Autopilot Controller

App Guide

English

Software version: 2.1

NSS® 4 | Zeus® SR

NSX® | Zeus® S

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Trademarks

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This product's safety, disclaimer and compliance statements are supplied as a separate document.

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

More information

Document version: 001

This document was prepared using software version 2.1.

Features described in this document may vary from your unit due to connected devices, settings, brand, and continuous software development.

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OVERVIEW

An autopilot is a navigational device that automatically keeps your vessel on a steady course or route.

> ℹ Refer to your autopilot system's commissioning manual for further guidance on setup and installation.

SAFETY

> ⚠ **WARNING:** An autopilot is a useful navigational aid, but it does not replace a human navigator. Ensure the autopilot has been installed correctly, commissioned and calibrated before use.

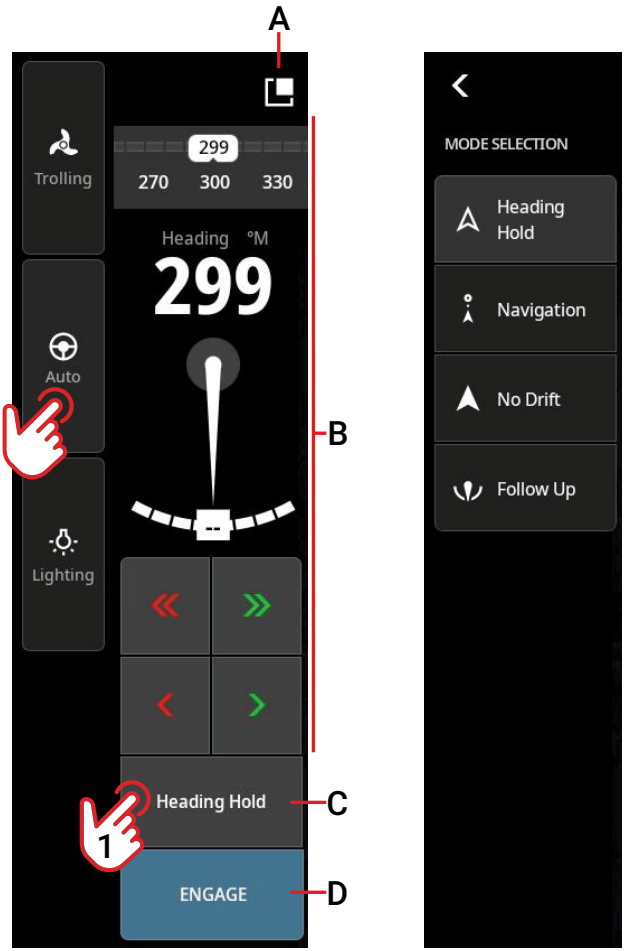
Do not use automatic steering when in:

- Heavy traffic areas or narrow waters.
- Poor visibility or extreme sea conditions.
- Areas where use of an autopilot is prohibited by law.

When using an autopilot:

- Do not leave the helm unattended.
- Do not place any magnetic material or equipment near the heading sensor used by the autopilot system.
- At regular intervals, verify the course and position of the vessel.
- Always switch the autopilot to standby and reduce speed in time to avoid hazardous situations.

AUTOPILOT CONTROLLER



A Float button — select to undock/dock the controller from the control bar.
→ *Note: This option is only available on units with 12" and larger displays.*

B Autopilot (mode-dependent) information and buttons.

C Mode button — displays the current mode or last active mode. Select the mode button (**1**) to open the mode selection list.

D Engage — select to engage the autopilot.
→ *Note: When you select the **ENGAGE** button, it changes to **STANDBY**. Select **STANDBY** to stop navigating with the autopilot.*

→ *Note: The controller layout and appearance may change based on the display screen size.*

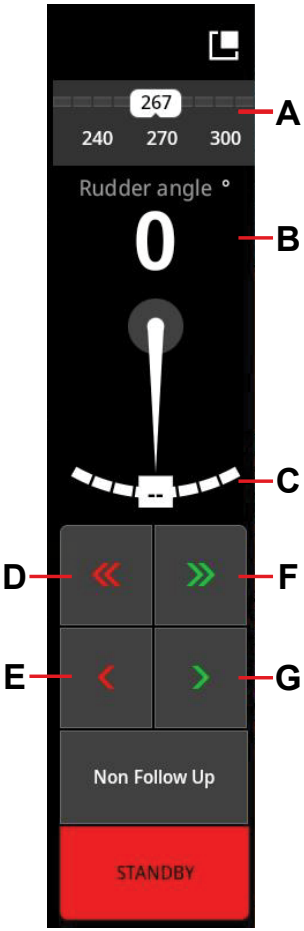
AUTOPILOT MODES

The autopilot offers various steering modes. The number of modes and features within each mode depends on the autopilot computer, the vessel type and available inputs.

Non Follow Up mode

In this mode, you use the port and starboard buttons to control the rudder.

To turn on this mode, select the port or starboard button when the autopilot is in **STANDBY**.



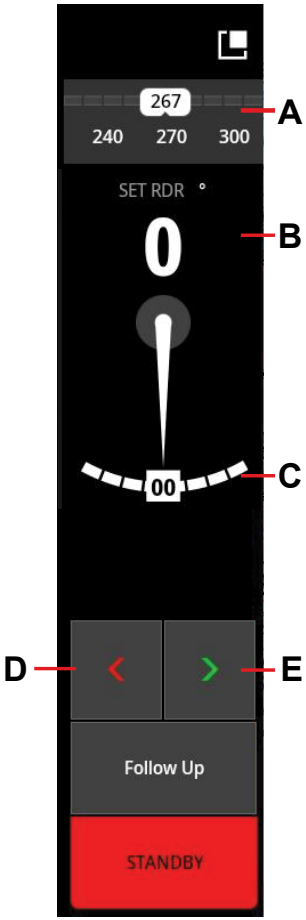
A Current heading
B Command rudder angle
C Current rudder angle
D 10° port — press and hold to move the rudder 10° to port.
E 1° port — press and hold to move the rudder 1° to port.
F 10° starboard — press and hold to move the rudder 10° to starboard.
G 1° starboard — press and hold to move the rudder 1° to starboard.

➔ ***Note:*** *When you press and hold the 1° or 10° buttons, the rudder moves in the direction indicated. When you release either button, the rudder stops moving and remains at the position it reached.*

➔ ***Note:*** *To return the rudder to center, press the opposite button and release when at center.*

Follow Up mode

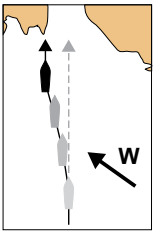
From standby, select the mode button and choose **Follow Up** mode from the mode selection list. In this mode, the autopilot moves the rudder to a set angle and maintains that angle.



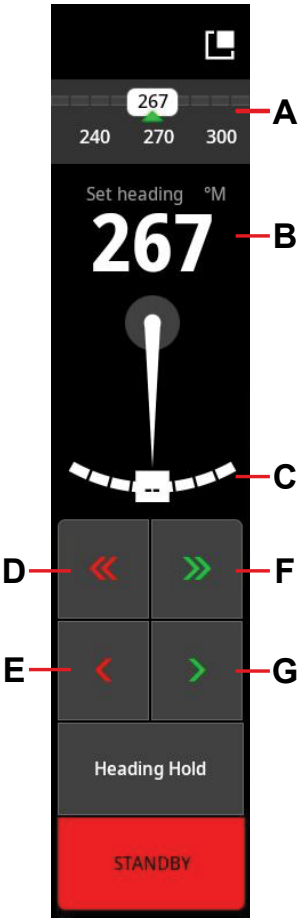
A Current heading
B Set rudder angle
C Current rudder angle
D 1° port — select to move the rudder 1° to port.
E 1° starboard — select to move the rudder 1° to starboard.

Heading hold mode

Select the mode button, then select **Heading Hold** from the mode list. In this mode, the autopilot steers the vessel on the set heading. It selects the current compass heading as the set heading.



➔ *Note: In this mode, the autopilot does not compensate for drifting caused by current and/or wind (**W**).*



A Current heading — the bar shows the offset between the set heading and the current heading.
B Set heading
C Current rudder angle
D 10° port — select to change vessel heading 10° to port.
E 1° port — select to change vessel heading 1° to port.
F 10° starboard — select to change vessel heading 10° to starboard.
G 1° starboard — select to change vessel heading 1° to starboard.

Turn patterns

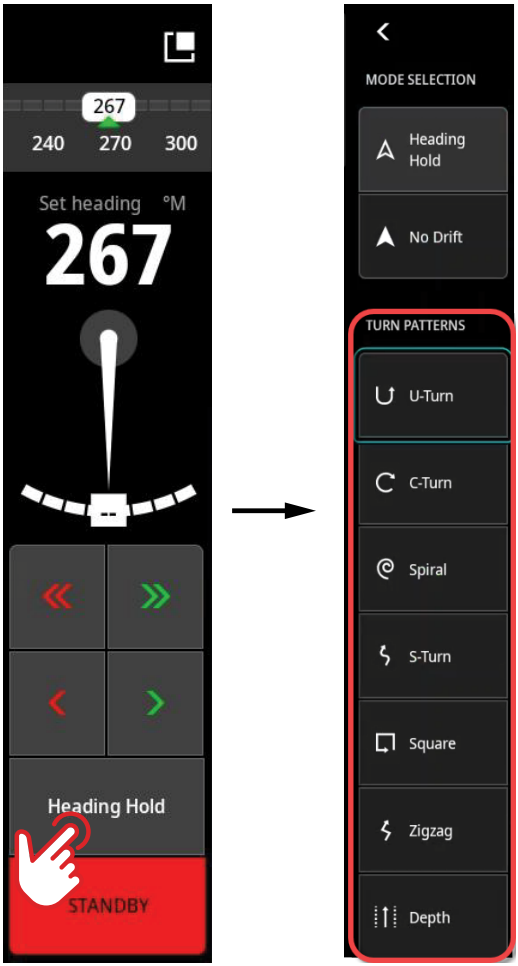
> This functionality is displayed when the boat type is set to **Motor** on the autopilot computer.

In **Heading Hold** mode, you can select from pre-defined turn patterns.

The **TURN PATTERNS** panel is visible only when the following autopilot computers are commissioned and connected to the system:

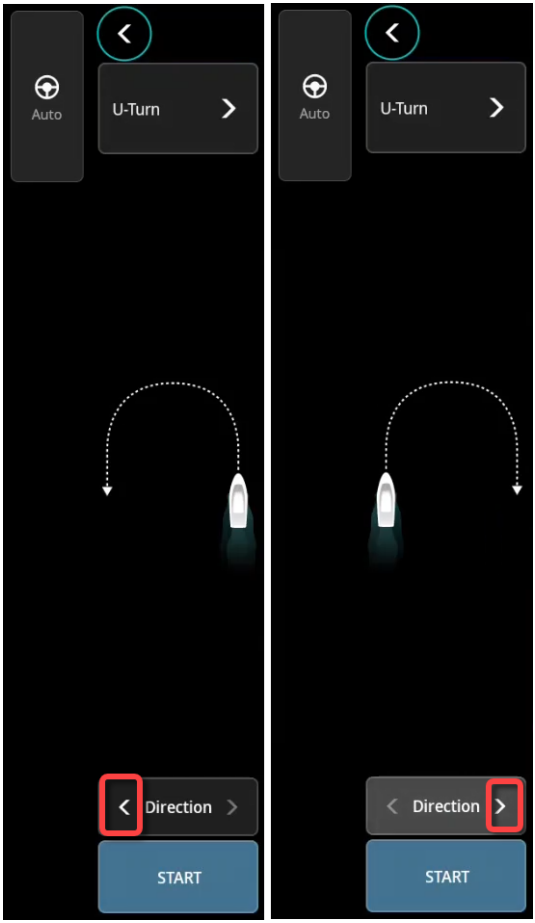
- NAC-1
- NAC-2
- NAC-3
- NAC-D

When you select a turn pattern, controls for that turn pattern are displayed.



U-Turn

A U-Turn makes a 180-degree course change to return the vessel on a reciprocal heading. Choose between U-Turn to port or to starboard. Select **START** to initiate the turn.



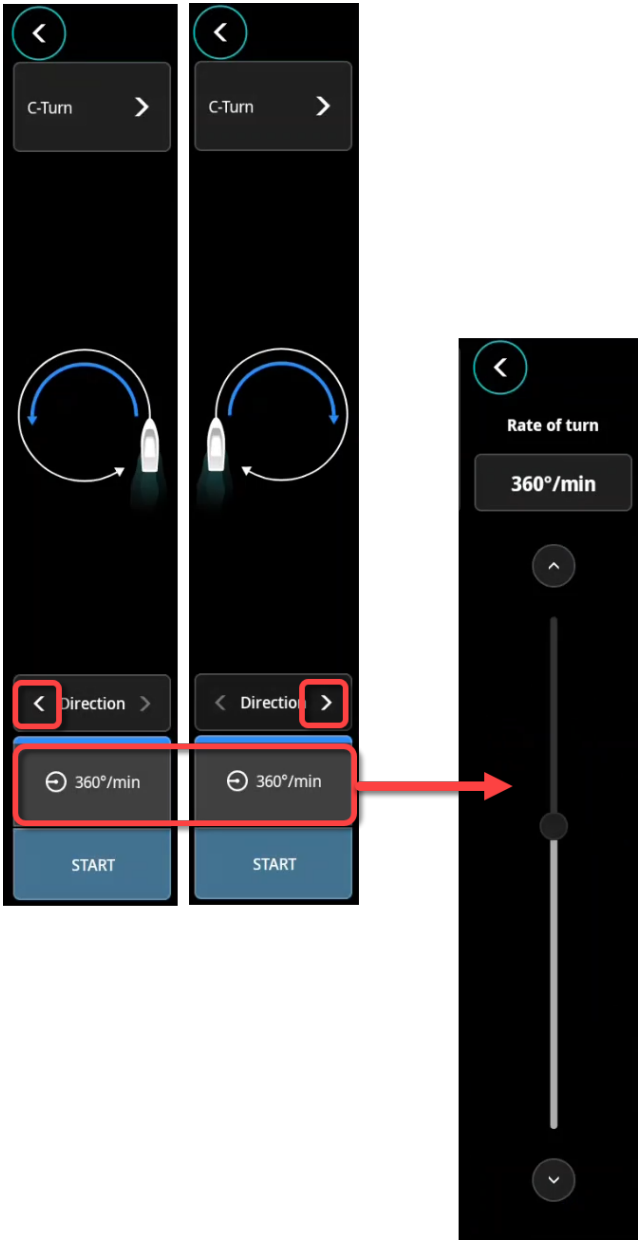
➔ *Note: You can adjust the turn rate under **Autopilot settings > Tune Autopilot > Rate Limit**.*

C-Turn

A C-Turn makes alternating turns based on set parameters.

First select the direction of turn (Port or Starboard) and select the Rate of turn. Select **START** to initiate the turn.

➔ ***Note:*** *Increasing the rate of turn value makes the vessel turn a smaller circle.*



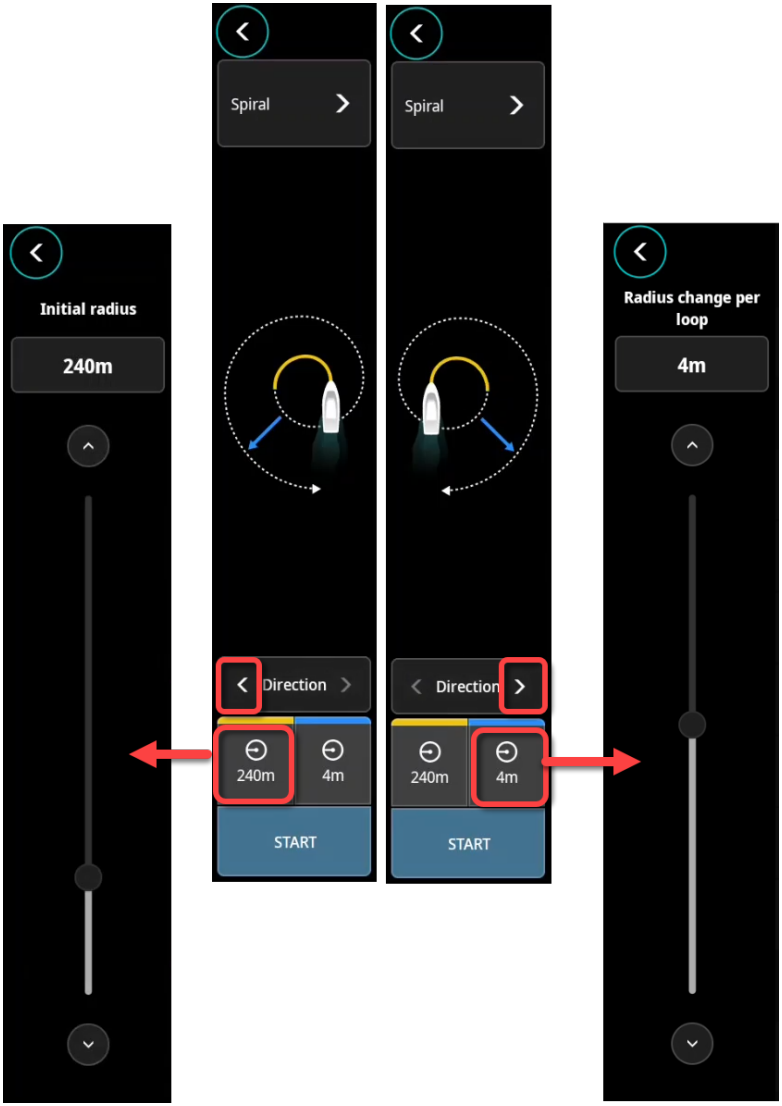
Spiral

Makes the vessel turn in a spiral with a decreasing or increasing radius. You can:

1 Set the values for **Initial radius** before starting the turn.

2 Alter the **Radius change per loop**. If this value is set to zero, the boat will turn in a circle. Negative values indicate decreasing radius while positive values indicate increasing radius.

Select **START** to initiate the turn.



S-Turn

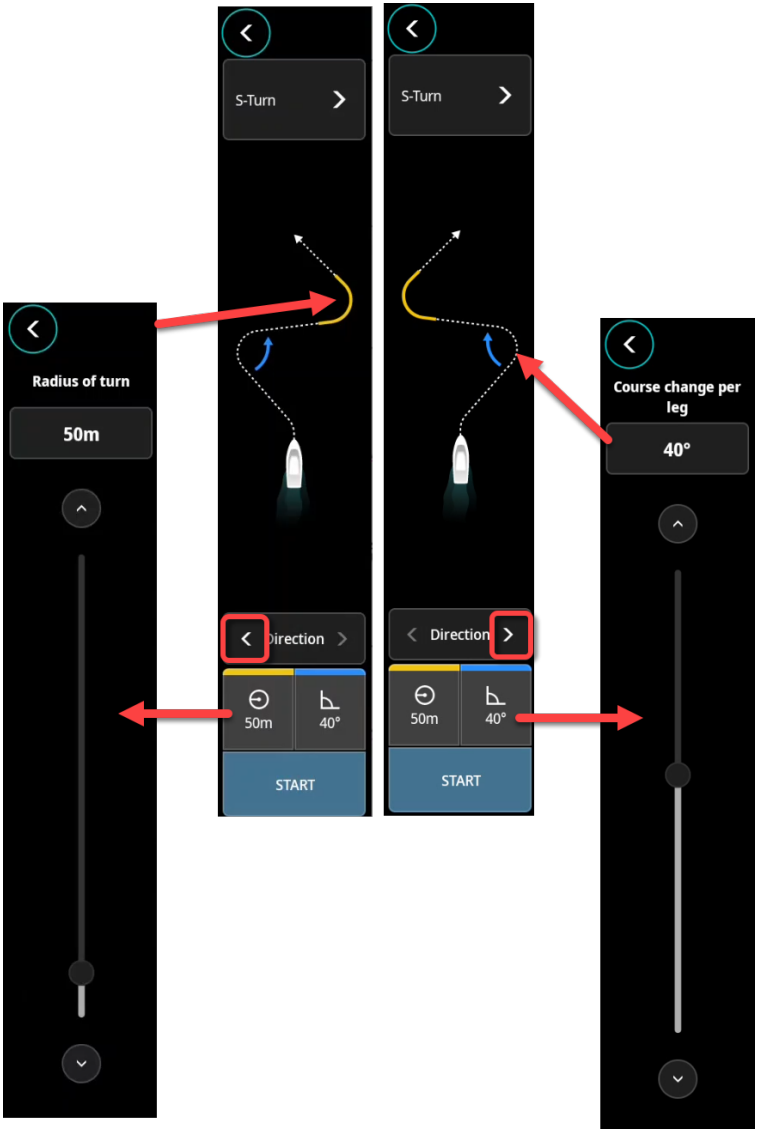
Makes the vessel yaw around the main heading.

1 Set the **Radius of turn** before starting the turn.

2 Set the **Course change per leg**.

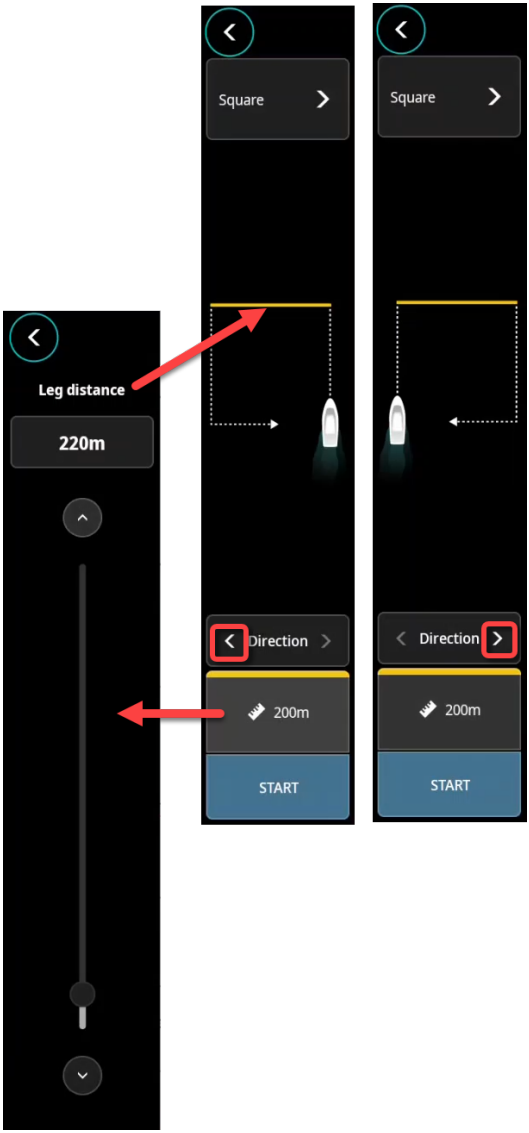
➔ *Note: You can adjust the main course during the turn by rotating the knob (NSS 4 and Zeus SR).*

Select **START** to initiate the turn.



Square

Steers the vessel in a square pattern, doing 90° course changes. You can set the direction of turn and the desired leg distance. Select **START** to initiate the turn.



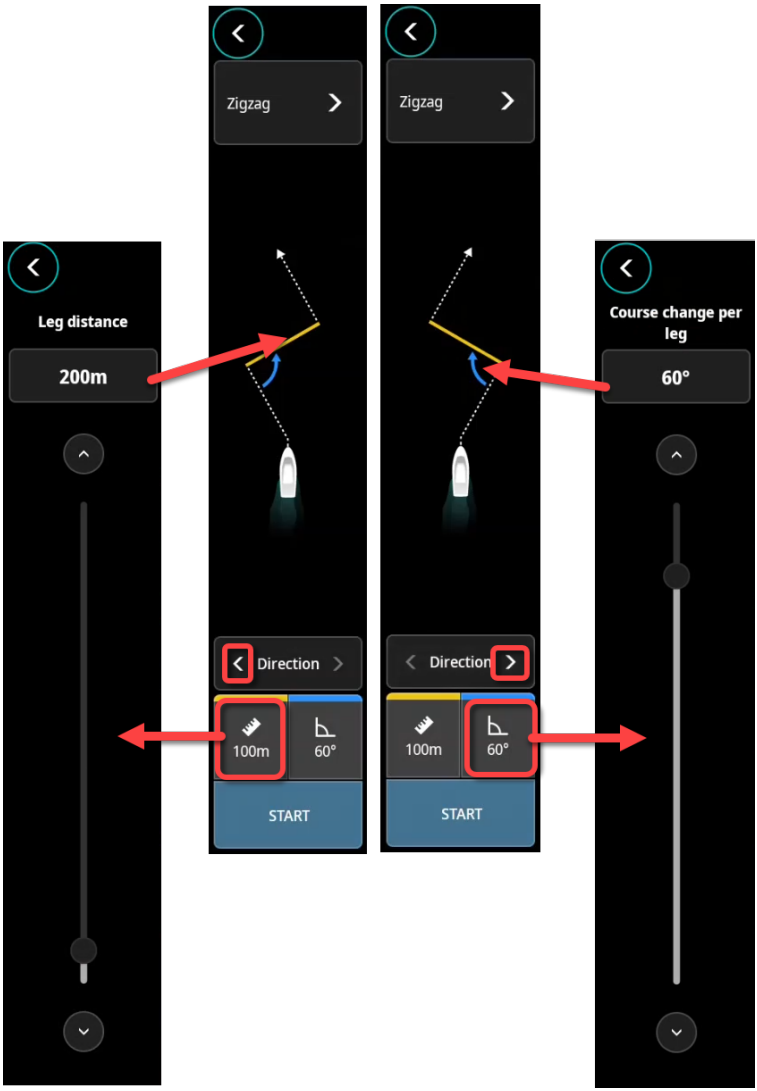
Zigzag

Steers the vessel in a zigzag pattern.

1 Set the **Leg distance**.

2 Set the **Course change per leg**.

Select **START** to initiate the turn.

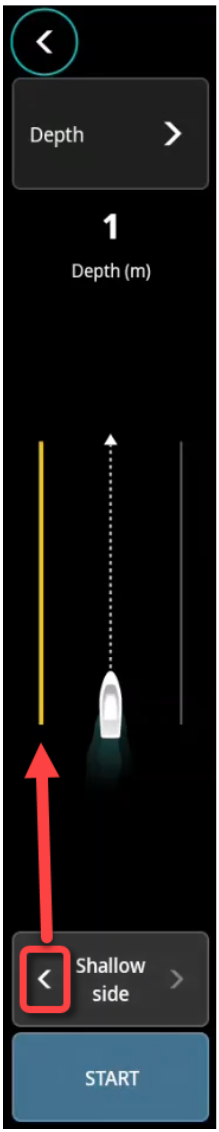


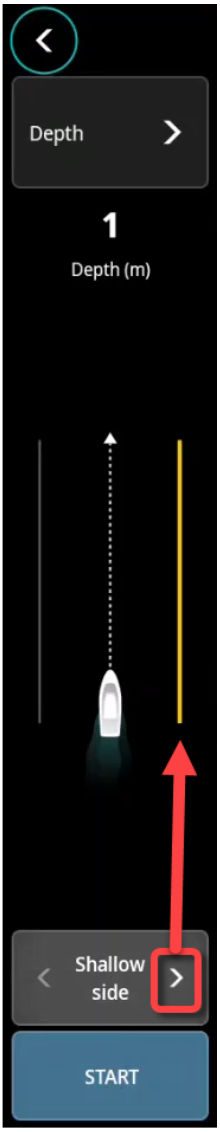
Depth

Makes the autopilot follow a depth contour. Set the **Shallow side** and select **START** to initiate the autopilot.

➔ *Note: Depth pattern is only available if the system has a valid depth input.*

> ⚠ **WARNING:** Do not use the depth pattern unless the seabed is suitable. Do not use it in areas with a rocky seabed where the depth varies significantly over a small area.



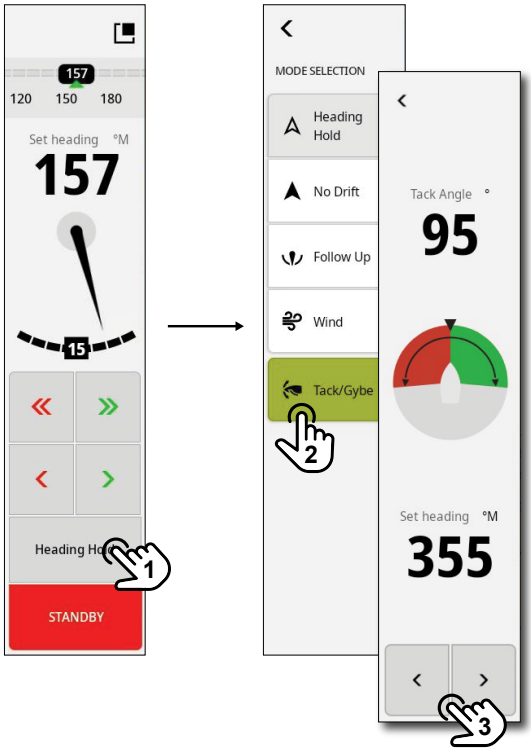


Tack/Gybe in heading hold mode

> ℹ This functionality is displayed when the boat type is set to **Sailing** on the autopilot computer.

- Tacking should only be performed into the wind and must be tried out in calm sea conditions with light wind.
- Tacking in heading hold mode changes the heading by a fixed tack angle, either to port or starboard.

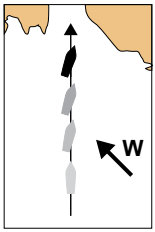
In heading hold mode, select **Heading Hold** (**1**), select **Tack/Gybe** (**2**), then select the port or starboard tack button (**3**) to tack/gybe to port or starboard by the tack angle indicated. The tack angle can be adjusted under autopilot settings.



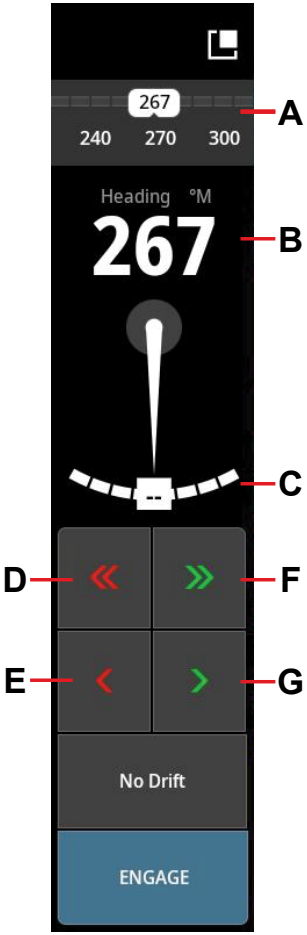
➔ *Note: The tack angle and rate of turn during the tack/gybe are set in the autopilot sailing settings.*

No drift mode

Select the mode button, then select **No Drift** from the mode list. In this mode, the autopilot steers the vessel along a calculated track line, from the present position and in the direction you set. It selects the current compass heading as the set heading.



➔ *Note: If the vessel drifts away from the track line due to current and/or wind (**W**), the vessel follows the line with a crab angle.*



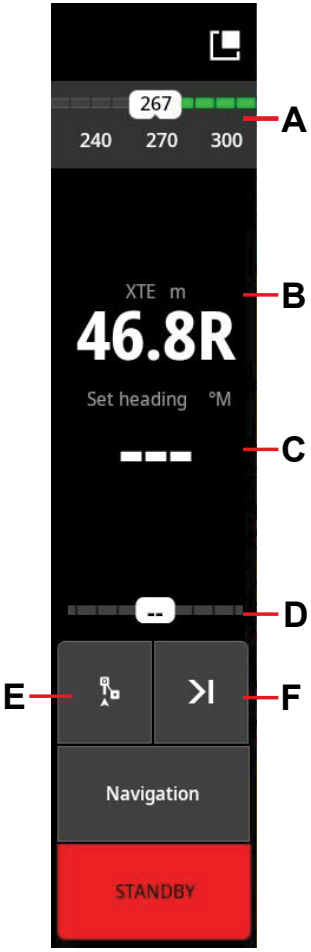
A Current heading — the bar shows the error between the set heading and the current course.
B Set course
C Current rudder angle
D 10° port — select to change heading 10° to port.
E 1° port — select to change heading 1° to port.
F 10° starboard — select to change heading 10° to starboard.
G 1° starboard — select to change heading 1° to starboard.

Navigation mode

⚠ **WARNING:** Navigation mode should only be used in open waters. It must not be used while sailing because course changes can result in unexpected tacks or gybes.

In this mode, the autopilot automatically steers the vessel to a specific waypoint location, the cursor, or along a predefined route. Position information is used to keep the vessel on the track line to the destination waypoint.

➔ *Note: Before entering navigation mode, you must be navigating a route or towards a waypoint or cursor position.*



A Current heading — the bar shows the offset between the set heading and the current heading.
B Cross track error
C Set heading
D Current rudder angle
E Restart button — restarts the navigation from the vessel's current position.
F Skip button — skips the active waypoint and steers towards the next waypoint.

➔ *Note: The controller layout and appearance will change based on the display screen size.*

Turning in navigation mode

When the vessel reaches a waypoint, the autopilot will give an audible warning and display a dialog with the new course information.

➔ ***Note:*** *To silence the audible warning, go to* ***Settings > Alerts > Autopilot****.*

There is a limit for the allowed automatic course change to the next waypoint in a route:

- If the required course change to the next waypoint is less than the course change limit, the autopilot will automatically change the course.
- If the required course change to the next waypoint is more than the set limit, you are prompted to verify that the upcoming course change is acceptable. If the turn is not accepted, the vessel will continue with the current set heading.

The course change limit setting depends on the autopilot computer. Refer to the autopilot computer documentation for more information.

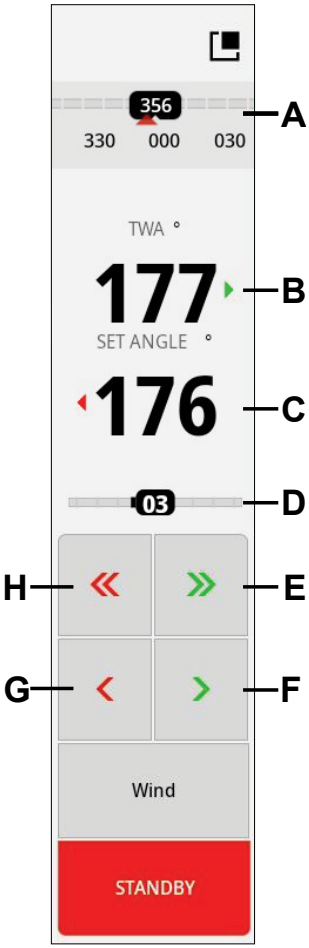
Wind mode

ℹ This functionality is displayed when the boat type is set to **Sailing** on the autopilot computer.

⚠ **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 an undesired course.

In this mode, the autopilot captures the current wind angle as steering reference, and adjusts the heading of the boat to maintain this wind angle. The autopilot keeps the boat on the set wind angle until a new wind angle is set.

➔ *Note: Wind mode is only available when the boat type is set to Sailing in the autopilot settings. You cannot activate wind mode if wind information is missing.*



A Current heading – the bar shows the offset between the set heading and the current heading.
B True wind angle (TWA)/Apparent wind angle (AWA)
C Set angle
D Set heading
E 10° starboard – select and hold to change the TWA 10° to starboard.
F 1° starboard – select and hold to change the TWA 1° starboard.
G 1° port – select and hold to change the TWA 1° to port.
H 10° port – select and hold to change the TWA 10° to port.

➔ *Note: The controller layout and appearance will change based on the display screen size.*

Wind reference angle

To change the set wind reference angle, select a port or starboard button. An immediate change of wind reference angle takes place.

Wind mode display

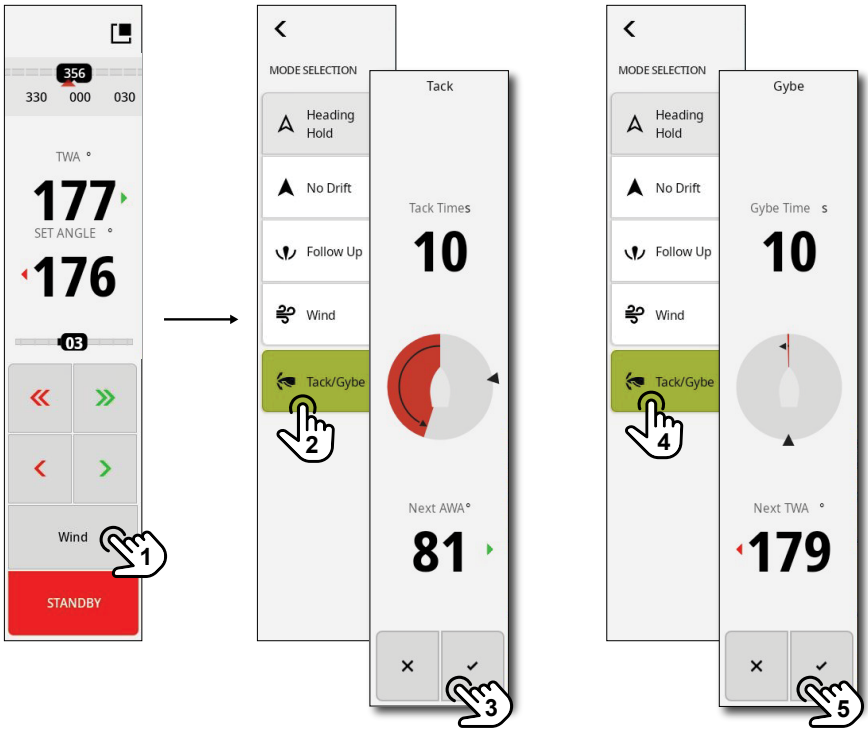
To change the wind mode display for (**B**) to either TWA or AWA, go to **Wind function** under autopilot settings. For more details, refer to **Autopilot computer settings** on page 23.

Tack/Gybe in wind mode

The tack/gybe option in wind mode mirrors the set wind angle on the opposite tack. Tacking and 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° (tacking) and more than 120° (gybing).

The rate of turn during the tack/gybe is set by the **Tack time** in the autopilot sailing settings. For more details, refer to **Autopilot computer settings** on page 23.

Select **Wind** (**1**) and choose **Tack/Gybe** (**2**) (**4**) depending on wind angle, and you will be prompted on the direction the boat will turn. Accept the tack (**3**) or gybe (**5**) or reject with the **X** button.

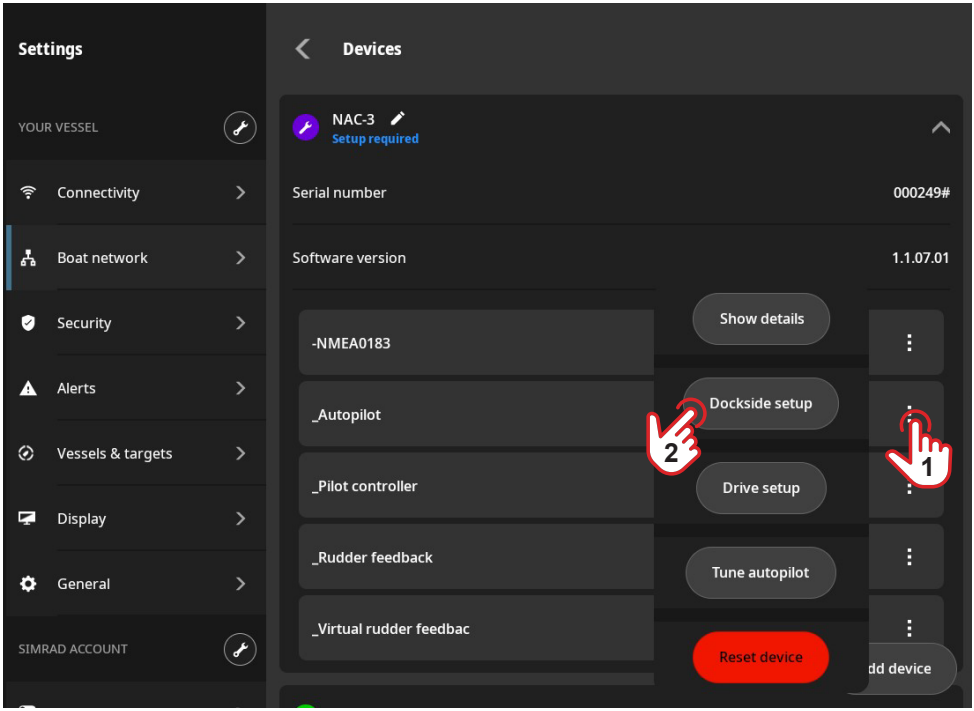


➔ *Note: The autopilot will temporarily add a 5° bear-away on the new tack to allow the boat to pick up speed. After a short period the wind angle will return to the set angle.*

AUTOPILOT COMPUTER SETTINGS

Navigate to **Settings > Boat network > Devices.** Select your autopilot computer, then select the autopilot menu (**1**). From here, you can configure the various autopilot settings (**2**).

Select **Reset device** to reset the autopilot computer to factory defaults.



TUNE AUTOPILOT

These options allow for manually changing low speed and high speed parameters that were set during the commissioning of the autopilot computer.

Beside **Autopilot**, select **Tune autopilot**. From here, you can further tune your autopilot settings.

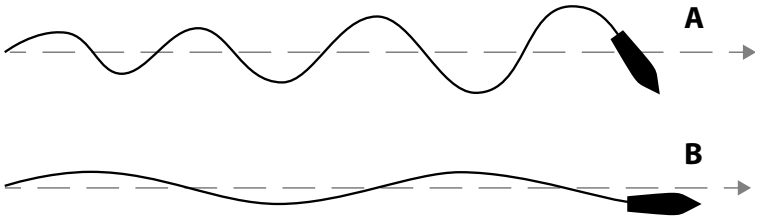
➔ *Note: Most of the settings should already have been made during the setup of the autopilot computer.*

➔ *Note: Only some of the settings are described in this document. Refer to your autopilot computer documentation for further information.*

Rudder gain

This parameter determines the ratio between the commanded rudder and the heading error.

More rudder is applied when a higher rudder gain value is used. If the value is too small (**B**), it takes a long time to compensate for a heading error, and the autopilot fails to keep a steady course. If the value is set too high (**A**), the overshoot increases and the steering is unstable.



Counter rudder

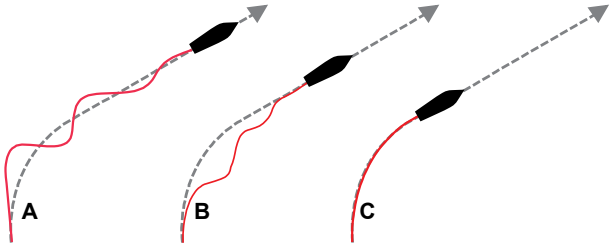
Counter rudder is the amount of counteracting (opposite) rudder applied to stop the turn at the end of a major course change.

The settings depend on the vessel's characteristics, inertia, hull shape, and rudder efficiency.

- If the vessel has good dynamic stability, a relatively small value is sufficient.
- An unstable vessel needs a high value.
- The greater the vessel's inertia, the greater the value needed.

Increasing the counter rudder value can result in some higher rudder activity when steering a straight course, particularly in high waves.

The best time to check the value of the counter rudder setting is when the autopilot is turning the vessel. The following illustrations show the effects of various counter rudder settings.



A A low counter rudder value causes an overshoot response.
B A high counter rudder value causes a sluggish and creeping response.
C The correct counter rudder value gives an ideal response.

Perform various course changes and observe how the vessel settles on the new heading. Start with small changes, 10° - 20°, and proceed with bigger changes, 60° - 90°. Adjust the counter rudder value to get the best possible response.

➔ *Note: Because vessels turn differently to port and starboard (due to propeller rotation direction), you have to make course changes in both directions. You may end up with a compromised counter rudder value that gives a little overshoot to one side and a marginal creeping response on the other.*

Auto trim

Auto trim (seconds) controls how fast the autopilot will apply a constant heading offset. E.g., when external forces such as wind or current affects the heading. Lower auto trim will give faster, limitation of a constant heading offset.

➔ *Note: This setting should be increased proportionally with vessel length.*

Rate limit

Sets the target rate of turn (degrees per minute) used for a heading change.

Rudder limit

Sets a rudder angle limit when an alert is displayed for maximum rudder angle.

Off heading limit

Sets an alert when the heading changes beyond the set limit.

Track response

Defines how aggressively the autopilot should steer towards the active route's leg.

Track approach angle

This setting is a limit to prevent approaching the track too steeply. Approaching the track at shallower angles is permitted depending on the cross track distance (**XTD**) and track response setting. This setting is used both when you start navigating and whenever the autopilot is working the boat towards the route.

Navigation change limit

Defines the limit for automatic course change to next waypoint in a route when the autopilot is following a route (navigation mode). If the course change is greater than this set limit, you are prompted to verify that the upcoming course change is acceptable.

Init rudder

Sets the rudder starting position after initiation of auto steering. Choose between **Actual** or **Centre** positions.

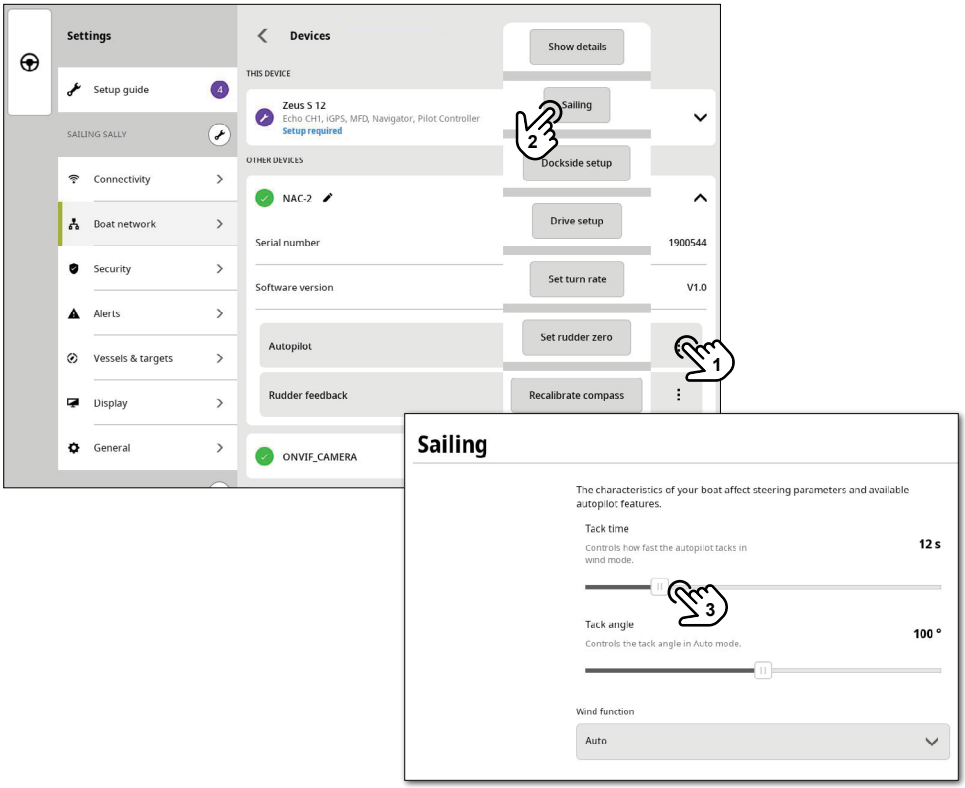
- Actual — engages the pilot at current rudder angle.
- Centre — moves the rudder back to 0°.

Sailing settings

> This functionality is displayed when the vessel type is set to **Sailing** on the autopilot computer.

Navigate to **Settings > Boat network > Devices.** Select your autopilot computer, then select the autopilot menu (**1**).

To change the **Tack time** settings, select **Sailing** (**2**).



Tack angle

Set the tack angle for auto mode to the desired setting.

Wind function

Select what wind function the autopilot will use when in wind mode. Set the wind function to **Apparent**, **True** or **Auto**.

In **Auto**:

- If TWA is <70º, Wind mode will use AWA.
- If TWA is ≥70º, Wind mode will use TWA.

➔ ***Note:*** *The autopilot will temporarily add a 5° 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.*