applied acoustics

underwater technology

Easytrak Pyxis

3690 Series

Quick Ref Guide

ISO9001:2015 Certificate No: QEC 80128837a/108/Q Rev: 001

Revision History

Issue	Change No.	Reason for change	Date
A	N/A	FIRST ISSUE	08/07/22

Contents

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These written instructions must be followed fully for reliable and safe operation of the equipment that this manual refers to. Applied Acoustic Engineering Ltd cannot be held responsible for any issues arising from the improper use or maintenance of equipment referred to in this manual or failure of the operator to adhere to the instructions laid out in this manual. The user must be familiar with the contents of this manual before use or operation.

1. Introduction to the 3690 Easytrak Pyxis

This guide provides the user with quick reference information on the installation, operation of the Easytrak Pyxis Inertial Ultra-Short Base Line (USBL) underwater acoustic positioning system..

The Easytrak Pyxis USBL takes the best of applied acoustic engineering's USBL technology and combines it with a highly advanced inertial navigation system (INS). To create a state of the art, inertially aided Ultra Short Baseline system capable of accurate subsea tracking with survey grade performance. The high precision combination of aae's Sigma 2 acoustic protocols and SBG Systems' OEM version of the Navsight Apogee INS brings together two leading names in the field of marine technology, resulting in aae's most accurate and long range positioning system, providing many time, cost and performance benefits to global survey operators.

As a tightly coupled, factory fitted package, Pyxis is a calibration free system able to immediately operate from any vessel as soon as the work site has been reached. The MEMS based INS does not fall under ITAR regulations, and the range restricted option means the whole system can be shipped unhindered and without export control to almost anywhere in the world. Available with omni-directional and directional transceiver options, and boasting an accuracy of up to 0.1% of slant range.

Easytrak Pyxis is ideal for surveys. Utilising the integrated INS and GNSS the absolute positioning of divers, sonar fish, ROVs, or seabed objects in UTM (Universal Transverse Mercator) co-ordinates can be achieved. With GNSS enabled, Easytrak Pyxis can also be used to navigate to and from the worksite indicated by an entered waypoint. Place marks can also be added to log items of interest.

The necessity of determining an accurate velocity of sound (VOS) through water is critical. VOS accuracy is important in two areas, (1) across the face of the transducer (used for measuring the bearing and depression angle to a target), and (2), the distance to and from the target (the range). To help overcome this source of error, a sound velocity profile may be loaded into Pyxis. Alternatively, if a sound velocity profile is not available, the operator can enter two values of VOS into Easytrak, one for the transceiver and a second for the beacon range calculation.

Depth beacons are recommended to provide greater positioning accuracy, particularly appropriate at low depression angles where the slightest change can result in a significant shift in the target's vertical position.

The integrated SBG Navsight and Apogee IMU provides a comprehensive inertial navigation solution. The factory calibrated OEM Apogee IMU integrated in the Pyxis Transceiver is the main motion sensing element and the most important performance driving factor coupled with the Navsight processing unit housed within the Pyxis console.

The integrated OEM Navsight embeds all the navigation algorithms processing, dual antenna, triple frequency GNSS receiver, capable of PPP and centimetre precision using RTK, plus all inputs and outputs interfaces.

An integrated lever arm alignment calibration tool is included to allow loosely coupled processing of lever arm data. Providing a solution for vessels of all sizes and manoeuvrability. The INS retains standalone functionality to provide vessel attitude, heave and position data to other sensors.

Note: Easytrak Pyxis takes about 90 seconds to initialise from power up.

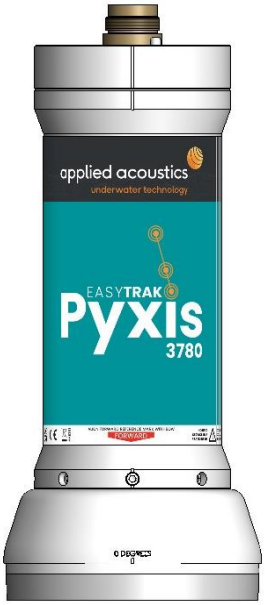
2. System Description

Easytrak Pyxis consists of an EZT-3690 console, EZT-3780 series transceiver, EZT-PC deck cable, 2 x GNSS antenna and up to 16 beacons.

Easytrak Pyxis 3690 Console Unit

Easytrak Pyxis is an advanced inertial Ultra Short Baseline (USBL) positioning and tracking system which incorporates Sigma Spread Spectrum Technology to provide a secure acoustic link The console integrates the main PC and INS processing unit and provides control and interfaces for the system. The console also provides power and communications to the Easytrak Pyxis Transceiver and GNSS antennas.

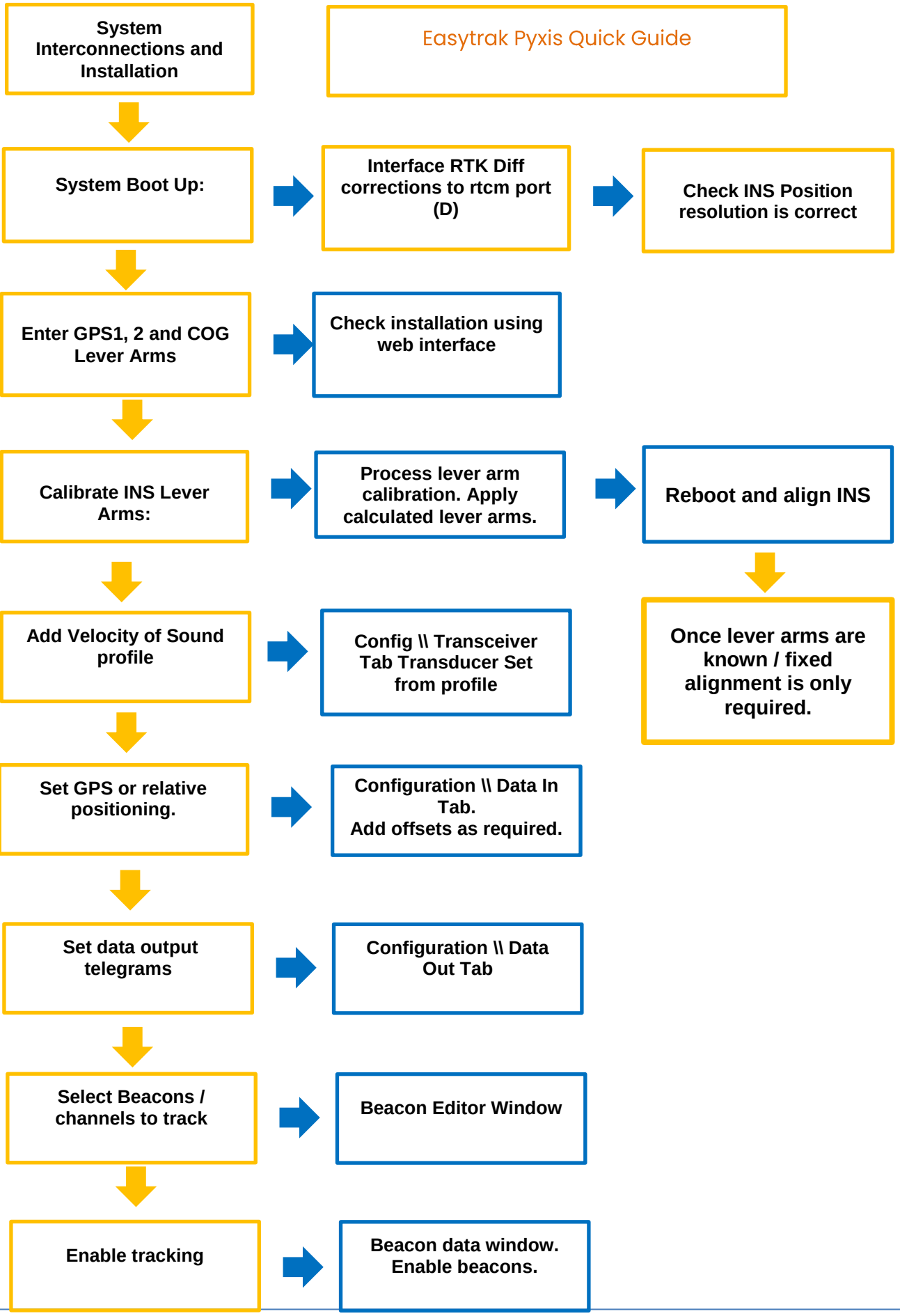
378X Series Easytrak Pyxis Transceiver



The Easytrak Pyxis transceiver transmits and receives acoustic signals using a multi element ceramic transducer. The transceiver is fitted with a factory calibrated and aligned survey grade IMU to provide attitude information for the acoustic solution. The transceiver calculates the position of dynamic subsea targets through the transmission and reception of acoustic signals between the submerged transceiver and the target beacon. The transceiver also has an integral depth and temperature sensors.

1100 and 1300 Series Beacon

The 1100 and 1300 Series Beacon incorporates Spread Spectrum Technology; the wide bandwidth transmissions reducing its susceptibility to interference thus enabling accurate positioning and secure data transmission. AAEs beacons retain flexibility by incorporating tone burst channels and analogue data telemetry options as standard. The 1100 series beacons may be connected to the Pyxis console to read and change the beacon configuration if required.


System Interconnections and Installation
Easytrak Pyxis Quick Guide
System Boot Up:
Interface RTK Diff corrections to rtcm port (D)
Check INS Position resolution is correct
Enter GPS1, 2 and COG Lever Arms
Check installation using web interface
Calibrate INS Lever Arms:
Process lever arm calibration. Apply calculated lever arms.
Reboot and align INS
Once lever arms are known / fixed alignment is only required.
Add Velocity of Sound profile
Config \\ Transceiver Tab Transducer Set from profile
Set GPS or relative positioning.
Configuration \\ Data In Tab.
Add offsets as required.
Set data output telegrams
Configuration \\ Data Out Tab
Select Beacons / channels to track
Beacon Editor Window
Enable tracking
Beacon data window.
Enable beacons.

3. Installation

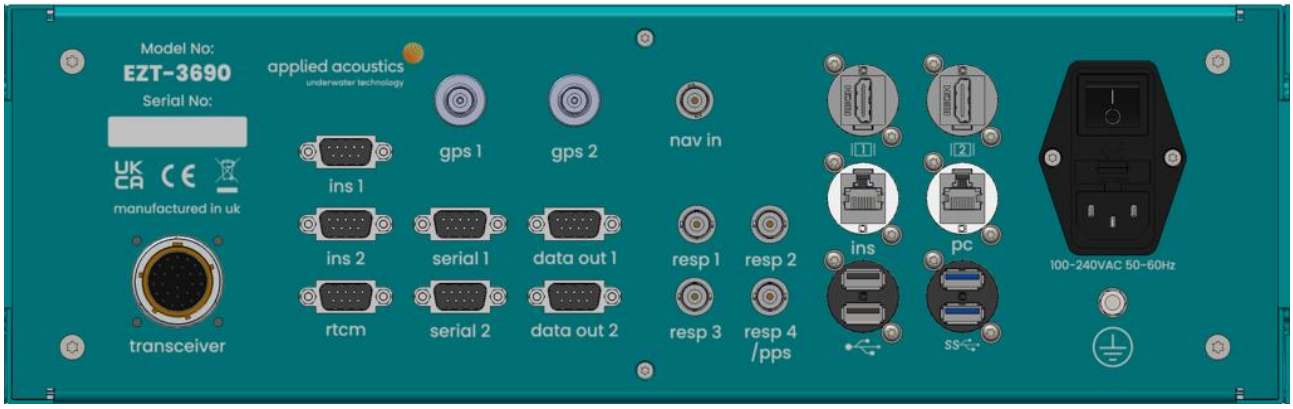
Easytrak Pyxis 3690 Console Unit

Front Panel

USB Port x 2	User USB connections
On // Off Switch	With VAC supply connected and switched on, press to start

Rear Panel

Ensure the console is secured to prevent falling or sliding due to vessel movement. The console can be mounted in a standard 19’ rack.



transceiver: connection to the Pyxis transceiver using the Pyxis deck cable.

ins 1(B) and ins 2(C): ins port B and C serial ports available for data output or external sensor interface.

serial 1 and 2: 2 serial ports available for external sensor interface, aux inputs and for a secondary data out configuration.

data out 1 and 2: 2 serial ports available for data out configuration.

gps 1: TNC connection for primary gps antenna (1).

gps 2: TNC connection for secondary gps antenna (2).

nav in: external trigger for beacon position cycle synchronistion.

resp 1 to 4: 4 BNC connection to beacon to be triggered in responder mode. Responder 4 is PPS output or responder.

HDMI 1 and 2: 2 HDMI monitor connections.

ins LAN: Ethernet connection to INS for UDP data out.

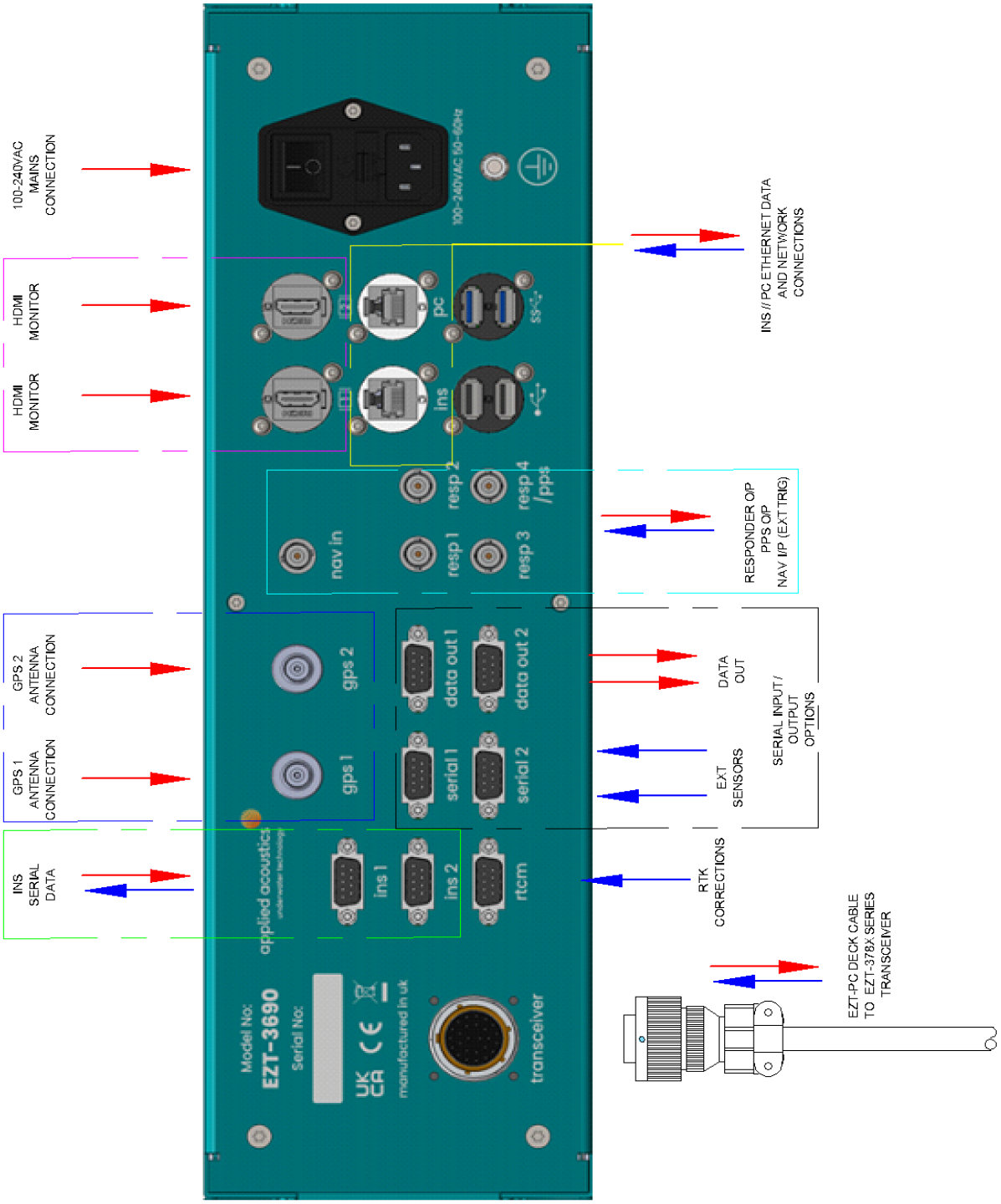
pc LAN: Ethernet connection to PC for remote VNC desktop, internet connection and UDP USBL data out

USB 3: 2 USB 3 ports.

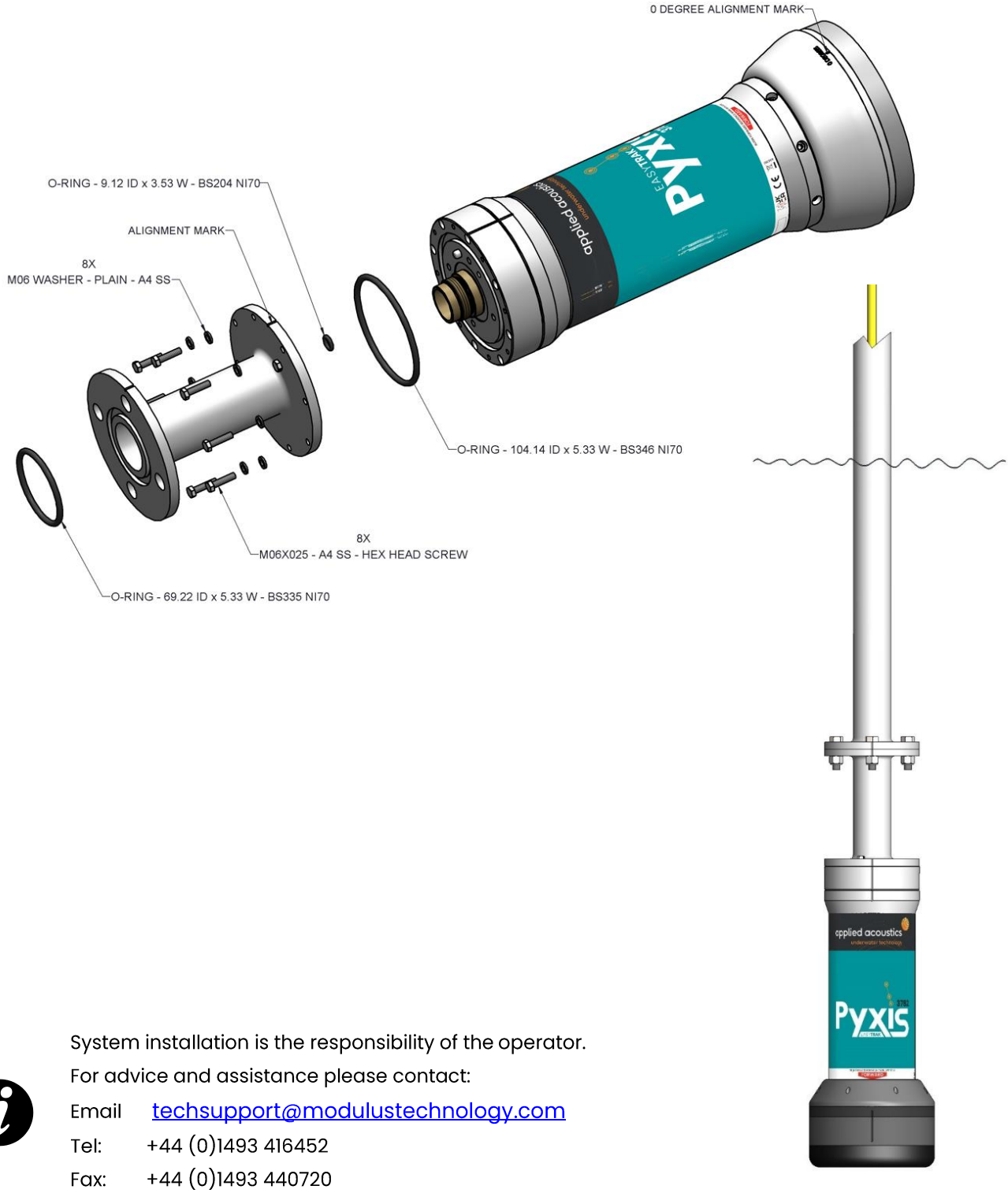
USB 2: 2 USB 2 ports.

mains inlet: The power supply is auto-ranging (115 – 230VAC 50/60Hz).

earth: chassis earth connection.

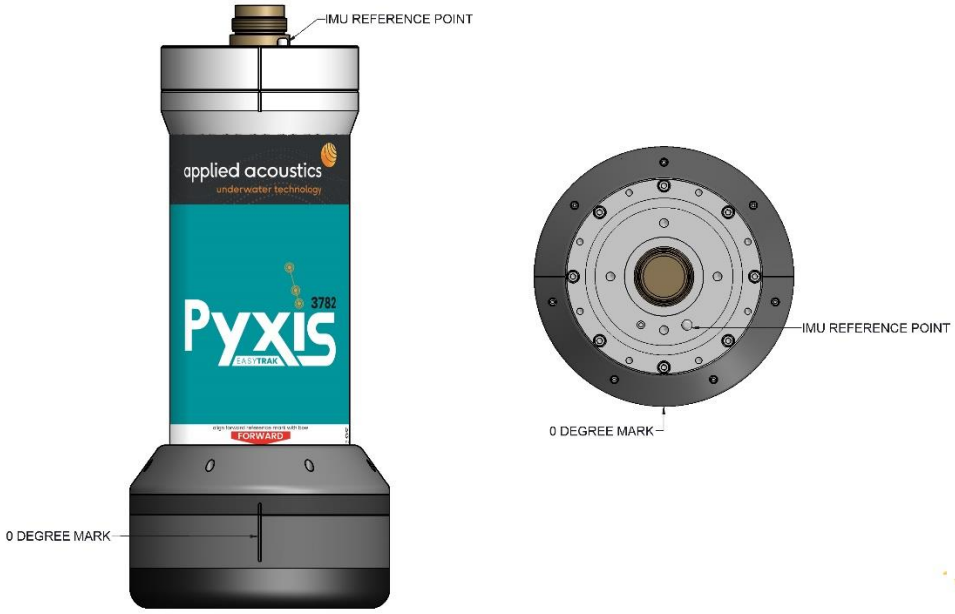

100-240VAC MAINS CONNECTION
HDMI MONITOR
HDMI MONITOR
INS // PC ETHERNET DATA AND NETWORK CONNECTIONS
RESPONDER O/P
PPS O/P
NAV I/P (EXT TRIG)
GPS 2 ANTENNA CONNECTION
GPS 1 ANTENNA CONNECTION
INS SERIAL DATA
DATA OUT
EXT SENSORS
SERIAL INPUT / OUTPUT OPTIONS
RTK CORRECTIONS
EZT-PC DECK CABLE TO EZT-378X SERIES TRANSCEIVER
100-240VAC 50-60Hz
pc
ins
nav in
resp 1
resp 2
resp 3
resp 4 /pps
gps 2
gps 1
data out 1
data out 2
serial 1
serial 2
ins 1
ins 2
rtcm
transceiver
applied acoustics
Model No:
EZT-3690
Serial No:
manufactured in uk

Easytrak Pyxis 378X Transceiver Deployment



System installation is the responsibility of the operator.
For advice and assistance please contact:

Email techsupport@modulustechnology.com
Tel: +44 (0)1493 416452
Fax: +44 (0)1493 440720


IMU REFERENCE POINT
applied acoustics
underwater technology
Pyxis
3782
EASYTRAK
FORWARD
0 DEGREE MARK
IMU REFERENCE POINT
0 DEGREE MARK


IMU REFERENCE POINT
applied acoustics
underwater technology
EASYTRAK
Pyxis
3780
FORWARD
0 DEGREE
0 DEGREE MARK
IMU REFERENCE POINT
0 DEGREE MARK

Pole Mounted – Over the Side

The Easytrak Pyxis transceiver can be fixed over the side of a ship with a suitable pole. The pole mount should be rigid to provide a stable platform for the transceiver whilst the vessel is underway at the desired operating speed. The diameter of the pole will depend on the length required and the anticipated maximum speed of the ship. It is recommended that the pole be secured by cables fore and aft to prevent bending and strumming when the ship is underway.

Ensure that when deployed the transducer is at least 1 metre below the draft of the vessel and that it has clear horizontal visibility through 360°. Ensure the alignment mark on the transducer is inline (forward) with the forward / aft line of the vessel. Extreme care has to be taken in shallow water that the transducer does not strike the seabed.

See appendix A for mounting bracket dimensions.

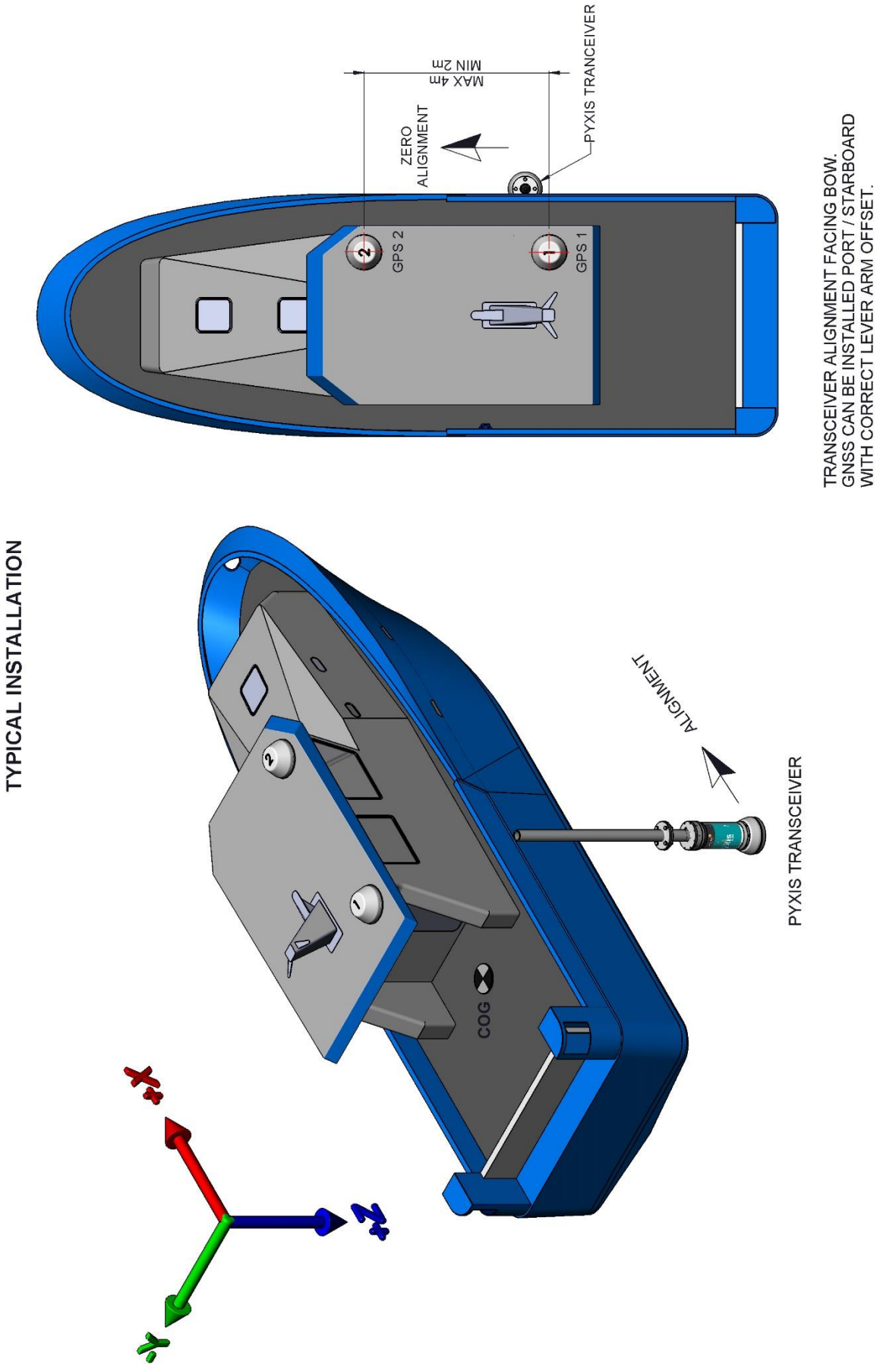
Pole Mounted – Through a Gate Valve

Ensure the gate valve is of a suitable diameter to take the transducer and any mounting hardware. The transducer should be mounted on a suitable shaft; see appendix C for transceiver mounting dimensions.

Ensure that when deployed, the transducer's black potted end is below the draft of the vessel by at least 1 meter and that it has clear horizontal visibility through 360°.

The gate valve's deployment system must be designed to ensure that the alignment mark on the transducer is inline (forward) with the forward / aft line when positioned through the gate valve.

Note: Please see Section 8 INS Alignment.


TYPICAL INSTALLATION
PYXIS TRANSCEIVER
ALIGNMENT
COG
TRANSCEIVER ALIGNMENT FACING BOW.
GNSS CAN BE INSTALLED PORT / STARBOARD
WITH CORRECT LEVER ARM OFFSET.
PYXIS TRANCEIVER
MAX 4m
MIN 2m
ZERO
ALIGNMENT
GPS 2
GPS 1

GNSS Antenna placement

First, the GNSS antennas must be installed on the ship, according to the following requirements:

- The antennas must be fixed with respect to the transceiver IMU.
- Both antennas must be mounted in the same orientation with respect to the vessel.
- Both antennas must have the same optimal view of sky (avoiding signal masks due to the vessel structure)
- The cables must be the same length and type for both antennas.
- Baseline of typically greater than 2m, 3 m is recommended.

The above diagram shows a typical installation, with antenna 1 (position and velocity) at the back and antenna 2 (heading) on the front.

Once installed, the two GNSS antennas lever arms must be measured. These are the signed distances, expressed in the vessel coordinate frame, FROM the IMU Transceiver reference, TO the GNSS antenna. It must be measured within 5 cm of accuracy. A calibration is then performed to estimate these lever arms within 1 cm of accuracy.

INS Antenna Lever Arm Offsets

Primary Antenna (GPS1): Enter the lever arm X,Y and Z from the IMU reference to the primary GNSS antenna.
Secondary Antenna (GPS2): Enter the lever arm X,Y and Z from the IMU reference to the secondary GNSS antenna.

INS Centre of Gravity Lever Arm Offsets

Enter the lever arm X,Y and Z from the IMU reference to the vessels centre of rotation / gravity. This is to reference the IMU to the vessel's orientation frame.

4. Operation Power Up

- Ensuring connections are made as Section 4; the Easytrak Pyxis can be powered up.
- Switch the main power button on the rear panel.
- Press the On/Off button on the front panel. The switch will indicate green.
- The system will automatically launch and set the configuration to the selected setup.

Note: System boot is approx. 90 seconds, allow INS data to show active.
The INS warm up time is 5 mins post boot.

- To power down the system briefly press the power button the front panel. This will perform a controlled shut down of the system.
- The mains power can be isolated by the rear switch.

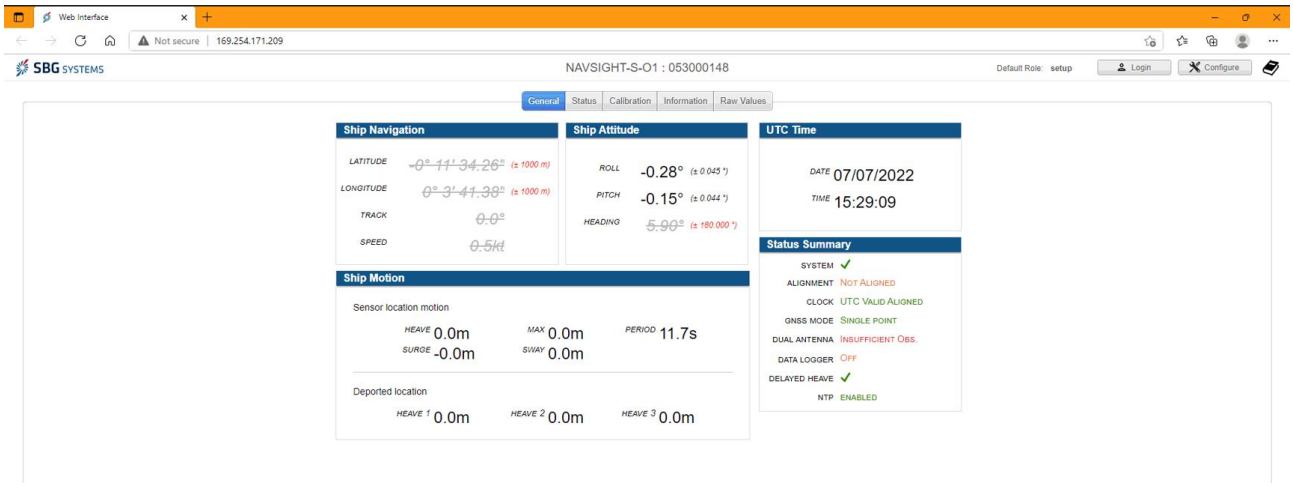
Front Panel Indicators

transceiver power	Green when power is applied to transceiver
system status	Green when system is operation
ins status	Green when ins is operation
tx / rx	Flashes green when transceiver has transmitted or received an acoustic signal
serial 1, 2	Green when external data is connected and decoded

5. INS Configuration and Calibration

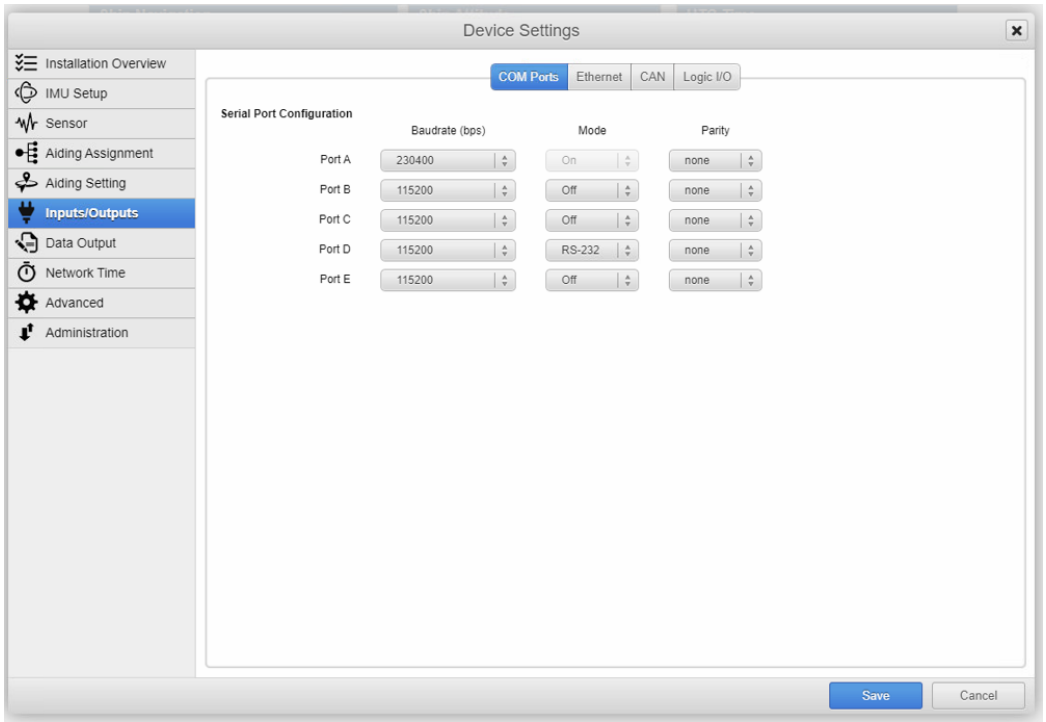
Ensure RTK differential corrections are interfaced to INS using rtcm port (D) on rear of console.

Check interface and settings using SBG web interface, click ‘Web Interface’ button on INS Status.

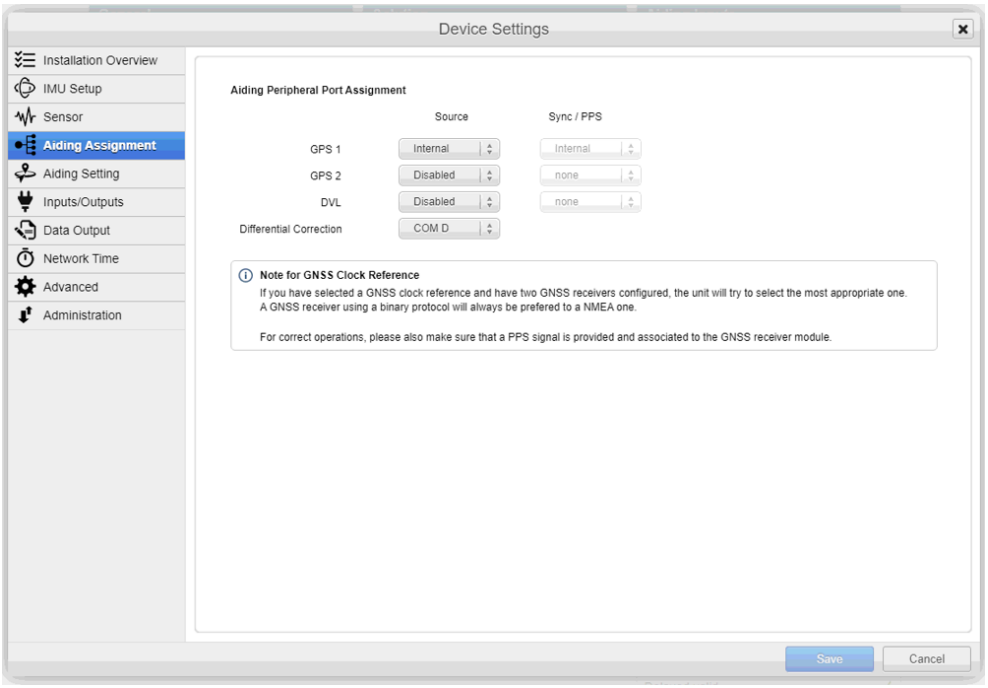


Click on the ‘Configure’ button to launch settings:

To configure Port D (rtcm), select Inputs/Outputs. Switch Port D to RS232 and select baudrate of incoming corrections.



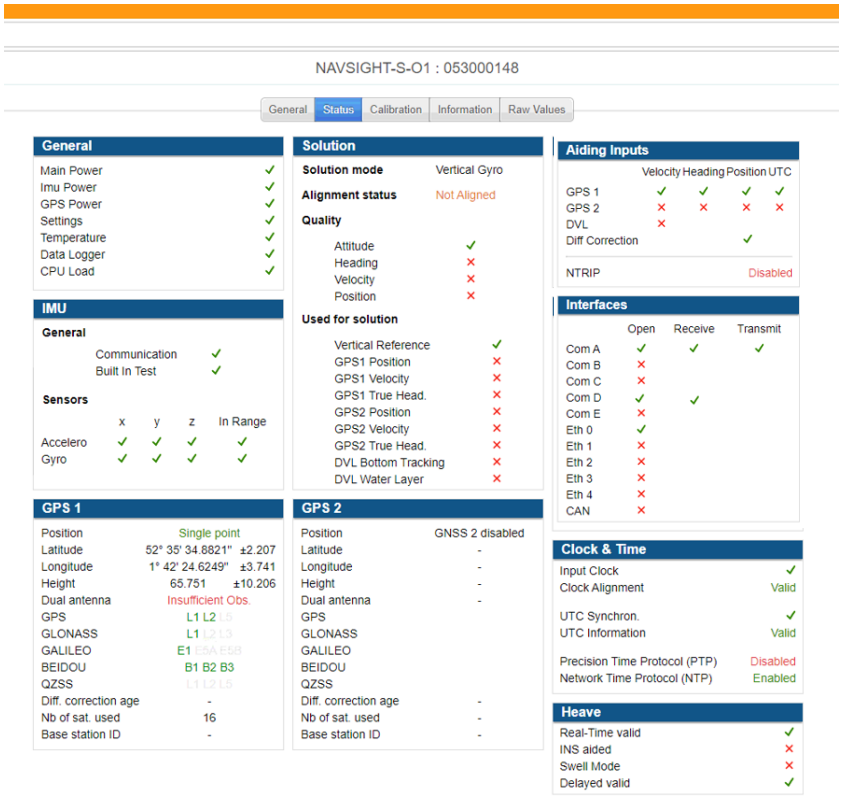
Check Aiding Assignment, COM D is set to DIFF correction:



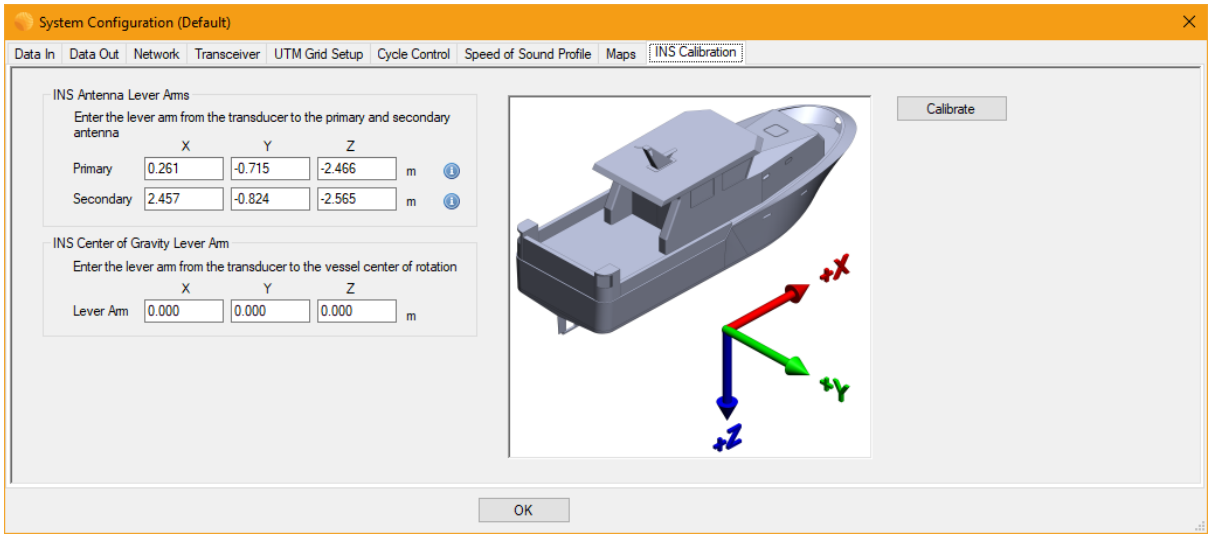
Click save and reboot system, allow Navsight to re-boot.

Then Re-start Pyxis console.

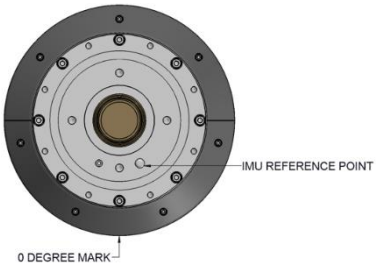
Confirm Diff Corrections are active on system.



Once system has restarted, navigate to Pyxis configuration \\ INS Calibration –



Enter installation lever arms as measured.
A positive X is forward of the transceiver IMU reference point.
A positive Y is to starboard (right) of transceiver IMU reference point.
A negative Z is above the transceiver IMU reference point.



Note X axis forward / aft and Y axis port / starboard.

INS Antenna Lever Arm Offsets

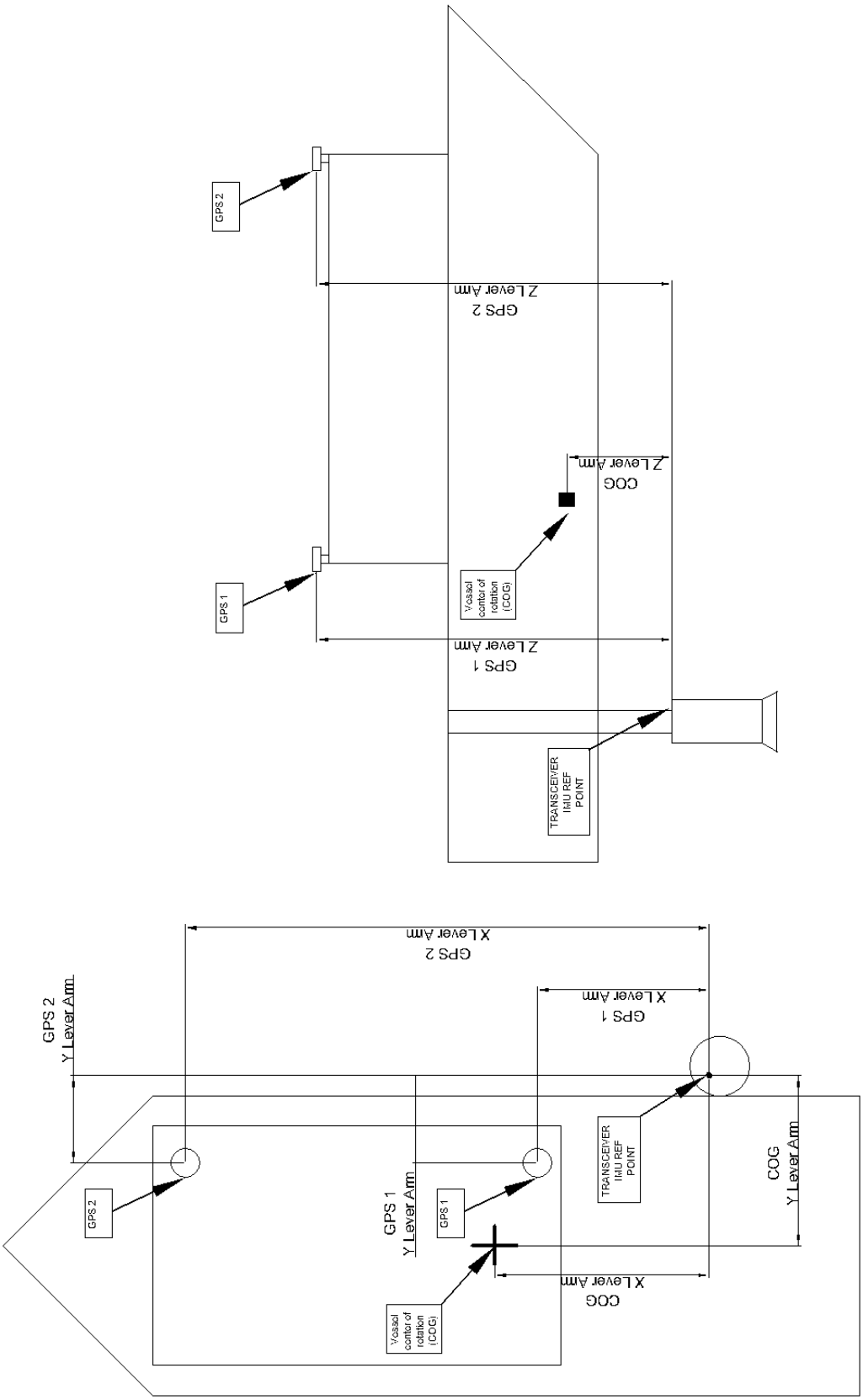
Primary Antenna (GPS1): Enter the lever arm X,Y and Z from the IMU reference to the primary GNSS antenna.
Secondary Antenna (GPS2): Enter the lever arm X,Y and Z from the IMU reference to the secondary GNSS antenna.

INS Centre of Gravity Lever Arm Offsets

Enter the lever arm X,Y and Z from the IMU reference to the vessels centre of rotation / gravity. This is to reference the IMU to the vessel's orientation frame.

Ensure lever arms are entered within 5cm precision.

INS Offset


GPS 2
Z Lever Arm
GPS 2
Z Lever Arm
COG
GPS 1
Vessel center of rotation (COG)
Z Lever Arm
GPS 1
TRANSCEIVER IMU REF POINT
X Lever Arm
GPS 2
X Lever Arm
GPS 1
GPS 2
Y Lever Arm
GPS 1
Y Lever Arm
GPS 2
GPS 1
TRANSCEIVER IMU REF POINT
COG
Y Lever Arm
X Lever Arm
COG
Vessel center of rotation (COG)

INS Calibration

Easytrak Pyxis combines high precision acoustic USBL, INS and GNSS technologies to provide survey grade repeatable subsea positioning. The Pyxis system has an integrated INS, this allows operations without performing a USBL calibration. All acoustic and chassis alignments are calibrated in the factory with only installation specifc INS alignment required in the field. The factory calibrated Pyxis system significantly reduces vessel mobilisation delays be removing the requirement for USBL calibrations.

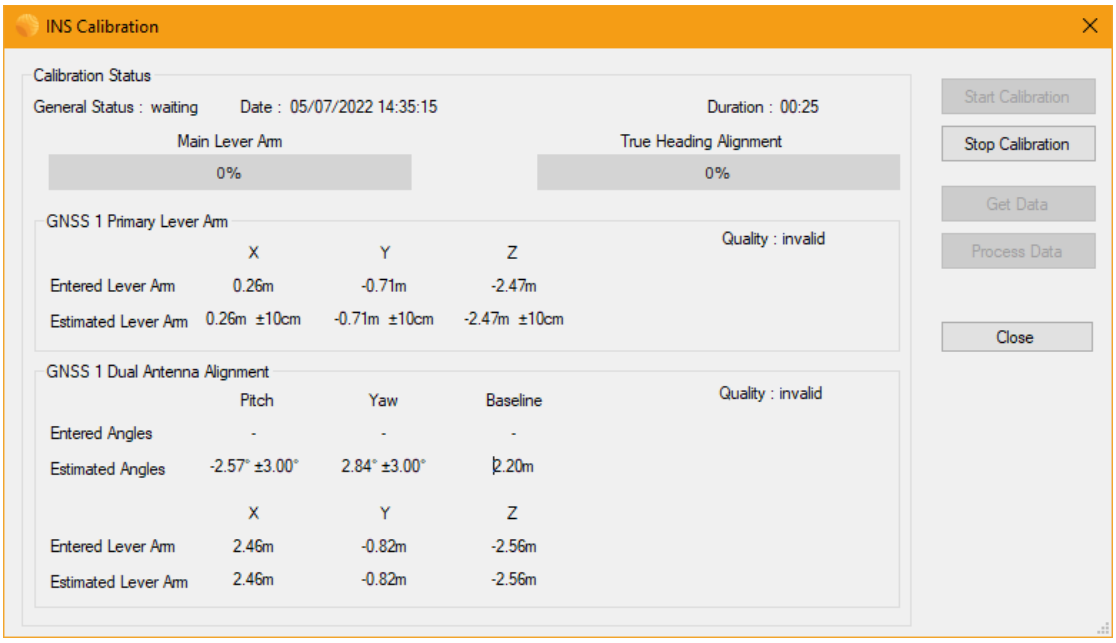
An INS lever arm calibration routine is needed to align the vessel installation and provide full system accuracy. Easytrak Pyxis's embedded lever arm calibration tool provides calibration covering all survey vessels. System calibration is normally complete within 20 to 30 minutes.

The Pyxis INS calibration tool requires RTK GNSS differential corrections to be interfaced.

The tool runs an online calibration with status and data feedback and logs the calibration data for offline Qinertia loosely coupled processing before applying.

The calibration tool is launched by clicking the 'Calibration' button.

Ensure lever arms are correctly estimated before starting the calibration.
Check configuration using the web interface.
Ensure RTK corrections are interfaced.



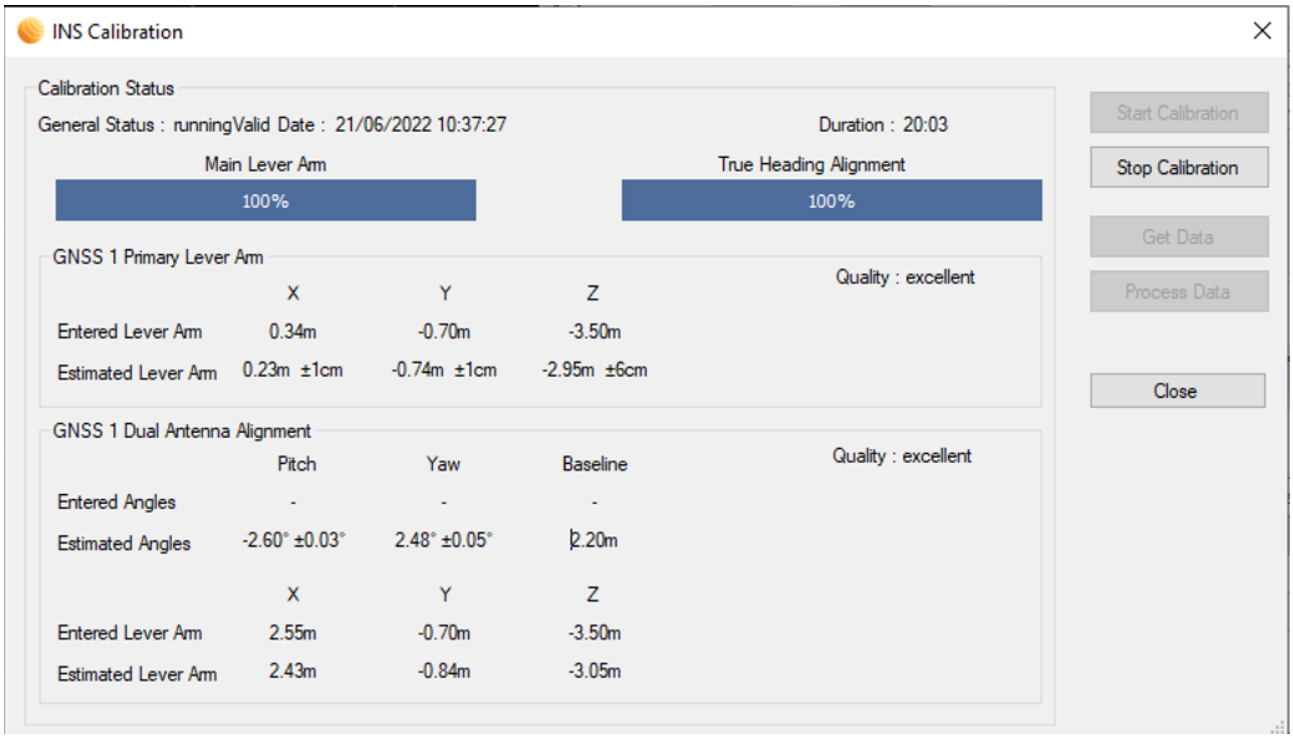
The calibration tool provides the status of the calibration together with the estimated lever arms, quality, accuracy and duration.

General Status:

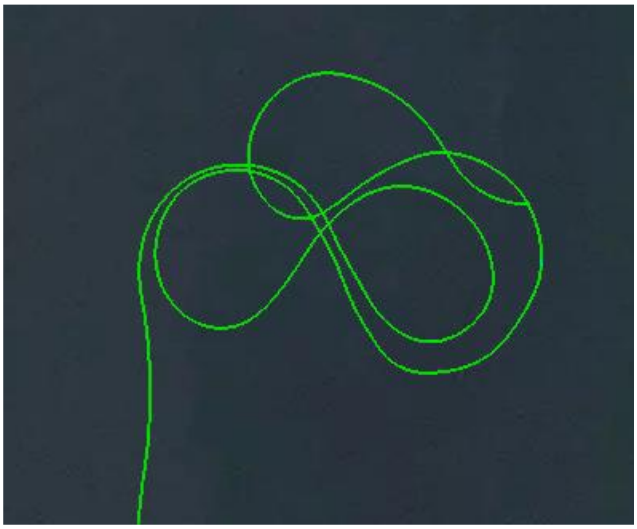
Waiting	System is waiting for forward motion or full navigation mode to commence estimation.
Running	System is acquiring data.
Running Valid	Calibration is valid and runnning.

To start the calibration click 'Start Calibration' button.

Once started, the calibration status will typically go into "Waiting" state. In order to actually run the calibration, the INS switches into full navigation mode, which means the heading and position are resolved. Once the calibration is started and the vessel is operated with sufficient speed (higher than 2.5m/s), the calibration status will transition to "running" mode. Two progress bars now display the calibration progress: one for the Main GNSS lever arm estimation, and one for True Heading alignment (linked to the secondary lever arm). The more dynamics and quality of the GNSS the INS receives, the faster the calibration will be.



The typical recommendation is to perform high speed manoeuvres, eight shape patterns, accelerations and deceleration phases.



For advanced feedback on the performance of estimated parameters, the calibration page also displays the estimated lever arms and angles, in comparison to what you entered initially, with associated standard deviations.

Typically with RTK GNSS corrections the error in the primary lever arm is 1cm indicating high confidence in the calculation.

Completing the Online Calibration / Data acquisition

When active, the calibration continuously improves the lever arm and alignments. Even after reaching 100% completion, it is still possible to enhance the estimated values by continuing with vessel manoeuvres. On the opposite side, in case of poor GNSS environment and/or low dynamics, it might be challenging/impossible to reach a 100% complete calibration.

It is recommended that for small survey vessels with RTK GNSS a minimum calibration of 20mins is performed. It is recommended that for large survey vessels with RTK GNSS and lower dynamics, a minimum calibration of 35mins is performed.

Before ending the online calibration the user should also verify the consistency of the estimated parameters with respect to the entered values and actual setup.

Note: For a 20 minute calibration, RTK and dynamics are required. Low dynamic or non RTK applications can take longer to perform a calibration (1 hour).

To end the calibration click 'Stop Calibration'.

The form will return to the previous online calibration data used and not the last performed. The Pyxis system includes an offline processing tool to improve data therefore the online estimation data is not used.

The calibration status at the end of the calibration will be not applied.

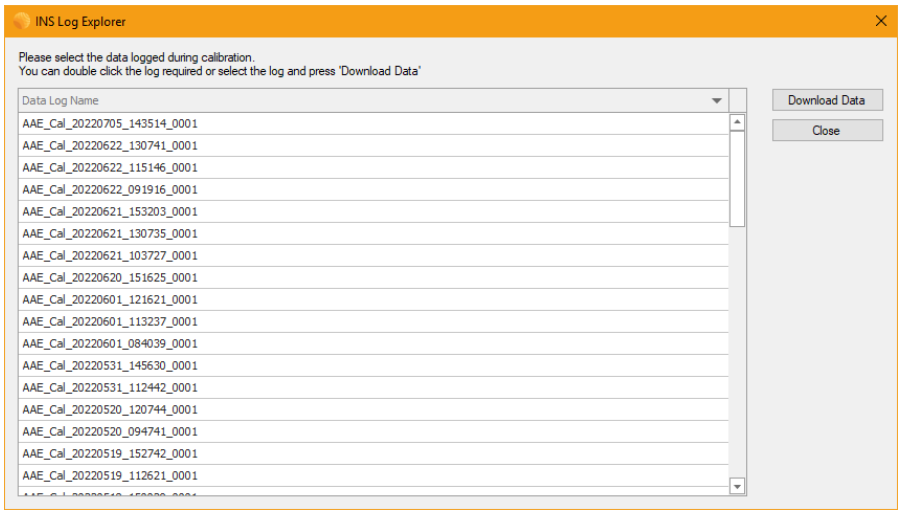
Calibration Processing

There are 3 simple steps to automatically process the calibration data:

(1) Get Data, download the logged data from the INS.

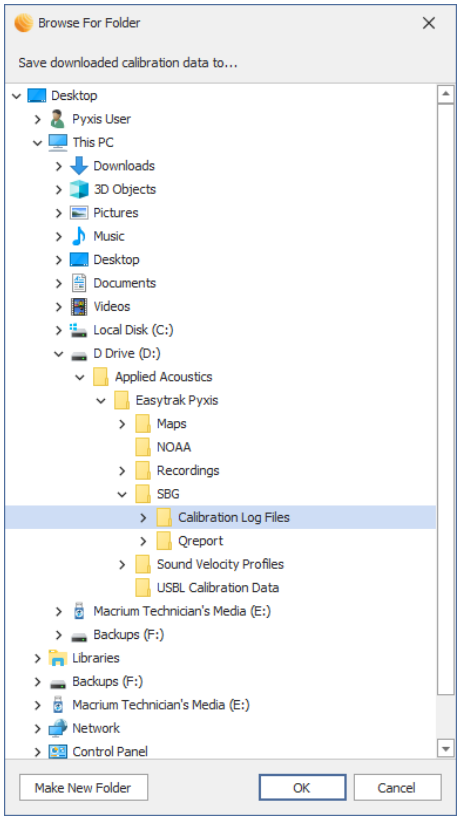
Click 'Get Data' to display available data files. These are arranged in date order, newest first.

To select highlight log name and click 'Download Data'



Select the default destination folder and click OK

Once complete click 'Close'

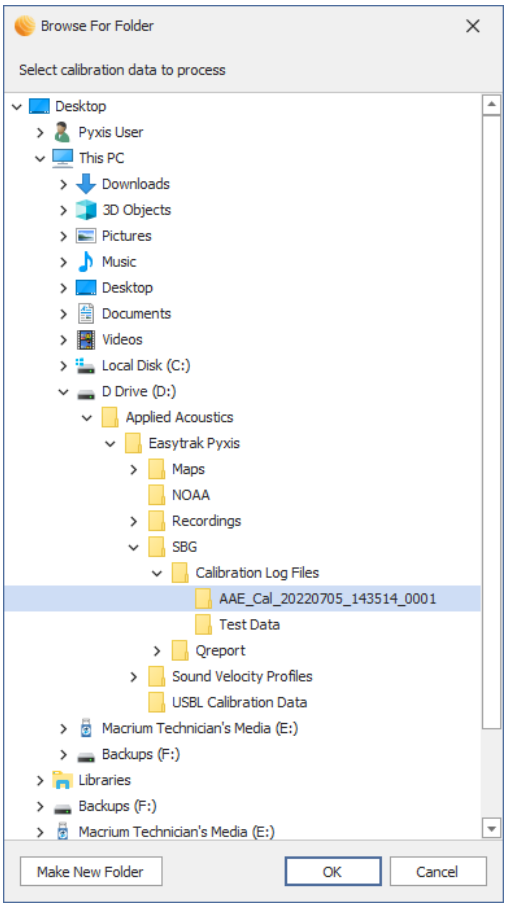


(2) Process Data, select data file to process.

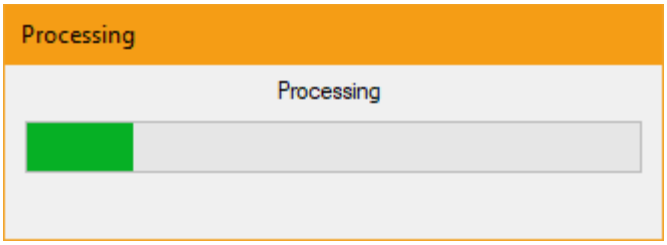
Click ‘Process Data’

Select the desired log file

Click ‘OK’



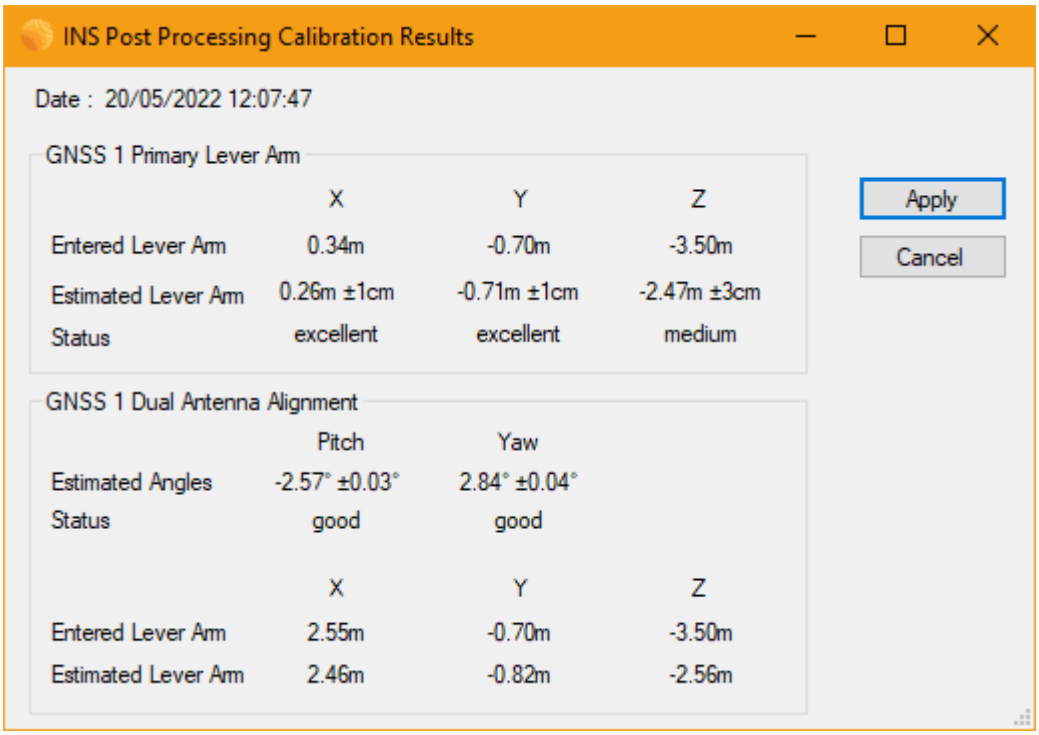
The data file is then analysed and processed.



(3) Review results and apply.

Once processed the results are presented for review.

Click apply to use the calculated lever arm offsets.



Following applying the new lever arms the Pyxis system will require re-boot and INS alignment.

Following re-boot, full performance is reached after an initial warm-up time of 5 minutes. The system is operational before that time, but performance parameters cannot be guaranteed.

To align the INS from a static position accelerate the vessel to perform 2-3 minutes of motion patterns with GNSS availability that will be used to let the Kalman filter converge, then decelerate to a stationary position, this will allow the alignment phase to complete.

There is no standard pattern to perform, the INS will only need as much dynamics as possible (orientations and accelerations).

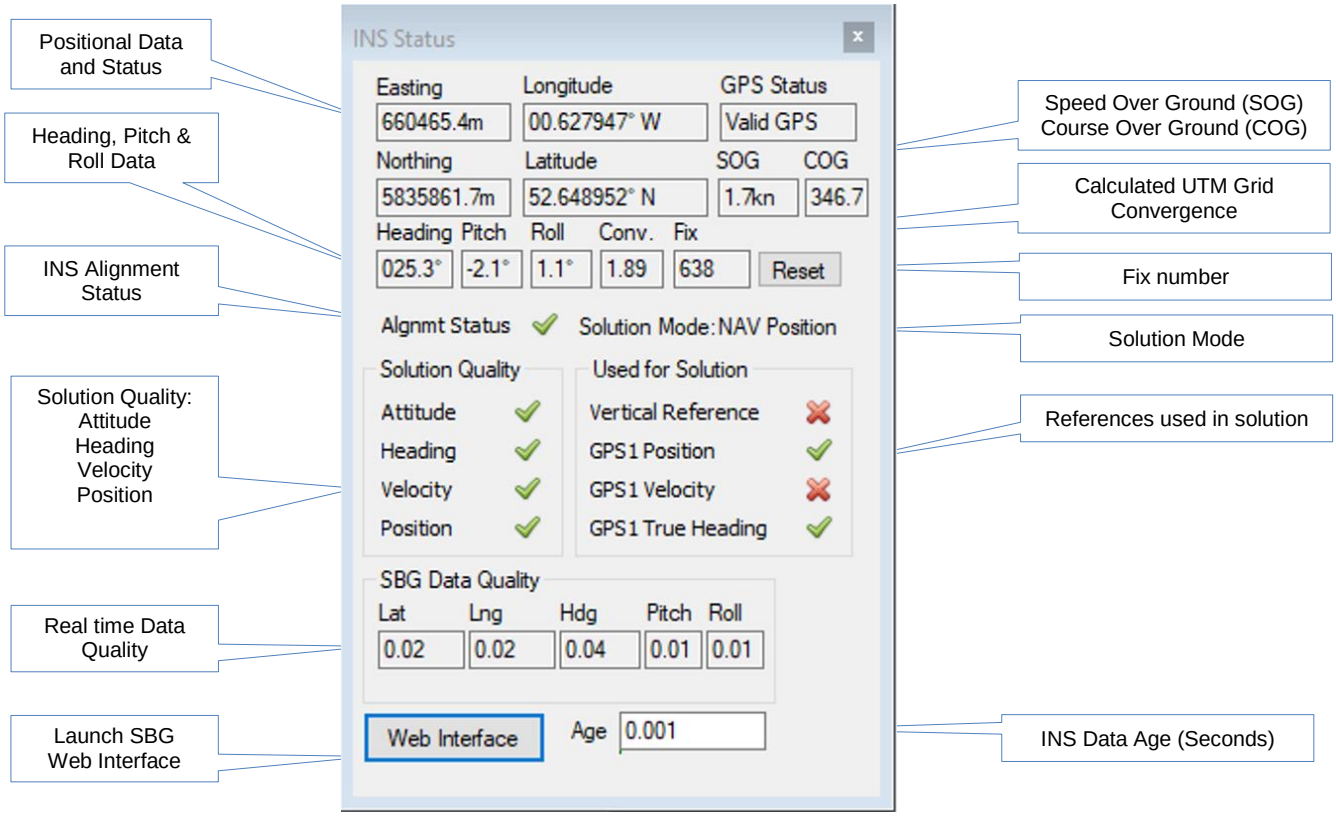
Upon applying calibrated lever arms, save settings and re-boot system.
Upon re-boot, perform alignment prior to operations

INS Window

Toolbar Button: 

The INS Status window provides the full status of the INS system together positional and attitude data.

Ensure a tick is next to the Alignment for correct operation.

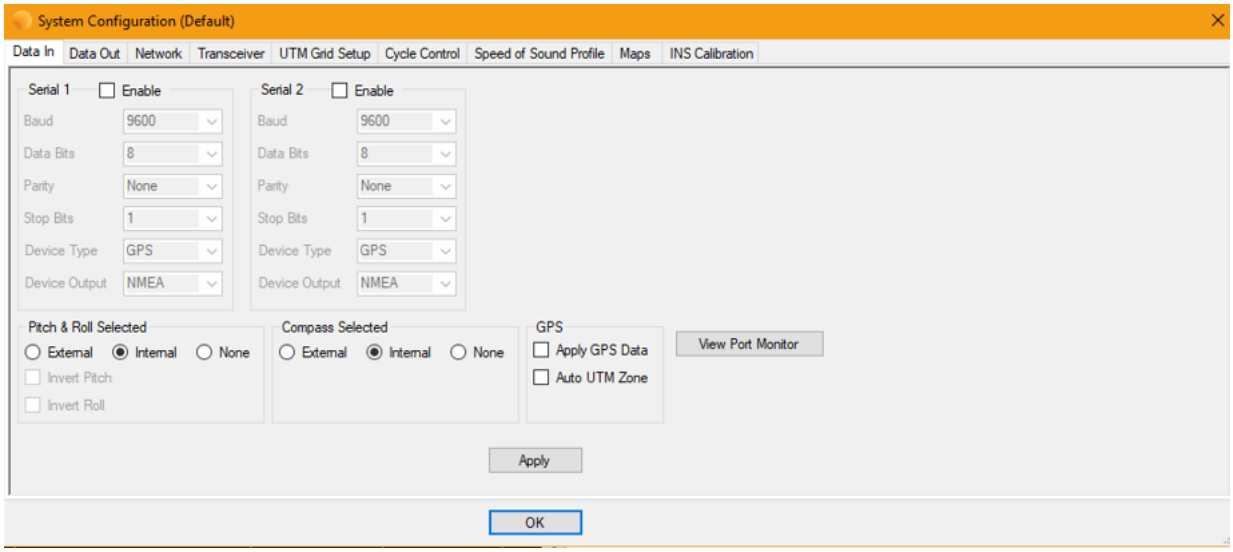


When aligned and operational the Pyxis INS system status will be as above.

6. GPS On / Off

Toolbar Button: 

Data In



GPS

GPS data can be applied to the calculated position to give an absolute position of the target. Tick 'Apply GPS Data' to calculate absolute positions. Go to the UTM Grid Setup tab to configure the local grid origins.

The Pyxis console automatically synchs to UTC time.

Auto UTM function, tick box to select. The UTM grid will be automatically calculated once upon valid GPS position. To re-calculate toggle function on / off.

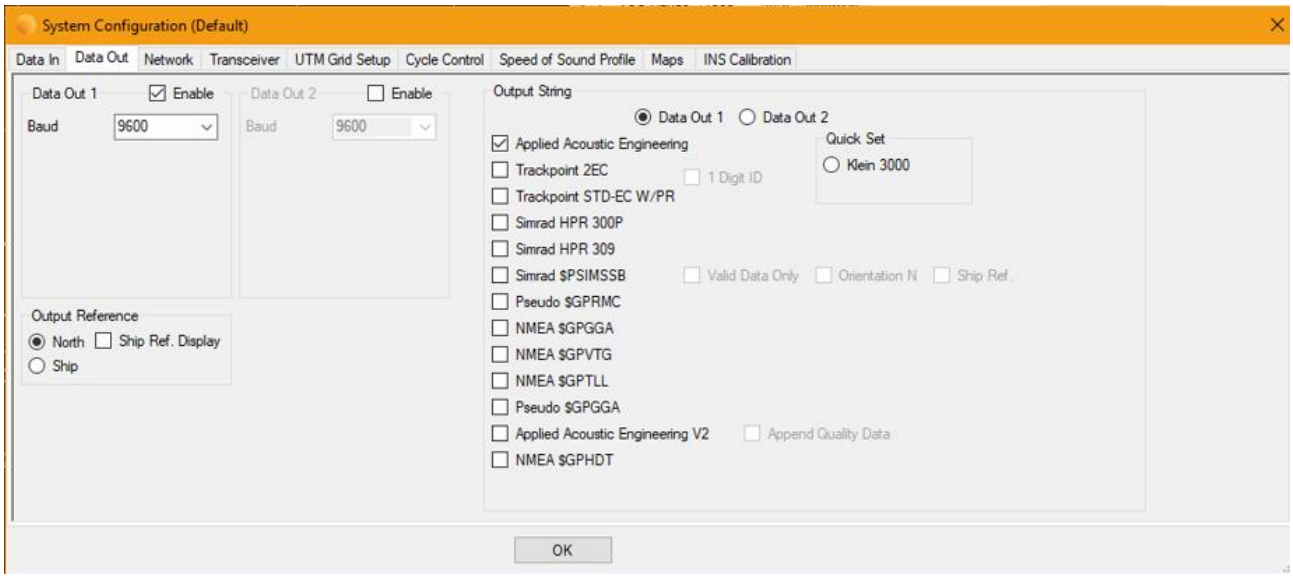
View Port Monitor

The 'View Port Monitor' button may be used to view valid data being received on each serial port in real time.

7. Data Out

The Data Out tab is the RS232CC communications set-up for the output of serial data. The Nexus 2 Lite may either output serial data from an RS232 serial port on the PC running the Nexus 2 Lite software if one is available. Alternatively, if the PC does not have a local serial port, a serial port on the rear of the Nexus 2 Lite console may be selected to output the data.

Data is output after each Fix is processed (not at a pre-defined rate).



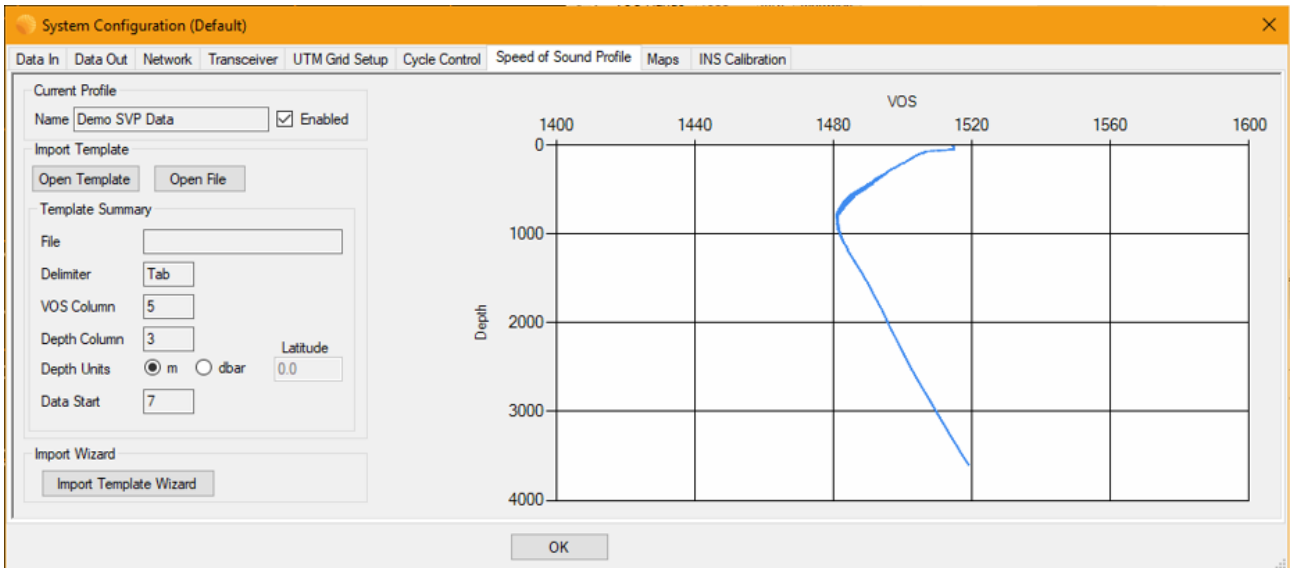
Output Reference

The data type viewed on the Plot window is linked to the data out port, the data type can be controlled from this tab or via the Plot Window \ Context Menu. The link between viewed data and exported data is for QC purposes.

- North Ref
  Positions are referenced to the NORTH. Compass, pitch, roll, and offset values are applied to the computed position. A Compass must be used to be north referenced, otherwise the data will be ship (bow) referenced.
- Ship Referenced
  Positions are referenced to the bow of the vessel. Compass, pitch, roll, and offset values are applied to the computed position if available.

8. Speed of Sound Profile

The Speed of Sound Profile tab enables data gathered from any profiling hardware to be imported into Nexus.



Once a Sound Velocity Profile has been loaded and enabled, the system will automatically calculate the optimum velocity of sound value for each beacon, based on the current depth of the beacon. This value will be continually updated as the beacon depth changes.

Ensure that the 'Enabled' check box is selected in the 'Current Profile' to use the loaded speed of sound profile within the system.

Loading a new Speed of Sound Profile

There are two possible ways of loading a new speed of sound profile from a data file into the system.

If a previously created import template has been loaded, then once the data file has been selected, the import can continue without any user intervention.

If a template for the data file to import has not been loaded, then the 'Import Wizard' may be used. The wizard enabled the user to select the position of the first line of data, the columns containing the depth and velocity of sound data and also if the depth units are meters or decibars.

Load Profile using Import Template

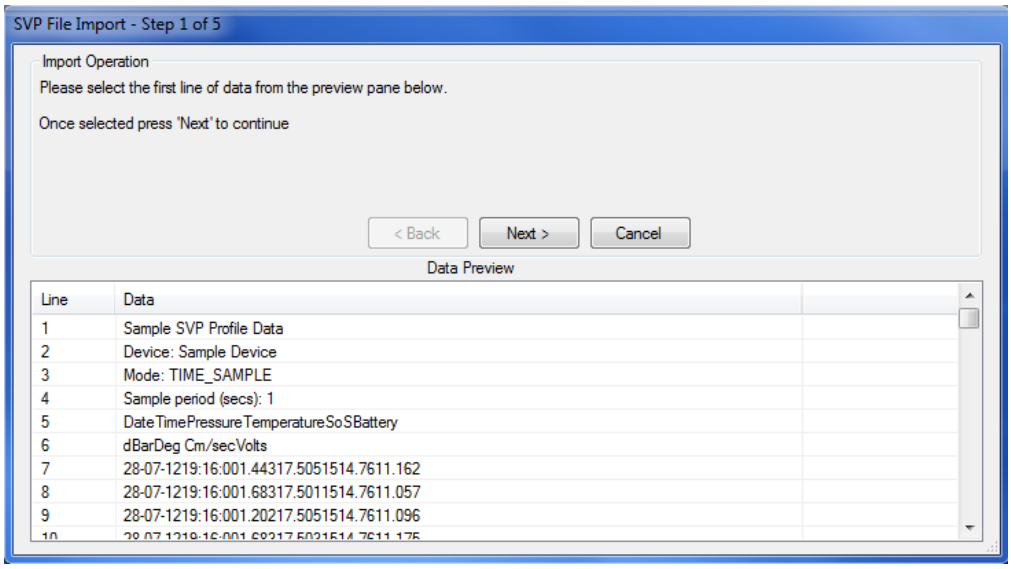
If no template is loaded press the 'Open Template' button to select a previously saved import template (note that the system will automatically remember the last template used and load this on startup). When a template is loaded it will be summarised in the 'Template Summary' section.

Once a template is loaded, the 'Open File' button will be enabled. Press this button to select the SVP data file to load into the system. After a file has been loaded, the 'Enabled' check box will be automatically set. Also, the VOS @ Transducer will be adjusted, based on the data in the SVP file and the current transducer depth value.

Load Profile using Import Wizard

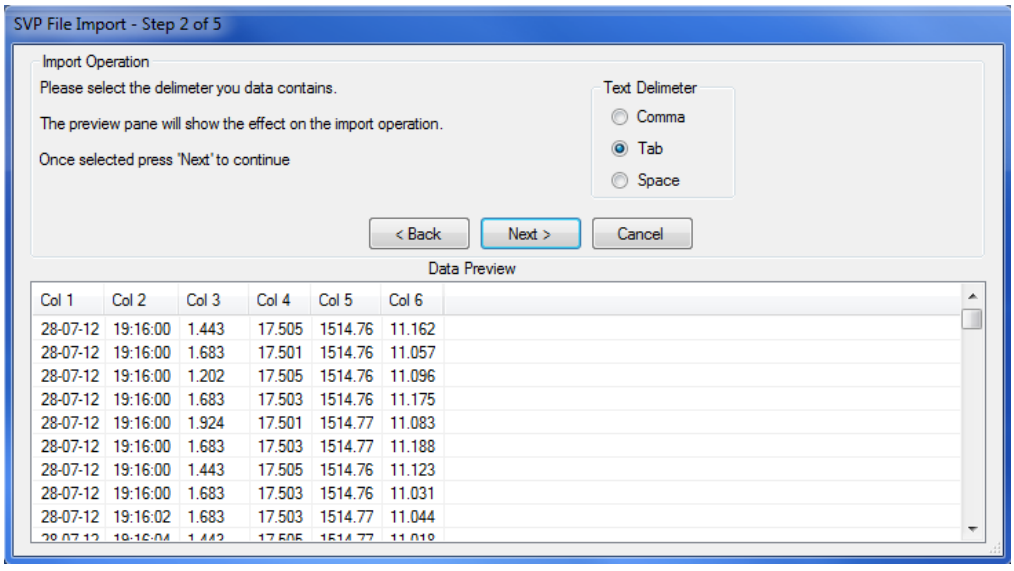
To start the wizard press the 'Import Template Wizard' button. After selecting the data file to import the following screen will be displayed

Step 1 of 5



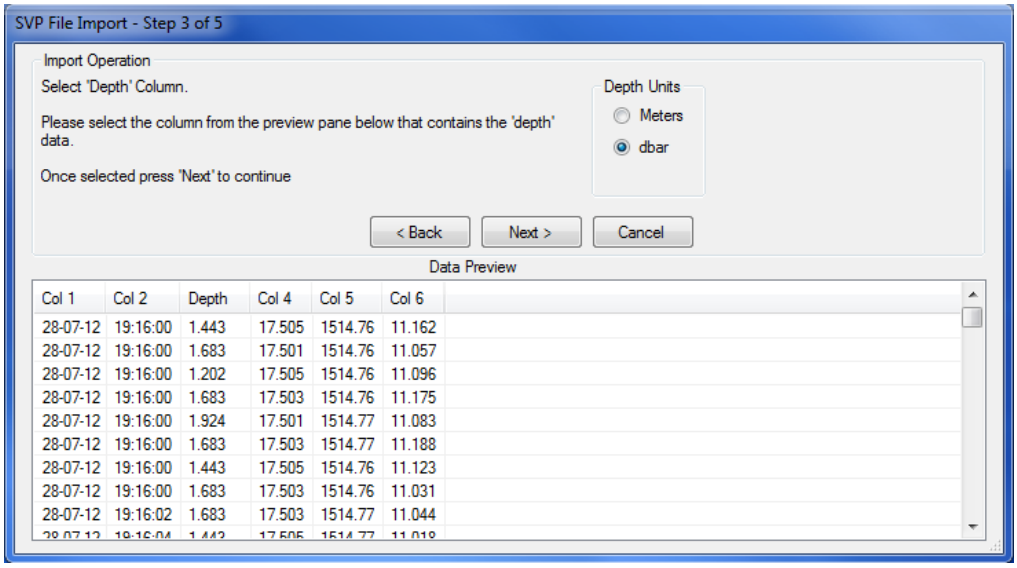
In the data preview window, select the line that contains the first line of sound velocity data. Once selected, press 'Next' to continue.

Step 2 of 5



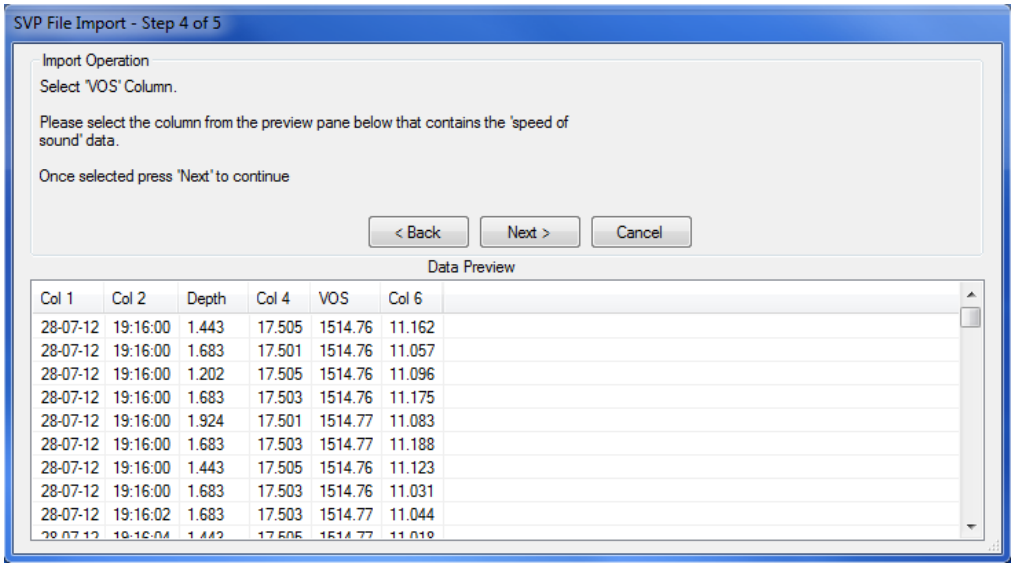
Select the column delimiter. The wizard will have automatically chosen the text delimiter that it thinks is used in the file. The delimiter may be changed if required, the results of the change will be displayed in the 'Data Preview' window. Once selected, press 'Next' to continue.

Step 3 of 5



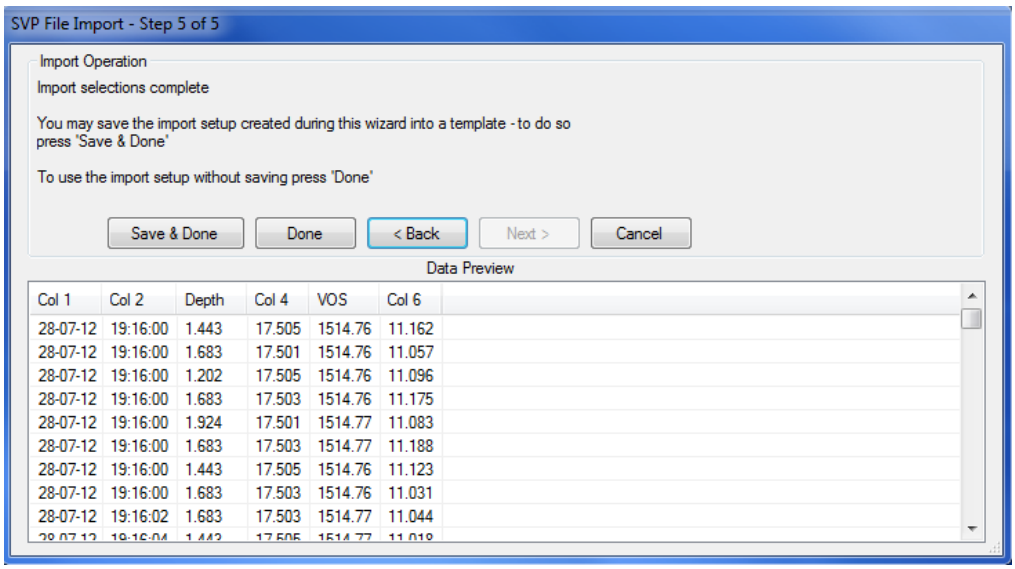
In the data preview window, select the column that contains the depth value by clicking on the relevant column header. The depth units will default to meters, if the data is in decibars then ensure the Depth Units is set accordingly. Once selected, press 'Next' to continue.

Step 4 of 5



In the data preview window, select the column that contains the velocity of sound value by clicking on the relevant column header. Once selected, press 'Next' to continue.

Step 5 of 5



Please confirm that the correct columns have been selected.

If required, the results of the import wizard may be saved into an SVP template to enable any future imports of data files in the same format to be quickly processed. To save as a template and complete the import press ‘Save & Done’

If a template is not required for future data file imports, press the ‘Done’ button to complete the import.

9. Beacon Editor Setting channels

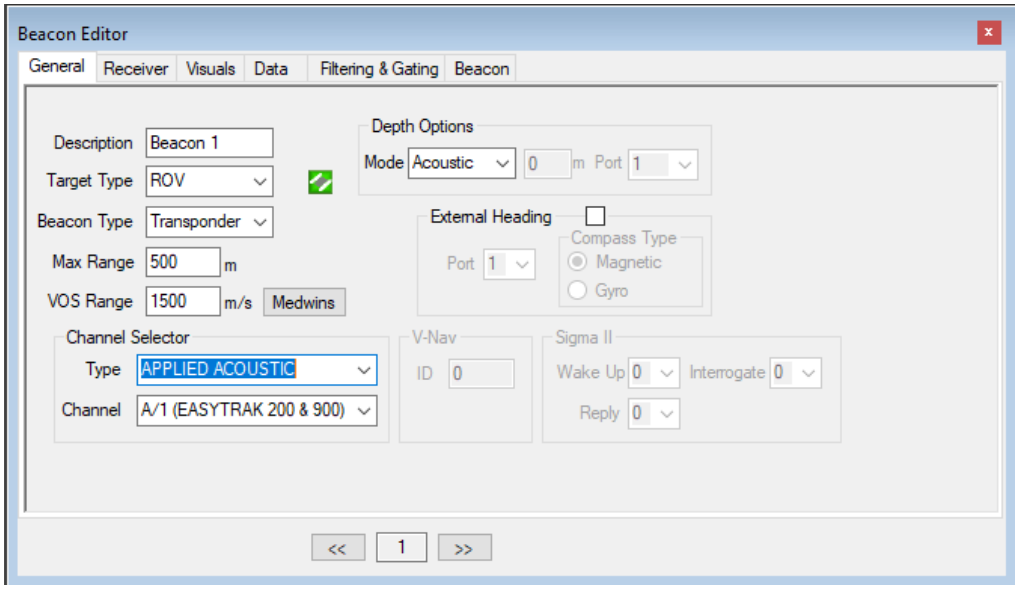
Toolbar Button: 

General

The General tab allows the operator to set the individual beacon parameters for up to 16 different beacons. To select the required beacon, use either the mouse wheel or the '<<' and '>>' buttons

Important settings of note in this tab are the beacon type (transponder is the normal mode of operation,) max range and Depth options depth options include Acoustic, Manual, telemetry or external depth. Set the max range to allow the expected operating range. In most cases acoustic depth should provide an acceptable depth, if working in shallow water manual depth may provide a more stable position.

If performing a depth sensitive operation a beacon with built in depth sensor should be used, with the depth option being set to telemetry.



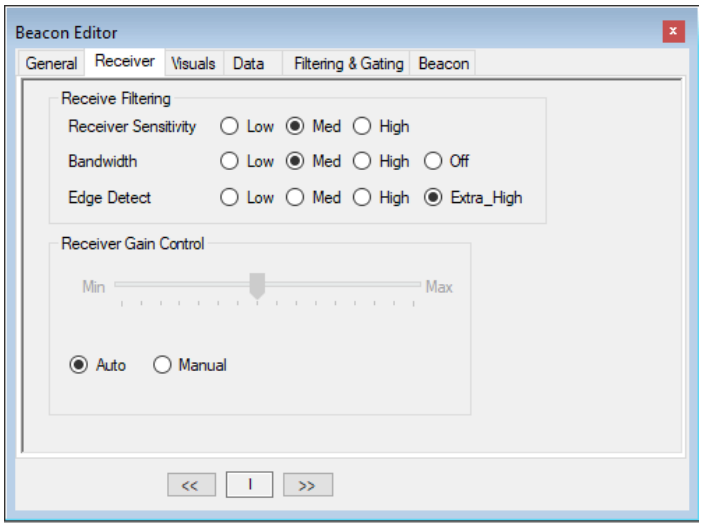
The beacon's channel is required to be set.
1119 and 1300 Beacons support Sigma 2 and Sigma 2 Quick Set channels.

For ease a Sigma 2 Quick Set channel can be set on all AAE beacons.

On the Pyxis select channel type ‘AAE Sigma 2 QUICKSET’ the Channel ‘ A/A (Sigma 2 Quickset 1).

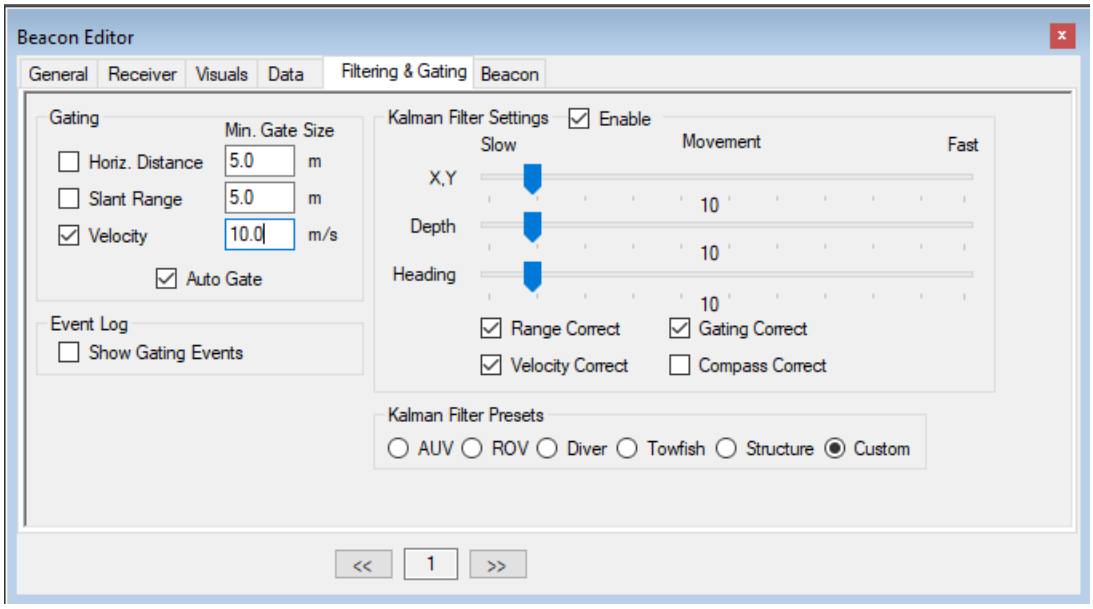
Receiver Tab

If using the 1100 or 1300 series beacons on a Sigma 2 Quickset channel, and typically as the range increases there are some adjustments that can be made to improve performance. Leaving the gain control on auto adjust the edge detect from extra high down to high or medium for longer ranges. The edge detect is expected gradient of the received edge of the beacon reply, over longer ranges doppler effects are increased reducing the slope.



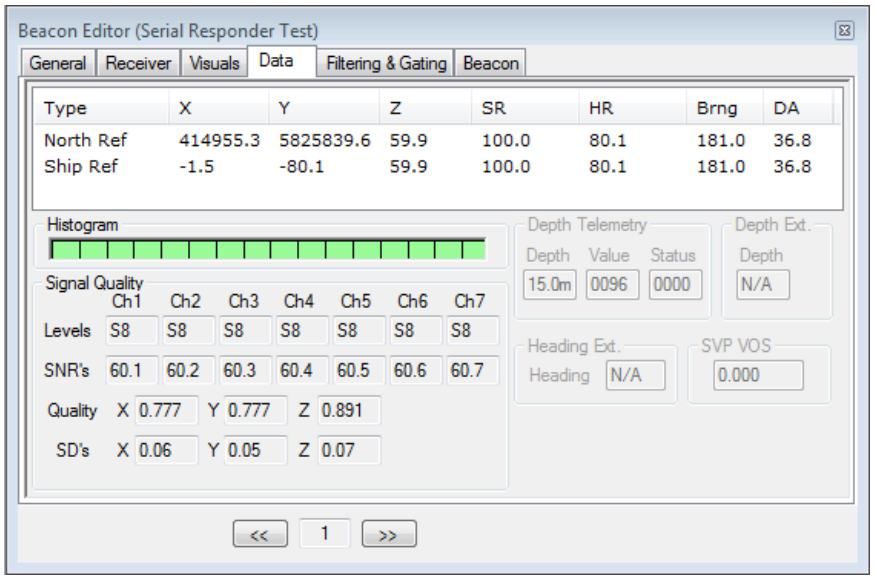
Filtering and Gating

For smoothing, a typical starting point is as below. Running with a coarse velocity gate catches any large positional jumps in the data and apply a relative slow changes in acceleration values on the kalman.



Data

The 'Data' tab displays position and signal quality data.



Signal Quality

- Levels
  S0 (Minimum) to S9 (Maximum), is an indication of the signal received at each of the receiver elements (channels).

- Signal to Noise Ratio (SNR's)
  This is the signal to noise ratio measured at each of the receiver channels.
- Quality factor
  This is the quality of the confidence level in the solution, 1 or <1 indicates a high level of confidence.
- SD's (Standard Deviations)
  This is the standard deviation of the X,Y and Z positions over the last 16 positions. This indicates the stability or relative movement of the target depending on application.

Depth Telemetry

This is the depth telemetry data received from a depth telemetry enabled beacon.

Depth Ext.

This displays the depth data received from an assigned external serial port (see System Configuration -> Data In).

Heading Ext.

This displays the heading data received from an assigned external serial port (see System Configuration -> Data In).

SVP VOS

This displays the velocity of sound value used from the loaded sound velocity profile (see System Configuration -> Speed of Sound Profile)

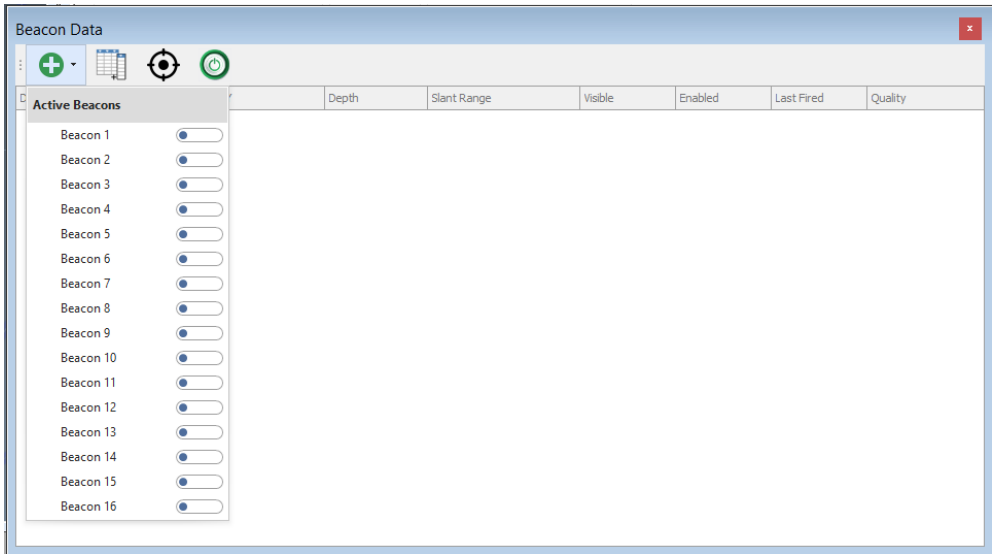
Histogram

This shows the status of last 16 interrogations of the displayed beacon.

- Green - Good
- Amber- Gated Position (only shows if gated or smoothed data is selected)
- Red - No response from beacon

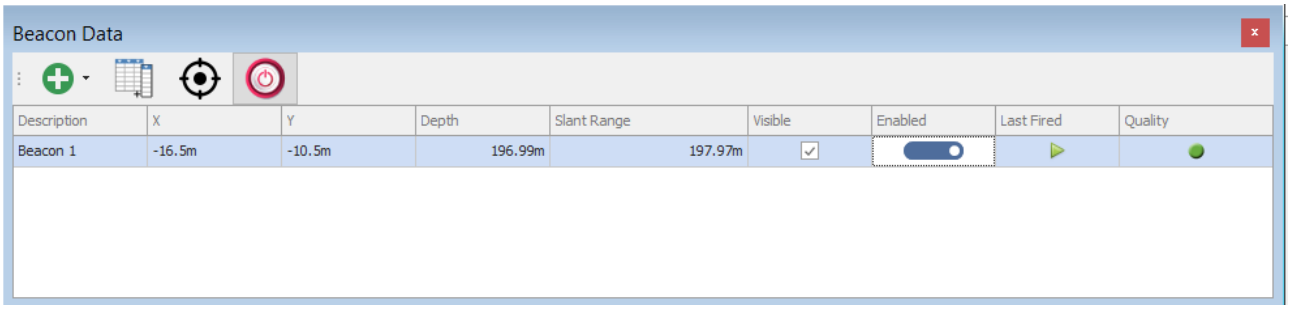
10. Beacon Data - Tracking

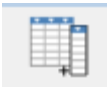
Toolbar Button  Shortcut Key: Ctrl+D



This is the primary control and monitoring window for the system, the beacon configuration is set within Beacon Editor.

Press the  to select Active Beacons. The window provides controls for the active beacons along with positional and status information all of the beacons that are active.



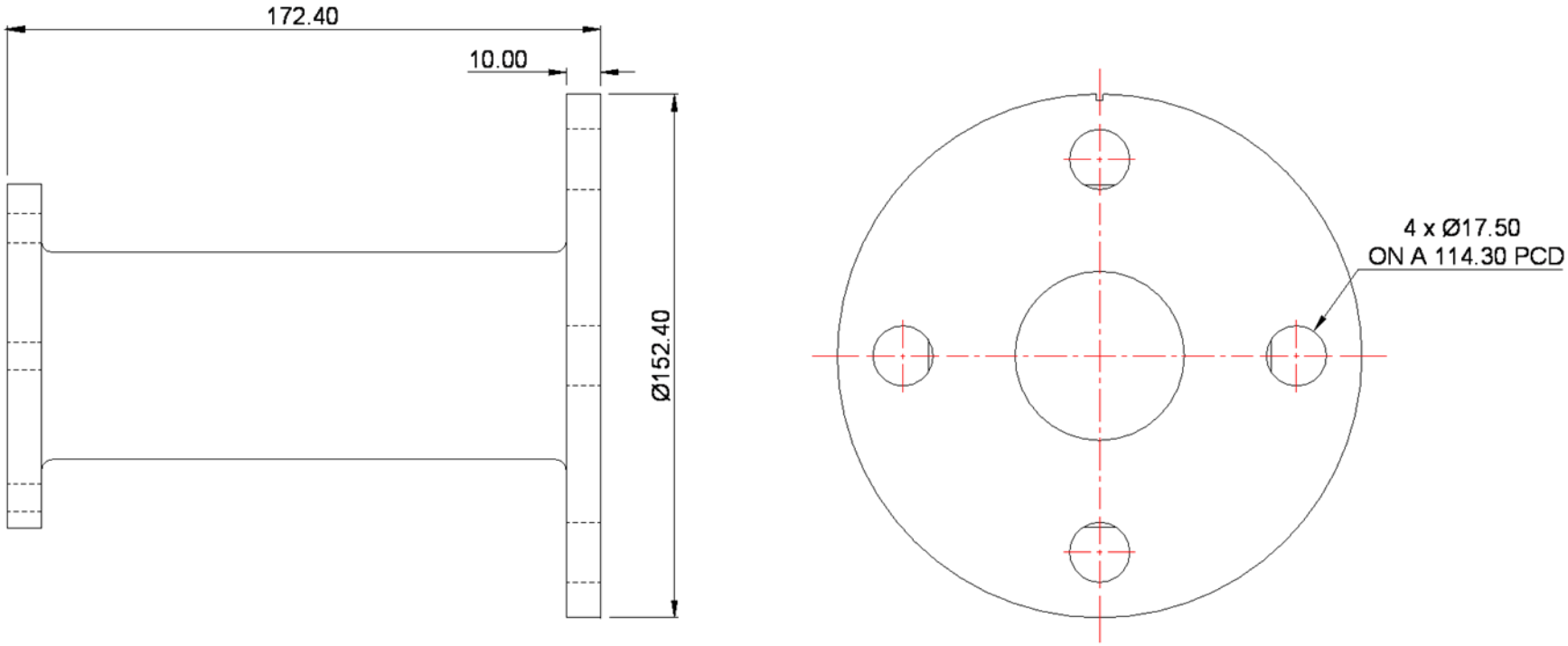
 Column picker, allows the user to configure the table.

 Centre of selected beacon.

 Toggle all beacons on / off.

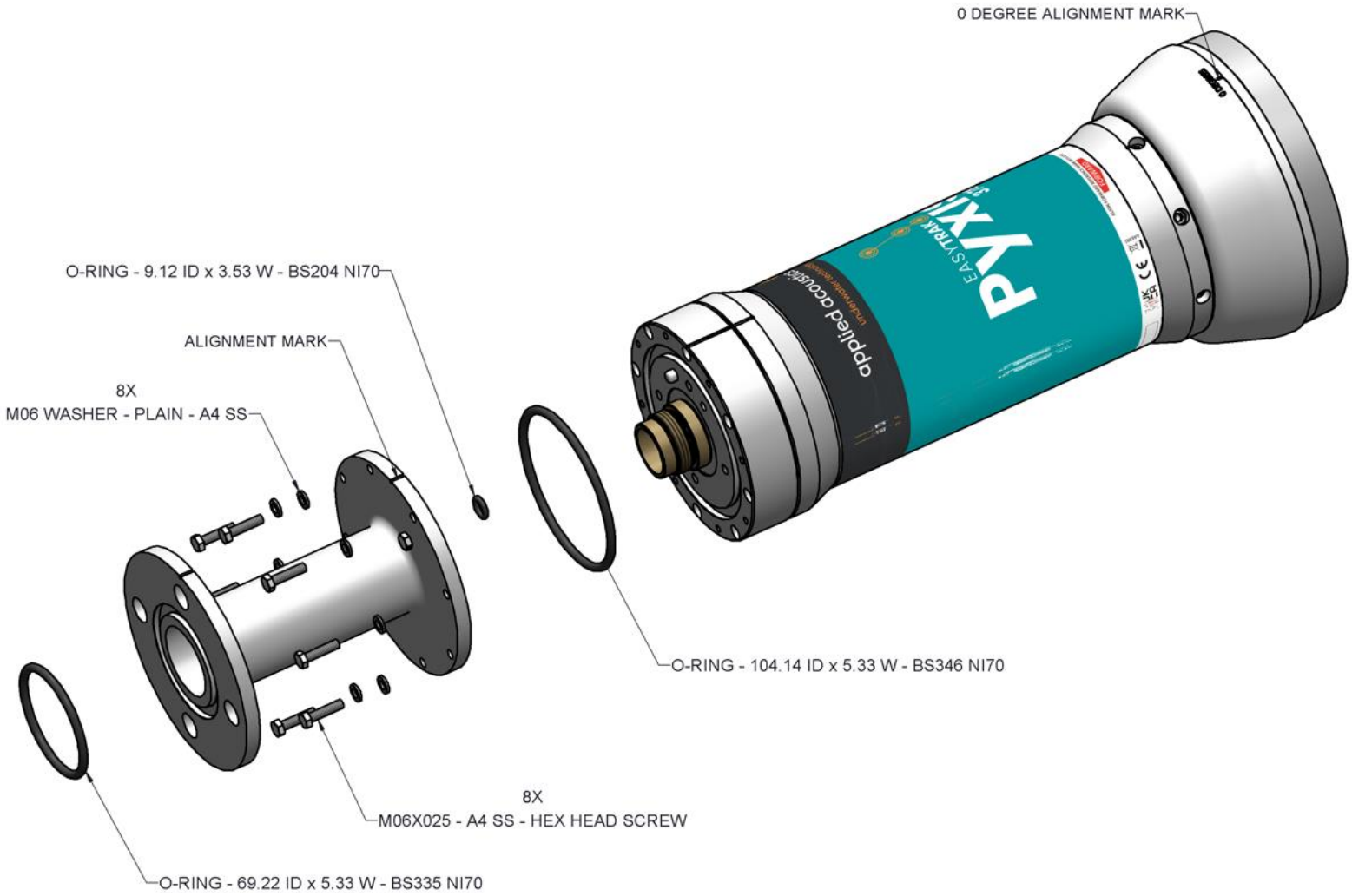
- The  shows the last beacon that was interrogated.
- The 'Visible' check box determines if the beacon is displayed in the plot window.
- The beacons description is displayed here. The description may also be edited from here.
- X and Y (or Eastings and Northings) indicate the relative or absolute co-ordinates on the horizontal plane in meters.
- Z is the distance of the target below the transducer or reference point in meters.
- SRng is the slant range to the target in meters.
- HDist is the horizontal distance to the target in meters.
- Brng is the bearing to the target in degrees.

Appendix A – Transducer Mounting Bracket

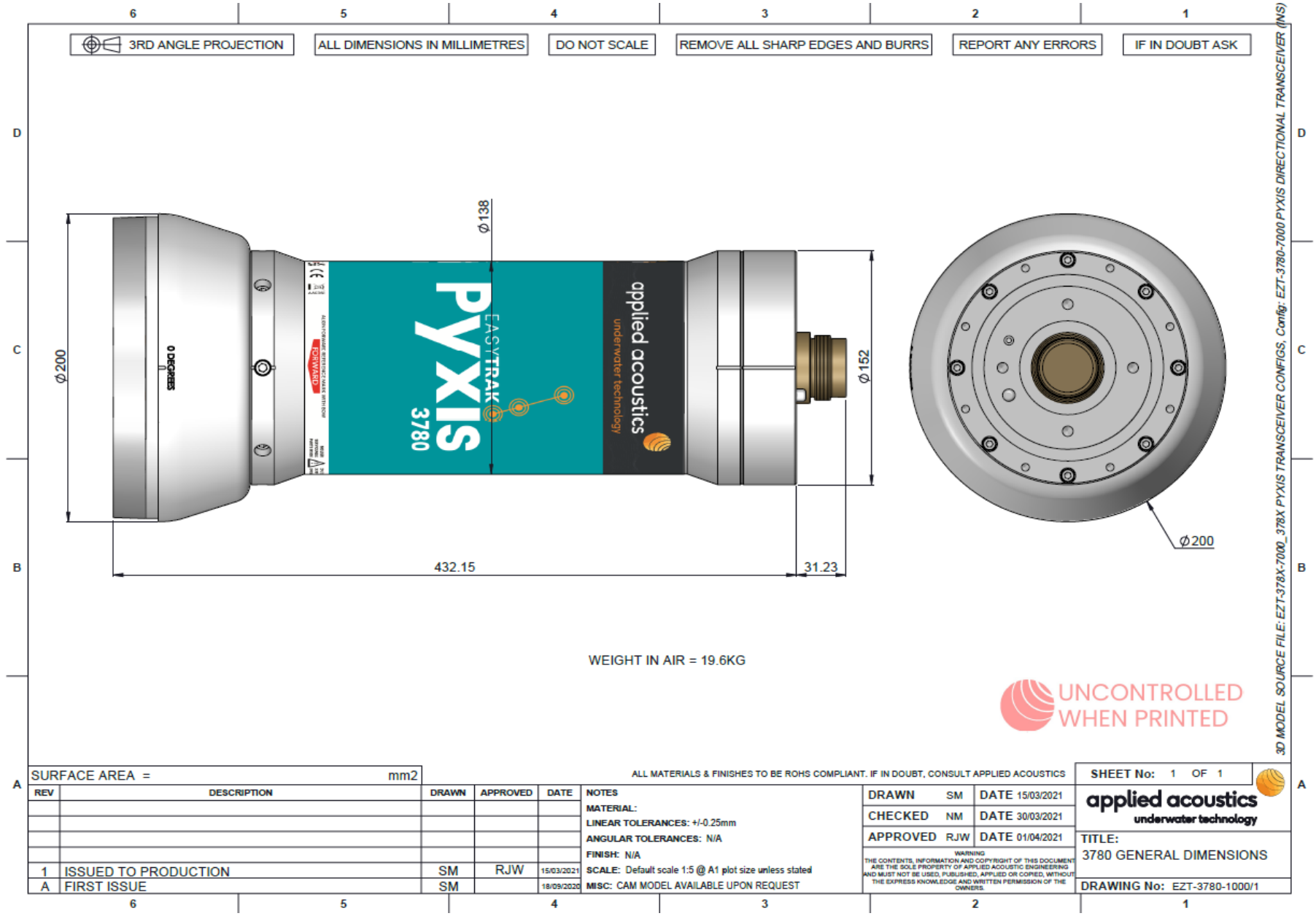


Transceiver installation is the responsibility of the operator.

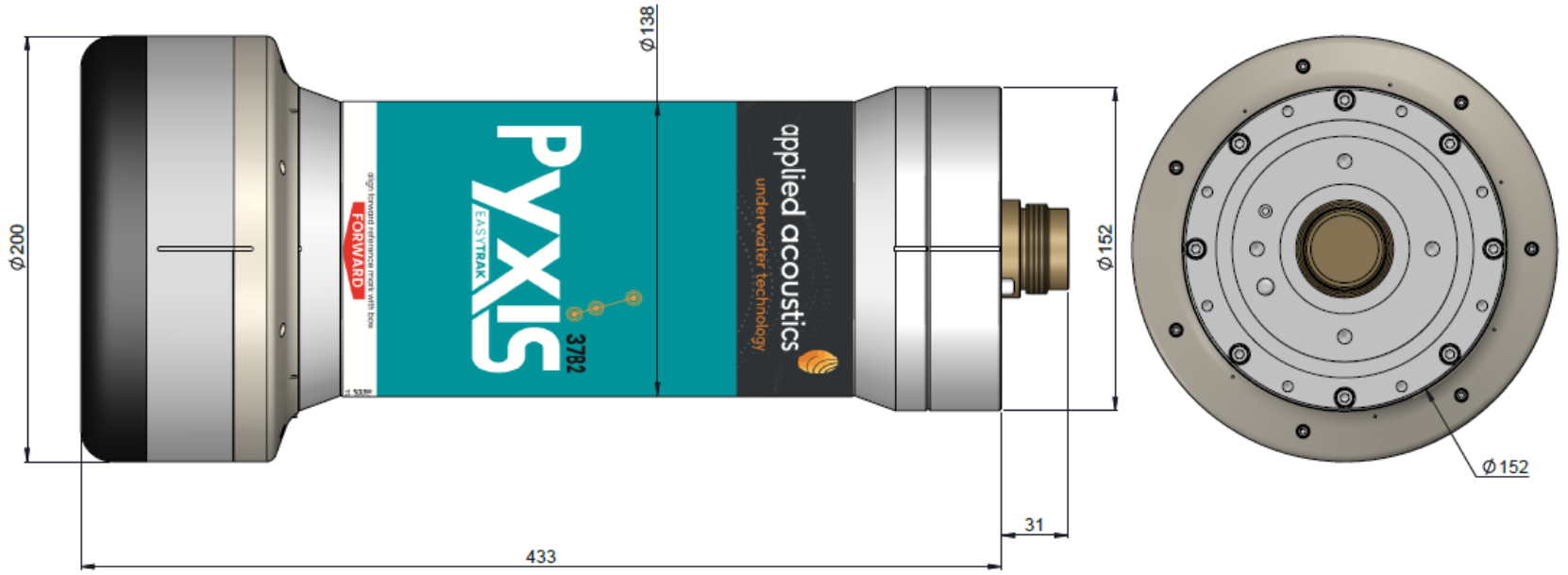
Appendix B – EZT-378X Transducer Mounting



Appendix C – Transceiver Dimensions



3RD ANGLE PROJECTION | ALL DIMENSIONS IN MILLIMETRES | DO NOT SCALE | REMOVE ALL SHARP EDGES AND BURRS | REPORT ANY ERRORS | IF IN DOUBT ASK



WEIGHT IN AIR = 15.33KG

UNCONTROLLED WHEN PRINTED

3D MODEL SOURCE FILE: EZT-378X-7000_378X PYXIS TRANSCEIVER CONFIGS, Config: EZT-3782-7000_INS VERSION 7 ELEMENT OMNI

SURFACE AREA = mm2

ALL MATERIALS & FINISHES TO BE ROHS COMPLIANT. IF IN DOUBT, CONSULT APPLIED ACOUSTICS

REV	DESCRIPTION	DRAWN	APPROVED	DATE
1	PRODUCTION	SM	JRH	10/02/2022

NOTES
MATERIAL:
LINEAR TOLERANCES: +/-0.25mm
ANGULAR TOLERANCES: +/-1.0 Degrees
FINISH: SEE DRAWING NOTES
SCALE: Default scale 1:5 @ A1 plot size unless stated
MISC: CAM MODEL AVAILABLE UPON REQUEST

DRAWN	SM	DATE 10/02/2022
CHECKED	NM	DATE 01/03/2022
APPROVED	JRH	DATE 01/03/2022

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SHEET No: 1 OF 1

applied acoustics
underwater technology

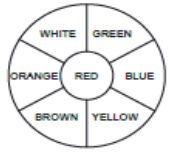
TITLE:
3782 GENERAL DIMENSIONS

DRAWING No: EZT-3782-1000/1

Appendix D – Deck Cable Wiring

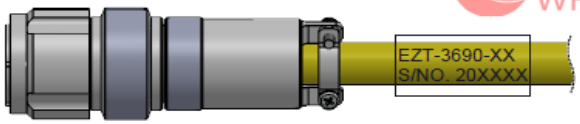
3RD ANGLE PROJECTION | ALL DIMENSIONS IN MILLIMETRES | DO NOT SCALE | REMOVE ALL SHARP EDGES AND BURRS | REPORT ANY ERRORS | IF IN DOUBT ASK

LABELLING NOTES - MODEL NUMBER OF CABLE IS EZT-3690-XX
WHERE XX IS THE LENGTH OF THE CABLE IN METERS.
SERIAL NUMBER IS THE NEXT CONSECUTIVE NUMBER TAKEN
FROM THE SERIAL NUMBER LOG.
COVER LABEL WITH 1 x 50MM CLEAR HEATSHRINK



NOTE - DIAGRAM SHOWS END OF CABLE WIRE ORIENTATION
TO LOCATE TO JUPITER CONNECTOR. EACH COLOUR
REPRESENTS ONE TWISTED SCREENED PAIR.

UNCONTROLLED WHEN PRINTED



ENGRAVE MODEL AND SERIAL NUMBER

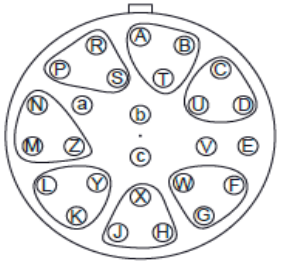
CONNECTOR TYPE :-

D38999/26FE-26PN (AAE NO. ECN050168)
EMC BACKSHELL (EZT-3690-2017)

CABLE TYPE - 7 x0.5MM² STP CABLE (AAE NO. ELD050029)
CABLE LENGTH TO BE SPECIFIED ON ORDER
(NOTE - MUST BE NO LONGER THAN 100M)

CONNECTOR TYPE - SOURIAU
JUPITER 'M' SERIES
PART NUMBER: FED F 20M T 27.16 SA

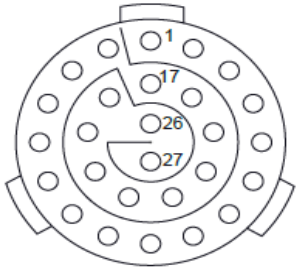
CABLE OUTER SCREEN TO BE
FITTED TO PIN a



FACE VIEW

D38999/26FE-26PN CONNECTOR PINS	FUNCTION	WIRE	JUPITER CONNECTOR PINS
A	48V	RED (1)	1
B	48V RETURN	BLACK (1)	2
T	SCREEN	SCREEN (1)	17
P	48V	ORANGE (2)	15
R	48V RETURN	BLACK (2)	16
S	SCREEN	SCREEN (2)	25
C	USBL SYNC	BROWN (3)	3
D	0V SIGNAL RETURN	BLACK (3)	4
U	SCREEN	SCREEN (3)	18
F	APOG RS485 A	YELLOW (4)	6
G	APOGRS485 B	BLACK (4)	7
W	SCREEN	SCREEN (4)	20
H	APOG SYNC A	BLUE (5)	8
J	APOG SYNC B	BLACK (5)	9
X	SCREEN	SCREEN (5)	21
K	USBL RS422 RX A	GREEN (6)	10
L	USBLRS422 RX B	BLACK (6)	11
Y	SCREEN	SCREEN (6)	22
M	USBL RS422 TX A	WHITE (7)	12
N	USBL RS422 TX B	BLACK (7)	13
Z	SCREEN	SCREEN (7)	24
a	OUTER SCREEN	OUTER SCREEN	N/C

NOTE
CABLE OUTER SCREEN TO BE CUT OFF
AND ISOLATED FROM WIRING
AND CONNECTOR



REAR VIEW

NOTE - THE NUMBERS SHOWN IN BRACKETS IN THE WIRE COLUMN RELATE TO ONE TWISTED SCREENED PAIR

3D MODEL SOURCE FILE: EZT-3690-4000_DECK CABLE, Config: Default

SURFACE AREA = mm2

ALL MATERIALS & FINISHES TO BE ROHS COMPLIANT. IF IN DOUBT, CONSULT APPLIED ACOUSTICS

REV	DESCRIPTION	DRAWN	APPROVED	DATE
2	DCR2498	SM	RJW	01/04/2021
1	PRODUCTION RELEASE	SM	RJW	12/03/2020

NOTES
MATERIAL:
LINEAR TOLERANCES: +/-0.25mm
ANGULAR TOLERANCES: +/-1.0 Degrees
FINISH: SEE DRAWING NOTES
SCALE: Default scale 1:2 @ A1 plot size unless stated
MISC: CAM MODEL AVAILABLE UPON REQUEST

DRAWN	SM	DATE 26/03/2021
CHECKED	NM	DATE 30/03/2021
APPROVED	RJW	DATE 01/04/2021

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SHEET No: 1 OF 3

applied acoustics
underwater technology

TITLE:
PYXIS CABLE WIRING
ASSEMBLY

DRAWING No: EZT-3690-4000/2

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