B&G

Triton

Operation Manual

ENGLISH

bandg.com

Preface

As Navico are continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the instrument and transducers in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

NAVICO HOLDING AS AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Copyright

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand web site of your display or system:

www.bandg.com

About this manual

This manual is a reference guide for operating the B&G Triton instrument and Pilot controller. It assumes that all equipment is installed and configured, and that the system is ready to use.

The manual assumes that the user has basic knowledge of navigation, nautical terminology and practices.

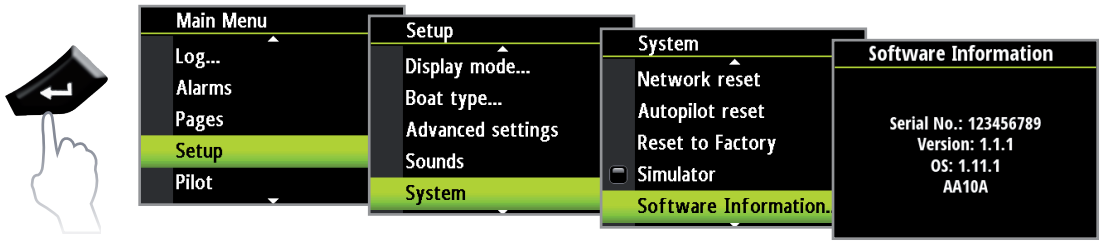
Important text that requires special attention from the reader is emphasized as follows:

→ ***Note:*** Used to draw the reader's attention to a comment or some important information.

> ⚠ **Warning:** Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

The software

This manual is written for B&G Triton Release to Market 2 (RTM2). Please check web site for details on the current release version.



➔ ***Note:*** The menu route shown above is an example only and may not match the software installed on your unit!

➔ ***Note:*** To update the software you will need a compatible multifunction display / chartplotter running on the network. eg. B&G Zeus multi function display (MFD). If you do not have a suitable device on the network you can arrange to update the software via a B&G dealer.

You can download the latest version of the software from www.bandg.com and upgrade the displays via the B&G MFD, instructions on how to do this can be found on the B&G website. www.bandg.com

➔ ***Note:*** The manual may have been updated to match new software releases. The latest available manual version can be downloaded from www.bandg.com

➔ ***Note:*** Portions of this software are copyright © 2011 The FreeType Project (www.freetype.org). All rights reserved.

Contents

1 Operation

The B&G Triton system is a networked multifunction instrument display and Pilot controller. The display shows speed, depth, heading, position, wind and environmental data measured by sensors and other equipment connected to the system.

Navigational data, engine/battery status and vessel parameters such as accumulated log and rudder angle may also be displayed.

The instrument calculates speed trim, wind, trip distance and time, average speed, set and drift parameters. A race timer is also included.

If a compatible autopilot is installed and connected to the same network it can be controlled by the Pilot controller.

The Triton Display and Pilot Controller

1 Display

2 Menu / Enter key

Used to enter the main menu, select sub menus and confirm selection.

→ ***Note:*** Press and holding the Enter key for 3 seconds takes you directly to the display setup lighting level screen. If the lighting level is set below 5 it will automatically increase to 5. Use the up and down keys to set the desired level and press Enter to confirm.

3 Page key

Scrolls through the eight default display pages and navigates back a step in menus.

→ ***Note:*** the eight default display pages including Pilot page can be customized to display the required data.

4 Directional keys

Scrolls up and down through selected menus / set values.

5 Pilot Controller

6 Mode key

Changes the Pilot mode.

7 STBY key

Disengages the autopilot.

8 Course control keys

Changes target course / Activates Non Follow Up (NFU) mode when in Standby mode.

9 Auto key

Engages the autopilot.

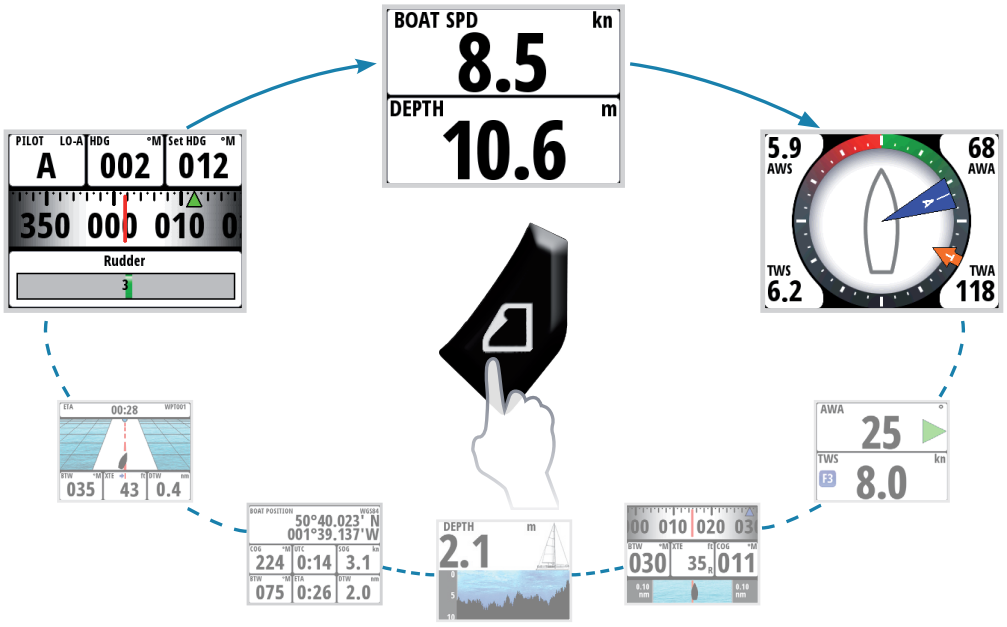
Pages

From new the display shows eight default data pages. Data pages show a variety of boat data and information available from sensors and devices on the Network.

The display default pages show: Basic speed/depth, wind composite, basic wind/speed, steering, depth history, GPS, highway and autopilot.

Each press of the page key will change the current data page to the next preselected page in the cycle.

➔ ***Note:*** Pressing the page key will change the data pages in sequence and in continuous rotation.



You can choose to have up to eight pages as part of the data page cycle, these can be any combination of the eight default and nine template pages available from the pages menu.

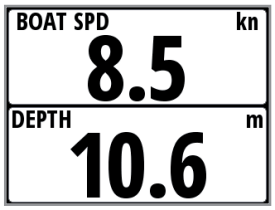
➔ ***Note:*** Only seven pages will be available when in Instrument Only display mode.

➔ ***Note:*** Two or more pages need to be enabled for the page key to function.

Default pages

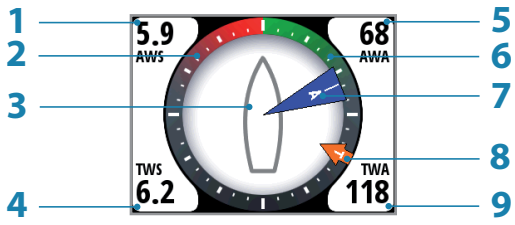
Basic Speed / Depth

Two line data display. Boat speed and Depth



Wind Composite

The wind composite page presents the following information:



1 **Apparent wind speed (AWS)**

2 **Red - Close hauled port tack**

3 **Boat orientation. (Always pointing forwards)**

4 **True wind speed (TWS)**

5 **Apparent wind angle (AWA)**

6 **Green - Close hauled starboard tack**

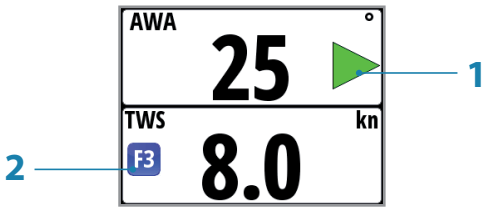
7 **Apparent wind angle graphic**

8 **True wind angle graphic**

9 **True wind angle (TWA)**

Basic Wind / Speed

Two line data display. Apparent Wind Angle and True Wind Speed

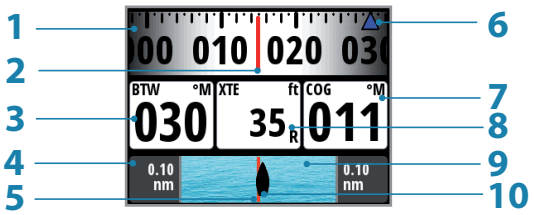


1 **Wind angle indicator - Green arrow right = Starboard tack. Red arrow right = Port tack**

2 **Beaufort scale indicator**

Steering

The Steering page presents the following information:



1 **Compass graphic (Heading)**

2 **Heading**

3 **Bearing to waypoint (BTW)**

4 **Off track limit**

5 **Rhumb line**

6 **Bearing to waypoint indicator**

7 **Course over ground (COG)**

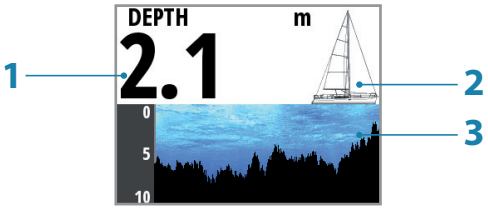
8 **Cross track error (XTE) R = Right / L = Left**

9 **Cross track error graphic**

10 **Boat position from rhumb line**

Depth History

Current depth and histogram of recorded depth data.



1 **Depth value**

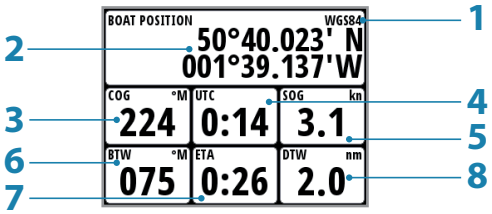
2 **Boat type - Sail or Motor boat image**

3 **Depth graphic**

→ ***Note:*** You can adjust the time period scale via the up & down keys.

GPS

The GPS page presents the following information:



1 **Coordinate system**

2 **Boat position (Latitude & Longitude)**

3 **Course over ground (COG)**

4 **Local time**

5 **Speed over ground (SOG)**

6 **Bearing to waypoint (BTW)**

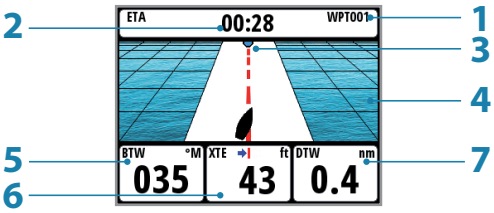
7 **Estimated time of arrival (ETA)**

8 **Distance to waypoint (DTW)**

→ ***Note:*** GPS information relies on a suitable GPS connected to the network and selected on the display as the current GPS.

Highway

The Highway page presents the following information:



1 **Waypoint name**

2 **Estimated time of arrival (ETA)**

3 **Next waypoint**

4 **Highway graphic**

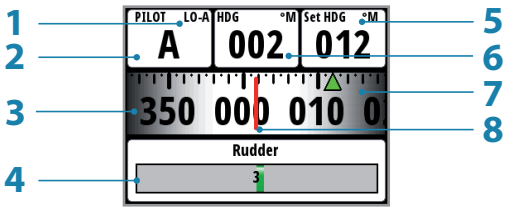
5 **Bearing to waypoint (BTW)**

6 **Cross track error (XTE)**

7 **Distance to waypoint (DTW)**

Autopilot

The Autopilot page presents the following information:



1 **Response mode**

2 **Pilot mode**

3 **Compass graphic (Heading)**

4 **Rudder angle graphic**

5 **Set heading / Wind angle / Rudder angle**

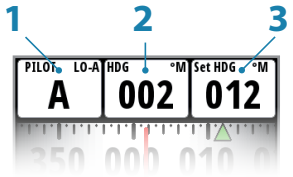
6 **Current heading / Wind angle**

7 **Set heading indicator - Green = Starboard / Red = Port**

8 **Heading**

Pilot modes

The current heading and Set heading information will change on the display depending on which mode the pilot is in. Below is a list of the pilot modes, pilot mode symbol and the current/target data that will be displayed.



1 **Pilot mode / Pilot mode symbol**

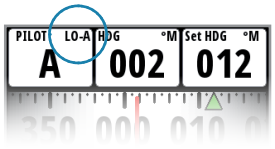
2 **Current**

3 **Target**

Pilot Mode	Symbol	Current	Target
Standby	S	Heading	N/A
Auto	A	Heading	Set heading
Non FollowUp	NFU	Heading	Rudder Angle
Navigation	N	Heading	Set heading
Wind	W	True Wind Angle (TWA)	Set Wind Angle
		Apparent Wind Angle (AWA)	
NoDrift	ND	Heading	Set heading

Response modes

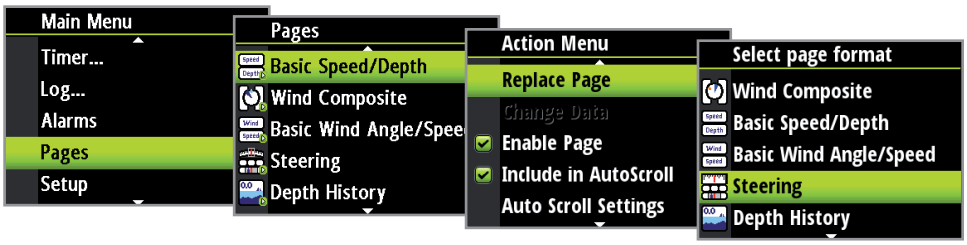
The response mode is next to the Pilot mode symbol. Select auto or hi/low manual modes from the pilot response settings in the pilot menu.



Response Mode	Symbol	Description
Auto	Hi-A Lo-A	When set to Auto the pilot will automatically select a high or low response mode determined by boat speed and wind angle
Hi	Hi-M	Manual selection of Hi response mode
Lo	Lo-M	Manual selection of Lo response mode

Replacing a data page

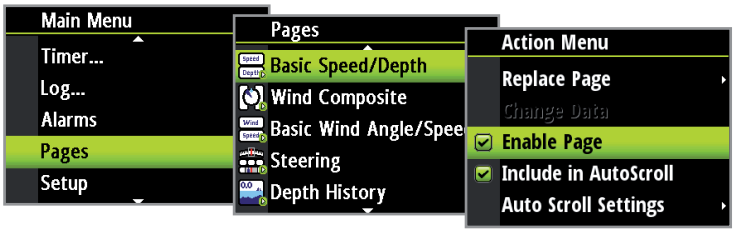
Go to the pages menu. Select the page you wish to replace then select the new page you would like to replace it with.



Enabling a data page

To make a data page available via the page key you will need to first ensure it has been selected as one of the eight available pages.

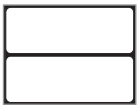
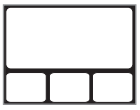
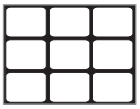
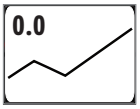
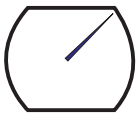
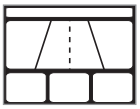
Once the page has been selected as one of the eight data pages you can enable it by selecting Enable Page. Once selected a tick will be visible in the check box.



Template pages

There are several template pages that can be configured to display specific data suited to the user.

Chose from the following:

Template Page	Symbol	Description
Single Line		One piece of data
Two Line		Two pieces of data on a split level, top and bottom
Four Panel Horizontal		Four pieces of data. One on top and three below
Four Panel Equal		Four pieces of data. Split equally
Nine Panel		Nine pieces of data. Split equally
Histogram		Displays data as a histogram with a data value shown above
Analog		Displays data as an analog display
Full Screen Analog		Displays data as a full screen analog display
Highway		Highway graphic with three pieces of data below
Wind Plot		True Wind Speed (TWS) & True Wind Direction (TWD) data

Customizing a template page

Once selected you can change the displayed data by editing the page.

Change data

You can edit a template page so it displays the specific information that you require.

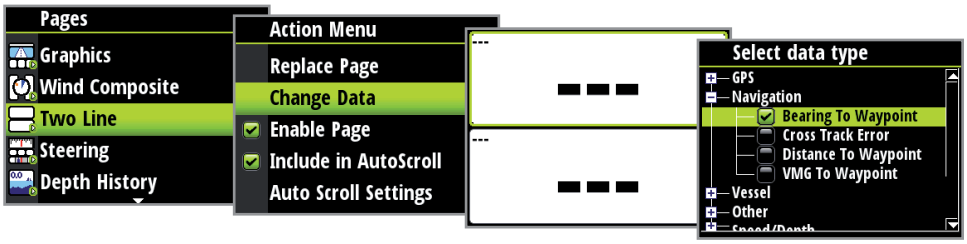
➔ ***Note:*** A template page cannot be edited until it has been selected as one of the eight data pages.

To change the display data shown on a template page first select the template from the pages menu. In the action menu select Change Data. Highlight the desired field in the page you wish to edit and press 'Enter'

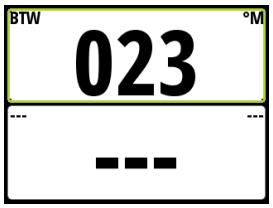
➔ ***Note:*** Use the directional keys on the display to navigate between the individual data fields. Pressing the directional key in one direction will change the highlighted field in sequence and in continuous rotation.

Once the data field has been selected you can chose the data type you wish to place in this field from the menu.

Select the data type by pressing 'Enter' Once selected a tick will appear in the check box.



The required data will now appear in the selected field. To populate other blank fields repeat the process.



➔ ***Note:*** If a data type is selected but there is no sensor on the network providing the information there will be no data reading on the display. Instead there will be dashes.

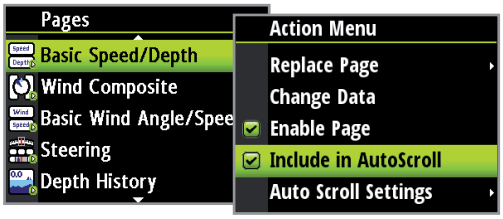
➔ ***Note:*** Press the page key at anytime to return to the template.

Auto scroll

When selected, auto scroll automatically scrolls between the enabled pages at a timed interval predetermined by setting the desired scroll time in the auto scroll settings menu.

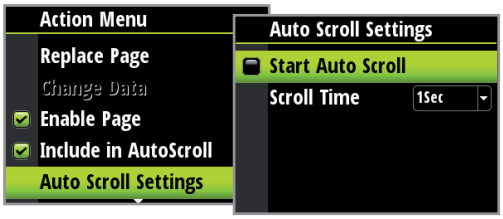
Include in auto scroll

To include a page in auto scroll, go to the auto scroll settings in the action menu of the specific page and select Include in auto scroll. Once selected a tick will appear in the check box.



Auto scroll settings

In the auto scroll settings menu you can start the auto scroll function and set the time interval between page changes.



→ ***Note:*** The scroll time interval can be set to change the displayed data page between 1 and 10 second intervals.

Start auto scroll

To start auto scroll, select any of the data pages from the pages menu, select Auto scroll settings and select Start auto scroll. Once selected a tick will appear in the check box and the display will scroll through the pages on a cycle set to the desired auto scroll interval. To stop auto scroll deselect Start auto scroll.

→ ***Note:*** You can set the time interval of the screen transition from this menu, by selecting Scroll time and modifying the interval time.

Timer

The timer can be used as a countdown timer to a race start and as a means of measuring the time elapsed after a race start or for any other timed operation.

➔ ***Note:*** The timer is by default shared between interconnected displays on the network. All timer values will be identical.

The timer can be started at any time by selecting Start Timer from the timer setup menu. If the Start value is set to zero (00:00) when the timer is started the timer will begin counting up, recording the elapsed time.

➔ ***Note:*** The timer set value is in hours : Minutes, the timer counter will show Minutes : Seconds with the hours in the top right hand corner of the display.

Countdown Timer

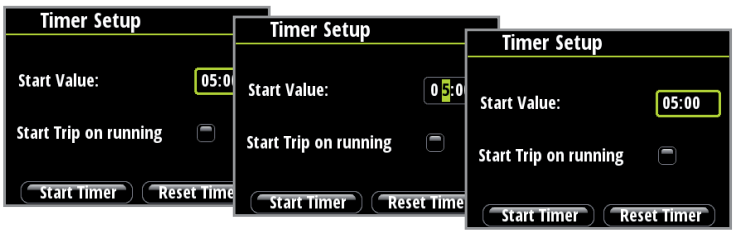
If you want to count down to a race start a time value can be set in the Start Value field in the timer setup menu. When a time is present in the start value field the timer will begin to countdown from that number when the timer is started. Once the time reaches zero it will begin counting up recording the elapsed race time.

➔ ***Note:*** Time format = Hours (Shown in the top right-hand corner) Minutes : Seconds (MM:SS).

Start Value

To set a start value. Highlight and select Start Value. Pressing the 'Page' key will scroll through the race timer digits from left to right. When the desired number is highlighted, scrolling up and down will change that digit. Once complete press 'Enter' to confirm.

➔ ***Note:*** Minimum timer value greater than zero is one minute.



Start/Stop Timer

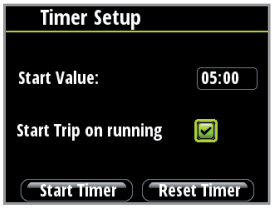
Once a start value has been set, to start the timer, highlight Start timer and press 'Enter'. The display will turn to the timer page and begin counting accordingly. To stop the timer from counting select Timer Setup , highlight Stop Timer and press 'Enter'.

Reset Timer

Selecting Reset timer will reset the timer to the start value. If the timer was running, it will continue to run from the start value.

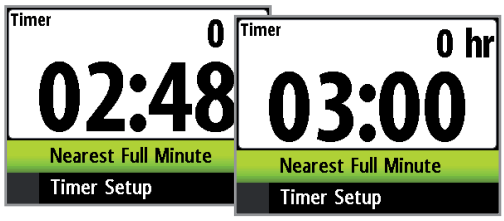
Start Trip on Running

When selected the trip log will record your time and millage from the moment the countdown clock begins counting up from zero.



Nearest Full Minute

When the timer is counting down selecting Nearest Full Minute will synchronize the time up or down to the nearest full minute.



Log

The Log page presents the following information:

1 **Current trip distance**

2 **Current time**

3 **Total logged distance**

4 **Current date**

The log shows the current time and date, total recorded distance for the instruments life time and trip log showing total distance travelled from the time of the trip reset and the selection of Start trip. Once started it will change to Stop trip. The trip log counter will continue to count up until it is stopped.

→ ***Note:*** The Log and Date cannot be reset. The date is taken from the global time and date settings. The time can be set to correspond with your global position.

Reset trip and time

To reset the trip and time to zero select Reset trip and time.

Alarms

If you have the relevant sensor connected to the network you can enable the corresponding alarm by selecting it from the Alarms list.

Alarm on / off

Turn an alarm on or off from the alarm list. A tick symbol next to the alarm in the alarm list will indicate that the alarm is on.

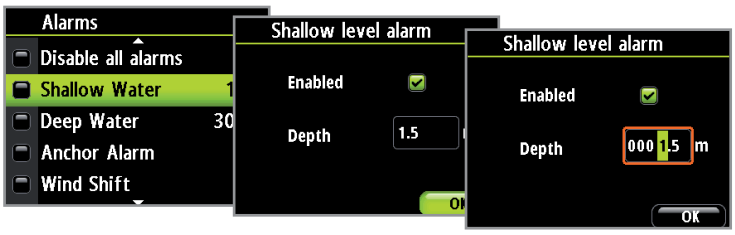
→ ***Note:*** It is possible to disable all alarms by selecting Disable all alarms

Setting alarm parameters

Selecting an alarm that requires parameters to be set will take you to its alarm page. Set the required parameter, select Enabled and select OK once complete.

The alarm can be disabled by deselecting Enabled.

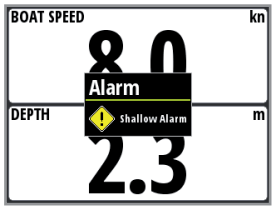
Below is an example of how to set a shallow water alarm. Select Enabled and set the desired depth.



Alarm indication

The alarm system is activated if any alarm settings are exceeded.

When an alarm is notified, the alarm will be indicated with an alarm text and with an audible alarm. There are two types of audible alarm indication. Single alarm tone or continuous alarm tone.



→ ***Note:*** See Alarm settings for further details on how to set an alarm.

→ ***Note:*** If a Pilot is not on the network all Pilot alarms will be greyed out and will not be accessible.

If the display is connected to other Network units, any alarm in the system will be displayed on the instrument.

If no specific alarm text is displayed, an alarm code will appear.

Acknowledging an alarm

An alarm is acknowledged by pressing the 'Enter' key. This will remove the alarm notification (text, light and sound) from all units that belongs to the same alarm group.

A reminder will reappear at given intervals for as long as the alarm condition exists.

→ ***Note:*** An alarm received from other networked units must be acknowledged on the unit generating the alarm.

Analog display alarm zones

For True Wind Speed (TWS), and deep and shallow depth alarms a red warning zone will be visible on the analog display to give you a visual indication of alarm zones.

1 **Shallow depth alarm**

2 **Deep water alarm**

Alarm types

Alarm	Value	Alarm description	Type
Disable all alarms	OFF	All alarms off.- NO Alarms will be raised!	Cont'
Shallow water	m	Shallow water limit - Meters	Cont'
Deep water	m	Deep water limit - Meters	Cont'
High wind	kn	Max wind speed - Knots	Cont'
Off course	nm	Max off course distance - Nautical miles	Cont'
Anchor alarm	N/A	Use when at anchor. The alarm will sound when there is a significant change of depth caused by a change in tide or boat drifting into deeper or shallower water. The anchor depth alarm value is predefined in the software and cannot be configured by the user. The anchor alarm should be turned off when the boat is not at anchor.	Cont'
Pilot system alarms only			
Wind shift	°	Maximum wind shift - Degrees	Cont'
Depth data missing	N/A	Missing data	Single
Wind data missing	N/A		Single
Navigation data missing	N/A		Single
Compass data missing	N/A		Single
Speed data missing	N/A		Single
Position data missing	N/A		Single
Rudder feedback failure	N/A	Pilot failure	Cont'
Rudder response failure	N/A		Cont'
Drive overload	N/A		Single
High temperature	N/A		Single
Bypass/clutch overload	N/A		Single
Bypass/clutch disengaged	N/A		Single
High drive supply	N/A		Single
Low drive supply	N/A		Single
No active control unit	N/A		Single
No autopilot computer	N/A		Single
ACXX Memory failure	N/A		Single
RF must be calibrated	N/A		Single

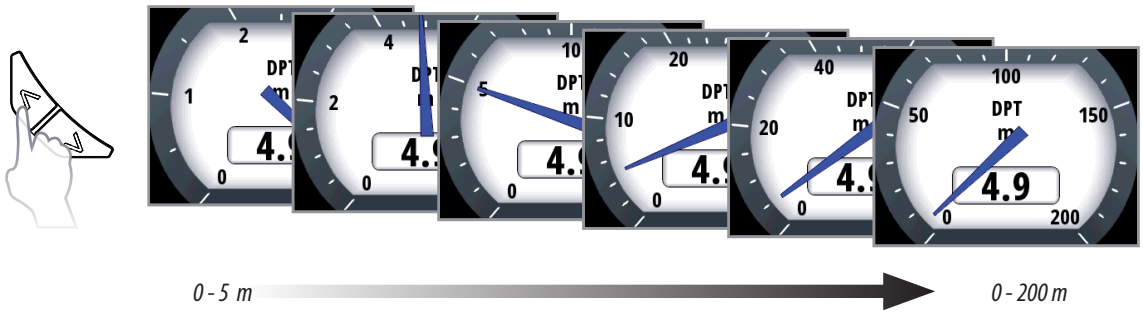
➔ ***Key:*** Alarm type. Single = Single sound alarm, Cont' = Continuous sound alarm. Both types of alarm will have a notification appear on the display until the alarm is acknowledged.

Changing an analog display scale

For some full screen analog displays pressing the arrow keys will change the analog scale range. Select the scale range to suit your environment and requirements.

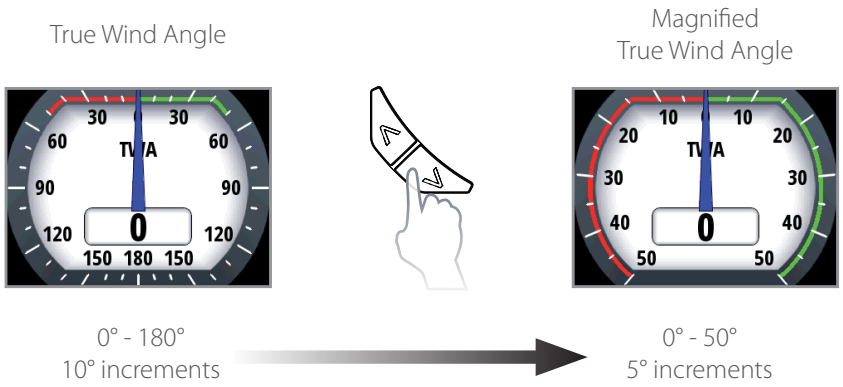
➔ ***Note:*** If the actual recorded data is greater than the selected analog scale, the analog needle will remain at the highest point on the scale. The digital window in the center of the display will show the actual value.

The example below shows the available scale range for the depth analog set to meters. Pressing the up arrow key scrolls through the available analog scales from 0-5 m through to 0 -200 m. Pressing the down arrow key will decrease the analog scale.



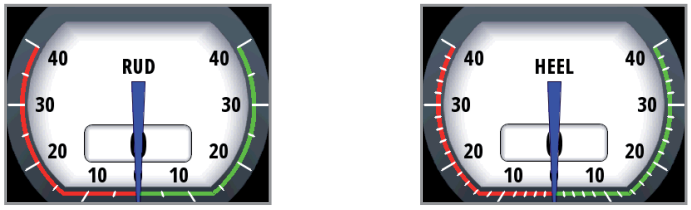
Magnified wind analog display

Changing the scale of a wind angle analog will change the display to the magnified wind angle.



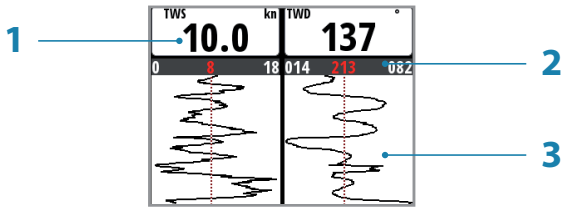
Rudder angle & Heel angle analog displays

The rudder angle and heel angle analog displays have an inverted scale with zero at the bottom.



Wind Plot display

The wind plot is a plotted graph over a specified timescale that shows True Wind Direction (TWD) and True Wind Speed (TWS).

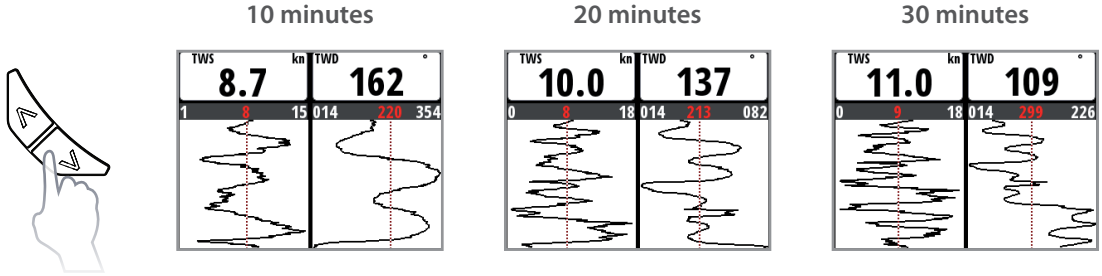


1 **True Wind Speed (TWS) / True Wind Direction (TWD)**

2 **Low / Average / High measurement for the time period shown**

3 **Plotted graph for the related TWS & TWD data**

Choose from 10, 20 or 30 minute time periods. The desired time period is selected by the arrow keys.



HV display support

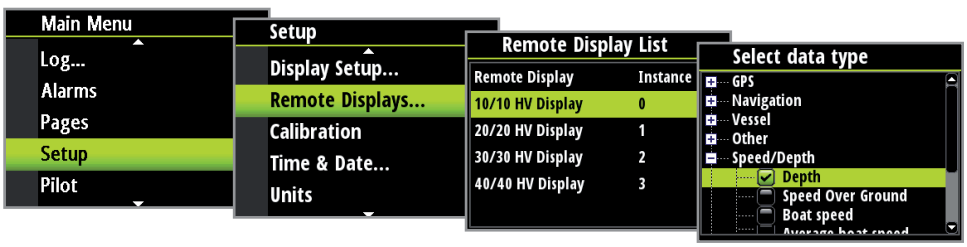
Any compatible B&G HV display connected to the network can be configured via a Triton display to show desired data e.g. speed, depth, wind speed.

→ ***Note:*** HV displays using the Fastnet network are not compatible with Triton.

→ ***Note:*** When an HV display is added to the network the default data displayed will be boat speed. If no boat speed data source is available the display will show the word 'OFF'

Remote displays

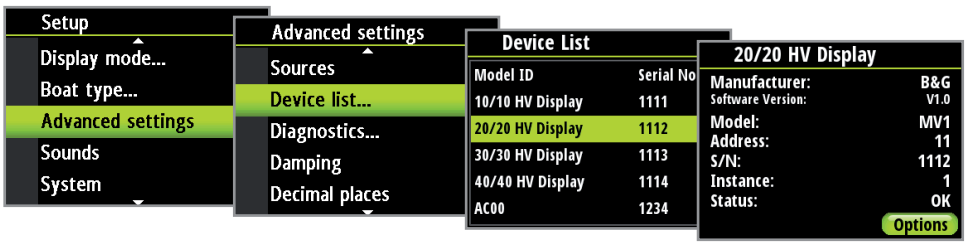
You can quickly access the HV display data selection page as shown below.



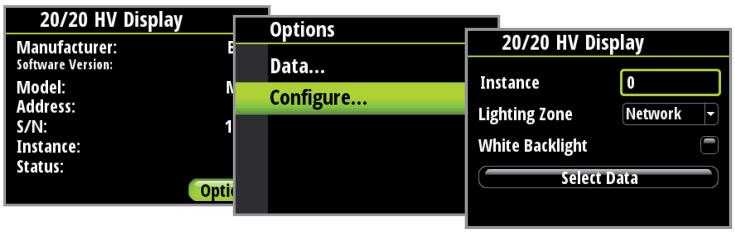
→ ***Note:*** You can differentiate between displays in the Remote display list by setting an instance number when you configure the remote display.

Configuring an HV display

From the device list menu, select the HV display that you wish to configure. The device details will be shown for that individual display.



Select the Configure option to access the display setup.



HV display Instance

The display instance is a number than can be set as a reference for the user to distinguish between different displays. For example you could set the instance numbers to be 1, 2, 3 top to bottom on three mast displays. By default the display instance is set to zero.

HV Lighting zone

Set the lighting zone on the display. All units in the selected lighting zone will mirror each others light settings. Default setting is network.

HV White Backlight

Changes the HV display to white backlight mode.

→ ***Note:*** This option is not available for the 10/10 HV display.

Selecting HV display data

Enables selection of the data to be shown on the selected HV display.

→ ***Note:*** This can be also be set via the Remote displays menu as described previously.

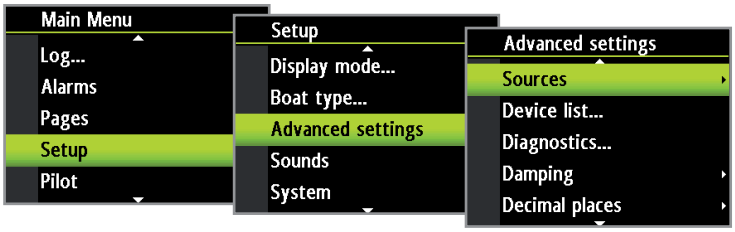
2 Setup

Sources

A data source can be a sensor or a device connected to the NMEA2000 network, providing information and commands to other networked devices. The data sources are normally configured at first time turn on. It should only be necessary to update this data if a new source is added, source is missing (sensor failure), source has been enabled/disabled, sensor replaced or a network reset.

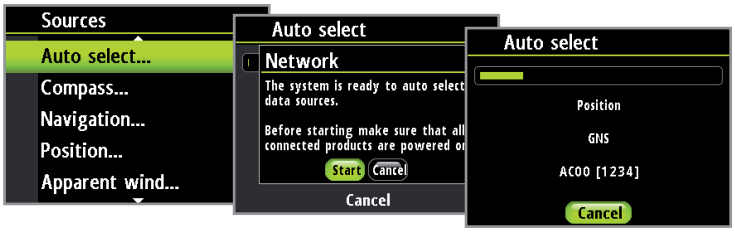
Auto select

The Auto select option will look for all sources connected to the instrument system. If more than one source is available for each item, the display will automatically select from the internal device priority list.

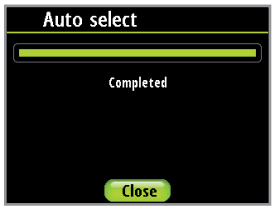


1: Verify that all interfaced units are powered on

2: Press the 'Enter' key to start the auto select procedure



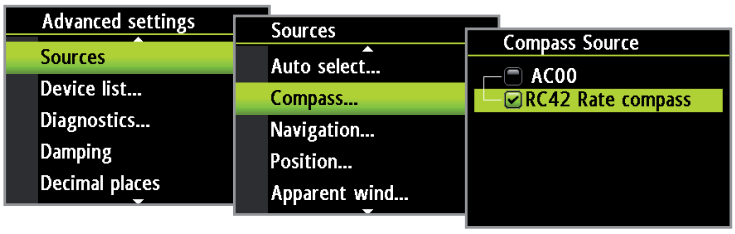
The operator will be noted when the auto select process is completed.



→ ***Note:*** If more than one source is available on the network you can chose your preferred source from the sources menu. See Manual source selection for more information.

Manual source selection

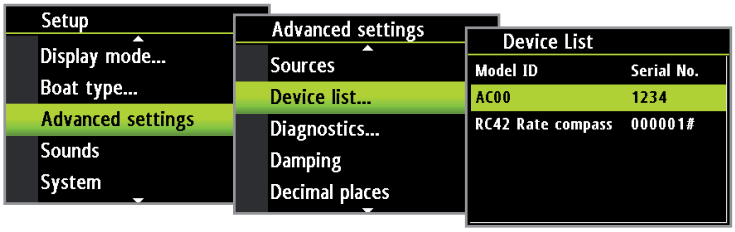
If more than one source is available for an item, the preferred source may be selected manually. As an example, the following illustrations show how the compass source is changed.



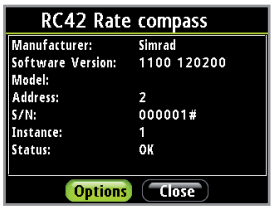
Select the preferred data source. The selected source will be indicated by a tick in the check box.

Device list

Shows a list of devices connected to the Network.



Selecting a device from the list will show you an information pane with details of that device.



Some devices such as an RC42 compass store their configuration, calibration and offset data in their own memory and not in the display memory. For devices of this type you can check the data information, configure and calibrate the device by selecting Options.

Data

The data list shows the data type that the device is transmitting.

Configure

Instance

Enter a number to differentiate between instances of the same device.

Offset

Certain devices will let you enter an offset value to compensate for the position of the sensor or variation of sensor data.

→ ***Note:*** Some devices can be configured further. If a device transmits other data it may be shown on this page also.

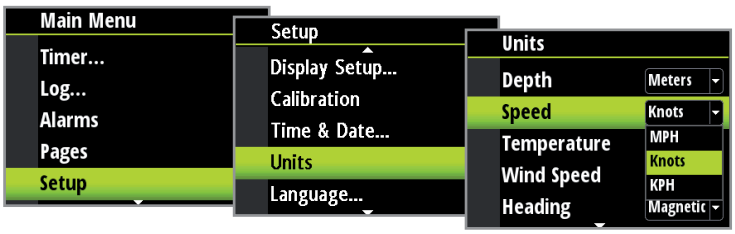
Calibrate

For compass sensors only, once installed you will need to calibrate the device

Select Calibrate and follow the instructions on the display.

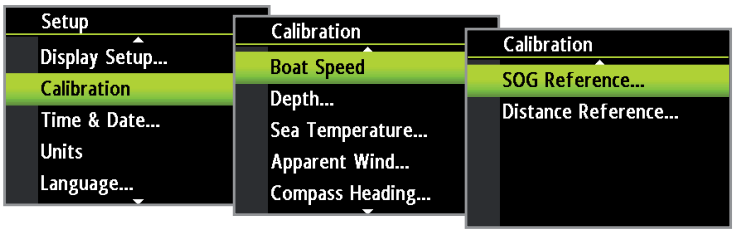
Boat speed

Speed calibration is necessary to compensate for hull shape and paddlewheel location on your boat. For accurate speed and log readings, it is essential that the paddlewheel is calibrated. Boat speed values can be shown in knots, kph or mph. Your preferred unit of measurement can be set in the units page of the setup menu.



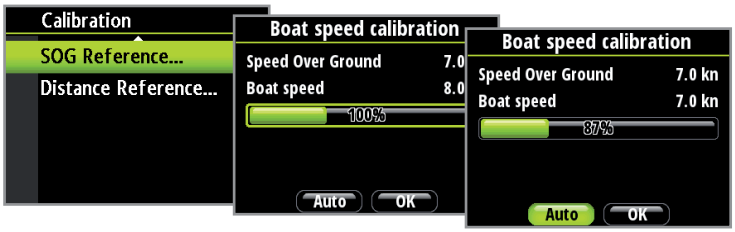
Auto - Calibration via reference to GPS SOG value

This is an AutoCal facility that uses speed over ground (SOG) from your GPS and compares the average of SOG against the average boat speed from the speed sensor for the duration of the calibration run.



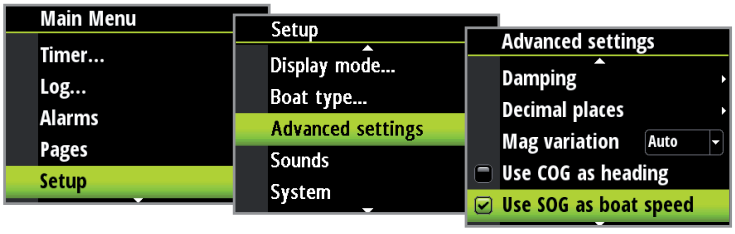
➔ ***Note:*** This calibration should be made in calm sea with no effect from wind or tidal current.

1. Bring the boat up to cruising speed (above 5 knots)
2. Select Auto on the Boat speed calibration page
3. When the calibration is completed the Boat speed calibration scale will show the adjusted percentage value of the boat speed.



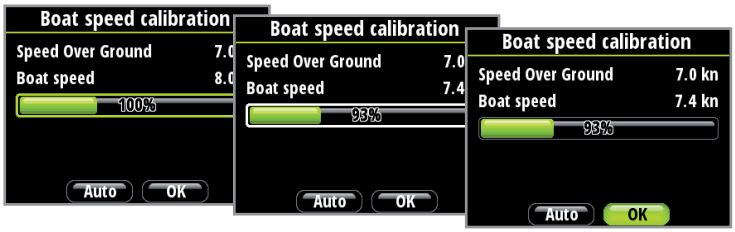
USE SOG as boat speed

If boat speed is not available from a paddle wheel sensor it is possible to use speed over ground from a GPS. SOG will be displayed as boat speed and used in the true wind calculations and the speed log.



Manual adjustment of boat speed

Adjust the boat speed manually by selecting the Boat speed percentage slider. Adjust the percentage up or down as desired. Confirm the value. Select OK once complete.



Distance Reference

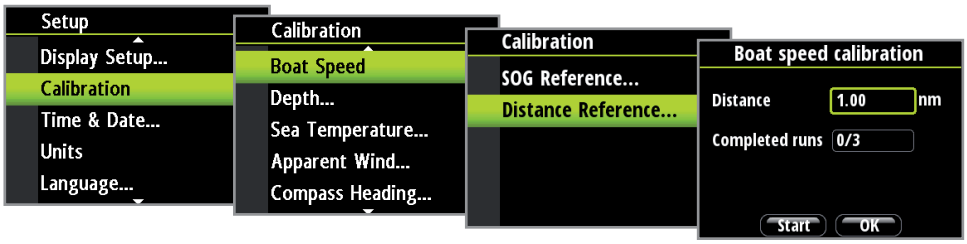
This facility enables the user to calibrate the log accurately and simply. Calculations are performed by the display that works out the boat speed over a known distance.

To calibrate the boat speed via a distance reference you will need to complete consecutive runs, under power at a constant speed made along a given course and distance.

➔ ***Note:*** To eliminate the effect of tidal conditions it is advisable to perform at least two runs, preferably three, along the measured course.

How To Calibrate via Distance Reference

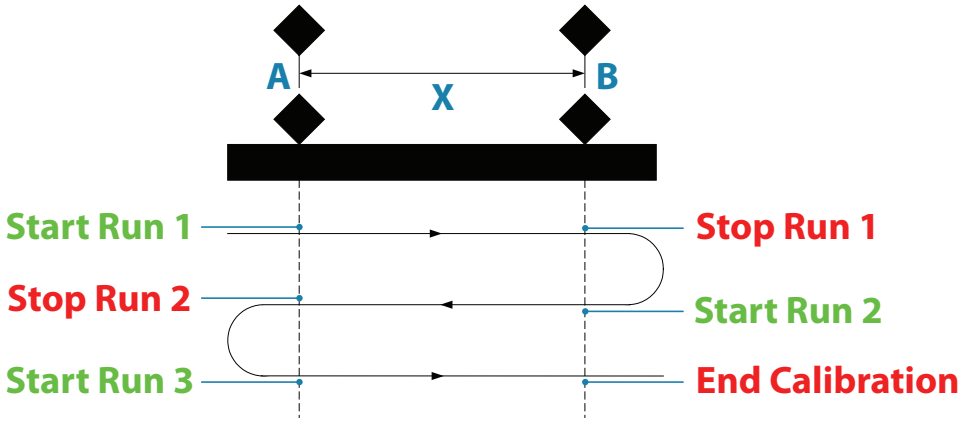
Enter the desired distance in nautical miles that you would like to calculate the distance reference over.



When the boat gets to the predetermined starting position of the distance reference calculation start the calibration timer.

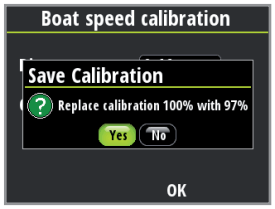
Distance reference diagram

Referring to the diagram, A and B are the markers for each run and X is the actual distance for each run as measured from a suitable chart.



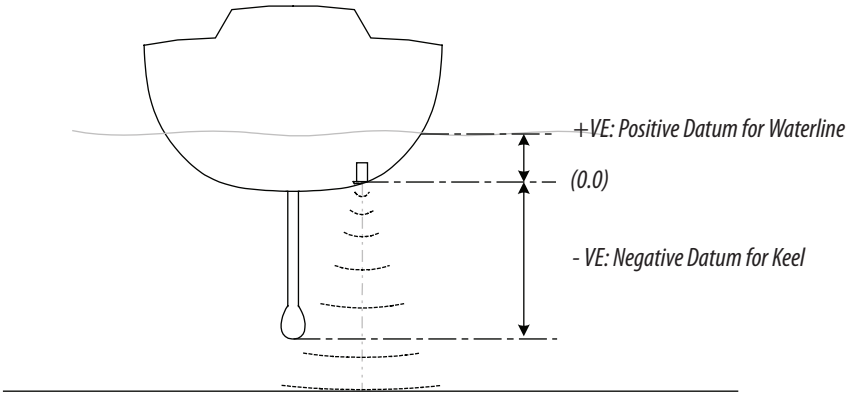
As the boat passes marks A and B on each run, instruct the system to start (Start Run) and stop (Stop Run) and finally OK to end calibration (End Cal Runs).

After the last run is completed and OK has been selected, a pop up warning will ask you if you wish to replace the current calibration with the new one. Select Yes to complete.



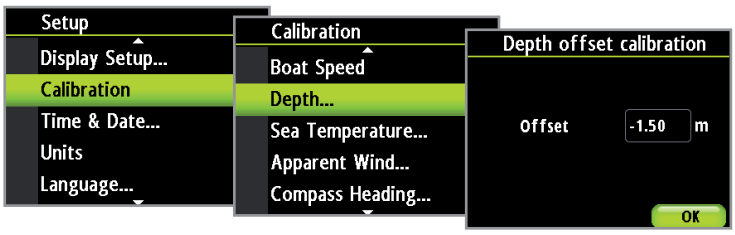
Depth

A typical transducer installation is through the hull in front of the keel. A datum (offset value) can be set, such that the depth display refers to either the water line or the base of the keel.



Setting the depth offset displays depth readings from directly below the keel or propellers of the boat, or from the waterline to the seabed. This makes it easier to see the available depth, taking into account the draught of the boat.

The offset value to be entered should represent the distance between the face of the depth transducer, and the lowest part of the boat below the waterline, or the distance between the face of the depth transducer and the water surface.



Sea Temperature

If a suitable temperature sensor is fitted, the system will monitor the current sea temperature.

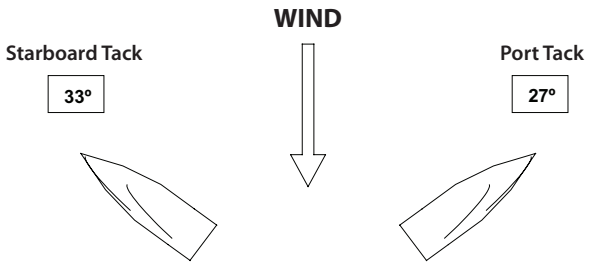
The offset value to be entered should adjust the temperature reading from the sensor to match a calibrated thermometer when submersed in the water

Apparent Wind

This provides an offset calibration in degrees to compensate for any mechanical misalignment between the masthead unit and the center line of the vessel.

To check the masthead unit alignment error we recommend you use the following method which involves a sailing trial.

Sail on a starboard tack on a close hauled course and record the wind angle, then repeat the process on a port tack. Divide the difference between the two recorded numbers and enter this as the wind angle offset.



Starboard tack = 33°

Port tack = 27°

Difference: 33° - 27° = 6°

Offset: 6°/2 = -3°

If the starboard apparent wind angle is greater than the port angle then divide the difference by 2 and enter this as a negative offset. If the port angle is greater than the starboard then divide the difference by 2 and enter this as a positive offset.

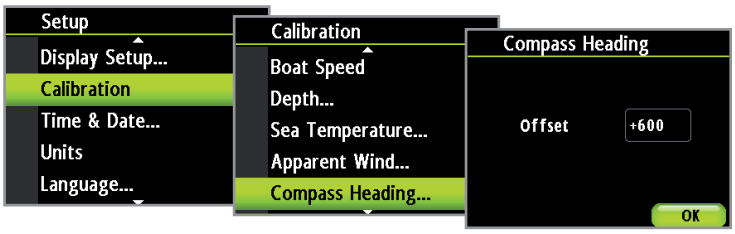
Compass Heading

The compass offset compensates for fixed errors (misalignment) between the compass sensor and the direction of the boat.

To accurately enter a compass offset, the boat's heading must be referenced to, for example: a calibrated bowl compass.

The offset value will be the difference between the known source and the currently displayed heading.

Enter this value as the offset in the compass heading field as a plus or minus integer up to 180º



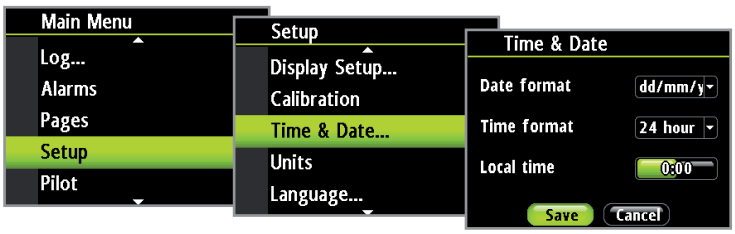
USE COG as heading

If heading data is not available from a compass sensor it is possible to use course over ground from a GPS. COG will be displayed as heading and used in the calculation of true wind direction.

➔ ***Note:*** The autopilot cannot be operated using COG as the heading source. COG cannot be calculated when stationary.

Time & Date

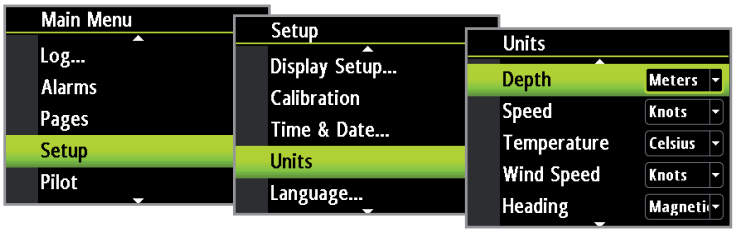
From the time and date menu you can set your preferred time / date format and local time offset. Once complete select Save to save your settings and exit.



➔ ***Note:*** Local time is calculated based on UTC provided via a GPS unit connected to the network.

Units

Set the preferred unit of measurement you want data to be displayed in.



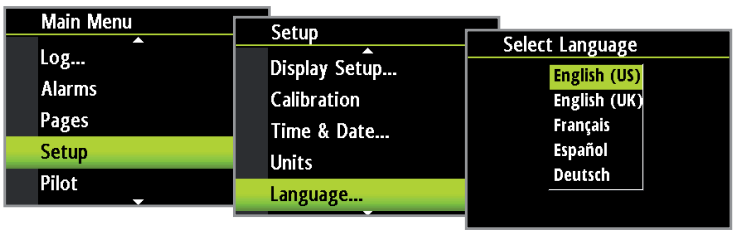
Parameter	Options	Default value
Boat speed	kn Knots	kn
	kph Kilometers per hour	
	mph Miles per hour	
Wind speed	kn Knots	kn
	m/s Meters per second	
	mph Miles per hour	
Distance	nm Nautical miles	nm
	mi Miles	
	km Kilometers	
Depth	ft Feet	ft
	m Meters	
	fa Fathoms	
Heading	°M Magnetic	°M
	°T True	
Temperature	°F Fahrenheit	°F
	°C Centigrade	
Volume	gal Gallons	gal
	L Liters	
Pressure	Hg Inches of Mercury	mb
	mb Millibars	
	hPa Hectopascal	

→ ***Note:*** If magnetic variation is not available via a GPS an offset can be entered manually. See Magnetic variation for more information.

The same applies if the user wants to read magnetic heading, but only receives true heading from the compass.

Language

The display can be set to different languages to suit your preference.



Display mode

There are 3 display functionality modes. Highlight the desired mode and press 'Enter' to select.

Instrument display only

Displays instrument data only. No Pilot data page is viewable.

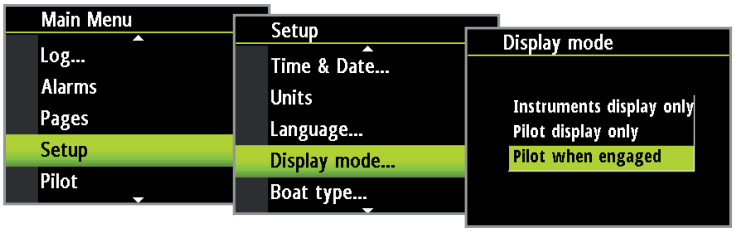
Pilot display only

Displays Pilot data only. No instrument data pages are viewable.

Pilot when engaged

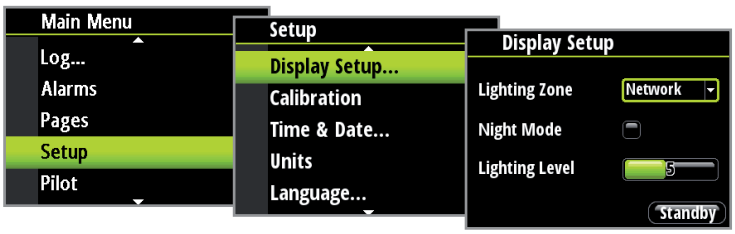
Possible to view instrument data pages at all times and Pilot data when a Pilot system is installed and connected to the network.

➔ ***Note:*** The Pilot page is automatically displayed when the Pilot is engaged.



Display setup

Set the light zone, enter night mode and change the lighting level.



➔ ***Note:*** Press and holding the 'Enter' key for 3 seconds takes you directly to the display setup lighting level screen. If the light level is set below 5 it will automatically increases to 5. Use the up and down keys to set the desired level and press 'Enter' to confirm.

Lighting zone

Set the lighting zone on the display. All units in the selected lighting zone will mirror each others light settings. Default setting is Network.

Night mode

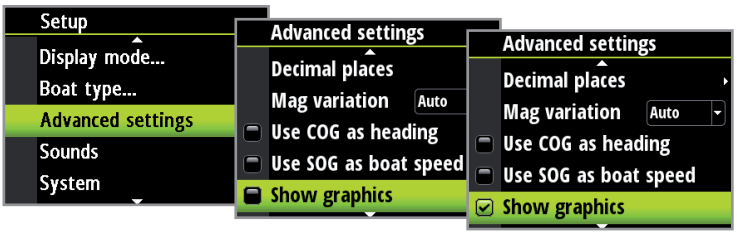
Change the display to night mode colour pallet. All displays in the selected lighting zone will also change to night mode.

Lighting level

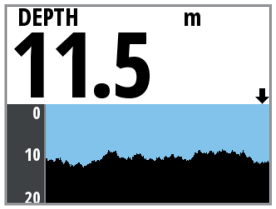
Adjust the back light level from 1 - 10.

Show graphics

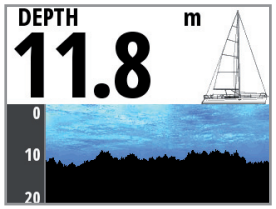
It is possible to turn on or off background graphics for some pages. Example shown below.



Background graphics off



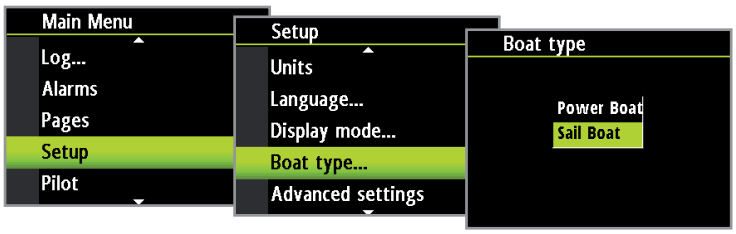
Background graphics on



→ ***Note:*** Graphics cannot be individually set on or off for each page.

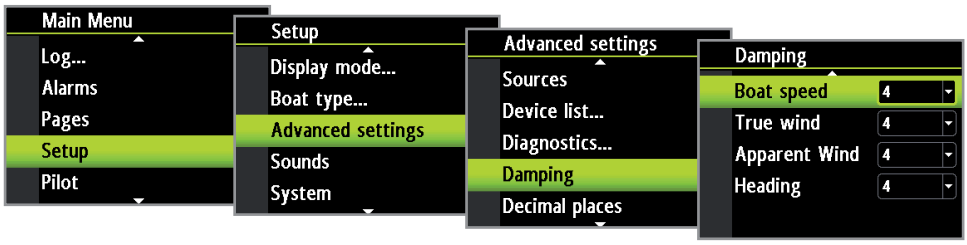
Boat type

Select the type of boat that is installed on. Chose either Sail or Power depending on the vessel.



Damping

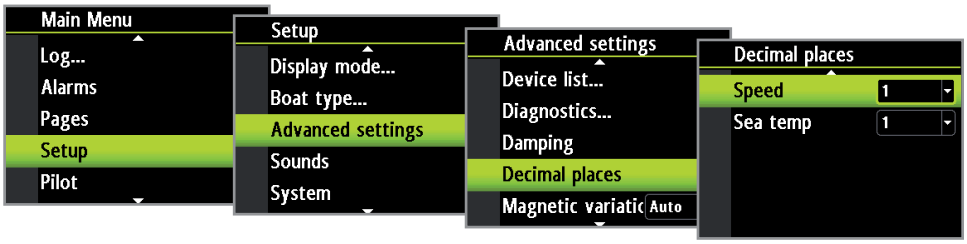
The damping rate effects the frequency that the sensor data is updated on the display, the greater the damping value the smoother the number change will be but the slower the response will be to data change.



Decimal places

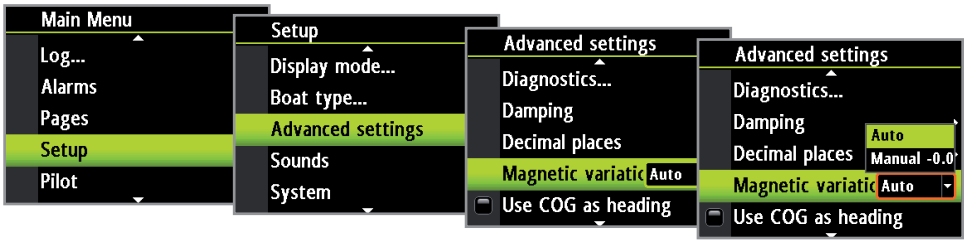
It is possible to change how many decimal places speed and sea temperature data will be displayed with.

Choose how many decimal places you wish to have shown for that specific data type.



Magnetic variation

Adjust how the system handles magnetic variation.



Auto

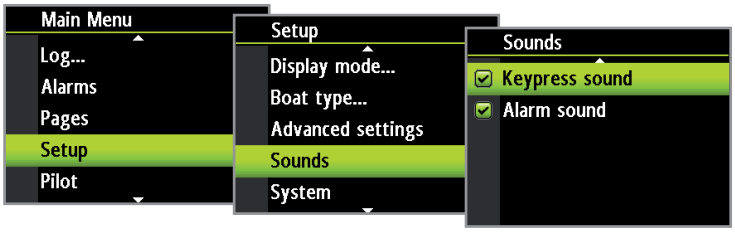
Automatically calculates variation based on position and time.

Manual

If variation is not available enter a value manually.

Sounds

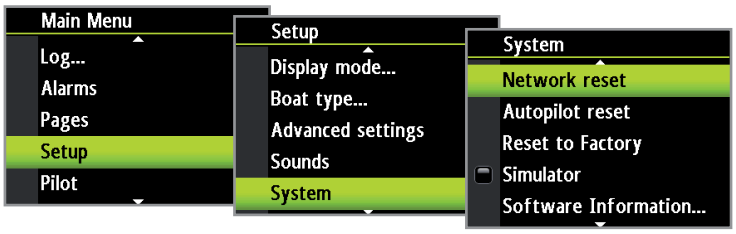
Turn the keypress and alarm sounds on or off.



➔ ***Note:*** Silencing the alarm sound does not deactivate the alarms. When an alarm is activated the warning notification will be shown on the display regardless of the sound being on or off.

System

From the system menu there are several options to reset the system, place the display into simulator and get the current software information.



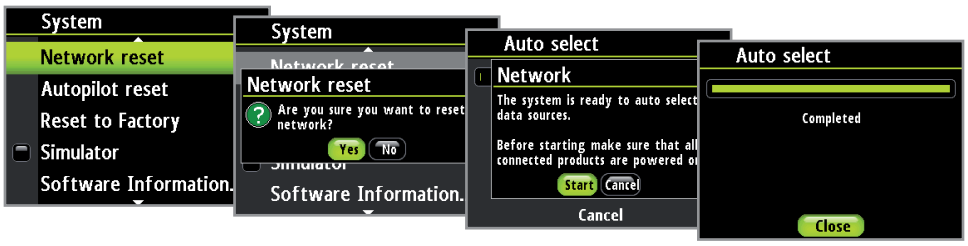
Reset options

There are a variety of reset options available from the system menu.

➔ ***Note:*** Whenever a reset option is selected there will be a dialog box asking you to confirm that you wish to reset before any further action is taken. If you wish to cancel the reset, select No will return you to the system menu.

Network reset

Resets the source selection on all displays connected to the network.



Autopilot reset

Resets the Pilot and returns all settings to factory defaults.

> ⚠ **Warning:** The Pilot will need to be commissioned before it is fit for purpose. Do not engage the autopilot until it has been commissioned and a sea trial has been completed.

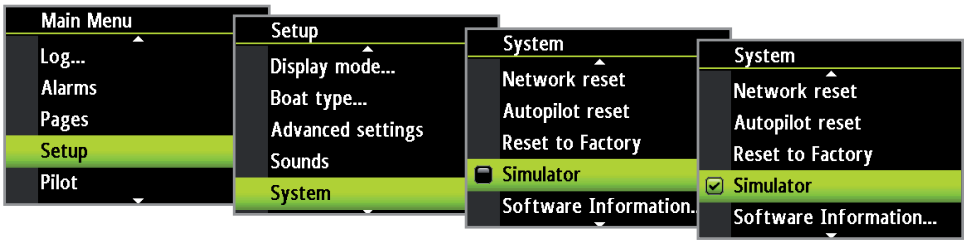
Reset to Factory

Resets the current display to the default settings. When the unit is restarted you will see the original startup wizard asking you to set the display.

> ⚠ **Warning:** All settings for instrument and Pilot will be restored to factory default. The Pilot will need to be commissioned before use.

Simulator

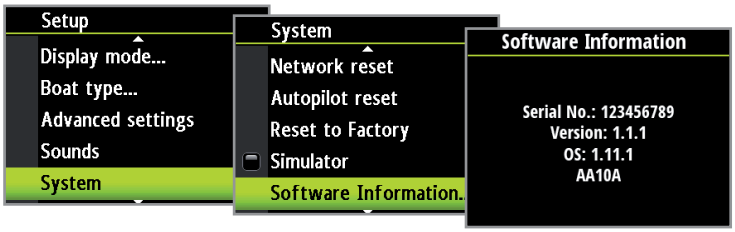
Simulator mode sends simulated data to the display.



> ⚠ **Warning:** It is not advisable to enter simulator mode when using your instrument system as a navigation aid.

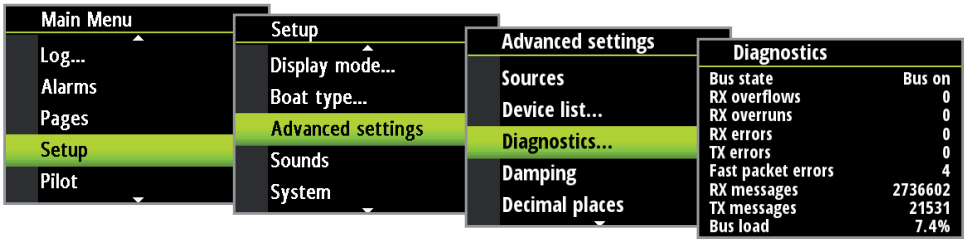
Software Information

Shows the software version currently installed on the display. Press 'Enter' or the 'Page' key to navigate back to the menu.



Diagnostics

Shows an overview of the data being transmitted on the network, The list shows the network bus status, bus load as a percentage as well as quantity and type of data messages.



→ ***Note:*** We recommend that you use this diagnostic tool as a basic overview of the network status. For more detailed information it is suggested that you check the individual source information via the device list.

3 Autopilot

Overview

If a Pilot control system is installed and connected to the network then you will be able to see the Pilot functionality on your display.

The autopilot is designed to maintain an accurate course in all sea conditions with minimal movements to the rudder.

As the autopilot steers so accurately, it will get you to your destination faster and more efficiently, especially when navigating to a waypoint or following a route.

All Pilot functionality and data can be accessed via the display but the Pilot Controller must be installed to operate all of the Pilot core functions.

Operation

> ⚠ **Warning:** An autopilot is a very useful navigational aid, but DOES NOT under any circumstances replace a human navigator!

> ⚠ **Warning:** Ensure the Pilot has been installed correctly, commissioned and calibrated before use.

➔ ***Note:*** You can switch from Auto to Standby mode at anytime by pressing the STBY key on the Pilot controller.

Do not use automatic steering when:

- In heavy traffic areas or in narrow waters
- In poor visibility or extreme sea conditions
- When in areas where use of autopilot is prohibited by law

When using an autopilot:

- Do not leave the helm unattended
- Do not place any magnetic material or equipment near heading sensor used in the autopilot system
- Verify at regular intervals course and position of vessel
- Always switch to Standby mode and reduce speed in due time to avoid hazardous situations

Pilot controller

Keys

The Pilot controller is operated by 7 keys. These are used to operate the autopilot and adjust autopilot parameters.

Connectors

The Pilot controller is equipped with 1 network connector at the rear.

Network

The Pilot controller can be connected at any point on the network.

Keys	Function
	Mode: Changes the autopilot mode. When the autopilot's boat type is set to Sail and Auto mode is engaged, pressing the mode key will change the autopilot to Wind mode. If the autopilot is set for any other boat type and the autopilot is in Auto mode, pressing the mode key will enter the autopilot into NoDrift mode. For all boat types, when in Auto mode a long key press of the mode key will enter the autopilot into Navigation mode which will require confirmation via the display before it is engaged.
	STBY: Disengages the autopilot. Places the autopilot into Standby mode.
	Left 1: Adjust the set course or wind angle 1 degree / steer to Port in Non Follow Up mode (NFU). When pressed in Standby mode this will enter the autopilot into Non Follow Up mode.
	Right 1: Adjust the set course or wind angle 1 degree / steer to Starboard in Non Follow Up mode. When pressed in Standby mode this will enter the autopilot into Non Follow Up mode.
	Left 10: Adjust the set course or wind angle 10 degrees / steer to Port in Non Follow Up mode. When pressed in Standby mode this will enter the autopilot into Non Follow Up mode.
	Right 10: Adjust the set course or wind angle 10 degrees / steer to Starboard in Non Follow Up mode. When pressed in Standby mode this will enter the autopilot into Non Follow Up mode.
	Auto: Engage the autopilot / Acknowledge tack/gybe or navigation course change.

Turning the autopilot on / off

Engaging the autopilot

At anytime while the autopilot is disengaged press the 'Auto' key to engage the autopilot. The autopilot will steer the boat on the current selected course.

Disengaging the autopilot

At any time the autopilot is engaged press the 'STBY' key to disengage the autopilot. The autopilot will go into Standby mode and you will be required to take manual control of the helm.

> ⚠ **Warning:** In Standby mode pressing any of the directional keys will engage the autopilot in Non Follow Up mode!

Autopilot operation modes

Below is a list of autopilot modes that can be initiated via the Pilot controller

Mode	Boat Type		Description	Required Input
	Motor	Sail		
 Standby			Passive mode used when manually steering the boat at the helm	
 Auto	✓	✓	Keeps the boat on set heading	Heading
			Cancels a turn and continues on the heading read from the compass	
 Wind		✓	Steers the boat to maintain the set wind angle	Heading, Speed, Wind Angle
 NoDrift	✓		Steers the vessel on a straight bearing line by compensating for drift	Heading, Position
Press & Hold 3 sec +  Navigation	✓	✓	Steers the boat to a specific waypoint location, or along a route	Heading, Speed, Position, Waypoint, Route information
 Non Follow Up	✓	✓	Steer the boat manually using the Pilot controller	

Autopilot symbols

More autopilot modes may be available via a compatible chartplotter connected to the network. Any autopilot mode selected via the chartplotter will be shown on the display. Below is a list of autopilot modes and their display symbols accessible via the Pilot controller.

Mode Symbol	Function / Mode
S	Standby
A	Auto (Compass)
W	Wind
N	Navigation
NFU	Non Follow Up (Power steer)
ND	NoDrift

➔ ***Note:*** The autopilot mode can be selected or changed at anytime via the controller or compatible chartplotter connected to the network.

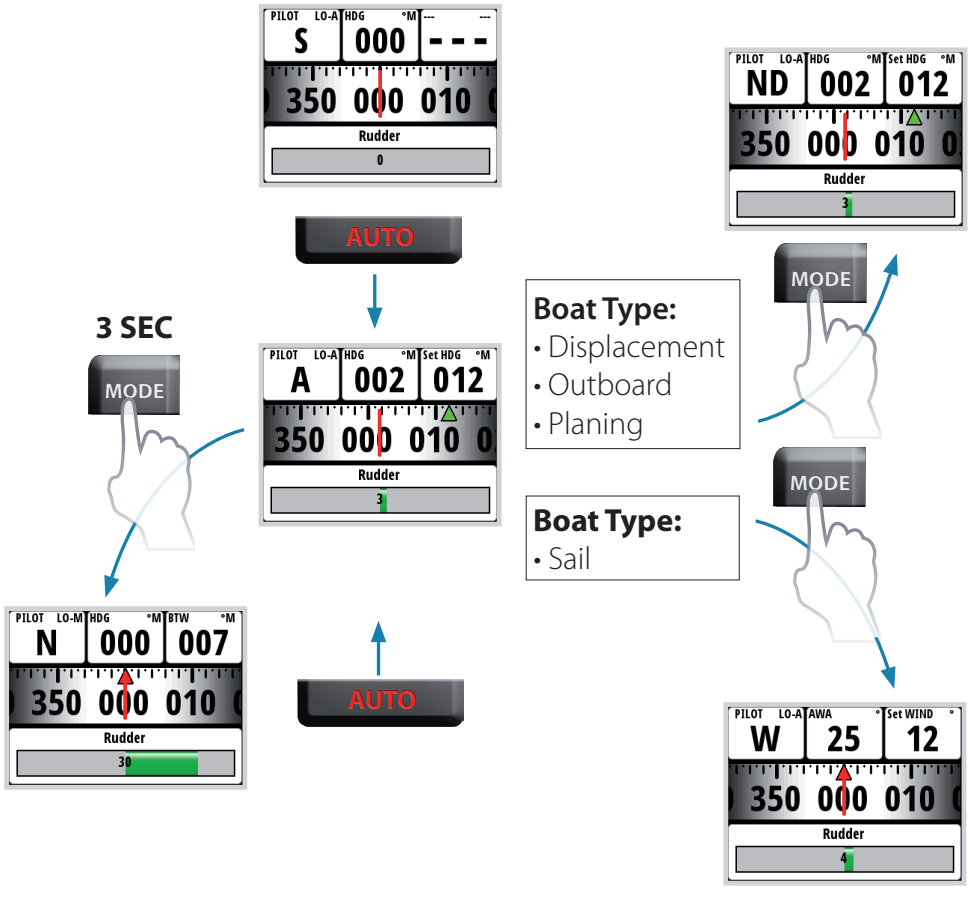
Selecting an autopilot mode

Press the 'Auto' key to engage the autopilot. Press the 'Mode' key to enter Wind or NoDrift mode (depending on boat type). Press and hold the Mode key to activate Navigation mode.

➔ ***Note:*** Wind mode can only be selected when the autopilot boat type is set to sail.

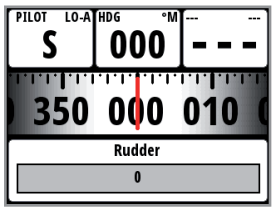
➔ ***Note:*** The autopilot must be engaged in Auto mode before other modes can be selected.

➔ ***Note:*** Press the 'Auto' key to enter Auto mode or accept a tack/gybe or navigation course change. Press the 'STBY' key to place the autopilot into Standby mode.



➔ ***Note:*** The display will not update until the autopilot engages the new selected mode.

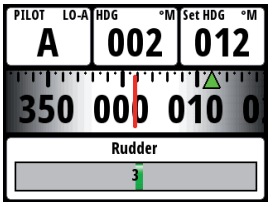
Standby mode (Manual helm steering)



The autopilot must be in Standby mode when you steer the boat at the helm.

You can switch the autopilot to Standby mode at any time by a short press on the 'STBY' key.

Auto mode (Compass steer mode)

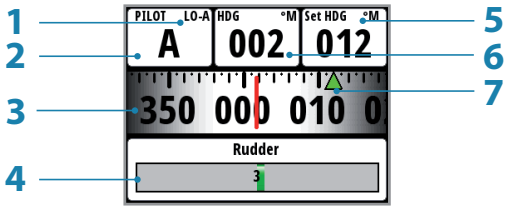


When the 'Auto' key is pressed, the autopilot selects the current boat heading as the set course. The autopilot will keep the boat on the set course until a new mode is selected or a new course is set with the 'Course' keys. Once the course is changed to a new set course, the boat will automatically turn to the new heading and maintain the new course.

➔ ***Note:*** The autopilot will continue to steer to the set heading until the mode is changed or the autopilot is turned to Standby (disengaged).

Autopilot - Auto page

The wind display presents the following information:



1 **Response mode**

2 **Autopilot mode: A = Auto mode**

3 **Compass graphic (Heading)**

4 **Rudder angle graphic**

5 **Set Heading**

6 **Heading**

7 **Set heading indicator - Green = Starboard / Red = Port**

Steering via the Pilot controller

Steer port, 1°/press

Steer port, 10°/press

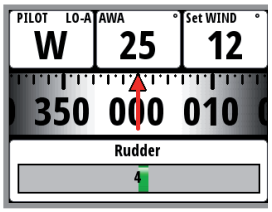
Steer stbd., 10°/press

Steer stbd., 1°/press

Regain manual steering by pressing the 'STBY' Key

Wind mode

When Wind mode is selected the autopilot stores the current wind angle and adjusts the course of the boat to maintain this wind angle.



To select Wind mode set the autopilot to Auto mode then press the 'Mode' key. The Wind mode symbol (W) is shown on the display and Wind mode is engaged

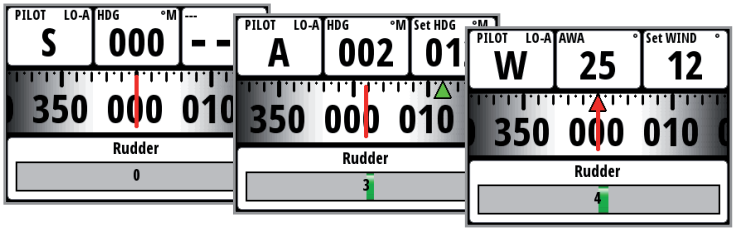
The autopilot will keep the boat on the set wind angle until a new mode is selected or a new wind angle is set.

> ⚠ **Warning:** In wind mode the autopilot steers to the apparent or true wind angle and not to a compass heading. Any wind shift could result in the vessel steering on a undesired course.

→ ***Note:*** The Wind mode is only available if the autopilot boat type is set to Sail.

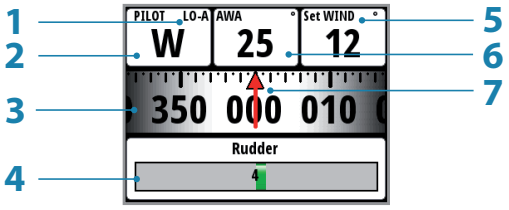
Prior to entering Wind mode the autopilot system should be operating in Auto, with valid input from the wind transducer.

Enter the Wind mode by pressing the 'Auto' key then the 'Mode' key until W appears in the top left corner of the display.



Autopilot - Wind page

The wind display presents the following information:



1 **Response mode**

2 **Autopilot mode: W = Wind mode**

3 **Compass graphic (Heading)**

4 **Rudder angle graphic**

5 **Wind angle**

6 **Apparent / True Wind angle (depending on wind setting)**

7 **Set Wind Angle**

The set heading and set wind angle are entered from the compass heading and the masthead unit at the moment the Wind mode is selected. From that point the autopilot will change the course to maintain the wind angle as the wind direction may change.

→ ***Note:*** If the wind direction changes by more than a set limit a Wind shift alarm will sound.

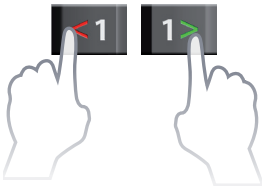
Tacking & Gybing in Wind mode

Tacking & Gybing in Wind mode can be performed when sailing with apparent or true wind as the reference; in either case the true wind angle must be less than 90 degrees.

The tacking/gybing operation will mirror the set wind angle on the opposite tack and a tack confirmation window will appear on the display.

The rate of turn during the tack/gybe is set by the 'Tack/Gybe Time' parameter in the Setup/ Sailing menu. The tack/gybe time is also related to the speed of the boat to prevent excessive loss of speed during a tack.

To tack or gybe in wind mode press both 1° course keys on the Pilot controller together.



When you enter a command to tack or gybe a pop-up will appear on the display asking you to confirm the action.

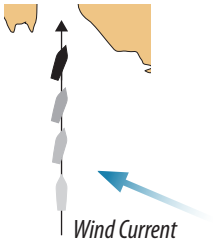
Pressing 'Enter' on the display, or 'Auto' on the Pilot controller, will activate the tack/gybe function and the boat will start turning to the new wind angle.

→ ***Note:*** To cancel the tack/gybe request, press the 'STBY' key on the Pilot controller or select cancel using the display. If neither Tack/Gybe or Cancel is selected the tack/gybe pop up will close after 10 seconds and the requested tack/gybe will not be initiated.

→ ***Note:*** The autopilot will temporarily add a 5 degree bear-away on the new tack to allow the boat to pick up speed. After a short period the wind angle will return to the set angle.

NoDrift mode

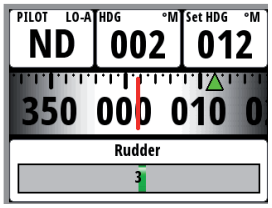
→ ***Note:*** NoDrift mode is not available if the system has been set up for Sail in the Installation Menu.



In NoDrift mode the vessel is steered along a calculated track from present position to infinity in a direction set by the user. If the vessel is drifting away from the original course line due to current and/or wind, the vessel will follow the line with a crab angle.

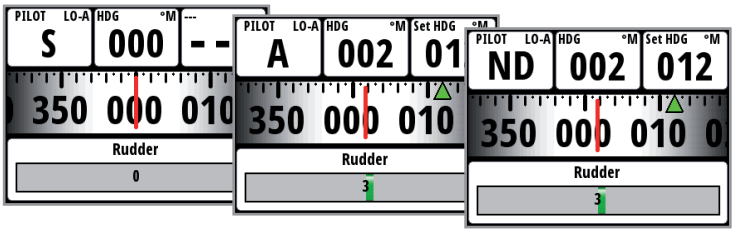
Press the 'Mode' key until the NoDrift mode symbol is visible in the mode field on the display. The autopilot will now use the position information to calculate the cross track distance, and automatically steer along the calculated track.

→ ***Note:*** It is not possible to select NoDrift if position or heading information is missing.



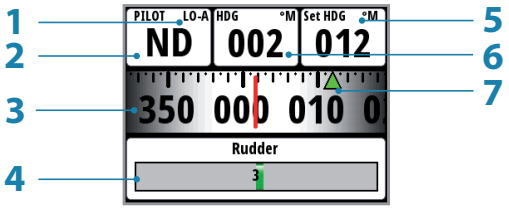
The autopilot will keep the boat on that course until a new mode is selected.

Prior to entering NoDrift mode the autopilot system should be operating in Auto, with valid input from the GPS receiver.



Autopilot - NoDrift page

The NoDrift display presents the following information:



1 **Response mode**

2 **Autopilot mode: ND = NoDrift mode**

3 **Compass graphic (Heading)**

4 **Rudder angle graphic**

5 **Set Heading**

6 **Heading**

7 **Set heading indicator - Green = Starboard / Red = Port**

Navigation mode (Steer to waypoint)

Navigation mode requires a compatible chartplotter connected to the network for it to be an available mode. In Navigation mode the autopilot will steer to the active waypoint.

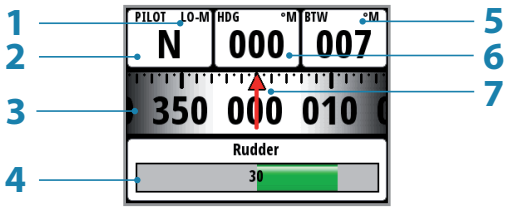
> ⚠ **Warning:** Navigation mode must not be used while sailing, course changes may result in unexpected tacks or gybes!

Press 'Mode' for approximately 3 seconds, until the Navigation mode confirmation appears on the display.

→ ***Note:*** When Navigation mode is selected a pop-up message will appear. You will need to select Yes to confirm the course change before Navigation mode will be engaged.

Autopilot - Navigation page

The Navigation display presents the following information:



1 **Response mode**

2 **Autopilot mode: N = Navigation mode**

3 **Compass graphic (Heading)**

4 **Rudder angle graphic**

5 **Bearing to waypoint**

6 **Heading**

7 **Bearing to waypoint**

The autopilot has the capability to use information from a navigation device (e.g. GPS, chartplotter) to steer the boat to a specific waypoint, or along a route. The autopilot uses the information received from the navigator to keep the boat on a direct line to the destination waypoint.

→ ***Note:*** If the autopilot is connected to a chartplotter that does not transmit a message with bearing to next waypoint, it will steer using Cross Track Error (XTE) only. In that case you must revert to Auto mode at each waypoint and manually change set course to equal bearing to next waypoint and then select Navigation mode again.

To obtain satisfactory navigation steering, the following points must be fulfilled prior to entering Navigation mode:

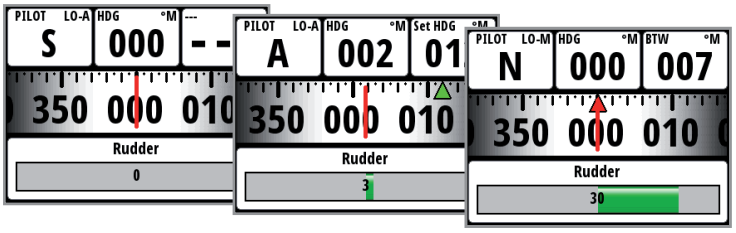
- The autopilot steering must be tested and determined satisfactory
- The navigation device (GPS, chartplotter) must be operating correctly, with adequate satellite coverage
- At least one waypoint must be entered and selected as the active waypoint

→ ***Note:*** The system's data source when operating in Navigation mode is the Navigation source. It is normally the same as the Position source (GPS/chartplotter).

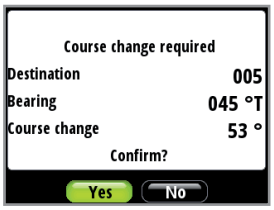
→ ***Note:*** Navigational steering should only be used in open waters.

→ ***Note:*** When selecting Navigation mode the autopilot initially maintains the current course and prompts the user to accept the course change towards the destination waypoint.

Press 'Auto' then press and hold the 'Mode' key until Navigation mode is selected.



The prompt display shows the name of the destination waypoint, the new waypoint bearing and course change from the previous waypoint to the destination waypoint.



➔ ***Note:*** If only one waypoint has been entered the bearing will be from the boat's position to the destination waypoint.

➔ ***Note:*** For Cross Track Error, the number of decimals shown depends on the output from the GPS/chartplotter. Three decimals give more accurate course keeping.

When operating the autopilot in Navigation mode to steer along a route, the autopilot will steer to the nearest waypoint in the direction of the route after you accept the Navigation mode prompt. When you arrive at the waypoint, the system will output an audible warning, display an alert screen with the new course information, and automatically change course onto the new leg.

Alert warning

An alert screen will warn you that the course change is greater than 10°. Press 'Enter' to confirm the course change.

➔ ***Note:*** If the required course change is more than the Navigation change limit (default 10°), you have to verify that the upcoming course change is acceptable. This is a safety feature. See Navigation change limit on how to change this setting.

Non Follow Up mode

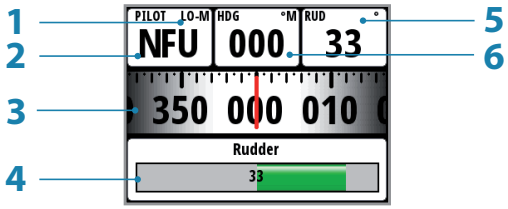
Whilst in Standby mode, pressing any of the port or starboard keys will move the rudder to your desired angle and change the autopilot mode to Non Follow Up.

Non Follow Up mode allows you to control the rudder position manually via the autopilot controller.

➔ ***Note:*** The pilot will remain in Non Follow Up mode until it is disengaged by pressing 'STBY' or a new mode is selected.

Autopilot - Non Follow Up page

The Non Follow Up display presents the following information:



1 **Response mode**

2 **Autopilot mode: NFU = Non Follow Up mode**

3 **Compass graphic (Heading)**

4 **Rudder angle graphic**

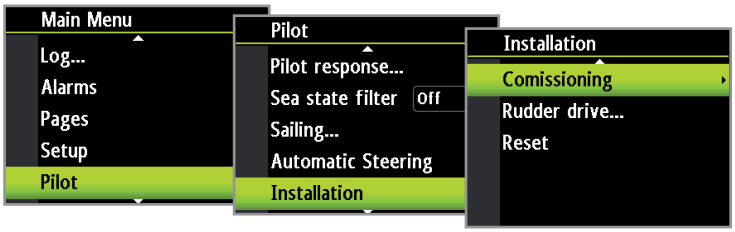
5 **Rudder angle**

6 **Heading**

4 Autopilot settings

Installation menu

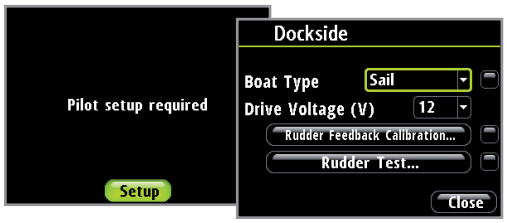
⚠ **Warning:** The installation settings must be performed as part of the commissioning of the Pilot system. Failure to do so correctly may prohibit the Pilot from functioning properly! The Installation menu can only be accessed in Standby mode.



➔ ***Note:*** Some important points regarding the installation settings:

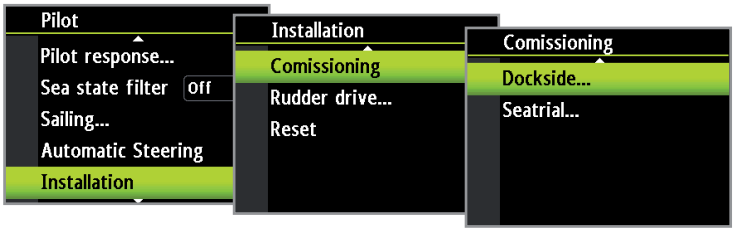
- When the Pilot is delivered from factory and ANY TIME AFTER AN AUTOPILOT RESET HAS BEEN PERFORMED, the installation settings are all reset to factory preset (default) values. The automatic interface prompt will appear and a complete setup has to be made.
- The Sea trial settings are dependent on successful completion of the Dockside settings.

➔ ***Note:*** If you select the Pilot page and the Pilot has not been commissioned you can go straight to the commissioning page by selecting Setup.



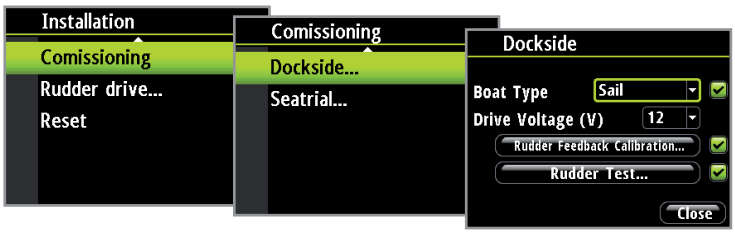
Commissioning

Before the Pilot can be used you must first commission it and complete all of the dockside procedures before it is operational.



Dockside

The dockside procedures are initiated from the commissioning dialog. Completed procedures are labelled with a tick.



The following menu items are accessible and can be set up in the Installation menu:

- Boat type
- Rudder feedback
- Drive voltage
- Drive engage
- Rudder test
- Depth calibration
- Minimum wind angle
- Nav change limit

Boat Type

Type of boat selected will affect the steering parameters, and the functions available in the autopilot system. The options are: Planing, Displacement, Sail and Outboard.

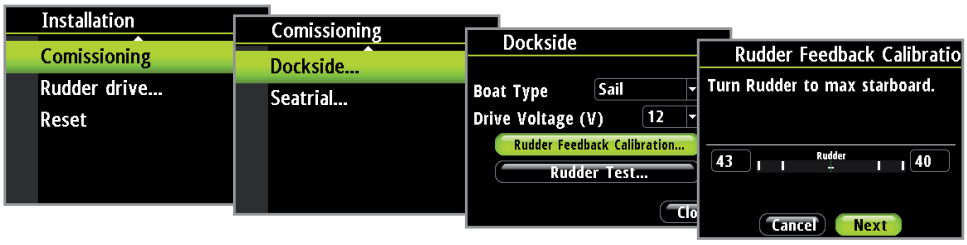
➔ ***Note:*** Wind mode is only available if boat type is set to sail.

Drive voltage (V)

Sets the drive voltage type to 12 or 24V

Rudder Feedback Calibration

Make sure the unit is installed and aligned as per instruction in the AC12/42 Installation manual. The rudder feedback calibration will set the correct relationship between the physical rudder movement and the rudder angle readout.



Max starboard

• Manually move the helm to starboard until the rudder stops at starboard lock hard over.

• The Max starboard angle is the angle read by the rudder feedback unit before any adjustment is made.

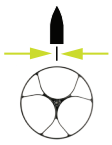
• If the actual rudder angle is different from the angle displayed, correct the reading with the Up/Down keys.

• Confirm Rudder feedback calibration to starboard by selecting Next.

Max port

- Manually move the helm to port until the rudder stops at port lock hard over.
- Adjust the displayed angle the same way as for starboard rudder.
- Confirm Rudder feedback calibration to port by selecting Next.

➔ ***Note:*** Many boats have ±45° (90° H.O. - H.O.) rudder angle as standard. So if you are not going to make any adjustment to the displayed angle you should still highlight the reading and confirm. This is necessary to prevent the rudder from hitting the end stops.



Set Rudder to 0 (zero)

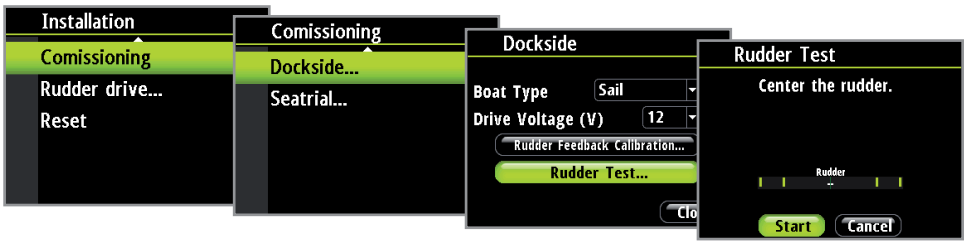
Bring the rudder to midship position and confirm. This will adjust an incorrect reading caused by misalignment of the rudder feedback unit.

Rudder Test

➔ ***Note:*** If the boat uses power assisted steering, it is important that the engine or electric motor used to enable the power assist steering be turned on prior to this test.

> ⚠ **Warning:** Stand CLEAR of the wheel and do not attempt to take manual control of the wheel during this test!

Bring the rudder manually to midship position before starting the test.



After a few seconds the autopilot Computer will issue a series of PORT and STBD rudder commands and automatically verify correct rudder direction.

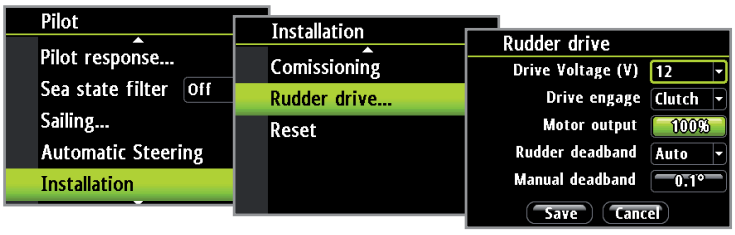
It detects minimum power to drive the rudder and reduces the rudder speed if it exceeds the maximum preferred speed (8°/sec.) for autopilot operation.

The Rudder test is verified by the display showing Completed Rev. motor, Completed Solenoids, or Failed. If Failed is given, check for correct electrical connection.

Also refer to "Alarms"

Rudder drive

Ensure that the rudder information is set correctly before you continue with the Dockside commissioning.



Drive voltage (V)

Sets the drive voltage to the type installed on the vessel 12 or 24V

Drive engage

Drive engage has the following settings: Auto and Clutch.

Clutch:

This is the default setting and it allows you to steer the boat from the helm when in Standby mode. A clutch will be engaged on the drive unit locking out the steering when Auto is selected.

Auto:

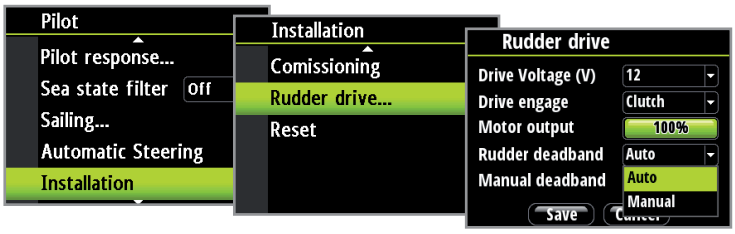
This setting is implemented for future use. Always use the Clutch (default) setting.

Motor output

The Motor output (displayed as a percentage) is the amount of available power needed to achieve correct rudder speed on automatic steering (Maximum speed is used in NFU mode). This setting will allow you to adjust the rudder speed to be different from the one automatically set in the rudder test.

Rudder deadband

The rudder deadband function is adaptive and is continuously updating. It prevents the rudder from hunting and the adaptive function optimizes the deadband to the speed of the boat and the load on the rudder.

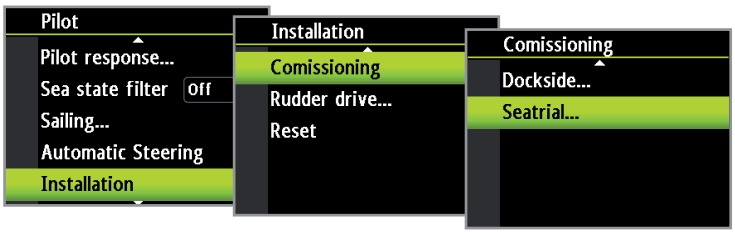


If the auto-setting does not perform properly due to high inertia from the wheel, it can be adjusted manually.

Find the lowest possible value that will prevent the rudder from continuous hunting. A wide deadband will cause inaccurate steering. It is recommended to check rudder stability in Auto mode when the boat is moving to get pressure on the rudder.

Sea trial

After completing the Pilot calibration and all settings in the installation menu, you will need to perform a final sea trial.



➔ ***Note:*** The sea trial should be conducted in open waters at a safe distance from other traffic.

- Steer the boat on all cardinal headings in Auto mode
- Start with low and medium speeds to get familiar with the response from the Pilot
- Verify the Hi/Lo transition and the effect of Lo and Hi parameter settings
- Check the effect of the Response adjust
- Set waypoints into each navigator connected to the system, and verify that the Pilot steers in Navigation mode for each Navigation source
- If the boat is a sailboat use the Wind mode and engage the Pilot at different wind angles.
- If the rudder response feels aggressive during the sea trial, you may want to reduce the rudder speed to get a smoother steering. On a sailboat you may want to have a higher rudder speed when running downwind.
- The motor Drive Out can be set with the above in mind. Never adjust in more than 10% steps with respect to the reading set during the automatic rudder test. Always perform a new Autotune after the adjustment.

Transition speed

The Transition speed is the speed at which the Pilot will automatically change the steering parameter set from Hi to Lo parameters, or vice versa.

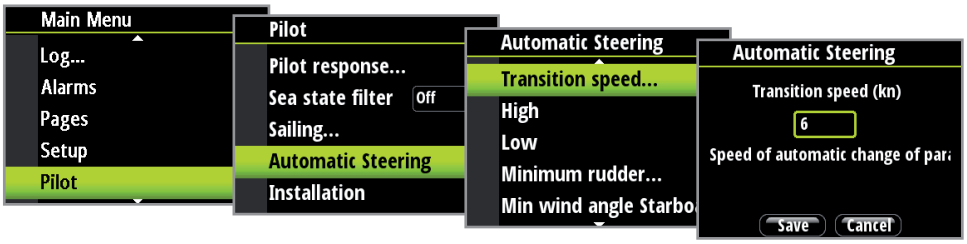
➔ ***Note:*** The default setting of the Transition speed is 6 knots

On power boats it is recommended that you set the Transition speed to represent the speed where the hull begins to plane or the speed where you change from slow to cruising speed.

On sailboats the Transition speed should be set to 3-4 knots to give the best response in a tack.

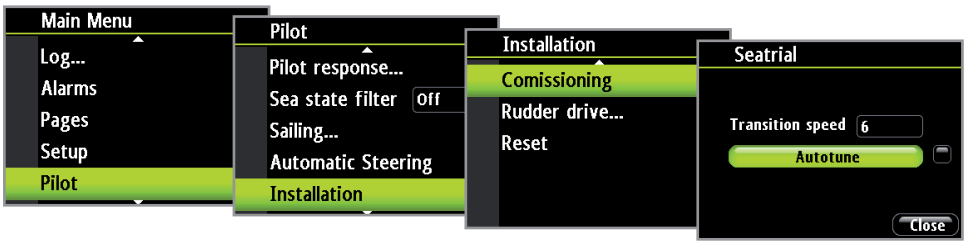
The speed used for the automatic transition is obtained with the following priority:

1. Speed through water from the speed log source.
2. Speed Over Ground (SOG) from the GPS/chart plotter.



Autotune

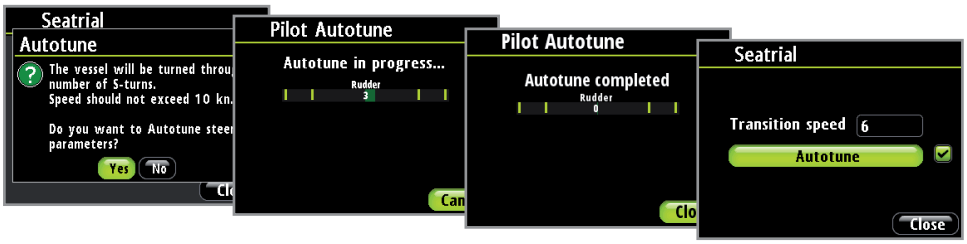
Autotune is a feature that automatically sets the most important steering parameters (Rudder and Counter Rudder) by taking the boat through a number of S-turns. The scaling factors of the parameters are also set automatically as a function of the boat type selection performed in the Dockside menu.



The automatic tuning process is also verifying/adjusting the Rudder zero alignment made in Dockside setup. Automatic tuning is a procedure that is not required for the Pilot to function as it is preset with steering parameters that should steer most boats in the 30 - 50 foot range.

Recommended speed during Automatic tuning should not exceed 10 knots. It should be performed in calm or moderate sea conditions. For displacement boats use a speed that is approximately half the normal cruising speed (i.e. if cruising speed is 10 knots, perform the Autotune at about 5 knots).

Select Autotune to begin the tuning process. Select yes to confirm Autotune.



After the Autotune has been completed the rudder must be controlled manually, as the autopilot has returned to Standby mode. The Automatic tuning function will take control of the boat and perform a number of S-turns.

➔ ***Note:*** Autotune must always be performed in open waters at a safe distance from other traffic. The Automatic tuning function may take from 2 to 3 minutes to complete. To stop the Autotune, press the 'Enter' key.

After the Autotune process has been completed, a tick will appear next to the Autotune tab and there should be no need for further adjustments. Fine tuning of these parameters are made by the response control, however, viewing or changing the parameters can be made in Auto mode by entering Installation in the Main menu.

Pilot response

The Autotune function is so refined that the majority of boats will need no further adjustments of the steering parameters. On some boats, however, in particular sea conditions a fine tuning of the steering parameters may improve the performance of the autopilot.

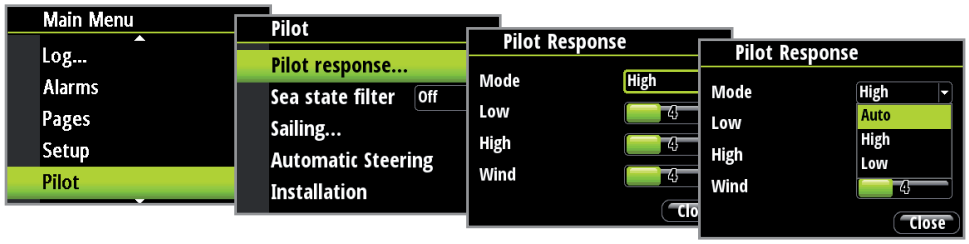
The Response control allows you to make this fine tuning for each of the two (Hi/Lo) parameter sets. The response can be set to nine levels. Level 4 is default with parameter values as set by the Autotune function. If no Autotune is made (not recommended) the level 4 values are the factory default values.

- A low response level reduces the rudder activity and provides a more loose steering.
- A high response level increases the rudder activity and provides a more tight steering.
- Response level too high will make the boat start S-ing.

When you access the RESPONSE page the highlighted Response parameter is the one that is active.

➔ ***Note:*** Adjustment of Hi and Lo values can be performed even with the boat out of the water.

Selection of Hi / Lo parameters



The Manual select item has three alternatives:

Auto – Hi – Lo.

- Auto is automatically set by speed input
- Hi or Lo must be set manually when there is no speed input

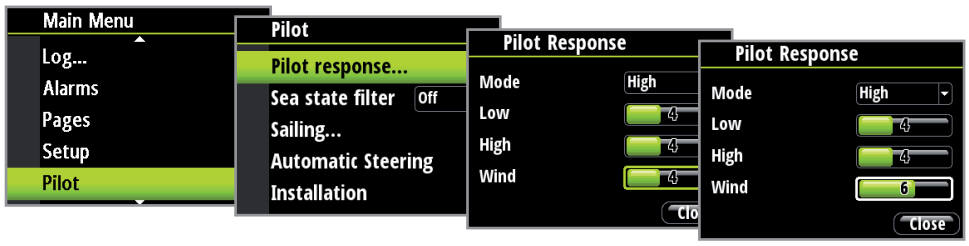
The sub-headline in the display shows the active parameter set and how it is selected.

Wind response

Verify that the difference between Set Heading and the actual heading is at an acceptable minimum.

If the difference between the set wind angle and the actual wind angle is too high, increase the Wind response to reduce the difference.

If the actual wind angle is S-ing around the set wind angle, or the rudder activity is too high, the Wind response should be reduced.



Range	Change per step	Default
1 - 9	1	4

Sea state filter

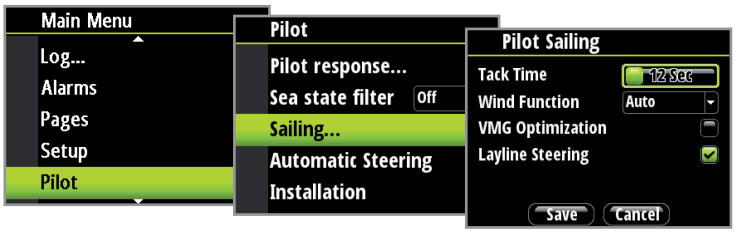
The Seastate filter is used to reduce rudder activity and autopilot sensitivity in rough weather.

Off:	Seastate filter is disabled. This is default.
Auto:	Reduces rudder activity and autopilot sensitivity in rough weather by an adaptive process. The Auto setting is recommended if you want to use the Seastate filter.
Manual	Linked to the Response control setting in the Main menu. It may be used to manually find the optimum combination of course keeping and low rudder activity in rough but steady sea conditions.

Sailing

Set how the Pilot will respond when it is set for use with a sail boat.

➔ ***Note:*** Sailing is only available in the menu if Boat type is set to Sail in the Installation menu



Tack time

When performing a tack in Wind mode, the rate of turn (tack time) can be adjusted. This will give single-handed sailors time to handle the boat and the sails during a tack.

A turn performed without shifting wind side, will also be made at a controlled turn rate.

Range	Change per step	Default	Units
2 - 50	1	12	Second

Tack angle

In Wind function Auto mode the set tack angle replaces a similar change of the set course using the starboard and port keys.

Range	Change per step	Default	Units
50 - 150	1	100	°

Wind function

With Wind function set to auto, the autopilot will automatically select between apparent and true wind steering. Auto is default and recommended for cruising. When the boat is running, it will also be surfing on the waves. This may lead to significant changes in boat speed, hence changes in apparent wind angle. True wind steering is therefore used when running, while steering to apparent wind is used when beating or reaching.

When sailing in closed waters, the apparent wind angle may change temporarily due to gusts. It may then be preferred to sail to; select True.

Range	Default
Auto - Apparent - True	Auto

VMG optimizing

Optimizing the VMG to wind will be active for 5–10 minutes after a new wind angle has been set and only when beating.

Range	Default
On - Off	On

Layline steering

Layline steering is useful when navigating. Cross Track Error (XTE) from the navigator will keep the boat on the rhumb line. If the XTE from the navigator exceeds 0.15 nm, the autopilot will calculate the layline and track towards the waypoint.

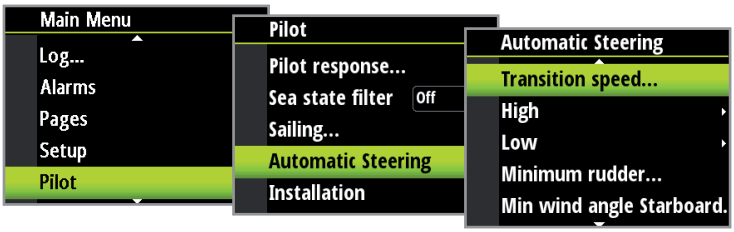
XTE will be displayed in the upper left corner above the mode index when layline steering is active

Range	Default
Off - On	Off

Automatic steering

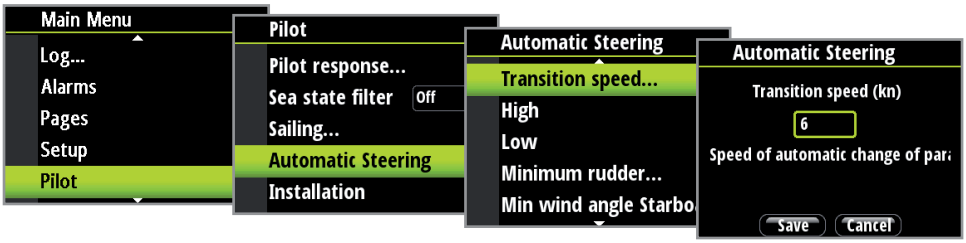
The Automatic steering menu contains steering parameters for compass steering, wind steering and nav steering. These steering parameters can be changed if needed to improve sailing performance.

From this menu you can set the transition speed, high and low boat speed parameters to account for changes in boat speed, rudder angle, wind and compass settings.



Transition speed

The Transition speed is the speed at which the Pilot will automatically change the steering parameter set from Hi to Lo parameters, or vice versa.



➔ ***Note:*** The default setting of the Transition speed is 6 knots

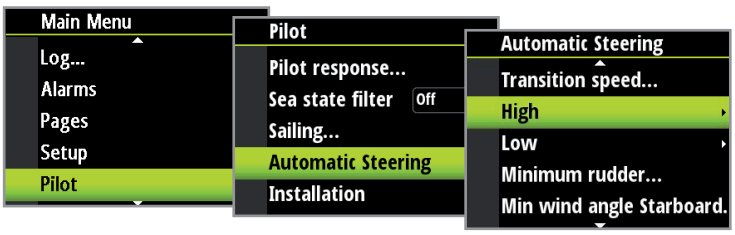
High

High value parameters for automatic steering at low speed and when running with a sailboat.

Low

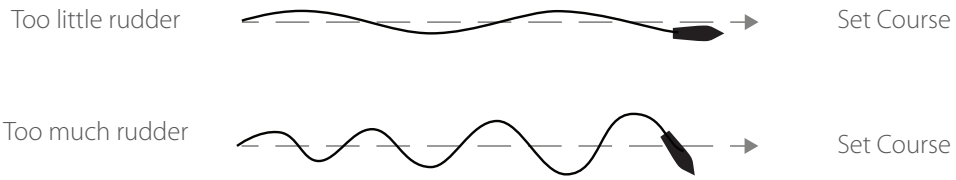
Low value parameters for automatic steering at high speed and when sailing into the wind or reaching with a sailboat.

➔ ***Note:*** The two most important parameters that determine the performance of the automatic steering are Rudder Gain and Counter Rudder.

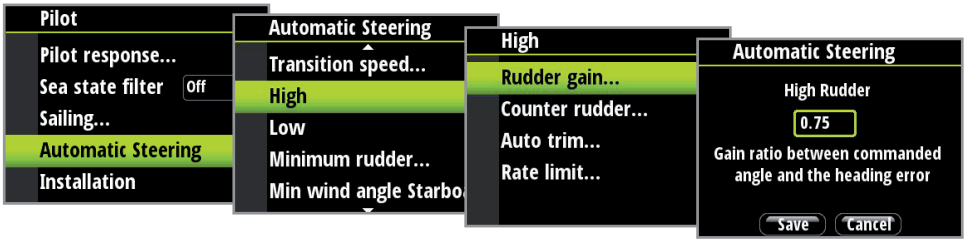


Rudder gain

Sets the rudder gain which is the ratio between the commanded angle and the heading error.



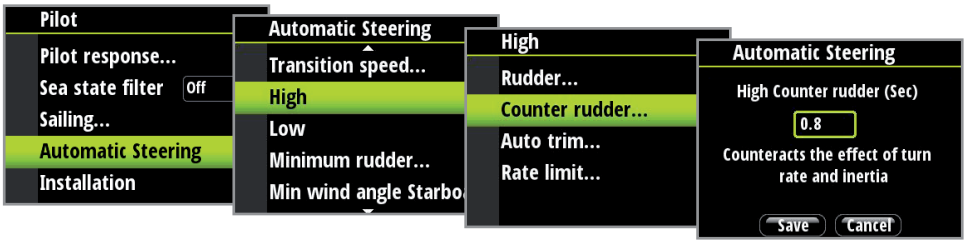
- Too little Rudder gain and the autopilot fails to keep a steady course
- Too much Rudder gain gives unstable steering and reduces speed
- Low speed requires more rudder gainthan high speed



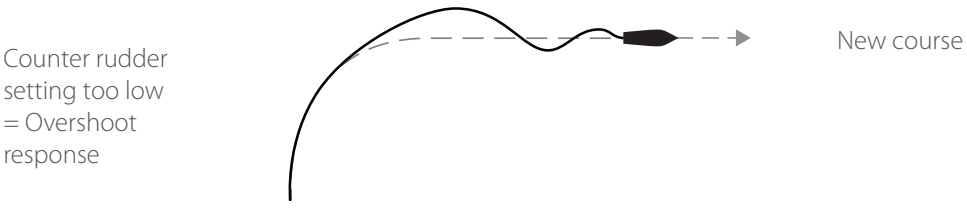
→ ***Note:*** See also "Minimum Rudder"

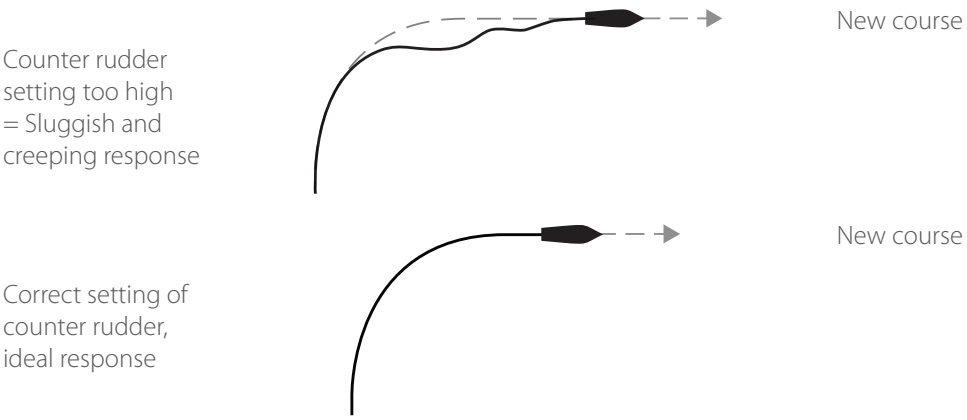
Counter rudder

Counter Rudder is the parameter that counteracts the effect of the boat's turn rate and inertia. For a short time period it is superimposed on the proportional rudder response caused by the heading error. It may sometimes appear as if it tends to make the rudder move to the wrong side (counter rudder).



The best way of checking the value of the Counter Rudder setting is when making turns. The figures illustrate the effects of various Counter Rudder settings.





Autotrim

Autotrim standard value is 40 seconds which should work well on most boats.

Rule of thumb: Set to same value (seconds) as the boat's length in feet.

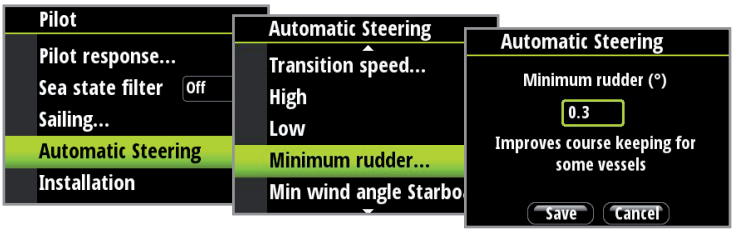
➔ ***Note:*** On boats operating on VRF it is set to 20 seconds as default.

Rate limit

Should be kept at 6.0°/second unless there is a need for more rapid response in turns.

Minimum rudder

Some boats may have a tendency to not respond to small rudder commands around a set course because of a small rudder, rudder deadband or Whirls/disturbance of the water-stream passing the rudder. Turning the Minimum Rudder function on, may improve the course keeping performance on some boats, but will increase the rudder activity.

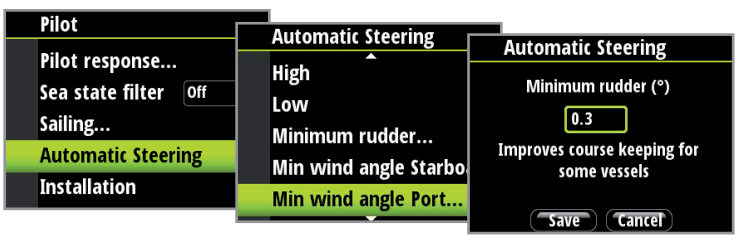


Range	Change per step	Default	Units
Off - 5	0.1	Off	°

➔ ***Note:*** During the sea trial, only set Minimum Rudder to ON if it proves to give a better course keeping performance in calm sea. It should be set after the Autotune has been performed and a possible fine tune of the Rudder parameter.

Minimum wind angle Port / Starboard

The Minimum wind angle is the apparent wind angle that the boat sails to when close hauled. This parameter will vary from boat to boat.



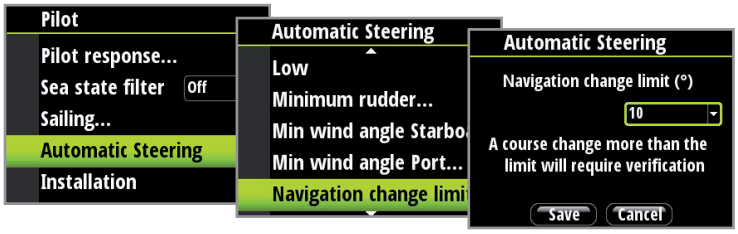
The Minimum wind angle applies for the tack-prevent function. It also applies when the autopilot is operating in WindNAV mode.

You can select different minimum wind angles for port and starboard. The difference between port and starboard will be taken into account when calculating the Distance To Turn (DTT).

Range	Change per step	Default	Units
15 - 90	1	30	°

Navigation change limit

In Navigation mode, when the required course change to next waypoint in a route is more than the set limit, you are prompted to verify that the upcoming course change is acceptable. The limit is adjustable.



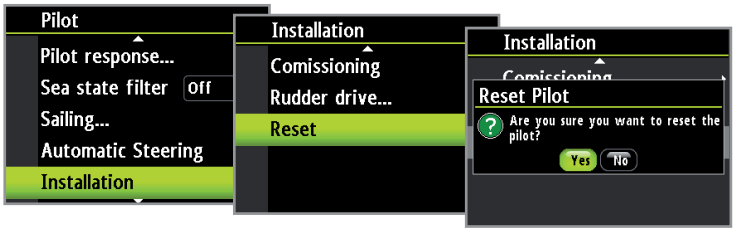
➔ ***Note:*** Nav change limit screen can also be reached from the Nav mode main screen by pressing the 'Menu' key followed by the 'Mode' key within 2 seconds.

Range	Change per step	Default	Units
10 - 30	10	10	°

Reset

Resets the Pilot to factory settings.

> ⚠ **Warning:** all previous Pilot settings will be lost! Before engaging the Pilot the commissioning and calibration process must be completed.



5 Maintenance

General maintenance

The instruments are repair by replacement units, and the operator is therefore required to perform only a very limited amount of preventive maintenance.

If the unit requires any form of cleaning, use fresh water and a mild soap solution (not a detergent). It is important to avoid using chemical cleaners and hydrocarbons such as diesel, petrol etc.

Always put on the weather cover when the unit is not in use.

Checking the keys

Make sure that no keys are stuck in the down position.

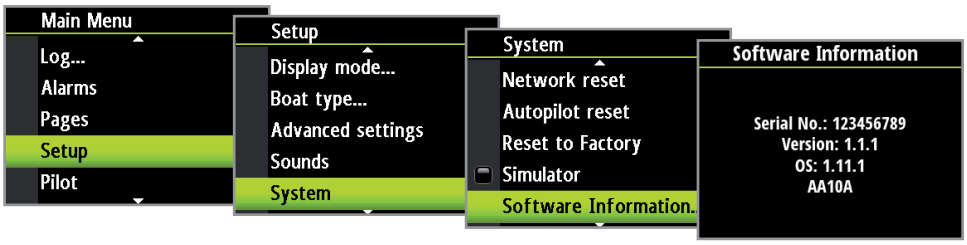
Checking the connectors

The connectors should be checked by visual inspection only. Ensure that cables are connected correctly and any unused terminals are protected.

Software upgrade

To find out the latest version of software available for your display go to the B&G website www.bandg.com

To verify what software you are currently running go to the software information page on your display.



6 Specifications

Technical specifications

Declarations and conformance

This equipment is intended for use in international waters as well as coastal sea areas administered by countries of the E.U. and E.E.A. For more information refer to the separate Triton Installation manual.

Display

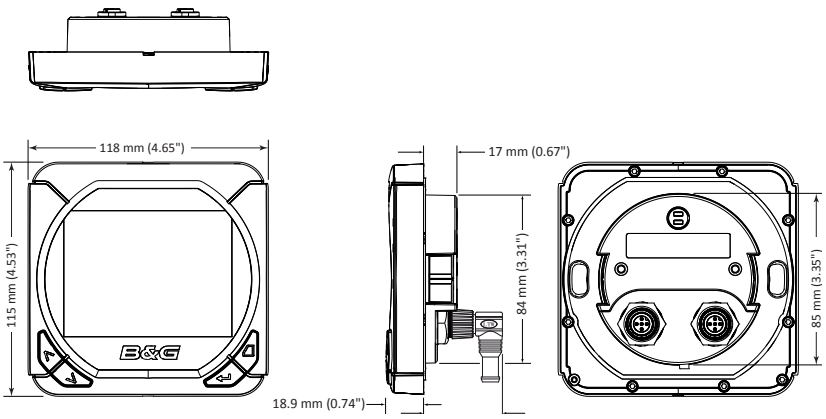
Weight		0.28 kg (0.6 lbs)
Power consumption		155 mA at 13.5V
Network load		Maximum 10 Triton displays
Colour		Black
Display		
	Size	4.1" (Diagonal) 4:3 Aspect ratio
	Type	Transmissive TFT-LCD - White LED back-light
	Resolution	320 x 240 pixels
	Illumination	White (day mode) / Red (night mode)
Environmental Protection		IPX7
Safe distance to compass		0.3 m (1.0 ft.)
Temperature		
	Operating	0 to +55 ºC (+32 to +130 ºF)
	Storage	-30 to +70 ºC (-22 to +158 ºF)

Pilot Controller

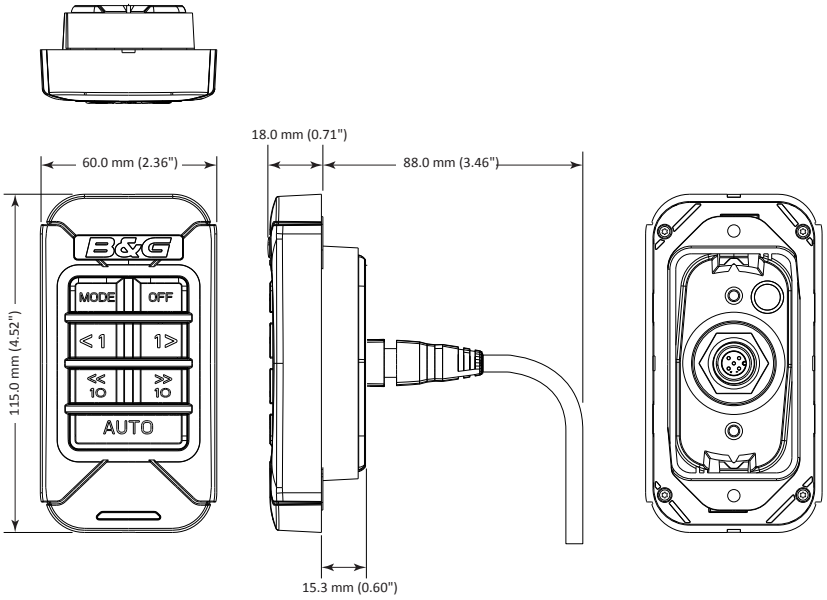
Weight		0.14 kg (0.3 lbs)
Power consumption		145 mA at 13.5V / 45 mA at 13.5V No backlight
Colour		Black
Environmental Protection		IPX7
Safe distance to compass		0.3 m (1.0 ft.)
Temperature		
	Operating	0 to +55 ºC (+32 to +130 ºF)
	Storage	-30 to +70 ºC (-22 to +158 ºF)

Dimensional drawings

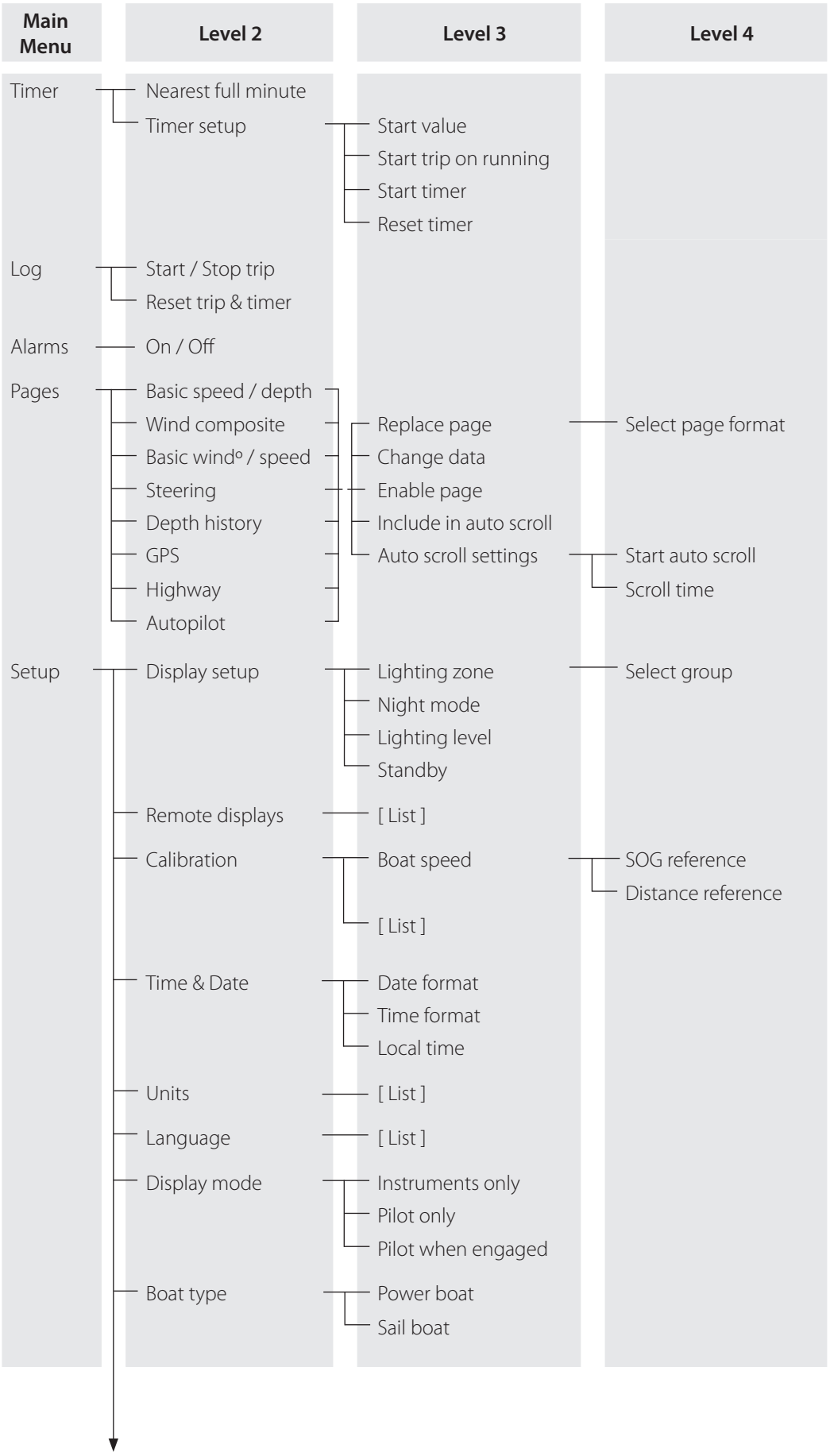
Display

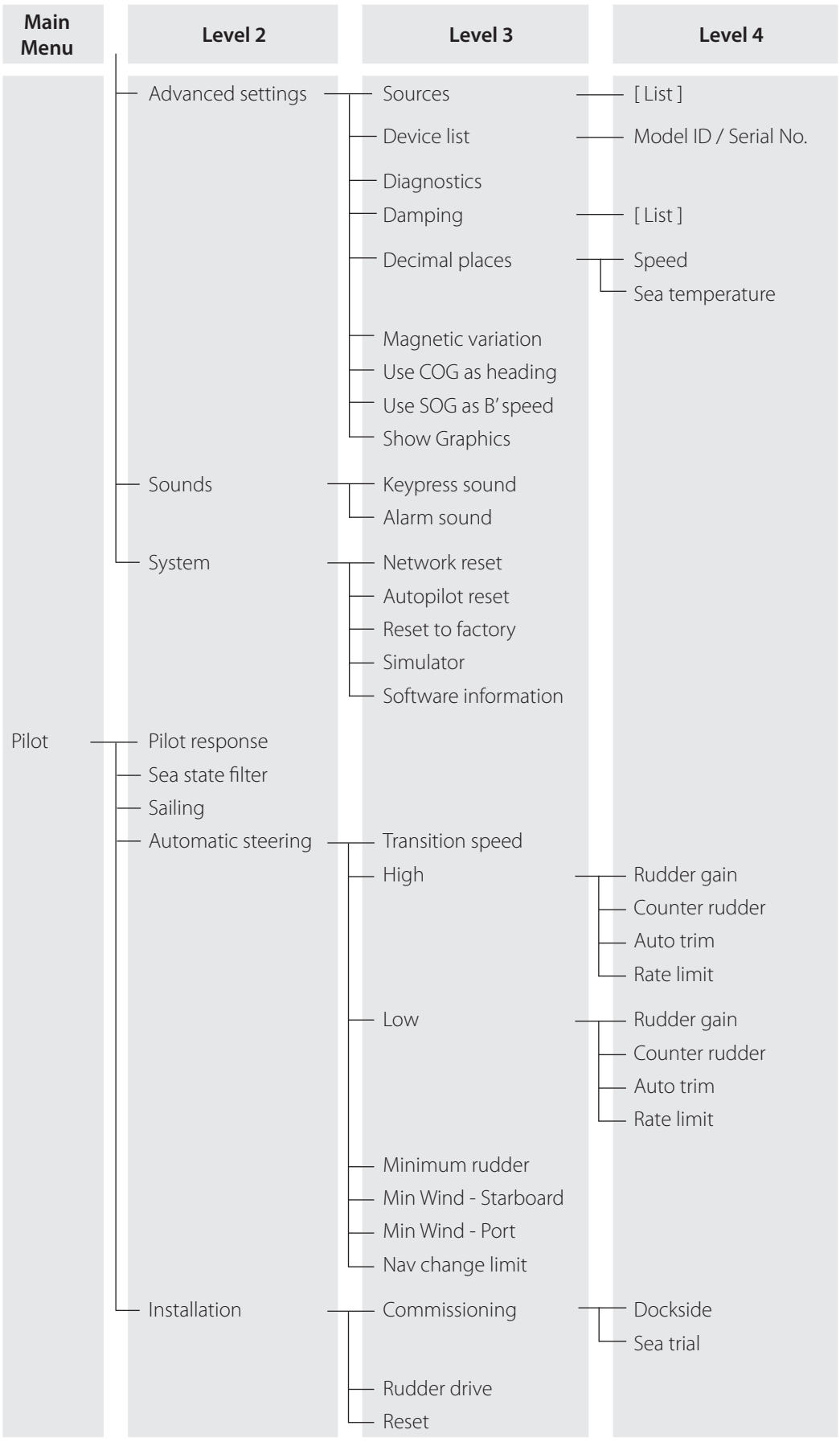


Pilot controller



Menu flow chart




Main Menu
Level 2
Level 3
Level 4
Advanced settings
Sources
[List]
Device list
Model ID / Serial No.
Diagnostics
Damping
[List]
Decimal places
Speed
Sea temperature
Magnetic variation
Use COG as heading
Use SOG as B' speed
Show Graphics
Sounds
Keypress sound
Alarm sound
System
Network reset
Autopilot reset
Reset to factory
Simulator
Software information
Pilot
Pilot response
Sea state filter
Sailing
Automatic steering
Transition speed
High
Rudder gain
Counter rudder
Auto trim
Rate limit
Low
Rudder gain
Counter rudder
Auto trim
Rate limit
Minimum rudder
Min Wind - Starboard
Min Wind - Port
Nav change limit
Installation
Commissioning
Dockside
Sea trial
Rudder drive
Reset

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