WiFi Compass v1.0 – User Guide

# What is the WiFi Compass?

The WiFi compass will provide a constant stream of compass headings, in NMEA 0183 format, to any client device that connects to it over WiFi. The device provides its own WiFi network named “WiFi Compass V1.0”. When powered up you should be able to see this appear on your list of WiFi networks (e.g. on a smartphone). It does not require the boat to have any existing WiFi. This WiFi network does NOT provide any access to the internet and there is no WiFi password. Technical details for the interface are provided below. It has been designed for and tested extensively using the “EAST Assist” Android app from Martin Waller. It will work with any other client that conforms to the technical interface.

# Installation

The device is supplied pre-calibrated, with the assumption that it is installed with the arrow on top, pointing forwards and parallel to the centre line of the boat. If this is not possible, the device can be installed in any orientation but will then require a one-off calibration (see below) before use. The device can be used without calibration to provide heading *changes* (relative to a previous course) but the absolute headings thus provided will be inaccurate unless the device is calibrated.

The device uses an internal microelectronic compass module. These are quite susceptible to stray magnetic interference and so the device should be installed well away from large lumps of iron or steel (e.g. the keel and/or engine). Ideally at least 2 metres. Also try to keep smaller iron/steel objects a foot or two away. The device should obviously be firmly attached such that it cannot move about, relative to the boat. It can be screwed down or attached with double sided tape or Velcro.

After installation, just connect up a USB lead to the power input (USB “C”) and the device will be operational within a couple of seconds.

# LED indicator

The LED status indicator will glow various colours as follows;

1. Not glowing – there is no power to the device
2. Steady green – device is starting up – not yet functional. This should not be more than a few seconds.
3. Flashing yellow – device is functioning but calibration might be required (check accuracy of output).
4. Flashing green – device is functioning normally.
5. Flashing red – there is a hardware fault with the device and it needs to be repaired.

# Calibration

There are two calibration procedures. Either, or both, may be required depending up on circumstances;

1. **Internal calibration** – This procedure is required to calibrate the internal microchip compass sensors. **The device is supplied with an initial internal calibration** which should be sufficient in most circumstances. However, this calibration can be affected by nearby ferrous metal objects and or electrical devices. If it is proving difficult to obtain a reliable and reasonably accurate heading then re-calibration is recommended. But in most cases the supplied internal calibration will be adequate. This procedure requires the unit to be rotated in various ways and so cannot be performed with the unit fixed in final position. However, it is desirable to have the unit close to its intended fixed position, if possible. This procedure needs to be performed in stable, stationary situation i.e. NOT with the boat underway. If the output headings are within a few degrees of the boat (or any other) compass, then it is much easier to compensate for any residual errors using the boat compass alignment procedure (below). It is both difficult and unnecessary to achieve a “perfect” internal calibration.
2. **Boat compass alignment –** This *may* need to be performed when the device is first installed into a new position on a boat.  **If the WiFiCompass unit is installed with the yellow arrow label on top, pointing forwards, parallel to the centreline of the boat and well clear of any sources of magnetic interference, then this step may not be at all necessary**. This procedure will require the boat to be turned through circles and hence must be performed when underway. This procedure will also compensate for any residual errors in the internal calibration. If you are experiencing errors in the supplied headings, it is recommended that you perform this procedure first. It will fix most problems. If you do need to perform an internal calibration (above) then you WILL need to also repeat the boat compass alignment procedure afterwards.

A laptop PC (or possibly a tablet computer) will be required to perform calibration. It is NOT recommended to use a mobile phone although this might also be possible.

A separate web page is provided by the WiFiCompass device which will guide you step by step through either of the above procedures.

Calibration – getting started

1. Power-up the device, wait a few seconds.
2. Connect your laptop to the WiFi network “WiFiCompass V1.0”. It will probably tell you that there is “No Internet connection”. This is normal and expected.
3. Start a web browser (e.g. Chrome or Edge)
4. In the browser address bar, enter “192.168.4.1/sensorCalibration.html”
5. This will download and run the calibration app.
6. There are 3 tabs in the app “Home”, “Boat alignment” and “Sensor calibration”
7. Follow the appropriate on-screen instructions.

# Technical interface (for developers of client applications)

## Message format

The device supplies a low latency magnetic compass heading in NMEA 0183 format. It uses the “HDM” message sentence format e.g.

$HCHDM,x.x,M\*hh <CR><LF>

“x.x” = Heading in degrees, magnetic , “hh” = Checksum

It transmits this message 5 times per second to any/all connected client devices.

## Network connection

The client device must connect to the WiFi Compass server using the Telnet protocol over a WiFi connection. There are various smartphone apps (e.g. Juice SSH) that can be used for testing. The app will need to be configured with the IP address of the compass server, which is 192.168.4.1 (port 23, for Telnet). The client device must be first connected to the correct WiFi network i.e. “WiFi Compass V1.0”.