

QUICK START
GUIDE

HYDRINS

NAVIGATING & POSITIONING

Objective

This guide describes the HYDRINS installation and the basic configuration required before beginning the positioning.

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HYDRINS SYSTEM OVERVIEW

The HYDRINS system is an Inertial Navigation System (INS).

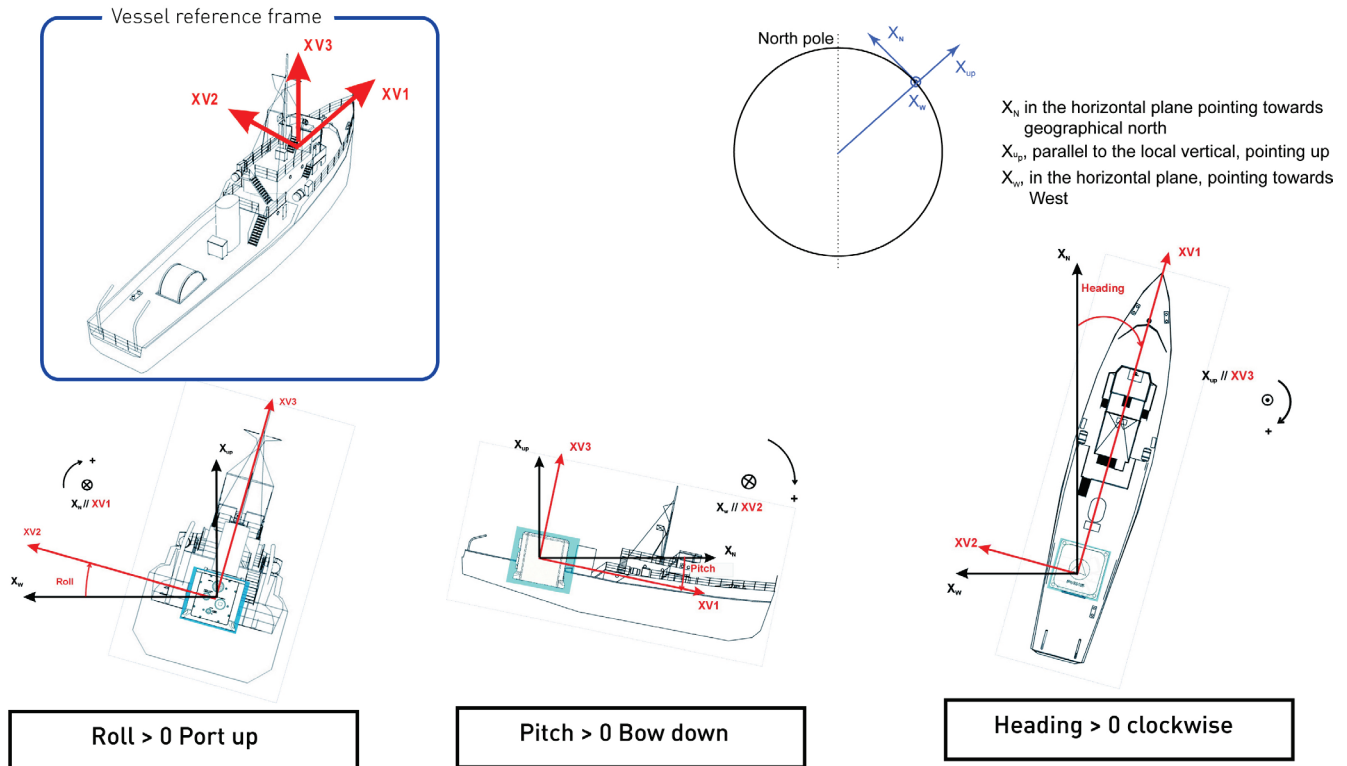
It delivers heading and attitude information as well as position and speed, to other systems or to display.

It can receive data from a GPS to improve its accuracy. HYDRINS contains a self-consistent navigation algorithm based on Kalman Filtering. This structure enables HYDRINS to work either as a standalone system or to be connected to a GPS. HYDRINS is delivered with a powerful and easy-to-use Web-Based User Interface, which allows you to configure and operate your product.

BASIC INSTALLATION: HYDRINS + GPS

This guide describes how to install HYDRINS with a GPS, and the basic configuration required before beginning the positioning. HYDRINS being versatile, you have to define its configuration to insure optimal operation.

In this installation, we assume that HYDRINS is aligned with respect to the vessel reference frame (X_1, X_2, X_3). All the mechanical information necessary to fix HYDRINS are detailed in the figure below.



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 reception**. Specifically, you should check that all the items shown below 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.

HYDRINS



Ethernet straight cable



Installation & Repeater cable



Power supply block



Power supply cable



**Power supply cable
(local standard)**



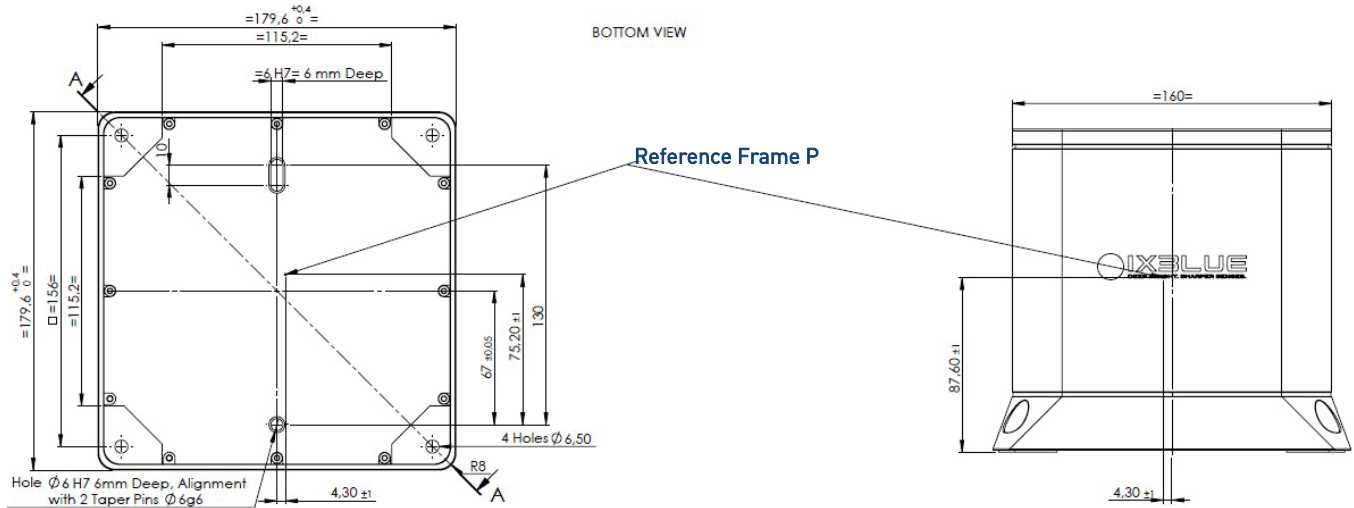
Kit connector 41 pins



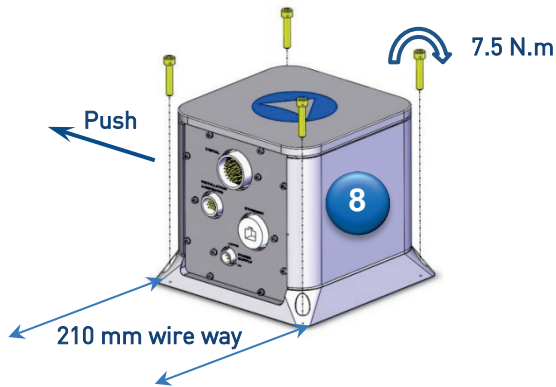
INSTALLING & CONNECTING HYDRINS

Step 1 Place HYDRINS on the mounting plate.

All inertial measurements are default performed with respect to HYDRINS reference frame (P) defined in the figure below, it is not located at the center of the unit.



Step 2 Fix HYDRINS onboard using four CHC M6 bolts.



In case of installation with alignment pins it is recommended to push the unit into the X2 direction during the fixation of the 4 bolts. This to ensure the best mounting repeatability.

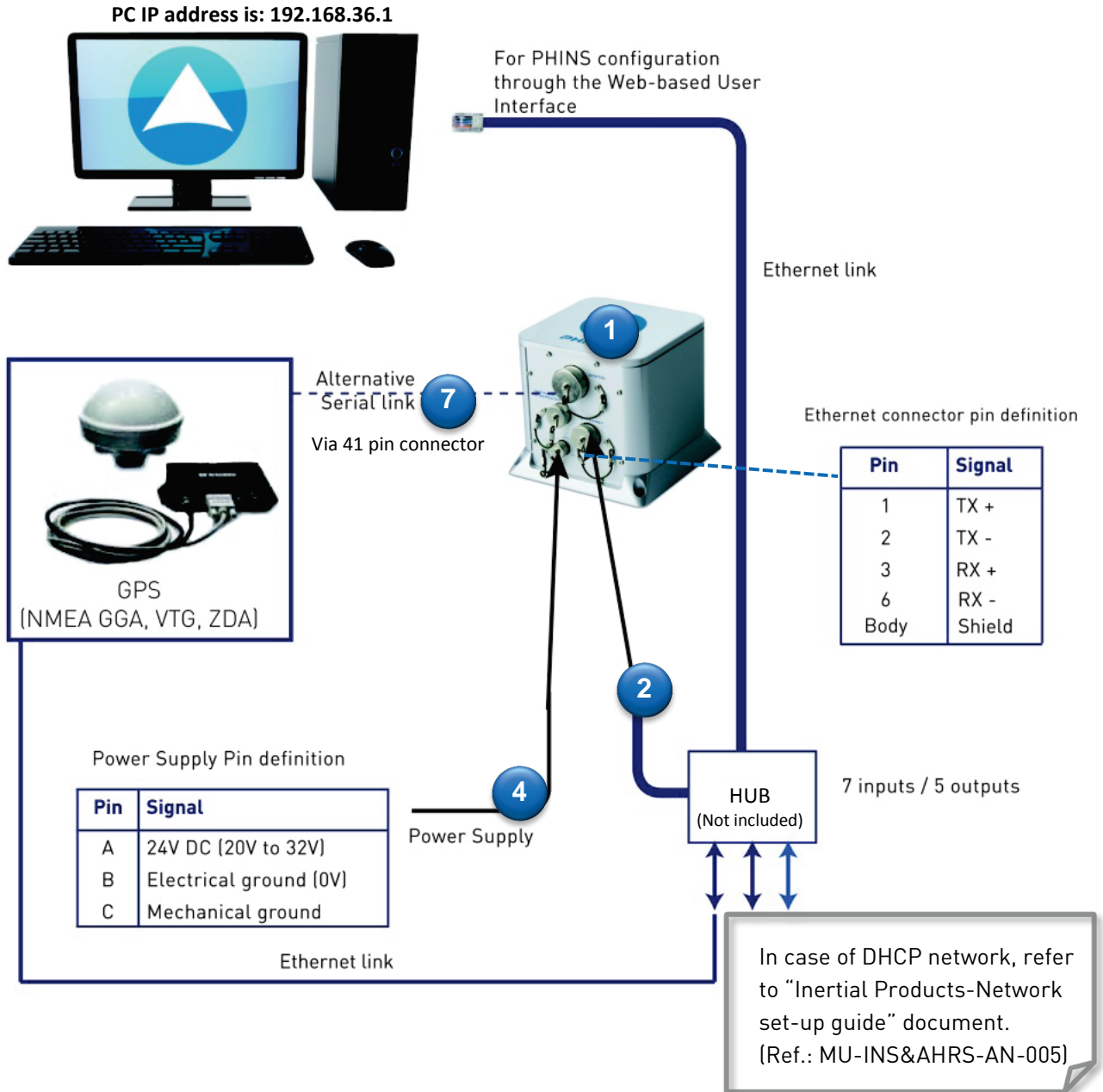
For mechanical installation recommendations, refer to:

- Inertial Products – Application Note – Mechanical Integration of Inertial Systems (Ref.: MU-MECHAAPN-AN-001)

In case of optional interface plate, refer to:

- INSIII-OCTANS IV Interface plates - Product Description (Ref.: MU-INSPLATE-AN-001)

Step 3 Connecting HYDRINS



LAUNCHING THE WEB-BASED USER INTERFACE

Step 1 Checking the version of the required softwares in the CD-ROM



Firefox

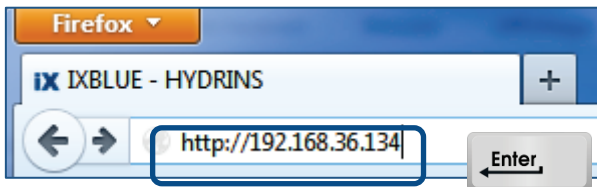


Flash Player

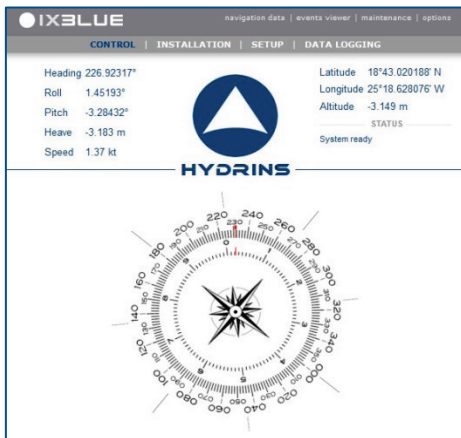


Java Environment

Step 2 Launching the web-based user interface with Firefox



The control page is displayed with the compass.



MANDATORY

- Note the two last numbers of the HYDRINS serial number (by default).
- Type the following URL address:
192.168.36.1xx
xx is the two last numbers of the HYDRINS serial number.
For example: in the screen capture the two last numbers of the HYDRINS is 34 and the URL address is:

192.168.36.134

- To change this URL address, refer to “Inertial Products-Network set-up guide” document. Ref.: MU-INS&AHRS-AN-005
- In case of the IP address has been changed or lost, you can retrieve it by connecting the repeater port to an hyperterminal (19200/N/1/8). At next reboot the product broadcasts its TCP/IP address.

Step 3 Choosing the language, if needed



HYDRINS STARTING SEQUENCE

During the first five minutes after powering-on, HYDRINS performs its coarse alignment: HYDRINS 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, HYDRINS uses the most recent position saved in the non-volatile memory of the system or a position entered manually. The coarse alignment phase lasts 5 minutes.

The fine alignment is ended automatically by HYDRINS when the heading covariance is below 0.1 degree. In this mode they will use both inertial sensors and external sensors to compute optimal estimates of attitude, heading, speed and position.

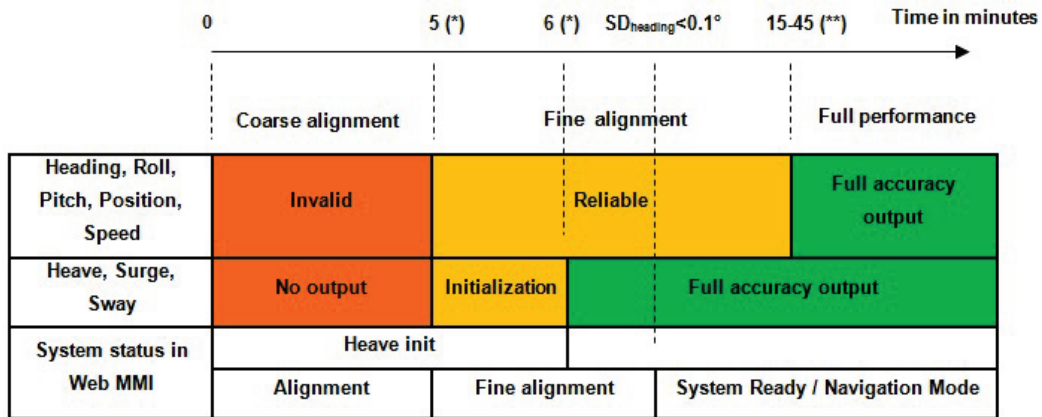


Figure 1 – HYDRINS Starting Sequence (at powering on or software restart)

(*) Fixed time (**) Variable time

CONFIGURING THE MECHANICAL PARAMETERS

Step 1 **MANDATORY:** Configuring HYDRINS orientation with respect to vehicle

IX3BLUE navigation data | events viewer | maintenance | options

CONTROL | **INSTALLATION** | SETUP | DATA LOGGING

MECHANICAL PARAMETERS

▼ Orientation

Product Logo Side

- Upward
- Downward
- Right (starboard)
- Left (port side)
- Front (bow)
- Back (stern)

Connectors Side

- Upward
- Downward
- Right (starboard)
- Left (port side)
- Front (bow)
- Back (stern)

► Misalignments

► Primary Lever Arm

► Secondary Lever Arms

► Vessel Center Of Gravity (Heave computation)

Cancel OK

The orientation is used when the product axes orientation is different from vehicle axes orientation (displayed in red), with 90 degrees rotations of any of the product axis with respect to the vehicle axes.

Define simply the orientation by indicating:

- The direction to which the **Product Logo Side** is pointing.
- The direction to which the product **connector side** is pointing.

On the illustration, the product logo side and the product connector side point to the chosen direction.

ORIENTATION & LEVER ARMS

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

Restart

Step 2 Configuring the misalignments

The screenshot shows the IXBLUE software interface. At the top, there are navigation tabs: CONTROL, INSTALLATION, SETUP, and DATA LOGGING. Below these, there are sub-tabs: MECHANICAL PARAMETERS and INPUTS. A blue arrow points from the MECHANICAL PARAMETERS sub-tab to the Misalignments section below. The Misalignments section contains three input fields: Roll (4.7), Pitch (1.4), and Heading (0.1). Below the input fields are three diagrams illustrating misalignment: Roll (labeled 2), Pitch (labeled 1), and Heading. Below the diagrams are three expandable sections: Primary Lever Arm, Secondary Lever Arms, and Vessel Center of Gravity (Heave computation). At the bottom, there are two circular buttons: Cancel and OK. A blue arrow points to the OK button.

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP | DATA LOGGING

MECHANICAL PARAMETERS
INPUTS

▼ Misalignments

| Roll | Pitch | Heading |
|------|-------|---------|
| 4.7 | 1.4 | 0.1 |

2 1

► Primary Lever Arm

► Secondary Lever Arms

► Vessel Center of Gravity (Heave computation)

Cancel OK

The illustrations help you to see which angle you have to measure precisely.

Enter the value of misalignments measured by the metrology survey. Positive and negative values can be entered in degree.

Step 1 Configuring the GPS input parameters

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP | DATA LOGGING

MECHANICAL PARAMETERS

Heading -3.4717° Roll -1.673°

Latitude 54°55.889624' N Longitude 5°34.287923' W

INPUTS

OUTPUTS

INPUT AND EXTERNAL SENSORS SETTINGS

| | Input A | Input B | Input C | Input D | Input E |
|----------|-------------------------------------|---------|---------|---------|---------|
| Protocol | GPS | NONE | NONE | NONE | NONE |
| GPS | <input checked="" type="checkbox"/> | | | | |
| UTC | | | | | |

• INPUT A SETTINGS

Protocol Protocol

Physical Link Physical Link

Ethernet Transport Layer IP Port

• GPS SETTINGS

Lever Arms

LV1 m

LV2 m

LV3 m

Advanced Settings

Forced mode

Cancel OK

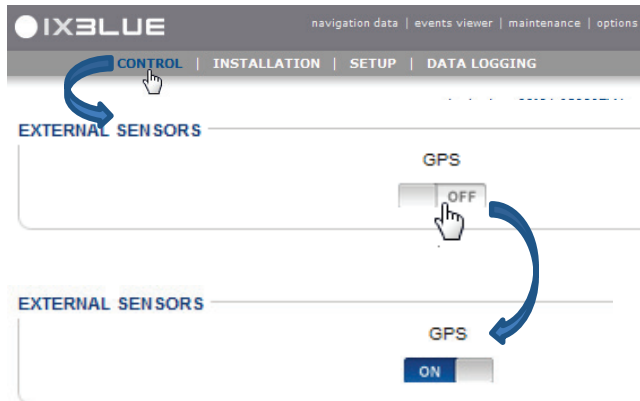
- For example, parameters of the inputs for a GPS:
 Protocol: **GPS**
 Physical link: **Ethernet only**
 Transport layer: **TCP client**
 (if the transport layer is TCP server on the GPS side)
 IP: **IP address**
- The GPS **lever arms** corresponds to the lever arm from the product center of measurements to the GPS antenna.
 Note that **X** on the window gives the orientation not the real scale.

Step 2 Configuring the UTC input parameters



For example, parameters of UTC:
Syncho In: **Pulse A**
Protocol: **PPS Rising + Time**
(following the GPS configuration)

Step 3 Activating the GPS sensor



Step 4 Configuring the output parameters

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | SETUP | DATA LOGGING

MECHANICAL PARAMETERS

Heading 309.19098° Roll -2.75540° Pitch -3.9939°

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

MECHANICAL PARAMETERS

INPUTS

OUTPUTS

NETWORK

OUTPUT SETTINGS

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

▼ Protocol

Protocol

Lever Arm

Rate

Synchro In

▼ Physical Link

Physical Link

▼ Serial

Parity

Stopbits

Standard

Baudrate

► Advanced Settings

Cancel OK

Important: when configuring the output port in serial mode, check that sampling period and baudrate are consistent with the protocol data field length.

If not, data output will not be correct, 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.
- Select Baudrate and Sampling period so that:
$$\text{Nb} \times \text{Sampling Period} < \text{Baudrate}$$

Sampling Period is in ms
Baudrate is in kBauds

Step 5 Entering the initial position

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | **SETUP** | DATA LOGGING

POSITION FIX
NAVIGATION PARAMETERS

Manual Position

Latitude 57° 52.8' N

Longitude 2° 7.38' E

Altitude 100 m

Replace Current Position

Label

Shortcuts

Delete

Advanced Mode

Manual position forced

Cancel Restart

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | **SETUP** | DATA LOGGING

POSITION FIX
NAVIGATION PARAMETERS

NAVIGATION PARAMETERS

Starting Mode Immediate Run

ZUPT Mode Autostatic 0.1m/s

Altitude Mode Stabilization

UTM Zone Mode

Extend current UTM Zone

Cancel Restart

IXBLUE navigation data | events viewer | maintenance | options

CONTROL | INSTALLATION | **SETUP** | DATA LOGGING

RESTART SYSTEM

Click to restart the system.

Restart

Entering the initial position is only necessary if no GPS is available upon starting HYDRINS.

Once saved by clicking on OK button, the entered position is used at next HYDRINS start after defining the Starting Mode as "Immediate Run".

As soon as you have clicked on the Restart button, HYDRINS starts its alignment phase with this input position.

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', and 'DATA LOGGING'. The main content area is titled 'CONTACT SUPPORT' and contains the following text: 'Click to create a support ticket.', 'You can attach the last recorded log file (max 500 KB).', and a 'Statistics' link. A circular 'Contact Support' button is highlighted with a hand cursor. Below this is an email form with the following fields: 'To:' (support@ixblue.com), 'Cc:', 'Subject:' (Support ticket 3453-1052/2014102118741), and a large text area containing pre-filled information: 'Product name : HYDRINS', 'Serial number : 3453-1052', 'Owning company :', 'Operating company :', 'Your contact details :', 'You can attach the last recorded log file (max 500KB).', and 'Comments :'. A 'Send' button is located on the left side of the form.

Enter all the parameters before sending the mail to iXBlue support.

TROUBLESHOOTING

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

If you encounter problems when installing or using HYDRINS, 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 HYDRINS 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 HYDRINS 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 HYDRINS once connected. You will get the HYDRINS boot sequence message that contains its attributed IP address (line beginning with "IFCONF") 2) Enter this URL address in the Web browser |
| The compass does not display on the Web-Based User Interface | Flash player not installed on the PC or its version is too old | Install Flash player which is provided on the CD-ROM |

| Symptom | Possible causes | Solution |
|---|--|---|
| Impossible to record data, nothing happens when clicking on DATA LOGGING menu | Java Runtime Environment not installed on the PC or its version is too old | Install Java Runtime Environment which is provided on the CD-ROM |
| Heading out of the specifications | Wrong initial latitude | Check that the latitude entered in the POSITION FIX page is the current one. Restart the unit. |
| Status displayed red | Error message | Refer to "INS-Interface Library" document to get the explanation of the messages |
| Status displayed orange | Warning message | Refer to "INS-Interface Library" document" 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) |

