Precision-9 Installation Guide

General

The Precision-9 compass is designed to output magnetic heading for sail and power boats. It connects to the boat's NMEA 2000 network, which will allow setup and control from units on the network. The Precision-9 compass outputs magnetic heading data suitable for autopilot steering, and also rate of turn, pitch, roll and heave.

➔ **Note:** Roll and Pitch are called Heel and Trim for B&G products.

Installation

The Precision-9 compass can be mounted on a flat surface or bulkhead, athwart ship or along ship. Select a location that provides a solid mounting place free from vibration (as much as possible), and as close to the vessel's centre of roll and pitch as possible, i.e. close to the water line. It should be as far as possible away from disturbing magnetic interferences e.g. engines (min. 2 meters), ignition cables, other large metal objects and particularly the autopilot drive unit. On steel hull boats, it can be mounted 0.75-1 m (2.5 - 3.3 ft) above the wheel house on a non-magnetic stand, if no other options are available.

➔ **Note:** Never mount the compass upside down! Level the sensor as close to horizontal as possible.

Use the supplied mounting kit, inclusive the mounting template, and drill holes through the centre of the slots.
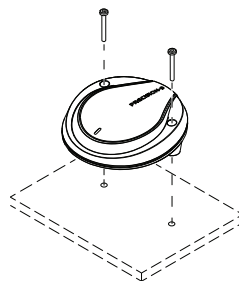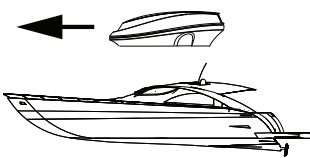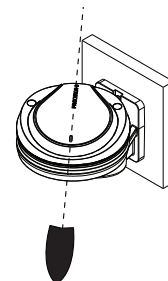
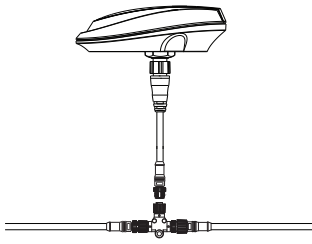The compass can be mounted directly to a flat surface, or by using a wall bracket.
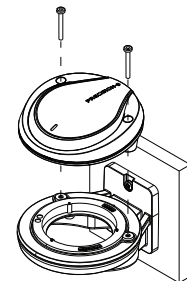
1. When the compass is in place, the mounting screws should at first only be tightened loosely (half way).
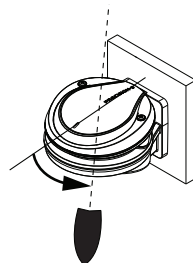
2. Mechanically adjust compass orientation to be parallel to boat's center line.

3. Finish the tightening of the mounting screws to secure compass.

Wiring

The Precision-9 compass is connected to the NMEA 2000 backbone (Network) via the supplied T-connector.

Setup

To achieve the best possible performance, the compass should be calibrated, and any offsets should be compensated for.

The setup needs to be done from an appropriate display unit. Depending on the unit, access to the setup is available from the Device information dialog (MFDs), or from a dedicated Calibration section in the unit's Settings menu (e.g. the AP44).

Example 1: Simrad MFD
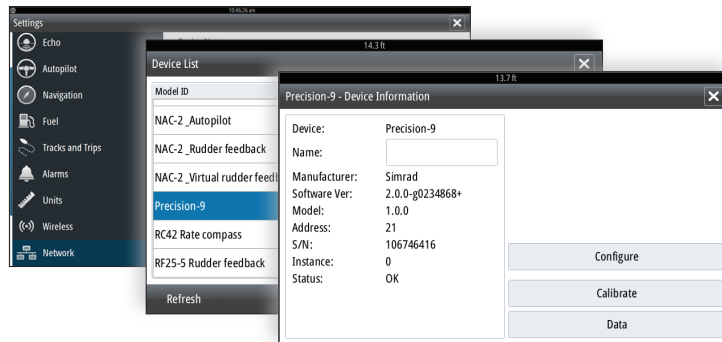
Example 2: AP44
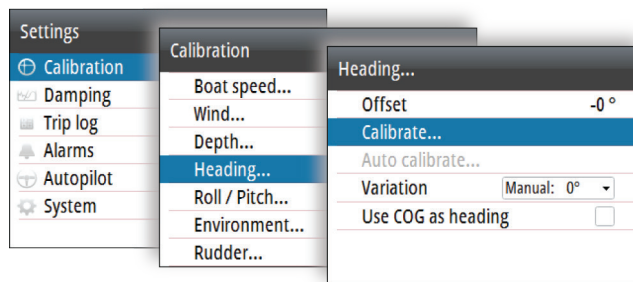
➜ **Note:** *If you have a Navico display unit, but are unable to find a way to configure the Precision-9, please check if there is a software update available for your unit.*

Calibration

Good calibration compensates for the deviation (local field) on board the boat, and adapts the sensors to the earth magnetic field strength for optimal resolution.

The compass supports two calibration modes:

- Autocalibration
- Manual calibration

➜ **Note:** *The setup of the compass should be done in calm sea conditions and with minimal wind and current to obtain good results. Ensure that there is enough open water around the vessel to make a full turn.*

➜ **Note:** *For optimal performance, new calibration may be required if the boat has traveled very far, to a location where the earth's magnetic field is significantly different from the location where it was last calibrated. This is because the strength of the magnetic field varies in different locations.*
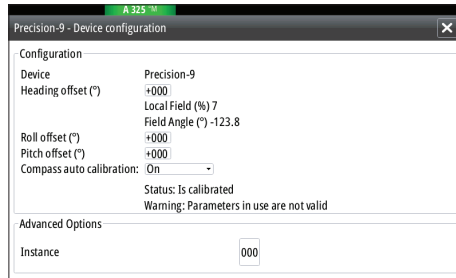
Autocalibration

In this mode, the compass will continuously collect magnetic data and try to determine the optimal calibration parameters. You can see the current calibration status in the setup menu, as well as possible warnings.

There are 4 different modes, with slightly different behavior. In all modes, data is continuously collected and new calibration parameters calculated; the difference is in how and when new parameters are used.

The default mode is Auto, and for most users it is not necessary to change this. However, if you wish to make sure that the compass does not change its calibration, you can set it to Locked once you are satisfied with the performance.

Select the Configure option to display the Device configuration dialog.

Configure

You select compass auto calibration mode from the drop-down list.

Auto
New calibration parameters will be phased in only if the existing parameters are invalid.

Locked
In this mode, the compass will not change the parameters in use by itself. If new parameters are deemed better than the current ones, a warning text will be updated: Parameters in use are not valid.

On
New calibration parameters will be phased in whenever they are deemed better than the existing ones.

Off
In this mode, no autocalibration parameters are used, and the compass uses the manual calibration.

Statuses and warnings

Status and warnings are shown in the setup dialog.

Statuses	Description
Is not calibrated	The needed magnetic raw data is not yet collected.
Is calibrating	New calibration parameters have been found, and is being phased in.
Is calibrated	Calibration parameters have been found and are being used.
- - -	Autocalibration is Off.

Warnings	Description
First calibration in progress	Data for first calibration is being collected.
No warning	Performance of current parameters is deemed good.
Parameters in use are not valid	Current parameters are not valid. If this is seen when the mode is Locked, the mode should at least temporarily be set to On or Auto, to switch parameters.
- - -	Autocalibration is Off.

Manual calibration

Manual calibration is also possible, and requires turning the vessel through several full circles. There are two ways to start a manual calibration:

- By pressing the Calibrate button in the setup dialog from a Navico display unit.
- By doing 2 consecutive 360 degree turns within 5 minutes after power is applied to the compass.

→ *Note: If you use the Precision-9 with a non-Navico display unit, you can use method 2 above to start manual calibration.*

Once calibration is started, you can complete calibration by doing another 390 degree turn with a steady, stable, low rate of turn 2-3°/second.

If you use method 1 to start calibration, the on-screen instructions will guide you. Once calibration is complete, a message will appear.

Offsets

An offset can be applied for the heading, roll and pitch outputs. This offset is meant to compensate for any mounting offset.

For roll and pitch, offsets should be set so that the output values are 0 while stationary at the dock.

The heading offset option is used for compensating for any difference between the boat's center line (**A**) and the compass lubber line (**B**).
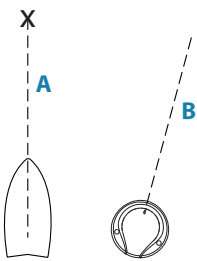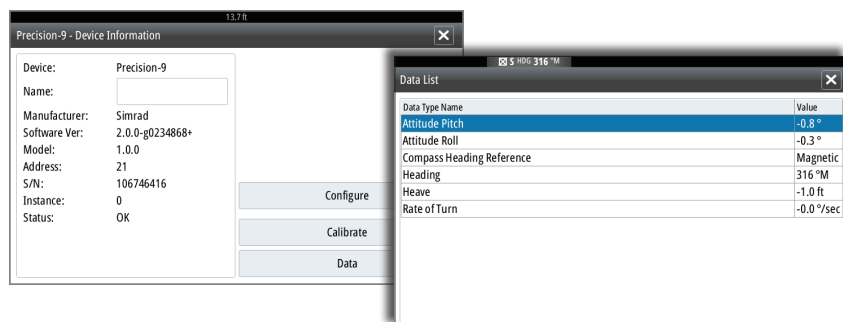
1. Find the bearing from the boat position to a visible object. Use a chart or a chart plotter
2. Steer the boat so that the center line of the boat is aligned with the bearing line pointing towards the object.
3. Change the **Offset** parameter so that the bearing to the object and the compass readout become equal.

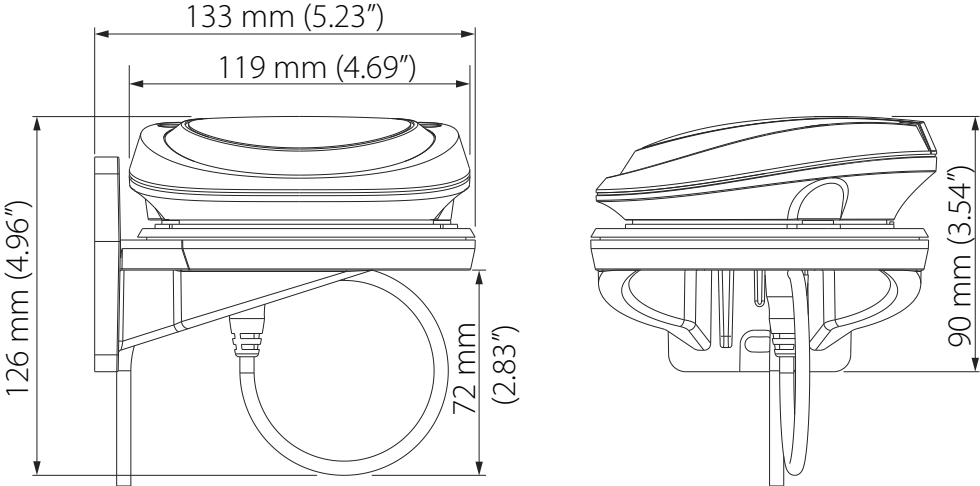→ *Note: Make sure that both the compass heading and the bearing to the object have the same unit (Magnetic or True).*

→ *Note: Be aware that the displayed heading and bearing values may be damped. Allow time for the heading and bearing values to settle before applying offset.*

Displaying compass data

Select the Data button to display the data the compass is providing to the NMEA 2000 network.

Dimensions

119 mm (4.69")

119 mm (4.69")

36 mm (1.42")

90 mm (3.54")

126 mm (4.96")

133 mm (5.23")

119 mm (4.69")

126 mm (4.96")

72 mm (2.83")

90 mm (3.54")
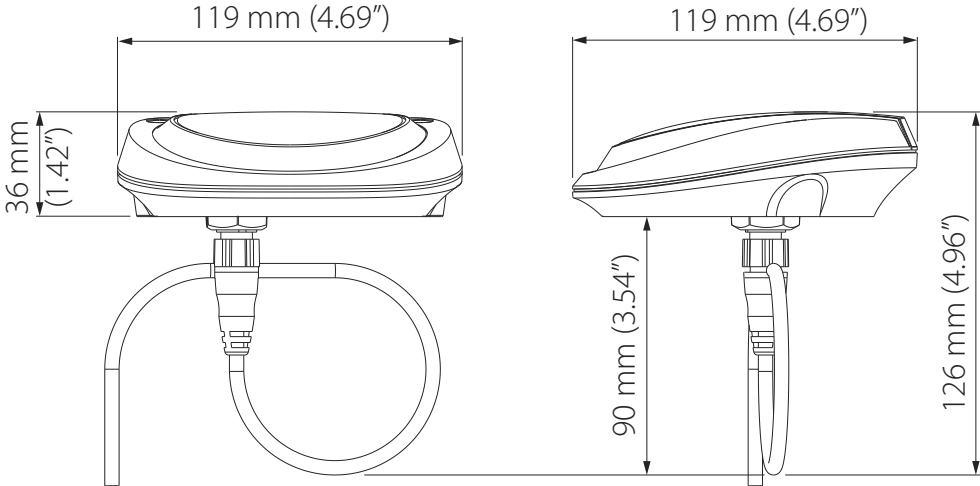
Technical specifications

Dimensions:	H: 36 mm (1.42"), W & D: 119 mm (4.69")
Weight:	
- module:	165 g (5.8 oz)
- bracket:	130 g (4.6 oz)
Supply and interface:	8-16 V via NMEA 2000
Power consumption:	0.4 W
- NMEA 2000 Load Equivalence No. (LEN):	1
- NMEA 2000 ports (input/output):	1
Calibration:	Automatic
Repeatability:	± 1.0° (or better)
Roll/Pitch range:	± 45°
Heading accuracy:	± 2° after calibration
Dynamic performance:	
- with random excitation of ± 10° at max 1 Hz:	Heading error <2°
- with heading step input of 90° at a rate of 10°/s:	Heading error 10 sec. after turn <2°
Environmental protection:	IPx7
Compass safe distance:	0.5 m (1.7')
Temperature range:	
- operation:	-25 to +65°C (-13 to +149°F)
- storage:	-30 to +70°C (-22 to +158°F)
Cable supplied:	4.5 m (15') incl. connector
Mounting:	Bulkhead or flat surface
Material:	Plastic

Output on NMEA 2000 format

- Messages: PGN 127250, 127251, 127257, 127252
- Data output: Magnetic heading (20 Hz), rate of turn (20 Hz), pitch/roll (10 Hz), heave (10 Hz)
- Status information

Compliance statement

Precision-9 Compass comply with:

- CE under EMC directive 2014/30/EU
- The requirements of level 2 devices of the Radio communications (Electromagnetic Compatibility) standard 2008

The relevant Declaration of Conformity is available on the product site on the following websites:

www.bandg.com / www.lowrance.com / www.simrad-yachting.com

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