WASSP SENSOR BOX INSTALLATION MANUAL

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WASSP SENSOR BOX INSTALLATION MANUAL

The WASSP Sensor Box is an interfacing box to simplify installation of an integrated sensor system required by WASSP multibeam systems.

Sensor integration comprises:

- Position, Heading and PPS from a satellite compass
- Roll, Pitch and Heave from a motion sensor

NOTE: For DRX serial numbers below #217 please refer to Sensor Box Installation Manual Version 3.3 due to connector configuration changes.

DOCUMENT REVISION HISTORY

REVISION DATE	REASON FOR CHANGE	VERSION
May 2016	Compilation	1.0
May 2016	Updated Screen Shots & info	1.1
May 2016	Updated Figure 2 and Section 5	1.2
June 2016	Update for Revision 2 of Sensor Box	2.0
July 2016	Update for Revision 3 of Sensor Box	3.0
November 2016	Update Appendix A.3	3.1
November 2016	Updates to Section 4 Sensor Configuration	3.2
November 2016	Corrected GNSS Offset instruction	3.3
June 2017	Update RS422 to RS422-A, Satellite Compass support updated	3.4

RELATED DOCUMENTS

» Hemisphere Reference Manual; https://hemispheregnss.com/Portals/0/TechnicalDocumentation/875-0287-000%20%28MNL,USER%20GUIDE,V103%29_B1.pdf

» Spatial Reference Manual; http://www.advancednavigation.com.au/product/spatial#documentation

» WMB-X230 Installation Manual; Shipped with WMB-X230

» DRX Installation Manual; Shipped with DRX

RELATED TOOLS

» Spatial Manager Application; http://www.advancednavigation.com.au/product/spatial#software

» Hemisphere PocketMax3 Application; https://hemispheregnss.com/Resources-Support/Software

Further documentation can be found at wassp.com

SENSOR BOX INSTALLATION MANUAL

General Notices

Support information

If you require maintenance or repair, contact your local dealer. You can also contact WASSP Ltd. using the following address: wassp.com/support/.

If you need information about WASSP products, visit wassp.com.

On the website you will also find a list of WASSP dealers and distributors.

Warnings, Cautions, and Notes

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

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 could be helpful while performing a procedure.

CONTENTS

APPENDIX

SENSOR BOX INSTALLATION MANUAL

FIGURES

Doc: Sensor Box Installation Manual
Version: 3.4 June 2017
wassp.com

1 INTERCONNECTION DIAGRAM

1.1. INTERCONNECTION DIAGRAM WIDESCAN OPTION – S3/F3

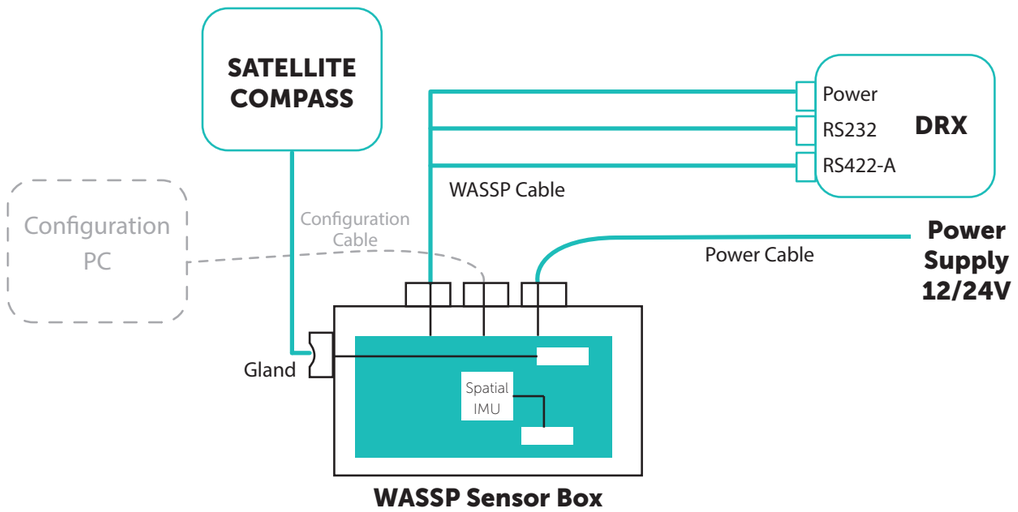


Figure 1. Interconnection Diagram Widescan Option - S3/F3

1.2. INTERCONNECTION DIAGRAM WMB-X230/WMB-3250 OPTION

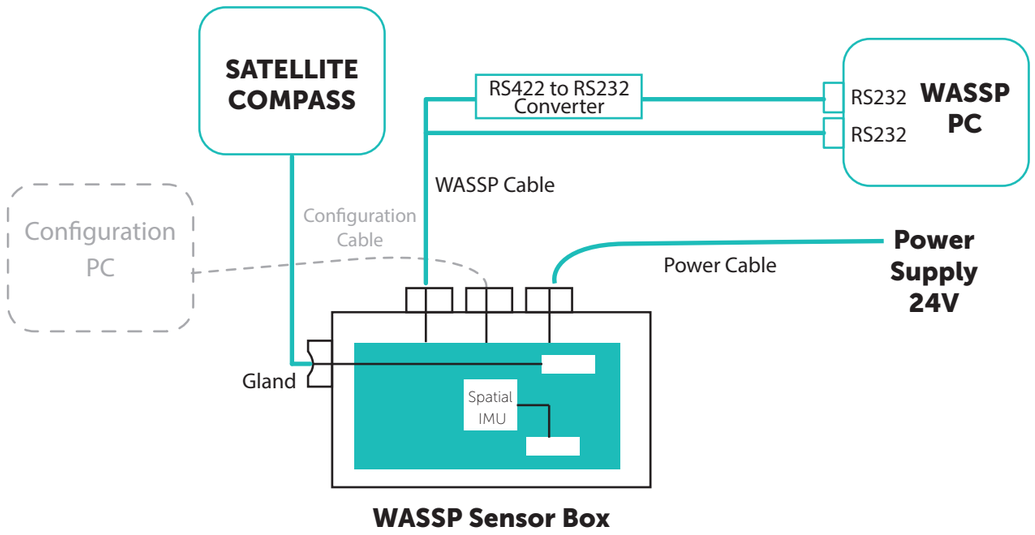


Figure 2. Interconnection Diagram WMB-X230/WMB-3250 Option

2 COMPONENTS

2.1. WASSP SENSOR BOX

Central box for sensor interconnectivity with the WASSP system. Incorporates internal Spatial IMU.

Figure 3. WASSP Sensor Box

2.2. POWER CABLE

Power Supply to POWER connector on WASSP Sensor Box

Powers the WASSP Sensor Box. All sensors are directly powered from the WASSP Sensor Box.

Figure 4. Power Cable

2.3. WASSP CABLE

DRX or WASSP PC To DRX connector on WASSP Sensor Box.

Option 1: Widescan Option; Connects WASSP Sensor Box to DRX

Figure 5. WASSP Cable: Widescan Option; Connects WASSP Sensor Box to DRX

Option 2: WMB-X230/WMB-3250 Option; Connects WASSP Sensor Box to WASSP PC

Figure 6. WASSP Cable: WMB-X230/WMB-3250 Option; Connects WASSP Sensor Box to WASSP PC

2.4. SATELLITE COMPASS PLUS CABLE

Satellite Compass to SATELLITE COMPASS terminal block in the WASSP Sensor Box.

Option 1: Sensor Package Option; Hemisphere V103 plus Cable

Figure 7. Sensor Package Option; Hemisphere V103 plus Cable

Option 2: Motion Package Option; Owner supply supported Satellite Compass

NOTE: For Currently Supported Satellite Compasses see "4 Sensor Configuration" on page 13.

2.5. CONFIGURATION CABLE

Configuration PC to CONFIG connector on WASSP Sensor Box.

Connects WASSP Sensor Box to PC for Spatial IMU configuration and for Hemisphere V103 configuration.

Figure 8. Motion Sensor and Satellite Compass Configuration cables

3 WASSP SENSOR BOX INSTALLATION

3.1. WASSP SENSOR BOX MOUNTING

The WASSP Sensor Box should be installed taking the following into consideration:

- WASSP Sensor Box should be as close to the vessels centre of motion as possible (usually very close to the vessel centre of gravity). This will give optimum motion sensor performance which is essential to achieve acceptable WASSP performance
- Cabling from the GPS Compass and WASSP system needs to be accessible.
- Flat rigid mounting location is required for optimum motion sensor performance. Pitch accuracy should be +/- 2 degrees.
- WASSP Sensor Box needs to be mounted accurately in fore/aft vessel orientation as per the arrow on the box. Angular accuracy should be +/- 1 degree.
- Area needs to have space for connectors.

Once a suitable location and fixing plate is identified the WASSP Sensor Box should be mounted using the supplied mounting pieces and instructions supplied with the box.

NOTE: WASSP Sensor Box needs to be mounted aligned fore/aft as per the arrow on the box. Tolerances are +/- 1 degree fore/aft and +/- 2 degrees pitch.

Figure 9. WASSP Sensor Box Alignment

3.2. WASSP SENSOR BOX CONNECTION

Refer to *"1 Interconnection diagram" on page 6* for system configuration.

For sensor configuration, the following connections are required:

- Power
- Configuration cable to a PC, for Spatial configuration *(*See *"4 Sensor Configuration" on page 13).*
- Spatial IMU - Internal to WASSP Sensor Box

NOTE: If Hemisphere Satellite Compass requires configuration this can also be connected

For operation, the following connections are required:

- Power
- WASSP Cable to DRX or WASSP PC
- Satellite Compass
- Spatial IMU - Internal to WASSP Sensor Box

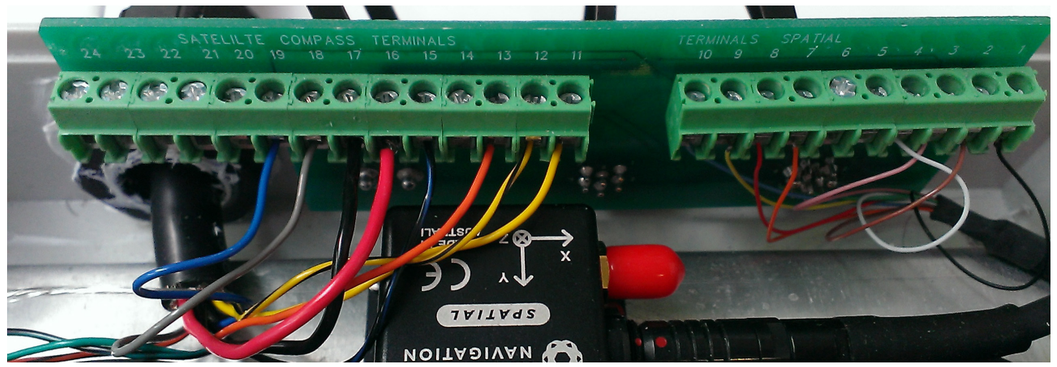
3.2.1. Satellite Compass

To connect the Satellite Compass Connection connect the cable to the internal terminal block as per the instructions below.

1. Strip 50mm of the outer insulation from the Hemisphere cable exposing the coloured cables.
2. Cut off unused cables, see *"Appendix A.3 Satellite Compass Terminal Block" on page 22* for required cable.
3. Strip back 5mm of insulation from all the remaining wires and twist them (tin them if practical).
4. Open the connection box by unlatching the 4 screws on top of the box.

To open the connection box, twist all 4 screws half a rotation anti-clockwise.

5. Insert the Satellite Compass cable into the box through the gland. Insert the wires into the terminal block seen below and then tighten the terminal screws. See *"Appendix A.3 Satellite Compass Terminal Block"* for Satellite Compass pin out.



When the cable connection is made, tighten the gland and make sure the cable is secured.

3.2.2. Spatial IMU Connection

The Spatial IMU is mounted internally to the WASSP Sensor Box. If the Spatial IMU needs to be mounted external to the WASSP Sensor Box, follow instructions in *"Appendix B - Spatial external connection" on page 25.*

See "Appendix A.4 Spatial Terminal Block" on page 23 for Spatial Pin Out.

4 SENSOR CONFIGURATION

4.1. SATELLITE COMPASS CONFIGURATION

GPS Compasses supported currently include:

» Hemisphere V103; Supplied preconfigured as part of the Widescan Sensor Package

4.1.1. Hemisphere V103

Hemisphere V103 will be supplied preconfigured.

» Mount fore/aft for true heading

» Port B (RS422-A): 38400 Baud
- GGA 20Hz
- VTG 2Hz
- ZDA 1Hz
- HDT 20Hz

» PPS Out

» Port A (RS232): 38400 Baud
- $JBIN, 1, 20
- $JASC, GPHDT, 20

4.2. SPATIAL CONFIGURATION

Spatial IMU will be supplied preconfigured. Other than External Offset.

» Auxiliary baud rate; 38400 Baud

» GPIO
- Aux Tx Function: TSS1
- Aux RX Function: Hemisphere GNSS Input
- GPIO1; 1PPS Input

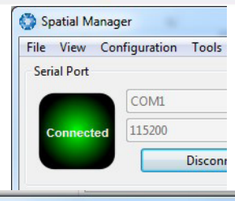
» GPIO Output
- TSS Auxiliary output rate 50Hz

» Filters
- Vehicle Profile = SHIP
- Internal GNSS = OFF
- Magnetic Heading Enabled = OFF
- Atmospheric Altitude Enabled = OFF
- Velocity Heading Enabled = OFF
- Reversing Detection Enabled = OFF
- Motion Analysis = OFF
- Automatic Magnetic Calibration = OFF

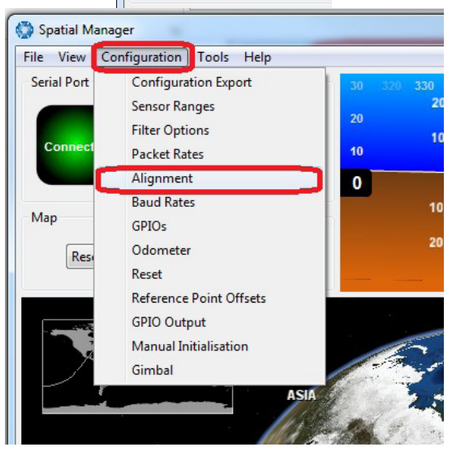
4.2.1. Configuring External Offset

1. Connect WASSP Sensor Box to configuration PC using the configuration cable, *see "2.5. Configuration Cable" on page 9.*
2. Connect power cable to the WASSP Sensor Box, *see "2.2. Power Cable" on page 7.*
3. Install and Run SPATIAL MANAGER
   - SPATIAL MANAGER can be download from http://www.advancednavigation.com.au/product/spatial#software
     It is also available on USB flash drive shipped with DRX
   - SPATIAL MANAGER requires Java. If not already installed on your PC; http://www.java.com
4. Select the com port that you connected the CONFIG.
5. Enter 115200 as the baud rate then press CONNECT.

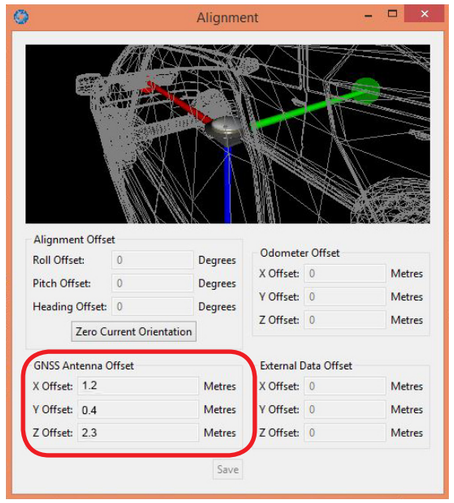
6. When you are connected the Connection Status Indicator will turn green and show "Connected".



7. Click on CONFIGURATION then choose ALIGNMENT.

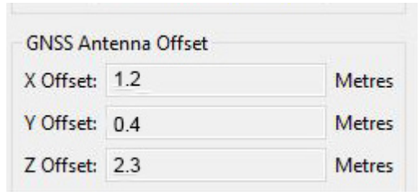


8. Adjust GNSS ANTENNA OFFSET so that it matches the distance that the spatial is offset from the external GPS unit.

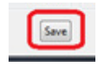


9. The GNSS Antenna Offsets should be measured from the center of the Spatial unit to the center of the antenna with coordinate system:
   - X positive forward
   - Z positive down
   - Y positive starboard

Example:



10. Press SAVE and then exit the application



NOTE: GNSS Antenna Offset needs to configured for acceptable attitude data.

NOTE: Spatial Firmware should be 4.501 or later.

5 WASSP CONFIGURATION

5.1. WIDESCAN - S3/F3; DRX CONFIGURATION

For sensor configuration on DRX refer to the DRX Installation Manual.

Connect the WASSP Cable from the DRX connector on the WASSP Sensor Box to the DRX as per *"Figure 1. Interconnection Diagram Widescan Option - S3/F3" on page 6.*

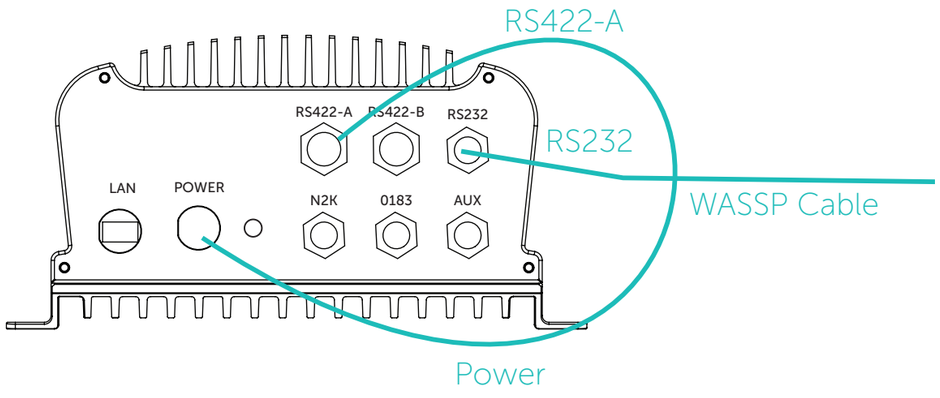


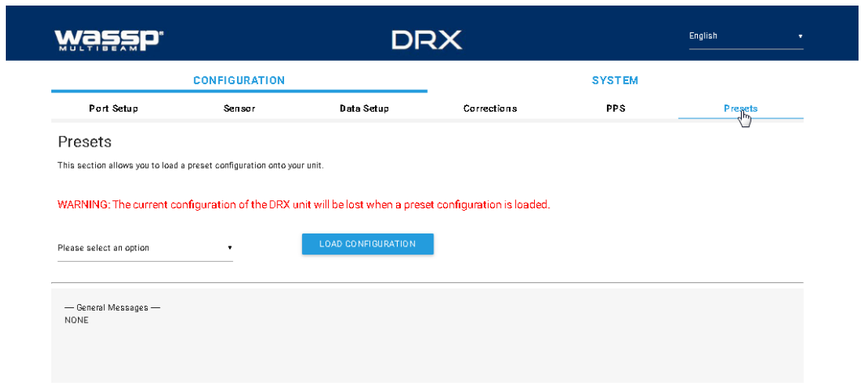
Figure 10. Widescan - S3/F3; DRX Configuration

CAUTION: Noise due to poor grounding will have direct impact on DRX performance and signal integrity (RS-232 is particularly susceptible).

Configure the DRX using the DRX SETUP WEBPAGES. If the DRX version supports PRESETS the sensor setup can be automated for Port Setup, Data Setup, Corrections and PPS using the Configuration Presets.

Sensor offsets will need to be input manually.

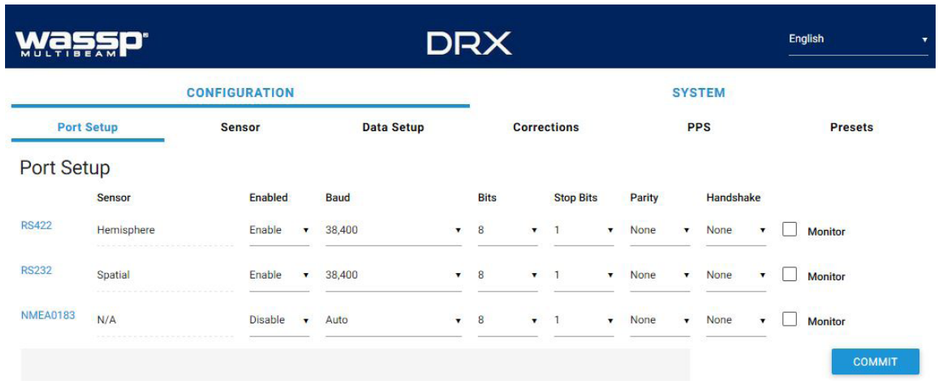
Refer to the DRX Installation Manual for more details.



For manual configuration, follow these steps:

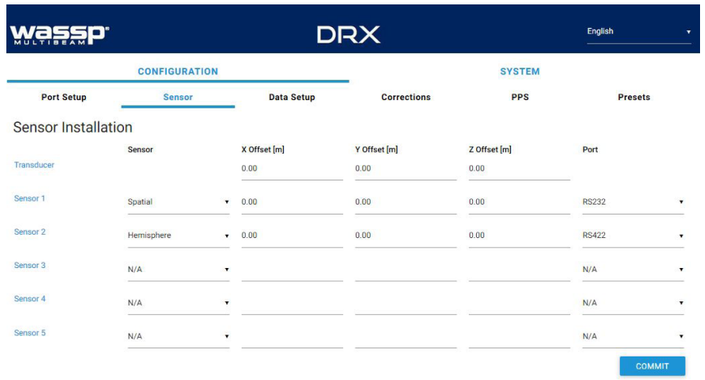
1. Configure Port Setup

» RS422-A; Enable, Baud 38400
» RS232; Enable, Baud 38400



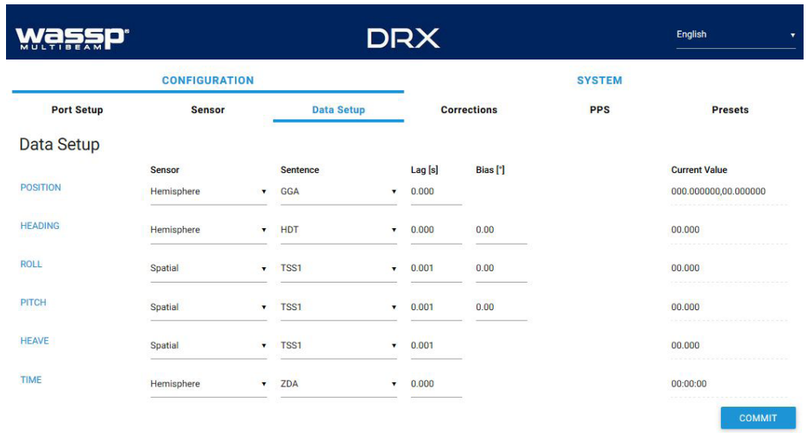
2. Configure Sensor

» Sensor 1; Spatial, Port RS232
» Sensor 2; Hemisphere, Port RS422-A
» Configure the Offsets as per the DRX Installation Manual



3. Configure Data Setup

» Position; Sensor Hemisphere, Sentence GGA
» Heading; Sensor Hemisphere, Sentence HDT
» Roll; Sensor Spatial, Sentence TSS1, Lag 0.001
» Pitch; Sensor Spatial, Sentence TSS1, Lag 0.001
» Heave; Sensor Spatial, Sentence TSS1, Lag 0.001
» Time, Sensor Hemisphere, Sentence ZDA



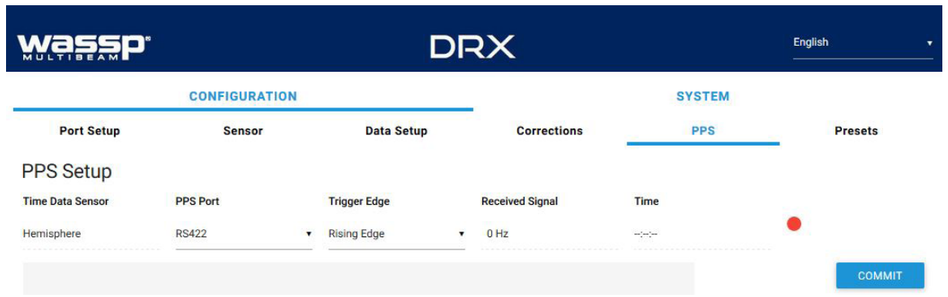
NOTE: Any Bias will need to be calculated for Heading, Roll and Pitch.

NOTE: Lag for Hemisphere V103 is not required for position if PPS is used, other Satellite Compass Lags will need to be calculated and applied.

4. Configure PPS

» PPS Port; RS422-A

» Trigger Edge; Rising Edge



NOTE: If PPS is not supported configure POSITION LAG as per CONFIGURE DATA SETUP above.

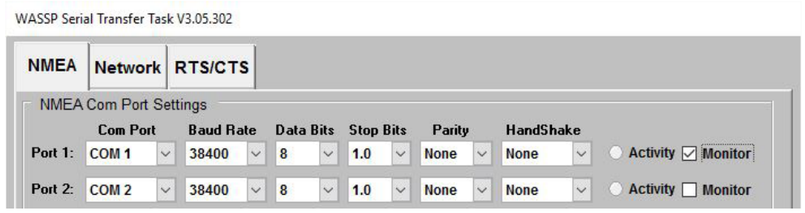
5.2. WMB-X230/WMB-3250; WASSP PC CONFIGURATION

For sensor configuration on WASSP PC refer to the WMB-X230/WMB-3250 Installation Manual.

Connect the WASSP Cable from the DRX connector on the WASSP Sensor Box to the WASSP PC serial ports as per *"Figure 2. Interconnection Diagram WMB-X230/WMB-3250 Option" on page 6.*

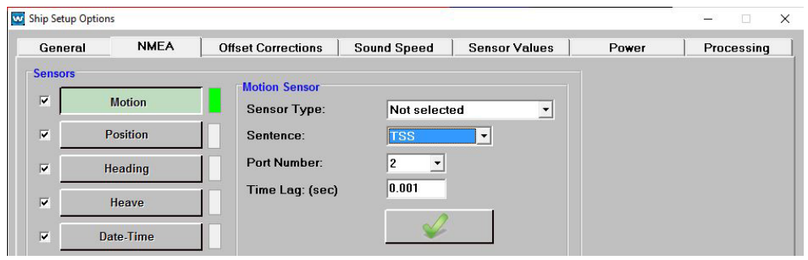
Below shows configuration using the Hemisphere V103 Satellite Compass.

1. Configure the COM ports using the Serial Transfer Task.

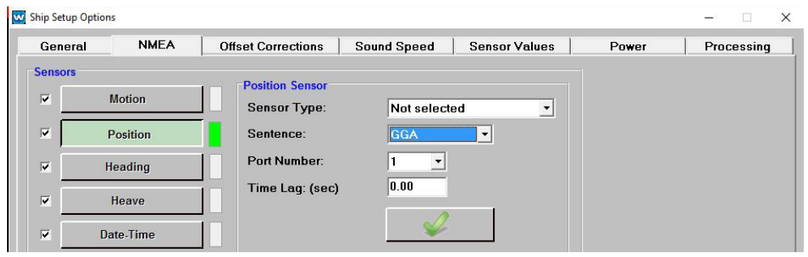


2. Verify the data using the monitor option above.
3. Setup the sensors on the WMB-X230/WMB-3250 application. Example below is for the WMB-3250.

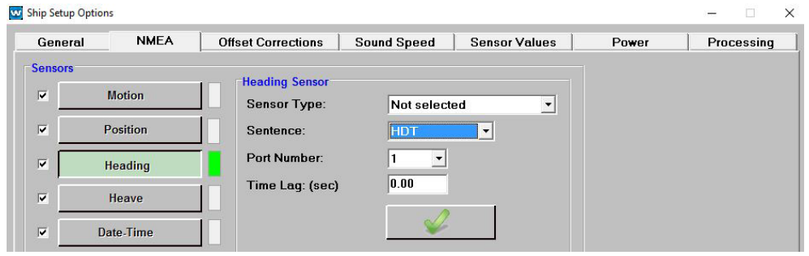
Motion;
Sentence TSS,
Port Number 2,
Time Lag 0.001



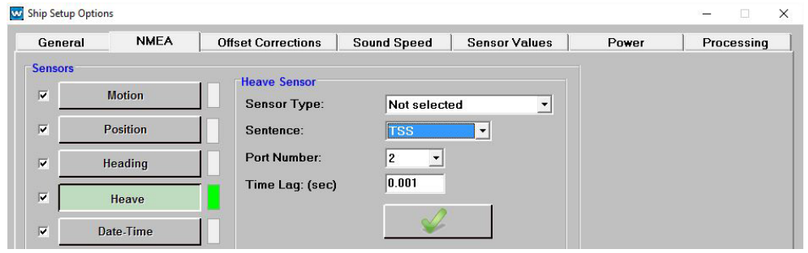
Position;
Sentence GGA,
Port Number 1,
Time Lag as
calculated



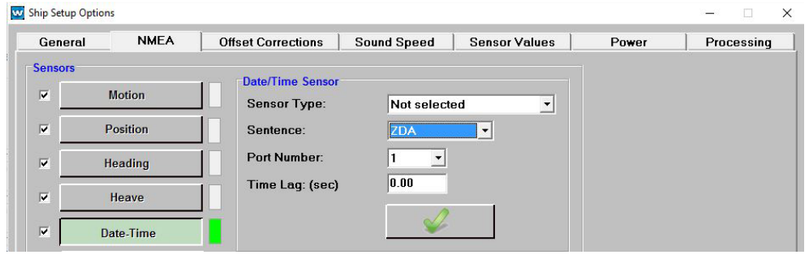
Heading;
Sentence HDT,
Port Number 1



Heave;
Sentence TSS,
Port Number 2,
Time Lag 0.001



Date/Time;
Sentence ZDA,
Port Number 1



NOTE: Any Bias will need to be calculated for Heading, Roll and Pitch and input under SENSOR VALUES tab.

NOTE: Lag is for Hemisphere V103 without PPS being used should be set at 0.005s, other Satellite Compass Lags will need to be calculated and applied.

6 APPENDIX

APPENDIX A - CONNECTOR PIN-OUTS

APPENDIX A.1 POWER CONNECTOR

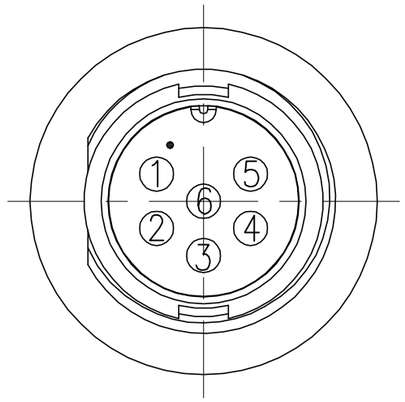
Labeled; POWER

PIN	Colour
1	Main Power +
2	Main Power -

APPENDIX A.2 CONFIG CONNECTOR

Labeled; CONFIG

PIN	Function
1	Spatial Primary RS-232 Tx
2	Spatial Primary RS-232 Rx
3	Signal Ground
4	Hemisphere Port A Tx RS-232
5	Hemisphere Port A Rx RS-232
6	Signal Ground



APPENDIX A.3 SATELLITE COMPASS TERMINAL BLOCK

Labeled; SATELLITE COMPASS

24	23	22	21	20	19	18	17	16	15	14	13	12	11

For Hemisphere V103 Satellite Compass

PIN	Function	
24	Spare	
23	Spare	
22	Spare	
21	Spare	
20	Spare	
19	Port A Tx RS-232	Blue
18	Signal Ground	Grey
17	Power -	Black
16	Power +	Red
15	Port A Rx RS-232	Black / blue
14	Spare	
13	PPS (+)	Orange
12	Port B Tx RS-422 (-)	Yellow / black
11	Port B Tx RS-422 (+)	Yellow

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APPENDIX A.4 SPATIAL TERMINAL BLOCK

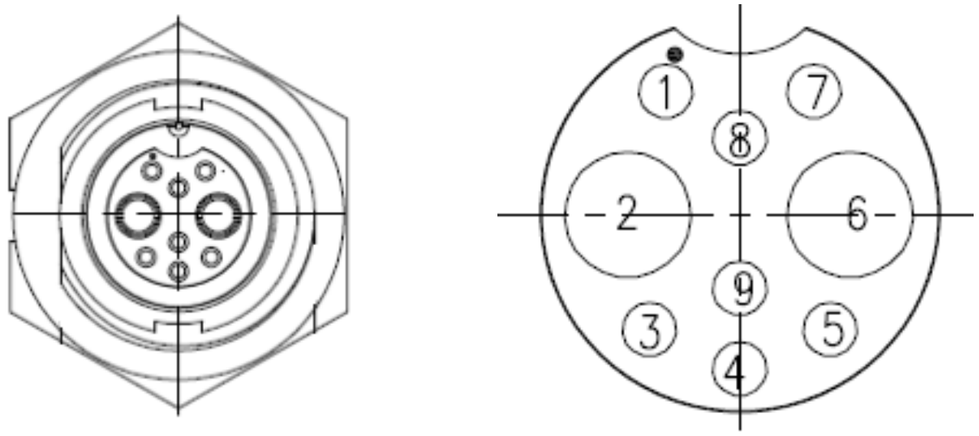
Labeled; SPATIAL

10	9	8	7	6	5	4	3	2	1

PIN	Function	
10	Auxiliary RS-232 Rx	Blue
9	Auxiliary RS-232 Tx	Yellow
8	Primary RS-232 Tx	Red
7	Primary RS-232 Rx	Orange
6	Ground	Pink
5	Ground	Pink
4	GPIO1	White
3	Ground	Pink
2	Power +	Brown
1	Power -	Black

APPENDIX A.5 WASSP CONNECTOR

Labeled; DRX



For DRX - Referenced to DRX. See DRX Manual.

PIN	Function
1	RS-232, Rx
2	Power +
3	RS-422, RD B (IN)
4	RS-422, PPS (AUX)
5	RS-422, RD A (IN)
6	Power -
7	RS-422, GND
8	RS-232, GND
9	RS-232, GND

For WASSP PC - Referenced to PC COM Ports.

Convertor connected to COM 1.

PIN	Function
1	COM2 (Pin 2), RS-232 Rx
2	NC
3	RS-422 to RS-232 Converter (Pin 4), Rx-
4	COM2 (Pin 8), RS-232 CTS
5	RS-422 to RS-232 Converter (Pin 3), Rx+
6	NC
7	COM2 (Pin 5), RS-232 GND
8	COM2 (Pin 5), RS-232 GND
9	COM2 (Pin 5), RS-232 GND

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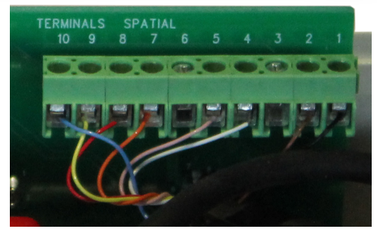
APPENDIX B - SPATIAL EXTERNAL CONNECTION

The Spatial IMU is recommended to be installed mounted in the WASSP Sensor Box. These instructions are only applicable if the Spatial IMU needs to be mounted external to the WASSP Sensor Box.

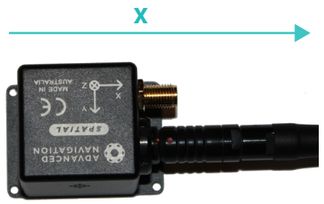
1. Unlatch the four screws on the top of the box. To open the connection box, twist all 4 screws half a rotation anti-clockwise.

2. Remove the Spatial IMU connection to the terminal block.



3. Remove the mounting plate.
4. Remove the Spatial IMU from the mounting plate.
5. Run the cable through a gland into the WASSP Sensor Box.
6. Insert the wires into the Spatial IMU terminal block and tighten the terminal screws. See *"Appendix A.4 Spatial Terminal Block" on page 23* for Spatial IMU terminal pin out.
7. Spatial IMU should be mounted taking the following into consideration:

- Spatial should be as close to the vessels centre of motion as possible (usually very close to the vessel centre of gravity). This will give optimum motion sensor performance which is essential to achieve expected WASSP performance.
- Cabling to the WASSP Sensor Box needs to be accessible.
- Flat rigid mounting location is required for optimum motion sensor performance. Pitch accuracy should be +/- 2 degrees.
- Spatial IMU needs to be mounted accurately in fore/ aft oriented in X direction. Angular accuracy should be +/- 1 degree.



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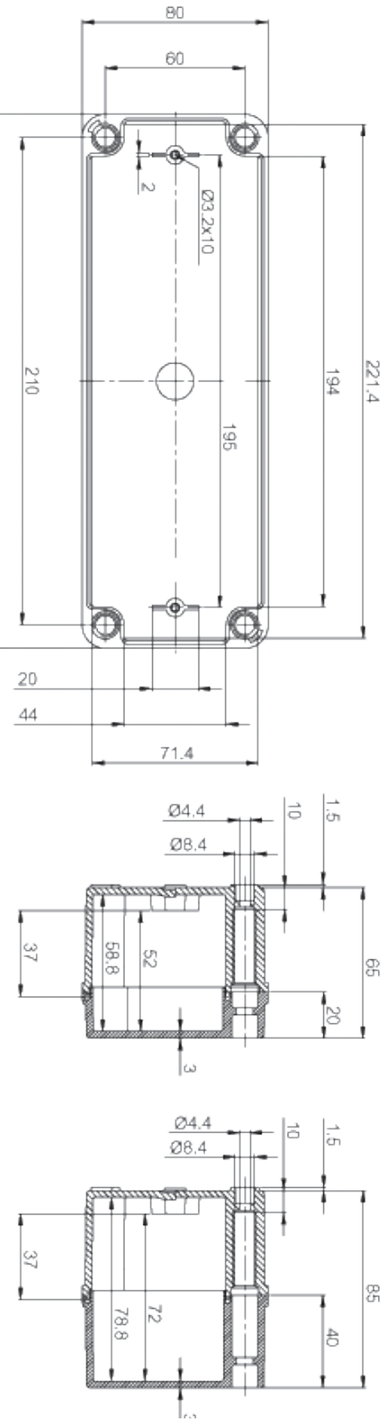
APPENDIX B.1 WASSP SENSOR BOX DIMENSIONS



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