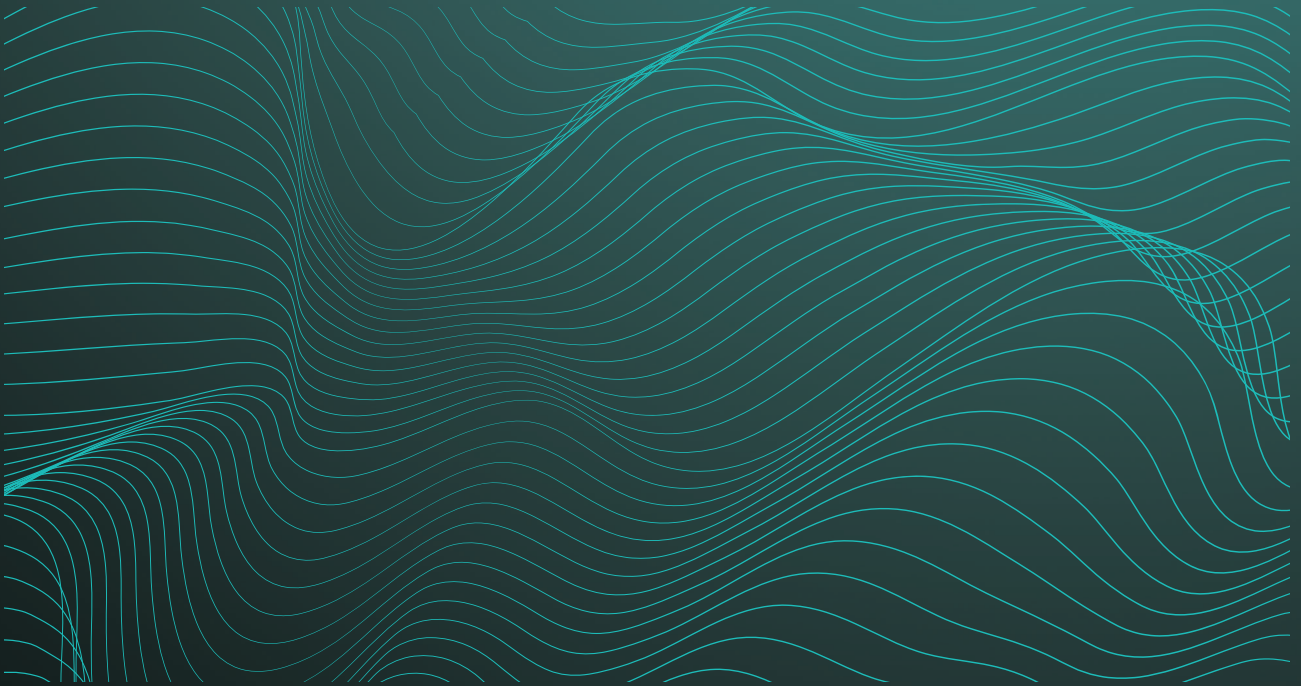


WASSP DRX INSTALLATION MANUAL

V 6.1



SEE IT ALL

WASSP DRX INSTALLATION MANUAL

This installation manual covers the following:

- » DRX installation, configuration and operation.
- » Sensor configuration and commissioning.
- » Control and Display Application interfacing.

This manual does not cover installation and setup of external sensors. Refer to installation and operation manuals for the specific sensors that are being used.

DRX Interconnect change history can be seen in *"Appendix F - DRX Interconnect change history" on page 92.*

DOCUMENT REVISION HISTORY

REVISION DATE	REASON FOR CHANGE	VERSION
March 2016	Compilation.	1.0
June 2016	Corrected RS-422 pin-out.	1.1
July 2016	Connector and Setup Webpages.	2.0
November 2016	Various Notes.	2.1
June 2017	Update DRX to new configuration.	3.0
January 2018	Updates to Section 4 Operating the DRX and Section 5 Sensor Configuration.	4.0
March 2018	Update to AUX connector configuration.	4.1
April 2018	Update to DRX Interconnection.	4.2
June 2018	Updates to support DRX-46.	5.0
September 2018	Corrected RS422 labelling to industry standard, clarified ship's measurements and reference point location.	5.1
April 2019	Technical Updates.	5.2
May 2019	Technical Updates.	6.0
December 2019	Update to fan connector configuration	6.1

RELATED DOCUMENTS

- » WASSP DRX Installation Manual – For the latest version of this manual go to wassp.com
 - » WASSP Transducer Installation Manual – Installation manual for specific transducers supported by DRX.
 - » WASSP CDX Operators Manual – User manual for the WASSP CDX application for control, visualisation and data post processing of DRX data.
 - » 3rd Party Application Manuals – 3rd Party Applications that interface with DRX
 - » Sensor Installation and Operation Manuals – Sensors supported by DRX.
 - » WASSP DRX ICD – Interface documentation for DRX and associated DRX SDK/API documentation.
 - » Sensor Box Installation Manual - Installation Manual for the WASSP Sensor package
- Further documentation and updated specifications and DRX installation manual can be found at wassp.com

GENERAL NOTICES

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

Contact WASSP Ltd. regarding copying or reproducing this manual.

SAFETY NOTICES

The installer of the equipment is solely responsible for the correct installation of the equipment. WASSP Ltd. holds no responsibility for any damage associated with incorrect installation.

ELECTRICAL SAFETY

- » Fire, electrical shock, or equipment damage may occur if the transceiver comes into contact with liquid.
- » The DRX is rated for operation at 9-32 V DC or 18-32 V DC model dependent.
- » 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 or access equipment covers unless you have had DRX service training and are cognisant with the system's electrical circuits.
- » Make sure all safety precautions for electrical equipment are taken when operating or servicing the equipment. These are to be carried out in accordance with local or national regulatory body safety regulations.
- » Make sure that the DRX is secure and will not loosen due to the vessels vibration.

SUPPORT INFORMATION

For details on Registration, Support and Resources see *"Appendix H - Product Registration, Support and Resources" on page 94.*

WARNINGS, CAUTIONS AND NOTES

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



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



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



NOTE indicates a TIP or additional information that can be helpful while performing a procedure.

CONTENTS

1 INTRODUCTION	9		
1.1. Main Features	10		
2 SYSTEM OVERVIEW	11		
2.1. Complete System	12		
2.2. Recommended System	12		
2.3. Survey System	13		
3 INSTALLATION PROCEDURES	14		
3.1. Installation Parts	15		
3.2. Transducer	15		
3.3. Locating the DRX System	15		
3.4. Mounting the DRX	16		
3.5. Connecting the DRX	18		
3.5.1. Power Supply			
3.5.2. Connectors and Components			
3.5.3.1. Cables and Components – Front Plate			
3.5.3.2. Connectors and Components – Back Plate			
3.6. Display and Control Devices	23		
3.6.1. DRX Setup Webpages			
3.6.2. DRX Client Applications			
3.7. Electrical environment check	25		
4 OPERATING THE DRX	26		
4.1. Power	26		
4.2. LED Status	26		
4.2.1. Startup sequence.			
4.2.2. Normal Operation LED Indications			
4.3. System Update & Diagnostics	28		
4.3.1. Diagnostics Information			
4.4. System Restore	29		
4.5. Network Configuration	30		
4.6. System Features	31		
5 SENSOR CONFIGURATION	34		
5.1. Commissioning Step 1: Ship Measurements	34		
5.2. Commissioning Step 2: Sensor Configuration	36		
5.2.1. Presets Tab			
5.2.1.1. Applying Presets			
5.2.1.2. Saving Custom Presets			
5.2.1.3. Downloading and Uploading Presets			
5.2.2. Port Setup Tab			
5.2.3. Sensor Tab			
5.2.4. Data Setup Tab			
5.2.5. Corrections Tab			
5.2.6. Key Pulse Tab			
5.2.6.1. Configuring Key Pulse Slave			
5.2.6.2. Configuring Key Pulse Master			
5.2.6.3. Configuring Key Pulse Blanking			
5.2.6.4. Advanced Key Pulse			
5.2.7. PPS Tab			
5.2.8. Geoids Tab			
5.2.8.1. Configuring Height Relative to the DRX Geoid File			
5.2.8.2. Configuring Height Relative to the Internal GPS Geoid			
5.3. Commissioning Step 3: On Water Patch Tests	52		
5.3.1. GPS Time Delay			
5.3.2. Roll Offset			
5.3.3. Pitch Offset			
5.3.4. Heading Offset			
5.3.5. Patch Test Validation			
6 CONTROL AND DISPLAY APPLICATION SUPPORT	59		
6.1. Connecting the WASSP CDX to the DRX	59		
6.2. Connecting Maxsea TimeZero Plot to the DRX	61		
6.3. Connecting HYPACK to the DRX	63		
7 OUTLINE DRAWINGS	65		
7.1. DRX-32 Outline Drawings	65		
7.2. DRX-46 Outline Drawings	68		
8 DRX INTERCONNECTION	71		
8.1. DRX-32 Interconnection	71		
8.2. DRX-46 Interconnection	72		
9 TECHNICAL SPECIFICATIONS	73		
10 APPENDIX	74		

APPENDIX

APPENDIX A - CABLE DRAWINGS	74
Appendix A.1 Transducer RX	74
Appendix A.2 Transducer Cable Restrainer	75
Appendix A.3 Transducer TX	76
Appendix A.4 RS-232	77
Appendix A.5 RS-422-A	78
Appendix A.6 RS-422-B	79
Appendix A.7 NMEA 0183	80
Appendix A.8 Remote Power	81
Appendix A.9 KP1/KP2 In	82
Appendix A.10 KP1 Out	83
Appendix A.11 Power Connection	84
Appendix A.12 Ethernet	84
Appendix A.13 NMEA2K	85
Appendix A.14 FAN	85
APPENDIX B - SUPPORTED SENSORS AND SENTENCES	86
APPENDIX C - SHIP'S MEASUREMENT POINTS	88
Appendix C.1 Transducer Measurement Location	88
Appendix C.2 GPS Antenna Measurement Location	88
Appendix C.3 Motion Sensor Measurement Location	88
APPENDIX D - SEA LEVEL HEIGHT USING GPS HEIGHT	89
Appendix D.1 Sea Level Height using DRX Geoid File	
Appendix D.2 Sea Level Height using Internal GPS Geoid	89
Appendix D.3 Enabling GPS Height for Sea Level Height	90
APPENDIX E - AUTO CONTROL IN CDX	91
APPENDIX F - DRX INTERCONNECT CHANGE HISTORY	92
APPENDIX G - GLOSSARY	93
APPENDIX H - PRODUCT REGISTRATION, SUPPORT AND RESOURCES	94

FIGURES

Figure 1. Complete System	12
Figure 2. Recommended System	12
Figure 3. Survey System	13
Figure 4. DRX Bulkhead Mount	17
Figure 5. DRX Horizontal Mount	17
Figure 6. Front Plate	18
Figure 7. Back Plate	19
Figure 8. RX Cable Connection	20
Figure 9. Find My DRX App	24
Figure 10. Example of an Electrical Environment Check of an 80kHz install.	25
Figure 11. Startup Sequence	26
Figure 12. Normal Operation LED Indications	27
Figure 13. System Upgrade	28
Figure 14. Restore Defaults Tab	30
Figure 15. System Features	31
Figure 16. License Status	32
Figure 17. Ship Measurements Diagram	35
Figure 18. DRX Setup, Port Setup Table	38
Figure 19. DRX Setup, Port Setup Tab with Sensor Data	38
Figure 20. DRX Setup, Sensor Tab	39
Figure 21. DRX Setup, Data Setup Tab	40
Figure 22. DRX Setup, Corrections Tab	41
Figure 23. DRX Setup, Key Pulse Tab	43
Figure 24. DRX Setup, PPS Tab	46
Figure 25. PPS Status	48
Figure 26. GPS Time Delay Stage 1	52
Figure 27. GPS Time Delay Stage 2	53
Figure 28. GPS Time Delay Stage 3	53
Figure 29. Manual Roll Patch Test	55
Figure 30. Measurement of Swath Width H	55
Figure 31. Pitch Corrections	57
Figure 32. DRX-32 Dimensions	65
Figure 33. DRX-32 Front Plate Dimensions	66
Figure 34. DRX-32 Back Plate Dimensions	67
Figure 35. DRX-46 Assembly	68
Figure 36. DRX-46 Front Plate Dimensions	69
Figure 37. DRX-46 Back Plate Dimensions	70
Figure 38. DRX-32 Interconnection Diagram	71
Figure 39. DRX-46 Interconnection Diagram	72

YOUR NOTES

1 INTRODUCTION

The WASSP DRX is a 'Black Box' smart transceiver that interfaces to devices and sensors to make up the WASSP Multibeam Sounder System.

The system can be configured to operate in various modes, typically using a wide-angle sonar transducer to profile the water column and seafloor in high resolution.

Using appropriate sensors, the DRX can be configured to be suitable for operations such as commercial fishing, sport fishing, survey and mapping, exploration, search and rescue and many more.

Actual data types output to client applications, such as WASSP CDX, will be determined by:

- » Data types enabled in DRX, as determined by the licensing model.
- » Data types the client application supports and queries for.
- » If the client application is using raw, processed or post processed data .
- » Data types that are supported will increase through continual product development and DRX upgrades.

The DRX functionality is defined by the software installed, the data types enabled, the transducer connected, and the physical DRX model. The physical DRX model is supported in 4 configurations:

- » WSP-603-200; DRX-25 wideband model (no longer available).
- » WSP-603-200; DRX-32 wideband model used with S3 and F3 products.
- » WSP-603-205; DRX-32 wideband model with IP67 rating.
- » WSP-603-250: DRX-46 wideband model used with F3X.

The same software package is applicable to all models.

For specification details on each model *see "9 Technical Specifications" on page 73.*



NOTE: DRX Serial numbers below #70 are model DRX-25.
DRX Serial numbers #70 and above are DRX-32.
DRX Serial numbers #10001 and above are DRX-46

1.1. MAIN FEATURES

The main features of DRX in a multibeam configuration will depend on the model as follows:

- » Variable number of beams - Model and configuration dependent.
- » 120° Swath coverage – Transducer dependent.
- » Depth capability is configuration and environment dependent. Typical configurations:
 - DRX-25 with WMB160 transducer; 1 to 150m
 - DRX-32 with WMB160 transducer; 1 to 200m
 - DRX-46 with WMB160 transducer; 1 to 400m
 - DRX-46 with WMB80 transducer; 2 to 600m
- » Variable frequencies.
- » Supported by multiple client applications to meet different customer requirements.
- » Direct Ethernet connection to multiple client applications.
- » Continuous real-time 2D and 3D mapping.
- » Easy to operate and quick to install.
- » Web based setup and configuration.
- » Beam stabilisation.
- » Variable beam width.

2 SYSTEM OVERVIEW

The WASSP multibeam sounder system requires the following components:

DRX; Transmit, receive, digital signal processing, display processing, License management and data server for client applications.

WASSP TRANSDUCER; See WASSP Transducer Reference Manual.

PC; Control, post processing and viewing of sounder, sonar and mapping needs to be handled by a suitable application, running on PC or tablet.

GPS; Position and time required for water column and bathymetry geo-referencing.

HEADING SENSOR; Required for correctly orienting the multibeam data.

MOTION SENSOR; Required for stabilising the water column and bathymetry data for vessel roll, pitch and heave.

SOUND VELOCITY PROBE; Required for correcting Sound Velocity in order to improve depth accuracy across the swath.

SOUND VELOCITY PROFILER; For accurate range measurement, sound velocity needs to be known at the transducer and through the water column. The Sound Velocity Profile information can be applied if using 3rd Party applications supporting SVP.



NOTE: As with any multibeam sounder, the quality of the sensors connected will directly affect the performance of the system. Enhancements to system performance include using high precision RTK GPS, accurate sound velocity measurements, sound velocity profiles, and high performance motion sensors. Your WASSP dealer can advise on sensors to suit your requirements. WASSP recommended sensors are also detailed in this manual, see *“Appendix B - Supported Sensors and Sentences”* on page 86.

The WASSP system can be supplied in various configurations to allow customised or turnkey solutions. These include:

- » DRX and transducer with WASSP CDX and sensor package; Customer supplies PC or tablet and optionally 3rd Party navigation, fishing or survey package.
- » DRX and transducer with WASSP CDX; Customer supplies sensors, PC or tablet and optionally 3rd Party navigation, fishing or survey package.
- » DRX and transducer with WASSP CDX and sensor package and wireless package; Customer supplies PC or tablet.

For details on WASSP system packages available see wassp.com



NOTE: Sensor package details can be found in the WASSP Sensor Box Installation Manual.

Some typical system configurations are as follows:

2.1. COMPLETE SYSTEM

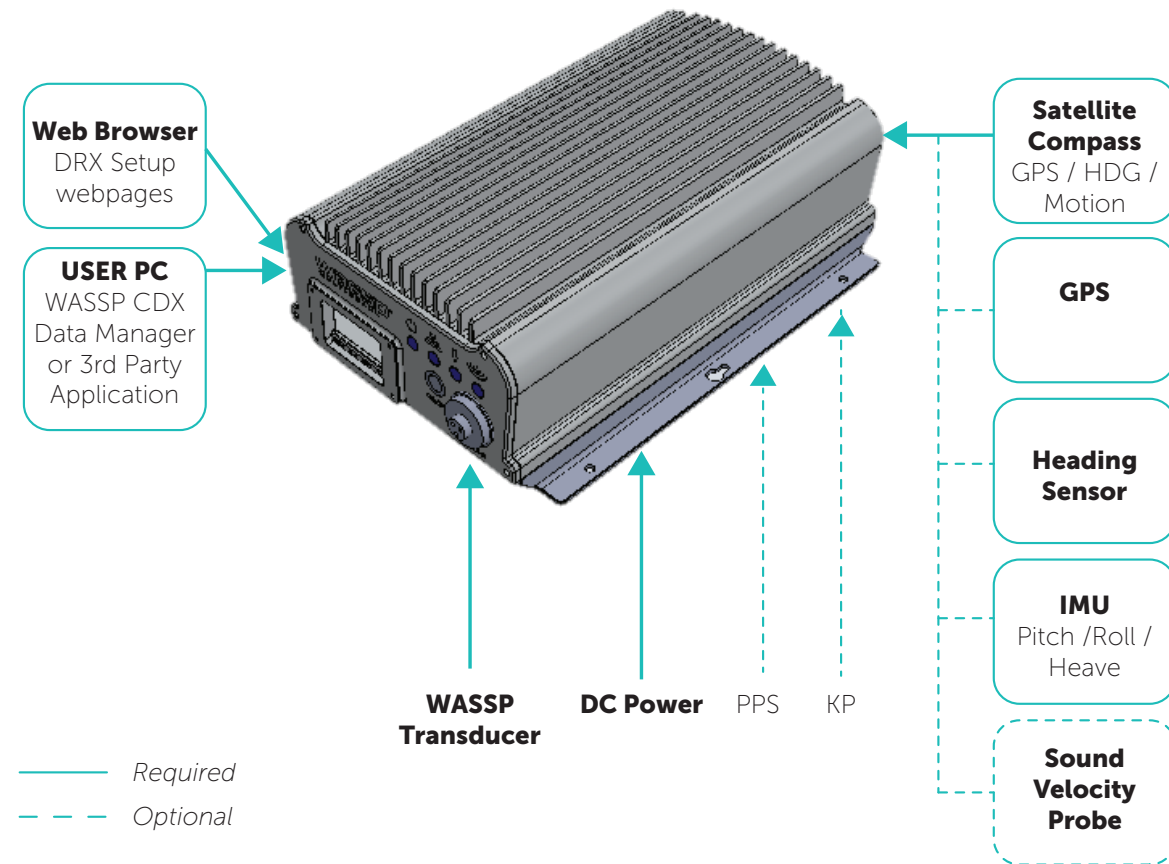


Figure 1. Complete System

2.2. RECOMMENDED SYSTEM

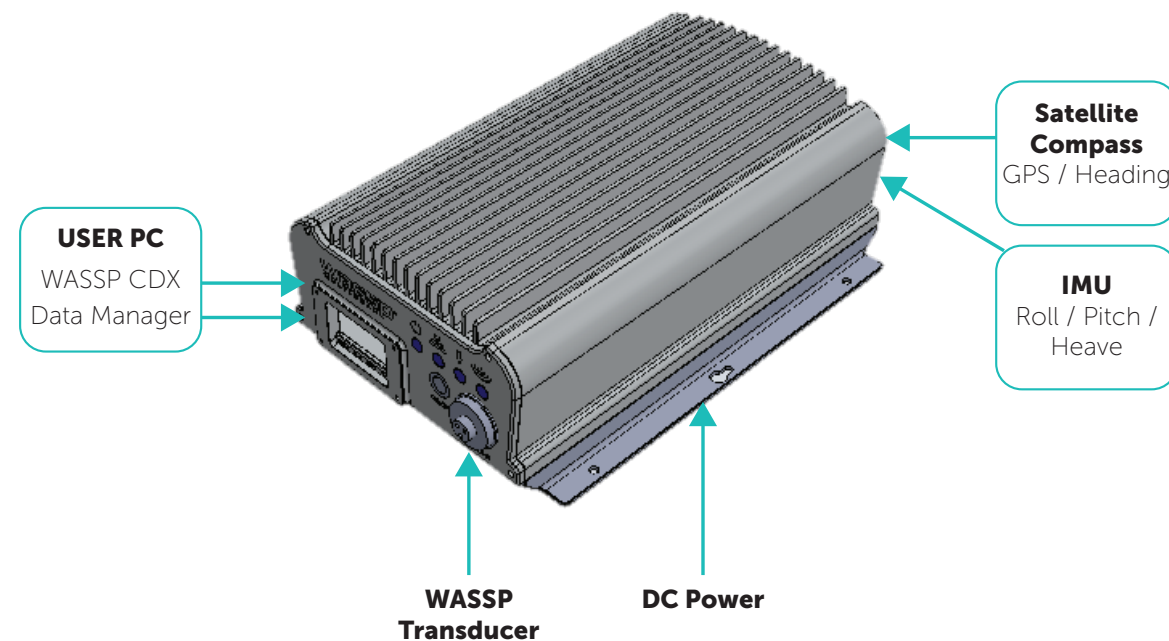


Figure 2. Recommended System

See "Appendix B - Supported Sensors and Sentences" on page 86 for supported sensors.

2.3. SURVEY SYSTEM

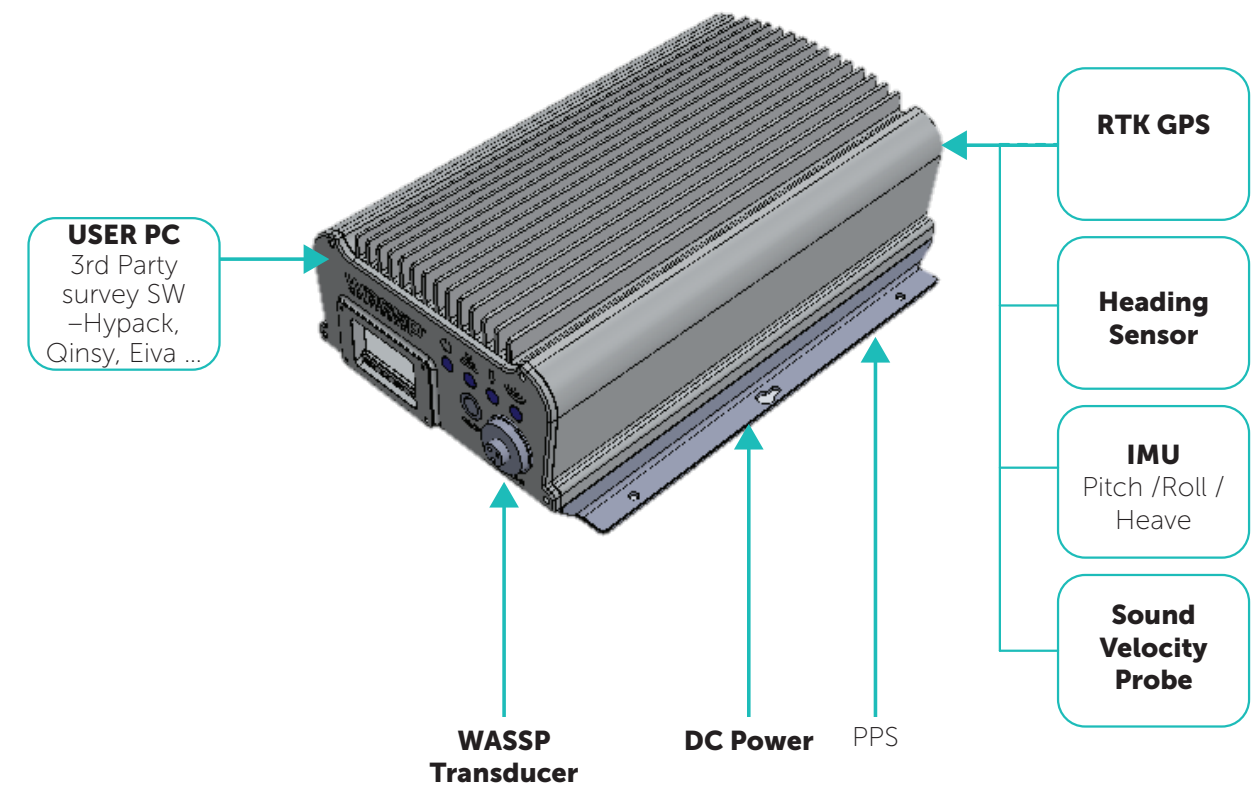


Figure 3. Survey System



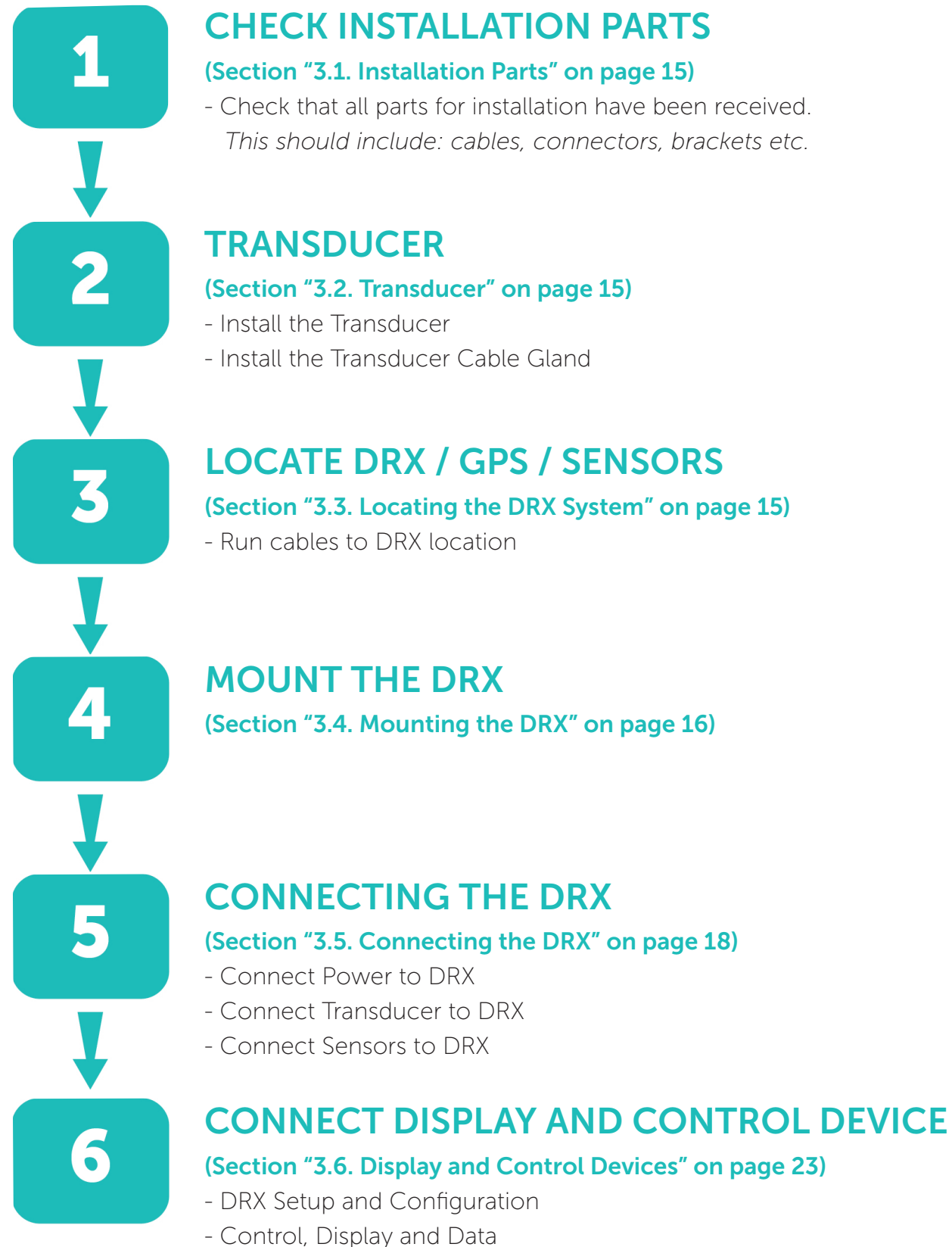
NOTE: Check "Appendix B - Supported Sensors and Sentences" on page 86 for which sensors and sentences are support for input of position, heading, attitude and sound velocity.



NOTE: Images show DRX-32 throughout the manual. See "7 Outline Drawings" on page 65 for DRX-32 and DRX-46.

3 INSTALLATION PROCEDURES

Basic Installation Flow:



3.1. INSTALLATION PARTS

Standard supply:

- » 1 x DRX unit
- » 4 x Connector plugs
- » 1 x power cable
- » 1 x LAN cable
- » 1 x USB Flash Drive:
 - Find My DRX Application
 - WASSP CDX Application
 - WASSP Utilities
 - License key for Data Manager
- » Depending on kit:
 - Transducer installation kit (a package with a transducer cable clamp, a TX connector and installation manual)
 - Widescan Sensor package (refer to Sensor Box Installation Manual)
- » WASSP DRX Installation Manual

3.2. TRANSDUCER

The DRX supports multiple transducer types and can be setup to operate in a variety of configurations. Typical setup will be multibeam wideband mode with:

- » WMB160
- » WMB80

Detailed specification and mounting methods for supported transducers is described in the WASSP Transducer Installation Manual.

Transducer selection is described in "5.2.4. Data Setup Tab" on page 39.

3.3. LOCATING THE DRX SYSTEM

The DRX is a highly sensitive receiver which is capable of discerning signals of less than one microvolt. In order to get the highest performance out of the DRX system keep the transducer, transducer cable and the DRX far away from sources of electrical and acoustic noise. AC/DC inverters and DC/DC converters are particularly noisy and even if not used to power the system, should be kept as far away as possible.

The DRX will need to be located with access to all required sensors. This needs to include transducer cable, GPS, motion sensor and LAN connections. Serial cables from sensors should be run direct to DRX with no splitters or interfaces boxes.

When selecting a mounting location, keep the following points in mind to maintain optimal performance:

- » Maintain ambient temperature in the vicinity of the DRX within operating specifications. Operating in temperatures outside of specification will result in reduced operating lifetime or direct failure due to overheating:
 - The area needs to be well ventilated in order to avoid local ambient increase from self heating.
 - Keep out of direct sunlight. Exposure to sunlight will result in direct solar gain

- Keep away from exhaust pipes and vents.
- » Avoid electrical and acoustic noise as this will have a direct impact on system performance:
 - Avoid locations close to electrical equipment such as inverter, converters and other power supplies.
 - Keep away from electromagnetic field-generating equipment such as motors and generators.
- » To avoid damage to the DRX:
 - Locate where Shock and vibration are minimal.
 - The area should not be prone water ingress or high moisture content.



CAUTION: Electrical or acoustic noise will directly impact system performance and signal integrity. AC/DC inverters and DC/DC converters will impact system sensitivity and can cause system noise even if not directly connected. If an AC/DC or DC/DC PSU is required only use low noise, good quality products in order to minimise impact on system performance.



CAUTION: Operating outside the temperature specification will reduce the operating lifetime of the DRX. For specifications, see "9 Technical Specifications" on page 73.

Refer to Knowledge Base for guidelines on the Operating Environment. "Appendix H - Product Registration, Support and Resources" on page 94.

3.4. MOUNTING THE DRX

Installation & Mounting Considerations

The DRX can be installed on a desktop, deck or on a bulkhead.

Using the mounting flanges on the bottom plate, the DRX is mounted vertically on a bulkhead, or horizontally on a hard surface. Important considerations are:

- » A vertical position is ideal for optimal thermal performance (Transducer Connectors front face down). See "Figure 4. DRX Bulkhead Mount" on page 17.
- » The second option is horizontal on a hard, flat surface. See "Figure 5. DRX Horizontal Mount" on page 17.
- » If mounted in an enclosed space, forced ventilation will be required to maintain an ambient temperature within the stated limits around DRX. See "Figure 4. DRX Bulkhead Mount" on page 17. and See "Figure 5. DRX Horizontal Mount" on page 17.
- » Leave slack in cables for maintenance and servicing ease.
- » For maintenance and checking purposes, leave sufficient space at the sides and rear of the DRX installation location.
- » Fasten the DRX to the mounting location with a minimum of four self tapping screws. See Section "7 Outline Drawings" on page 65 for DRX dimensions and mounting clearances.
 - Mounting screws; Minimum M6 x 40mm x 4.
 - When installing the DRX, thread locking fluid or locking washers are recommend to avoid vibration loosening.
 - Anti Vibration Mounts are recommended.
- » DRX should be always be mounted on a hard surface capable of supporting the DRX weight.



CAUTION: Operating outside the temperature specification will reduce the operating lifetime of the DRX. For specifications, see "9 Technical Specifications" on page 73.



CAUTION: IF DRX is mounted in an enclosed space forced ventilation as described below is required.

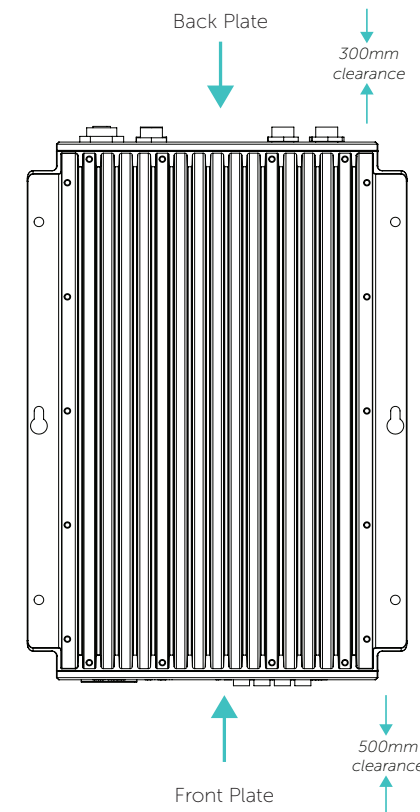


Figure 4. DRX Bulkhead Mount

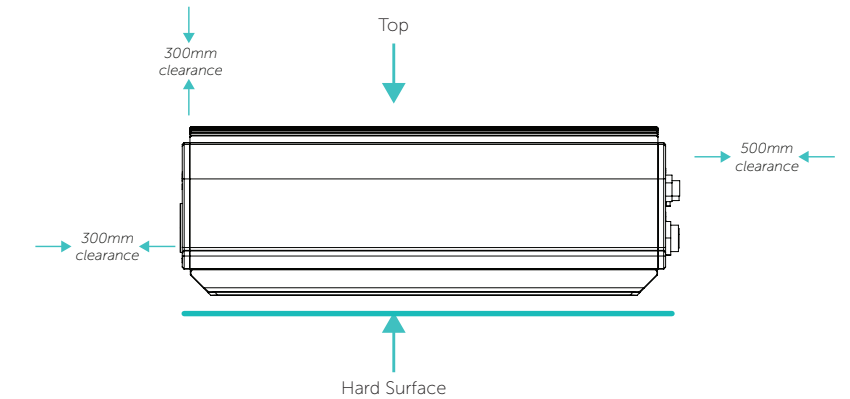


Figure 5. DRX Horizontal Mount

Figures 4 and 5 show clearance required for cabling and forced air ventilation if DRX is in an enclosed space.

Before installing the DRX in an enclosed space ensure that the ventilation is sufficient to prevent overheating. Consider the following:

- » Cool air supply needs to be able to adequately dissipate the thermal output of DRX.
- » Ensure the hot exhaust air from the enclosed area does not recirculate into the DRX. Perforations in the top will assist in removing exhaust air.
- » Install the DRX in a position to allow the air flow to circulate effectively through the outlet.
- » Route all cabling to minimise blockage of airflow.



NOTE: If operating in a high ambient environment forced airflow over the DRX will significantly improve thermal performance. Always make sure that there is adequate ventilation.

3.5. CONNECTING THE DRX

This section describes the installation requirements for cables from and to the DRX. Access to, and connection of all cables should be performed by a qualified installer.

3.5.1. Power Supply

The DRX should use a clean power supply. For best performance use a DC battery supply or as a secondary alternative it is recommended to use a low noise converter.



CAUTION: A noisy power supply will have direct impact on system performance.

3.5.2. Connectors and Components

This section identifies the various connectors exposed on the DRX.

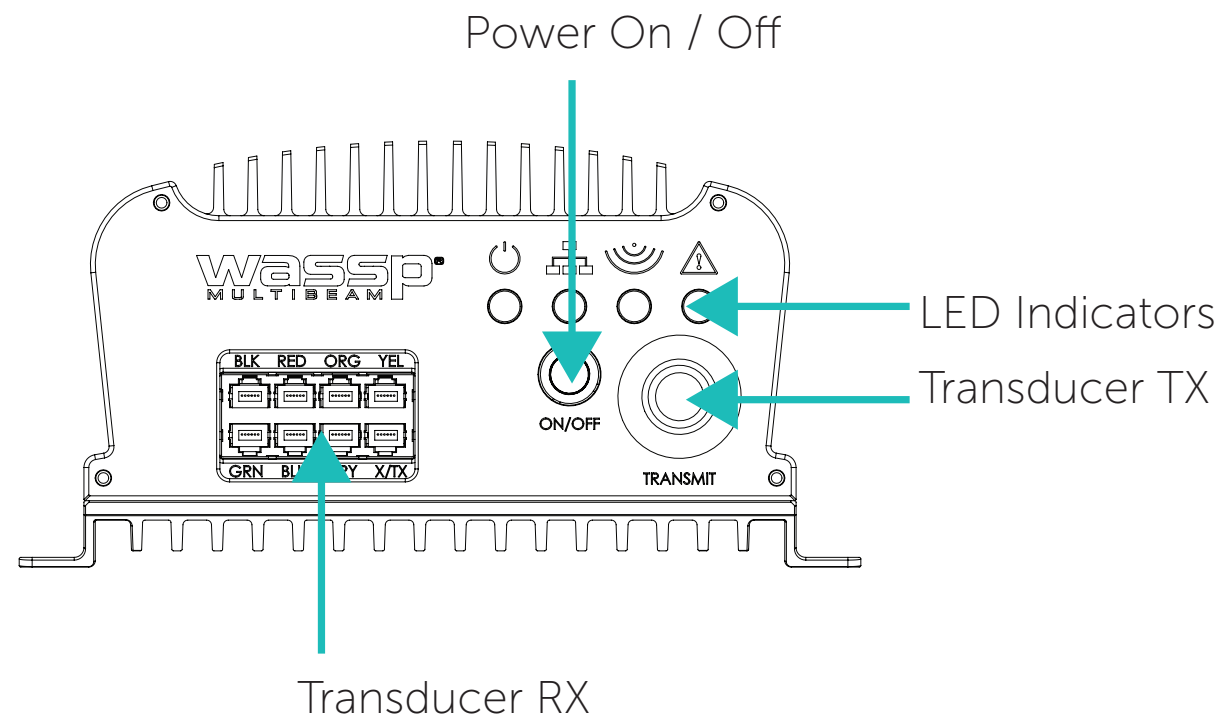


Figure 6. Front Plate



NOTE: X/TX connector in Transducer RX block is only used for IP67 version of DRX.

For descriptions, see "3.5.3.1. Cables and Components – Front Plate" on page 19.

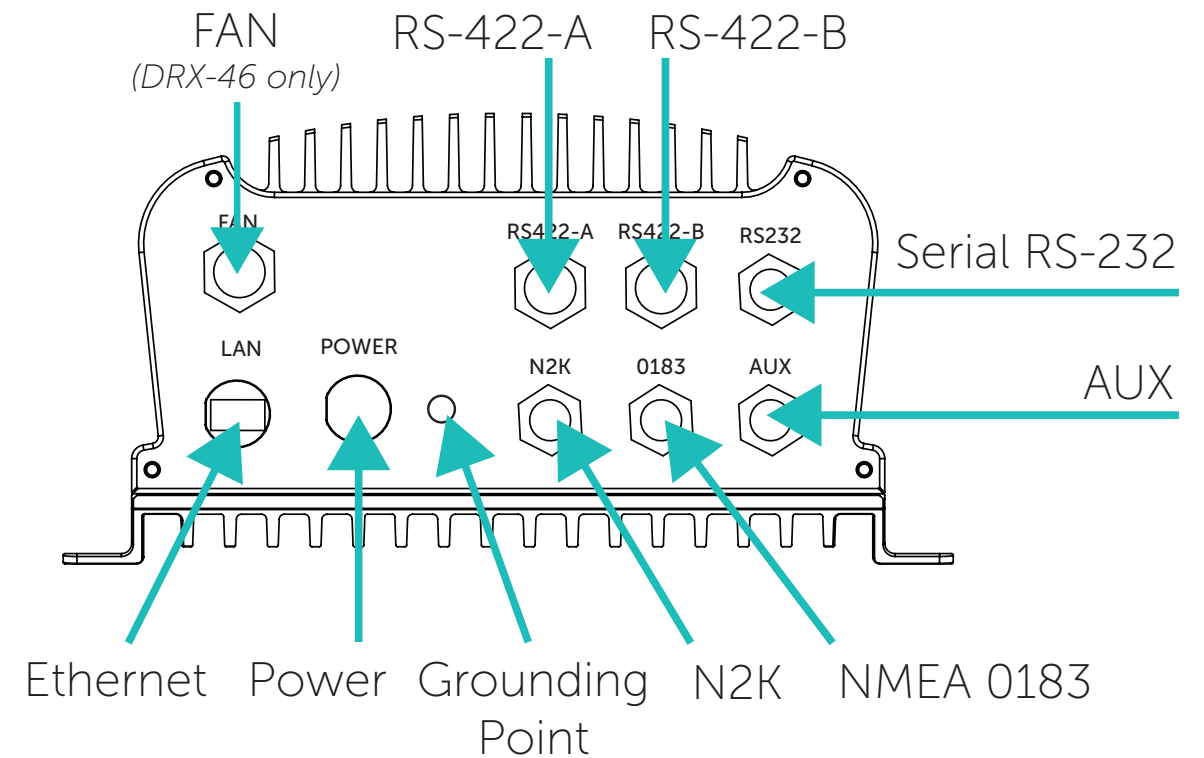


Figure 7. Back Plate



CAUTION: All serial cables from sensors on RS-232, RS-422 or NMEA 0183 should be direct with no splitters or interface boxes, unless supplied by WASSP. Failure to do this will result in compromised mapping performance due to potential timing issues.

For descriptions, see "3.5.3.2. Connectors and Components – Back Plate" on page 21.

3.5.3. Cables and Components

3.5.3.1. Cables and Components – Front Plate

Power On/Off

The power button controls system on/off through soft control. It requires power to be connected to the unit.

- » Short press the power button to turn the power on. To power down, press and hold the power button for 4 seconds (to prevent bumping starting a power down).
- » Power on/off can also be controlled remotely using the remote control cable on back plate, referenced in the following page.



NOTE: Remote Power Control is described in "3.5.3.2. Connectors and Components – Back Plate" on page 21.

Transducer RX

The Transducer RX is connected to the DRX through seven receive cables. The receive cables must be connected in the colour order shown on the connector.

See ["Appendix A.1 Transducer RX" on page 74](#) for connection specification.

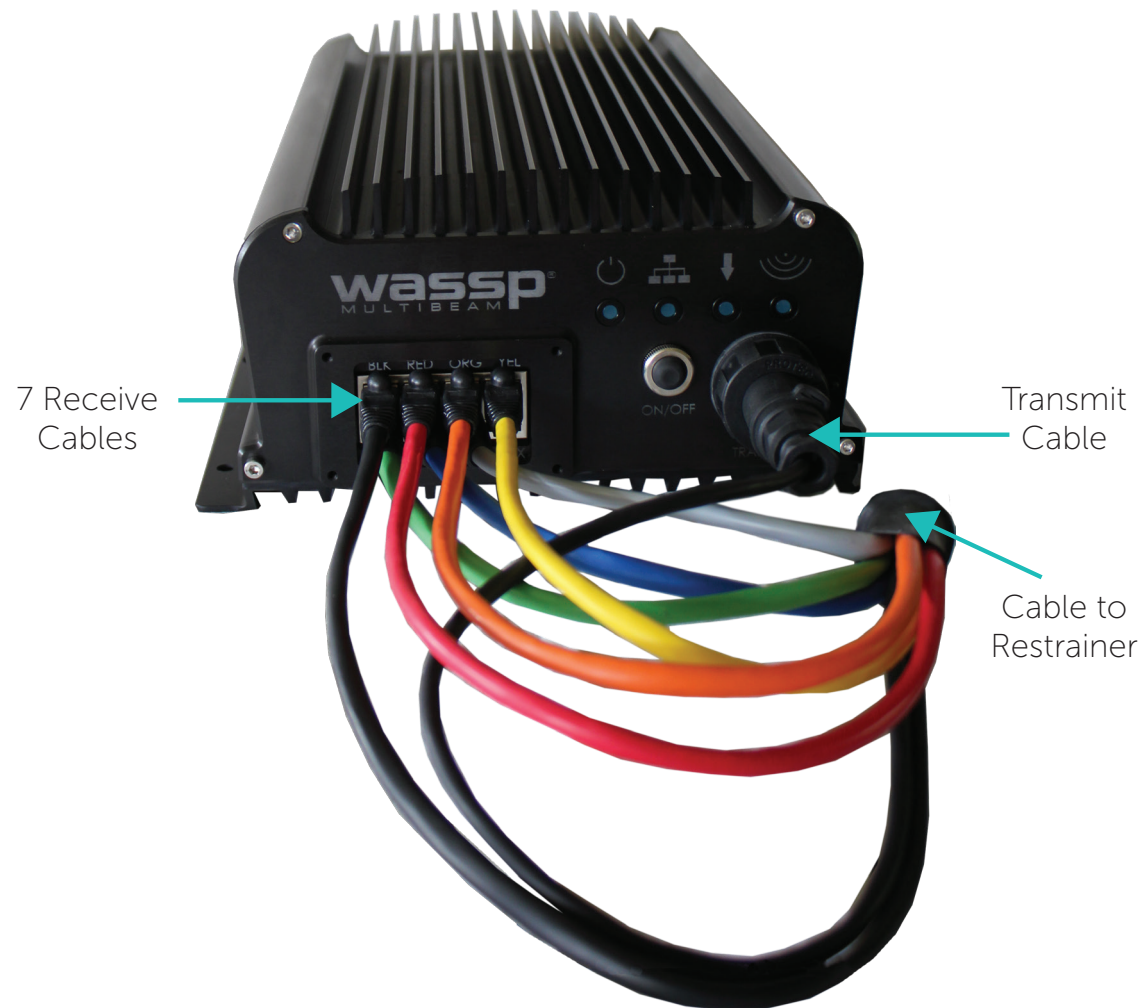


Figure 8. RX Cable Connection



CAUTION: The 7 receiver cables **MUST** be connected in the colour order indicated on the DRX. Failure to do this will result in faulty operation of the WASSP system.



CAUTION: The cable **MUST** be fitted with the supplied cable restrainer to prevent stress on the RJ45 Receive connector block. See ["Appendix A.2 Transducer Cable Restrainer" on page 75](#).



NOTE: Actual product may differ from images depending on model. See ["7 Outline Drawings" on page 65](#).

Transducer TX

The Transducer TX cable applies transmit signal to the transducer.

See ["Appendix A.3 Transducer TX" on page 76](#) for connection specification.

3.5.3.2. Connectors and Components – Back Plate

RS-232 IN/OUT

Connector **RS232**

RS-232 is a serial connection for sensors/processors that natively output RS-232. For NMEA 0183 talkers it will depend on the instrument as to whether it will be RS-232 compliant or require a converter. RS-232 supports power out at same voltage as DRX power supply.

See ["Appendix B - Supported Sensors and Sentences" on page 86](#).

RS-232 can be configured using the [DRX SETUP WEBPAGES](#). See ["5.2. Commissioning Step 2: Sensor Configuration" on page 36](#).

See ["Appendix A.4 RS-232" on page 77](#) for connection specification.

RS-422 IN/OUT

Connector **RS422-A and RS422-B**

RS-422 is a serial connection for sensors natively outputting RS-422 or by using RS-232 to RS-422 converter. For NMEA 0183 talkers it will depend on the instrument as to whether it will be RS-422 compliant or require a converter.

The RS-422 Connector also supports PPS IN:

- » RS-422-A supports power out at same voltage as DRX power supply
- » RS-422-B allows data forwarding and power out at same voltage as DRX power supply

See ["Appendix B - Supported Sensors and Sentences" on page 86](#).

RS-422 can be configured using the [DRX SETUP WEBPAGES](#). See ["5.2. Commissioning Step 2: Sensor Configuration" on page 36](#).

See ["Appendix A.5 RS-422-A" on page 78](#) and ["Appendix A.6 RS-422-B" on page 79](#) for connection specifications.

NMEA 0183

Connector **0183**

NMEA 0183 is a serial connection for sensors natively outputting NMEA 0183 (single talker, multi listener). As well as an NMEA input, this connector also features an NMEA output.

The 0183 Connector also supports PPS IN.

See ["Appendix B - Supported Sensors and Sentences" on page 86](#).

NMEA 0183 can be configured using key [DRX SETUP WEBPAGES](#). See ["5.2. Commissioning Step 2: Sensor Configuration" on page 36](#).

See ["Appendix A.7 NMEA 0183" on page 80](#) for connection specification.

Remote Power

Connector **AUX**

A local supplied latching switch can be connected to pins eight (Remote PWR On) and nine (Remote PWR On GND) of connector AUX. When the switch is closed the DRX will power on. When the switch is open (circuit open) then the DRX will power off.

See ["Appendix A.8 Remote Power" on page 81](#) for connection specification.

KP1/KP2 IN

Connector **AUX**

KP IN interface is to allow the DRX to transmit in sync with another sounder/sonar. This feature is useful for helping reduce transmit pulse interference.

KP IN takes the key pulse from an external system (master) and synchronises the DRX (slave) transmit pulse with that key pulse as a trigger.

See ["Appendix A.9 KP1/KP2 In" on page 82](#) for connection specification.

See ["5.2.6. Key Pulse Tab" on page 42](#) for connection information.

KP1 OUT

Connector **AUX**

KP OUT interface is to allow the DRX to transmit in sync with another sounder/sonar. This mode allows the DRX to be the KP master, and the receiving sounder/sonar to be the slave. This feature is useful for helping reduce transmit pulse interference.

This mode is recommended to optimise the interference immunity from the connected sounder.

See ["Appendix A.10 KP1 Out" on page 83](#) for connection specification.

See ["5.2.6. Key Pulse Tab" on page 42](#) for connection information.

PPS IN

Connectors **RS422-A, RS422-B and 0183**

Pulse-per-second (PPS) input allows connection equipment with a PPS timing output. PPS input allows the DRX to be accurately synchronised with GPS UTC enabling highly accurate positional timing accuracy, potentially improving mapping data positional accuracy by removing GPS latency issues.

Through the [DRX SETUP WEBPAGES](#) the user can choose which PPS input is tied to which input, and view that the signal is being correctly received. See ["5.2. Commissioning Step 2: Sensor Configuration" on page 36](#).

See ["Appendix A.5 RS-422-A" on page 78](#) and ["Appendix A.7 NMEA 0183" on page 80](#) for connection specification.

Power

The DRX is designed to be run on DC voltage, [see specs in "9 Technical Specifications" on page 73](#).

See ["Appendix A.11 Power Connection" on page 84](#) for connection specification.

Ethernet

Connector **LAN**

The Ethernet link is used for all communication between the client application running on PC (or other devices) and the DRX. This link is used for control of the DRX and for the DRX to supply data for visualisation and post processing to the client device.

The Ethernet connection can be connected either:

- directly using crossover cable or auto crossover (DRX supports auto MDI/MDI-X) OR
- via a network switch if supporting multiple clients or running the DRX on vessel LAN (local area network).

The Ethernet connection needs to support at least Gigabit network to enable full functionality.

If there is a DHCP server on the LAN, the DRX will be assigned an appropriate IP address by the DHCP server. If there is no DHCP server, the DRX will fall through to Zero-configuration assignment in block 169.254.0.0/16. Any connected device will need to be assigned an appropriate IP address on the same subnet as the DRX, either via DHCP server, Zero-configuration or fixed IP.

See ["Appendix A.12 Ethernet" on page 84](#) for connection specification.

NMEA2K

Connector **N2K**

See ["Appendix B - Supported Sensors and Sentences" on page 86](#).

See ["Appendix A.13 NMEA2K" on page 85](#) for connection specification.

Power Out

Connector **FAN**

Availability dependent on model.

The fan connector powers the optional single or double fan assembly.

See ["Appendix A.14 FAN" on page 85](#) for connection specification.

Grounding Point

The grounding point is used to minimise the pickup of noise from interfering sources.

The earth lug on the DRX should be connected to a good earth point on the vessel. Use a short braided cable for optimal noise rejection.



CAUTION: Noise due to poor grounding will have direct impact on DRX performance and signal integrity.

3.6. DISPLAY AND CONTROL DEVICES

The DRX supports two levels of communication over the Ethernet link; web browser based [DRX SETUP WEBPAGES](#) and IP based DRX client applications.

In order to initiate communication with the DRX the client needs to know the DRX IP address. This can either be done through the client application discovery mechanism or using the [FIND MY DRX](#) Help utility.

The [FIND MY DRX](#) utility can be run on any PC connected to the DRX over the Ethernet connection. [FIND MY DRX](#) will find any DRX on the network by IP address.



NOTE: The PC only needs a physical Ethernet connection to find DRXs on the network. IP address and subnet is unimportant, however, for connectivity the DRX Client Application needs to be on the same TCP/IP Subnet.

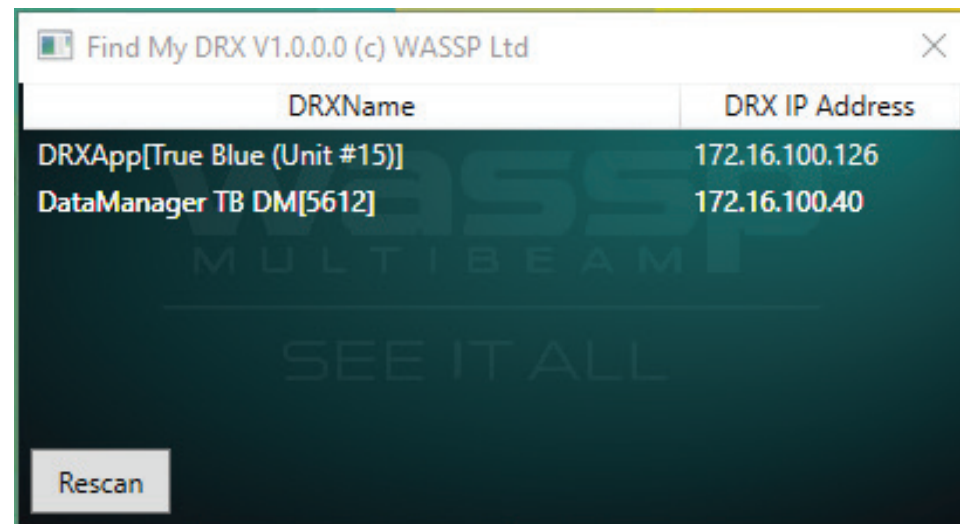


Figure 9. Find My DRX App

3.6.1. DRX Setup Webpages

DRX SETUP WEBPAGES are used for upgrade, setup, feature licencing and configuration. For more details see ["4 Operating the DRX" on page 26](#) and ["5 Sensor Configuration" on page 34](#).

The **DRX SETUP WEBPAGES** are launched by opening any supported web browser and entering the DRX IP address followed by port 2001 e.g. 169.254.54.69:2001



NOTE: Clicking on the appropriate DRX in 'FIND MY DRX' will automatically launch the web browser with the appropriate URL.



NOTE: Chrome browser, shipped with DRX, is fully supported. Other browsers may not behave as expected. If webpage does not update use CTRL F5.



CAUTION: Only one instance of 'DRX SETUP WEBPAGES' should be run otherwise a corruption may occur.

3.6.2. DRX Client Applications

Ethernet IP is used for discovery, control and data through supported DRX client applications. Current supported client applications include WASSP CDX, 3rd Party Navigation, sounder and survey applications and are described in ["6 Control and Display Application Support" on page 59](#).



NOTE: For DRX client application connection, the DRX and client application need to be on the same TCP/IP subnet.
If DRX and client applications have incompatible IP addresses, discovery will succeed but connection will fail.

3.7. ELECTRICAL ENVIRONMENT CHECK

It is important to validate the electrical environment in dock after installing the DRX, connecting all the sensors and transducer.

Steps to validate electrical environment:

1. Turn all electrical equipment and engines on
2. Ensure no acoustic equipment is in a transmitting state
3. Turn the DRX on
4. Run DRX Diagnostics
 - » Select the DRX
 - » Connect
 - » Start

See ["Figure 10. Example of an Electrical Environment Check of an 80kHz install."](#) Each coloured line represents a transducer channel and all of them should ideally be under the red line in the operating spectrum of the specific WASSP transducer.

Operating spectrum transducer:

80KHz: 40 to 100kHz

160KHz: 80 to 180kHz

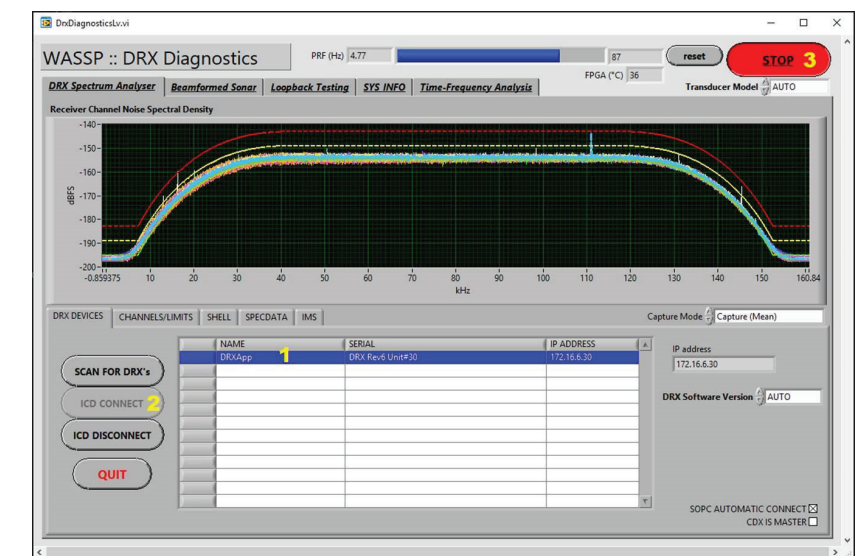


Figure 10. Example of an Electrical Environment Check of an 80kHz install.

Please contact your local dealer for support or refer to our Knowledge Base (see ["Appendix H - Product Registration, Support and Resources" on page 94](#)) if the channels are not all under the red line.

4 OPERATING THE DRX

- » To turn ON the DRX, short press the power key.
- » To turn OFF the DRX, press and hold the power key for more than 4 seconds. All LEDs will turn off, indicating that power has been turned off.

4.1. POWER

The DRX can be powered on/off using the power button or the remote power switch.

4.2. LED STATUS

The DRX features 4 LEDS next to the power button which give a quick indication of the status of the DRX system.

4.2.1. Startup sequence.

The boot sequence is as below:

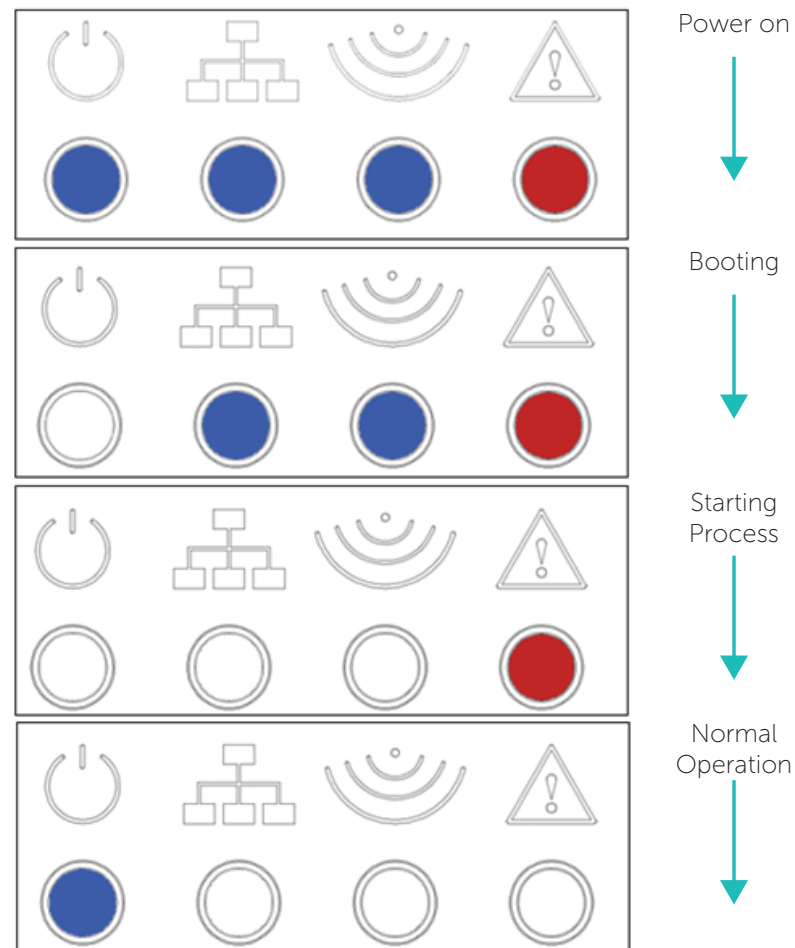


Figure 11. Startup Sequence

4.2.2. Normal Operation LED Indications

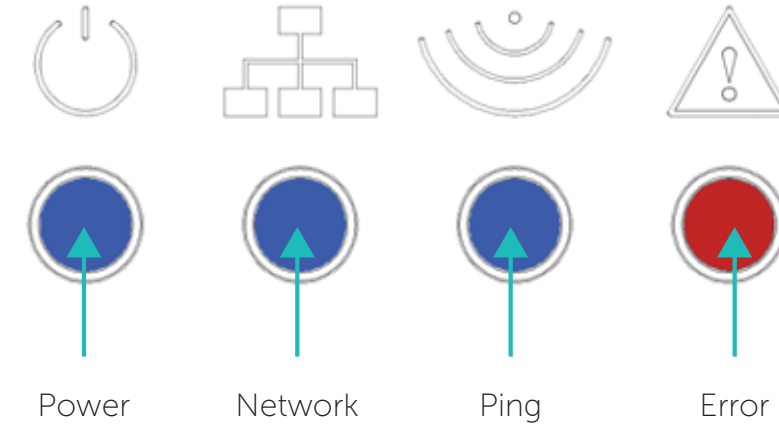


Figure 12. Normal Operation LED Indications

Power LED:

Off = Power OFF
On Solid = DRXApp is running

Network LED:

Off: No Link (cable not connected)
Solid: Link/Link Established
Blinking: TX or RX traffic

Ping LED:

Off: Not pinging
Blinking: Pinging with frequency relative to ping rate (not actual ping rate).

Error LED:

Off: Normal operation
On: (While booting) system is booting
On: (After booting) Indicates an error state. All LED states should be noted and reported to WASSP Support. See ["Appendix H - Product Registration, Support and Resources"](#) on page 94.

4.3. SYSTEM UPDATE & DIAGNOSTICS

The System section of the [DRX SETUP WEBPAGES](#) is used for checking DRX versions, upgrading the DRX and restoring the DRX settings.

Launching the [DRX SETUP WEBPAGES](#) is described in “3.6. Display and Control Devices” on page 23.

To check DRX version, open the [DRX SETUP WEBPAGES](#) and open the [SYSTEM](#) tab and open the [UPGRADE](#) tab. Versions should be recorded by copying and pasting or through screen capture.



CAUTION: Do not power down your DRX during the update procedure, this may result in complete system failure.



CAUTION: System upgrade cannot be performed whilst DRX is pinging as this may result in failure.



NOTE: Note down version numbers before and after upgrading.

To perform a system upgrade:

1. Open the [DRX SETUP WEBPAGES](#), open the [SYSTEM](#) tab and select the [UPGRADE](#) tab.
2. Select the [BROWSE](#) button to navigate to the folder containing the software update package and select the [UPLOAD](#) button.
3. During the update procedure the DRX system will reboot. Once completed, check the new software version in the System tab.

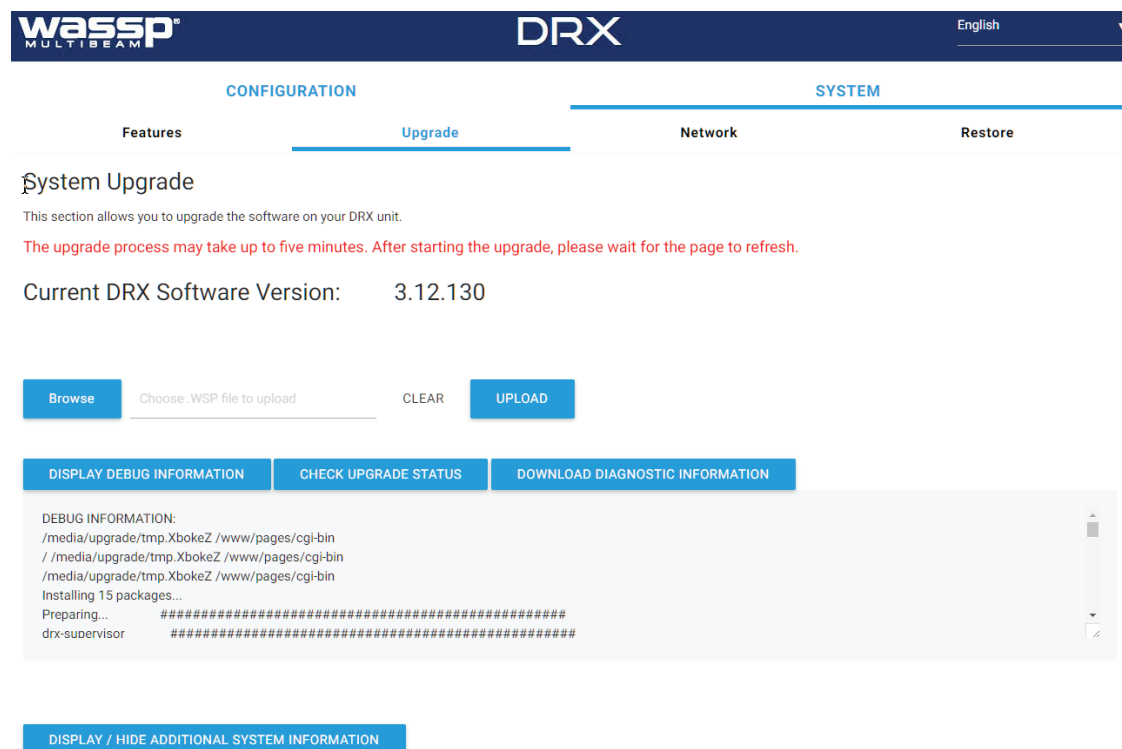


Figure 13. System Upgrade

Upgrade Error Codes

Upgrade may fail for various reasons. An error code and/or text will be displayed in the message box.

1	Transferred Data is not a file.
2	Transferred File is not of valid type.
3	Transferred File contains bad data.
4	Unable to initiate upgrade, stage 1.
5	Failed to install.
6	Unable to initiate upgrade, stage 2.
7	Unable to restart after upgrade.
8	No File transferred.
9	Undefined.
10	Failure. See error log files for detail.
Contact WASSP Support if this error occurs.	



TIP: F5 (refresh button) should be pressed if there is any doubt in data consistency between the Webpage and the DRX.

4.3.1. Diagnostics Information

Under [SYSTEM](#) tab, [UPGRADE](#) option there are diagnostics and information options.

- » [DISPLAY DEBUG INFORMATION](#) will display the DRX logs in the display window.
- » [CHECK UPGRADE STATUS](#) can be used to confirm with an upgrade has been completed successfully.
- » [DOWNLOAD DIAGNOSTICS INFORMATION](#) will download the DRX logs.



NOTE: If there is anything unusual requiring WASSP Support the DRX logs should be supplied for analysis

- » [DISPLAY / HIDE ADDITIONAL SYSTEM INFORMATION](#) shows detailed system information with version and product details.

4.4. SYSTEM RESTORE

System Restore sets all settings to factory default values.

1. Select the [SYSTEM](#) tab and select the [RESTORE](#) tab.
2. Click the [RESTORE DEFAULTS](#) button to restore the unit to default configuration settings. The unit will reboot and you will then need to re-enter all the sensor setup and offset values. See “5 Sensor Configuration” on page 34.

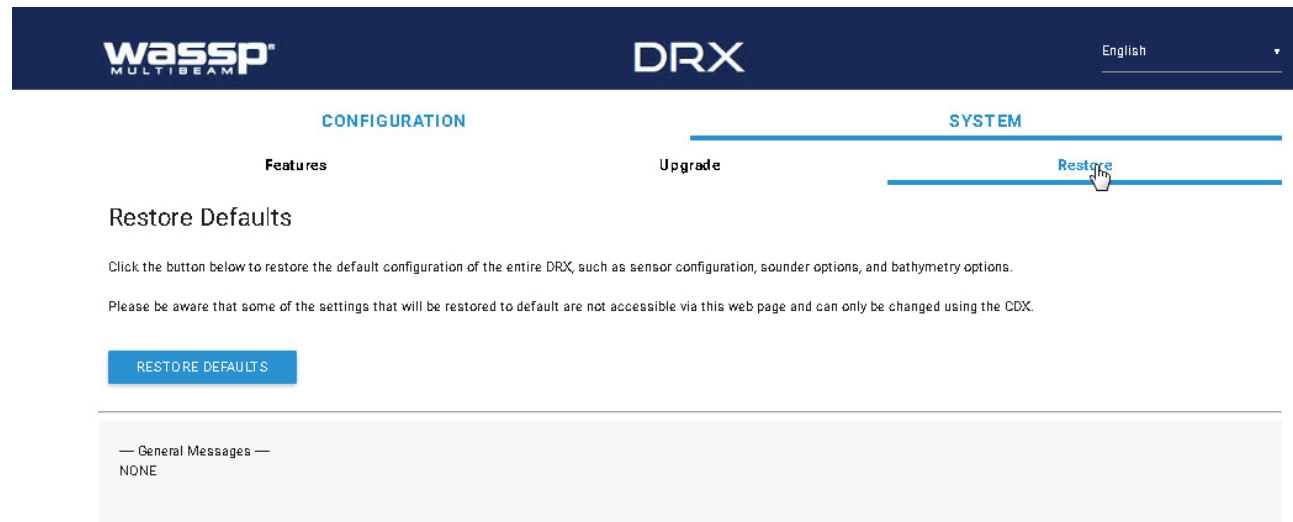


Figure 14. Restore Defaults Tab



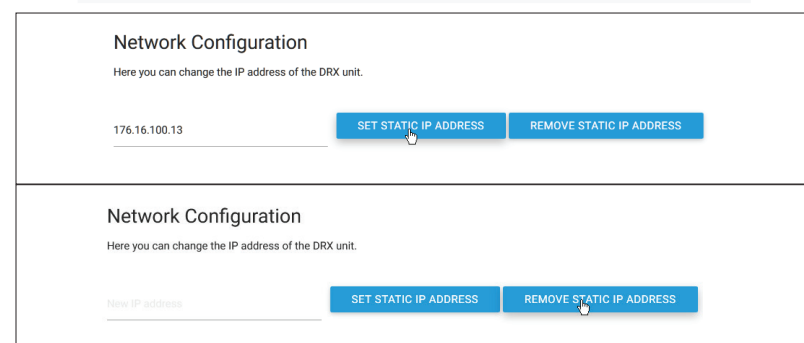
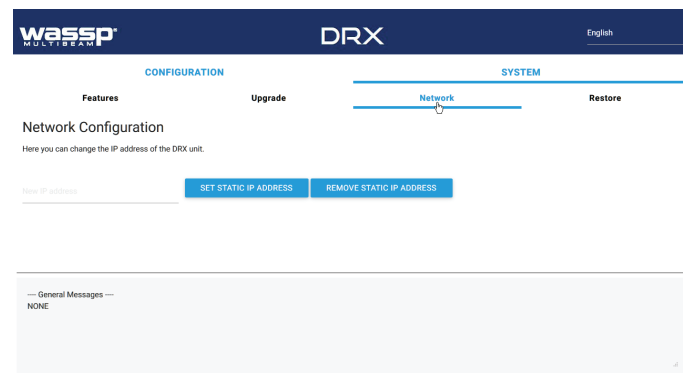
NOTE: **RESTORE DEFAULTS** will restore entire DRX configuration, not just Sensor Setup.

4.5. NETWORK CONFIGURATION

Network configuration allows setting the DRX to a fixed IP address.

By default DRX will be assigned an IP through Zero-configuration or by a DHCP server if there is one on the LAN. By setting a fixed IP this will override automatic assignment.

1. Select **SYSTEM** tab and select **NETWORK** tab.
2. Use the **SET STATIC IP ADDRESS** button to set a fixed IP.
3. Use the **REMOVE STATIC IP ADDRESS** button to revert to automatic IP assignment.



NOTE: The PC/Client Application needs to be in the same subnet as the DRX for connectivity. DRX IP address can always be identified using 'Find my DRX' ; see "Figure 9. Find My DRX App" on page 24.

4.6. SYSTEM FEATURES

DRX optional features can be enabled through license keys.

To enable a feature, the appropriate feature license file needs to be purchased through a WASSP dealer or directly through WASSP Ltd. The license will be supplied as a license file over email, on a USB flash drive or other media. Available features can be seen by selecting **SYSTEM** tab and selecting **FEATURES** tab.

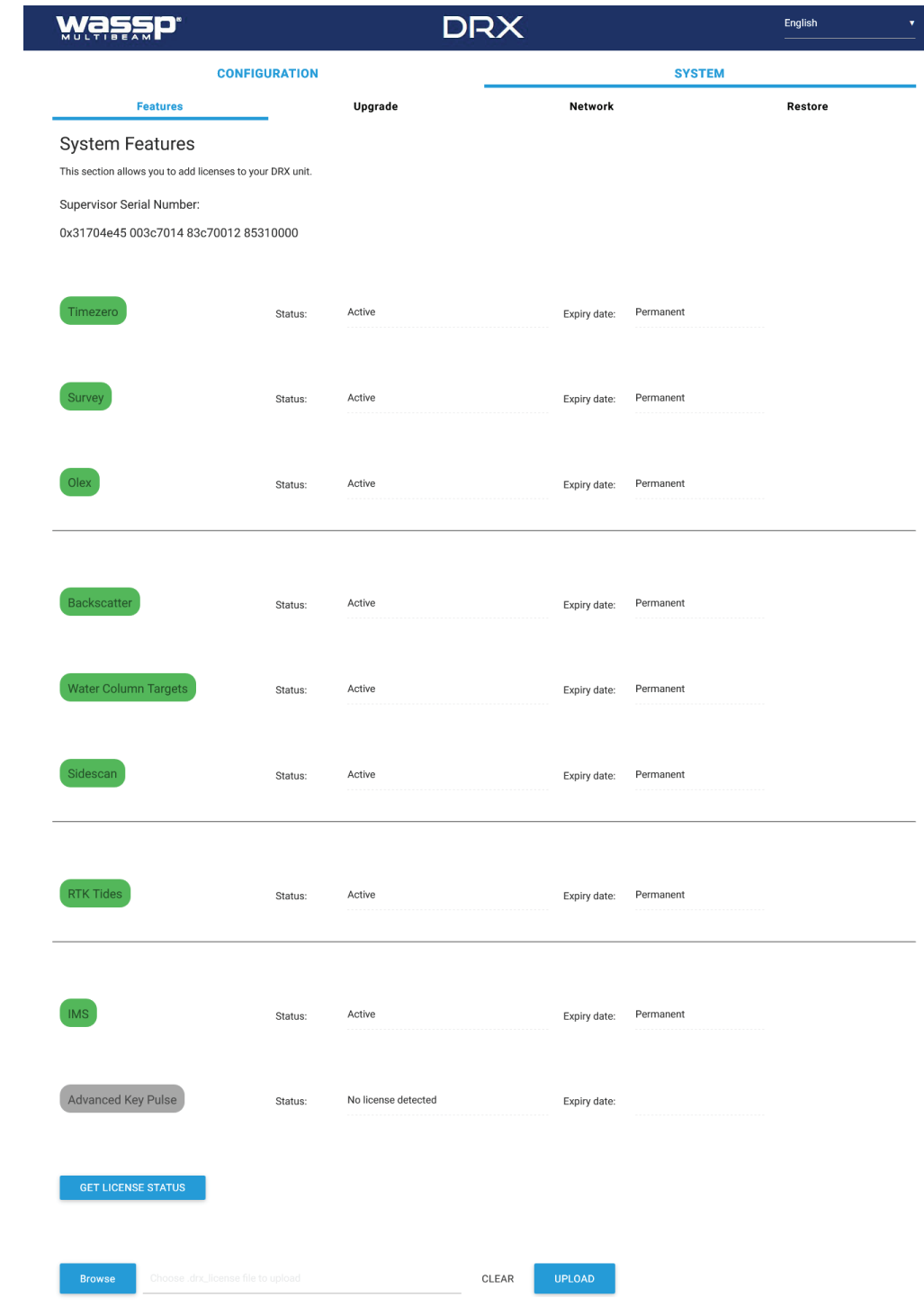


Figure 15. System Features

Licenses can be in one of 3 states:

- **ACTIVE**; License is installed and active.



NOTE: The license may be a permanent or time limited license.

- **EXPIRED**; License is installed but has expired/timed out.
- **NO LICENSE**; No License for this feature has been installed.

RTK Tides	Status: Active	Expiry date: Permanent
Olex	Status: License expired	Expiry date: 2017-12-31
Advanced Key Pulse	Status: No license detected	Expiry date:

Figure 16. License Status

Licensed Features include:

Application Interfaces

TIMEZERO; Allows direct interface between DRX and TZ. TZ controls the DRX and displays data supplied by the DRX, depending on which display functionality is enabled.

SURVEY; Enables interface between DRX and various survey platforms. DRX supplies the appropriate data for post processing on the survey application.

OLEX; Allows interfacing to Olex through CDX. Control is required by CDX and display data is passed through to Olex.

Display Functionality

BACKSCATTER; Seafloor backscatter data is enabled allowing the client application to display backscatter strength on 2D and 3D overlays or to use for post processing.

WATER COLUMN TARGETS; Targets detections in the water column, such as fish, are enabled. This allows client applications to display discrete targets and their target strengths on the 2D or 3D displays.

SIDESCAN; Data is processed as sidescan is enabled. This allows port/starboard sidescan imagery on the client application.

Control Functionality

RTK TIDES; Use of GPS height can be used to compensate for sea level change. This is particularly useful for accounting for tidal height when mapping bathymetry. *See "5.2.8. Geoids Tab" on page 48 and "Appendix C - Ship's Measurement Points" on page 88.*

IMS; Used for automated optimisation of DRX for improving performance when there is acoustic interference. IMS is enabled or disabled from the client application. *See "Appendix E - Auto Control in CDX" on page 91.*

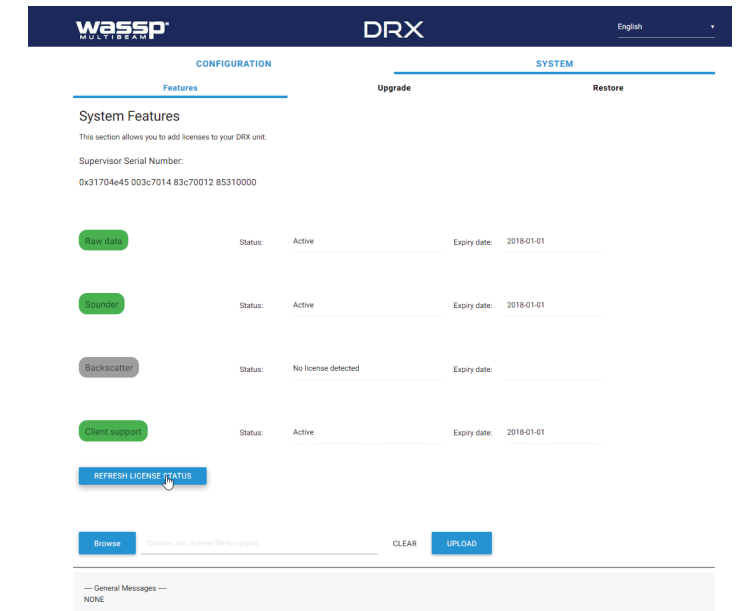
ADVANCED KEY PULSE; As part of IMS, AKP (Advanced Key Pulse) functionality can be used to improve management of interfering acoustic equipment. *See "5.2.6.4. Advanced Key Pulse" on page 45.*



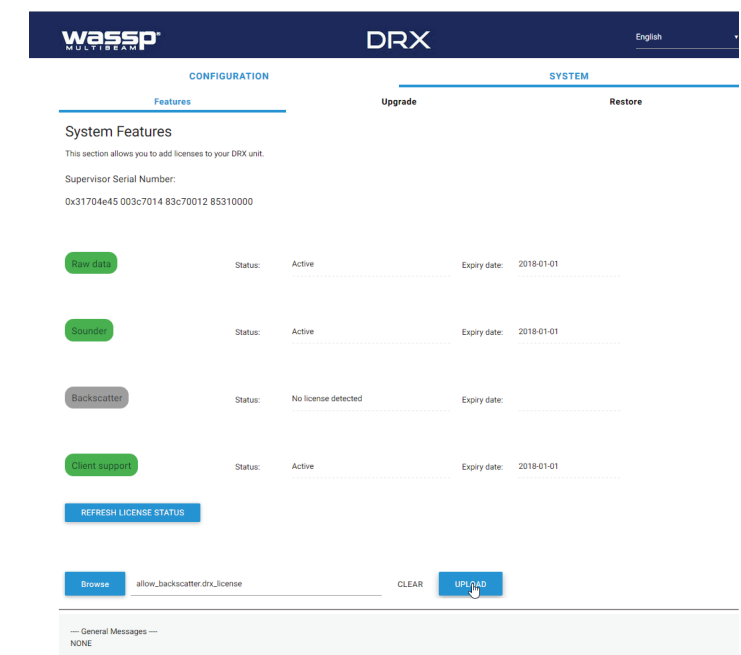
NOTE: IMS is not available on all DRXs. Check with WASSP Support with your DRX Serial Number for more information.

To install the license follow the steps:

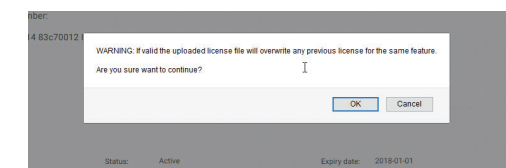
1. Select **SYSTEM** tab and select **FEATURES** tab.
2. Select the **REFRESH LICENSE STATUS** button to see current active Licenses and associated expiry date.



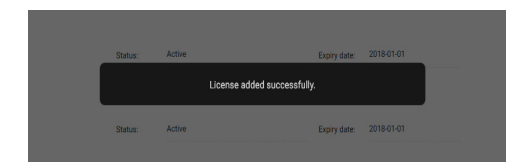
3. Select the **BROWSE** button to select the appropriate license file.
4. Select **UPLOAD** button for the selected license file.



5. You will be asked to confirm selection.



6. License file will be uploaded and applied.



5 SENSOR CONFIGURATION

The WASSP system requires position, heading, attitude, heave and time information in order to be fully functional. The overall performance will be directly affected by the quality of the sensors chosen and being configured as described below.

WASSP supplies sensor package kits for recommended install. See the WASSP Sensor Box Installation Manual for detailed information.

For supported sensors and sentences, see *"Appendix B - Supported Sensors and Sentences"* on page 86.



NOTE: Currently support sensors and sentences will depend on software version and can be found at wassp.com

5.1. COMMISSIONING STEP 1: SHIP MEASUREMENTS

Take measurements from the GPS antenna, motion sensor and transducer to the vessel's reference point. See *"Figure 17. Ship Measurements Diagram"* on page 35.

These measurements must be as accurate as possible and should be measured to cm level accuracy. The accuracy of these measurements have a direct impact on the WASSP Multibeam performance. Position to measure from on the transducer, GPS antenna and motion sensor is described in *"Appendix C - Ship's Measurement Points"* on page 88.

Enter these values in the spaces below, and in the **SENSOR INSTALLATION** tab within the **SENSOR** tab of the **DRX SETUP WEBPAGES**. See *"Figure 20. DRX Setup, Sensor Tab"* on page 39.



NOTE: The Ship's Reference Point needs to be a point on the vessel that is easy to measure to and should be located with this in mind. The actual position of the Reference Point is unimportant but should be clearly marked and measurements between the sensors and the Reference Point made as accurately as possible.

Transducer (XDCR) Depth (Draft) Displacement:	m A _____
GPS X Displacement from reference:	m B _____
GPS Y Displacement from reference:	m C _____
GPS Z Displacement from reference:	m D _____
Transducer (XDCR) X Displacement from reference:	m E _____
Transducer (XDCR) Y Displacement from reference:	m F _____
Transducer Z Displacement from reference:	m G _____
Motion Sensor X Displacement from reference:	m H _____
Motion Sensor Y Displacement from reference:	m I _____
Motion Sensor Z Displacement from reference:	m J _____



NOTE: Separate sensors can be used for GPS data, heading, roll, pitch and heave as required. Make sure to note down all Sensor offset.

Sensor Installation

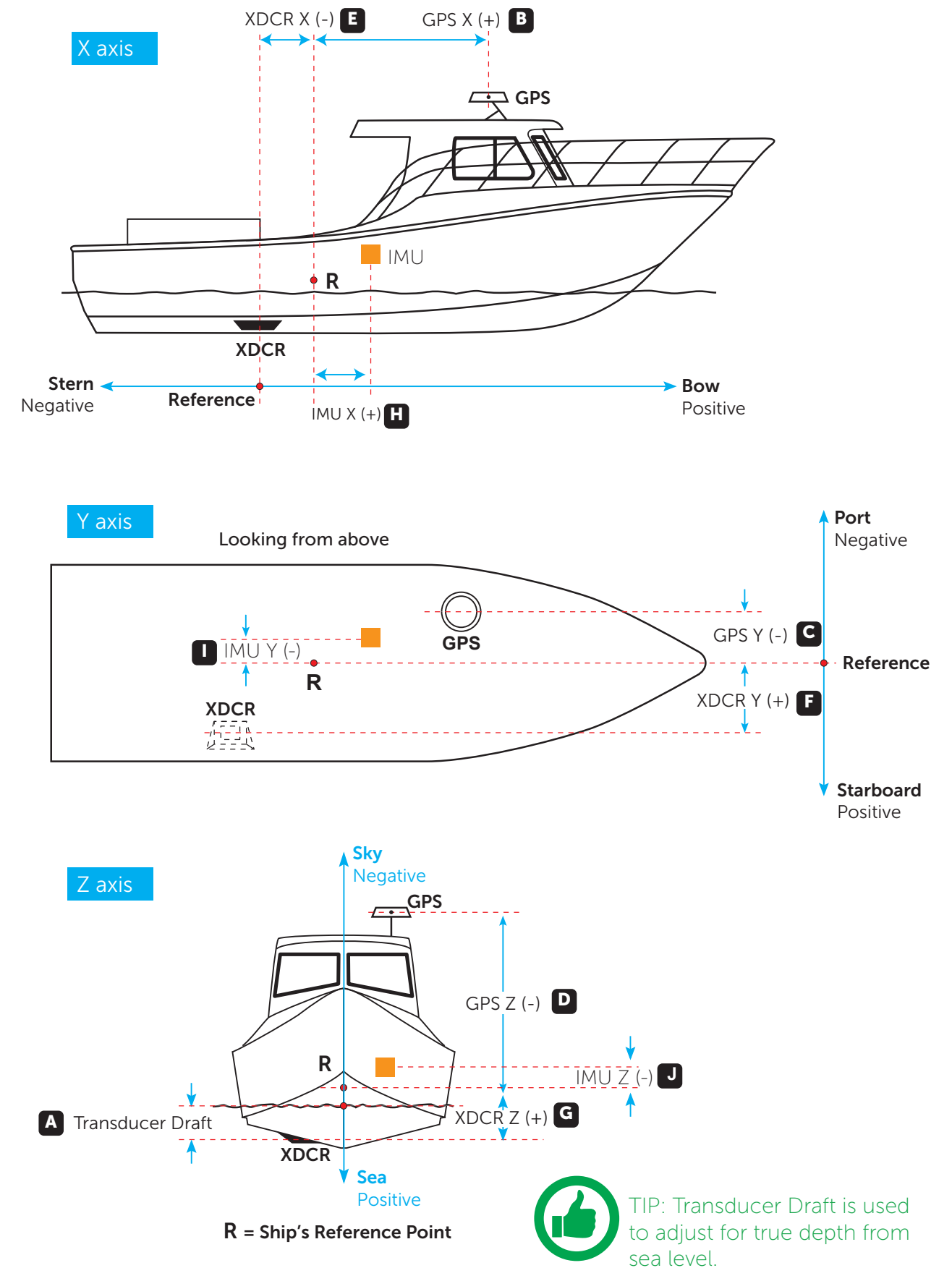


Figure 17. Ship Measurements Diagram

5.2. COMMISSIONING STEP 2: SENSOR CONFIGURATION

The Configuration section of the [DRX SETUP WEBPAGES](#) is used for configuring the DRX physical ports and the sensors connected to the DRX.

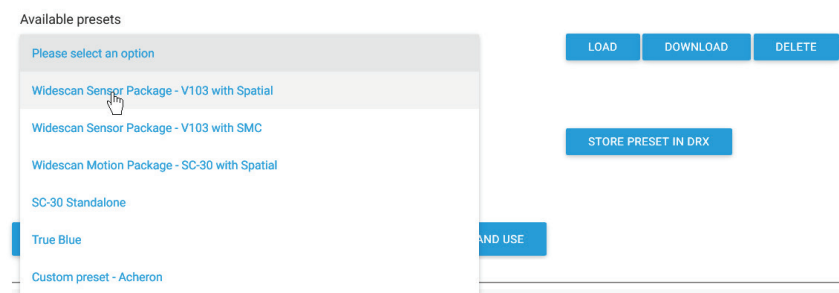
Launching the [DRX SYSTEM WEBPAGE](#) is described in *"3.6. Display and Control Devices" on page 23.*

5.2.1. Presets Tab

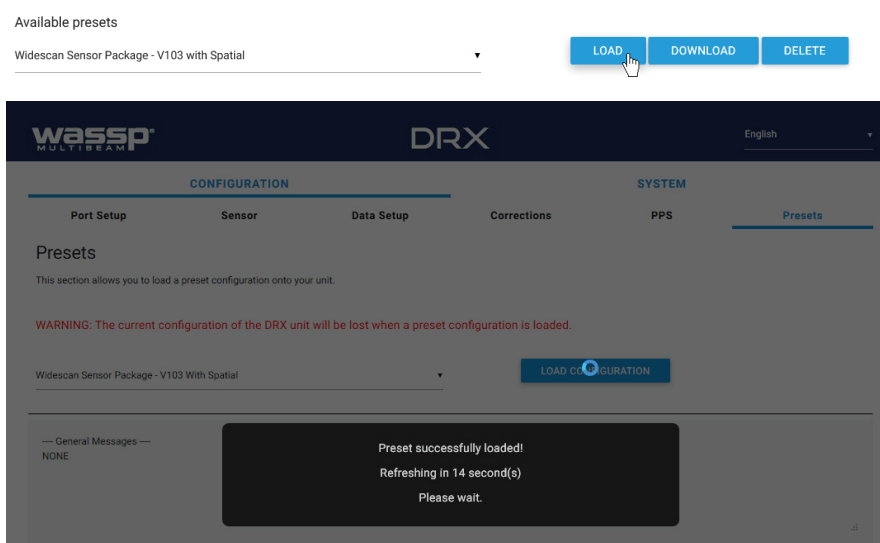
The [PRESETS](#) tab allows a selection of preconfigured sensor setup options and the ability to save and retrieve custom or user defined preset options.

5.2.1.1. Applying Presets

1. Select the required preset from the dropdown of [AVAILABLE PRESETS](#).



2. Select [LOAD](#) to apply the chosen preset.
3. Presets will be loaded and set [PORT SETUP](#), [SENSOR](#), [DATA SETUP](#), [CORRECTIONS](#). [PPS](#) configuration.



NOTE: Sensor Offsets still need to be manually setup.



NOTE: Available Presets will consist of defaults loaded into the DRX and any custom presets applied by the user.

Preset options include:

- » Widescan Sensor Package – V103 With Spatial; Sensor package supplied as optional kit. Reference Sensor Box Installation Manual for details.
- » Widescan Sensor Package – V103 With SMC; Sensor Package available from WASSP Ltd. Configures as SMC IMU on [RS232](#) Port and V103 on [RS422](#) Port with PPS configures.
- » SC-30 Standalone; Configuration for customer supply SC-30 used for Position,

heading and attitude data. Configure with SC-30 on [0183](#) port. These presets may change depending on version and model.

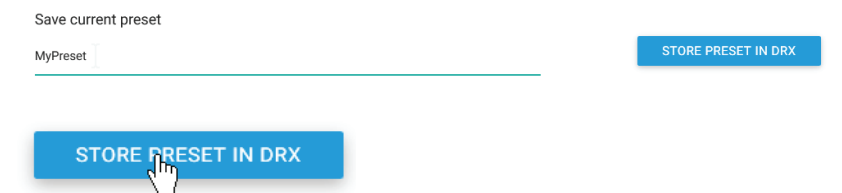


NOTE: Presets will configure [PORT SETUP](#), [SENSOR](#), [DATA SETUP](#), [CORRECTIONS](#), [PPS](#).

5.2.1.2. Saving Custom Presets

To save current configuration as a Preset:

1. Enter a name for the Preset under [SAVE CURRENT PRESET](#).
2. Select [STORE PRESET IN DRX](#).



The preset will be stored in the DRX.

5.2.1.3. Downloading and Uploading Presets

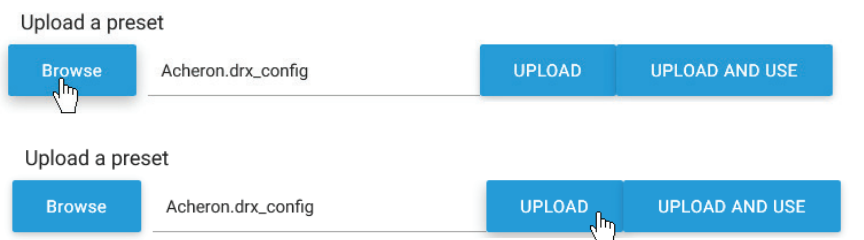
Custom configurations can be stored externally to the DRX.

1. Select a custom preset from the Available Presets
2. Select [DOWNLOAD](#) and store in your preferred location.



Custom configurations stored externally can be uploaded to the DRX

1. Select [BROWSE](#) and select the appropriate preset file.
2. Select [UPLOAD](#) or [UPLOAD AND USE](#).



3. The preset will now appear under Available Presets as a custom preset.



NOTE: Only upload presets that were downloaded from the DRX.

5.2.2. Port Setup Tab

The [PORT SETUP](#) tab is used for configuring the physical DRX ports to receive data from the sensors attached to that port.

NMEA 0183 port can also be used to transmit data and uses the same configuration as receive.

The screenshot shows the 'Port Setup' tab in the DRX configuration interface. It features a table with columns for Sensor, Enabled, Baud, Bits, Stop Bits, Parity, Handshake, and a Monitor checkbox. Three rows are visible: RS422_01, RS232_01, and NMEA0183_01. Each row has a 'COMMIT' button at the bottom right.

Figure 18. DRX Setup, Port Setup Table

The following options need to be set up for each of the DRX ports being used:

- » Enabled; Marks a port as active or not active.
- » Baud; Sets port's baud rate to match the sensor baud rate. Bits, Stop Bits, Parity and Handshake; Configures the port to match the incoming sentences from the sensor.

NOTE: You must COMMIT or these settings will be lost.

NOTE: Port assigned to sensor in the 'Sensor' tab.

TIP: F5 (refresh button) should be pressed if there is any doubt in data consistency between the Webpage and the DRX.

The monitor check box can be selected to display the incoming sentences on the specific port. This can be used to identify if the port is configured correctly and the sensors are outputting the correct data.

The screenshot shows the 'Port Setup' tab with a list of sensor data sentences displayed in a text area. The sentences include timestamps and sensor identifiers like RS232_01 and RS232_02. A 'COMMIT' button is visible at the bottom right.

Figure 19. DRX Setup, Port Setup Tab with Sensor Data

5.2.3. Sensor Tab

The **SENSOR** tab is used to configure the physical position of each sensor being used and which port that sensor is connected to on the DRX. **SENSOR** tab is also used for selecting transducer type.

The screenshot shows the 'Sensor' tab in the DRX configuration interface. It features a table with columns for Sensor, X Offset [m], Y Offset [m], Z Offset [m], and Port. The table lists various sensors like Transducer, Sensor 1, Sensor 2, etc., with their respective offsets and ports. A 'COMMIT' button is visible at the bottom right.

Figure 20. DRX Setup, Sensor Tab

For each Sensor being used, set the following:

- » **SENSOR**; Select the sensor type from the drop down list. Select **USER DEFINED** if the sensor being used is not listed (any sensors not listed have not been specifically tested with DRX).
- » **X, Y, Z OFFSET**; Set the measurement as per section "5.1. Commissioning Step 1: Ship Measurements" on page 34.
- » **PORT**; Select the physical port on the DRX that the sensor is connected to from the drop down list.

Transducer selection allows for currently available WASSP transducer supported by DRX.

The screenshot shows a dropdown menu for selecting a sensor. The options are 80kHz and 160kHz. A hand icon is pointing at the 160kHz option.

NOTE: You must COMMIT or these settings will be lost.

NOTE: Offsets should be entered in meters to nearest cm (0.01m).

5.2.4. Data Setup Tab

The **DATA SETUP** tab is used to setup each external data type that is required by DRX to function correctly. Each of the data types; position, heading, roll, pitch, heave and time need to be set.

Data Setup	Sensor	Sentence	Lag [s]	Bias/Offset	Current Value
POSITION	Hemisphere	GGA	0.000		000.000000,00.000000
HEADING	Hemisphere	HDT	0.010	0.00	00.000°
COG/SOG	N/A	N/A	0.000		00.000°,00.000kts
ROLL	Spatial	TSS1	0.001	-1.20	00.000°
PITCH	Spatial	TSS1	0.001	0.00	00.000°
HEAVE	Spatial	TSS1	0.001		00.000m
TIME	Hemisphere	ZDA	0.000		00:00:00
TEMPERATURE	User 4	N/A	0.000		0.0°
MEAN SEA LEVEL	N/A	N/A	0.000	0.00	0.000m
SOUND VELOCITY	N/A	N/A	0.000	0.00	

Figure 21. DRX Setup, Data Setup Tab

For each data type setup the following:

- » **SENSOR**; The specific sensor that is supplying the data, selected from the drop down. This sensor will have been configured under the **SENSOR** tab.
- » **SENTENCE**; Select the appropriate sentence from the drop down. This can be cross-referenced with the data being monitored under the **PORT SETUP** tab to make sure that it is available to the DRX.
- » **LAG**; The sentence lag (also called latency or delay) from the specified sensor should be entered here. *Section "5.3. Commissioning Step 3: On Water Patch Tests" on page 52* gives detail on calculating delay for GPS position. Lag for attitude data should be obtained from the sensor manufacturer specification.
- » **BIAS**; The bias (also called offset or correction) of a data type should be entered here. *"5.3. Commissioning Step 3: On Water Patch Tests" on page 52* gives details on calculating bias for each of roll, pitch and heading.

Data Types that are required to be setup include:

- » **POSITION** and **HEADING**; Required for georeferencing the vessel for bathymetry mapping.
- » **ROLL PITCH** and **HEAVE**; Required for compensating for vessel motion
- » **TIME**; Required for UTC time synchronisation and specifically for PPS accurate time synchronisation.

Other data types that can be setup include:

- » **WATER TEMPERATURE**; Used to calculate sound velocity which is required for multibeam operation
- » **SOUND VELOCITY**; Direct input of sound velocity allows for accurate compensation for multibeam operation

- » **MEAN SEA LEVEL**; Required if RTK Tides feature License is being used for compensating for sea level using GPS height. *See "5.2.8. Geoids Tab" on page 48.*
- » **COG/SOG**; Allows for COG and SOG display the client application.



NOTE: 'Current Value' will display the values being used by the DRX. However these will be raw values and not account for latency settings.



NOTE: Lag is in seconds and Bias is in degrees. Lag should be entered to nearest millisecond and Bias to nearest 0.01 degrees.



NOTE: You must COMMIT or these settings will be lost.

5.2.5. Corrections Tab

The **CORRECTIONS** tab is used to enable or disable specific attitude corrections being applied, to invert attitude corrections, to correct for depth through adjusting transducer draft and to adjust swath width.

Corrections	Enabled	Invert
Roll	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pitch	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Heave	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Induced Heave	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Transducer Array	<input type="checkbox"/>	<input type="checkbox"/>

Transducer Draft [m]: 1.8

Keel Depth Below Transducer [m]: 0.1

Bathymetry Beam Width: Port 60° Starboard 60°

Figure 22. DRX Setup, Corrections Tab

By default, all attitude corrections should be applied for optimal performance. To enable or disable specific attitude corrections:

1. Select the check boxes of the attitude correction that should be applied, under **ENABLED**.
2. Press **COMMIT** button to save any changes.
3. The indicator beside the check box shows the status of the DRX. If the indicator is green the correction is enabled in the DRX. If the indicator is red the correction is disabled in the DRX.

Attitude corrections may need to be inverted if either the sensor is mounted incorrectly or if the sensor supplies inverted roll data, for instance:

1. Select the check boxes of the attitude correction that should be inverted, under **INVERT**.
2. Press **COMMIT** button to save any changes.
3. The indicator beside the check box shows the status of the DRX. If the indicator is green the correction is inverted in the DRX. If the indicator is red the correction is not inverted in the DRX.

TRANSDUCER DRAFT value will correct the depth by taking into account the transducer draft. See “Figure 17. Ship Measurements Diagram” on page 35, measurement A.

KEEL DEPTH VALUE will correct the depth by taking in to account the keel depth. See “Table 3. NMEA Sentences Output” on page 87.

BATHYMETRY BEAM WIDTH; The overall swath width for mapping can be adjusted using port and starboard angle from nadir. Maximum swath width is 60° either side of nadir for a 120° swath width.

Transducer Draft [m]	1.8
Keel Depth Below Transducer [m]	0.1
Bathymetry Beam Width	<div>Port 60°</div> <div>Starboard 60°</div>



NOTE: ‘Induced Heave’ may depend on whether a motion sensor is configured to account for induced heave.



NOTE: Transducer draft might be adjusted for change in ballast due to fuel, payload etc.



NOTE: You must **COMMIT** or these settings will be lost.



NOTE: Transducer Invert can be used to correct for a transducer being installed back to front.

5.2.6. Key Pulse Tab

The **KEY PULSE** tab is use for syncing the DRX transmit to other acoustic equipment that the DRX is physically wired to.

Key pulse configuration will be specific to the vessel and operating environment and is used to optimise operation for all of the equipment by minimising acoustic interference. Key pulse is configured under the **KEY PULSE** tab.

Figure 23. DRX Setup, Key Pulse Tab

Key Pulse can be configured to either be Disabled, Master, Slave or Auto Modes under **KEY PULSE SETUP**.

- » **DISABLED**; DRX Tx is not affected by key pulse.
- » **MASTER**; DRX will act as a key pulse Tx master.
- » **SLAVE**; DRX will act as key pulse slave for Tx.
- » **AUTO**; Allows DRX to automatically switch from slave to master with blanking as required.

5.2.6.1. Configuring Key Pulse Slave

In **SLAVE** mode the DRX will transmit on the key pulse signal from external equipment. DRX has 2 key pulse inputs available for Slave mode.

To configure Slave mode:

1. Make sure that **KEY PULSE SETUP MODE** is either **SLAVE** or **AUTO**
2. Under **KEY PULSE HARDWARE CONFIGURATION** select the Hardware type.

3. If **HARDWARE TYPE** selected is Custom, set the required trigger threshold level. **THRESHOLD VALUE** indicates a sensitivity level to the input signal.

Key Pulse Hardware Configuration					
	Hardware Type	Threshold Value [-]	Invert Polarity	Detected Rate [ppm]	Duty Cycle
KP Input 1	Custom	0	<input type="checkbox"/>	0	100.00%
KP Input 2	Furuno	4	<input type="checkbox"/>	0	100.00%

4. If the KP signal coming in is inverted select the **INVERT POLARITY** option.

5. Under **SLAVE CONFIGURATION** select which key pulse inputs DRX should transmit on. One, both or neither key pulse input can be used.

Slave Configuration	
	Trigger
KP Input 1	<input checked="" type="checkbox"/>
KP Input 2	<input type="checkbox"/>



NOTE: The input signal activity can be indicated using the **DETECTED RATE** (ppm) and **DUTY CYCLE** monitors.

5.2.6.2. Configuring Key Pulse Master

In **MASTER** mode the DRX will transmit a key pulse signal based off the time of the DRX transmit pulse. Equipment connected to DRX as slaves will transmit relative to this key pulse.

To configure **MASTER** mode:

1. Make sure that **KEY PULSE SETUP** mode is set to **MASTER**.

2. Enable the Key pulse transmit under the **KEY PULSE OUTPUT CONFIGURATION**.

Key Pulse Output Configuration			
DRX Transmit	<input checked="" type="checkbox"/>	Pulse Width [ms]	Same as DRX
Invert Polarity	<input type="checkbox"/>	Output Offset	Just before DRX
KP Output	4095	Detected Rate [ppm]	Duty Cycle
			50.00%

3. Select time of key pulse relative to DRX transmit time. The % value indicates the relative time between DRX Tx's.

Key Pulse Output Configuration			
DRX Transmit	<input checked="" type="checkbox"/>	Pulse Width [ms]	Same as DRX
Invert Polarity	<input type="checkbox"/>	Output Offset	Just before DRX
KP Output	4095	Detected Rate [ppm]	Duty Cycle
			50.00%



NOTE: The output signal activity can be indicated using the **DETECTED RATE** (ppm) and **DUTY CYCLE** monitors..



NOTE: Pulse Width is only used for Advanced Key Pulse Setting, described in section "5.2.6.4. Advanced Key Pulse" on page 45.

5.2.6.3. Configuring Key Pulse Blanking

Rx Blanking allows any data during the key pulse input period to be blanked out so that potential interference is removed. This blanking will also remove potentially useful acoustic return.

To configure Rx blanking:

1. Under **KEY PULSE HARDWARE CONFIGURATION** select the **HARDWARE TYPE**.

Key Pulse Hardware Configuration					
KP Input 1	Furuno	Invert Polarity	<input type="checkbox"/>	Detected Rate [ppm]	Duty Cycle
KP Input 2	Simrad	<input type="checkbox"/>	0	100.00%	

2. If **HARDWARE TYPE** selected is Custom set the required trigger threshold level.

Key Pulse Hardware Configuration					
KP Input 1	Custom	Threshold Value [-]	0	Invert Polarity	<input type="checkbox"/>
KP Input 2	Furuno	4	0	<input type="checkbox"/>	Duty Cycle
					100.00%

3. If the KP signal coming in is inverted select the **INVERT POLARITY** option.

4. Enable the blanking using the **BLANK ENABLE** selections.

Rx Blanking Configuration					
KP Input 1	Hold Off [ms]	Blank Enable	<input checked="" type="checkbox"/>	Combined Blank	Detected Rate [ppm]
KP Input 2	0	<input type="checkbox"/>		0	Duty Cycle
					0.00%

5. The blanked region can be offset from the key pulse input signal using the **HOLD OFF** selection.

Rx Blanking Configuration	
KP Input 1	Hold Off [ms]
KP Input 2	1



NOTE: The input signal activity can be indicated using the signal rate and duty cycle monitors.

5.2.6.4. Advanced Key Pulse

Advanced key pulse functionality can be enabled by applying the AKP license under **SYSTEM FEATURES**.

The advanced key pulse functionality includes:

- » **KP TIMEOUT**; If no key pulse is identified over a given period DRX will revert to standard operation.
- » **JITTER**; Jitter can be configured in order to decorrelate transmit while maintaining synchronisation through key pulse operation.

Key Pulse Setup	
KP Mode	Master
Advanced KP License detected	
Jitter Slots	Enabled
Jitter Slot Padding [ms]	0
Maximum DRX Ping Rate	N/A

Jitter Slot width for key pulse output is controlled by the **PULSE WIDTH SETTING** under **KEY PULSE OUTPUT CONFIGURATION**.

JITTER SLOT PADDING can be used to increase the width of Jitter Slots.

- » **SLAVE TRIGGER HOLD OFF**; Tx can be delayed and staggered relative to the key pulse in.
- » **PING PONG**; This mode forces time division between equipments' full Tx/Rx cycle.
- » **IDLE KP MUTE**: If **KEY PULSE OUTPUT** is enabled and DRX is not pinging, on timeout key pulse will be output at 250Hz allowing slaved devices to continue running. **IDLE KP MUTE** selection will disable this mode

Slave Configuration		
	Trigger	Trigger Hold Off [ms]
KP Input 1	<input checked="" type="checkbox"/> ●	20
KP Input 2	<input type="checkbox"/> ●	0

Key Pulse Output Configuration		
	Enable	Output Offset
KP Output	<input checked="" type="checkbox"/> ●	Just after DRX
Invert Polarity	<input type="checkbox"/> ●	

	Detected Rate [ppm]	Duty Cycle
KP Output	0	21.95%

KP PING PONG	<input type="checkbox"/> ●
IDLE KP MUTE	<input checked="" type="checkbox"/> ●



NOTE: The positive and negative edges of the key pulse output can be used to key two systems that would otherwise interfere with each other. The 2 edges of the key pulse are decorrelated in time.



NOTE: You must select COMMIT to apply these settings.

5.2.7. PPS Tab

PPS input can be configured from the **PPS** tab.

PPS can be configured for the sensor that is supplying time data as long as that sensor also supports PPS out.

Figure 24. DRX Setup, PPS Tab

The following parameters need to be set:

- » **PPS PORT**.
- » **TRIGGER EDGE**; Typically this is rising edge for PPS.



NOTE: The Time data sensor that has been selected under DATA SETUP is indicated under PPS Setup. This needs to correspond with the PPS Port selected.



NOTE: You must COMMIT or these settings will be lost.

With correct configuration **TIME** will update and status will proceed from Disabled, red indicator, to Training, amber indicator, to synchronised, green indicator, as the following shows:

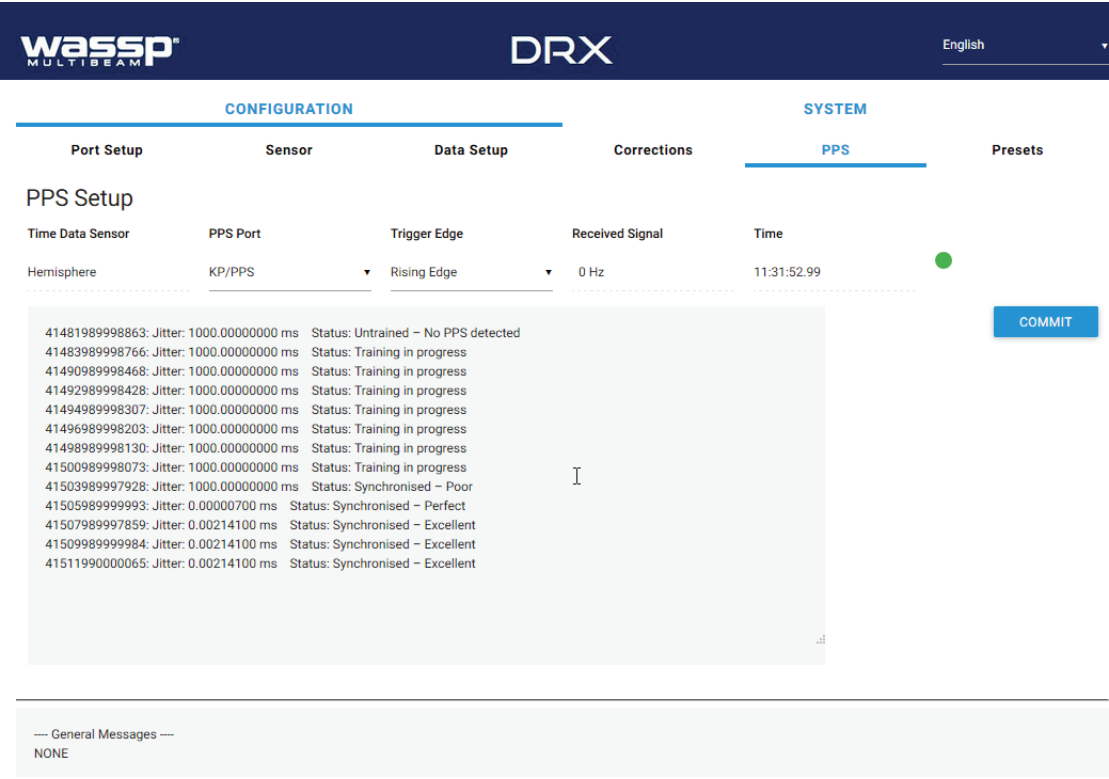
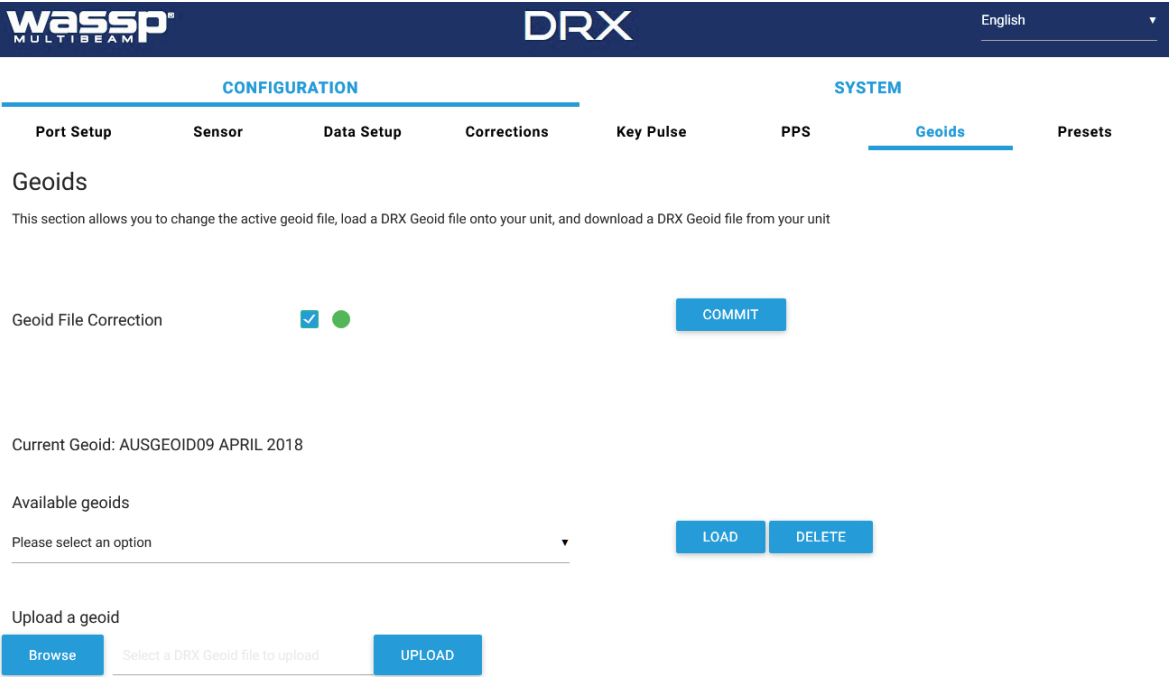


Figure 25. PPS Status
With PPS operating correctly status indicator will remain on green.

5.2.8. Geoids Tab

To use GPS height for calculating sea level in the DRX the GPS should be configured to supply an accurate height fix using Differential or RTK. GGA field 6, GPS Quality Indicator needs to be at 2 or above.

Sea level height can be configured to be relative to the internal GPS Geoid or relative to the Geoid file loaded into the DRX.



5.2.8.1. Configuring Height Relative to the DRX Geoid File

The DRX Geoid file for the appropriate region needs to be uploaded to the DRX. DRX Geoid files are available on request from WASSP Support through the WASSP Support Portal, [see "Appendix H - Product Registration, Support and Resources" on page 94](#).

If the required Geoid file is not available a request can be made through the WASSP Support Portal.

To upload a DRX Geoid file:

1. **BROWSE** and select an appropriate DRX Geoid File.

Upload a geoid

Browse
Select a DRX Geoid file to upload

UPLOAD

Upload a geoid

Browse
NZGEOID2009_AUCKLAND.drx_geoid

UPLOAD

2. Select **UPLOAD** to upload the DRX Geoid File to the DRX.

3. Uploaded Geoid files will be available in the **AVAILABLE GEOIDS** section.

4. Select the applicable Geoid file and select **LOAD**. This will become the current Geoid used by DRX.

Current Geoid: AUSGEOID09 APRIL 2018

Available geoids

Please select an option

AUSGEOID09 MAY 2018

AUSGEOID09 APRIL 2018

LOAD
DELETE

5. Select **GEOID FILE CORRECTION** and hit **COMMIT**.

Active Geoid: AUSGEOID09 APRIL 2018

Geoid File Correction
☒

COMMIT

The **CURRENT GEOID** will now be used for compensating for sea level change or tidal height when correcting the Bathymetry level.

If required an offset can be applied to the Geoid file. This can be applied under the **DATA SETUP** tab in the **DRX SETUP WEBPAGES**.

MEAN SEA LEVEL

Hemisphere

GGA

0.000

10.00

[See "Appendix C - Ship's Measurement Points" on page 88](#), section Sea Level Height using DRX Geoid File for details on the calculated sea height using DRX Geoid File.

5.2.8.2. Configuring Height Relative to the Internal GPS Geoid

The internal GPS Geoid can be used if a DRX Geoid file is not available for your area.

Deselect **GEOID FILE CORRECTION** and hit **COMMIT**.

Active Geoid: AUSGEOID09 APRIL 2018

Geoid File Correction
☐

COMMIT

An offset can be applied to the Internal GPS Geoid. This can be applied under the **DATA SETUP** tab in the **DRX SETUP WEBPAGES**.

MEAN SEA LEVEL

Hemisphere

GGA

0.000

10.00

[See "Appendix C - Ship's Measurement Points" on page 88](#), Sea section Level Height using Internal GPS Geoid for details on the calculated sea height using Internal GPS Geoid.

5.3. COMMISSIONING STEP 3: ON WATER PATCH TESTS

On water patch tests are essential for correctly configuring the DRX. The accuracy of the values derived from these patch tests will directly impact system performance.

These patch tests can be run using various tools including those in 3rd Party application such as HYPACK, WASSP Patch Test Utility shipped with WASSP CDX or manually through WASSP CDX. The sections below describe methods for running patch tests manually using WASSP CDX.

5.3.1. GPS Time Delay

Most GPS sources used in conjunction with WASSP will have a significant delay between when the ship passes through a position and when that position is sent on the serial port. This delay may be in the order of 1 second. This means at 10 knots an object will move 10 metres if passed in opposite directions at this speed.



IMPORTANT NOTE: NMEA Buffer and multiplexers can add significant delays to serial data. Any configuration change will require recalculation of delays. All connections from sensors should be direct to DRX..



NOTE: If using PPS input to synchronise to UTC time (configured through the DRX SETUP WEBPAGES) the GPS time delay will be automatically accounted for, and the GPS Patch Test is not required.

Test 1: For use with standard GPS

To perform this test, find a distinct feature such as a big rock, sharp slope or cable.

1. Run over the distinct object at SOG (e.g. 5kts).

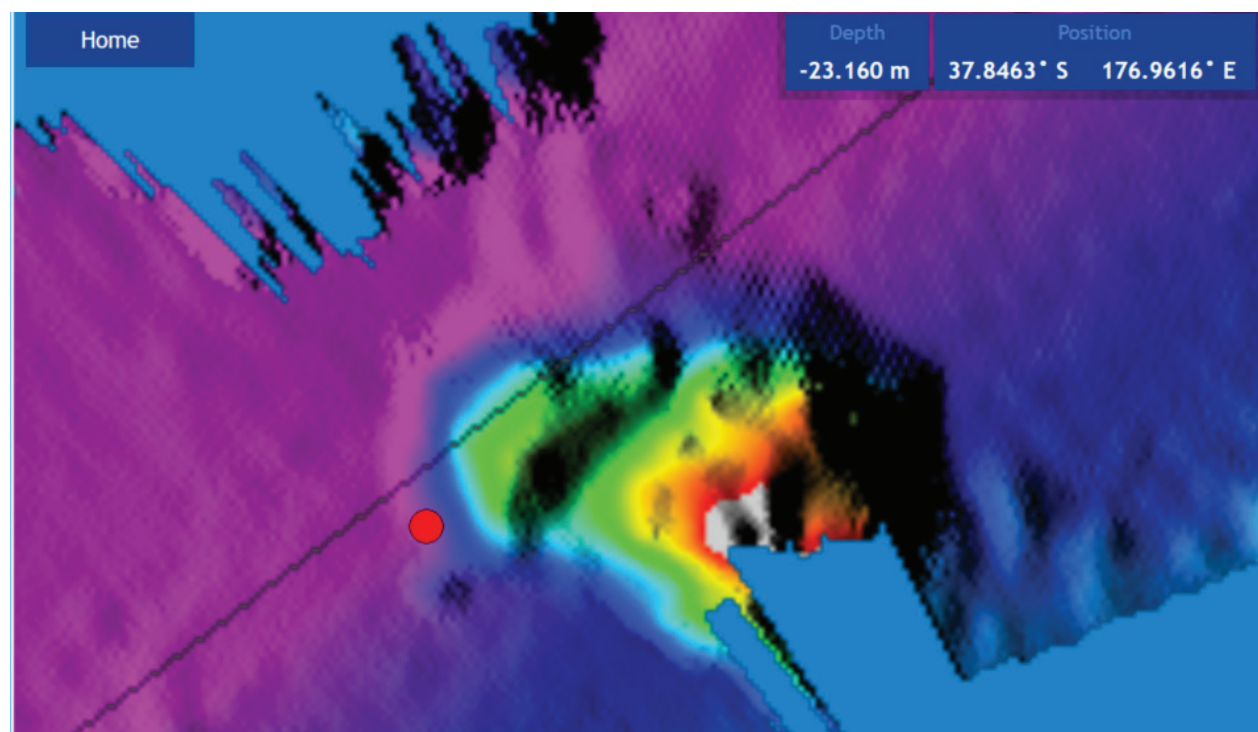


Figure 26. GPS Time Delay Stage 1

2. Run back over object in the opposite direction, same SOG (e.g. 5kts) and drop a mark on the same spot.

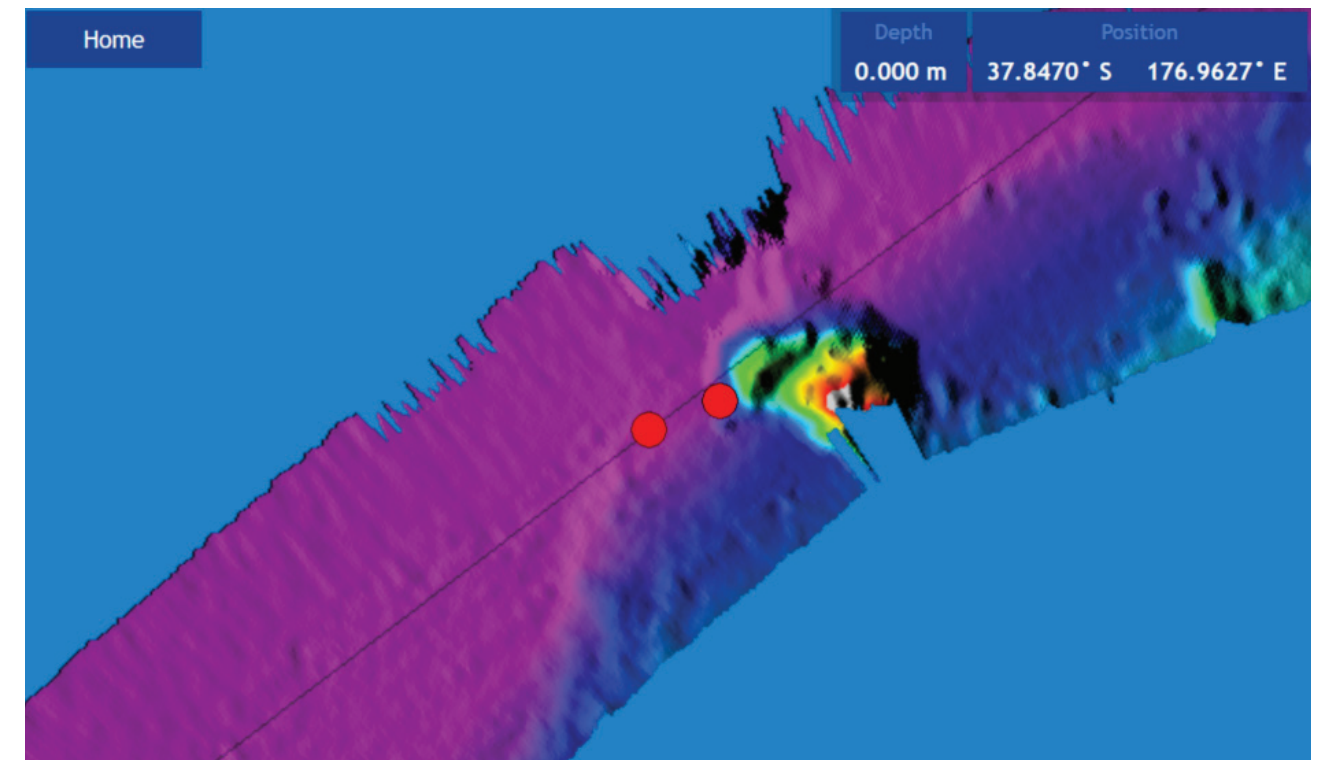


Figure 27. GPS Time Delay Stage 2

3. Use the measure tool to measure the difference between the object's position in the direction the vessel traveled. If the object appears earlier than the previous pass, the time delay is positive.

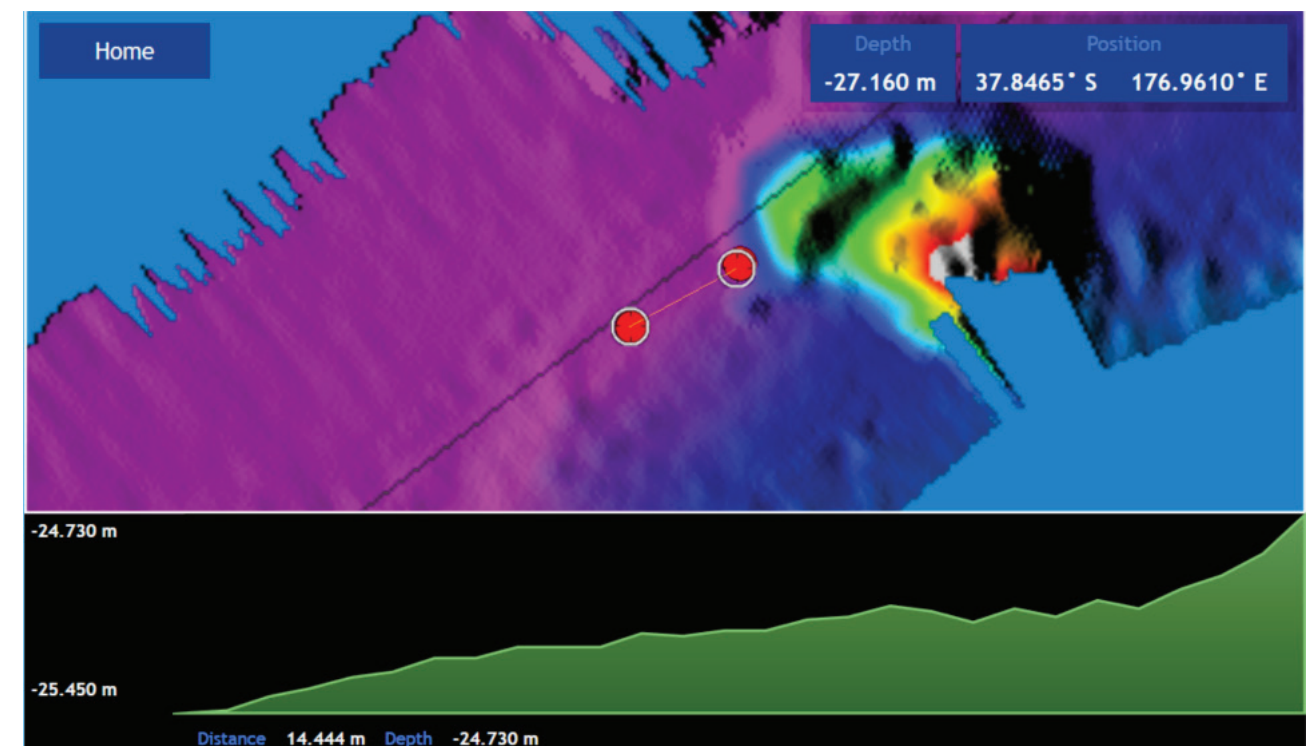


Figure 28. GPS Time Delay Stage 3

The formula below outlines this process.

$$\text{adjustment} = \frac{(- \text{late} / + \text{early}) \text{ change in position in metres}}{\text{speed in knots used in both directions}}$$

- The delay adjustment is added to the current Time Lag (Sec) value in the [DATA SETUP](#) section of the [DRX SETUP WEBPAGES](#). See "5.2.4. Data Setup Tab" on page 39.

Test 2: For use with DGPS

The advantage of this approach over the previous test is that it will eliminate pitch errors. However, the displacement of the object will be smaller and this will be difficult to measure accurately as GPS errors can make this impossible.

Approach the distinct feature from the same direction at two vastly different known speeds, as close to zero and at the fastest mapping speed. If the object moves by *delta* metres further along the vessel track (+ve) at a faster speed the adjustment to the time delay will be:

$$\text{adjustment} = \frac{(- \text{late} / + \text{early}) \times 2 \times \text{delta}}{(\text{fast speed in knots}) - (\text{slow speed in knots})}$$

5.3.2. Roll Offset

Before attempting a roll patch test it is suggested that the GPS Time lag and any latencies are accounted for. Also, it is recommended that you conduct a preliminary adjustment of the Sound Speed settings to get things in the correct ballpark. Configure the mapping width to be at the maximum 120° for best results.

The WASSP Patch Test Utility, shipped with CDX, can be used to automatically calculate and apply Roll Offset. Alternatively, Roll Offset can be manually calculated.

Manual Roll Patch Test

- Use the local chart and local knowledge to identify a spot for the roll patch test – ideally a flat area between 20-40m (shallower than 10m will make it hard to get an accurate reading).
- Run the ship along a line in direction *A* (it may help to run with the tide and wind behind the vessel as the return journey is the important one).
- Turn the ship and make a return journey *B* so that the same area is mapped but where the exact opposite heading is used. It may help to use the Heading Up and COG functions.

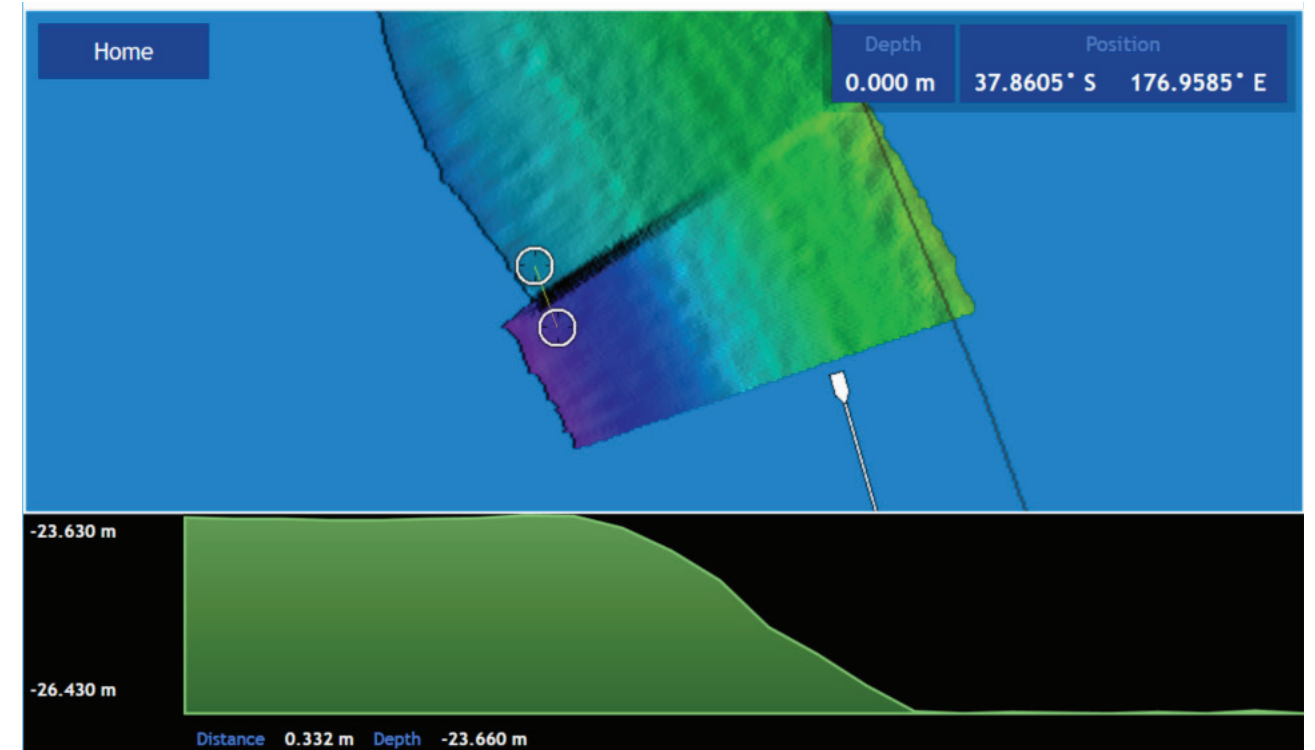


Figure 29. Manual Roll Patch Test



NOTE: Showing path *A* and path *B* overlapping. Measurement *D* is the change in the depths (2.8m in this case) between the edges of swaths.

- Use the WASSP CDX Profile tool to measure the depth displacement between the edges of the swath on one side. This value is *D*. It will help to stop pinging while making the measurement so that the swath does not get overwritten.
- Measure the entire width of the swath at the point you have measured the displacement. This value is *H* (73.229m in this case).

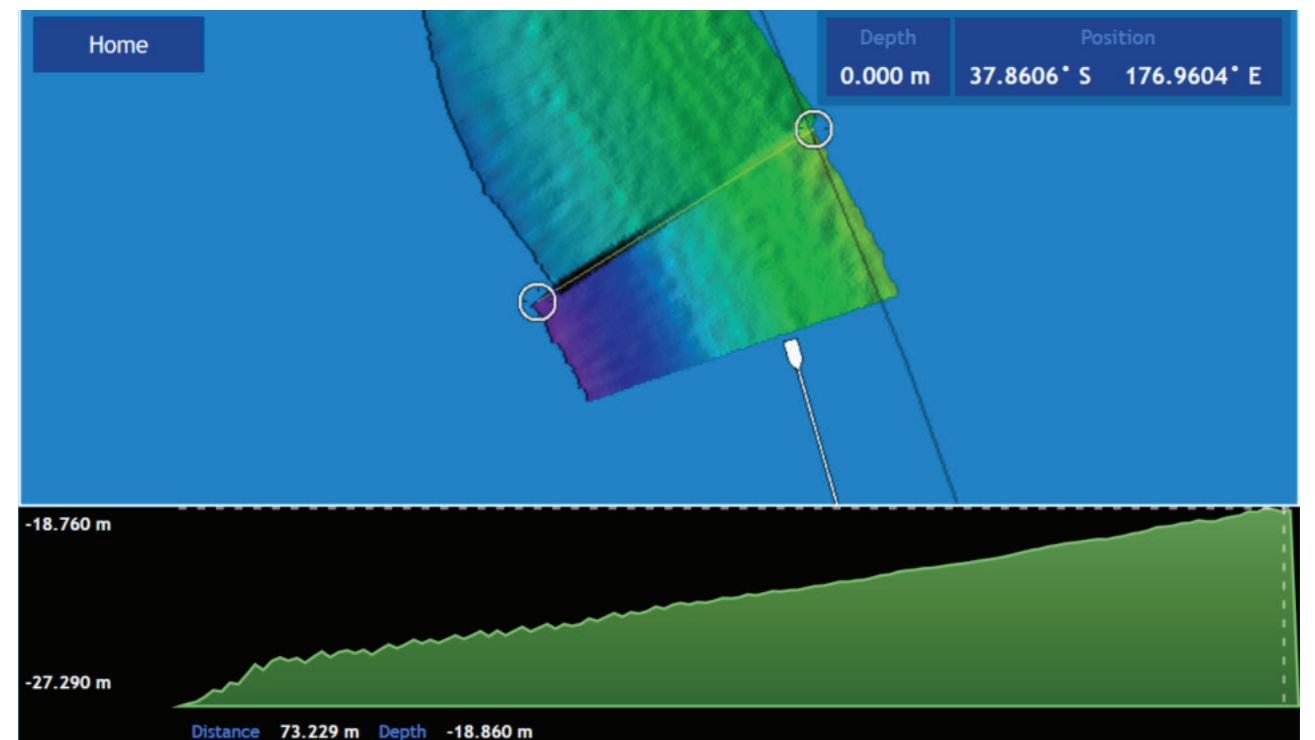


Figure 30. Measurement of Swath Width *H*



NOTE: the measurement is the distance of the line in this case rather than the depth change – this depth change across the swath is not used.

6. Use a calculator (one is present in Windows) to compute $\tan(\alpha)$ (D/H) e.g.
 - a. Run window Calculator, Select 'View: Scientific Mode'
 - b. Enter D (e.g. 2.8)
 - c. Press '/'
 - d. Enter H (e.g. 73.23m)
 - e. Press '='
 - f. Select 'Inv'
 - g. Press 'tan⁻¹'
 - h. Record this number as the Patch Roll Quantity
7. To compute the sign (positive roll or negative roll) of the Roll patch look at the Starboard side-track as journey B is made.
If this is shallower than track A then the sign for the roll offset is positive. If this is deeper then the depths from track A the sign for the roll offset is negative.
8. Enter the Roll offset value computed into the Roll Offset setting in the [DATA SETUP](#) section of the [DRX SETUP WEBPAGES](#). See "5.2.4. Data Setup Tab" on page 39.
9. Repeat these steps in a different area, or on a different Mapping database. If there is still a significant difference > 50cm add any difference generated to the Roll offset already computed and then test again. It should be possible to generate a roll offset within 0.1 degrees.

5.3.3. Pitch Offset

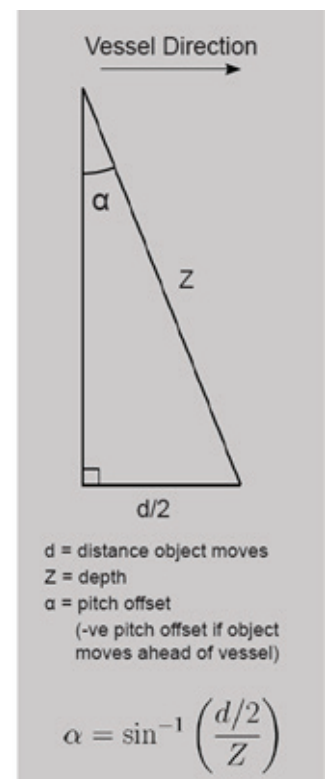
If GPS time delay can be completed using variable speed, See 'Test 2 For use with DGPS' "5.3.1. GPS Time Delay" on page 52 then attempt to compute pitch offset as follows:

Pitch Correction

Requires: >10m depth, Distinct Object, DGPS or better, Accurate Time Lag.

1. Once the Time Lag is accurately ascertained using the variable speed method described in the previous commissioning step, a Pitch Correction value can be ascertained by having the Ship travel over a distinct object in opposite directions.
2. The object will move if the Pitch offset is incorrect and the use of trigonometry will determine the Pitch offset between the Motion Sensor and the Transducer.
3. Enter this number into the Pitch Offset in the [DATA SETUP](#) section of the [DRX SETUP WEBPAGES](#). See "5.2.4. Data Setup Tab" on page 39.

Figure 31. Pitch Corrections

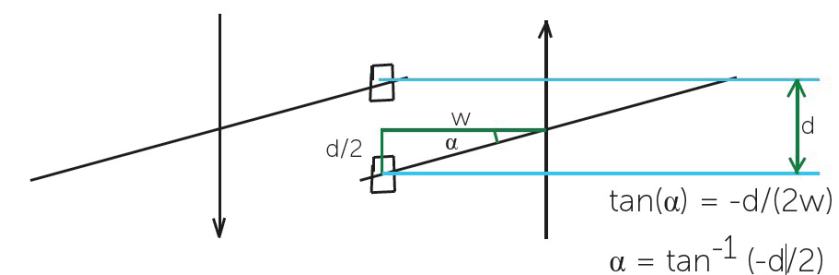


5.3.4. Heading Offset

Requires: DGPS or better, Distinct Object and >10m depth.

To determine an accurate heading correction between the heading sensor and the transducer orientation we need high accuracy position sensors and corrected seafloor data.

1. Approach a small, distinct seafloor feature so that the port side of the swath covers the object.
2. Pass over the object so that the starboard side of the swath crosses the same object in the opposite direction. It is important that these two tracks are on exactly parallel heading lines.
3. Use basic trigonometry to calculate the required heading offset that will allow the object to remain stationary. Redo the heading test to check that the heading offset was entered correctly.



$$\tan(\alpha) = -d/(2w)$$

$$\alpha = \tan^{-1}(-d/2w)$$

If object moves as above the sign is negated otherwise remove the -ve sign from this equation.

4. Enter the calculated value for α into the Heading Offset in the [DATA SETUP](#) section

of the [DRX SETUP WEBPAGES](#). See “5.2.4. Data Setup Tab” on page 39.

5.3.5. Patch Test Validation

With on water patch tests complete the configuration can be checked.

1. Find an area with distinct features such as sand waves, depth variance, rocks etc
2. Map the area with parallel overlapping tracks in both directions.
3. Validate alignment of the features.

Any misalignment will be due to inaccuracies in the commissioning values that have been applied.

6 CONTROL AND DISPLAY APPLICATION SUPPORT

The DRX system is supported by a number of PC and/or Tablet based applications for DRX control and data post processing, data storage and data visualisation.

For detailed operating instruction refer to the applications’ appropriate user manual.

Supported applications and connection procedures are outlined here.



NOTE: DRX SDK and API with integration instructions are available from WASSP Ltd.

6.1. CONNECTING THE WASSP CDX TO THE DRX

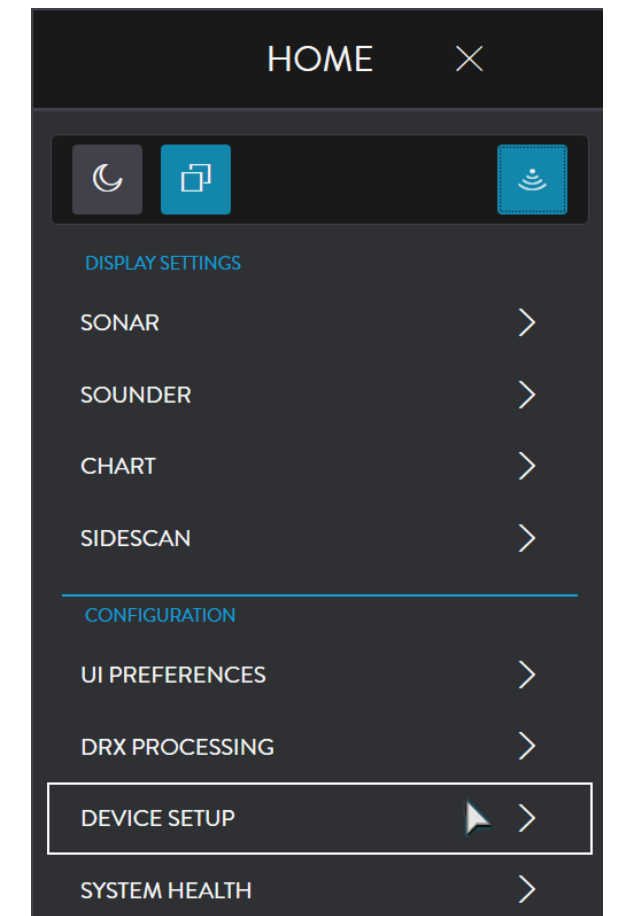
WASSP CDX ships free with DRX and can be installed directly from the USB Flash Drive.

1. After installing WASSP CDX on your PC, start the DRX and run [WASSP CDX](#).
2. [WASSP CDX](#) will automatically select the DRX as long as the network has been correctly configured.
3. To manually select the DRX you wish to connect to:

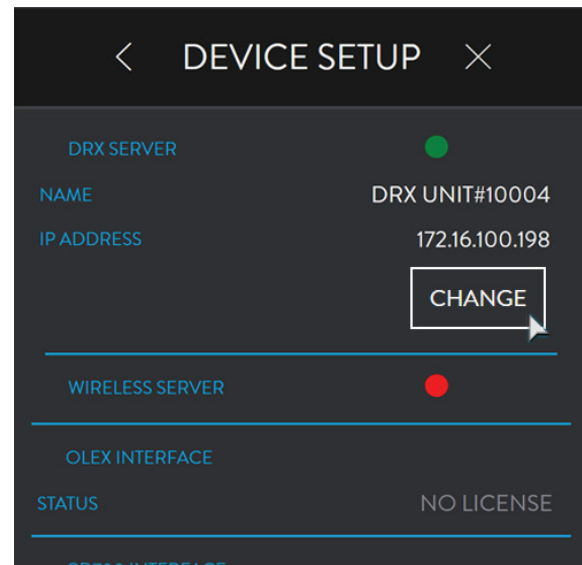
From the [HOME](#) menu select [DEVICE SETUP](#).



NOTE: Navigation to DEVICE SETUP will depend on CDX version.

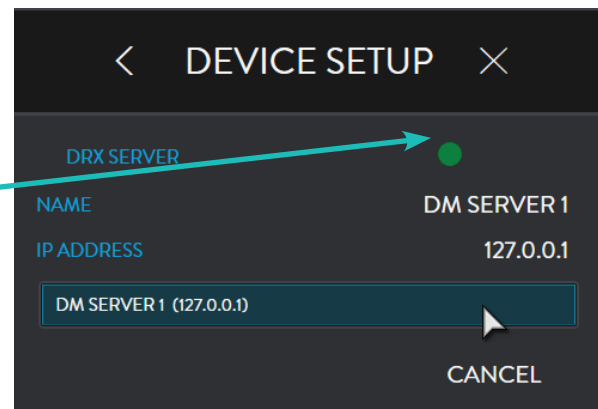


4. The **DEVICE SETUP** page displays the current (or previous) connection. Press the **CHANGE** button and a drop-down list of available connections will be displayed.



Select your desired connection.
The connection indicator will display the following depending on the current status of the connection:

- » GREEN: Connected.
- » AMBER: Connection is being changed.
- » RED: No connection.

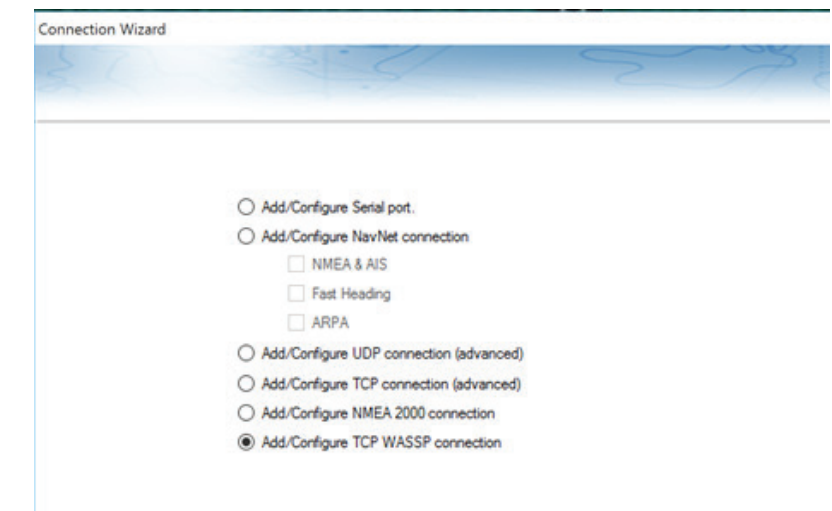
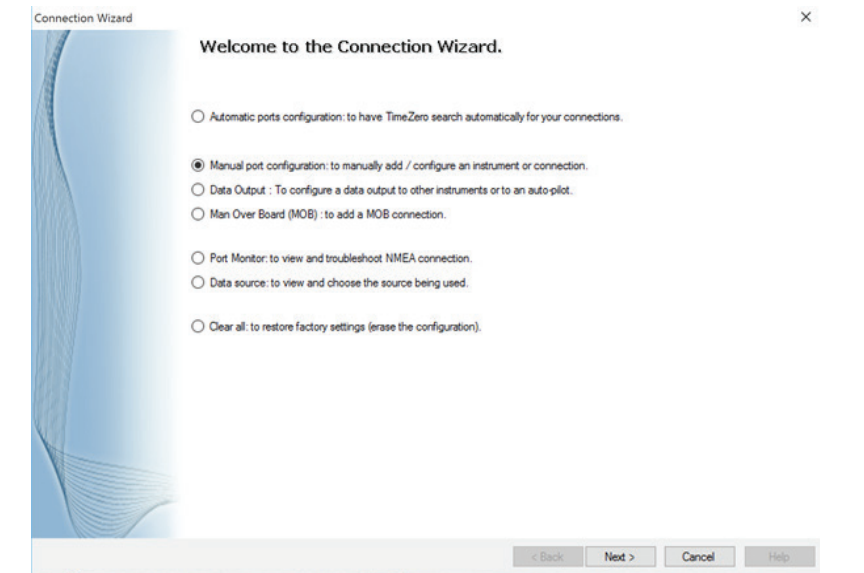


NOTE: Refer to WASSP CDX Operators Manual for more details and WIRELESS SETUP.

6.2. CONNECTING MAXSEA TIMEZERO PLOT TO THE DRX

TimeZero Plot needs to be purchased from Maxsea, see <http://www.maxsea.com/products/software>
After installing the TZ Professional software on your PC, start the configured DRX and ensure that all connected sensors are on and sending data.

1. Open the **CONNECTION WIZARD**.
2. Select 'Manual Port Configuration' and press the **NEXT** button.
3. Select 'Add/Configure TCP WASSP Connection'.

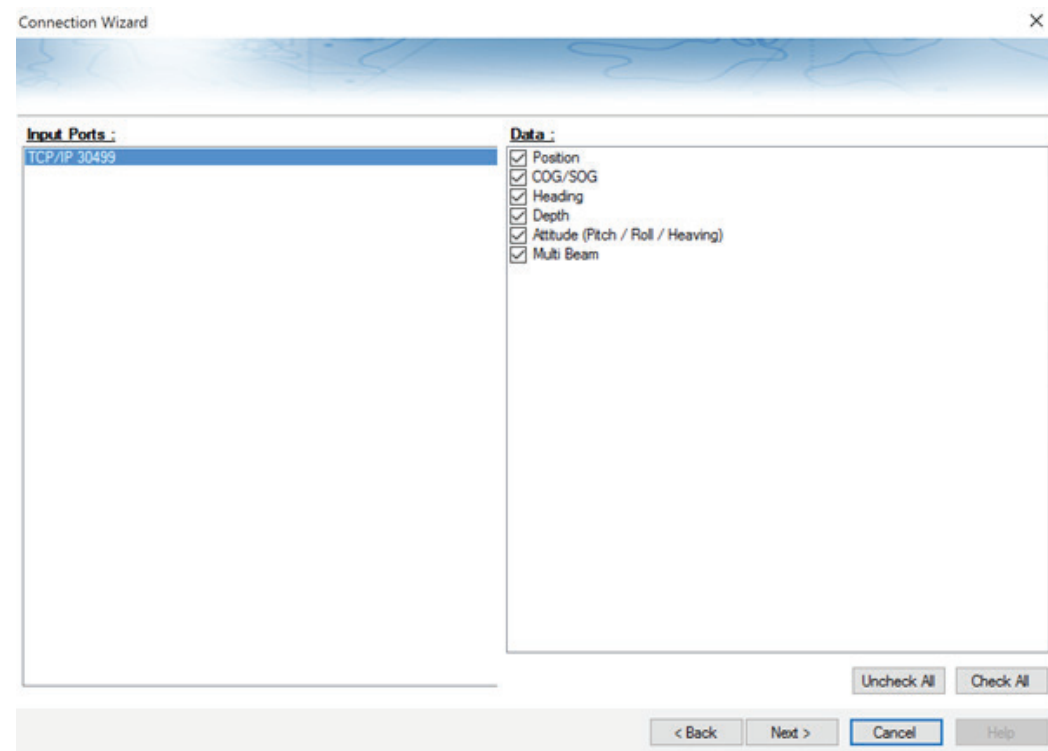


4. Enter in the IP address of the DRX and the TCP port (default is 55555).



NOTE: If you don't know the IP address of the DRX, use the 'Find My DRX' app to locate it.

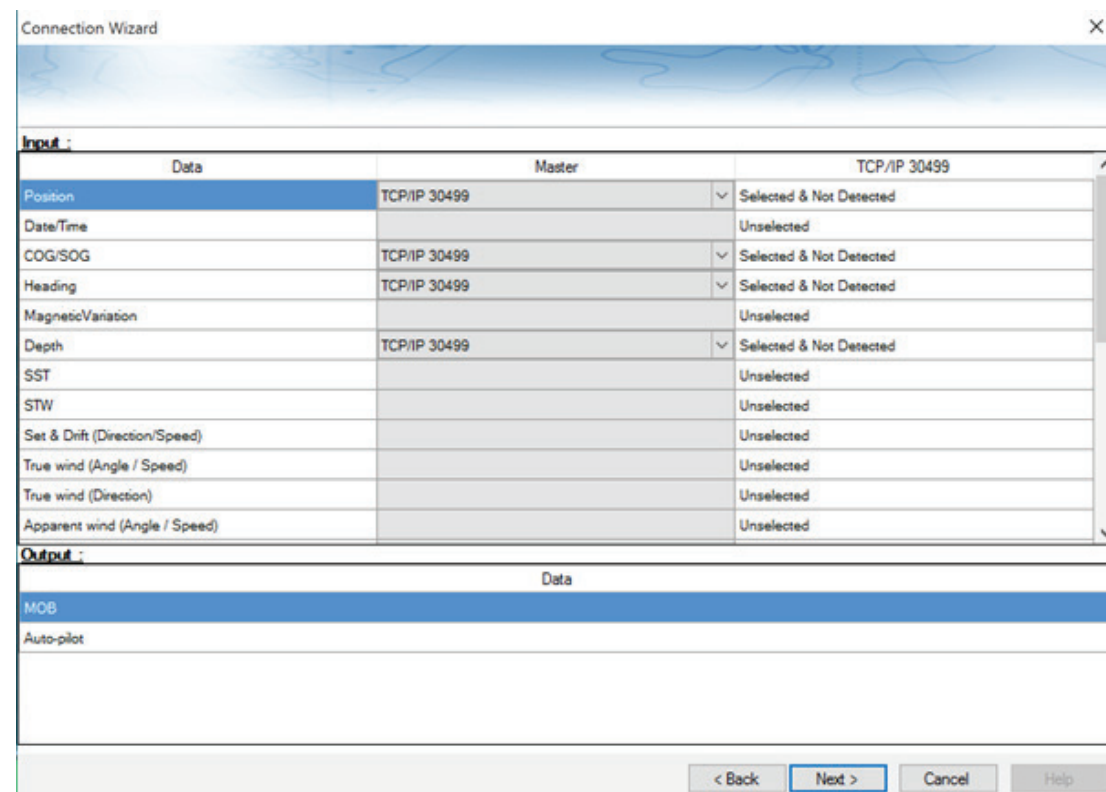
5. The TZ Professional software should find all the data being output from the DRX. If not, recheck your network settings.



6. Select your desired sources for each connected sensor.



NOTE: Navigation sources can be different from the DRX, but this may make installation simpler to use the DRX as the primary source.



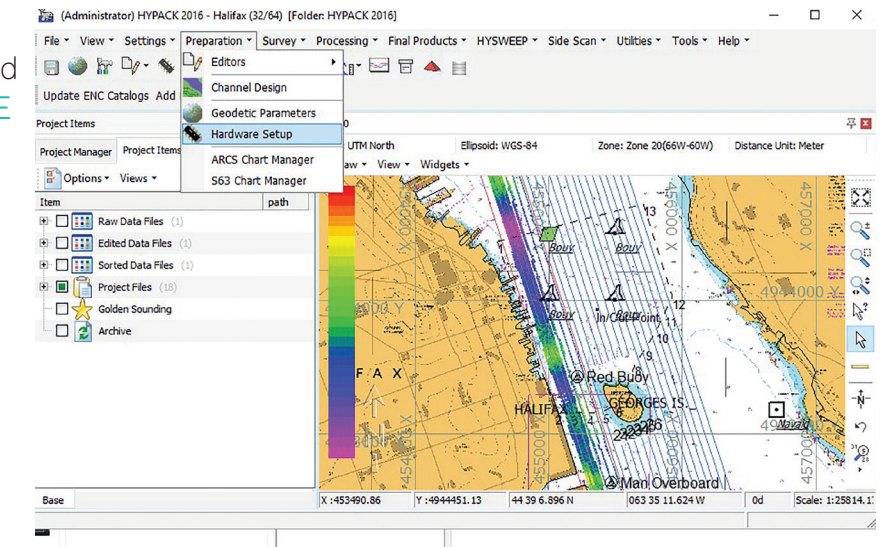
7. To begin logging on to TZ Professional software, ensure that PBG icon is enabled.

6.3. CONNECTING HYPACK TO THE DRX

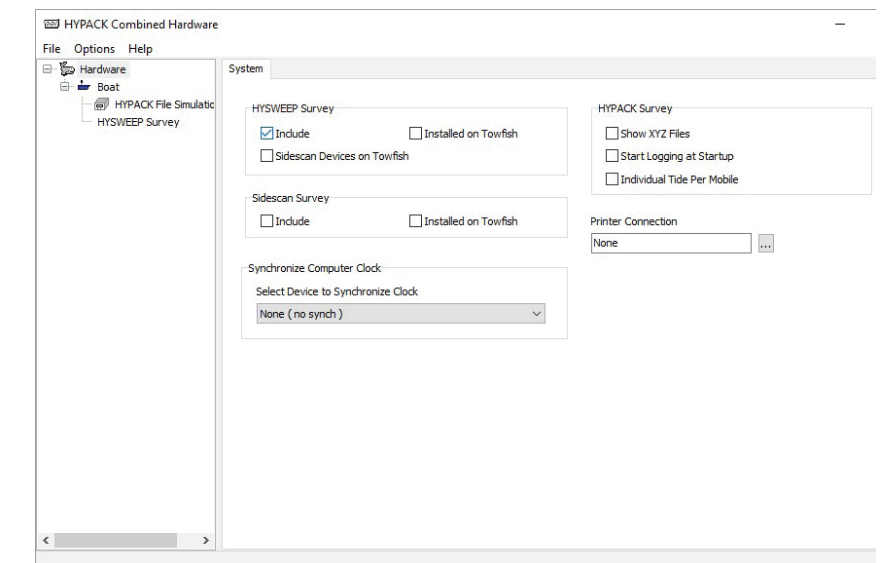
HYPACK needs to be purchased from your local HYPACK dealer. See www.hypack.com for details.

Install HYPACK 2016A or later. Refer to HYPACK manual for details.

- Go to **PREPARATION** and select **HARDWARE SETUP**.



- INCLUDE** HYSWEEP Survey.



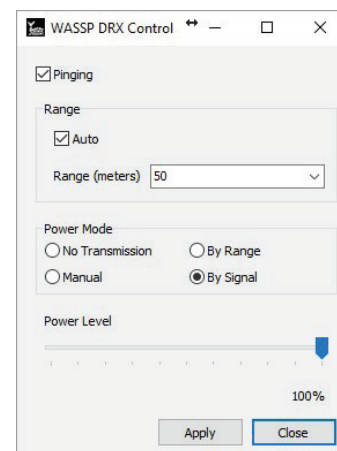
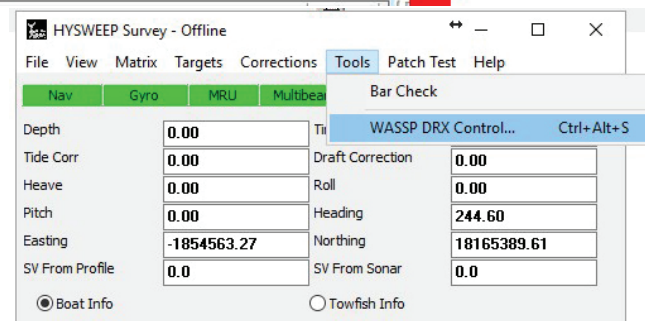
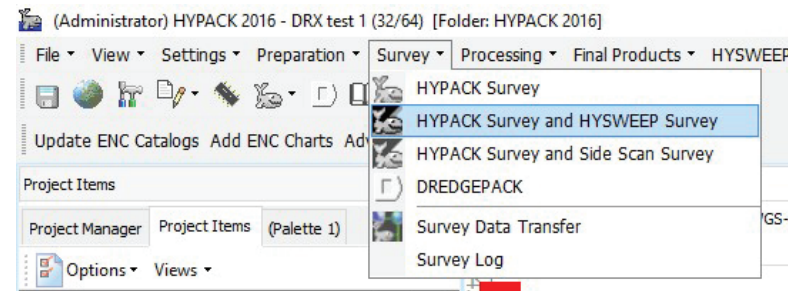
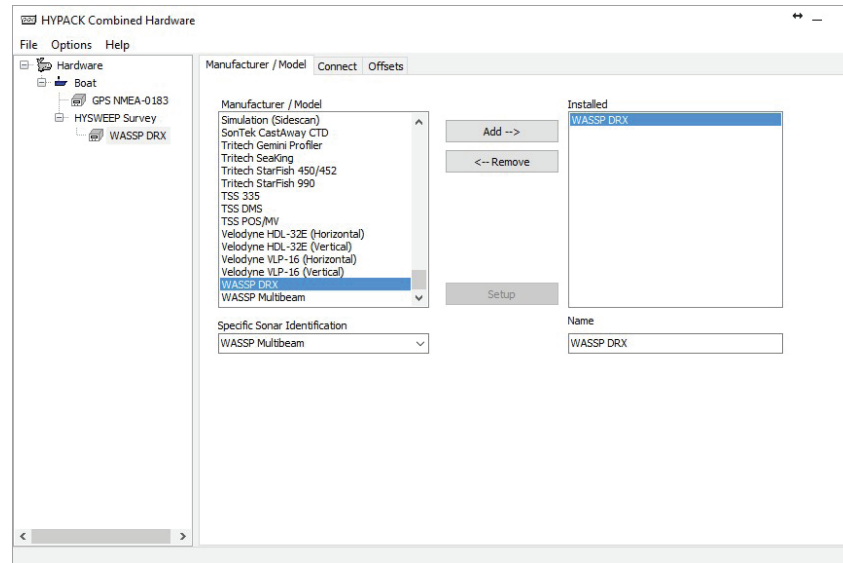
NOTE: All GPS and sensor data should be connected to the DRX.

DRX supplies all required data to HYPACK over the ethernet link.



NOTE: Refer to Knowledge Base for guidelines on system configuration with HYPACK. See "Appendix H - Product Registration, Support and Resources" on page 94.

3. Select **HYSWEEP SURVEY** in the tree on the left.
4. Then select **WASSP DRX**.
5. Select **ADD** (WASSP DRX will now be in the list of Installed devices).
6. Close HYPACK Combined Hardware and save changes.
7. Select **SURVEY** in the menu.
8. Select **HYPACK SURVEY AND HYSWEEP SURVEY**.
9. Once connection is established DRX control can be performed through the **WASSP DRX CONTROL** accessed from HYSWEEP **TOOLS** menu.



7 OUTLINE DRAWINGS

7.1. DRX-32 OUTLINE DRAWINGS

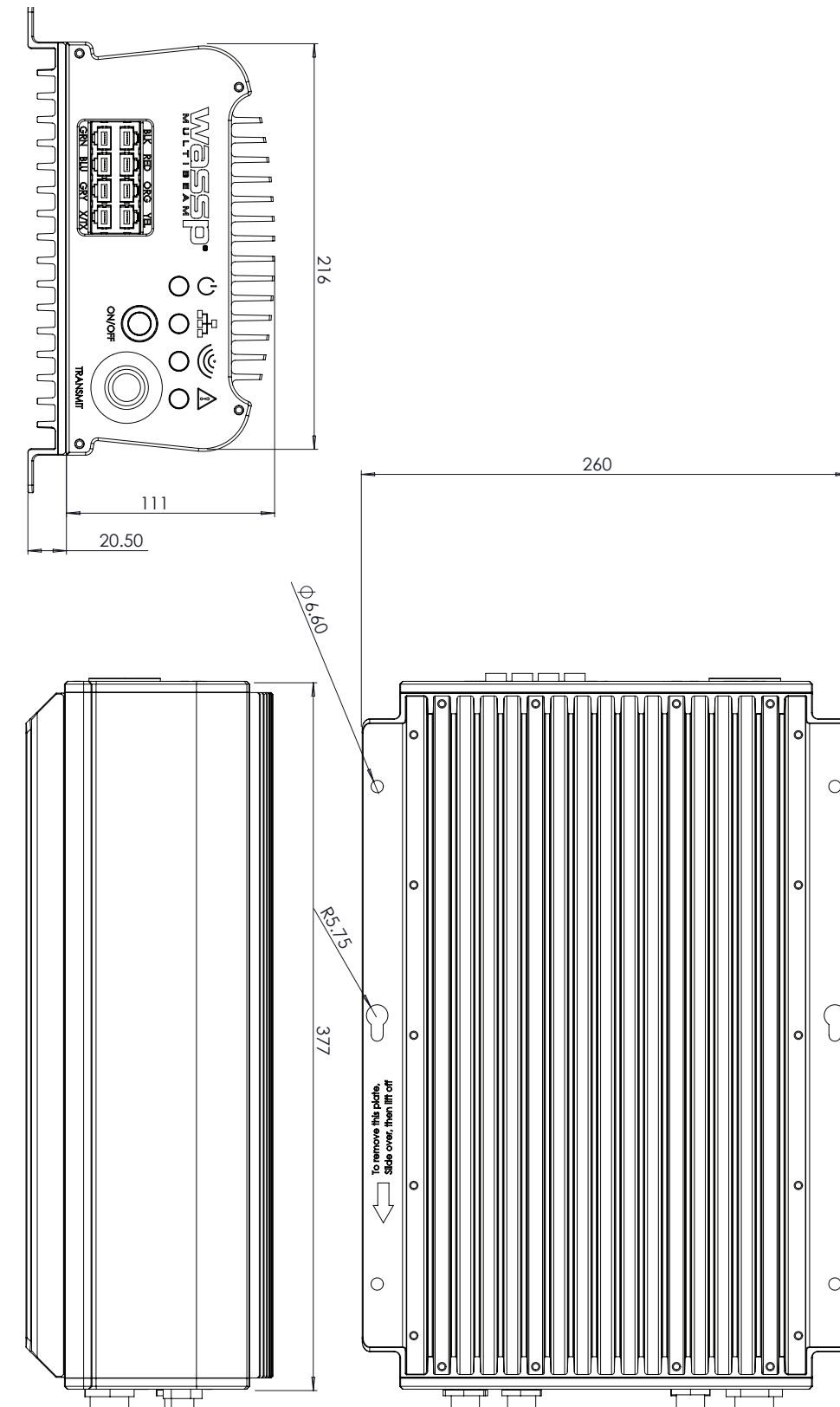


Figure 32. DRX-32 Dimensions



NOTE: Offsets recorded under "5.1. Commissioning Step 1: Ship Measurements" on page 34 need to be applied in HYPACK directly.

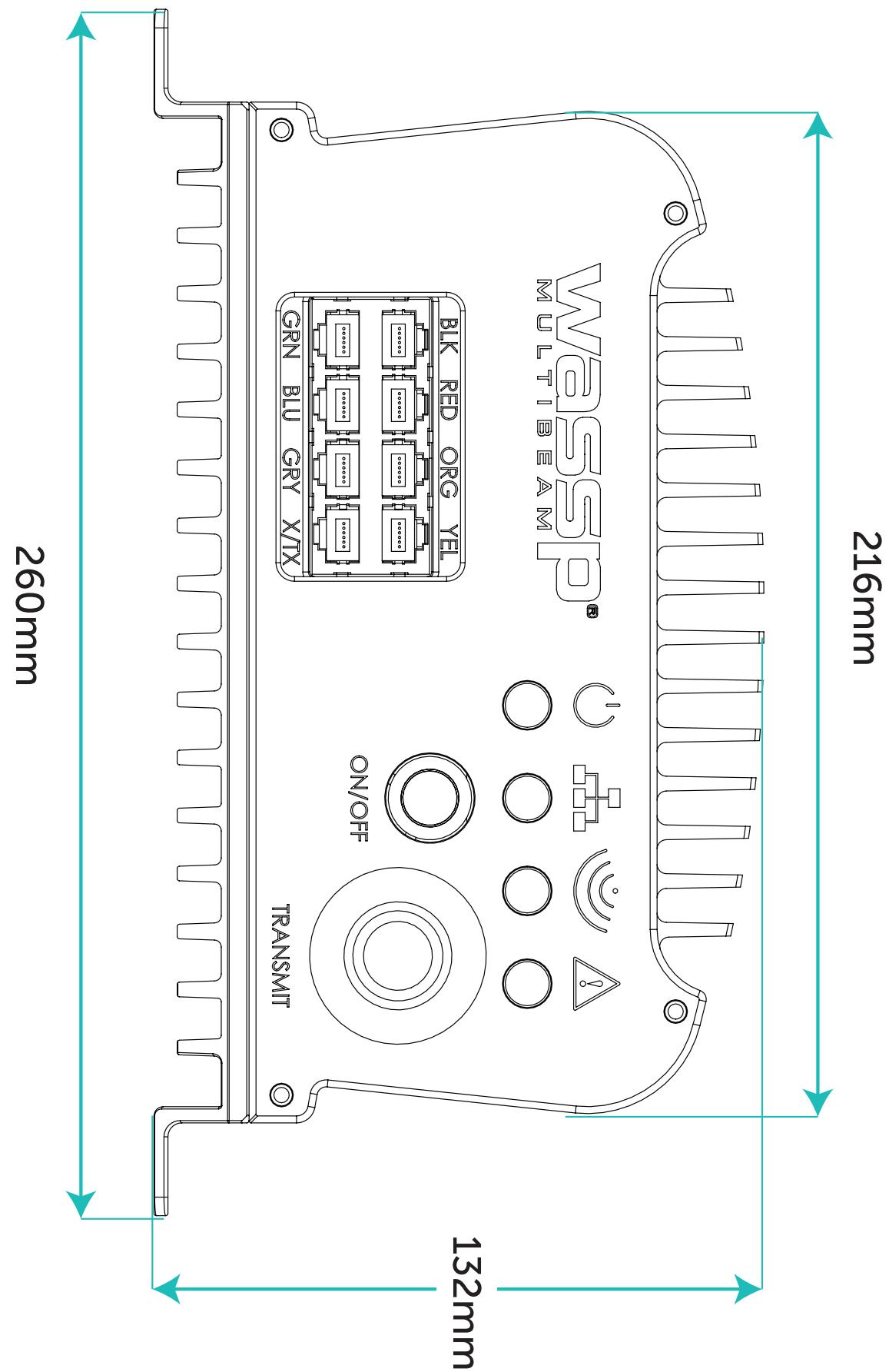


Figure 33. DRX-32 Front Plate Dimensions

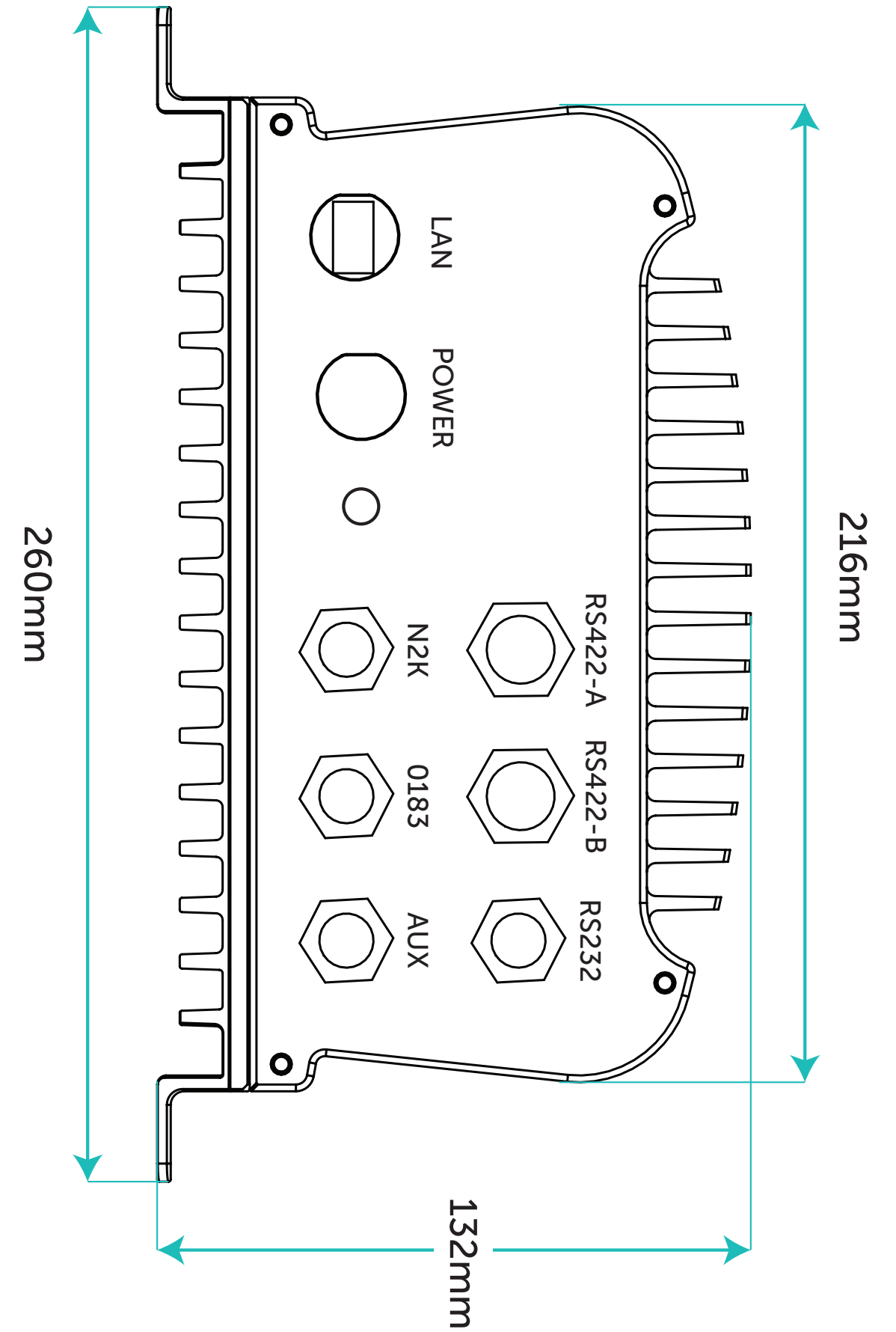


Figure 34. DRX-32 Back Plate Dimensions

7.2. DRX-46 OUTLINE DRAWINGS

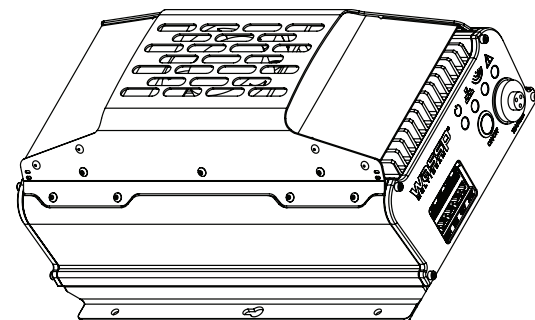
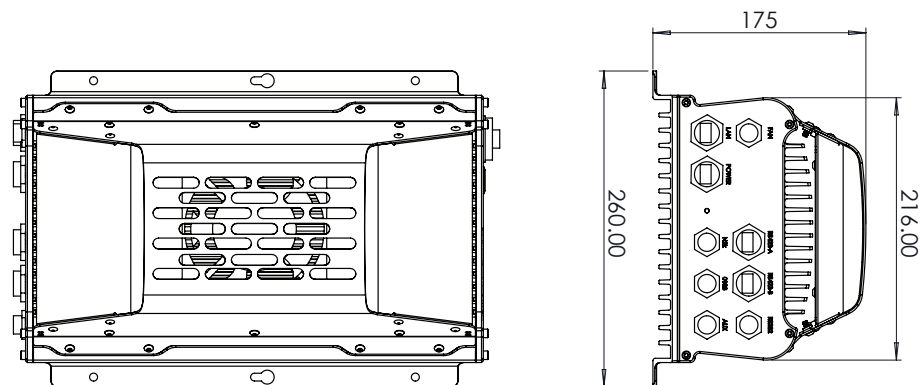
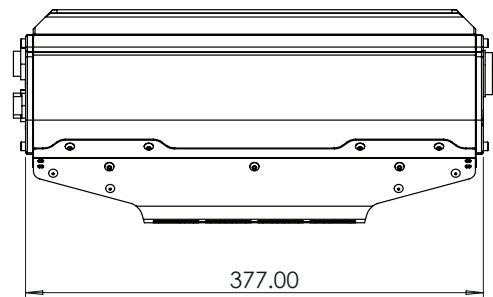
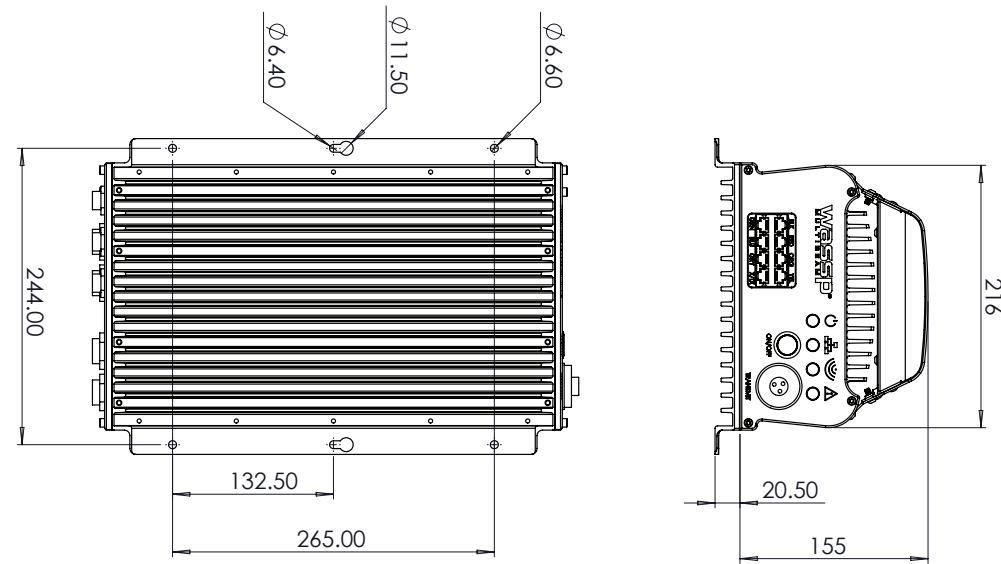


Figure 35. DRX-46 Assembly

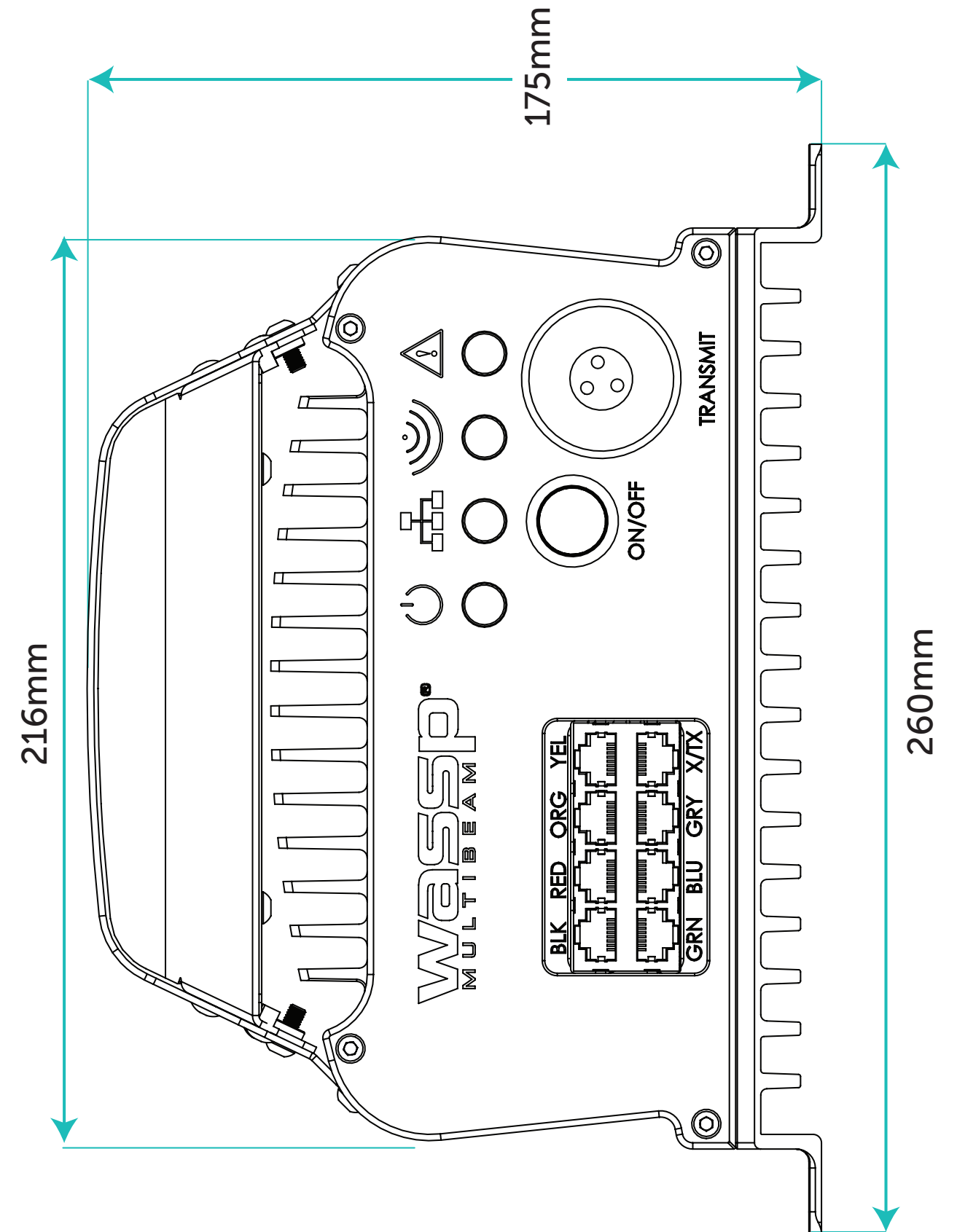


Figure 36. DRX-46 Front Plate Dimensions

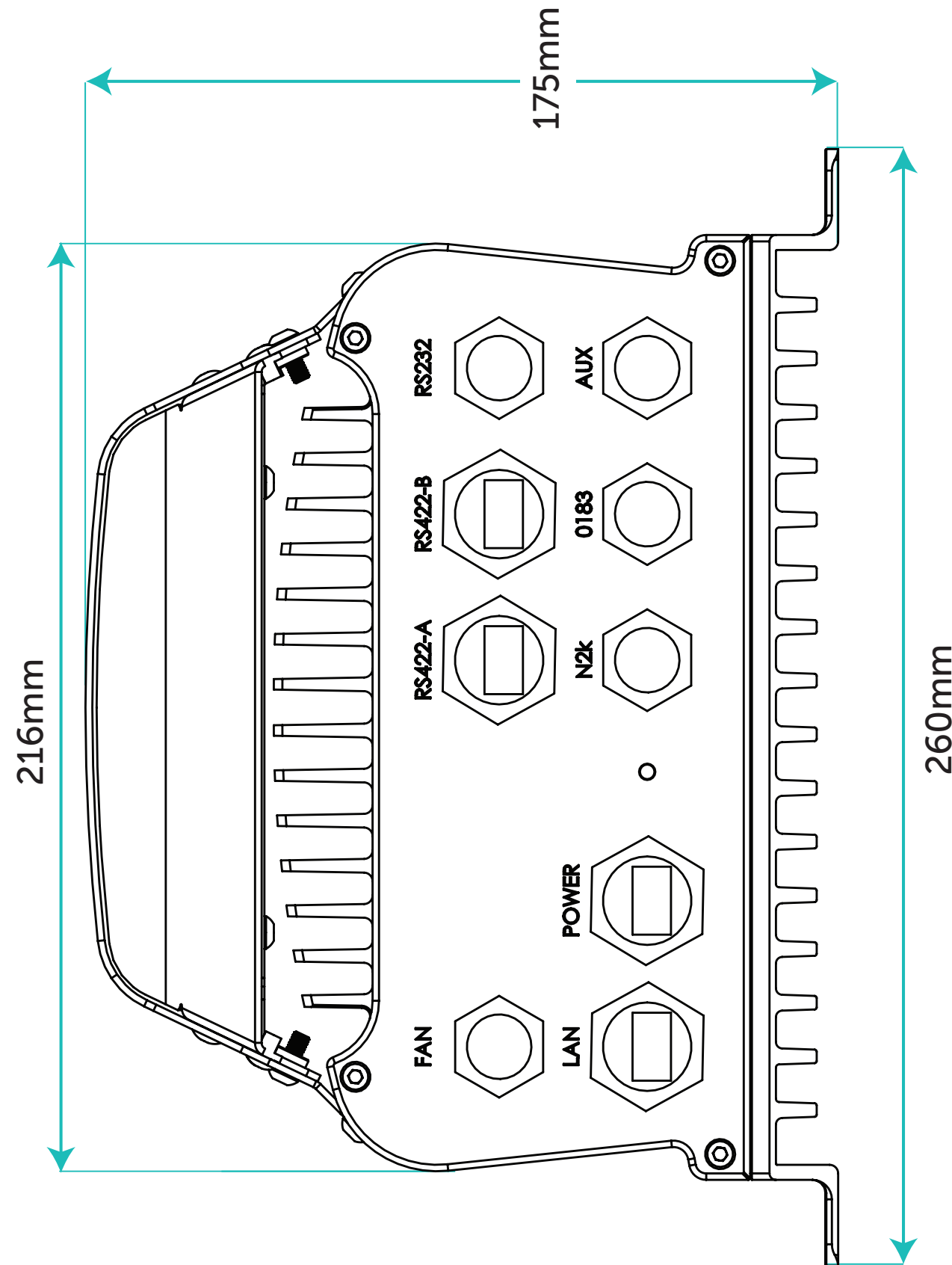


Figure 37. DRX-46 Back Plate Dimensions

8 DRX INTERCONNECTION

8.1. DRX-32 INTERCONNECTION

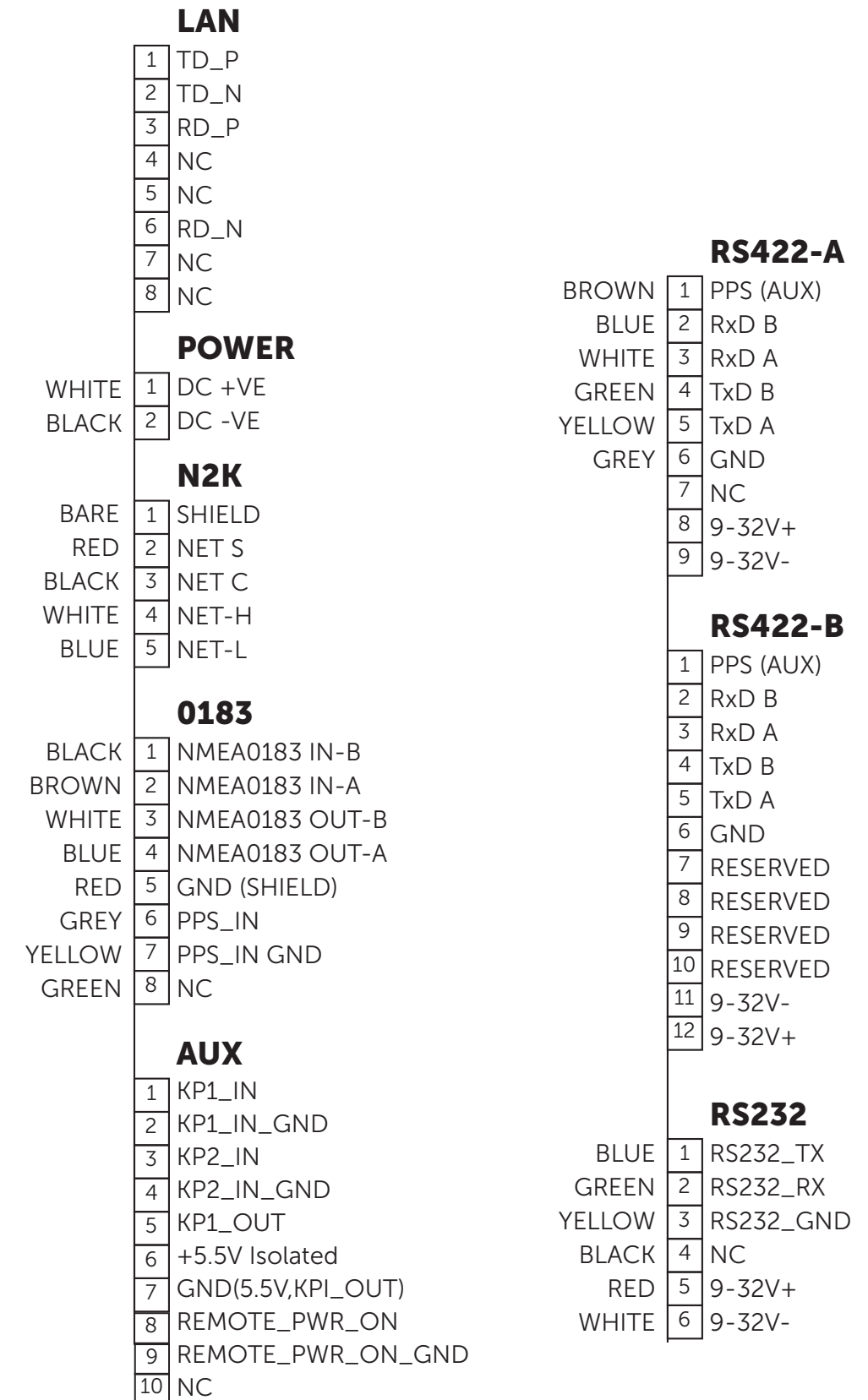


Figure 38. DRX-32 Interconnection Diagram

8.2. DRX-46 INTERCONNECTION

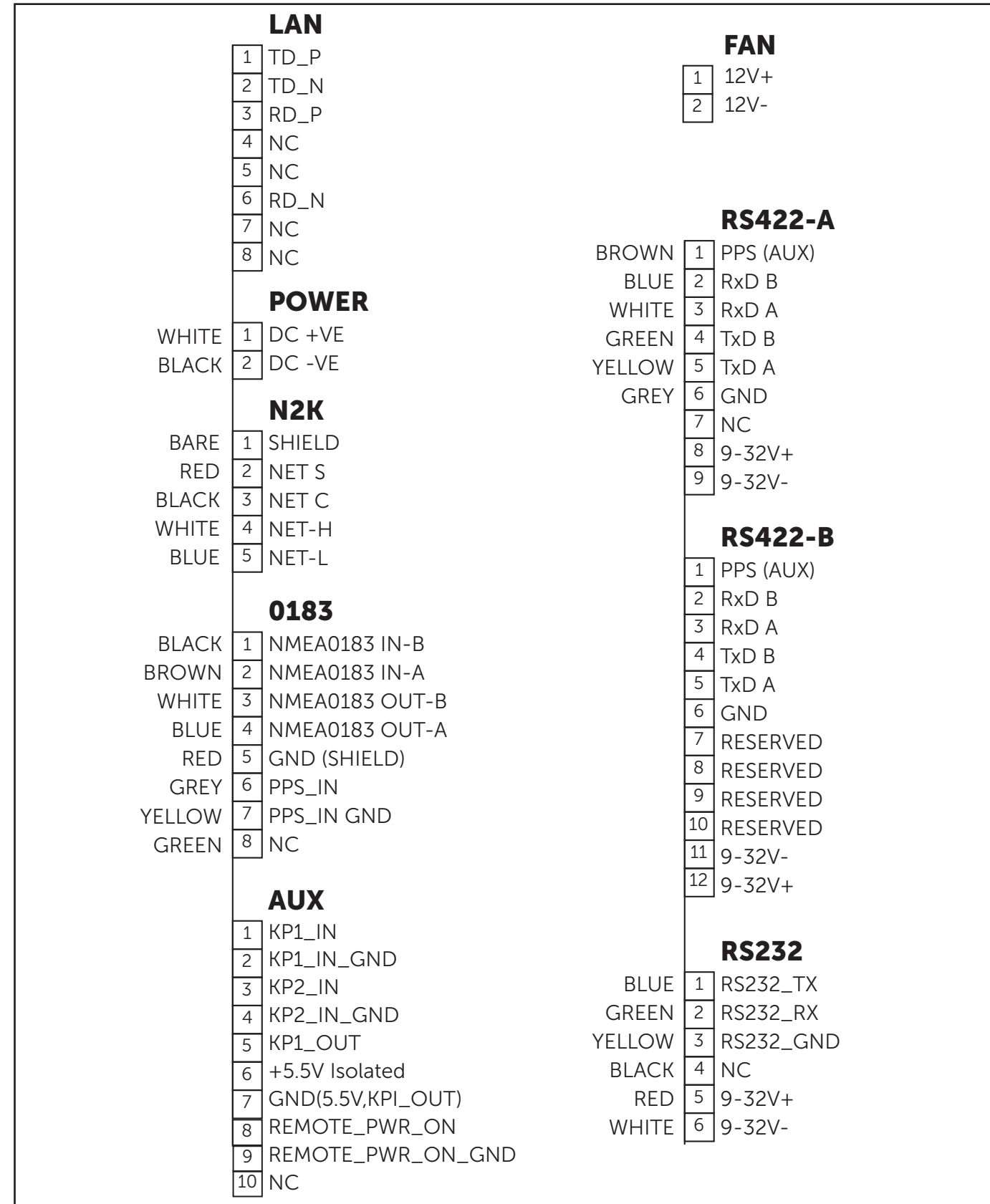


Figure 39. DRX-46 Interconnection Diagram

9 TECHNICAL SPECIFICATIONS

DRX Spec Sheet

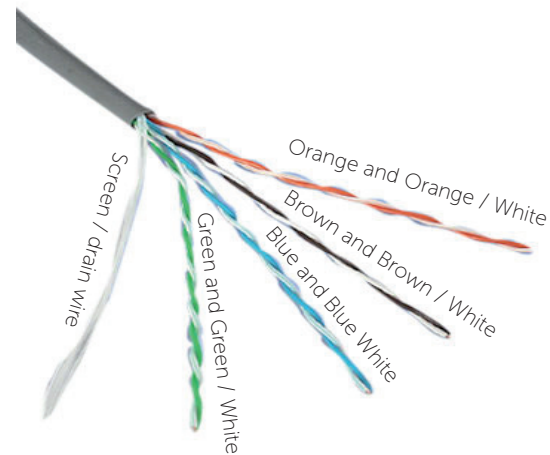
System		
- Frequency	Variable, Wideband, Transducer Dependent	
- Signal Type	DRX-32, WSP-603-20X; FM DRX-46, WSP-603-25X; FM/CW	
- Tx Type	DRX-32, WSP-603-20X; Full Digital DRX-46, WSP-603-25X; Digital	
- Ping Rate	Automatic, depth determined; Maximum 50Hz	
- Depth Range	Transducer and environmental dependent. Nominally: DRX-32, WSP-603-20X; 1-200m (WMB160). 2-450m (WMB80) DRX-46, WSP-603-25X; 1-400m (WMB160). 2-600m (WMB80)	
-Range Resolution	Maximum 2cm	
I/O Interface		
- Ethernet	GbE	
- Serial	RS-232, RS-422 x 2 (model dependent), NMEA 0183	
- CAN	NMEA 2K	
- Analog	KP in x2, KP out, PPS	
- Other	Remote Power Control, Fan Power out 12V x2 (model dependent)	
Data Formats		
- Input Sentences	See "Appendix B - Supported Sensors and Sentences" on page 86	
- Output Sentences	See "Appendix B - Supported Sensors and Sentences" on page 86	
- Output Data types	See WASSP DRX ICD (Interface documentation for DRX and associated DRX SDK/API documentation)	
Power		
- Power Supply	DC Input DRX-32, WSP-603-20X; 9-32V DC DRX-46, WSP-603-25X; 18-32V DC	
- Power Consumption (max)	DTX-32, WSP-603-20X (S3,F3,F3L)	Peak operating power: 36W Average operating power: 30W
	DTX-46, WSP-603-25X (S3X,F3X,F3XL)	Peak operating current: 6.5 Amps Average operating power: 70W
Mechanical		
- Dimensions	DRX-32, WSP-603-20X; DRX377mm(L) x 260mm(W) x 132mm (H) DRX-46, WSP-603-25X; DRX377mm(L) x 260mm(W) x 175mm (H)	
- Weight	DRX-32, WSP-603-20X; 8.3kg DRX-46, WSP-603-25X; 9.5kg	
- Mounting	Bulkhead or Flat	
Environmental		
- Operating Temperature	DRX-32, WSP-603-20X; 0°C to 50°C DRX-46, WSP-603-25X; 0°C to 50°C	
- Storage Temperature	-20°C to 85°C	
- Ingress/Water Impact*	IP53, Bulkhead Mounted	
- Humidity/Damp Heat	IEC60945 +40°C 93 % relative humidity	
- Vibration	DRX-32, WSP-603-20X; "IEC60945 Sweep 2 Hz – 13,2 Hz at ± 1 mm, 13,2 Hz – 100 Hz at 7 m/s2 and for 2 h on each resonance, otherwise 2 h at 30 Hz in all three axes"	
- Shock	DRX-32, WSP-603-20X; MIL-STD-901, Grade B, Class II	
- EMC	IEC60945	

*Extended ingress rating to IP67 available; model WSP-603-205

10 APPENDIX

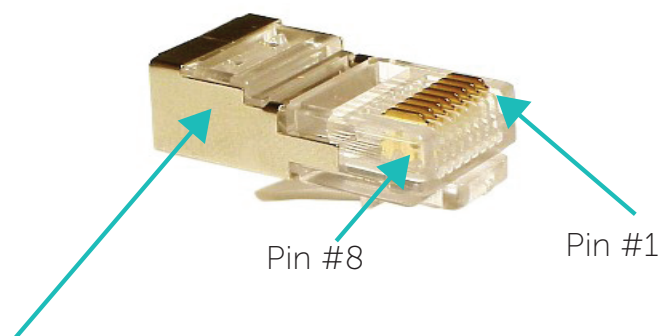
APPENDIX A - CABLE DRAWINGS

APPENDIX A.1 TRANSDUCER RX

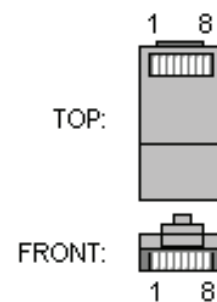


The CAT5E cables used in the transducer cable follow standard CAT5 colour codes but the RJ-45 plug wiring is specific to the DRX and does NOT conform to T568A or B.

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)

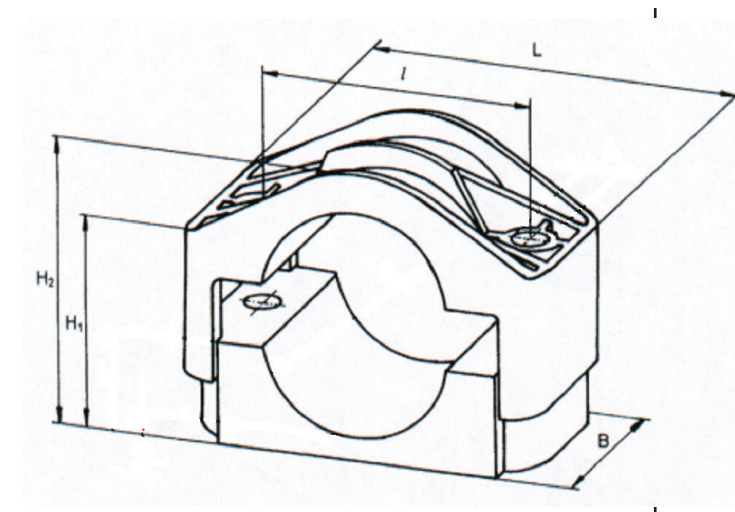


The screen / drain wire should be soldered on to the side of the RJ-45 connector. Scratch the side of the connector with something sharp before soldering to assist with the join.



APPENDIX A.2 TRANSDUCER CABLE RESTRAINER

The supplied cable restrainer must be fitted to ensure that transducer connections are not damaged due to strain from the transducer cable. Ensure that when mounted there is still room to remove the cables from the DRX for servicing.



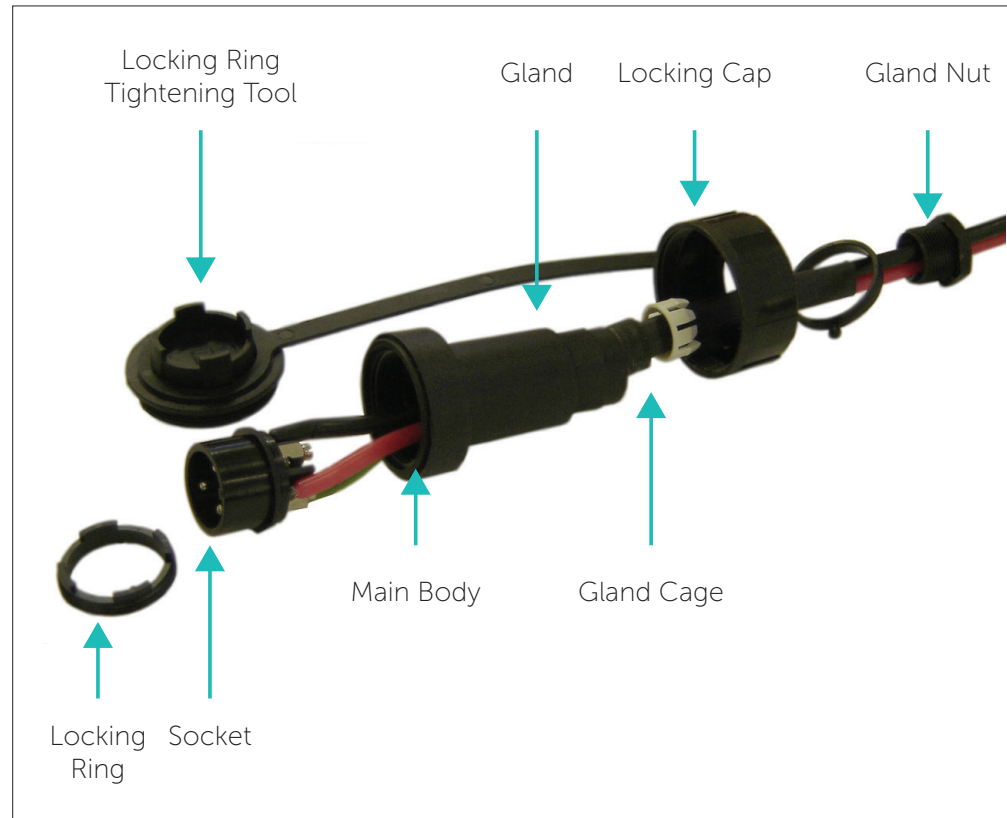
APPENDIX A.3 TRANSDUCER TX

Transmitter Cable Socket Assembly

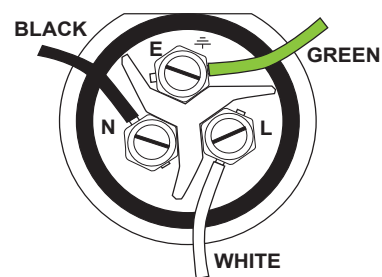
If the transmitter cable socket needs to be disassembled, use the locking ring tightening tool (supplied with the DRX) to loosen the locking ring. To assemble the 3-pin sealed plug:

Push the following parts over the transmitter wires:

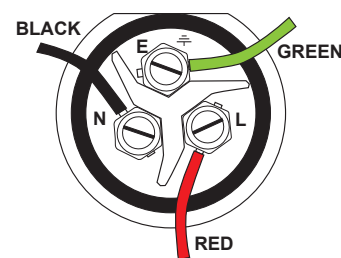
- Gland Nut
- Gland Cage
- Gland
- Main Body



1. 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.



Later Cable Colour Code



Early Cable Colour Code

2. Push the socket into the main body, making sure that the flat on the socket locates into the flat on the main body.
3. Using the tightening tool, screw the locking ring into the front of the socket until tight.
4. Push the gland, gland cage, and gland nut into the main body as far as it will go and tighten the nut securely.



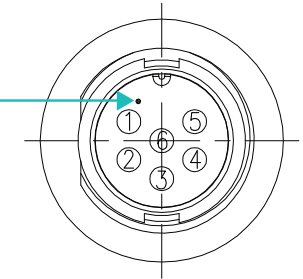
Tightening tool

APPENDIX A.4 RS-232

Connector **RS-232**

PIN	Function
1	RS-232_TX
2	RS-232_RX
3	RS-232_GND
4	
5	9-32V+
6	9-32V-

Marker identifies pin 1.
View: Looking **into** the socket on the DRX. Wiring view of cable side on plug.



Example Connection:

1	RS-232_TX		RS-232_TX
2	RS-232_RX		RS-232_RX
3	RS-232_GND		RS-232_GND
4			
5	9-32V+		
6	9-32V-		

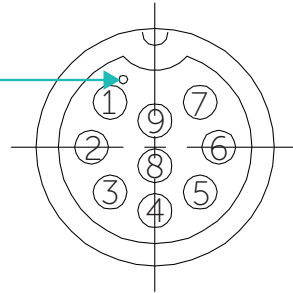
- » Isolation; Fully electrically isolated.
- » Cable; Multi core or multi core screened with tinned copper conductors.

APPENDIX A.5 RS-422-A

Connector **RS422-A**

PIN	Function
1	PPS (AUX)
2	RxD B
3	RxD A
4	TxD B
5	TxD A
6	GND
7	
8	9-32V+
9	9-32V-

Marker identifies pin 1.
View: Looking **into** the socket on the DRX. Wiring view of cable side on plug.



Example Connection:

1	PPS (AUX)	←	PPS OUT
2	RxD B	←	TxD +
3	RxD A	←	TxD -
4	TxD B	→	RxD +
5	TxD A	→	RxD -
6	GND	←	PPS OUT GND
7			
8	9-32V+		
9	9-32V-		

- » Isolation; Fully electrically isolated.
- » Cable; Multi core screened with tinned copper conductors.
- » Shield; Should be connected at far end.



NOTE: Depending on sensor compliance, this may be used as direct NMEA 0183 input.



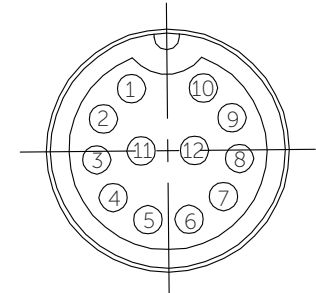
NOTE: Depending on equipment, Rx / Tx polarity may be labelled B and A or + and -. This polarity must be maintained as per the example.

APPENDIX A.6 RS-422-B

Connector **RS422-B**

PIN	Function
1	PPS (AUX)
2	RxD B
3	RxD A
4	TxD B
5	TxD A
6	GND
7	RESERVED
8	RESERVED
9	RESERVED
10	RESERVED
11	9-32V-
12	9-32V+

View: Looking **into** the socket on the DRX. Wiring view of cable side on plug.



Example Connection:

1	PPS (AUX)	←	PPS OUT
2	RxD B	←	TxD +
3	RxD A	←	TxD -
4	TxD B	→	RxD+
5	TxD A	→	RxD -
6	GND	←	PPS OUT GND
7	RESERVED		
8	RESERVED		
9	RESERVED		
10	RESERVED		
11	9-32V-		
12	9-32V+		

- » Isolation; Fully electrically isolated.
- » Cable; Multi core screened with tinned copper conductors.
- » Shield; Should be connected at far end.



NOTE: Depending on sensor compliance, this may be used as direct NMEA 0183 input.



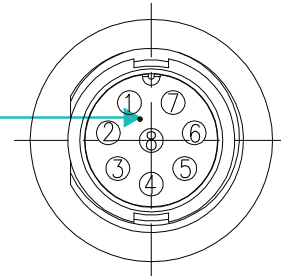
NOTE: Depending on equipment, Rx / Tx polarity may be labelled B and A or + and -. This polarity must be maintained as per the example.

APPENDIX A.7 NMEA 0183

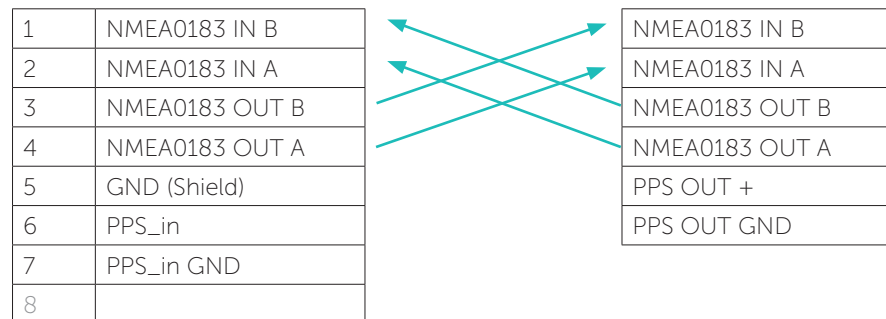
Connector **0183**

PIN	Function
1	NMEA0183 IN B
2	NMEA0183 IN A
3	NMEA0183 OUT B
4	NMEA0183 OUT A
5	GND (Shield)
6	PPS_in
7	PPS_in GND
8	

Marker identifies pin 1.
View: Looking **into** the socket on the
DRX. Wiring view of cable side on plug.



Example Connection:



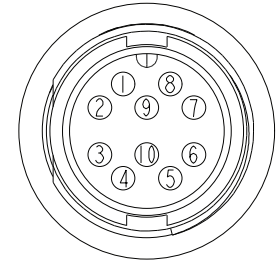
- » Isolation; Input electrically isolated. Output isolation, if required, should be at receive end.
- » Cable; Multi core screened with tinned copper conductors.

APPENDIX A.8 REMOTE POWER

Connector **AUX**

PIN	Function
1	KP1_in
2	KP1_in_GND
3	KP2_in
4	KP2_in_GND
5	KP1_OUT
6	+5.5V Isolated
7	GND(5.5V,KP1_OUT)
8	REMOTE_PWR_ON
9	REMOTE_PWR_ON_GND
10	

View: Looking **into** the socket on the
DRX. Wiring view of cable side on plug.



Example Connection:

1	KP1_in
2	KP1_in_GND
3	KP2_in
4	KP2_in_GND
5	KP1_OUT
6	+5.5V Isolated
7	GND(5.5V,KP1_OUT)
8	REMOTE_PWR_ON
9	REMOTE_PWR_ON_GND
10	



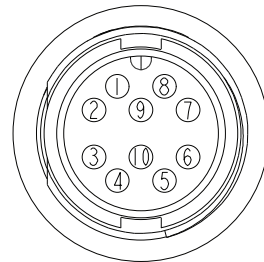
APPENDIX A.9 KP1/KP2 IN

Connector **AUX**

A Key Pulse (KP) can be connected to/from the sensor port of the DRX connection plate. Input can detect a short circuit in addition to a voltage ranging from 0 - 15 V. See "KP (Key Pulse) Settings" operating the WASSP system with a key pulse.

PIN	Function
1	KP1_in
2	KP1_in_GND
3	KP2_in
4	KP2_in_GND
5	KP1_OUT
6	+5.5V Isolated
7	GND(5.5V,KP1_OUT)
8	REMOTE_PWR_ON
9	REMOTE_PWR_ON_GND
10	

View: Looking **into** the socket on the DRX. Wiring view of cable side on plug.



Example Connection:

1	KP1_in
2	KP1_in_GND
3	KP2_in
4	KP2_in_GND
5	KP1_OUT
6	+5.5V Isolated
7	GND(5.5V,KP1_OUT)
8	REMOTE_PWR_ON
9	REMOTE_PWR_ON_GND
10	



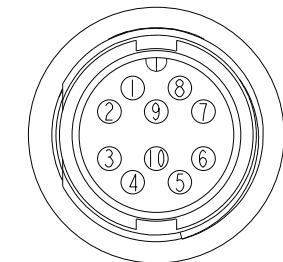
- » Isolation; Fully electrically isolated.
- » Drive; Selectable as high, low or auto.

APPENDIX A.10 KP1 OUT

Connector **AUX**

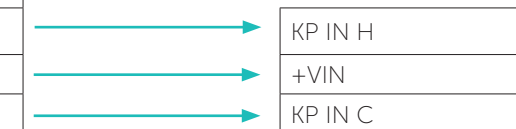
PIN	Function
1	KP1_in
2	KP1_in_GND
3	KP2_in
4	KP2_in_GND
5	KP1_OUT
6	+5.5V Isolated
7	GND(5.5V,KP1_OUT)
8	REMOTE_PWR_ON
9	REMOTE_PWR_ON_GND
10	

View: Looking **into** the socket on the DRX. Wiring view of cable side on plug.



Example Connection:

1	KP1_in
2	KP1_in_GND
3	KP2_in
4	KP2_in_GND
5	KP1_OUT
6	+5.5V Isolated
7	GND(5.5V,KP1_OUT)
8	REMOTE_PWR_ON
9	REMOTE_PWR_ON_GND
10	



- » Isolation; Fully electrically isolated.



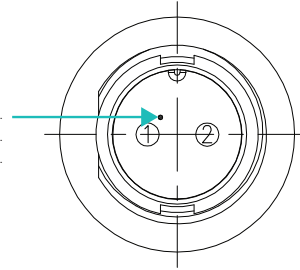
NOTE: For DRX serial numbers below #360 please refer to WASSP DRX Installation Manual Version 4.0, as output isolation, if required, should be at receive end.

APPENDIX A.11 POWER CONNECTION

Connect the cable assembly to appropriate DC power supply and connect to the **POWER** connector located on the connection end of the DRX.
See below for connection details.

Pin No.	Colour
1 (+)	Red or Clear
2 (-)	Black

Marker identifies pin 1.
View: Looking **into** the socket on the DRX.
Wiring view of cable side on plug.



NOTE: Recommended Fuse/Circuit Breaker ratings:

DRX WSP-603-20X; DRX-32

Peak current at 12V is 3A

Peak current at 24V is 1.5A

Recommended 5A to 10A Breaker

DRX WSP-603-250; DRX-46

Peak current at 24V is 12A

Recommended 15A Breaker

APPENDIX A.12 ETHERNET

Standard Gigabit Ethernet.
Std T568A wiring:

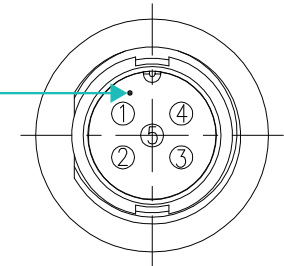
1	TP1+
2	TP1 -
3	TP2 +
4	TP3 +
5	TP3 -
6	TP2 -
7	TP4 +
8	TP4 -

APPENDIX A.13 NMEA2K

Connector **N2K**

PIN	Function
1	SHIELD
2	+12V
3	GND
4	NET-H
5	NET-L

Marker identifies pin 1.
View: Looking **into** the socket on the DRX.
Wiring view of cable side on plug.



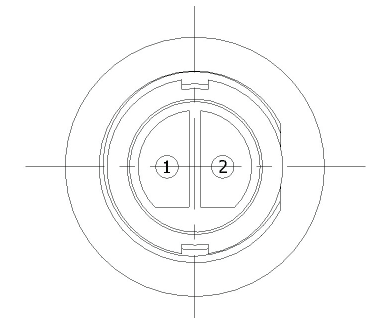
- » Isolation; Fully electrically isolated.
- » Standard DeviceNet, "NMEA 2000 Approved".

APPENDIX A.14 FAN

Depending on DRX Model, an optional FAN can be added to assist cooling the DRX in high temperature environments. The fan connector has a 12V output that is switched on when the DRX is turned on/off.

PIN	Function
1	12V +
2	GND

View: Looking **into** the socket on the DRX.
Wiring view of cable side on plug.



- » Voltage; Regulated.
- » Current should not exceed 1A.

APPENDIX B - SUPPORTED SENSORS AND SENTENCES

The following tables show sensors and sentences currently supported by DRX. This is not a definitive list and is updated as required.

Device	Configuration
Furuno SC30/SC50	Position and heading via IF-NMEASC Interface unit <i>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.</i>
SMC IMU-108	Roll, pitch, heave, TSS1
Trimble GPS	Position, heading, speed, TNL GGK, HDT, VTG sentences
Hemisphere V103	Position and heading; GGA, HDT, ZDA, VTG
Spatial IMU	Roll, Pitch, Heave; TSS1
SMC IMU-008	Roll, Pitch, Heave; TSS1
Valeport MiniSVS/ MiniSVP	Valeport Real Time format; Sound Velocity<TAB> Units<CR><LF>
Valeport Midas	
AML Xchange	Xchange Format; Sound Velocity<CR><LF>

Table 1. Supported Sensors

NMEA 0183 and serial sentences supported by DRX:

NMEA / Serial Sentence	Description
GGA	GPS Position Fix and related data
GLL	Position, Latitude/Longitude
GNS	GNSS position fix data and related data
PTNL GGK	Trimble Geographic Position
RMC	Navigation Information; Position, Track Made Good and Speed Over Ground
ZDA	Time and date
HDG	Magnetic Heading
HDT	True Heading
HDM	Heading Magnetic
PFEC ATT	True heading (Furuno proprietary sentence), optionally pitch and roll
PFEC HVE	Heave (Furuno proprietary sentence)
TSS1	Roll, pitch, heave
PASHR	Roll, pitch, heave, heading
VTG	Track Made Good and Ground Speed
MTW	Water Temperature
AML SVS	Sound Velocity, see Supported Devices
Valeport SVS	Sound Velocity, see Supported Devices

Table 2. Supported NMEA / Serial Sentences

NMEA 0183 sentences output by DRX. Sentences are output from the NMEA 0183 port at 1Hz.

NMEA	Description
DBT	Depth Below Transducer
DBS	Depth Below Surface
DBK	Depth Below Keel

Table 3. NMEA Sentences Output

NMEA 2K	Description
None currently supported.	

Table 4. Supported NMEA 2K Sentences

Points to Note:

- » Satellite Compass with PPS output will improve system timing and simplify commissioning.
- » IMU performance will be improved with Satellite Compass input. Depending on IMU, Satellite Compass input may be required for accurate attitude data.

APPENDIX C - SHIP'S MEASUREMENT POINTS

APPENDIX C.1 TRANSDUCER MEASUREMENT LOCATION

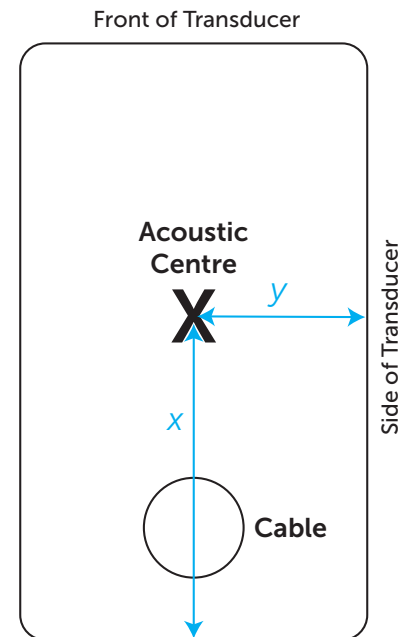
Transducer measurement location will be at the transducer acoustic centre as indicated in the below diagram.

WASSP 160kHz Transducer Acoustic Centre:

- » Distance from Cable end of transducer; 0.19m (x)
- » Distance from side of transducer; Central (y)
- » Distance from transducer face (wet side); 0.01m

WASSP 80kHz Transducer Acoustic Centre:

- » Distance from Cable end of transducer; 0.3m (x)
- » Distance from side of transducer; Central (y)
- » Distance from transducer face (wet side); 0.02m



APPENDIX C.2 GPS ANTENNA MEASUREMENT LOCATION

GPS measurement location will be described in the GPS installation manual.

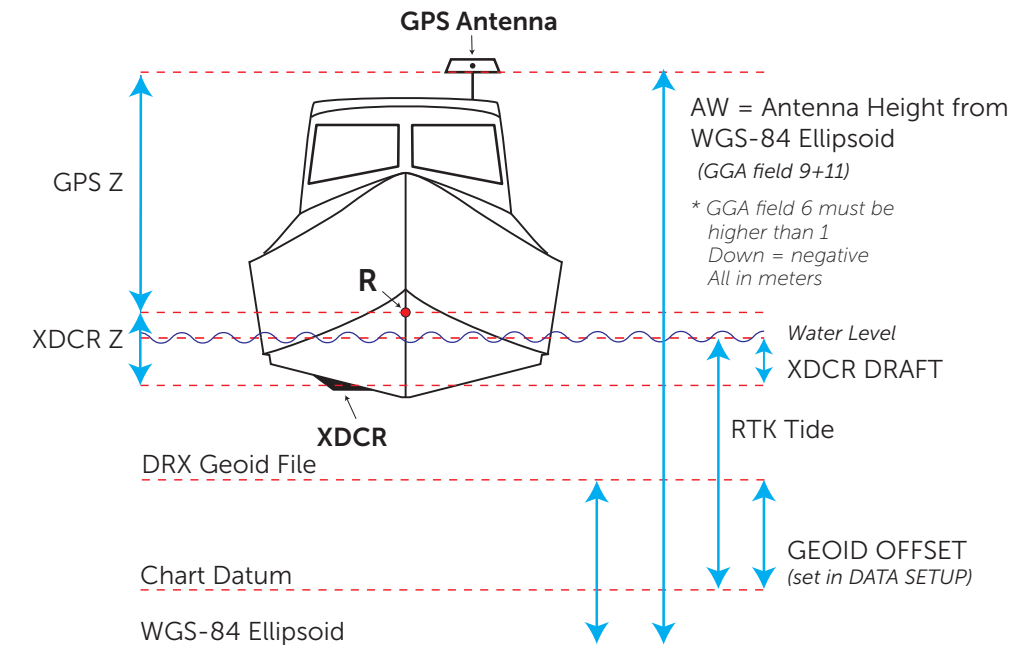
For instance, the measurement location for the WASSP V123 is the Primary Antenna which is located on the opposite location of the recessed arrow on the enclosure.

APPENDIX C.3 MOTION SENSOR MEASUREMENT LOCATION

IMU measurement location will typically be central on the IMU unless indicated otherwise in the Motion Sensor installation manual.

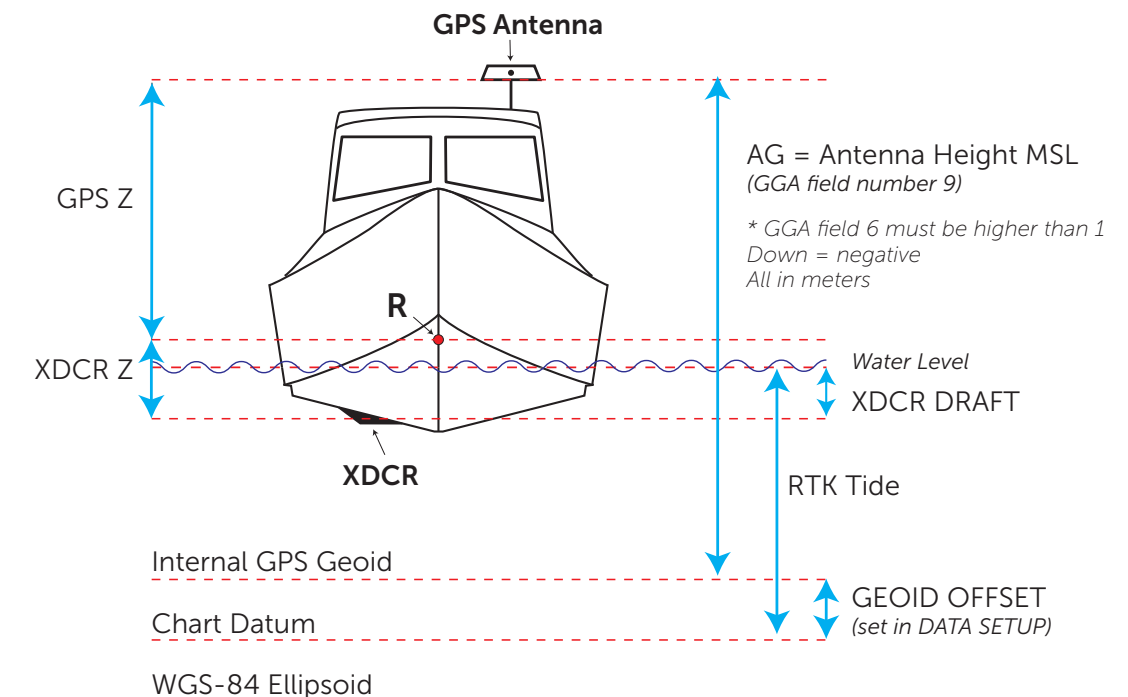
APPENDIX D - SEA LEVEL HEIGHT USING GPS HEIGHT

APPENDIX D.1 SEA LEVEL HEIGHT USING DRX GEOID FILE



$$\text{RTK Tide} = \text{AW} + \text{DRX GEOID FILE} - \text{GPS Z} - \text{XDCR Z} + \text{XDCR DRAFT} + \text{GEOID OFFSET}$$

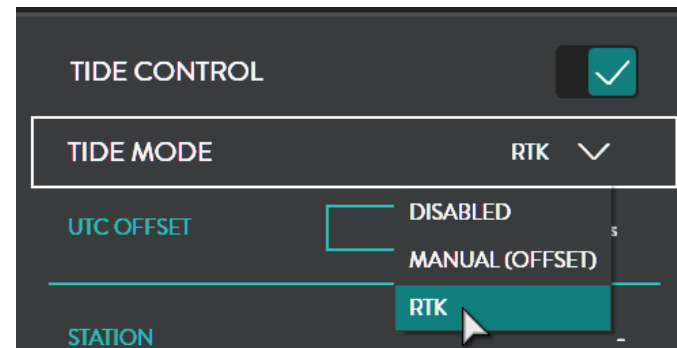
APPENDIX D.2 SEA LEVEL HEIGHT USING INTERNAL GPS GEOID



$$\text{RTK tide} = \text{AG} - \text{GPS Z} - \text{XDCR Z} + \text{XDCR DRAFT} + \text{GEOID OFFSET}$$

APPENDIX D.3 ENABLING GPS HEIGHT FOR SEA LEVEL HEIGHT

RTK tide mode can be enabled in CDX under the **TIDE CONTROL**.



TIDE CONTROL

TIDE MODE RTK

UTC OFFSET DISABLED

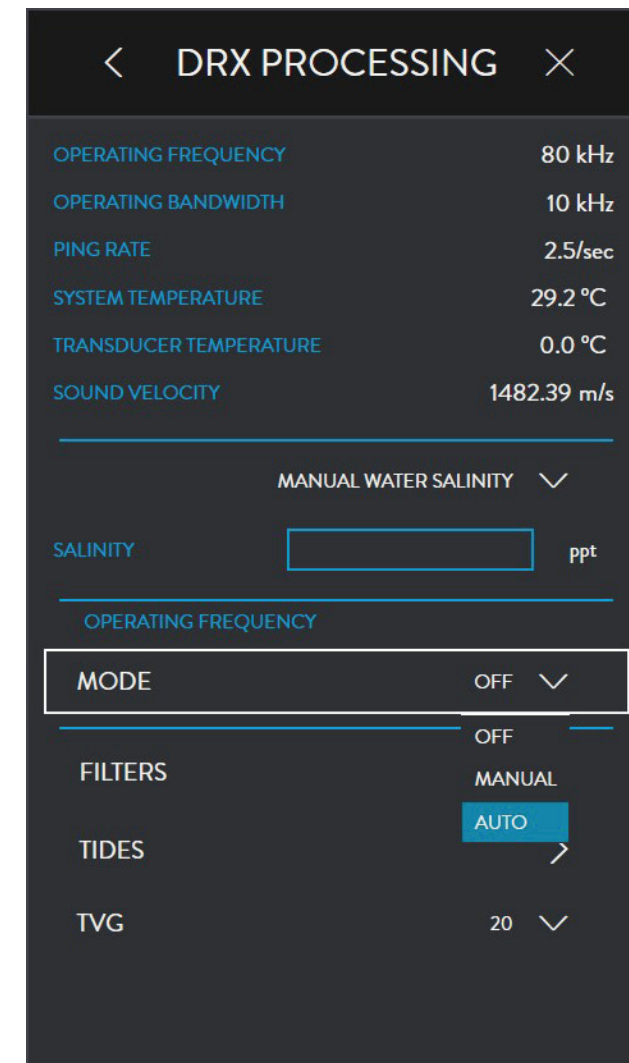
STATION RTK



NOTE: To enable RTK tide mode in other applications refer to the appropriate manual.

APPENDIX E - AUTO CONTROL IN CDX

AUTO can be turned on in CDX under **DRX PROCESSING**.



DRX PROCESSING

OPERATING FREQUENCY 80 kHz

OPERATING BANDWIDTH 10 kHz

PING RATE 2.5/sec

SYSTEM TEMPERATURE 29.2 °C

TRANSDUCER TEMPERATURE 0.0 °C

SOUND VELOCITY 1482.39 m/s

MANUAL WATER SALINITY

SALINITY ppt

OPERATING FREQUENCY

MODE OFF

FILTERS MANUAL

TIDES AUTO

TVG 20

APPENDIX F - DRX INTERCONNECT CHANGE HISTORY

	Back Panel 1 Up to DRX #50		Back Panel 2 DRX #51 to #216		Back Panel 3 DRX #217+		Back Panel 4 DRX #360+		Back Panel 5 DRX #389+, DRX-46 #1+		Back Panel 6 DRX-46	
	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin
RS422-A	RS-422, PPS	6	RS-422, PPS	9	RS-422, PPS, DC 9-32V	9	RS-422, PPS, DC 9-32V	9	RS-422, PPS, DC 9-32V	9	RS-422, PPS, DC 9-32V	9
RS422-B	n/a	-	n/a	-	RS-422, PPS	12	RS-422, PPS	12	RS-422, PPS, DC 9-32V	12	RS-422, PPS, DC 9-32V	12
RS232	RS-232, Remote PWR	6	RS-232	6	RS-232, DC 9-32V	6	RS-232, DC 9-32V	6	RS-232, DC 9-32V	6	RS-232, DC 9-32V	6
0183	NMEA0183, PPS	8	NMEA0183, PPS	8	NMEA0183, PPS	8	NMEA0183, PPS	8	NMEA0183, PPS	8	NMEA0183, PPS	8
AUX	KP In, KP Out, PPS	8	KP In, KP Out, Remote PWR	8	KP In, KP Out, Remote PWR	8	KP In, KP Out (Isolated) KP-EXT-SW, Remote PWR	10	KP In, KP Out (Isolated) KP-EXT-SW, Remote PWR	10	KP In, KP Out (Isolated) KP-EXT-SW, Remote PWR	10
12V x 1, Pin 2									12V x 2	4	12V x 1	2
Manual Reference	Version 1.1		Version 2.0		Version 4.0		Version 4.2		Version 5.0		Version 6.1	

APPENDIX G - GLOSSARY

Term	Description
DHCP	Dynamic Host Configuration Protocol, for automatically providing IP addresses.
DRX-32	DRX model used with S3 And F3 product models.
DRX-46	DRX model used with F3X product models.
DRX Setup Webpages	Webpages that DRX provides for configuration, setup, installation, upgrading.
GbE	Gigabit Ethernet.
HDG	Heading.
IMU	Inertial Motion Unit/Motion Sensor, typically for roll, pitch and heave.
KP	Key Pulse, typically used to synchronise sonar/sounder transmit timing.
LAN	Local Area Network.
LED	Light Emitting Diode.
PPS	Pulse Per Second, used for synchronising time, typically to UTC through GPS.
RTK GPS	Real Time Kinematic GPS, used for high quality positioning.
RX	Receive.
TX	Transmit.
WASSP CDX	WASSP PC application for control, visualisation and post processing of DRX data.
XDCR	Transducer.

APPENDIX H - PRODUCT REGISTRATION, SUPPORT AND RESOURCES

YOUR NOTES

WARRANTY

DRX products are covered with a one year limited warranty. In order to be covered by the warranty, the WASSP DRX must be registered with WASSP Ltd. The product warranty registration form can be filled in online by going to:

<http://wassp.com/product-warranty-registration/>

TECHNICAL SUPPORT

If you require maintenance and/or repair contact your local dealer. A list of WASSP dealers and distributors is available at wassp.com.

DRX technical support is available directly through:

» Online: <http://wassp.com/support/> and click on 'Request Support'

LATEST RESOURCES

- » For the latest version of manuals: <http://wassp.com/support/> and click on 'Manuals'
- » For software updates and release notes: <http://wassp.com/support/> and click on 'Request Support'
- » For Knowledge Base: <http://support.wassp.com:8095/display/KB/>
- » For System drawings, mechanical drawings and declarations of conformity: <http://wassp.com/support/> and click on 'Request Support'

