

# Manual

## Simrad SCJ14 Hand Controller

For service and advice please contact the main Simrad dealer in your country of residence.

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## 1 General

### 1.1 Introduction

The Simrad SCJ14 is a second control station kit for the AP12 and AP14 series of autopilots. It comprises an SHC14 handheld control unit, an SJB12 junction box and the required cables for connection to an existing AP12 or AP14 autopilot system.

This will allow the autopilot to be controlled from a second steering position, such as a flybridge on a sports cruiser.

**To ensure the best results from your autopilot system it is essential that this unit is installed correctly - please read this manual thoroughly before attempting installation and use.**

**Thank you for choosing Simrad**

We hope you will also be interested in our full range of marine electronic equipment, which are all manufactured to the same high standards as the AP12 and AP14. Please contact your nearest Simrad Agent for a catalogue showing our full range of high tech marine electronic equipment.

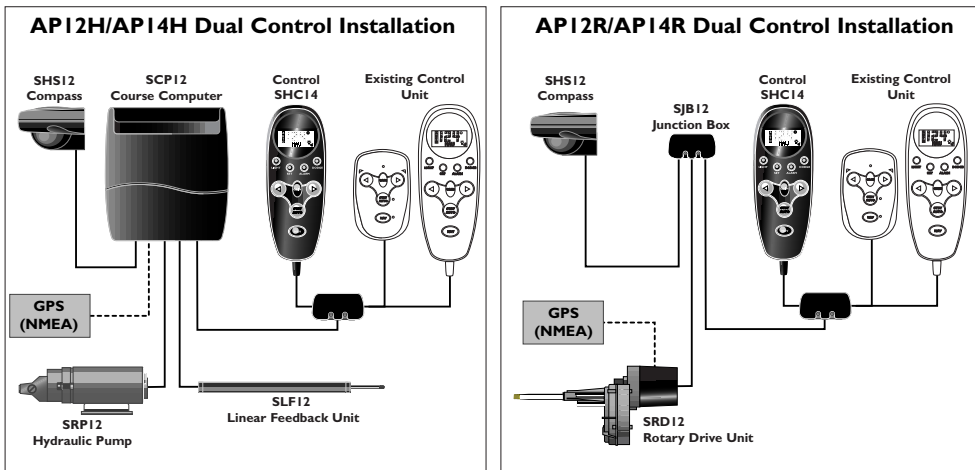
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### 1.2 AP12 & AP14 System Configurations

The AP12 / AP14 autopilot system is designed for power vessels and each model is available in two configurations.

- The **API2H & API4H** - designed for hydraulically steered boats with a ram displacement of 15 in<sup>3</sup> (250cc).
- The **API2R & API4R** - designed for powerboats with a push-pull steering cable system which are 30 ft (9M) or smaller in length.

There are differences in the installation of the SCJ14 depending on whether it is an H or an R configuration. This manual clearly describes how to install the SCJ14 on both types.



## 2 Operation

### 2.1 General

The keypad of the SHC14 controller is easy to operate. Using the five main keys it is simple to change modes, set the course to steer and adjust navigational functions.

When powered up the autopilot enters Standby Mode indicated by the STBY legend in the display (Fig 2.1)

While in Standby Mode, the helmsman is in control. The boat can be hand steered using the helm as normal, or “power steered” using the ◀ and ▶ (Port and Starboard) keys on the controller.

- All functions are confirmed audibly by a “beep” and visually on the display. The display also shows the current magnetic bearing of the vessel.
- If fitted to an AP12H or AP14H, the display will also show the rudder angle (Fig 2.1).

### 2.2 Autopilot Mode

To engage Autopilot Mode, press the **Stby/Auto** key and the pilot will lock onto the current course (Fig 2.2). The AUTO legend will show on the display while the pilot is in Autopilot Mode.

- To lock the pilot onto the desired course, either steer the correct course and then engage the pilot, or engage the pilot and then adjust the heading until the correct course is being steered (see section 2.3).

**API2R/API4R Rotary Pilot** - it is recommended that if a sudden course change is necessary while in Auto Mode (e.g. to avoid an obstacle) the clutch is disengaged and the autopilot is returned to Standby Mode by pressing **Stby/Auto**. *In an emergency the clutch can be overridden by firmly turning the steering helm, although the autopilot will try to bring the boat back to the set course.*

**API2H/API4H Hydraulic Pilot** - The autopilot must be disengaged by pressing **Stby/Auto** if a sudden course change is necessary otherwise the autopilot will counteract any movement made manually to the helm.



Fig 2.1 - Standby Mode (API2H / API4H)

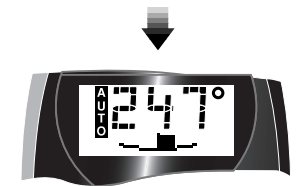


Fig 2.2 - Engaging autopilot Mode

## 2.3 Adjusting Course

While in Autopilot Mode, precise course adjustments can be easily made -

- Press the ◀ or ▶ key once to make a 1° course adjustment, confirmed by one beep and on the display by the new heading shown.
- Press and hold the key for a 10° course change, confirmed by a double beep and on the display by the new heading shown (Fig 2.3).



Fig 2.3 - Course adjustment to Port

## 2.4 Nav Mode

Press **Nav** to activate Nav Mode (Fig 2.4). The display will show NAV and the pilot will steer to the first waypoint.

- If no NMEA information is being received, the autopilot will beep twice and will not enter Nav Mode.
- If **Nav** is pressed while in Standby mode, the pilot will beep once if Nav Mode is available when in Auto Mode, or twice if Nav Mode will not be available.

At the target waypoint, an intermittent alarm will sound. As a safety feature (to avoid an unexpected course change) the next waypoint will not be loaded until the **Nav** key is pressed again. When the boat reaches the final waypoint, the pilot will switch back to Auto Mode, holding the current course.

Note - If a course correction is made while in Nav Mode using the ◀ and ▶ keys, the boat will gradually return to the original track, so that the boat can avoid an obstacle without exiting Nav Mode or having to reset the boat on the correct course.

Pressing **Nav** when in Standby mode will bring up the current Bearing To Waypoint (BTW) on the display.

- If Cross Track Error data is being received, but no Bearing To Waypoint data, then the display will show “--” instead of the Bearing To Waypoint.



Fig 2.4 - Activating Nav Mode

## 2.5 Set Key

The **Set** key performs several functions, including adjusting the parameters of the autopilot such as seastate, dodge angle etc. Refer to the relevant sections for more information on these.

In addition, depending on the NMEA data being received by the autopilot, the following data can be displayed by pressing the **Set** key the specified number of times -

Press SET	Data Shown
1	Cross Track Error [XTE] (Fig 2.5)
2	Bearing To Waypoint [BTW] (Fig 2.6)
3	Distance To Waypoint [DTW] (Fig 2.7)

- The individual data will only be shown if it is being received from the navigational receiver, so for example, if BTW is not being received, the second press will show DTW. Subsequent presses of the **Set** key will access functions in the following order -

### SEASTATE SETTING

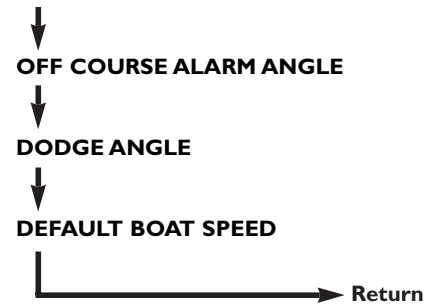


Fig 2.5 - Cross Track Error



Fig 2.6 - Bearing To Waypoint



Fig 2.7 - Distance To Waypoint

## 2.6 Dodge

The Dodge function allows the autopilot to dodge to port or starboard by a specified angle (normally 40°), and then return to the original course. This function is useful for avoiding obstacles in the path of the boat.

A Dodge can only be initiated in Auto mode. Press the **Dodge** key - the display will show DODGE.

- If no further key is pressed within 5 seconds, the display will return to normal.

Press either ◀ or ▶ within 5 seconds to choose the direction to dodge (Fig 2.8). The display will show the new heading selected and DODGE will flash in the display.


Selecting a dodge in the opposite direction while the manoeuvre is in progress will cancel it, and the boat will return to its original course.

- The default dodge angle is 40°, but this can be adjusted by the SHC14 - see section 2.10.

## 2.7 Backlighting

To switch the display backlighting on and off, press **Light**.

To set the backlighting level (1-5), press and hold **Light**. The SHC14 will step through each lighting level, which will be shown on the display (Fig 2.9). Release the **Light** button when the desired lighting level has been selected.

- While the backlighting is on, the Lamp symbol  will be shown. The backlighting level set is retained by the SHC14 even if it is disconnected from the power.

## 2.8 Alarms

When an alarm is triggered by the autopilot ALARM will flash in the display. To acknowledge and cancel the alarm, press **Alarm**.

- The alarm may continue to sound at the autopilot if the alarm condition still exists.

### 2.8.1 Off-course Alarm

The Off-course Alarm will sound if the boat goes off course further than a pre-set limit for more than 10 seconds.




Fig 2.8 - Dodging to Starboard

Press & hold



Fig 2.9 - Selecting backlighting level

To toggle the alarm on and off, press and hold the **Alarm** key (Fig 2.10). The alarm icon  will be displayed while the alarm is on.

- If the off course alarm sounds, press **Alarm** to acknowledge and disable the alarm.

The off-course limit can be set from 10-60°. Press **Set** (see section 2.5) until ALARM appears at the bottom of the display (Fig 2.11). The display will show the alarm limit set.

While ALARM is shown in the display, press ▶ to increase the value and ◀ to decrease it.

- If no key is pressed within 5 seconds, the controller will return to the main display and the value currently entered will be set.

## 2.9 Default Boat Speed

The autopilot needs to know how fast the boat is going for accurate performance when in Nav mode. If this information is not available through the NMEA input, an average value can be manually entered.

Press **Set** (see section 2.5) until SPEED appears on the display. The main boat speed will be shown in knots. Press ▶ to increase the setting and ◀ to decrease it.

- If no key is pressed within 5 seconds, the controller will return to the main display and the speed currently entered will be set.

- This option will not appear if the true boat speed is being received through the NMEA input.

## 2.10 Adjusting Dodge Angle

The SHC14 is set with a default dodge angle of 40°, but this can be adjusted to any value between 10 and 40°.

Press **Set** (see section 2.5) until DODGE appears in the display and the display shows the current dodge angle.

Press ▶ to increase angle and ◀ to decrease it.

- If no key is pressed within 5 seconds, the controller will return to the main display and the dodge angle currently entered will be set.



Pressed and held



Fig 2.10 - Turning off-course alarm on



Pressed 3 times



Fig 2.11 - Setting off-course alarm

## 3 Parameter Adjustment

### 3.1 Gain

The Gain can be adjusted in all modes, without interrupting the operation of the pilot.

Press **Gain** once. The display will show GAIN on the bottom line, along with the Gain setting (1-9). The default setting is 5, which should give good course keeping in most situations.

To increase, press **▶** (Fig 3.1). To decrease Gain, press **◀**.

- If no key is pressed within 5 seconds, the controller will return to the main display and the Gain currently entered will be set.



Fig 3.1 - Adjusting Gain setting



Fig 3.2 - Auto Seastate

### 3.2 Seastate

The Seastate can be adjusted in all modes, without interrupting the operation of the pilot.

Press **Set** (see section 2.5) until the display shows SEA on the bottom line, along with the Seastate setting (1-10° or “-” for the fully automatic Seastate setting).

To increase the Seastate, press **▶**. To decrease, press **◀**. To select auto Seastate, press **◀** until “-” appears in the display (Fig 3.2).

- If no key is pressed within 5 seconds, the controller will return to the main display and the Seastate currently entered will be set.

### 3.3 Compass Orientation

- Note this function would normally be set after installation of the autopilot, so it will not be necessary to use this unless the compass has been repositioned in a different orientation, or if the compass has been replaced.

The SHS12 compass can be mounted pointing four different ways - 0°, 90°, 180° or 270° to the bow (Fig 3.3).

- The factory preset is 0° (pointing forward). If the compass is mounted pointing any other

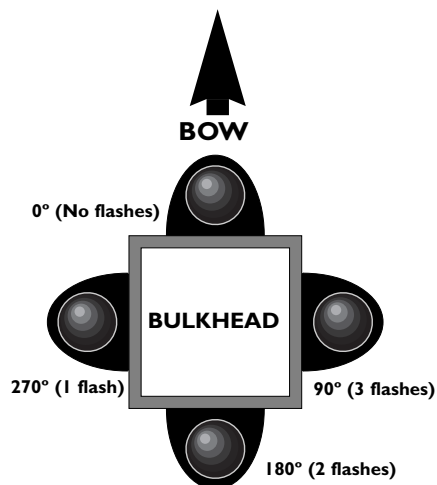


Fig 3.3 - Compass orientation

way, this must be programmed in before using the pilot.

Press and hold **Set** until the controller beeps twice.

Press **Set** again - the display will show the current offset.

Press **◀** to adjust the offset in 90° steps to port, press **▶** to adjust the offset in 90° steps to starboard - 90°, 180°, 270°.

- If no key is pressed within 5 seconds, the controller will return to the main display and the orientation currently entered will be set.

### 3.4 Compass Adjustment

The bearing shown on the SHC14 display can be adjusted by  $\pm 15^\circ$  so that it matches the boat's magnetic compass, or a known heading.

- This procedure should be performed after the compass has been orientated (see above).

Press and hold the **Set** key. The controller will beep twice and the display will show ADJUST along with the current bearing detected by the SHS12 fluxgate compass.

Use the **◀** and **▶** keys to adjust the displayed bearing until it matches the boat's magnetic compass, or known heading (Fig 3.4).

- If no key is pressed within 5 seconds, the controller will return to the main display and the bearing entered will be set.

- Note that the bearing can be adjusted by a maximum of  $\pm 15^\circ$  from the original. If the error is greater than 15°, check that the SHS12 compass is not receiving interference from nearby metallic, magnetic or electrical objects.



Fig 3.4 - Adjusting compass bearing

### 3.5 Setting Rudder Limits (AP12 / AP14H only)

- Note this procedure is performed immediately after installation of the autopilot, so it will only be necessary to repeat this if the SCP12 course computer is replaced or the SLF12 feedback unit is replaced/repositioned.

- Turn the power to the pilot off at the breaker (or switch). Press and hold the ◀ and ▶ keys while switching the power on.

- The SHC14 display will show CAL and PORT (Fig 3.5). If this display is not shown, repeat step 1, holding the ◀ and ▶ buttons down firmly.

- Disconnect the SLF12 rod from the ram and pull it fully from the feedback body (the rod is not physically attached to the SLF12 and can be removed easily).

- Slide the rod all the way into the feedback body as far as it will go, then reattach the rod to the rudder. This sets the maximum limits of the SLF12

- Turn the helm hard over to Port, then back it off 1/4th of a turn. Push the ◀ key once, and the controller will beep, showing STBD on the display.

- Turn the wheel hard over to Starboard, then back it off 1/4th of a turn. Push ▶ once - the controller will beep and show CENTRE on the display.

- Turn the helm to the midships position and press **Gain**. The pump will drive the rudder briefly to test the limits entered. If the rudder limits are accepted, the controller will beep four times and the display will show OKAY, otherwise it will sound a continuous alarm and show FAIL, meaning that the calibration has failed - repeat the above steps carefully.

- Refer to the AP12/AP14 instruction manual for advice if the calibration still fails.



Fig 3.5 - Setting rudder limits

### 3.6 Compass Calibration

- Again, this should only need to be done once when the autopilot is first commissioned, unless the compass is changed, repaired, relocated or if any metallic objects have been installed or removed near to the compass since it was calibrated. In the interests of accurate performance, always bear in mind the location of the compass when installing any metallic objects on the boat. If in any doubt, recalibrate the compass as shown -

- With the boat motoring along slowly (2-3 knots) in calm conditions press the ▶ key a number of times (or manually steer) to induce a slow clockwise rotation of the boat (approx 3°/sec).

- Press and hold **Gain**, followed by the ◀ and ▶ keys simultaneously to enter Auto Compass Calibration Mode (Fig 3.6) The display shows the heading, and the bottom line will show CAL.

- Allow the boat to turn through a minimum of 1 1/4 turns (450°) in approximately 2 1/2 minutes, during which time the fluxgate compass will automatically calibrate itself.

- If the rate of turn is too high, the display will flash arrows pointing to Port indicating decrease the angle of turn - press ◀. If the rate or turn or boat speed is too slow the display will flash arrows pointing to Starboard indicating increase the angle of turn (Fig 3.7) - press ▶.

- It is recommended that the calibration is restarted if the Port arrows are shown more than twice.

A sequence of 4 beeps means that the calibration has been successful, and the autopilot will return to Standby Mode.

- If after about four minutes the compass has not calibrated, an alarm will sound. Repeat the above procedure, following the directions carefully. If the compass will still not calibrate then it is usually because the deviation being detected is too great, which may be due to the compass being too close to a metallic or magnetic object (minimum safe distance - 1m [3 Ft]). Move the compass to a position as close to the ideal centreline location as possible, but away from speakers, metallic superstructure etc. Repeat the above procedure.

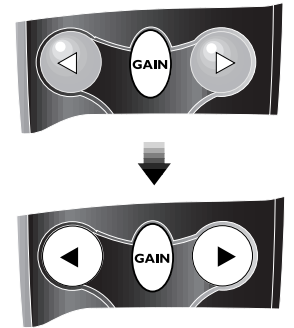


Fig 3.6 - Auto Compass Calibration



Fig 3.7 - Rate of turn too slow

## 4 Installation

### 4.1 Fitting Control Unit SHC14

The SHC14 controller is supplied with a cradle that can be screwed to a convenient bulkhead using the supplied self-tapping screws. Drill 2.5mm (0.1 in) pilot holes for the screws.

- If fitting to glassfibre (GRP) countersink the holes before screwing in to avoid splitting the gelcoat.

The SHC14 is fitted with a coiled cable ending in a three-pin plug. This connects to the autopilot via a weatherproof socket assembly and junction box.

- Fit the bulkhead socket to a vertical surface to prevent standing water gathering around or in the socket. Always fit the weather cap when the remote is not plugged in.

To fit the socket to the dash, a 25mm (1 in) hole will need to be drilled for the socket (Fig 4.1), which is fixed using the four self-tapping screws provided with the socket assembly. Drill 2mm (0.1 in) pilot holes for the screws.

- Again, to avoid splitting the gelcoat if fitting to GRP, countersink the holes before screwing in.

### 4.2 Connection to API2H or API4H

The SCJ14 kit is supplied with a three-way junction box SJB12 to allow an extra control unit to be connected to the SCP12 course computer -

1. Fit the SJB12 junction box supplied in a convenient location between the SCP12 course computer, the new SHC14 and the existing control unit using the self tapping screws provided.
2. Switch off the power to the autopilot. Remove the cover from the SCP12 course computer.
3. Disconnect the cable from the existing SFC12 (AP12H) or SHC14 (AP14H) control unit and replace with the three core wire supplied.

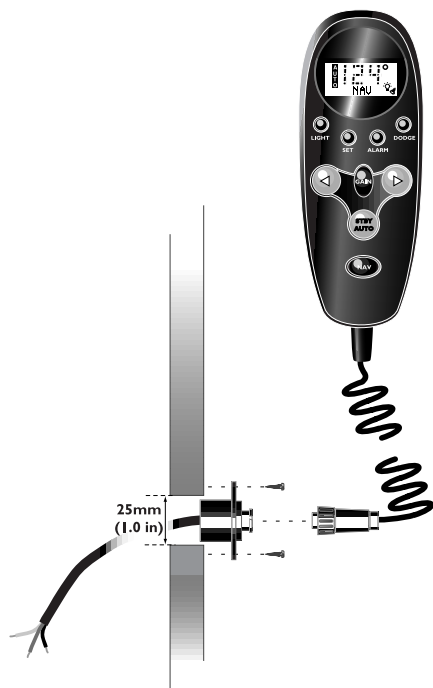


Fig 4.1 - Installing control unit

4. Connect the other end of this wire to one set of terminals in the SJB12 junction box (either of the three terminal blocks can be used).

5. Connect the existing control unit to one of the other sets of terminals in the junction box.

6. Connect the three core wire from the new SHC14 bulkhead socket to the remaining set of terminals in the junction box (Fig 4.2)

7. Fit the cover to the junction box.

8. Replace the cover on the SCP12 course computer.

### 4.3 Connection to API2R or API4R

The SCJ14 kit is supplied with an extra three-way junction box SJB12 to allow an extra control unit to be connected to the existing SJB12 -

1. Fit the second SJB12 junction box supplied in a convenient location between the existing SJB12, the new SHC14 and the existing control unit using the self tapping screws provided.

2. Switch off the power to the autopilot. Remove the cover of the existing SJB12 junction box.

3. Disconnect the cable from the existing SFC12 (AP12R) or SHC14 (AP14R) control unit and replace with the three core wire supplied.

4. Connect the other end of this wire to one set of terminals in the second SJB12 junction box (either of the three terminal blocks can be used).

5. Connect the existing control unit to one of the other sets of terminals in the junction box.

6. Connect the three core wire from the new SHC14 bulkhead socket to the remaining set of terminals in the junction box (Fig 4.3)

7. Replace the covers of the junction boxes.

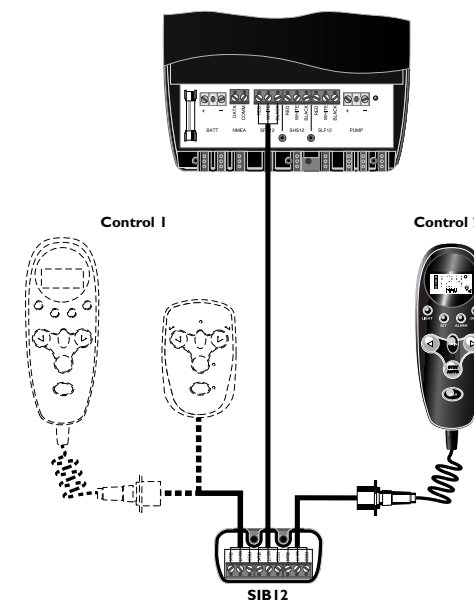


Fig 4.2 - Electrical installation (API2H/API4H)

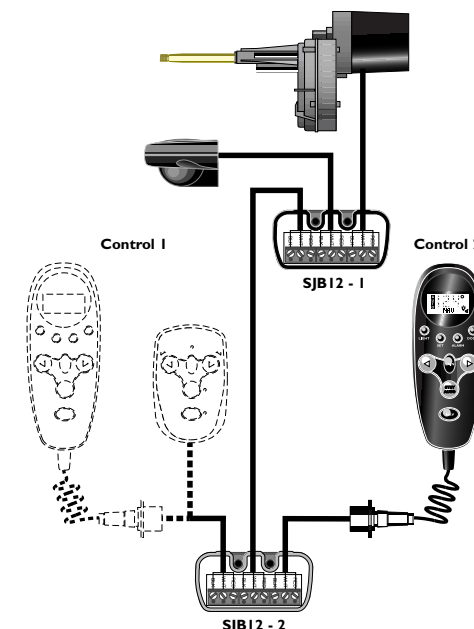


Fig 4.3 - Electrical installation (API2R/API4R)



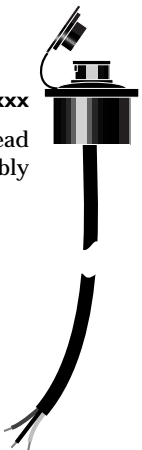
## 5 Appendix

### 5.1 Spares & Accessories

The following spares and accessories can be ordered from your local authorised Simrad agent. Please quote the relevant part when ordering.



**E02540BK**  
Spare SHC14  
Mounting Cradle



**E0xxxx**  
Spare Bulkhead  
Socket Assembly

### 5.2 Specification & Dimensions

#### HAND CONTROLLER SHC14 SPECIFICATIONS

Supply Voltage	12v DC (10v-16v)
Current Consumption	30mA (backlight off) 40mA (backlight on)
Programmer Mounting	Above or Below Decks (Weatherproof)
Maximum control units per AP12 / AP14 system (SHC14 and SFC12)	3



### 5.3 Service & Warranty

This unit is guaranteed for 2 years from date of retail sale. If it is necessary to have the unit repaired, return it carriage prepaid to the agent in the country of purchase with a copy of the receipted invoice showing the date of purchase. Where possible, return all the components unless you are certain that you have located the source of the fault. If the original packing is not available, ensure that it is well cushioned in packing; the rigours of freight handling can be very different from the loads encountered in the marine environment for which the unit is designed.

For Warranty details, please refer to the Warranty Card supplied with this unit.



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**Manufacturer:**

Simrad Navico  
Star Lane, Margate  
Kent CT9 4NP  
United Kingdom

Telephone: +44 (0) 1843 290290

Telefax: +44 (0) 1843 290471

E-Mail: [sales@simrad-navico.co.uk](mailto:sales@simrad-navico.co.uk)