INSTALLATION MANUAL

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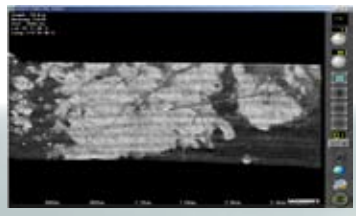
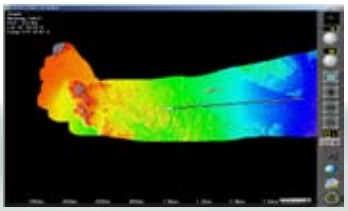
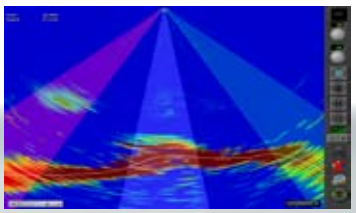
WMB-160F







Multi-Beam Sonar System

ENL Electronic Navigation Ltd™

Doc. P/N: IM_WMB160F_SYS
Version: V1.6
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Document Revision History

Revision Date	Reason for Change	Version
4 May 2006	Original Document.	V1.0
16 October 2006	Added changes to reflect ENL complete system and both fairing type and sea chest type transducer installation procedures. Also added reference to installation CD.	V1.1
12 November 2007	Updated with new software changes and addition of Snapshot button to GUI.	V1.2
4 February 2008	Modified patch test description.	V1.3
9 February 2009	New version incorporating Compact Transducer and software version 104.048 changes	V1.4
7 April 2009	Detail of use with RJ-45 Type BTxR and transducer cable with RJ-45 connectors added.	V1.41
11 May 2009	Minor wording correction, detail of Shuttle PC added.	V1.42
23 June 2009	New version incorporating changes for software version 104.049	V1.5
9 July 2009	Updates and Backscatter Gain test added.	V1.51
8 Dec 2009	Updated following release of V.50 software	V1.6

Related Documents

Document P/Number	Title
OM_WMB160F_SYS	WMB-160F System Operator Manual

General Notices

ENL reserves the right to change the contents of this manual and any system specifications without notice.

Contact ENL regarding copying or reproducing this manual.

The WMB-160F is not designed to comply with hydrographical mapping standards and therefore must not be used as a navigational mapping tool.

Warnings, Cautions, and Notes

Warnings, cautions, and notes are indicated by the following icons throughout this manual:

A WARNING indicates that if the instruction is not heeded, the action may result in loss of life or serious injury.

A CAUTION indicates that if the instruction is not heeded, the action may result in equipment damage.

A Note indicates a tip or additional information that could be helpful while performing a procedure.

Safety Notices

The installer of the equipment is solely responsible for the correct installation of the equipment. ENL assumes no responsibility for any damage associated with incorrect installation.

Electrical Safety

- Fire, electrical shock, or equipment damage may occur if the transceiver becomes wet.
- The equipment is rated for operation at:
  - Transceiver: 24 V DC.
  - ENL supplied computer: 230 V AC.
- Make sure that the power is switched OFF at the main supply (e.g. switchboard) before beginning the installation. Fire or electrical shock may occur if the power is left ON.
- Do not open equipment covers unless you are totally familiar with the system's electrical circuits.
- Make sure all safety precautions for electrical equipment are taken when operating or servicing the equipment. These to be carried out in accordance with local or national regulatory body safety regulations.
- Make sure that the transducer will not loosen due to the vessels vibration.

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Purpose of this Manual

This installation manual describes the procedures to install the following WMB-160F equipment:

- A WMB-160F-CT transceiver internally on a vessel keel or floor.
- An ENL supplied Shuttle XPC personal computer.
- A WMB-160F software program onto a computer hard disk drive.

It also provides procedures to commission the WMB-160F system during dockside and sea trials.

Introduction

The WMB-160F is a multi-beam Sonar system that uses wide-angle sonar transducer to profile the water column and seafloor to very high resolution. It is this unique combination of multi-beam sonar and computer processing power which provides you with unparalleled information about the fishing environment. It gives you a wide 120° port-starboard swath of the water column and seafloor, allowing you to find and position reefs and wrecks, fish schools, seafloor hardness changes, and foreign objects in the water column or on the seafloor. From the 120° swath, the system processes 112 dynamic beams, with each beam containing detections from the water column and seafloor.

The WMB-160F can be applied to a variety of fishing methods, as well as search and rescue, customs, and police applications.

The information is presented in a user-friendly, mouse controlled, Windows-based operating system. The system can output data to plotting software packages. For optimal performance, roll, heave, pitch, heading and position inputs are all required. These can be provided through an ENL recommended SC-30 satellite compass.

The efficiency of heave compensation depends on the quality of the input data. The WMB-160F does not correct the effects of heave, but minimises them. This is why accurate ship measurements must be taken and the dockside and sea trial commissioning procedures carried out thoroughly.

Main Features

- **Improved performance**.
  The use of separate transmit and receive arrays has enabled ENL to optimise both transmit performance and receive sensitivity, giving improved performance over traditional sonar and sounders.
- **High detail picture of the marine environment**.
  The transmit beam spreads over a 120° port-starboard swath and covers 4° fore-aft while the receive beam covers 10° fore-aft, displaying a highly detailed picture of the marine environment.
- **Beam stabilisation**.
  Beam stabilisation compensates for the movement of the vessel, providing accurate seafloor profiles and fish school locations.
- **Variable beam width**.
  Unique to the WMB-160F, the single beam view can not only be stabilised, but the beam width can be varied from 5° to 40°.
- **Triple beam view**.
  With variable width and angle, the port, centre, and starboard views display together to help build your understanding of the sea environment.

- **Bottom lock**.
  Bottom lock provides a traditional bottom lock mode where the changes in bottom depth are ignored and the bottom is drawn flat. Fish and other echoes are shown relative to the flat bottom image, enabling better discrimination between bottom fish and the seafloor.
- **Computer based profile storage**.
  A computer-based system means the WMB-160F can generate and store very detailed seafloor profiles.
- **Digital signal processing (DSP)**.
  Using DSP technology, the WMB-160F can provide an indication of changes in seafloor hardness, ideal for scalloping, crayfishing, and trawling where you want to understand and locate small changes on the seafloor.
- **160 kHz operating frequency**.
  Operating at a frequency of 160 kHz provides high seafloor definition.
- **2-D and 3-D zoom**.
  2-D zooming from 250 m out to 3 km. 3-D zooming from 10 m out to 1 km.
- **Depth and seafloor coverage**.
  Seafloor coverage is determined by the beamwidth in use: For a 90 degree beamwidth, the seafloor coverage will be approximately twice the water depth. For example, 100 m depth gives 200 m seafloor coverage with 112 beams - every ping. For a 120 degree beamwidth, the seafloor coverage is 3.4 x depth. For example 200m depth gives approximately 680m seafloor coverage.
- **Unique power management system (14 power levels)**.
  14 power levels provide optimal performance over a wide range of seafloor types and water depths.
- **More accurate 3-D**.
  Profiles 90 times faster than conventional single beam echo sounders, leading to reduced costs and improved accuracy.
- **Future proof technology**.
  The computer based operating system and transceiver firmware are both upgradeable as new features and methods in software are developed.

System Configuration

Figure 1 shows a fully functional WMB-160F Sonar system.

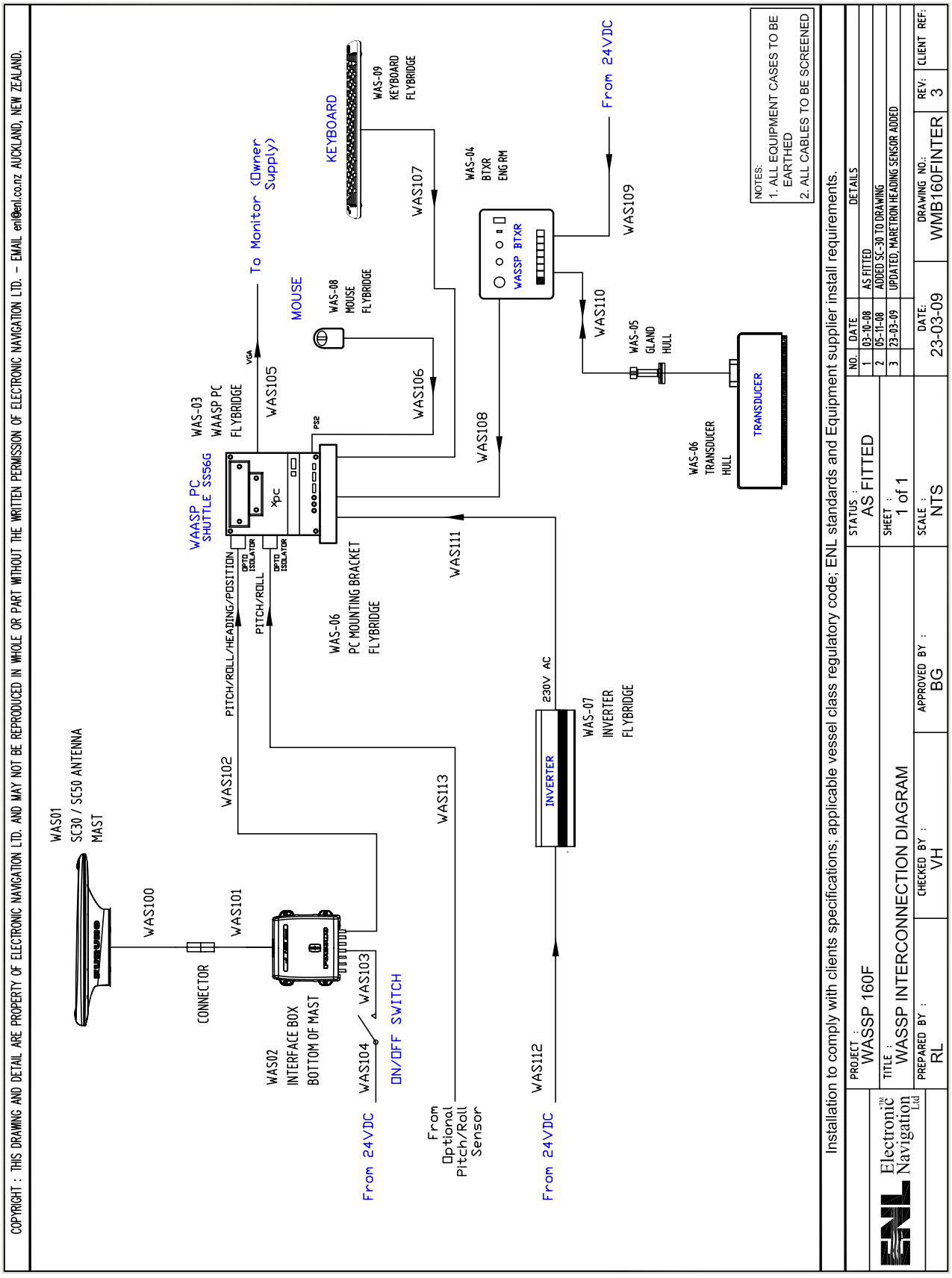


Figure 1 – Overview of a Fully Functional WMB-160F Sonar System with Options

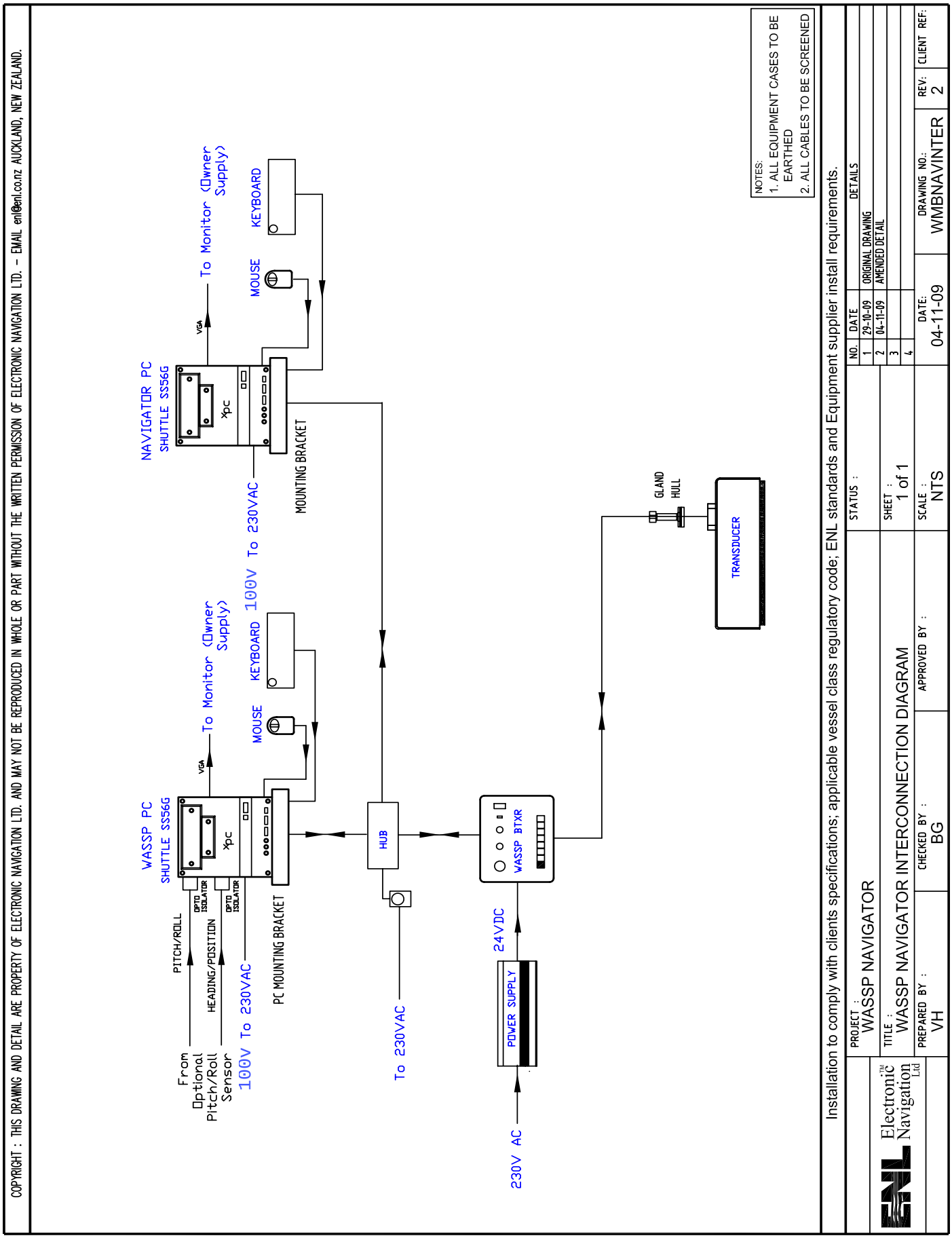
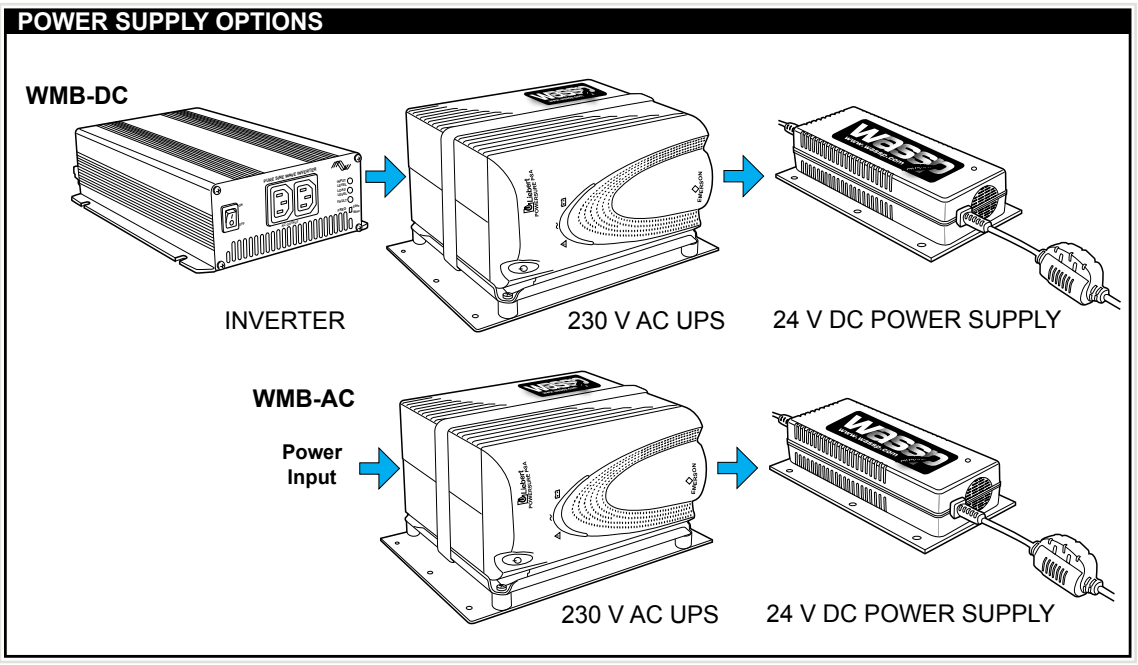


Figure 2 – Overview of a Fully Functional WMB-160F Navigator System



Equipment Lists

Transducer Type

The WMB-106F system uses a compact transducer intended to be mounted inside the hull through a suitable opening to allow the bottom face of the transducer to be in contact with the sea water.

Type WMB-160F-CT

The compact transducer is a rectangular-shaped, low-profile transducer for through-hull mounting, encased in a sealed sea chest made to suit the vessel's hull deadrise angle. The compact transducer is best suited to steel and aluminium hulls.

A sea chest for housing and sealing the transducer should be designed and constructed by a reputable shipyard to suit the size and contours of the hull of each individual vessel. This must be sized and constructed accurately.

The sea chest provides a stable platform for the transducer and must be mounted as horizontal to the vessel as possible. An optional gland supplied by ENL in alloy, plastic, or steel, provides the transducer cable through-hull seal.

The Compact Transducer is supplied standard with a 10m cable. Different cable lengths are available. Please ask your WASSP representative for details.

WMB-160F-CT System — Standard Supply

Table 1 lists the equipment and cabling shipped with a standard WMB-160F-CT Type System.

Table 1 – Standard Equipment: Multi-beam 160 kHz System Compact Type Transducer

Name	Part Number	Qty.	Weight	Remarks
Transducer	WMBT-160F-CT	1	13 kg	Including 10m cable.
Transceiver	WMB-BTxR	1	5 kg	Electronics housing
Shuttle computer complete with Win XP operating system	WMB-SHUTTLEPC	1	~8 kg	Computer c/w keyboard and mouse/trackball. Fully loaded with WMB-160F software.
USB dongle with software	WMB-USB-DONGLE	1	-	Required to operate transducer and transceiver.
PC mounting bracket	WMB-PC-MOUNT	1	-	Required to mount Shuttle PC.
Cable Clamp	CC-K26/38	1	-	Clamps transducer cable
Keyboard	WMB-PC-KEYBOARD	1	-	
Trackball	WMB-PC-TRACKBALL	1	-	
Ethernet cable	WMB-BTxR-TCPCable	1	-	15 m
NMEA optocoupler	NMEA-Opto	1	-	
NMEA 9-pin cable	WMB-NMEA-CABLE	1	-	5 m
Power cable Transceiver	WMB-BTxR-PWRCable	1	-	5 m
Installation Manual	WMB160F_INMAN	1	-	This manual
Operator Manual	WMB160F_OPMAN	1	-	Related manual

WMB-160F-CT System — Options

Table 2 lists the options available for use with the WMB-160F Compact Transducer Type System.

Table 2 – Optional Equipment

Name	Part Number	Qty.	Remarks
Satellite compass: - Interface unit	SC-30 - IF-NMEASC	 1	A GPS satellite compass is required for roll stabilisation. Interface unit provides data outputs to BTxR.
Aluminium gland	WMB-AG	1	Through hull type.
Plastic gland	WMB-PG	1	Through hull type.
Steel gland	WMB-SG	1	Through hull type.
AC power kit	WMB-AC	1	Complete with 230 V AC UPS and 24 V DC power supply.
DC power kit	WMB-DC	1	Complete with inverter, 230 V AC UPS, and 24 V DC power supply.
Compact Transducer with 5m cable	WMBT-160F-CTR5	1	
Compact Transducer with 20m cable.	WMBT-160F-CTR20	1	

Mounting

Mounting Considerations

Mounting the Transducer – General Considerations

The transducer is mounted on the hull below the water line, normally using a permanent sea chest. The transducer must be mounted so that it is aligned with the fore-aft axis of the vessel. It must also be mounted so that the flat underside of the transducer is as close to horizontal as possible.

If the vessel has a keel, the transducer can be mounted somewhere along the length of it. If it is mounted on the hull, it should be far enough away from the keel so that the keel will not be detected within the 120° beam angle. Figure 2 shows a sea chest type through-hull mounting designed specifically for a fast moving, alloy hull crayfish boat.

The performance of the system is directly related to the mounting location of the transducer, especially for high-speed cruising. The installation should be planned in advance, keeping in mind the fixed cable length of 10 meters and the following factors:

- Air bubbles and turbulence caused by movement of the vessel seriously degrade the sounding capability of the transducer. The transducer should be located in a position with the smoothest water flow.
- The transducer should not be mounted close to propellers because noise from propellers can adversely affect the performance of the transducer.
- Mount the transducer inboard of lifting strakes as these create acoustic noise.
- The transducer must always remain submerged, even when the boat is rolling, pitching or planing at high speed.
- A practical choice would be somewhere between a ⅓ and a ½ of the boat's length from the stern. For planing hulls, a practical location is generally towards the rear of the vessel, to ensure that the transducer is always submerged, regardless of the planing angle.
- Do not mount another transducer near the WASSP transducer as it will interfere with the 120° beam.

Mounting Considerations for the Personal Computer

The ENL supplied Shuttle XPC computer must be mounted on a flat, stable surface. The computer can be mounted horizontally using the supplied stand. Keep the following in mind when selecting a mounting location for the computer:

- Secure the computer so that it cannot come loose in rough seas.
- Keep the computer out of direct sunlight.
- The temperature and humidity of the location where the computer is mounted should be moderate and stable.
- Locate the computer away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the computer where shock and vibration are minimal.
- Keep the computer away from electromagnetic field-generating equipment, such as motors or generators.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the computer installation location.
- A magnetic compass will be affected if placed too close to the computer. Do not locate the computer closer than the following compass safe distances to prevent interference with the magnetic compass:
  - Standard compass: 0.8 meters.
  - Steering compass: 0.6 meters.

Mounting Methods

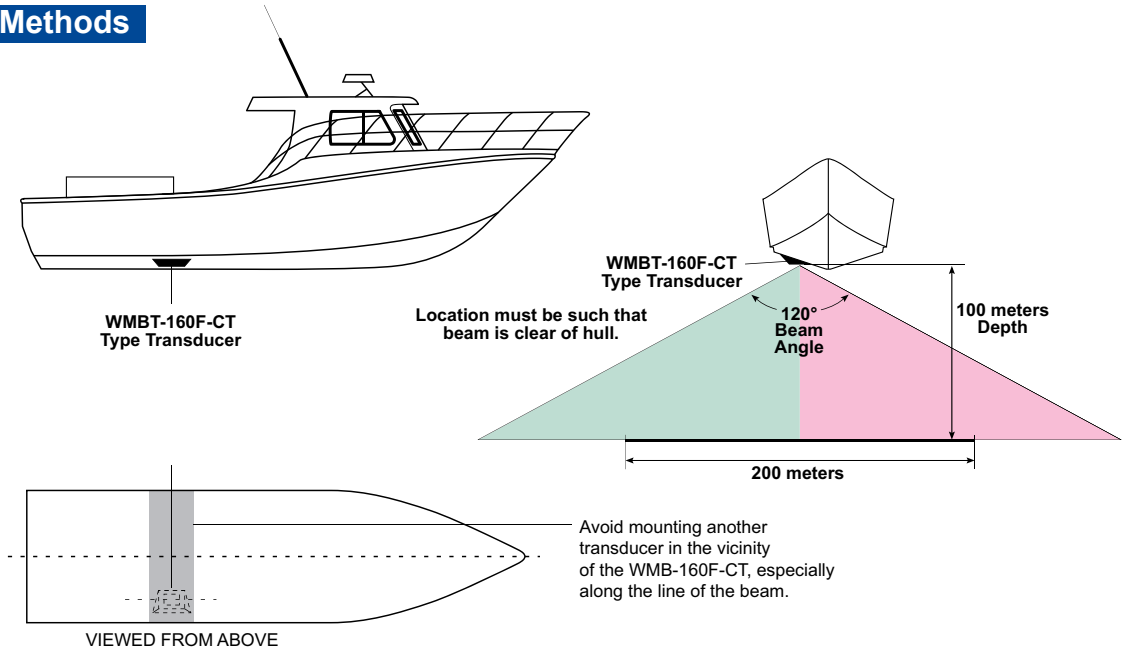


Figure 3 – Through-hull Compact Type Transducer Mounting

- When mounting the transducer, ensure it is accurately running parallel to the keel in a bow-stern direction. See Figure 4.

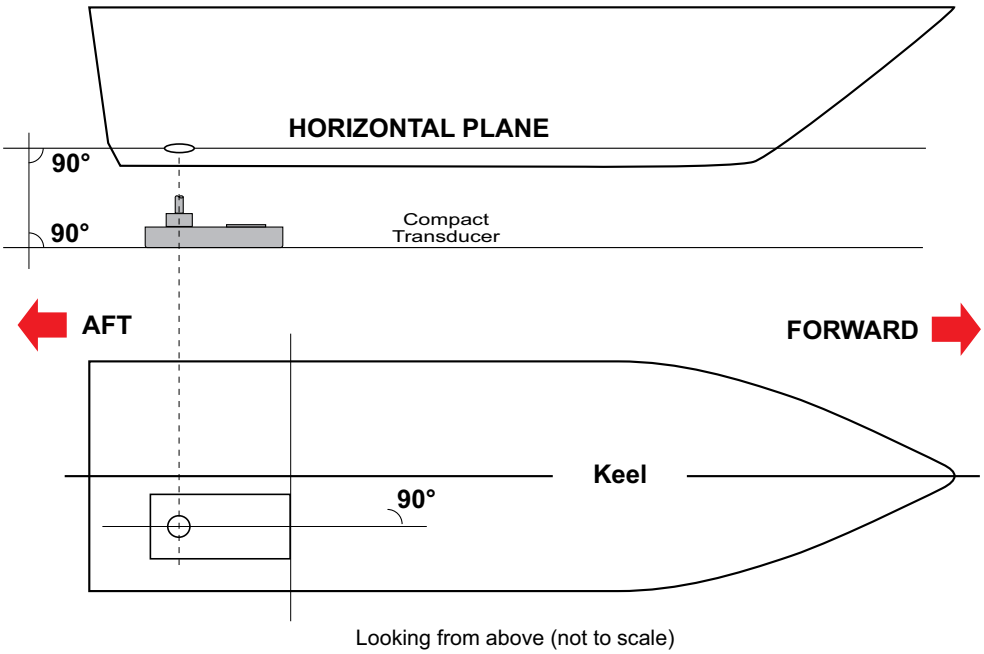


Figure 4 – Placing the Transducer on the Keel

CAUTION

The above mounting example is provided as a guide.

ENL recommend that a reputable boat builder is used to install the transducer to prevent damage to the vessel's hull.

Outline Diagrams

The outline diagrams in Figures 4 to 10 provide the physical dimensions of the major items of equipment to be installed.

Transducer Mounting Dimensions

Figure 4 shows the physical dimensions of the compact type transducer. These sizes are required by the installing shipyard to construct a sea chest to mount the transducer to the hull.

Note: Use the sizes in this diagram to assist in the manufacture of the sea chest and transducer backing plate. .

Drawing not to scale
All sizes in millimeters

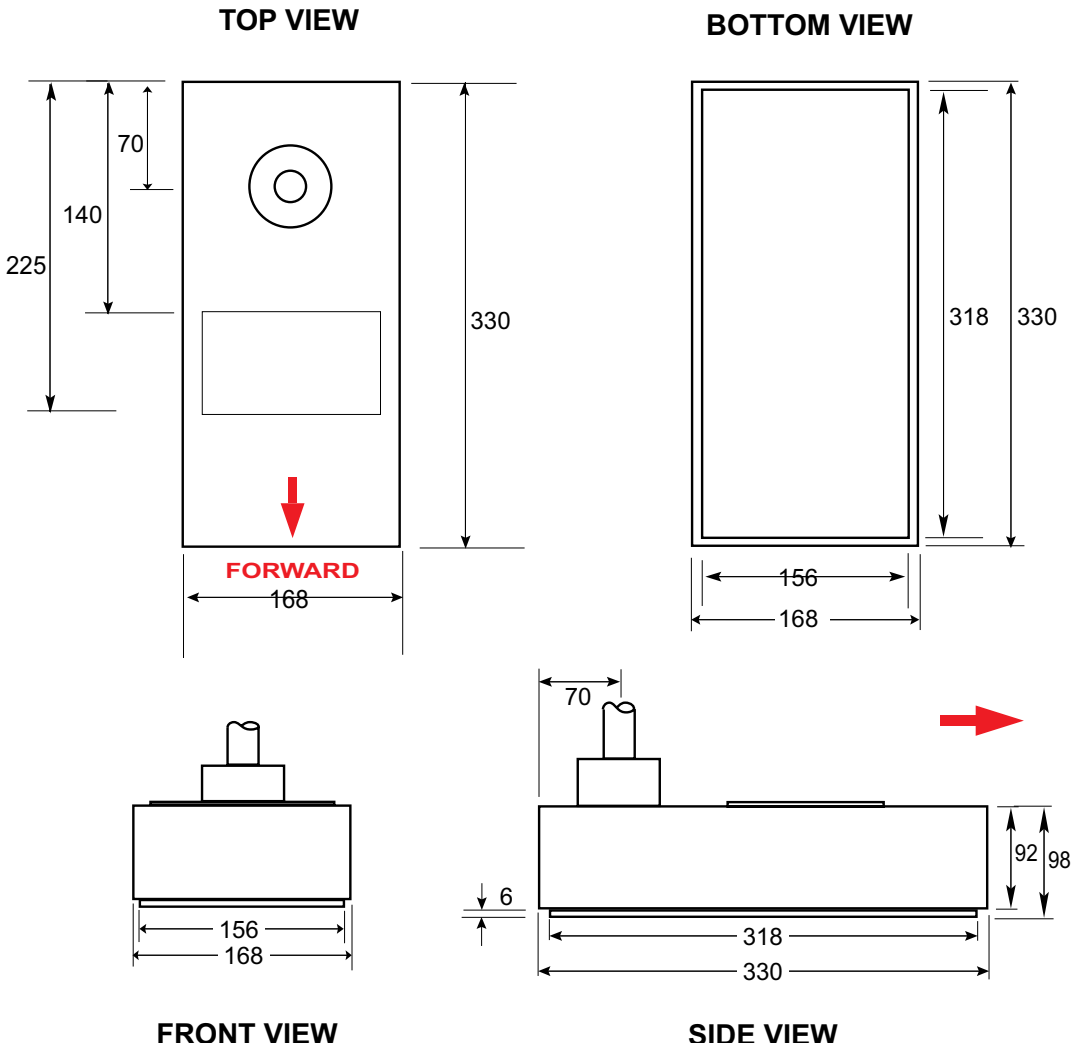


Figure 5 – Compact Type Transducer Outline

Transceiver Mounting Dimensions

Figure 6 shows the physical dimensions of the transceiver. The hole centres on the mounting brackets are required for mounting the transceiver.

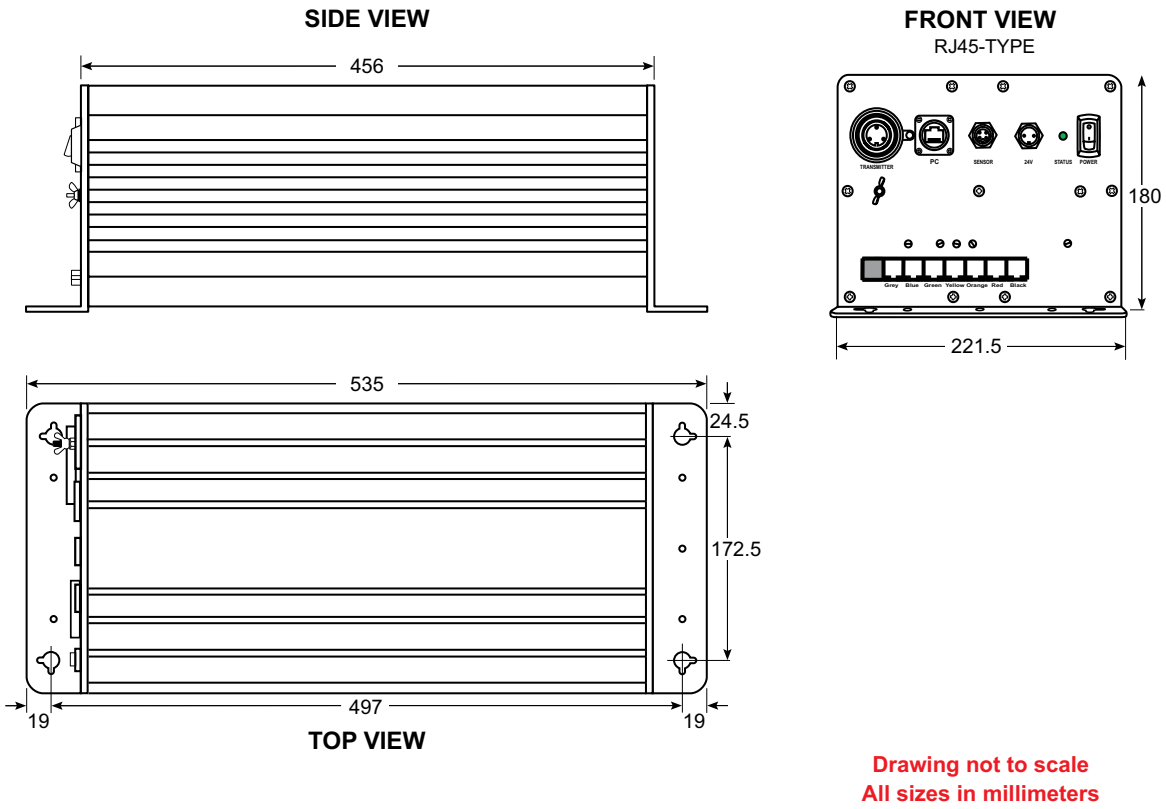
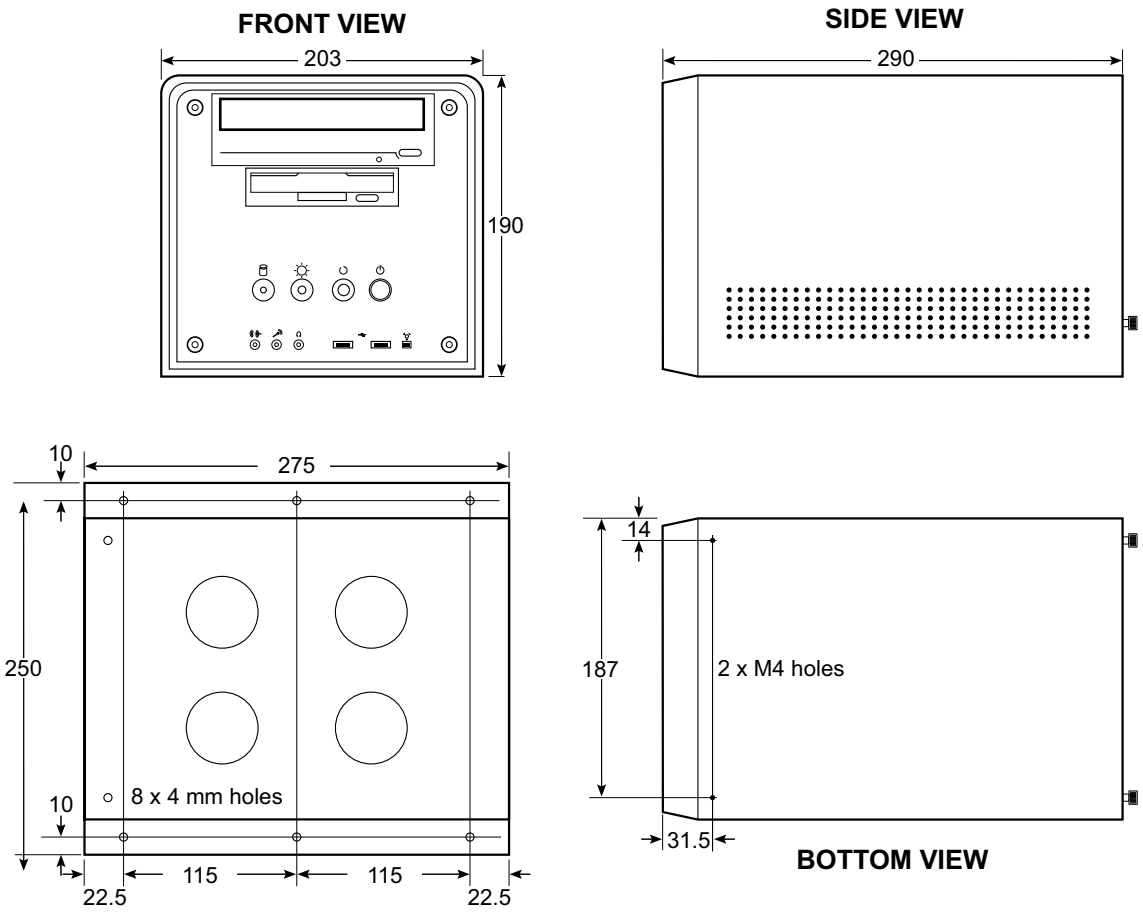


Figure 6 – Transceiver Outline and Mounting Bracket Hole Centres

Shuttle Computer Mounting Dimensions

Figure 7 shows the physical dimensions of the ENL supplied computer and mounting bracket. The hole centres on the mounting bracket can be used as a template for installing the mounting bracket and computer.



Footprint of Computer Mounting Bracket

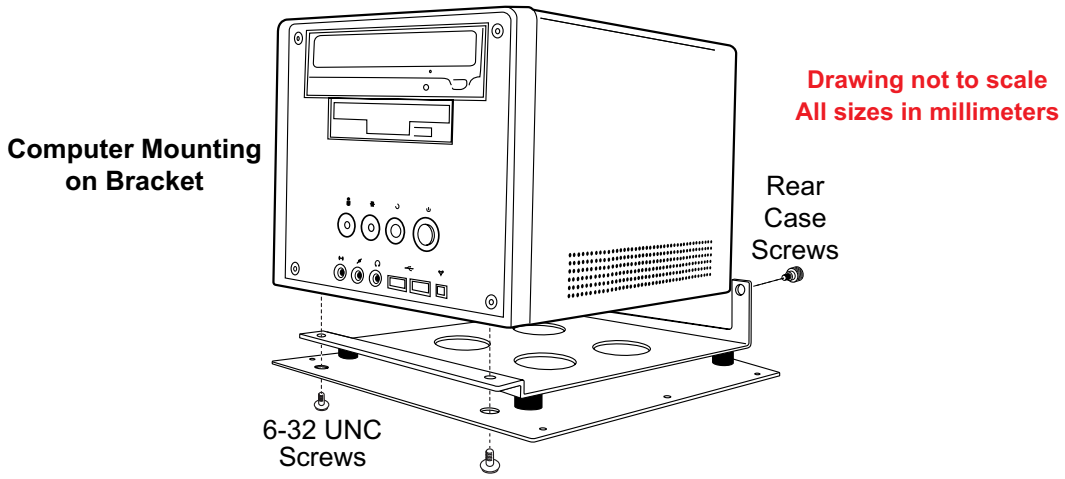


Figure 7 – Shuttle XPC Computer Outline

Gland Assembly Dimensions

Figure 8 shows the physical dimensions of the ENL supplied gland assembly.

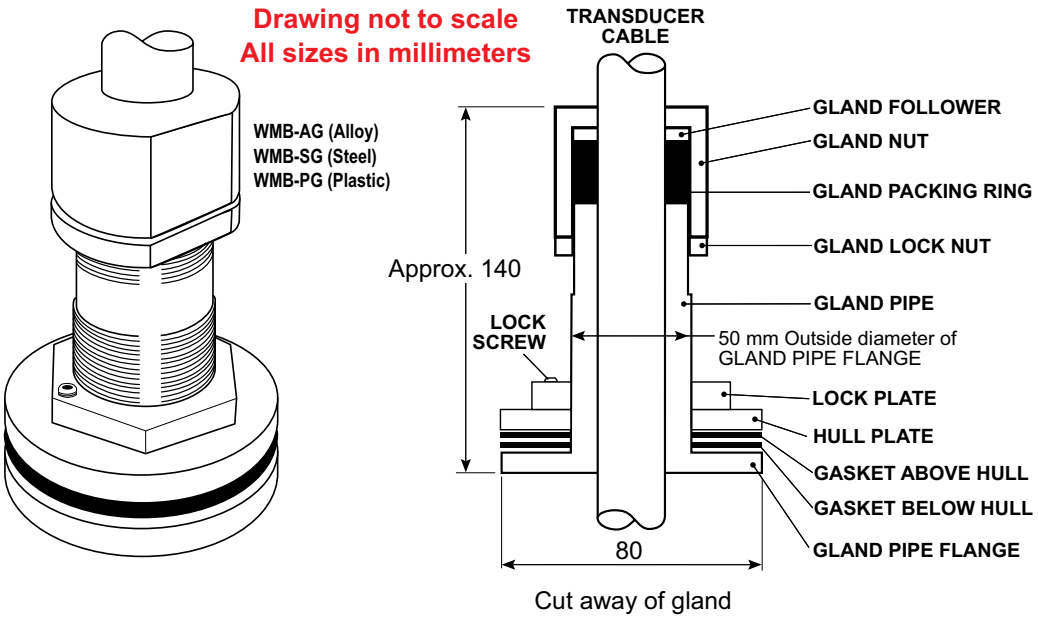


Figure 8 – Gland Assembly Outline and Dimensions

UPS Installation and Mounting Dimensions

Figure 9 (over page) shows the physical dimensions of the optional ENL supplied 230 V AC UPS. The hole centres on the mounting bracket can be used as a template for installing the mounting bracket and UPS.

If installing the UPS, carefully read the supplied manufacturer's quick start guide and install and operate the UPS accordingly:

1) Install the UPS indoors in a controlled environment where it cannot be accidentally turned off. Place it in an area with unrestricted airflow around the unit, away from water, flammable liquids, gasses, corrosives, and conductive contaminants. Maintain a minimum clearance of 100 mm on each side of the UPS. Maintain an ambient temperature range of 0°C to 40°C (32°F to 104°F).

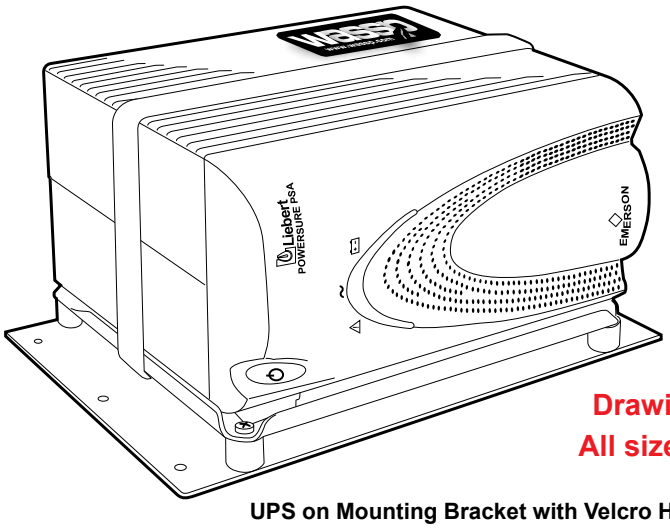
2) Connect equipment to the receptacles at the rear of the UPS: computers and monitors should be connected to the ORANGE receptacles for battery back up and surge protection. Other office machines that do not exceed the capacity of the UPS may be plugged into either of the two BLACK receptacles that provide surge protection only.

3) Obtain a suitable input power cable with a minimum cross-sectional area of 1 mm^2 to connect the UPS to the mains supply socket.

4) Connect phone/fax/DSL/internet/modem devices to data line connectors.

5) Press and release the ON/OFF / Alarm Silence button to turn on the UPS. The UPS beeps and the mains indicator lights up (GREEN).

6) Turn on the connected equipment.



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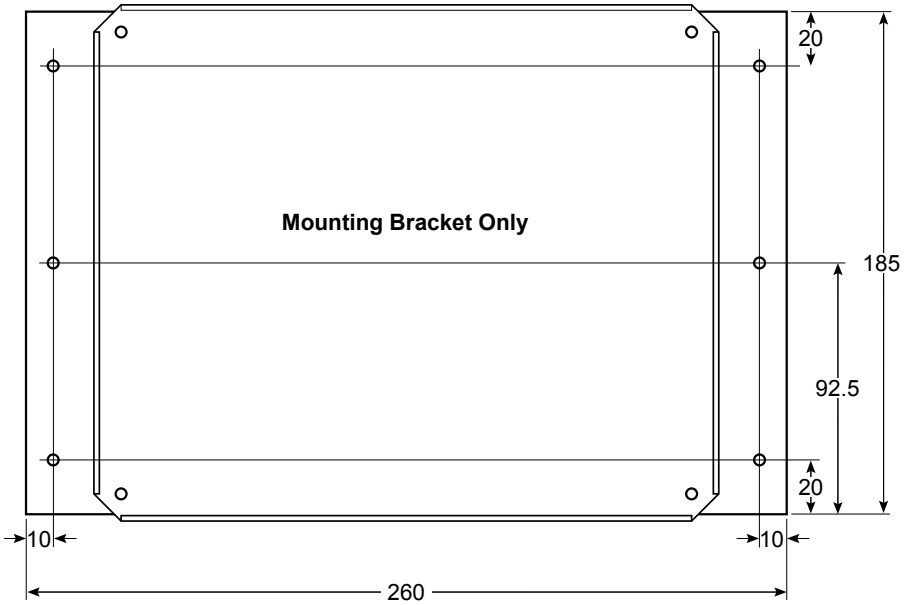
All sizes in millimeters

UPS on Mounting Bracket with Velcro Holding Strap
TOP VIEW



SIDE VIEW

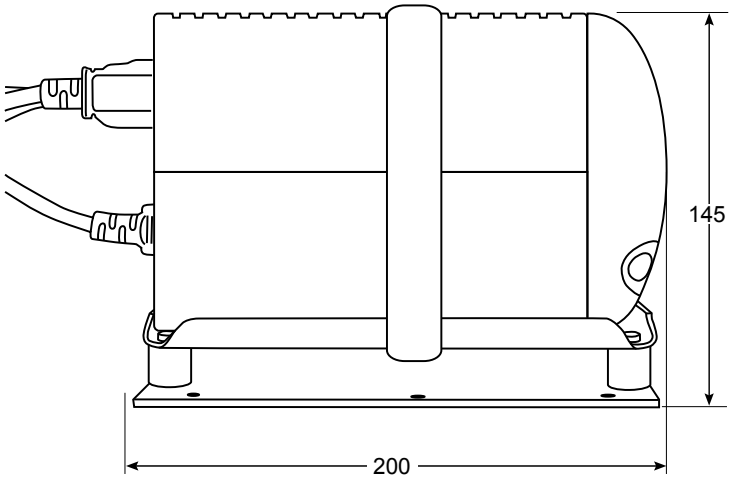


Figure 9 – 230 V AC UPS Mounting Bracket Outline and Dimensions

DC Power Supply Mounting Bracket Outline and Dimensions

Figure 10 shows the physical dimensions of the optional ENL supplied 24 V DC Power Supply Unit (PSU). The hole centres on the mounting bracket can be used as a template for installing the mounting bracket and PSU. The PSU has been set to receive 230 V AC input before being attached to the mounting bracket.

Due to changes in power supply manufacturer, the power supply may differ from the illustration. However the mounting bracket dimensions and mounting centres remain the same.

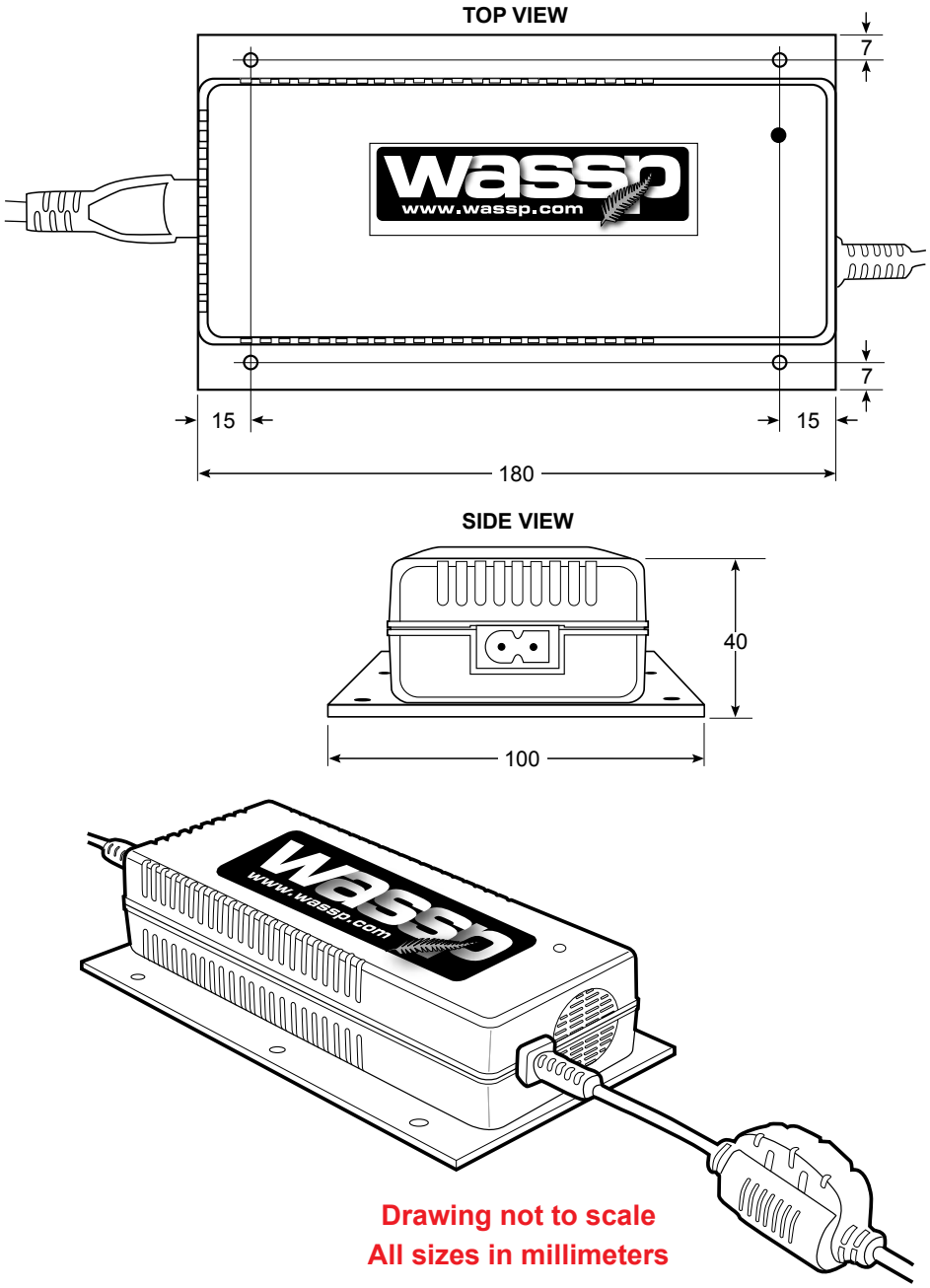


Figure 10 – 24 V DC Power Supply Unit Mounting Bracket Outline and Dimensions

Inverter Outline and Dimensions

Figure 11 shows the physical dimensions of the optional ENL supplied inverter. If installing the inverter, carefully read the supplied manufacturer's user manual and install and operate the inverter accordingly ensuring the environment is:

1) DRY – Do not allow water to drop on or enter the inverter.

2) COOL – The ambient air temperature should be between 0°C and 33°C - the cooler the better.

3) SAFE – Do not install the inverter in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.

4) VENTILATED – The inverter must be well ventilated at all times. Ensure there is at least 25 mm of space around the inverter. Ensure the ventilation fan and air holes are not obstructed at both ends of the inverter.

5) DUST FREE – Do not install the inverter in a dusty environment as the dust can be drawn into the unit when the fan is operating.

6) CLOSE TO BATTERIES – Do not install the inverter in the same compartment as batteries. Do not mount the inverter where it will be exposed to the gasses produced by the battery, as these are corrosive and prolonged exposure will damage the inverter. Avoid excessive cable lengths. Use the recommended wire lengths and sizes (detailed in Section 3-6 of the user manual).

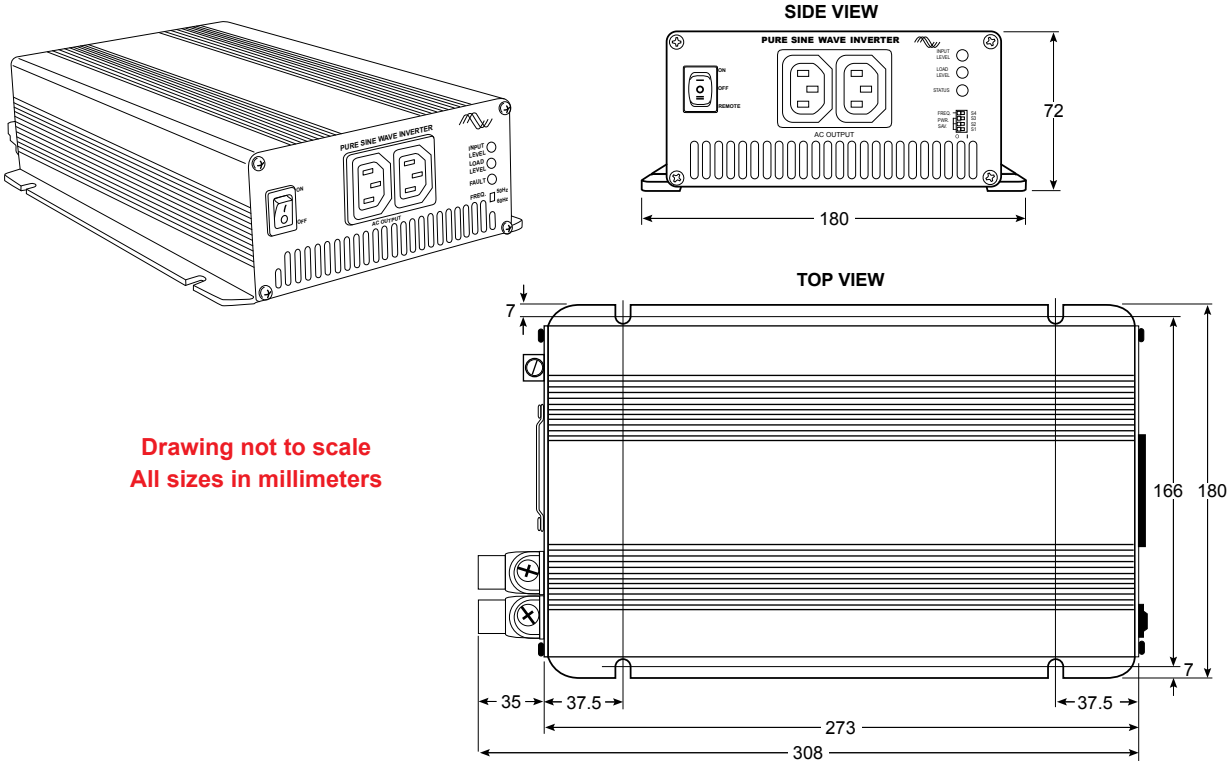


Figure 11 – Inverter Mounting Bracket Outline and Dimensions

Mount the Transducer Cable Gland

See Figures 12 and 13.

In the external sea chest and fairing type installations, the cable gland forms a seal where the transducer cable passes through the hull. In low profile sea chest installations, the gland passes through the sea chest cover.

The gland pipe and a single gasket are the only parts of the gland that are located inside the sea chest or outside the hull, all other parts are attached to the gland pipe inside the vessel.

Mounting Instructions

Depending on the type of installation, there are various ways of mounting the cable gland to the hull. The following example describes how to mount the gland through the hull and then feed the cable through the gland. Adapt the following procedure to suit your installation while taking the following into consideration:

- Always use a good quality marine sealant to seal across areas that can leak.
- When installing the gland packing ring, apply soapy water to the inside of the packing ring and pass it over the transducer cable until it is sitting on top of the gland pipe. The soapy water allows the packing ring to slide easily down the cable. When sitting on top of the gland pipe, clean as much of the soapy water off as possible to ensure the packing ring grips the cable when pressure is applied by the gland nut.
- Tighten the gland nut by hand until secure. With the vessel in the water, check for leaks at the gland and if leaking slightly, tighten the gland nut with a spanner until the leak stops.
- When all leaks are stopped, tighten the gland lock nut against the gland nut.

STEP 1 Place the bottom gasket over the gland pipe and apply marine sealant to both sides of the gasket. See Figure 12.

Push the gland pipe into the hole.

STEP 2 Place the top gasket over the gland pipe and apply marine sealant to both sides of the gasket.

Place the plate over the gland pipe and onto the top gasket.

Screw the lock plate onto the gland pipe until a good joint is achieved. Clean away any excess marine sealant.

STEP 3 Feed the transducer cable through the gland.

See Figure 13 for a set of steps to feed a **RJ-45 type** cable through the gland pipe.

STEP 4 Screw the gland lock nut as far as it can go onto the gland pipe.

Place the gland packing ring over the cable until it sits on top of the gland pipe.

Place the gland follower and gland nut over the cable and screw the nut onto the gland pipe firmly by hand.

STEP 5 With the vessel in the water, check for leaks at the gland and if leaking slightly, tighten the gland nut with a spanner until the leak stops.

With all leaks stopped and while holding the gland nut with a spanner, tighten the gland lock nut against the gland nut with a spanner.

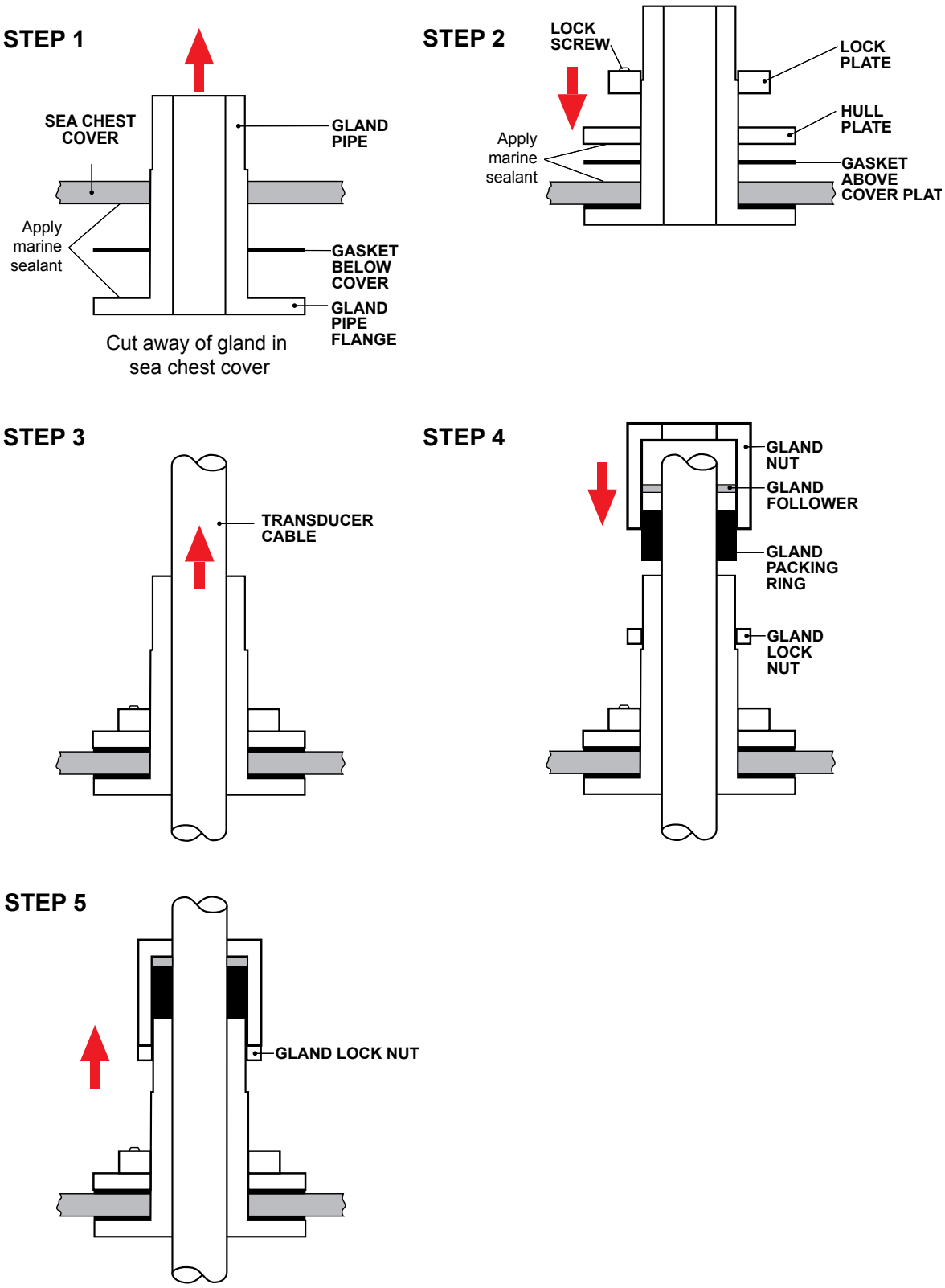


Figure 12 – Mounting the Gland Assembly

RJ-45 Type BTxR and Cable:

The RJ-45 Type BTxR uses a transducer cable consisting of seven CAT-5 cables and one screened pair for the transmit connection.

To fit the RJ-45 connectors and cable through the gland, no special preparation is required.

The BTxR Transceiver cable end has the RJ-45 connectors fitted with “staggered” cable lengths. This allows each RJ-45 connector and its associated cable to be fed through the gland fitting easily.

Commencing with the black RJ-45 cable and black transmit cable, feed each cable in turn through the gland, finishing off with the grey RJ-45 connector and cable.

Complete fitting and tightening the gland as shown in Figure 12 above.

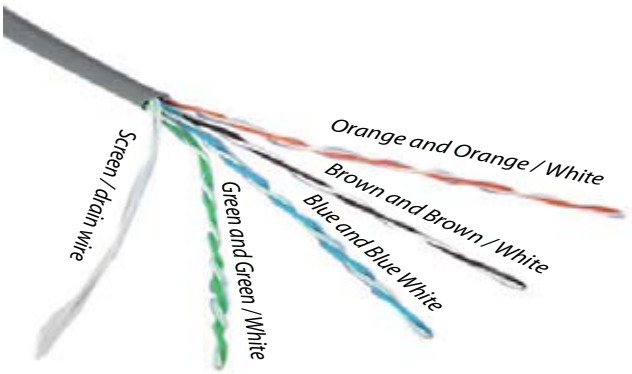
Note different colour code for transmit cable conductors: White, Black and Green. Previous cable had .red, black and green coloured conductors.

Figure 13 – Gland Assembly - RJ-45 type Cable Connectors

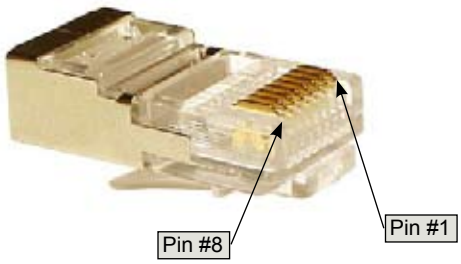
Replacing / Repairing an RJ-45 Connector

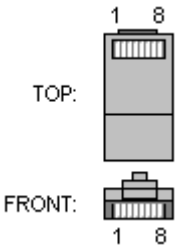
If one or more of the RJ-45 connectors gets damaged during the installation process, the connector can be easily replaced. Wiring details and colour codes used are shown below.

The CAT5E cables used in the transducer cable follow standard CAT5 colour codes but the RJ-45 plug wiring is specific to the BTxR and does NOT conform to T568A or B.:



RJ-45 Plug Pin Number	CAT 5 conductor colour
1	Orange
2	Orange / White
3	Green
4	Green / White
5	Blue
6	Blue / White
7	Brown
8	Brown / White
Case	Screen / drain wire (solder)





Mounting Instructions – Transceiver

Transceiver Installation Considerations

For maintenance purposes, the PCB assembly can be removed from the case in situ. Always leave at least 600 mm clearance at the faceplate end cover to allow the PCB assembly to be withdrawn from the case.

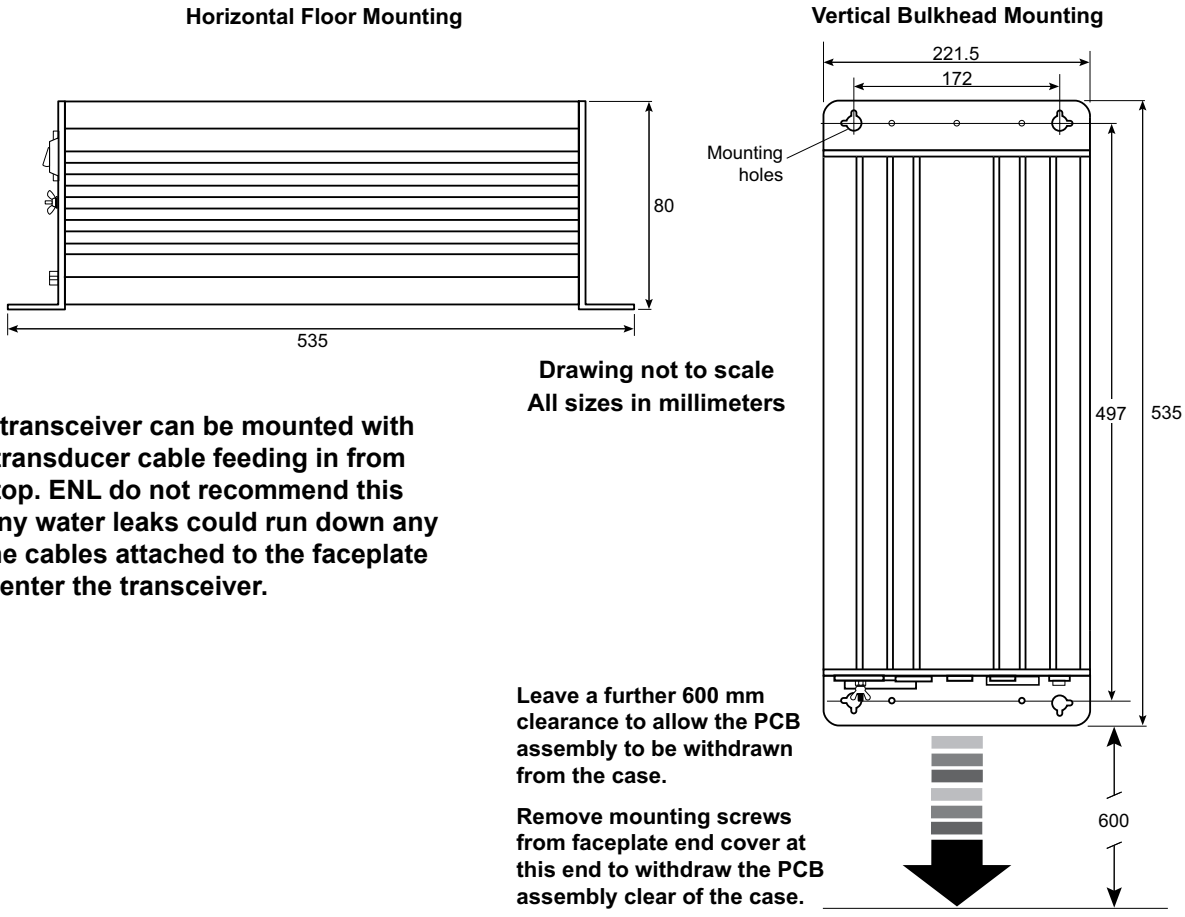
Transceiver Installation

Using the mounting flanges on the end covers, the transceiver can be mounted vertically on a bulkhead, or horizontally on the floor. See Figures 6 and 14 for transceiver dimensions and mounting clearances.

1) Using the mounting holes on the mounting flanges, secure the transceiver to the mounting surface.

2) Connect the following cables to the faceplate end cover. See **Interface Connections** for cable connection details:

   - Transducer cable to Transceiver. See page 26 for details.
   - Personal Computer CAT5 cable to Transceiver
   - 24V DC power to Transceiver



CAUTION

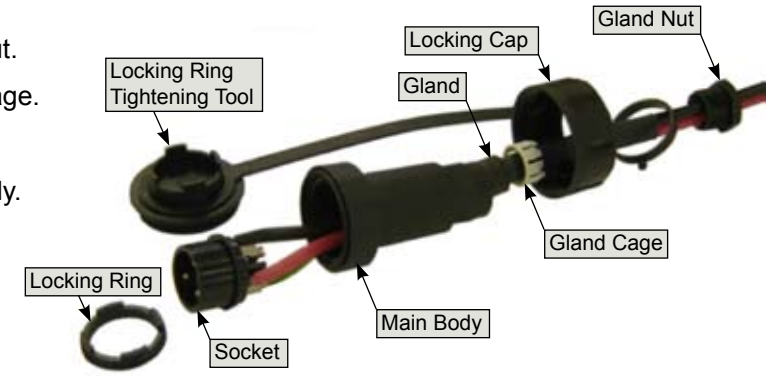
The transceiver can be mounted with the transducer cable feeding in from the top. ENL do not recommend this as any water leaks could run down any of the cables attached to the faceplate and enter the transceiver.

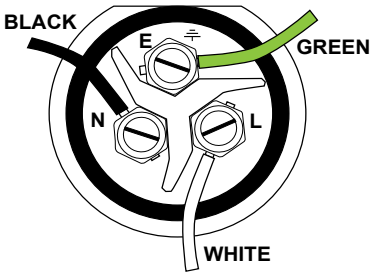
Figure 14 – Transceiver Mounting Diagram

Transmitter Cable Socket Assembly

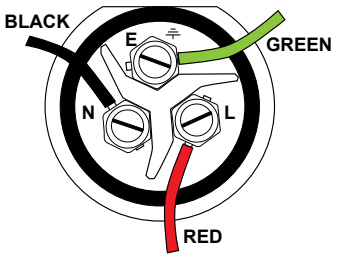
If the transmitter cable socket needs to be disassembled, use the locking ring tightening tool supplied with the BTxR to loosen the locking ring. To assemble the 3-pin sealed plug:

- Gland Nut.
- Gland Cage.
- Gland.
- Main Body.





Later cable colour code



Early cable colour code

1) Push the following parts over the transmitter wires:

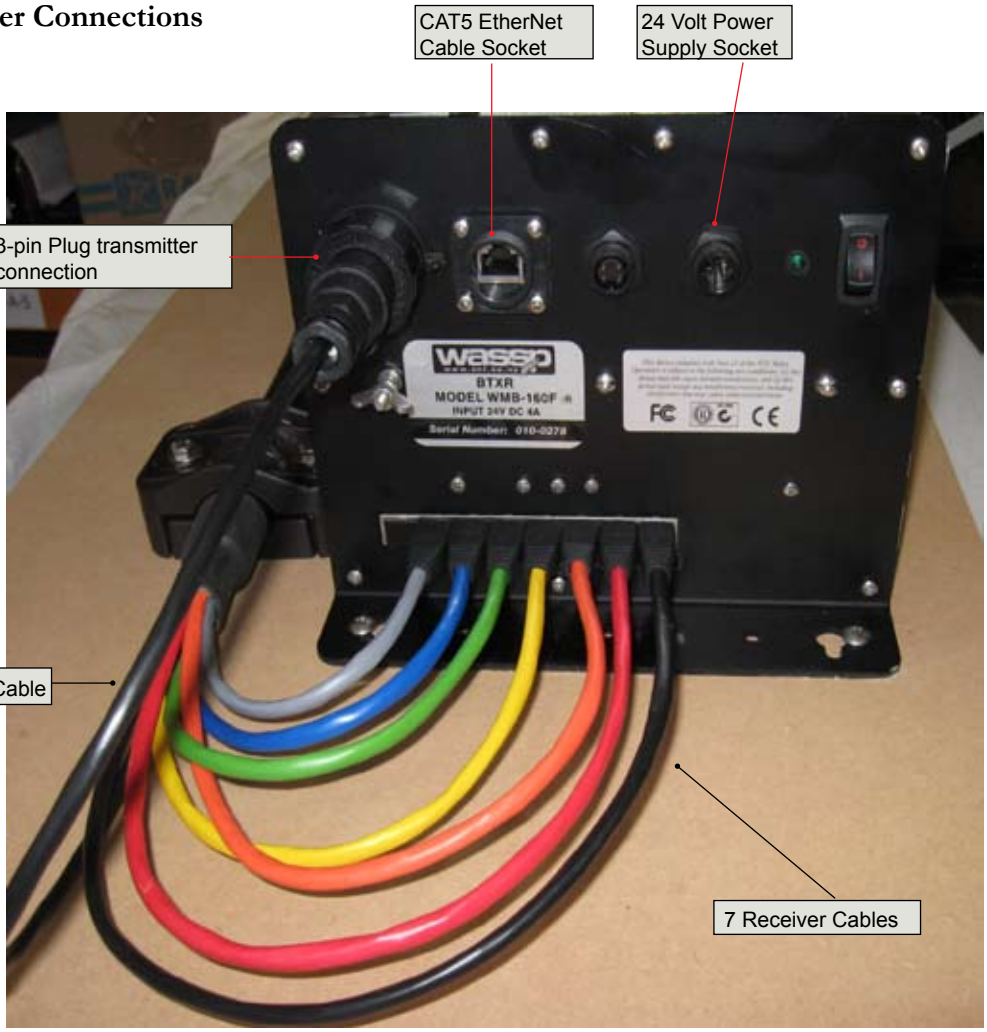
2) Attach the RED or WHITE wire to **L**, the BLACK wire to **N**, and the GREEN wire to **E** on the socket and tighten all three screws.

3) Push the socket into the main body, making sure that the flat on the socket locates into the flat on the main body.

4) Using the tightening tool, screw the locking ring into the front of the socket until tight.

5) Push the gland, gland cage, and gland nut into the main body as far as it will go and tighten the nut securely.

RJ-45-Type Transceiver Connections



CAUTION

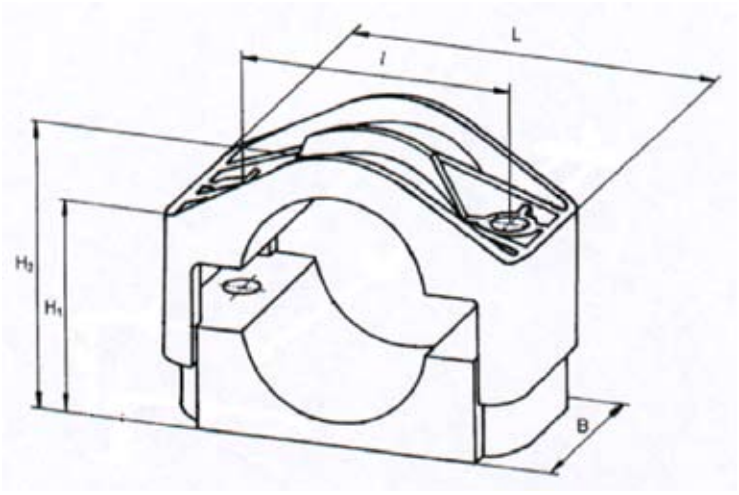
The seven receiver cables MUST be connected in the order shown. Failure to do this will result in faulty operation of the WASSP system.

Figure 15 – Transducer to RJ45-type Transceiver Cable Connections

CAUTION

The transceiver cable MUST be fitted with the supplied cable clamp to prevent strain on the RJ-45 connectors where they plug into the front of the BTxR.

Figure 16 – RJ45-type Transceiver Cable Clamp



H1	H2	l	L	B
34-46	45-57	60	90	60

Figure 17 – Cable Clamp dimensions

Mounting Instructions – Satellite Compass

Satellite Compass Installation Considerations

For GPS input data, ENL recommend a Furuno SC-30 satellite compass. The model SC-30 consists of:

- An antenna unit in closed radome housing.
- An Interface Unit.

Make sure the SC-30 has been selected as the **Positioning Sensor** in the WMB-160F user interface (See **Satellite Compass Software Set Up** on Page 32):

1) Click the **System Configuration** icon.
2) Click the **Technician** button.
3) Click the **Ship Setup** button.
4) Click the **Positioning Sensor** list and select **Furuno SC30/SC50**.

See **Satellite Compass Software Set Up** for a detailed set of procedures.

For full details on mounting the units of the SC-30, see the Furuno documentation supplied with the equipment:

Furuno Satellite Compass, Model SC-30 Operator's Manual.

Interface Connections

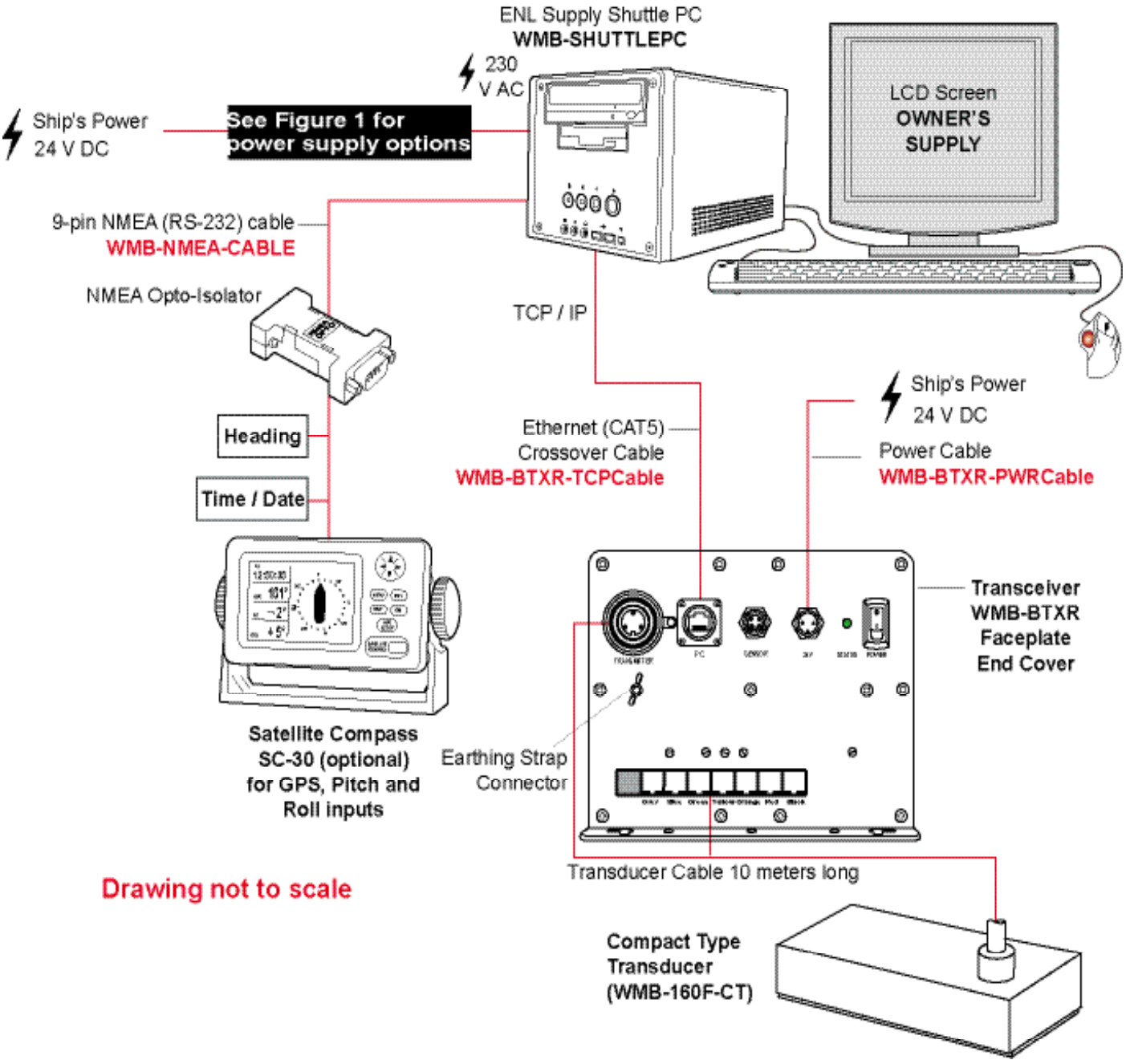


Figure 18 – WMB-160F Transceiver Interface Connections RJ-45 Type BTxR

Computer to Transceiver

A CAT5 ethernet crossover cable, with RJ-45 connectors, connects the transceiver to the computer through the connector socket on the transceiver's faceplate end cover marked **PC**.

Power to Transceiver

24 V DC power is input to the transceiver from the vessel's power supply through the connector on the transceiver's faceplate end cover marked **24V**.

The power input uses a Switchcraft-EN3 2-way connector to connect to the face-plate end cover. See below for connection details.

Pin No.	Colour
1 (+)	RED or CLEAR
2 (-)	BLACK

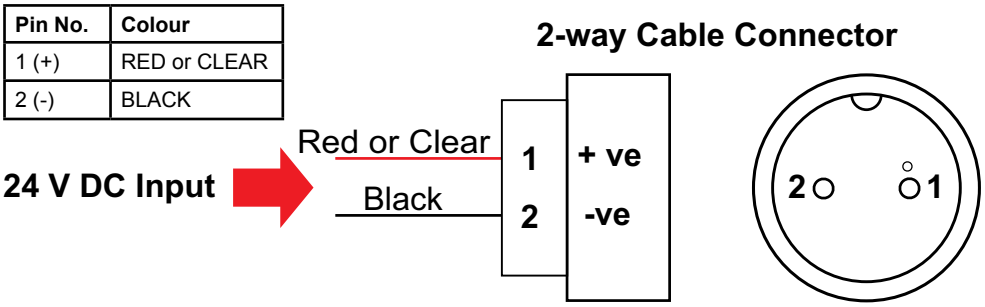


Figure 19 – Transceiver 24 V DC Input Connector Pin out Diagram

CAUTION

NMEA sentences need to be converted from current loop, to the RS-232 that is used by the computer.

If the data sources (talkers) do not have the capability of doing this themselves, a data converter must be used.

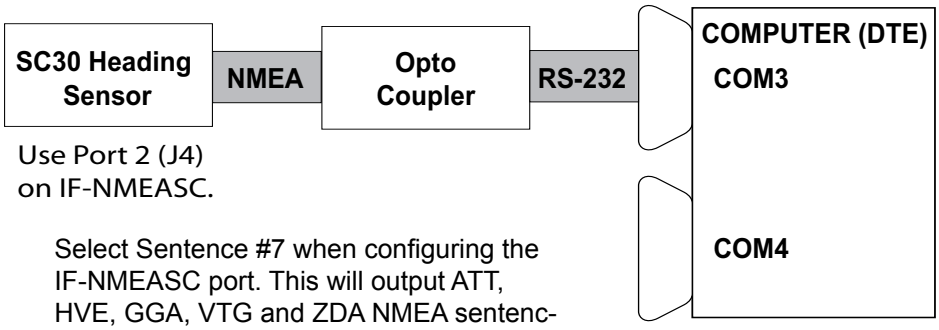
Data cables should be run from existing sensors on the vessel to the two of the three serial ports at the rear of the computer (COM 1, COM 3, and COM 4) using 9-pin female D connectors, terminated as shown in Figure 21.

NMEA Interconnection

The WMB-160F uses information from the GPS position and ships true heading to create the sea profile displays. This information is normally available on the vessel from existing sensors. If heading is not available, the GPS course over ground can be used instead, though this will seriously affect the accuracy of the seafloor profiling.

The WMB-160F will extract the required data from NMEA format input sentences. The NMEA sentences accepted by the system are: ATT*, GGA, GGL, HDT, HDG, HVE*, RCD, RMC, VTG, ZDA, PSXN, PFEC-GPatt, PFEC-GPhve, PASHR.

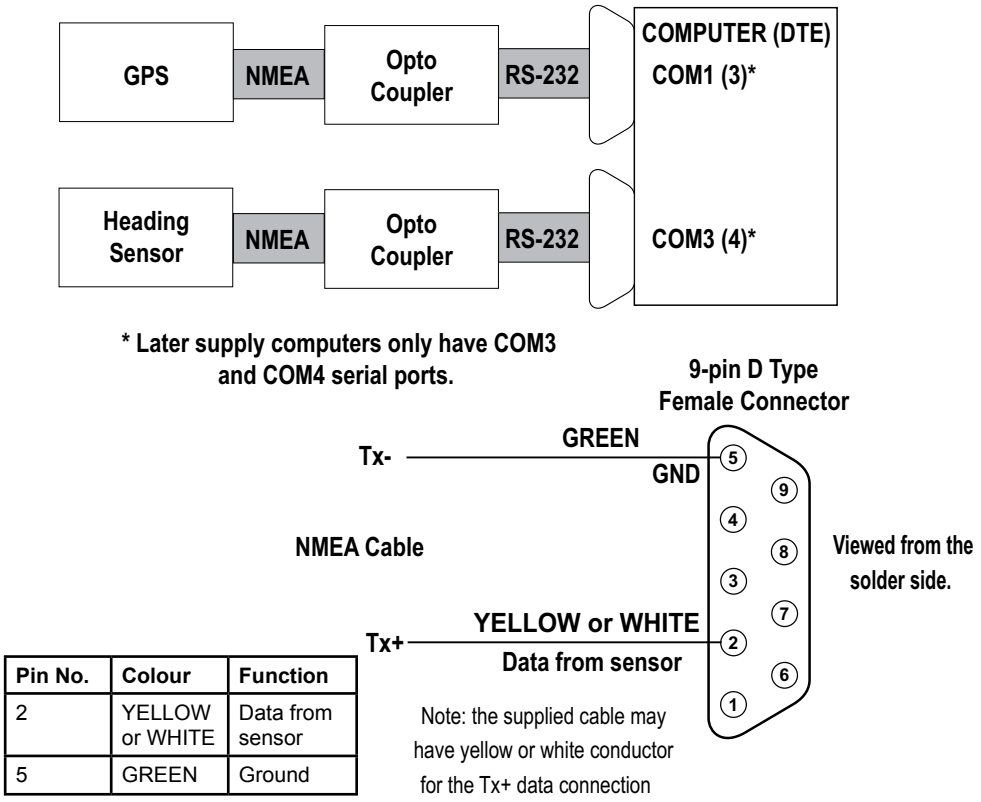
If an SC-30 with IF-NMEASC Interface Unit is installed, route the NMEA information to the computer. Only one cable is required. See below for configuration detail:



Select Sentence #7 when configuring the IF-NMEASC port. This will output ATT, HVE, GGA, VTG and ZDA NMEA sentences. Set baud rate to 38400bps and interval to 25ms.

For full details on connecting the SC-30 inputs to the computer, refer to the **Furuno Interface Unit, Model IF-NMEASC Operator's Manual,** supplied with the equipment.

* Furuno proprietary sentences



Pin No.	Colour	Function
2	YELLOW or WHITE	Data from sensor
5	GREEN	Ground

Figure 20 – NMEA Connections and Pin out Diagram

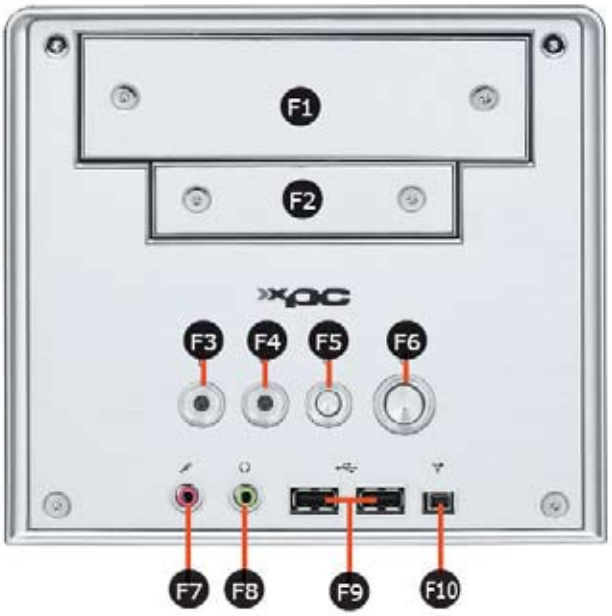
NMEA Sentence	Description
ATT	True heading, pitching, rolling (Furuno proprietary sentence)
GGA	Global positioning system (GPS) fix data.
GLL	Geographic position, Latitude and Longitude
GNS	GNSS fix data
HDM	Magnetic Heading (obtained by adding magnetic variation to HDT)
HDT	True Heading
HVE	GPS antenna up-down motion amplitude (Furuno proprietary sentence)
ROT	Rate-of-turn data
VDR	Set and drift
VTG	Course over ground and ground speed
VHW	Water speed and heading
VBW	Dual ground/water speed
ZDA	Time and date

Table 3 – NMEA Sentences

Shuttle PC

The WASSP system is supplied with a Model SG31 Shuttle PC.

Note: The Shuttle PC front may be black, not silver as shown..



F1. 5.25" Bay
F2. 3.5" Bay
F3. HDD LED
F4. Power LED
F5. Reset
F6. Power Switch
F7. Mic
F8. Headphone
F9. USB2.0 Ports
F10. Mini IEEE1394

Figure 21 - Shuttle PC Front View

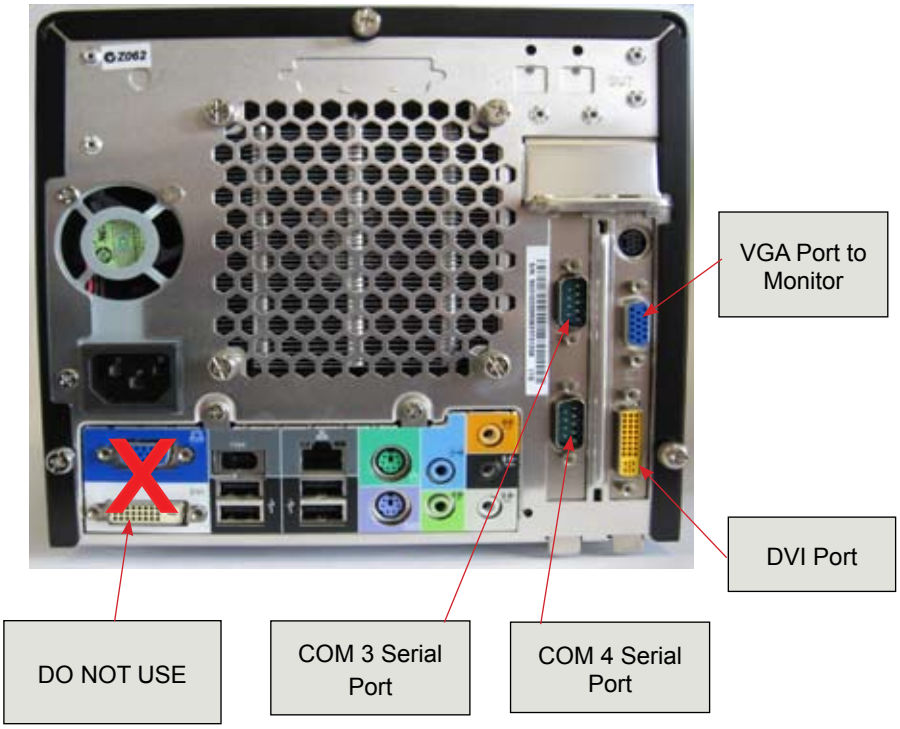


Figure 22 - Shuttle PC Rear View - connections

Software Installation

Your WASSP system is supplied with the following software fully pre-loaded onto the computer:

- Windows XP operating system and all device drivers required by the WMB-160F Sonar system.
- WMB-160F Sonar system software program.

Re-installing the WMB-160F System Software Program

Before re-installing the WMB-160F software program you need to start up the system. See **Start Up / Shut Down Procedures** on Page 56.

If you have to re-install the WMB-160F system program on to your computer:

- Start your WASSP computer.
- Close the WASSP application software.
- Check that your WASSP dongle is unplugged. If not, unplug it now.
- Plug the WASSP dongle back in again.
- Wait a few seconds for the install wizard to start up.
- When the Auto Run box removable disk appears, select “Open with Windows Explorer”
- Select “ Setup.exe” and “run”
- When finished double-click the WMB-160F icon on your desktop. 

User Dongle

To run the system, you must connect the supplied WMB-160F user dongle. If you do not have a dongle attached to the system you will not be able to run the WMB-160F program with transceiver input or GPS input. The software prompts you that a dongle is not connected.

If operating without a dongle you can play recorded WMB-160F data files, regenerate contour maps, and view the five displays. The **mode** button has the text DEMO to show that you cannot operate the transducer or transceiver.

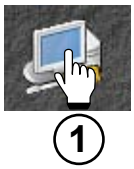
If you attach a dongle after running the WMB-160F software program, restart the WMB-160F program.

For a complete description of the WMB-160F Multi-beam Sonar System program functions, refer to the WASSP **Operator Manual.**

Satellite Compass Software Set Up

If a satellite compass is used as the positioning sensor it must be selected in the WMB-160F program. Follow the steps below to set the user interface up for an SC-30 satellite compass:

Note: The transceiver does not need to be running to set up the SC-30 as the satellite compass.

STEP	PROCEDURE	SCREEN
1	With the WMB-160F program running, click the **System Configuration Utility** icon on the **Menu** task bar. The System Configuration Utility window opens.	
2	Click **Technician**. The Technician Utility box appears.	
3	Click **Ship Setup**. The **Ship Setup Options** box appears.	

STEP	PROCEDURE	SCREEN

4 In the **General** tab, click the **Heading Type** drop down list and select **SC30/SC50** from the list.

5 Click the **Positioning Sensor** drop down list and select **Furuno SC50** from the list. The SC50 setting is used for both SC50 and SC30

6 Click the **Motion Sensor** drop down list and select **Furuno SC50** from the list. The SC50 setting is used for both SC50 and SC30.

7 Click **Close**.

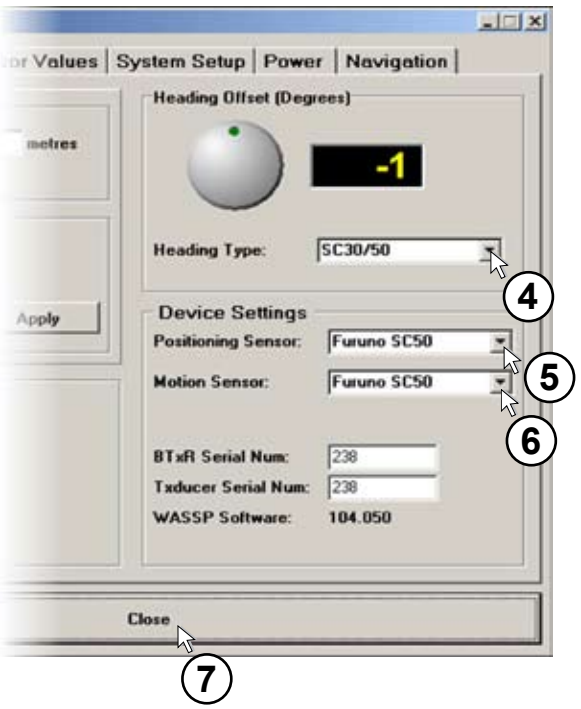
The **Ship Setup Options** box closes.

8 In the **Technician Utility** box, click **Close**.

The **Technician Utility** box closes.

9 In the **System Configuration Utility** box, click **Close**.

The **System Configuration Utility** box closes, displaying the user interface screen again.



Software / Firmware Upgrades

Software / Firmware upgrades are supplied on a CD, USB memory stick or via download from the Internet. When you run the new install programme, the WMB-160F Install.exe program automatically performs a system check and compares the current versions of software and firmware against the versions in your system.

Depending on the versions of software and firmware installed in your system, the install program has a number of responses:

If the install program supports the versions detected in your system then a box is displayed similar to this:

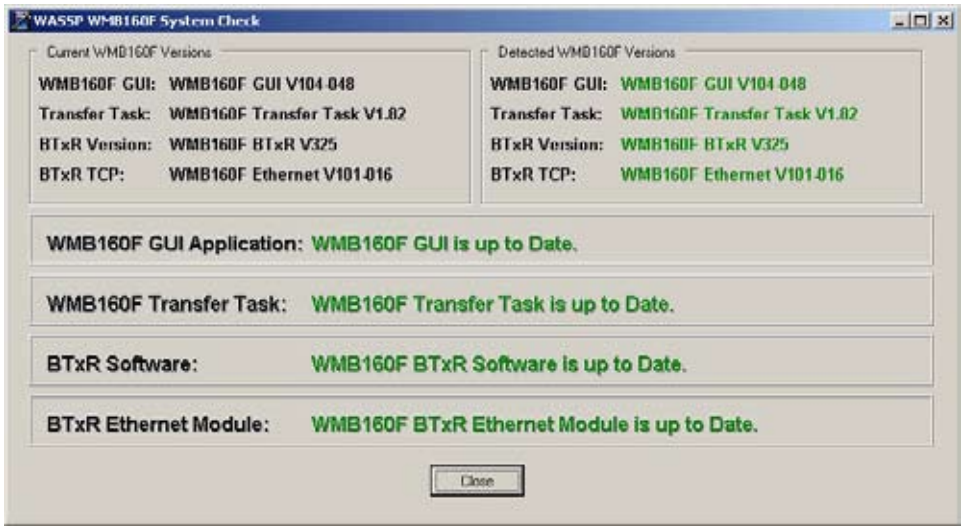
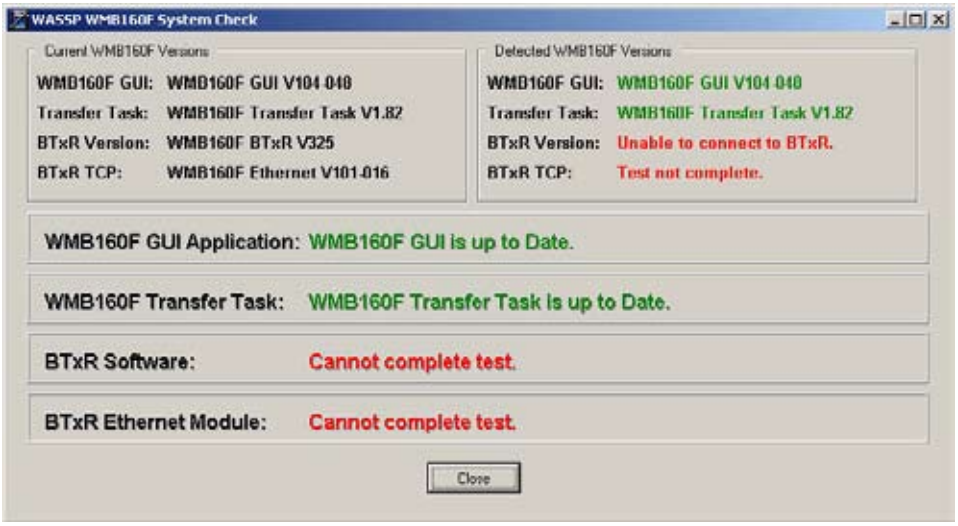
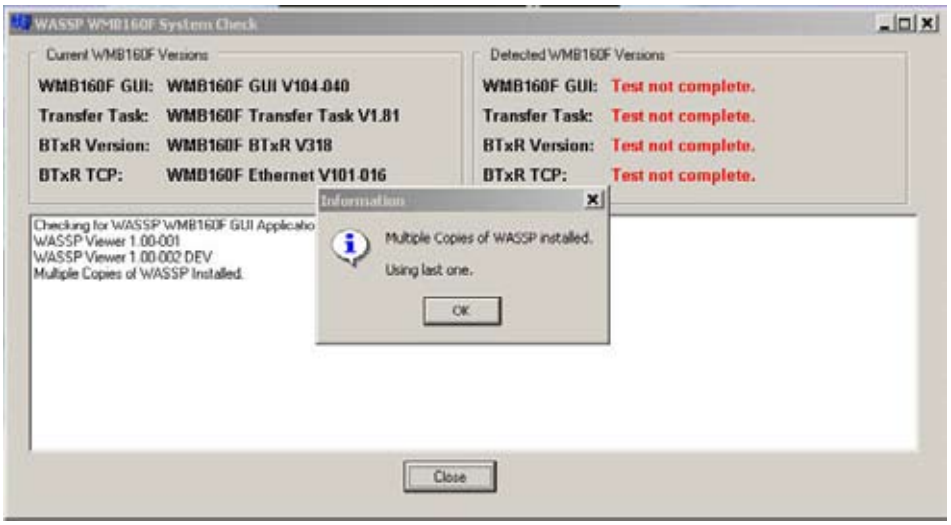


Figure 23 – WMB160F System Check Screen

If the install program supports the versions detected in your system, **but the BTxR is not connected**, then a box is displayed similar to this:



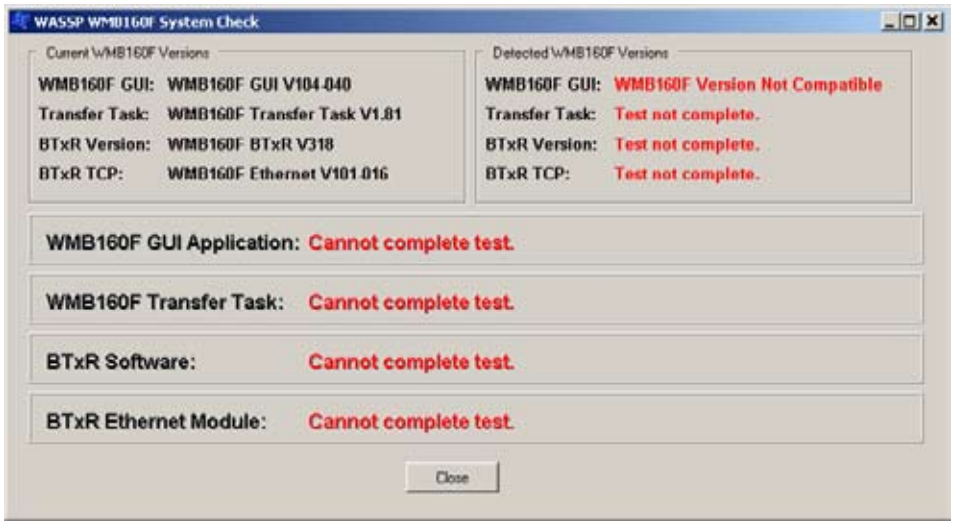
If, while the system check is running, **multiple copies of the WMB-160F system software and firmware are detected**, an Information box informs you of this and states that it is using the last one for comparison.



As the installer will use the first WMB-160F application installed, which may be the wrong one, it is usually better to click OK and then remove all existing copies from your system before going any further.

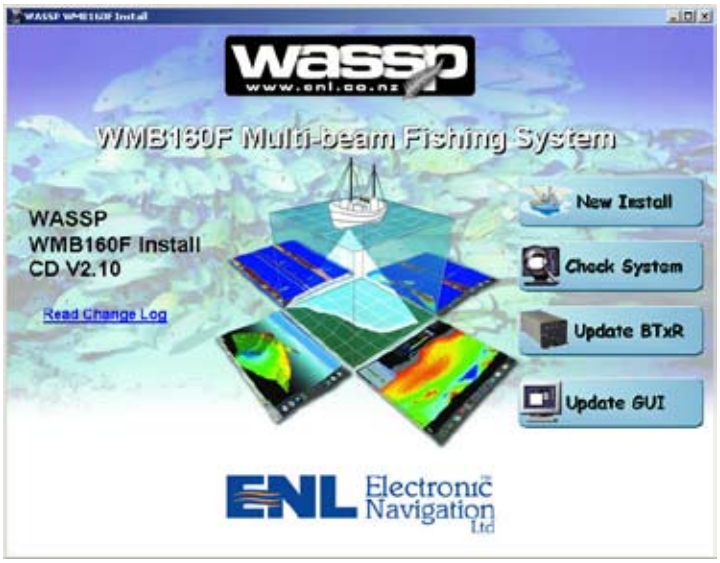
This is not an issue if there is only one WMB-160F application installed.

If the install program does not support the versions detected in your system (existing system is older than the install program supports, or older USB version is still running), then a box similar to one of these is displayed:



After the system check has been performed and you have closed the System Check box, the install program user interface displays. The following four buttons are available for installing or upgrading your system. These are:

- New Install.
- Check System.
- Update BTxR.
- Update GUI.



Click the **Read Change Log** link to open a description of the system changes that have occurred to update the system to this version.

New Install

Clicking the **New Install** button displays a **Warning** box.

This box informs you that performing a new install will overwrite existing setup information and your configuration settings will be lost. It also requests that you remove any previous WMB-160F installations before continuing.

Clicking OK displays a setup wizard that allows you to install the latest version of the WMB-160F system. Follow the steps to install.

Check System

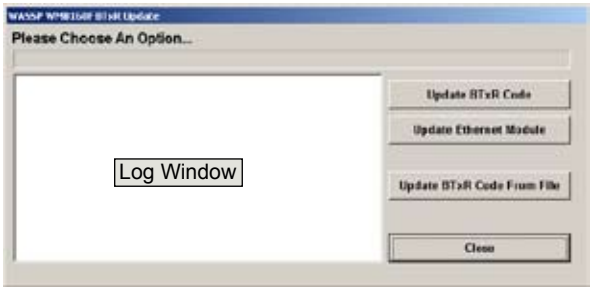
Clicking the **Check System** button performs a system check (Figure 24) identical to the system check performed when you opened the install program.

Use Check System to confirm that your software and firmware are up-to-date after an install or upgrade.

Update BTxR

Clicking the **Update BTxR** button displays a BTxR Update box with the following update options available:

- Update BTxR Code.
- Update Ethernet Module.
- Update BTxR Code From File.



Clicking one of these buttons starts a process that is logged in the log window.

Update BTxR Code

Clicking this button starts the update process and automatically selects the BTxR code from the installation software.

Update Ethernet Module

Clicking this button starts the Ethernet module update process.

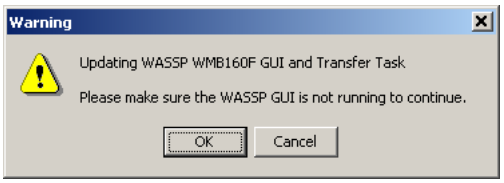
Update BTxR Code From File

This button performs the same function as the Update BTxR Code button, but allows you to browse for the specific file you want.

Update GUI

Clicking the Update GUI button displays a Warning box.

This box requests that you make sure the WMB-160F is not running while performing the GUI update and transfer task.



If the GUI is not running, clicking OK automatically starts updating the GUI software.

Pre-commissioning Procedures

Note: The computer must be started before the satellite compass.

Pre-commissioning procedures consist of ensuring the required software is loaded and the display and network settings correctly set. This is generally only required if the supplied computer settings have been changed or another computer installed.

Required Software

- Windows XP.
- Latest graphics drivers for your graphics card.
- WASSP WMB-160F program version 50.

Required Display Settings

1) If running, close the WASSP WMB-160F program.
2) Right-click in the Windows desktop and click **Properties**.
3) Click the **Settings** tab.
4) In the **Colours** drop down box, set the colour to 32 bit.

Recommended Display Settings

1) Set the screen resolution (**Screen area**) to 1024x768.
2) Click the **Screen Saver** Tab
3) Select Screen Saver **(None)**.
4) Click the **Power…** button.
5) Configure the power management settings so the monitor and hard disks never turn off automatically.
6) Click **OK** (to close the **Power Options Properties** box).
7) Click **OK** (to close the **Display Properties** box).

Network Settings

If using an Ethernet WMB-160F version you must ensure the LAN settings are correct.

1) In the **Control Panel**, open **Network Connections**.
2) View the Properties of the Local Area Connection that the WMB-160F is connected to.
3) Select **Internet Protocol (TCP/IP)** (install if not present).
4) Click **Properties**. Select **Use the following IP Address** and input the following:

   IP address: 192.168.65.10
   Subnet mask: 255.255.255.0
   Default gateway: (leave blank).

5) Click **OK** (to close this window).
6) Click **Close** (to save these settings).

Serial Transfer Task Settings

The Serial Task Transfer box has two tabbed pages for configuring serial transfer settings:

- NMEA Settings tab page. See Figure 24.
- WASSP Settings tab page. See Figure 25.

The NMEA and WASSP tabbed pages allow you to configure a number of NMEA and WMB-160F set up and communication port settings.

To open the Serial Task Transfer box and enter the NMEA and WMB-160F set up and communication port settings:

1) Right-click the **Serial Transfer Task** icon on the Windows Task bar.

2) Click **Setup**.

   The Serial Transfer Task box opens.

3) In the NMEA Settings and WASSP Settings tabbed page configure the **Network Setup** and **NMEA Com Port Settings**.

Note: If the Serial Transfer Task icon is not available on the Task Bar, click Start > Programs > WASSP WMB160F Transfer Task.

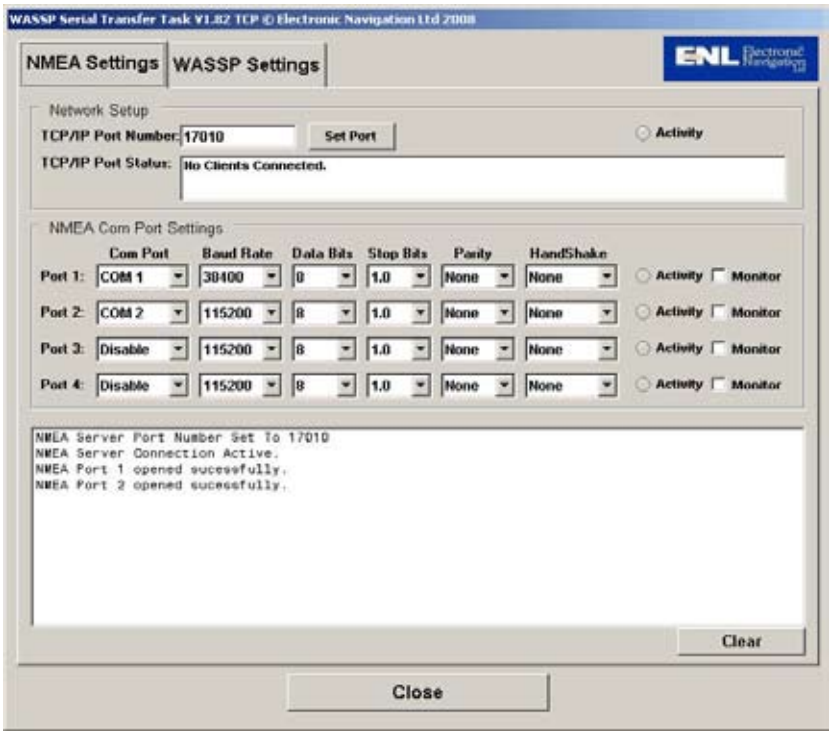


Figure 24 – NMEA Settings Tabbed Page

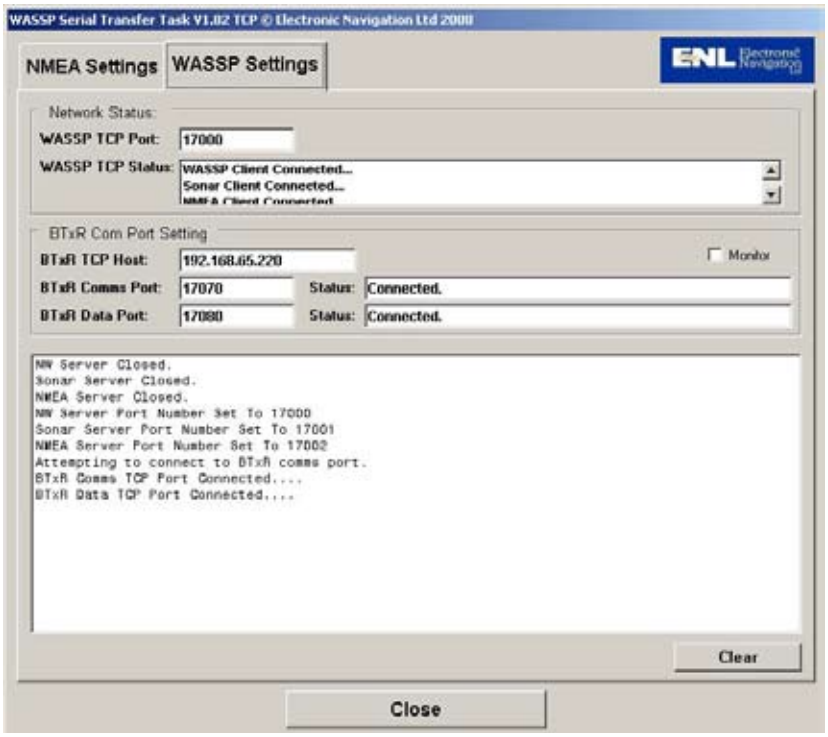


Figure 25 – WASSP (WMB160F) Settings Tabbed Page

Commissioning Procedures

Commissioning should be performed by a trained WMB-160F technician immediately after installation of the system.

The commissioning procedures are designed to be carried out in sequential order. If a test fails, fix the system until that test can be completed satisfactorily before continuing. Failure to do this may invalidate the commissioning procedure. Commissioning procedures are divided into two sets:

- Dockside Tests.
- Sea Trials.

A. Dockside Tests

The first part of the commissioning procedures requires a number of **dockside tests** to confirm that the WMB-160F system is installed and operating correctly, before actually taking to sea.

Ship Measurements

Take measurements on the vessel between the vessel's reference point, the GPS antenna, and the transducer's receiver face. These measurements must be as accurate as possible. The accuracy of these measurements has a direct effect on the accuracy of depth soundings. Enter these values in the spaces below, and on the **Offset Corrections** tab in the **Ship Setup** box. See Figure 26:

	A _____	
Transducer Tx Depth (Draft) Displacement:	B _____	m
GPS X Displacement from reference:	C _____	m
GPS Y Displacement from reference:	D _____	m
GPS Z Displacement from reference:	E _____	m
Transducer Tx X Displacement from reference:	F _____	m
Transducer Tx Y Displacement from reference:	G _____	m
Transducer Tx Z Displacement from reference:		m

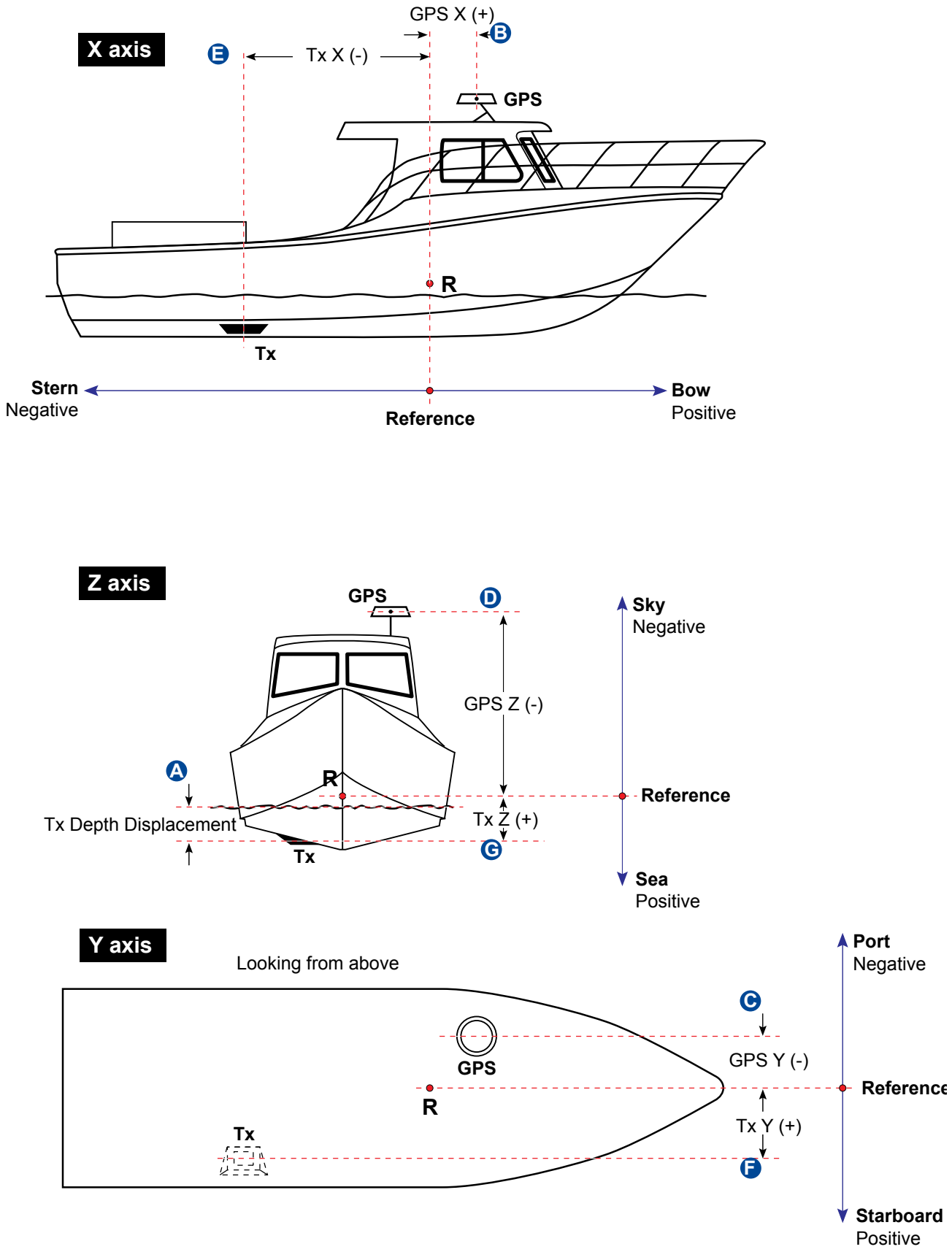


Figure 26 – Ship Measurements Diagram

Advanced Technician Utilities

The Advanced Technician Utility forms part of the System Configuration Utility. The advanced set up operations are only accessible when a technician's dongle is connected to the P.C. and should only be performed by a trained technician.

The advanced set up options do not help the system operator to use the system. Any changes made to the options are more likely to hinder operation. They are mainly available to allow advanced diagnosis of the system and to help trouble-shooting any problems it may have.

CAUTION

These functions can adversely affect the performance of the WMB-160F system. Read this section carefully as any changes you make may not be recoverable.

To enter the system configuration utility. See Figure 27:

1) Click the **System Configuration Utility** button.

   The system configuration utility window opens.

2) Click **Technician**.

   This opens the Technician Utility box.

3) Click Options.

   This opens the Options box.

4) Click BTXR Options

Advanced Technician Options

By default, the advanced technician options are pre-configured to optimal settings. Caution is advised as changing these options can drastically affect the performance of the WMB-160F system.

The **Beam Forming** and **Data Decimation** dialog boxes provide a list of the default values to enable a technician to return the system back to its factory settings if it becomes necessary. The default values are:

- FFT Window: **DolphChebychev**.
- Suppression **-30 dB**.
- Depth for 2: **20**.
- Depth for 4: **80**.
- Integration Factor 1: **2**.
- Integration Factor 2: **2**.
- Integration Factor 3: **2**.
- Percent Water Column to Ignore: **3.0**
- Maximum Gap Acquiring width: **4**
- Maximum jump for WMT v. Depth: **30%**

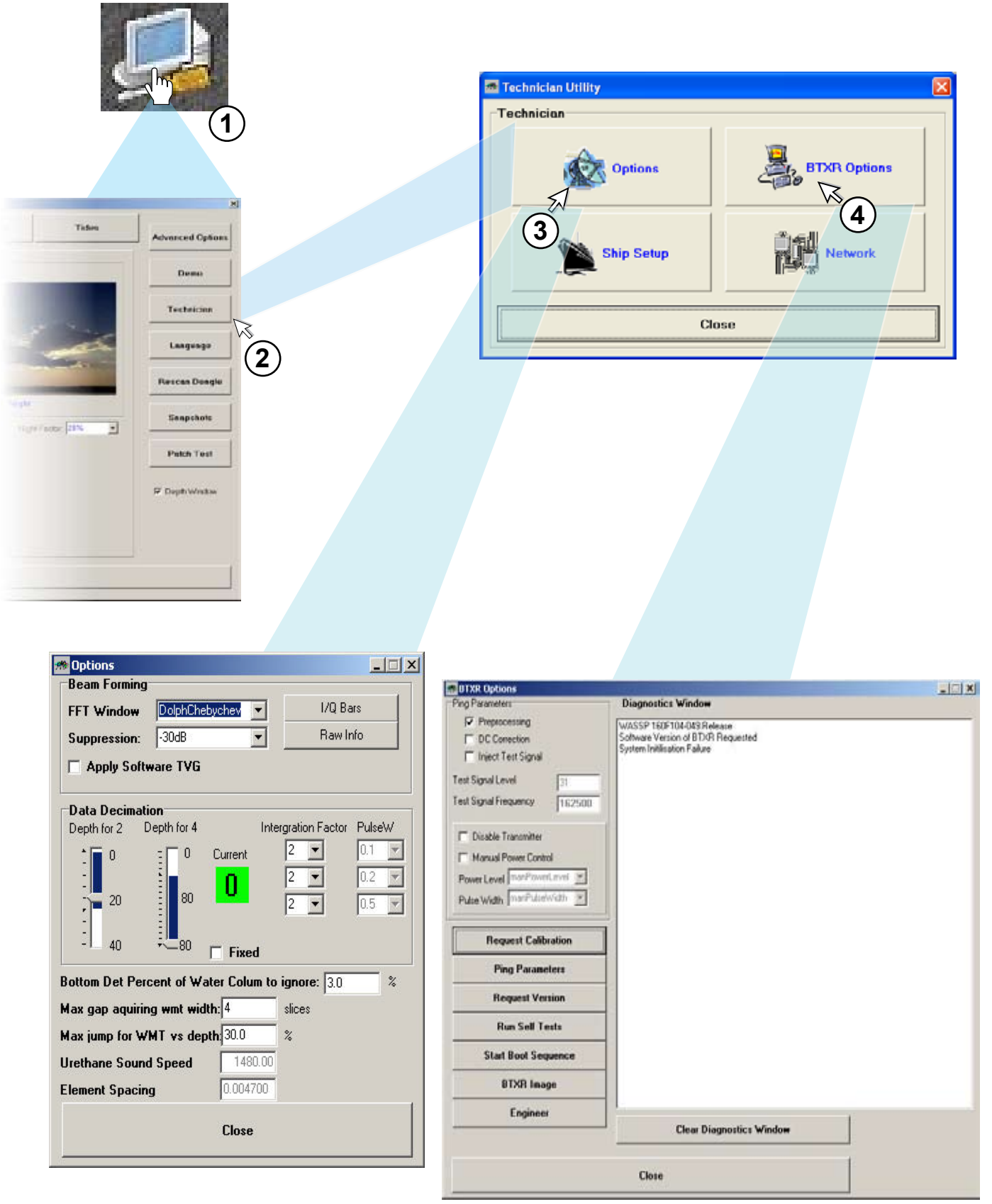


Figure 27 – Technician Utility – Showing Options Available with a Technician Dongle Connected

The remaining data values shown in the **Options box** are for information only and cannot be changed.

The **Beam Forming** dialog box also provides access to two ways of visualizing the information collected from the transducer. These are the I/Q Bar Graphs and Raw Information Graph. See Figures 28 and 29 for details.

Note: The I/Q Bars and the Raw Info boxes can also be accessed directly by clicking the Advanced Options button. See Figure 32.

BTXR Options Box

The **BTXR Options** box provides the installing technician with a number of additional diagnostic tools to help with troubleshooting installation problems.

Request Calibration forces the BTxR to perform a new calibration routine

Ping Parameters reloads the BTxR with the default set of ping parameters.

Request Version provides a read-out of the current WASSP software version plus the DSP Board software revision and NetBurner software revision numbers.

Run Self Tests is not currently functional. Running this test will not do any harm, but the test results have no meaning.

Start Boot Sequence performs a “warm start” on the BTxR - i.e. the BTxR will run through the same start-up sequence but without turning the power off and on.

BTXR Image is used to load a new version of the BTXR firmware.

Engineer - This option should not be used. **Do not** make any changes to any of the parameters in this box.

WMB-160F Program Settings

1) Start the transceiver and run the WMB-160F program. See **Start Up / Shut Down Procedures** on Page 57.

   With the transceiver ON, configured and connected correctly, the system should now be ready to acquire data.

2) When displaying **TX**, click the **Mode** button to begin pinging.

3) Check that the button animates to show transmission is in progress.

Commissioning Test 1: Channel Gain

The **I/Q Bar Graph** is used to diagnose issues with the transducer. In general operation the I/Q graph is mostly unreadable, although any major problems with any of the transducer elements would be reasonably easy to spot (such as one of the channels not being connected to the receiver board).

The **Channel** drop down box allows for a channel to be selected to form a reference for the other channels. The top bar graph is a double sided bar graph referenced to the selected channel. The lower bar graph is an absolute bar graph of the value received on that channel. As the data comes in throughout the duration of a ping, the display instantly changes. The **I channel** is displayed in LIGHT BLUE and the **Q channel** is displayed in GREEN. The letters along the lower axis are directly linked to the respective 26 channels on the receiver board and the transducer elements. The slider bar to the right of the bars controls the gain of the display. UP increases the gain, while DOWN decreases the gain. See Figure 29.

1) Click the **I/Q Bar**s button in the **Beam Forming** box. If the **I/Q Bars** box is blank, then the WMB-160F system is not acquiring data.

2) Use the **slider bar** on the side of the box to adjust the lower 52 bars so that they fill about a third of the form height.

   Ensure there are no extreme (more than 200%) changes in signal strength across the channels. The display should update regularly and the values should fluctuate, but if any bars are full ON or full OFF there is a problem that you need to resolve before continuing.

The source of problems identified in this test is most likely to be in the connections from the transducer cable into the transceiver receiver board. If a wire/connector is loose or has lost some of its insulation you will likely see a blank or very high channel.

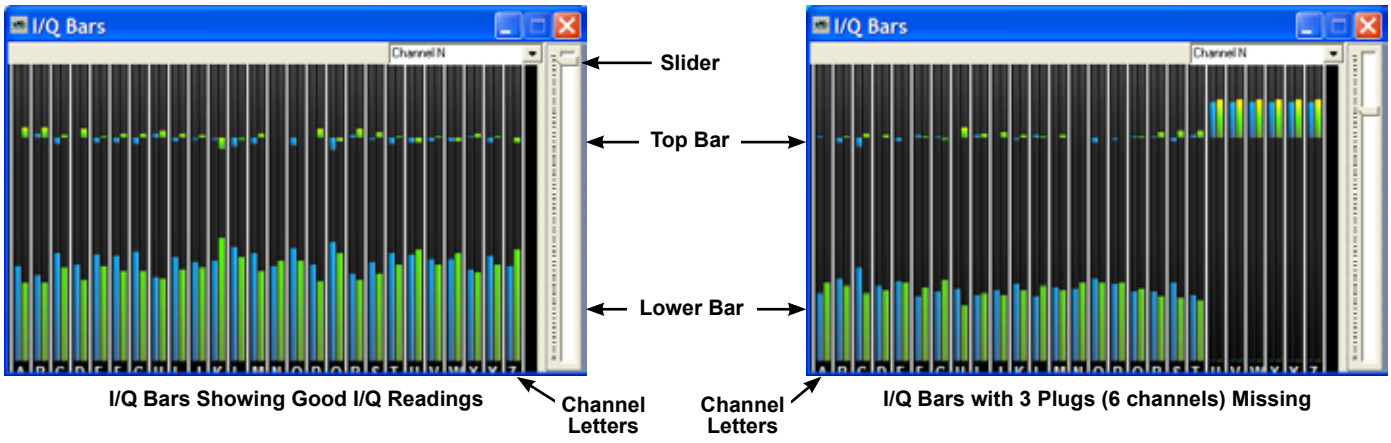


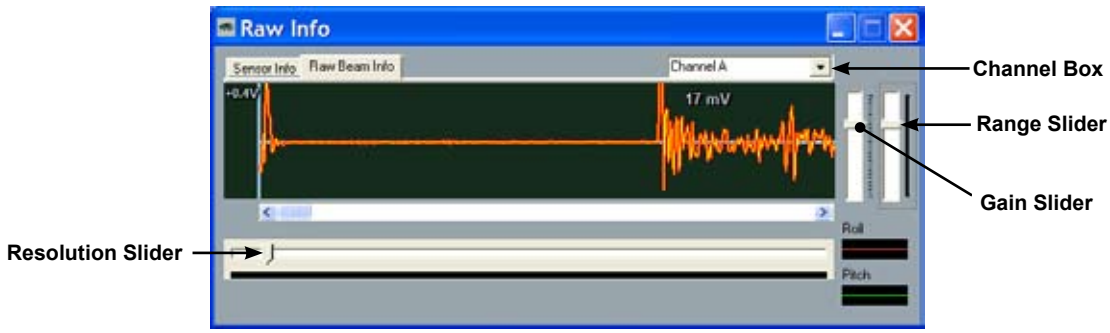
Figure 28 – I / Q Bar Graphs

Commissioning Test 2: Channel Signal Function

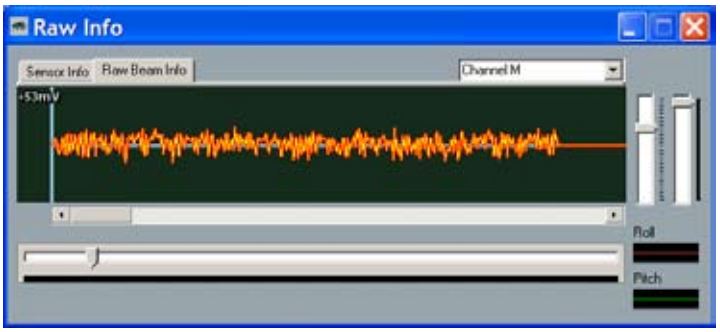
The **Raw Beam Info** tab shows a voltage graph of signals received over a single ping. The sliders at the bottom of the box allow you to change the horizontal resolution of the graph, allowing you to fit signals onto the screen that would otherwise be lost off the end of the screen.

You can select the desired channel from the **Channel** box. The slider on the right-hand side of the box allows you to modify the gain of the graph. The screen in Figure 30 shows a typical transmission pulse with a reasonably weak bottom return, which is a typical shape. When functioning correctly, all 26 channels should display very similar information to each other.

Click the **Raw Info** button on the technician **Options** box to open the **Raw Info** box. Click the **Raw Beam Info** tab. Adjust the gain and range of the graph so that the graph's maximum range only just fits on the axis. The graph should have a small ripple at the beginning followed by a relatively blank period and then a strong pulse with a rippling tail. This strong pulse is the return from the seafloor. Use the selections in the Channel box to view channels A to Z. Check that all of the channels have similar shaped waveforms on them. If any have non random noise, significant DC offsets or are without the correct general shape, resolve these problems electrically (check connections).



Expected Waveform Shape



Abnormal Waveform Shape

Figure 29 – Channel Signal Function Diagram

Commissioning Test 3: Electrical Noise

Before running the following tests, with the advanced technician **Options** box open, make the following changes if necessary. See Figure 31 below:

1) Set the **FFT Window** to: DolphChebychev.

2) Set the **Suppression** to: -30 dB.

3) Set the three **Integration Factor** boxes to: 2.

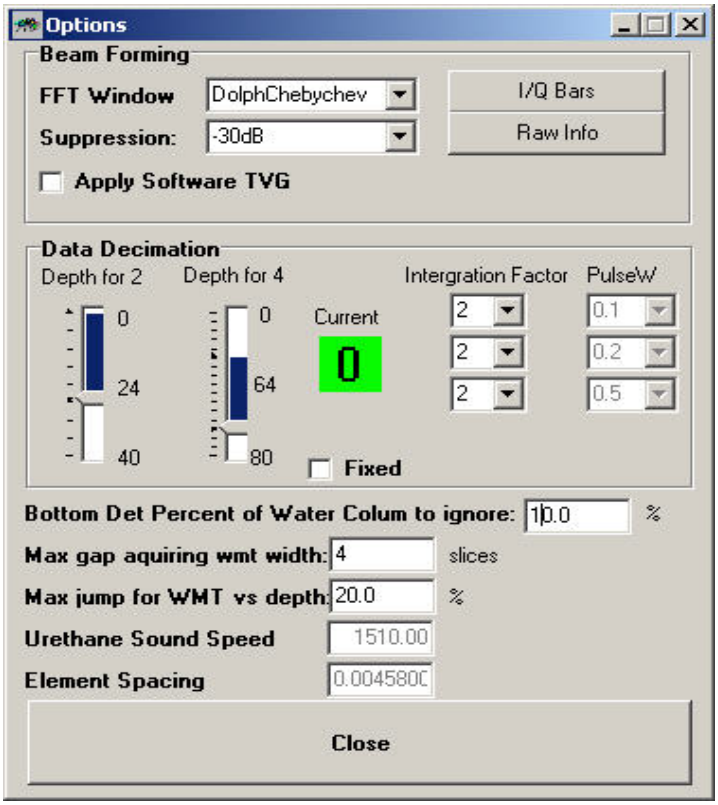


Figure 30 – Options Box

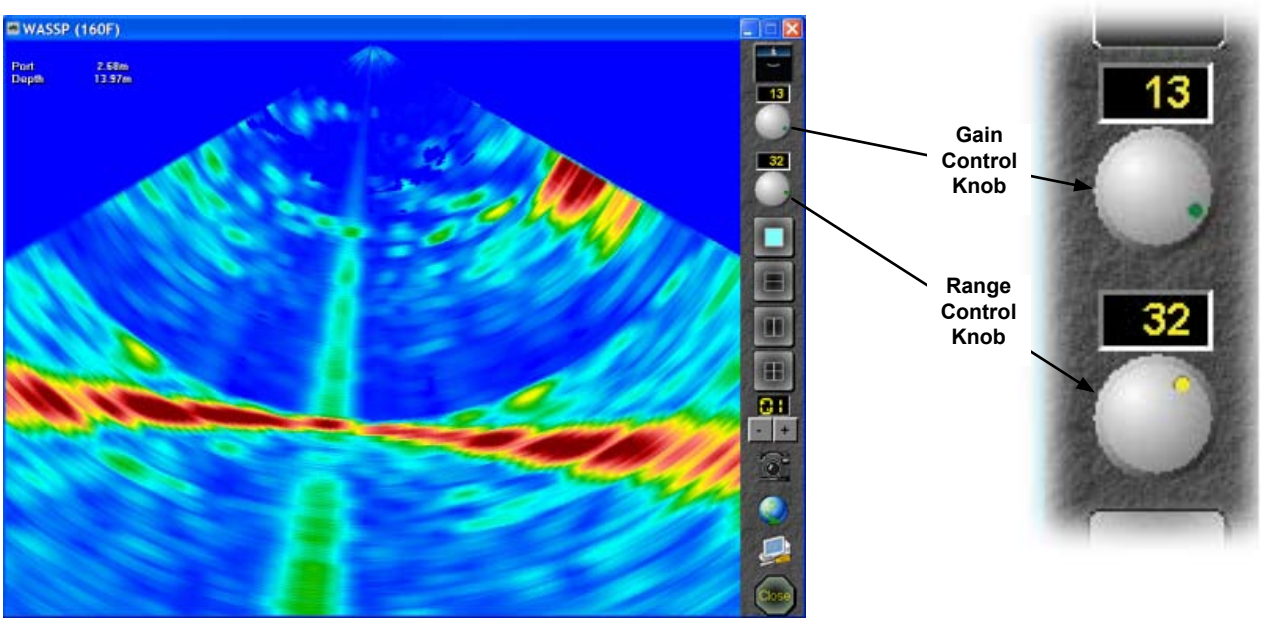
Close the **Options** and **Advanced Options** boxes and then carry out the following. See Figure 31:

1) Open a Sonar display as a full screen display.

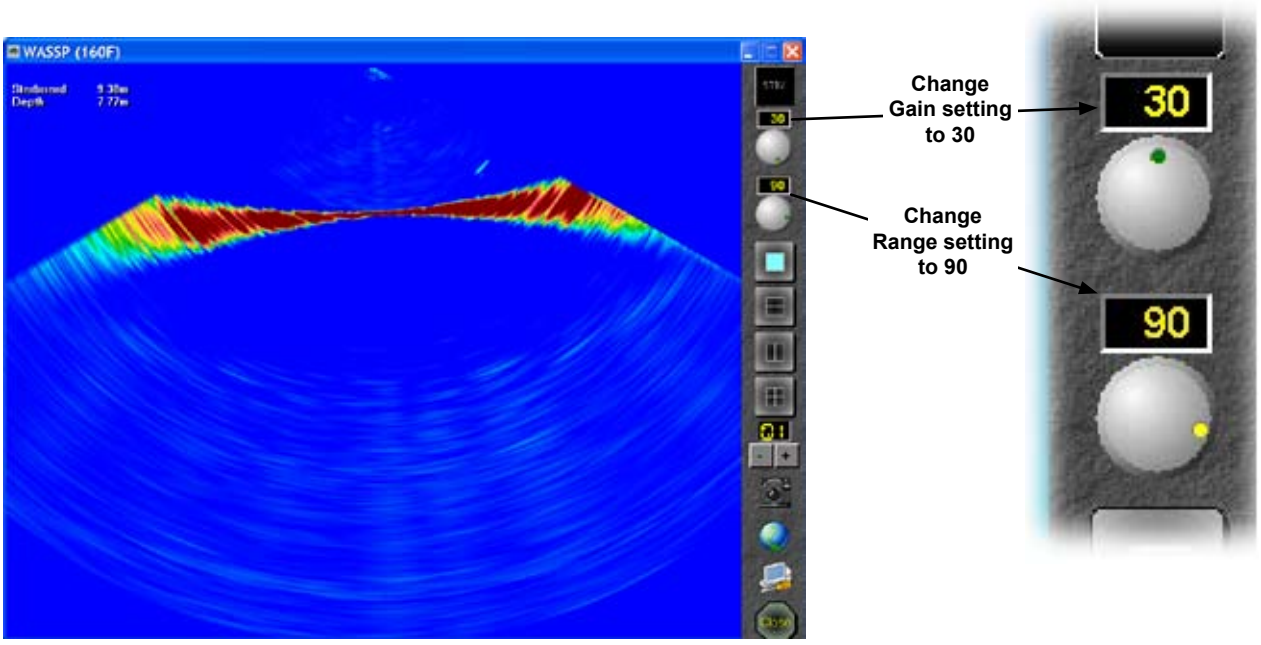
2) Enable manual range control on the **Range Control Knob** and change the range dial to 90 m.

3) Change the gain to 30 on the **Gain Control Knob**.

Check the centre line of the Sonar display for a consistent signal. If present this is evidence of noise signals common to all channels. If this noise can be clearly seen as more than a faint blue-white vertical line on the display, it is likely that all of the receiver channels are picking up electrical noise. If the display is relatively clean move to the next test. The most likely cause of noise problems is incorrect termination of the transducer cable grounding and screening.



System with Significant Electrical Noise



System with Low Noise

Figure 31 – Electrical Noise Level Indications on Sonar Display

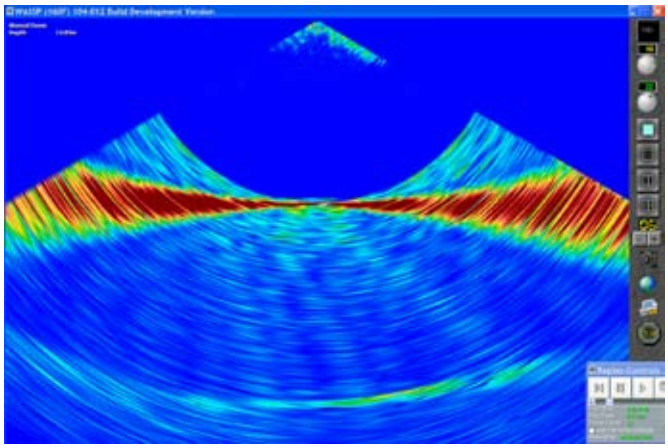
Note: Test 4 is also required for bottom detection to track correctly.

Commissioning Test 4: Side Lobe Levels

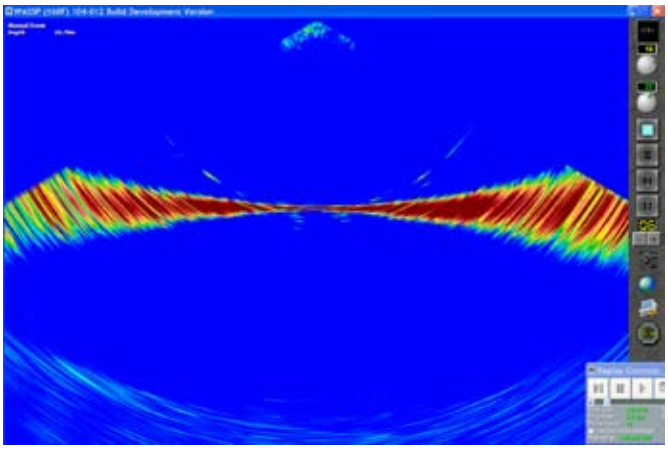
Minimisation affects the translation of echoes to lateral (athwart - both sides) positions on the display. The individual elements of the transducer receive an echo at minutely different times and amplitudes. These differences are used to determine where the display should represent this echo. Minimisation affects one of the parameters used in this calculation. If the setting is too low there will be excessive side lobes, meaning echoes will be spread too wide. If this setting is too high then some echoes will be suppressed. **Values of 2000 to 10,000 work best**.

In the Sonar display, check the side lobes. This is best checked in a minimum of 10 metres of water below the transducer with power level set to ≈4 to 7, any less and it will be difficult to see a problem. Side lobe levels should be YELLOW/BLUE while the seafloor is RED with Minimisation at 0. Set the Minimization at a level as low as possible, but where the side lobe levels are negligible on the display. This value should be between 2000 and 10,000. See Figure 33.

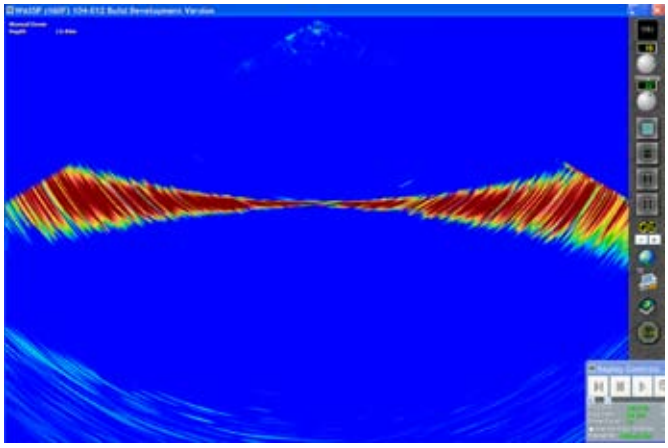
If Minimisation set to 10,000 does not totally remove all side lobe signals on the sonar display it is possible something is wrong. Confirm that the transducer has been mounted so that there is no obstruction to either the 120° transmission angle or the face of the receiver array. (Refer Figure 2). If the keel of the boat obscures the 120° angle you may need to conduct this test at sea.



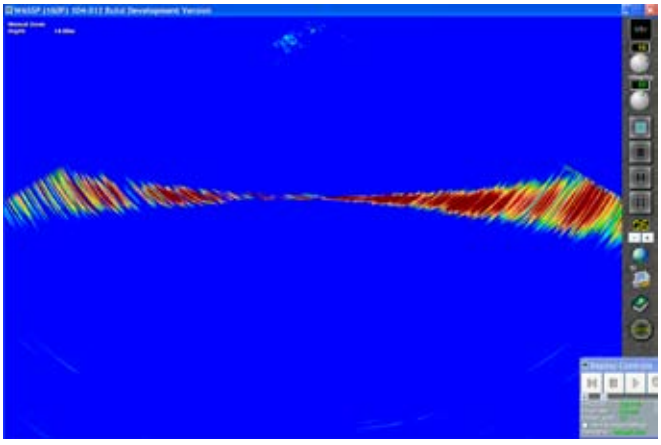
No Minimisation



Light Minimisation



Full Side Lobe Suppression



Too Much Minimisation

Figure 32 – Side Lobe Levels

Advanced Options:

Default values for the Advanced Options are:

Interference Filter: Enabled

Minimisation: 3000

Smoothing: 2

Interference Filter - The Interference Filter enables reduction in interference caused by other ultrasonic sub-sea acoustic devices such as sounders. It also provides some noise filtering. It is recommended that the interference filter be left selected (ON) on if you have another sounder or sonar on your vessel that operates at the same time as the WMB-160F. Best results are achieved if all other sounders are turned off.

Set the Interference Filter Level to High when encountering strong interference, and Low when the interference is weak.

Smoothing - Smoothing only affects the single beam view. It allows averaging of the individual seafloor samples in the longitudinal (fore-aft) direction to eliminate the quantised or pixelated effect that would otherwise be visible on the single beam view. Generally, the best value for smoothing is 2.

Minimisation - Minimisation describes the filtering process used to remove sidelobe signals. Sidelobe generated signals show up as a ring on the sonar view where the transmission pulse first strikes the seafloor, or as a mirror of features on either port or starboard.

Sidelobe generated features can confuse the sonar picture making it hard to interpret. Too much minimisation can also distort the sonar image.

Clutter - Clutter describes the filtering process used to remove low level (noise) signals. The control sets the threshold for the minimum signal level that will be displayed.

Normalise Sonar Displays - Ticking the Normalise Sonar Displays check box boosts the overall system gain to compensate for the weaker signal returns when working in deeper water. This effectivley gives a “brighter” bottom display. Default condition is box unchecked.

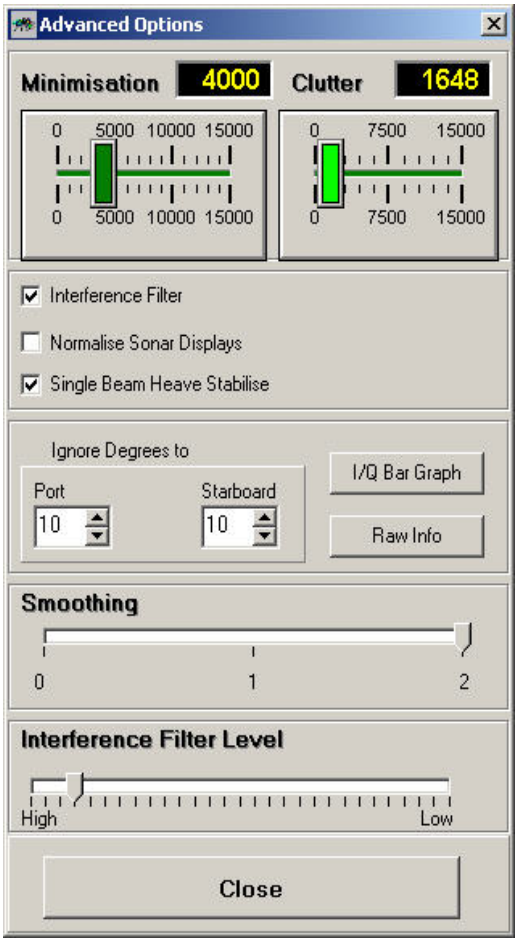


Figure 33 – Advanced Options Box

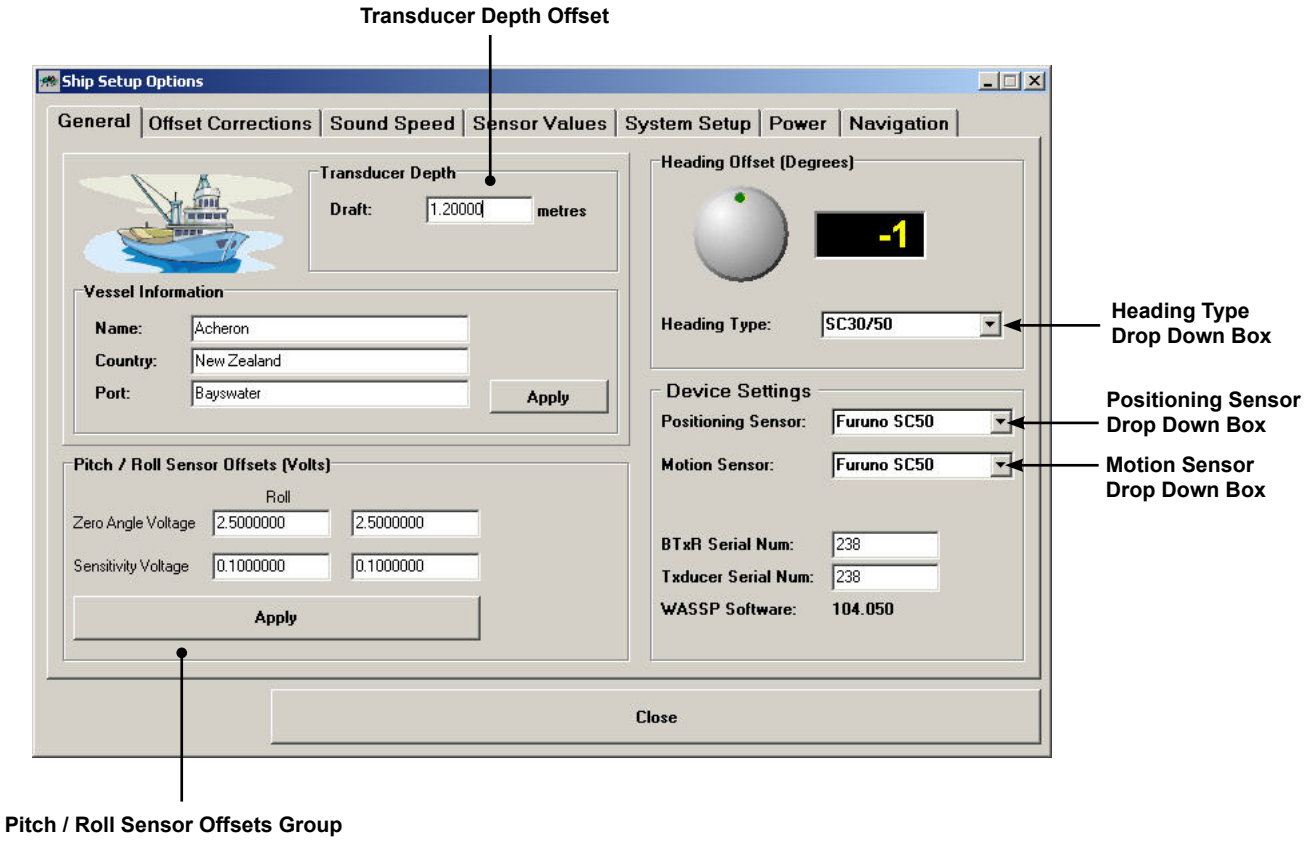


Figure 34 – Sensor Selection Settings

Commissioning Test 5: Sensor Selection

In the **Ship Setup Options** box, click the **General** tab to select the appropriate **Heading Type**, **Positioning Sensor**, **Motion Sensor** and any magnetic offset if using HDG. If an analog roll sensor is connected to the transceiver (**Pitch / Roll Sensor Offset**), enter the **Zero Angle Voltage** and **Sensitivity Voltage** values. See Figure 35.

Return to the user interface (main display) and select the contour view. If the NMEA settings are correct a small boat icon in the centre of the contour view screen will display with a YELLOW heading line.

Commissioning Test 6: Heading (Yaw) Offset

If possible use a known gyro compass or magnetic device along with known magnetic deviation to calculate the ships heading accurately (within 1°). Compare this value with the **Heading** value shown in the **Text Box** at the top left of the user interface. If these values are different apply a heading offset to compensate in the **Heading Offset** group box in the **General** tab. See Figure 36.

The system is now ready for sea trial commissioning procedures. This requires the vessel to leave the dock and perform some basic manoeuvres. The deeper the water the more accurate the tests can be. Aim for at least 20 metres of water.

1) Compare the Heading on the WMB-160F user interface (102°) with a gyro heading or known good heading (101°).

   The vessel compass can be used if accurate and the magnetic variation is known.

2) Adjust the Heading Offset setting in the General tab of the Ship Setup Options to bring the reading into line with the ship's compass.

WMB-160F Heading:	**102°**
Known Good Heading:	**101°**
Heading Offset:	**–1°**

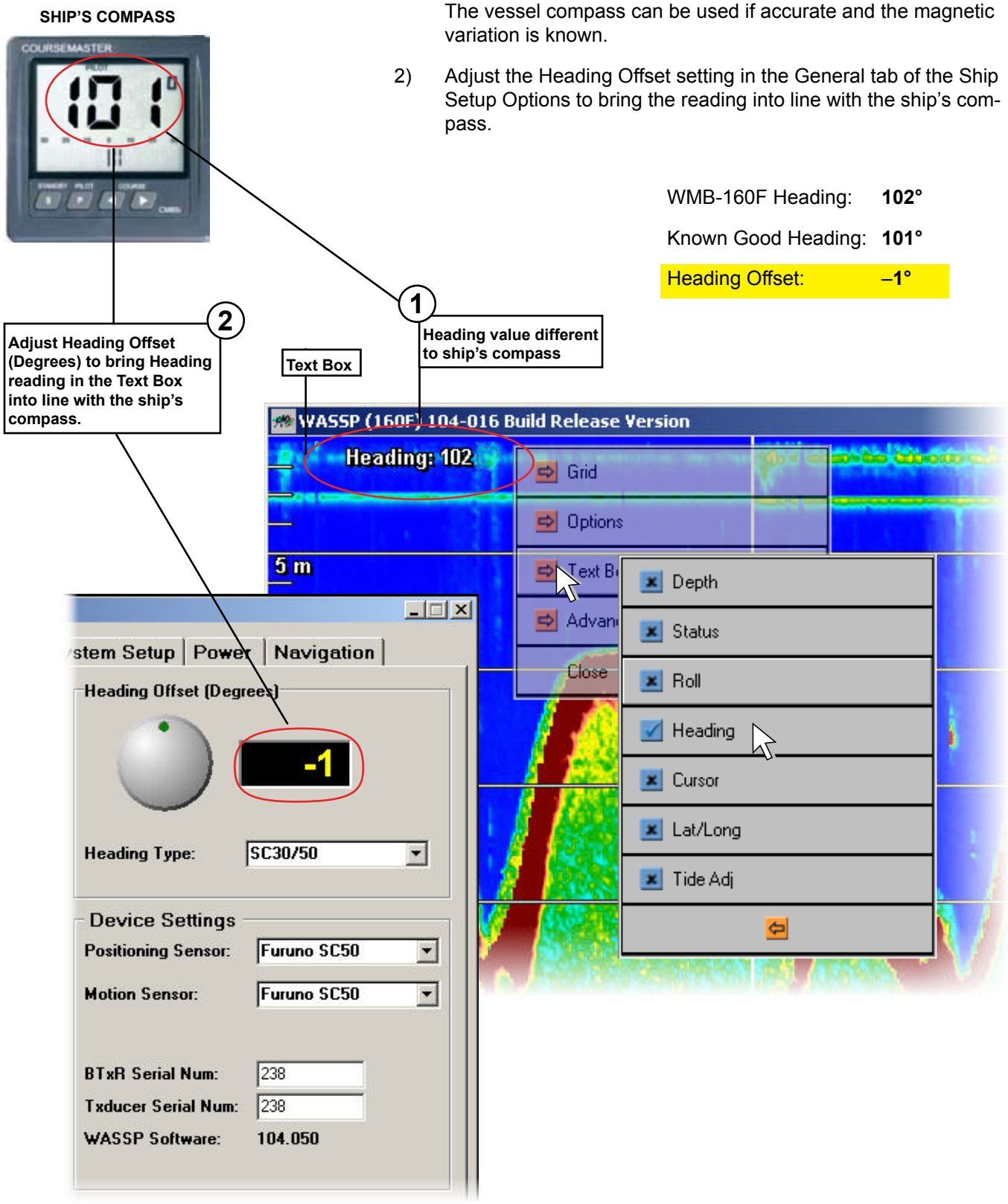


Figure 35 – Heading Offset Settings

B. Sea Trials

The second part of the commissioning procedures requires taking the vessel on a short **sea trial**.

Sea Trial Commissioning Step 1: Array Polarity

With the WMB-160F running and displaying the sonar view, determine if the right side of the sonar display shows topography that is on the starboard side of the vessel.

If you are unsure of the nature of the sea floor you will need to find a feature such as a rock, bank or significantly sloped sea profile. Use the contour view to navigate and cross your own track in opposite directions over this feature. If the display seems incorrect, change the polarity of the **Swap Array** check box in the **Ship Setup Options**, **Sensor Values** tab and record the new value below. See Figure 37.

Swap Array Selected	Yes	/	No

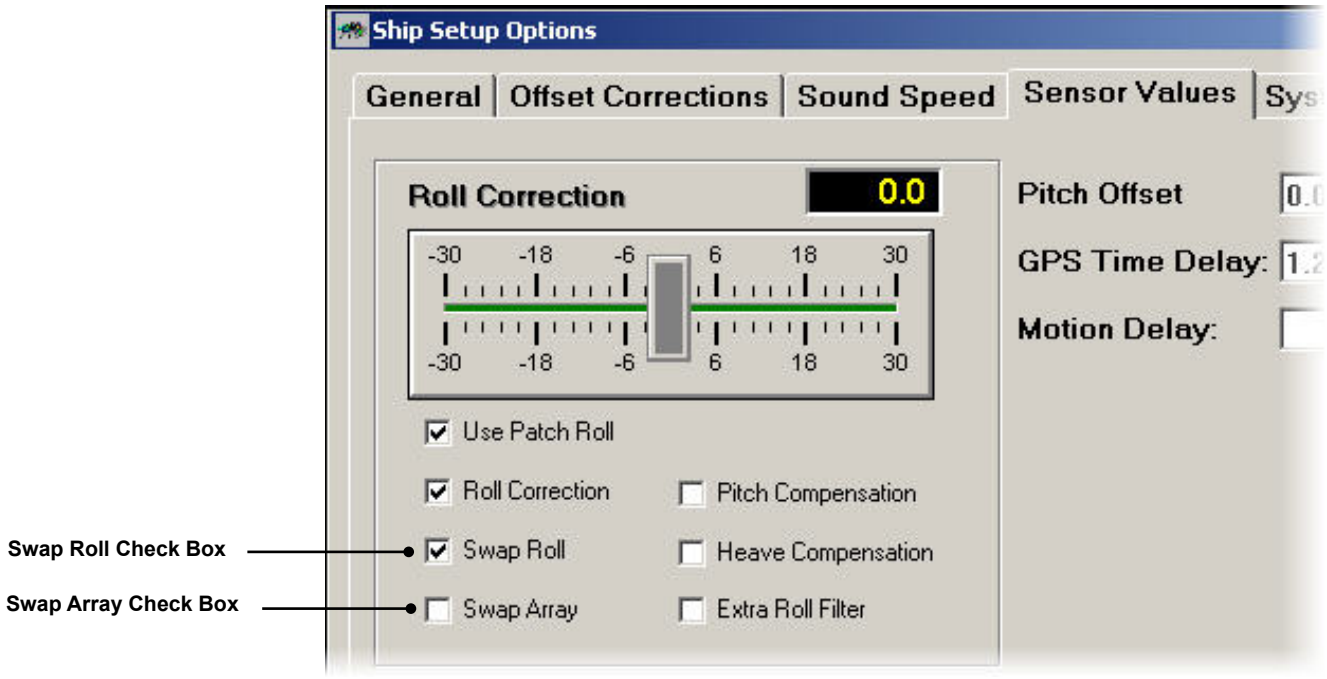


Figure 36 – Swap Array and Swap Roll Check Boxes

Sea Trial Commissioning Step 2 : Roll Correction Polarity

Watch the **sonar** view carefully when the vessel is subject to some roll. Once the patch test (see Step 3 and Figure 38) is completed, if the roll polarity is correct the sea floor shown on the **sonar** view should stay steady as the vessel rolls. If the roll polarity is not correct, the roll of the **sonar** display will double what is actually present. If you are unsure, compare the results with the **Swap Roll** check box selected and then deselected.

Note the correct polarity value below and leave the **Swap Roll** check box in that state.

Swap Roll Selected	Yes	/	No

Sea Trial Commissioning Step 3 : Patch Test (Roll Correction)

Carry out the following patch test. This test has been automated and the software will calculate the value of roll correction and store this value. Before proceeding, check and confirm that there is a tick in the “Use Patch Roll” box, Ship Setup Options -Sensor Values tab. See Figure 36.

It can be quite hard to perform a patch test in some vessels. Generally the more room you have, the easier it will be to get the paths overlapping in exactly opposite directions. Look at the screen shots in Figure 37 for guidance. Note: The patch testing needs to be performed at a depth of at least 15 metres over an area of smooth flat seafloor.

1) Set the screen display (user interface) to **contour** view.

2) Find a straight clear area of water at least a 500 metres long.

3) In the System Configuration Utility, click on the box marked “Patch Test” and follow the instructions on the bottom of the screen.

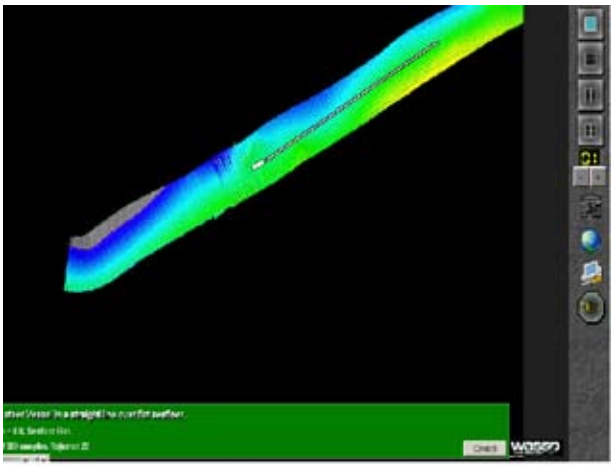
4) Drive the vessel at a constant heading for a few hundred metres until the Patch Test screen requests a 180 degree turn.

5) Turn the vessel around and head down the exact same path in the opposite direction. Use the Contour view to assist and note the course information shown on the bottom of the screen.

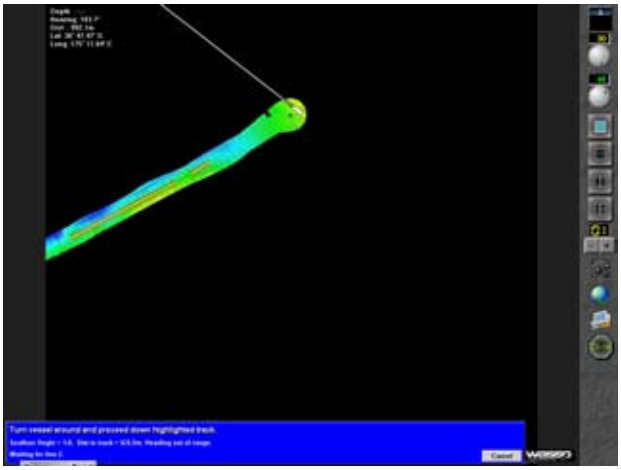
6) Follow the previous track as close as possible until you reach the point you started the first line from. At this time the prompt information on the bottom of the screen will advise that the patch test is complete.

7) Exit the Patch Test and check in the Ship Set-Up Options Screen under Sensor Values that a value for “Roll Correction” has been saved - See Figure 36.

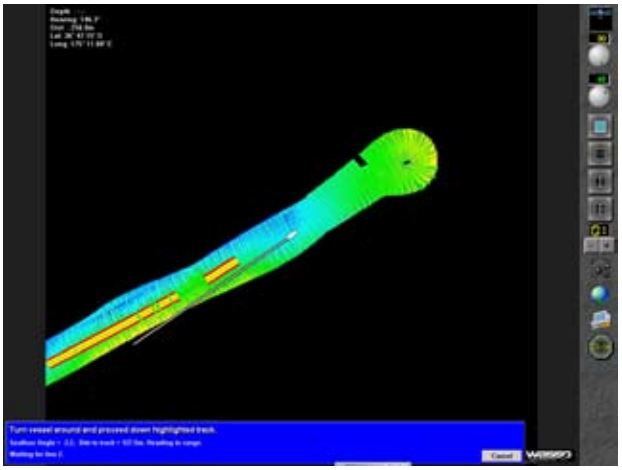
8) Exit the Ship Set-UP Screen.



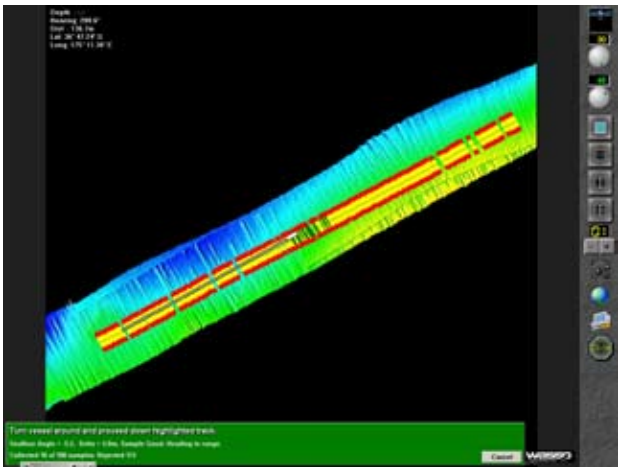
1. FIRST PASS



2. TURN



3. SECOND PASS



4. ENDING SECOND PASS

Figure 37 – Example Patch Test Screen Shots

Sea Trial Commissioning Step 4 : Setting Sidescan Backscatter Gain Limit:

1) Set the screen display (user interface) to **Sidescan** view.

2) Find a straight clear area of water at least a 500 metres long over sea bed with a rocky bottom (this will give high backscatter return).

3) Right click in the sidescan view window to open the options box and click on “gain” to open the Sidescan Gain settings box. This will allow you to adjust the gain factor for the sidescan backscatter view.

4) Drive the vessel at a constant heading for a few hundred metres over the rocky bottom.

5) Adjust the Sidescan Gain Threshold value up or down until the seafloor map is very dark except for small white areas where the highest backscatter is received.

6) Now adjust the Sidescan Gain slider control to give the desired picture. See Figure 39 (next page) for an illustration of a correctly adjusted sidescan backscatter image

7) When satisfied with the backscatter image, click on “Close” to close the Sidescan Gain adjust box. The settings will be automatically saved.

The Sidescan Gain control can be varied at any time without affecting the saved backscatter maps, but changes to the Sidescan Gain Threshold Limit after this commissioning set-up will alter the reference point for all sidescan backscatter values saved after the change

Note: Recommended Gain Threshold Setting for the 160kHz WASSP system ia 63. Once set as part of this commissioning test, this should NOT be changed.

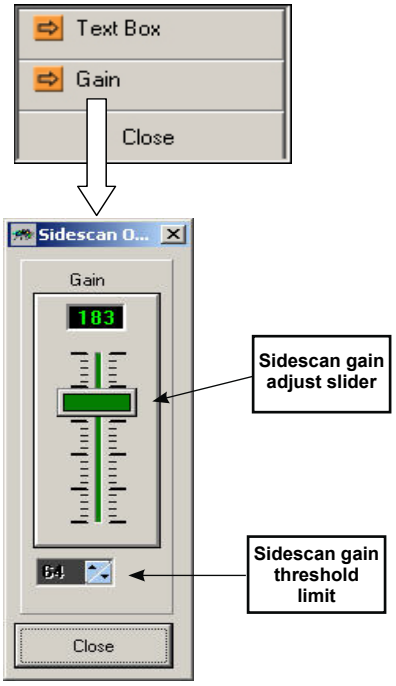


Figure 38 – Sidescan Gain Setting Box

Figure 39 – Correctly adjusted sidescan image

Sea Trial Commissioning Step 5 : Setting Backscatter Gain Limits:

Commissioning Step 4 and Step 5 can both be done at the same time.

1) Set the screen display (user interface) to **Contour** view.

2) Find a straight clear area of water at least a 500 metres long over sea bed with a rocky bottom (this will give high backscatter return).

3) Right click in the Contour view window to open the options box and click on “Show BackScatter” to open the Backscatter Gain settings box. This will allow you to adjust the gain factor for the sidescan backscatter view.

4) Drive the vessel at a constant heading for a few hundred metres over the rocky bottom.

5) First adjust the Backscatter gain threshold limit to 63 (recommended setting for 160kHz WASSP systems).

6) To change the backscatter gain, two modes are available: Auto and Manual. The default setting is Auto and it is recommended that this be used to allow the software to set the backscatter gain based on the reflected backscatter energy.

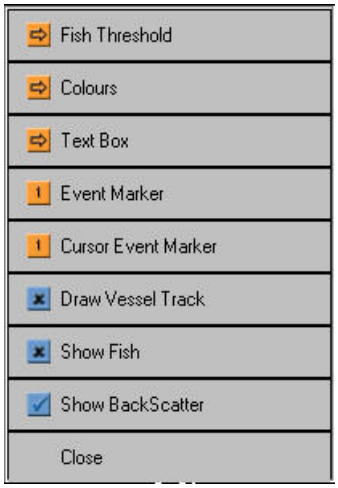
7) Observe the backscatter image in the Contour view window and confirm that the backscatter image shows good bottom detail. Switch between Grey and Colour and again check the image.

8) If the Auto mode does not give the desired bottom image, selecting Manual mode allows you to choose a greater or lesser part of the backscatter energy spectrum. In Manual mode, hold the mouse cursor over the arrow symbols and drag the arrow up or down to change the gain values for Soft/Steep bottom or Hard/Flat bottom. See Figure 40 below for an illustration of a correctly adjusted colour backscatter image

9) When satisfied with the backscatter image, click on “Close” to close the BackScatter Gain adjust box. The settings will be automatically saved.

The Backscatter Gain control can be varied at any time without affecting the saved backscatter maps, but changes to the Backscatter Gain Threshold Limit after this commissioning set-up will alter the reference point for all backscatter values saved before the change

Contour Mode Backscatter Gain (cont.)



Note: Recommended Backscatter Gain Threshold Setting for the 160kHz WASSP system is 63. Once set as part of this commissioning test, this should NOT be changed.

Click to display Backscatter Gain Contols.

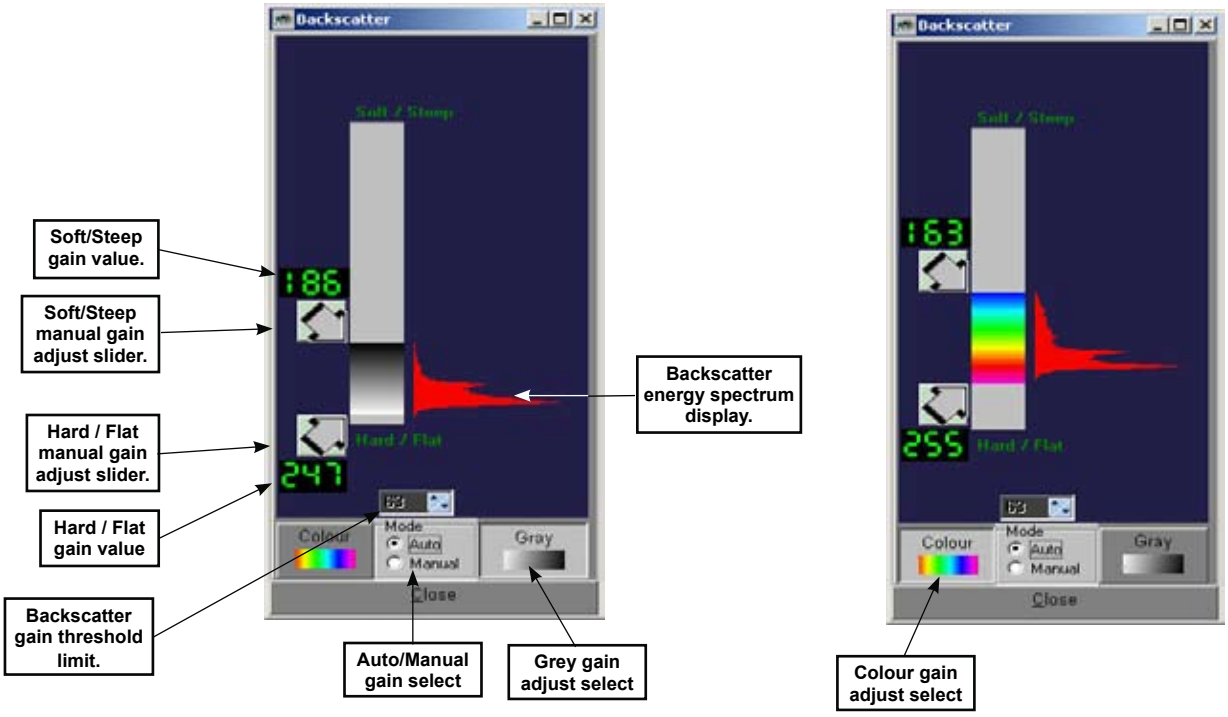


Figure 40 – Grey and Colour Backscatter gain adjust boxes.

Congratulations, this WMB-160F system is now officially commissioned.

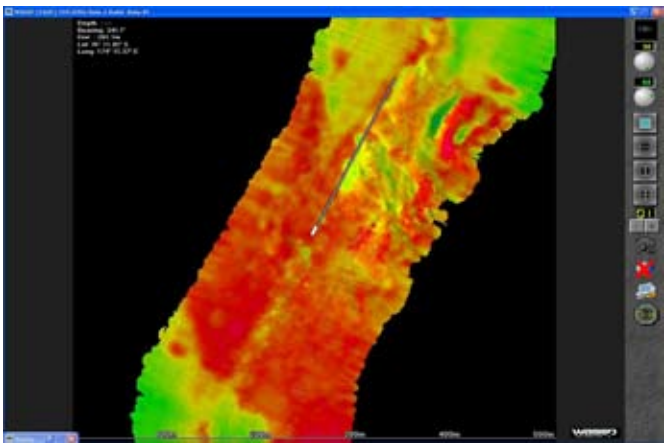


Figure 41 – Colour Backscatter image.

Start Up / Shut Down Procedures

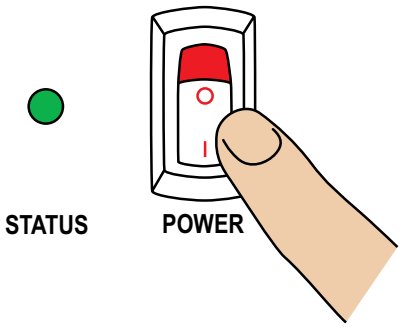
With all units installed, their cables connected, all software installed and the computer and satellite compass running, start the transceiver and carry out the following procedures:

STEP	PROCEDURE	SCREEN

1 Turn on the power:

a. Press the POWER button on the transceiver.

The transceiver starts up and the STATUS lamp glows GREEN - this can take up to 30 seconds.

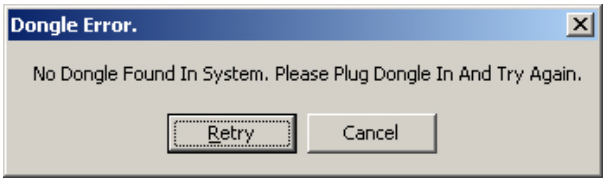


b. Turn on the computer.

In standard installations, the WMB-160F program self loads.

The program then performs a self-calibration (STBY button turns YELLOW). When the button turns BLUE it is ready to go.

If no dongle is found, a **Dongle Error.** box appears on the screen.



You can click **Cancel** and run a demo file from the System Configuration Utility.

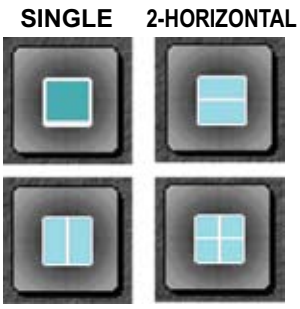
Ensure a dongle has been plugged into the computer's USB port and click **Retry**.

c. Turn on the satellite compass according to the manufacturer's instructions.

2 Choose a display mode:

a. Click the window layout button representing the screen layout you require:

Single.
2-Horizontal Split Screen.
2-Vertical Split Screen.
4-Screen.



b. Keep clicking the layout button you have chosen until the display mode or modes you require displays.

These can be reconfigured in the **System Configuration Utility**.

See Operator Manual OM_WMB160F_SYS for details.

Note: It is usually easier to select the display modes after you have started transmitting, as you can see the actual modes displayed.

STEP	PROCEDURE	SCREEN

3 **Transmit, receive**:

a. Click the MODE button to switch from STBY (standby) to TX (transmit) mode.

When transmitting, the TX button animates showing a pulse being transmitted.

Note: The MODE button is disabled while playing back a demo file. While in the TX (transmit) mode a demo file cannot be played back.

A RED counting TX button means that a ping was requested but no data was received. A new ping is sent every 5 seconds.

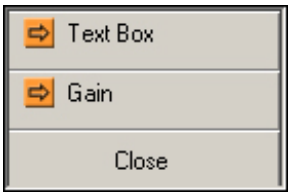
4 **Set up the selected screen layout**:

a. Right-click anywhere in the selected screen layout window.

A set of options appears.

b. Click the options you require.

Example of right-click options



5 **Perform the profiling operations you require**:

See Operator Manual: OM_WMB160F_SYS for full details on operating the system.

6 **Quit the WMB-160F program**:

When you have completed your profiling operations:

a. Click the **MODE** button to set the transceiver to standby.

b. Click **Close** on the task bar.

The **Exit System** box appears.

c. Click **OK**.

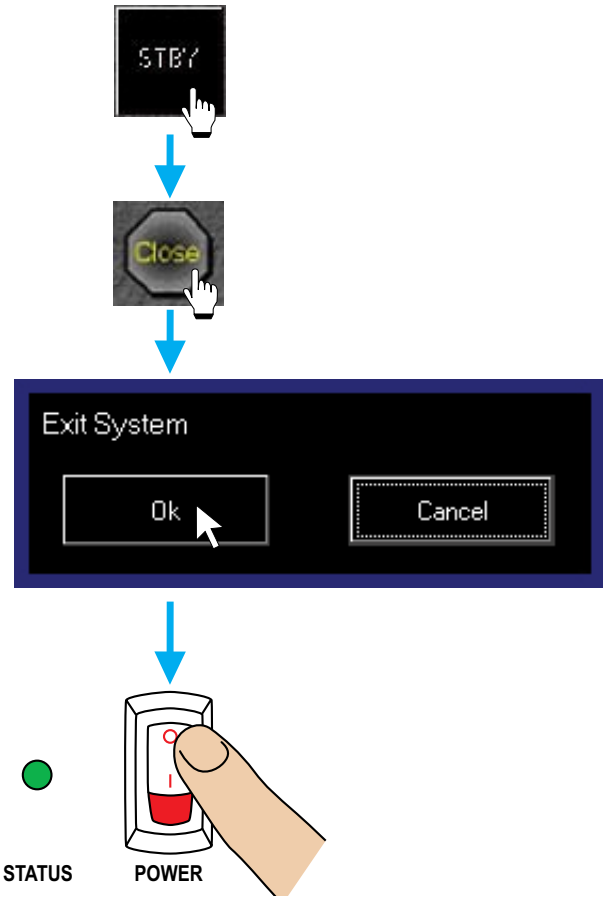
All files opened by the system are closed automatically and the program shuts down.

d. Shut down the computer following standard Windows procedure.

e. Turn the transceiver OFF using the POWER button on the faceplate.

f. Turn off the satellite compass according to the manufacturer's instructions.

The WMB-160F system is now shut down.



Troubleshooting

If the WMB-160F program provides no data when you transmit, check the following:

- Ensure that all cables have been installed and connected correctly.

  See **Figure 19, WMB-160F Transceiver Interface Connections** for details.

- Software installation and settings.

  See procedures for **Checking Software Installation** in the **WASSP Operator Manual**.

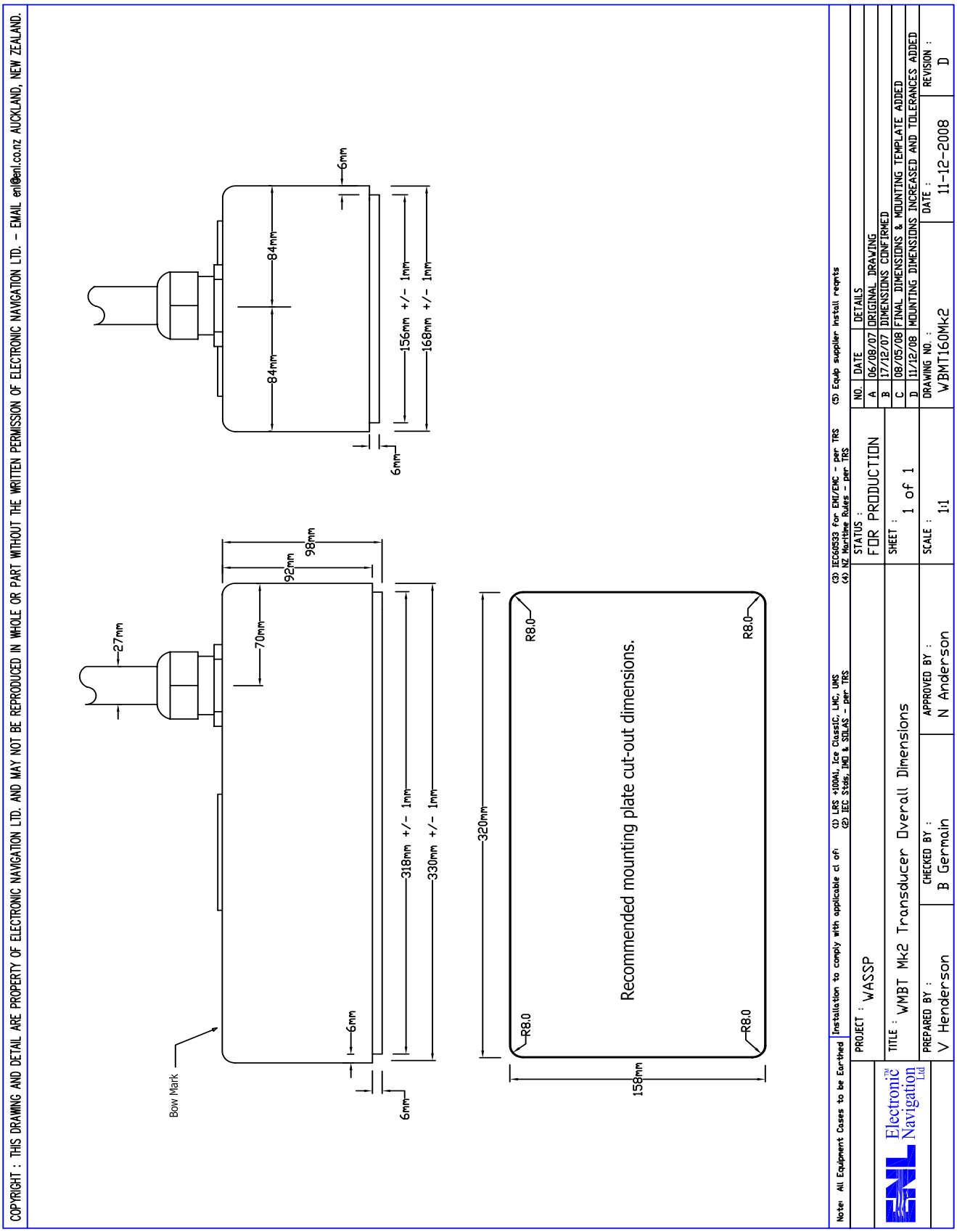
- NMEA data sentences.

  See **Checking Software Installation** procedures to check NMEA data sentences in the **WASSP Operator Manual**.

- For further troubleshooting assistance, refer to the **Frequently Asked Questions** (FAQ) section in the back of the **WASSP Operator Manual**.

Compact Transducer Dimensions

The drawing below gives the overall dimensions of the WASSP WMB-160F Compact Transducer. The recommended cut-out dimensions for a mounting plate are also shown.



Index

Technical Specifications

Wide Angle Sonar Seafloor Profiler

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Dimensions

Transceiver:	Height: 180 mm. Width: 221.5 mm. Length: 535 mm.	**Compact Type Transducer**:	Height: 98 mm. Width: 168 mm. Length: 330 mm.

Computer Requirements

CPU:	Minimum 2.5 GHz 32-bit processor.
Memory:	1 GB RAM (2GB recommended).
HDD:	40 GB (160 GB recommended).
Graphics:	XFX GeForce 9400GT Graphics 1GB DDR2 (or faster DirectX10 and OpenGL 2.0 compatible graphics card).
CD-ROM Drive:	Required for software installation.
Serial Ports:	At least 2.
Ethernet Port:	1.
Power:	230 V AC (ENL supplied Shuttle PC).
Display unit:	Owner supplied.
Resolution:	1024x768 or better.

Display

Display range:	
Range	5 to 300 m.
Shift	5 to 200 m.
Zoom range	2-D zooming from 250 m to 3 km, 3-D zooming from 10 m to 1 km.
Display modes:	Sonar view. Single / Triple beam view. 3-D sonar view. Contour view. Backscatter view.
Display windows:	Single screen. Vertical split screen. Horizontal split screen. 4-screen.
Advance speed:	Slow – fast (5 speeds).
Record:	Raw data, capture maps.

Transceiver

Output power:	14 power settings from 40 W to 1.5 kW.
TX rate:	Automatic ping rate, determined by depth.
Frequency:	160 kHz.
Beam width:	112 beams at 1.07° over 120° port/ starboard swath, Transmit 4° fore/aft, Receive 10° fore/aft.
Maximum depth:	200 m.

Stabilisation

Roll:	±30° depending on sensor.

Interface

Inputs:	NMEA sentences: GGA, GGL, HDG, HDT, MTW, VTG, RMC, ZDA, PSXN, PFEC-Gpatt, PFEC-Gphve.

Power Supply

Transceiver:	24 V DC, 70 W.
Computer:	230 V AC, 50 to 60 Hz (inverter from 24 V DC ships supply).

Environmental

Temperature:	0 to 40 °C.
Relative humidity:	5 to 95% non condensing.
Vibration:	IEC 60945, protected equipment.

Weight

Transceiver:	5 kg.
Transducer:	
Compact type:	13 kg including cable.

Equipment List

Standard:	See Table 1 on Page 8 for a full list
Transducer:	WMB-160F-CT Compact type (for steel and alloy hulls).
Transceiver:	WMB-BTxR.
Computer:	WMB-SHUTTLEPC.
Gland:	WMB-AG (alloy), WMB-SG (steel), WMB-PL (plastic).
Options:	See Table 2 on Page 9 for a full list

Disclaimers:

The WMB-160F is not designed to comply with hydrographical mapping standards and therefore must not be used as a Navigational Mapping Tool.

Specifications subject to change without notice.

ENL reserve the right to change this manual without notice.

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