50°45'3.186"N

B&G

HERCULES®, HERCULES® WTP, & HERCULES® EXPANSION

BASIC OPERATION GUIDE

ENGLISH

www.bandg.com

Copyright

Trademarks

Warranty

The warranty for your sailing processor is supplied as a separate document.

Safety, disclaimer and compliance

Safety, disclaimer and compliance statements for the Hercules series of sailing processors are supplied as a separate document.

Internet usage

Some features in this product use an internet connection to perform data downloads and uploads. Internet usage via a connected mobile/cell phone internet connection or a pay-per-MB type internet connection may require large data usage. Your service provider may charge you based on the amount of data you transfer. If you are unsure, contact your service provider to confirm rates and restrictions. Contact your service provider for information about charges and data download restrictions.

More information

Document version: 002

This document was prepared using software version 2.0-123

Features described and illustrated in this guide may vary from your unit due to continuous development of the software.

For the latest version of this document in supported languages, and other documentation related to your sailing processor, visit
www.bandg.com/downloads/hercules
www.bandg.com/downloads/herculeswtp
www.bandg.com/downloads/herculesexpansion

CONTENTS

THE HERCULES FAMILY

The Hercules series of sailing processors contains:

- Hercules
- Hercules WTP
- Hercules Expansion

Hercules

Hercules is a state-of-the-art sailing processor from B&G, boasting greater accuracy, richer features, and better connectivity than ever before. The brand new web interface allows for easy data recording and management, and broad compatibility and advanced datasets give you the upper hand in competition.

Hercules WTP

Hercules WTP is B&G's most advanced sailing processor, sitting at the heart of Grand Prix sailing systems. Python® scripting allows you to define custom variables, calibration routines and more. Extended third-party support and the addition of ModBus technology open Hercules WTP up to a new world of integration.

Hercules Expansion

The Hercules Expansion processor is compatible with Triton Edge, Hercules, and Hercules WTP sailing processors. (Hercules Expansion is not designed to be used by itself.) It uses the same web interface as the other sailing processors in the Hercules series. Hercules Expansion has a comprehensive set of analog, serial and digital interfaces that let you integrate more sensors into your racing and cruising sailing systems.

CONNECT TO HERCULES OR HERCULES WTP

Connect a mobile device or laptop to your Hercules series sailing processor via a Wi-Fi® router on the same network, or Ethernet cable.

→ ***Note:*** *Follow the instructions in the Hercules/Hercules WTP Installation Guide, and the Hercules Expansion Installation Guide if applicable, to install the sailing processor on your vessel. Power on the sailing processor before attempting to connect to it.*

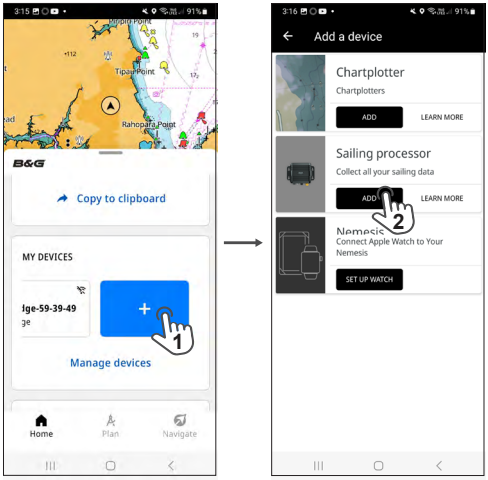
Communication with Hercules processors is via a user-friendly web interface. Access the web interface by connecting to the Hercules and using either the B&G app, or a compatible web browser such as Google Chrome®, Microsoft Edge®, Firefox®, or Safari®.

Start using the B&G mobile app

Use a mobile device to visit the App Store® or Google Play®, download the B&G Sailing & Navigation app, and create a login if you don't already have a one.

Connect your mobile device to the same network as Hercules. (When your mobile device is within range of the Wi-Fi® router, the name of the router will be visible under network settings on your mobile device).

In the app, open the **My devices** menu, select **+** (1). Select **Add** (2) under **Sailing processor** to add Hercules or Hercules WTP to your list of paired devices.



→ ***Note:*** *Hercules Expansion can not be added to the app under* ***My devices****. Hercules Expansion can be accessed through your primary sailing processor on the app.*

The app will prompt you to scan the QR code® that came with the sailing processor. If the printed card showing the QR code® is misplaced, the code is also on a label inside the front cover of the unit. Device registration can be completed without a QR code®.

→ ***Note:*** *A password is supplied with the QR code®. The password will unlock the sailing processor if you forget the personal identification number (PIN) you set up to secure the sailing processor. The QR code® and password are inside the front cover of the sailing processor.*

On completion of all the steps, the Hercules will be paired to the profile that was used to sign in to the app. You can now use the app to communicate with Hercules.

→ ***Note:*** *A B&G sailing procesor can be registered to only one profile.*

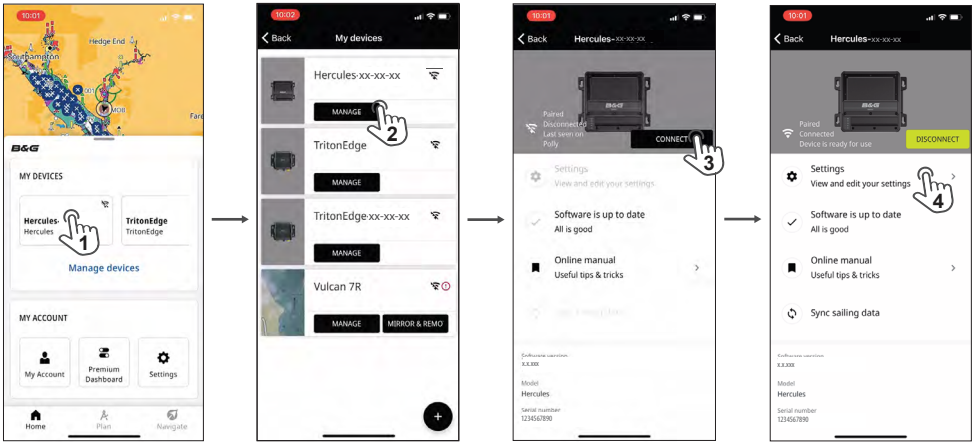
Connect to Hercules using the app

Open the B&G app.

In the mobile app, select Hercules (**1**) from the devices panel. Select **Manage** (**2**) to open Hercules' details page, then select **Connect** (**3**).

→ ***Note:*** *The app remembers the Wi-Fi® network on which it most recently connected to Hercules, and rejoins that network when you select* ***Connect*** *(**3**). You may need to enter the password for the Wi-Fi® router.*

Once connected, select **Settings** (**4**) to open the main menu for the Hercules web interface.



Connect via Ethernet

An IP address is assigned to Hercules when it connects to Ethernet.

You can use the B&G app on a connected mobile device, or a display connected on the NMEA 2000® network, to find the IP address for Hercules.

→ ***Note:*** *The IP address assigned to Hercules is required to access the web interface using a web browser.*

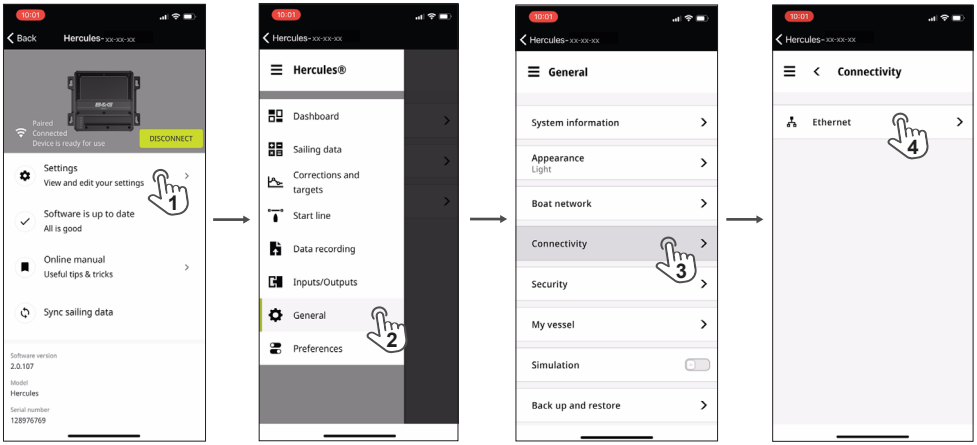
→ ***Note:*** *You can assign a permanent IP address to your Hercules unit using the web interface. Navigate to* ***General > Connectivity > Ethernet****, then select* ***Edit*** *under* ***Manual setup****.*

Find Hercules' IP address using the app

Connect to Hercules via the app, and select **Settings** (1) to open the web interface.

The **Setup guide** is visible if there are setup tasks awaiting your attention. Select the menu icon ☰ to pass the **Setup guide** and enter the main menu.

Navigate to **General** (2) > **Connectivity** (3) > **Ethernet** (4) to see the IP address for Hercules on the network.

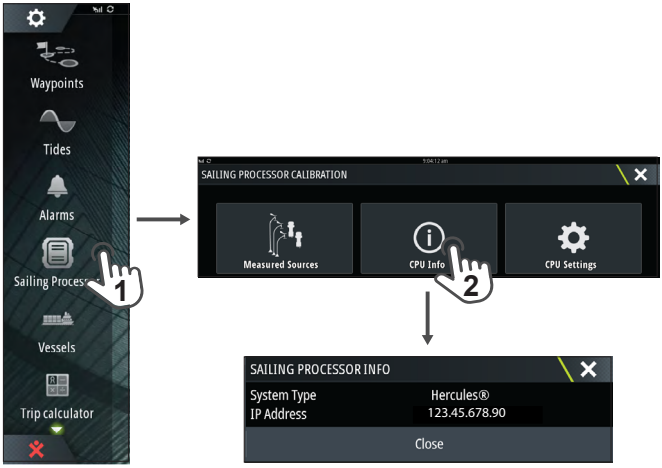


To communicate with Hercules using a different device, connect the device to the same network as Hercules and enter the IP address into the device's web browser.

Find Hercules' IP address using a display

When Hercules is on a NMEA 2000® network, its IP address is shared across the NMEA 2000® network and can be viewed on a compatible display or multi-function display (MFD).

On your MFD or display, navigate to **Sailing processor > CPU info**. Record the IP address displayed under **Sailing processor info**.



To communicate with Hercules using a different device, connect the device to the same network as Hercules and enter the IP address into the device's web browser.

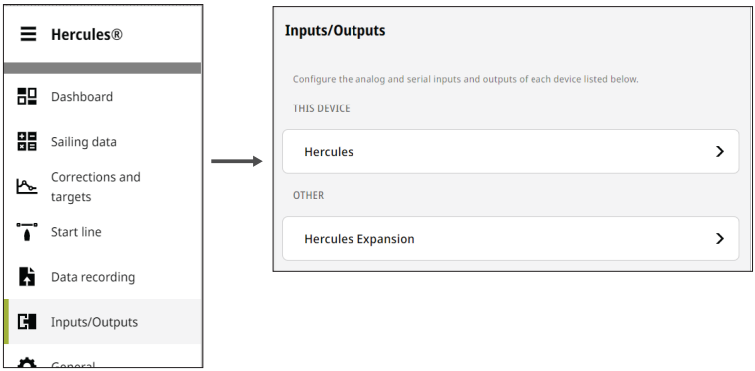
→ ***Note:*** *A compatible display or MFD can be used to update basic settings on the sailing processor, however, the web interface is recommended for a detailed system setup.*

CONNECT TO HERCULES EXPANSION

Hercules Expansion is a separate processor that extends your system with further configurable inputs.

→ ***Note:*** *To connect a Hercules Expansion to your Hercules, Hercules WTP, or Triton Edge, refer to the instructions in the Hercules Expansion Installation Guide.*

Hercules Expansion and the sensors connected to it are visible under the **Inputs/Outputs** menu on the same web interface as your primary sailing processor. For information about how to configure the inputs and outputs, refer to the **Inputs/Outputs** section on page **29** of this manual.



→ ***Note:*** *Hercules Expansion does not come with a QR code® and cannot be registered to your B&G profile.*

FIRST STARTUP

The first time you start the Hercules sailing processor and access the web interface, prompts will guide you through system settings such as naming your sailing processor, choosing your preferred units for data, and setting the time zone.

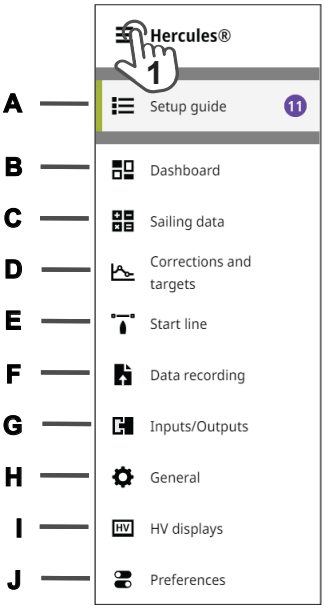
This onboarding process is only repeated following a factory reset.

These settings may be adjusted later through the **Preferences** and **General** menus, which you can access from the main menu on the web interface.

THE WEB INTERFACE: MAIN MENU

Toggle the list icon ☰ (1) on the main menu to reveal the list of menus, or collapse the list to give yourself more room on-screen.

→ ***Note:*** *Items may be arranged differently when viewed on differently sized screens.*



A **Setup guide**—Lists tasks for setting up and checking your sailing instruments.

→ ***Note:*** *The **Setup guide** only displays when there are setup tasks awaiting your attention.*

B **Dashboard**—Overview of data values and sensor statuses.

C **Sailing data**—Displays calculated and measured values, and gives access to sensors for checking and configuration.

D **Corrections and targets**—Gives access to advanced calibration of boat speed, true wind angle, true wind speed, and polar tables.

E **Start line**—Ping the start line and control your race timer.

F **Data recording**—Start a data recording, configure data recording settings, and upload or export sailing data.

G **Inputs/Outputs**—Configure the Hercules (and other compatible units, including Hercules Expansion) for your connected sensors.

H **General**—Gives access to general system settings such as network connections and software version.

I **HV displays**—Allows you to configure and control your HV displays using the Hercules web interface.

→ ***Note:*** *This menu option is only present when one or more HV displays are connected.*

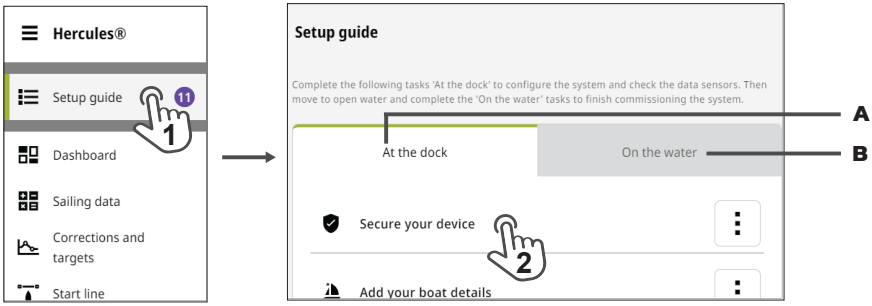
J **Preferences**—Gives access to options related to the web interface display, such as units of measurement.

SETUP GUIDE

The **Setup guide** opens automatically following the onboarding sequence. Follow the prompts and complete the tasks in the order they're presented. Some data-entry and source selection tasks can be completed on your vessel **At the dock** (A). Tasks listed under **On the water** (B) require you to maneuver the vessel at sea.

To return to the setup guide from a different screen, select **Setup guide** (1). To start a task, select it (2) in the setup guide.

To remove a task from the setup guide, select the more icon ⋮ then **Dismiss**.



→ ***Note:*** *The **Setup guide** does not display if all tasks have been completed or dismissed. All tasks can be reopened and adjusted later.*

At the dock tasks

Secure your device

Protect your settings with a personal identification number (PIN). To revisit this task later, navigate to **General > Security > Secure your device**.

➔ ***Note:*** *If you forget the PIN, the sailing processor can be unlocked from the PIN screen by entering the password found on the inside of your Hercules' front cover.*

Add your boat details

Enter your vessel's name, type, model, and dimensions. To revisit this task later, navigate to **General > My vessel**.

Select measured sources

Select the configurations and core sensors to be used by the Hercules processor for boat speed and wind. (This should be performed before running an Auto source selection.) To revisit this task later, navigate to **General > Boat network > Sources**.

Review source selection

If your vessel has an instrument system with more than one sensor for a data category, you can swap which sensor is used. To revisit this task later, navigate to **General > Boat network > Sources**. The **Auto source selection** wizard is also found under this menu, and if used, will nominate sensors for you.

Review sailing data

Lists key data, and indicates the status of related data sources. A green status indicates a reading is valid; a red status indicates that a reading isn't valid. Navigate to **Sailing data** in the main menu to review the readings at any time.

Review depth offset

Enter an offset so that the depth reading displays depth below keel or, if preferred, depth measured from the water surface. To revisit this task later, navigate to **Sailing data > Sensors > Depth**.

Review GPS offsets

Enter the positions of each of your GPS receivers, relative to vessel's bow, to get accurate start line values. To revisit this task later, navigate to **Sailing data > Sensors > GPS > Operations**.

➔ ***Note:*** *Your vessel's beam and length must be entered for a GPS offset to work. To enter beam and length, navigate to* ***General > My vessel > Boat dimensions****.*

Connect to B&G cloud

Manage B&G cloud data sharing preferences. To revisit this setting later, access **Preferences** from the main menu.

On the water tasks

Calibrate the boat speed

In a sea trial, follow the steps in the calibration wizard to calibrate your boat speed sensor. To revisit this task later, navigate to **Sailing data > Sensors > Boat speed > Input**.

Calibrate the compass

In a sea trial, follow the steps in the calibration wizard to calibrate your compass.To revisit this task later, navigate to **Sailing data > Sensors > Heading > Input**.

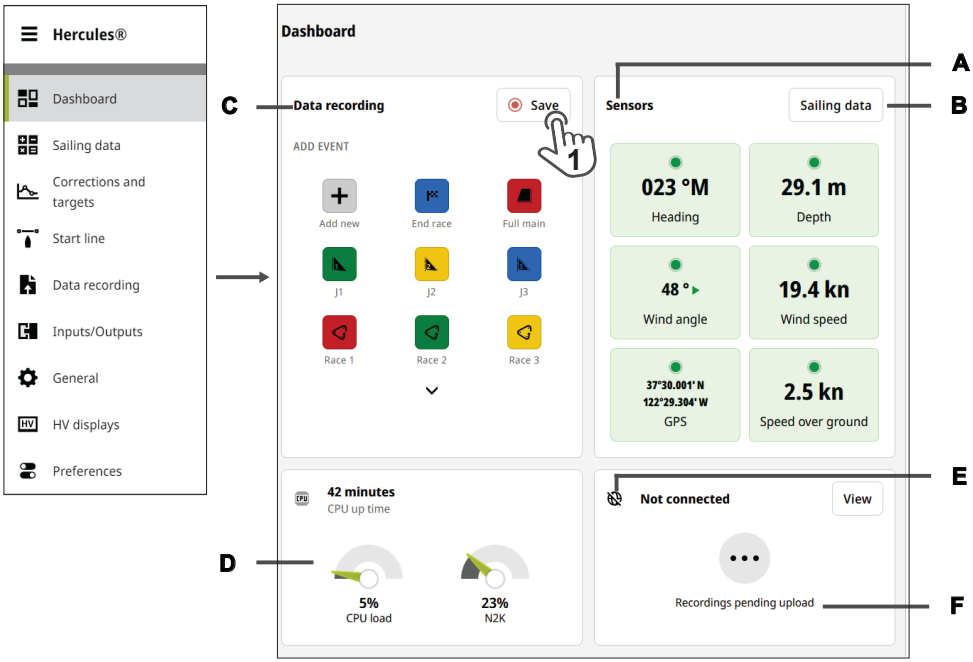
Calibrate the wind angle offset

In a sea trial, follow the steps in the calibration wizard to calibrate the measured wind angle offset. To revisit this task later, navigate to **Sailing data > Sensors > Wind angle > Operations**.

→ ***Note:*** *Precise measurement of the wind angle offset requires a steady wind direction. If possible, delay the calibration of the wind angle offset until the conditions are suitable.*

DASHBOARD

The dashboard provides an overview of key readings and operations without you accessing the menu.



A **Sensors**—Gives an overview of core selected sensors.

→ ***Note:*** *A red background indicates that data may not be valid, and you should review the sensors associated with that reading (including checking the sensors' physical connections).*

B **Sailing data**—Gives you access to all the calculated values and associated settings for each piece of data.

C **Data recording**—When a recording is in progress, you can add event markers, and save the recording (**1**) from this panel on the dashboard. If recording is not in progress, you can start a recording from this panel.

D The gauges panel shows the loads on the central processing unit (**CPU load**) and NMEA 2000® network (**N2K**).

E Internet connection status.

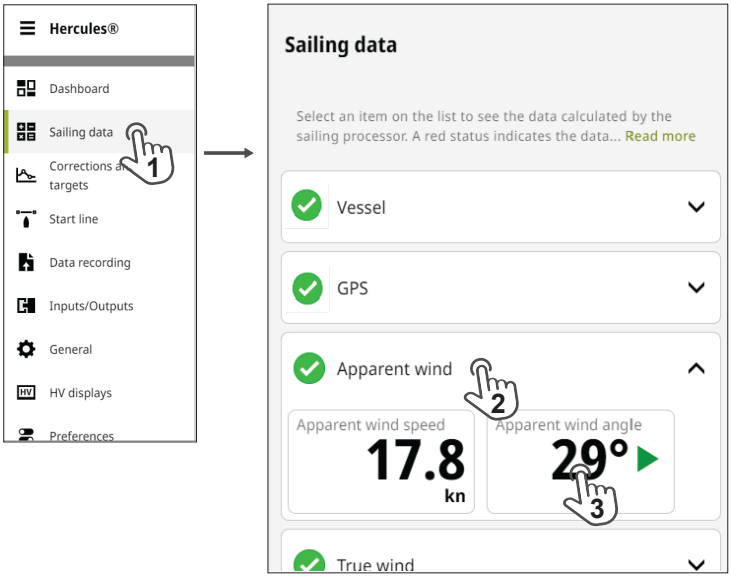
F **Recordings pending upload**—Recorded data files sare stored in the sailing processor's memory. Data types recorded by default will be uploaded to your profile in the cloud when an internet connection is available, provided you've chosen that option in the data recording menu.

SAILING DATA AND SENSORS

Sailing data

Open the **Sailing data** (1) menu, and select a category (2) to display readings for that category.

Select a reading (3) to open the data and sensors card associated with that reading.



Readings are in real-time, with the refresh rate determined by the damping value.

→ ***Note:*** *The units of measurement can be changed via* ***Preferences*** *under the main menu.*

Sensors

The **Sensors** menu is on the right of the **Sailing data** screen, and is used to access data cards and settings for core connected sensors. Values from these sensors are also displayed on the **Dashboard**.

A Live data value—This is derived from the inputs and operations applied.

B **Directly used by**—Lets you know which calculations depend on the live data value.

C **Input**—Lets you check or change the source used for the live data value, and view other readings from the same source.

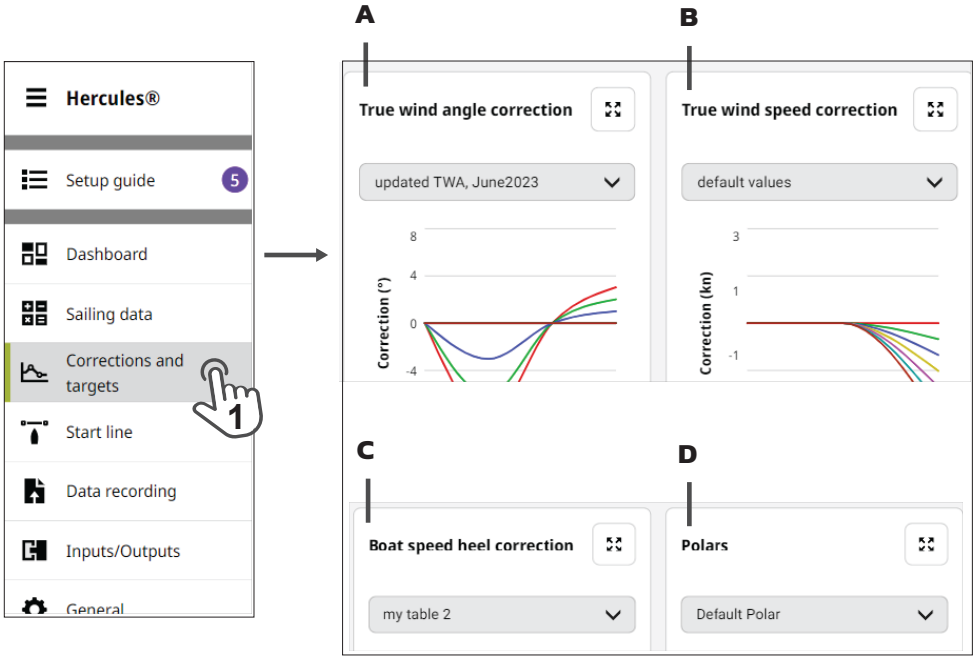
D **Operations**—Allows you to apply settings and adjust offsets for that source.

→ ***Note:*** *Refer to the inline help text on the web interface for detailed information.*

CORRECTIONS AND TARGETS

Correction tables allow you to correct boat speed and true wind direction tack to tack by applying offsets at different wind speeds or heel angles.

Select **Corrections and targets** (1) to see an overview of the corrections data..



Hercules sailing processors can store correction tables for each of the following:

A **True wind angle correction**—Adjust the true wind angle reading depending on true wind angle, across a range of different true wind speeds.

B **True wind speed correction**—Adjust the true wind speed reading depending on true wind angle, across a range of different true wind speeds.

C **Boat speed heel correction**—Adjust the boat speed reading depending on heel angle, across a range of different boat speeds.

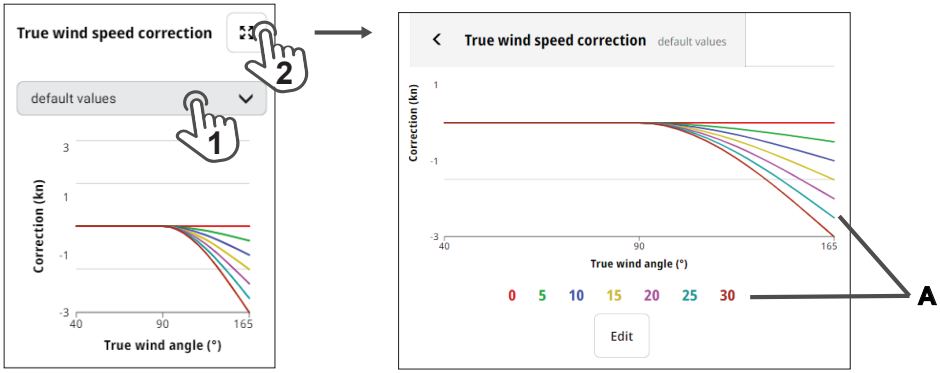
D **Polars**—Show target boat speed as a function of true wind angle, across a range of different true wind speeds.

Apply a set of corrections or targets

Use the drop-down list (**1**) at the top of a corrections table or polar table to select and apply a set of corrections.

For polar tables, the polar data selected from the drop-down list is used for targets displayed under **Performance** in the **Sailing data** menu.

Select the enlarge icon ⁘ (**2**) at the top right of any table to open its graph full screen. This allows you to view the legend for the different wind speeds (**A**), and to access the data for editing.



Edit a correction table or polar table

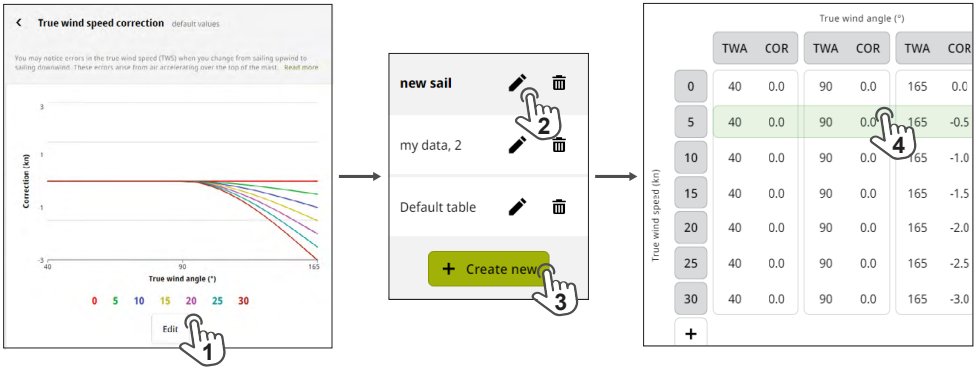
Enlarge the correction graph or polar graph to full screen, then select **Edit** (1).

To edit an existing correction table, select the pencil icon (2) beside its name.

To open a new table filled with default data you can overwrite, select **Create new** (3).

Select a cell (4), or tab between the cells, to enter true wind angles or corrections. Corrections can be negative or positive.

→ ***Note:*** *Refer to the inline help on the web interface to view the processes for determining correction values. The true wind angle correction table contains an* ***Auto-calibrate*** *wizard that gives prompts for maneuvers to calculate the correction.*

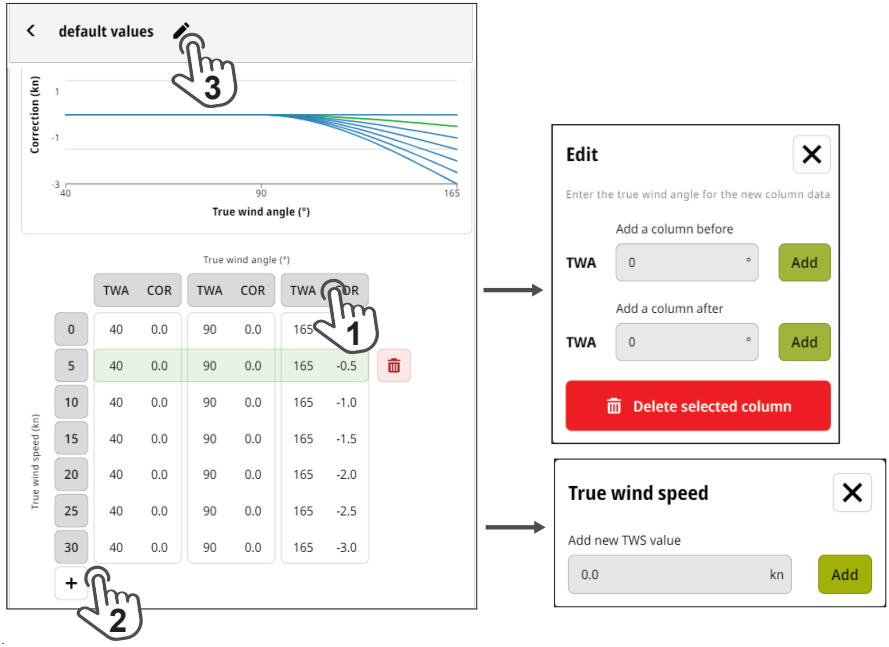


Correction tables and polar tables on Hercules sailing processors can be customized by adding (or deleting) rows and columns using the web interface.

With the table open for editing, select a column at its heading (1) to insert a new column for true wind angle.

Select + (2) to add a new row for true wind speed (the new row will be inserted at its correct position in the table automatically).

Select the pencil icon (3) to change the title of the set of corrections or polar table.



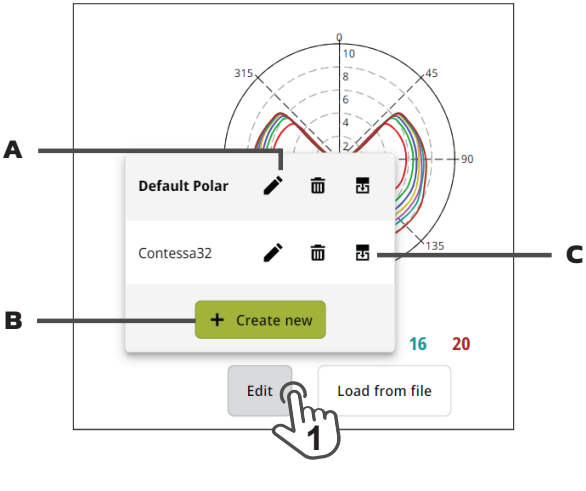
Upload or export polar tables

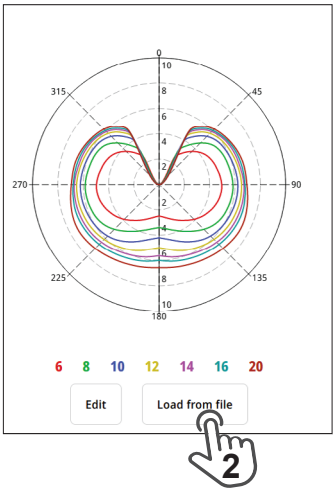
Select **Edit** (1) to open the list of polar tables saved on the sailing processor.

To edit a polar table, select the pencil icon (A) beside its name.

To open a new polar table filled with default data you can overwrite, select **Create new** (B).

Select the export icon (C) to save the currently selected polar table to a connected device. Files are exported in .txt format.





Load from file (2) allows you to search your connected device for a pre-written polar table, and upload it to your Hercules sailing processor.

Files from the following software tools can be uploaded: Expedition™, PredictWind®, Adrena™, iPolar™, and B&G H5000™. The following file formats are accepted: .pol, .txt, and .csv.

START LINE

Race timer

The race timer (A) can be used to count down to zero from a specified time.

Use the – (1) and + (2) buttons to adjust the race timer.

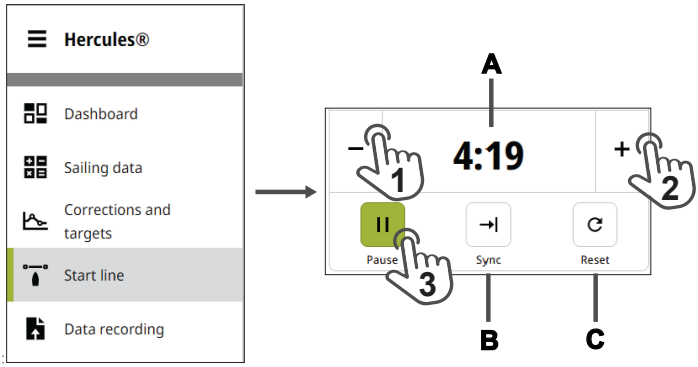
Use the **Start/Pause** (3) button to start, pause, and resume the countdown.

→ ***Note:*** *The option to start a data recording when the race timer starts its countdown is found under the* ***Data recording settings*** *menu.*

When the timer reaches zero, it starts counting up to show the time elapsed from zero. The timer continues to count until you stop it.

The **Sync** (B) button jumps the timer forward or back to the nearest whole minute.

The **Reset** (C) button reverts the timer to its start value.



Start line position

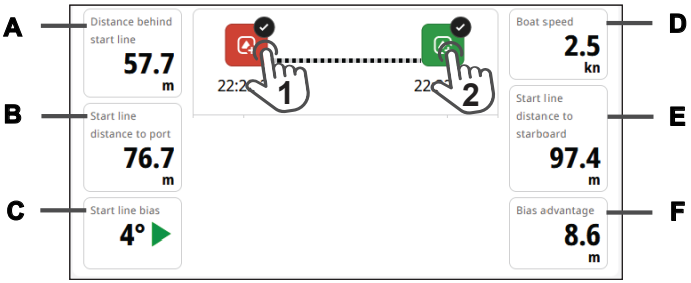
When a Hercules sailing processor has the position of a race start line, it can display a range of helpful calculations related to the start line.

→ ***Note:*** *Before pinging the start line, ensure you have entered the offset (relative to the bow) for the GPS source you are using. Enter the offset by navigating to* ***Sailing data > Sensors > GPS > Operations****.*

To 'ping' (record the positions of) the ends of the start line, position the bow of the vessel at the port end of the start line, and select the port icon on-screen (**1**).

Move the vessel to the starboard end of the start line, and when the bow is at the starboard end of the start line, select the starboard icon on-screen (**2**).

The times displayed at each end of the start line on-screen show when each position was recorded. Data values shown against a red background indicate invalid calculations (the position of the start line has not been recorded correctly).



A Distance behind start line

B Start line distance to port

C Start line bias

D Boat speed

E Start line distance to starboard

F Bias advantage

DATA RECORDING

Hercules and Hercules WTP can record a wide range of calculated values and sensor readings.

→ ***Note:*** *Hercules Expansion cannot record data, and its microSD® card slot should only be used for software updates.*

Configure recording settings

Select the settings icon ⚙ (**A**) to configure settings such as starting a data recording when the vessel exceeds a certain speed, or synchronize recording with the start timer in a race. (You can also access advanced recording options here, if available.)

Start a recording manually

Select **Data recording** (**1**) from the main menu, then select **Start new** (**2**) to begin recording.

Select **Save** (**3**) to end the recording and save the file to the sailing processor.

→ ***Note:*** *Data recording continues until you select* ***Save****.*

Default data set

If you don't set any other recording preferences, Hercules or Hercules WTP records the following data at a sampling rate of once per second (1 Hz) when you start a recording:

True wind direction, true wind speed, true wind angle, apparent wind speed, apparent wind angle, velocity made good, true wind angle correction, true wind speed correction, bow position, boat speed, depth, signed leeway angle, speed through water, speed over ground, course over ground, course, heading, magnetic variation, heel, trim, rudder angle, air temperature, sea temperature, tide set, tide rate, mainsheet, forestay, backstay, V0 port, V0 starboard, V1 port, V1 starboard, barometric pressure.

→ ***Note:*** *If data isn't valid, for example if the relevant sensor is disconnected, then the data isn't recorded.*

The values recorded for these data types are stored in the sailing processor's memory. If you have inserted a microSD® card into the unit, the data is stored on the microSD® card instead.

→ ***Note:*** *To access the data card slot, use a #1 Phillips head screwdriver to loosen the eight captive screws on the Hercules unit's front cover, and remove the cover. The data card fits into the slot at the top right of the circuit board. Replace the cover as soon as possible, to protect the sailing processor's circuit board and connectors.*

→ ***Note:*** *When a microSD® card is inserted, a data card icon* 🖴 *appears beside the* ***Storage used*** *indicator on the* ***Data recording*** *screen.*

Select **Automatically upload recordings** from the **Data recording settings** menu to ensure recordings will be uploaded to your account in the B&G cloud when an internet connection is available.

Advanced recording

Advanced recording options are accessible when a microSD® card is in the card slot.

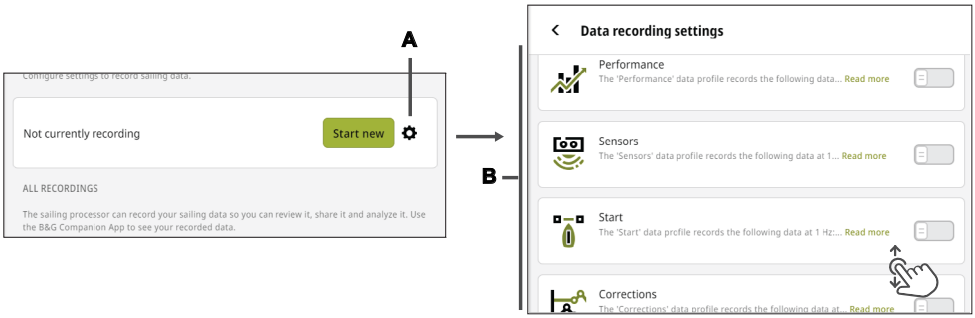
To access advanced recording options, select the settings icon (A).

Preset data profiles

The Hercules sailing processor comes with several preset data-recording profiles that let you record a set of sensor outputs and/or calculated values at the touch of a button.

The list of preset profiles (B) is visible under recording settings (A). (A microSD® card is required.)

Use the inline help beside the name of each profile to see the data types recorded for that profile. You can select more than one preset profile.



The data types in the profiles you selected, as well as the **Default data set** on page **25** are recorded onto the microSD® card ready to export.

→ ***Note:*** *Data from sensors connected to Hercules Expansion are recorded onto the microSD® card in your primary sailing processor. The card slot in the Hercules Expansion can only be used to carry software updates for the Hercules Expansion; it cannot be used to record data.*

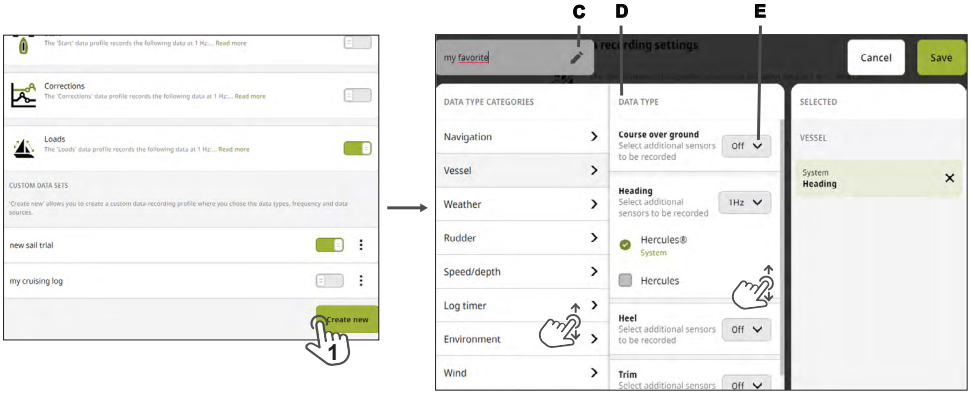
Create custom data profiles

You can set up and save one or more custom recording profiles.

To create collections of favorite variables for recording, select **Create new** (**1**).

Use the checkboxes to select each **Data type** (**D**) or sensor you want to record, and the frequency (**E**) it records at.

Give your preset a name (**C**) so you can choose the preset to reuse it.

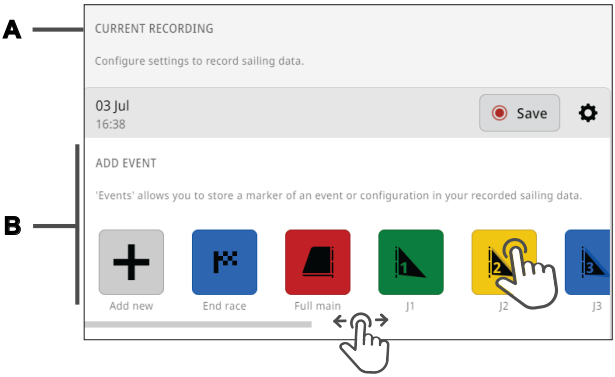


Add events

You can place time-stamps with labels into your data during a recording.

When a recording is in progress (**A**), select one or more pre-labelled **Add event** (**B**) markers. You can also create your own event labels.

→ ***Note:*** *You can also start and stop recordings, and place event markers, from the* ***Dashboard*** *on the main menu.*



Access data recordings

Past recordings are listed on the **Data recording** screen and are identified by their date, start time, and size.

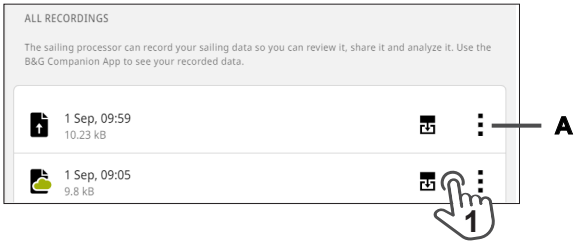
To analyze your recorded sailing data, you can export the files to a connected device.

To upload data recordings to your B&G account, navigate to the **Data recording settings** menu by selecting the cog icon and set the switch **Automatically upload recordings** to on.

→ ***Note:*** *Only default data (not advanced recordings) can be uploaded to your account in the cloud.*

Export recorded files

With the Hercules sailing processor connected to a laptop, tablet, or phone, navigate to the **Data recording** screen. Select the export icon (1) to export that file to the laptop, tablet, or phone in .gpx or .csv format.



Delete recorded files

To delete a recording permanently from the sailing processor, select the more icon (A), then **Delete**.

→ ***Note:*** *The option to delete data recordings from the unit automatically to free up space is configured from the settings icon on the* ***Data recording*** *screen.*

INPUTS/OUTPUTS

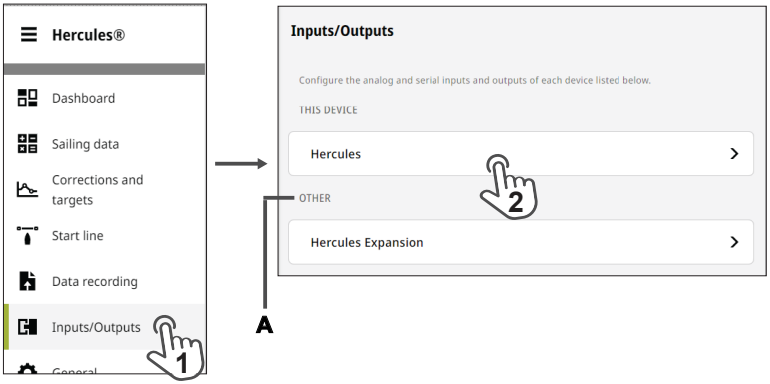
After you've connected sensors or alarms to your Hercules series sailing processor or Hercules Expansion, the input and output channels need to be configured so the sailing processor knows how to proccess the signals on each of its channels.

Open **Inputs/Outputs** from the main menu on the Hercules web interface (**1**).

Select the name of the input/output device to enter the configuration menu for that device (**2**).

If you have a Hercules Expansion connected to your Hercules or Hercules WTP, it displays as a device under **Other** (**A**).

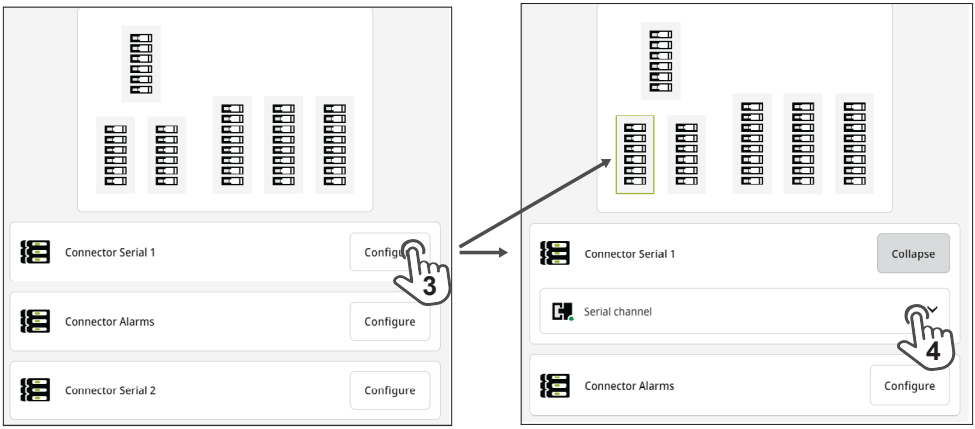
Further devices configurable from the Hercules web interface (if they are connected) include H5000 analog expansion modules, H5000 serial expansion modules, and the B&G NMEA 0183® to NMEA 2000® interface.



The diagram at the top of the **Inputs/Outputs** menu shows the six configurable ports on the Hercules circuit board. The ports are the same for all Hercules series sailing processors.

Select **Configure** (**3**) beside the name of the connector, or select the connector on the diagram, to list the inputs and outputs (channels) for that port.

Select an individual channel from the menu (**4**) to configure that channel, or to view data on the channel if the channel has already been configured.



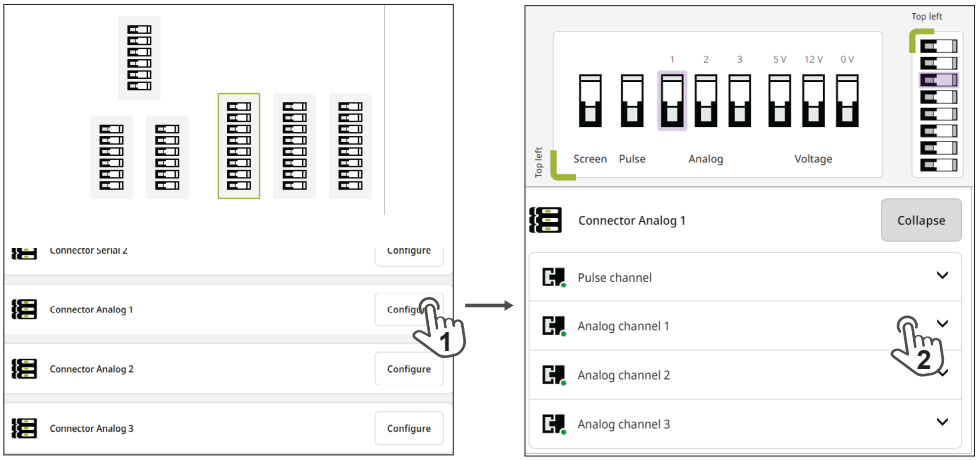
→ ***Note:*** *The functions for each pin on the printed circuit board (PCB) are displayed on the web interface when you use the web interface to open a channel for configuration. The PCB inside each sailing processor also has printed labels to identify each port and pin.*

Analog/pulse inputs

Open the **Inputs/Outputs** menu and select **Configure** (1) for the port you're configuring.

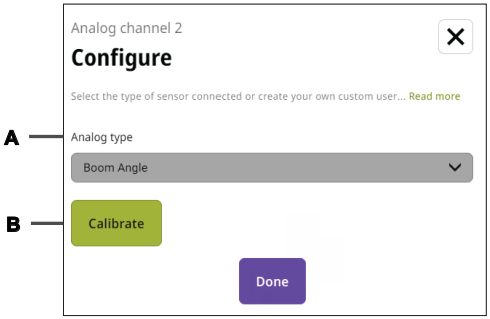
Select one of the analog channels (2).

→ ***Note:*** *A pulse channel is included on each of the analog connectors, and can be configured here by selecting* ***Pulse channel****.*



Use the **Analog type** (A) drop-down list to choose the type of sensor connected to the analog channel.

Some sensors have the option to open a calibration wizard for the sensor (**Calibrate**, (B)) to match the range of input voltages to a suitable range of readings.



→ ***Note:*** *Select* ***Wind*** *from the* ***Analog type*** *(A) drop-down list to automatically configure all the channels on the port for a 213 mast head unit.*

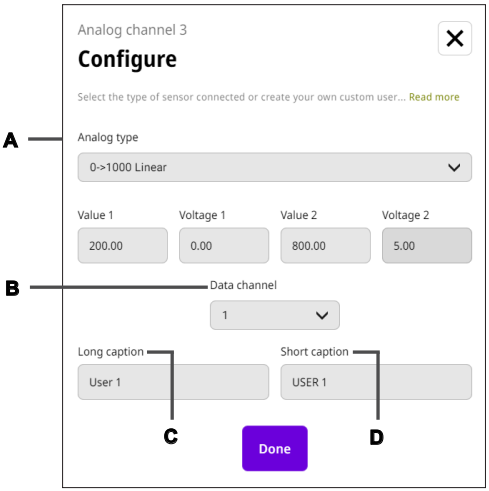
Enter your own sensors

If the type of sensor you connected is not already on the **Analog type** drop-down list, you can enter your own sensor.

Use the **Analog type** (**A**) drop-down list to select an approximate range for the sensor's readings (0–100 or 0–1000), then enter the sensor readings for two known voltage signals.

→ ***Note:*** *It is assumed sensors are linear.*

Assign a unique data channel (**B**), a long caption (**C**), and a short caption (**D**), to the sensor.



When you configure displays (such as an HV display) to show readings from your sensors, the long caption is used in the display's configuration menu. The short caption may be displayed on-screen with the reading, and in any data recordings.

Wiring examples

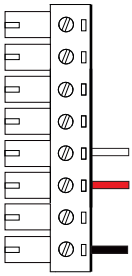
This section is for sensors and instruments. To connect power and NMEA 2000®, refer to your sailing processor's installation guide (published separately).

For cable wiring specific to your sensors, refer to the sensors' installation guides (published separately).

Generic 5 V analog sensor

→ ***Note:*** *The signal wire can be connected to any of the available analog channels.*

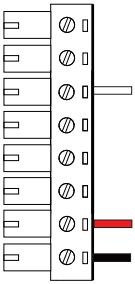
Pin function	Wire from sensor (typical color)
Screen	Not connected
Pulse	Not connected
Analog 1	Not connected
Analog 2	Not connected
Analog 3	Configurable signal input
5 V out	5 V DC + (red)
12 V out	Not connected
0 V	DC – (black)



Generic 12 V analog sensor

→ ***Note:*** *The signal wire can be connected to any of the available analog channels.*

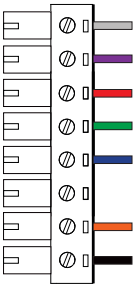
Pin function	Wire from sensor (typical color)
Screen	Not connected
Pulse	Not connected
Analog 1	Configurable signal input
Analog 2	Not connected
Analog 3	Not connected
5 V out	Not connected
12 V out	12 V DC + (red)
0 V	DC – (black)



213 mast head unit

When configuring the analog port for the 213 mast head unit, select ***Wind*** for one of the analog channels to automatically configure the entire port for the 213 mast head unit.

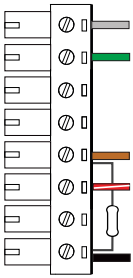
Pin function	Wire from sensor (typical color)
Screen	Screen (bare)
Pulse	Wind speed (violet)
Analog 1	Wind angle (red)
Analog 2	Wind angle (green)
Analog 3	Wind angle (blue)
5 V out	Not connected
12 V out	12 V DC + (orange)
0 V	DC – (black)



Speed and temperature sensor

- ***Note:*** *The water temperature wire can be connected to any of the available analog channels.*
- ***Note:*** *Some sensors require a 10 kΩ resistor connected between the 0 V and water temperature pins.*

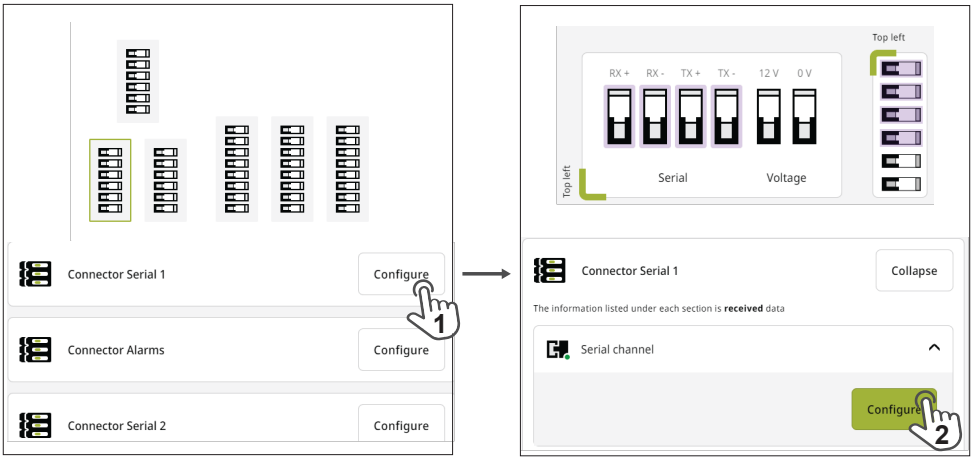
Pin function	Wire from sensor (typical color)
Screen	Screen (bare)
Pulse	Speed (green)
Analog 1	Not connected
Analog 2	Not connected
Analog 3	Water temperature (brown)
5 V out	5 V DC + (red and white)
12 V out	Not connected
0 V	DC – (black)



Serial inputs

The sailing processor has two serial inputs.

Open the **Inputs/Outputs** menu and select **Configure** (1, 2) for the port and channel you are configuring.

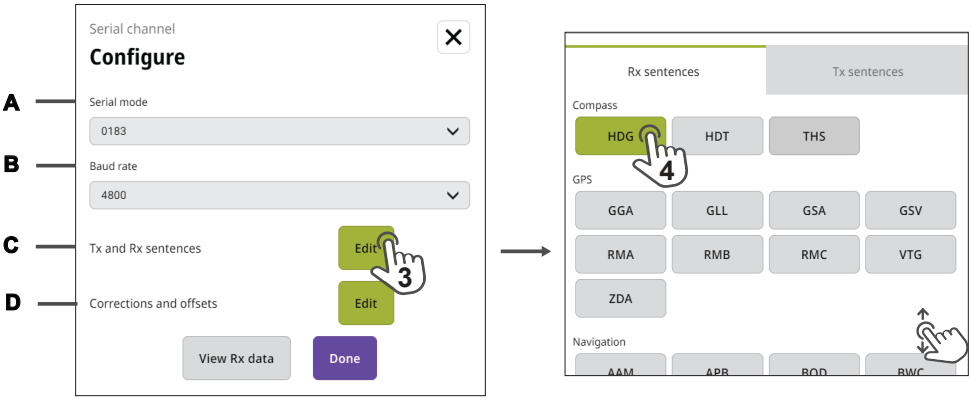


Use the drop-down menus to select the **Serial mode** (A) and **Baud rate** (B) for the serial sensor connected to this port.

Select **Edit** (3) to open the lists of transmitted and received serial data sentences (**Tx and Rx sentences** (C)).

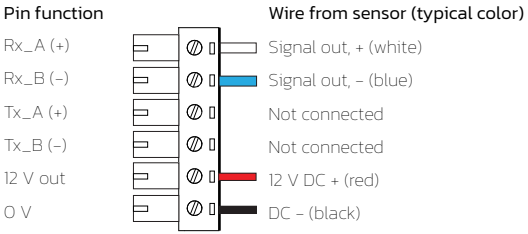
Select the sentence or sentences appropriate for the sensor you connected (4). Filter unused sentences by selecting them and switching them to **Off**.

→ ***Note:*** *The **Corrections and offsets** (D) menu allows you to enter a single offset value for the connected sensor.*



Wiring example: WS700 series wind sensor

→ ***Note:*** *The wind sensor's screen wire must be connected to the screen pin on the power connector, or a screen pin on one of the analog connectors, on the circuit board.*



Baud rate: 38,400

Data bits: 8

Parity: None

Stop bits: 1

ALARMS

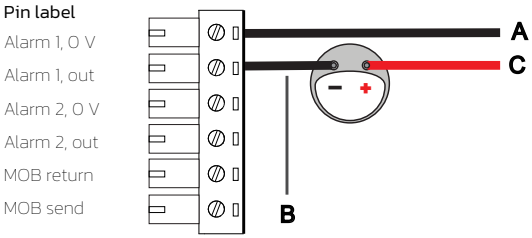
Hercules sailing processors have two alarm outputs. They can be configured so they are triggered by any alarm on the NMEA 2000® network (including an external MOB button), or by an external MOB button wired directly to the Hercules MOB input.

Connecting an alarm device

The Alarm 1 and Alarm 2 outputs are rated for a maximum of 150 mA and up to 31.2 V each.

Each alarm output forms a N/O (normally open) switch with its 0 V pin.

Connect the wires of an alarm device such as a siren or light to the Hercules' Alarms port as shown below. The pin labels are shown as they appear on the printed circuit board.



Wiring for alarm device

A DC – (connect to supply)

B Alarm device, DC – switched (connect to alarm device)

C Alarm device, DC + (connect to supply)

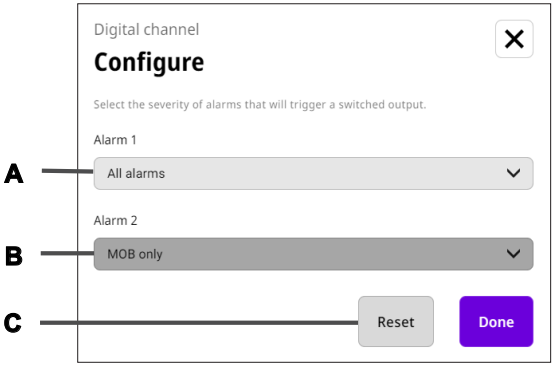
Alarms generated from a MFD

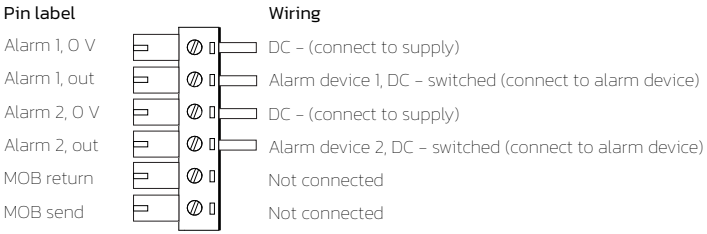
The Hercules sailing processors' alarm outputs can notify crew away from the helm about an alarm triggered on the multi-function display (MFD).

Use the MFD to define the data thresholds from sensors that will trigger alarm messages on the MFD (refer to the documentation for your MFD).

On the Hercules web interface, navigate to **Inputs/Outputs > Connector alarms > Digital channel**, and use the drop-down menus to select the severity of alarms which trigger Hercules alarm outputs 1 and 2, respectively.

In the configuration example below, **Alarm 1** will start for **All alarms** (**A**) that appear on a connected MFD. **Alarm 2** will start when **MOB only** (**B**) appears on a connected MFD.





→ ***Note**: The **Reset** (C) button on the configuration menu resets the alarm settings to their defaults. You must use the MFD display to stop or clear an alarm that has been passed to Hercules from the MFD.*

Alarms generated from Hercules' MOB input

Connect a push button to the **MOB send** and **MOB return** pins on a Hercules series sailing processor to create a crew overboard (Man Overboard, MOB) button that can be mounted anywhere on the vessel.

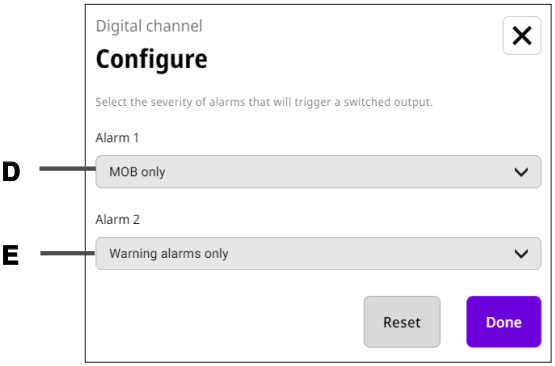
Connect your MOB alarm device, such as a loud siren, to the **Alarm 1 out** and **Alarm 1 0V** pins of the alarms port on the printed circuit board.

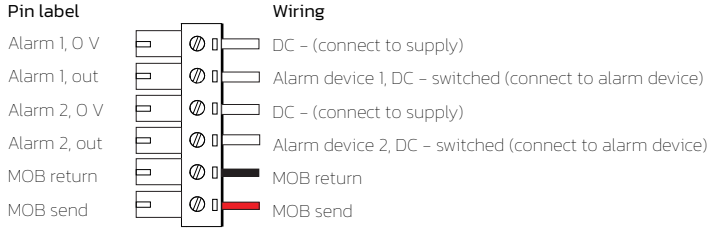
On the web interface, navigate to **Inputs/Outputs > Connector alarms > Digital channel**, and set **Alarm 1** to **MOB only** (**D**). **Alarm 1** will start when the button is pressed or when a MOB alarm is raised on a connected multi-function display.

The push button simultaneously raises a MOB event on the NMEA 2000® network. The MOB position, and in some cases, MOB dead reckoning position, show on connected displays.

→ ***Note:*** *MOB input pins are programmed so that a short press of the push button triggers (starts) the alarm, and a long press of the push button (> 3 seconds) stops the alarm.*

In the configuration example below, **Alarm 1** starts for a MOB event (**MOB only** (**D**)), and a different alarm (**Alarm 2**) starts for any **Warning alarms** (**E**) on the MFD.

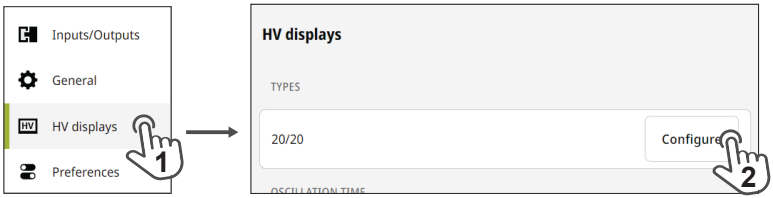




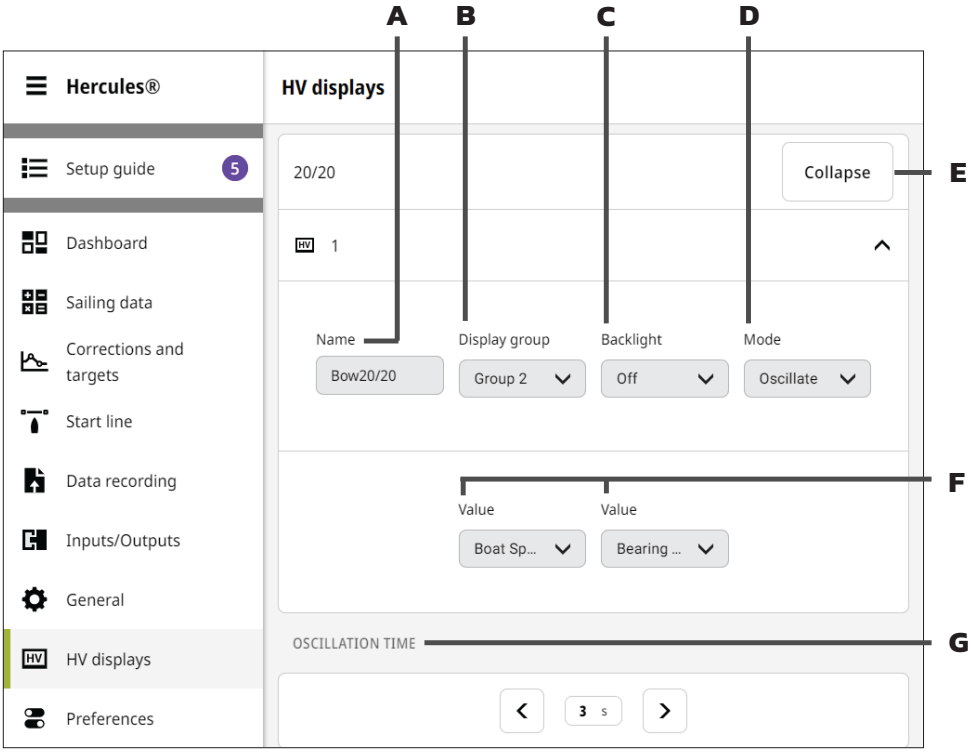
HV DISPLAYS

A B&G HVision display (HV display) connected to the NMEA 2000® network can be configured using the Hercules web interface.

Select **HV displays** (1) from the main menu. Connected displays are listed by their type. Select **Configure** (2) to configure each HV display.



→ ***Note:*** *The **HV displays** menu is only visible when one or more HV displays are connected.*



A **Name**—Select to edit the name of a display. If you have several HV displays on the network, renaming them according to their location might help you identify them for easy configuration.

B **Display group**—Assign the display to a display group to change settings for that group of displays simultaneously.

C **Backlight**—Adjust the backlight on the selected display.

D **Mode**—Set the contexts for the data displayed. For example, display a single data type continuously, or display different data types depending on whether you are sailing upwind or downwind.

E **Collapse**—Collapse the configuration menu for this HV display.

F Display values: 1st value, 2nd value—Use the drop-down lists to select the data types displayed on this HV display.

→ ***Note:*** *The visible options are determined by the* ***Mode*** *setting.*

G **Oscillation time**—Sets the duration, in seconds, a data type displays before switching to a different data type.

→ ***Note:*** *Not all modes allow oscillation.*

SOFTWARE UPDATES

Software updates for Hercules sailing processors are released from time to time and we recommend installing these as they become available.

Hercules series sailing processors use different software packages and must be updated individually.

Updates to Hercules and Hercules WTP

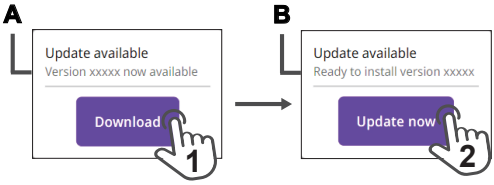
Download directly to Hercules from the internet

Hercules and Hercules WTP check for software updates when their Ethernet networks are connected to the internet.

When a software update is available, the notification **Version X now available** (A) appears on the web interface's main menu.

Select **Download** (1) on the notification to download the update file to Hercules (an internet connection is required).

When the notification changes to **Ready to install version X** (B), select **Update now** (2) to proceed.



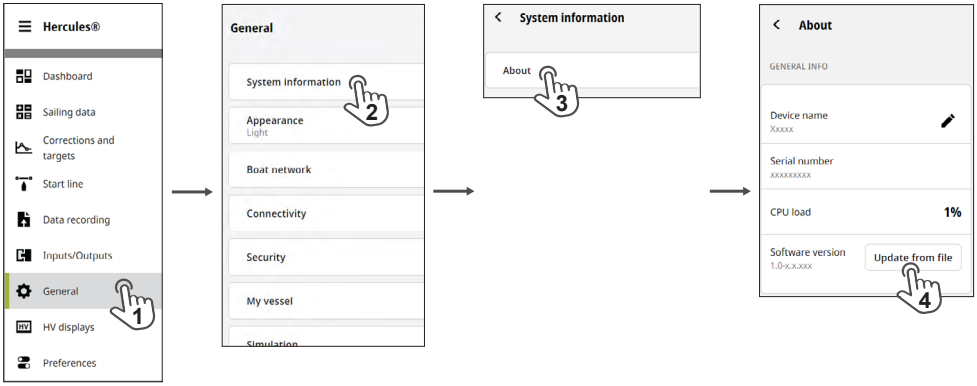
During the update, the sailing processor will briefly close its Ethernet connection and the web interface will show a message stating the sailing processor is unavailable. The web interface will relaunch automatically after about 60 seconds.

Updating software will not overwrite your details, preferences, correction tables, recorded data files, or calibration settings.

Update from file

The B&G app notifies you when software updates are available for registered devices. Use the app to download the update file to your mobile device using mobile data or an internet connection. Alternatively, you can download an update file from the B&G website. Go to **www.bandg.com/downloads/hercules** to update a Hercules processor, or go to **www.bandg.com/downloads/herculeswtp** to update a Hercules WTP processor. To install the software on a Hercules or Hercules WTP, connect your mobile device to the Hercules or Hercules WTP and use the web interface to navigate to **General** (1) > **System information** (2) > **About** (3) > **Software version**.

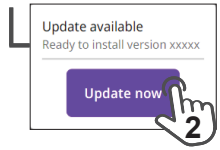
Select **Update from file** (4).



Locate and select the .upd file you downloaded to your mobile device.

When the notification changes to **Ready to install version X** (B), select **Update now** (2) to proceed.

B



During the update, the sailing processor will briefly close its Ethernet connection and the web interface will show a message stating the sailing processor is unavailable. The web interface will reopen automatically after about 60 seconds. (The PWR LED on the front of the unit will light steady green when the update and any necessary reboots have finished.)

Updating software will not overwrite your details, preferences, correction tables, recorded data files, or calibration settings.

Updates to Hercules Expansion

➔ ***Note**: To determine the software version currently installed on your Hercules Expansion, use the Hercules web interface to navigate to* **General > Boat network > All devices** *and select* **Hercules Expansion**.

Download the most recent Hercules Expansion update file to your phone, tablet, or laptop, from **www.bandg.com/downloads/herculesexpansion**.

Transfer the file to a microSD® card (maximum size 256 GB and FAT32 formatting). When you are ready to update Hercules Expansion, power off the unit and the sailing processor connected to it. Then insert the microSD® card into Hercules Expansion, and power on the unit. The software update will begin automatically. (The PWR LED on the front of the unit will light steady green when the update and any necessary reboots have finished.)

Updating the software will not change any of the Input/Output or calibration settings used by Hercules Expansion.

HERCULES WTP SCRIPTING SDK

The Hercules WTP sailing processor has the same installation, connectors, and simple web interface operation as the Hercules sailing processor.

In addition, Hercules WTP offers a software development kit (SDK) for writing custom scripts for your sailing processor using Python®. You can develop and debug your scripts locally on your PC using your preferred Python® Integrated Development Environment (IDE), then install your scripts on your Hercules WTP to perform tasks such as:

- reading data from the boat system sensors and devices,
- applying filtering or further calculations to the data,
- writing data back into the system for display on instruments and multi-function displays (MFDs).

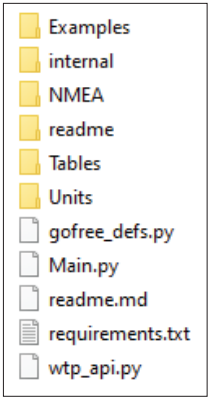
Requirements for your desktop PC or laptop

The desktop PC or laptop you use for writing scripts must have:

- an internet connection
- a port (or adaptor) for a microSD® card
- the ability to join the same Ethernet network as your Hercules WTP
- Python® installed
  - The minimum version of Python® required is Python 3.10, 64 bit. Go to **https://www.Python.org/downloads/release/Python-3100/** and follow the instructions to download and install Python® on your PC.
- an Integrated Development Environment (IDE).
  - Many Python® IDEs are readily available on the internet and many are free of charge. Select an IDE to download, and install it on your PC.
- the B&G Hercules WTP SDK
  - Download the Hercules WTP SDK to your PC from **www.bandg.com/downloads/herculeswtp**. If any folders are compressed (zipped), extract them.

Structure of the SDK

The SDK is presented as a folder called **Scripts**. The typical contents of the **Scripts** folder is shown below.



Readme.md

The SDK includes a text file called **readme.md** that can be opened and viewed in any text editor. Refer to **readme.md** for essential, up-to-date information about the structure of the SDK you downloaded, how to use its features, and examples of code.

Python libraries

Python® libraries for science and engineering are preinstalled on Hercules WTP. The text file **requirements.txt** in the SDK lists the libraries and versions that are included.

Examples

The folder in the SDK called **Examples** contains complete Python® scripts that you can adapt or copy for your use. The scripts are separated into folders whose names indicate the function of the script.

API

The Hercules WTP Application Progamming Interface (WTP API) provides a simple to use asynchronous interface. Scripts included in the **Examples** folder of the SDK illustrate how to include the WTP API in your scripts. For example, any script you write must call the API function `wtp_api.run()` in order to start.

Writing and debugging a script

You can write and debug scripts using the SDK on your PC. To enable a locally running script to communicate with the Hercules WTP, the PC and Hercules WTP need to be on the same Ethernet network, and the script needs the IP address of Hercules WTP on the network.

→ ***Note:*** *Refer to* ***readme.md*** *in the SDK for details on how to pass Hercules WTP's IP address into your code.*

Installing a script on Hercules WTP

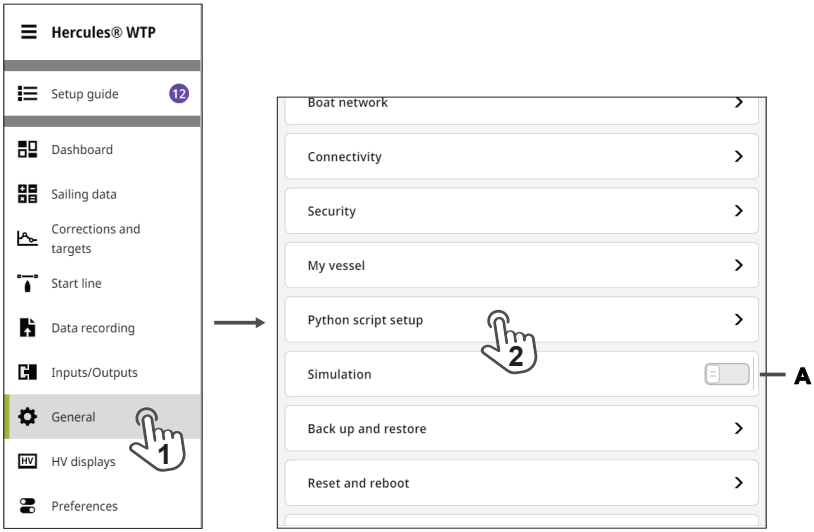
Scripts are stored on, and run from, a microSD® card inserted into the Hercules WTP.

The names and organisation of the files on the microSD® card is important. Copy the entire SDK from your PC to the microSD® card, ensuring that the **Scripts** folder is on the root of the microSD® card and that the Main.py script you want to deploy is inside **Scripts**.

```
MicroSD Memory Card
|-- Scripts/
       |-- Main.py
       |-- internal/
       |         |-- internal files
       |-- wtp_api.py
       |-- gofree_defs.py
```

To install a new Python® script on Hercules WTP, use the Hercules WTP web interface to navigate to **General > Python script setup** (1,2).

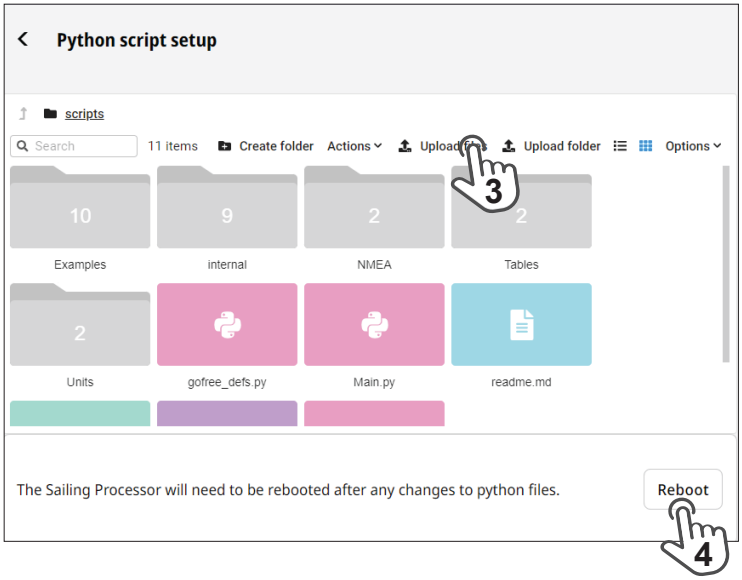
→ ***Note**: The slider for **Simulation** should be in its OFF postion (**A**) if you are executing a script that writes data to the Hercules WTP.*



The microSD® card, correctly loaded with the SDK, should be inserted into the Hercules WTP. If the microSD® card is not detected, a message on the web interface prompts you to insert it.

The file manager on the Hercules WTP web interface lets you navigate the SDK on the microSD® card. Select **Upload** (3) to browse files on your connected PC. Select one or more files to upload to the microSD® card. Select **Reboot** (4) to execute the files and apply the changes you uploaded.

→ ***Note:*** *A file will only be executed by Hercules WTP after rebooting, if its title is* ***Main.py*** *and it is located in the* ***Scripts*** *folder on the root drive of the microSD® card.*



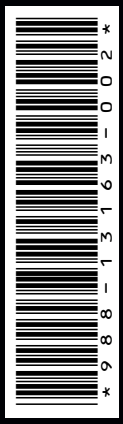
→ ***Note:*** *To reboot Hercules WTP at a later time, use the Hercules WTP web interface main menu to navigate to* ***General > Reset and reboot****.*

Executing a script

When a microSD® card containing the SDK is inserted, and the Hercules WTP is started up, the file **Main.py** in the **Scripts** folder on the card will run automatically.

If you want to change the action of the script, you need to edit **Main.py**, upload the updated version to Hercules WTP, and reboot Hercules WTP.

If you want to stop a script from executing, remove **Main.py** from the **Scripts** folder on the microSD® card and reboot Hercules WTP, or simply remove the microSD® card from Hercules WTP.



50°45'3.186"N
1°31'45.971"W

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