

OCTANS 3000

USER MANUAL

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bold	Bold text is used for items you must select or click in the software. It is also used for the field names used into the dialog box.
<code>Courier</code>	Text in this font denotes text or characters that you should enter from the keyboard, the proper names of disk Drives, paths, directories, programs, functions, filenames and extensions.
<i>italic</i>	Italic text is the result of an action in the procedures.

Icons



The **Note** icon indicates that the following information is of interest to the operator and should be read.



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 and Acronyms

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

Overview of this document

This document is the product user manual of your OCTANS 3000. It gives all information about your product, and about documentation applicable to your product.

This document is divided into several parts:

- **Part 1: Introduction** – This part gives a quick system presentation.
- **Part 2: Product Documentation** – This part lists the useful documents for a best use of your products.
- **Part 3: OCTANS 3000 Specificities (including External Sensors)** - This part describes the specificities of your product.
- **Part 4: Mechanical Specifications** – This part describes mechanical aspects of your product, except connectors.
- **Part 5: Electrical Interface Specifications** – This part describes electrical aspects of your product: the connectors, the power supply and the pin description. This section also gives recommended wirings.
- **Part 6: Verification of Pack Contents**– This part lists gives recommendation when you receive your product.

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I INTRODUCTION

This document is the OCTANS 3000 User Manual. It provides information on OCTANS specifications, mechanical and electrical interfaces.

OCTANS 3000 is a gyrocompass and a Motion Reference Unit for marine applications. OCTANS 3000 provides true heading, roll, pitch, yaw, heave, surge, sway, rates of turn and accelerations even in highly volatile environments.

II PRODUCT DOCUMENTATION

Your OCTANS 3000 belongs to the family of the iXBlue inertial products. The following documents are useful to use the best way your product.

- This **OCTANS 3000 User Manual** gives information about:
 - ❑ Mechanical Specifications
 - ❑ Electrical Interface Specifications (included : recommended wiring)
 - ❑ Verification of Pack Contents
- **OCTANS 3000 Technical Specifications** gives all specifications about your product
- **General Information** (Ref.: MU-INS&AHRS-AN-007) gives information about
 - ❑ Export Regulation
 - ❑ Warranty
 - ❑ ISO Certification
 - ❑ Customer Support
 - ❑ Contacts
- **Inertial Products - Principle & Conventions** (Ref.: MU-INS&AHRS-AN-003) gives information about
 - ❑ Abbreviations
 - ❑ Terminology
 - ❑ Behavior and operation principles
 - Fiber Optical Gyroscopes description
 - Alignment principle
 - ❑ Geometrical conventions
- Depending of the use of your product, the following **Application Note** can be useful for the product installation:
 - ❑ **Inertial Products – Application Note - Installation and Configuration of AHRS and INS for Seabed Mapping Measurements** (Ref.: MU-HEAVAPN-AN-001)
 - ❑ **Inertial Products - Application Note - Mechanical Integration of Inertial Systems** (Ref.: MU-MECHAAPN-AN-001)
- **Installation Form** (Ref.: MU-INS&AHRS-AN-004): this document is a link between the installation process and the configuration process. It contains empty tables to fill in.
- **Inertial Products - Network Set-up Guide** (Ref.: MU-INS&AHRS-AN-005) gives information about
 - ❑ default network configuration
 - ❑ network configuration
- **AHRS - Configuration & Operation through Web-based User Interface** (Ref.: MU-AHRS-AN-001) gives information about
 - ❑ how to perform the software configuration of the product (which sensor is connected, on which port, ...)
 - ❑ operation : how to use the product

- **AHRS Interface Library** (Ref.: MU-OCTIV-AN-005) gives information about all the protocols that your product can use
- **AHRS Advanced Configuration** (Ref. MU-AHRS-AN-002): this document gives all the configuration and monitoring commands which can be used during operation. These commands are sent directly through the repeater port
- **Inertial Products - Application Note - Switching from OCTANS 3000 to ROVINS (and vice versa)** (Ref.:MU-SWITCAPN-001)

III OCTANS 3000 SPECIFICITIES

Supported sensors

- GPS
- Speed log

Heave measurement / Center of Gravity of the vehicle (COG)

OCTANS 3000 can output two distinct heave measurements:

- Real Time Heave which provides heave in real time mode.
- Smart HeaveTM which provides a very accurate, latency-compensated, measurement of heave with a 100s delay

To avoid the effect of transient vehicle/vessel movement on heave measurement, you can define the position of the center of gravity (COG) of the vehicle/vessel. In this case, OCTANS 3000 will compute the heave at the COG and add the heave induced by lever arms from the COG to external monitoring points. For more details see:

- *Inertial Products – Application Note - Installation and Configuration of AHRS and INS for Seabed Mapping Measurements (Ref.: MU-HEAVAPN-AN-001)*
- *AHRS - Configuration and Operation with the Web-based User Interface (Ref.: MU-AHRS-AN-001)*

UTC/Time synchro

Your OCTANS 3000 internal clock can be synchronized with data coming from an external reference clock (i.e., GPS clock). In this case, time is synchronized with input coming from the selected interface with appropriate protocol. For more details see *AHRS-Configuration and Operation with the Web-based User Interface (Ref.: MU-AHRS-AN-001)*.

INS mode

OCTANS 3000 can be easily upgraded to full INS mode (i.e., ROVINS). Refer to the document *Inertial Products- Application Note- Switching from OCTANS 3000 to ROVINS (and vice versa) (Ref.: MU-SWITCAPN-001)*.

IV MECHANICAL SPECIFICATIONS

IV.1 OCTANS 3000 Interface Plate

The OCTANS 3000 interface plate is sketched on Figure 1. It is fixed onboard using six CHC M6 screws which form a 195 mm diameter.

Two accurate alignment holes can be used for fine alignment with alignment frame.

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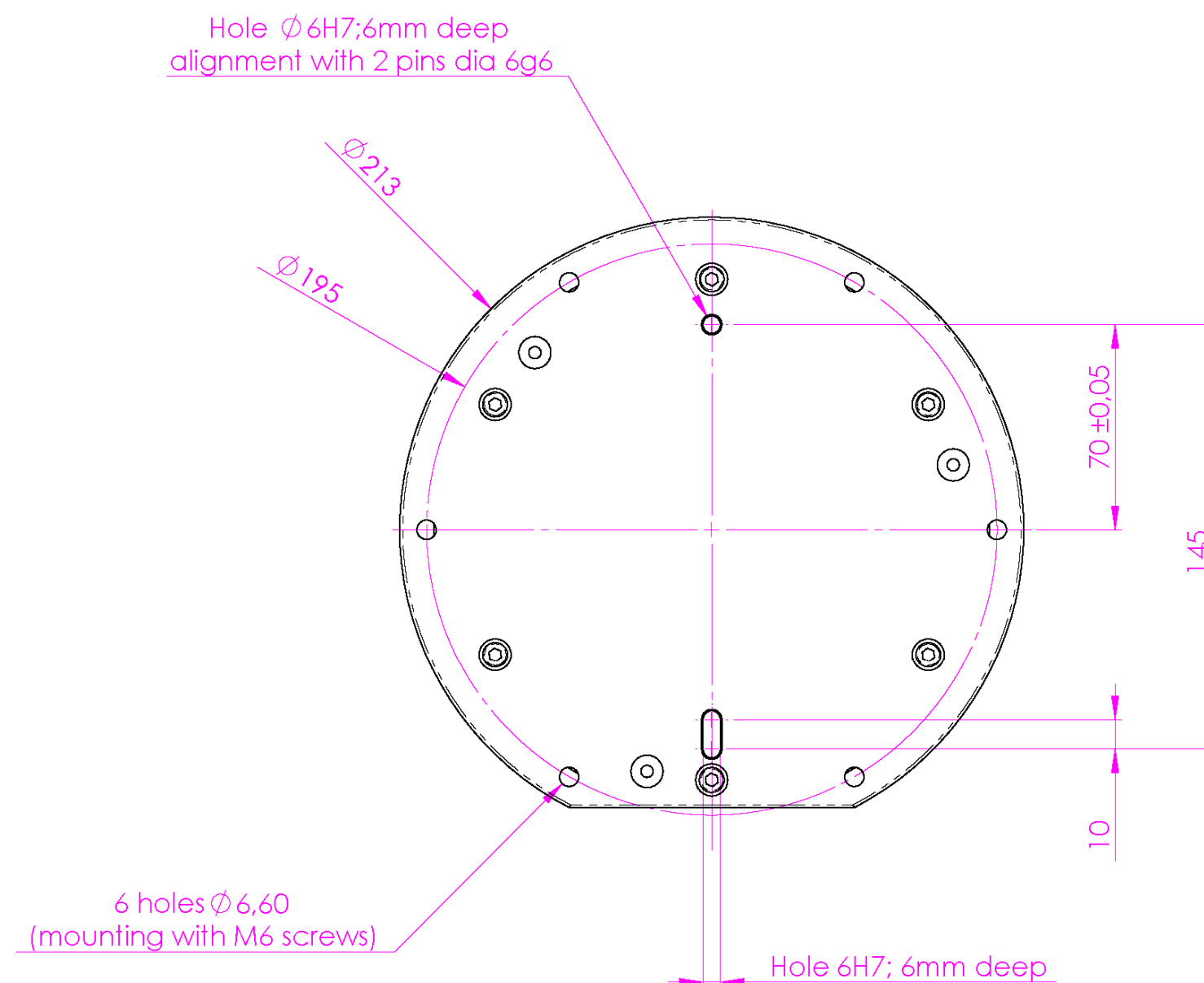


Figure 1 - OCTANS 3000 interface plate (bottom side) layout

IV.2 OCTANS 3000 Mechanical Alignment

OCTANS 3000 interface plate is designed with two holes for alignment of OCTANS 3000 axis X_1 with a reference direction on the matching adaptation plate fixed onboard. The accuracy of this mechanical alignment is ± 0.02 degree. For mechanical mounting recommendations refer to *Inertial Products - Application Note - Mechanical Integration of Inertial Systems* (Ref.: MU-MECHAAPN-AN-001).

. The adaptation plate should be designed with two pins $\phi 6$ g6 (see Figure 1).

IV.3 OCTANS 3000 Center of Measurements

The OCTANS 3000 center of measurement P is the intersection of the three OCTANS 3000 reference axis X_1 , X_2 and X_3 defined in the document *Inertial Products - Principle & Conventions* (Ref.: MU-INS&AHRS-AN-003). It lies inside OCTANS 3000, and its exact position is reported on Figure 2.

The OCTANS 3000 center of measurements P is the reference point for the determination of OCTANS 3000 and external sensor lever arms (Refer to the document *Inertial Products- Principle & Conventions* (Ref.: MU-INS&AHRS-AN-003) for details).

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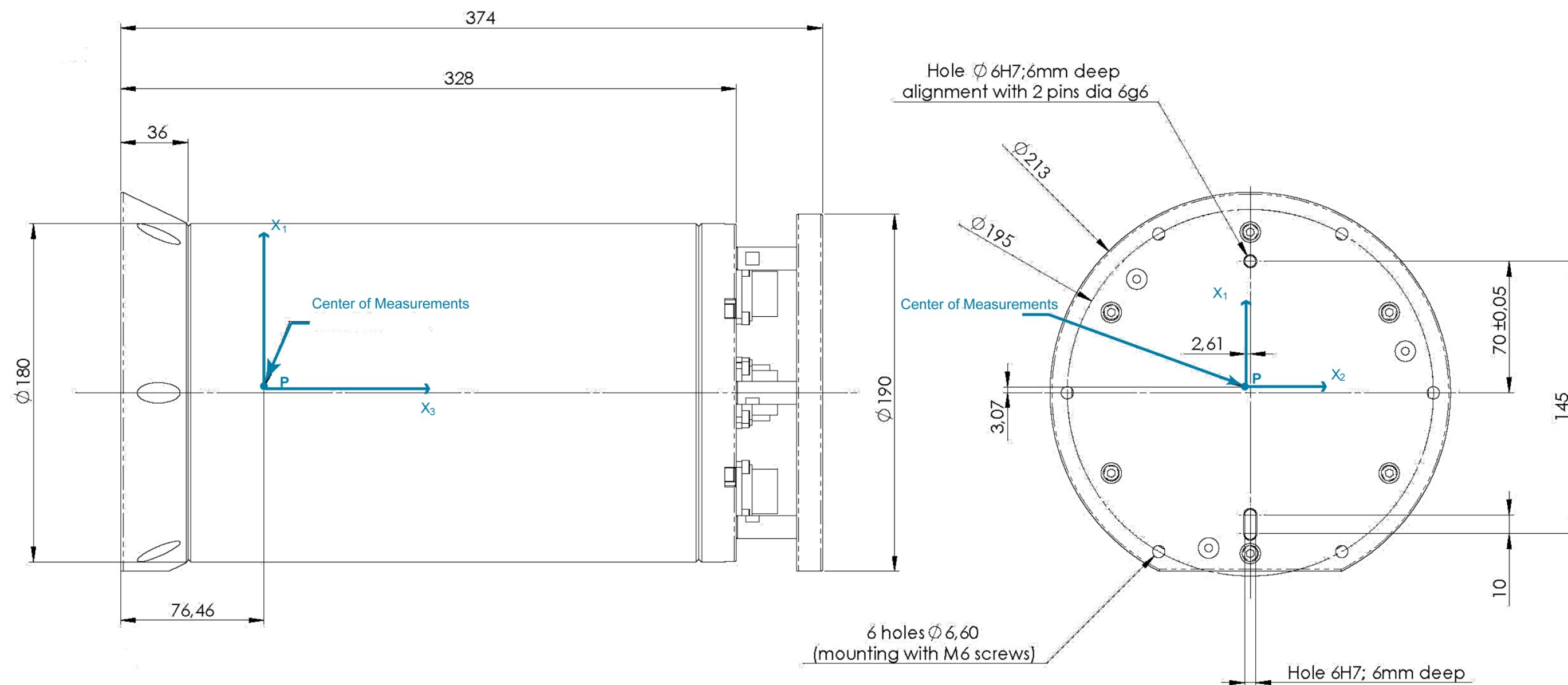


Figure 2 - Center of measurements position

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V ELECTRICAL INTERFACE SPECIFICATIONS

V.1 Overview of OCTANS 3000 Electrical Interface

Connectors are available on the top panel of OCTANS 3000. These connectors are referenced and identified by markings on the unit. They are all different and fool-proof to avoid any misconnection.

Figure 3 shows the details of the OCTANS 3000 top panel, with its connectors;

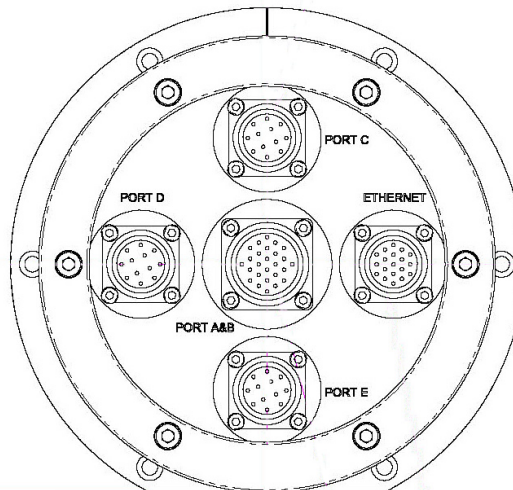


Figure 3 - OCTANS 3000 top panel with connectors

The connector types are the following

- 1 central connector (marked as Port A&B) SEACON MINM-FCR, size M 26#20 (26 pins) for powering, user external sensors and configuration. The reference of the corresponding plug to be plugged directly to the central connector is MINM-26#20-CCP-TI.
- 3 connectors SEACON MINK-FCR, size K 12#22 (12 pins) for user external sensors marked as Port C, port D and Port E. The reference of the corresponding plug to be plugged directly to the "Port C", "Port D" or Port E" connector is MINK-12#22-CCP-TI.
- 1 Ethernet connector SEACON MINK-FCR, size K 19#22 (19 pins). The reference of the corresponding plug to be plugged directly to the Ethernet connector is MINK-19#22-CCP-TI.

The following are supplied as a standard with the OCTANS 3000 unit:

- A 19-pin test cable with Ethernet, 3 power supply couples (OCTANS 3000, EXT1, EXT2), PPS and serial repeater
- A 24V power supply with banana pins
- A 12-pin pigtail
- A 19-pin pigtail
- A 26-pin pigtail

V.2 Listing of Interfaces

OCTANS 3000 is fitted with 5 connectors configured to provide the following:

- Power supply for OCTANS 3000 through the Port A&B and Ethernet connector
- 2 independent power lines for external sensor allowing to power sensors with different voltages: for example, a DVL powered in 24V and a SVP sensor powered with 12V
- 1 Repeater and configuration port either through the Ethernet connector (in RS232 only) or through the Port A&B one (in both RS232 and 422),
- 5 Inputs/ Outputs RS232/422 or Ethernet user-configurable
- 3 user-configurable pulse Inputs A, B and C
- 2 user configurable pulse Outputs A and B
- 1 external pulse (coming from the surface through the central connector and then dispatched to all other connectors): it can be used to output a trigger for the DVL (i.e., to allow the DVL to ping at chosen time)

V.3 Port A&B Connector (Central Connector) Specifications

The central connector is used when Ethernet is not available, to power and to connect OCTANS 3000 to a PC for installation, configuration and display purposes through the WEB-based User Interface which is embedded in the unit. See *Part 4 of the OCTANS 3000 User documentation* for details on OCTANS 3000 configuration with this WEB-based User Interface. In this configuration, the Web server connection will need to be configured in PPP.

The OCTANS 3000 unit is powered by 24 Volts direct current. OCTANS 3000 central connector is configured as shown in Figure 4.

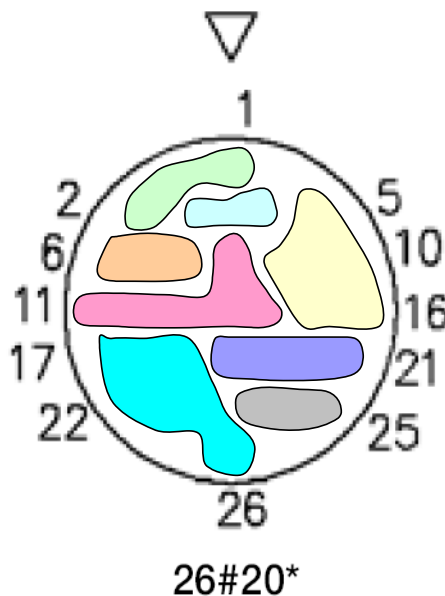


Figure 4 - Central connector

The full pin assignment for the central connector is described in Table 1.

Table 1 - Central connector pin definitions

PIN	Signal	PIN	Signal
1	System Power In (+24 V)	14	Port A: RS422 RX(+)(B)
2	System Power In GND (0/24 V) (*)	15	Repeater : RS422 RX(-)(A)/RS232 RX(+)
3	Ext sensor 1 In (+V1)	16	Repeater : RS422 RX(+)(B)
4	Ext sensor 1 In GND (0/+V1 V) (*)	17	Port B: RS422 TX(+)(B)/RS232 TX(+)
5	Repeater : GND_R (**)	18	Port B: RS422 TX(-)(A)
6	Ext sensor 2 In (+V2)	19	Pulse A : OUT TTL
7	Ext sensor 2 In GND (0/+V2 V) (*)	20	Pulse A: IN TTL
8	Port A: GND_A (**)	21	Pulse A: GND_A (**)
9	Repeater : RS422 TX(+)(B)/RS232 TX(+)	22	Port B: RS422 RX(-)(A)/RS232 RX(+)
10	Repeater : RS422 TX(-)(A)	23	Port B: RS422 RX(+)(B)
11	Port A: RS422 TX(+)(B)/RS232 TX(+)	24	Ext Pulse IN + (***)
12	Port A: RS422 TX(-)(A)	25	Ext Pulse IN -
13	Port A: RS422 RX(-)(A)/RS232 RX(+)	26	Port B: GND_B (**)

(*) OCTANS 3000 and Ext sensor 1 (resp.2) power lines are isolated from each other. Ext sensor 1 (resp. 2) pins are linked together. If Ext sensor 1 (resp. 2) is powered from 19 pin connector this voltage will be present on 26 pin and 12 pin connectors.

(**) Serial GND and Pulse GND are common for a given port (i.e., GND_A for port A, GND_R for repeater port).

(***) The external trigger lines are isolated. They can be used for example to trigger acoustic emission of a DVL connected to the OCTANS 3000.



THE USE OF THE POWER SUPPLY CONVERTER SHOULD BE RESTRICTED TO SITUATIONS WHERE THE MAINS POWER SUPPLY IS STABLE AND FILTERED OUT FROM NOISE. IN PARTICULAR, IT IS NOT RECOMMENDED FOR USE ONBOARD A VEHICLE.

V.4 Ethernet Connector Specifications

An Ethernet (input)/output is available on OCTANS 3000: it is SEACON MINK-FCR, size K 19#22 (19 pins). Refer to Figure 5 for the corresponding wiring.

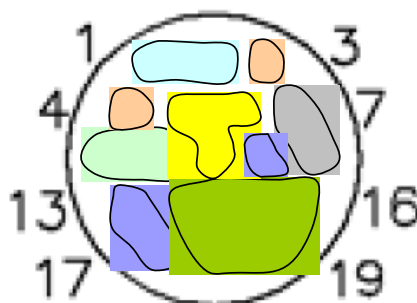


Figure 5 - Ethernet connector

The full pin assignment for the Ethernet connector is described in Table 2.

Table 2 - Ethernet connector pin definitions

PIN	Signal	PIN	Signal
1	Ext sensor 1 In (+V1)	11	Pulse B: OUT TTL
2	Ext sensor 1 In GND (0/ +V1 V) (*)	12	Ext Pulse IN -
3	Ext sensor 2 In (+V2)	13	GND_B
4	Ext sensor 2 In GND (0/+V2 V) (*)	14	Shield Ethernet
5	Repeater: RS232 TX(+)	15	Ethernet TX(+)
6	Repeater RS232 RX(+)	16	Ethernet TX(-)
7	Ext Pulse IN + (***)	17	Pulse B: IN TTL
8	OCTANS 3000 Power In (+24 V)	18	Ethernet RX(+)
9	OCTANS 3000 Power In GND (0/24 V) (*)	19	Ethernet RX(-)
10	Repeater: GND_R (**)		

(*) OCTANS 3000 and Ext sensor 1 (resp.2) power lines are insulated from each other. Ext sensor 1 (resp. 2) pins are linked together. If Ext sensor 1 (resp. 2) is powered from 19-pin connector this voltage will be present on 26-pin and 12-pin connectors.

(**) Serial GND and Pulse GND are common for a given port (i.e., GND_A for port A, GND_R for repeater port).

(***) The external trigger lines are insulated. They can be used for example to trigger acoustic emission of a DVL connected to the OCTANS 3000.

The Ethernet connector provides the following inputs and outputs:

- 1 Ethernet 10/100Mbit port used to transport up to 5 input/output streams user-configured either with UDP or TCP. Configuration is made through the WEB-based User Interface.
- 1 repeater serial port used to monitor system state and send configuration commands in serial mode.
- 1 input pulse user-configurable, usually used to send PPS synchronization.
- 1 output pulse user-configurable
- 1 ext pulse coming from the central connector to trigger external sensors
- 2 different power supply (EXT1 and EXT2) for powering external sensors

Important

DO NOT USE BOTH THE ETHERNET LINK AND THE SERIAL ONE TO CONFIGURE OCTANS 3000 IN THE SAME TIME.

V.5 Port X (X being C, D, or E) Connector Specifications

The Port C, Port D and Port E connectors are used to connect external sensors and system to OCTANS 3000. Refer to Figure 6 for the corresponding wiring. These inputs/outputs are user-configurable through the WEB-Based User Interface. See Part 4 of the OCTANS 3000 User documentation for details on OCTANS 3000 configuration with this WEB-based User Interface.

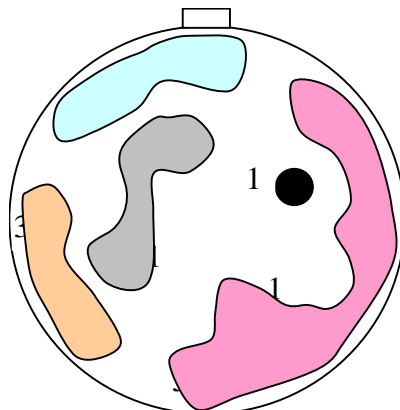


Figure 6 - Diagram of Port X (X being C, D or E) connector

The full pin assignment for Port X connector is described in Table 3.

Table 3 – Port X connector pin definitions

PIN	Signal
1	Ext sensor 1 Out (+V1)
2	Ext sensor 1 Out GND (0/ +V1 V) (*)
3	Ext sensor 2 Out (+V2)
4	Ext sensor 2 Out GND (0/+V2 V) (*)
5	Port X: RS422 TX(+)(B)/RS232 TX(+)
6	Port X: RS422 TX(-)(A)
7	Port X: RS422 RX(-)(A)/RS232 RX(+)
8	Port X: RS422 RX(+)(B)
9	Ext Pulse IN + (***)
10	Ext Pulse IN -
11	Port X: GND_X (**)
12	Reserved except if X=C : Pulse C: IN TTL

(*) OCTANS 3000, V1, V2 power GND are insulated and insulated from RS GND

(**) Serial GND and Pulse GND are common for a given port (i.e., GND_A for port A, GND_R for repeater port).

(***) The external trigger lines are insulated. They can be used for example to trigger acoustic emission of a DVL connected to the OCTANS 3000.

(****) Pulse C only on Port C, Pin 11 common for Pulse and Port C

The Port X connector provides the following inputs and outputs:

- 1 user-configurable digital input (RX). Pin assignment in RS232 or RS422 electrical levels is detailed in Table 3.
- For wiring, RS232 input signal should provide a voltage min ± 5 V to ± 20 V when loaded.
- 1 user-configurable digital outputs (TX). Pin assignment in RS232 or RS422 electrical levels is detailed in Table 3
- For wiring, RS232 output signal level is ± 5 V min when load is 3 k Ω .
- 1 pulse input. This pulse is only available on the Port C.
- 1 ext pulse coming from the central connector
- 2 different power supply (EXT1 and EXT2) for powering external sensor



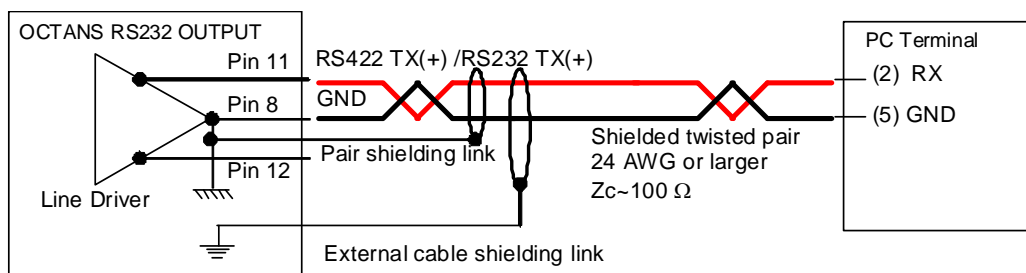
RS232/RS422 ports have to be wired with twisted shielded pairs. Refer to section V.6 for shielding recommendations.

V.6 OCTANS 3000 Recommended Wirings

The recommended wirings with Shielded Twisted Pairs for RS232 (Output and Input), RS422 (Output and Input), and Pulse (Output and Input) cables are described hereafter.

Important

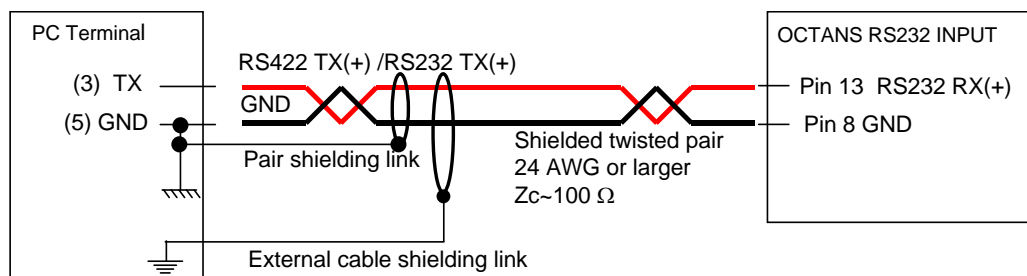
IF YOU DO NOT USE SHIELDED MULTI-TWISTED PAIRS YOU MAY ENCOUNTER CROSS-TALK PROBLEMS BETWEEN INPUT AND OUTPUT, AND THIS MAY GIVE ERROR OR DYSFUNCTION. SHIELD LINK SHOULD BE DONE AT ONE END ONLY TO AVOID GROUND LOOPS UNLESS SHIELD IS USED AS AN ELECTRICAL GROUND.



All pins marked GND are common electrical ground and can be used indifferently.

Mechanical GND connection is recommended through connector backshell.

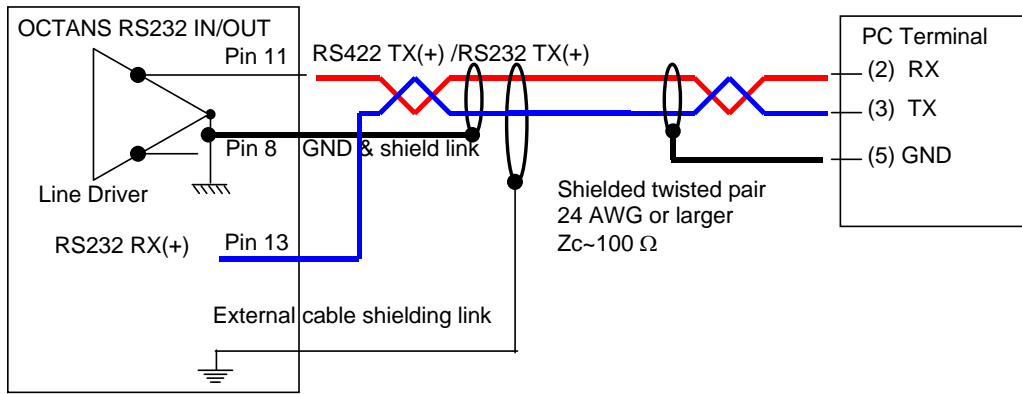
Figure 7 - Description of mono-directional RS232 Output wiring (Port A example)



All pins marked GND are common electrical ground and can be used indifferently.

Mechanical GND connection is recommended through connector backshell

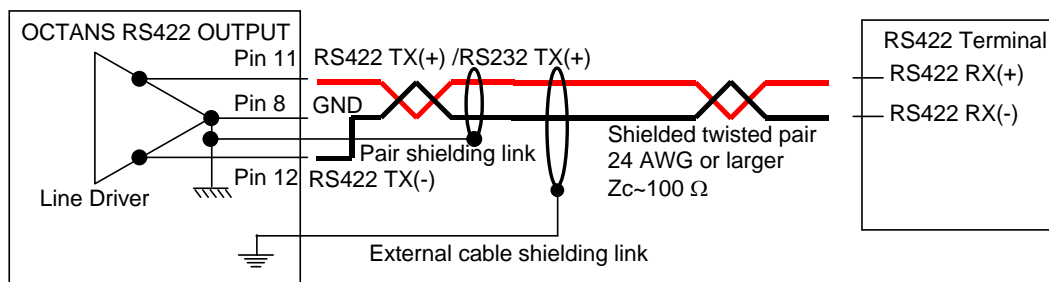
Figure 8 - Description of mono-directional RS232 Input wiring (Port A example)



⏏ All pins marked GND are common electrical ground and can be used indifferently.

⏏ Mechanical GND connection is recommended through connector backshell.

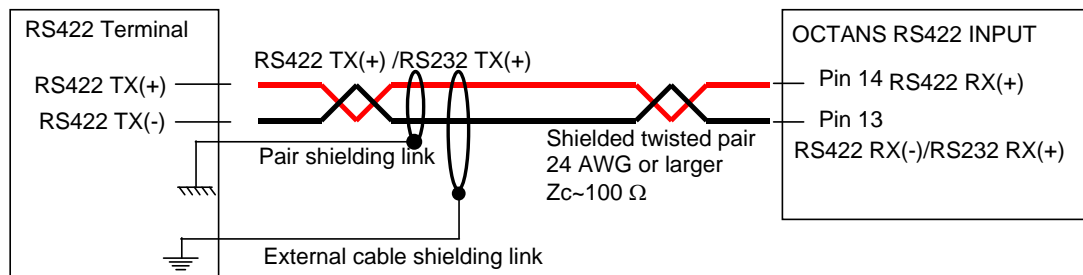
Figure 9 - Description of bi-directional RS232 Output wiring (Port A example)



⏏ All pins marked GND are common electrical ground and can be used indifferently.

⏏ Mechanical GND connection is recommended through connector backshell.

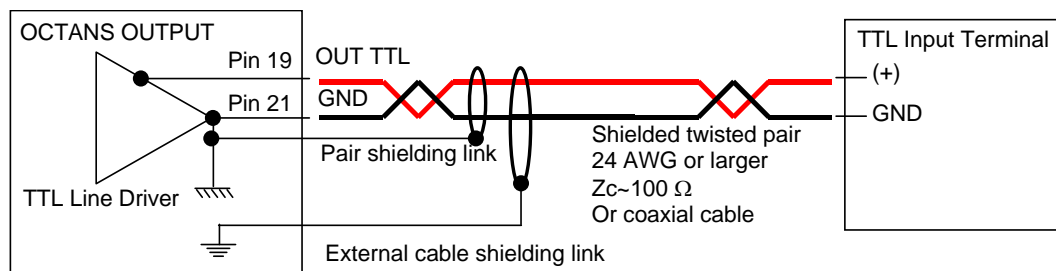
Figure 10 - Description of the RS422 Output wiring with a Shielded Twisted Pair (Port A example)



⏏ All pins marked GND are common electrical ground and can be used indifferently.

⏏ Mechanical GND connection is recommended through connector backshell.

Figure 11 - Description of the RS422 Input wiring with a Shielded Twisted Pair (Port A example)



⏏ All pins marked GND are common electrical ground and can be used indifferently.

⏏ Mechanical GND connection is recommended through connector backshell.

Figure 12 - Description of the Pulse Output wiring with a Shielded Twisted Pair (Pulse A example)

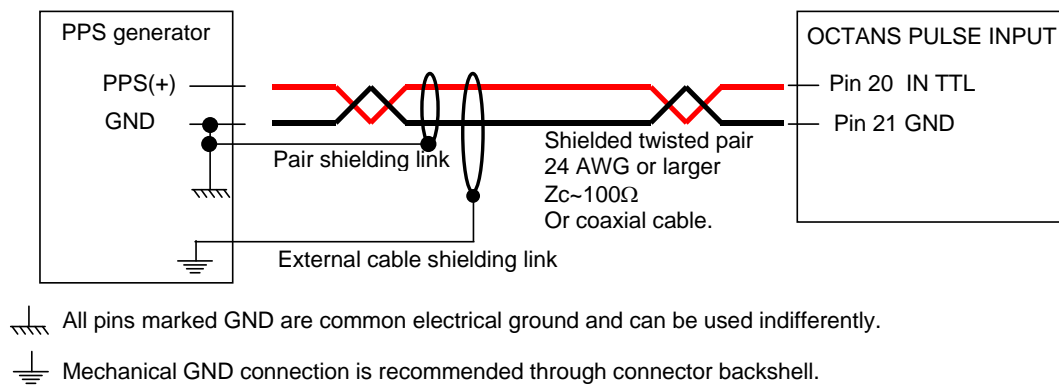


Figure 13 - Description of the Pulse Input wiring with a Shielded Twisted Pair (Port A example)

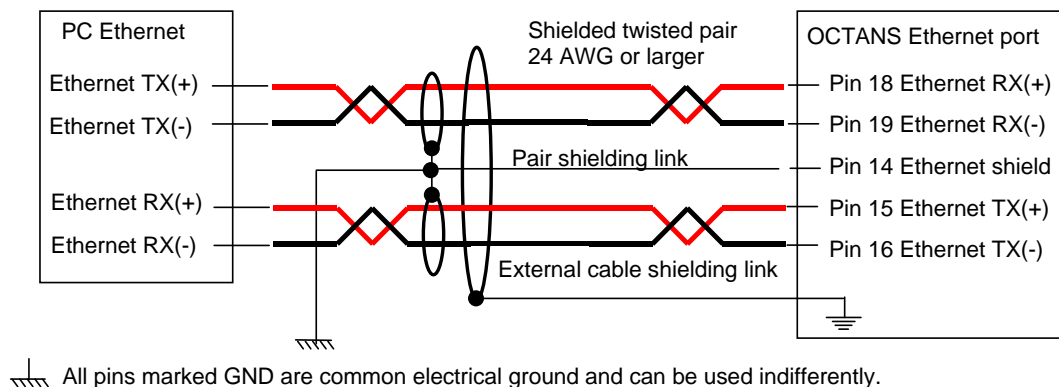


Figure 14 - Description of the Ethernet wiring with Shielded Twisted Pairs

Example of cabling with a multi twisted pair MacArtney ref. 4622

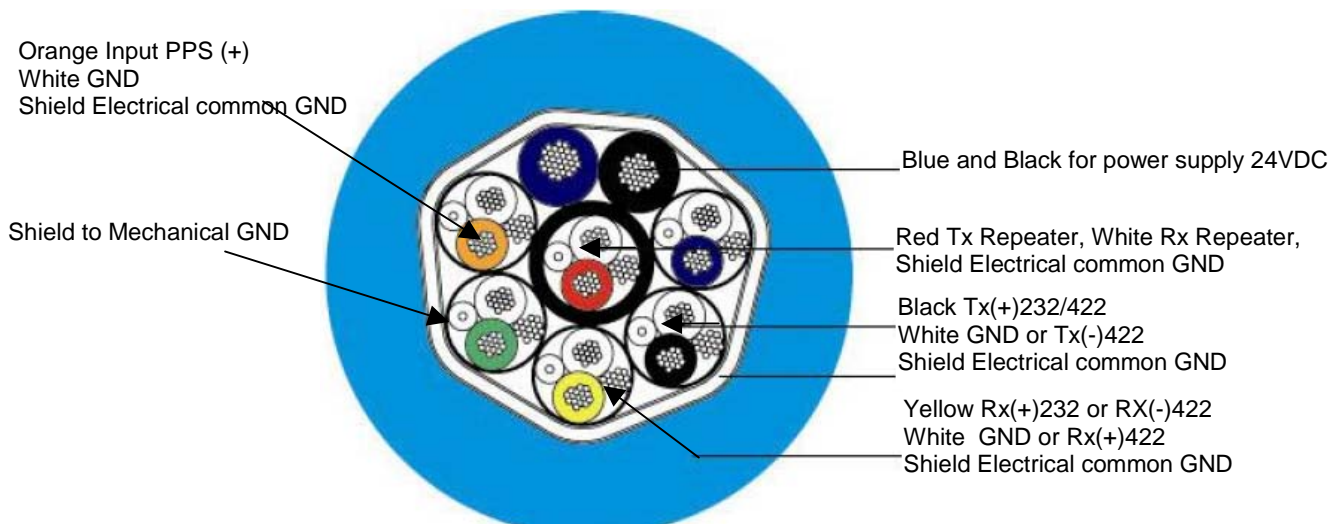


Figure 15 - Example of cabling with a Shielded Multi-Twisted Pairs

V.7 Specifications for Communication between OCTANS 3000 & PC

OCTANS 3000 can be connected to a PC for configuration, installation and display purposes through the Web-based User Interface software. The I/O signal is available

- Either through the Ethernet connector (see section V.4).
- Or through the central connector (see section V.3)



In default configuration, access to the Web-based User Interface is only possible through the Ethernet connector. The Installation and Repeater output has to be configured in PPP mode to have access to the Web-based User Interface (see *Network Set-up Guide (Ref.: MU-INS&AHRS-AN-005)* for more details).

For the Ethernet link, the following parameters are default defined:

- IP Address: 192.168.36.1xx, xx being the last two numbers of the OCTANS 3000 serial number
- Connection through http web server (port 80)
- Repeater flow available in TCP (port 8110)

By default, serial repeater link is configured as follows:

- Protocol used: OCTANS Standard (Refer to *AHRS Interface Library (Ref.: MU-AHRS-AN-003)* for a description of OCTANS Standard data frame output)
- Baudrate: 57.6 kBauds
- Flow Control: Odd, 2 stop bits
- Refresh rate: 5 Hz (200 ms)

V.8 Power Network

The connectors Port C, D, and E can be used for external sensor powering. In this case the 'external power input' shall be connected on pins 3 and 4 and to pins 6 and 7 on central connector. The total maximum current is 3 A and the maximum voltage is 200 V on these pins.

VI VERIFICATION OF PACK CONTENTS

You will find in the shipping case a Packing List detailing all the items delivered. This Packing List has been completed and checked by iXBlue before shipment, and should match the contents of the pack you have received.

However, **we recommend that you check the contents of the pack and the equipment immediately on receipt of your OCTANS 3000 unit.** Specifically, you should check that all the items referred to above are present on delivery and that none has sustained damage.

If you observe any non-conformity or damage, please inform the carrier and iXBlue without delay by certified mail, describing in detail the problem encountered.