

Rovins

Navigating & Positioning

QUICK START GUIDE

Objective

This guide describes the Rovins installation and the basic configuration required before operating the product. For more information, please refer to the flash drive available in the product package. It contains:

- the required software for the use of the embedded web-based user interface
- the full user manuals to get detailed technical information about the product, including product specifications/performances. These documents will help you configuring and operating the product in specific installation or application.

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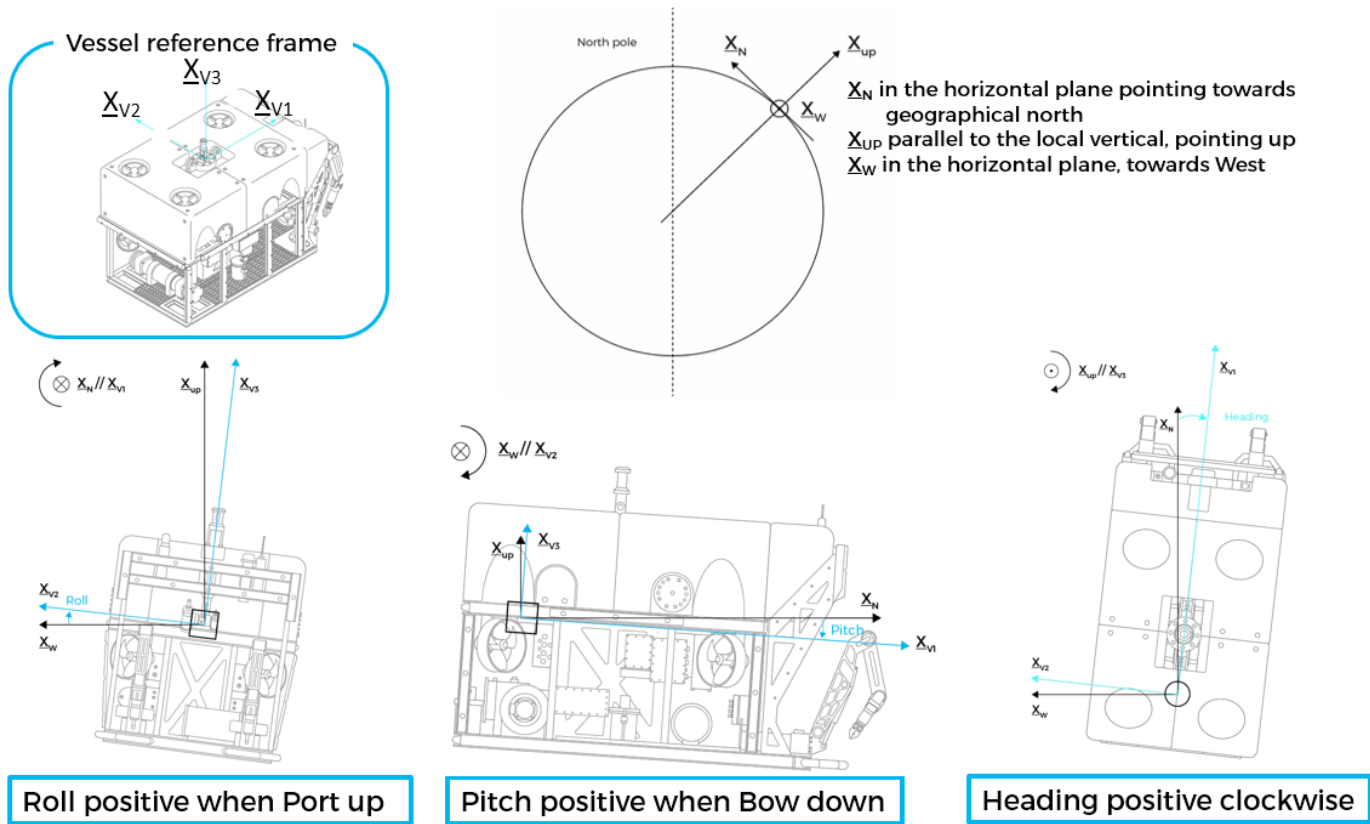
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Rovins System Overview

The Rovins system is an Inertial Navigation System (INS). It delivers heading and attitude information as well as position and speed to control systems, acquisition software or other third party systems. It can receive data from external sensors to improve its accuracy. Rovins contains a self-consistent navigation algorithm based on Kalman Filtering. This structure enables Rovins to work either as a standalone system or to be connected to external sensors (GNSS, Dopler Velocity Log, Depth sensor, acoustic positioning systems etc.). Rovins is delivered with a powerful and easy-to-use embedded Web-Based User Interface, which allows you to configure and operate your product.

Basic Installation: Rovins + DVL + Depth (+ acoustic)

This guide describes how to install Rovins with a DVL and/or DEPTH, and the typical configuration required before operating the product. Rovins being versatile, you have to define its configuration to insure optimal operation. **In this installation, we assume that Rovins is aligned with respect to the vessel reference frame (XV1, XV2, XV3).** Angular convention and reference frame used by Rovins are detailed in the figure below. Note that on some output message/protocol, sign convention may differ (refer to product Interface Library).



Pack Contents Verifying

You will find in the shipping case a Packing List detailing all the items delivered.

However, **we recommend checking the equipment of the pack immediately after receipt**. Specifically, you should check that at least all the items shown below are present upon delivery and that none have 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.

Rovins



Power supply block & Power supply cable



19-Pins Ethernet test cable



SEACON 12-pins Ti pigtail



SEACON 19-pins Ti pigtail



SEACON 26-pins Ti pigtail



12, 19, 26 pins pressure cap



SEACON 12 or 19, 26 pins O-ring tool



O-ring Kit



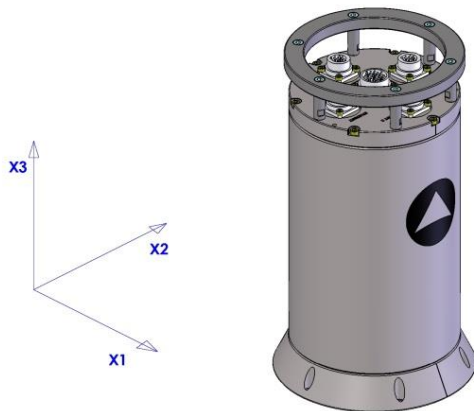
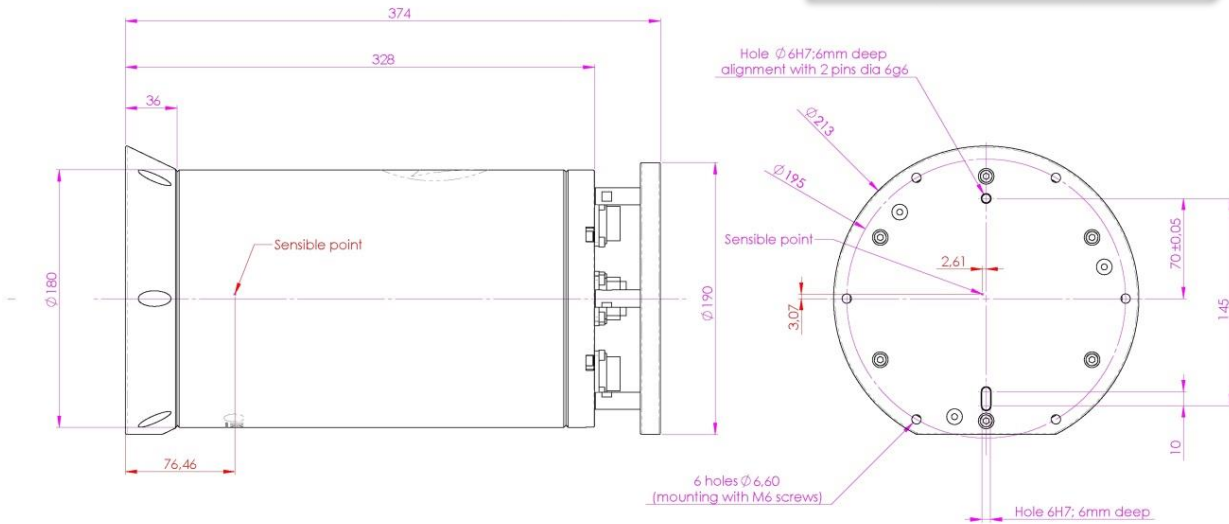
Installing and Connecting Rovins

Step 1 Placing the Rovins on the mounting plate/surface

Rovins has to be aligned either with ROV reference frame either with imagery survey sensor. Reference frame center is defined by (P) and shown in the figure below, it is not located at the center of the unit.

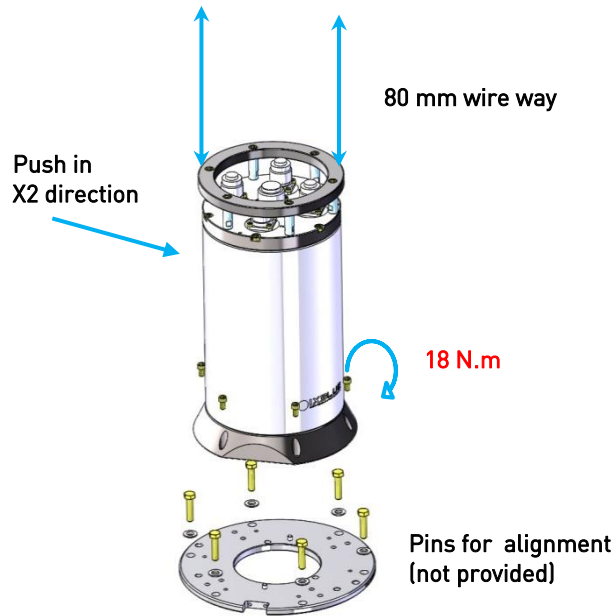
iXblue product reference frame may differ from 3rd party equipment convention.

The unit has to be fixed on a strong and very stable place.



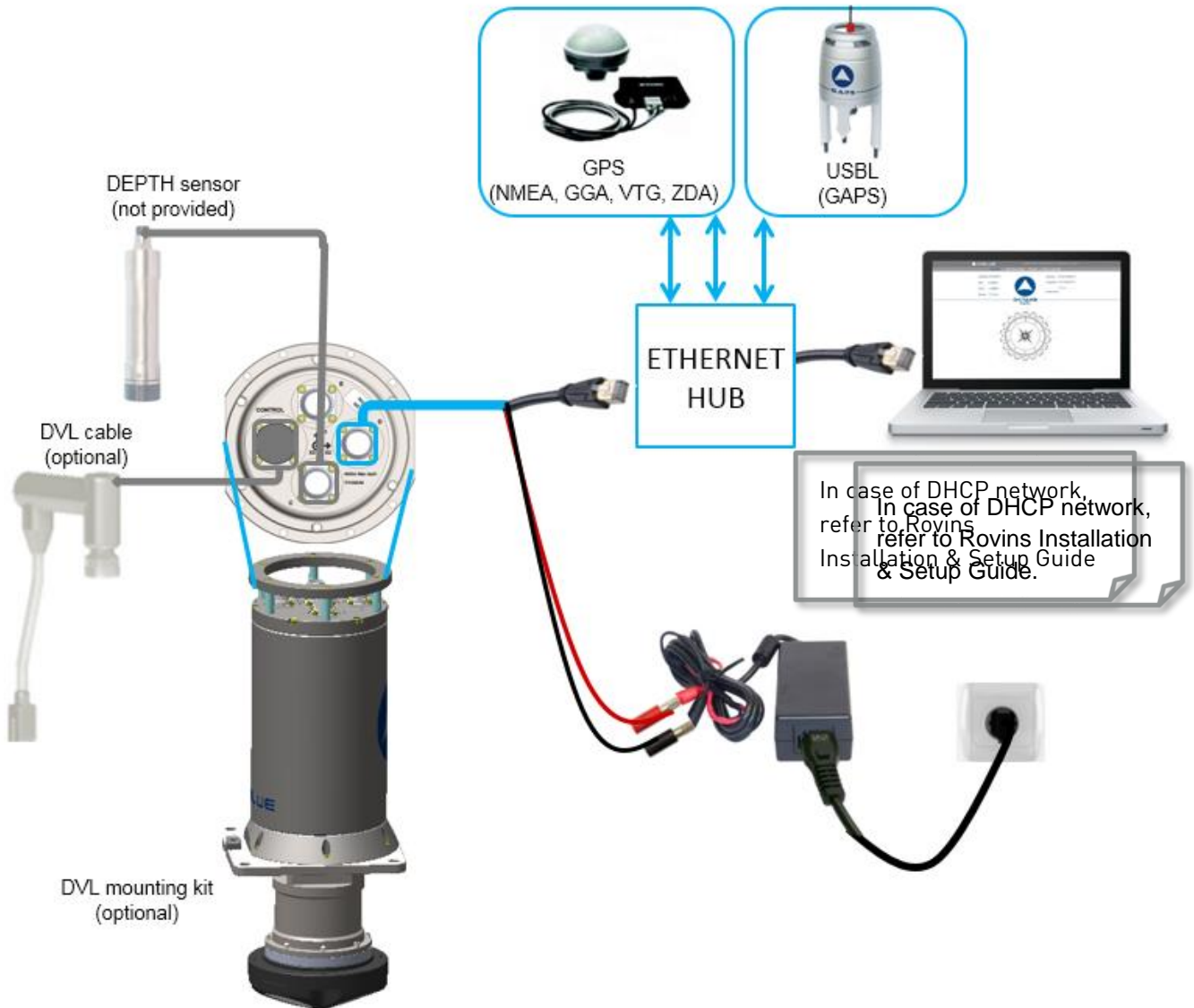
Step 2 Fixing Rovins with 6 CHC M6 screws

In case of installation with alignment pins (e.g. with DVL) it is recommended pushing Rovins against the pins in X2 direction while securing the screws to insure best mounting repeatability.



For mechanical installation recommendations refer to the Rovins Installation and Setup Guide.

Step 3 Connecting Rovins



Caution

At any power supply outage, Rovins restarts its full alignment process. It is then recommended to use an Uninterruptible Power Supply.

Launching the Web-Based Graphical User Interface

Step 1 Checking the version of the required software available on the flash drive



Firefox

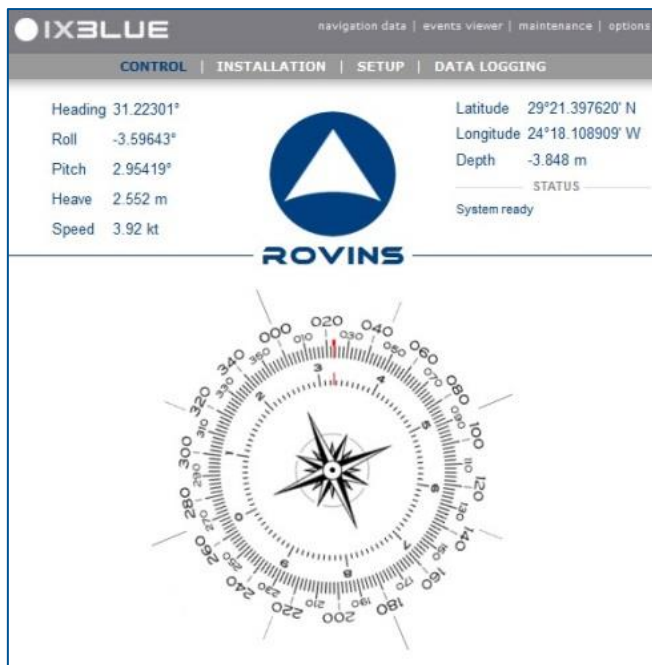


Java Environment

Step 2 Launching the web-based user interface with Firefox



The control page is displayed with the compass.



Factory default TCP/IP address

- Note the two last numbers of the Rovins serial number from product label ID.
- Type the following URL address:
192.168.36.1xx
xx is the two last numbers of the Rovins serial number.
For example: in the screen capture the two last numbers of the Rovins is 34 and the URL address is:

192.168.36.134
- To change this URL address, refer to Rovins Installation & Setup Guide.

Configuring the Language and the Display Options

IXBLUE navigation data | events viewer | maintenance | options
CONTROL | INSTALLATION | SETUP

MMI DISPLAY OPTIONS

▼ General

Language

Mode

▼ Coordinates

System

Notation

▼ Units

Speed

Angle

▼ Norms

Position Std. Dev.

▼ Attitude Conventions

Roll Sign

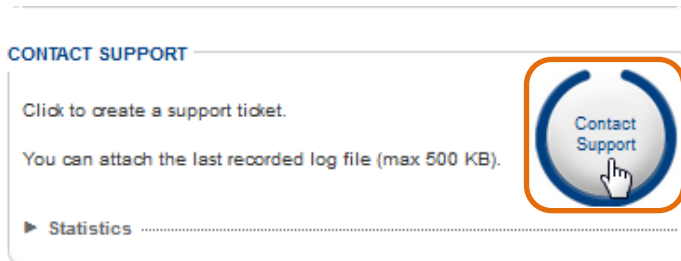
Pitch Sign

Activating the licence code (only in case of an upgrade)

Step 1 Getting the license ID



Step 2 Sending the license ID to iXblue support



Step 3 Entering the activation code received by mail from iXblue support



Upgrades may require to load a new set of firmwares: ask iXblue Support.

Configuring the Mechanical Parameters

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP

MECHANICAL PARAMETERS

ORIENTATION & LEVER ARMS

Orientation

Product Logo Side

- Upward
- Downward
- Right
- Left
- Front
- Back

Connectors Side

- Upward
- Downward
- Right
- Left
- Front
- Back

Misalignments

Roll: 4.7

Pitch: 1.4

Heading: 0.1

Primary Lever Arm

Secondary Lever Arms

Vessel Center of Gravity (Heave computation)

Cancel OK

ORIENTATION & LEVER ARMS

Settings have been saved.
Please restart the system to take them into account.

Restart

The orientation menu is used when the product axes orientation differs from vehicle axes orientation (displayed in red). It allows to change axes orientation with 90 degrees rotations of any of the product axis with respect to the vehicle axes.

1. Define simply the orientation by indicating:
 - The direction to which the **Product Logo Side** is pointing to.
 - The direction to which the product **connector side** is pointing to.
2. Enter the value of “misalignments” measured by the metrology survey.

Primary Lever Arm and Secondary Lever Arm allow to compute the inertial position, the heave, surge and sway at remote location.

Primary Lever Arm allows to compute speed and accelerations at remote location.

Configuring the Inputs & the Outputs

Step 1 Configuring the DVL input parameters

navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP

Heading -3.4717°

MECHANICAL PARAMETERS

Latitude 54°55.889624' N

INPUTS

INPUT AND EXTERNAL SENSORS SETTINGS

Input Ports | Input Pulses

	Input A	Input B	Input C	Input D	Input E	Input F	Input G
Protocol	NONE	NONE	NONE	NONE	NONE	NONE	NONE
GNSS 1							
GNSS 2							
DVL 1	<input checked="" type="checkbox"/>						
DVL 2							

INPUT A SETTINGS

Protocol: RDI PD6

Physical Link: Serial only

Serial

Parity: None

Stopbits: 1.0 bitstop

Standard: RS422

Baudrate: 9.6 kbauds

Lever Arms

LV1: 0 m

LV2: 1 m

LV3: 0 m

Misalignments

DVL Coupling Mode

Advanced Settings

Cancel

OK

Refer to Application note - INS + DVL Calibration:

- to configure the DVL input parameters
- to configure the lever arms
- to calibrate the DVL.

DVL calibration is required for optimum performances.

Purpose is to estimate accurately the angular misalignment and DVL scale factor.

Typical process is to navigate on surface with accurate GNSS + DVL bottom track.

Step 2 Configuring the Depth input parameters

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP

Heading -3.4717° MECHANICAL PARAMETERS Latitude 54°55.889624' N

INPUTS Longitude 5°13.927097' W

INPUT AND EXTERNAL SENSORS SETTINGS

Input Ports Input Pulses

Protocol	Input A	Input B	Input C	Input D	Input E	Input F	Input G
GNSS 1	NONE	NONE	NONE	NONE	NONE	NONE	NONE
GNSS 2							
DVL 1	•						
DVL 2							
EM Log							
USBL 1							
USBL 2							
USBL 3							
EBL							
Depth			•				

INPUT C SETTINGS

Protocol: NONE

Physical Link: Serial only

Serial:

- Parity: None
- Stopbits: 2.0 bitstop
- Standard: RS232
- Baudrate: 9.6 kbauds

DEPTH SETTINGS

Lever Arms:

- LV1: 0 m
- LV2: 0 m
- LV3: 0 m

Depth:

Depth Offset: 0 m Use Current Depth

Water Type Selection

Advanced Settings

Cancel OK

Refer to Rovins Installation & Setup Guide to configure the depth input parameters.

Refer to Rovins Interface Library to get information about the available protocol and formats.

Step 3 Configuring the GNSS (resp. USBL) input parameters

The screenshot shows the IXBLUE control interface with the following sections:

- MECHANICAL PARAMETERS**: Includes fields for Heading (-3.4717°), Latitude (54°55.889624' N), and Longitude (5°38.987992' W).
- INPUT AND EXTERNAL SENSORS SETTINGS**: A table for configuring input ports. Input B is selected for GNSS 1.
- INPUT B SETTINGS**: Configuration for Input B:
 - Protocol: NONE
 - Physical Link: Serial only
 - Parity: None
 - Stopbits: 1.0 bitstop
 - Standard: RS232
 - Baudrate: 9.6 kbauds
- GNSS SETTINGS**: Includes a diagram of lever arms (LV1, LV2, LV3) and a "Forced Mode" checkbox.

Blue arrows highlight the "INPUT AND EXTERNAL SENSORS SETTINGS" table and the "INPUT B SETTINGS" form. A blue circle with a hand icon is at the bottom right.

- For example, parameters of the inputs for the GNSS:
Protocol: **GPS**
Physical link: **Ethernet only**
Transport layer: **TCP client**
(if the GNSS is acting as a TCP server)
IP: **IP address of GPS receiver**
Port: use the same port ID on the both side (GNSS & PMINS)
- The GNSS **lever arms** corresponds to the lever arm from the product center of measurements to the GNSS antenna.
Note that **X** on the drawing gives its rough location not the real scale.

Step 4 Configuring the UTC input parameters

IX3BLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP

Heading -3.4717° Latitude 54°55.889624' N
Longitude 5°38.987002' W

MECHANICAL PARAMETERS INPUTS

INPUT AND EXTERNAL SENSORS SETTINGS

Input Ports Input Pulses

Protocol	Input A	Input B	Input C	Input D	Input E	Input F	Input G
GNSS 1	NONE	NONE	NONE	NONE	NONE	NONE	NONE
GNSS 2							
DVL 1							
DVL 2							
EM Log							
USBL 1							
USBL 2							
USBL 3							
LBL							
Depth							
CTD							
UTC 1							
UTC 2							

• UTC 1 SETTINGS

▼ Pulse and Protocol

Synchro In Pulse A

Protocol PPS Rising+Time

Cancel OK

For example, parameters of UTC:
Syncho In (for PPS input): **Pulse A**
Protocol: **PPS Rising + Time**
(depending on GNSS configuration)

Step 5 Configuring the Output parameters

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP

Heading 309.19098°
Roll -2.75540°
Pitch -3.997°

MECHANICAL PARAMETERS
Latitude 86°13.041110' N
Longitude 20°38.019504' W
Altitude 24.625 m

INPUTS
OUTPUTS
NETWORK

OUTPUT SETTINGS

Output A | Output B | Output C | Output D | Output E

▼ Protocol

Protocol GPS LIKE

Lever Arm Primary Lever arm

Rate 50ms - 20Hz

Synchro In None

▼ Physical Link

Physical Link Serial only

▼ Serial

Parity None

Stopbits 1.0 bitstop

Standard RS422

Baudrate 115.2 kbauds

► Advanced Settings

Cancel

Apply

Important: when configuring the output port in serial mode, check that sampling rate and baudrate are consistent with the protocol data field length. If not, data output will be corrupted and a “SerOut X full” flag will appear in the detailed status from the control window.

Checking procedure as follows:

- Count the maximum number of bits Nb (including parity and stop bits) in the protocol data frame. ASCII characters are 12 bits long max, each.
- Select Baudrate and Sampling period so that:
$$\text{Nb} \times \text{Sampling Period} < \text{Baudrate}$$

Sampling Period is in ms
Baudrate is in kBauds

Entering the Manual Position

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP

POSITION FIX

NAVIGATION PARAMETER

Manual Position

Latitude 57° 52.8' N

Longitude 2° 7.38' E

Altitude 100 m

Precision 10 m

Label

Shortcuts

Delete

Replace By Current Position

Advanced Mode

Manual position forced

Cancel OK

Entering the initial position is only necessary if no position input (GNSS, USBL,...) is available.

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP

RESTART SYSTEM

Click to restart the system.

Restart

As soon as you have clicked on the Restart button, Rovins starts its alignment phase with the manual position (unless receiving GNSS/USBL).

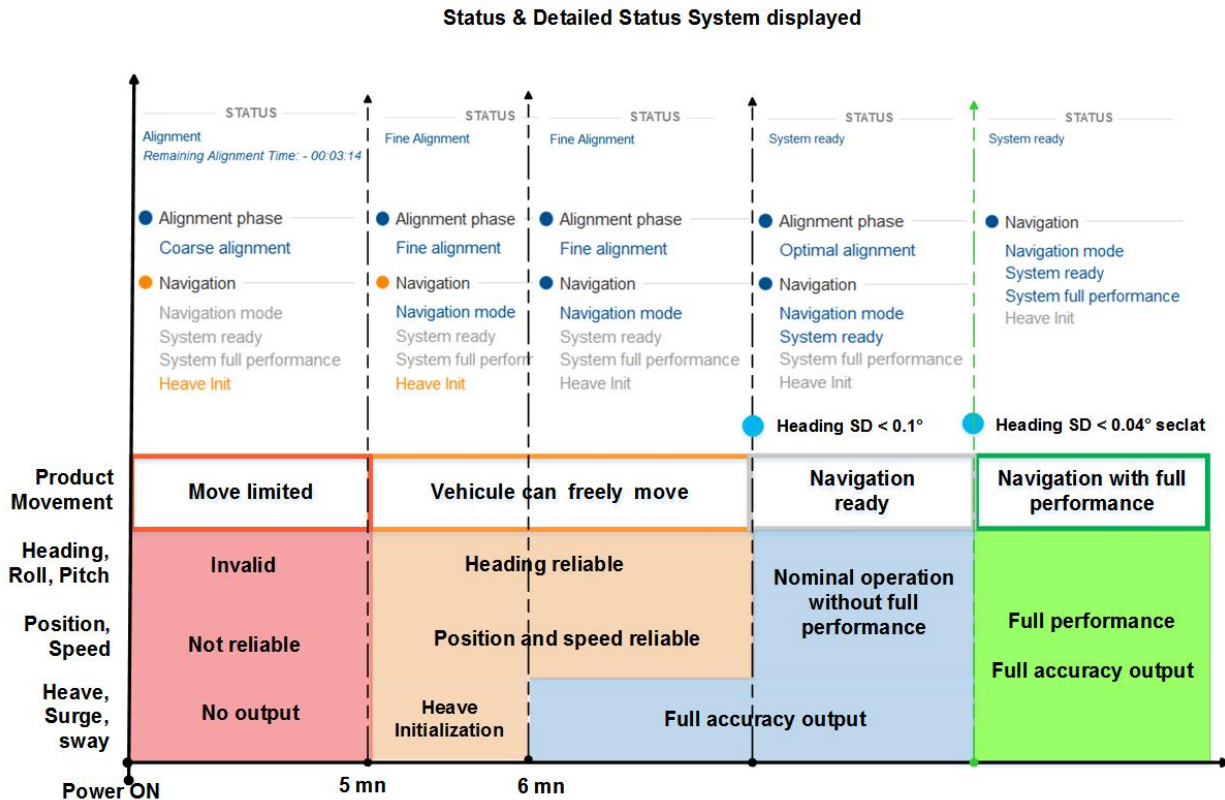
Operating Rovins

Step 1 Starting Rovins

When it is powered ON or re-started, Rovins performs an initial alignment which starts by a coarse alignment: Rovins inertial sensor data (accelerometers and gyrometers) are computed to estimate heading, roll and pitch angles. The coarse alignment phase is followed by a fine alignment phase to improve the accuracy of roll, pitch and heading estimations. During this phase the position is initialized with valid position data received from the external sensor. If no position is available, Rovins uses the most recent position saved in the non-volatile memory of the system or a position entered manually.

In the fine alignment mode the algorithm will use both inertial sensors and external sensors to compute optimal estimates of attitude, heading, speed and position. During this sequence the Rovins needs to observe large heading changes (~90°). E.g.: NE = 15 mn, NW = 15 mn.

After the fine alignment, Rovins switches to the Optimal alignment. At this time, the system is ready but it does not reach its full performance. Optimal alignment means that the system is reaching the specified heading performance. When optimal alignment is completed, the system is ready and gives all the data with full performance.



Step 2 Toggle the External Sensors input to navigation solution

The screenshot displays the IXBLUE ROVINS navigation control interface. At the top, there are navigation data fields: Heading 268.479°, Roll -0.260°, Pitch -0.118°, Heave -0.074 m, and Speed 0.188 m/s. On the right, there are position and depth data: Latitude 78.89910162° N, Longitude 2.06356426° E, and Depth 9.916 m. The system status is 'System Ready'. A blue arrow points from the 'CONTROL' tab to the 'EXTERNAL SENSORS' section.

EXTERNAL SENSORS

GNSS 1: ON
DVL BT: ON
DVL WT: OFF
Depth: OFF

EXTERNAL SENSORS

GNSS 1: ON
DVL BT: ON
DVL WT: OFF
Depth: ON

A blue arrow points from the 'Depth' toggle in the top section to the 'Depth' toggle in the bottom section, indicating the action of toggling the sensor on.

While operating, the operator can enable/disable the external sensor into the inertial solution from the main control page.

Step 3 Monitoring Rovins

The screenshot displays the IX3BLUE web interface for monitoring a Rovins system. At the top, there are navigation links for 'navigation data', 'events viewer', 'maintenance', and 'options'. Below this, there are tabs for 'CONTROL', 'INSTALLATION', and 'SETUP'. The main display area shows various parameters: Heading (268.479°), Roll (-0.260°), Pitch (-0.118°), Heave (-0.074 m), and Speed (0.188 m/s). It also shows Latitude (78.89910162° N), Longitude (2.06356426° E), and Depth (9.916 m). A central logo for 'ROVINS' is displayed. Below the main display, there is a 'DETAILED STATUS' section with three panels: 'Input / Output', 'System', and 'Ext. Sensors'. The 'Input / Output' panel shows 'Inputs' (Input A, B, C, D) and 'Outputs'. The 'System' panel shows 'Navigation' (Navigation mode, System ready, System full performance, Heave Init, GNSS altitude, Advanced filtering mode), 'System', and 'Sensors'. The 'Ext. Sensors' panel shows 'Altitude' (Altitude reception), 'GNSS 1' (GNSS1 reception), 'GNSS 2' (GNSS2 reception), 'DVL 1' (DVL1 BT reception, DVL1 BT valid, DVL1 BT rejected, DVL1 WT reception), 'CTD' (Sound velocity reception), and 'UTC 1' (UTC1 synchro, PPS1 synchro). At the bottom, there is an 'EXTERNAL SENSORS' section with four toggle switches: 'GNSS 1' (OFF), 'GNSS 2' (OFF), 'DVL BT 1' (ON), and 'DVL WT 1' (OFF).

The embedded Built In Test, also called Status, monitors Rovins stats warning and failures thanks to large set of flags.

Status are displayed on the web-based user interface with the following colors:

- **Message in blue:** information message
- **Message in orange:** warning message
- **Message in red:** error message
- **Grey:** disabled

For explanation of the status, refer to Rovins Interface Library

In this example:

- Rovins is in full performance mode
- DVL BT rejected status means that the the data is received but it is not taken into account by the rejection filter.

Contacting iXblue Support

The screenshot shows the iXblue web interface. At the top, there is a navigation bar with the iXblue logo and links for 'navigation data', 'events viewer', 'maintenance', and 'options'. Below this is a secondary navigation bar with 'CONTROL | INSTALLATION | SETUP'. The main content area is titled 'CONTACT SUPPORT' and contains the text 'Click to create a support ticket.' and 'You can attach the last recorded log file (max 500 KB)'. A circular 'Contact Support' button is highlighted with a blue arrow. Below this, a support ticket form is shown with the following fields:

To.. support@ixblue.com
CC.. [empty]
Subject: Support ticket 3453-1052/2015042311381

Product name : ROVINS
Serial number : 3453-1052
Owning company :
Operating company :
Your contact details :

You can attach the last recorded log file (max 500KB).

Comments :

Mandatory information to be provided:

- Serial number of your unit
- Firmware/loaders versions
- User interface version you are using
- Record the configuration file
- Record a set of data for analysis
- The latitude/longitude where currently the system is running
- Description of your application / potential problem you are facing to

For more information, refer to the maintenance manual.

Troubleshooting

Rovins has a Built-In status and error Test (BIT) which raises alarms (through the color of the iXblue Logo) and displays messages in the Rovins Web-Based User Interface.

If you encounter problems when installing or using Rovins, please refer to the following table.

If you still cannot resolve the problem, please contact iXblue support (see previous page).

Symptom	Possible causes	Solution
Impossible to display the Web-based User interface	Incorrect URL address entered in the Web browser	Type in back the URL address Default address is 192.168.36.1xx, xx being the last two numbers of your Rovins serial number. Check computer IP address should be in the same range as the unit.
	The URL address has been changed by another person	1) Retrieve the new Rovins IP address: connect the repeater cable to your PC and start a serial terminal (Hyperterminal, BBTALK, etc.) configured at 19200 baud, no parity, 1 stop bit, 8 data bits. Reboot Rovins once connected. You will get the Rovins boot sequence message that contains its attributed IP address (line beginning with "IFCONF") 2) Enter this URL address in the Web browser
Status displayed red	Error message	Refer to Rovins Interface Library to get the explanation of the messages
Status displayed orange	Warning message	Refer to Rovins Interface Library to get the explanation of the messages
After clicking on "Contact support" button, a message is displayed	No mail software is installed	Install a mail software on the computer (Outlook for example)

iXblue Contact - Support

For non-emergency support:
support@ixblue.com

For genuine emergencies only:
North America / NORAM
+1 617 861 4589

Europe Middle-East Africa
Latin-America / EMEA-LATAM
+33 1 30 08 98 98

Asia Pacific / APAC
+65 6747 7027