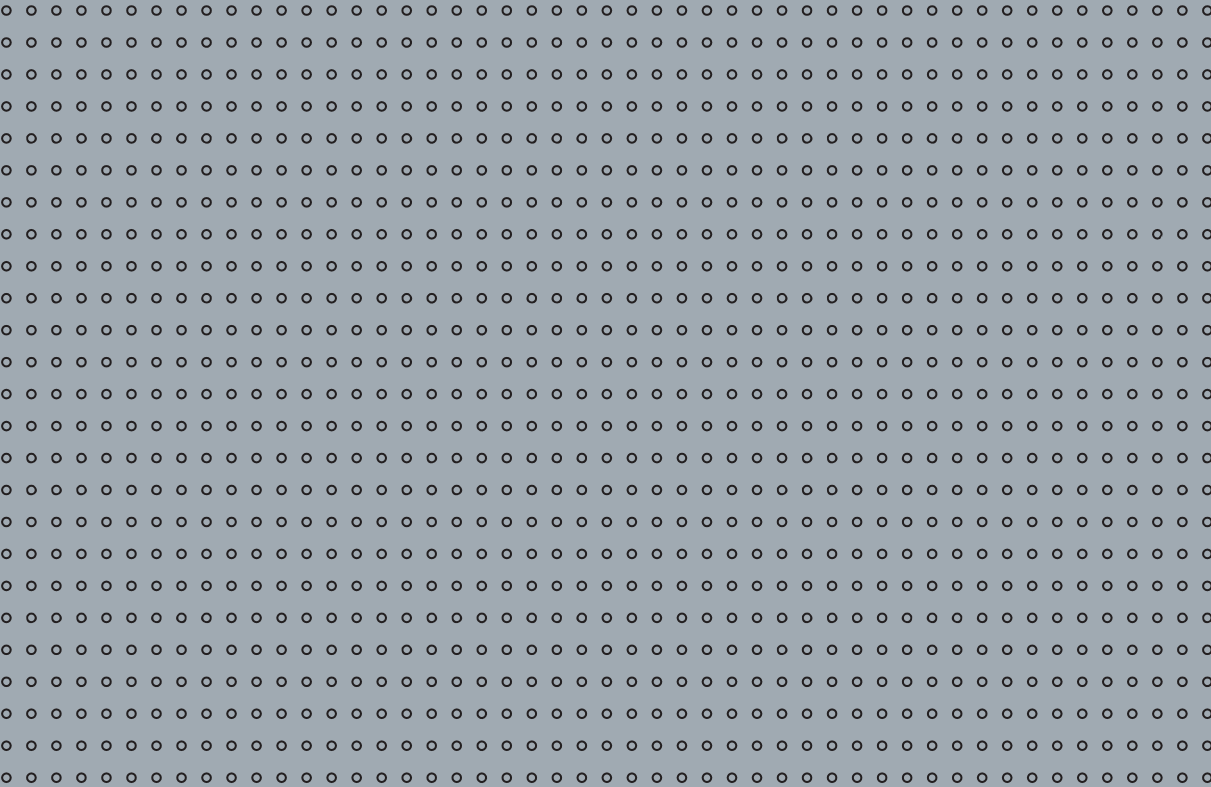**SIMRAD**

Master the Elements

Installation Manual

Simrad NSE8, NSE12 Multi Function Display

English

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 instrument and transducers 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 © 2011 Navico Holding AS.

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand web site of your display or system:

www.simrad-yachting.com

Declarations and conformance

This equipment is intended for use in international waters as well as coastal sea areas administered by countries of the E.U. and E.E.A.

Compliance Statements

The Simrad NSE complies with the following regulations:

• FCC Part 15

• CE compliant per EN60945

• C - Tick

For more information please refer to our website:

www.simrad-yachting.com.

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 has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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

Contents

Introduction

About this manual

This manual is a reference guide for installing the Simrad NSE8 and NSE12 Multi Function Display.

The information in this manual at the time of printing is correct to the best of our knowledge. Navico can not be liable for any inaccuracies or missing information.

Due to the constant improvement of Navico's products. Navico cannot be liable for changes between the product and the manual. Refer to www.simrad-yachting.com for the latest manuals and addendums.

Conventions

Used when it is necessary to warn personnel that a risk of damage to the equipment or injury/death exists if care is not exercised.

Used to draw the reader's attention to a comment or some important information.

Important safety and warning information

Please read carefully before use.

When navigating the vessel, use the Simrad NSE system only as a navigational aid. Proper navigation of the vessel is the sole responsibility of the vessel operator.

The electronic chart used by the NSE System is an aid to navigation only and is designed to supplement, not replace, official government charts. Only official government charts supplemented by notices to mariners contain the information required for safe and prudent navigation. Always supplement the electronic information provided by the Simrad NSE with other plotting sources such as observations, depth soundings, radar and hand compass bearings. Should the information not agree, the discrepancy must be resolved before proceeding any further.

Never operate the NSE in Simulate Mode while you are underway. It is the user's responsibility to ensure that Simulate Mode is used only in safe situations such as when you are moored in a marina.
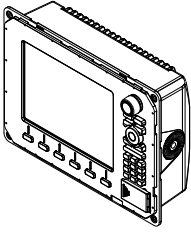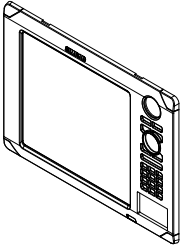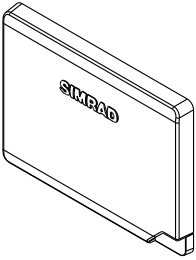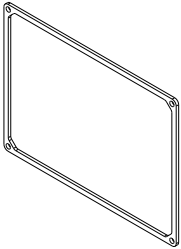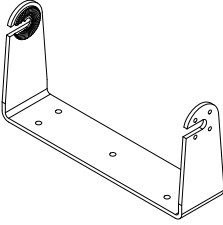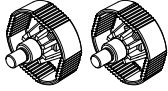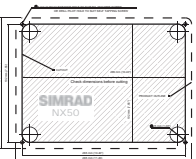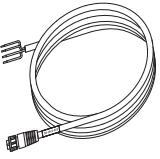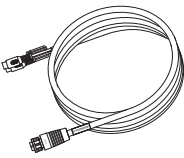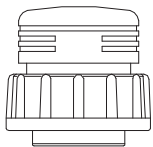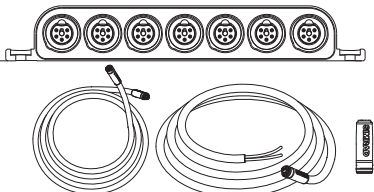
The Global Positioning System (GPS) is operated by the US Government which is solely responsible for its operation, accuracy and maintenance. The GPS system is subject to changes which could affect the accuracy and performance of all GPS equipment anywhere in the world.

The accuracy of the Echosounder depth display can be limited by many factors, including the type of transducer, the location of the transducer, and water conditions. Ensure that the transducer is installed correctly and the Echosounder is used correctly.

Check the parts

Packaged parts list			
NSE8 8.4 " Display unit		NSE8 Bezel	
NSE12 12 " Display unit		NSE12 Bezel	
NSE8 Dust cover		NSE8 Gasket	
NSE12 Dust cover		NSE12 Gasket	
NSE8 Mounting bracket		NSE8, NSE12 Bracket knobs	
NSE12 Mounting bracket		NSE8, NSE12 2 x Ratchet washers	
NSE8 Cut-out Template		NSE8, NSE12 Power cable	
NSE12 Cut-out Template			
NSE8, NSE12 Video-In / Comms Cable		NSE8, NSE12 Connector Caps	
NSE8, NSE12 This Installation Manual		NSE8, NSE12 Operation manual	
NSE8, NSE12 Quick start guide		NSE8, NSE12 Cleaning cloth	
NSE8, NSE12 5 x SCREW,14G x 1,PAN POZI,S/T,SS 316,BLACK		NSE8, NSE12 4 x SCREW, 8Gx1, PAN POZI, S/T,16,LO-HEAD	
SimNet Starter Kit: Includes • SimNet 5 m (16.5 ft) cable • SimNet 7-Prong Multi-Joiner • SimNet Termination Plug • SimNet 2 m (6 ft) power cable w/terminator			

Overview

NSE8 and NSE12 front
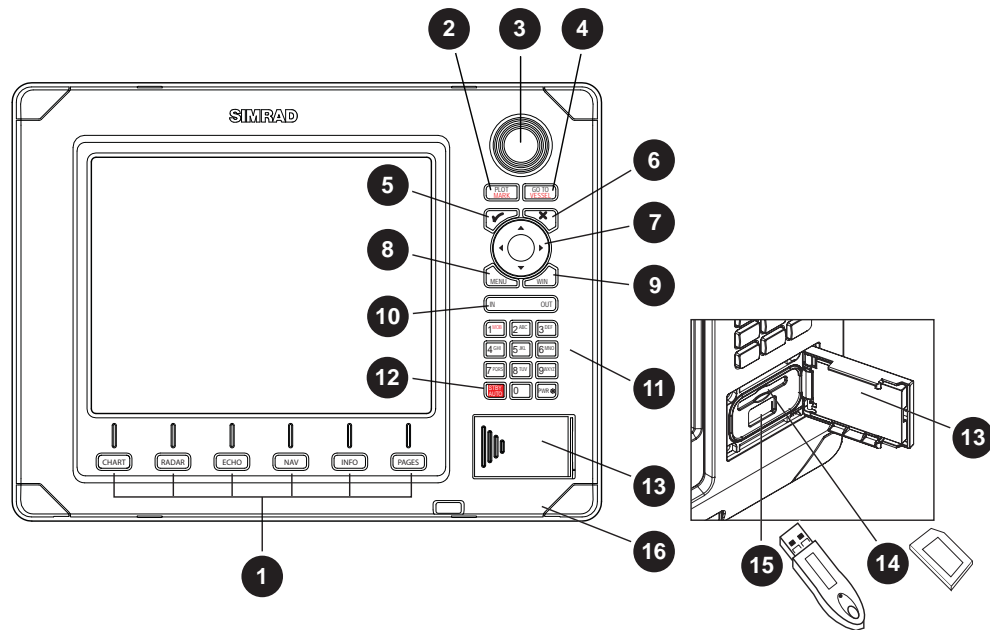
Key	Description
1	Direct Access Keys (DAK). Provide direct access to a page. Repeated presses of each DAK cycles through several different pages that relate to the DAK
2	PLOT/MARK key. A short press activates the Plot menu, a long press positions a waypoint at the vessel position
3	Rotary knob. The function of the knob is depending on active context
4	GOTO/VESSEL key. A short press activates the Goto menu, a long press centers the chart to vessel position
5	✓ key — Activates/confirms current selection
6	X key cancels changes and returns to previous menu level
7	Cursor keypad used to move the cursor on the display, and to maneuver in the menu system
8	MENU key. Used to display the context menu for the active panel/overlay, and for selecting options in edit mode. . 2 x MENU for system settings menu
9	WIN key, used on multiple panels pages. A short press toggles between the panels, a long press expands active panel to a full page panel and back again
10	Zoom buttons for radar, echosounder and chart pages
11	Alpha numeric keypad used for entering numbers and text in dialog boxes. A long press on the "1" key will position a Man Over Board (MOB) waypoint at the vessel's current position
12	STBY AUTO - Future use
13	Media port door. Press and slide to the right to open. Media can be used for optional Navionics chart data, software updates, transfer of user data and system backup
14	SD /MMC media card slot.
15	USB port
16	Removable bezel

NSE8 and NSE12 rear
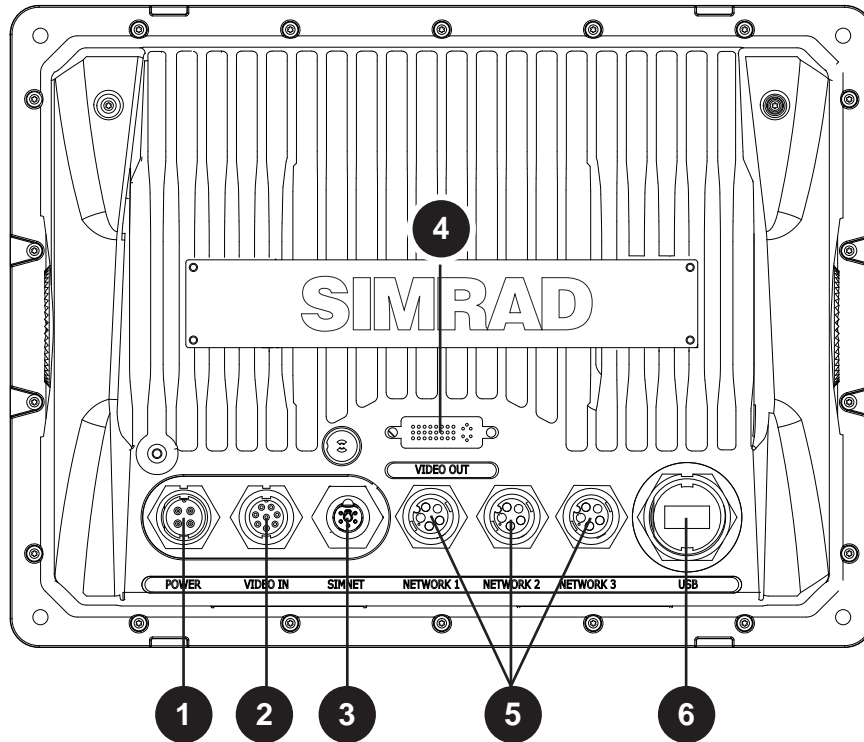
Key	Description
1	Power. For power input 12 or 24 V DC input (see "Connecting power" on page 24), Power control (see "Power control" on page 24) and external alarm (see "External alarm" on page 27).
2	Video In. Supplied cable provides two composite video inputs (see "Video In" on page 36) and one RS422 port (NMEA0183 TX, RX) (see "NMEA0183 wiring" on page 35)
3	SimNet. Connects NSE display to a SimNet or NMEA2000 network (see "SimNet" on page 28).
4	Video Out. Connect to an external monitor via optional DVI cable (see "Video Out" on page 37).
5	Network 1, 2 and 3. Three Ethernet network ports for connecting to other NSE displays and Network modules. (see "Ethernet" on page 33)
6	USB. Used for Software updates, chart data base updates, backing up waypoints routes and tracks. A better option to the front port if it is exposed to the weather. Note. A Water proof optional USB cable is available to extend this port to a dry location. (AA010078 USB dash mount)

OP40 (optional controller)

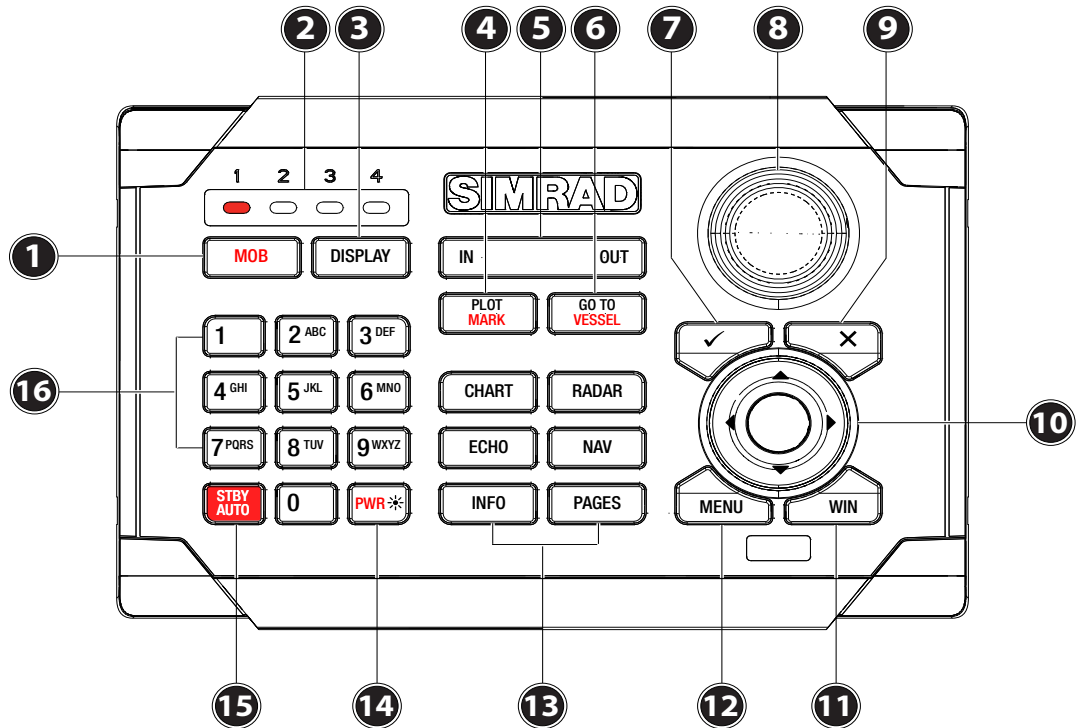| Key	Description
1	MOB (Man Overboard). A long press will position a Man Over Board (MOB) waypoint at the vessel's current position
2	Unit under command LEDs. Indicates which unit the OP40 is controlling.
3	DISPLAY: Changes which NSE unit the OP40 is controlling
4	PLOT/MARK key. A short press activates the Plot menu, a long press positions a waypoint at the vessel position
5	Zoom IN zoom OUT buttons for radar, echosounder and chart pages
6	GOTO/VESSEL key. A short press activates the Goto menu, a long press centers the chart to vessel position
7	✓ key — Activates/confirms current selection
8	Rotary knob. The function of the knob is depending on active context
9	X key cancels changes and returns to previous menu level
10	Cursor keypad used to move the cursor on the display, and to maneuver in the menu system
11	WIN key, used on multiple panels pages. A short press toggles between the panels, a long press expands active panel to a full page panel and back again
12	MENU key. Used to display the context menu for the active panel/overlay, and for selecting options in edit mode. 2 x MENU for accessing system settings menu
13	Direct Access Keys (DAK). Provide direct access to a page. Repeated presses of each DAK cycles through several different pages that relate to the DAK
14	The PWR / Brightness button can bring up options to adjust brightness and change day / night mode. It can turn off the NSE but cannot turn it on. To turn on a NSE you must use the power button on each specific NSE unit you wish to use.
15	STBY AUTO: Autopilot Auto steer / Stand-By
16	Alpha numeric keypad used for entering numbers and text in dialog boxes

The OP40 controller comes with a 4m SimNet to Micro-C adaptor cable, and can be plugged directly in to a SimNet network.

Installing the display

Mounting location

Choose the mounting locations carefully before you drill or cut. The display should be mounted so that the operator can easily use the controls and clearly see the display screen. Be sure to leave a direct path for all of the cables. The display screen is high-contrast and anti-reflective, and is viewable in direct sunlight, but for best results install the display out of direct sunlight. The chosen location should have minimal glare from windows or bright objects.

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.

At least 100 mm (4") away from the compass, at least 300 mm (12") away from any radio transmitter and at least 1.2 m (4 ft) away from any antenna.

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

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.
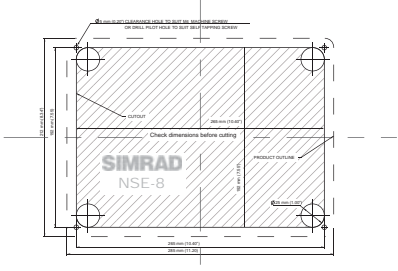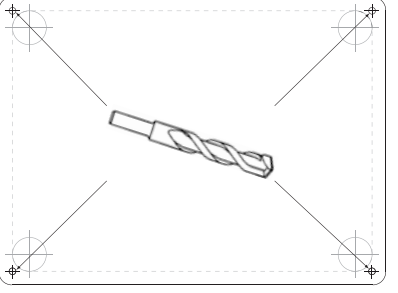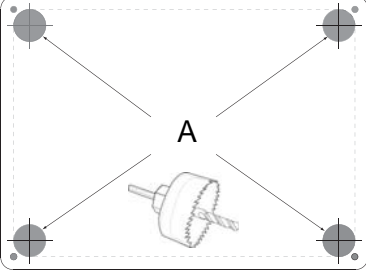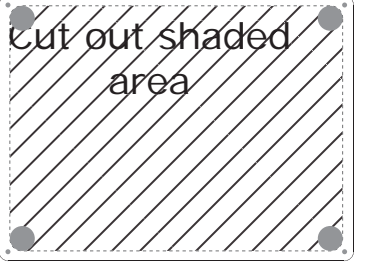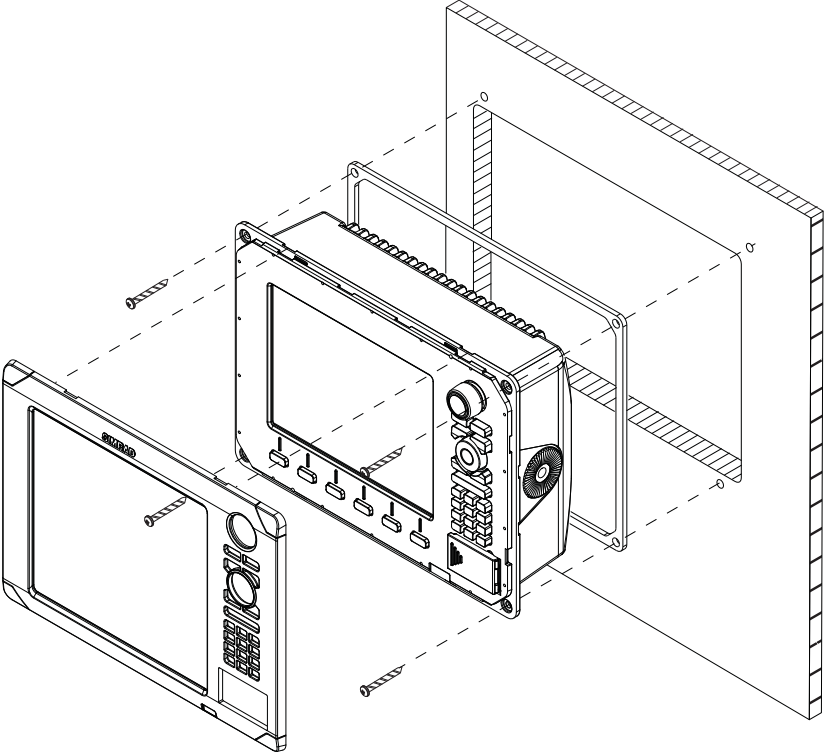
If bracket mounting chose a flat area where the display will not be subjected to excessive vibration.

Leave sufficient clearance space behind the display to connect all relevant cables.

Good ventilation is required behind the mounting panel. Poor ventilation may cause the display to overheat. The display is designed to operate in temperatures from -15° C to +55° C (+5° F to +131° F).
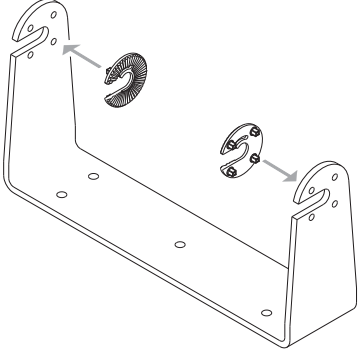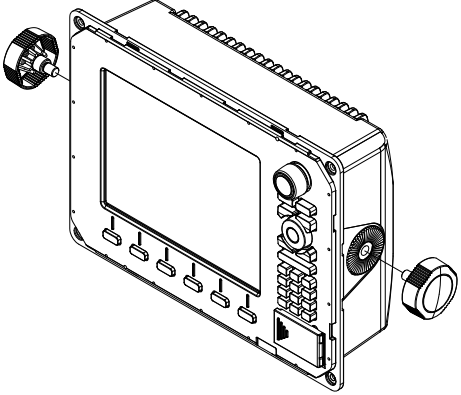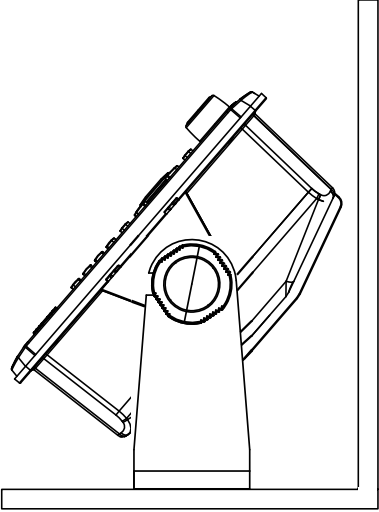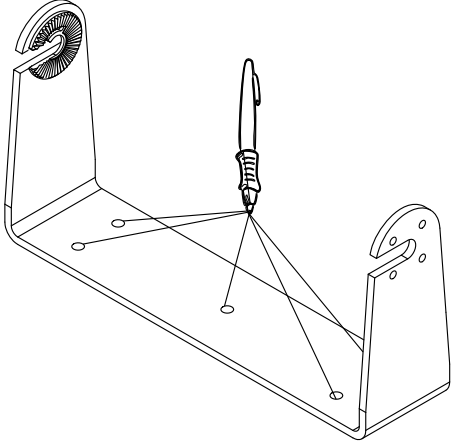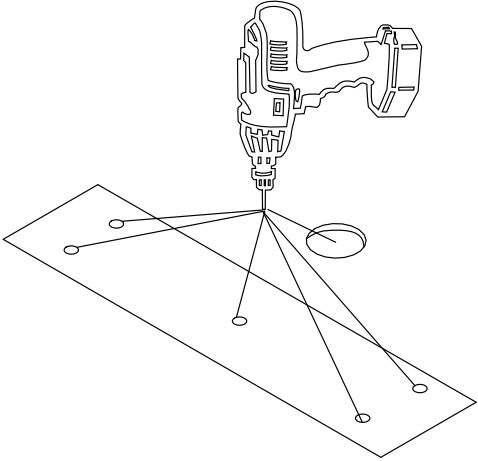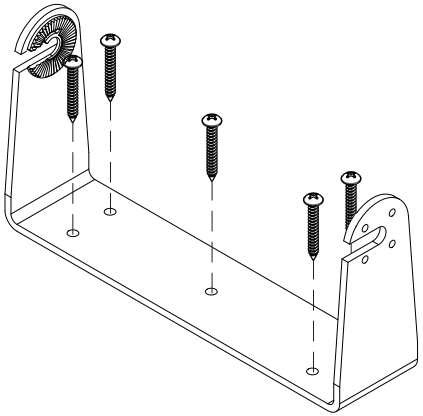
For overall width and height requirements, please see the drawings at the back of this manual.
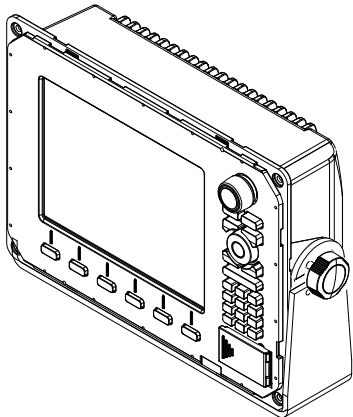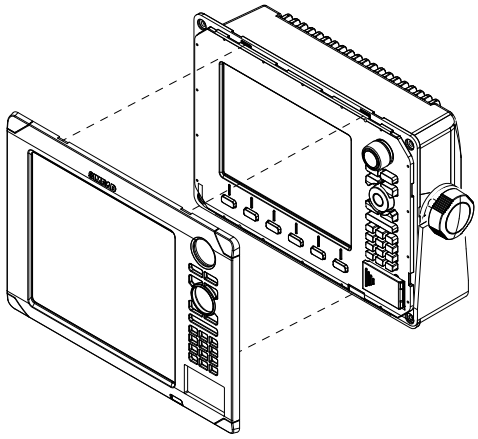
Panel mount

1 Attach the flush mounting template to the selected mounting position using adhesive tape.	**2** Drill pilot holes for the four hole saw cuts and four self tapping screws used to secure the display. If using M4 machine screws use a 5 mm (0.20 ″) drill bit.

3 Use a 25mm (1 ") hole saw to cut the four corner radius	**4** Cut along the dotted line and remove the shaded area.

5 Peel backing off the gasket and apply to the surface.

6 Connect all cables to the rear of the unit before placing the unit into the console.

7 Secure the display to the surface

8 To finish off the installation firmly clip the front bezel in place
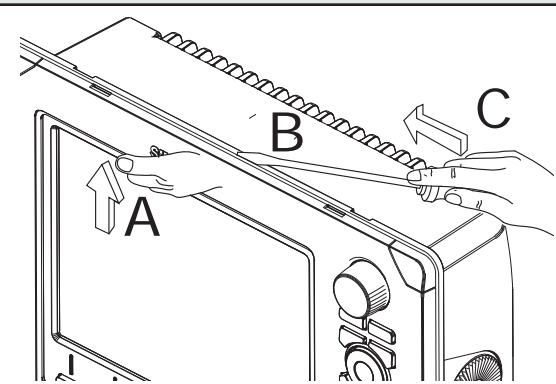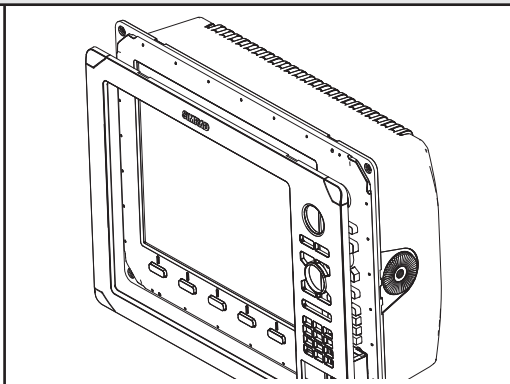
Bracket Mount

An alternative to flush mounting the NSE8 or NSE12 is to bracket mount the unit. This method has the advantage that the display can easily be removed when not in use. The display may be tilted for best possible viewing angle when bracket mounted.

1	Press the ratchet washers into the bracket.	**2**	Loosely screw securing knobs to the Display unit.
3	Temporarily mount the display unit in the bracket and make sure the display can be adjusted to the correct angle without interfering with the surroundings. Allow space for cables attached to the rear of the unit.	**4**	Remove the display unit and use the mounting bracket as a template to mark the five positions of the screw holes.

5	Drill a pilot hole for the five screws and an optional hole large enough for the cables to emerge from.	6	Secure 5 the bracket to the surface
7	Connect the cables.	**9**	Attach the bezel. Firmly clip the front bezel in place.
8	Slide the display into the mounting bracket and secure in place with the bracket knobs.		

NSE Bezel removal	

Protect the dash area adjacent to the top edge (or bottom edge) of the display.

Apply upwards pressure on the bezel (A), this will create an opening between the bezel and the case. Insert a medium size flat blade screw driver into the gap (B) Slide the screw driver along the gap to release the clips along the top. Continue down the side until the bezel releases. The same routine can be applied to the bottom edge if accessible.

System architecture

This section explains how the NSE connects to other devices as part of a system. The NSE has a highly scalable system architecture. A system can consist of a basic stand alone chart plotter, or expand to a networked, multi-display system connected to a wide range of accessories.

The system architecture is modular with a wide range of peripherals and accessories that can be connected to SimNet or NMEA2000 devices such as instrument systems, AIS, GPS and heading sensor to Ethernet devices such as Radar and Echosounder. For multi display installations the system can be set up to be truly masterless, i.e. have no dependency on other displays being powered on.

A NSE display can connect to other devices in the system by Ethernet, SimNet / NMEA2000 or NMEA0183.

A system can have:

- between one and six displays, The displays can be any mix of NSE8, NSE12, and NSO. Also, up to two NSS may be included.

- two radars

- three Navico echosounder modules

Networking, Data Interfacing

The NSE system can use three data networks. SimNet (NMEA2000), Ethernet and NMEA0183.

SimNet / NMEA 2000

- SimNet is Simrad's proprietary CAN bus network for transfer of navigation data such as wind, Position, AIS, etc between all SimNet or NMEA2000 devices on a SimNet/ NMEA2000 network.

- SimNet is lower bandwidth than the Ethernet network, but is 50 times faster than NMEA0183

Ethernet: (NETWORK ports)

- NSE uses an Ethernet network for the transfer of high bandwidth data between other NSE displays and from network modules such as Radar, Echosounder and Weather module

- Each NSE display has three Ethernet network ports. An optional 5 port expansion port is available. (Recommended for multiple NSE displays)

- Ethernet does not transfer navigation data such as position, heading etc. This is handled either by SimNet and or NMEA 0183. However navigation and display settings are synchronized over Ethernet

NMEA0183

- NMEA0183 is a point to point connection. Each NSE display has one NMEA0183 port using RS422 protocol. Each display can output to one NMEA0183 "Listener" and receive from one NMEA0183 "Talker".

Data Bridging

- Supported NMEA0183 sentences entering the system are bridged (converted) to SimNet/NMEA2000 and distributed on the SimNet backbone for all other displays to use

- Certain SimNet /NMEA2000 PGNs (messages/sentences) are bridged across to NMEA0183 to be available as an output from any NSE display

- Ethernet to SimNet. Limited data is bridged from the Ethernet echosounder. Speed, depth and temperature are bridged to SimNet and NMEA0183. Depth, speed and temperature data from the echosounder is the only data bridged from Ethernet

DISPLAY 1

DISPLAY 2

B

GPS

Heading

RX - RX +

NMEA0183 Talker

SimNet Network   SimNet Network

TX - TX +

NMEA0183 Listner

A

C
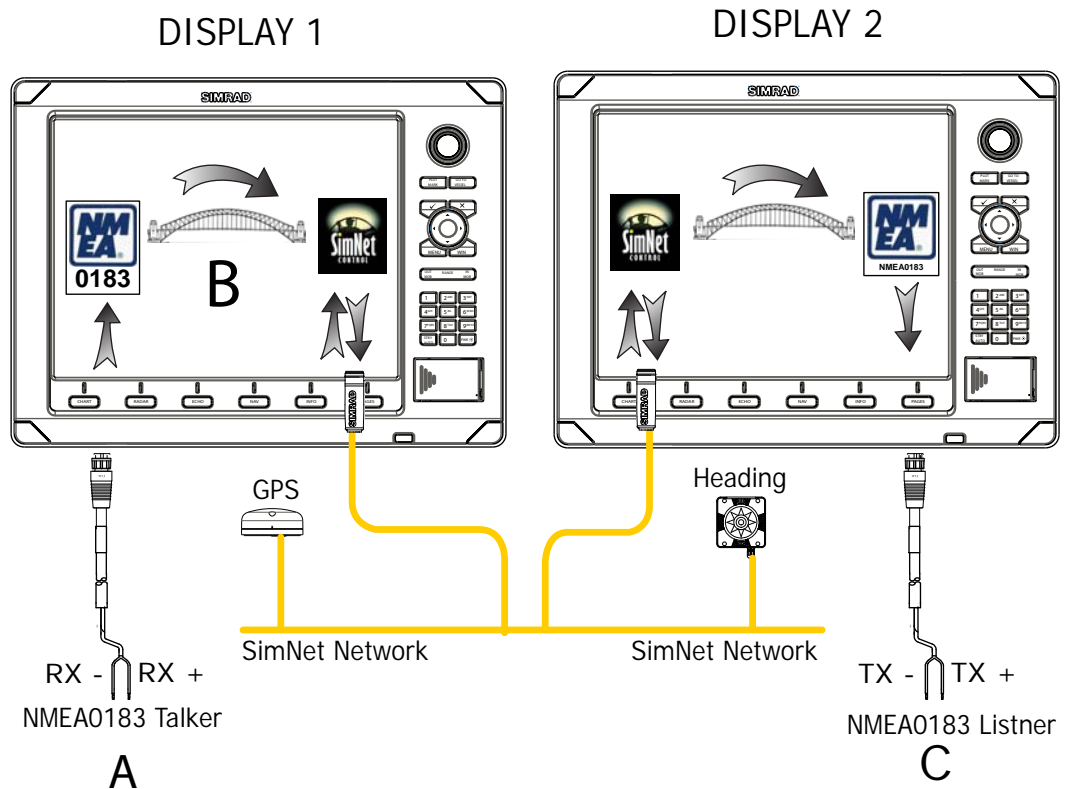
Example of data bridging	
A	In this example a NMEA0183 (talker) is connected to DISPLAY 1
B	The NMEA sentences are bridged across to SimNet and distributed on the SimNet network
C	The NMEA0183 listener connected to DISPLAY 2 can receive the NMEA0183 sentences from the device connected to DISPLAY 1 and also from other devices that are on the SimNet network

An NMEA talker can be connected to each NSE display and both set of data will be converted to SimNet. Each display can be setup for outputting selected NMEA sentences.

Speed, temp and depth data from the echosounder transducer that is to be displayed as an instrument has to bridged from ethernet to SimNet. A NSE display has to be nominated to bridge the data. If this nominated display is turned off, no data will be displayed, until the display is turned on or another display is selected to bridge the data. (see "Source selection (Auto select)" on page 51)

NMEA0183 to SimNet bridging only applies to the supported NMEA0183 sentences. (see "Supported NMEA0183 sentences" on page 81)

Single station configuration possibilities

POWER 12 or 24 V DC
- Black
- Red (FUSE)
- Yellow
- Blue

Power Control

Ext. Alarm

Power cable

NSE Display

SIMRAD

DVI Video Cable

VIDEO OUT

DI15 From NSE12

DI10 From NSE8

Simrad DI10 or DI15 display's
*Note: NSE8 only connects to DI10
NSE12 only connects to DI15*

OR

MO15-L, MO17-L, or MO19-L Monitor
Note: dimming not controlled by NSE

VIDEO /DATA

Composite Video

Video 2 (Green)

Video 1 (Red)

NMEA 0183
Serial port
1 x RS422 port
NMEA 0183

- Green ● RX +
- Orange ● RX -
- Yellow ● TX +
- Blue ● TX -

Video In / Data cable

POWER   VIDEO IN   SIMNET   NETWORK 1   NETWORK 2   NETWORK 3   USB

VIDEO OUT

SimNet cable 2m (6.5 ft)

Ethernet 5 Pin 2m (6.5 ft)

Ethernet 5 Pin 2m (6.5 ft)

Ethernet 5 Pin 2m (6.5 ft)

BROADBAND RADAR

SIMRAD

BR24 / 3G

SIMNET

SimNet starter kit
Power cable w/term
Drop cable 2 m (6 ft)
Termiator plug
7 way joiner

12 v DC

SIMNET NETWORK
SimNet & NMEA 2000 devices

GPS ANTENNA: GS-15
AIS: NAIS300, AI50
Autopilot: AP28, AC12, SG05
Heading Sensor: RC42
Instruments: IS20
(Graphic, Data, Wind)
Digital Switching: CZONE
Audio: SonicHub
Controller: OP40
NMEA 2000 Engines

Ethernet Adapter

Ethernet RJ45 2m (6.5 ft)

PULSE RADAR

SIMRAD

RADAR PROCESSOR

HD Digital Radar: 2,4,6,10 or 25 kW

ECHOSOUNDER

BSM-1

BSM-1
BSM-2
LSS-1

Amp for SIRIUS SATELLITE RADIO
USA Only

Audio cable

Sirius satelite weather and radio

WEATHER
USA Only

AUDIO   NETWORK   ANTENNA   POWER

GALAXY SIRIUS

Dual station configuration possibilities

Supplied with display or accessory

Optional accessory

Cameras

Video 2
Video 1

Video 2
Video 1

DVI Video Cable

VIDEO OUT

DI15 From NSE12

DI10 From NSE8

Simrad DI10 or DI15 display's
Note: NSE8 only connects to DI10
NSE12 only connects to DI15

OR

MO15-L, MO17-L or MO19-L Monitor
Note: dimming not controlled by NSE

Video In / Data

Video In / Data

NMEA 0183
RX +   Green
RX -   Orange

TX +   Yellow
TX -   Blue

NMEA 0183
RX +
RX -

TX +
TX -

NSE8 or NSE12

NSE8 or NSE12

SIMRAD

SIMRAD

Ethernet

Ethernet

Ethernet 5 Pin 2m (6.5 ft)

SimNet cable 2m (6.5 ft)
SimNet cable 2m (6.5 ft)

SIMNET

GPS ANTENNA: GS-15

AIS: NAIS300, AI50

Autopilot: AP28, AC12, SG05

Heading Sensor: RC42

Instruments: IS20
(Graphic, Data, Wind)

Digital Switching: CZONE

Audio: SonicHub

Controller: OP40

NMEA 2000 Engines

SimNet Starter kit
Power cable w/term
Drop cable 2 m (6 ft)
Termiator plug
7 way joiner

T

T

SIMNET

NEP

WEATHER

Sirius Satellite (USA Only)

Ethernet Adapter 5 pin to RJ45

Ethernet 5 Pin 2m (6.5 ft)

ECHOSOUNDER

BSM-1
BSM-2
LSS-1

BROADBAND RADAR

SIMRAD

Ethernet 5 Pin 2m (6.5 ft)

BR24 / 3G

PULSE RADAR

SIMRAD

Ethernet RJ45 2m (6.5 ft)

RADAR PROCESSOR

HD Digital Radar:
2, 4, 6, 10 or 25 kW

Suggested system

POWER BOATS 26–40 ft

Broadband Radar

GS15

SimNet inline joiner
(w/terminator)

IS20 Graphic

NSE
(optional 2nd display)

NSE

RS25

RX +
RX -
TX +
TX -
NMEA0183 Out

7 way joiner

AP24

R110

NMEA2000 Engines

SimNet to
Micro-C cable

BSM-1

Tansducer

RF25

AC 12

RC42

VHF

NAIS-300

GPS Ant

7 way joiner

SimNet backbone
SimNet drop cable
T SimNet terminator
Ethernet
P SimNet power 12 V DC
(with terminator)

Suggested system

POWER BOATS 36 ft +

Station 1

Station 2

Saloon

GS15

RS82 H/S

NSE

AP24

Third party DVI monitor

DVI Cable

RS82 H/S

IS20 Graphic

OP40 Controller

NSE

NEP-1

7 way joiner

A150

VHF

GPS Ant

NSE

Video In

AP28

6 kW

AC 42

RC42

RS82 BB

VHF

BSM-1

HD Radar processor

RF25

7 way joiner

AT10-HD

Tansducer

SimNet backbone
SimNet drop cable
SimNet terminator
Ethernet

T

P SimNet power 12 V DC (yellow, no terminator)

Suggested system

Sail boats 30–40 ft

Broadband Radar

SIMRAD

RD68

RX +
RX -
TX +
TX -

NSE

NMEA0183 Out

AP24

GS15

AIS NAIS-300

GPS Ant

VHF

IS20

IS20

IS20

T-joiner

7 way joiner

RI10

RF25

AC 12

RC42

7 way joiner

SimNet to Micro-C cable

DST800

SimNet backbone
SimNet drop cable
Ethernet
T SimNet terminator
P SimNet power 12 V DC
(with terminator)

Suggested system

Sail boats 40 ft +

Cockpit

IS20 Wind IS20 Graphic

AP24

NSE8

GS15

GS15 (Secondary)

RF25

Twin helm option

OP40

DI10 (Optional repeat screen)

DVI Cable

IS20 Wind IS20 Graphic

Nav station

VHF

NAIS300

GPS Ant

AC 42

NEP-1

RC42

IS20 Wind IS20 Graphic

AP24

7 way joiner

VHF

RS82 BB

RS82 H/S

7 way joiner

NSE

Video In

Weather (USA)

SimNet to Micro-C cable

AT10-HD

HD Radar processor

DST800

SimNet backbone
SimNet drop cable
Ethernet
SimNet power 12 V DC
Must be yellow (no terminator)
SimNet terminator

P

T

Wiring the NSE

Wiring guidelines

Most installation problems are caused by shortcuts taken with system cables. When wiring the NSE, follow the guidelines below.

Don't do this	Do this
Don't make sharp bends in the cables	Do make drip and service loops
Don't run cables in a way that allows water to flow down into the connectors	Do tie-wrap all cables to keep them secure
Don't route the data cables in areas adjacent to radar, transmitter, or large current carrying cables	If cables are shortened, lengthened, or re-terminated, do seal and protect all wiring connections
	Do leave room at the back to install and remove cables

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 NSE display

The NSE has a voltage rating of 12 V DC or 24 V DC. (9 V DC - 32 V DC max range). SimNet is 12 V DC only

The red wire should always be connected to (+) DC V using a fuse or thermal breaker (10 Amp)

Power

The NSE8 and NSE12 displays can be powered by either 12 V or 24 V DC. Displays are protected against reverse polarity, under voltage and over voltage.

The supplied power cable has a four core cable used for:-

• power into the system (Red and Black wires)

• controling power state of the display or power state of other displays and devices (Yellow wire)

• connecting to an external alarm (Blue wire)
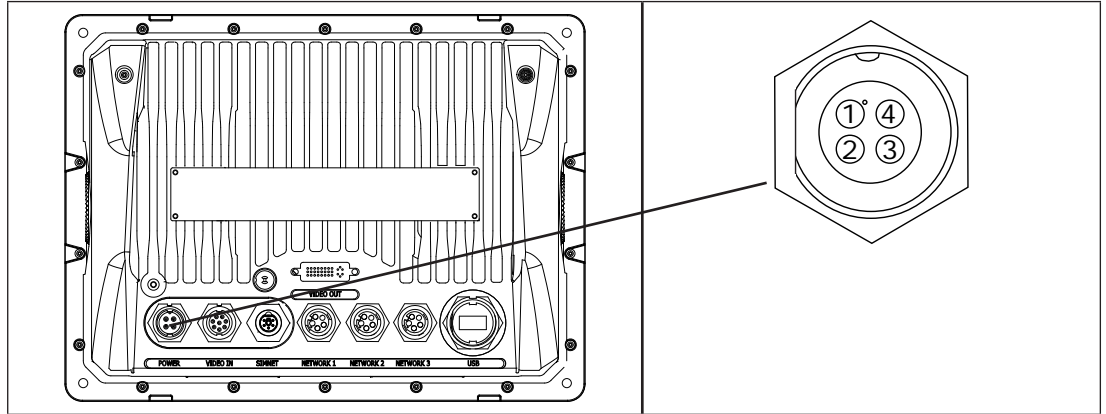
Power Cable (000-00129-001)	Con.	Pin	Wire color	Function
2 m (6.5 ft) 032-0167-02		1	Black	Battery (-)
		2	Blue	External Alarm
		3	Yellow	Power control
		4	Red	Battery (+) 12 - 24 V DC

Connecting power

The red wire should always be connected to (+) DC V using a fuse or thermal breaker (10 Amp)

Power control

The yellow (Power Control) wire can either be an input that will turn on the display when power is applied, or an output that turns on other devices when the display is powered on. It can be configured at the installation stage to control the power state of displays and compatible devices. Planning is required how you want to be able to turn on and off compatible devices. When commissioning the system, displays can be set to be a Power Control Slave or Power Control Master.

Power Control configuration options are:-

• Use the Power button to turn on the display only: Yellow wire not connected

• Display to turn on when power is applied to the display: Common red and yellow wires

• Use the Power button to turn on the display and other displays and or compatible devices such as Broadband Radar: Yellow wire connected to a Power Control Bus. (Set one or more displays to be a Power Control Master)
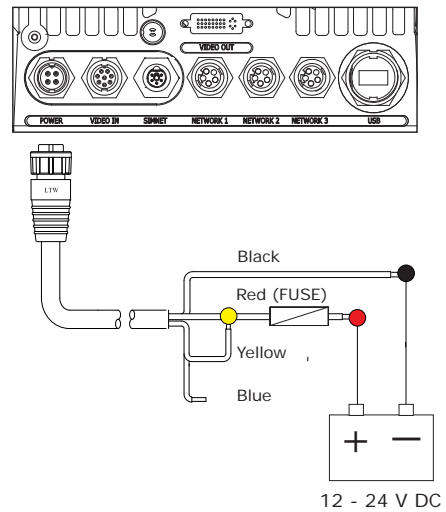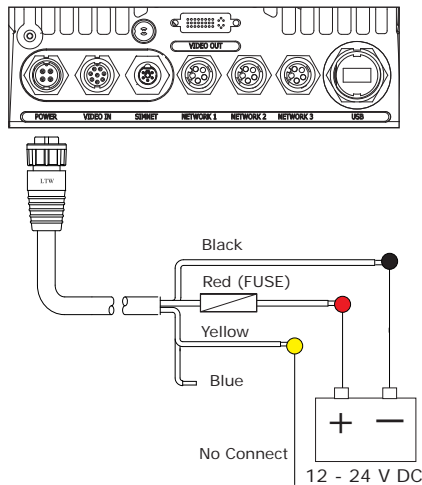
No Power Control

Display will turn on and off when the power button on the front of the unit is pressed. Power Control wire is not attached

Auto Power on

Display will turn on when power is applied to the display. Common the yellow wire with the red wire after the fuse.

Note: The unit can not be powered down but can enter a standby mode.
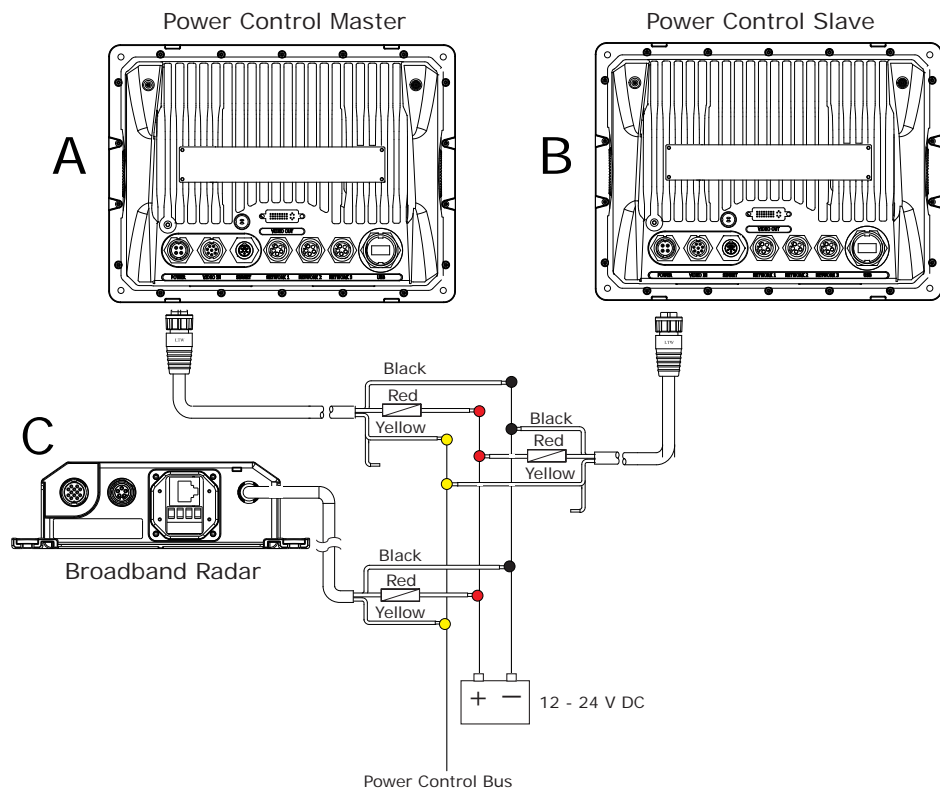
Power Control Master

Display (A) turns on using the power button. It is set as the Power Control Master and will output voltage on the Power Control bus to turn on display (B) and 3G Radar (C). Display (B) is set to Power Control Slave and if turned on by display (A) cannot be powered down using its power button, but can be set to standby. If display (A) is off, display (B) can be turned on using its power button, but won't turn on any other devices. Display (B) could, however also be set to Power Control Master.

Power control table	Slave	Master
Can turn on by own PWR button	YES *	YES
Can turn off by own PWR button	YES *	YES
Can turn on other devices	NO	YES
Can be turned on or off by another device	YES	YES
Can turn off entire system if started by an ignition switch	NO	NO
Can have more than one on a system	YES	YES

If Power control wire is not connected.

If a display has its power state controlled by another display or ignition switch, it can't be totally powered down. It can enter a standby state to save power. If the power button is pressed and Power Off selected, a message will appear "Preparing to standby…"

To configure a display as a Power Control Slave or Master. (see "Power Control" on page 46)

External alarm

An external alarm can be connected to one or more displays on the network. The external alarm can be a small peizo buzzer connected directly or a horn siren connected via a relay.

Alarms are configured globally in the system i.e they can be configured on one display and seen, heard and acknowledged from all displays. How ever the external alarm siren can be enabled or disabled on individual displays. For information on configuring alarms refer to the Alarms section in the Operation manual
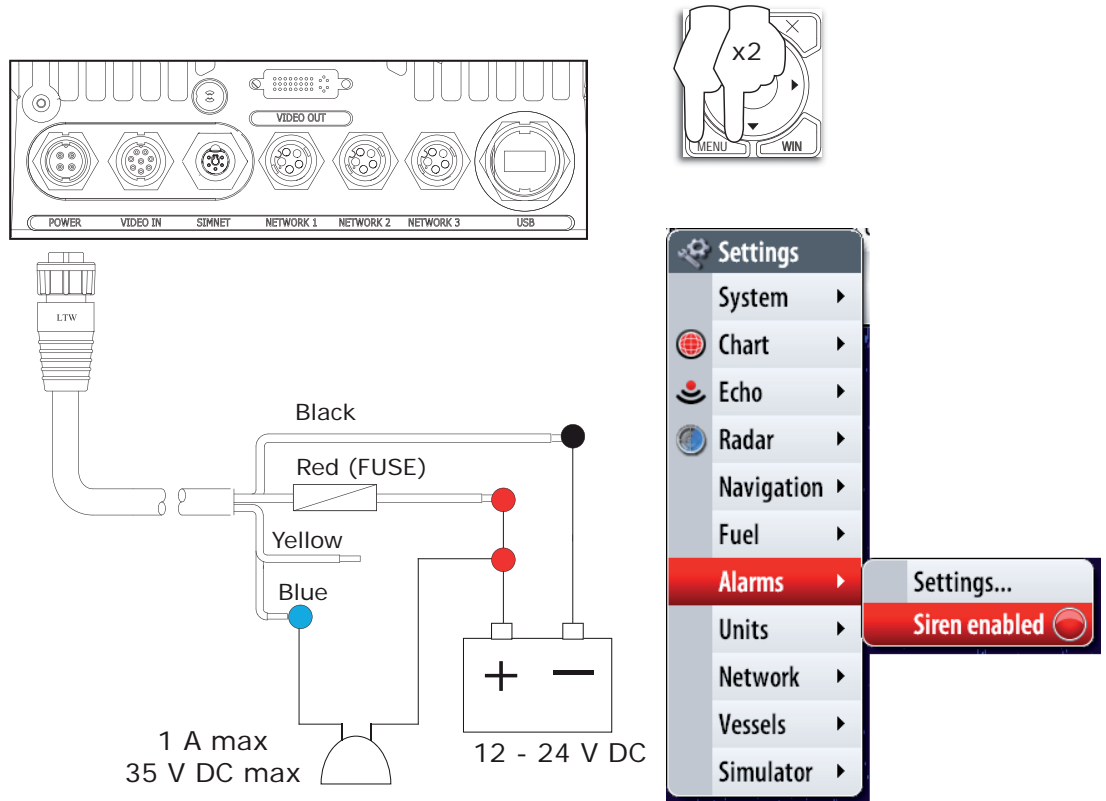
For sirens that draw more than 1 Amp use a relay
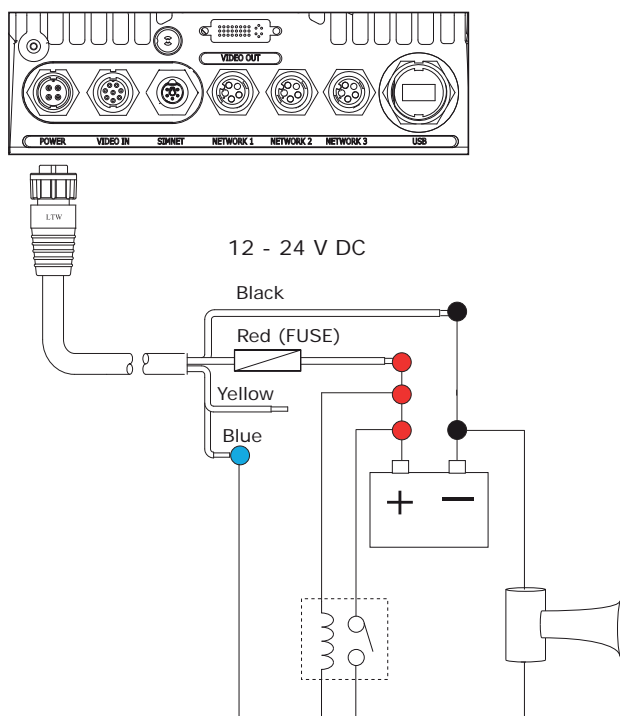
SimNet

SimNet is a data network based on NMEA2000 CAN bus technology that makes interconnection and integration of Simrad and NMEA2000 products simple. SimNet permits the exchange of data between the interfaced products and enables the flow of commands and instructions between the various SimNet and NMEA2000 compatible products. The data transfer capability of SimNet is 50 times higher than the NMEA0183 standard at 4800 baud.

The advanced SimNet Plug & Play (P&P) function provides flexibility and automatic interface setup to Simrad products. Previous models of Simrad products that are not SimNet compatible and non-Simrad products also benefit from this P&P setup function.

Certain NMEA0183 data can be converted to and from the SimNet network by;

* connecting directly to the NMEA0183 port on an NSE Display

* using and optional converter unit such as the AT10

* connecting to a device that has the built-in capability to convert NMEA0183 to SimNet / NME2000

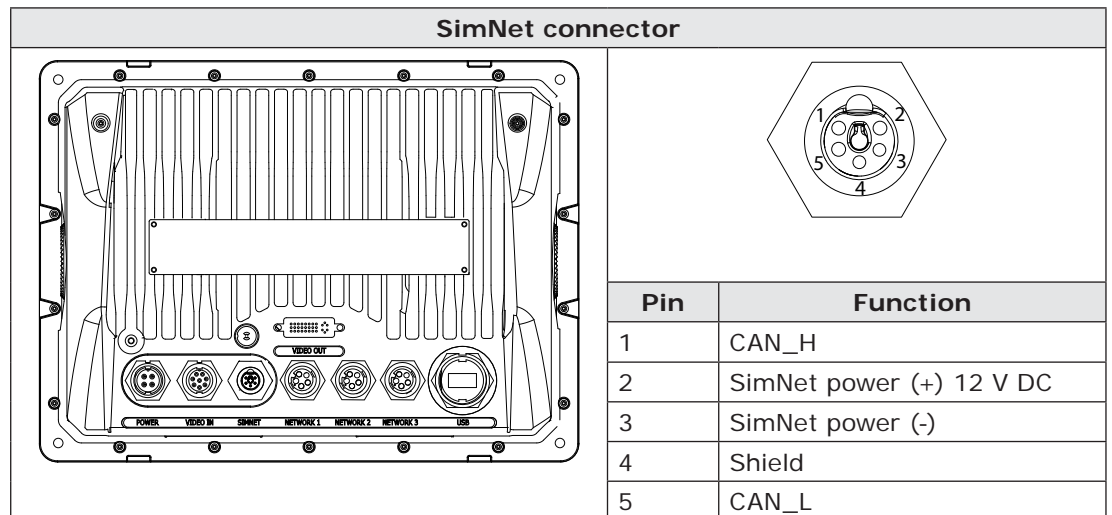Most NMEA2000 devices can be connected directly to a SimNet backbone and SimNet devices can be connected to a NMEA2000 network by using adapter cables. (*see SimNet cables list on page 77)*

SimNet connector		
Pin		**Function**
1		CAN_H
2		SimNet power (+) 12 V DC
3		SimNet power (-)
4		Shield
5		CAN_L

SimNet: The basics

* SimNet is Simrad's proprietary data network based on NMEA2000 CAN bus.

* SimNet is a powered network. It must have a separate 12-15 V DC power supply protected by a 5 Amp fuse. Do not connect the SimNet power cable to the same terminals as the start batteries, Autopilot Computer, Radar, thruster or other high current products.

* A SimNet network consists of a linear "backbone" from which "drop cables" to SimNet devices connect. Devices that have more than one SimNet connector can be part of a SimNet backbone (daisy chained) (But not as part of a NMEA2000 backbone).

* A drop cable is a SimNet cable that connects a SimNet device to the backbone. A drop cable has a maximum length of 6 m (20 ft).

* A SimNet Network has a maximum cable length of 120 m (394 ft), which includes drop cables + 30 m (98.5 ft) mast cable. Total 150 m (500 ft) max.

* A SimNet network, needs to have a terminator at each end of the backbone. A terminator can be one of the following:

  - a power cable with built in terminator (red cap)

  - a terminator plug (red cap)

  - terminated in-line joiner (red locking collars)

  - a wind transducer (terminator is in the mast head unit as opposed to mast cable).

- Certain Simrad products have two SimNet connectors, which can be made to be part of the backbone. This daisy chaining cannot be part of a NMEA2000 backbone
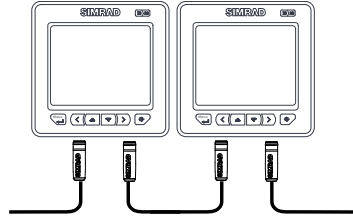
- NMEA2000 devices can be connected to the SimNet Network providing they:
  - are NMEA2000 certified
  - meet the CE, FCC regulations with a SimNet adapter cable
  - do not exceed the SimNet load specification (please refer to separate document Simrad SimNet Installation Manual (20222006)

Planning and installing a SimNet backbone

Plan the SimNet backbone carefully

For part numbers. (see "SimNet accessories" on page 77)

The SimNet backbone needs to run between the locations of all SimNet products you want to install, and be less than a 5.5 m (18 ft) cable run from a SimNet device.

Choose from the following components to make up your SimNet backbone

- SimNet cables: 0.3 m (1 ft), 2 m (6,6 ft), 5 m (16.6 ft), and 10 m (33 ft) cables
- SimNet power cables with or without termination
- SimNet in-line joiner with or without termination
- T-Joiner. Use at locations where you want to connect a single SimNet device or join lengths of SimNet cable
- 7 way joiner. Use to connect up to 5 devices at one location
- Wind transducer. If using a wind sensor, plan to connect this to one end of the backbone as this has a terminator built in

Power the SimNet network

A SimNet network requires its own 12 V DC power supply protected by a 5 amp fuse or breaker. For 24 V use a DC-DC converter

Connect power at one end of the backbone for smaller systems using a SimNet power cable with termination (red cap).

For larger systems introduce power at central point in the backbone to "balance" the voltage drop of the network. Use SimNet cable without termination (yellow cap) (24005910)

If joining to an existing NMEA2000 network or similar CAN bus network that has it's own power supply, do not connect to another power supply.

Do not connect the SimNet power cable to the same terminals as the start batteries, Autopilot Computer, Radar, thruster or other high current products

The drawing below shows a small SimNet network. Power is introduced at one end using a SimNet power cable with termination ending with a second terminator.

┄┄┄┄	SimNet drop cable
────	SimNet power
Ⓣ	SimNet terminator
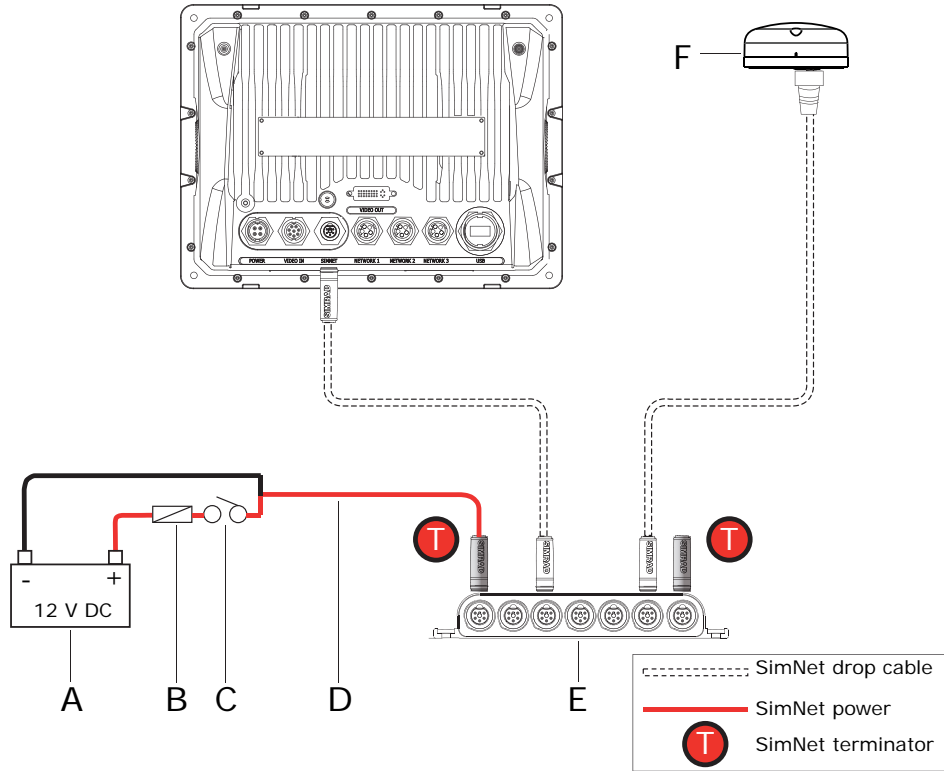
A slightly larger system is shown below. Power is connected at one end using terminated power cable. A second terminator is required at the end of the backbone.
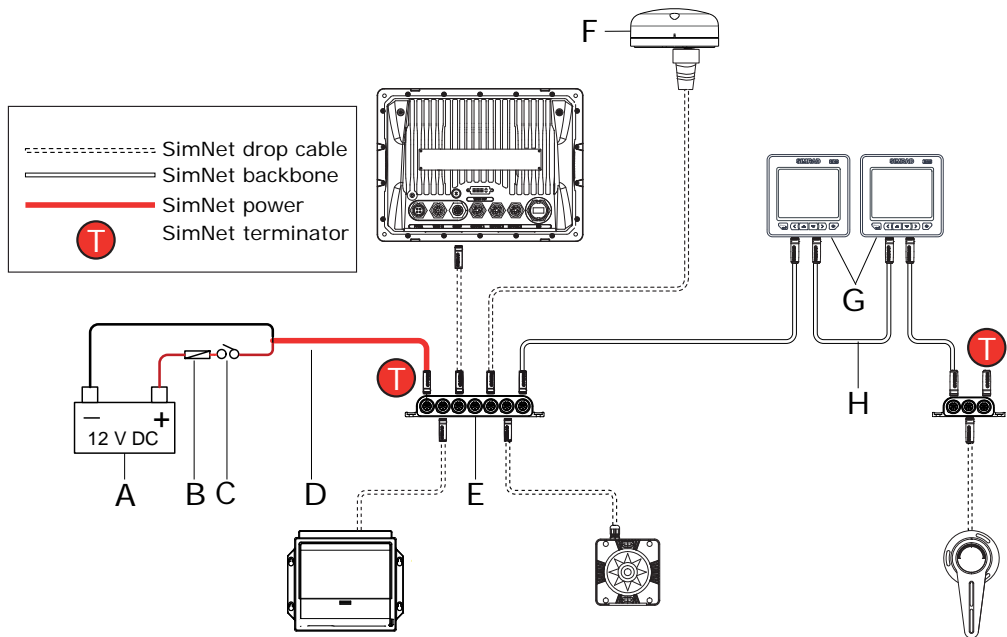
┄┄┄┄	SimNet drop cable
════	SimNet backbone
────	SimNet power
Ⓣ	SimNet terminator

Key	Description
A	SimNet power source. Stable 12 V DC only
B	5 Amp fuse or breaker
C	Switch
D	SimNet power cable with termination (red disc) (24005902)
E	SimNet 7 way joiner
F	SimNet or NMEA 2000 GPS antenna
G	SimNet backbone daisy chained using instruments with two SimNet ports.
H	SimNet backbone

For a large systems or sailboats with a mast head wind sensor and long mast cable, it is recommended to use a SimNet noise filter (24006934). On sail boats the filter should be inserted at the mast junction. On larger systems without a mast head unit, the filter should be inserted centrally along the backbone.
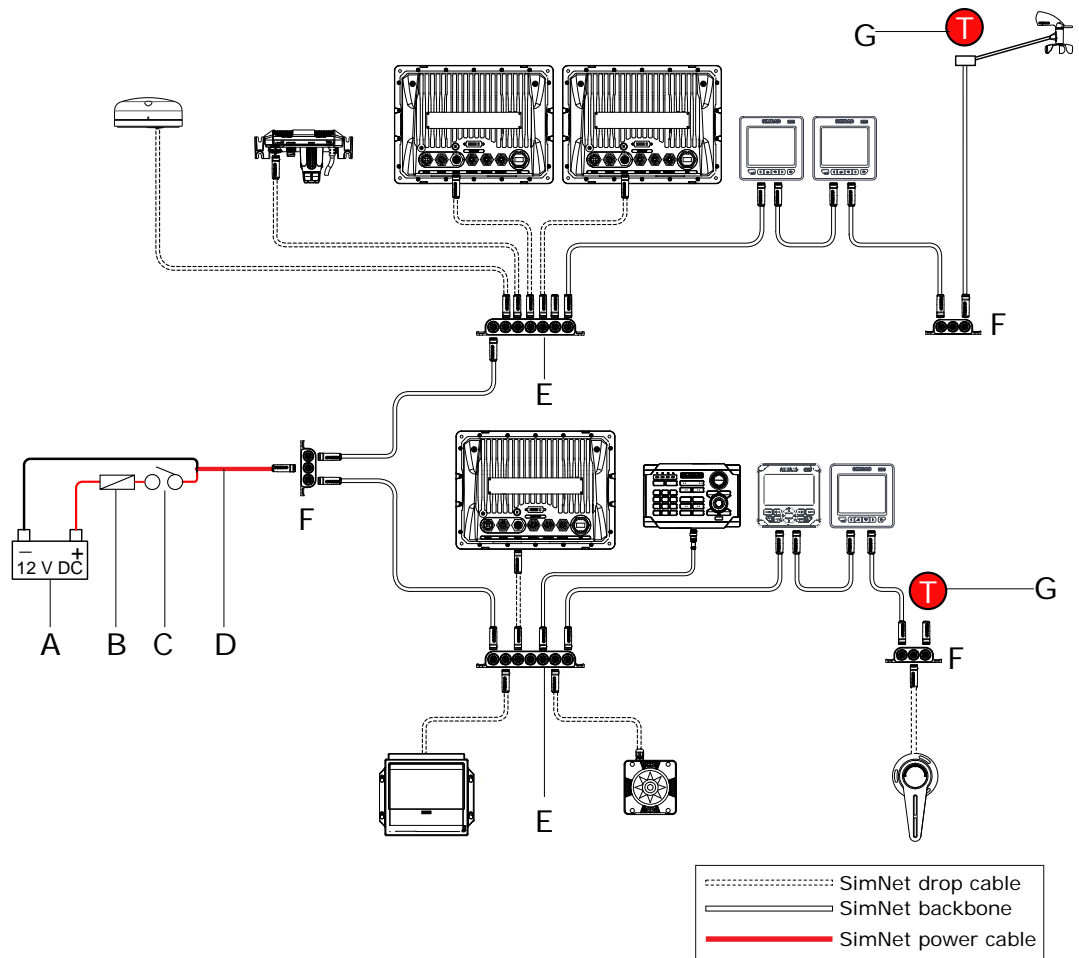
Key	Description
A	SimNet power source. Stable 12 V DC only
B	5 Amp fuse or breaker
C	Switch
D	SimNet power cable without termination (yellow disc) (24005910)
E	SimNet 7 way joiner
F	SimNet 3 way joiner
G	Terminator

CZone Connection to SimNet

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

The CZONE / NMEA2000 Network interface bridge isolates the power of the two networks, but allows data to be freely shared between both sides.

The Network Interface has built in terminators so needs to be placed at the extremity of each network backbone.

The Interface Bridge can also be used for expansion of the SimNet network, when the maximum node limit (node = any device connected to the SimNet network) for the network has been reached or the maximum cable length of 150m 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.

BEP part number 80-911-0057-00

A SimNet to Micro-C cable (24006413) is required to connect to a SimNet network.
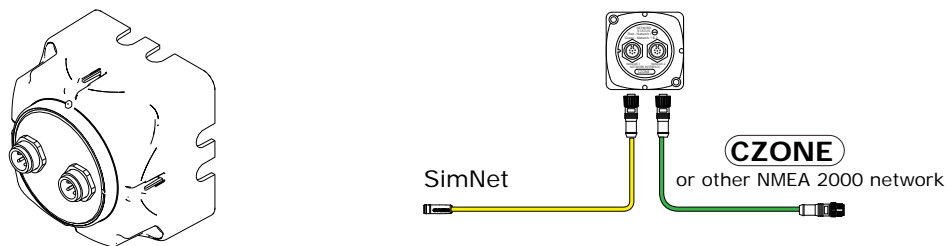
Below is an example of a SimNet network bridged to a CZone network. In this example, power is injected twice but connecting the two networks together via the BEP Network interface bridge provides power isolation and correct termination.
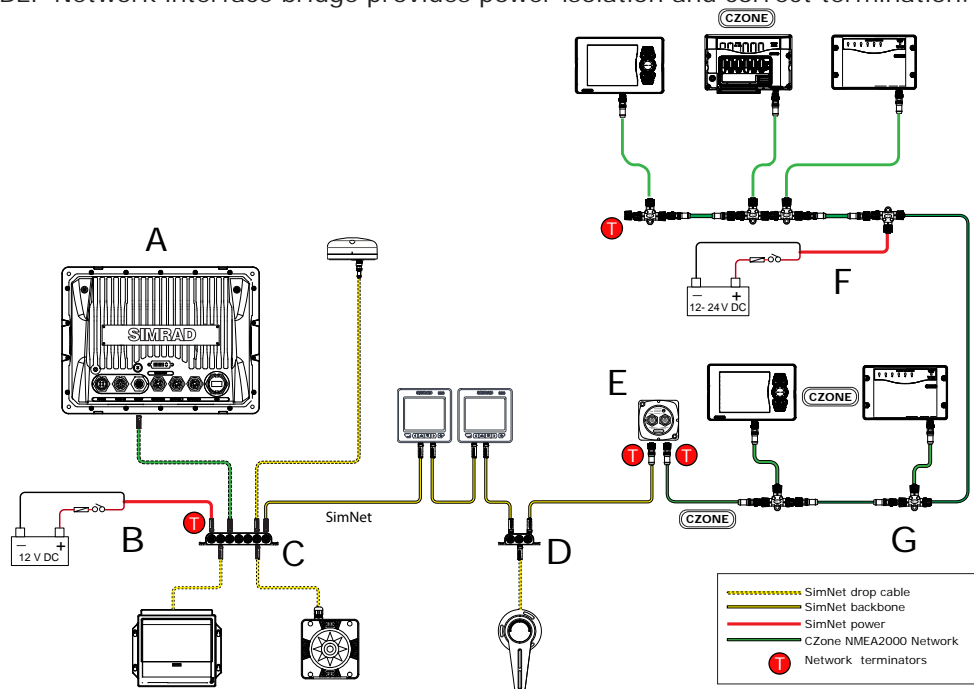
Key	Description
A	NSE
B	SimNet power cable with termination
C	SimNet 7 way joiner
D	SimNet 3 way joiner
E	BEP Network interface bridge
F	Micro-C power cable
G	Micro-C network with Micro-C T joiners

Ethernet

The NSE system uses an Ethernet network to interconnect high bandwidth devices such as other NSE displays, radar and echo sounder. Each NSE display has three network ports with 5 pin connectors. Ethernet network cables have orange connectors that are retained by a bayonet type locking collar.

If more than three network devices need to be connected, use the optional network expansion Port.

For multi-station systems it is recommended to use a network expansion port to join two or more displays. Connecting this way removes the dependency of another display being powered on that may have an Ethernet device connected, such as a radar

Ethernet connector	
Pin	Function
1	TX +
2	TX -
3	RX +
4	RX -
5	GND

Single Station

Broadband Sounder™

Broadband Radar™
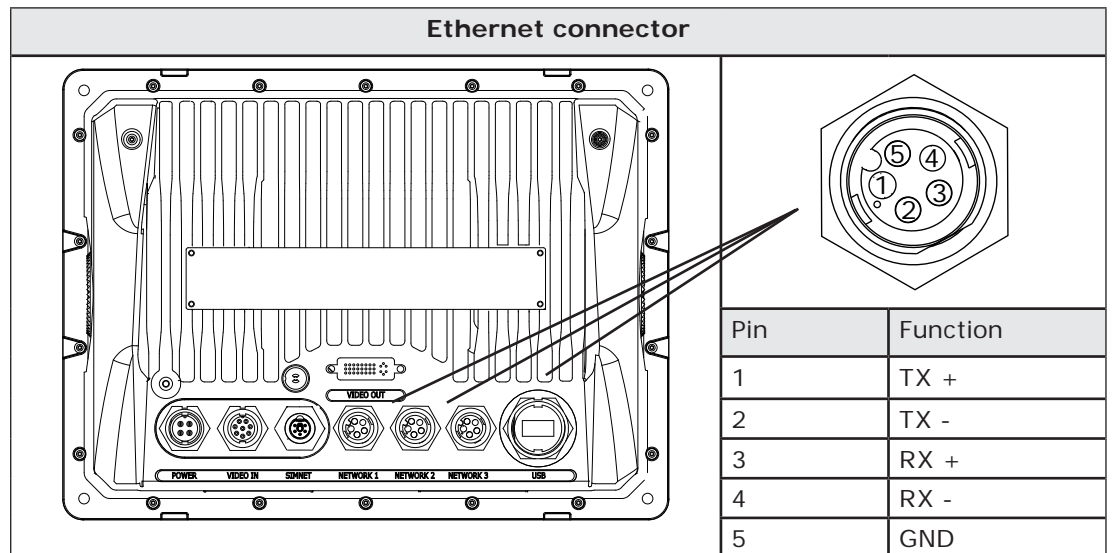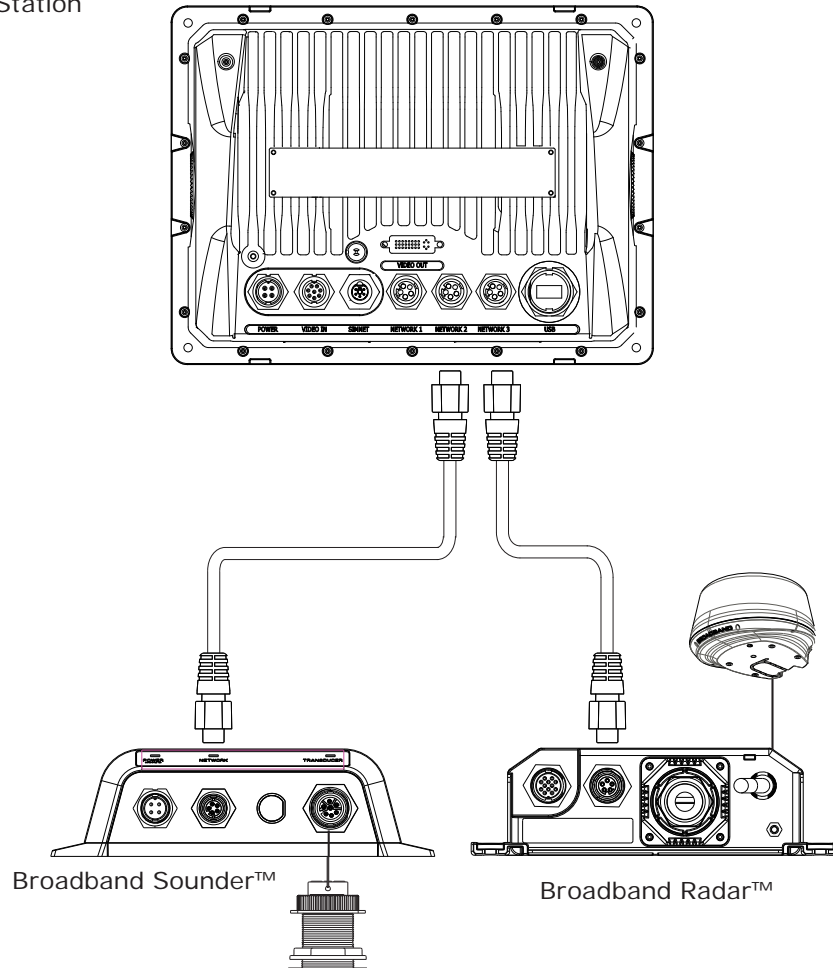
Dual and Multi Station

If there is more than one display it is recommended to use a network expansion port

Network Expansion Port

Broadband Radar™

Broadband Sounder™
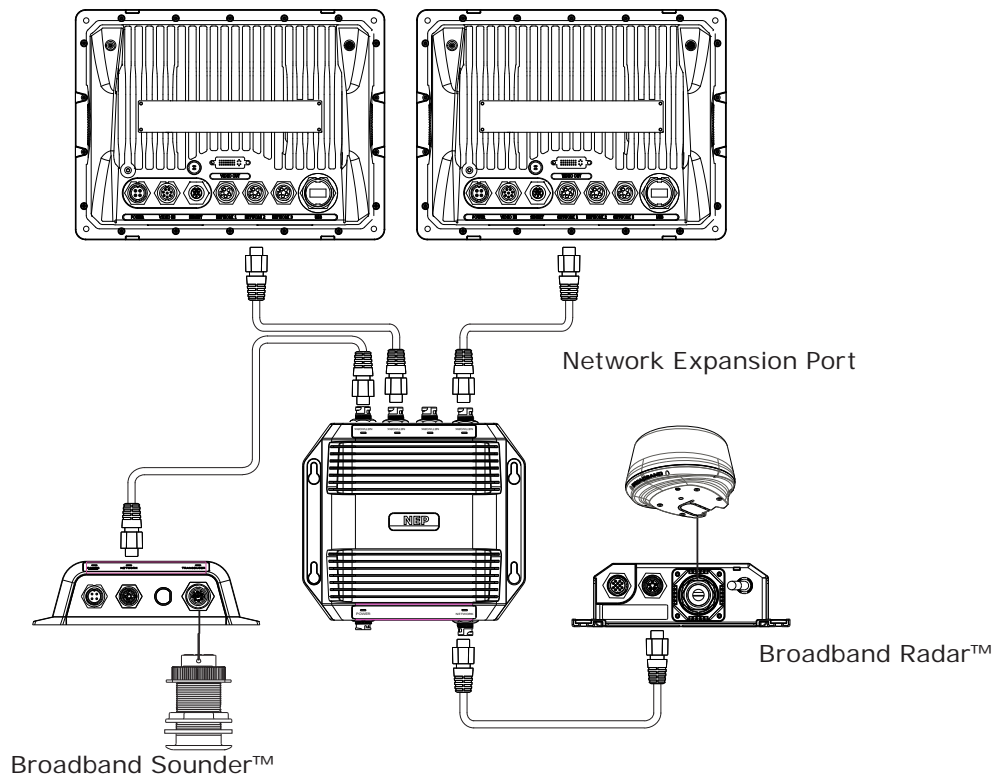
Alternatively you can connect two or more NSE displays without an network expansion port. However, this will mean any display with a device connected by Ethernet will need to be powered on for other NSE displays to use the device.

DISPLAY A   DISPLAY B

Broadband Sounder™   Broadband Radar™
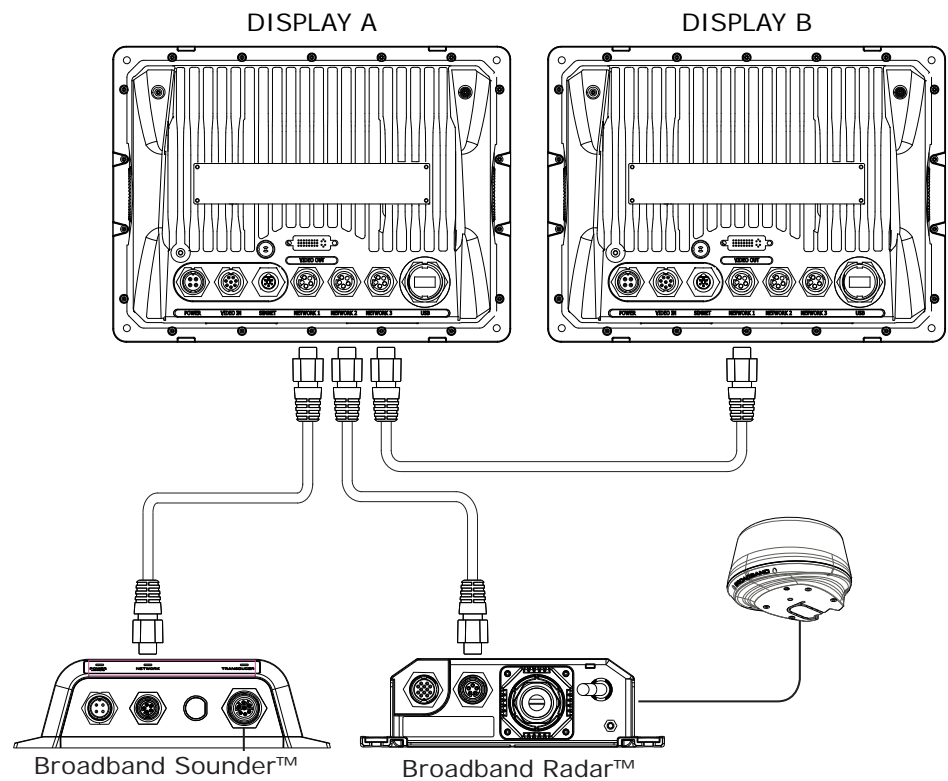
Display (A) must always be on to enable radar and echo sounder data transfer to DISPLAY (B)

Connecting to Navico HD Radar / Older Sirius Weather module (RJ45 Ethernet connectors)
Ethernet Adapter cable 5 Pin yellow female to Navico RJ45 cable. (Straight though 000-10438-001
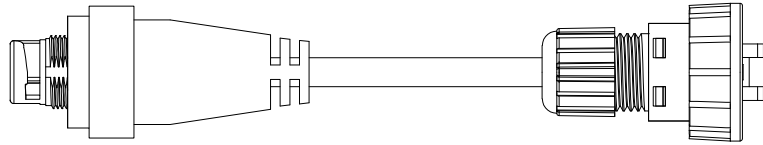
NMEA0183 wiring

To exchange NME0183 data, the NSE8 and NSE12 display units have a NMEA0183 communication port.

The port uses RS422 protocol and can be configured in the software for different baud rates. NMEA sentences can be turned on or off. (see "NMEA 0183 output" on page 67)

(see "Supported NMEA0183 sentences" on page 81) for a complete list of sentences
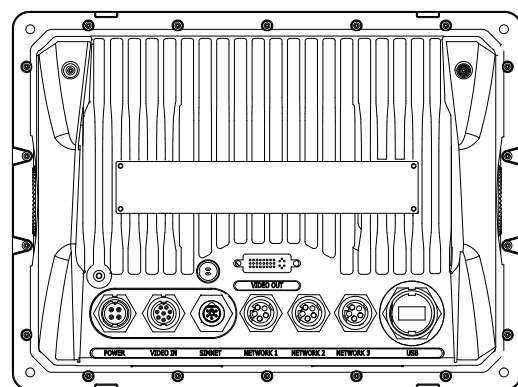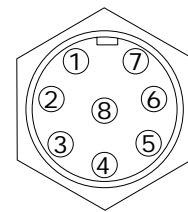
Pin	Function
1	Video 1 Ground
2	Video 1 (+)
3	Video 2 Ground
4	Video 2 (+)
5	RS422 TX -
6	RS422 TX +
7	RS422 RX +
8	Rs422 RX -
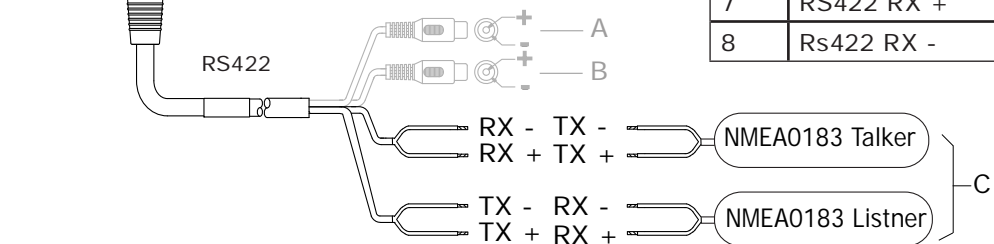
Key	Pin	Color	Cable color description	Cable Connector
A		Red	Video in port 1	
B		Green	Video in port 2	
C	8	Orange	RS422 RX -	
	7	Green	RS422 RX +	
	6	Yellow	RS422 TX +	
	5	Blue	RS422 TX -	

Video In

Connect up to two composite video cameras to each display unit using the supplied Video / Data cable. This connects to the VIDEO IN port on the rear of the display. Video inputs are only displayed locally and are not distributed to other displays. Only one video input can be viewed at a time. Video inputs can be cycled.

Video In Connector	

Pin	Function
1	Video 1 Ground
2	Video 1 (+)
3	Video 2 Ground
4	Video 2 (+)
5	RS422 TX -
6	RS422 TX +
7	RS422 RX -
8	Rs422 RX +

Video In / Data Cable (000-00129-001)

Key	Color	Description
A	Red	Video in port 1
B	Green	Video in port 2
C	Orange	RS422 RX -
	Green	RS422 RX +
	Yellow	RS422 TX +
	Blue	RS422 TX -
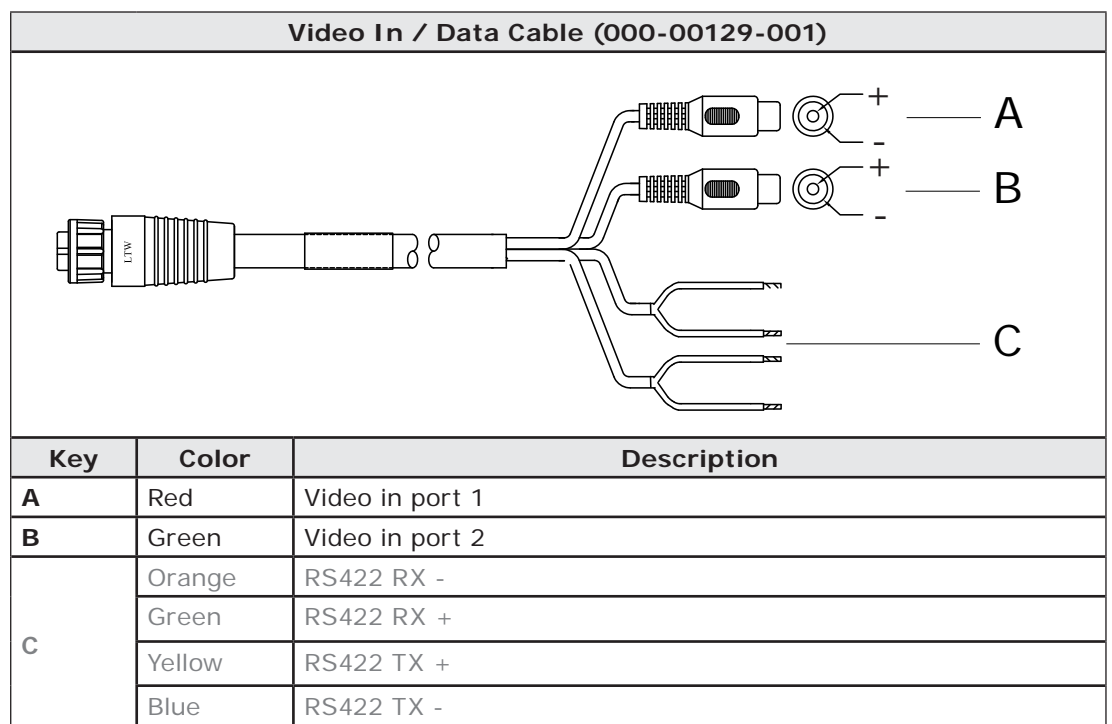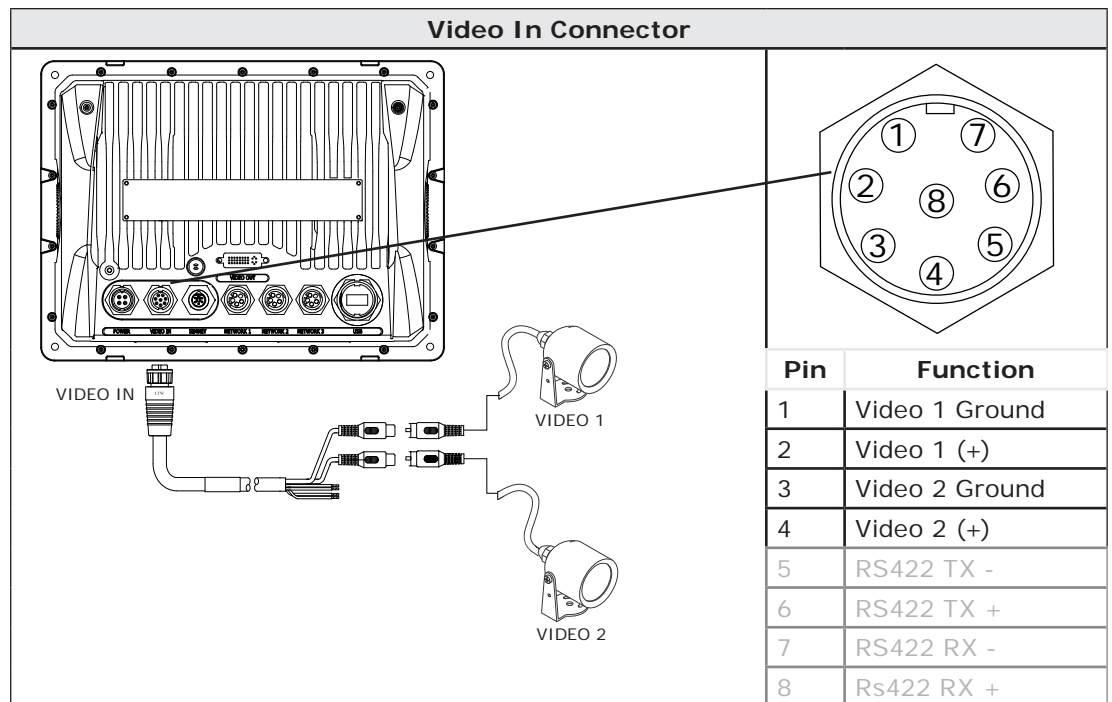
Video Out

The NSE display has a DVI-I Video connector. Connect a second display to replicate what is on the screen of the NSE display.

A DI10 display can only interface to NSE8 and DI15 only to NSE12 due to fixed resolutions.

The MO-L series monitors or another scalable monitor or TV can be connected to either NSE8 and NSE12

See page 78 for monitor and cable options and part numbers.

Connecting Broadband Radar

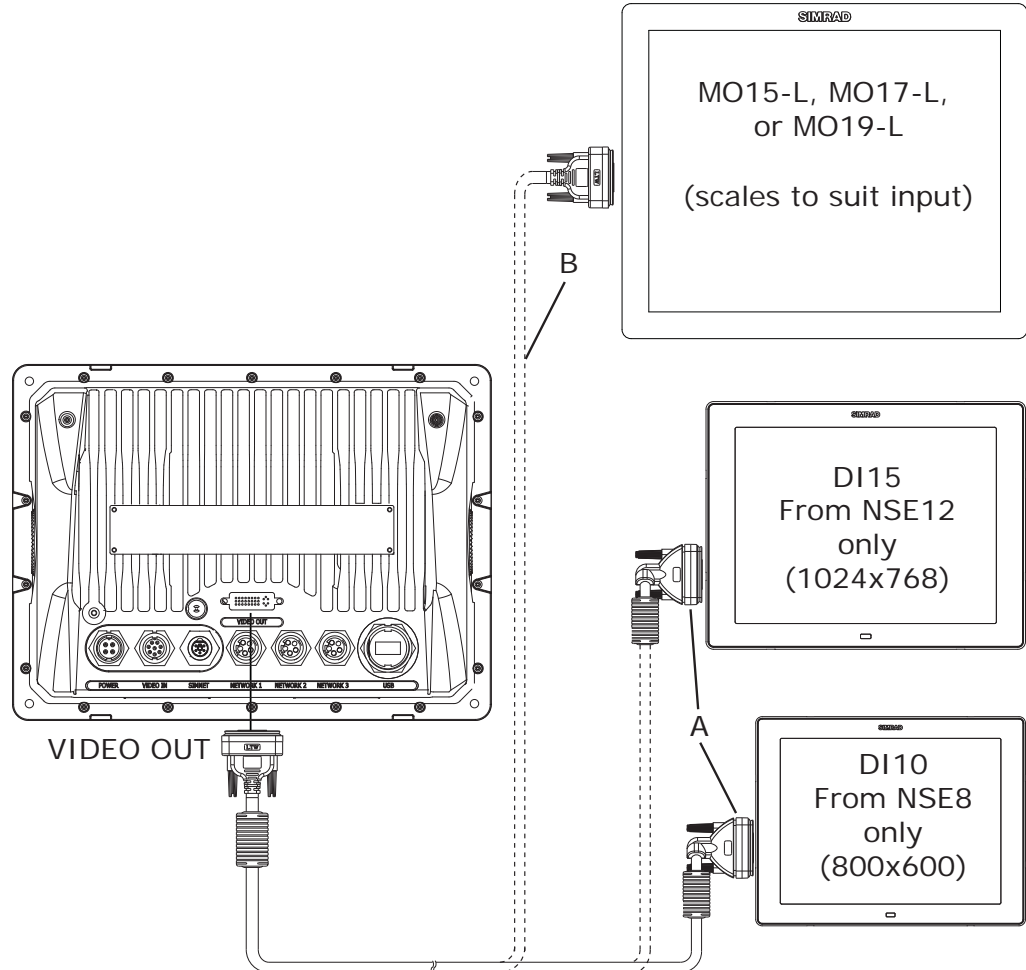| Key	Description
A	NSE Display.
B	BroadBand™ Radar system for NSE. Includes parts C,D and E.
C	Scanner cable. 20 m (65 ft) : Optional 10 m (33 ft) and 30 m (98 ft).
D	RI10 Radar interface box.
E	Ethernet cable. The Broadband Radar comes with a 1.8 m (6 ft) 5 pin cable. The radar can be connected directly to NSE or via a Network Expansion Port (see "Ethernet" on page 33) for more information. (see "Ethernet cables (yellow)" on page 78) for more cable length options.
F	SimNet Drop Cables: The Broadband Radar and NSE are connected to the SimNet backbone The Radar dome uses heading at 10 hz to calculate MARPA. (Not included)
G	Power cable. (see "Power" on page 24). Always use a fuse or breaker.
H	SimNet backbone. (see "SimNet" on page 28)
I	Power control bus: In this case the Broadband Radar is connected to Power Control Bus. It is turned on when the NSE is powered on.
J	For MARPA and chart overlay use a heading sensor.
	Either a SimNet / NMEA2000 heading sensor such as the RC42. Or if a NMEA0183 10 hz heading sensor is installed, convert to SimNet using a AT10HD or connect to the NMEA in port on a NSE. (see "NMEA0183 wiring" on page 35)

Connecting HD Radar

Key	Description
A	NSE display
B	HD Radar Scanner: Options are 2 kW or 4 kW Radome, and 6 kW, 10 kW or 25 kW open array.
C	Scanner cable
D	HD Radar Processor
E	Network Expansion Port (NEP)
F	Ethernet Adapter X over. RJ45 to Yellow 5 pin
G	Ethernet network cable 5 pin yellow Male / Male
H	Ethernet Adapter Straight through. RJ45 to Yellow 5 pin
I	SimNet backbone.
J	Power cable. Make sure a fuse is used. See Radar installation manual for fuse size. *Note voltage requirements are model dependant*
K	AT10HD: SimNet to NMEA0183 converter (Heading only @10 Hz). Provides heading to the radar processor for MARPA calculations
L	RC42 SimNet heading sensor. Required for radar chart overlay and MARPA)
M	Optional 2nd Radar

Dual Radar Support

BR24 and HD radar

Interference will be seen on BR24 at most ranges, when a pulse radar is transmitting at the same time on the same boat. It is Navico's recommendation to only transmit one radar at a time: e.g. BR24 for typical navigational usage, or pulse radar to locate weather cells, defined coastlines at a distance and to trigger Racons.

Key	Description
A	NSE display
B	HD radar Scanner: Options are 2 kW or 4 kW Radome and 6 kW, 10 kW or 25 kW open array.
C	Scanner cables
D	HD Radar Processor
E	Network Expansion Port (NEP)
F	Ethernet network cable 5 pin yellow Male / Male
G	Ethernet Adapter Straight through. RJ45 to Yellow 5 pin (BLACK)
H	SimNet backbone.
I	Power cable. Make sure a fuse is used. See Radar installation manual for fuse size. *Note voltage requirements are model dependant*
J	AT10HD: SimNet to NMEA0183 converter (Heading only @10 Hz). Provides heading to the radar processor for MARPA calculations
K	RC42 SimNet heading sensor (required for chart overlay and MARPA)
L	BR24 Scanner
M	RI10 Radar Interface box for BR24

Connecting BSM-1 Broadband Echosounder
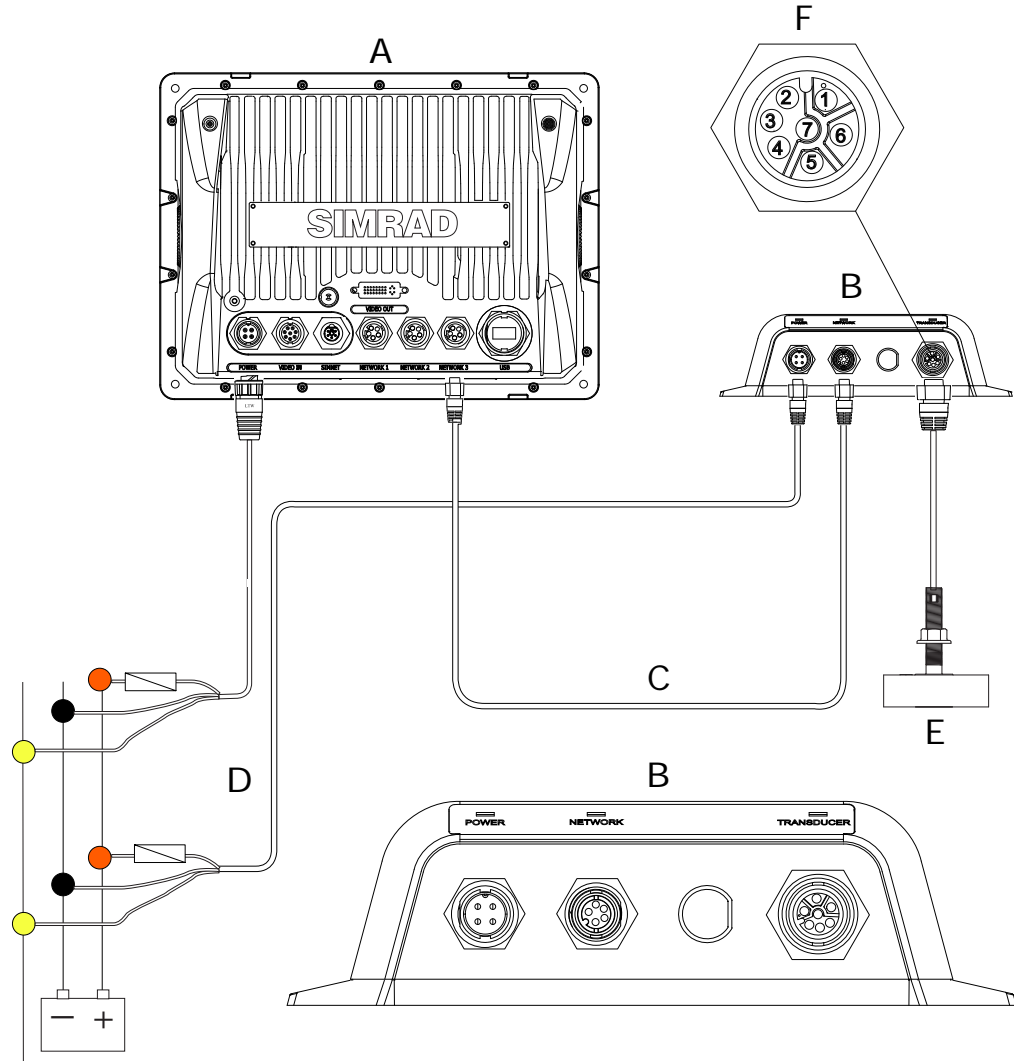
Key	Description
A	NSE display
B	BSM-1 Broadband Echosounder module
C	Ethernet cable yellow 5 pin (see "Ethernet cables (yellow)" on page 78) for more cable length options. Cable can be connected directly to NSE or via a Network Expansion Port (see "Ethernet" on page 33)
D	12 or 24 V DC
E	Transducer:. (see "Compatible BSM-1 Transducers" on page 77)
F	**Transducer Connector**
Pin 1	Depth +
Pin 2	Speed
Pin 3	Speed power
Pin 4	Temp
Pin 5	Depth -
Pin 6	Shield
Pin 7	Temp / speed ground

Connecting BSM-2 Broadband Echosounder
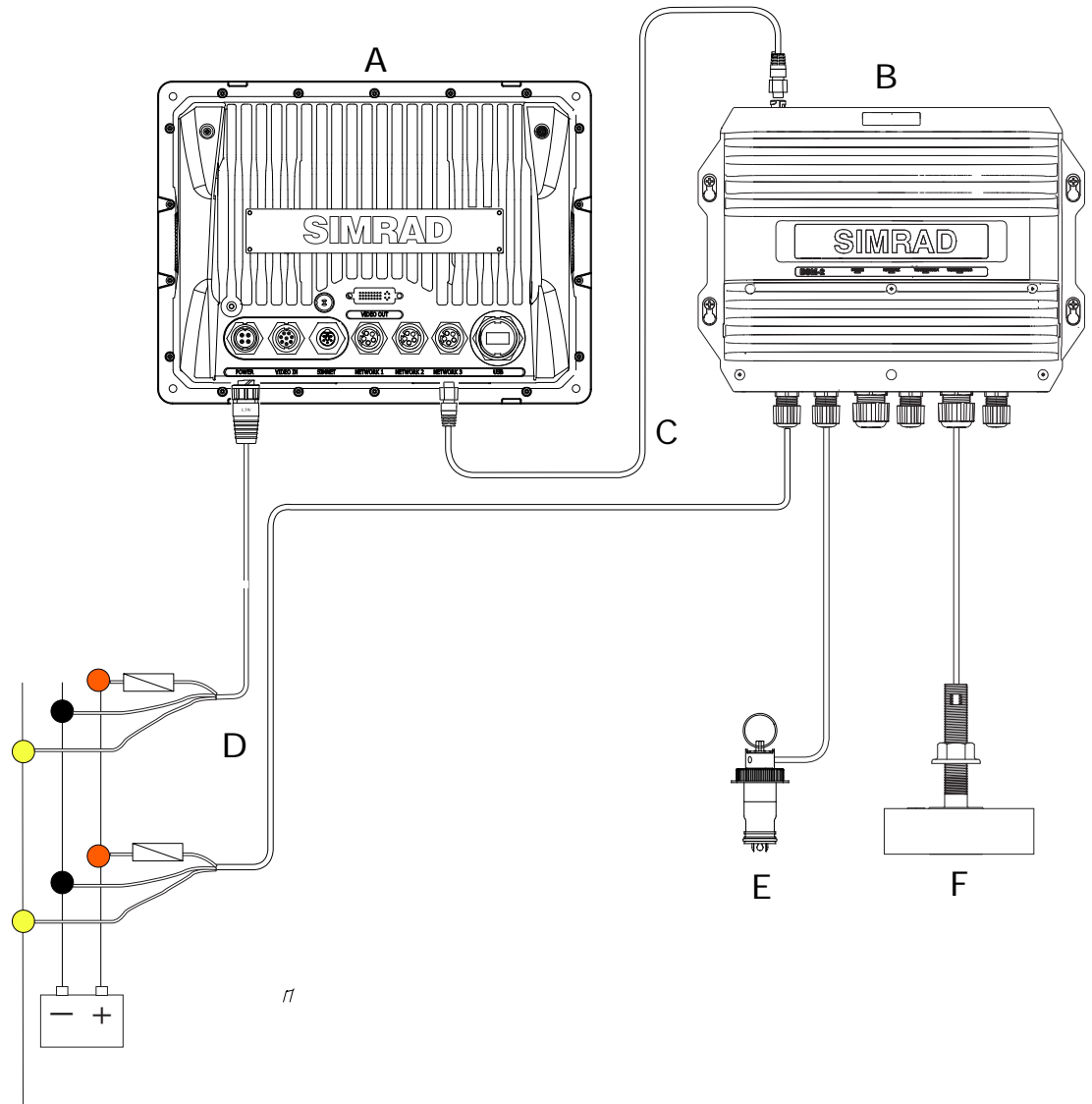
Key	Description
A	NSE display
B	BSM-2 Broadband Echosounder module
C	Ethernet cable yellow 5 pin (see "Ethernet cables (yellow)" on page 78) for more cable length options. Cable can be connected directly to NSE or via a Network Expansion Port. (see "Ethernet" on page 33)
D	12 or 24 V DC
E	Speed paddle wheel transducer
F	Sonar transducer
	Note: transducers are hard-wired in to the BSM-2 module; see **Simrad BSM-2 Broadband Sounder Module** manual for further details

Connecting LSS-1 StructureScan
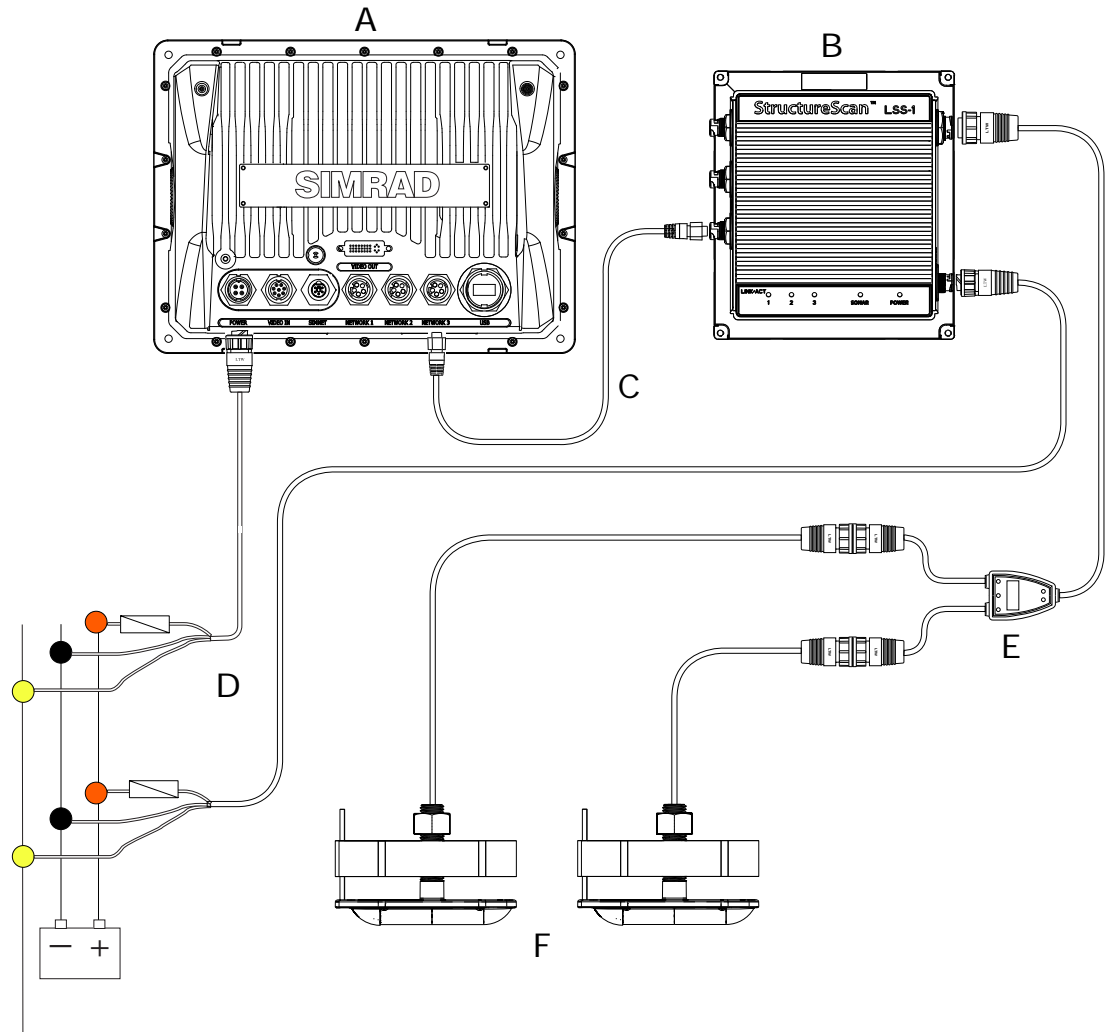
Key	Description
A	NSE display
B	LSS-1 StructureScan module
C	Ethernet cable yellow 5 pin (see "Ethernet cables (yellow)" on page 78) for more cable length options. Cable can be connected directly to NSE or via a Network Expansion Port (see "Ethernet" on page 33)
D	12 or 24 V DC
E	StructureScan Y-cable (optional)
F	LSS-1 Thru-hull transducer See the **LSS-1 Sonar Module** manual for further transducer mounting information.

Commission the system

Turning on the system for the first time

Before starting the system for the first time, check the following;

- Check radar is physically clear to rotate (where 'open array' scanner is fitted)
- Leave a HD pulse radar in standby for 30 minutes before transmitting for the first time
- Check all personnel are clear of radar beam (HD Radar)
- Check all wiring is correctly connected. Apply power to the breaker

To turn ON the display, press and release the **PWR** key.

To place display in to Standby, press PWR key and select stand by.

To turn OFF the display, press and hold **PWR** key for three seconds.

If you turn the unit ON when no external equipment is connected you will be asked to run in simulator mode.
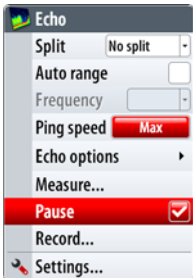
Operating the menu system

In this manual you will see few direct text references to keys, menus and menu entries, and few step-by-step descriptions. By using graphics we will guide you to the key and the required menu selections.

In the illustrations throughout the commissioning section the following symbols are used:

Single short press on illustrated key

Press twice on illustrated key

Press and hold on illustrated key with time indication

Rotate rotary knob

Single short press on rotary knob
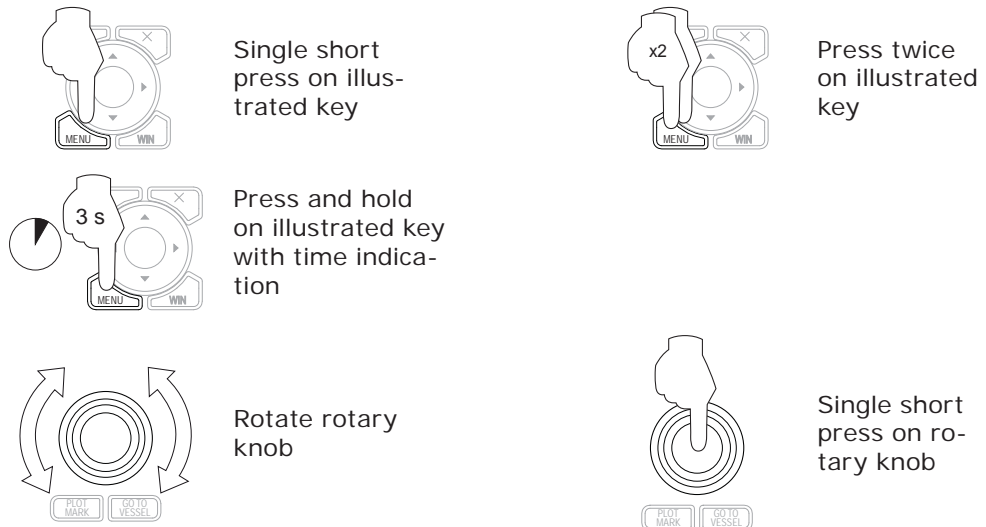
References to keys on the operator panel are written in boldface, e.g. **WIN** key.

For further information on the operating the system refer to the Operation Manual

Commissioning checklist

The NSE has a number of advanced features which can be configured through the settings menu.

It is recommend you become familiar with the operation of the unit using the default settings before making any changes to these menus.

Settings menus will vary depending on the optional sensors and devices attached.

Before changing system settings make sure that all displays are powered on as a lot of settings are global and are shared across the Ethernet network.

It is recommended to note the original settings before making adjustments or changes.

| NSE related check list	Refer Page
System	
Set Language	46
Set Units	
Set time	46
Set Time and Date format	46
Set power control option if used. Repeat on all relevant displays	46
Data sources	
Perform auto source selection	51
Perform any manual source set up	51
Set NMEA0183 baud rate and output sentences. Settings relevant to displays with NMEA0183 devices attached.	67
Set up of SimNet groups for parameters such as dimming and alarms	51
Set up SimNet source selection groups as needed or leave as default. Default is all parameters are set to SIMRAD group	52
Any custom setup of devices such as renaming sources. Source select advanced	52
Calibrate any dock side devices e.g SimNet depth offset	
Confirm Auto pilot interface	58
Echosounder	
Set transducer type	48
Set depth offset	47
Sea temperature calibration	48
Speed calibration	48
Water speed averaging	48
Radar	
Set antenna height: HD and Broadband Radar	51
Set zero bearing: HD and Broadband Radar (note, perform heading sensor calibration first	51
Set zero range (main bang): HD Radar	50
Adjust for local interference: Broadband Radar	49
Park angle: Open array HD Radar	49
Heading sensor calibration	61
AIS	
Enter own ships MMSI number	68
Back up settings	
Create a backup of the display settings and transfer to portable drive or SD card	70

System settings menu

To access the system settings menu press
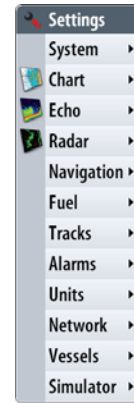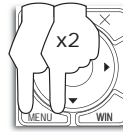
Language

Language used on menus and dialog boxes

Step 1	Step 2	Step 3	Notes
Choose Language	Select Language	Yes to restart	*The display will need to be restarted for change to take effect*

Time: Local Time, Time format, Date Format
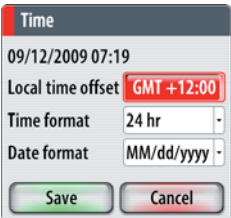
Step 1	Step 2	Step 3	Notes
Choose Local time	To time fomat or save		Local time (Time Offset) against GMT from the GPS. Default is GMT
Highlight Time format	Choose Time format	To date format or Save	12 or 24 hour time values Default is 12 hour
Highlight Date format	Choose Date format	Save Or Cancel	Day/Month/Year Month/Day/Year

Power Control

If the system has been wired to use the yellow power control wire, it is necessary to make each display either a power control Slave or power control Master. Refer to *Power Control* section on page 24.

Step 1	Step 2	Step 3	Notes
Choose Power control mode	Select Power Control mode		
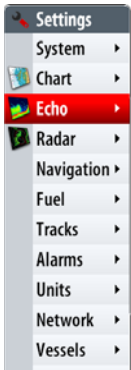
Echosounder setup

The following section applies to the BSM-1, BSM-2, .

Depth offset

Is a value that can be entered to make the depth on the Echo page represent either depth below the transducer or depth below the surface.

A) Depth below Keel value: Is the distance from transducer to the keel:

Enter a negative value. `-2.0`

B) Depth Below Transducer: no offset required.

C) Depth Below Surface (waterline) value: Is the distance from transducer to the surface:

Enter a positive value. `+0.5`

Echo Installation - BSM-1 v1.3.0

Depth offset (m)	+2.0
Water speed calibration (%)	100
Water speed averaging	1 sec
Water Temperature calibration (°C)	+0.0
Water Temperature averaging	1 sec
StructureScan Temperature calibration (°C)	+0.0
StructureScan Temperature averaging	1 sec
Transducer type	HST-DFSBL / HST-50/200-WSU

Water speed calibration

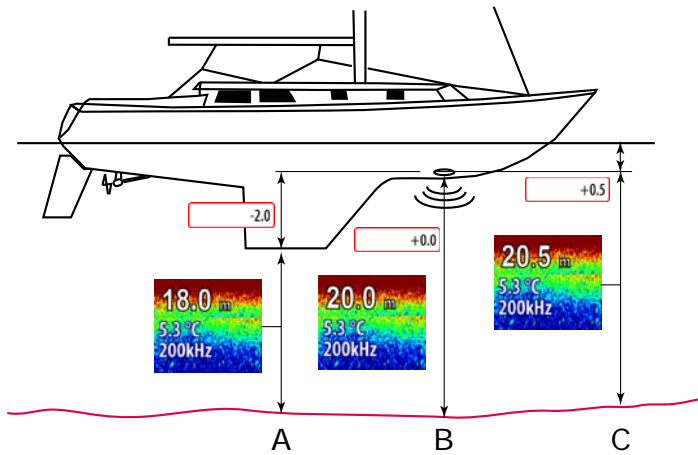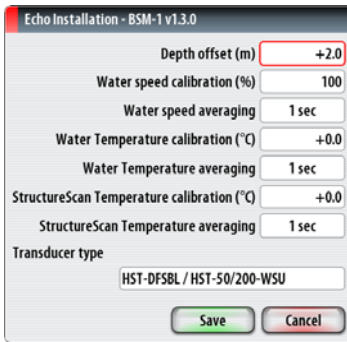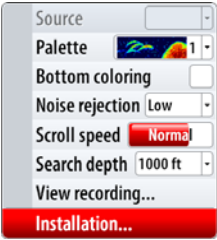Calibration can be performed from the Echo Installation page or the Network menu if a paddle wheel is connected to the BSM-1 or BSM-2. The calibration value is stored in the echo module, so all devices using it as a speed source will display the calibrated value. The example below shows the Network calibration method.

Calibrate Water Speed	**Water speed off set**
This calibration will be applied at all displays in the Simrad Group. Adjust water speed using the Correction (%) slider. Press Auto correct to automatically choose the correction that matches water speed to ground speed. Water Speed (kn) 8.5 Speed Over Ground (kn) 10.0 Correction (%) 117 Auto correct OK Cancel	Water speed calibration is used to adjust the speed value from the paddle wheel to match the actual speed. This can be measured either from the GPS speed over ground (SOG) or by timing the boat over a known distance. Water speed calibration should be performed with as little wind and current movement as possible. Select Auto correct to match water speed to ground speed Manual calculation. If in average the water speed reads 8.5 knots and SOG records 10 knots. Increase the offset to 117%. The calculation is: $\dfrac{\text{Difference in speed}}{\text{Paddle wheel speed}}$ x 100. If water speed is lower than SOG then increase the calibration value. Calibration range is 10-400 % for network speed sources, but 50-200% for BSM-1. Default is 100 %
Echosounder software version	**Echo Installation - BSM-1 v1.3.0** Depth offset (m) +2.0

Software version is displayed in the header of the Installation dialogue. To upgrade echosounder software (see "Upgrading Module Firmware" on page 55)

Water speed averaging

Dampens the water speed by averaging over the selected time interval. The higher the setting, the less the more consistent the displayed value will appear to be.

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

Water temperature calibration

Temperature calibration is used to adjust the water temperature value from the echo sounder transducer to match the data from another temperature sensor.

If the vessel is fitted with an LSS-1 as well as a BSM-1 or BSM-2 with a temperature sensing transducer, then the water temperature calibration option will be shown for both modules.

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

Water temperature averaging

Dampens the water temperature by averaging over the selected time interval. The higher the setting, the less the more consistent the displayed value will appear to be.

If the vessel is fitted with an LSS-1 as well as a BSM-1 or BSM-2 with a temperature sensing transducer, then the water temperature averaging option will be shown for both modules.

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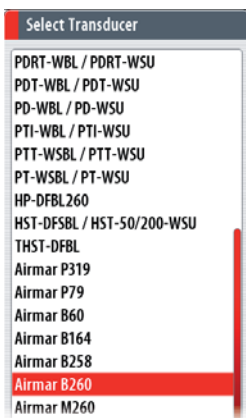
Transducer type

Transducer type is used for selecting the transducer model connected to the echosounder module. In some transducers with built-in temperature sensors, the temperature may not be correct if the correct transducer is not selected from the transducer type menu. The BSM-2 allows selection of two transducers, one for the high frequency band, and one for the low frequency band. These may be two individual transducers, or a single transducer with seperate cabling for each set of elements ie the Airmar R299. Refer to the BSM-2 Installation Guide for further details.

For BSM-1(see "Compatible BSM-1 Transducers" on page 77).

For BSM-2 compatible transducers, refer to the **BSM-2 Broadband Sounder Module** manual.

Other depth sources such as NMEA 2000 smart transducers, will have their own calibration.

Radar setup

Basic set up is required on all new radar installations. The set up varies slightly between Broadband radar and the range of conventional HD pulse radars. The NSE will detect the type of radar and display relevant information.

If two radar exist on the network, both radar will require individual setup. When the first radar setup is completed choose the second radar from SOURCES in the Radar Options menu, then complete second radar setup.

Broadband Radar™		HD Pulse Radar	
	To commission a 3G or BR24 Radar: • set bearing alignment • set antenna height • local interference rejection (if needed)		To commission a pulse radar; • set bearing alignment • set antenna height. • set range offset • Park angle for open array scanners

HD Pulse Radars: Leave in standby for 30 min before transmitting. (First time only) to burn in the magnetron.

Radar software version

Radar type and software version are displayed under radar installation. To upgrade radar software refer to **Software Upgrades** on page 71.
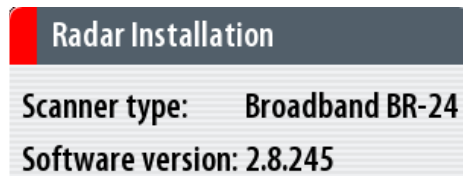
Radar Transmit, Standby or off Press Radar function button to display the radar	Press Menu to bring up radar options		
To make radar adjustments. • select item to adjust	Adjust the setting value as needed	Setting value is displayed on screen	To confirm

Broadband Radar™	
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 off
HD Pulse Radar	
Range Offset	The timing of the transmit and receive circuits can be adjusted to determine zero range. Position the vessel stationary about 150-200 m from a straight jetty or sea wall. Set the radar to 1/8 nm. If the sea wall appears bent or bowed adjust until the wall appears straight
All Radars	
Adjust bearing alignment...	• This will compensate for any physical misalignment of the scanner in relation to the center line of the vessel Set the radar to transmit. Point the boat in the direction of a stationary objet such as a pier or the end of a head land or peninsular. Adjust the bearing alignment so the heading line touches the end of the same head land or peninsular.
Adjust antenna height...	Set the radar scanner height. The Radar uses this value to calculate sea clutter
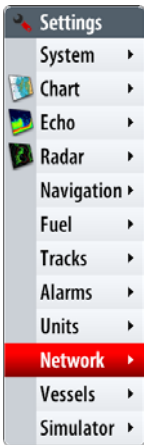
Data setup

Data set up is required on initial start up of the system, or if any part of the SimNet or NMEA 2000 network has been changed or replaced.

From Network in the main system settings menu you can

- Select SimNet / NMEA2000 data sources either automatically or manually

- Configure SimNet / NMEA2000 devices

- Control how device parameters such as backlighting, units and damping are grouped on the network

- Share waypoints via SimNet or NMEA2000

- Monitor and diagnose both Ethernet and SimNet Networks

- Setup NMEA0183 port, baud rate and output data

- Control damping

SimNet / NMEA2000 setup

Source selection (Auto select)

SimNet Plug and Play offers easy and uncomplicated interfacing to data sources with automatic system setup.

The Auto Select option will look for all sources connected to the NSE system. If more than one source is available for each data type, the NSE will automatically select from an internal SimNet priority list.

Make sure all devices are connected and are turned on

Step 1	Step 2	Step 3	Step 4
Choose Auto Select	Start Auto Select	Auto select / OK	Select OK when finished

Source selection (Manual)

Devices can be selected manually to be the preferred source. This is useful if you have more than one of the same type of device on the network e.g. two GPS antennas.

It is also useful if you prefer that one display is to get position from one GPS antenna and another display to get position from another GPS antenna.

Group Source Selection (SIMRAD)

SimNet products such as the NSE, IS20 or AP24 have the ability to;

- use data sources that all other products on the network use, or use a data source independently from other units.

- globally change all displays over to a different source from any display. (This will only include products set to Simrad Group mode.)

When configuring data sources on an NSE display you can select or change a source used by all the displays on the SimNet network, this is called group source selection.

For example you can select to change the position source globally on all displays that are

in a source selection group.

There is only one source selection group available and this is group is called Simrad.

There are ten categories of sources such as Compass, Navigation, Position etc. Under each of these categories a display can be set to receive data from sources as part of the Simrad group or receive the source data independently from the group (None)

The example below shows the available options for position sources, and that the GS15 GPS is used by all displays with group selection set to Simrad. If you selected the GS10 all displays in the Simrad group would use the GS10 GPS.
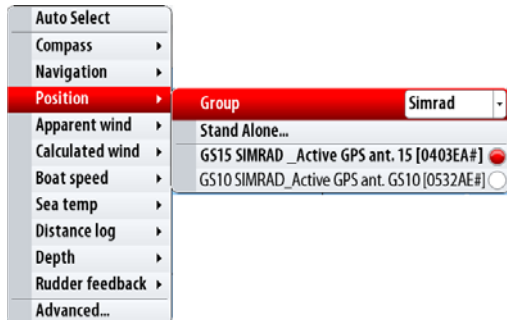
Group Source Selection (NONE)

You may prefer one display to receive its position information from the GS10 antenna independently from the rest of the displays in the source selection group Simrad.

Set the position information to None.

	Select None	Select the GS10 antenna
Under the position category, change group selection from Simrad to None		to confirm and exit
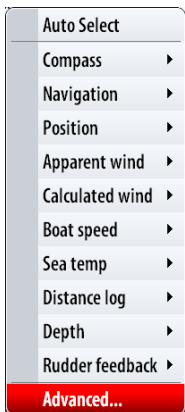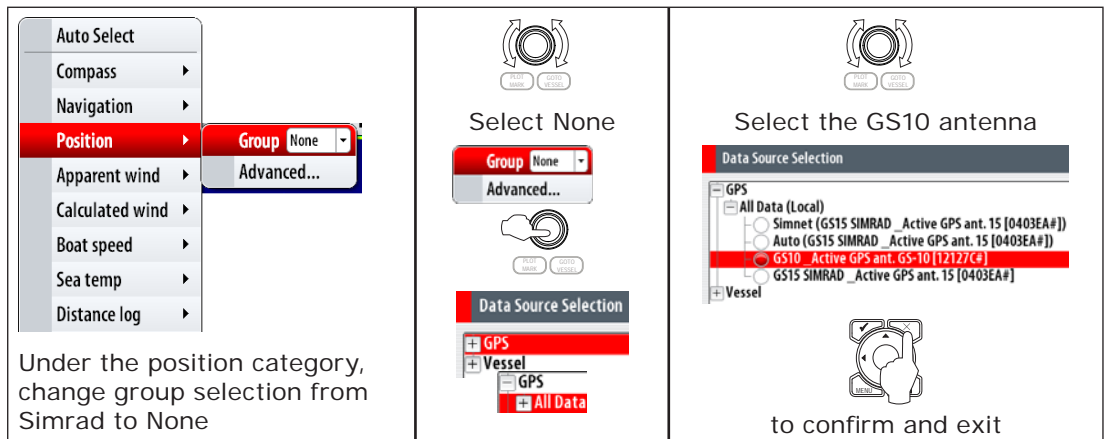
Source selection advanced

Allows the selection of a source not using Simrad group - eg Engine and Tank sources.
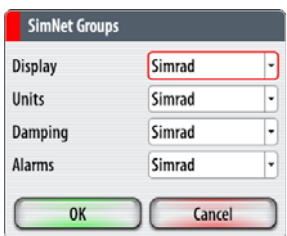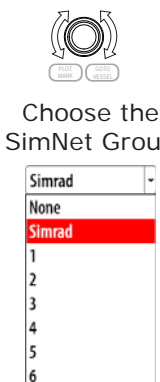
SimNet Groups

The SimNet Group function is used to control parameter settings, either globally or in groups of units. It groups parameter settings such as backlighting, units and alarms. The function is used on larger vessels where several units are connected via the SimNet 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.

The following example shows a two station installation. All four displays in the cockpit have their Display and Alarms in a different SimNet Group from the displays on the bridge. If a back light or alarm is adjusted on a display in the cockpit, it will change on all displays in the cockpit. It wont change the back light or alarms or displays on the bridge.

Step 1	Step 2	Step 3	Notes
Select the SimNet Group to be applied to the category	Choose the SimNet Group	Select OK when finished	There are seven groups or none to choose from. Default is Simrad

Damping

Controls how quickly instruments respond to changes in values from sensors.

Damping can be used for heading, wind, boat speed and depth instruments.

Increasing the damping applies more averaging or smoothing of the data update rate on the instrument or display. Damping settings are applied to SimNet displays and Instruments belonging to particular damping SimNet Groups.

Damping		
Heading		1
Apparent wind		4
Calculated wind		4
Boat speed		4
Depth		1
OK	Cancel	

Device List

Using the Device List Function you can:

- list all of the active SimNet and NMEA2000 devices on the network, showing model description and serial number. Devices can be sorted by model ID or by serial number

- display information relating to a device such as, name, manufacturer, software version, instance, status

- give the device a logical name relevant to the user

- see data coming from the device

Enter a logical name for the device such as a location to differentiate same devices

e.g. GS15 Port

	Serial No.
e GPS ant. GS-10	12127C#
D _Active GPS ant. 15	0403EA#
i instr.	001884#
	This device
or	This device

RAD _Active GPS ant. - Device Information

GS15 SIMRAD _Active GPS ant.

GS15 GPS

re: Simrad

/ersion: 01200_E 0011

246
0403EA#
0
OK

Configure

Data

Close

GS15 SIMRAD _Active GPS ant. - Device configuration

Configuration

Device   GS15 SIMRAD _Active GPS ant. GS15 GPS

☐ Enable WAAS

Advanced Options

Instance   000
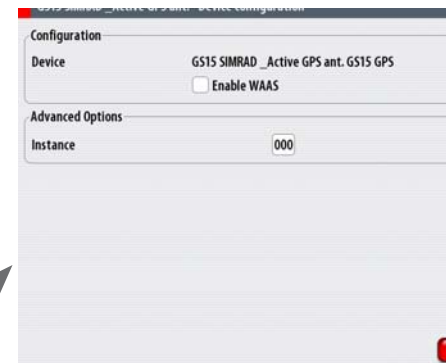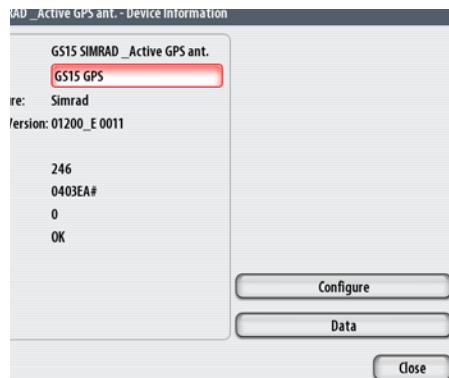
Some devices can be configured further

Data List	
Data Type Name	Value
Altitude	45.5 m
Course Over Ground	342 °M
GPS Best of Four SNR	32.8
GPS Fix Type	3D
Geoidal Separation	26.6 m
HDOP	1.5
PDOP	2.0
Position	S 36°45.216' E 174
Position Error	10.0 m
Position Integrity	None
Position Quality	Fix
Sats In View	10
Speed Over Ground	0.0 kn
UTC Date	07/28/2009

Device data can be viewed

CZone Setup

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

The functionality of the CZone system is determined by the CZone Config File (.zcf), which is stored on all CZone modules, and supported Simrad displays such as the NSE. The file is created using the CZone Configuration Tool, a specialised PC application available from BEP Marine Ltd, and associated CZone distributors.

The NSE system provides a means to load the Config file, as well as apply updates to module firmware, removing the need to take a laptop computer aboard the vessel.
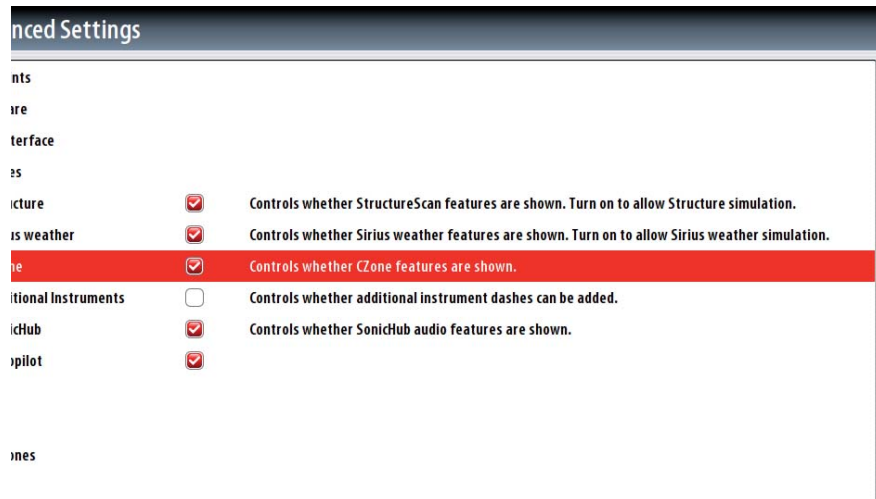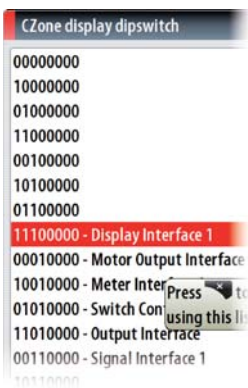
Enabling CZone Functionality

Once CZone is enabled, an addtional CZone menu appears at the bottom of the Advanced Settings page.

Assigning the Dipswitch Setting

Every Simrad 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 config file already exists on the CZone system, but it may also be set in advance.

When the config is already available on the network (on a Czone module, or loaded to another Simrad display), it will immediately commence uploading to the NSE 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 will be shown first, every time the NSE is powered up.

CZone Backlight Control

Enabling this will cause the NSE to synchronize it's backlight setting with that of any CZone Display Interfaces set up to share backlight settings.

Import and Backup a Config File

The files page may be used to import CZone config files, or export a copy to a Micro SD card. Importing will overwright the existing file on the NSE and all connected CZone devices.

Upgrading Module Firmware

The files page also allows the loading of CZone module firmware updates. Pressing menu with the firmware highlighted will bring up the UPGRADE option. Once selected, choose which modules to upgrade, and select start. Firware is module specific, so only modules of the same type will be shown.

OP40 Controller Setup

From the factory the OP40 controller is not assigned to control any NSE unit and will not be responsive until it has been assigned to control an NSE unit on the network.

NSE displays will need to be turned on using their PWR button (if not already switched on by the yellow power control wire). When in OP40 configuration mode, all four OP40 LEDs will be lit red. Once connected and powered up the OP40 configuration wizard can be entered into at any time with a 5 second press of the DISPLAY key.

Assigning an OP40 control of a single display

Press 1, 2, 3 or 4 to assign DISPLAY A to LED position 1, 2, 3 or 4 respectively.

Example user presses 1

DISPLAY A is now assigned to LED position 1 of this OP40
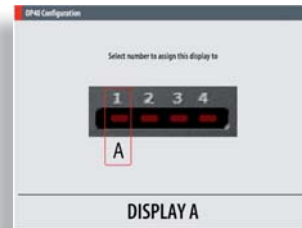
Assigning an OP40 to control multiple displays

Press **DISPLAY** key until the display to be assigned shows the active display page.

Displays connected to other NSE units will show the inactive selection page
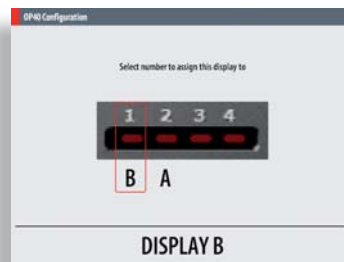
It is logical to assign LED(s) 1 through 4 (left to right) to units moving from left to right.

Note: During assignment the letters assigned to each display (for assignment purposes only) are random and are not in any particular order.

Assign each display to an LED number by selecting a number one through four.

Unassign a display from an OP40
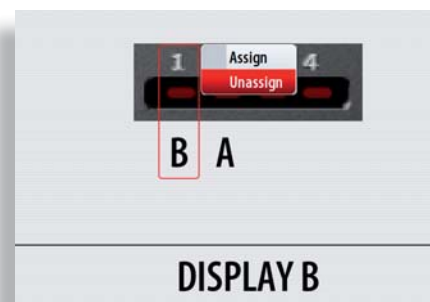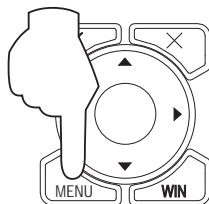
Configure the next OP40

To take command of another OP40 in configuration mode press and hold the DISPLAY key for 1 second
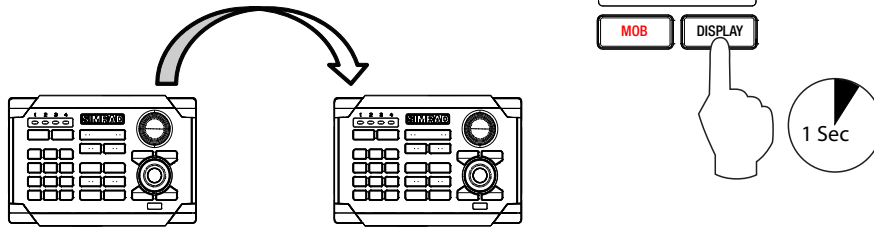
Finish OP40 configuration

To Exit out of OP40 configuration mode press **X**
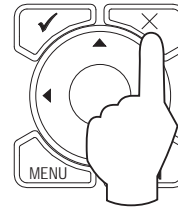
OP40 LED sequences
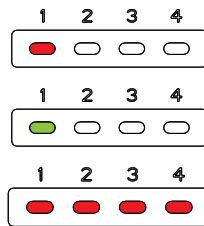
Steady Red: Processor assigned to LED position 1 powered OFF

Steady Green: Processor assigned to LED position 1 powered ON

All LEDs steady RED: System started but the OP40 is not assigned to any display

Autopilot Setup

If an AC12, AC42, or SG05 autopilot computer is connected to an NSE system, autopilot control functionality will be available on the NSE.

The NSE can be connected to a full autopilot system including an AP24 or AP28 control head, or the NSE can be used as the only control head in the autopilot system.

Wiring the autopilot system

The AC12, AC42, or SG05 are connected to the NSE system using the SimNet network.

For more information about how to install and wire the autopilot, refer to the separate AC12/AC42 Installation manual (doc no 20222568), or SG05 Installation manual (doc no 20223210A).

Verifying the autopilot connection

When an AC12, AC42, or SG05 is connected to the NSE system, the NSE will automatically detect the autopilot and an Autopilot menu item will be included in the **Settings** menu.

If no **Autopilot** item is available in the menu, establish the connection by running the auto select process.

The auto select process may also be used if the list of data sources needs to be updated when a unit has been physically replaced.

If the AC12/42 later is disconnected the **Autopilot** menu item will remain available, but only a few of the menu items will be available.
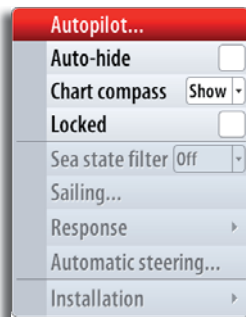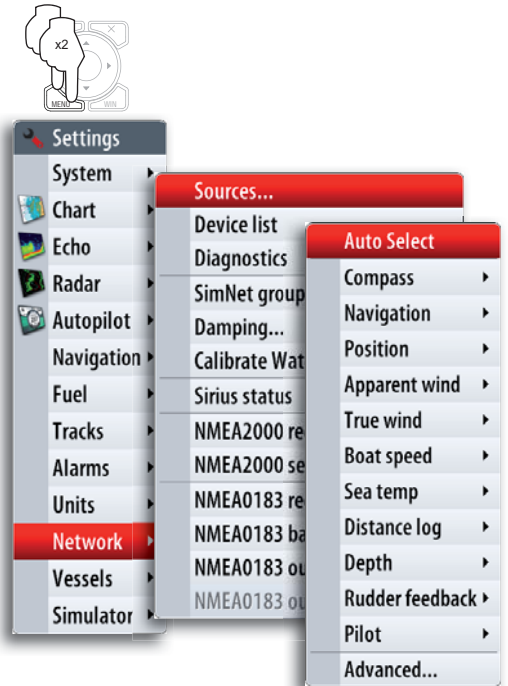
Commissioning the autopilot

Before you perform any commissioning of the autopilot, the hardware installation and electrical connections must be completed as described above and in the separate AC12, AC42, or SG05 Installation manual.

When the autopilot installation is confirmed, the commissioning procedures must be performed. Failure in setting up the autopilot correctly may prohibit the autopilot from functioning properly.

The setup of the autopilot computers (AC12/42/SG05) can be done from the NSE unit or from the AP24 or AP28 control head, if such is included in the system. The following sections describe how you configure the autopilot from the NSE unit. If you select to setup the system from an AP24 or AP28 control head, refer to the AP24 Operator manual (part no 20222535) or the AP28 Operator manual (part no 20222527).

If you connect the NSE to an already commissioned autopilot system, you only have to do an automatic source selection as described above before the autopilot is ready to be used.

Dockside setup

The dockside procedures are initiated from the commissioning dialog. Completed procedures are labelled with a tick.
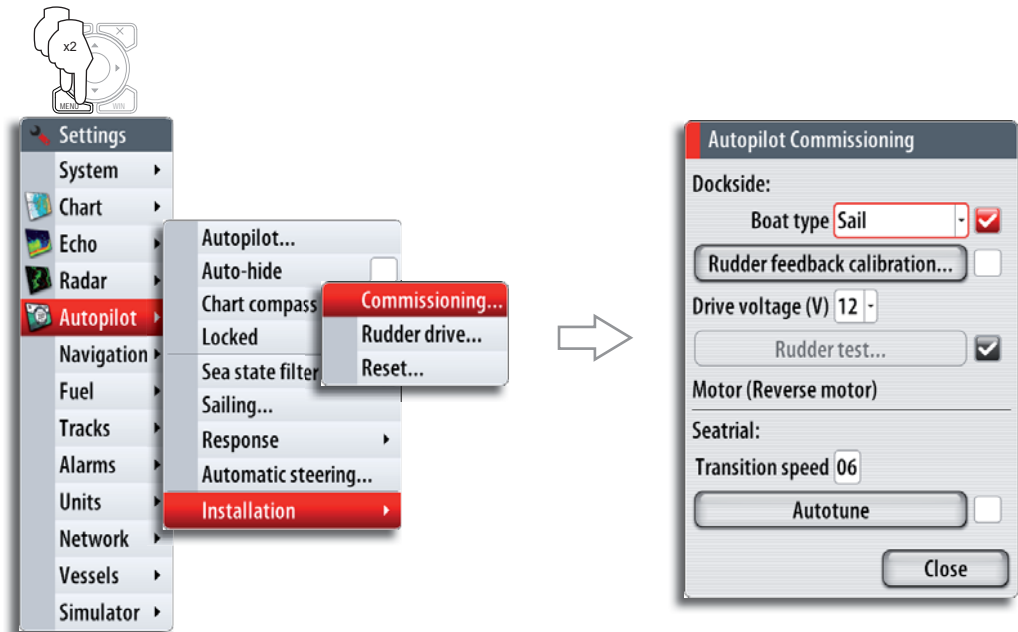
When the autopilot computer is delivered from factory AND ANY TIME AFTER AN AUTOPILOT RESET HAS BEEN PERFORMED, you will have to run a complete setup again.

All steps in all commissioning procedures are clearly described on-screen, and you will be guided step by step through the process.

1   Press the **STBY/AUTO** key to ensure that the autopilot is in standby mode

2   Activate the autopilot commissioning dialog as shown above

3   Select boat type

-   The boat type setting is used by the system to select appropriate preset steering parameters. It will also affect available autopilot features.

4   Perform the rudder calibration

Rudder feedback calibration:

-   Used if you have a rudder feedback unit installed. This calibration is used to ensure that the physical rudder movement corresponds to the rudder angle displayed on the NSE unit.

VRF (Virtual Rudder Feedback) calibration:

-   The Virtual Feedback option enables your autopilot to steer without a conventional rudder feedback unit. This function is designed for vessels up to 40 ft. powered by outboard or stern drives only.

-   The Virtual Feedback option will only be available when there is no feedback unit connected at first time turn on or at turn on after an autopilot reset.

Installing a feedback unit will enhance the performance of the autopilot and provide an accurate rudder angle indicator on the autopilot display. Unless impractical or impossible, a rudder feedback unit should be installed.

5   Set the drive voltage (not required for SG05 systems)

-   Refer to the drive unit table in the AC12/AC42 Installation manual or to your drive unit documentation for information.

6   Run the rudder test as described in the on-screen instructions

If the boat uses power assisted steering, it is important that the engine or electric motor used to enable the power assist steering is turned on prior to this test.

Stand CLEAR of the wheel and do not attempt to take manual control of the wheel during this test!

- When this test is started the autopilot computer will issue a series of PORT and STBD rudder commands and automatically verify correct rudder direction. It detects minimum power to drive the rudder and reduces the rudder speed if it exceeds the maximum preferred speed (8°/sec.) for autopilot operation. The system will also detect whether the drive unit is a reversible motor or if a solenoid valve is operated.

Rudder drive setup

The rudder drive setup controls how the autopilot computer controls the steering system.
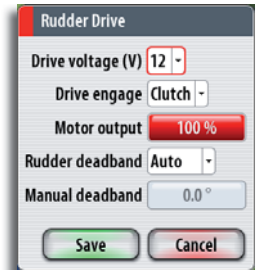
Drive voltage

Voltage specified for your drive unit.

The Drive unit voltage setting does not apply when the system operates solenoids on a continuous running pump/steering gear, or when the system uses an SG05. Hence, the output voltage to the solenoids will be the same as the input voltage.

Refer to the drive unit table in the AC12/AC42 Installation manual or to your drive unit documentation for information.

Selection of improper voltage level for your drive unit may damage both the drive unit and the AC12/42 even if the protection circuits are activated.

Drive engage

Clutch	This is the default setting and it allows you to steer the boat with the helm or wheel when in STBY mode (FU and NFU modes) as well as in all auto steering modes
Auto	This option is typically used to switch between two rudder speeds on a continuous running pump, used when different rudder speeds are required for automatic and Follow-up/Non-Follow-up steering

Motor output

Shows the amount of power needed to achieve the correct rudder speed. The reading is obtained from the Rudder test.

The automatically set value may be increased or decreased.

Rudder deadband

This parameter is used to prevent the rudder from hunting. The reading is obtained from the Rudder test which optimizes the deadband to the speed of the boat and the pressure on the rudder.

If the auto-setting does not perform properly due to high inertia from the wheel or a loose steering gear, it can be adjusted manually. Find the lowest possible value that will prevent the rudder from continuous hunting. A wide deadband will cause inaccurate steering.

The rudder deadband setting is not available when the autopilot is configured for Virtual Rudder Feedback.

Seatrials

A seatrial can only be performed if the dockside settings are completed and confirmed.

The seatrial must always be performed in open waters at a safe distance from other traffic.

*You can switch the autopilot to standby mode and take manual control of the boat at any time during the seatrial by pressing the **STBY/AUTO** key.*

The following seatrial calibration should be done:

- Compass calibration; used to automatically compensate for on-board magnetic interference

- Compass offset adjustment, used to compensate for a fixed offset in the final heading readout

- Wind calibration to compensate for a fixed mechanical offset of the Wind vane

- Boat speed calibration

- Transition HI/LO speed setting (the speed at which you want to change the set of steering parameters)

- Automatic tuning of the steering parameters

- Setting the seastate filer

- Saiboat setup

Compass calibration

Before the compass calibration is started, make sure that there is enough open water around the vessel to make a full turn.

The calibration should be done in calm sea conditions and with minimal wind to obtain good results. Follow the on-screen instruction, and use about 60-90 seconds to make a full circle.
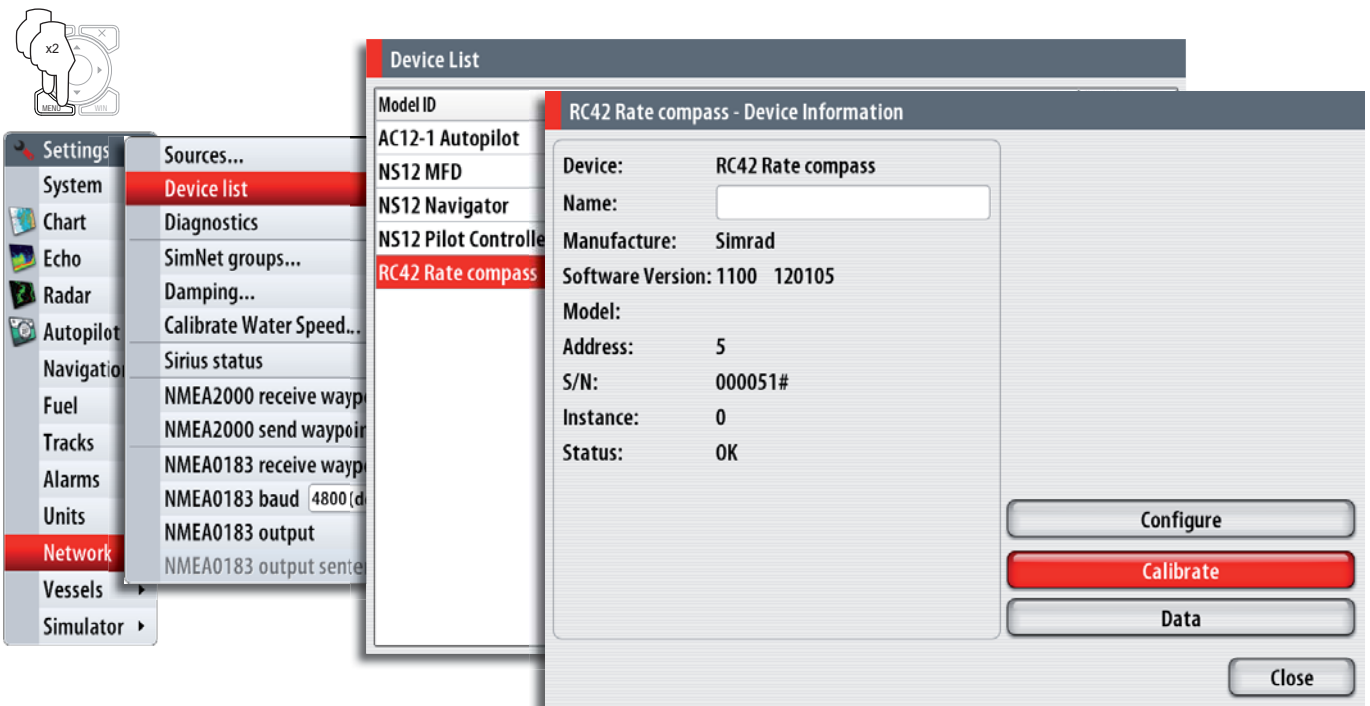
During the calibration, the compass will measure the magnitude and direction of the local magnetic field. Refer graphic on next page.

- If the local magnetic field is stronger than the earth's magnetic field (the local field is reading more than 100%), the compass calibration will fail

- If the local field is reading more than 30%, you should look for any interfering magnetic objects and remove them, or you should move the compass to a different location. The (local) field angle will guide you to the local interfering magnetic object.

Calibration must be made on the compass that is active for the autopilot. If another model compass from Simrad or another manufacturer is installed, refer to the instruction for that compass regarding calibration.

RC42 Rate compass - Device configuration

Configuration

Device	RC42 Rate compass
Offset (º)	**+**000
	Local Field: 020.00 %
	Field Angle: 010.0 º

Advanced Options

Instance

LUBBER LINE

20%

Magnitude of local field in % of earth's magnetic field.

10°

Direction of local field with respect to lubber line. It can also be on the reciprocal.

In certain areas and at high latitudes the local magnetic interference becomes more significant and heading errors exceeding ±3° may have to be accepted.

Compass mounting offset

After compass calibration, the difference between the compass lubber line and the boat's center line should be compensated for.

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 becomes equal. Refer graphic above

☞ *Make sure that both the compass heading and the bearing to the object have the same unit (°M or °T).*

Setting the transition HI/LO speed

This is the speed at which the system automatically changes from LO to HI steering parameters.

On power boats it is recommended that you set a value that represents the speed where the hull begins to plane or the speed where you change from slow to cruising speed.

On sailboats the transition speed should be set to 3-4 knots to give the best response in a tack.

Autopilot Commissioning

Dockside:

Boat type Sail ☑

Rudder feedback calibration... ☐

Drive voltage (V) 12
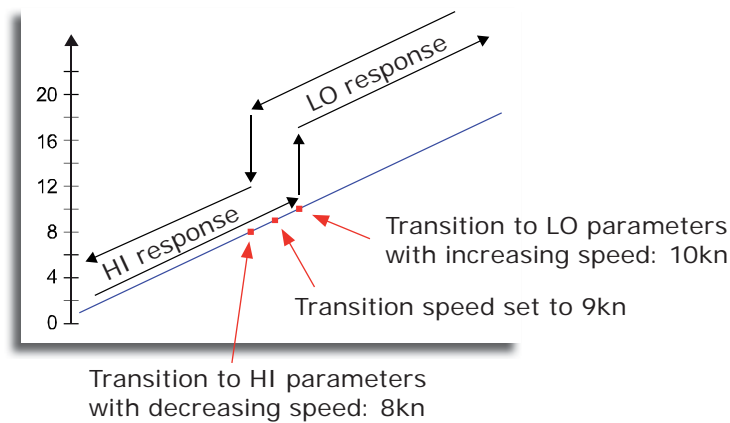
Rudder test... ☑

Motor (Reverse motor)

Seatrial:

Transition speed 09

Autotune ☐

Close

Transition to LO parameters
with increasing speed: 10kn

Transition speed set to 9kn

Transition to HI parameters
with decreasing speed: 8kn

Active response parameter set is shown in the autopilot popup, and the following abbreviations are used:

HI-A	High response parameters set automatically
LO-A	Low response parameters set automatically
HI-M	High response parameters set manually
LO-M	Low response parameter set manually

Autotuning

The autotune feature will run the boat through several tests and then automatically set the most important steering parameters.

Autotune is not required for the autopilot to function as it is preset with steering parameters that should steer most boats in the 30-50 foot range.

You can manually set all parameters that are set during autotuning. Refer next page.

Seastate filter

The Seastate filter is used to reduce rudder activity and autopilot sensitivity in rough weather.

OFF	Seastate filter is disabled. This is default
AUTO	Reduces rudder activity and autopilot sensitivity in rough weather by an adaptive process. The AUTO setting is recommended if you want to use the seastate filter
MANUAL	Linked to the steering response control settings described previously. It may be used to manually find the optimum combination of course keeping and low rudder activity in rough but steady sea conditions
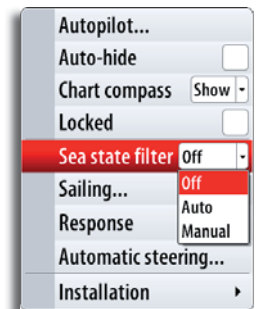
Setting sailing parameters

Sailing parameter settings are only available if the boat type is set to Sail.

Tack time

When performing a tack in WIND mode, the rate of turn (tack time) can be adjusted. This will give single-handed sailors time to handle the boat and the sails during a tack.

A turn performed without shifting wind side, will also be made at a controlled turn rate.

Range	Change per step	Default	Units
2 - 50	1	12	seconds

Tack angle

This value is used to preset the course change used when tacking in AUTO mode. By pressing the left/right arrow keys the course will change as much as this value.

Range	Change per step	Default	Units
50 - 150	1	100	°

Wind function

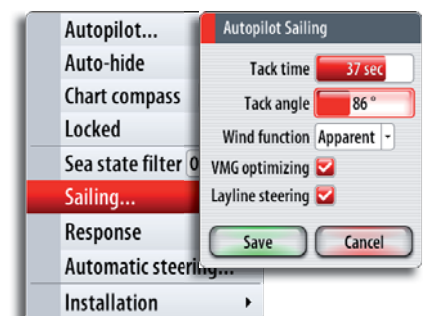With wind function set to **Auto**, the autopilot will automatically select between apparent and true wind steering. **Auto** is default and recommended for cruising.

When the boat is running, it will also be surfing on the waves. This may lead to significant changes in boat speed, and thereby also changes in apparent wind angle. True wind steering is therefore used when running, while steering to apparent wind is used when beating or reaching.

Apparent wind steering is preferred when you want to achieve maximum boat speed. The autopilot tries to maintain a constant apparent wind angle to get maximum thrust from a given trim of the sails.

When sailing in closed waters, the apparent wind angle may change temporarily due to wind gusts. It may then be preferred to sail to the true wind.

VMG optimizing

You can optimize the VMG to wind. When selected the function will be active for 5–10 minutes after a new wind angle has been set and only when beating.

Layline steering

Layline steering is useful when navigating. Cross Track Error (XTE) from the navigator will keep the boat on the track line. If the XTE from the navigator exceeds 0.15 nm, the autopilot will calculate the layline and track towards the waypoint.

Manually adjusting steering parameters

The autotune function in the autopilot is so refined that the majority of boats will need no further adjustments of the steering parameters. On some boats, however, or at particular sea conditions a fine tuning of the steering parameters may improve the performance of the autopilot.
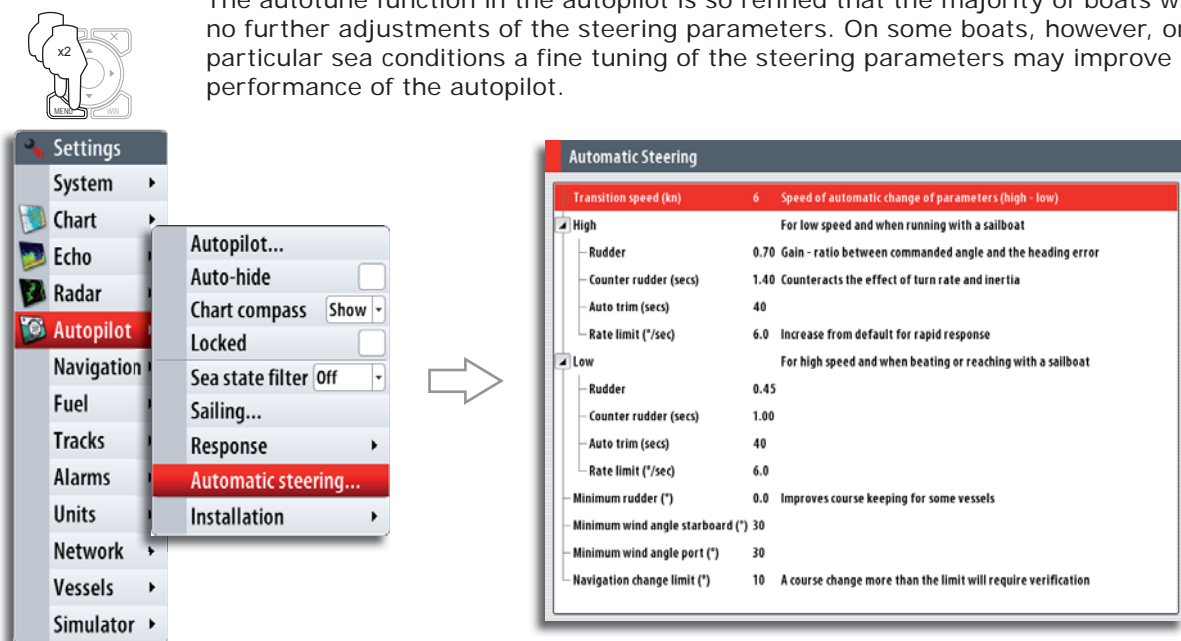
Transition speed

Refer previous description.

Rudder

This parameter determines the ratio between commanded rudder and the heading error. The higher rudder value the more rudder is applied.

If the value is too small it will take a long time to compensate for a heading error, and the autopilot will fail to keep a steady course.

If the value is set too high the overshoot will increase and the steering will be unstable.

Counter rudder

Counter rudder is the amount of rudder used to try to prevent the boat from yawing around the set course. Higher counter rudder settings result in more rudder being applied.

The best way of checking the value of the Counter rudder setting is when making turns.

The figures illustrate the effects of various Counter Rudder settings;

A: Counter rudder too low; overshoot response

B: Counter rudder too high; sluggish and creeping response

C: Correct setting or counter rudder; ideal response
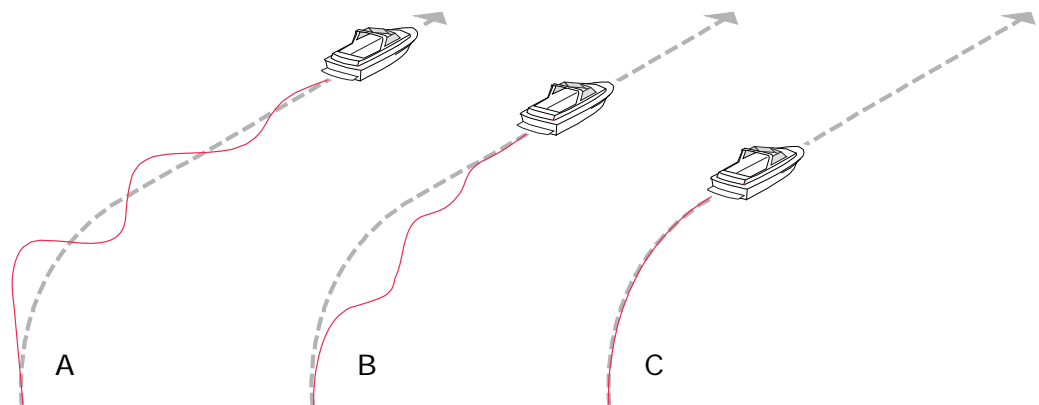
Auto trim

This parameter defines how fast the autopilot shall correspond after having registered a heading error.

The standard value is 40 seconds which should work well on most boats. Rule of thumb: Set to same value (seconds) as the boat's length in feet. On boats operating on VRF the value should be set to 20 seconds.

Rate limit

Sets the maximum allowed rate of turn.

The value should be kept at 6.0°/second unless there is a need for more rapid response in turns.

Minimum rudder

This parameter filters small rudder commands to prevent high rudder activity.

Some boats may have a tendency to not respond to small rudder commands around the "course keeping" position because of a small rudder, a rudder deadband, whirls/disturbance of the water-stream passing the rudder or it is a single nozzle water jet boat.

By increasing the Minimum rudder parameter you may improve the course keeping performance on some boats. This will however increase the rudder activity.

Minimum wind angle to port and starboard

These parameters should be set identical to the minimum apparent wind angle that will keep the sails well shaped and give an acceptable thrust. The parameters will vary from boat to boat.

The settings are used for the tack-prevent function. They also applies when the autopilot is operating in WindNAV mode. Refer to the *Operating the autopilot* section.

You can select different minimum wind angles for port and starboard. The difference between port and starboard will be taken into account when calculating the Distance To Turn (DTT).

Navigation change limit
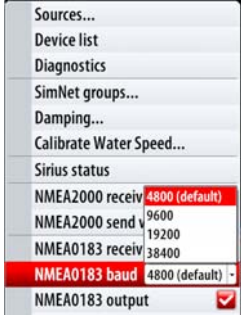
This parameter defines the maximum course change where the autopilot is allowed to automatically change the course when the NSE follows a route (NAV steering).

If the required course change to next waypoint in a route is more than the set limit, you are prompted to verify that the upcoming course change is acceptable.

Serial port setup

Configure the serial port to match the NMEA0183 device that it is connected to.

Baud Rate (common for input and output)

Step 1	Step 2	Step 3
Select Baud Rate |
Select OK |

NMEA 0183 output

Select the desired NMEA0183 sentences to be transmitted. (see S*upported NMEA0183 sentences* page 81).

Uncheck NMEA0183 output to turn off all sentences.

Output rate is shown. Heading is output as fast as possible depending on band width
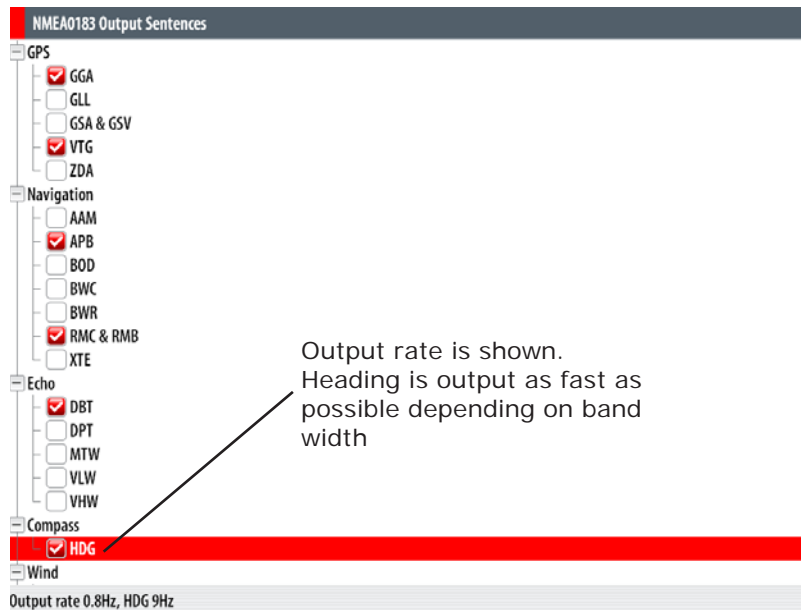
☞ *All NEMA0183 sentences are set to off when unit is shipped*
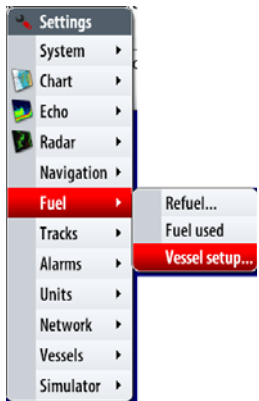
Fuel

If the vessel has an NMEA2000 interface to its engines and fuel tanks the NSE can display the following fuel consumption information:

• Fuel used since last fill

• Fuel used on current trip

• Fuel used during the season

Calibration of the tanks is needed to display accurate fuel levels.

Vessel Setup
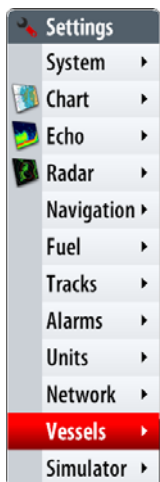
AIS own vessel

If an AIS system is installed. Enter the vessels MMSI number to prevent the own vessels AIS icon being displayed on the chart

Diagnostics

NMEA2000 Diagnostics

Diagnostics

NMEA 2000 | UDB

Bus State:	**Bus State:** Indicates if SimNet backbone is operating: Check power: Check termination
Rx Overflows:	**RX Overflows / Overruns** greater than 0 could indicate the software is very busy and unable to keep up with incoming messages.
Rx Overruns:	0
Rx Errors:	**RX / TX Errors:** CAN interface error counters. Count up when there are errors on the CAN bus, and down when things are Ok. Should normally be 0. Goes bus off when 255 is reached. Check same things as for Bus state if greater than 0 observed.
Tx Errors:	0
Fast packet Errors:	**Fast Packet Errors:** Detected errors since power up. Check the network if this is continually increasing.
Rx Messages:	0
Tx Messages:	**Rx / Tx Messages:** A count since power up of messages received / transmitted.
Bus Load:	0.0 %

USER Database UDB

The diagnostic page shows the MAC address of the display, the status and versions of the five user data bases.

The UDB (user database) is a database of all user created items and settings. Every time a change is made on a NSE display, the databases are synchronized so no one display holds all the user information. All displays should display the same version number for all databases.

The IP address of NSE displays that have had changes made to their settings are also shown.

Diagnostics

NMEA 2000 | UDB

MAC D7:1A:AB:DA:D8:B1   Connected

Database name	Version	Dirty	Size
UDB Wp/Rt DB	21	◯	19
UDB EventLog DB	9	◯	9
UDB Variables DB	54	◯	50
UDB Alarm DB	110	◯	101
UDB SharedSetting DB	145	◯	98

Master	IP address (this display first)
◯	172.28.29.56

Check GPS signal

Press direct access key **PAGES** >**3**
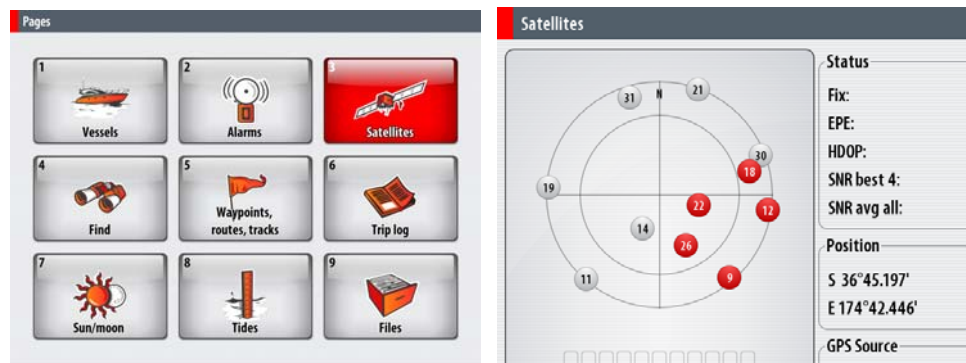
System backup

A backup of all the NSE settings such as page layouts, custom instruments can be made at any time, and either stored on the NSE or transferred to a USB key or SD Card

Press direct access key **PAGES** > **9**.	Name the backup using the alphanumeric key pad.
Press MENU select copy.	Select destination to copy file too.
Restore a backup To restore or import a backup, Select the file, Press menu and select import. The system will perfom a restart for imported settings to take effect.	

Software upgrades

Software upgrades can be performed on the following types of devices from any NSE display.

• NSE displays

• SimNet devices

• Ethernet devices

The same procedure is used to upgrade software on all types of devices. Upgrade files for different types of devices have different file extensions.

NSE displays	Ethernet devices	SimNet / NMEA2000 devices
xxx.xxx.xxx.UPD	device.RIW	Device_x.x.xx.xx.swup (or .luf)

Displaying current software version

NSE Display software version
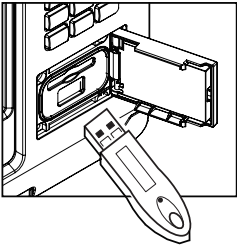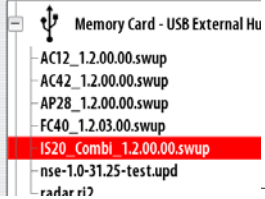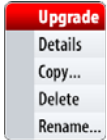
Software version is 25.31.32 Platform 1.0.0-r2

Ethernet module software version

Echo Sounder: On Echo page select Menu	Radar: On Radar page select Menu

Software version : CA1637C

Software version: 2.8.245

Example below shows upgrading a SimNet IS20 Combi instrument but is the same for NSE displays

Menu Item	Step 1	Step 2	Step 3
Copy upgrade files on to a USB Stick Insert USB Stick into front or rear USB ports	Press function button PAGES Press 9 or navigate to files button	Select Memory card Select the upgrade file	Press Menu Select Upgrade

Additional NSE display upgrade steps

Display Upgrade — Select the display you want to upgrade — This Display / Remote Display	Upgrade This Display — Press OK to reboot this display and start the upgrade. Do not remove the upgrade card. — OK / Cancel
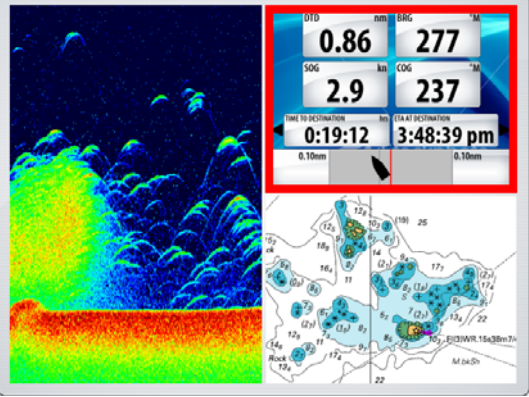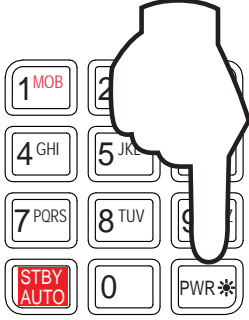
Do not interrupt power or remove the card, key in "01" when prompted after restart

Step 3 Continued

Remote Upgrade		
Device Name	Version	Selected
IS20 _Combi instr. 001884#	1100 120000	☑

The NSE will list devices that can be ungraded by the selected software upgrade file. Select the unit to be upgraded. (there is only one IS20 Combi on this network)

Step 4	Step 5
Select start upgrade	Select OK to finish
Remote Upgrade — Device Name — IS20 _Combi instr. 0018 — Select ☑ / Show all / Start upgrade	Upgrade Complete — Upgrade Complete. — OK
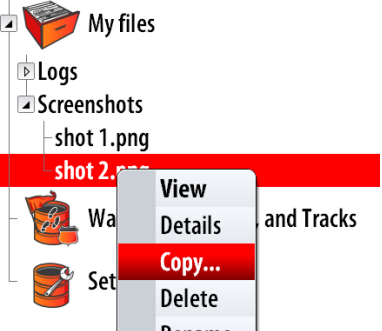
After upgrading a display or Ethernet device please power cycle the entire system

Screen capture

It is possible to capture a snap shot of the current screen

Step 1	Step 2
Settings **System** ▸ 🖼 Chart ▸ 🖼 Echo ▸ 🖼 Radar ▸ Navigation ▸ Fuel ▸ Tracks ▸ Alarms ▸ Units ▸ Network ▸ Vessels ▸ Simulator ▸ Language English (US) Text size Normal Key beeps Off Time... Sirius audio ☐ **Screen capture** ☑ Restore defaults... Power control... Advanced... About Enable screen capture	 Create desired screen to capture
Step 3	
  Short press on PWR button to capture screen shot	

File transfer

Step 1	Step 2
Insert a USB Flash drive or SD card **Files** Press PAGES > 9	▲ 🗄 **My files** ▷ **Logs** ▲ **Screenshots** ├ shot 1.png │ shot 2.png **View** │ **Details** ├ Wa... and Tracks │ **Copy...** │ Set **Delete** Rename Browse to the desired screen shot to copy Press MENU and select Copy select the USB Drive or SD card as the location to copy the file too.

Drawings

NSE8 Dimensions

35 mm (1.38")

111.3 mm (4.38")

86.5 mm (3.40")

221.0 mm (8.70")

212.0 mm (8.35")

285.0 mm (11.22")

315.5 mm (12.40")

SIMRAD

NSE12 Dimensions

35 mm (1.38")

122.7 mm (4.83")

98 mm (3.85")

65 mm (2.55")

273.0 mm (10.75")

266.0 mm (10.47")

357.0 mm (14.01")

385 mm (15.16")

SIMRAD
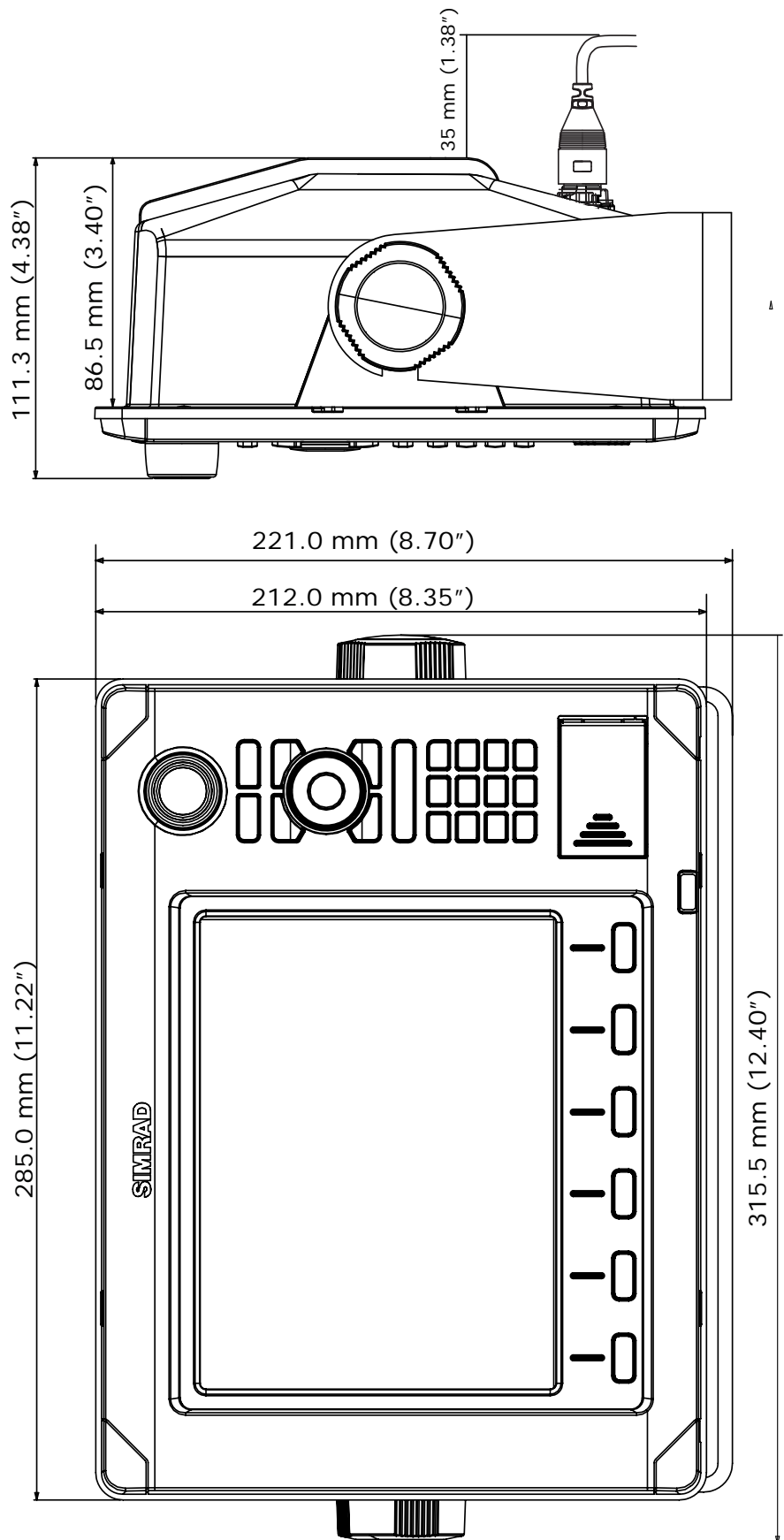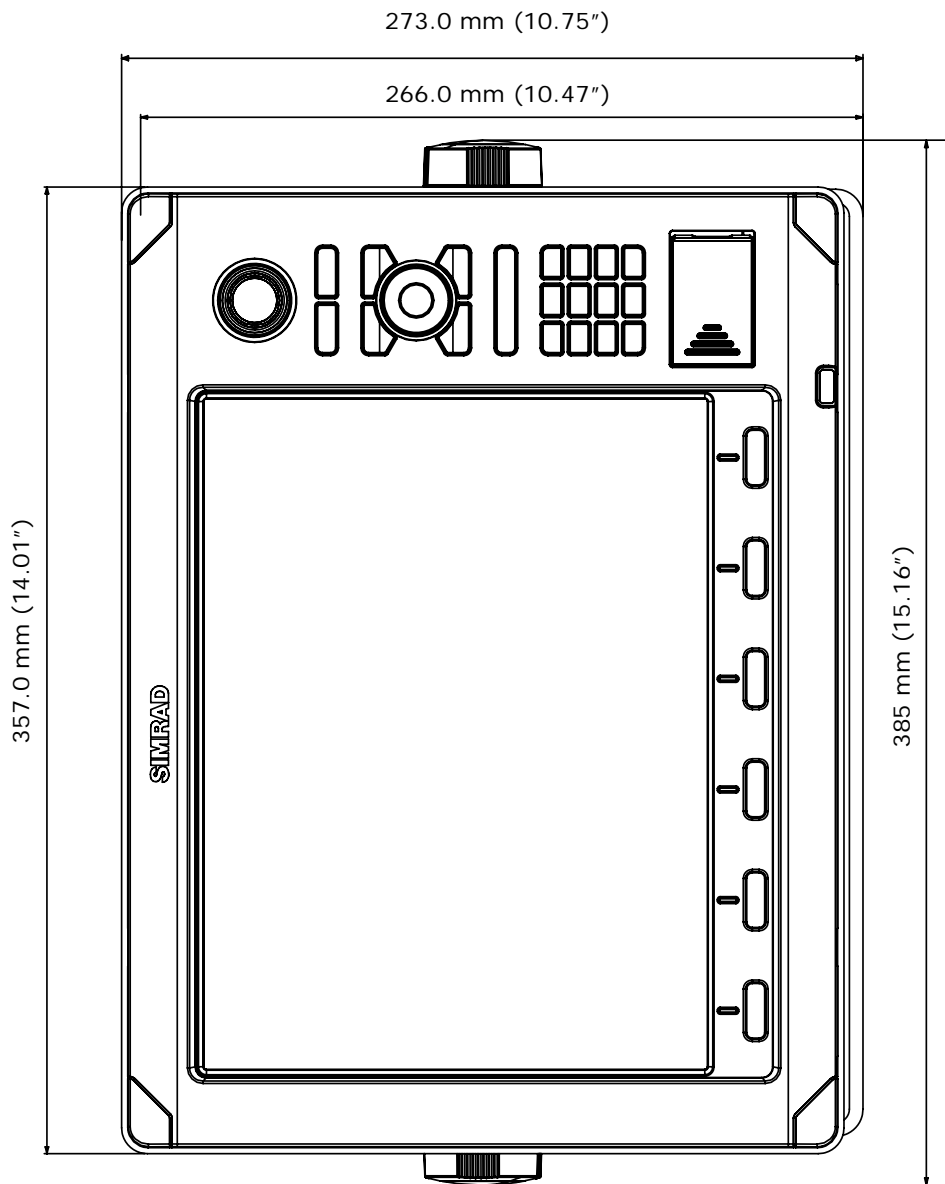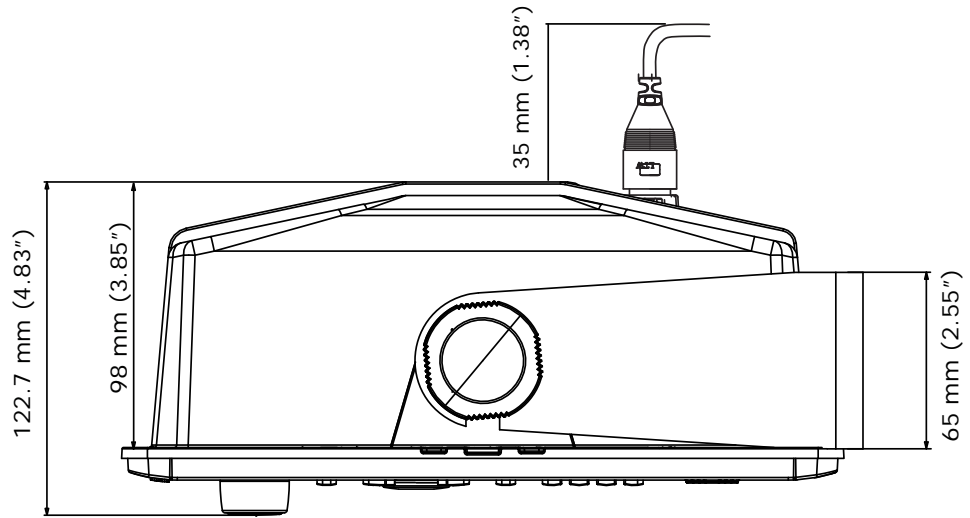
Spare parts

NSE Spare parts

Part Number	Description
000-00132-001	NSE8 Bezel with decal
000-00133-001	NSE12 Bezel with decal
000-00134-001	NSE8 Dust cover
000-00135-001	NSE12 Dust cover
000-00136-001	NSE8 Mounting bracket
000-00137-001	NSE12 Mounting bracket
000-00138-001	Mounting bracket knobs & washers (pair L/R)
000-00143-001	Flush mount kit
000-00139-001	Rotary knob
000-00140-001	SD card door kit
000-00128-001	Power cable
000-00129-001	Video in / NMEA0183 comms cable
000-00130-001	Connector caps

NSE Optional accessories

Part Number	Description
000-0125-25	Simrad GS15 GPS Antenna
3G Radar Broadband Radar	
000-10420-001	3G Broadband Radar for NSE
Pulse radar	
DX42S-1	2kW 18 Inch Radome, radar processor and 15 m scanner cable
DX64S-1	4 kW 24 Inch Radome, radar processor and 15 m scanner cable
TX06S-1	6 kW 4 ft open array, radar processor and 20 m scanner cable
TX010S-1	10 kW 6 ft open array, radar processor and 20 m scanner cable
TX025S-1	25 kW 7 ft open array, radar processor and 20 m scanner cable
BSM-1 Broadband Echosounder	
000-0132-05	BSM1 Broadband Echosounder
BSM-2 Broadband Echosounder	
000-10138-001	BSM2 Broadband Echosounder
LSS-1 Structure Scan Module	
000-10238-001	Structure scan Module
WM2 Weather Module (USA only)	
000-10036-001	WM-2 Sirius Weather Radio Module
SonicHub	
000-10143-001	Sonic Hub

Compatible BSM-1 Transducers

Part Number	Description
000-0136-02	Airmar P319, plastic, low profile, thru hull 50/200 KHz, depth/temp, 7 pin blue connector
000-0136-03	Airmar P79, plastic, In-Hull 50/200 KHz, depth only, 7 pin blue connector
000-0136-04	Airmar B60, bronze, low profile, thru hull, 50/200 KHz, depth/temp, 12° tilt, 7 pin blue connector
000-00021-001	Airmar B60, bronze, low profile, thru hull, 50/200 KHz, depth/temp, 20° tilt, 7 pin blue connector
000-0136-05	Airmar B744V, bronze, thru hull 50/200 KHz, depth/temp/speed, high-speed fairing block, 7 pin blue connector
000-0136-06	Airmar B164, bronze, low profile, thru hull, 1 kW 50/200 KHz, depth/temp, 12° tilt, 7 pin blue connector
000-0136-00	Airmar B258, bronze, thru hull, 50/200KHz, depth/temp, high-speed fairing block, 7 pin blue connector
000-0106-82	Airmar B260, bronze, thru hull, 50/200KHz, depth/temp, high-speed fairing block, 7 pin blue connector
000-0106-91	Airmar M260, plastic In-hull, 50/200KHz, depth only, tank kit
000-0106-77	HST - DFSBL 50/200 kHz transom-mount skimmer depth/temp
000-0099-95	TS-1BL Temperature sensor (non-networked)
000-0099-93	XT-12BL 3.65 m (12 ft) blue transducer extension cable
000-0099-94	XT-20BL 6 m (20 ft) blue transducer extension cable
000-00022-001	Cable, adapter, 6 Pin LTW to 7 Pin BLUE

SimNet accessories

Part Number	Description
000-10298-001	OP40 Wired Remote
SIMKIT-1	SimNet Starter Kit: Includes • 24005845 SimNet 5 m (16.5 ft) cable • 24006298 SimNet 7-Prong Multi-Joiner • 24005894 SimNet Termination Plug • 24005902 SimNet 2 m (6 ft) power cable w/terminator
SIMKIT-2	SimNet Starter Kit with one AT10 NMEA0183 interface • 24005936 AT10 two way general NMEA0183 to SimNet Converter • 24005837 SimNet 2m (6 ft) cable • 24005845 SimNet 5m (16.5 ft) cable • 24006298 SimNet 7 Prong Multi-joiner • 24005894 SimNet termination plug • 24005902 SimNet 2m (6 ft) power cable w/terminator
24005829	0.3 m (1 ft) SimNet cable
24005837	2 m (6.6 ft) SimNet cable
24005845	5 m (16.6 ft) SimNet cable
24005852	10 m (33 ft) SimNet cable
44172260	SimNet In-line joiner
24005860	SimNet T-joiner (3 prong)
24006298	SimNet Multijoiner (7 prong)
24006306	SimNet Bulkhead T-connector
24005878	SimNet cable gland
24005886	SimNet protection plug

Part Number	Description
24005894	SimNet termination plug
44172278	SimNet termination In-Line joiner
24005902	2 m (6.6 ft) SimNet power w/termination
24005910	2 m (6.6 ft) SimNet power w/o termination
24005936	AT10 Universal NMEA0183 converter
24006694	AT10HD Heading data NMEA0183 converter
24005928	SimNet cable protection cap
24005729	SimNet to Micro–C (male) cable that connects a SimNet product to a NMEA2000 network
24006199	SimNet to Micro-C (female) cable that connects a NMEA2000 product to SimNet
24006413	SimNet to Micro-C female to SimNet 4 m (13 ft)
24006363	SimNet cable, 5.5 m (18 ft), with 1 plug

Ethernet cables (yellow)

Part Number	Description
000-0127-55	Adapter cable: Ethernet Yellow (M) to RJ45 adaptor 0.3m (1 ft)
000-0127-56	Adapter cable: Ethernet Yellow (M) male to RJ45 female 2 m (6.5 ft)
000-0127-51	Ethernet cable yellow 5 Pin 2 m (6.5 ft)
000-0127-29	Ethernet cable yellow 5 Pin 4.5 m (15 ft)
000-0127-30	Ethernet cable yellow 5 Pin 7.7 m (25 ft)
000-0127-37	Ethernet cable yellow 5 Pin 15.2 m (50 ft)

Repeater screens

Part Number	Description
000-0134-00	DI10 Display (only for NSE8)
000-0134-01	DI15 Display (Only for NSE12)
000-10506-001	MO15L 15″ Hi-Bright LED Backlit Monitor with remote keypad
000-10507-00	MO17-L 17″ Hi-Bright LED Backlit Monitor with remote keypad
000-10508-00	MO19-L 19″ Hi-Bright LED Backlit Monitor with remote keypad

Video cables for repeater screens

Part Number	Description
AA010152	3 m (9.8 ft) Video cable DVI-HD26 (DI10 & DI15 only)
AA010154	10m (33 ft) Video cable DVI-HD26 (DI10 & DI15 only)
AA010156	3 m DVI - DVI video cable for MO19 monitor

Specifications

Mechanical	
Back Case	Die cast aluminium
Heat Sinking	Direct heat transfer from processor to casting
Screen	Direct bonded, anti reflective, LED backlit

Environmental	
Operating temperature	-15° C to +55° C (+5° F to +131° F)
Waterproof integrity	IPx7
Certificates of Conformity	CE(EN60945:2002)/CTick

Electrical	
Operating Voltage	12 or 24 V DC (9 - 34 V DC max)
Processor	Via Eden ULV 1.6 GHz
RAM	512 MB
Hard drive	80 GB

User interface	
User interface	Direct access keys (DAK's), alphanumeric keypad, rotary knob with push-to-Enter
Languages	(31) English (UK), English (US), German, French, Spanish, Italian, Portuguese, Croatian, Finnish, Icelandic, Dutch, Norwegian, Polish, Swedish, Slovenian, Russian, Ukrainian, Bulgarian, Asian language pack

Plotter Characteristics	
Display modes	Head-up*, Course-up, North-up (*external heading or COG)
Cartography	Embedded: Navico Insight HD US/Navionics Platinum Rest of World; Navionics Platinum Plus via SD Card
Latitude Limit	83° North, 85° South
Alarms	Position, Off-Course, Waypoint Radius, Arrival, Anchor, Anchor Depth, Shallow, Deep, Water Temp Rate, Low Boat Speed, True Wind Shift, True Wind High, True Wind Low, Guard Zone 1 & 2, Voltage Hi/Lo, Missing Data: Depth/Rudder/Wind/Heading/Weather, Weather: Lightning, Severe Weather, Storm, Weather Watchbox, Vessels: Dangerous, AIS Lost, Message, MARPA Lost, MARPA Unavailable, Autopilot Alarms

Radar Characteristics	
Radar compatibility	Broadband: Simrad 3G Simrad HD Digital Series 2 kW to 25 kW
Display Modes	Head-up, Course-up*, North-up*, Relative Motion (*Heading input required)
Echo Trails	Intervals: 15 sec, 30 sec, 1 min, 3 min, Continuous. Clear Trails
VRM/EBL	2: User configurable

Video In	
Channels	Two multiplexed
Format	Composite
Standard	Support for NTSC type N and 4.4.43, PAL type B, D,G,H, I, M,N, Selected by user

Communications	
NMEA0183	1 x RS422 port
Supported baud rates	4,800, 9,600, 19,200, 38,400 Note. Port will transmit and receive at the set baud rate
Ethernet	10/100 base Ethernet, three ports
Max number of displays	6 in any combination NSE8 or NSE12
External connectors (front)	x 1 USB and x 1 SD
External Connectors (rear)	Power (power control, ext. alarm), Video-in (NMEA 0183/ Composite video x2), SimNet (NMEA2000), Network (3 x ethernet, USB x 1, Video Out (DVI-I x 1)

Display specific specifications			
NSE8		NSE12	
Display size	8 " Diagonal	Display size	12.1" Diagonal
Display resolution	800 x 600	Display resolution	1024 x 768
Brightness (max)	1500 nits	Brightness	1500
Contrast ratio	850:1	Contrast ratio	600:1
Viewing angle	60 deg. above and below normal axis with: >75% nominal brightness >100:1 contrast ratio 60 deg. side to side about normal axis with: >75% nominal brightness >100:1 contrast ratio		
Height	212 mm (8.35")	Height	266 mm (10.47")
Width	285 mm (11.22")	Width	356 mm (14.01")
Depth	111 mm (4.38")	Depth	122.7 mm (4.83")
Weight	3.2 kg (7 lb)	Weight	5.5 kg (11.5 lb)
Current Draw (in Watts) at 12/24VDC Display only	21.6W or 1.8A @ 12.0 V DC / 21.6W or 0.9A @ 24VDC	Current Draw (in Watts) at 12/24 VDC Display only	33.6W or 2.8A @ 12.0 V DC / 33.6W or 1.4A @ 24VDC

Supported NMEA0183 sentences

TX / RX	GPS							
Receive	GGA	GLL	GSA	GSV	VTG	ZDA		
Transmit	GGA	GLL	GSA	GSV	VTG	ZDA		
	Navigation							
Receive	RMC							
Transmit	AAM	APB	BOD	BWC	BWR	RMC	RMB	XTE
	Echo							
Receive	DBT	DPT	MTW	VLW	VHW			
Transmit	DBT	DPT	MTW	VLW	VHW			
	Compass							
Receive	HDG	HDT	HDM					
Transmit	HDG							
	Wind							
Receive	MWV	MWD						
Transmit	MWV							
	AIS / DSC							
Receive	DSC	DSE	VDM	AIS sentences are not bridged to or from SimNet.				
	MARPA							
Transmit	TLL	TTM	These are only out put sentences					

NMEA 2000 PGN List

NMEA 2000 PGN Receive

59392	ISO Acknowledgement
59904	ISO Request
60928	ISO Address Claim
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
127505	Fluid Level
127508	Battery Status
128259	Speed, Water referenced
128267	Water Depth
128275	DistanceLog
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
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
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
61184	Parameter Request/Command
65323	Data User Group Request
65325	Reprogram Status
65341	Autopilot Mode
65480	Autopilot Mode
130840	Data User Group Configuration
130842	SimNet DSC Message
130845	Parameter Handle
130850	Event Command
130851	Event Reply
65285	Temperature with Instance
65292	Clear Fluid Level Warnings
65293	LGC-2000 Configuration
130817	Product Info
130820	Reprogram Status
130831	Suzuki Engine and Storage Device Config
130832	Fuel Used - High Reolution
130834	Engine and Tank Configuration
130835	SetEngineAndTankConfiguration
130838	Fluid Level Warning
130839	Pressure Insect Configuration
130843	Sonar Status, Frequency and DSP Voltage

NMEA2000 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	DistanceLog
129025	Position, Rapid Update
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129283	Cross Track Error
129284	Navigation 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
61184	Parameter Request/Command
130840	Data User Group Configuration
130845	Parameter Handle
130850	Event Command
65287	Configure Temperature Insects
65289	Trim Tab Insect Calibration
65290	Paddle Wheel Speed Configuration
65292	Clear Fluid Level Warnings
65293	LGC-2000 Configuration
130818	Reprogram Data
130819	Request Reprogram
130828	Set Serial Number
130831	Suzuki Engine and Storage Device Config
130835	SetEngineAndTankConfiguration
130836	Fluid Level Insect Configuration
130837	Fuel Flow Turbine Configuration
130839	Pressure Insect Configuration
130845	"Weather and Fish Prediction and Barometric Pressure History"
130850	Evinrude Engine Warnings

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