

GARMIN®

REACTOR™ 40 SAIL WITH SMARTDRIVE™

Configuration Guide

Important Safety Information

WARNING

See the *Important Safety and Product Information* guide in the product box for product warnings and other important information.

To avoid possible personal injury and damage to your boat, the autopilot system should be installed by a qualified marine installer. Specific knowledge of marine steering and electrical systems is required for proper installation.

You are responsible for the safe and prudent operation of your vessel. The autopilot is a tool that enhances your capability to operate your boat. It does not relieve you of the responsibility of safely operating your boat. Avoid navigational hazards and never leave the helm unattended.

Always be prepared to promptly regain manual control of your boat.

Learn to operate the autopilot on calm and hazard-free open water.

Use caution when operating the autopilot near hazards in the water, such as docks, pilings, and other boats.

Performing maintenance while in motion, operating with the cover removed, or inserting fingers into the opening could cause serious personal injury or property damage.

CAUTION

Failure to install and maintain this equipment in accordance with these instructions could result in damage or injury.

When in use, beware of hot surfaces on the heat-sink and motor components to avoid possible personal injury.

When in use, beware the risk of entrapment or pinching from moving parts to avoid possible personal injury.

NOTICE

Failing to recalibrate the rudder after performing maintenance or adjustments could result in damage to the device or the vessel.

Configuring the Autopilot

The autopilot system must be configured and tuned to your boat dynamics. You should use the Dockside Wizard and the Sea Trial Wizard to configure the autopilot. These wizards walk you through the necessary configuration steps.

If your autopilot package did not contain a helm control, you must configure the autopilot system using a compatible chartplotter on the same NMEA 2000® network as the autopilot CCU. These instructions address configuration using either a helm control or a chartplotter.

Dockside Wizard

CAUTION

When performing the Dockside Wizard, while your boat is either in or out of the water, you must provide rudder-movement clearance to avoid damage to the rudder or other objects, and you must use caution to avoid personal injury that may be caused by moving parts.

You can complete the Dockside Wizard while the boat is in or out of the water.

If the boat is in the water, it must be stationary while you complete the wizard.

Performing the Dockside Wizard

- 1 Turn on the autopilot.
The first time you turn on the autopilot, you are prompted to complete a short setup sequence.
- 2 If the **Dockside Wizard** does not start automatically after the setup sequence, on a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Wizards > Dockside Wizard > Begin**.
- 3 Select the vessel type.
- 4 Set the rudder force to high, medium, or low ([Setting the Rudder Force, page 2](#)).
- 5 Calibrate the rudder sensor ([Calibrating the Rudder Sensor, page 2](#)).
- 6 Test the steering direction ([Testing the Steering Direction, page 2](#)).
- 7 If necessary, select the speed source ([Selecting a Speed Source, page 2](#)).
- 8 Review the results of the **Dockside Wizard** ([Reviewing the Results of the Dockside Wizard, page 3](#)).

Setting the Rudder Force

The rudder-force setting determines the maximum force the actuator can apply when moving the rudder. You should select a force level appropriate for the vessel and steering system. If you are not certain about the rudder force needed for the rudder, it is recommended that you leave the default option of Medium when configuring the autopilot. You can select a different option later, if needed.

NOTICE

You should select the lowest option that provides reliable steering performance to avoid potentially damaging the steering system on the vessel.

NOTE: This setting limits only the maximum force that can be applied by the actuator. This does not affect steering responsiveness or autopilot tuning.

When prompted to select the rudder-force setting, select an option:

High: This option provides maximum force. The actuator provides up to approximately 1,050 pounds of force, and this option should be used only for installations that require the strongest possible force to steer.

Medium: This is the default option and it provides moderate force. The actuator provides up to approximately 600 pounds of force, and this option is suitable for most installations.

Low: This option provides reduced force. The actuator provides up to approximately 400 pounds of force, and this option should be used for installations that require limited force.

Calibrating the Rudder Sensor

- 1 Position the rudder so that the boat would steer fully starboard, and select **OK**.
- 2 After the starboard calibration is complete, position the rudder so that the boat would steer fully port, and select **OK**.
- 3 After the port calibration is complete, center the rudder position, let go, and select **Begin**.
The autopilot takes control of the rudder.
- 4 Without touching the rudder, helm control, or chartplotter, allow the autopilot to calibrate the rudder.
- 5 Select an option:
 - If the calibration did not complete successfully, repeat the previous steps.
 - If the calibration completed successfully, select **Next**.

Testing the Steering Direction

- 1 While observing the rudder, select **<** and **>**.
When you select **<**, the rudder must move so it will turn the boat to the left. When you select **>**, the rudder must move so it will turn the boat to the right.
- 2 Select an option:
 - If the steering test confirms that it will turn the boat in the correct direction, select **Next**.
 - If the steering test shows that it will turn the boat in the opposite direction, select **Switch Direction**, and repeat this test.

Selecting a Speed Source

Select an option:

- If the autopilot CCU is connected to the same NMEA 2000® network as a GPS antenna or a device containing a GPS antenna, select **GPS** as a speed source.

NOTICE

Garmin® recommends using an external GPS antenna mounted with a clear view of the sky to provide reliable and accurate GPS speed information.

- If a GPS antenna or device is not available as a speed source, select **None**.

NOTICE

If you select **None** as the speed source, the autopilot system will perform best when traveling at the speed used during the **Autotune** procedure.

This setting provides the least-favorable performance, and should only be used if no other speed source is available. If the autopilot does not perform well using **None** as the speed source, Garmin recommends installing an external GPS antenna to use as the speed source.

Reviewing the Results of the Dockside Wizard

The values you chose when you ran the Dockside Wizard are displayed.

- 1 Examine the results of the **Dockside Wizard**.
- 2 Select and correct incorrect values.
- 3 When you are finished reviewing the values, select **Done**.

Sea Trial Wizard

The Sea Trial Wizard configures the fundamental sensors on the autopilot, and it is extremely important to complete the wizard in conditions appropriate for your boat.

Important Sea Trial Wizard Considerations

The Sea Trial Wizard must be completed in calm water. Because the nature of calm water is relative to the size and shape of the boat, before you begin the Sea Trial Wizard, the boat must be in an appropriate location.

- The boat must not rock while sitting still or moving very slowly.
- The boat must not be significantly affected by the wind.

While completing the Sea Trial Wizard, observe these considerations.

- Weight on the boat must remain balanced. While completing any of the steps in the Sea Trial Wizard, do not move around on the boat.

Performing the Sea Trial Wizard

- 1 Drive your boat to an open area of calm water.
- 2 On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Wizards > Sea Trial Wizard > Begin**.
- 3 Calibrate the compass ([Calibrating the Compass, page 3](#)).
- 4 Perform the **Autotune** procedure ([Performing the Autotune Procedure, page 4](#)).
- 5 Set north ([Setting North, page 4](#)), or set the fine heading adjustment ([Setting the Fine Heading Adjustment, page 5](#)).

Calibrating the Compass

- 1 Select an option:
 - If you are performing this procedure as part of the **Sea Trial Wizard**, select **Begin**.
 - If you are performing this procedure outside of the **Sea Trial Wizard**, on a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Compass Setup > Compass Cal. > Begin**.
- 2 Follow the directions until calibration is complete, taking care to keep the boat as steady and flat as possible.

The boat should not list during calibration. Make sure one side of the vessel is not loaded more heavily than the other.
- 3 Select an option:
 - If the calibration is not successful, repeat the previous step.
 - If the calibration completes successfully, select **Next**.

When the calibration is complete, a magnetic environment quality value is shown. A value of 100 indicates the CCU was installed in a perfect magnetic environment and calibrated correctly. If this value is low, you might need to relocate the CCU and calibrate the compass again.

Performing the Autotune Procedure

Before you can begin this procedure, you must have a large stretch of open water available.

- 1 When under power (not under sail), adjust the throttle so the boat travels at approximately 5 knots and provides prompt, responsive steering.
- 2 Select an option:
 - If you are performing this procedure as part of the **Sea Trial Wizard**, select **Begin**.
 - If you are performing this procedure outside of the **Sea Trial Wizard**, on a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Autopilot Tuning > Autotune > Begin**.

The boat performs various zigzag motions while the Autotune is in progress.

- 3 After the procedure is finished, follow the on-screen instructions.
- 4 If the **Autotune** procedure is not successful, select an option:
 - If the **Autotune** procedure is not successful and you have not reached maximum cruising speed, increase the speed, select **Run Standard Autotune** and repeat steps 1 through 3 until the **Autotune** procedure completes successfully.
 - If the **Autotune** procedure is not successful and you have reached maximum cruising speed, reduce your speed to the initial **Autotune** speed, and select **Run Alternate Autotune** to begin an alternate procedure.
 - If the **Autotune** fails immediately and you are traveling in a circle instead of performing zigzag motions, select **Switch Direction > Run Standard Autotune** and repeat steps 1 through 3 until the **Autotune** procedure completes successfully.

When the Autotune procedure is complete, gain values are displayed. You can use these values to determine the quality of the Autotune procedure.

Autotune Gain Values

After the Autotune procedure is complete, you can review the gain values provided on the helm control. You can record these numbers for reference if you want to run the autotune procedure at a later time.

NOTICE

These values are for reference only. For best performance, you should not adjust these values after the autotune procedure is complete. Instead, you should set the Response setting to Auto Medium

Gain: Sets how tightly the autopilot holds the heading and how aggressively it makes turns.

Setting North

Before you can begin this procedure, you must have a large stretch of open water available.

This procedure appears if the autopilot is connected to an optional GPS device, and the device has acquired a GPS position. During this procedure, the autopilot aligns the compass heading with the Course over Ground (COG) information from the GPS device.

If you do not have a GPS device connected, you are prompted to set the fine heading adjustment instead ([Setting the Fine Heading Adjustment, page 5](#)).

- 1 Drive your boat at in a straight line at cruising speed, downwind, and in the same direction as the current.
- 2 Select an option:
 - If you are performing this procedure as part of the **Sea Trial Wizard**, select **Begin**.
 - If you are performing this procedure outside of the **Sea Trial Wizard**, on a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Compass Setup > Set North > Begin**.
- 3 Continue to drive the boat in a straight line at cruising speed, downwind, in the same direction as the current, and follow the on-screen instructions.
- 4 Select an option:
 - If the calibration is not successful, repeat the previous step.
 - If the calibration completes successfully, select **Next**.

Setting the Fine Heading Adjustment

This procedure appears only if you do not have an optional GPS device connected to the autopilot. If the autopilot is connected to a GPS device that has acquired a GPS position, you are prompted to set north instead ([Setting North, page 4](#)).

- 1 Select an option:
 - If you are performing this procedure as part of the **Sea Trial Wizard**, proceed to step 2.
 - If you are performing this procedure outside of the **Sea Trial Wizard**, on a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Compass Setup > Fine Heading Adjustment**.
- 2 Adjust the fine heading setting until it shows the correct heading as determined by a trusted heading indicator, such as the ship compass or a handheld compass.
- 3 Select **Back**.

Testing and Adjusting the Configuration

NOTICE

Test the autopilot at a slow speed. After the autopilot has been tested and adjusted at a slow speed, test it at a higher speed to simulate normal operating conditions.

- 1 Drive the boat in one direction with the autopilot engaged (heading hold).
The boat may oscillate slightly, but it should not oscillate significantly.
- 2 Turn the boat in one direction using the autopilot and observe the behavior.
The boat should turn smoothly, not too quickly or too slowly.
When you turn the boat using the autopilot, the boat should approach and settle on the desired heading with minimal overshoot and oscillation.
- 3 Select an option:
 - If the boat turns too quickly or too sluggishly, adjust the autopilot acceleration limiter ([Adjusting the Acceleration Limiter Settings, page 5](#)).
 - If the heading hold oscillates significantly or the boat does not correct when turning, adjust the autopilot gain ([Adjusting the Autopilot Gain Settings, page 5](#)).
 - If the boat turns smoothly, the heading hold oscillates only slightly or not at all, the boat adjusts the heading correctly, the configuration is correct. No further adjustments are necessary.

Adjusting the Acceleration Limiter Settings

- 1 On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Autopilot Tuning > Accel. Limiter**.
- 2 Select an option:
 - Increase the setting if the autopilot turns too quickly.
 - Decrease the setting if the autopilot turns too slowly.

When you manually adjust the acceleration limiter, make relatively small adjustments. Test the change before making additional adjustments.
- 3 Test the autopilot configuration.
- 4 Repeat steps 2 and 3 until the autopilot performance is satisfactory.

Adjusting the Autopilot Gain Settings

The autopilot gain settings are set during the Autotune procedure. Adjusting these values is not recommended, and you should record the values set by the Autotune procedure before making any changes.

NOTICE

Garmin® advises that you do not adjust the gain value when using a SmartDrive™ actuator. After completing the Autotune procedure, if you are not satisfied by the performance of the autopilot, instead of adjusting the gain settings, you should first try adjusting the response setting ([Adjusting the Response Setting, page 6](#)).

- 1 On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Autopilot Tuning > Rudder Gains**.
- 2 Select **Gain** and adjust how tightly the rudder holds the heading and makes turns.
If you set this value too high, the autopilot may be overactive and attempt to constantly adjust the heading at the slightest deviation. An overactive autopilot can drain the battery at a faster-than-normal rate.
- 3 Test the autopilot configuration, and repeat step 2 until the autopilot performance is satisfactory.

Advanced Configuration Settings

You can calibrate the compass, run the autotune procedure, and set north on the autopilot without running the wizards. You can also manually define each setting individually, in order to make slight adjustments, without running the full configuration or calibration processes.

Manually Running the Automated Configuration Processes

- 1 On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup**.
- 2 Select an automated process:
 - To start the compass calibration procedures, select **Compass Setup > Compass Cal.** (*Calibrating the Compass, page 3*).
 - To start the automatic autopilot tuning procedures, select **Autopilot Tuning > Autotune** (*Performing the Autotune Procedure, page 4*).
 - To start the procedures to define north, select **Compass Setup > Set North** (*Setting North, page 4*).
- 3 Follow the on-screen instructions.

Manually Defining Individual Configuration Settings

Configuring certain settings may require you to modify other settings. Review the detailed configuration settings section prior to modifying any settings (*Detailed Configuration Settings, page 6*).

- 1 On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup**.
- 2 Select a setting category.
- 3 Select a setting to configure.

Descriptions of each setting are available in this manual (*Detailed Configuration Settings, page 6*).
- 4 Configure the value of the setting.

Multiple Sources of Sensor Information

There may be multiple sources of sensor information available to the autopilot system. If so, you can select a preferred data source.

For example, because GPS speed from an external antenna is more reliable and accurate than that from an integrated GPS receiver inside a chartplotter, you should select the external GPS antenna as the preferred source of GPS data. Also, because it can be difficult to find an ideal mounting location for the autopilot CCU, you can optionally select an external NMEA 2000® GPS compass or other heading sensor as the preferred source of heading data.

Selecting a Preferred Source of Sensor Information

- 1 On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Preferred Sources**.

NOTE: Some items in the Preferred Sources menu are shown only when multiple sensors providing the same data are available to the system.
- 2 Select a data category.
- 3 Select a source.

Detailed Configuration Settings

Although all of the configuration is typically completed automatically through wizards, you can manually adjust any setting to fine-tune the autopilot.

NOTE: Depending upon the configuration of the autopilot, certain settings may not appear.

Adjusting the Response Setting

The Response setting allows you to adjust the autopilot responsiveness for varying sea and wind conditions. This is a quick way to adjust how the autopilot system responds without having to change configuration or tuning settings. It is recommended to adjust the response before making any other gain settings. For installations on a sailboat using a mechanical drive unit or a SmartDrive™ actuator, you should adjust this setting to Auto Medium, and that should provide the best response for most sea conditions.

- 1 From the autopilot screen, select **••• > Response**.
- 2 Adjust the rudder response to **Auto Medium**.

Autopilot Tuning Settings

On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Autopilot Tuning**.

Autotune: Starts the Autotune procedure ([Performing the Autotune Procedure, page 4](#)).

Rudder Gains: Adjusts the rudder-gain settings ([Rudder Gain Settings, page 7](#)).

Accel. Limiter: Allows you to limit the speed of autopilot-controlled turns. You can increase the percentage to limit the turn rate, and decrease the percentage to allow a higher turn rate.

Speed Source Settings

On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Speed Source Setup**.

Speed Source: Allows you to select the speed source.

NOTICE

Selecting None for the speed source produces the least-favorable performance, and should only be used as a last resort when a more-accurate speed source, such as GPS, is not available.

Max. Speed: Allows you to adjust the maximum speed of your boat. If the value does not match the value on the helm control or chartplotter, you can adjust the value.

Rudder Gain Settings

NOTICE

If you set these values too high or too low, the autopilot may become overactive, attempting to constantly adjust the heading at the slightest deviation. An overactive autopilot can cause excess wear on the actuator and drain the battery at a faster-than-normal rate.

On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Autopilot Tuning > Rudder Gains**.

Gain: Allows you to adjust how tightly the rudder holds a heading and makes turns.

Counter Gain: Allows you to adjust how tightly the rudder corrects turn overshoot. If you set this value too low, the autopilot can overshoot a turn when attempting to counter the original turn.

Rudder Sensor Settings

On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Steering System Setup > Rudder Sensor Setup**.

Calib. Rudder: Initiates a procedure that establishes the maximum range of movement of the rudder and calibrates the rudder-position sensor. If an error appears during calibration, there may be an issue with the actuator. If the error persists, contact Garmin® product support.

Calib. Center: Initiates a procedure that establishes the center position of the rudder. You can use this calibration if the on-screen rudder position indicator does not match the true rudder center on your boat.

Max. Port Angle: Allows you to enter the angle at which your rudder turns furthest port.

Max. Stbd. Ang.: Allows you to enter the angle at which your rudder turns furthest starboard.

Steering System Settings

On a helm control or the autopilot screen on a chartplotter, select **••• > Autopilot Setup > Autopilot Installation Setup > Steering System Setup**.

Steering Dir.: Sets the direction the rudder must move to turn the vessel to port and to starboard. You can test and reverse the steering direction if necessary.

Adjusting the Wind Gain Setting

The wind gain setting sets how the autopilot responds when in Apparent Wind Hold or True Wind Hold. The higher you set the wind gain, the more the autopilot reacts to changes in the wind.

1 From the autopilot screen, select **••• > Autopilot Setup > Sailing Setup > Wind Gain**.

2 Adjust the **Wind Gain** value.

NOTICE

If you set this value too high, the autopilot may be overactive and attempt to constantly adjust the heading at the slightest deviation. An overactive autopilot can drain the battery at a faster-than-normal rate.

Adjusting the Tack and Gybe Speed

The tack and gybe speed settings adjust how quickly the autopilot system performs tack and gybe maneuvers. You should set these values to match the needs of the vessel and the crew.

- 1 From the autopilot screen, select **••• > Autopilot Setup > Sailing Setup**.
- 2 Select **Tack Speed** or **Gybe Speed**
- 3 Adjust the value.
- 4 Test the setting and repeat these steps until the tack and gybe speeds are appropriate for the vessel and crew.

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