B&G

Vulcan R Series

Installation Manual

ENGLISH

www.bandg.com

Preface

Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

NAVICO HOLDING AS AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Copyright

Copyright © 2017 Navico Holding AS.

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand website of your unit or system: www.bandg.com.

Compliance statements

This equipment complies with:

- CE under 2014/53/EU Directive

- The requirements of level 2 devices of the Radio communications (Electromagnetic Compatibility) standard 2008
- Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The relevant Declaration of conformity is available in the product's section at the following website: www.bandg.com.

Industry Canada

IC RSS-GEN, Sec 8.4 Warning Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie

Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Warning

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna

- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that of the receiver
- Consult the dealer or an experienced technician for help

Internet usage

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.

Countries of intended use in the EU

AT - Austria

BE - Belgium

BG - Bulgaria

CY - Cyprus

CZ - Czech Republic

DK - Denmark

EE - Estonia

FI - Finland

FR - France

DE - Germany

GR - Greece

HU - Hungary

IS - Iceland

IE - Ireland

IT - Italy

LV - Latvia

LI - Liechtenstein

LT - Lithuania

LU - Luxembourg

MT - Malta

NL - Netherlands

NO - Norway

PL - Poland

PT - Portugal

RO - Romania

SK - Slovak Republic

SI - Slovenia

ES - Spain

SE - Sweden

CH - Switzerland

TR - Turkey

UK - United Kingdom

Trademarks

B&G® is a registered trademark of Navico Holding AS.

Navionics® is a registered trademark of Navionics, Inc.

NMEA® and NMEA 2000® are registered trademarks of the National Marine Electronics Association.

SiriusXM® is a registered trademark of Sirius XM Radio Inc.

Fishing Hot Spots® is a registered trademark of Fishing Hot Spots Inc. Copyright© 2012 Fishing Hot Spots.

FUSION-Link™ Marine Entertainment Standard™ is a registered trademark of FUSION Electronics Ltd.

C-MAP® is a registered trademark of C-MAP.

SD™ and microSD™ are trademarks or registered trademarks of SD-3C, LLC in the United States, other countries or both.

Additional mapping data: Copyright© 2012 NSI, Inc.: Copyright© 2012 by Richardson's Maptech.

Bluetooth® is a registered trademark of Bluetooth SIG, Inc.

Navico product references

This manual refers to the following Navico products:

- Broadband Sounder™ (Broadband Sounder)
- Broadband 3G™ (Broadband 3G Radar)
- Broadband 4G™ (Broadband 4G Radar)
- DownScan Imaging™ (DownScan)

- DownScan Overlay™ (Overlay)
- GoFree™ (GoFree)
- INSIGHT GENESIS® (Insight Genesis)

About this manual

This manual is a reference guide for installing the Vulcan Series units.

Important text that requires special attention from the reader is emphasized as follows:

→ *Note:* Used to draw the reader's attention to a comment or some important information.

> ⚠ Warning: Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

Contents

1

Check the contents

Check the contents of the box for your unit.

Parts included
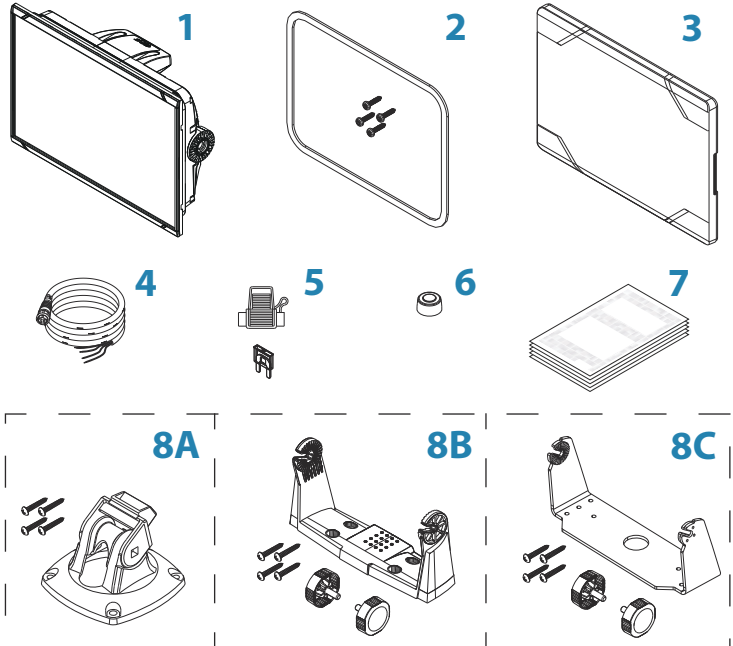
1 Display unit

2 Panel mounting kit
- Gasket
- Mounting screws (4x #4 x 3/4" PN HD SS)

3 Sun cover

4 Cable
Combined power and NMEA 2000 cable - 5" unit
Power cable - 7", 9" and 12" units

5 Fuseholder and fuse (3 A, ATC-blade)

6   Protective caps
2x - 5" unit
3x - 7", 9" and 12" units

7   Documentation package
- Installation manual
- Quick guide
- Mounting template

8   A: Bracket mounting kit - 5" unit
- Quick Release Bracket
- Mounting screws (4x #10 x 3/4" PN HD SS)

B: Bracket mounting kit - 7" and 9" units
- U bracket (plastic)
- Mounting screws (4x #10 x 3/4" PN HD SS)
- Bracket knobs (2x)

C: Bracket mounting kit - 12" unit
- U bracket (metal)
- Mounting screws (4x #10 x 3/4" PN HD SS)
- Bracket knobs (2x)

2

Overview

The unit has a built-in CHIRP/Broadband, StructureScan and ForwardScan Echosounder.

The unit can network over NMEA 2000, this allows access to sensor data.

The unit has a built-in high speed GPS receiver (10Hz). The system supports charts from Navionics and C-MAP as well as content created by a variety of third party mapping providers in the AT5 format. For a full selection of available charts, visit www.gofreemarine.com, www.c-map.com or www.navionics.com.

The unit may be mounted to the vessel with the supplied mounting bracket, or panel mounted.

The unit is intended for 12 V DC operation and will accept the moderate fluctuations commonly seen in DC systems.

Front controls
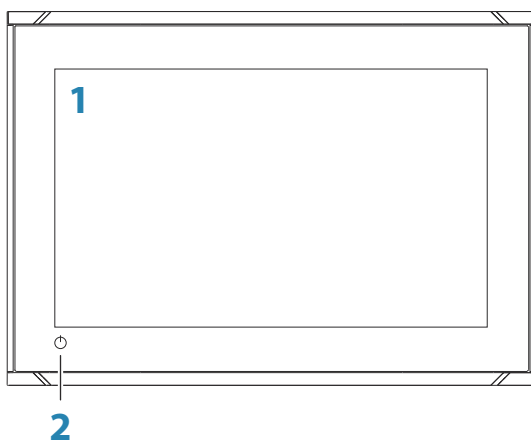
1 **Touch screen**

2 **Power button**
Press and hold to turn the unit ON/OFF.
Press once to display the System Controls dialog.

Rear connections

5" unit rear connections
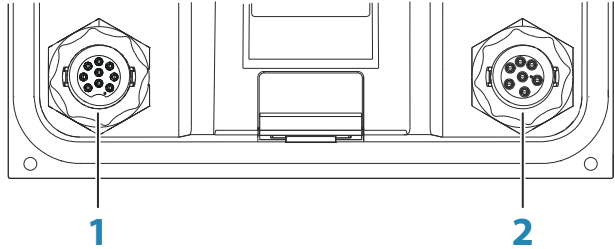
1 **Sonar** - CHIRP, Broadband, DownScan, and SideScan imaging (dependent on the transducer)
2 **Power** 12 V DC supply input and **NMEA 2000**

7", 9" and 12" units rear connections
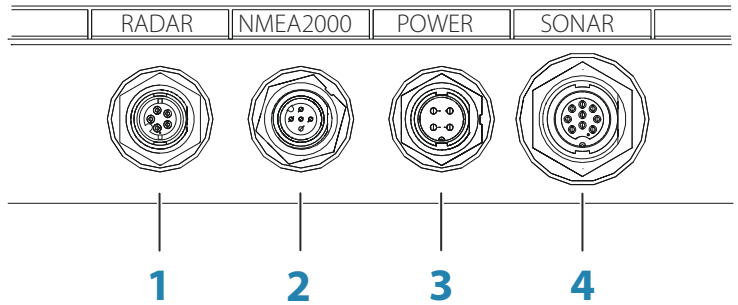
1 **Radar** - radar (Ethernet) connection
2 **NMEA 2000** - data input / output
3 **Power** - 12 V DC supply input
4 **Sonar** - CHIRP, Broadband, DownScan, and SideScan imaging (dependent on the transducer)

Card reader

Used for inserting a microSD memory card. The memory card can be used for detailed chart data, software updates, transfer of user data, and system backup.

→ **Note:** Do not download, transfer or copy files to a chart card. Doing so can damage chart information on the chart card.

The card reader door is opened by pulling the rubber cover open.

The card reader door should always be securely shut immediately after inserting or removing a card, in order to prevent possible water ingress.
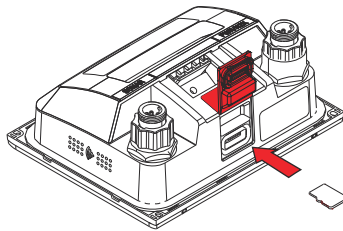
Card reader on the 5" unit   *Card reader on the 7" and 9" units*
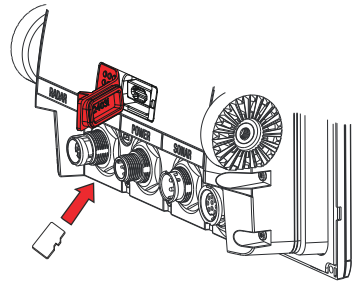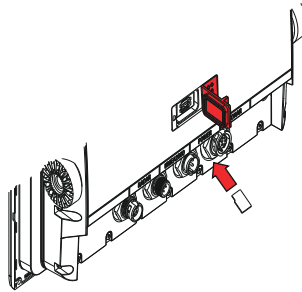
Card reader on the 12" unit

3

Installation

Mounting location

Choose the mounting locations carefully before you drill or cut.

For overall width and height requirements, refer to *"Dimensional drawings"* on page 68.

Do not mount any part where it can be used as a hand hold, where it might be submerged, or where it will interfere with the operation, launching, or retrieving of the boat.

The unit should be mounted so that the operator can easily use the controls and clearly see the screen.

The unit has a high-contrast screen and is viewable in direct sunlight, but for best results install the unit out of direct sunlight. The chosen location should have minimal glare from windows or bright objects.

The mounting location and surrounding materials may affect the internal wireless and/or GPS performance. Metal and carbon materials are known to impact the performance in a negative way. Test the unit in its intended location to ensure satisfactory reception.

An external GPS source can be added to overcome poor GPS reception areas.

An external wireless module can be added to compatible devices to overcome poor wireless reception areas.

Consider access to the card reader which is located in the back of the unit.

Check that it is possible to route cables to the intended mounting location.

Leave sufficient clearance to connect all relevant cables.

Before cutting a hole in a panel, make sure that there are no hidden electrical wires or other parts behind the panel.

Ensure that any holes cut are in a safe position and will not weaken the boat's structure. If in doubt, consult a qualified boat builder, or marine electronics installer.

→ *Note:* Where flush mounted, the enclosure should be dry and well ventilated. In small enclosures, it may be required to fit forced cooling.

> ⚠ Warning: Inadequate ventilation and subsequent overheating of the unit may cause unreliable operation and reduced service life. Exposing the unit to conditions that exceeds the specifications could invalidate your warranty. – refer to *"Technical specifications"* on page 66.

Bracket mounting

Quick release bracket mounting

The 5" unit can be mounted with the quick release bracket.

1. Place the bracket in the desired mounting location. Ensure that the chosen location has enough height to accommodate the unit fitted in the bracket, allows tilting of the unit and connecting cables in the back.

→ **Note:** Ensure that the chosen location has enough height to accommodate the unit fitted in the bracket, allows tilting of the unit and connecting cables in the back.

2. Mark the screw locations using the bracket as a template, and drill pilot holes.

→ **Note:** Use fasteners suited to the mounting surface material. If the material is too thin for self-tappers, reinforce it, or mount the bracket with machine screws and large washers. Use only 304 or 316 stainless steel fasteners.

3. Screw down the bracket.
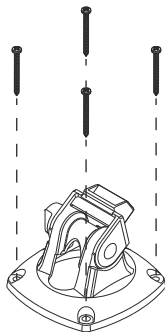
4. Snap the unit to the bracket.
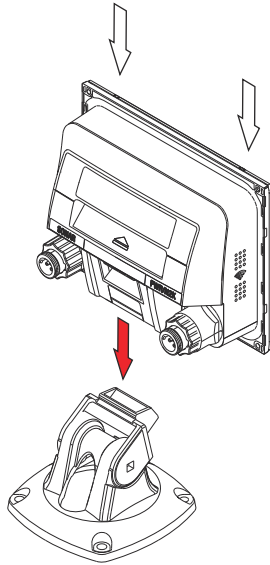
5. Tilt the unit to the desired position angle.

Removing the unit from the quick release bracket
Pull and hold the release handle and then pull the unit from the
bracket.
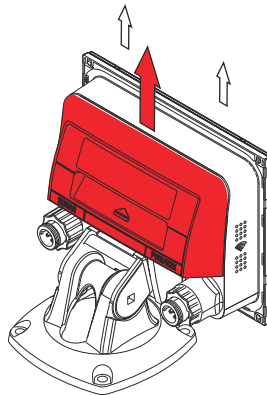
U-bracket mounting

The 7", 9" and 12" units can be mounted with the U-bracket.

1. Place the bracket in the desired mounting location. Ensure that the chosen location has enough height to accommodate the unit fitted in the bracket, and allows tilting of the unit. Also adequate space is required on both sides to allow tightening and loosening of the knobs.
2. Mark the screw locations using the bracket as a template, and drill pilot holes. Use fasteners suited to the mounting surface material. If the material is too thin for self-tappers, reinforce it, or mount the bracket with machine screws and large washers. Use only 304 or 316 stainless steel fasteners.
3. Screw down the bracket.
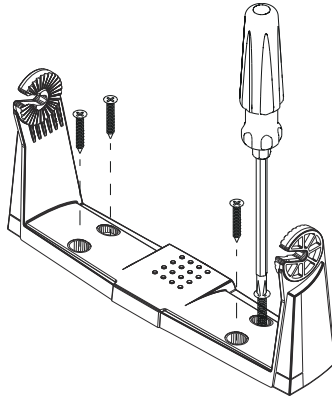
4. Mount the unit to the bracket using the knobs. Hand tighten only. The ratchet teeth in the bracket and unit ensure a positive grip and prevent the unit from changing from the desired angle.
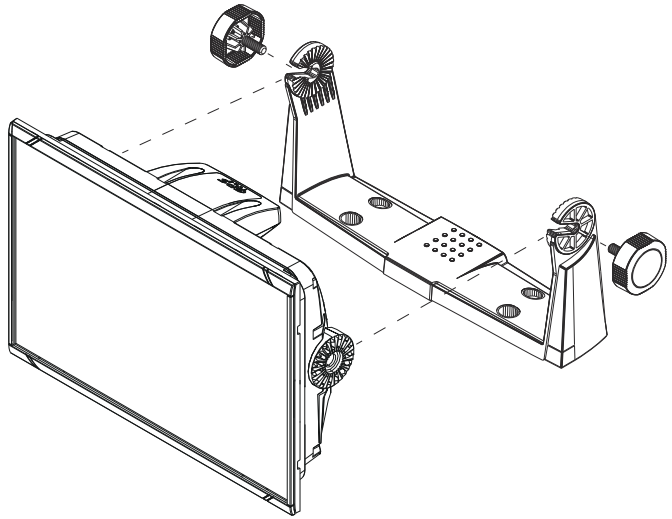
Panel mounting

The screws and gasket used for panel mounting are included in the box.

For mounting instructions, refer to the mounting template.

Bezel fitment and removal

The bezel trim have been designed to be very low profile, and therefore fully conceal the locking tabs that keep it from being accidentally disengaged from the mounting flange. To release the locking tabs, gently insert a thin object between the bezel and the screen frame. When the first locking tab is released and an opening is visible, carefully release the remaining locking tabs and remove the bezel.
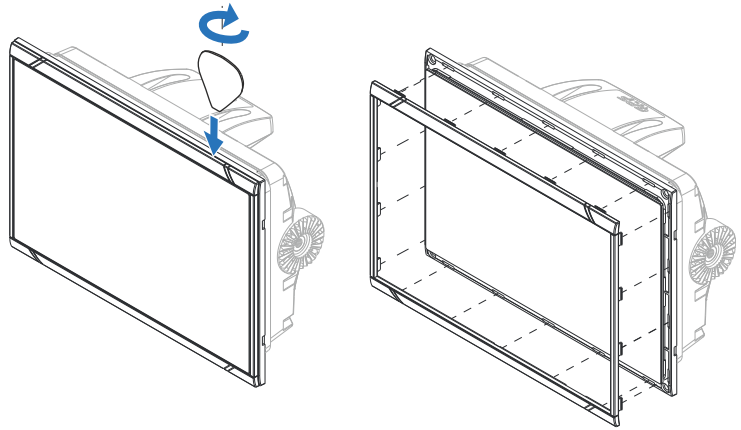
When fitting the bezel, ensure that the hook tabs on the back of the bezel recess in to opposing slots in the screen frame. Secure the bezel to the screen frame by gently pressing the bezel against the screen frame.

Transducer installation

For transducer installation information, refer to separate installation instructions included with the transducer.

4

Wiring

Guidelines

Don't:

- make sharp bends in the cables
- run cables in a way that allows water to flow down into the connectors
- run the data cables adjacent to radar, transmitter, or large/high current carrying cables or high frequency signal cables.
- run cables so they interfere with mechanical systems
- run cables over sharp edges or burrs

Do this:

- make drip and service loops
- use cable-tie on all cables to keep them secure
- solder/crimp and insulate all wiring connections if extending or shortening the cables. Extending cables should be done with suitable crimp connectors or solder and heat shrink. Keep joins as high as possible to minimize possibility of water immersion.
- leave room adjacent to connectors to ease plugging and unplugging of cables

⚠ **Warning:** Before starting the installation, be sure to turn electrical power off. If power is left on or turned on during the installation, fire, electrical shock, or other serious injury may occur. Be sure that the voltage of the power supply is compatible with the unit.

⚠ **Warning:** The unit has a voltage rating of 12 V DC, it is not suited for use with 24 V DC systems.

⚠ **Warning:** The positive supply wire (red) should always be connected to (+) DC with the supplied fuse or a circuit breaker (closest available to fuse rating).

Power connections

5" unit power connection

The unit is powered by 12 V DC. It is protected against reverse polarity, under voltage, and over voltage (for a limited duration).

The plug of the supplied power cable has two discrete cables exiting from it. The thickest of the two cables provides the following:

- Power into the system (Red and Black wires).
- Controlling power state of the unit (Yellow wire).

1	Power cable
2	12 V DC positive wire (red) shown with fuse holder fitted
3	12 V DC negative wire (black)
4	Power control wire (yellow)
5	Vessel's 12 V DC supply
6	NMEA 2000 cable and connector

Connect Red to (+) DC using a 3 amp fuse.

Connect Black to (-) DC.

The unit can be powered on and off using the power button on the front of the case.

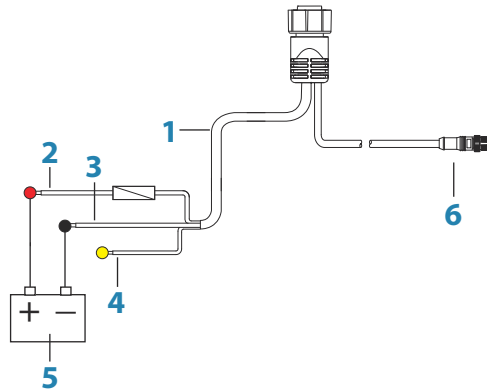### 7", 9" and 12" units power connection

The units are powered by 12 V DC. They are protected against reverse polarity, under voltage, and over voltage (for a limited duration).

The supplied power cable has four cores used for:

- Power into the system (Red and Black wires).
- Controlling power state of the unit (Yellow wire).
- Connecting to an external alarm (Blue wire).
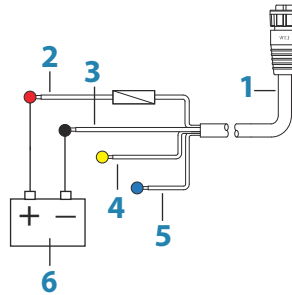
1	Power cable
2	12 V positive wire (red) shown with fuse holder fitted
3	12 V negative wire (black)
4	Power control wire (yellow)
5	Alarm wire (blue)
6	Vessel's 12 V DC supply

Connect Red to (+) DC using a 3 amp fuse.

Connect Black to (-) DC.

The units can be powered on and off using the power button on the front of the case.

Power Control connection

The yellow Power Control wire in the power cable is an input that will turn on the unit when power is applied.

Power Control unconnected

Device will turn on and off when the power button on the front of the unit is pressed. Leave the yellow Power Control wire disconnected and tape or heat-shrink the end to prevent shorting.
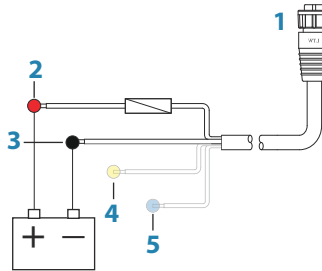
1	Power cable connector to unit
2	Positive wire (red)
3	Ground wire (black)
4	Power control wire (yellow)
5	Alarm wire (blue)

Power Control to supply positive (auto on)

Device will turn on immediately when power is applied. Common the yellow wire with the red wire after the fuse.

→ **Note:** The unit cannot be powered down by power button, but can be put in to standby mode. (The screen backlight turns off.)
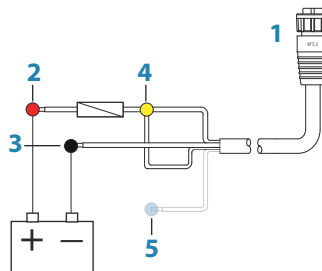
1	Power cable connector to unit
2	Positive wire (red)
3	Ground wire (black)
4	Power control wire (yellow)
5	Alarm wire (blue)

Power Control to ignition

Device will turn on once ignition is turned on to start engines.
Connect the yellow wire to the accessories output of the engine key
switch.

→ *Note:* Engine start batteries and house batteries should have a
common ground connection.
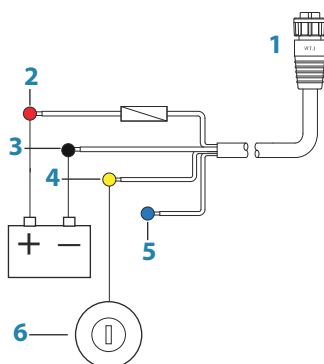
1	Power cable connector to unit
2	Positive wire (red)
3	Ground wire (black)
4	Power control wire (yellow)
5	Alarm wire (blue)
6	Ignition switch

External alarm

→ *Note:* An external alarm cannot be connected to the 5" unit.

The external alarm can be a small piezo buzzer connected directly, or a horn siren connected through a relay.

Alarms are configured globally in the system. That is, they can be configured on any one networked multifunction device or instrument, and be seen, heard, and acknowledged from all devices. Individual devices can also be configured to not sound their internal buzzer, but still display the alarm information. For information about configuring alarms, refer to the Alarms section in the Operator Manual.

For sirens that draw more than 1 Amp, use a relay.

Buzzer   *Siren*
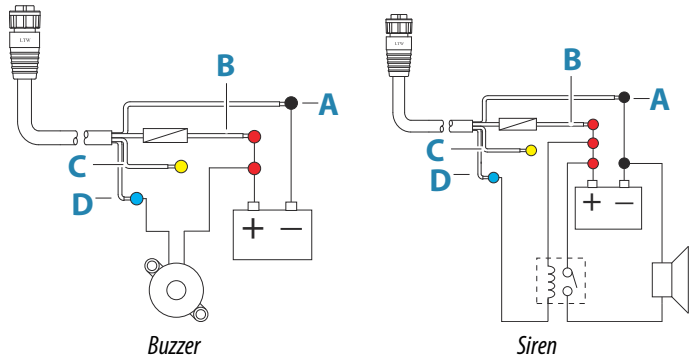
A   Negative power wire (black)

B   Positive power wire (red)

C   Power control wire (yellow)

D   Alarm wire (blue)

Connecting control devices

The unit can be controlled with an ZC1 or ZC2 Remote controller connected on the NMEA 2000 network.

NMEA 2000 backbone

NMEA 2000 device connection

The NMEA 2000 data port allows the receiving and sharing of a multitude of data from various sources.
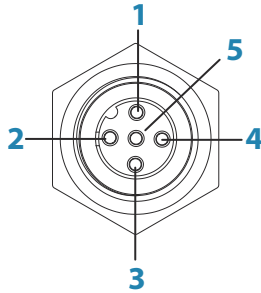
Unit socket (male)
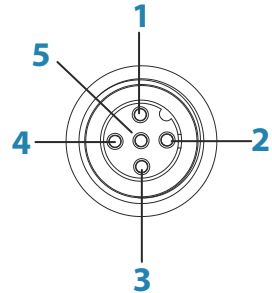
Cable plug (female)

Key	Purpose	Color
1	Shield	Drain
2	NET-S (+12 V DC)	Red
3	NET-C (DC negative)	Black
4	NET-H	White
5	NET-L	Blue

Essential network information

The standardized physical cables/connectors for NMEA 2000 are Micro-C and Mini-C, directly derived from the automation industries **DeviceNET - Micro-C** being the more commonly used size.

• While most Navico products use Micro-C cabling and connectors, some products still use proprietary SimNet connectors, which are easily made compatible with adaptor cables.
• A network consists of a linear backbone from which drop-cables connect to NMEA 2000 compliant devices.

- A single drop cable has a maximum length of 6 m (20 ft). The total length of all drop cables combined should not exceed 78 m (256 ft).
- A NMEA 2000 network, using Micro-C cabling, has a maximum cable length of 100 m (328 ft), between any two points.
- A NMEA 2000 network needs to have a terminator at each end of the backbone. A terminator can be one of the following:
  - A terminator blank plug.
  - A wind transducer (where the mast cable is one end of the backbone).

Planning and installing a network backbone

The backbone needs to run between the locations of all products to be installed - typically in a bow to stern layout - and be no further than 6 m from a device to be connected.

Choose from the following components to make up the backbone:

- Micro-C cables: 0.6 m (2 ft), 1.8 m (6 ft), 4.5 m (15 ft), and 7.6 m (25 ft) cables.
- T-connector or 4-way connector. Used to connect a drop cable to the backbone.
- Micro-C power cable. Connect to the backbone at a position that is central to the network load using a T-connector or 4-way connector.

→ **Note:** When using a wind sensor, the mast cable should be connected at one end of the backbone, as the sensor is fitted with a termination resistor.

→ **Note:** Most NMEA 2000 devices can be connected directly to a SimNet backbone and SimNet devices can be connected to a NMEA 2000 network by using adapter cables.

Power the network

Connect power at any location in the backbone for smaller systems.

For larger systems introduce power at a central point in the backbone to *balance* the voltage drop of the network.

→ **Note:** If joining to an existing NMEA 2000 network that already has its own power supply, do not make another power connection elsewhere in the network, and ensure the existing network is not powered by 24 V DC.

→ **Note:** Do not connect the NMEA 2000 power cable to the same terminals as the engine start batteries, autopilot computer, bow thruster or other high current devices.

The following drawing demonstrates a typical small network. The backbone is made up of directly interconnected T-connectors.
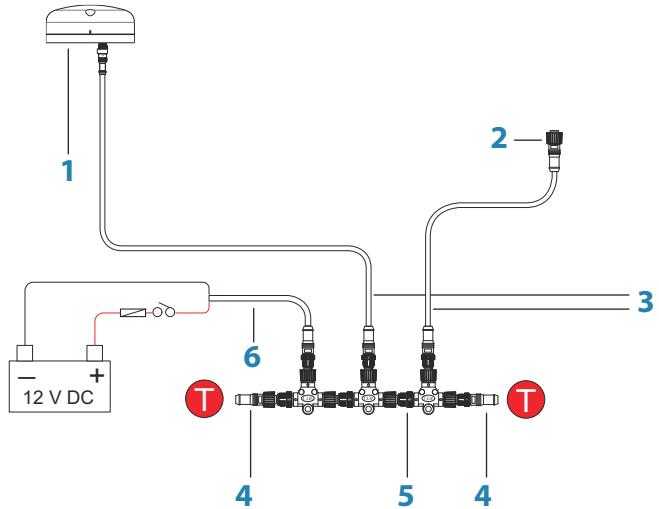
1	NMEA 2000 device
2	Connector to unit
3	Drop-cable, should not exceed 6 m (20 ft)
4	Terminators
5	Backbone
6	Power cable

CZone connection to NMEA 2000

When interfacing to CZone network it is recommended to use a BEP Network interface bridge to join the two network backbones together.

The CZone / NMEA 2000 Network interface bridge isolates the power of the two networks, but allows data to be freely shared between both sides.

The Interface Bridge can also be used for expansion of the NMEA 2000 network, when the maximum node limit (node = any device connected to network) for the network has been reached or the maximum cable length of 150 m will be exceeded. Once an Interface Bridge has been fitted, a further 40 nodes and additional cable length can be added.

The Network Interface is available from your BEP dealer. For more information please refer to the BEP web site www.bepmarine.com.
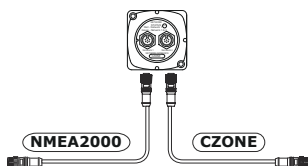
Transducer connection

The unit has internal CHIRP, Broadband, StructureScan, TotalScan and ForwardScan sonar.

Transducers fitted with a 9-pin connector can be plugged directly into the 9-pin port on the back of the unit. For connector location, refer to the embossed labeling on the back of the unit or the section *"Rear connections"* on page 14.

→ **Note:** The connector attached to the transducer cable is keyed, and can only be inserted in one orientation. Once inserted, turn locking collar to secure.

→ **Note:** A 7-pin transducer cable can be connected to a 9-pin port using a 7-pin to 9-pin adaptor cable. However, if the transducer has a paddle wheel speed sensor, the water-speed data will not be displayed on the unit.

→ **Note:** For transducer installation information, refer to separate installation instructions included with the transducer.

Radar connector

→ **Note:** The 5" unit does not have a Radar port.

The Radar port allows connecting the unit to your radar scanner using a 5 pin Ethernet connector.
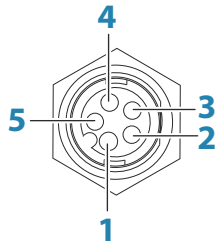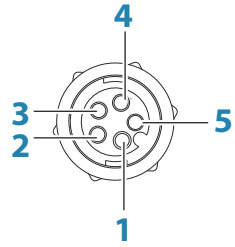
Unit socket (female)   *Cable plug (male)*

Key	Purpose	Color
1	Transmit positive TX+	Blue/White
2	Transmit negative TX-	Blue
3	Receive positive RX+	Orange/White
4	Receive negative RX-	Orange
5	Shield	Bare

5

Waypoints

Routes

Tracks

Tides

Alarms

Settings

System

System

Software Setup

This unit requires some initial configuration before use, in order to get the most out of the product. The following sections focus on settings that typically do not require change once configured. User preference settings and operation are covered in the Operator Manual.
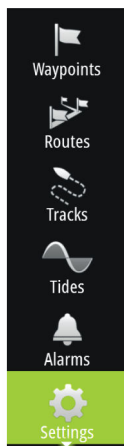
Selecting the Home button opens the Home page, which has three distinct areas. The scrollable left column of icons is the Tools panel. Select Settings in the Tools panel to open the Settings dialog and access items that require configuration.

First time startup

When the unit is started for the first time, or after a factory default, the unit displays a setup wizard. Respond to the setup wizard prompts to select some fundamental setup options.

You can perform further setup using the system settings option and later change settings made with the setup wizard.

Time and Date

Configure time settings to suit vessel location, along with time and date formats.

Start line - vessel configuration

In order for the start line feature to work at it's optimum, the exact position of the vessels bow must be known. This is achieved by entering position offsets for the GPS sensor. These offsets combined with heading data will allow the software to accurately determine the bows distance from the start line. To set the offsets, open the **Advanced Settings** page and expand the **Instruments** option.

Advanced Settings

Wind		
Instruments		
Use COG as Heading	☐	Controls whether COG is used as Heading when calculating true wind
Use SOG as Boat Speed	☐	Controls whether SOG is used as Boat Speed when calculating true wind
GPS Bow Offset (m)	0.00	Distance from bow to GPS
GPS Centerline Offset (m)	0.00	Distance centerline to GPS (negative to port)
Speed decimal places	1	Controls the number of decimal places for speed values

1 **GPS Bow Offset** - enter the distance from bow to GPS (always a positive value)

2 **GPS Centerline Offset** - enter the distance from vessel centerline to GPS (negative to port)

3 Vessel LOA (Length Over All)

4 GPS

→ *Note:* Ensure the bow offset includes any projections forward of the hull, such as a bowsprit.

Rotating mast compensation

System

If the vessel is fitted with a rotating mast it will impact any sensors or radar mounted to it. Provided the mast is also fitted with a sensor to measure rotation, the effect can be compensated for. Open the **Advanced Settings** page to access the following;

Radar

Enable **Use mast rotation** to ensure the radar image alignment stay correct relative to the vessel.

Wind

Enable **Use mast rotation** to ensure the apparent and calculated wind heading stays correct relative to the vessel.

→ *Note:* If using H5000 with a rotating mast, **Use Mast Rotation** for **Wind** needs to be disabled as the H5000 CPU will automatically correct the wind information relative to the vessel.
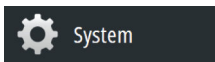
Data source selection

Data sources provide live data to the system.

The data may originate from modules internal to the unit (for example internal GPS or sonar), or external modules connected to the NMEA 2000 or via NMEA 0183 if available on the unit.

When a device is connected to more than one source providing the same data, the user can choose the preferred source. Before commencing with source selection make sure all external devices and the NMEA 2000 backbone are connected and are turned on.

Auto Select

The Auto Select option looks for all sources connected to the device. If more than one source is available for each data type, selection is made from an internal priority list. This option is suitable for the majority of installations.

Manual source selection

Manual selection is generally only required where there is more than one source for the same data, and the automatically selected source is not the one desired.

Auto Select		
Compass ▶	Group	Default ▾
Navigation ▶	Advanced...	
Position ▶	[OFF] SI80 -Ch1 VDR [000000#] ☑	
Apparent wind ▶		
True wind ▶		
Boat speed ▶		
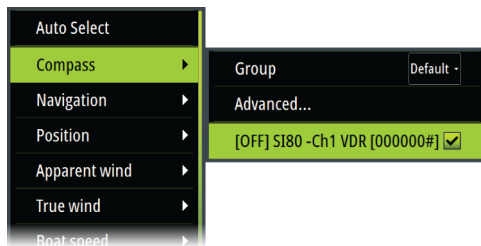
Group source selection

Multifunction displays, autopilot controllers, and instruments have the ability to:

• Use data sources (for example position, wind direction, and so on) that all other products on the network use, or alternatively use a data source independently from other units.

- Globally change all displays over to a different source from any display. (This only includes products set to Group mode.)

→ **Note:** In order to enable group selection, the display must be set to Simrad group.

Devices with the Group set to None can be set to use different sources to those of the rest of the network devices.
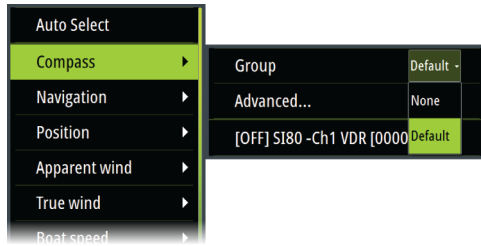
Advanced source selection

This allows the most flexible and precise manual control over which devices provide data. Some data sources, such as those for fuel level, or engine RPM, can only be changed from the Advanced menu. Occasionally Auto Select may not assign the desired source, which may be corrected using the Advanced Source Selection. An example of this is where twin installations with NMEA 2000 compliant engines are not programmed with unique instance numbers. This means that the auto select feature cannot determine which engine is fitted on the port and which is fitted on the starboard side.

→ **Note:** The **Advanced** option is visible in multiple places - the bottom of the **Sources** list, and under each source category (for example, Compass). The latter shows a filtered list that only relates to devices that output data relevant to the category.

Device list

Network

The Device list shows the devices that provide data. This may include a module inside the unit, or any external NMEA 2000 device.

Selecting a device in this list will bring up additional details and actions:
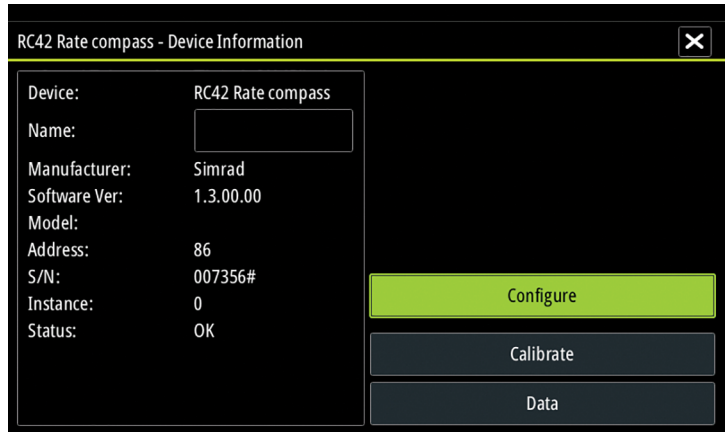
All devices allow allocation of an instance number in the **Configure** option. Set unique instance numbers on any identical devices on the network to allow for the unit to distinguish between them. The **Data** option shows all data being output by the device.

Some devices will show additional option(s) specific to the device - the RC42 illustrated above has a **Calibration** option, to allow easy setup of this device.

→ *Note:* Setting the instance number on a 3rd party product is typically not possible.

Network groups

Network

The Network Groups function is used to control parameter settings, either globally or in groups of units. The function is used on larger vessels where several units are connected to the network. By assigning several units to the same group, a parameter update on one unit will have the same effect on the rest of the group members.

Display (backlighting), **Units** (metric or imperial units of measure), **Damping** (to dynamic data), and **Alarms** can be grouped either in **Default** group, or groups **1** through to **6**. If any of the settings require discrete control, set it to **none**.
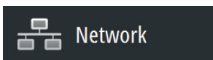
Diagnostics

Provides information useful for identifying an issue with the network.

→ **Note:** The following information may not always indicate an issue that can be simply resolved with minor adjustment to network layout or connected devices and their activity on the network. However, Rx and Tx errors are most likely indicating issues with the physical network, which may be resolved by correcting termination, reducing backbone or drop lengths, or reducing the number of network nodes (devices).

Bus state
Simply indicates whether the bus is powered, but not necessarily connected to any data sources. However, if bus shows as **off**, but power is present along with an increasing error count, it is possible that termination or cable topology is incorrect.

Rx Overflows
The unit received too many messages for its buffer before the application could read them.

Rx Overruns
The unit contained too many messages for its buffer before the driver could read them.

Rx/Tx Errors
These two numbers increase when there are error messages, and decrease when messages are received successfully. These (unlike the other values) are not a cumulative count. Under normal operation these should be at 0. Values around 96 upwards indicate a heavily error prone network. If these numbers go too high for a given device, it will automatically drop off the bus.

Fast Packet Errors
Cumulative counter of any fast packet error. This could be a missed frame, or a frame out of sequence etc. NMEA 2000 PGNs are made of up to 32 frames. The entire message will be discarded when a frame is missed.

Damping

Network

If data appears erratic or too sensitive, damping may be applied to make the information appear more stable. With damping set to off, the data is presented in raw form with no damping applied.

Calibration

Network
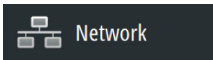
An offset (positive or negative) can be applied to correct inaccuracies in boat speed, sea temp, air temp, barometric pressure, and depth sourced from NMEA 2000.

➔ **Note:** Any calibrations made here will ONLY be applied locally to this unit. Other devices on the network will not have these offsets applied.
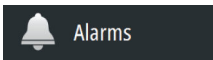
External Alarm Setup

Alarms

The **Siren Enabled** option must be set in order for the unit to activate the buzzer when an alarm condition arises. Its setting also determines the operation of the external alarm output.
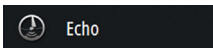
Echosounder setup

Echo

Make general settings from the Echosounder Settings dialog. Define and configure Echosounder sources in the Installation dialog.

Overlay downscan

When a HDI transducer with DownScan is connected to your system, you can overlay DownScan images on the regular Echosounder image.

When activated, the Echosounder menu expands to include basic DownScan options.

Structure depth offset

Setting for Structure transducers.

All transducers measure water depth from the transducer to the bottom. As a result, water depth readings do not account for the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.

To show the depth from the lowest point of the boat to the bottom, do the following. Before setting the Structure offset, measure the distance from the structure transducer to the lowest point of the boat in the water. If, for example, the distance is 0.3 m (1 ft), it will be input as (minus) - 0.3 m (-1 ft).

To show the depth from the water surface to the bottom, do the following. Before setting the Structure offset, measure the distance from the structure transducer to the water surface. If, for example, the distance is 0.3 m (1 ft), it will be input as (plus) 0.3 m (1 ft).

A setting of 0 (zero) causes the depth displayed to be the distance from the transducer to the bottom.

Echosounder installation

Use this dialog to setup and configure available Echosounder sources.
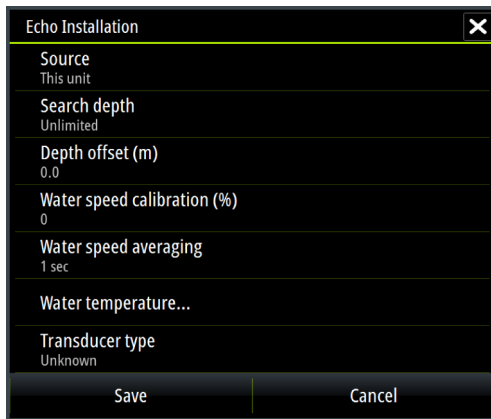
Source
Select this option to display a list of Echosounder sources available for setup. The settings you make in the rest of the dialog pertain to the source selected. The sources setup in this dialog are available for selecting to display in the image in the Echosounder panel.

Search depth

Noise may cause the echosounder to search for unrealistic depths. By setting the search depth manually the system displays echoes received from objects within the set depth range.

Depth offset

This is a value that can be entered on the Echo Installation page to make depth readings relate to any point from the water surface, to the deepest point of the vessel. Below are some alternative ways in which the offset can be entered:

Before setting the offset, measure the distance from the transducer to the lowest point of the boat in the water or from the transducer to the water surface.

A) For depth below keel: Set the distance from transducer to the bottom of the keel - this should be set as a negative value. For example, -2.0.

B) For depth below transducer: no offset required (the offset is set to 0).

C) For depth below surface (waterline): Set the distance from transducer to the surface - this should be set as a positive value. For example,+0.5.
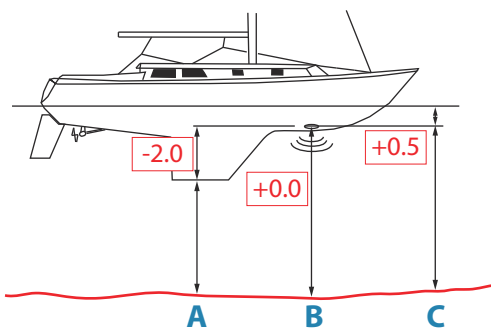
Echosounder software version

For external sounder modules, the software version is displayed in the header of the Echo Installation dialogue. For upgrade software information, refer to *"Software updates and data backup"* on page 57.

Water speed calibration

Water speed calibration is used to adjust the speed value from the paddle wheel to match the actual boat speed through the water. Actual speed can be determined from GPS speed over ground (SOG) or by timing the boat over a known distance. Water speed calibration should be performed in calm conditions, with minimal wind and current movement.

Increase this value above 100 % if the paddle wheel is under reading, and decrease this value if it is over reading. For example, if the average water speed reads 8.5 knots (9.8 MPH) and SOG records 10 knots (11.5 MPH) the calibration value needs to be increased to 117 %. To calculate the adjustment, divide the SOG by the paddlewheel speed, and multiply the product by 100.

Calibration range: 50-200 %. Default is 100 %.

Water speed averaging

Averages water speed by measuring your speed at a selected interval of time. Water speed intervals range from one to thirty seconds. For example if you select five seconds, your displayed water speed will be based on averaging over 5 seconds of sampling.

Calibration range: 1-30 seconds. Default is 1 second.

Water temperature calibration

Temperature calibration is used to adjust the water temperature value from the sonar transducer to match the data from another temperature sensor. It may be required to correct for localized influences to the measured temperature.

Calibration range: -9.9° - +9.9°. Default is 0°.

→ **Note:** Water temperature calibration only appears if the transducer is temperature capable. Check transducer type selection if this option should be available.

Transducer type

Transducer type is used for selecting the transducer model connected to the sonar module. The transducer selected will determine what frequencies the user can select during sonar operation. In some transducers with built-in temperature sensors, the temperature reading may be inaccurate or not available at all if the wrong transducer is selected. Transducer temperature sensors

are one of two impedances - 5k or 10k. Where both options are given for the same model transducer, refer to paperwork supplied with transducer to determine impedance.

ForwardScan installation

Available when the ForwardScan feature is turned on. For installation and setup information, refer to the separate ForwardScan documentation.

StructureScan

This feature is automatically enabled when a TotalScan or StructureScan HD transducer is plugged in before the unit has been powered on.

It is possible to set a **Structure depth offset** for the structure transducer. This setting is in the Echosounder Settings dialog.

Radar setup

→ **Note:** The 5" unit does not support radar.

Use the Radar Installation dialog to setup the radar.

→ **Note:** The installation can vary depending on the radar. Follow the installation and setup instructions supplied with the radar.
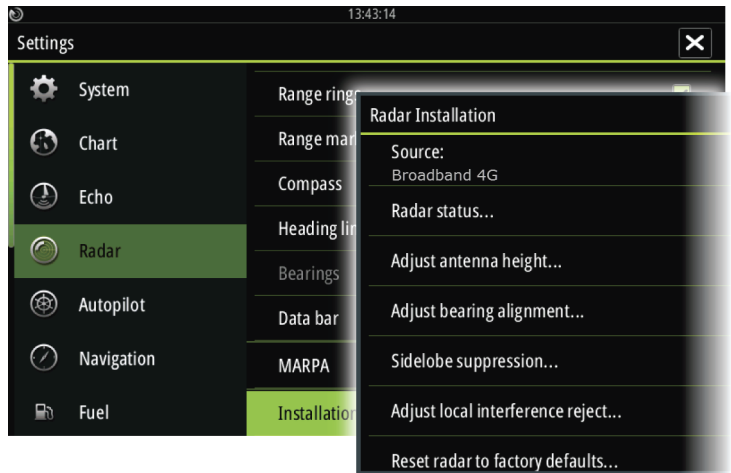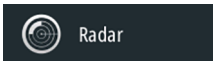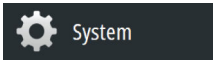
Radar source

In a system with more than one radar, the correct device to configure can be selected from this menu.

→ **Note:** Radars that support dual radar mode are represented twice in the source list, with an A and B suffix.

Radar status
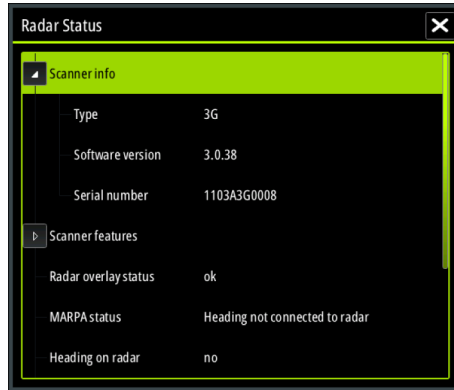
Scanner type
Identifies the model of scanner connected to the network.

Software version
Check to make sure you have the latest software. Check the latest software version available at: www.bandg.com.

Serial Number
This number should be recorded for support and insurance purposes.

MARPA status
The MARPA status can identify if a heading sensor is on the network and that the radar is receiving heading information essential for MARPA calculations.

Reset device ID

Should a radar be connected to the network that has been connected to a dual radar network in the past, it might not be detected by the system because it might have an invalid Device ID. With the radar connected and powered up, select the Reset Device ID button to resolve this problem.

→ **Note:** This procedure must be performed with only one radar on the network, and only applies where a network combines an older MFD with other MFDs.

Adjust antenna height

Set the radar scanner height relative to the water surface. The Radar uses this value to calculate the correct STC settings.

Adjust bearing alignment

This is to align the heading marker on the screen with the center line of the vessel. This will compensate for any slight misalignment of the scanner during installation. Any inaccuracy will be evident when using MARPA or chart overlay.

Point the boat to be perpendicular to the very end of a breakwater or peninsula. Adjust the bearing alignment setting, so that the heading marker and land mass intersect.

Sidelobe suppression

Occasionally false target returns can occur adjacent to strong target returns such as large ships or container ports. This occurs because not all of the transmitted radar energy can be focused into a single beam by the radar antenna, a small amount energy is transmitted in other directions. This energy is referred to as sidelobe energy and occurs in all radar systems. The returns caused by sidelobes tend to appear as arcs.

→ **Note:** This control should only be adjusted by experienced radar users. Target loss in harbor environments may occur if this control is not adjusted correctly.

When the radar is mounted where there are metallic objects near the radar, sidelobe energy increases because the beam focus is degraded. The increased sidelobe returns can be eliminated using the Sidelobe Suppression control.

By default, this control is set to Auto and normally should not need to be adjusted. However, if there is significant metallic clutter around the radar, sidelobe suppression may need to be increased. The control should be adjusted as follows:

1. Set Radar range to between 1/2 nm to 1 nm and Sidelobe Suppression to Auto
2. Take the vessel to a location where sidelobe returns are likely to be seen. Typically, this would be near a large ship, container port, or metal bridge.
3. Traverse the area until the strongest sidelobe returns are seen.
4. Change Auto sidelobe suppression to OFF then select and adjust the sidelobe suppression control until the sidelobe returns are just eliminated. You may need to monitor 5-10 radar sweeps to be sure they have been eliminated.
5. Traverse the area again and readjust if sidelobes returns still occur.
6. Exit the dialog.

Adjust local interference reject

Interference from some onboard sources can interfere with the Broadband radar. One symptom of this could be a large target on the screen that remains in the same relative bearing even if the vessel changes direction.

Choose from Local interference rejection LOW, MED or HIGH. Default is LOW.

Restore radar to factory defaults

This option can be used to revert all user adjustments.

Autopilot setup
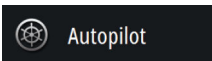
For setup and commissioning of autopilot computers, refer to the documentation included with your autopilot system or autopilot computer.

Fuel setup
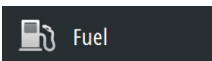
The fuel utility monitors a vessel's fuel consumption. This information is totaled to indicate trip and seasonal fuel usage, and is used to calculate fuel economy for display on instrument pages and the data bar.

To use the utility, a Navico Fuel Flow sensor, or a NMEA 2000 engine adaptor cable/gateway with Navico Fuel Data Storage device must be fitted to the vessel. Neither the Navico Fuel Flow sensor, nor the Suzuki engine interface require the use of a separate Fuel Storage device. Refer to the engine manufacturer or dealer for information on whether or not your engine provides a data output, and what adaptor is available to connect to NMEA 2000.

Once the physical connection is made, ensure source selection is completed. Multiple engine installations using Fuel Flow sensors, or Fuel Data Storage devices, require setup of related engine location in the Device list. For general source selection information, refer to *"Data source selection"* on page 35.

Vessel setup

The Vessel setup dialog must be used to select the number of engines, the number of tanks and vessel's total fuel capacity across all tanks.

Vessel Setup	✕
Number of Engines 2	
Number of Fuel Tanks 1	
Vessel total fuel capacity (L) 100	
Save	Cancel
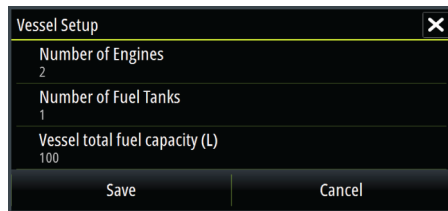
Fuel remaining measurement

The Fuel remaining measurement can be determined from fuel used by engine(s), or fuel level from tank sensors. Nominal fuel consumption is required to set the scale on the fuel economy gauge. This value should be determined from experience, over time. Alternatively the boat builder or designer may be able to give an approximate value to use.

→ **Note:** Fuel remaining measurement taken from level sensors while underway can get inaccurate readings due to vessel movement.

→ **Note:** Nominal fuel consumption setting should be determined taking into account typical vessel loads. That is, filled fuel and water tanks, stowed tender, supplies, etc.

Fuel flow configuration

After the number of engines is set, it is required to set which fuel flow sensor is connected to which engine. Under **Device list** on the Network page, view the Device Configuration dialog for each sensor, and set the **Location** to match the engine the device is connected to.

Unconfigure - defaults the device which clears all user settings.

Reset Fuel Flow - restores only the Fuel K-Value setting, if set in Calibrate. Only Navico devices can be reset.

EP-60R Fuel Flow - Device configuration	✕

Configuration	
Device	EP-60R Fuel Flow
Location	Starboard ▾

Advanced Options		
Instance	001	Unconfigure
		Reset Fuel Flow.
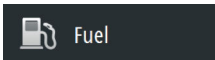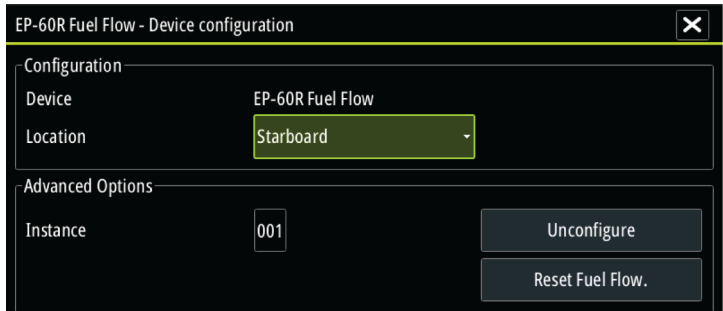
Calibrate

Calibration may be required to accurately match measured flow with actual fuel flow. Access calibration from the **Refuel** dialog. Calibration is only possible on Navico's Fuel Flow sensor.
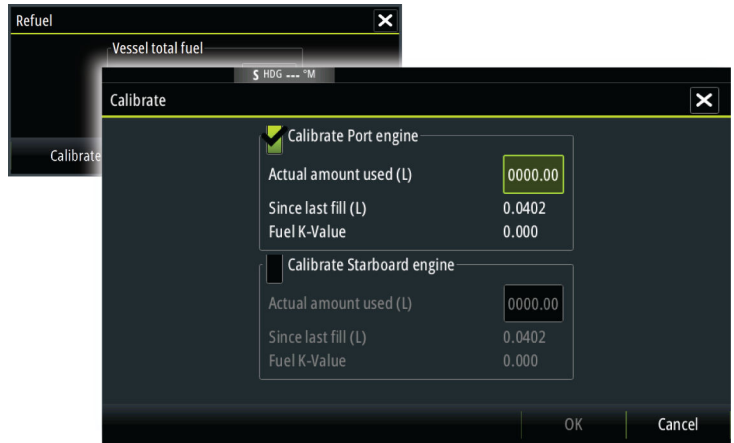
1. Start with a full tank and run the engine as it would normally be operated.
2. After at least several liters (a few gallons) have been used, the tank should be fully refilled, and the **Set to full** option selected.
3. Select the **Calibrate** option.
4. Set the **actual amount used** based on amount of fuel added to the tank.
5. Select **OK** to save settings. The **Fuel K-Value** should now show a new value.

→ **Note:** To calibrate multiple engines repeat the steps above, one engine at a time. Alternatively, run all engines simultaneously, and divide the *Actual amount used* by the number of engines. This assumes reasonably even fuel consumption on all engines.

→ **Note:** The **Calibrate** option is only available when **Set to full** is selected, and a Fuel Flow is connected and set up as a source.

→ **Note:** A maximum of 8 engines is supported using Fuel Flow sensors.

Fuel Level

With the use of a Navico Fluid Level device connected to a suitable tank level sensor, it is possible to measure the amount of fuel remaining in any equipped tank. The number of tanks must be set in Vessel Setup dialog, initiated from the Fuel setting options page, to allow discrete tank assignment of the Fluid Level devices.

Select **Device list** on the Network page, and view the Device Configuration dialog for each sensor, and set the Tank location, Fluid type, and Tank size.

EP-65R Fluid Level - Device configuration	✕

Configuration

Device	EP-65R Fluid Level
Tank	Port ▾
	Port
	Starboard
Fluid type	Unknown
Tank size (L)	0519.90

Advanced Options

Instance	000	Unconfigure
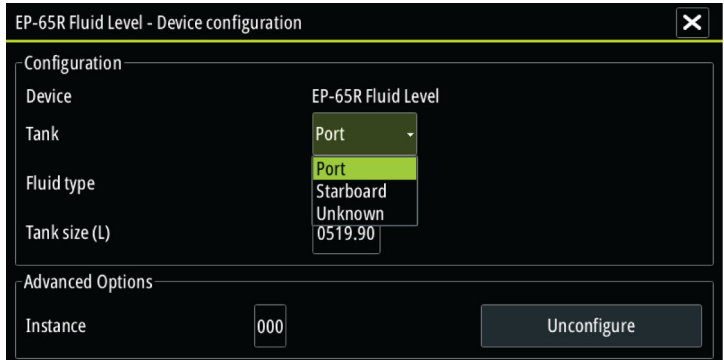
For setting up the Instrument bar or a gauge on the Instrument page with Fluid Level device data, refer to the Operator Manual.

→ *Note:* A maximum of 5 tanks is supported using Fluid Level devices.

→ *Note:* Tank data that is output by a compatible engine gateway can also be displayed, however tank configuration for such a data source is not possible from this unit.

CZone setup

In order to communicate with the CZone modules connected to the network, the Vulcan Series must be assigned a unique CZone Display Dipswitch setting.

The functionality of the CZone system is determined by the CZone Config File which is stored on all CZone modules and the Vulcan Series. The file is created using the CZone Configuration Tool, a specialized PC application available from BEP Marine Ltd, and associated CZone distributors.

For more information, refer to the documentation provided with your CZone system.

Enabling CZone functionality

⚙ System

If the CZone device(s) are not automatically detected, it is possible to manually enable CZone.
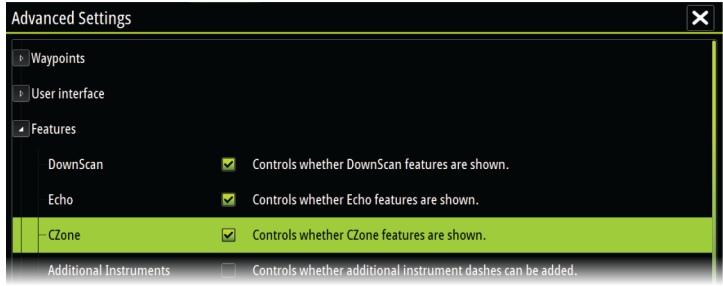
Assigning the dipswitch setting

CZONE CZone

Every product capable of controlling and viewing CZone devices must be assigned a virtual dipswitch setting. This setting is unique for each device. Typically it is set after the configuration file already exists on the CZone system, but it may also be set in advance. To do so, access the CZone menu on the Settings page.

When the configuration is already available on the network, it will immediately commence uploading to the Vulcan Series once the dipswitch is set. Allow this to complete, without interruption.

Setting CZone to display at startup

With this option selected, the CZone control page is shown first, every time the Vulcan Series is powered up.

CZone backlight control

Enabling this causes the Vulcan Series to synchronize its backlight setting with that of any CZone Display Interfaces set up to share backlight settings.

→ **Note:** CZone Config also needs to have the Vulcan Series set as a controller.

Wireless setup

((•)) Wireless

The unit includes built-in wireless functionality that lets you:

- Use a wireless device to remotely view (smartphone and tablet) and control the system (tablet only). Wireless devices use the GoFree app downloaded from their relevant application store.
- Access the GoFree Shop.

- Upload your logs to create custom maps at Insight Genesis.
- Download software updates
- Connect to third party applications

Connecting a tablet

Install the GoFree App on the tablet before following this procedure.

1. Set the internal wireless to **Access Point** mode. To do this, select the **Wireless devices** page in the Wireless settings dialog and then select the Internal wireless. Next, select the **Mode** option and then select **Internal Access Point**.
2. Select the Internal Wireless device on the **Wireless devices** page to view its Network key.
3. Navigate to the wireless network connection page on the tablet, and find the unit or GoFree wireless *xxxx* network. If more than one is in range, review the **Wireless devices** page on the unit to confirm which wireless device is connected to the unit.
4. Enter the Network Key in the tablet to connect to the network.
5. Open the GoFree application - the unit should be automatically detected. The name displayed will be either the default, or that assigned in the Device Name setting. If the unit does not appear, follow the on screen instructions to manually find the device.
6. Select the graphic icon of the unit. The unit displays a prompt similar to the following:
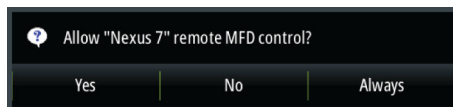
7. Select **Yes** for one-time connection, or **Always** if device is to be remembered for regular connection. This setting can be changed later if required.

➔ *Note:* The internal wireless module only supports GoFree connection to itself. Other units connected on the network are not visible.

Connecting a smartphone

Install the GoFree App on the smartphone before following this procedure.

1. Set the internal wireless to **Access Point** mode. To do this, select the **Wireless devices** page in the Wireless settings dialog and then select the unit's Internal Wireless. Next, select the **Mode** option and then select **Internal Access Point**.
2. Select the Internal Wireless device on the **Wireless devices** page to view its Network Key.
3. Navigate to the wireless network connection page on the smartphone, and find the unit or GoFree wireless *xxxx* network. If more than one is in range, review the **Wireless devices** page from the unit's Wireless settings dialog to confirm which wireless device is connected to the unit.
4. Enter the Network Key in the smartphone to connect to the network.
5. Open the GoFree application on the smartphone, the unit should be automatically detected. The name displayed will be either the default, or that assigned in the Device Name setting. If the unit does not appear, follow the on screen instructions to manually find the device.

The MFD's display is shown on the smartphone. To change the MFD's display on the smartphone, use the MFD to change the display on the MFD. The display change on the MFD is reflected on the smartphone.

Remote controllers

When a wireless device is connected, it should appear in the **Remote controllers** list.

Selecting **Always allow** means the device can automatically connect without needing a password each time. This menu also allows disconnection of devices that no longer require access.

Wireless devices

This dialog shows the internal wireless and any connected WIFI-1 devices, as well as their IP and channel number. Selecting the internal wireless or a WIFI-1 device provides additional detail.

➔ **Note:** WIFI-1 is possible with the 7", 9" and 12" unit only, using the Radar/Ethernet connection on the back of the unit.

To view and change internal wireless detail values (Network name (SSID), Network key, or Channel) the internal wireless must be in **Access Point** (Internal Wifi) mode. To select a network (hotspot) to connect to, the internal wireless must be in **Client Mode**.

Mode

Displays if the internal wireless is set to **Access Point** (Internal Wifi) mode or **Client Mode**. Select it to change the wireless between **Access Point** mode and **Client Mode**.

If the internal wireless is set to **Access Point** (Internal Wifi) mode, smartphones and tablets can access the unit to view and control (tablet only) it. Also when set to **Access Point** (Internal Wifi) mode you can view and change the internal wireless details. **Client Mode** allows the unit internet access via a wireless hotspot.

Hardware

Provides MAC address details of the wireless.

Networks

Only visible if the internal wireless is in **Client Mode** when the device is selected. Shows a list of all networks (hotspots) available for connection. Select the name of the desired network to enter its network key and connect to it.

Network Name (SSID)

Displays the name of the internal wireless network.

Only visible if the internal wireless is set to **Access Point** (Internal Wifi) mode when the device is selected. You can select it and change the internal wireless network to any name you want for easy identification.

Network Key

Required by the smartphone or tablet to connect to the internal wireless network.

Only visible if the internal wireless is set to **Access Point** (Internal Wifi) mode when the device is selected. You can select it and change it to increase network security. The key must be at least 8 characters.

Channel

Only visible if the internal wireless is set to **Access Point** (Internal Wifi) mode when the device is selected. Select it to change the Channel setting to overcome potential interference to the internal wireless by another RF device transmitting in the same frequency band.

Restore defaults

Deletes all user made changes, and restores the wireless to factory settings.

Advanced

Tools are available within the software to assist in fault-finding and setting up the wireless network.
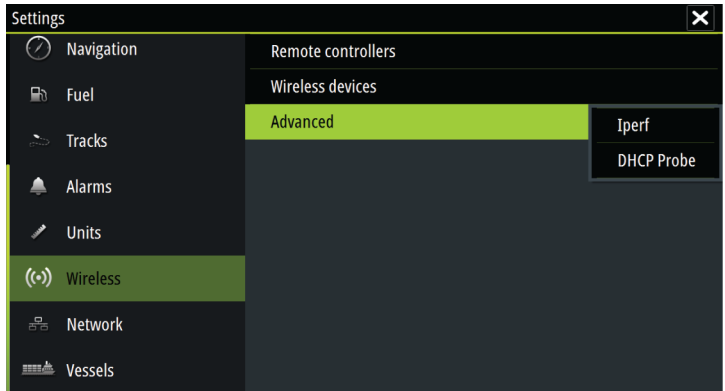
Iperf

Iperf is a commonly used network performance tool. It is provided for testing wireless network performance around the vessel so weak spots or problem areas can be identified. The application must be installed on and run from a tablet device.

The Vulcan Series must be running Iperf server before initiating the test from the tablet. On exiting the page, Iperf automatically stops running.

DHCP Probe

The wireless module contains a DHCP server that allocates IP addresses for all the MFDs, and Echosounder in a network. If integrating with other devices, such as a 3G modem or satellite phone, other devices in the network may also be acting as DHCP servers. To make it easy to find all DHCP servers on a network, dhcp_probe may be run from the Vulcan Series. Only one DHCP device may be operational on the same network at a time. If a

second device is found, turn off its DHCP feature if possible. Refer to the device's own instructions for further assistance.

➔ ***Note:*** Iperf and DHCP Probe are tools provided for diagnostic purposes by users familiar with network terminology and configuration. Navico is not the original developer of these tools, and cannot provide support related to their use.

Internal Wireless

Select this option to enable or disable the internal wireless module.

Disabling wireless when not in use reduces the unit's power consumption.

NMEA 2000 setup
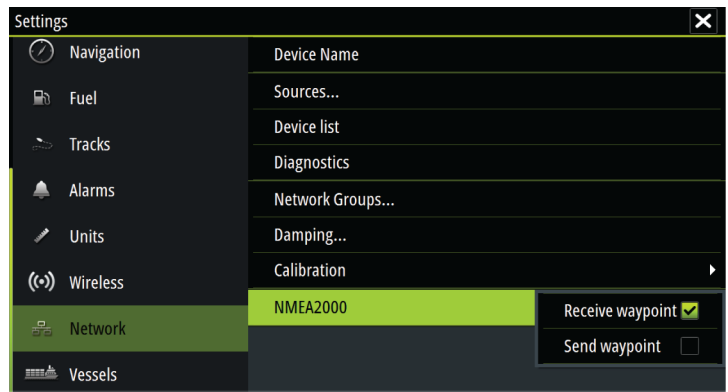
Receive waypoint

Select this option to allow another device capable of creating and exporting waypoints via NMEA 2000 to transfer directly to this unit.

Send waypoint

Select this option to allow this unit to send waypoints to another device via NMEA 2000.

Mercury®

If the unit is on the same NMEA 2000 network as a Mercury VesselView® 4, 7, 403, 502, 702, 703, or Link, a host of Mercury® specific features are automatically unlocked on the unit. When the features are enabled, the display may prompt the user for some basic configuration information. Refer to the VesselView® manual or engine supplier for further information.

Software updates and data backup

From time to time we release software updates to our existing products. Updates are created for a variety of reasons; to add or improve features, to add support for new external devices, or to fix software bugs.

Updates can be found on the website: www.bandg.com

When the unit is connected to the internet, a pop-up can appear advising that a software update is available and encourages you to download the update.

The unit may be used to apply software updates to itself, and to supported network devices, with files read off a memory card inserted in the card reader.

Before initiating an update to the unit itself, be sure to back up any potentially valuable user data.

Network analyzer and service assistant

The system has a built-in service assistant that creates a report of the devices installed on the NMEA 2000 network such as the software versions, serial numbers, and information from the settings file to assist in technical support enquiries.

To use the analyzer, open the About page of the System settings dialog and select Support. Two options are displayed:

Create report

Analyzes your network and prompts you for information required for support and creates the report with information automatically gathered from the network. You can add screenshots and log files that will be attached to the report. There is a 20MB limit for the report attachments. You can save the report to a memory card and email it to support or upload it directly if you have an internet

connection. If you call technical support first, you can enter an incident number to assist with tracking.

Check system for updates

Analyzes your network and checks if updates are available for compatible devices.

→ *Note:* Connect your unit to the internet to check for the latest available software versions. The software versions will be up to date as of the last time you updated your unit or connected to the internet.

Backing up and Importing user data

There are two files that can be backed up that relate to user changes made to the system:

- Waypoints, Routes, and Tracks database.
- Settings database (includes preferences such as unit settings, custom pages, and CZone configuration files).

Insert a memory card into the unit's card reader as a storage location for backup data.

Waypoints, Routes, and Tracks database backup

You can export all Waypoints, Routes, and Tracks, or export only those contained within a specific region.

If Export Region is selected, the chart page will be displayed, centered on vessel location. Using the touch screen, adjust the red boundary box to outline the area to be exported. The export option offers different file formats to save as:

- **User Data File version 5**
  This is used to import and export waypoints and routes with a standardized universally unique identifier (UUID), which is very reliable and easy to use. The data includes such information as the time and date when a route was created.
- **User Data File version 4**
  This is best used when transferring data from one system to another, since it contains all the extra bits of information these systems store about items.
- **User Data file version 3 (w/depth)**
  Should be used when transferring user data from one system to a legacy product (Lowrance LMS, LCX).
- **User data file version 2 (no depth)**

Can be used when transferring user data from one system to a legacy product (Lowrance LMS, LCX).
- **GPX (GPS Exchange, no depth)**
  This is the format most used on the web that shares among most GPS systems in the world. Use this format if you are taking data to a competitor's unit.
- **Northstar.dat (no Tracks)**
  Used to transfer data to a legacy Northstar device.

After you select the file type, select Export and destination memory card. The receiving GPS/PC typically needs to be set to allow import of Waypoints.

Settings database export
Select **Setting database** to export the Settings database, or export CZone configuration (CZone installation dependent). Choose the desired option and select the memory card destination.

Importing a database
Later, if the unit has been restored to factory defaults or user data is accidentally deleted, return to the files page, select the backed up file, and then **Import**. View file details for creation date.

Software upgrades
The update file must be loaded to the root directory of the memory card.

The update may be initiated at boot up: insert the memory card into the card reader before turning the unit on, boot the unit, and follow the on-screen instructions.

Alternatively, in the Files menu, locate the update file on the memory card inserted in the card reader and select **Upgrade**, followed by **This Display**. Accept the prompt to reboot the unit, and wait a few moments as the unit restarts. Do not remove the memory card or repower the unit until the process is completed (this typically takes no more than a couple of minutes).

Software upgrade of remote device
It is possible to run an update remotely from one unit and apply it to another, provided they are on the NMEA network. This is only possible for units without a card slot.

Remote updating is similar to updating a local unit; select the file on the memory card and select the **Upgrade** option, followed by **Remote Upgrade**. Follow the onscreen options.

NMEA 2000 device upgrades

The update file must be loaded to the root directory of a memory card inserted in the card reader.

1. Select the Files toolbar option and select the update file under Memory card.
2. Select the Upgrade option presented when the file is highlighted. A list should appear displaying any compatible devices the update file applies to. In most cases this will be a single device.

→ *Note:* If no device is shown, check that the device to be updated has power, and run any outstanding updates for the unit first.

3. Select the device and initiate the upgrade. Do not interrupt the upgrade process.

6

Accessories

The most up-to-date accessories list is available at:
www.bandg.com.

5" unit accessories

Part number	Description
000-13168-001	Sun cover
000-10027-001	Quick release bracket
000-13171-001	Power and NMEA 2000 cable
000-13170-001	Bezel
000-13169-001	Panel mount kit
000-13313-001	7 to 9 pin transducer adapter

7" unit accessories

Part number	Description
000-14228-001	Sun cover
000-14229-001	Panel mount kit
000-12372-001	U-bracket
000-14230-001	Bezel replacement
000-00128-00	Power cable
000-13313-00	7 to 9 pin transducer adapter

9" unit accessories

Part number	Description
000-13701-001	Sun cover
000-13699-001	Panel mount kit
000-13702-001	U-bracket
000-13700-001	Bezel replacement
000-00128-001	Power cable
000-13313-001	7 to 9 pin transducer adapter

12" unit accessories

Part number	Description
000-14152-001	Sun cover
000-14246-001	Panel mount kit
000-14148-001	U-bracket
000-14247-001	Bezel replacement
000-00128-001	Power cable
000-13313-001	7 to 9 pin transducer adapter

7

Supported data

→ **Note:** NMEA 0183 and NMEA 2000 data output requires the connection of relevant sensors.

NMEA 2000 compliant PGN List

NMEA 2000 PGN (receive)

59392	ISO Acknowledgement
59904	ISO Request
60928	ISO Address Claim
126208	ISO Command Group Function
126992	System Time
126996	Product Info
127237	Heading/Track Control
127245	Rudder
127250	Vessel Heading
127251	Rate of Turn
127257	Attitude
127258	Magnetic Variation
127488	Engine Parameters, Rapid Update
127489	Engine Parameters, Dynamic
127493	Transmission Parameters, Dynamic
127503	AC input status
127504	AC Output Status
127505	Fluid Level
127506	DC Detailed Status
127507	Charger Status
127508	Battery Status
127509	Inverter Status
128259	Speed, Water referenced
128267	Water Depth

128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129033	Time & Date
129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS aids to Navigation
129283	Cross Track Error
129284	Navigation Data
129539	GNSS DOPs
129540	AIS Class B Extended Position Report
129794	AIS aids to Navigation
129801	Cross Track Error
129283	Cross Track Error
129284	Navigation Data
129539	GNSS DOPs
129540	GNSS Sats in View
129794	AIS Class A Static and Voyage Related Data
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129808	DSC Call Information
129809	AIS Class B "CS" Static Data Report, Part A
129810	AIS Class B "CS" Static Data Report, Part B
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130313	Humidity
130314	Actual Pressure

| 130576 | Small Craft Status |
| 130577 | Direction Data |

NMEA 2000 PGN (transmit)

126208	ISO Command Group Function
126992	System Time
126996	Product Info
127237	Heading/Track Control
127250	Vessel Heading
127258	Magnetic Variation
128259	Speed, Water referenced
128267	Water Depth
128275	Distance Log
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129283	Cross Track Error
129284	Navigation Data
129285	Route/Waypoint Data
129539	GNSS DOPs
129540	GNSS Sats in View
130074	Route and WP Service - WP List - WP Name & Position
130306	Wind Data
130310	Environmental Parameters
130311	Environmental Parameters
130312	Temperature
130577	Direction Data

8

Technical specifications

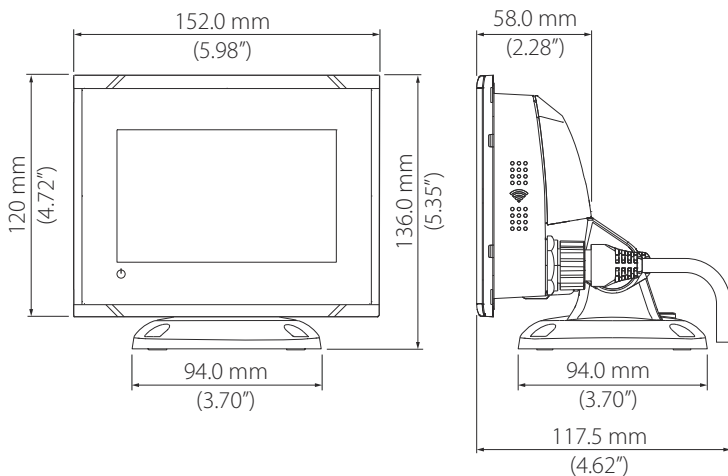➔ **Note:** The most up-to-date specifications list is available at: www.bandg.com

All units

Approvals	
Compliance	*"Compliance statements"* on page 3
Display	
Resolution	
5" unit	800 x 480
7" unit	800 x 480
9" unit	800 x 480
12" unit	1280 x 800
Type	TFT Widescreen
Brightness	>1200 nits
Touch screen	Full touch screen (multi-touch)
Viewing angles in degrees *(typical value @ contrast ratio = 10)*	Left/right: 70, top: 50, bottom: 60
Electrical	
Supply voltage	12 V DC (10 - 17 V DC min - max)
Recommended fuse rating	3 A
Protection	Protection reverse polarity and temporary over-voltage to 18 V
Power consumption	
5" unit	12 W (900 mA @ 13.5 V)
7" unit	12 W (900 mA @ 13.5 V)
9" unit	12 W (900 mA @ 13.5 V)
12" unit	20 W (1500 mA @ 13.5 V)
Environmental	
Operating temperature range	-15°C to +55°C (+5°F to +131°F)

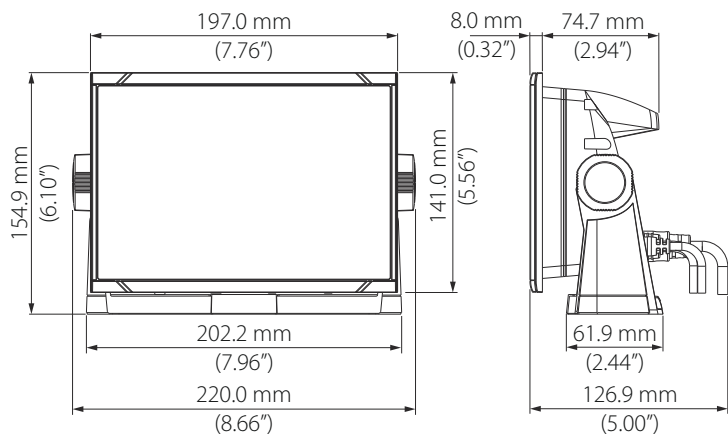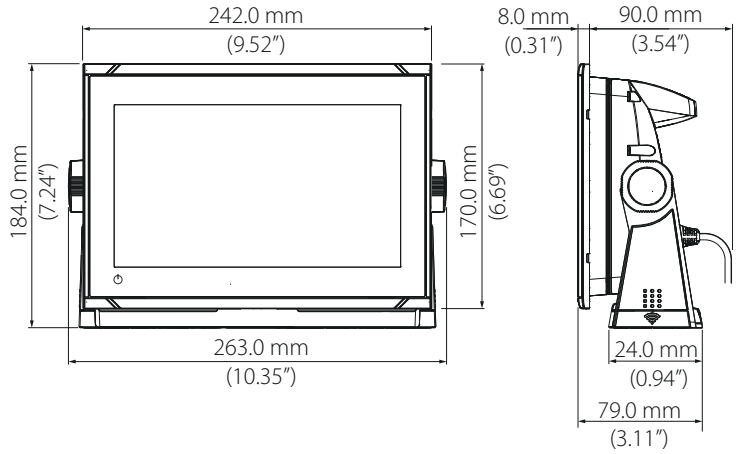|	
Storage temperature	-20°C to +60°C (-4°F to +140°F)
Waterproof rating	IPx7 and IPx6
Humidity	IEC 60945 Damp heat 66°C (150°F) @ 95% relative (18 hr)
Shock and vibration	100 000 cycles of 20 G
GPS	10 Hz high speed update (internal) WASS, MSAS, EGNOS, GLONASS
Interface	
Ethernet/Radar	
5" unit	Not available
7" unit	1 port (5 pin connector)
9" unit	1 port (5 pin connector)
12" unit	1 port (5 pin connector)
NMEA 2000	1 port (Micro-C)
Sonar	1 port (9 pin connector)
Data card slot	
5" unit	1 slot (microSD)
7" unit	1 slot (microSD)
9" unit	2 slot (microSD)
12" unit	2 slot (microSD)
Wireless	Internal 802.11b/g/n
Physical	
Dimensions (W x H x D)	Refer to *"Dimensional drawings"* on page 68
Weight (display only)	
5" unit	0.53 kg (1.16 lbs)
7" unit	0.91 kg (2 lbs)
9" unit	1.32 kg (2.9 lbs)
12" unit	2.22 kg (4.90 lbs)
Mounting type	Bracket (supplied) or panel mount

9

Dimensional drawings
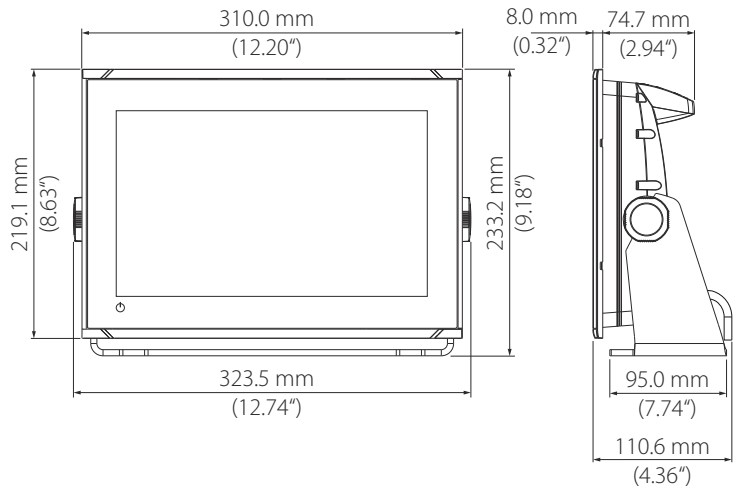
5" unit dimensional drawings

7" unit dimensional drawings

9" unit dimensional drawings

242.0 mm
(9.52″)

8.0 mm
(0.31″)

90.0 mm
(3.54″)

184.0 mm
(7.24″)

170.0 mm
(6.69″)

263.0 mm
(10.35″)

24.0 mm
(0.94″)

79.0 mm
(3.11″)

12" unit dimensional drawings

310.0 mm
(12.20″)

8.0 mm
(0.32″)

74.7 mm
(2.94″)

219.1 mm
(8.63″)

233.2 mm
(9.18″)

323.5 mm
(12.74″)

95.0 mm
(7.74″)

110.6 mm
(4.36″)

Dimensional drawings | **Vulcan R Series Installation Manual**

B&G

micro SD

CE