Inertial Products

Installation Form

IXBLUE
DEEP INSIGHT. SHARPER SENSES.

Document Revision History

Edition	Date	Comments
A	09/2011	First Edition
B	02/2012	iXBlue graphical chart applied to the document
C	10/2013	New iXBlue colors applied to the document
D	02/2014	ATLANS product added Reference of web-based interface user guides updated
E	06/2014	OCTANS NANO product added
F	03/2015	New style guide applied to the document
G	05/2016	PHINS COMPACT C7 product added
H	09/2016	PHINS COMPACT C3 and ROVINS NANO products added

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Icons

The **Note** icon indicates that the following information is of particular interest and should be read with care.

Important

The **Important** mention indicates that the following information should be read to forbid or prevent a product dysfunction or a faulty operation of the equipment.

The **Caution** icon indicates that the following information should be read to forbid or prevent product damage.

The **Warning** icon indicates that possible personal injury or death could result from failure to follow the provided recommendation.

Abbreviations, Acronyms and terminology

Abbreviations, acronyms and terminology are described in the *Inertial Products - Principle & Conventions* document *(Ref.: MU-INS&AHRS-AN-003).*

Overview of this Document

When installing an Attitude and Heading Reference Sensor (AHRS) or an Inertial Navigation System (INS), it is necessary to note down several configuration parameters. This document gives empty tables to guide the installer and the configuration manager. The installer will note the entire electrical and mechanical configuration, including all external sensors. The configuration manager will use these data to configure the software.

This document is divided into several parts:

- **Part 1: Introduction and Products Concerned** - This section explains how to use this document ant lists the inertial products concerned by this document.
- **Part 2: Electrical Interfacing** - This section contains the available port list with empty tables to describe the connected equipments (inputs and outputs).
- **Part 3: Mechanical Interfacing** - This section contains empty table to fill in with the mechanical configuration of the system, including external sensors.

A Table of Contents is available in the following pages to get quickly the dedicated information.

Table of Contents

1 INTRODUCTION AND PRODUCTS CONCERNED

This document is a link between the mechanical / electrical installation and software configuration.

It is recommended to complete this document each time new equipment is installed, or wired. Once completed, this document is an aide-memoire to configure the product software.

This document is generic for all inertial products (INS and AHRS), therefore some parameters (including input or output ports) may be not configurable for your product.

For installation, wiring, sensor capabilities: refer to the *product user manual* of your product. This document contains specific information about your product. That is the reason why it must be used as a reference guide for the mechanical and electrical installation.

For mechanical and sign convention, refer to the *Inertial Products – Principle and Conventions* document *(ref.: MU-INS&AHRS-AN-003).*

For software configuration, refer to the following document, depending on your product:

- AHRS - Configuration & Operation with the Web-based User Interface (ref.: MU-AHRS-AN-001)
- Inertial Products-Web-based interface user guide (ref.: MU-INSIII-AN-021)
- INS, Land & Air applications – Web-based interface user guide (ref.: MU-INSIII-AN-022)
- LANDINS – Configuration & Operation with the Web-based Interface (ref.:MU-LANDINS-016)

The current edition of this document is applicable to all inertial products:

- AHRS 4th generation:
  - ❑ OCTANS
  - ❑ OCTANS SUBSEA
  - ❑ OCTANS NANO
  - ❑ QUADRANS
- INS 3rd generation:
  - ❑ PHINS
  - ❑ ROVINS
  - ❑ PHINS 6000
  - ❑ PHINS COMPACT C7
  - ❑ HYDRINS
  - ❑ MARINS
  - ❑ LANDINS
  - ❑ AIRINS
  - ❑ ATLANS

2 ELECTRICAL INTERFACING

2.1 With DMI

- Perform the appropriate wiring between the DMI and the inertial product from the DMI connector.
- Select the appropriate DMI connection type.
- Write down the DMI connection in Table 1.

Table 1 - Configuration of the DMI input

DMI Type
Ex: TTL Dual Phase

2.2 With Internal or External GNSS

- If you use external GNSS, perform the appropriate wiring between the GNSS and the inertial product.
- Configure the external GNSS settings to log both real time GNSS data and raw GNSS data used for post-processing.
- Write down the configuration for the external GNSS connection with the product in Table 2.

Table 2 - Configuration of the external GNSS interfacing with the inertial product

External GNSS data	Input on inertial product connector	Physical Device	
		Serial	Ethernet
		RS232 /Com settings	Transport protocol/IP address/ Port socket N°
Ex: GST, GGA, UTC frames	Ethernet	N/A	TCP server/192.168.36.119/ 5017
Ex: Raw data	Digital	N/A	TCP client/192.168.36.119/ 5018

If you use the internal GNSS receiver of the product there are no communication settings to perform.

2.3 With Event Marker Inputs

- Perform the appropriate wiring between the systems (i.e., Camera, LIDAR …) and the inertial product from the product I/O pulses connector.
- Write down the configuration for the external GNSS connection with the product in Table 3

Table 3 - Configuration of the Event markers

Device	Inertial product				
Identification	Event marker	Trigger[1]			
		Rising edge in real time	Falling edge in real time	Rising edge in post-processing	Falling edge in post-processing
Ex : camera	A	X			
	A				
	B				
	C				
	D				

(1) The event marker data will be available only in postprocessing protocol or in real time protocol.

2.4 With External Sensors

For each sensor connected to the inertial product, select the input stream then

- The physical link (RS232, RS422 or Ethernet)
- The input protocol

Then according to the physical link chosen, define:

- For the serial Input: Baud rate, parity, stop bit, Electrical level (RS232 or RS422)
- For the Ethernet input: Transport, IP address, port number

Write down the configuration for the external sensors connections with the inertial product in Table 4 for the serial or Ethernet inputs and in Table 5 for the pulse inputs.

Important

Input and output serial parameters of each port are common. This means that changing input serial parameters of a port impacts the output serial parameters of the port and vice-versa.

Table 4 - Configuration of the inputs

External Sensor	Input stream	Input Protocol	Physical Device	
			Serial	**Ethernet**
			RS232/RS422/ Com settings	**Transport protocol/IP address/ Port socket N°**
Ex.: Depth sensor	In A	PAROSCIENTIFIC	RS232, 9600,8,N,1	N/A
Ex.: USBL sensor	In B	APOS PSIMSSB	N/A	UDP/192.168.36.172/ 7112
	In A			
	In B			
	In C			
	In D			
	In E			

Table 5 - Configuration of pulse inputs

External Pulse Signal (1)	Pulse input stream
Ex.: PPS	Input Pulse A
	Input Pulse A
	Input Pulse B
	Input Pulse C
	Input Pulse D

(1) For OCTANS, the external pulse signal A is reserved for PPS pulse of GNSS/GPS and the external pulse signal D is reserved for pulse Speed Log.

For subsea systems, to synchronize emission of DVL with sonar emission for example you can use the external synchro pins.

Table 6 - Configuration of external synchro signal

<table>
<tr><th colspan="2">External Synchro
(only for subsea products)</th><th>Pin Wiring</th></tr>
<tr><td>Coming from</td><td>Ex.: Sonar synchro</td><td>Pin 24(+) &25(-) of Port A&B connector</td></tr>
<tr><td>Going to</td><td>Ex.: DVL trigger input</td><td>Pins 9(+) & 10(-) of Port C connector</td></tr>
<tr><td>Coming from</td><td></td><td>Pin 24(+) &25(-) of Port A&B connector</td></tr>
<tr><td>Going to</td><td></td><td>Pins 9(+) & 10(-) of Port C connector</td></tr>
<tr><td>Going to</td><td></td><td>Pins 9(+) & 10(-) of Port D connector</td></tr>
<tr><td>Going to</td><td></td><td>Pins 9(+) & 10(-) of Port E connector</td></tr>
</table>

2.5 With Instruments and Displays

- Perform the appropriate wiring between system and the inertial product from the serial connector(s) and / or Ethernet connector.
- For each external system connected to the inertial product, select the output stream and appropriate parameters
- Write down the configuration for external systems connections with the inertial product in Table 7 for serial outputs, Table 8 for Ethernet outputs and
- Table 9 for pulse outputs.

Important

Input and output serial parameters of each port are common. This means that changing input serial parameters of a port impacts the output serial parameters of the port and vice-versa. An output can be duplicated on both serial and Ethernet ports.

Table 7 - Configuration of the serial outputs

External system Identification	Serial output port	Output protocol	(RS422/RS232) / Com port settings	Output frequency (Hz)
Ex.: Navigation package	Out A	SIMRAD EM	RS422 / 115200, 8,N,1	10
	Out A			
	Out B			
	Out C			
	Out D			
	Out E			

Table 8 - Configuration of the Ethernet outputs

External System Identification	Ethernet output port	Output protocol	Transport layer / IP address	Port socket number	Output frequency (Hz)
Ex.: Multibeam	Out A	SIMRAD EM	UDP, 192.168.36.147	7110	10
	Out A				
	Out B				
	Out C				
	Out D				
	Out E				

Table 9 - Configuration of the pulse outputs

External System Identification	Pulse output port	Pulse output protocol	Output frequency (Hz)
Ex.: Navigation PC	Pulse out A	RTC	10
	Pulse out A		
	Pulse out B		
	Pulse out C		
	Pulse out D		
	Pulse out E		

3 Mechanical Interfacing

Refer to the document *Inertial Products-Principle and Conventions* for all references about mechanical conventions.

3.1 Product/Vehicle Misalignment - Rough Misalignment

- Measure inertial product / vehicle rough misalignment,
- Tick the appropriate 2 boxes in Table 10 to define the product rough misalignment.

Table 10 - Determination of Product/vehicle rough misalignment

	Vehicle Orientation					
	Front /bow	Back /stern	Left /port side	Right /starboard	Upward	Downward
Product Connector side						
Product Logo side						

3.2 Product/Vehicle Misalignment - Fine Misalignment

- Measure inertial product / vehicle fine misalignment,
- Report the measured misalignment angles in Table 11 to be entered into the system using MMI. For sign convention refer to document *Inertial Products-Principle and Conventions.*

Table 11 - Determination of Product/Vehicle fine misalignment

	Product /Vehicle fine misalignment
Roll misalignment (degrees)	
Pitch misalignment (degrees)	
Heading misalignment (degrees)	

3.3 Lever Arms - Primary and Secondary Monitoring Points

LVs sign conventions

Depending on the location of the monitoring point(s) with respect to the center of measurements of the INS/AHRS and to the reference axes, the sign conventions for the LV1, LV2 and LV3 measured values are summed up in Figure 1.

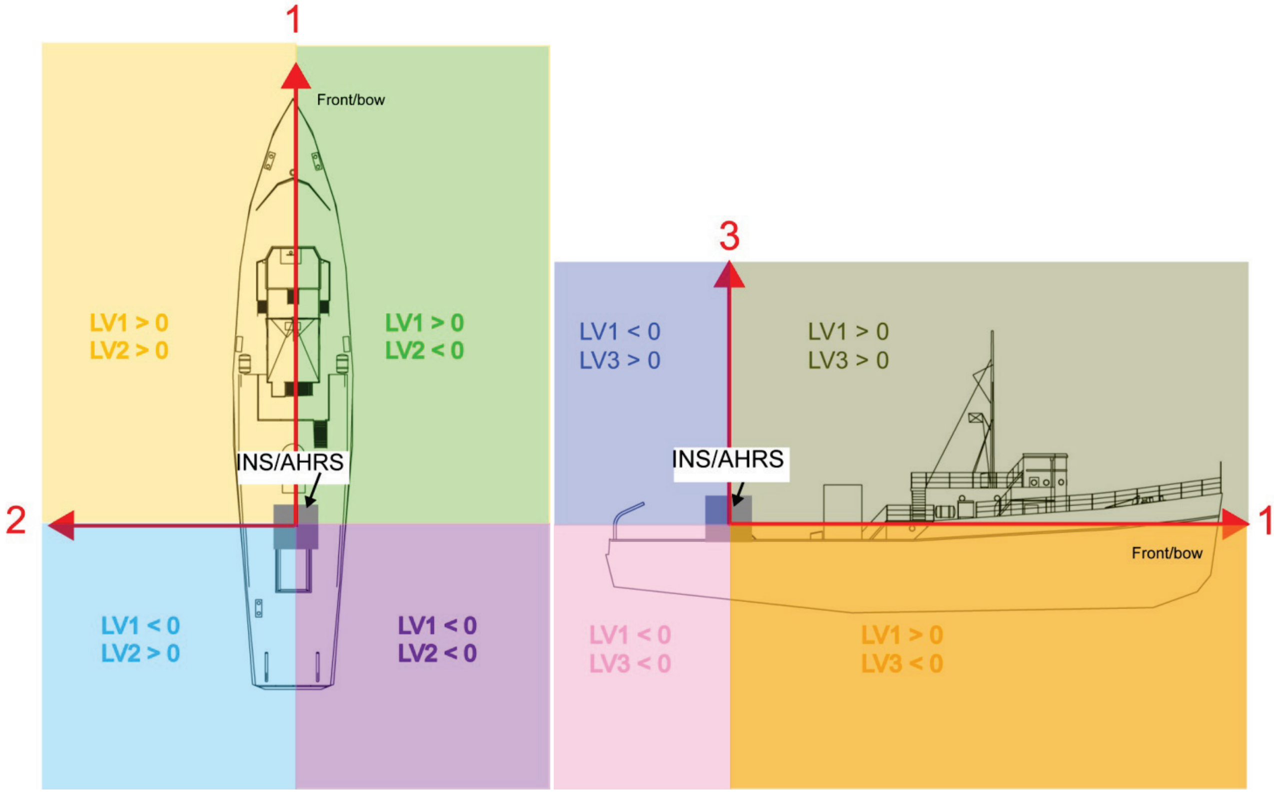

Figure 1 – LV1, LV2, LV3 sign conventions

- Measure LV1, LV2 and LV3 main monitoring point coordinates to the inertial product center of measurements.
- Report the measured values in Table 12.

Table 12 - Determination of the inertial product lever arm

	LV1 (meter)	LV2 (meter)	LV3 (meter)
Monitored Point			

- Measure LV1, LV2 and LV3 secondary monitoring point coordinates to the inertial product center of measurements.
- Report the measured values in Table 13.

Table 13 - Determination of the inertial product Secondary lever arm

	LV1 (meter)	LV2 (meter)	LV3 (meter)
Secondary A			
Secondary B			
Secondary C			

3.4 Lever Arms - Vehicle Center of Gravity (COG)

The Lever Arm sign conventions defined in section 3.3 and Figure 1 apply.

Measure LV1, LV2 and LV3 COG coordinates to the inertial product center of measurements.

Report the measured values in Table 14.

Table 14 - Determination of vehicle COG lever arm coordinates

	LV1 (meter)	LV2 (meter)	LV3 (meter)
COG			

3.5 Lever Arms - External Sensors

The Lever Arm sign conventions defined in section 3.3 and Figure 1 apply.

- For each sensor to be connected to the inertial product, measure LV1, LV2 and LV3 external sensor lever arm coordinates to the inertial product center of measurement.
- Report the measured values in Table 15.

Table 15 - Determination of external sensors lever arms coordinates

External Sensor	LV1 (meter)	LV2 (meter)	LV3 (meter)
GPS 1			
GPS 2			
Log sensor			
EM Log 1 Sensor			
EM Log 2 Sensor			
CTD sensor			
DVL			
DMI			
Depth sensor			
USBL Beacon 1			
USBL Beacon 2			
USBL Beacon 3			
LBL			