P-Sea Underwater Computer System

Operator & Installation Manual

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Handling of Electrostatic-Sensitive Devices

Certain semiconductor devices used in the equipment are liable to damage due to static voltages.

Observe the following precautions when handling these devices in their unterminated state, or sub-units containing these devices:

- Persons removing sub-units from any equipment using electrostatic sensitive devices must be earthed by a wrist strap via a 1MΩ resistor to a suitable discharge reference point within the equipment.

- Soldering irons used during any repairs must be low voltage types with earthed tips and isolated from the Mains voltage by a double insulated transformer. Care should be taken soldering any point that may have a charge stored.

- Outer clothing worn must be unable to generate static charges.

- Printed Circuit Boards (PCBs) fitted with electrostatic sensitive devices must be stored and transported in appropriate anti-static bags/containers.

F110.0

P-Sea Underwater Console

Warranty Statement

Tritech International Limited herein after referred to as **TIL**

TIL warrants that at the time of shipment all products shall be free from defects in material and workmanship and suitable for the purpose specified in the product literature.

The unit/system warranty commences immediately from the date of customer acceptance and runs for a period of 365 days. Customer acceptance will always be deemed to have occurred within 72 hours of delivery.

Note: Any customer acceptance testing (if applicable) must be performed at either TIL premises or at one of their approved distributors unless mutually agreed in writing prior to despatch.

Conditions:

These include, but are not limited to, the following:

1   The warranty is only deemed to be valid if the equipment was sold through TIL or one of its approved distributors.

2   The equipment must have been installed and commissioned in strict accordance with approved technical standards and specifications and for the purpose that the system was designed.

3   The warranty is not transferable, except or as applies to Purchaser first then to client.

4   TIL must be notified immediately (in writing) of any suspected defect and if advised by TIL, the equipment subject to the defect shall be returned by the customer to TIL, via a suitable mode of transportation and shall be freight paid.

5   The warranty does not apply to defects that have been caused by failure to follow the recommended installation or maintenance procedures. Or defects resulting from normal wear & tear, incorrect operation, fire, water ingress, lightning damage or fluctuations in vehicles supply voltages, or from any other circumstances that may arise after delivery that is out with the control of TIL.
(**Note:** The warranty does not apply in the event where a defect has been caused by isolation incompatibilities.)

6   The warranty does not cover the transportation of personnel and per diem allowances relating to any repair or replacement.

7   The warranty does not cover any direct, indirect, punitive, special consequential damages or any damages whatsoever arising out of or connected with misuse of this product.

8   Any equipment or parts returned under warranty provisions will be returned to the customer freight prepaid by TIL

9   The warranty shall become invalid if the customer attempts to repair or modify the equipment without appropriate written authority being first received from TIL.

10   TIL retains the sole right to accept or reject any warranty claim.

11   Each product is carefully examined and checked before it is shipped. It should therefore be visually and operationally checked as soon as it is received. If it is damaged in anyway, a claim should be filed with the courier and TIL notified of the damage.

Note: TIL reserve the right to change specifications at any time without notice and without any obligation to incorporate new features in instruments previously sold.

Note: If the instrument is not covered by warranty, or if it is determined that the fault is caused by misuse, repair will be billed to the customer, and an estimate submitted for customer approval before the commencement of repairs.

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SAFETY STATEMENTS

⚠ **NOTE**	*Throughout the manual certain potential problems, or further information relating to the installation, maintenance, understanding or use of the apparatus will be highlighted to the operator by indications identified by the adjacent symbol and text.*
⚠ **CAUTION!**	*Throughout the manual certain safety or operational related comments and requirements will be highlighted to the operator by indications identified by the adjacent symbol and text.*
⚠ **DANGER!**	*Throughout the manual certain safety or operational related comments and requirements that could lead to injury or loss of life will be highlighted by the adjacent symbol and text.*

Technical Support

Contact your local agent or Tritech International Ltd

✉	**Mail**	***Tritech International Ltd.*** Peregrine Road, Westhill Business Park, Westhill, Aberdeen, AB32 6JL, UK
☎	**Telephone**	++44 (0)1224 744111
	Fax	++44 (0)1224 741771
💻	**Email**	support@tritech.co.uk
	Web	www.tritech.co.uk

**An out-of-hours emergency number is available by
calling the above telephone number**

If you have cause to use our Technical Support service, please ensure that you have the following details at hand **prior** to calling:

- System Serial Number (if applicable)
- Fault Description
- Any remedial action implemented

Due to the expansion of equipment capabilities and the fact that new sub-modules are continually being introduced, this manual cannot detail every aspect of the operation.

The name of the organisation which purchased this system is held on record at *Tritech International Ltd*. Details of new software and hardware packages will be announced at regular intervals. Depending on the module, free upgrades will be offered in keeping with our policy of maintaining the highest levels of customer support.

Tritech International Ltd can only undertake to provide software support for systems loaded with Operating System and Tritech Sonar Display software in accordance with the instructions given in the System Re-installation section of this manual. It is the responsibility of the customer to ensure the compatibility of any other package that they may choose to load unless with the prior consent of *Tritech*.

SECTION 1

1.1 GENERAL OVERVIEW

The "P-Sea Underwater Console" is designed to be a fully water-proof computer incorporating all the standard features of a desktop PC with interfaces to a range of existing and future Tritech sub-surface sensors (sonar's, modems, etc) and other products such as cameras.

Power supplied to the "P-Sea" unit must be in the range of +12 to +36VDC. The power provided must be from a DC source capable of supplying at least 30W (in addition to any power required for connected sensors), such as a SCUBA Diver tank-mounted battery pack, a surface supply or an ROV power supply. The unit is powered through a dedicated high current connector.

Sensors and other external peripherals interface to the P-Sea through up to 2 x serial ports and 4 x USB ports. The number of ports actually fitted to the P-Sea are customer specified at the time of order.

Individual serial ports can be configured for either RS-232 or RS-485 protocols through the Windows-based configuration software. The maximum data rate available for RS-232 mode is 115kBaud and 1MBaud for RS-485. Should an external serial device require power, the P-Sea can provide an external supply from +12V to +36V at 1A. This feature can be disabled through software configuration if devices have their own power source.

USB ports support USB 2.0 devices and are also backwards compatible with older USB[1] devices which support the USB 1.1 specification. Peripherals which require external power can use the 5V supply provided on the USB connectors, however the current is limited to 500mA on each port.

The P-Sea runs a Windows XP Embedded operating system and is capable of running additional software displays to interface with sensors such as a Sonar Display application for the Tritech range of Sonar heads. The visual display is in the form of a 6.5" LCD display with software adjustable backlight control, whilst an optional external VGA connector is also available for the use of HMD[2] displays.

The processor in the P-Sea is an Intel Celeron 1GHz CPU with 512Mb (optional 1Gb) RAM. Data storage comes in the form of 4GB flash disk drive. This is partitioned in 2 to give a dedicated volume for operating system/applications and a separate volume for data storage.

Status LED's built into the display window give the user an indication of:

- o Comm Port Activity
- o Comm Port Power Status
- o USB Device Connectivity
- o Ethernet Link and Activity Status
- o Storage Device Read/Write
- o Power and System Status
- o Keypad Status

The brightness of the status LED's is software adjustable.

A "Preset" menu allows numerous predefined configurations to be saved and recalled at the touch of a button. All settings are memorised from power down to the next time the unit is powered up. The unit incorporates a covert mode in which all external lighting on the console is extinguished.

⚠️ **CAUTION!**	*Older versions of the P-Sea console which carry the part number/serial number combination 7533.xxxxxx are not covered by this manual*

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[1] Universal Serial Bus
[2] Head-Mounted Display for use as a SCUBA Diver

SECTION 2

2.1 CONSOLE GENERAL SPECIFICATION

2.1.1 Power Supply

Operating Voltage	12-36VDC
Power Rating	30W for the basic console excluding any attached peripherals, the power rating for these needs to be considered separately.
Power Conditioning	The console should be operated from a supply that is clean and free of RF spikes or surges.
	The P-Sea also has limited built in protection from noise and spikes If further protection is necessary, this should be added externally to the unit.
Power Connector	Power is supplied to the unit via a dedicated 3-way impulse connector, type IE55-1003-BCR

2.1.2 Computer Specification

Processor	Intel Celeron (M) 1GHz
RAM	512Mb
Storage	4Gb IDE Flash disk

2.1.3 Display Specification

Size	6.5" (17cm) Diagonal
Colours	262k (6-bit)
Resolution	1024x768 pixels

2.1.4 Software

Operating System	Microsoft Windows XP Embedded
	• Microsoft Logo and Windows references removed from boot-up and shutdown screens
	• Microsoft Windows License Label attached to the exterior of the unit in accordance with the terms of the license
Tritech Control Application	Tritech Micron Sonar Application supplied to allow control of Tritech Sonar heads and display of compass and depth data from external instruments using the NMEA protocol.
P-Sea Control Application	Loads automatically on boot-up to allow control of the P-Sea console via the keypads. Also allows control over various aspects of the console (serial protocols, external power control and brightness of the console illumination) and provides direct control of the Tritech Sonar application

2.2 INTERFACE AND INDICATION

2.2.1 Serial Interfaces

Number of Ports	2 external Serial Ports (COM1 & COM2)
Available Protocols	Software selectable between RS232 and RS485
Maximum data rates	RS232 – 115kbps
	RS485 – 1Mbps
External Power	The input power to the console is available at both the serial ports. Power is software switchable
Connector	6-way, Impulse type IE55-1206-BCR

2.2.2 USB Interface

Number of Ports	1 External Port
Protocol	USB2.0 with backwards compatibility to USB1.1
External Power	5V at 500mA as per the USB2.0 standard
Connector	4-way, Impulse type IE55-1204-BCR

2.2.3 Ethernet Interface

Number of Ports	1 External Port
Maximum data rate	100Mbps
Connector	6-way, Impulse type IE55-1206-BCR

2.3 MECHANICAL DETAILS

Materials	Rear Heatsink – Black Anodised Aluminium
	Sides and Front – Black Polycarbonate
	Display Window – Clear Polycarbonate
Buttons	Pressure compensated, non-latching, spring loaded plastic buttons
Weight	In air – 5.98kg
	In Water – 2.2kg
Operational Depth in water	200m (19.6bar)
Pressure Test Requirements	External pressure 20bar (203m of water)
Operating Temperature	-10°C to +40°C
Storage Temperature	-20°C to +60°C

2.4 BATTERY PACK OPTION (PART NO. S7535)

The battery pack provides a re-chargeable power source for the P-Sea.

During missions involving SCUBA Divers, powering the P-Sea down an umbilical cable from the surface might not be a suitable option. Using the optional tank-mounted battery pack allows the Diver to move around more freely without the restrictions of cable length and the possibility of "snagging" on underwater objects.

The P-Sea battery will give an average of 4 hours operation before the battery discharges and the P-Sea shuts down without warning. Current drawn by any sensors powered through the console will reduce this battery life accordingly.

2.4.1 Battery Specification

Output	12V at 9000mAH
Battery Type	NiMH
Charger	MP2500 Fast Charger (Part S7536)
Charge Time	4.5 hours (minimum)
	Battery module connects to the dedicated power port. P-Sea Connector type Impulse IE55W-1003-CCP; length over connector body 36mm.
Weight	
In Air	2.3Kg
In Water	1.6Kg
Hyperbaric pressure rating	35Bar

2.4.1.1 Battery Pack Cable (Part No. S8644)
A 1.5m long undersea cable to connect between the Battery Pack and the 3-pin P-Sea 'Power' port.

2.4.1.2 Bench Power Cable, Surface (Part No. S8408)
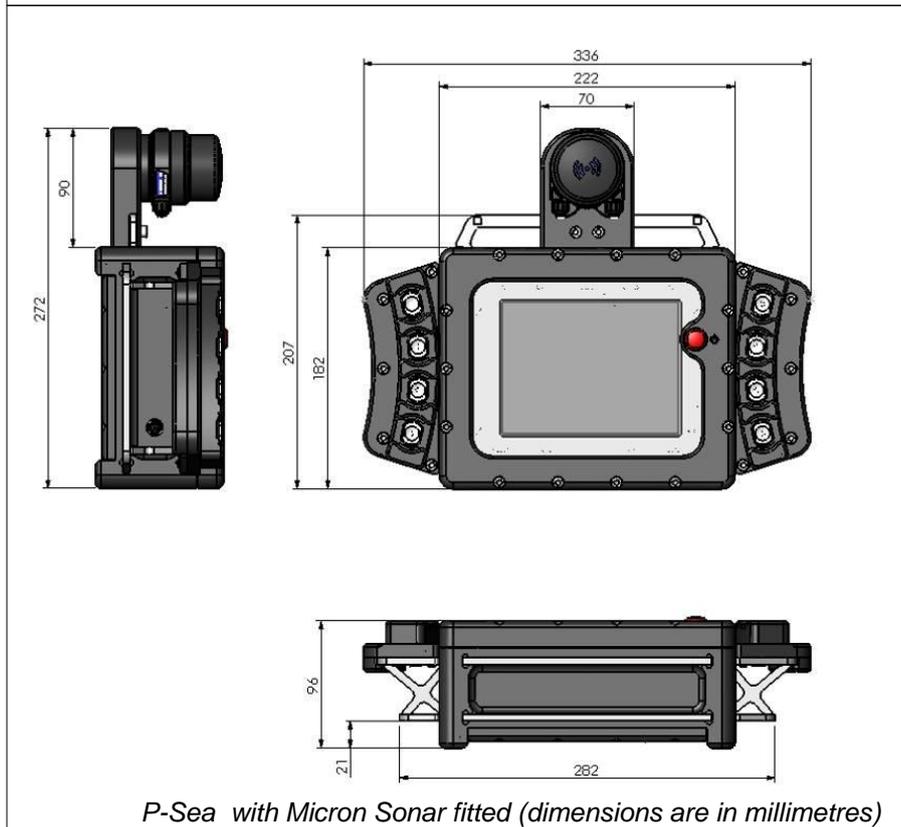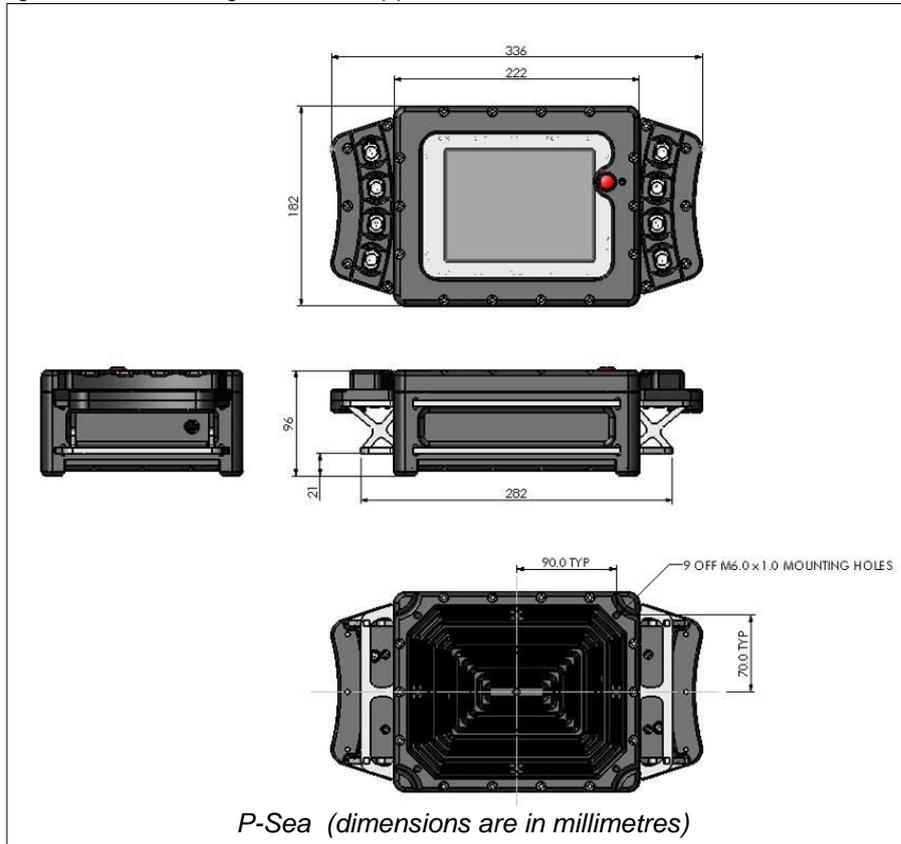A 12m long surface cable to connect between the 3-pin P-Sea 'Power' port and suitable bench supply (+12Vdc to +36Vdc, 60Watts).

SECTION 3

3.1 MECHANICAL INSTALLATION

The following dimensional diagrams are supplied to assist the user to mount the P-Sea console.

P-Sea (dimensions are in millimetres)

P-Sea with Micron Sonar fitted (dimensions are in millimetres)

3.2 ELECTRICAL INSTALLATION

3.2.1 Console Connection.

If a Sonar head is supplied, first ensure this is connected to the P-Sea SERIAL port using the supplied sonar cable. One end of the sonar cable fits to the SERIAL port on the top side of the P-Sea. The other cable end must then be connected to the 'Main' port on the Sonar head

Note: For dual port heads the 'Main' and 'Aux' are etched onto the endcap or, in the case of a Micron Sonar, will be identified on the blue tag holding the port protective covers.

To connect the console to a power source, first, ensure that the Power Cable has been terminated correctly. Locate the Power Port on the Console and Connect the receptacle to the P-Sea Console ensuring the connection is sufficiently tight.

A power source of between +12 and +36V is required to power the console. However sensors connected to the Console may have a different voltage range, for example a standard DST SeaKing sonar will require between +18 and +36V. Ensure the power source is capable of powering the P-Sea and any connected sensors.

⚠ NOTE	When connecting the Power cable to the P-Sea, apply extra care and do not over tighten. Ensure that the connector is properly engaged and mated before tightening the locking ring. Be careful when installing and removing the connector that the cable does not twist when tightening or undoing the locking ring.
⚠ NOTE	For information regarding external port locations, please refer to the section at the end of this manual observing the **Front View** figure.

⚠ NOTE	Please refer to sections 3.2.2 and 3.2.3 for more information regarding connecting to the external sockets on the front of the P-Sea console.

The system is now ready for use in water.

⚠ CAUTION!	**Never put the P-Sea in water unless all ports are either properly fitted with a protective cap or mating connector.**
⚠ CAUTION!	**Do not exceed a submersion depth of greater than 200m.**

3.2.2 Connecting a Micron Sonar to the P-Sea (option)

Unscrew the protective cover and carefully align the cable connector so that the flat key is correctly positioned relative to the flat key within the port connector. Then gently push home and screw down the retaining ring. Do not over tighten.

SERIAL Port

Protective cap
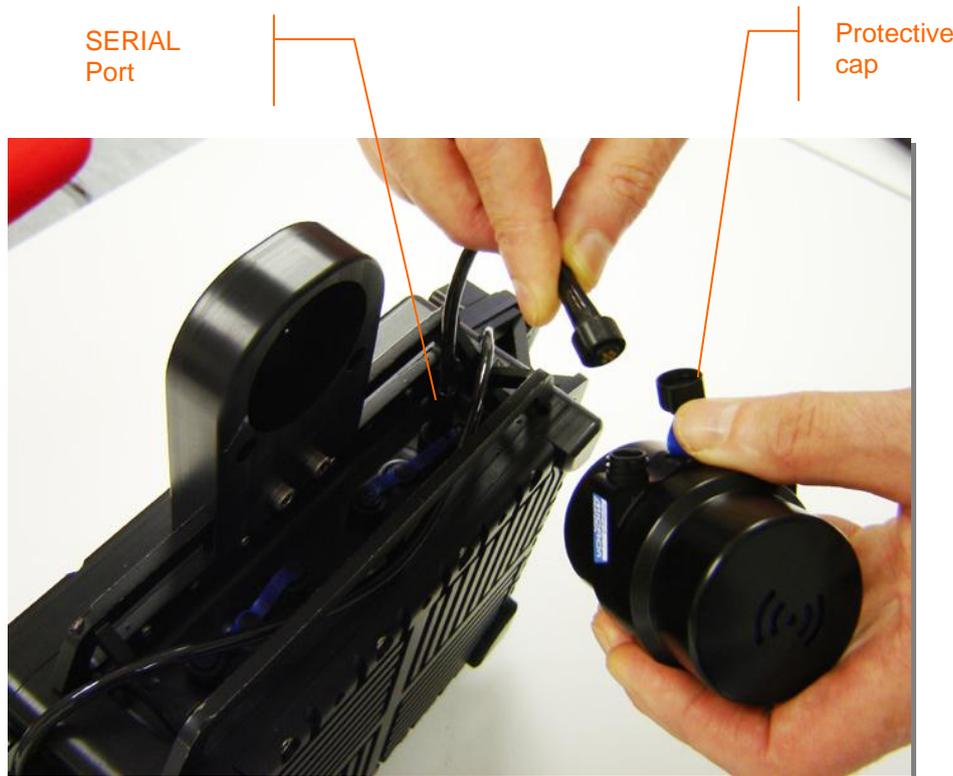
Now position the Sonar head into the mounting bracket as shown allowing the cable to take up a gentle curve between the head and the P-Sea – avoid any kinks.

Note: The mounting bracket can be fitted anywhere on the grill. It is shown with Sonar in an 'Inverted' orientation but may not be supplied fitted this way.

Next secure the head in position using the 4 (M3X6 socket cap) fasteners provided. Again, only tighten these gently to avoid damaging the mountings in the head. (Use a 2.5mm Allen key)

3.2.3 Connecting a Battery Pack to the P-Sea (Option)

If the battery pack option is used then follow the guidelines below for its use and charging. Prepare the battery for connection to the P-Sea, charge if necessary (see Section 3.2.3.1)

Remove the battery connector protective cap by turning ¼ turn anti-clockwise.

Fit the underwater cable in the same manner, securing with ¼ turn clockwise.

Attach the other end of the underwater cable to the POWER port on the side of the P-Sea, e.g. in the same way as described for the external supply described earlier.

⚠️ **CAUTION!**	*When connecting the Power cable to the P-Sea POWER port, apply extra care and do not over tighten the locking ring. Ensure that the connector is properly engaged/mated before tightening the locking ring. Be careful when installing and removing the connector that the cable does not twist whilst tightening or undoing the locking ring.*

The system is now ready for use in water.

⚠️ **CAUTION!**	**Never put the P-Sea in water unless all ports are either properly fitted with a protective cap or mating connector.**
⚠️ **CAUTION!**	**Do not exceed a submersion depth of greater than 200m.**

3.2.3.1   Charging the Battery Pack

The METALSUB Battery Pack is supplied with the METALSUB MP2500 Fast Charger (Part no 07536). This charger is only suitable for charging METALSUB batteries and should not be used with other battery packs. The Charger is suitable for mains between 110-240VAC, 50-60Hz.

The Battery Pack connects to the 2-way plug of the Charger with the same ¼ turn as indicated in Section 3.2.3 above.

The recommended charge time for the supplied Battery Pack is 4.5 hours. This will fully re-charge a Battery that has been fully discharged. A fully charged battery will give on average around 4 hours operating time on the P-Sea (this will vary with application and operational environment).

The METALSUB MP2500 Fast Charger has an LED Indicator with the following states:

Continuous <u>Red</u> LED = The connected battery pack is charging.

Continuous <u>Green</u> LED = The connected battery pack is at full charge. The battery pack should be disconnected when at full charge capacity.

⚠️ **CAUTION!**	Always use the Battery Charger in a dry and well ventilated place at an ambient temperature between 0-30⁰C.

SECTION 4

4.1 GENERAL INFORMATION & OPERATING DETAILS

The P-Sea unit will normally be delivered with the operating software pre-installed and configured to run the sensors supplied with the system.

The P-Sea is designed to operate down to depths of up to 200m. It can be operated in fresh and salt water and should be washed down after every use.

The visual display is a TFT screen. This is protected with a 20mm clear polycarbonate window. The P-Sea and screen will absorb minor impacts but like any computer it should be handled with the best care possible to prevent accidental damage from any major impact.

The P-Sea should not be exposed to direct sunlight for any length of time nor should a connected Sonar be operated in the air for longer than 30 minutes, particularly in hot ambient environments.

It is recommended that any configuration of the P-Sea display be done on a bench whilst connected to a bench power supply. It is good practice to test all connected devices such as Sonar whilst on the bench and quickly run through the display settings to ensure the unit is ready for the dive and no further setup is required whilst in the water.

If the P-Sea is fitted with a USB port then, using a suitable interface cable, a USB Mouse or USB Storage Device can be connected. The user may find that connecting and operating a USB mouse whilst bench testing and/or configuring will be quicker than operating the Function keys in the Mouse mode to drive the mouse pointer. If a USB mouse is used, once it is removed prior to dive ensure that the USB Port on the P-Sea is fitted with the pressure-rated blanking plug. It is then advisable to do a function test of the keys whilst the P-Sea is set to the Mouse mode in order to verify operation.
Connecting a USB Storage Device (e.g. memory stick / pen drive) to the USB Port will enable any log files or software updates to be transferred whilst bench connected.

There is option to fit an Ethernet port to the P-Sea. This would provide an alternative method of transferring files to/from the unit in place of a USB Storage device.

If the battery option is used to power the console then a short battery test should be performed before diving. It is recommended that the battery be fully charged immediately prior to the dive (see Section 3.2.3.1). If the battery has remained on the shelf for a number of days/weeks then it may slowly discharge during this time. Once fully charged, connect the Battery Pack to the P-Sea and then power on and wait for the System software to boot up. Then check the Application software is configured as required before powering down the P-Sea ready for the dive.

Prior to dive, do not leave the P-Sea powered from the battery for a period of time that is longer than is required to do a short test. The P-Sea battery will power the console alone for an average of 4 hours operation before the battery discharges and the P-Sea shuts down.

⚠️ **CAUTION!**	*The P-Sea and any attached device forms a negatively buoyant unit. As a result, measures should be taken to ensure the P-Sea is not detached from the Diver whilst being operated in the water. There are several points on the unit where a strap can be tied and then attached to the diver for extra security.*

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4.2 P-SEA STATUS LED OVERVIEW…

The Tritech P-Sea console provides a number of status LED's showing the current operational status of the unit.

Please refer to the table below for the specific function of each individual LED.
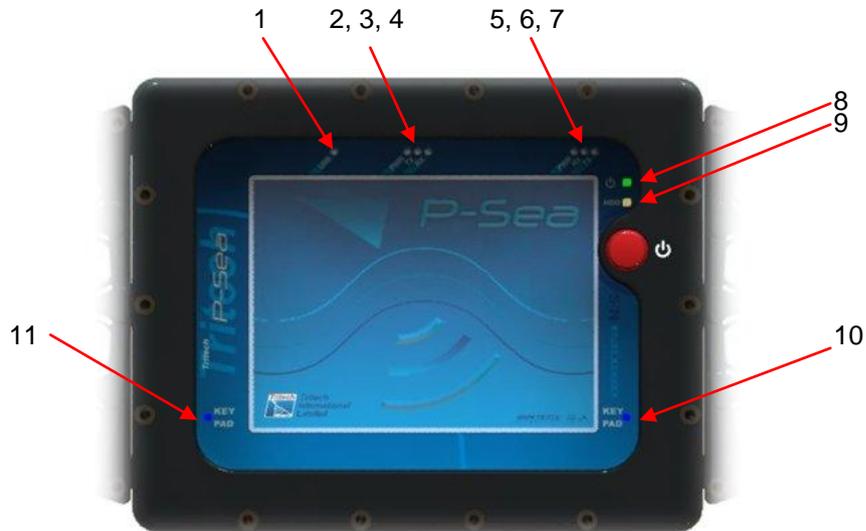
LED No.	Description	Colour
1	External USB Port Device Connection	Blue
2	Serial Port 1 Power Enable	Blue
3	Serial Port 1 Data Receive	Red
4	Serial Port 1 Data Transmit	Green
5	Serial Port 2 Power Enable	Blue
6	Serial Port 2 Data Receive	Red
7	Serial Port 2 Data Transmit	Green
8	P-Sea Status LED	Green
9	P-Sea Disk Drive Activity	Amber
10	Right Keypad Device Connection	Blue
11	Left Keypad Device Connection	Blue

4.3 POWER CONTROL

4.3.1 Powering Up the Console…

Ensure that the power cable is connected to the console as described in <u>section 3.2</u> and that the source supplying power to the Tritech P-Sea is turned on.

⚠ **CAUTION!**	Please ensure that the input voltage lies within the range of 10V to 36V DC and that the supply can provide at least 30W of power. Exceeding this input voltage may damage the P-Sea console.

1. Push the **Red** power button located on the right-hand side of the Tritech P-Sea console to power up the unit.

    After a short delay while the P-Sea console initialises, the **Green** status LED will illuminate indicating that the unit is now powered up.

2. If the LED's and display remain dark it could be because the P-Sea has entered covert mode, the console can be brought out of covert mode by simply pressing and releasing the power button (see section 3.3 for more details on covert mode).
3. The P-Sea console will continue to boot into the Windows environment following this short initialisation period.

    The **Amber** Hard Disk activity LED will periodically pulse to indicate that loading is commencing and, depending on the devices currently connected to the P-Sea, other **Blue** status LEDs will illuminate.

⚠ **NOTE**	On first power up after the power has been disconnected the console lighting will be at the default brightness until windows has finished loading after which the previously used values will be implemented. If the power to the console has not been disconnected since the last session then the brightness settings from the previous session will be used from startup. See <u>section 4.5.2 </u>for more information about the brightness controls.

4.3.2   Covert Operation.

The P-Sea console has the ability to go into a **Covert Operations** mode, during which the LCD display, LED's and Keypads switch off while keeping the core of the system – including any external sensors and USB devices - active.

To put the P-Sea into this Covert mode:

1. Ensure that the P-Sea is powered up
2. Briefly press and release the power button

Upon the release of the power button, covert mode will be active. To restore normal operation and to come out of covert mode:

1. Ensure that the P-Sea is powered on **AND** in Covert mode
2. Briefly press and release the power button

The system will now return back to normal and all LED's together with the LCD display will become active again.

⚠ **NOTE**	Covert mode can be activated from the instant the P-Sea is powered on however the user must take care when pushing the power button as any depression will activate covert mode – making the P-Sea console appear as if it hasn't been powered on. A single press of the power button again will restore normal operation

4.3.3   Powering Down the Console

The P-Sea console can be powered down using either the Shutdown Console button on the configuration window or the **Shut Down Windows** dialog within the Microsoft Windows operating system. To do this, please follow the instructions below:

Shut down through the configuration window

1. Open the **Configuration Window** by pressing the bottom keypad button on the right hand side (keypad button 8)
2. Select the **Shutdown Console** button, the button is now replaced with **Cancel Shutdown** and the **Confirm Shutdown** button is now visible
3. If the **Shutdown Console** button was selected in error, this can now be undone by selecting the **Cancel Shutdown** button
4. To continue shutting down the console, select the **Confirm Shutdown** button, this will start a ten second countdown after which the console will be shut down

⚠ **NOTE**	Once the **Confirm Shutdown** button has been pressed the shutdown process cannot be stopped, all work should be saved prior to beginning the shutdown process.

Shut down through windows

1. Launch the **Start Menu** by clicking on the **Start** button located at the bottom left hand side of the screen (Note: the taskbar is hidden but will appear when the cursor is taken to the bottom of the screen)
2. Click on the **Shut Down** item from the menu
3. Select **Shut Down** from the drop down list before clicking the **OK** button

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⚠️ **NOTE**	These are the recommended ways of shutting down the P-Sea console as they reduce the possibility of data loss and allow all the current processes running on the unit to exit properly.

4.3.4   Emergency Shut Down

⚠️ **CAUTION!**	This emergency shutdown is **ONLY** recommended in a situation where software or hardware has malfunctioned as there is a greater risk of data loss with the internal power supplies disconnecting immediately. When possible, always try to observe the normal shutdown procedure.

To perform this emergency shutdown, perform the following tasks:

1. Ensure that the P-Sea is fully powered on
2. Depress the power button for 4 seconds or more, instantly powering off the console
3. The P-Sea can now be powered up again using the usual procedure

P-Sea Underwater Console
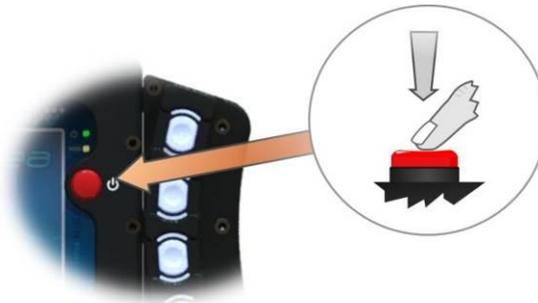
4.4 OPERATING THE P-SEA CONSOLE

The P-Sea console allows user input in the form of a pair of USB keypad devices.

These devices allow the user to navigate through the Windows operating system and to also control specific functions.

⚠️ **NOTE**	When the Tritech P-Sea application is the active application, it is not possible to access the Windows taskbar. In order to access the taskbar the user must first perform a mouse left click on either another application or the desktop.

4.4.1 Keypad Button Overview

Depending on the current **Input Mode** selected by the user each key will perform a specific action. The following pages detail how these buttons are used to control all functions of the P-Sea

Fixed Function Keys
The functionality of the following keys **DOES NOT** change when cycling through the modes.

4.4.1.1 Mode Selection [Key 4]

Action	Function
PRESS	Pressing this key will cycle to the next **Mode** in the series. Please see below for a list of modes available on the P-Sea console
HOLD	Holding down this key for a period greater than **4seconds** will visually display the functionality of each Keypad key within the current mode. Holding this key down again will hide this visual indicator.

4.4.1.2 System Configuration [Key 8]

Action	Function
PRESS	Pressing this key will display the P-Sea System Configuration window where many P-Sea settings can be modified. If this window is already visible, pressing this key again will hide it. Please refer to section 4.5 for more information regarding this window.
HOLD	Holding down this key for a period greater than **4seconds** will return all the brightness sliders to their default values (i.e. overall brightness will be at the midpoint, the backlight offset, status LED offset and keypad LED offset sliders are moved to the zero offset position). Please refer to section 4.5.2 for more information on setting the P-Sea brightness levels.

4.4.2 Available Input Modes
As standard, the P-Sea console provides various built-in input modes to allow the user to control the Operating System and other software applications easily and quickly using both Keypads.

By default the P-Sea will start up in **Preset Mode** and will cycle through the modes in the order listed below. Each individual mode is described in the following section; please refer to this for more information.

The following modes are available as standard:

Mode Name	Description
Preset Mode	Allows the user to switch between different preset values and control the sonar gain and scan behaviour
Mouse Mode	Allows the user to control the mouse pointer
Utilities Mode	Provides control over main P-Sea settings
Sonar Mode	Provides common commands for control of the **Sonar Display** application
Text Input Mode	Simulates keyboard operation allowing the input of text
Menu Mode	Enables the user to quickly navigate through menus and dialogs

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4.4.2.1 Mouse Mode…

In mouse mode, the Keypad buttons allow the user to move the mouse pointer around the screen and also perform both left and right click actions on features such as buttons, drop down lists, etc.

The Keypad button assignment in this mode is as follows:

Button	Name	Description
1	Mouse Up	Moves the mouse pointer towards the top of the screen
2	Mouse Down	Moves the pointer towards the bottom of the screen
3	Left Click	Performs a left click operation
4	**NA**	**Not applicable**
5	Mouse Left	Moves the pointer to the left hand side of the screen
6	Mouse Right	Moves the pointer to the right hand side of the screen
7	Right Click	Performs a right click operation
8	**NA**	**Not applicable**

⚠ **NOTE**	Holding down either the **Left Click** or **Right Click** keys while moving the cursor at the same time will initiate a drag operation. Files, windows, etc can be controlled using this drag method. Releasing the key will end the operation.

4.4.2.2 Menu Mode…

The menu mode provides easy navigation through menu trees, emulating the functionality of the cursor keys located on a standard keyboard and also some extra features.

The Keypad button assignment in this mode is as follows:

Button	Name	Description
1	Key Up	Performs the action of pressing the **Up** key
2	Key Down	Performs the action of pressing the **Down** key
3	Escape	Performs the action of pressing **Escape**
4	**NA**	**Not applicable**
5	Key Left	Performs the action of pressing the **Left** key
6	Key Right	Performs the action of pressing the **Right** key
7	Enter	Performs the action of pressing the **Enter** key
8	**NA**	**Not applicable**

⚠ **NOTE**	When textual input is required in an application such as Notepad, this mode can be used to move the Cursor through the text. Pressing the **Enter** key will insert a new line character.

4.4.2.3   Preset Mode…

The Preset mode gives the user direct access to the presets setup in the configuration window **Preset Setup** tab (see section 4.5.3). This mode also allows independent adjustment of the **Sonar Display** gain and scan controls.

The Keypad button assignment in this mode is as follows:

Button	Name	Description
1	Previous Preset	Move to the previous set of preset values
2	Gain Decrease	Decreases the amount of gain within the Sonar
3	Reverse Scan Direction	Provides an 'instant reversal' of the scan line direction
4	**NA**	**Not applicable**
5	Next Preset	Move to the next set of preset values
6	Gain Increase	Increases the gain within the Sonar
7	Toggle Narrow Sweep	Toggles a narrow sweep of ±10° either side of the scan line
8	**NA**	**Not applicable**

4.4.2.4   Sonar Mode...

The Sonar mode gives the user direct access to functions within the S**onar Display** application environment, allowing changes to the operation of the Sonar device attached to the P-Sea console.

The Keypad button assignment in this mode is as follows:

Button	Name	Description
1	Gain Decrease	Decreases the amount of gain within the Sonar head
2	Range Decrease	Decreases the overall Sonar range
3	Sector Toggle	Toggles the scanning sector views in the **Sonar Display** application
4	**NA**	**Not applicable**
5	Gain Increase	Increases the amount of gain within the Sonar head
6	Range Increase	Increases the overall Sonar range
7	Scan Speed	Toggles the speed at which the Sonar scans
8	**NA**	**Not applicable**

⚠ **NOTE**	In order for the Sonar Display controls to operate correctly, the Sonar Display application must be the currently focussed window.

4.4.2.5 Text Input Mode…

The Text Input mode enables the user to enter characters into any text field. All 26 alphabetic characters together with common punctuation symbols are available to be entered.

When in this Text Input mode with only the base letters showing, pressing the required key will bring up another set of letters effectively narrowing down the choice of letter to be selected.

For example, after pressing **Key 2 – G to L**, the letters **G, H, I, J, K** and **L** will then be available to be input. Pressing **Key 2** again will now insert the letter "**H"**

Base letter input key assignments are as follows:

Button	Name	Description
1	A…F	Allows characters A, B, C, D, E and F to be entered
2	G…L	Allows characters G, H, I, J, K and L to be entered
3	M…R	Allows characters M, N, O, P, Q and R to be entered
4	**NA**	**Not applicable**
5	S…X	Allows characters S, T, U, V, W and X to be entered
6	Y, etc	Allows characters Y, Z and common symbols to be entered
7	Misc	Allows miscellaneous punctuation to be entered
8	**NA**	**Not applicable**

⚠ **NOTE**	Pressing the **Mode** key when in the individual letter mode will return the user back to the **Base Letter** selection screen. A further press of the **Mode** key will cycle to the next available mode.

4.4.2.6 Utilities Mode…

The Utilities Mode gives you quick access to many of the user configurable settings available within the P-Sea system. Any changes made within this mode have an instant effect on the console.

The Keypad button assignments are as follows:

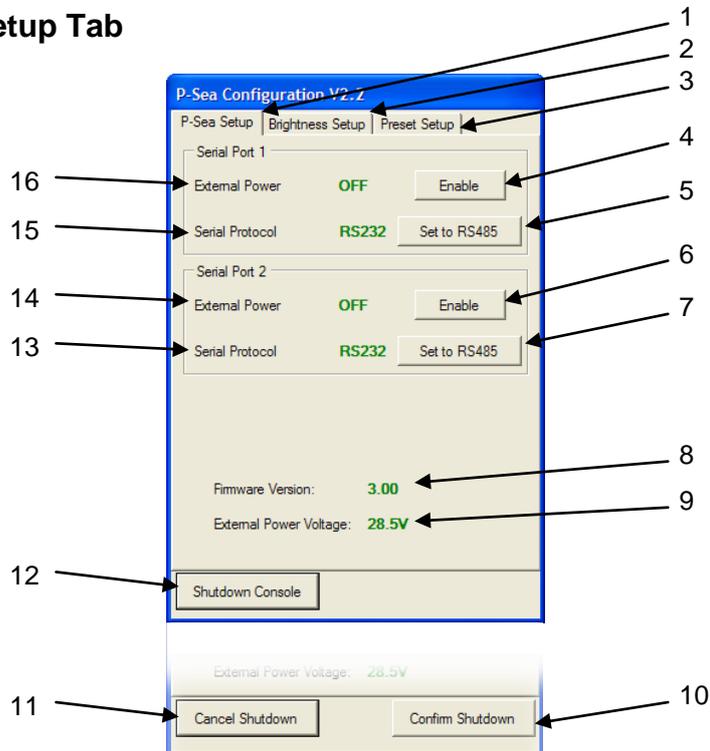| Button	Name	Description
1	Brightness Decrease	Decreases the Brightness of the LCD and LED displays
2	Serial Port 1 Power	Toggles Serial Port 1 external power **ON** and **OFF**
3	Serial Port 1 Mode	Toggles Serial Port 1 mode between RS232 and RS485 mode
4	**NA**	**Not applicable**
5	Brightness Increase	Increases the Brightness of the LCD and LED displays
6	Serial Port 2 Power	Toggles Serial Port 2 external power **ON** and **OFF**
7	Serial Port 2 Mode	Toggles Serial Port 2 mode between RS232 and RS485 mode
8	**NA**	**Not applicable**

4.5 P-SEA CONFIGURATION WINDOW

The configuration window provides the operator with controls to adjust many of the P-Sea system settings instantly with a click of a button. The configuration window is split into three tabs to control different aspects of the console. Some of these functions are also available via dedicated keypad buttons in the **Utilities Mode.**

⚠️ **NOTE**	Refer to the <u>section 4.4.1.2</u> entitled **System Configuration** for more details on how to display the P-Sea configuration window.

4.5.1 P-Sea Setup Tab

No.	Description
1	P-Sea Setup Tab (Available in all tabs)
2	Brightness Setup Tab (Available in all tabs)
3	Preset Setup Tab (Available in all tabs)
4	Button to turn **ON** or **OFF** the external power on Serial Port 1
5	Button to switch between **RS232** and **RS485** mode on Serial Port 1
6	Button to turn **ON** or **OFF** the external power to Serial Port 2
7	Button to switch between **RS232** and **RS485** mode on Serial Port 2
8	Current version of the P-Sea firmware, used for reference
9	A reference indicating the approximate voltage available to the serial port power pins
10	Confirm Shutdown Button (Available in all tabs, only appears after shutdown console has been selected)
11	Cancel Shutdown Button (Available in all tabs, only appears after shutdown console has been selected)
12	Shutdown Console Button (Available in all tabs)
13	Serial Port 2 Mode Status
14	Serial Port 2 Power Status
15	Serial Port 1 Mode Status
16	Serial Port 1 Power Status

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4.5.2 Brightness Setup Tab

The Brightness Setup Tab contains four sliders, one to control the overall brightness of all the lighting on the P-Sea console and another three to allow an individual offset from the overall brightness to be applied to the LCD backlight, the status LED's and the keypad LED's. In addition the individual offsets may also be set to on or off in which case that particular area of lighting will be either fully on or fully off irrespective of the current overall brightness setting.

⚠ **NOTE**	**NOTE:** The user may return the brightness settings to their default values (i.e. overall brightness at mid-point and all offsets at zero) by holding down the bottom right keypad button (button 8) for more than 4 seconds.

No.   **Description**

1   Overall Brightness – Controls the overall brightness of the lighting on the P-Sea console from fully off to fully on. This control is also available directly from the keypads in utilities mode by pressing the top left button (button 1) to decrease brightness and the top right button (button 5) to increase brightness (see section 4.4.2.6).

2   Backlight Offset – Controls the brightness of the LCD display backlight as an offset from the overall brightness. Moving this control to on or off will make the backlight go to full brightness or completely off at all times irrespective of the overall brightness setting.

3   Status LED Offset – Controls the brightness of the Status LED's as an offset from the overall brightness. Moving this control to on or off will make the Status LED's go to full brightness or completely off at all times irrespective of the overall brightness setting.

4   Keypad LED Offset – Controls the brightness of the Keypad LED's as an offset from the overall brightness. Moving this control to on or off will make the Keypad LED's go to full brightness or completely off at all times irrespective of the overall brightness setting.

4.5.3 Preset Setup Tab

The Preset Setup tab allows the user to define a number of preset values of gain, range, scan opening, resolution, contrast, threshold and frequency (for dual frequency sonars). These ranges can then be selected using the keypads in preset mode, where the top left button (button 1) selects the previous set of preset values and the top right button (button 5) selects the next set of preset values (see section 4.4.2.3) . The preset settings are saved in a configuration file and different files can be loaded as required by the user.
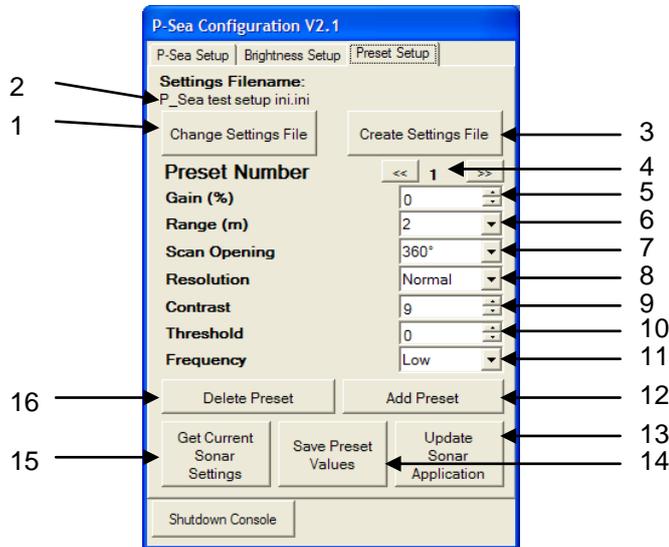
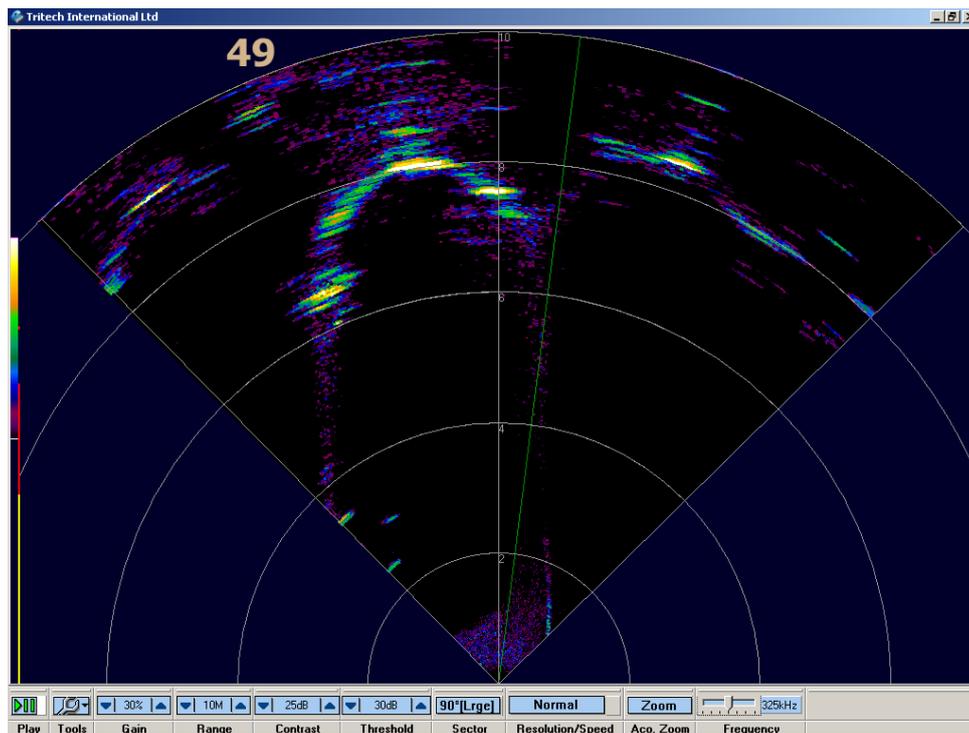| No.	Description
1	Change Settings File – Allows the user to load a different presets setup file, the current settings file will be re-loaded the next time the P-Sea console is started.
2	Settings Filename – Displays the filename of the current presets setup file.
3	Create Settings File – Allows the user to create a new settings file, the new file will automatically start at range 1 and have only one preset set loaded with the default values.
4	Preset Number – The preset number whose values are currently displayed.
5	Gain (%) – The sonar gain value for the currently displayed preset set.
6	Range (m) – The sonar range for the currently displayed preset set.
7	Scan Opening – The scan sector opening for the currently displayed preset set.
8	Resolution – The sonar resolution for the currently displayed preset set.
9	Contrast – The sonar contrast for the currently displayed preset set.
10	Threshold – The sonar Threshold for the currently displayed preset set.
11	Frequency – The sonar frequency for the currently displayed preset set. This has no effect for single frequency sonars.
12	Add Preset – Adds a new set of preset values to the current set, these values will not be saved until the **Save Preset Values** button is selected. To disregard the new preset values, move to either the next or previous set of preset values.
13	Update Sonar Application – Sends the currently displayed values to the sonar application.
14	Save Preset Values – Saves the current preset values to the current settings file.
15	Get Current Sonar Settings – Populates the current preset values with the settings currently being used by the Sonar Display application.
16	Delete Preset – Deletes the current preset values from the current set. This also deletes the values from the current settings file and so cannot be undone.

SECTION 5

5.1 SONAR OPERATION

The P-Sea Console uses a variation of **SeaNet Pro** software to control the operation of an external Tritech Sonar device connected to the Sonar serial port.

⚠️ **NOTE**	The Keypads attached to the P-Sea Console can be used to control some of the functionality of a Sonar within this application – for more information refer to section 4.4.2.4 **Sonar Mode**.

5.2 P-SEA SONAR DISPLAY OVERVIEW

Below is a screenshot of the Sonar Display application interface in normal operation. The following manual sections define the various controls

5.2.1 Main Screen Controls - Description

No.	Description
1	Current Sonar status
2	Sonar PPI³ display
3	Contrast Control
4	Setup Menu
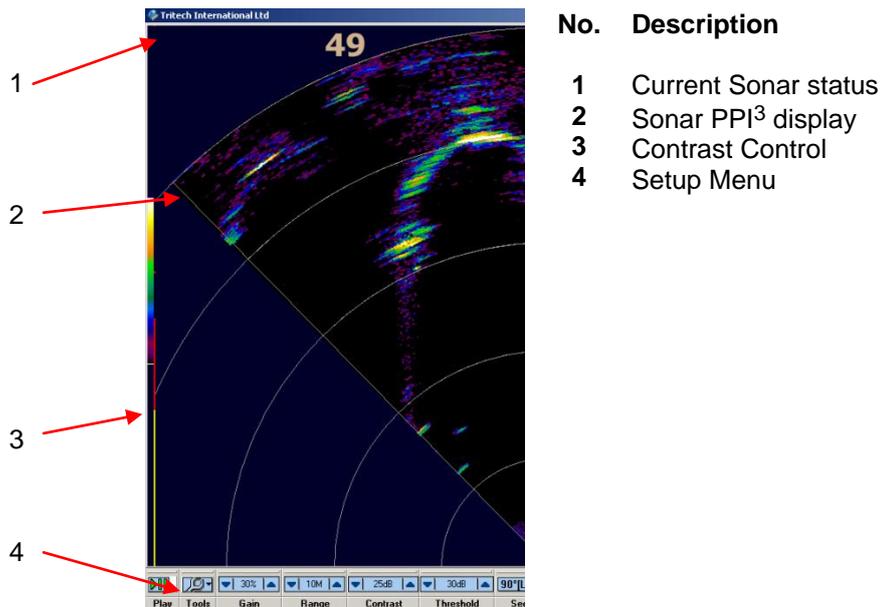
Current Sonar Status…
Displays the current status of a Sonar attached to the P-Sea Console. If a Sonar is connected but not responding, the status will display a **Timeout** message.

Sonar PPI Display…
Displays visually the target information from the area to be scanned.

Contrast Control…
This control is used to adjust the contrast between the **hard** and **soft** targets shown on the **Sonar PPI Display**, helping to locate small features in a heavily featured seabed. To increase the range drag the slider up and to decrease, drag the slider downwards.

Sonar Display Setup Menu…
Once clicked, a popup menu will appear allowing the user to adjust a number of secondary settings within the **Sonar Display** environment.
Refer to <u>section 5.2.2</u> **Setup Menu** for more detail on the sub-menus accessible through this button.

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³ Plan Position Indicator – A type of display on which target echoes are plotted in a plan view.

P-Sea Underwater Console
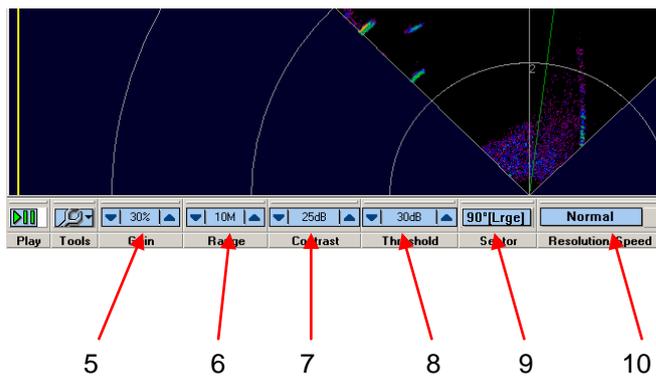
No.	Description
5	Sonar Gain control
6	Sonar Range control
7	Sonar Contrast Control
8	Sonar Threshold Control
9	Scan Sector control
10	Speed and Resolution control

Sonar Gain Control…

Adjusting this control sets the Sonar receive gain from a minimum level of 0% to a maximum of 100%. Typically this is set to approximately 20%, however this can be changed as required due to water and target conditions.

Sonar Range Control…

This control sets the maximum range the Sonar will scan. A longer range will scan more slowly that a short range due to the limit imposed by the velocity of sound in water.

Sonar Contrast Control…

This control is used to adjust the contrast between the **hard** and **soft** targets shown on the **Sonar PPI Display**, helping to locate small features in a heavily featured seabed. To increase the range drag the slider up and to decrease, drag the slider downwards.

Sonar Threshold Control…

This control is used to adjust the receiver ADC threshold level. The threshold is adjustable between 0dB and 80dB with a higher value requiring a stronger return before any data is plotted.

Scan Sector Control…

Adjusting this control sets the opening (or width) of the scanned sector and is usually changed according to the required seabed coverage. Possible values include 45°, 90°, 135°, 180° and 360°.

Speed and Resolution Control…

There are 3 preset settings for this control which can by cycled by clicking this control. Each setting varies the **Scan Speed** and **Sonar PPI Display** image detail. The presets are:

- **Normal** has a slower scan speed but produces the best image resolution on the display. Usually providing the best results, this mode is suitable for static targets.
- **Fast** preset has a quicker scan speed than in **Normal** mode however some of the image resolution is lost. Fast moving targets are best examined with this mode.
- **Very Fast** has the fastest scan speed but will produce the lowest resolution image. This preset is most suitable for fast moving targets.

P-Sea Underwater Console
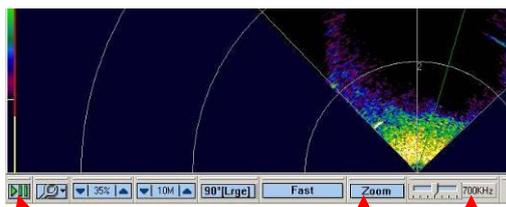
No.	Description
9	Sonar **Play** or **Pause** control
10	Zoom **ON** or **OFF** control
11	Transmission Frequency control

9   10   11   12

Sonar Play or Pause Control…
There are 3 states associated with this control:

- **Grey** indicates that no Sonar is connected or communications to the Sonar has not yet been established. In this state, the Sonar cannot be paused
- **Green** indicates that the Sonar is active and scanning correctly. Sonar operation can be paused when in this state
- **Red** indicates that the Sonar operation is currently paused and can be resumed

Zoom ON or OFF Control…
This control toggles a **Zoom** window on the display and can be re-positioned using the mouse cursor. The window represents a true acoustic zoom magnifier, giving more image detail in this selected area. Settings for this window can be adjusted from the **Setup Menu.**

Transmission Frequency Control…
The value of this control is set at the Sonar transmit pulse centre frequency.

P-Sea Underwater Console

5.2.2 Setup Menu

The setup menu provides access to many customisable features within the **Sonar Display** environment from adjusting the Sonar display through to changing settings related to the external serial ports used to communicate with devices.

The table below shows the layout of the **Setup Menu**:

Menu Bar Layout	Item	Title
About	1	About
AlwaysOnTop	2	Always On Top
Cursor On	3	Cursor On
Cursor Reporting	4	Cursor Reporting
Markers On	5	Markers On
Echosounder Chart	6	Echosounder Chart
Video Panel	7	Video Panel
GPS Input	8	GPS Input
Nav Input	9	Nav Input
Log	10	Log
Print	11	Print
Title Bar	12	Title Bar
Colours	13	Colours
Language	14	Language
Units	15	Units
Zoom Setup	16	Zoom Setup
Sonar Setup	17	Sonar Setup
Com Port	18	Com Port

About…

The **About** window displays information including: software version, company details and PC information including memory and CPU details.

Always On Top…

Selecting this option will make the **Sonar Display** always appear in front of other applications.

⚠️ **NOTE**	**NOTE:** If always on top is selected the Sonar Display window will obscure the P-Sea keypad legends.

Cursor On…

Adds the mouse cursor position to the Sonar display.

Cursor 82.11 331.1° ☑ Polar	**Polar** – Displays the coordinates in **Polar** format. When un-ticked, coordinates are displayed in **Cartesian** format.

Cursor Reporting…

When this option is enabled, clicking on an area or target within the **Sonar PPI Display** will result in the output of a string through the **Auxiliary Serial Port** configured in the **Port Setup Window**. This string contains both **Range** and **Bearing** information for the point.

⚠️ **NOTE**	Refer to section 5.2.3 **Port Setup Window** for more details on how to configure the Auxiliary Port to output this Cursor Reporting string

P-Sea Underwater Console

Markers On…

Adds two markers to the **Sonar PPI Display** and of which both the Range and Bearing to each marker is displayed. Marker A is represented by $+$ and marker B is shown as ⊕

| Markers A-B		X
$+$	36.93	323.5°
⊕	55.29	347.7°
Delta	26.33	22.6°

Left Column represents the range in metres (m)
Right Column represents the bearing in degrees (°)
Delta is the range and bearing between the two markers

Echosounder Chart…

This chart is used to display altitude data from a Micron Echosounder device (where available) connected to the **Sonar Auxiliary Port** (where available). The graph displays the change in altitude over time and the text display shows the current altitude.
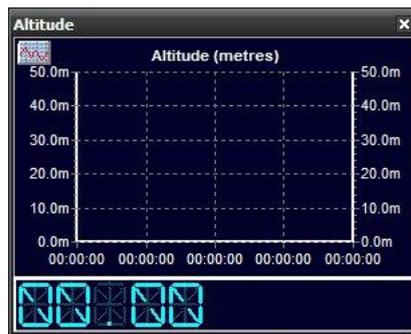
Video Panel…

Displays a separate Video preview window from a video capture source, such as an external video camera.

P-Sea Underwater Console

GPS Input…

Displays a GPS window which outputs positional data from an external GPS device connected to a serial port.
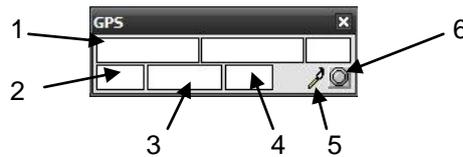
No.	Description
1	Latitude, Longitude and UTM data from the sentence
2	Course-over-ground data from the sentence
3	Speed-over-ground data from the sentence
4	Heading data from the GPS sentence
5	Settings window display to allow the configuring of the GPS device
6	Indicates whether the GPS device is responding

Nav Input…

Displays the Navigation windows to display **Course, Depth** and **Speed** information from an external Compass module.

Log…

The **Log** menu provides the user with 2 options:

- **Play** allows the user to play back existing pre-recorded log files
- **Record** enables the current Sonar data to be recorded to file ready for playback

Print…

Various print options are available from this **Print** menu, these are:
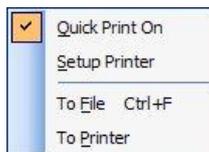
Quick Print – removes user input when printing
Setup Printer – allows the user to specify various printer settings
To File – creates a screen shot of the current window
To Printer – sends an image of the current window to the printer

Title Bar…

Selecting this option allows the user to specify a custom **Title Bar** description from the default caption of **"Tritech International Ltd"**.

Colours…

A number of colour schemes are available for selection, each of which change the way the **Sonar PPI Display** looks and feels. The choices are: **Default, Colour1, Colour2, Colour3, Colour4, Colour5, Colour6.**

Language…

Allows the user to set the default application language from the following list: **English (UK), English (US) and French**.

Units…

Allows the user to specify the units used within the Sonar Display environment. Available options are: **Metres, Feet, Fathoms, Yards**.

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Zoom Setup…

The **Zoom Setup** window contains two settings to allow the user to configure how the **Zoom** window is displayed. These are:
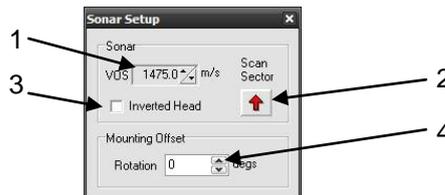
Size % – adjusts the size of the Zoom view area
Factor – allows the user to adjust the Zoom factor

Sonar Setup…

Allows the user to configure the operation of the Sonar head attached to the P-Sea console. The settings available are as follows:
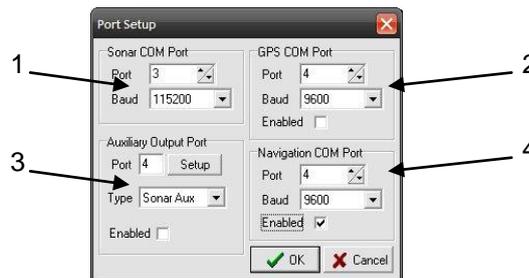
No.	Description
1	Value represents the velocity of sound in water and is applied to the Sonar display
2	When the display is in 180° view, this control selects the sector which the sonar scans from 4 possible options: **Up, Right, Down, Left**
3	Inverts the way the **Sonar PPI Display** is drawn from left-to-right to right-to-left
4	Display correction used for when the Sonar **Status LED** is not in its zero position

Com Port…

Refer to section 5.2.3 **Port Setup Window** for more information.

5.2.3 Port Setup Window

Allows user configuration of the Serial Communication ports available on the P-Sea console.

No.	Description
1	Sonar COM Port settings
2	GPS COM Port settings for an external GPS devices
3	Sonar Auxiliary Port settings
4	Navigation COM Port settings for an external Compass module

Sonar COM Port…
Allows the user to specify the **Port** which the P-Sea uses to communicate with the Sonar and also the **Baud Rate** at which the Sonar operates.

GPS COM Port…
Allows the user to specify the **Port** which the P-Sea communicates with an external GPS device and also at which **Baud Rate** the device operates. The **Enabled** check box turns on and off communications to this device.

Sonar Auxiliary Output Port…
The Sonar Auxiliary port is available on Tritech Sonars which have both a **Main** and an **Aux** port to allow the "daisy-chaining" of multiple sensors.

These settings allow the user to specify the **Port** which the P-Sea uses to send this auxiliary data; however more in-depth settings can be configured using the **Setup** button.

The **Type** setting can be one of the following values:

- **Sonar Aux** setting outputs data from only the auxiliary port on the Sonar
- **Cursor** setting outputs the cursor information when **Cursor Reporting** is **ON**
- **Aux + Cursor** outputs both aux data and cursor information

Again, the **Enabled** check box turns on or off auxiliary operation.

Navigation COM Port…
Allows the user to configure the **Port** which an external Compass module is connected and also the **Baud Rate** at which the device communicates. The **Enabled** check box turns on and off the communications to this device.

⚠ NOTE	The P-Sea has 2 external serial ports – COM1 and COM2. These relate to Serial Port 1 and Serial Port 2 respectively.

⚠ CAUTION!	When changing the **Port** settings, ensure that the port is not already in use. If a port is in use, the user will not be able to close this window until the conflict is resolved – by changing to an unused **Port**.

SECTION 6

6.1 MAINTENANCE

The P-Sea should be washed down with fresh water after every dive. This is mainly to prevent dirt build up around the keys which can limit their operating life.

There are no serviceable parts on the P-Sea.

Other than the Keypads, there are no user replaceable parts on the unit.

6.2 TROUBLESHOOTING

In the event of any failure on the P-Sea, details of the problem should first be reported to Tritech Technical Support (support@tritech.co.uk) who will assist with fault diagnosis. Please have to hand all part numbers and serial numbers for the console and sensor heads which your P-Sea system comprises.

6.3 SYSTEM SOFTWARE CONFIGURATION

Your system will be delivered with Windows XP™ Embedded pre-installed. If Sensor or peripheral devices are supplied then the P-Sea will be installed with Application Software to control and display the data from such devices.

The P-Sea has the following Drive Letters;

Drive C: *[Primary 2GB], boot drive where Operating System files, P-Sea Control software and application software are installed. This drive can also be used for storing any Sensor log files that may form part of installed application software.*

Drive D: *[Secondary 2GB], Data drive where the user can store log files*

*N.B. There is an option to fit a Storage device such as a Memory Stick to the USB Port. Such Storage devices will normally appear with the **Drive E:** letter.*

6.3.1 Software Updates

Software updates may become available for the P-Sea. These must be transferred onto the unit using the USB Port interface. This will require a USB interface cable to be connected to the USB port on the P-Sea. A storage device such as a Memory Stick would then connect to the interface cable and the software update uploaded.

6.3.2 System Software Re-Installation

If at any time the P-Sea needs to be re-installed with the full system software, including Operating System, then this would require to be co-ordinated with Tritech. Under many circumstances, it is recommended that the unit be returned to the factory for this software re-installation.

APPENDIX 1

P-SEA UNIT-SPECIFIC CONFIGURATION

Based on the selections made when purchasing your Tritech P-Sea console, your unit has one of many external port configurations. The **Front View** below will represent the port configuration available on your P-Sea device.

This is applicable to all models with part number/serial number combination 08632.xxxxxx
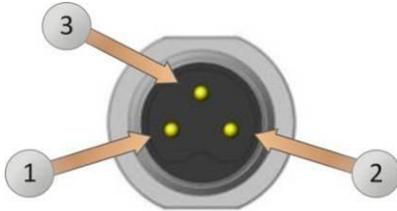
Top View

Front View

EXTERNAL PORT WIRING…

Please use the drawings below as a reference to correctly wire the external ports available on your Tritech P-Sea console.
Applicable to all models with part number/serial number combination 08632.xxxxxx

External Power Port…

Connector Face View   **Pin Assignment**

Pin	Function
1	-VE Supply
2	+VE Supply
3	No Connection

External USB Port…
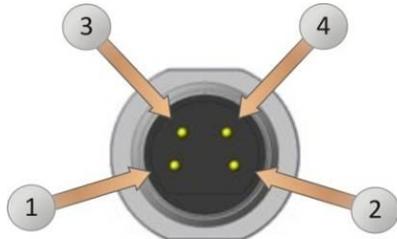
Connector Face View   **Pin Assignment**

Pin	Function
1	USB DM
2	USB DP
3	USB 5V Supply
4	USB Ground

External Serial Port…

Connector Face View   **Pin Assignment**
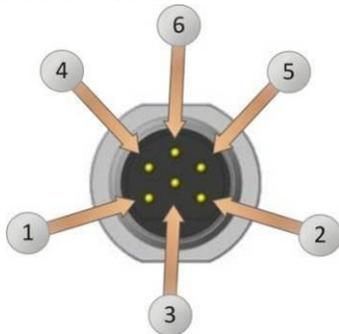
Pin	Function
1	P-Sea RX
2	P-Sea TX
3	P-Sea Supply (+VE)
4	P-Sea Ground (0V)
5	Not Connected
6	Screen

External Ethernet Port…

Connector Face View   **Pin Assignment**
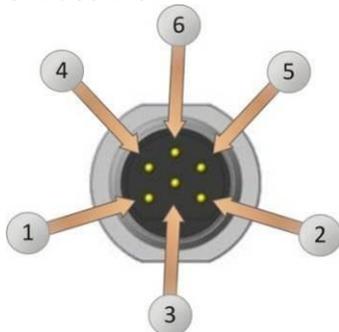
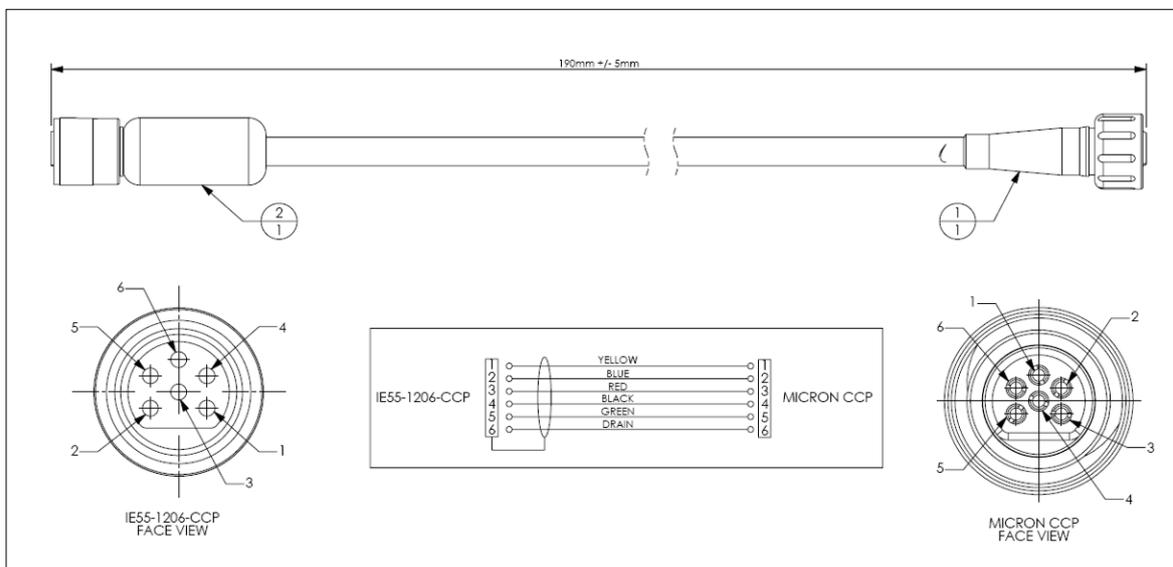| Pin	Function
1	P-Sea Tx+
2	P-Sea Tx-
3	P-Sea Rx+
4	P-Sea Rx-
5	Not Connected
6	Not Connected

P-Sea Underwater Console

P-SEA CABLE ASSEMBLY WIRING DIAGRAM
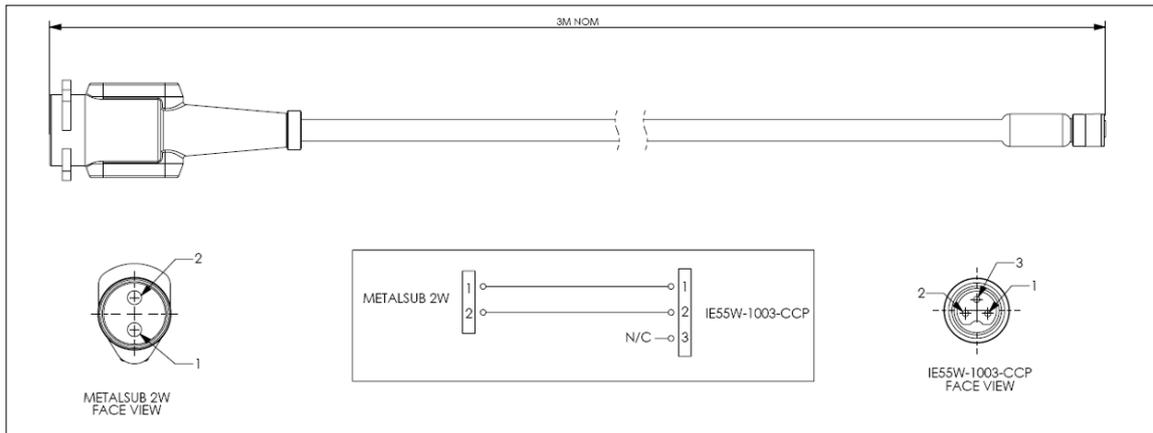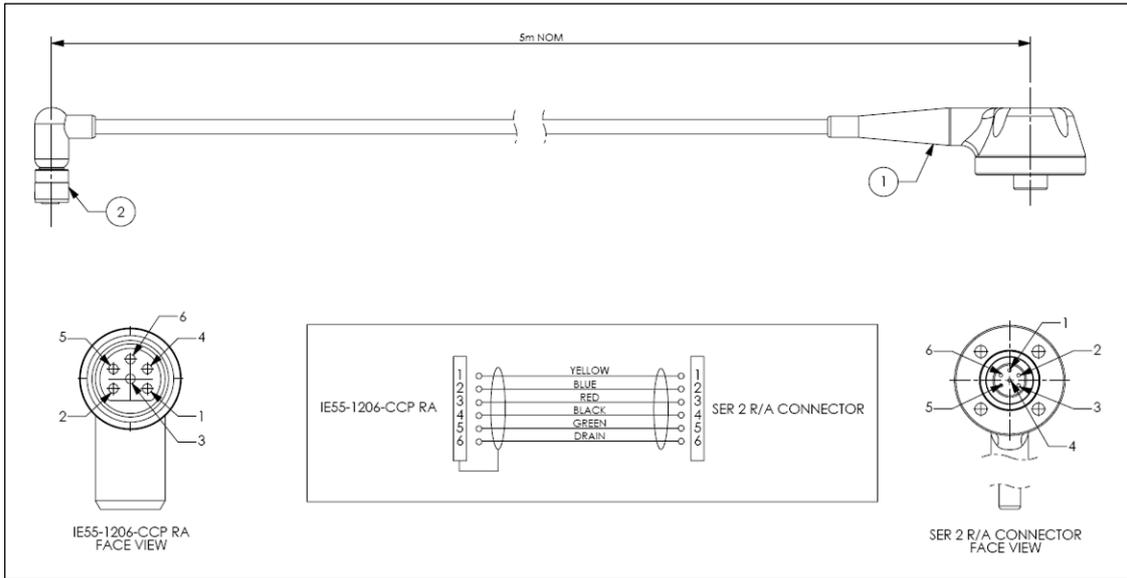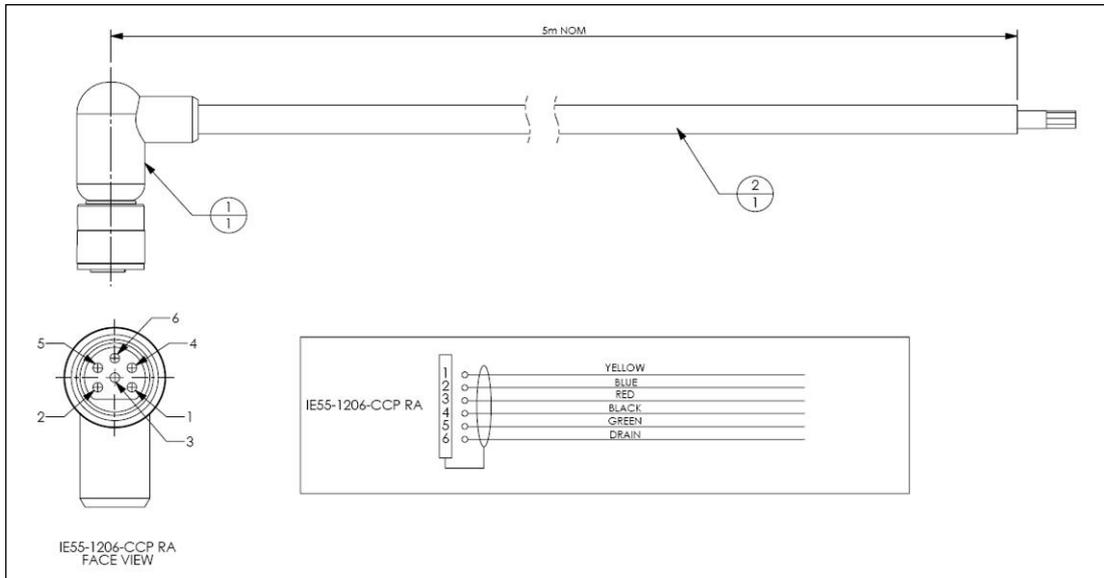

P-Sea Power Port to Battery Cable (Part No. S8644)
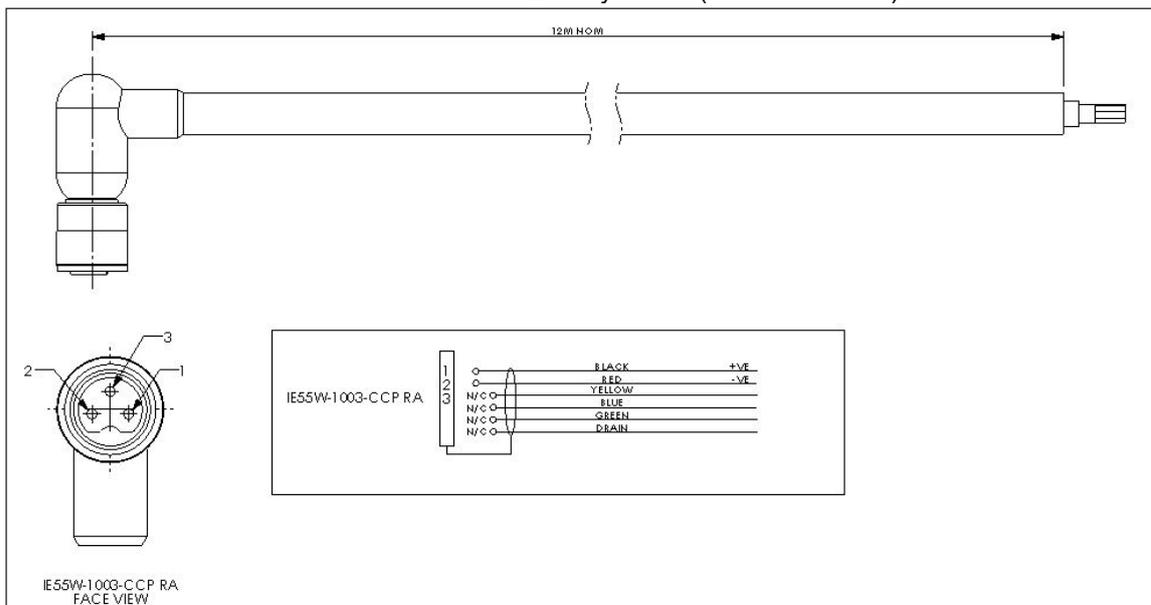
P-Sea Power Port Unterminated Cable (Part No. S8408)

P-Sea Serial Port to Micron Cable (Part No. S8311)

P-Sea Serial Port to ST Connector (Part No. S8819)

P-Sea Serial Port Unterminated (Part No. S8409)