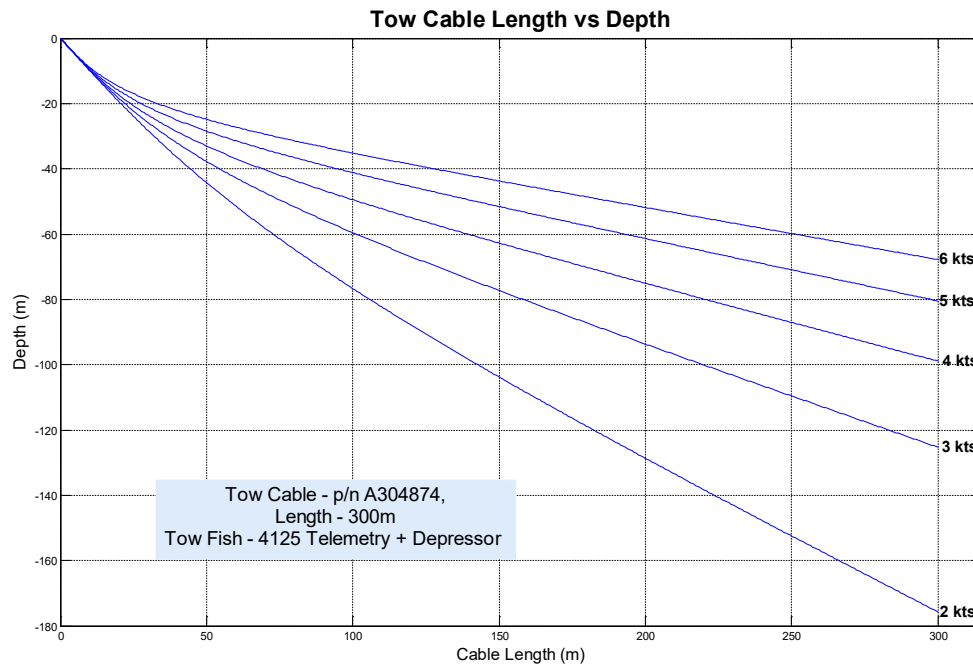
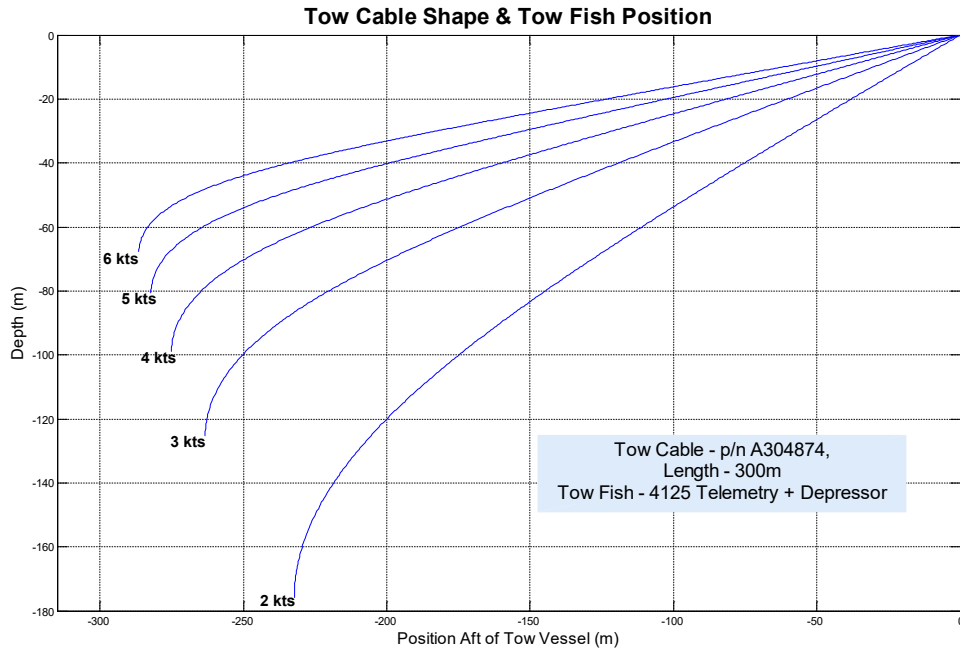


*The maximum length for this type of cable that can be used with the 4125 telemetry system is 250m.

3.14.1.13 Config. 26: 4125i + Depressor Wing, A304874 Cable - 100m Long

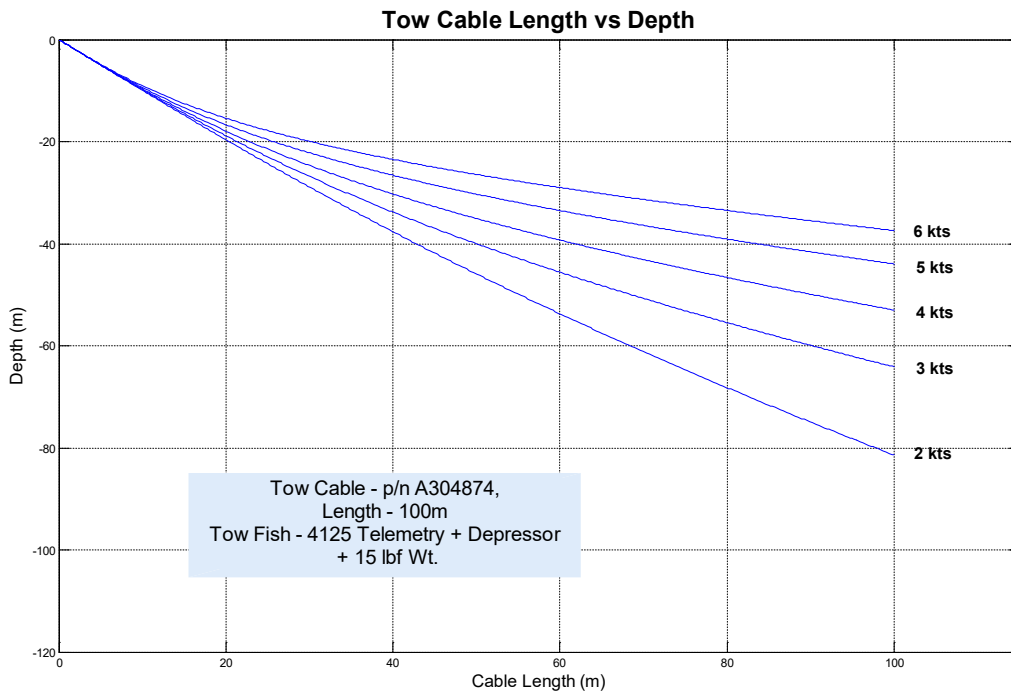
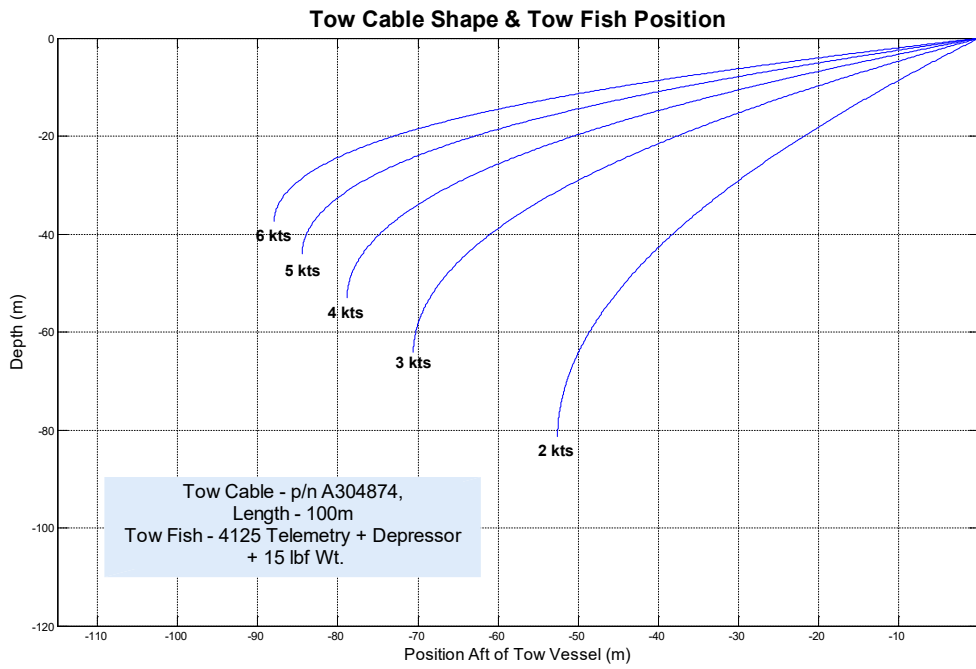


3.14.1.14 Config. 28: 4125i + Depressor Wing, A304874 Cable - 300m* Long

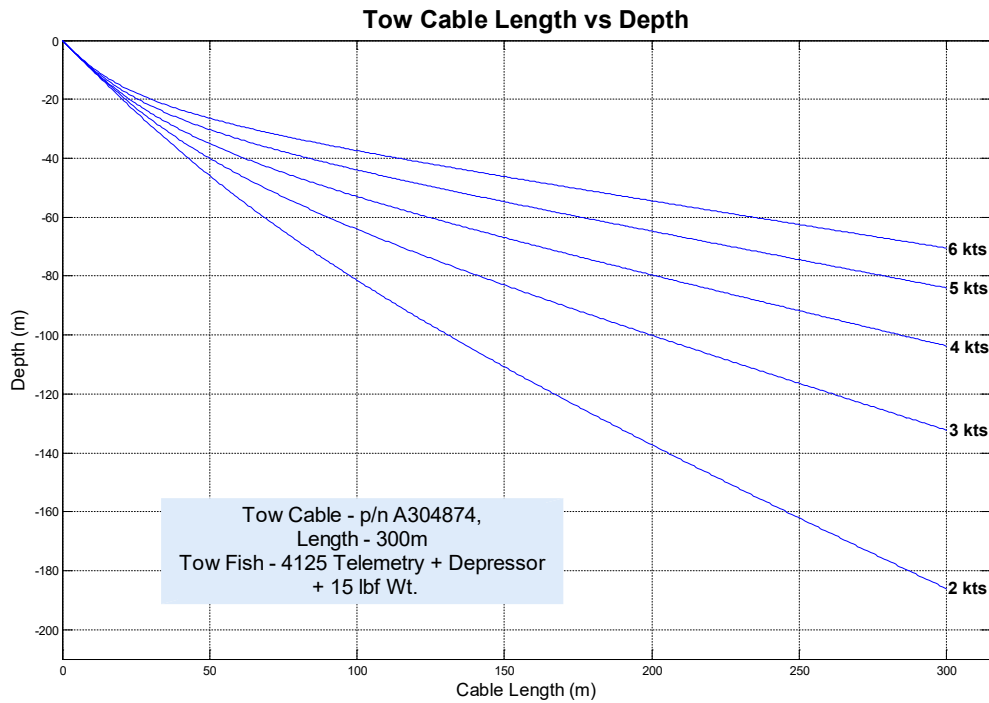
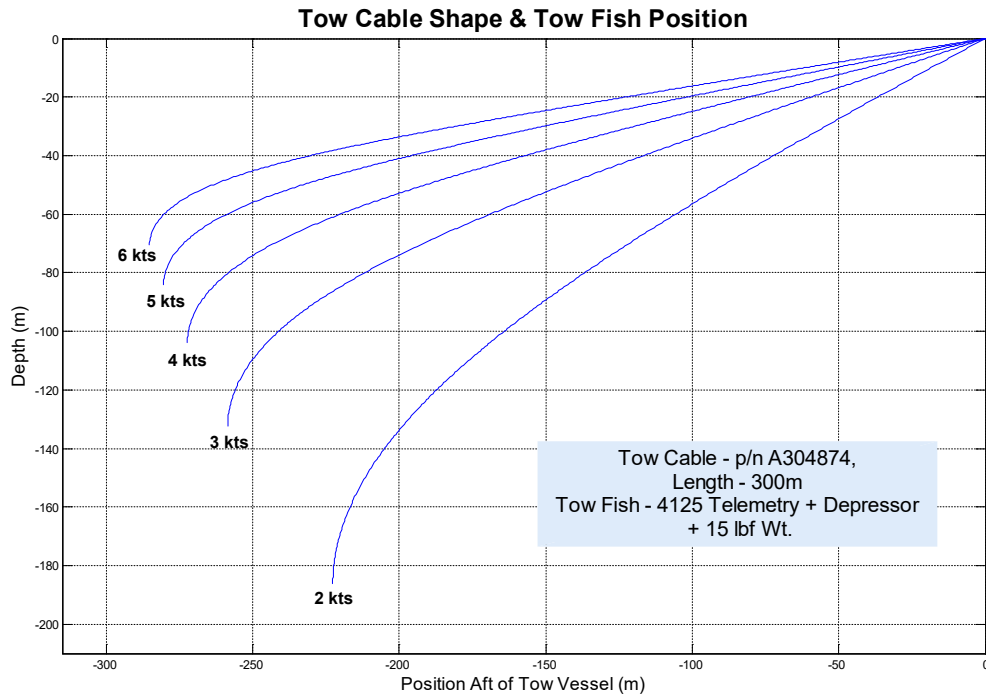


*The maximum length for this type of cable that can be used with the 4125i telemetry system is 250m.

3.14.1.15 Config. 30: 4125i + 15 lb. Keel Wt. + Dep. Wing, A304874 Cable - 100m

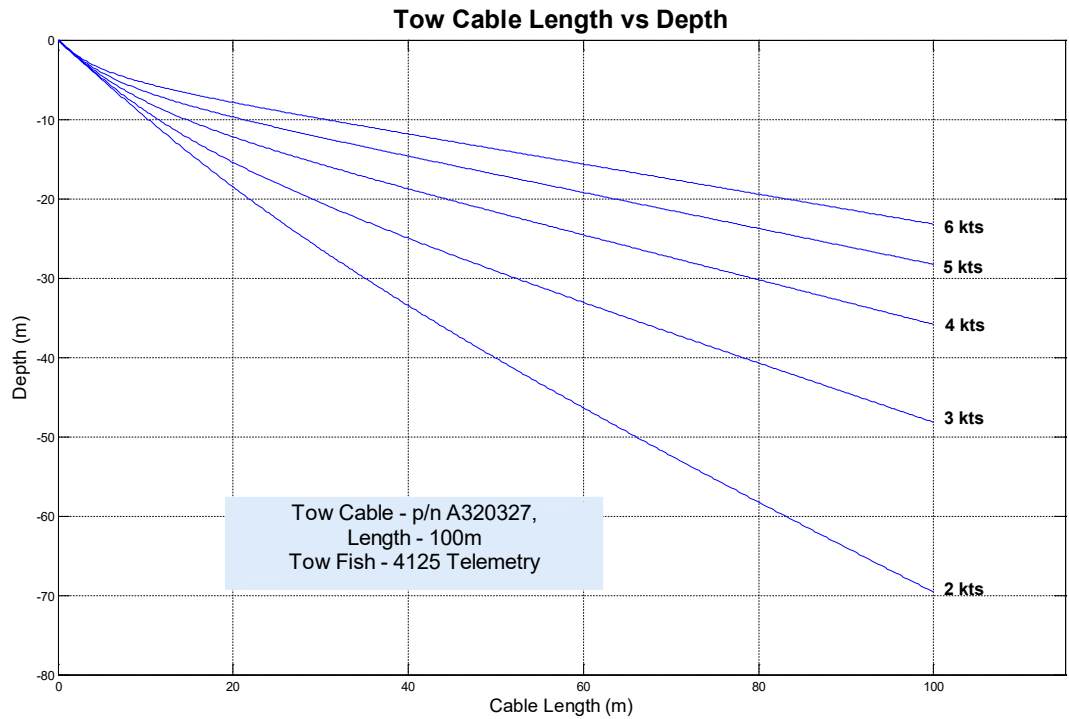
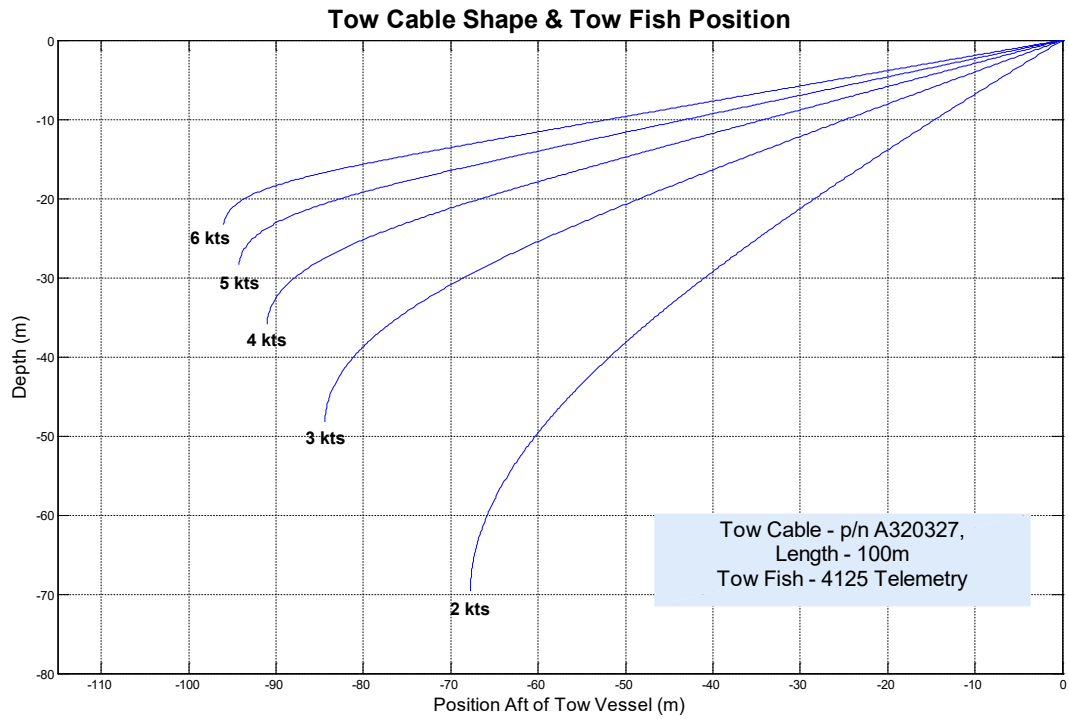


3.14.1.16 Config. 32: 4125i + 15 lb. Keel Weight + Dep. Wing, A304874 Cable - 300m*

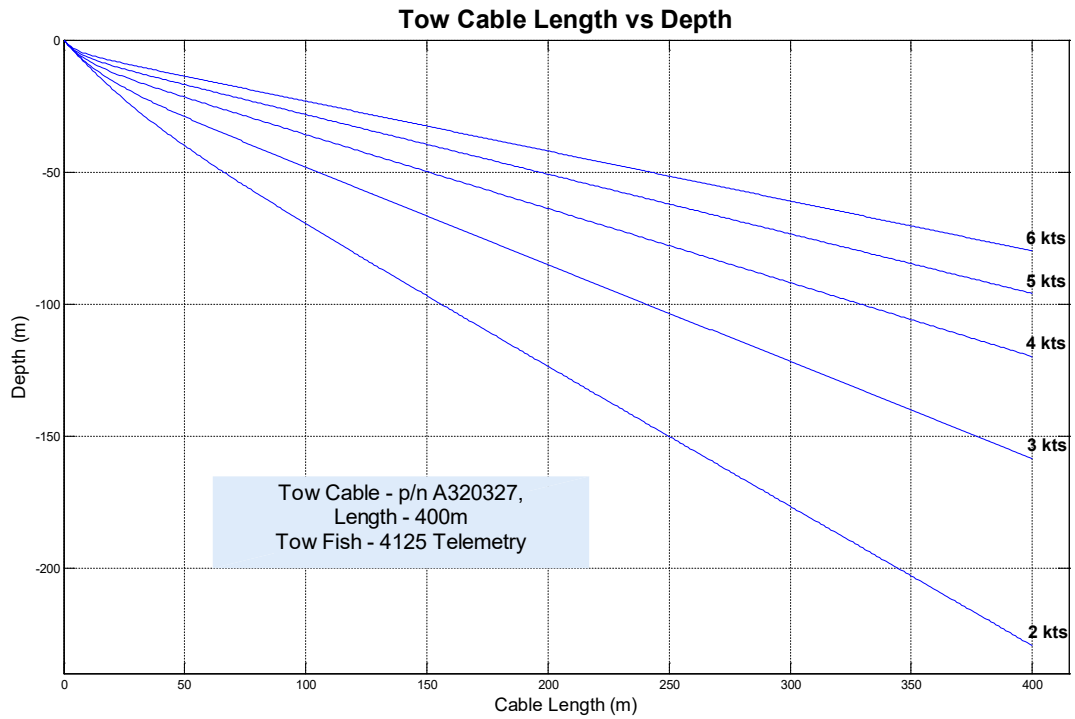
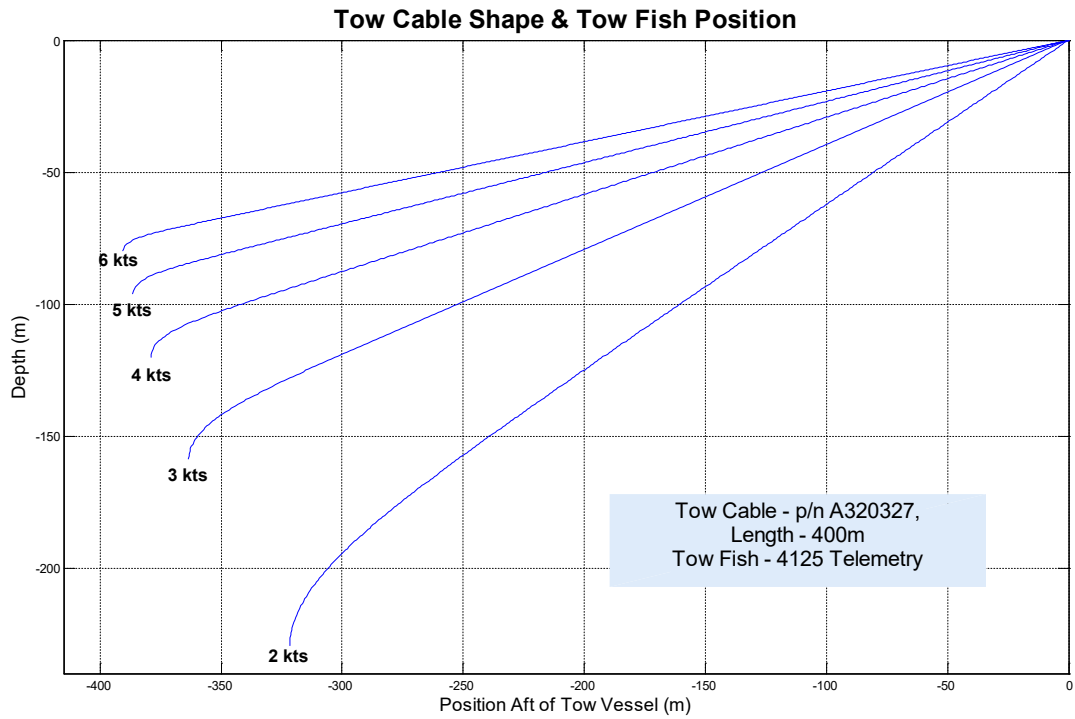


*The maximum length for this type of cable that can be used with the 4125i telemetry system is 250m.

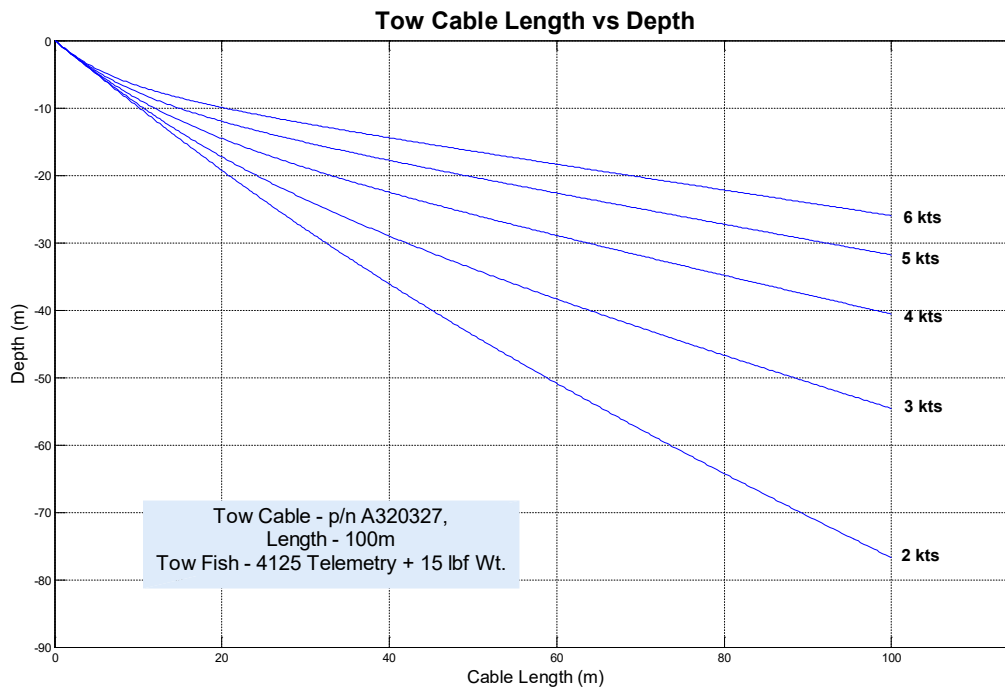
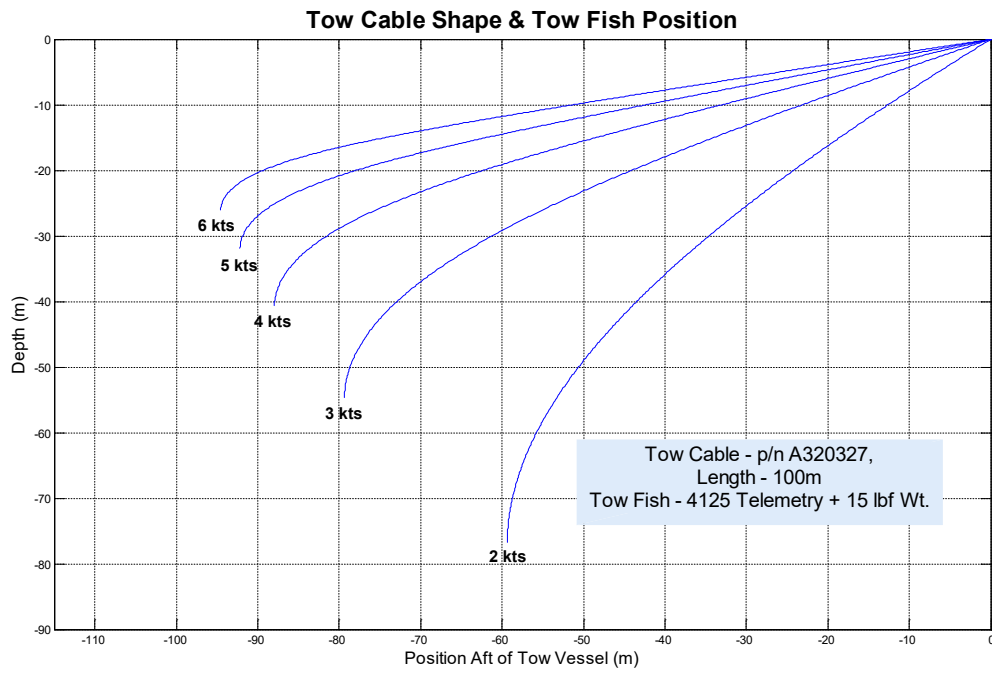
3.14.1.17 Config. 34: 4125i, A320327 Cable - 100m Long



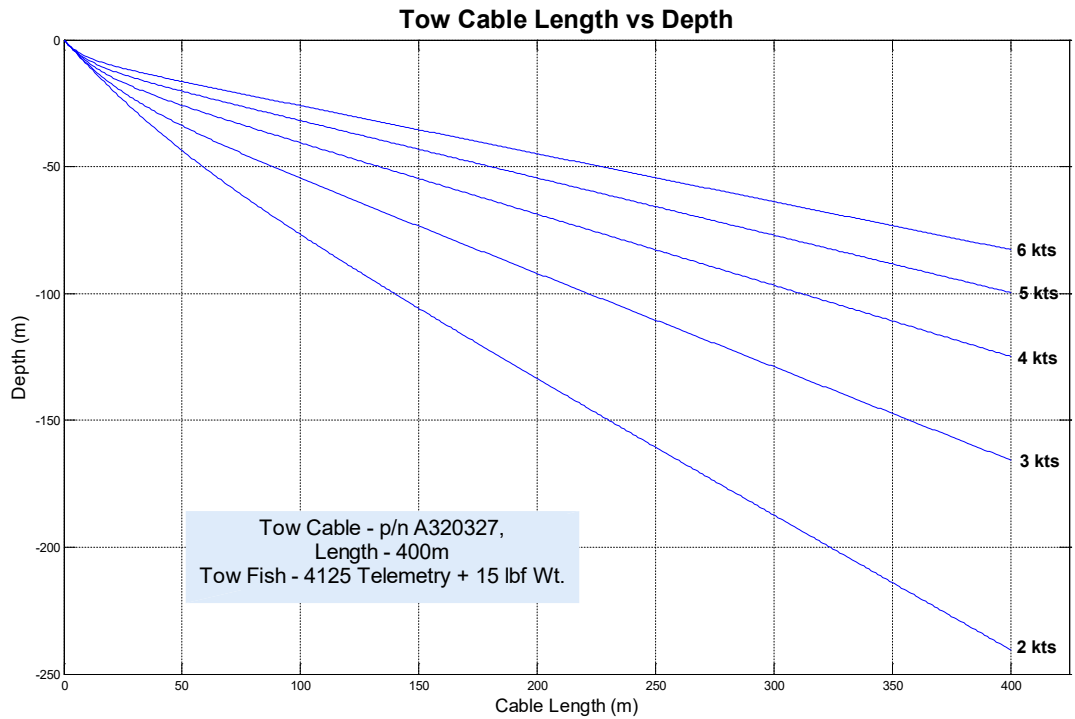
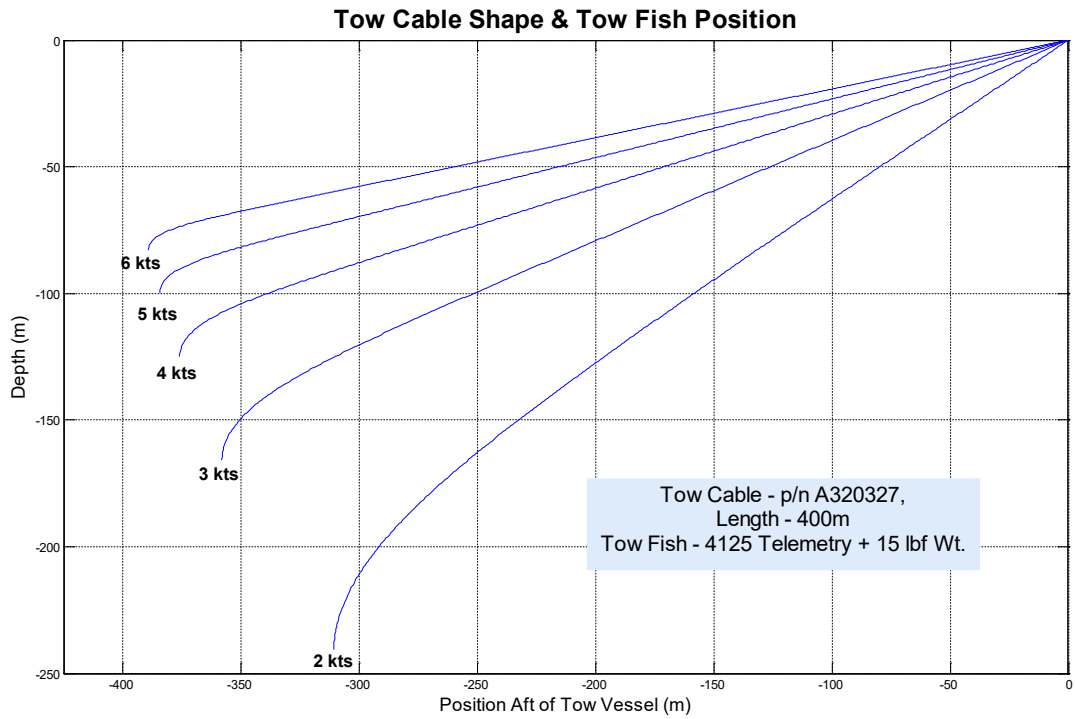
3.14.1.18 Config. 37: 4125i, A320327 Cable - 400m Long



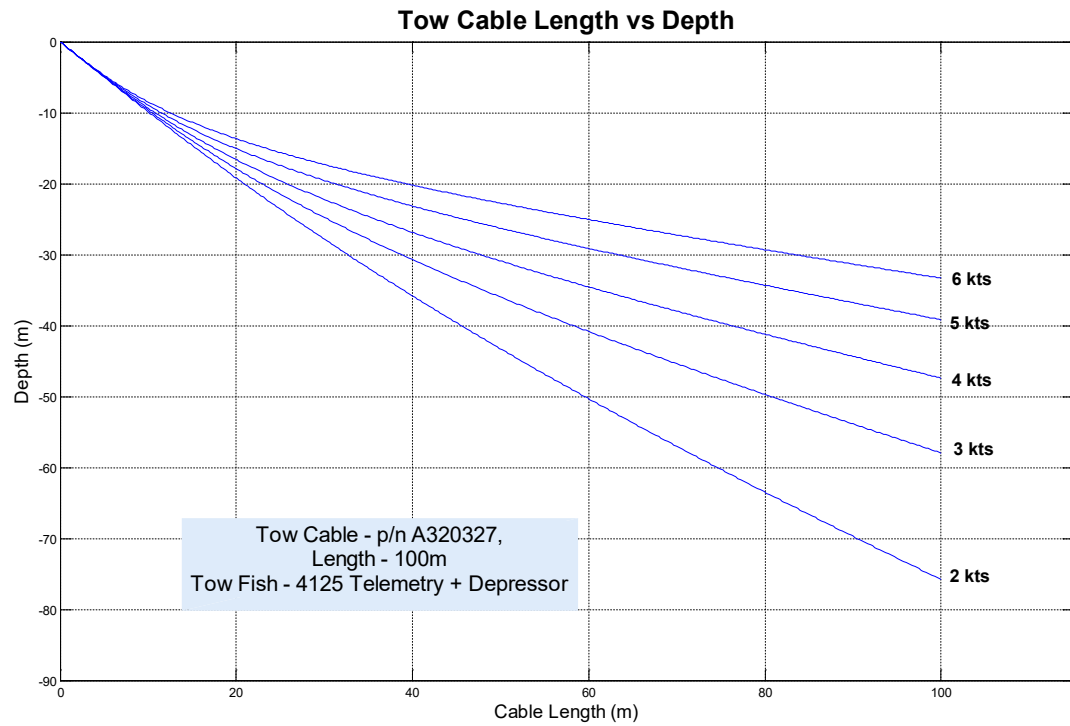
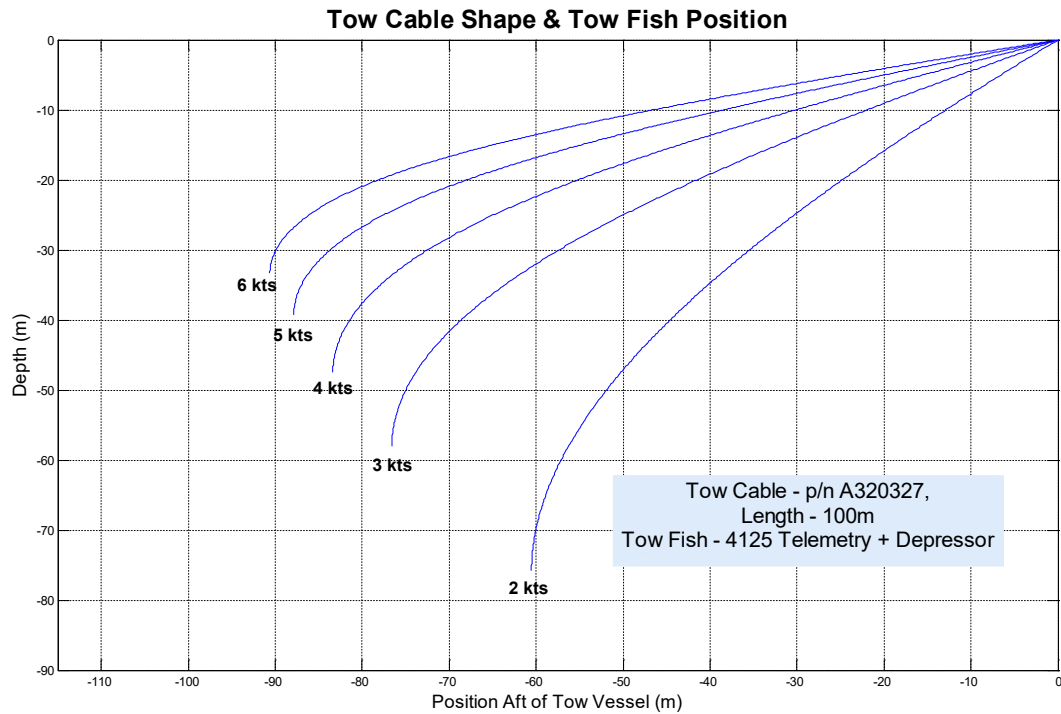
3.14.1.19 Config. 39: 4125i + 15 lb. Keel Weight, A320327 Cable - 100m Long



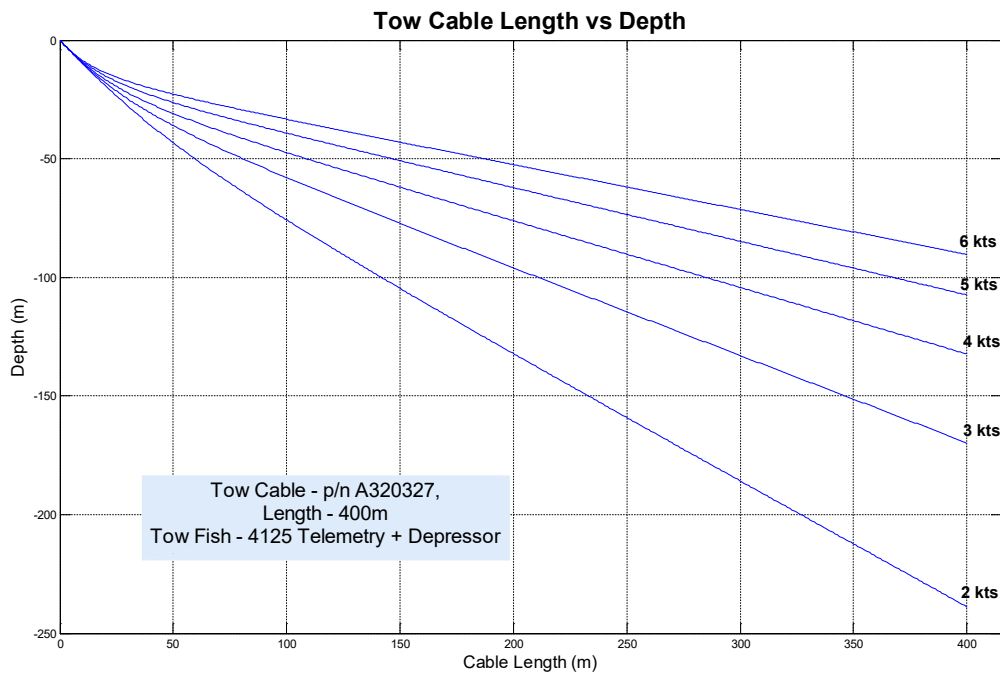
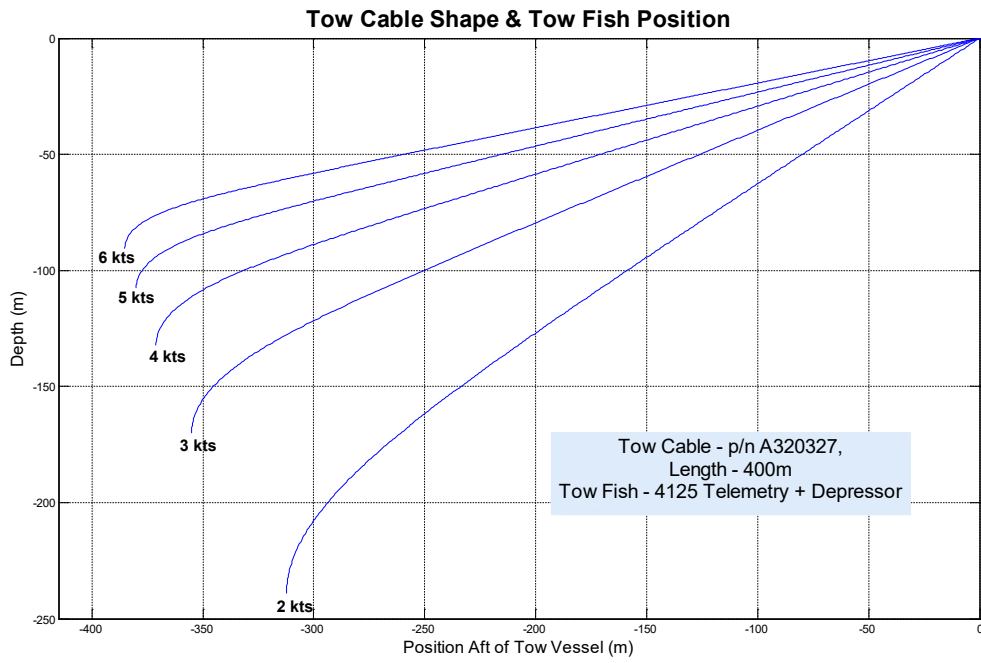
3.14.1.20 Config. 42: 4125i + 15 lb. Keel Weight, A320327 Cable - 400m Long



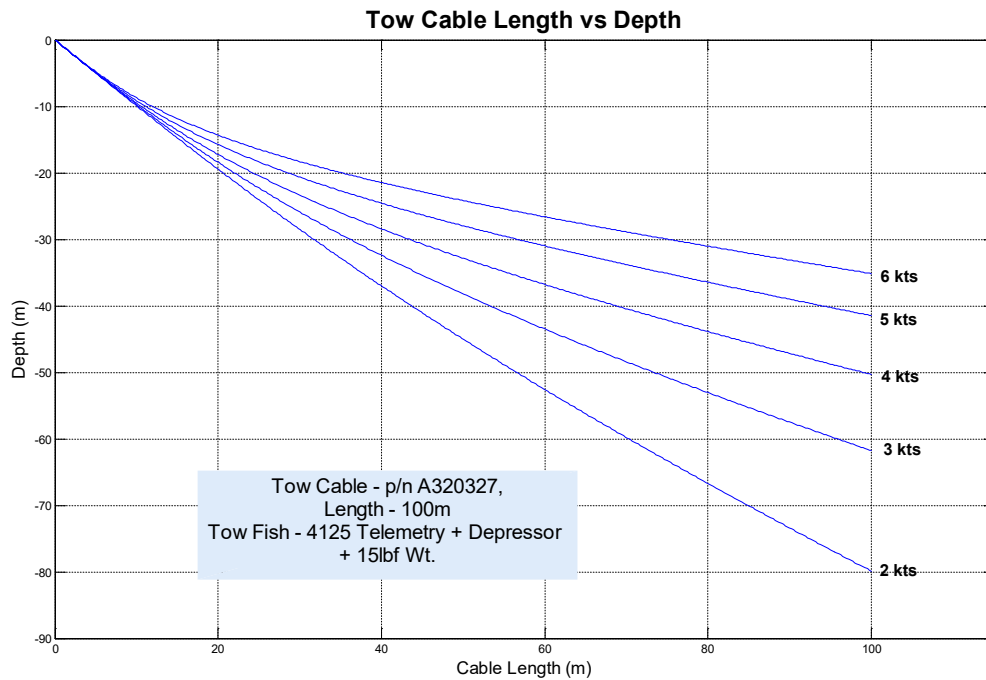
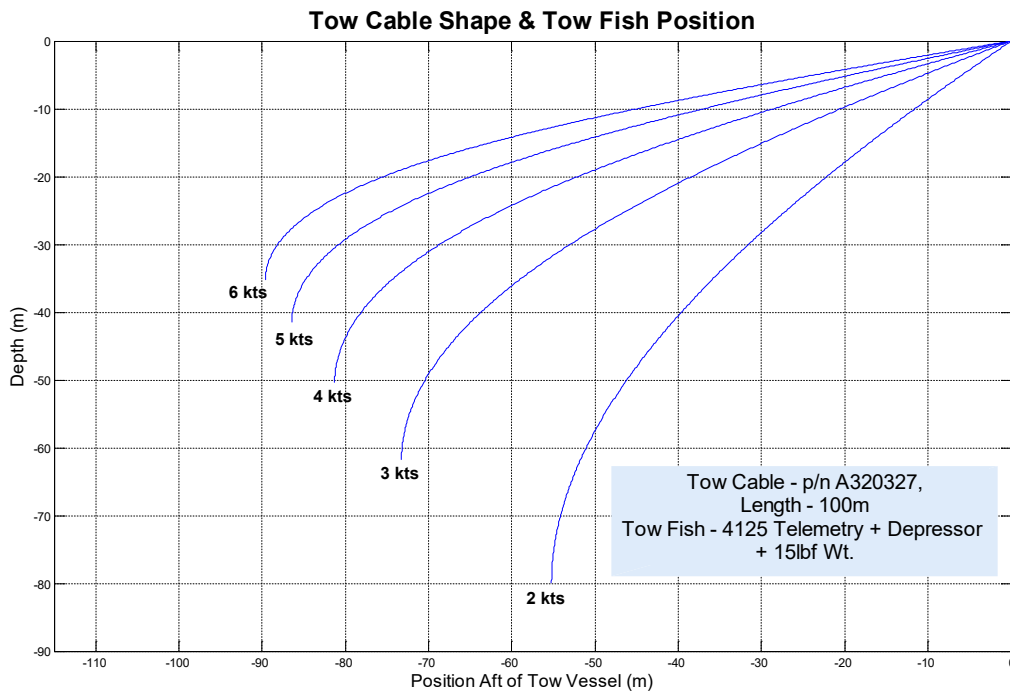
3.14.1.21 Config. 44: 4125i + Depressor Wing, A320327 Cable - 100m Long



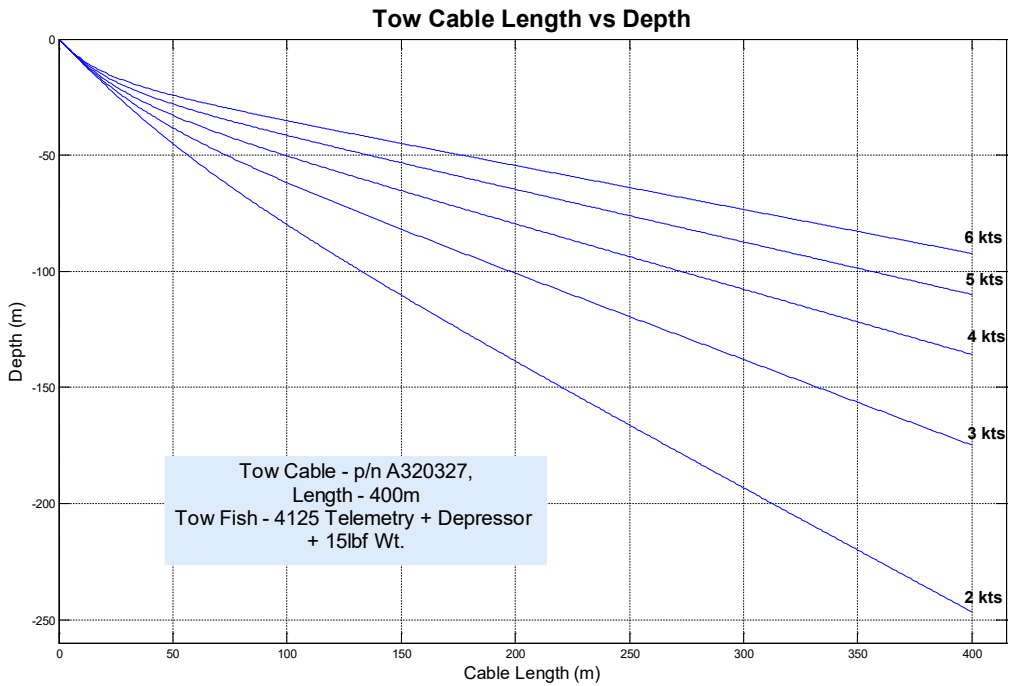
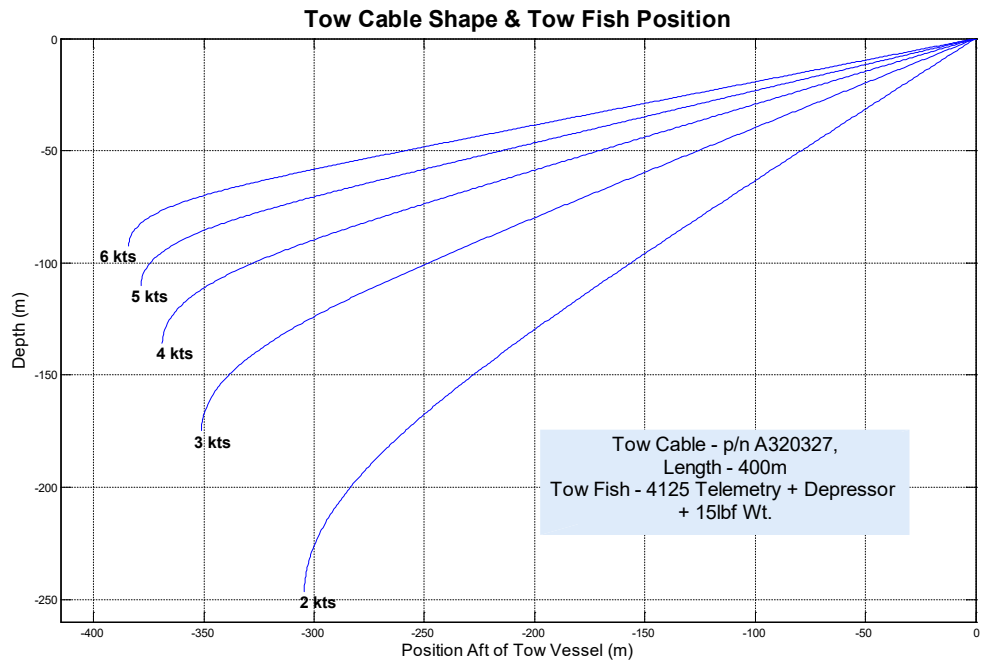
3.14.1.22 Config. 47: 4125i + Depressor Wing, A320327 Cable - 400m Long



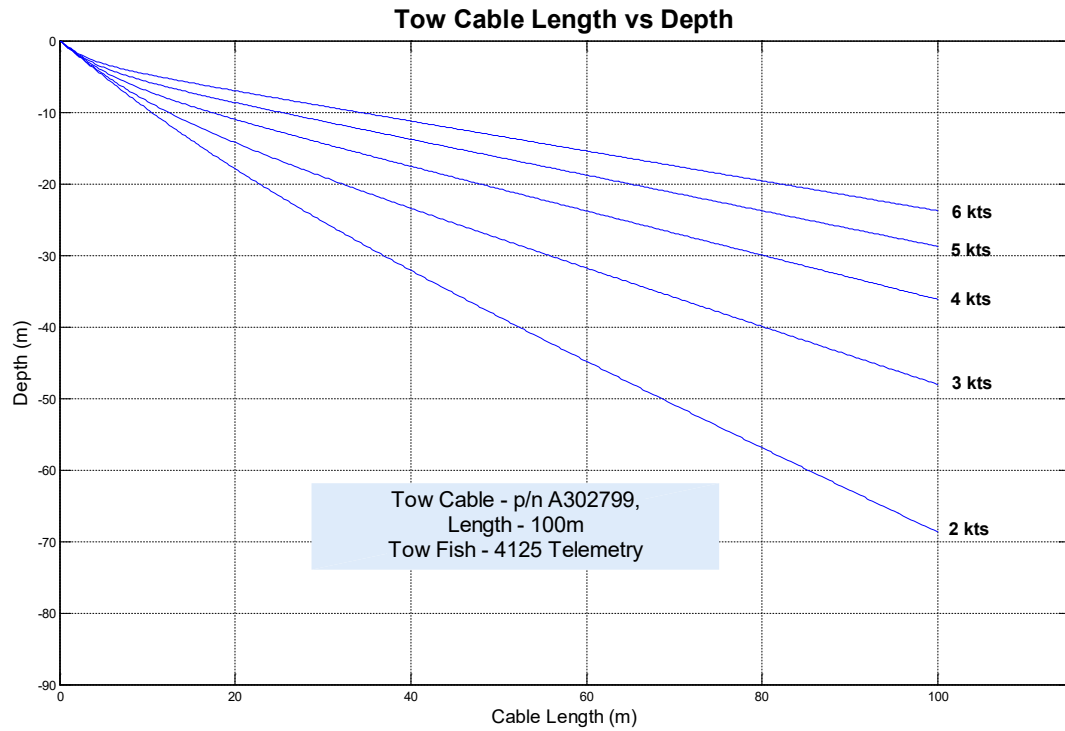
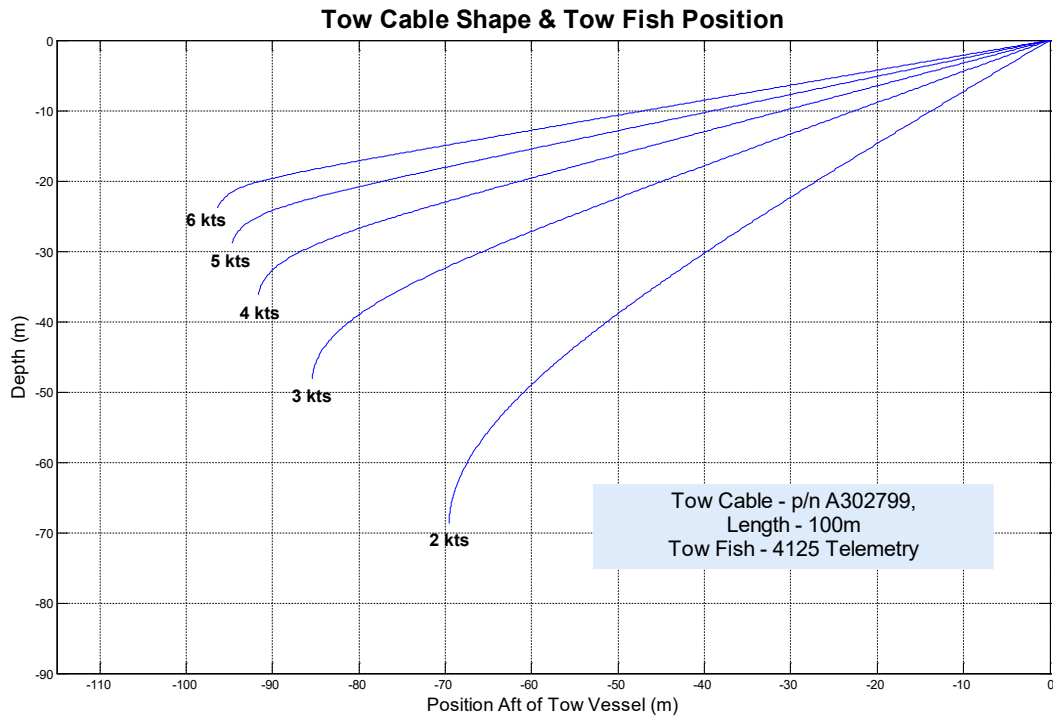
3.14.1.23 Config. 49: 4125i + 15 lb. Keel Wt. + Dep. Wing, A320327 Cable – 100m



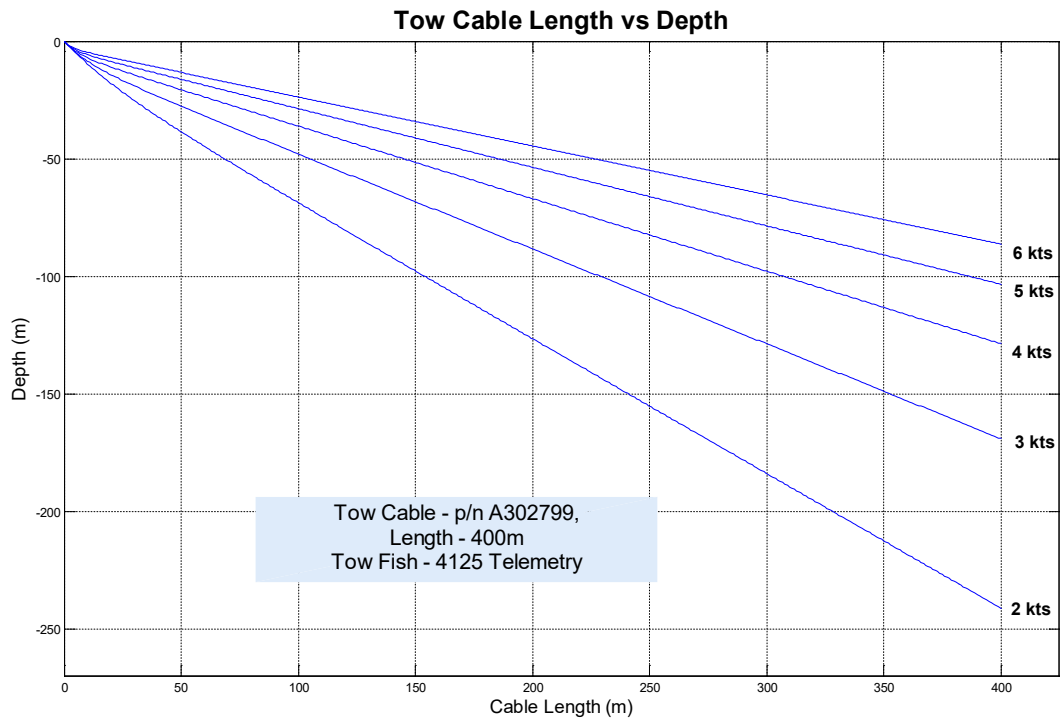
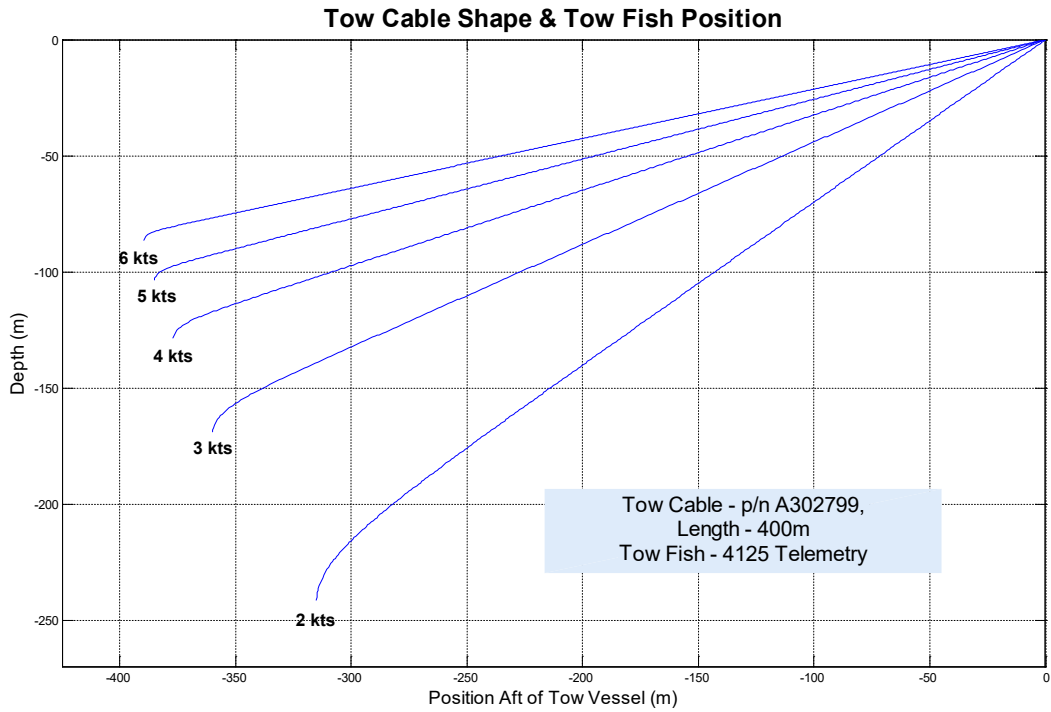
3.14.1.24 Config. 52: 4125i + 15 lb. Keel Wt. + Dep. Wing, A320327 Cable - 400m



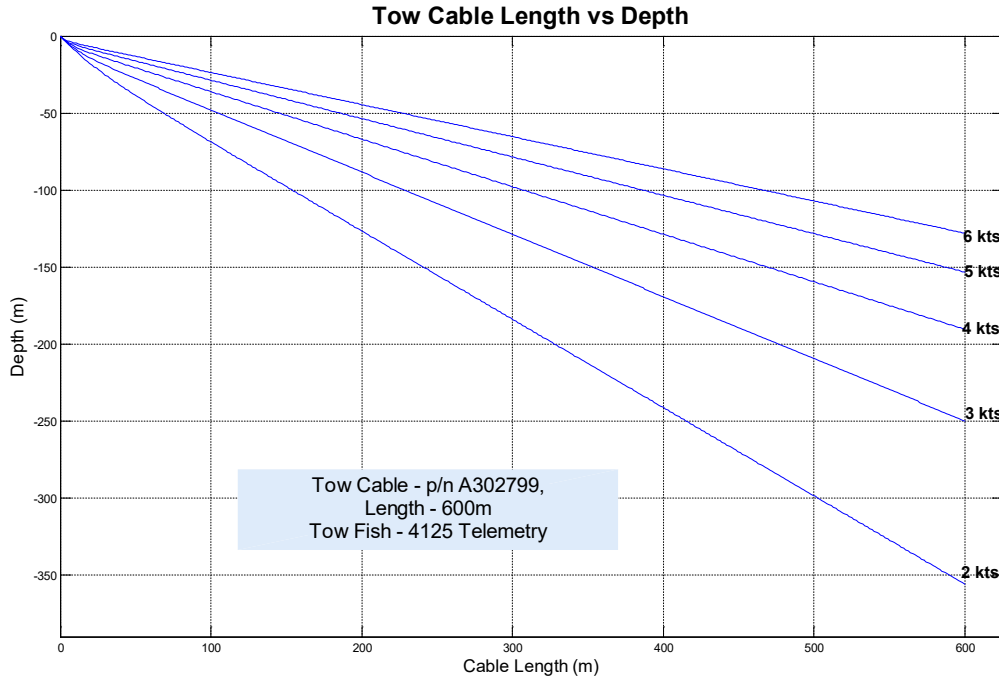
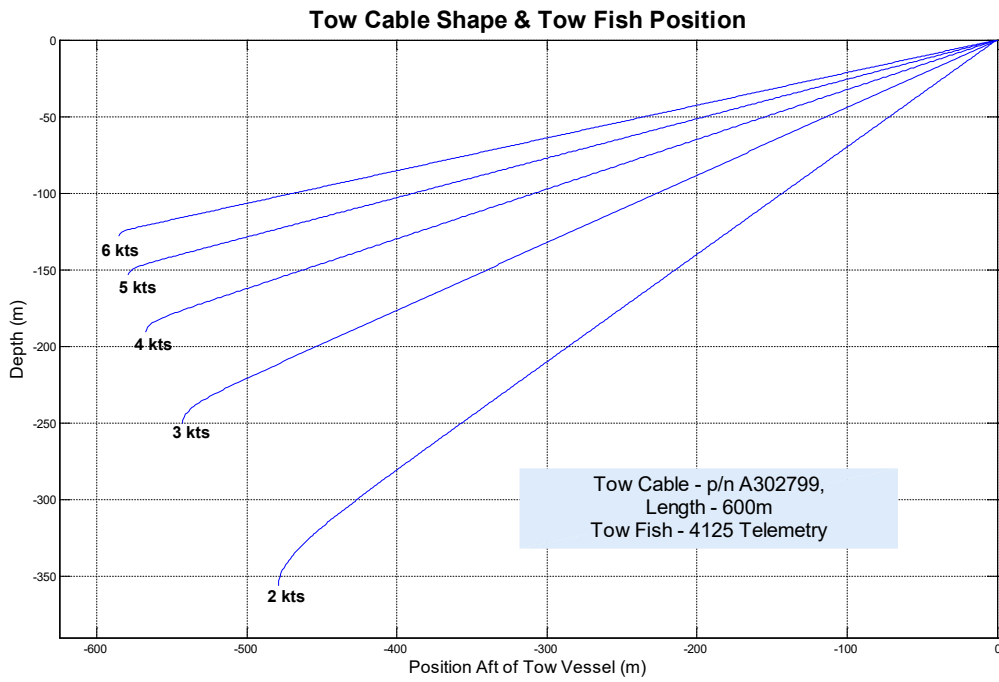
3.14.1.25 Config. 54: 4125i, A302799 Cable - 100m Long



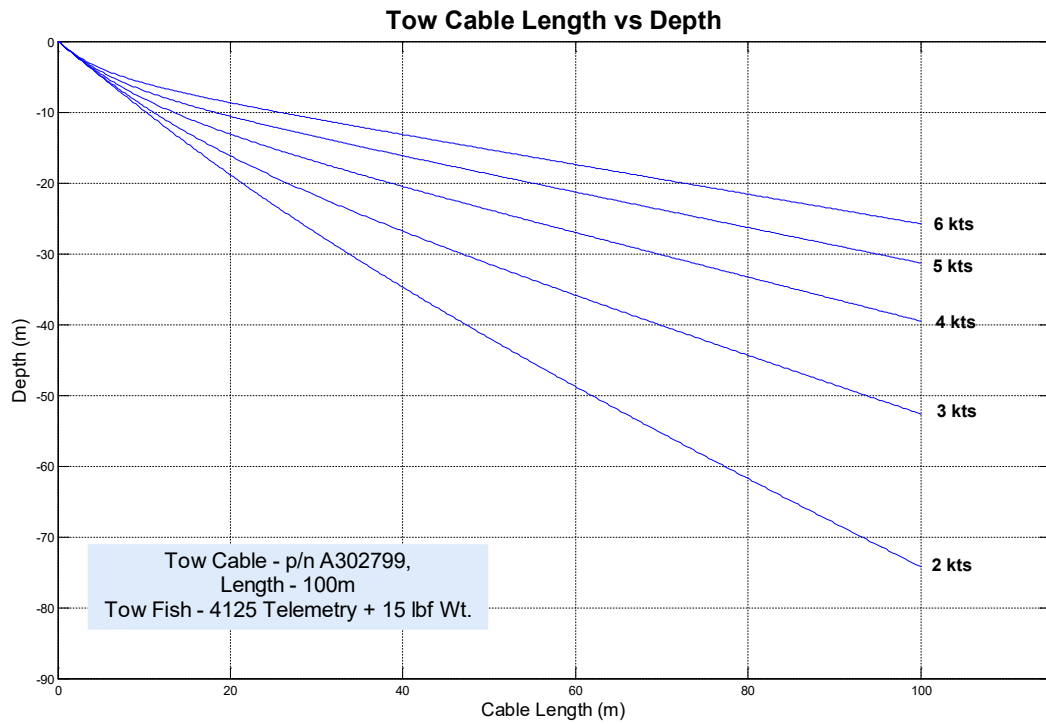
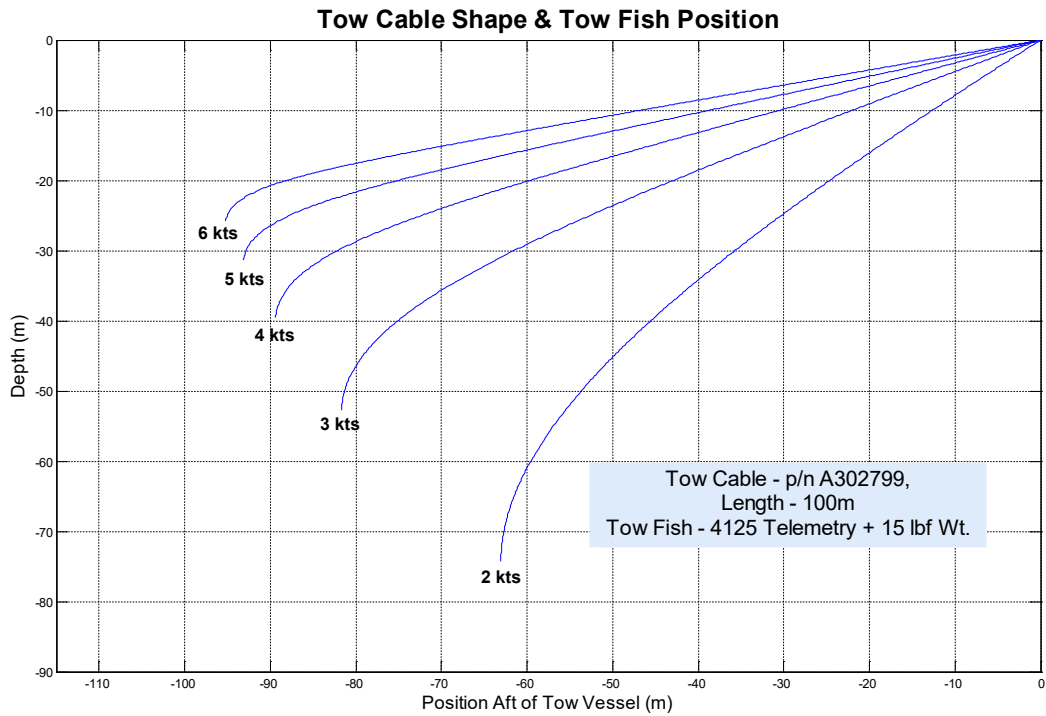
3.14.1.26 Config. 57: 4125i, A302799 Cable - 400m Long



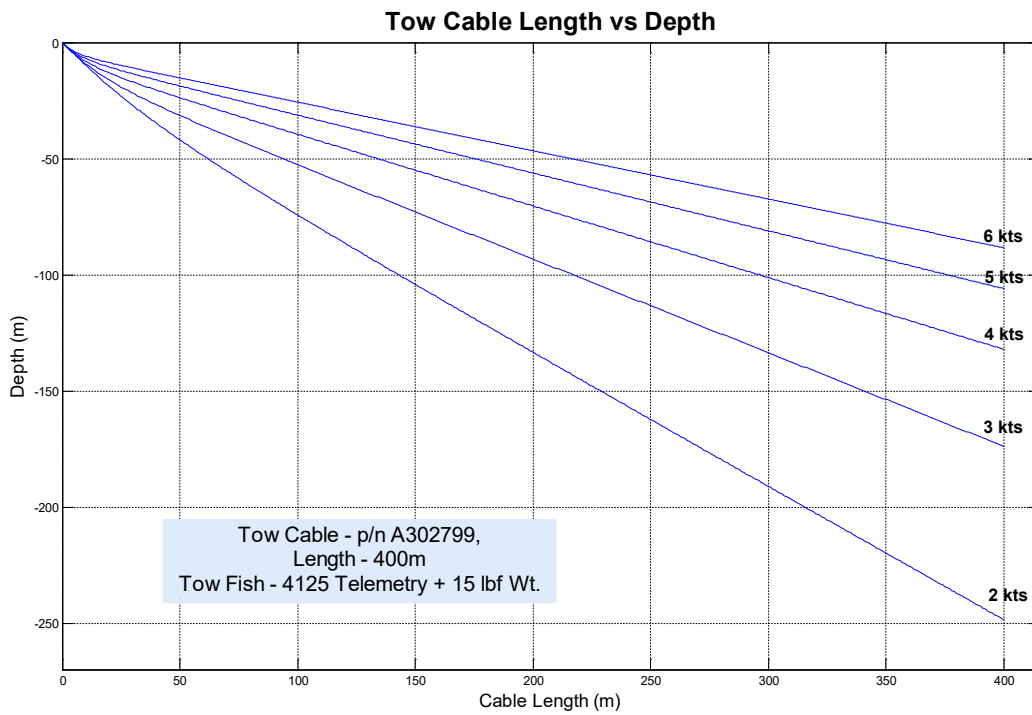
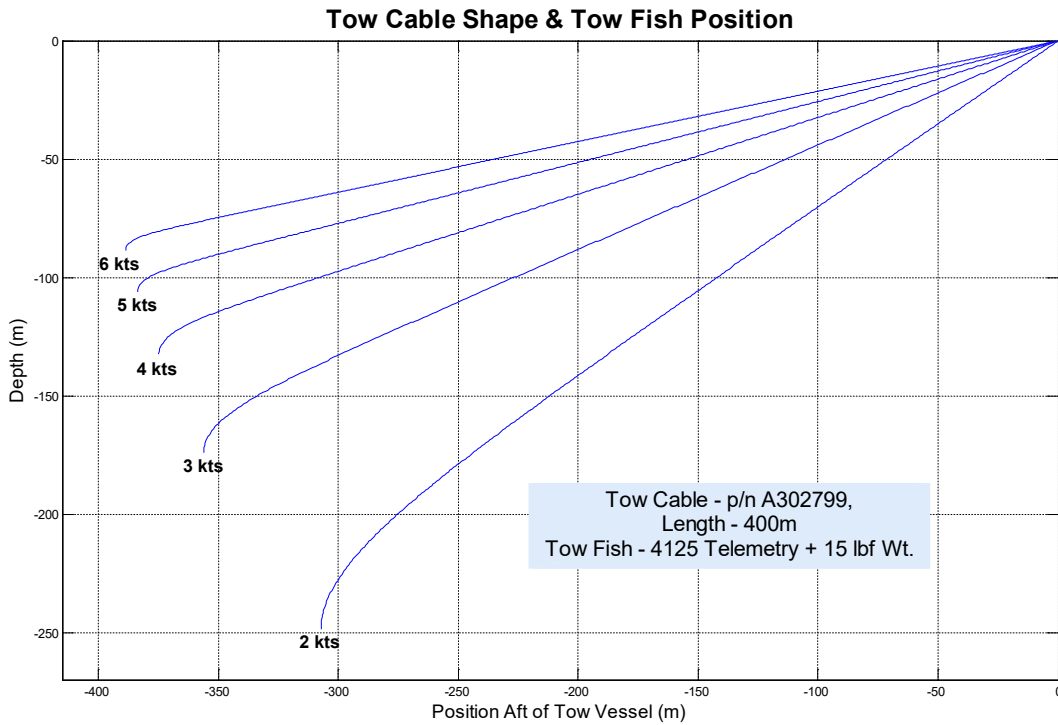
3.14.1.27 Config. 59: 4125i, A302799 Cable - 600m Long



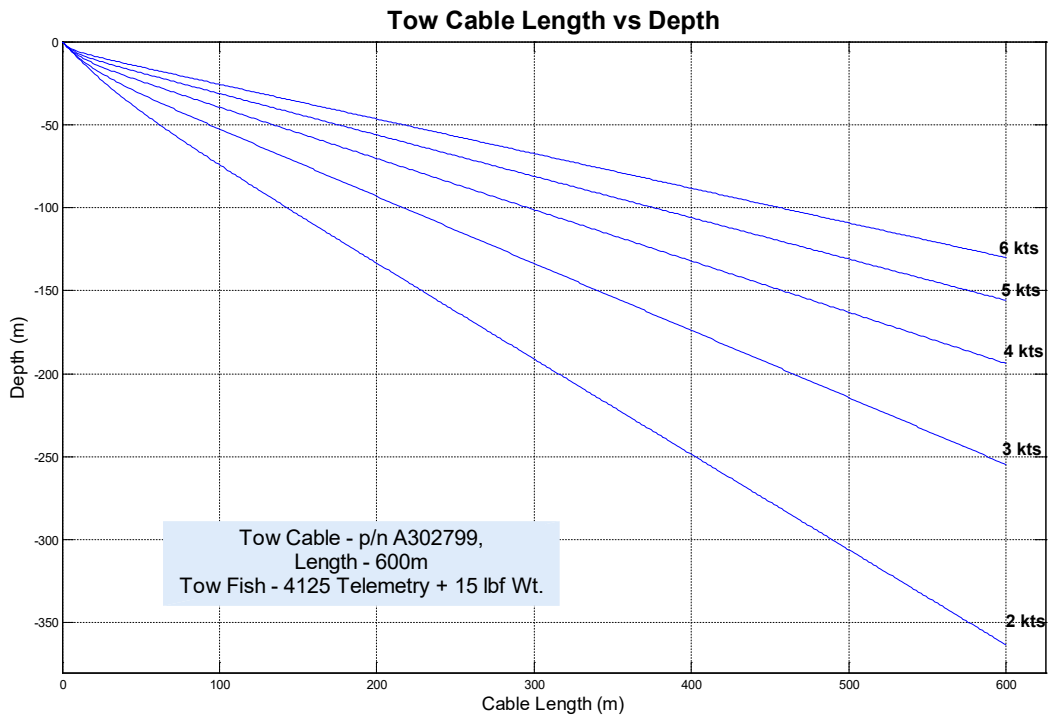
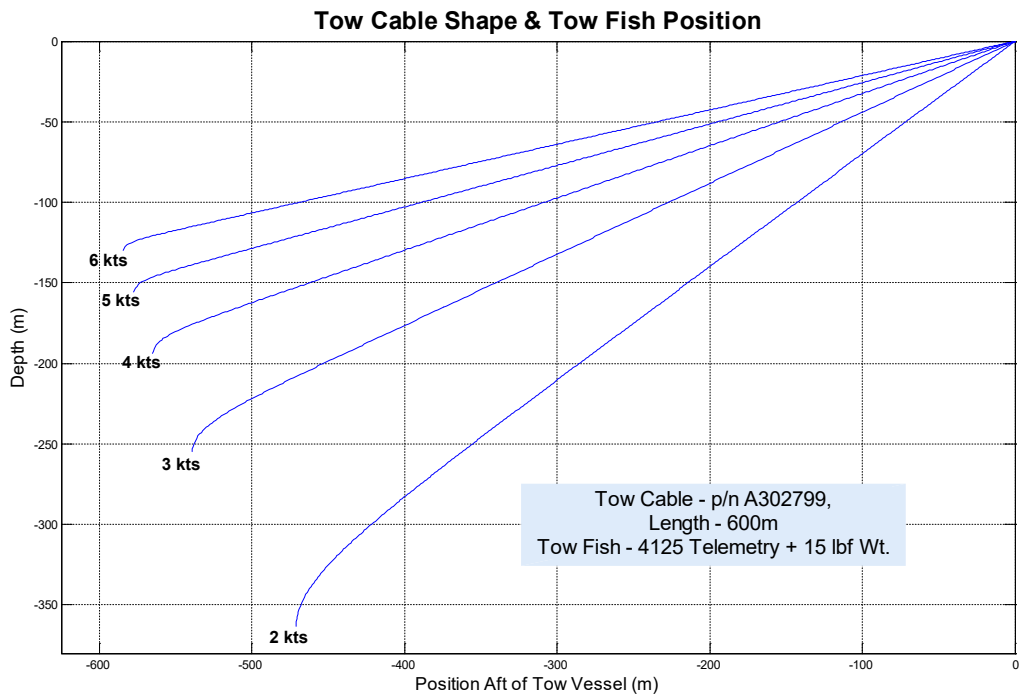
3.14.1.28 Config. 61: 4125i + 15 lb. Keel Weight, A302799 Cable - 100m Long



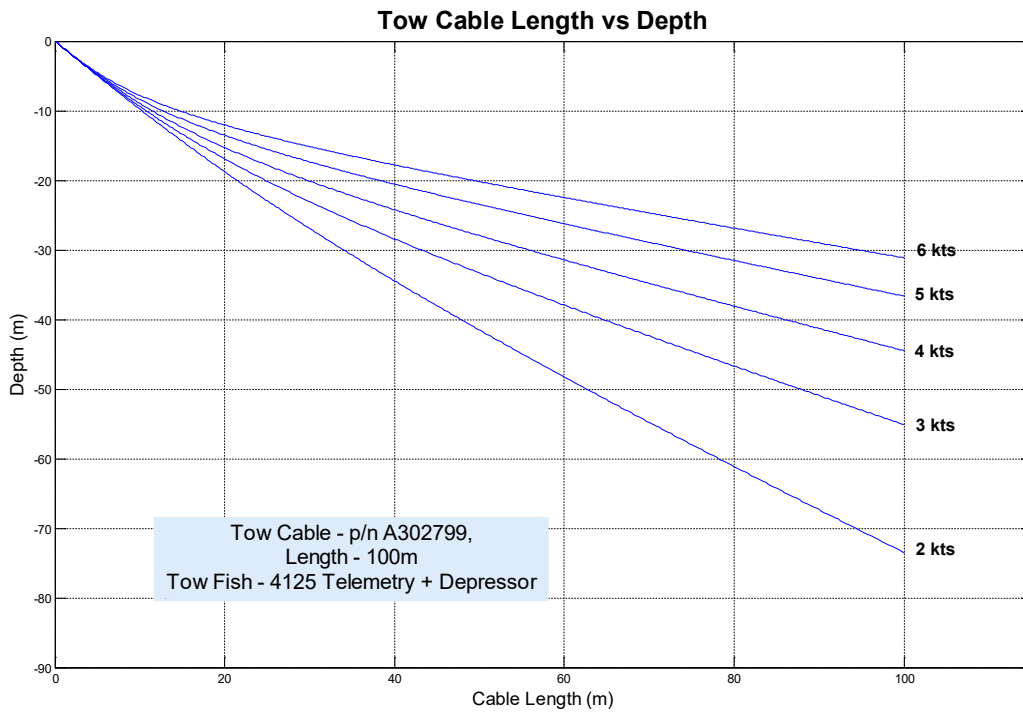
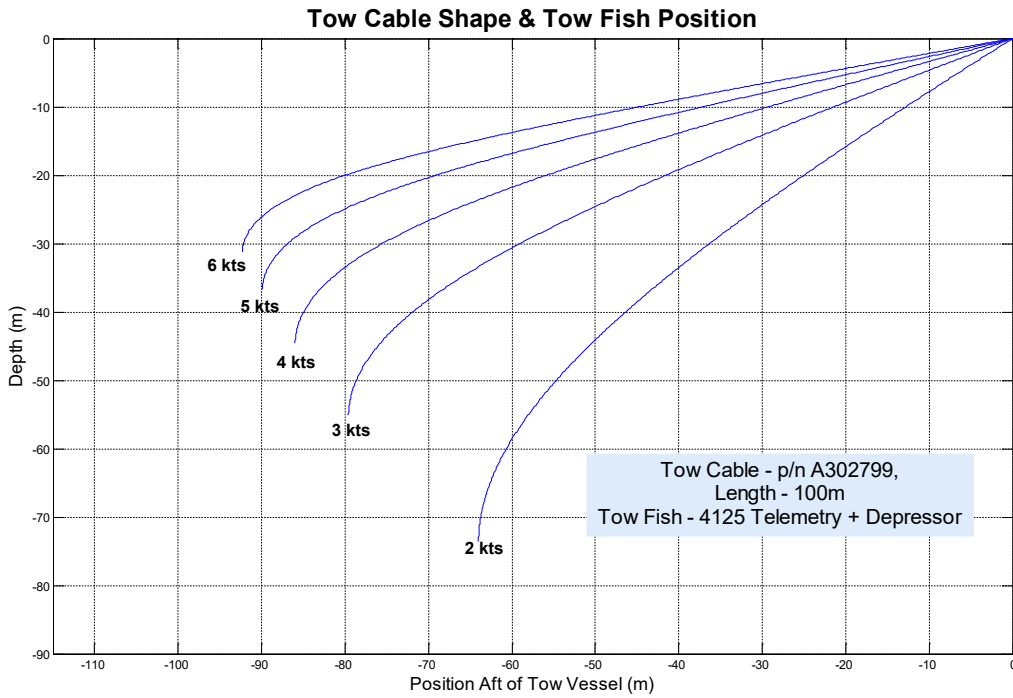
3.14.1.29 Config. 64: 4125i + 15 lb. Keel Weight, A302799 Cable - 400m Long



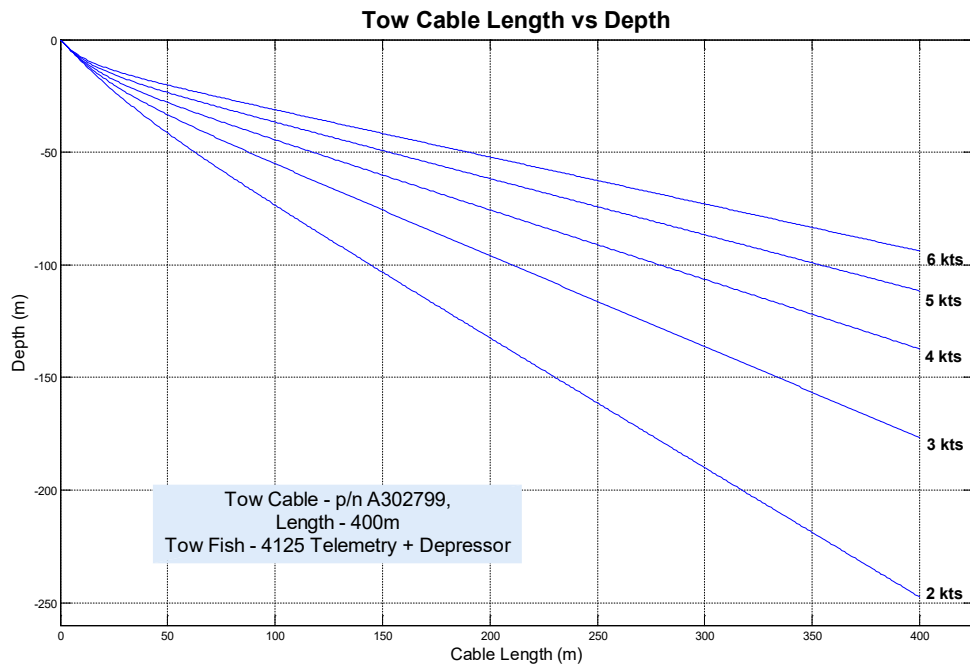
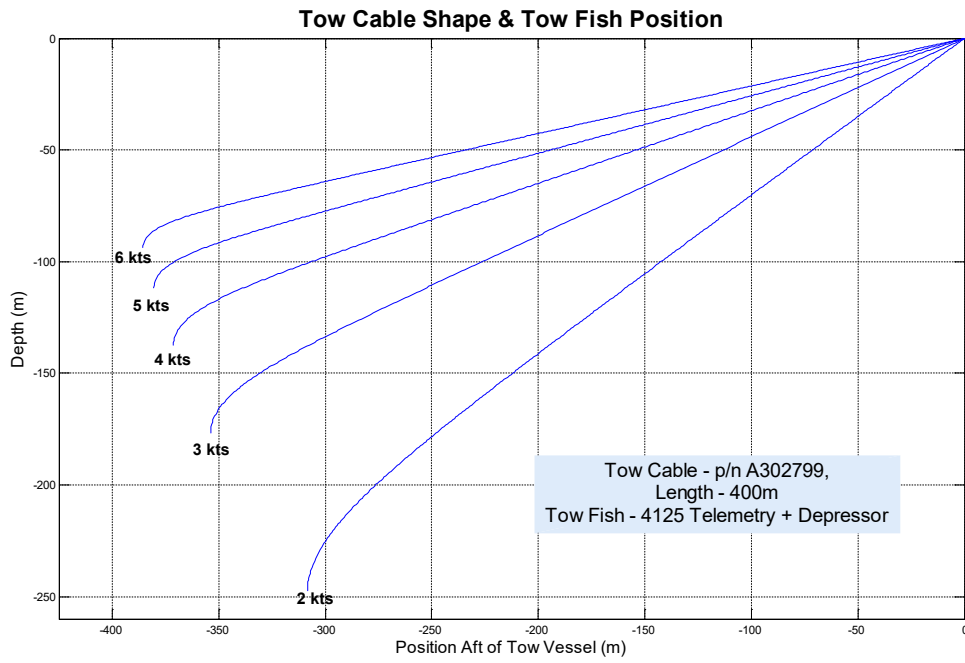
3.14.1.30 Config. 66: 4125i + 15 lb. Keel Weight, A302799 Cable - 600m Long



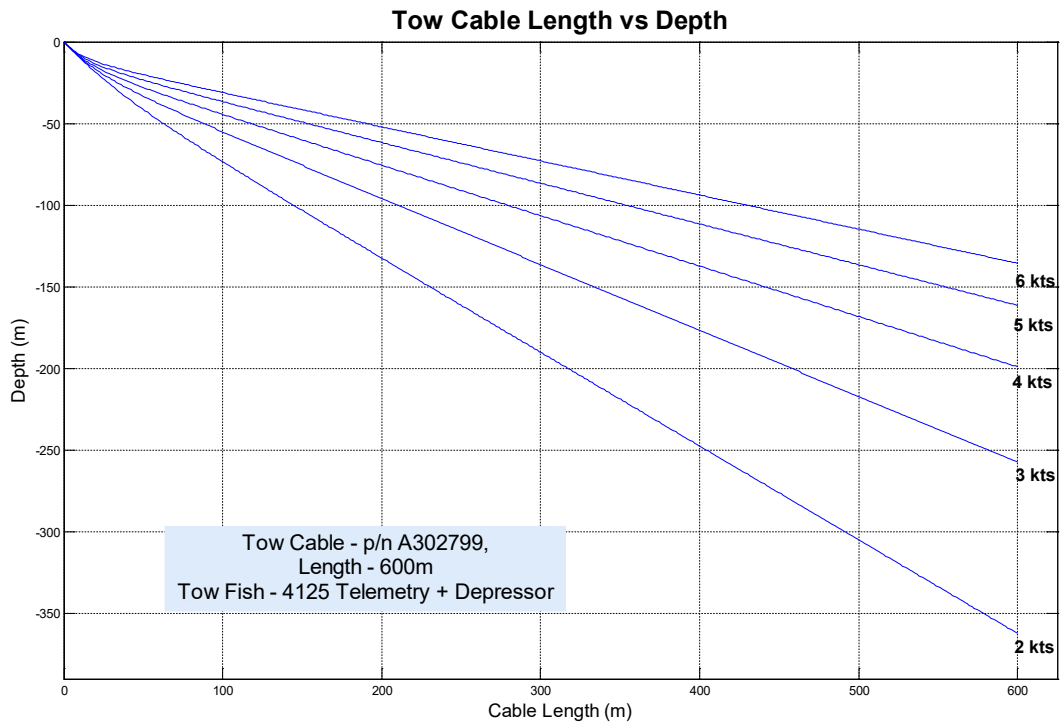
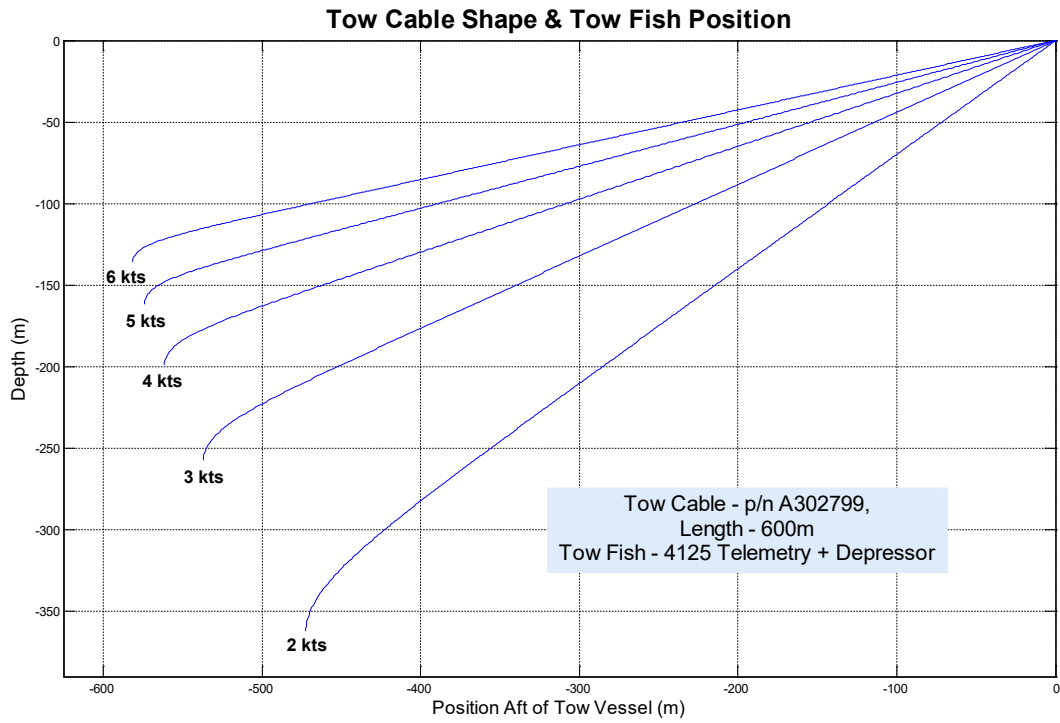
3.14.1.31 Config. 68: 4125i + Depressor Wing, A302799 Cable - 100m Long



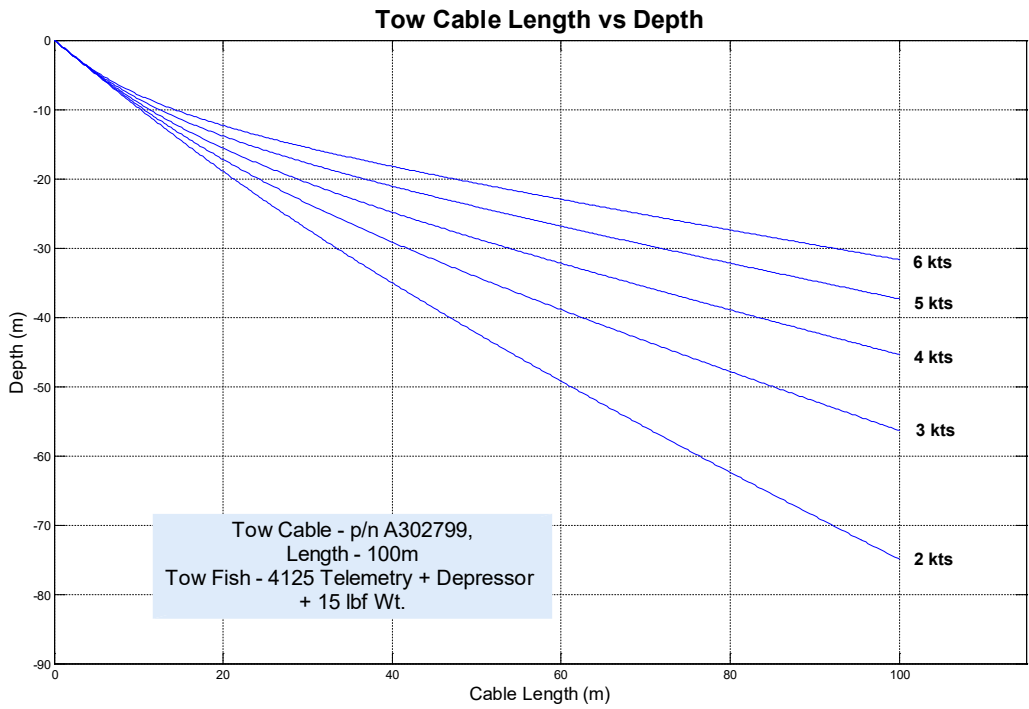
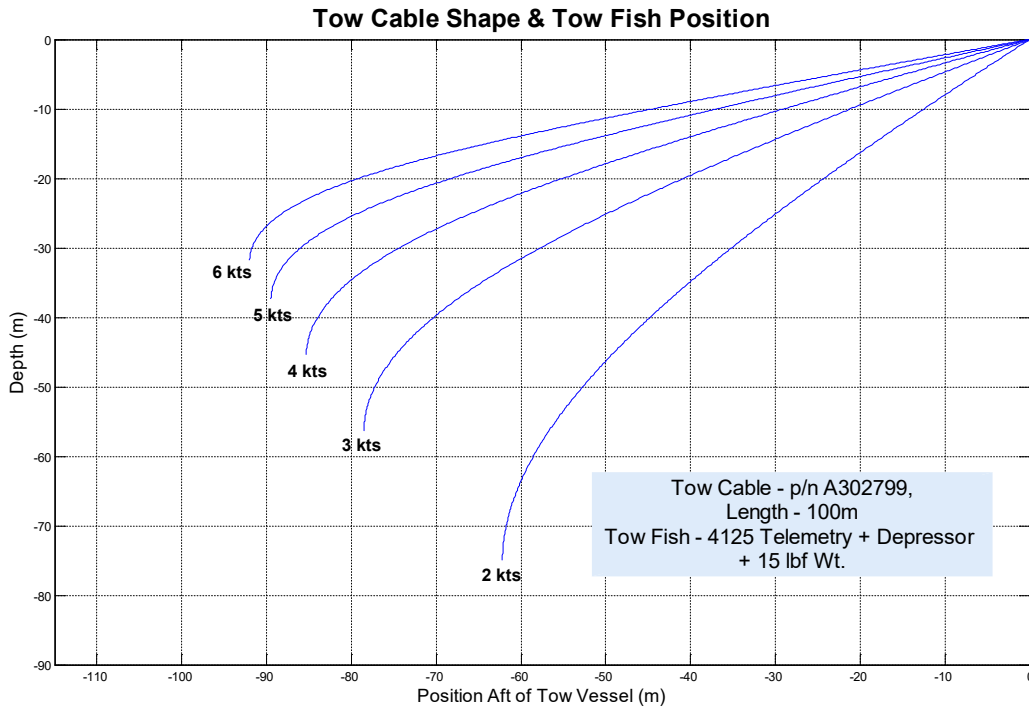
3.14.1.32 Config. 71: 4125i + Depressor Wing, A302799 Cable - 400m Long



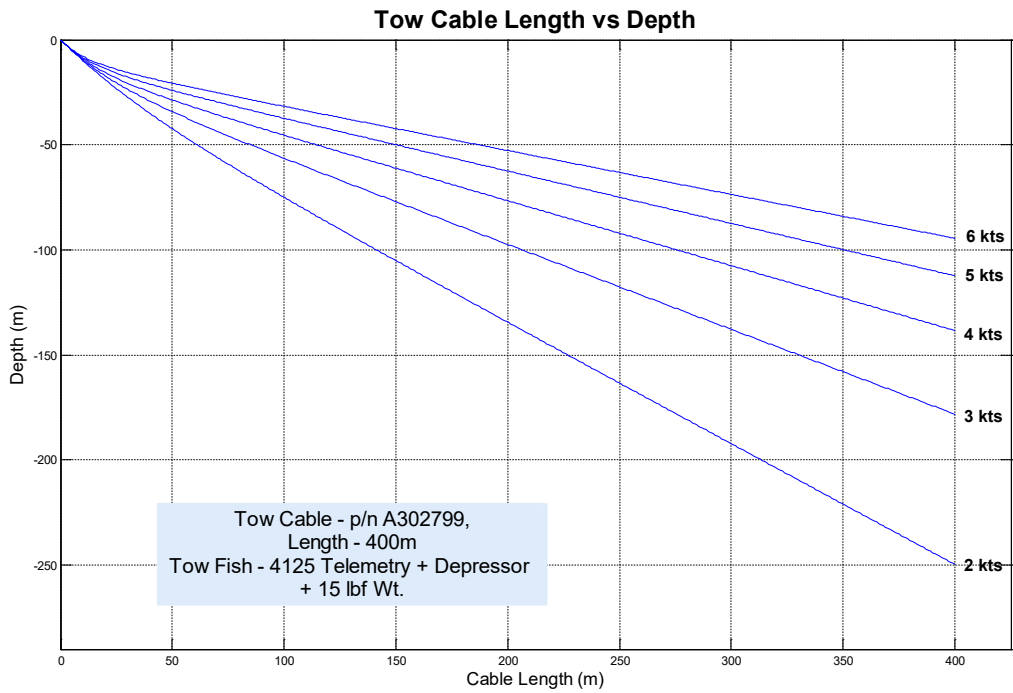
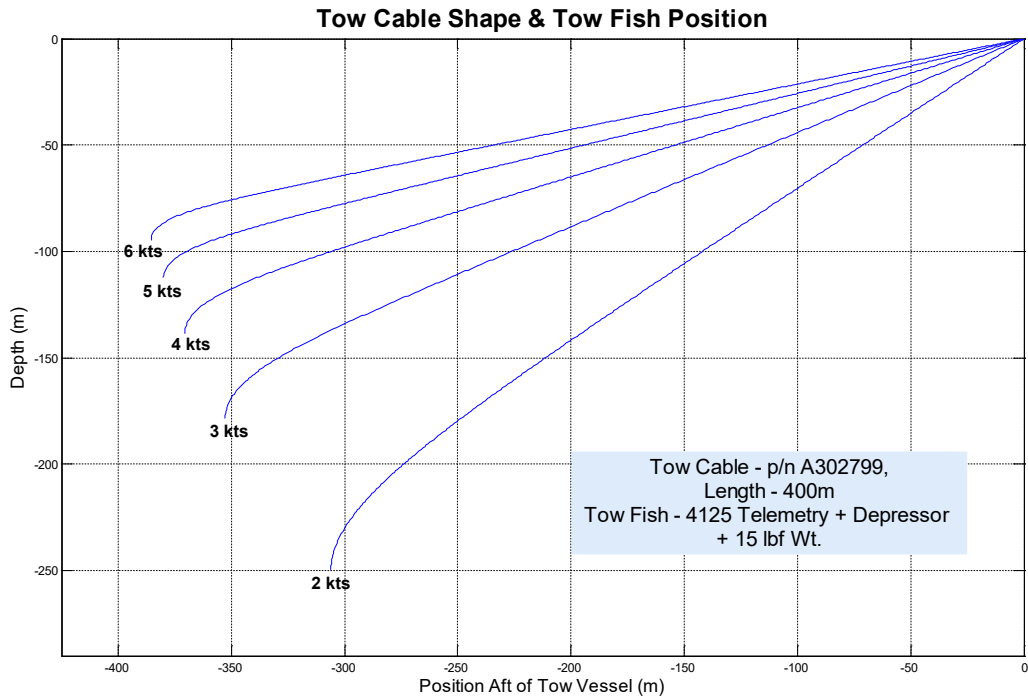
3.14.1.33 Config. 73: 4125i + Depressor Wing, A302799 Cable - 600m Long



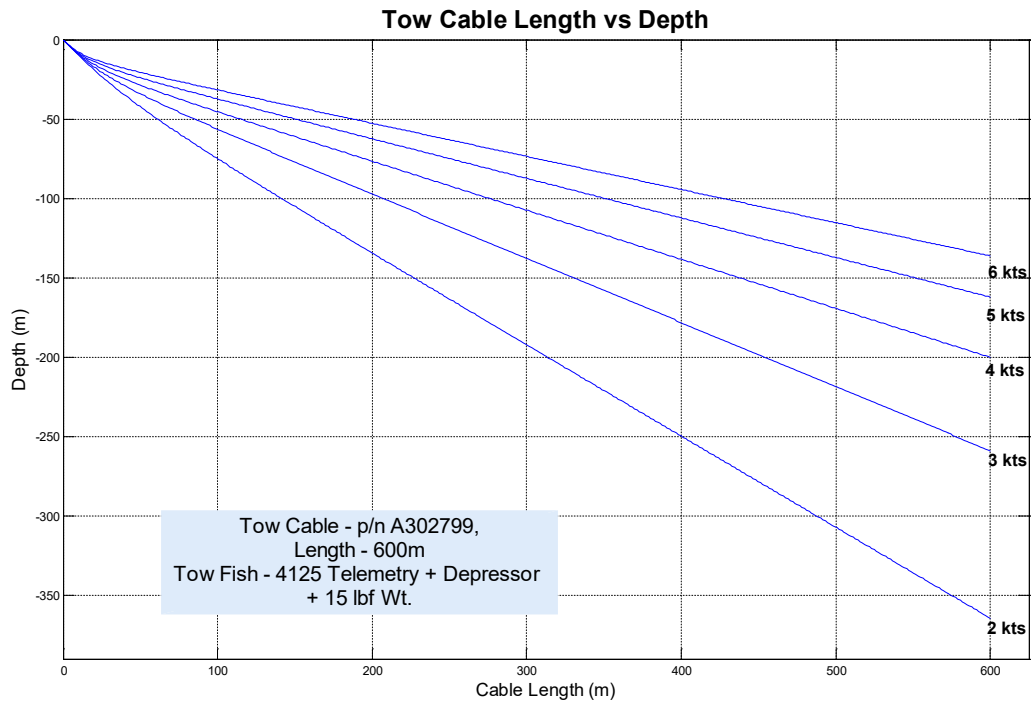
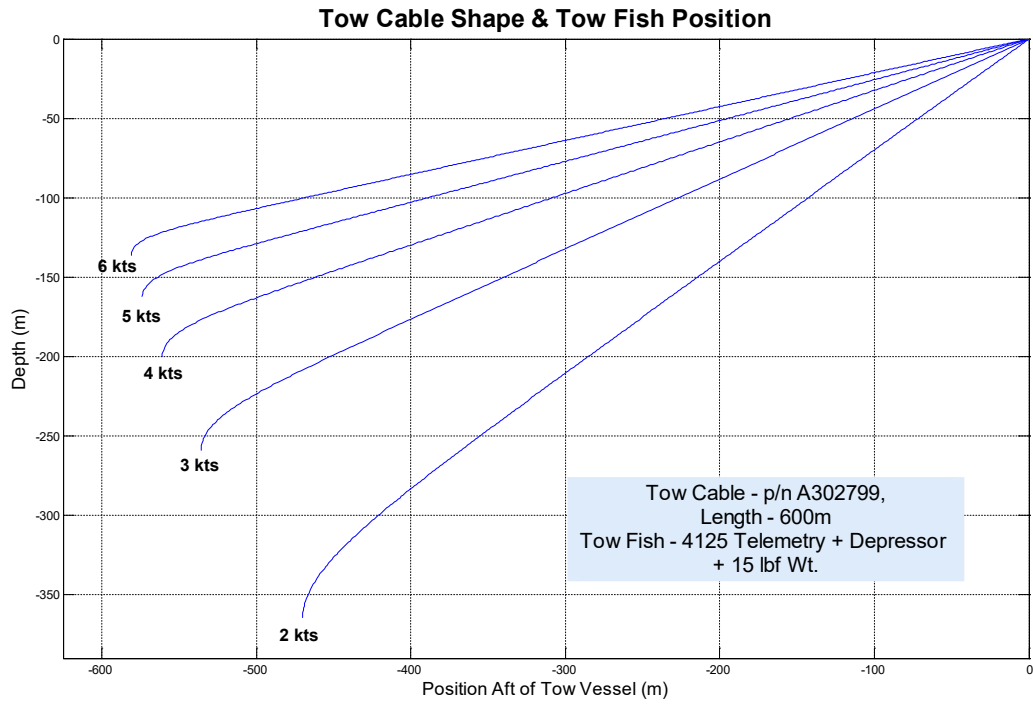
3.14.1.34 Config. 75: 4125i + 15 lb. Keel Wt. + Dep. Wing, A302799 Cable – 100m



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



3.14.1.36 Config. 80: 4125i + 15 lb. Keel Weight + Dep. Wing, A302799 Cable - 600m



3.15 Towfish Recovery

CAUTION! The following procedure is only meant as a general guide. Due to varying conditions, 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.

To recover the towfish:

1. Slowly pull in the tow cable until the towfish is just below the surface.
2. 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.
3. Retrieve the towfish from the water and carefully lower it on deck.
4. Set the Power switch to the OFF position.
5. Disconnect the tow cable from the tow cable connector.
6. Install the dummy plug on the tow cable connector.

Refer to **4.0 MAINTENANCE** for instructions on cleaning and inspecting the towfish, tow cable, and the underwater connectors after use.

4.0 MAINTENANCE

The 4125i Series Dual-frequency Side Scan Sonar System is ruggedly designed and built, requiring little maintenance. However, to ensure long-lasting, reliable service, some periodic maintenance is recommended, with most performed after each deployment and recovery cycle of the towfish.

4.1 Cleaning the 4125i System

The 4125i-P and 4125i-RM Topsides require minimal maintenance. However, the Tow Cable / 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 the shade, and when dry, store it in its case.

4.1.1 Inspecting and Cleaning the Connections

Regularly inspect the contacts on the 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 connectors' reliability, apply a thin film of silicone dielectric grease to each pin's entire surface. 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 tow cable's connectors and the towfish tow cable connector.

4.2 Rearming the Towfish

Should the shear pin snap, it must be replaced. Spare shear pins and retaining clips are in the spares kit. Be sure to use a plastic shear pin from the spares kit. The 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 before 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 to back up the system and restore it to its factory state in the unlikely event of its failure; refer to the [OPERATING SYSTEM RESTORATION](#) section of this manual.

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 screwdriver.

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.

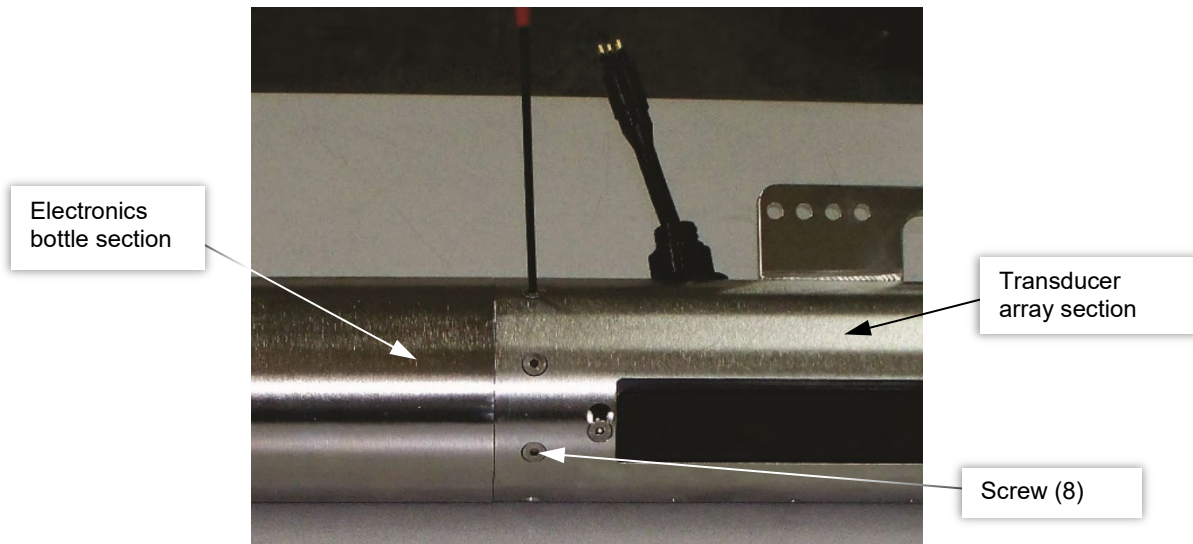


Figure 5-1: Towfish Parts of Note

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 reassembly difficult

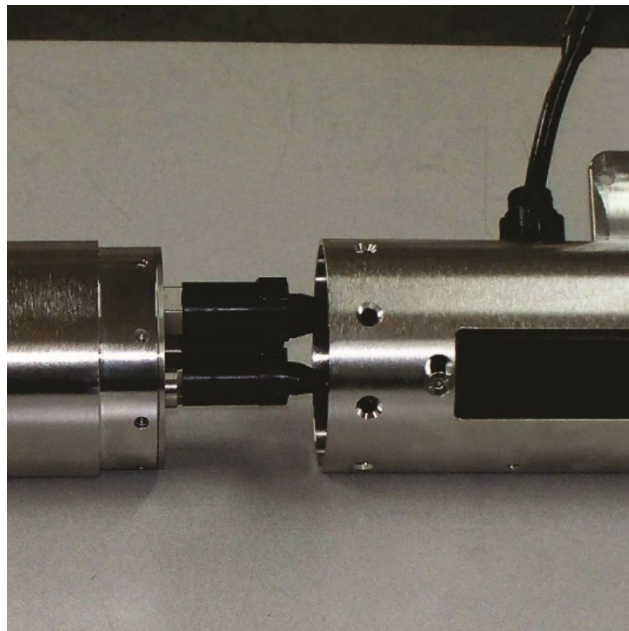


Figure 5-2: Electronics Bottle and Transducer Array Sections Separated

4. Disconnect the three cables from the electronics bottle.

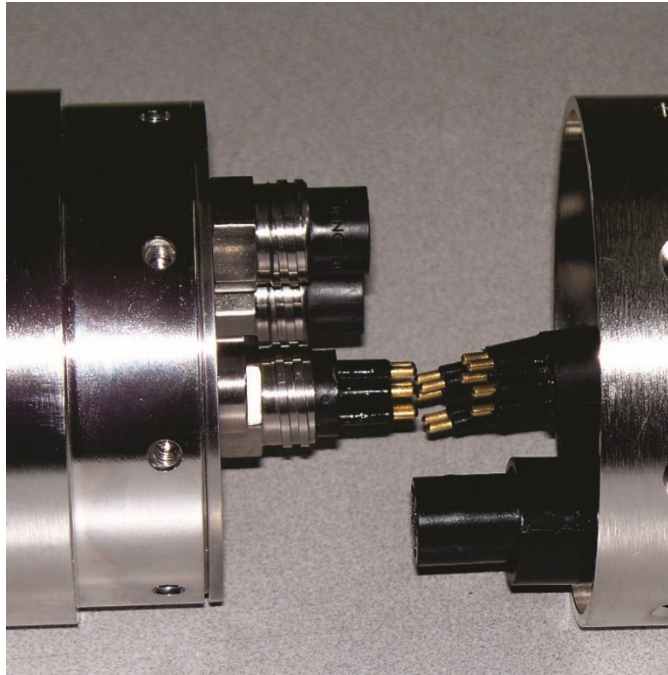


Figure 5-3: Cables Disconnected from the Electronics Bottle

5. Remove the two Phillips head screws from the electronics bottle. These screws are located under the “Void if Removed” labels.

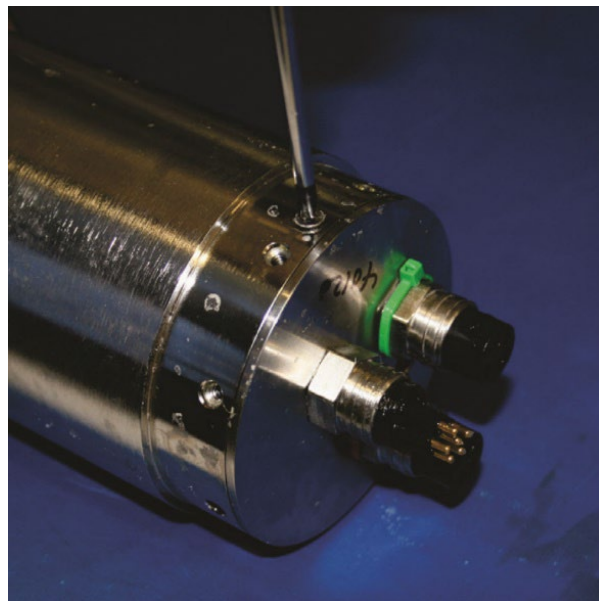


Figure 5-4: Removing the Phillips Head Screws from the Electronics Bottle

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. Contact **EDGETECH CUSTOMER SERVICE** for instructions on removing the electronics bottle. The process of doing so can be difficult without expert assistance.

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.

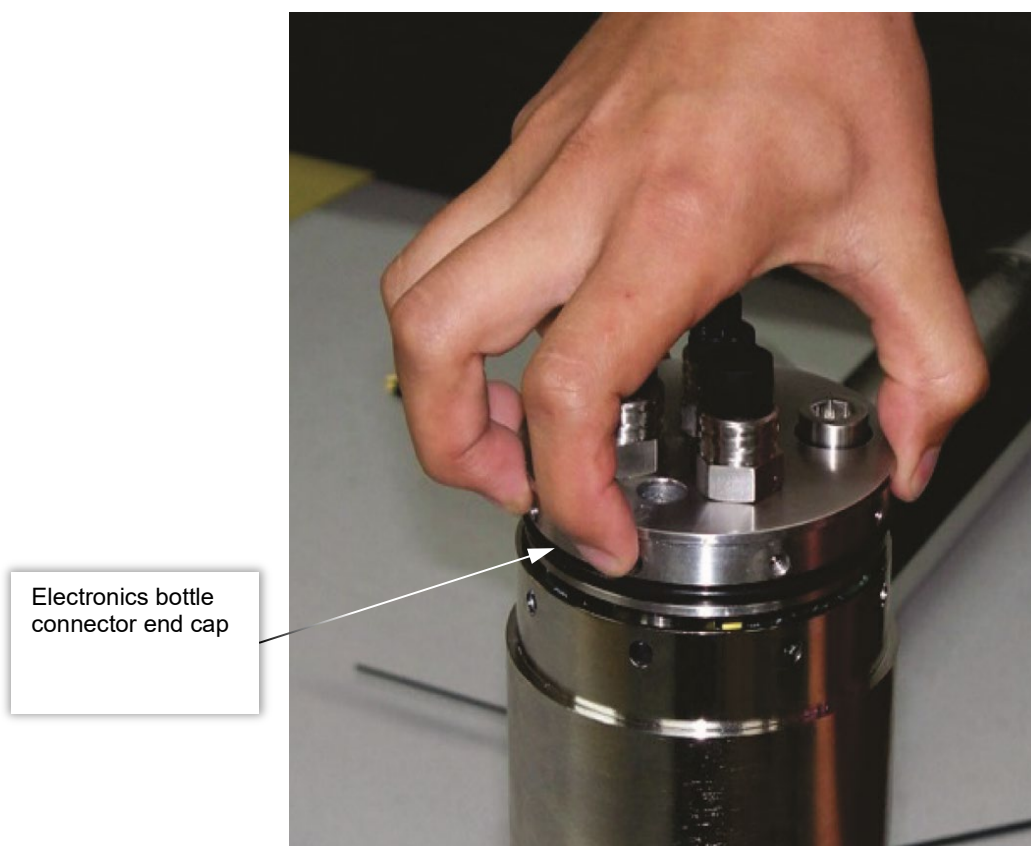


Figure 5-5: Removing the Electronics Chassis from the Electronics Bottle

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. Contact [EDGETECH CUSTOMER SERVICE](#) for instructions.

5.4 General Troubleshooting

Should some operational or performance problems occur with the 4125i Series Dual-frequency Side Scan Sonar System, it may be possible to correct them using the troubleshooting guides in the following pages. For the 4125i-P 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 4125i-P Topside Processor Troubleshooting

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No power and the POWER indicator is off.	The POWER switch is not turned on.	Verify that the POWER switch is turned on.
	No AC power.	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.
	No DC power.	Verify that the topside processor is connected to 12–24 VDC power.
		Check the internal DC fuse
		Test interconnect cables against wiring diagrams in section 2.0.

Table 5-1: Topside Processor System Troubleshooting Guide

5.6 4125i Towfish Troubleshooting

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Tow Fish Power Light off	Faulty Topside	Verify with another topside processor.
		Check Voltage at pins 1, 2 at the Tow Cable connector on the topside. It should measure +75vdc for approximately 10 seconds.
		Check that the Power Separation board's D2 is on. If not, replace the Power Separation board or Powerboard. To replace, Contact EdgeTech Customer Service
Tow Fish Power Light fades out	Faulty Tow Cable	Test cable continuity. If faulty, repair or replace the cable.
	Faulty Topside	Verify with other Topside.
		To replace Power Separation or Power board, Contact EdgeTech Customer Service .
	Faulty Tow Fish	Verify with another towfish.
		To replace Power Separation or CSMB board, Contact EdgeTech Customer Service .
	CM Light Flashes Slow	Open circuit

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
CM Light Flashes Fast	Short circuit	Typically tow cable fault. Test and repair or replace the tow cable.
Link Light Flashes	Faulty tow cable	Perform Meg-ohm check to cable or replace the cable
	Faulty topside modem	To check Modem settings or reconfigure or replace, Contact CUSTOMER SERVICE .
	Faulty towfish VDSL assembly	To replace the assembly, contact CUSTOMER SERVICE .
NET OFF in Discover	Topside PC's LAN is not set correctly	Check Lan setting is enabled and set to 192.9.0.XXX
	Discover IP and port set incorrectly	Configure Discover Network to 192.9.0.101, port 1700.
	Incorrect Discover last used .jni file	Delete files and re-open and reconfigure Discover.
	Faulty topside Ethernet cable	Remove topside's top plate and bypass connector panel E-net connector to verify. Repair or replace the cable.
		Check the wireless connection.
	Faulty topside modem or isolators	To replace modem or bypass isolators, Contact CUSTOMER SERVICE .
	Sonar is not running in the towfish	Check using Remote Desktop to connect to towfish processor. If Sonar (Sonar.exe) is not running, Contact CUSTOMER SERVICE .
Faulty towfish CPU	If unable to connect remotely, open the towfish, and connect the monitor to the CPU to confirm. Contact CUSTOMER SERVICE .	
Distortion or noise in the data	Interference from the ship's echo sounder	Turn off the echo sounder.
	Other sources of noise	Check for other sources of noise. Try an alternate survey area.
	Tow fins are damaged or missing	Inspect and replace if needed.
	Excess strumming of tow cable	Inspect and remove slack from cable.
Weak or Missing SS Data	Faulty towfish	Swap arrays port to starboard to confirm array or electronics issue.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Poor Data Quality	Incorrect towfish height	Check and adjust.
	Environmental issues	Try an alternate survey area.
	Faulty towfish	Verify with other Tow Fish.
Discover Diagnostic Window Opens	Many possibilities	Contact CUSTOMER SERVICE with the error.
Discover not displaying GPS	Incorrect GPS settings	Check using the Terminal Emulator. Check for obstructions on the antennae.
	Discover's com port not selected	Check Configuration, Serial Ports in Discover, and correct or enable the port.
	Topside PC's com port is faulty	Use another com port.
Missing Compass Data	Incorrect Discover last used .jni file	Delete the incorrect file and re-open and reconfigure Discover.
	Incorrect towfish <i>sonarserial.ini</i> file	Contact CUSTOMER SERVICE
	Incorrect or faulty towfish CPU com port	Contact CUSTOMER SERVICE
	Faulty compass	To replace the compass and recalibrate, contact CUSTOMER SERVICE .
Variation in Compass Heading	Compass in need of calibration	Perform compass calibration.
No Depth Display	Incorrect Discover last used .jni file	Delete the incorrect file and re-open and reconfigure Discover.
	A clogged or faulty depth sensor	Clean depth sensor port with low-pressure air.
		To replace the sensor, contact CUSTOMER SERVICE .

Table 5-2: 4125i Towfish Troubleshooting Guide

5.7 Tow Cable Inspection

If you think the 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 the cable was bent beyond the allowable radius. The tow cable's minimum bending radius used with the 4125i 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, which 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 it 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.

$$R1+R2 = \underline{\hspace{2cm}}$$

3. Remove the shorts.
4. Measure the resistance between a shorted pair on one end with an ohmmeter on the Rx1 scale.

$$R1+Rs = \underline{\hspace{2cm}}$$

5. Measure the resistance from the other end.

$$R2+Rs = \underline{\hspace{2cm}}$$

6. Add the measurements in Step 4 and 5 above, subtract the measurement in Step 2, and divide the result by 2.

$$Rs = \underline{\hspace{2cm}}$$

7. Subtract the value in Step 6 from the measurements in Step 4 and 5.

$$R1 = \underline{\hspace{2cm}}$$

$$R2 = \underline{\hspace{2cm}}$$

The distance to the short from end #1 is the ratio of $R1/(R1+R2)$ times the total cable length. Recheck from end #2 that is $R2/(R1+R2)$ 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 open conductor's capacitance 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 capacitance ratio using an adjacent good conductor in a multi-conductor cable. The 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 broken conductor's ends 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 of 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! Before cutting the cable for any of the above reasons, a careful visual examination should be made for any signs of physical damage.

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

5.7.4 Damaged Tow Cable Connector

The towfish includes a safety release mechanism that 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 Operating System Restoration

The following section outlines the procedures for backing up and restoring the system drive. EdgeTech currently uses Macrium Reflect as system restoration software.

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

NOTE: A mouse may be needed to operate the Macrium Reflect UI.

1. Before Powering on the topside, insert the USB3 flash drive into a blue USB3 port.
2. Power on the topside and press the **F**** key. **F**** will be different depending on what you are booting.
 - a. If the Topside is a rack mount, Press **F11**.
 - b. If the Topside is a laptop, Press **F10**.
3. Under the **Boot Manager**. Use the up/down arrows to select the flash drive **Corsair Voyager 3.0**.
4. Wait for **Macrium Reflect** to boot, and then select the **Existing Backup** tabs.
5. Under the **Image** tab, select **Edit**

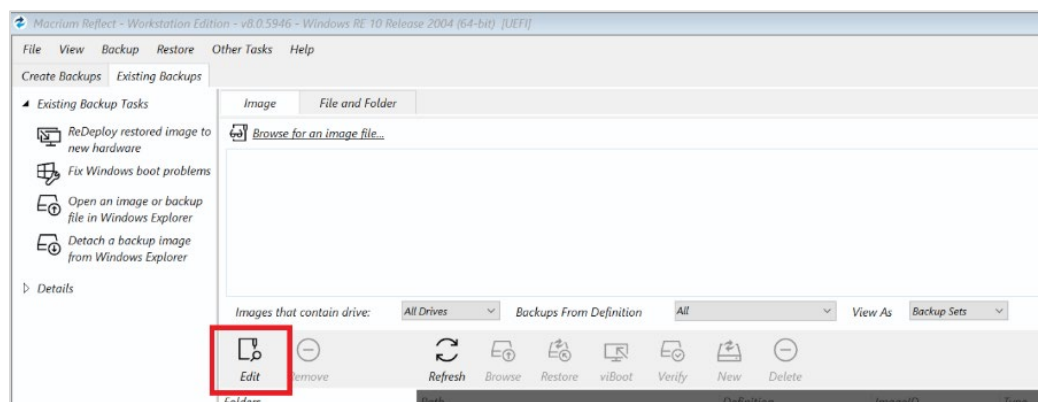


Figure 5-6: Restoration Edit Image Selection

6. **Browse** for the backup folder located on the "0020475_Rev_" drive. The folder should have the following format **XXXX_SNSSSSS**. Once the folder has been selected, click **OK** and then **OK**.

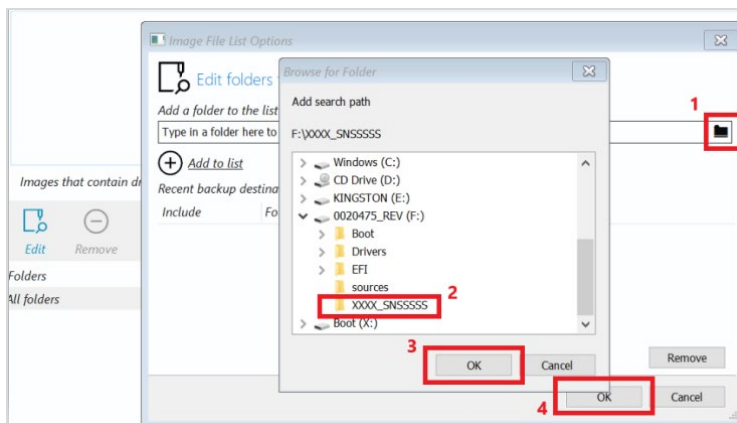


Figure 5-7: Restoration- Add Search Path Confirmation Buttons

7. You should now see that the restore file has been populated in the window. Next, click on **Restore**.

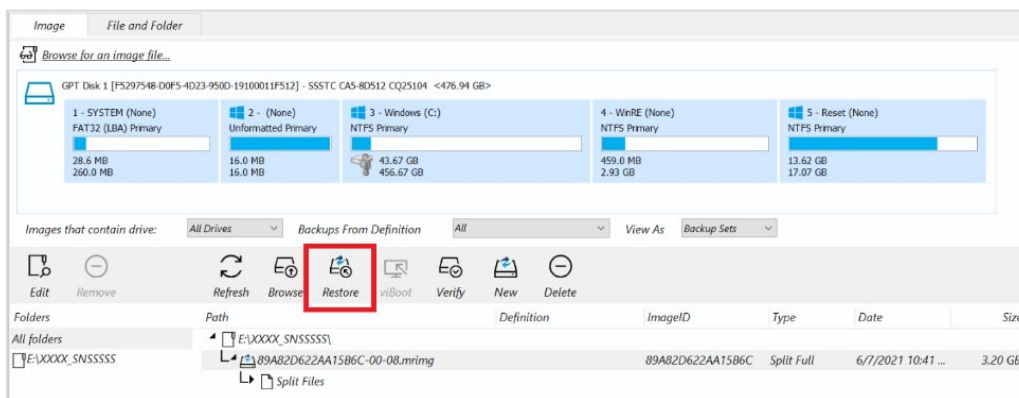


Figure 5-8: Restoration Restore Button

8. On the next window, Select **Next**, followed by **Finish**.

9. A window will open, warning you that everything will be overwritten. Click on the **Check Box** to approve and then click **Continue** on this window.

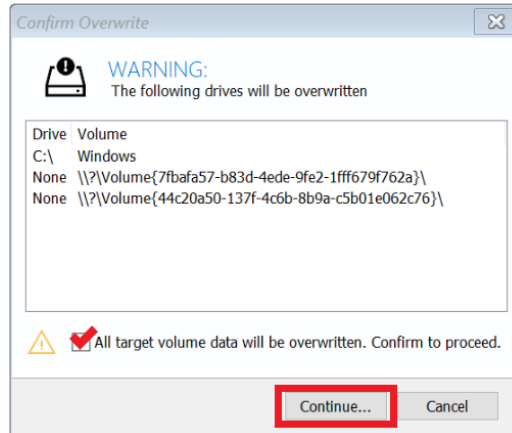



Figure 5-9: Restoration-Confirm Overwrite Continue Button

10. The restoring process should take 2-4 minutes to complete. Once it is finished, click the red button on the bottom left of the screen  and select **Shutdown** and then **Okay**.
11. Remove the USB3 flash drive and turn the power to the topside back on to verify the image has been restored successfully.

5.9 Printers

Printers connect to the 4125i-RM Topside Processor and 4125i-P 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 4125i Series system:

- EPC HSP 100
- EPC 1086-NT
- EPC 9206
- iSys V8.5
- iSys v12

NOTE: EdgeTech Topsides support the Ethernet-only Printers listed above. Consult manufacturer's operating manual for printer requirements and set up.

5.10 4125i and 4125 Spare Kits

0022465 REV B ASSY TOP KIT SPARES 4125I-P PORTABLE TOPSIDE PROCESSOR			
Part	MTL	Description	Qty
0025789	10	PCB ASSY TOP 4125 MAINBD2	1
0007469	20	POWER SUPPLY CHASSIS SW AC-DC 88-264 INPUT 24 OUTPUT 13A 312W	1
0023833	30	ASSY SUB KIT WIFI SWITCH PORTABLE MOUNT	1
0003728	40	CIRCUIT PROTECT FUSE 5A 250VAC FAST BLOW	5
0009587	50	CIRCUIT PROTECT HOLDER FUSE BLADE 15A 32V FAST	5
0008564	60	PCB ASSY TOP POWER SEPARATION 4125 TOPSIDE	1
0022431	70	ASSY SUB MODEM 4125i PORTABLE VDSL MOUNTED	1

Table 5-3: 4125i Portable Spares Kit

0007603 REV N ASSY SUB KIT SPARES 4125 TOPSIDE PORTABLE			
Part	MTL	Description	Qty
0025789	10	PCB ASSY TOP 4125 MAINBD2	1
0007469	20	POWER SUPPLY CHASSIS SW AC-DC 88-264 INPUT 24 OUTPUT 13A 312W	1
0023833	30	ASSY SUB KIT WIFI SWITCH PORTABLE MOUNT	1
0003728	40	CIRCUIT PROTECT FUSE 5A 250VAC FAST BLOW	5
0009587	50	CIRCUIT PROTECT HOLDER FUSE BLADE 15A 32V FAST	5
0008564	60	PCB ASSY TOP POWER SEPARATION 4125 TOPSIDE	1
0010903	70	ASSY SUB CABLE 4125 PORTABLE ADAPTER POWER BOARD RETROFIT LED	1
0021723	80	ASSY SUB MODEM 4125P VDSL2 MOUNTED	1

Table 5-4: 4125-P (Legacy) Spares Kit

0022466 REV D ASSY TOP KIT SPARES 4125I 400/900 KHZ TOW FISH			
PART	MTL	Description	Qty
0025229	30	PCB ASSY TOP SONAR ACQUISITION INTERFACE BOARD PCIEX SAIBX	1
0016420	40	PCB ASSY TOP MAIN CSMB3 4125 400-900 KHZ	1
0022409	50	ASSY SUB VDSL ETHERNET EXTENSION 4125i	1
0018349	70	ASSY SUB BOARDSET CPU MBT10 E3825 MINI PASSIVE HEATSINK ON GIGABIT USB 3.0 CARRIER	1
0014867	110	ASSY SUB CABLE 4125 KONTRON CPU POWER FROM CSMB2	1
0024940	120	CABLE USB-C RIGHT ANGLE TO USB-C STRAIGHT 0.3M LENGTH	1
0005460	130	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 6-32 0.25 INCH 18-8 SS	6
0007187	140	HARDWARE WASHER STD INTERNAL TOOTH LOCK 06 18-8 SS	6
0007188	150	HARDWARE WASHER STD INTERNAL TOOTH LOCK 08 400 SS	4
0005471	170	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 8-32 0.25 INCH 18-8 SS	4
0006925	210	TIE CABLE SELF-LOCKING 356MM 18LB NYLON ROHS	2
0006927	220	TIE CABLE CLAMP HEAD 102MM NYLON NATURAL ROHS	2
0005450	230	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 4-40 0.25 INCH 18-8 SS	4
0007208	240	HARDWARE WASHER STD SPLIT LOCK 04 18-8 SS	4
0014871	320	BRACKET SUPPORT 4125 CSMB2 AL	1
0022463	330	DOC FAT ELECTRONICS HOUSING 4125i LT	1
0023763	380	MEMORY FLASH R-DRIVE IMAGE KONTRON E38XX CPU WITH PNI PROGRAM	1
0021177	390	SOFTWARE EDGETECH FOLDER 4125 TOW FISH SONAR2	1
0003971	400	CONN INLINE 2MM HOUSING 10 POS FEMALE ROHS MILLI-GRID DOUBLE ROW POLARIZED	1
0004188	410	CONTACT FEMALE CRIMP 24-30 AWG GOLD ROHS MILLI-GRID	5

Table 5-5: 4125i 400/900 kHz Towfish Spares Kit

0022467 REV D ASSY TOP KIT SPARES 4125i 600/1600 KHZ TOW FISH			
Part	MTL	Description	Qty
0025229	30	PCB ASSY TOP SONAR ACQUISITION INTERFACE BOARD PCIEX SAIBX	1
0016421	40	PCB ASSY TOP MAIN CSMB3 4125 600-1600 KHZ	1
0022409	50	ASSY SUB VDSL ETHERNET EXTENSION 4125i	1
0025340	70	ASSY SUB BOARDSET E3825 CPU COM EXPRESS SLIM HEATSINK ON PCIEX CARRIER	1
0014867	110	ASSY SUB CABLE 4125 KONTRON CPU POWER FROM CSMB2	1
0024940	120	CABLE USB-C RIGHT ANGLE TO USB-C STRAIGHT 0.3M LENGTH	1
0005460	130	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 6-32 0.25 INCH 18-8 SS	6
0007187	140	HARDWARE WASHER STD INTERNAL TOOTH LOCK 06 18-8 SS	6
0007188	150	HARDWARE WASHER STD INTERNAL TOOTH LOCK 08 400 SS	4
0005471	170	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 8-32 0.25 INCH 18-8 SS	4
0006925	210	TIE CABLE SELF-LOCKING 356MM 18LB NYLON ROHS	2
0006927	220	TIE CABLE CLAMP HEAD 102MM NYLON NATURAL ROHS	2
0005450	230	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 4-40 0.25 INCH 18-8 SS	4
0007208	240	HARDWARE WASHER STD SPLIT LOCK 04 18-8 SS	4
0014871	320	BRACKET SUPPORT 4125 CSMB2 AL	1
0022463	330	DOC FAT ELECTRONICS HOUSING 4125i LT	1
0023763	380	MEMORY FLASH R-DRIVE IMAGE KONTRON E38XX CPU WITH PNI PROGRAM	1
0021177	390	SOFTWARE EDGETECH FOLDER 4125 TOW FISH SONAR2	1
0003971	400	CONN INLINE 2MM HOUSING 10 POS FEMALE ROHS MILLI-GRID DOUBLE ROW POLARIZED	1
0004188	410	CONTACT FEMALE CRIMP 24-30 AWG GOLD ROHS MILLI-GRID	5

Table 5-6: 4125i 600/1600 kHz Towfish Spares Kit

0010575 REV S ASSY TOP KIT SPARES 4125 ELECTRONICS 400-900 KHZ			
Part	MTL	Description	Qty
0013107	10	PCB ASSY SUB SONAR ACQUISITION INTERFACE BOARD USB AND DUAL LVDS INTERFACE SAIBU 2205 PROGTEST	1
0016420	20	PCB ASSY TOP MAIN CSMB3 4125 400-900 KHZ	1
0008855	30	ASSY SUB FAN 4125	1
0018349	40	ASSY SUB BOARDSET CPU MBT10 E3825 MINI PASSIVE HEATSINK ON GIGABIT USB 3.0 CARRIER	1
0024810	50	ASSY SUB SENSOR 4125 MICRO SBG COMPASS	1
0014867	140	ASSY SUB CABLE 4125 KONTRON CPU POWER FROM CSMB2	1
0012341	150	ASSY SUB CABLE 2205 CPU / USB SAIBU	1
0005460	160	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 6-32 0.25 INCH 18-8 SS	6
0007187	170	HARDWARE WASHER STD INTERNAL TOOTH LOCK 06 18-8 SS	6
0006925	260	TIE CABLE SELF-LOCKING 356MM 18LB NYLON ROHS	2
0006927	270	TIE CABLE CLAMP HEAD 102MM NYLON NATURAL ROHS	2
0009189	290	TUBING HEAT SHRINK 0.125 INCH BLACK POLY	1
0005450	390	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 4-40 0.25 INCH 18-8 SS	4
0007208	400	HARDWARE WASHER STD SPLIT LOCK 04 18-8 SS	4
0014871	710	BRACKET SUPPORT 4125 CSMB2 AL	1
0015618	720	DOC FAT 4125 SONARPRO ELECTRONICS ETHERNET / LT	1
0016184	730	ASSY SUB CABLE 4125 USB TO ENET	1
0021177	740	SOFTWARE EDGETECH FOLDER 4125 TOW FISH SONAR2	1
0023032	750	MEMORY FLASH R-DRIVE IMAGE KONTRON E38XX CPU WITH PNI PROGRAM	1

Table 5-7: 4125 Electronics 400-900 kHz Spares Kit

0010576 REV R ASSY TOP KIT SPARES 4125 ELECTRONICS 600-1600 KHZ			
Part	MTL	Description	Qty
0013107	10	PCB ASSY SUB SONAR ACQUISITION INTERFACE BOARD USB AND DUAL LVDS INTERFACE SAIBU 2205 PROGTEST	1
0016421	20	PCB ASSY TOP MAIN CSMB3 4125 600-1600 KHZ	1
0008855	30	ASSY SUB FAN 4125	1
0018349	40	ASSY SUB BOARDSET CPU MBT10 E3825 MINI PASSIVE HEATSINK ON GIGABIT USB 3.0 CARRIER	1
0024810	50	ASSY SUB SENSOR 4125 MICRO SBG COMPASS	1
0014867	140	ASSY SUB CABLE 4125 KONTRON CPU POWER FROM CSMB2	1
0012341	150	ASSY SUB CABLE 2205 CPU / USB SAIBU	1
0005460	160	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 6-32 0.25 INCH 18-8 SS	6
0007187	170	HARDWARE WASHER STD INTERNAL TOOTH LOCK 06 18-8 SS	6
0006925	260	TIE CABLE SELF-LOCKING 356MM 18LB NYLON ROHS	2
0006927	270	TIE CABLE CLAMP HEAD 102MM NYLON NATURAL ROHS	2
0009189	290	TUBING HEAT SHRINK 0.125 INCH BLACK POLY	1
0005450	390	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 4-40 0.25 INCH 18-8 SS	4
0007208	400	HARDWARE WASHER STD SPLIT LOCK 04 18-8 SS	4
0008354	450	HARDWARE SCREW METRIC MACHINE PAN HD PHILLIPS M3 0.50MM 5MM 18-8 SS	2
0014871	710	BRACKET SUPPORT 4125 CSMB2 AL	1
0015618	720	DOC FAT 4125 SONARPRO ELECTRONICS ETHERNET / LT	1
0016184	730	ASSY SUB CABLE 4125 USB TO ENET	1
0021177	740	SOFTWARE EDGETECH FOLDER 4125 TOW FISH SONAR2	1
0023763	750	MEMORY FLASH R-DRIVE IMAGE KONTRON E38XX CPU WITH PNI PROGRAM	1

Table 5-8: 4125 Electronics 4125 600-1600 kHz Spares Kit

0010577 REV R ASSY TOP KIT SPARES 4125 LT ELECTRONICS 400-900 KHZ			
Part	MTL	Description	Qty
0013107	10	PCB ASSY SUB SONAR ACQUISITION INTERFACE BOARD USB AND DUAL LVDS INTERFACE SAIBU 2205 PROGTEST	1
0016420	20	PCB ASSY TOP MAIN CSMB3 4125 400-900 KHZ	1
0008672	30	ASSY SUB VDSL ETHERNET EXTENSION 4125	1
0018349	40	ASSY SUB BOARDSET CPU MBT10 E3825 MINI PASSIVE HEATSINK ON GIGABIT USB 3.0 CARRIER	1
0014867	140	ASSY SUB CABLE 4125 KONTRON CPU POWER FROM CSMB2	1
0012341	150	ASSY SUB CABLE 2205 CPU / USB SAIBU	1
0005460	160	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 6-32 0.25 INCH 18-8 SS	6
0007187	170	HARDWARE WASHER STD INTERNAL TOOTH LOCK 06 18-8 SS	6
0006925	260	TIE CABLE SELF-LOCKING 356MM 18LB NYLON ROHS	2
0006927	270	TIE CABLE CLAMP HEAD 102MM NYLON NATURAL ROHS	2
0009189	290	TUBING HEAT SHRINK 0.125 INCH BLACK POLY	1
0005450	390	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 4-40 0.25 INCH 18-8 SS	4
0007208	400	HARDWARE WASHER STD SPLIT LOCK 04 18-8 SS	4
0014871	700	BRACKET SUPPORT 4125 CSMB2 AL	1
0015618	710	DOC FAT 4125 SONARPRO ELECTRONICS ETHERNET / LT	1
0021177	720	SOFTWARE EDGETECH FOLDER 4125 TOW FISH SONAR2	1
0023763	730	MEMORY FLASH R-DRIVE IMAGE KONTRON E38XX CPU WITH PNI PROGRAM	1
0007188	740	HARDWARE WASHER STD INTERNAL TOOTH LOCK 08 400 SS	4
0005471	750	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 8-32 0.25 INCH 18-8 SS	4
0003971	760	CONN INLINE 2MM HOUSING 10 POS FEMALE ROHS MILLI-GRID DOUBLE ROW POLARIZED	2
0004188	770	CONTACT FEMALE CRIMP 24-30 AWG GOLD ROHS MILLI-GRID	1

Table 5-9: 4125 LT Electronics 400-900 kHz Spares Kit

0010578 REV Q ASSY TOP KIT SPARES 4125 LT ELECTRONICS 600-1600 KHZ			
Part	MTL	Description	Qty
0013107	10	PCB ASSY SUB SONAR ACQUISITION INTERFACE BOARD USB AND DUAL LVDS INTERFACE SAIBU 2205 PROGTEST	1
0016421	20	PCB ASSY TOP MAIN CSMB3 4125 600-1600 KHZ	1
0008672	30	ASSY SUB VDSL ETHERNET EXTENSION 4125SSY SUB FAN 4125	1
0018349	40	ASSY SUB BOARDSET CPU MBT10 E3825 MINI PASSIVE HEATSINK ON GIGABIT USB 3.0 CARRIER	1
0023732	50	ASSY SUB SENSOR 4125i PNI PRIME COMPASS	1
0014867	140	ASSY SUB CABLE 4125 KONTRON CPU POWER FROM CSMB2	1
0012341	150	ASSY SUB CABLE 2205 CPU / USB SAIBU	1
0005460	160	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 6-32 0.25 INCH 18-8 SS	6
0007187	170	HARDWARE WASHER STD INTERNAL TOOTH LOCK 06 18-8 SS	6
0006925	260	TIE CABLE SELF-LOCKING 356MM 18LB NYLON ROHS	2
0006927	270	TIE CABLE CLAMP HEAD 102MM NYLON NATURAL ROHS	2
0009189	290	TUBING HEAT SHRINK 0.125 INCH BLACK POLY	1
0005450	390	HARDWARE SCREW STD MACHINE PAN HD PHILLIPS 4-40 0.25 INCH 18-8 SS	4
0007208	400	HARDWARE WASHER STD SPLIT LOCK 04 18-8 SS	4
0008354	450	HARDWARE SCREW METRIC MACHINE PAN HD PHILLIPS M3 0.50MM 5MM 18-8 SS	4
0014871	700	BRACKET SUPPORT 4125 CSMB2 AL	1
0015618	710	DOC FAT 4125 SONARPRO ELECTRONICS ETHERNET / LT	1
0021177	720	SOFTWARE EDGETECH FOLDER 4125 TOW FISH SONAR2	1
0023763	730	MEMORY FLASH R-DRIVE IMAGE KONTRON E38XX CPU WITH PNI PROGRAM	1

Table 5-10: 4125 LT Electronics 600-1600 kHz Spares Kit