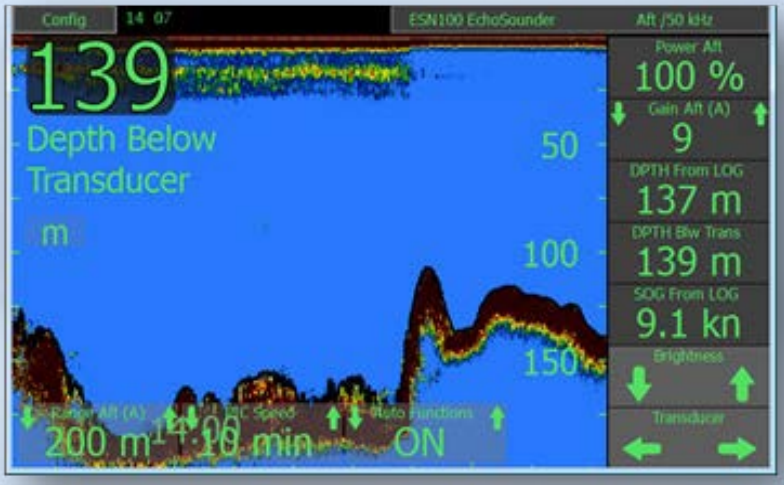
ESN100

Single channel Dual frequency Echo sounder

Operation and Installation manual



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Document revision log

Rev	Issue Date (DD.MM.YY)	Reason for Issue	Author	Approval
2620	07.05.26	Updated section *6.2 Presentation* with a new screenshot showing the updated location of the Config button.	KH	PC
2533	19.01.26	Updated the Alert section and GUI changes. Updated to latest company profile. Restructured the content and fixed typos. Added ESN100-SC (pending approval).	KH	PC
2123	10.11.22	New formats and changes in user manual mode.	PC	N/A
1725	28.04.21	Initial version	PC	N/A

Table of Contents

1 Safety instructions

Important! When doing service or repair, please wait two minutes after power off, before unplugging internal connectors.

Important! Do not run the sounder for a long time with the transducer in air. The transducer may be damaged.

2 Introduction

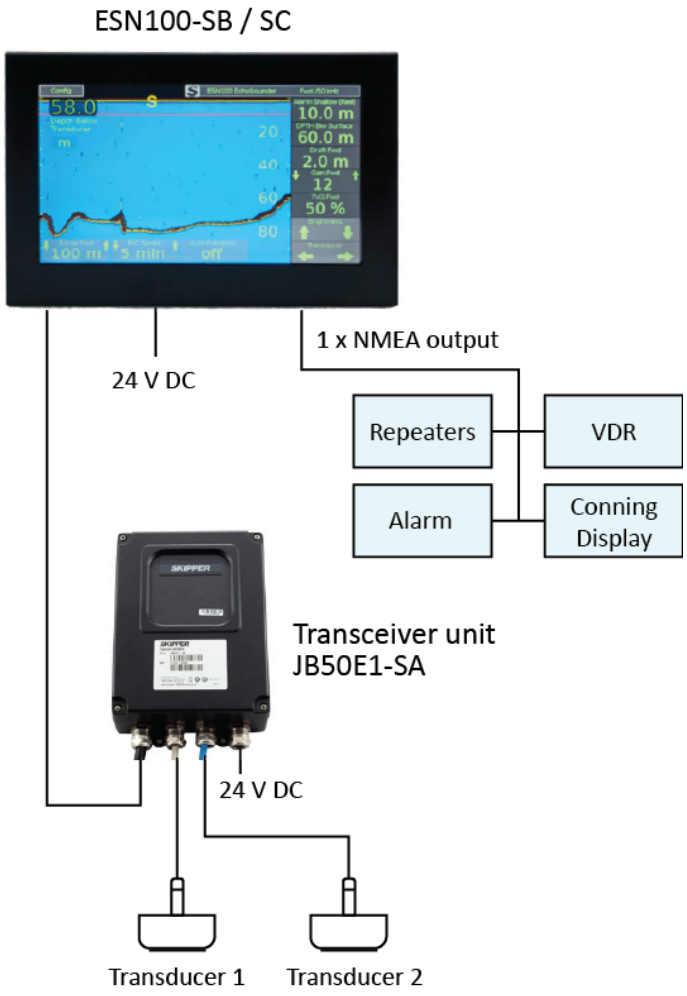
The SKIPPER ESN100 is a navigational echo sounder. It is made to fulfil the ISO/IMO standards, as well as the modern IEC standards for maritime equipment and alarm handling. Features include:

- Easy and logical operation via a touch display
- Flexible installation with minimal wiring
- Basic but comprehensive communication and features

The system has a single active channel and can be used on both 50 and 200 kHz transducers. The system is easy to install and operate, with automated functions that minimize the need for adjustment.

All images and drawings in this manual are illustrative. The supplied product may show minor differences in design, components, or accessories due to ongoing improvements. These deviations do not change the product's intended use.

2.1 Overview


ESN100-SB / SC
24 V DC
1 x NMEA output
Repeaters
VDR
Alarm
Conning Display
Transceiver unit JB50E1-SA
24 V DC
Transducer 1
Transducer 2

2.2 Specification

2.2.1 ESN100-SC

2.2.1.1 Physical specifications

Specification	Value
Dimensions	287 x 209.5 mm. See section 8.2 for details.
Display	10.1” Capacitive touch. 430 NITS
Buzzer	Internal: for alert sounding External (supplied): for extra volume
IP grade	Front: IP22/IP56 with kit (part number: KIT-CU-M101-IP56). Rear: IP22.
MTBF	26600 Hours

2.2.1.2 Electrical specifications

Specification	Value
Power	Nominal 24 VDC (Max 4 W) 18 – 28 VDC

Connectors	• 2 x 2-pin spring connector
	  ○ 24 VDC inputs
	• 2 x USB
	• 2 x Ethernet RJ45
	  ○ LAN
	• 1 x External beeper
	• 1 x 7-pin spring connector for sensor
	  ○ Power out (24 VDC)
	  ○ 1 x Powered sensor port (RS485)
	  ○ 1 x Relay
	• 2 x 6-pin spring connector for NMEA and AUX
	  ○ 2 x NMEA in, 2 x NMEA out. NMEA 0183 Outputs (IEC61162-1/2)
	  ○ 1 x Opto-isolated (TTL)
	• 1 x Micro-SD

2.2.1.3 Communication specifications

Specification	Value
LAN	2 x IEC61162-450
Input formats	2 x NMEA (IEC61162-1) Accepting signals from GPS, Gyro, Alarm, Draft, Dimming
Output formats	2 x NMEA (IEC61162-1) DPT, PSKPDPT, DBS, DBK, DBT, ALR, ALF
AUX	2 x Power failure

2.2.2 ESN100-SB

2.2.2.1 Physical specifications

Specification	Value
Dimensions	242 x 158 mm. See section 8.3 for details.
Display	9” Resistive touch. 320 NITS
Buzzer	Internal: For alert sounding
IP grade	IP22
MTBF	26600 Hours

2.2.2.2 Electrical specifications

Specification	Value
Power	Nominal 24 VDC (+/-10%) (Max 10 W, typical 6 W).

Connectors	• 1 x Ethernet RJ45
	  ○ LAN
	• 12-pin spring connector
	  ○ 2-pole connector 24 VDC In
	  ○ 2-pole connector for NMEA in 2
	  ○ 2-pole connector 24 VDC Out to display
	  ○ 2-pole connector for ground
	  ○ 2-pole connector for NMEA out
	  ○ 2-pole connector for NMEA in 1

2.2.2.3 Communication specifications

Specification	Value
LAN	1 x IEC61162-450
Input formats	2 x NMEA (IEC61162-1) Accepting signals from GPS, Gyro, Alarm, Draft, Dimming
Output formats	1 x NMEA (IEC61162-1) DPT, PSKPDPT, DBS, DBK, DBT, ALR, ALF

2.2.3 JB50E1-SA

2.2.3.1 Physical specifications

Specification	Value
Dimensions	254.8 x 163.8 mm. See section 8.4 for details.
IP grade	IP56
MTBF	26600 Hours

2.2.3.2 Electrical specifications

Specification	Value
Power	Nominal 24 VDC (Max 4 W) 21 – 32 VDC
Internal communication	2-pin screw connector
Alert	2-pin power failure relay
Transducers	2 x 3-pin screw connector

2.2.3.3 Communication specifications

Specification	Value
Internal communication	1 x RS485
Acoustic output power	Max 600 W
Frequency (selectable)	50 kHz and 200 kHz. Two transducers can be connected at one time. Only one is operational at a time.

2.2.4 System functions (according to ISO9875 (2023))

Specification	Value
Depth	1 – 1000 m (based on transducer)
Approved transducers	ETN050, 50 kHz: 1 m – 450 m ETN200, 200 kHz: 1 m – 250 m ETN200S, 200 kHz: 1 m – 200 m ETS50200, 50 kHz and 200 kHz: 1 m – 450 m
Alerts	Follows IEC standards (ALF and ALR). Power failure relay.
Auto	Auto Gain, TVG and Power Transducer positioning Internal sounder for alarm/button press
Depth logging	Basic 24 hours. External logging feature over network.

3 Mechanical installation

The ESN100 comprises of 2 units and up to 2 transducers.

ESN100-SB / SC Control unit: This display contains a single NMEA output, dual NMEA input and a communication pair to the transceiver. An additional RJ45 connector can be used for LAN communication.

JB50E1-SA Transceiver unit: This unit contains connections for 2 transducers (of either 50 or 200 kHz), a connection for a single paired wire to the Control unit (using RS485), and 24 VDC power input. This unit can be mounted on the bridge, with long cables coming from the transducers, or near the transducer for lower noise.

The NMEA will typically be sent to a splitter to give the information to the bridge/alarm system and VDR.

3.1 Positioning of the transducers

A transducer should be installed in an area securing optimal measurement free from noise and aeration. Transducers are normally installed in the noise free area in the foreship (see A on fig.)

Optimal system operation is achieved by fitting the transducer as deep as possible on the hull. The transmitting surface of the transducer must be installed horizontally.

Do not mount transducers close to the propeller or aft of other hull installations (outlets, vents or other protruding details). It is necessary to select a part of the hull that is submerged under all load and speed conditions, and to avoid positions where air is trapped in heavy weather. The transducer should be placed as close to the CL (Centre Line) as possible.

It should be possible to draw a cone of ±60 degrees underneath the transducer without any objects entering the cone. The face of the transducer should be horizontal with no more than 7 degrees tilt in all directions.

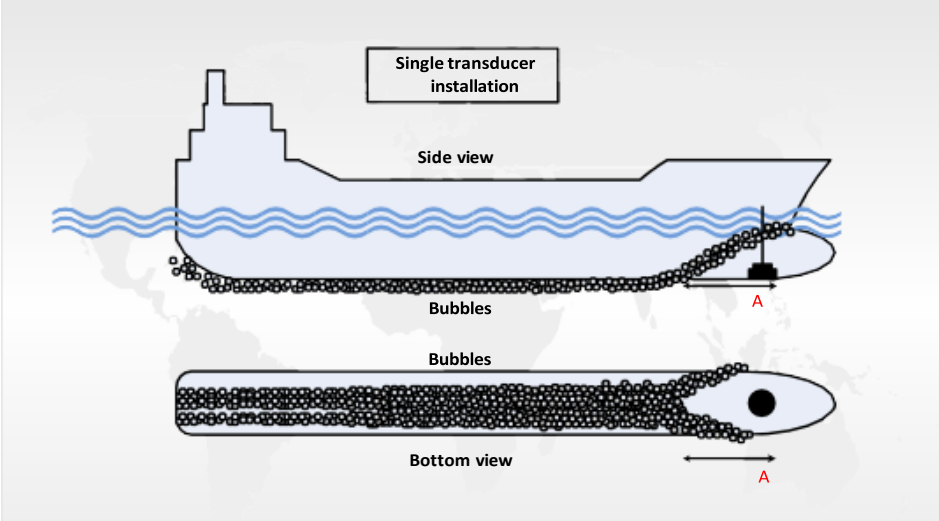
If a flat, horizontal section is not available for transducer fitting, the shipyard must construct a suitable bed or a blister. This should have at least 0.3m of flat area in front of the transducer and be tear drop shaped. Even welding seams should be grinded down to obtain a smooth surface to avoid any aeration and/or turbulence.

Generally, there should be nothing in front of the transducer that can cause turbulence, and nothing within 0.5 m to the side.

Note! Protect the active element of the transducer and **do not paint the surface**. Transmission in **the air must be avoided**! This may cause mechanical damage of the element.

Larger vessels are often fitted with two transducers, one fore and one aft. The fore transducer is the primary transducer, (normally 50 kHz). The aft transducer is a secondary transducer, (normally 200 kHz).

An aft transducer may be troubled with aeration and turbulence and may not operate in higher speed. It is normally solely used to measure aft depth in shallow water / slow speed.



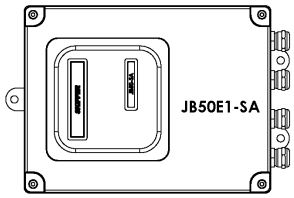
3.2 Installation details

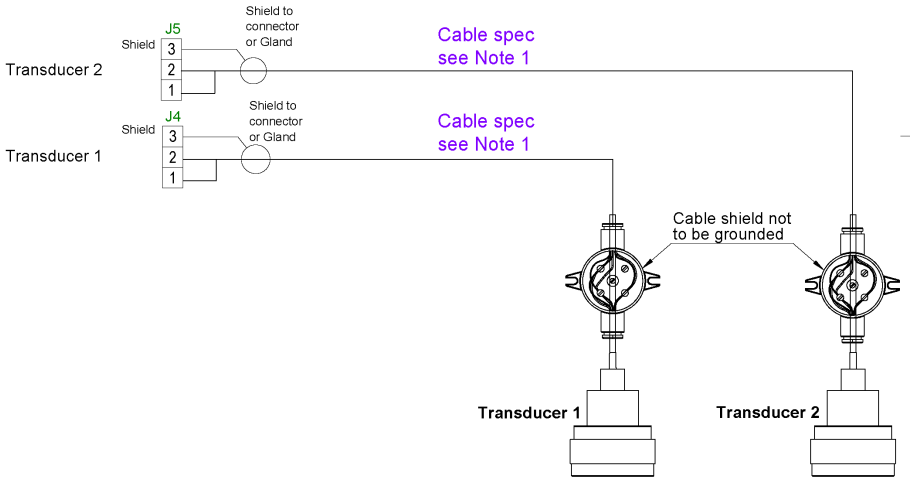
Refer to Jotron SKIPPER's installation procedures in the appendix and on our website www.skipper.no regarding information about sea valve, tank installation, welding, cable glands etc.

3.2.1 Wiring

The transceiver unit may be positioned in any suitable dry area (IP56) between display unit and transducer. Typically positioned near the bridge area for easy access to 24 VDC.

If the transducer(s) are forward, then there is an alternative to position the transducer in bow area closer to the transducer to avoid any electronic noise on the analogue signal between the transducer and transceiver.





Note 1

Length of cable	Cable Area
0-100	1,5mm²
100-300	2,5mm²
>300	JB50E1 unit to be mounted in Bow

Transducer cable type:

1 x shielded pair (twisted pair recommended if available)

3.2.1.1 Transducer cable

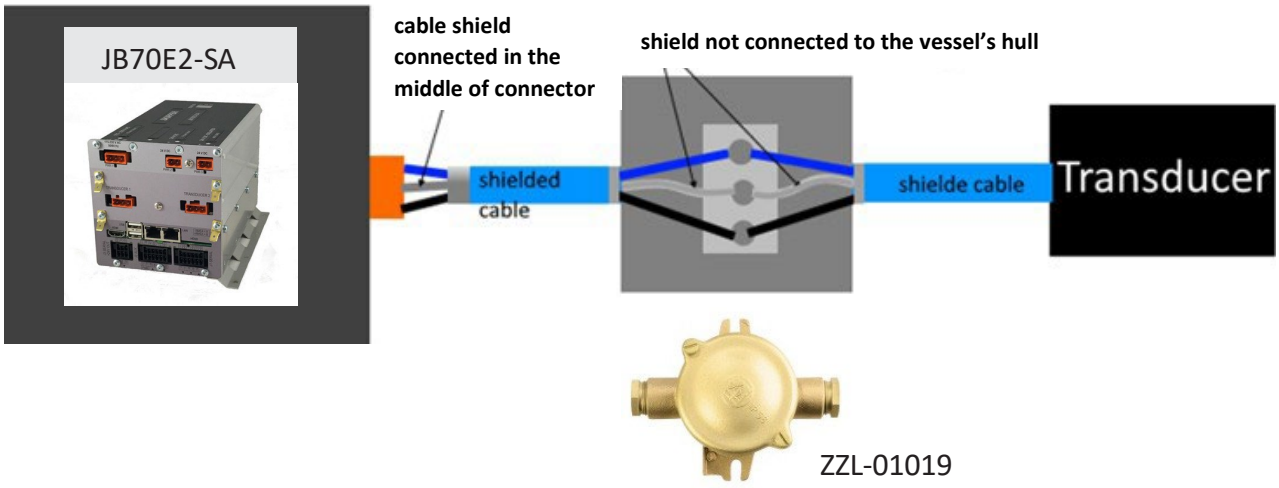
Do not connect unscreened transducer cables close to other electronic cables. The transducer signal is an analog signal vulnerable to external noise. It is important to protect the screened cable from external noise. The screen is a required noise protector all the way from the transducer to the electronic unit JB70E2-SA.

Any terminals/junction boxes in between to extend the cable should be separate grounded metal boxes. (Example ZZL-01019 supplied with all transducers from Jotron SKIPPER.)

The screen of one cable should be connected to the screen of the next cable. Transducer cable dimensions for extending the transducer cable (yard supplied):

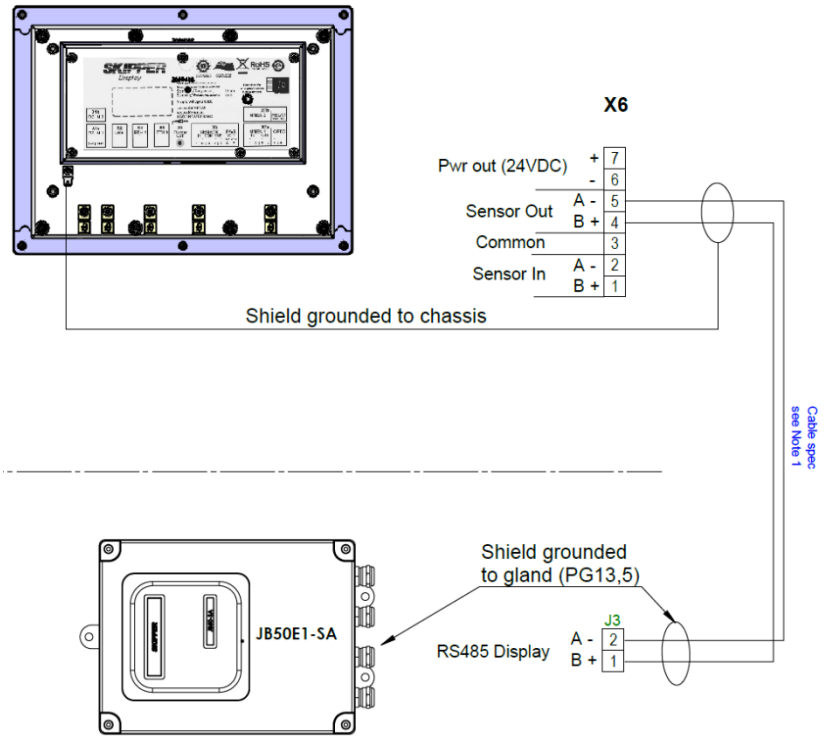
Length	**Transducer cable type:** **1 x shielded pair (twisted pair recommended if available)**
25/40 m	Connected transducer cable
40 – 100 m	1.5 mm
100 – 300 m	2.5 mm

See section 8.5 for more information about correct connection of the transducer.



3.2.1.2 Communication cable ESN100-SC / SB to JB50E1-SA

The communication between the operator display unit ESN100-SC / SB and the transceiver unit JB50E1-SA is a one pair cable, two-way communication, RS485. See below drawing for specs.



Note 1

Communucation cable		
Length of cable	Cable Area	AWG
< 30	≥0,33mm²	22
< 300	≥0,82mm²	18
> 300	≥1,0mm²	17

Figure 1 - ESN100-SC

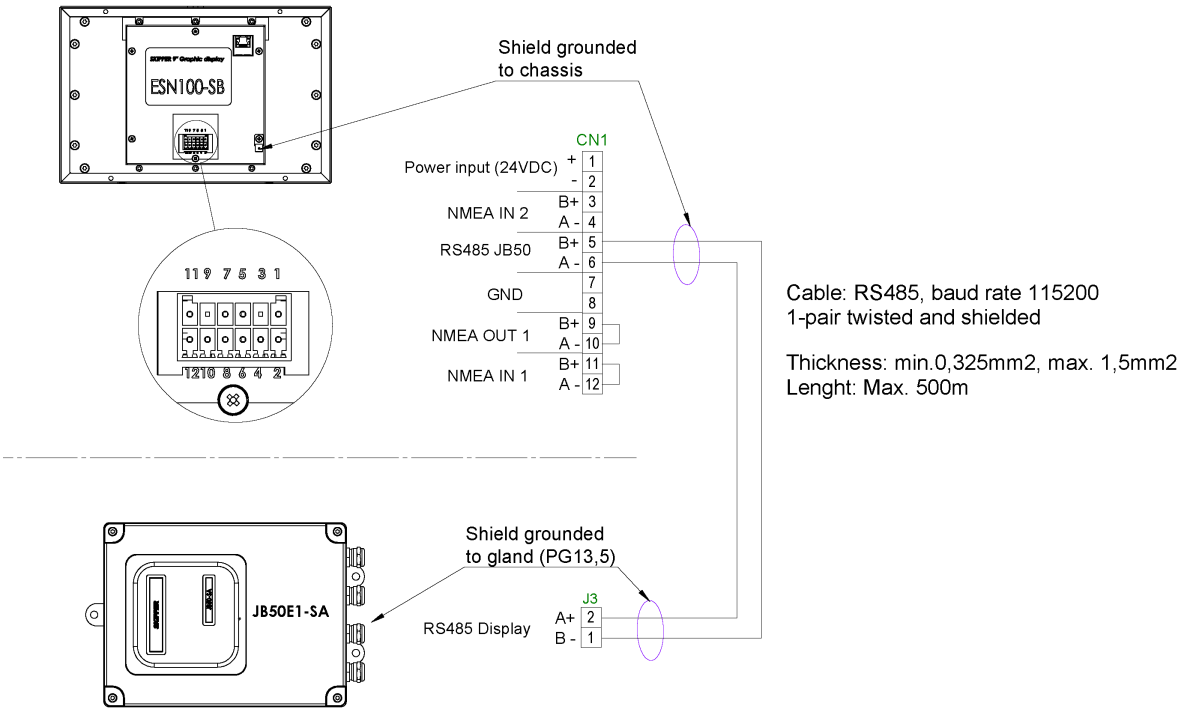


Figure 2 - ESN100-SB

3.2.1.3 Clamping the cables

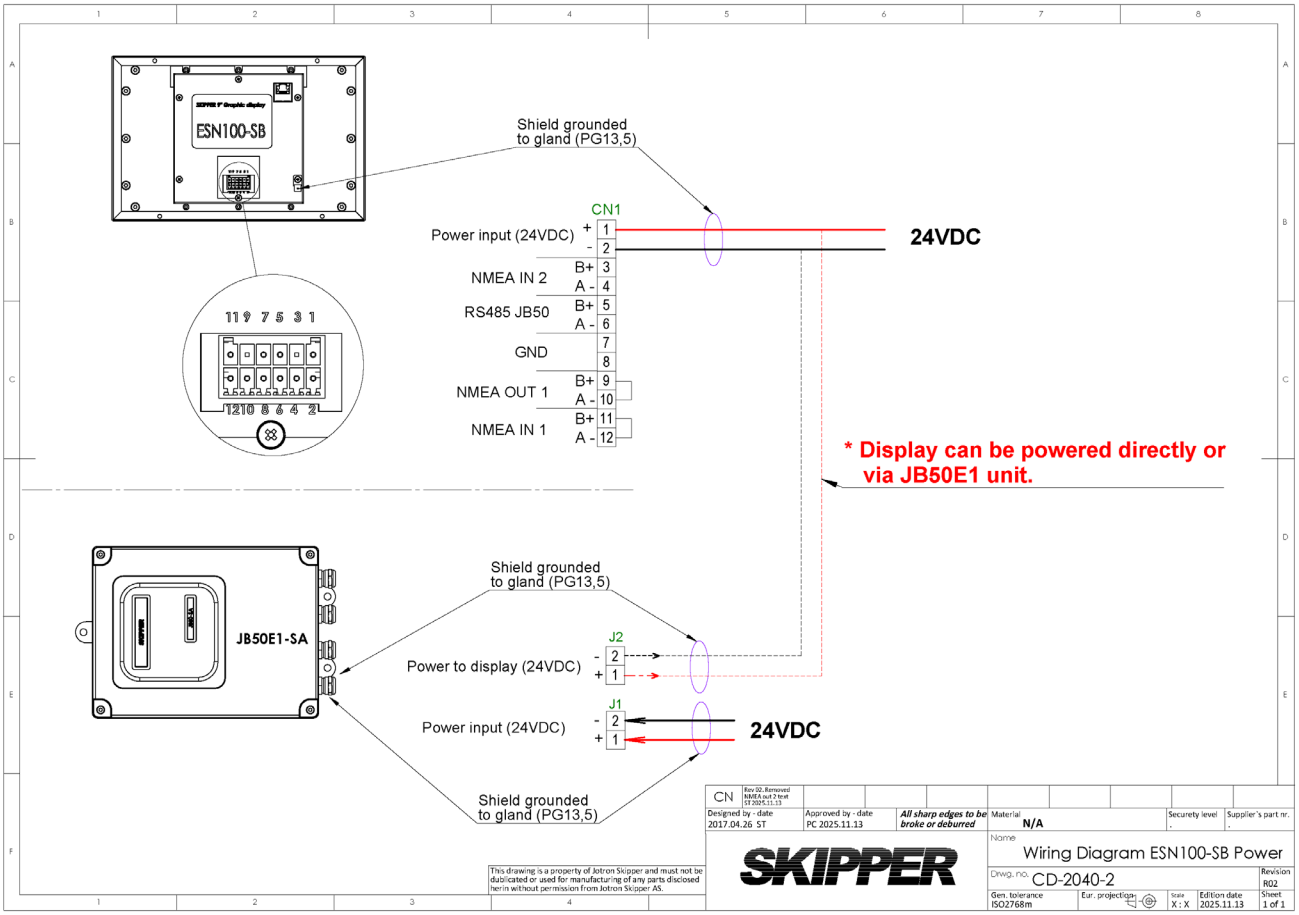
Cables should be connected to WAGO connector, leaving approximately 3 cm of tail. They should be stripped with 6-7 mm of metal showing and these should be connected as in the diagram above. A small screwdriver with blade size approx. 3.5 mm can be used. WAGO part no 210-719 is ideal for this use.

Outer shields should be collected and grounded in a ground stud on the edge of the cabinet. The outer insulation should be cable tied to the plastic handle of the connector and securely anchored nearby. When refitting the plugs, ensure their clips are fully positioned upward.

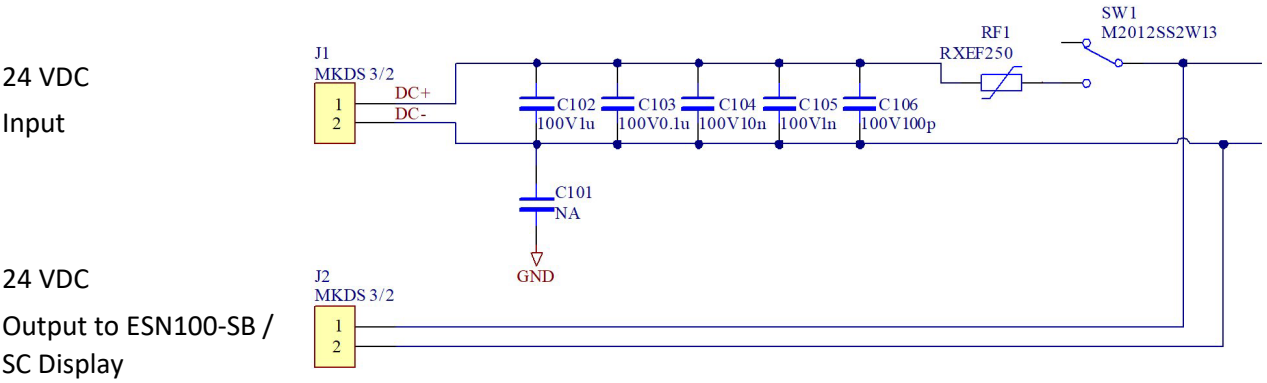
3.2.1.4 24 VDC power

Both the ESN100-SB / SC Display and the Transceiver unit JB50E1-SA require 24 VDC power supply.

Alternative 1: Display powered from JB50E1-SA
In this configuration the system is switched on/off by the power switch inside JB50E1-SA unit.



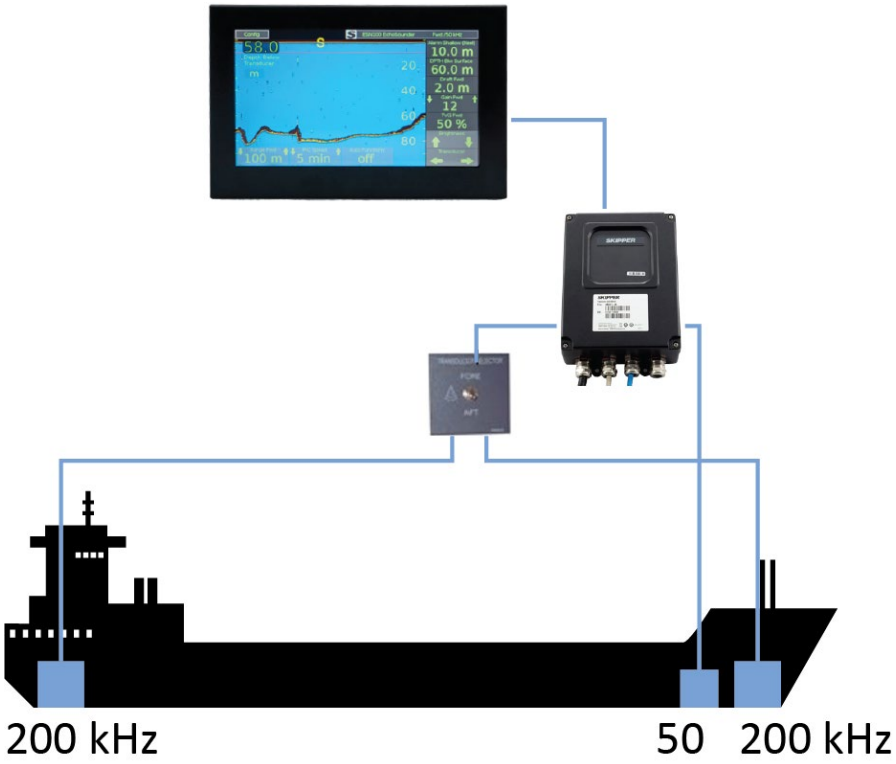
Power input circuitry inside JB50E1-SA with resettable fuse 2,5 A (at 20°C) power on/off switch and available 24 VDC output to display unit.



3.3 Transducer selector

The ESN100 has two transducer terminals that can be selected via software. If more than two transducers are required, a transducer selector switch, ENS518-SA, can be installed.

The transducer selector switch will only be able to select between two transducers of same type and frequency. The ESN100 does not receive selector feedback to indicate whether the fore or aft transducer is selected.



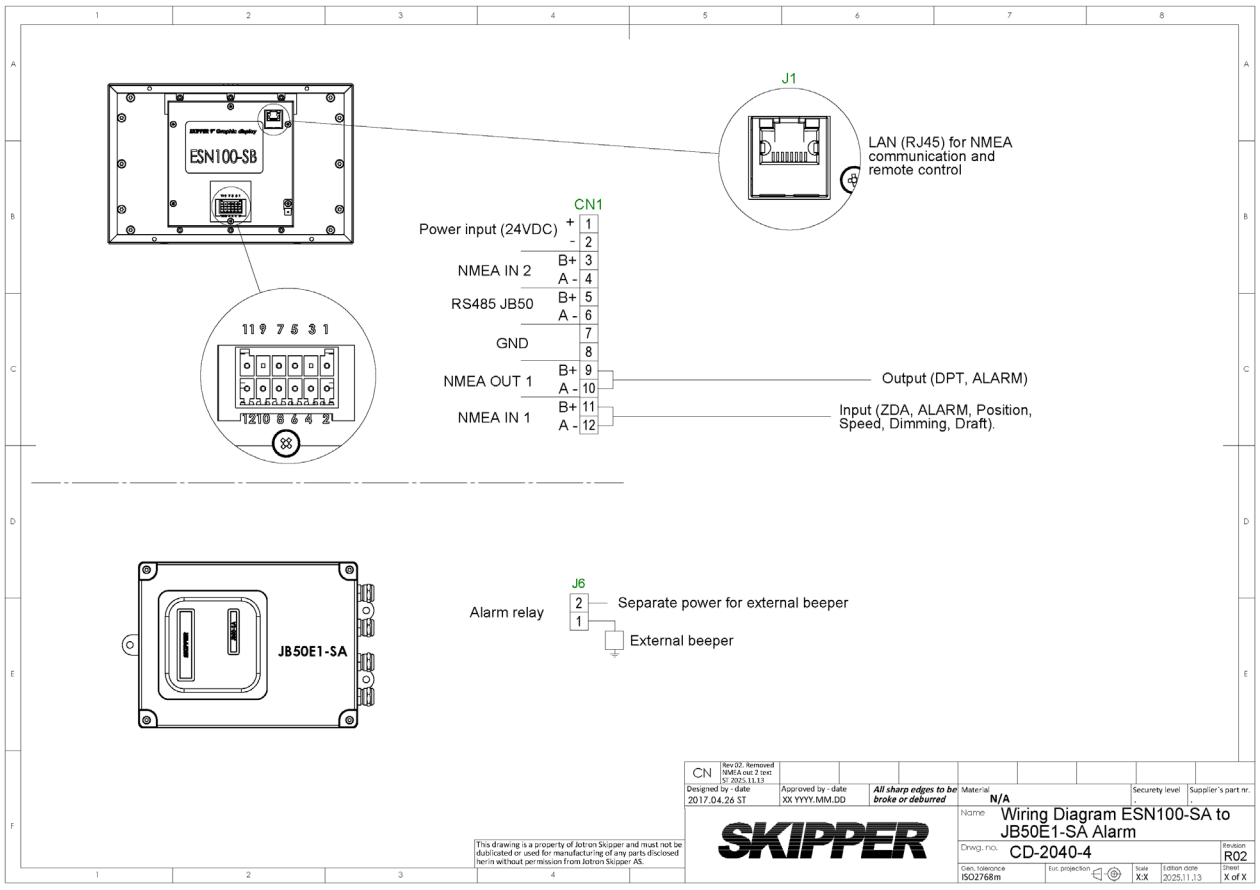
3.4 Alarm

There are a number of alerts available. Shallow water alarm and power failure alert are mandatory. In addition, there is a Deep-water alert, power reduction, system error and time synchronisation alerts. These are sent as alarm/alert sentences on the NMEA and LAN output of the ESN100-SB / SC unit.

The recommended setup of alarms from the navigational echo sounder is that echo sounder alarms are to be connected to CAM (Central Alarm Management). If the system fails, and there is no other system to detect the failure, a relay is available within the JB40POW unit that should be connected to an external beeper.

The ESN100 has two configurations of alarm NMEA formats available in the software setup.
ALF is the NMEA standard complying with IEC62923-1/2:2018 and IEC62288:2021.
ALR is the older standard and may comply with IEC61924-2:2012 and IEC62288:2021 only by connecting the "Power failure alarm relay" in JB50E1-SA to the external CAM. If no CAM is available, a beeper must be connected to the power failure relay in JB50E1-SA, and on "power failure" the beeper will sound.

More information about the alarm settings is available in the alarm setup part of this manual.



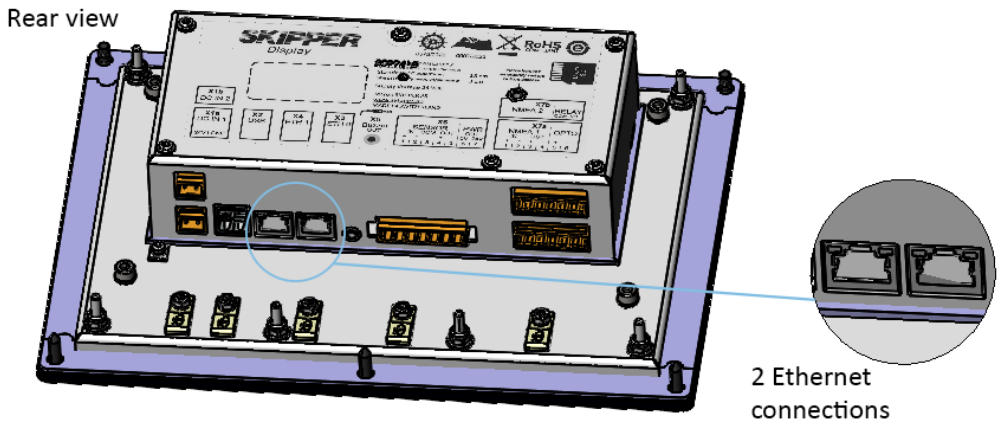
3.5 PC connection

ESN100 can be connected via an ethernet LAN connector to a PC. See section 5.1 for more information.

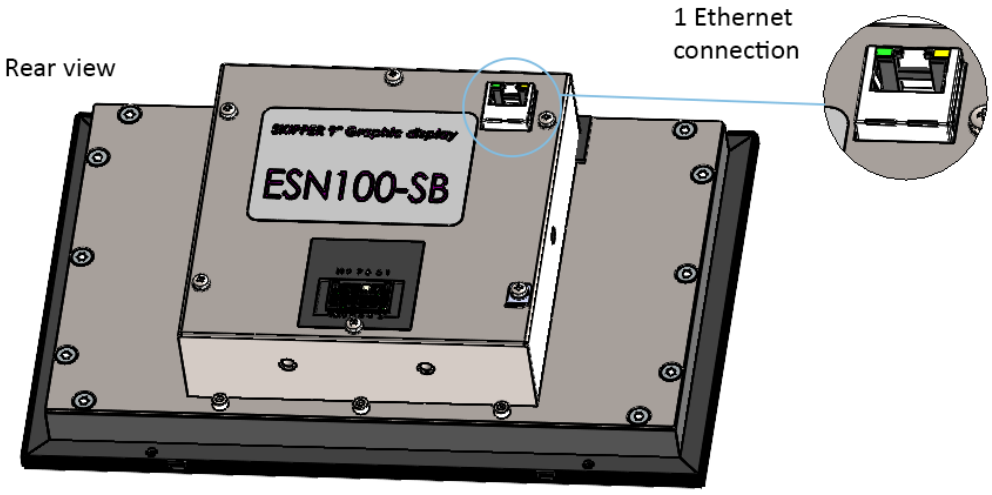
Features available via the ethernet LAN connector to a PC with SKIPPER software:

- Printing. Any printer can be used but the pages are formatted to A4 as standard.
- History download
- Software upgrade

ESN100-SC connection:



ESN100-SB connection:



3.6 Available accessories

The following accessories and options are available. Refer to skipper.no for documentation.

Accessories/Option	Description
SKIPPER IR31DIM NMEA Remote Dimmer	2 Channel NMEA Remote Dimmer
SKIPPER ETT985	Transducer tester, echo sounder tester, and NMEA tester
SKIPPER ENS518 Transducer Selector	Transducer selector

3.7 Installation kits for 10.1” display

The following kits are available for mounting and retrofitting a 10.1" display (CU-M101):

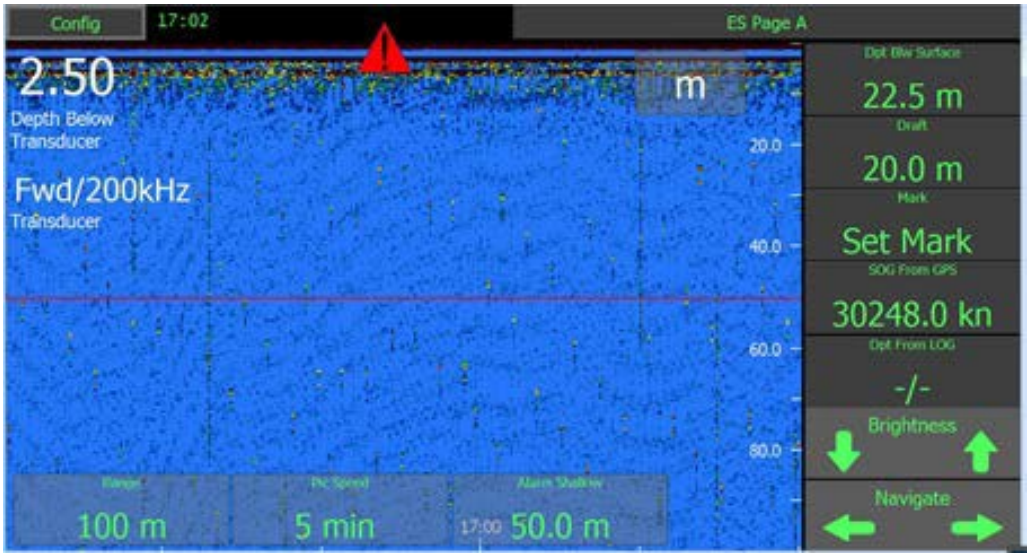
Kit part number	Description
KIT-RETROPLATE-002	Plate with mounting kit for 10.1” display in a ELAC LAZ 5100/5200 hole, flush mount.
KIT-RETROPLATE-003	Plate with mounting kit for 10.1” display in a GDS/DL850 hole, flush mount.
KIT-RETROPLATE-004	Plate with mounting kit for 10.1” display in a GDS/DL850 hole, with back mount of JB70.
KIT-DESKMOUNT-001	Mounting for 10.1” display for mounting to desktop, wall or ceiling, vertically adjustable.

The kits are available to order.

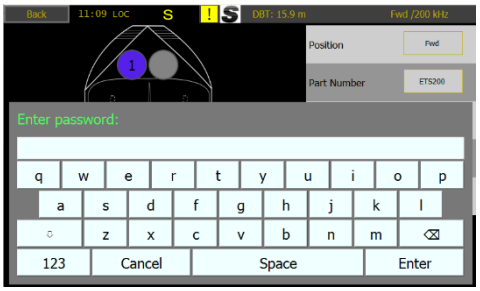
4 Software configuration

4.1 Display description

The display is programmable and can be made to show what the user wishes. It consists of 5 pieces of information on the right and 3 on the bottom. This information can show parameters of the system, or parameters being sent into the system from other equipment. After a short time, the parameters will slide off the screen. Touching the screen will make them return.



All these parameters are selected by default but can be changed to show whatever the user chooses. See the User Guide Runtime screen setup.

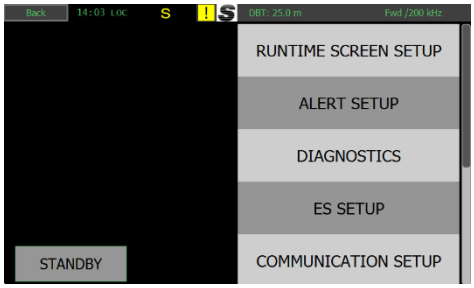


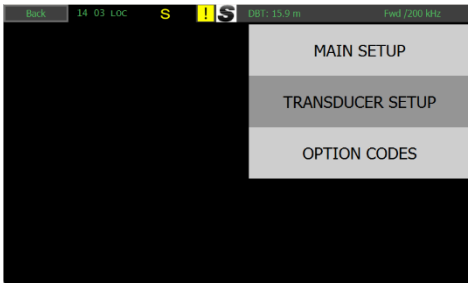
A password is required for some parameters, e.g. transducer and output settings.

The password for all units is ‘service’. The password will be remembered for 1 hour, or until the system reboots.

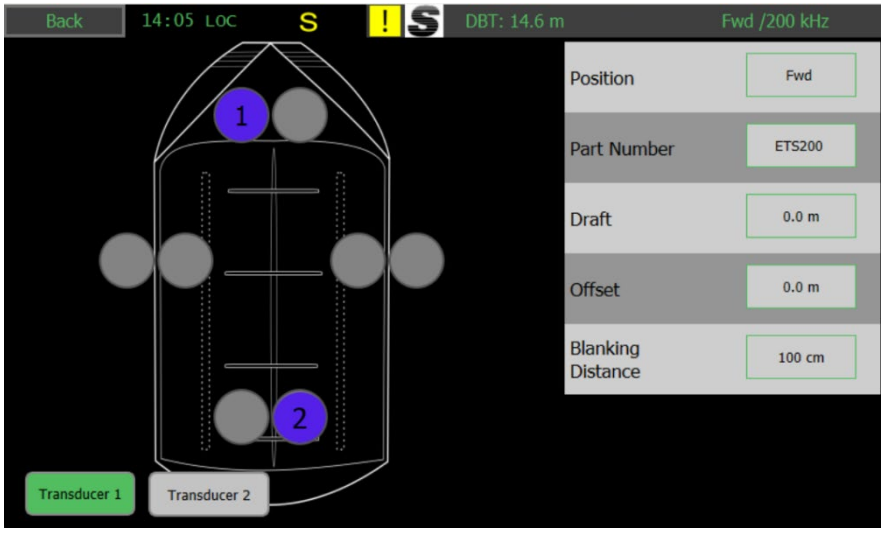
4.2 Transducer setup

Once connected, the system requires the installer to identify which transducer is connected to which of the 2 connectors. Both connectors can have a 50, 200 or combined 50/200 transducer fitted. To select the correct fixture, start the system and go to the Config menus, and then the ES setup.

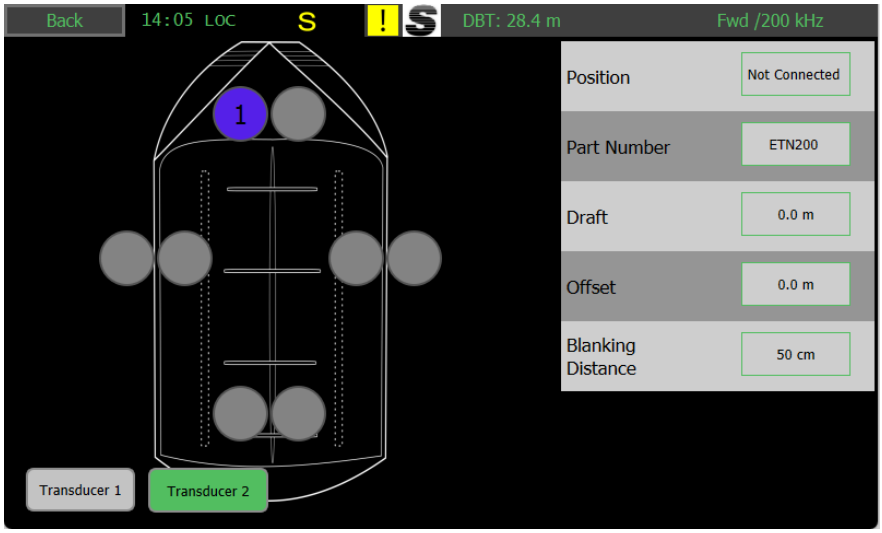




Here you can select the Transducer menu and by clicking on the transducer connector port you can move the transducer to the appropriate area of the vessel, and select the transducer, by part number. This will change the parameters to match your transducer.



If only one transducer is installed (to transducer 1), then “Transducer 2” must be set to position “Not connected”.



Selectable transducer types

Part number	Type	Approved for use
ETN050	50 kHz of types ETN50(X)G, ETN50(X)T	Yes
ETN200	200kHz of types ETN200(X)T	Yes
ETN200S	200kHz of type ETN200S(X)G, ETN200S(X)G	Yes
ETS50200	Combined 50 and 200kHz of types ETS50200(X)G and ETN50200(X)T	Yes
Other 50 kHz	Any other 50 kHz*	No
Other 200 kHz	Any other 200 kHz*	No

*max power from system is 600W. Transducers that are not SKIPPER-approved should be checked to ensure they can handle this power level.

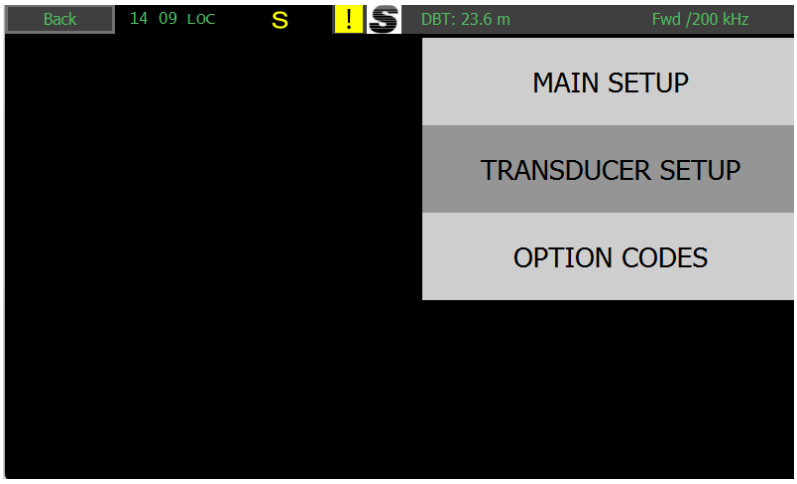
Standard transducers have the required values set for “Max power” and “Max range”. These can be changed in the ‘Other’ settings. See section ‘Other Transducers’.

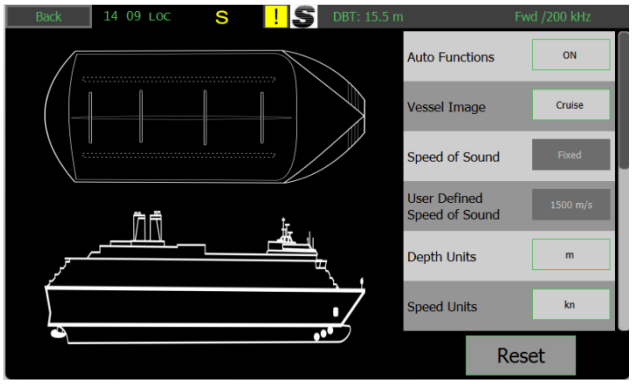
At least 1 installed transducer should be within the SKIPPER-approved list.

When the transducer setup is completed, run the diagnostic tests. See section 6.5.

4.3 Other echosounder parameters (Main setup)

Other echosounder parameters are set by default but can be adjusted in the ES menu if required. Some parameters and functions must be activated using a code number in the option codes tab. This is to prevent users inadvertently changing parameters that can make the system perform poorly.



Screen Main setup	
	Auto functions will take control of range gain (and frequency)
	Change the design of the vessel in the menus
	Acoustics, ping method (not in use)
	Speed of sound can be changed with an option or with a temperature input
	User can define the sound speed with an option
	The depth scale (also available on screen)
	Reset will reset the settings to default

4.4 NMEA in/out setup

The system has an internal RS485(isolated) communication to the transceiver. To the outside world it has:

- 2 x NMEA (IEC61162-1) Inputs
- 1 x NMEA (IEC61162-1) Output
- 1 x LAN (IEC61192-450) Port (In/Out)

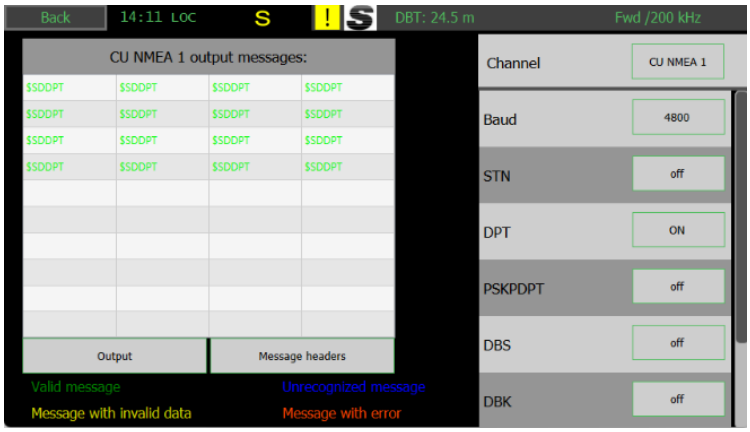
This port can provide communication both by TCP/IP V4.0 or using IEC61162-450. If being used it requires a network that does not exceed 20Mbits/second. The system will exert/receive a maximum load of 40 datagrams/second.

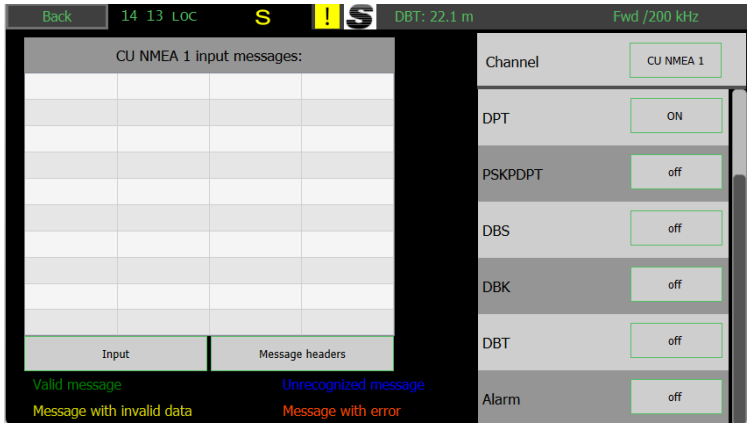
The communications menu allows the NMEA messages to be selected for the output.

4.4.1 NMEA outputs

By default, the DPT and ALARM outputs are configured to use the ALF version of the standard. NMEA style sentences will be shown as the 3-letter mnemonic when the sentence is sent or received.

The left side displays a terminal emulator showing input or output messages for the selected channel. Press “Message headers” to show the full message.





Channel	The selected channel (NMEA 1 or UDP)
Baud	The Baud rate output (4800, 32400 or 115200)
STN (default OFF)	$SDSTN A message to say which channel source the following data is from.
DPT (default ON)	$SDDPT Depth below Transducer, offset to keel, Max range
PSKPDPT (default ON)	$PSKPDPT Depth below transducer, offset to keel, max range, quality level (1-9), text
DBS (default OFF)	$SDDBS Depth below surface in feet, meters, fathoms
DBK (default OFF)	$SDDBK Depth below keel in feet, meters, fathoms
DBT (default OFF)	$SDDBT Depth below transducer in feet, meters, fathoms
Alarm (default ON)	$SDALR, $SDALF, $SDALC The selected alarm type (ALF or ALR) will be sent via this port. See section “Alert setup and usage”

Exact formats for these sentences can be found in the relevant IEC standards. PSKP sentences are proprietary for SKIPPER and have the following format.

$PSKPDPT,x.x,x.x,x.x,xx,xx,c--c*hh<CR><LF>	
| | | | | | |_____	Check sum
| | | | | |_____	Transducer location AFT, FWD, PORT, STB
| | | | |_____	Echo sounder channel number
| | | |_____	Signal strength
| | |_____	Maximum range scale in use, meters
| |_____	Offset to keel, meters
|_____	Water depth relative to transducer, meters

Example $PSKPDPT,3.7,0.0,500.0,,1,FWD*11

4.4.2 NMEA inputs

The ESN100 does not have any internal clock. Time from NMEA input is recommended to be installed: Time. ZDA. Also accept GGA, GLL, RMC.

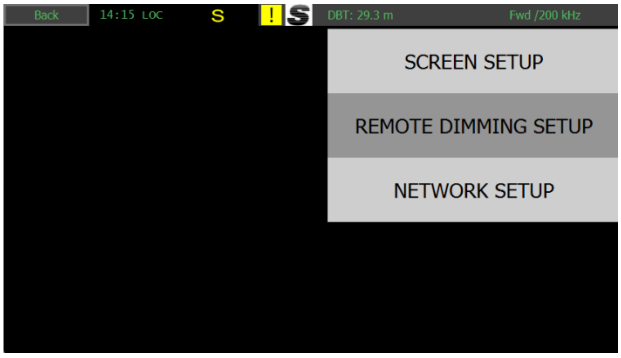
All accepted NMEA inputs will be logged in the history file.

Format	**Function**
$_DDC,X,yy,X,C*nn	Dimming function X = O, N, K, D, YY is % the system will accept X and adjust to the user set level (See dimming).
$_ACK,xxx*nn	Acknowledge alarm ALR
$--ACN,hhmmss.ss, aaa, x.x, x.x, c, a*hh	Acknowledge alarm ALF
$HBT	Alert heartbeat
$____XDR,D,x.x,M,pos,D,x.x,M,pos,D,x.x, M,pos,*nn	Draft sensor depth values. x.x - draft value pos - transducer position (fwd, aft, prt, str)
$GPZDA,	Time and local time. The system will show UTC or Local time if available in the message
$GPVTG	GPS Speed
$GPGGA	GPS time and Position
$GPGLL	GPS time and Position
$--RMC	Time, Position and speed
$--HDT	Heading true
$--THS	True heading and status
$--ROT	Rate of turn
$--VBW	Speed through water (STW) and speed over ground (SOG). Longitudinal + Transversal.
$IIDPT	Depth from doppler speed log
$--SRP	Identification

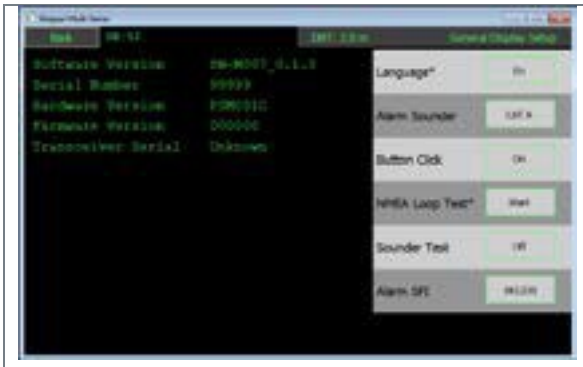
The communications on NMEA are 4800, 8 data bits, 1 stop bit. Baud rate can be changed to 38400 or 115200.

4.5 Display setup

The Display setup menu gives access to the system parameters, the dimming set up and the network parameters.



4.5.1 General screen setup



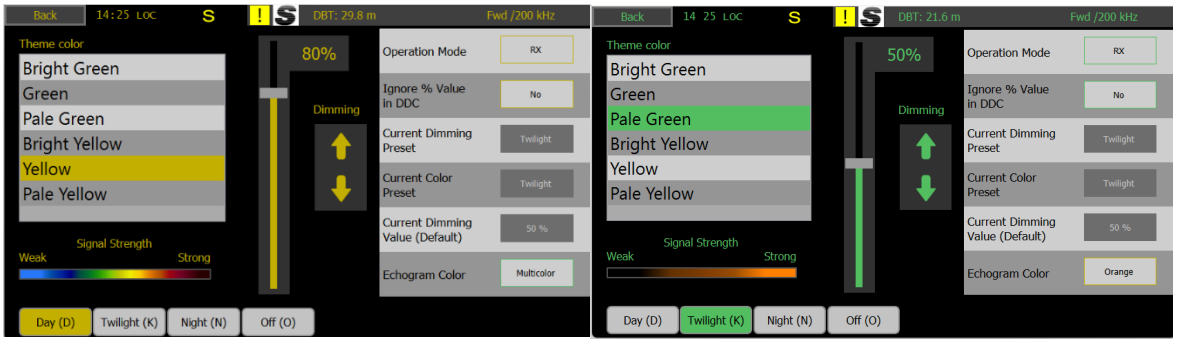
Software version can be updated via Service software
Serial number of this product
Hardware and firmware version and serial number of the JB50E1 transceiver unit

Language: only English is currently available
Alarm Sounder: on / off (Fixed on in ALF mode)
Button Click: sound feedback when touching the screen.
NMEA Loop Test: self-test on this screen.
Sounder Test: this will beep at full volume.

This screen is used to configure the control unit's hardware parameters.

4.5.2 Dimming setup

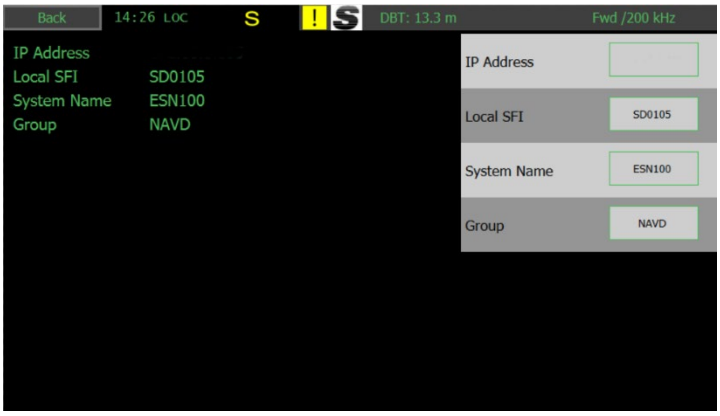
Use this screen to configure the Dimming levels. The user can select dimming and colour choices for the 4 preset levels that can be sent remotely (using DDC NMEA command). When the on-screen dimming is used, the colour scheme will change when the dimming level passes the set % value.



4.5.3 Network setup

The system uses TCP/IP for upgrade, and as default it is set to 172.16.1.105. Subnet mask is set to 255.255.255.0. The system allows use of private IP addresses, including the recommended IP addresses according to the standard. If a non-recommended IP address is entered, a pop-up warning will show, and the colour of the IP address on screen will be orange. Only static addresses can be used.

The system uses the IEC61162-450 (2018) LWE communication standard. This uses a multicast methodology, where NMEA style messages are sent on one of a number of multicast addresses/ports, as specified in the standard. These are called transmission groups, and the natural group for the system is navigation 'NAVD'. Messages are sent using the datagram type UdPbC, and RaUdP is used for echogram data. At startup, an Identification message (SRP) is sent via the NETA group, which is dedicated for this purpose according to the standard. This information will give the System Function Identifier (SFI), MAC address and the IP address.



This standard requires a unique identifier for this equipment. This is called the System Function Identifier (SFI). The default setting is SD0105, but it should be changed if multiple devices are connected to the network. The SFI is made up of 2 letters 'SD' as designated for an echosounder, and 4 digits from 0001 to 9999. This allows the equipment to identify itself to other devices and filter which messages are aimed for this device.

SFI and IP address can also be adjusted using the SKIPPER service software. UDP messages can also be viewed from this software.

The messages sent can use the following tag blocks as defined in the standard: s:,d:,g:,x:,z:,n:

4.6 Alert setup

There are three levels of alerts:

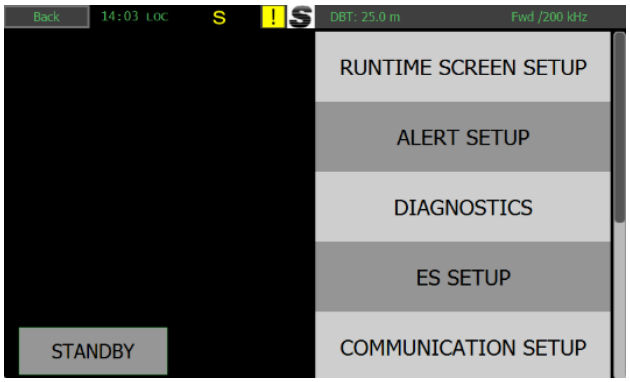
Alarm		Shallow water	Most critical alert
Warming		Example: Power failure	Less critical alert
Caution		Example: Deep water	Least critical alert

The echosounder's "Shallow water" alarm is safety-critical and should be configured to require the user to view the echogram screen to acknowledge the alarm. This ensures that the user can see the history of the water getting shallower.

"Shallow water" is classed as a category A alarm. On a single channel ESN100 the shallow alarm will be triggered when the depth goes from deeper area and passes the alarm limit on the active transducer.

If the system is part of an approved INS system with the capability of showing the echogram on other devices, the system can be classed as Category B. This allows the alarm to be acknowledged from that system. Responsibility transfer of this alarm will only be available in the CAT B mode.

The system has an internal alarm sounder, that can be disabled for CAT B usage on the display menu.



The ESN100 can be made to handle alerts using the ALR/ACK protocol or the ALF/ACN/ALC Protocol. The Protocol is selected on the config – Alert setup page.

The system is compliant with the 2018 version of IEC62923, and ISO9875(2023). Changes in the ISO standard clarify that the shallow water (Depth unsafe) alert should be of category B. This means an attached CAM/BAM may remotely acknowledge the alert. In this case it is no longer necessary to go to the echosounder to acknowledge the alert. And in the case of an active remote CAM/BAM, the responsibility for making the alert beeps may be moved to the CAM/BAM. In this case the sounder on the unit can be disabled. The system has this as default, however it is possible to run the system as category A for older system configurations by changing the Alert options.

Alerts can be configured by category on the Alert setup page, with each assigned an alert ID specified in the standard. Alerts may be disabled if required.

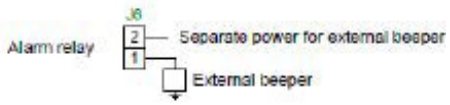
Multiple alerts may appear as symbols on the runtime screen. Tap a symbol for details, or press '?' in the alert dropdown to open the diagnostic screen for more information about the cause.

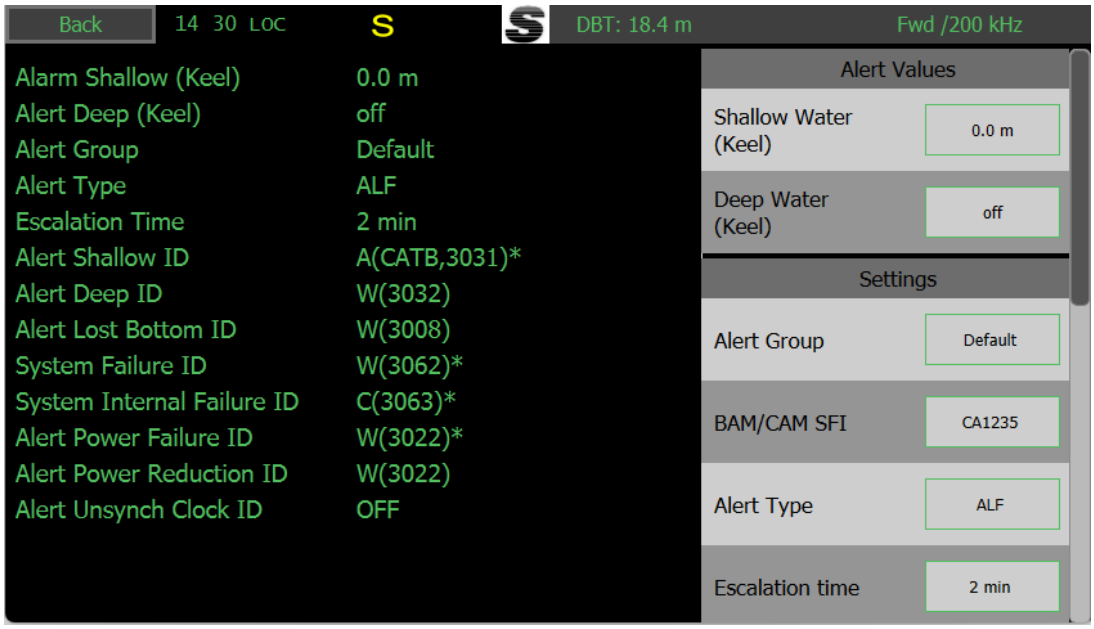
Alerts will be logged in the 24h history and can be seen in the table view or on the history screen using the mark feature.

The alerts will be sent out using the IEC61162-1/NMEA and IEC61162-450 LWE standard sentences. Aggregation is not in use for these sentences.

Responsibility transfer is available on all Category B warnings and alarms. This means the alert on Serial output will be present slightly before the alert shows on screen.

The system has a relay to indicate power failure in the JB50 transceiver unit. This will indicate failure in all parts of the system. If the connected CAM / INS cannot detect a loss of signal from the ESN100, it should be connected to a buzzer for an audible signal in case of power failure.





4.6.1 Alert values

Alert	Range	Default
Shallow water (Keel)	1-99 m	10m
Deep Water (Keel)	2-5000m Can not be less than shallow water alarm	OFF

4.6.2 Settings

Setting	Selection	Default	Description
Alert group	DEFAULT, CAM1, CAM2, BAM1, BAM2	Default	The LWE group for alert messages to be sent on Default is the group set for the system in Screen setup - Networks
BAM/CAM SFI	XXYYYY (X is letter, Y is number)	CA1235	The Identity of the centralised alarm system (normally CA or IN)
Alert type	ALF, ALR	ALF	The type of alert messages to be sent, ALF or ALR with or without acknowledge of shallow water
Escalation time	1m, 2,3,4,5 m	2 min	If escalation is selected on a warning, this becomes an alarm after this time.

4.6.3 Alarm sentences

The serial sentences follow the latest standards. ALF messages are in some cases accompanied by a second ALF message with additional alert information.

$SDALF,2,1,2,140311.11,B,C,N,,3119,8,4,0,UNSYNC CLOCK*64

$SDALF,2,2,2,,,,,,3119,8,4,0,NO EXTERNAL CLOCK INPUT*56

$SDALF,2,1,3,140330.30,B,A,V,,3031,1,1,0,SHALLOW WATER*3B

$SDALF,2,2,3,,,,,,3031,1,1,0,DEPTH BELOW KEEL < 10 M*3B

$SDALF,2,1,4,140330.30,B,W,V,,3032,2,1,0,DEEP WATER*7C

$SDALF,2,2,4,,,,,,3032,2,1,0,DEPTH BELOW KEEL > 0 M*0F

$SDALF,2,1,5,140330.30,B,W,V,,3008,3,1,0,LOST BOTTOM*3F

$SDALF,2,2,5,,,,,,3008,3,1,0,NO DEPTH DETECTED*36

$SDALF,2,1,6,140330.30,B,W,V,,3062,4,1,0,SYSTEM ERROR*61

$SDALF,2,2,6,,,,,,3062,4,1,0,SENSOR COMMUNICATIONS*51

$SDALF,2,1,7,140330.30,B,C,V,,3063,5,1,0,INTERNAL ERROR*76

$SDALF,2,2,7,,,,,,3063,5,1,0,SETTING DISRUPTING SYSTEM*3B

$SDALF,2,1,8,140330.30,B,W,V,,3022,6,1,0,POWER FAIL DC*4E

$SDALF,2,2,8,,,,,,3022,6,1,0,VOLTAGE TOO LOW < 12V*57

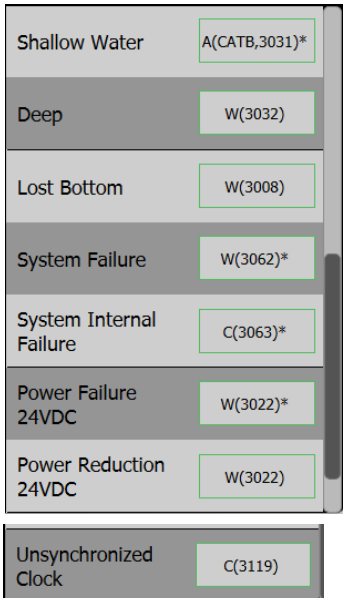
$SDALF,2,1,9,140330.30,B,C,V,,3023,7,1,0,POWER REDUCTION*27

$SDALF,2,2,9,,,,,,3023,7,1,0,JB70 24V < 21V*6B

$SDALC,02,01,21,5,,3031,1,1,,3032,2,1,,3008,3,1,,3062,4,1,,3063,5,1*65

$SDALC,02,02,21,3,,3022,6,1,,3023,7,1,,3119,8,1*6A

4.6.4 Alert



All alerts are category B unless otherwise stated. Responsibility can be transferred on all category B alerts and warnings.

The system will only support 1 instance of each type of alert at a time.

Aggregation is not supported.

The system can be locally or remotely silenced for a period of 30 seconds. After this time the audible signal will return. New alerts that occur during the silenced time will sound even in this period.

Alert title	Alert message	Description	Alert types selectable	Default	Alert ID ALF	Alert ID ALR	Remote Ack
Shallow water	SHALLOW WATER	DEPTH BELOW KEEL <xx M	• ALF CatA • ALF CatB	ALF CatA	3031	230	• No • Yes
Deep Water	DEEP WATER	DEPTH BELOW KEEL > xx M	• Caution • Warning • OFF	Caution	3033 3032	457 456	• No • Yes
Lost bottom	LOST BOTTOM	NO DEPTH DETECTED	• Caution • Warning • OFF	OFF	3009 3008	346 345	• No • Yes
System error	SYSTEM ERROR	SENSOR COMMUNICATIONS or DISPLAY COMMUNICATIONS	• Caution • Warning W-A (warning with escalation to alarm) • Warning • OFF	Warning	3062 3016 3015	458 457	• No • Yes
System internal failure	INTERNAL ERROR	SETTING DISRUPTING SYSTEM	• Caution • Warning • OFF	OFF	3063 3062	459 458	• No • Yes
Power failure 24VDC	POWER FAIL	DISPLAY 24V < 12V TRANSCEIVER 24V < 12V VOLTAGE TOO LOW <12V	• Warning • OFF	Off	3023 3022	460	• Yes
Power failure AC	POWER FAIL	JB70 AC MISSING	• Warning • OFF	Off	3023 3022	460	• Yes
Power reduction 24VDC	POWER REDUCTION	DISPLAY 24V < 21V DISPLAY 24V > 30V TRANSCEIVER 24V <21V TRANSCEIVER 24V >30V ALL 24V<21V ALL 24V>30V	• Warning • OFF	Off	3023 3022	460	• Yes
Power reduction AC	POWER REDUCTION	JB70 AC TOO LOW VOLTAGE	• Warning • OFF	Off	3023 3022	460	• Yes
Unsynchro-nised clock	UNSYNC CLOCK	NO EXTERNAL CLOCK INPUT	• Caution • OFF	Off	3119	119	• No

Shallow water alarm: The Shallow water alarm is mandatory, but can be used in one of 2 methods

- CAT A ALF/ACN/ALC: The newer IEC62923 standard allowing the system. In this mode no remote status operations are available, the system cannot be remotely acknowledged. Remote silencing is available.
- CAT B ALF/ACN/ALC: The system is connected to an approved INS, all remote functions are available.

Extra comments:
A number of alerts will provide a second sentence with some diagnostic help, stating which part of the system has the error and what the probable cause is.

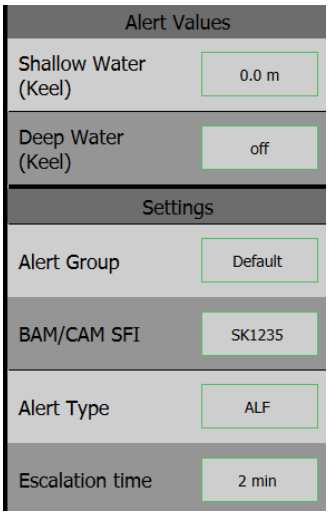
Internal errors are caused by the settings on the system.
System failure means the system is not working to specification.

Escalation

Escalation is the process of reminding the bridge staff that a warning has not been handled. The user can set a time that the system will wait before reminding. Escalation can either be sending a new message of the same status (warning) or can change the warning to an alarm, thereby demanding attention.

4.6.4.1 Values and settings

Shallow Water (keel)	The user-defined value that triggers the alarm as the vessel approaches shallow water.
Deep Water (keel)	A second warning/caution triggered if the vessel goes deeper than the specified value. Setting value to zero will deactivate them.
Settings	
Alert Group	The system will communicate with a CAM using a group. The default of this system is NAV, but this can be changed in the screen setup. Communication with the alarm management can also be via a second group, such as CAM1 or BAM1. This can be selected here, and in that case the alarm messages will be sent to this group only.
BAM/CAM SFI	The alarm management system will have a unique system function identity. This can be entered here. Communication with this is normally point to point, and other systems will not be able to send commands to this system.
Alert type	This setting lets you choose between the current alert method (ALF/ACNALC) and the legacy format (ALR/ ACK). Alert IDs will update automatically to comply with the standard.
Escalation time	The amount of time a warning can remain unhandled, before resending, or changing to alarm status.



4.6.4.2 Alert states

The following symbols indicate the current alert status

Symbol alarm	Symbol warning	Symbol caution	Alarm/Alert Status	Sound for Shallow water (Alarm)	Sound for other warnings
			Unrectified, unacknowledged	3 beeps	2 beeps
			Rectified, unacknowledged	No beep	No beep
			Unrectified, acknowledged	No beep	No beep
No symbol			Rectified, acknowledge (Normal)	No beep	No beep
			Silenced alarm	No beep for 30 seconds	No beep for 30 seconds
			Responsibility transferred	No beep	No beep
			Caution	No beep	No beep

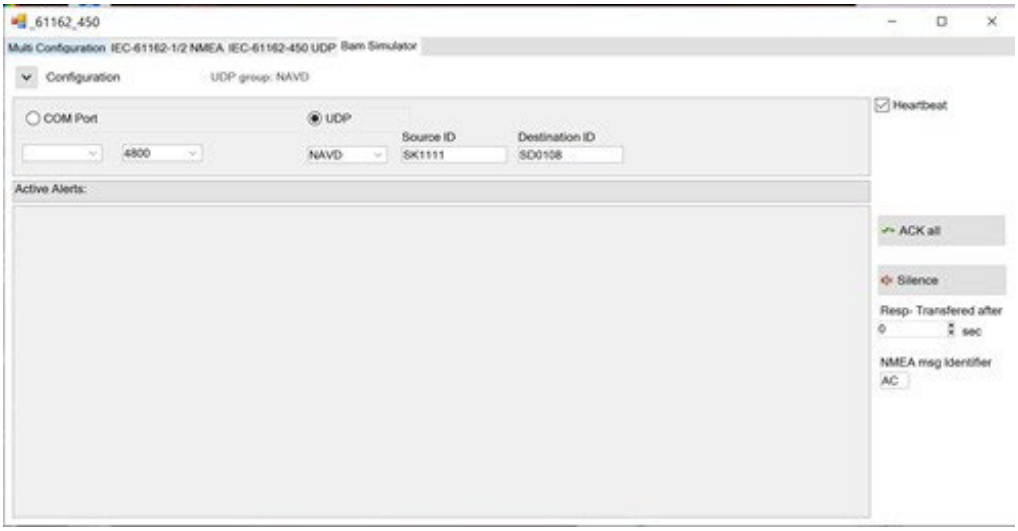
If responsibility is transferred, the alert is being handled by another equipment, and the system cannot be acknowledged locally (but can be acknowledged by the remote system). When the alarm is rectified, it will disappear from the system.

Example:

If connected to a central alarm management system, and this fails, the lack of an HBT NMEA message from the CAM will cause the system to take back control after a little more than a minute.

4.6.4.3 Diagnostics of alerts

The SKIPPER service software contains a BAM simulator within the Communications/Terminal Emulator application, enabling users to test, acknowledge and transfer responsibility, while displaying alerts and their current statuses. See section 4.6.3 for an overview of the alarm sentences.



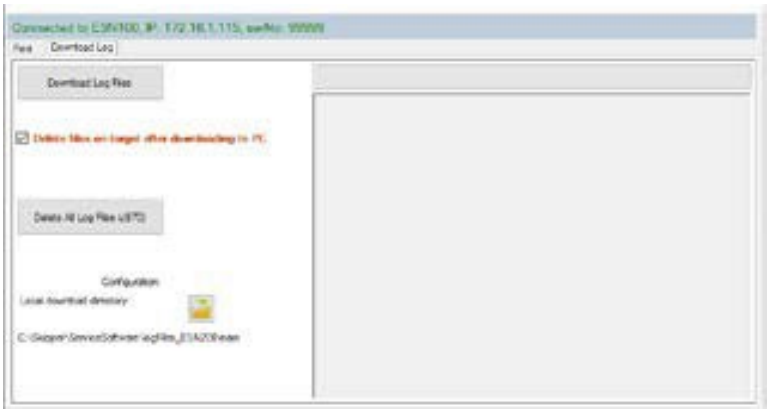
4.7 Download recorded data

The internally recorded files can be downloaded for diagnostics using the ‘Download log’ tab.

Set the desired folder for the data to be downloaded to, and whether to delete the files on the display, giving more room.

Files available for download are:

- History files in PDF format. The PDF files are the same files as being printed. The system has about 2 days of files stored.
- Raw data for diagnostics. May be sent to SKIPPER for evaluation. Latest 2 hours are stored.



5 System configuration

5.1 PC connection

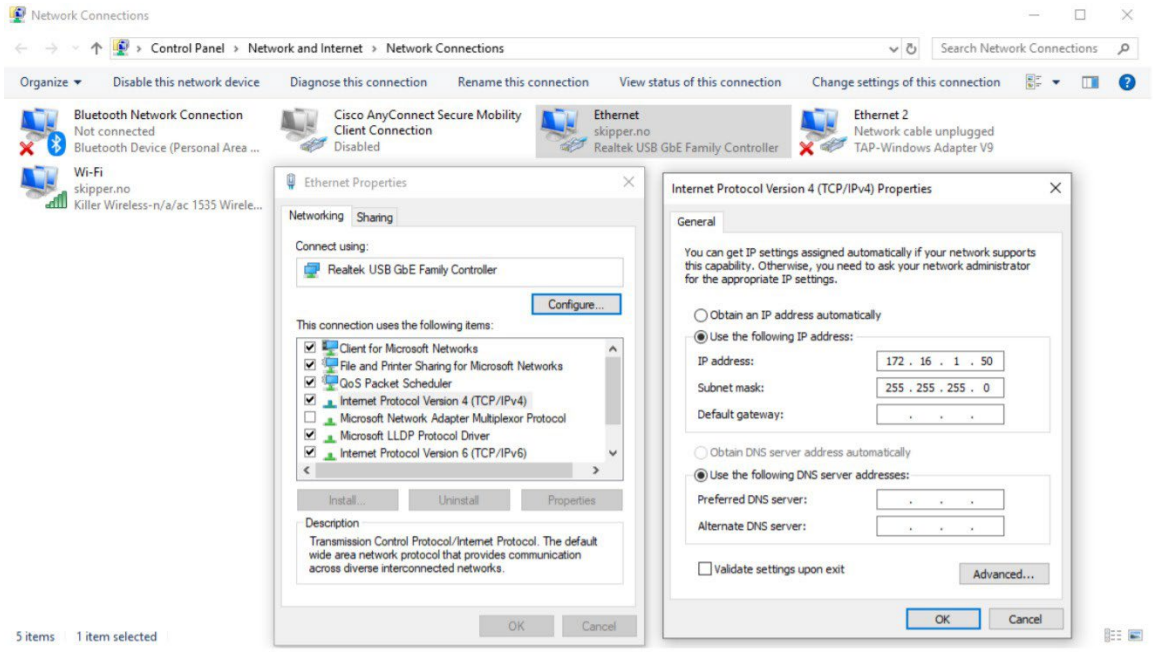
Some features are only available via the ethernet LAN connector to a PC with SKIPPER software:

- Printing
- History download
- Software upgrade
- Diagnostics of alerts

The PC ethernet adaptor to be connected to the ESN100 needs to be preconfigured to be on the same subnet mask as the ESN100. e.g. 172.16.1.xxx (The ESN100 default IP address is 172.16.1.105.)

Setting up static IP address in Windows:

1. Click Start menu > Control panel > Network and sharing center or Network and internet > Network and sharing center.
2. Click change adaptor settings.
3. Right click on local area connection.
4. Click properties.
5. Select Internet protocol version 4 (TCP/IPv4)
6. Click properties.
7. Select Use the following IP address



Install the stand-alone software “ESN printing.exe” or “SKIPPER service software”.

5.2 Upgrading software

Software upgrade of ESN100-SB / SC is performed in the SKIPPER service software tool.
Latest ESN100-SB / SC software is available for download at www.skipper.no.

1. Select “Echosounder” > “ESN100”

2. Select “Echosounder” > “ESN100”

5.3 Printing

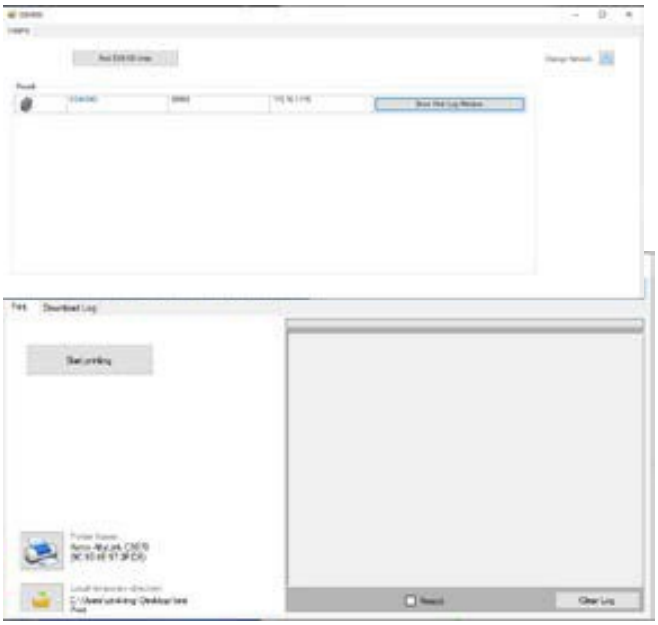
5.3.1 Printing setup on PC

The printer will print a full page of information approximately every 15 minutes. The printed page is in a .pdf format and uses the local pdf driver of the PC. If the format is wrong, we recommend using the windows PDF or Adobe Acrobat drivers.

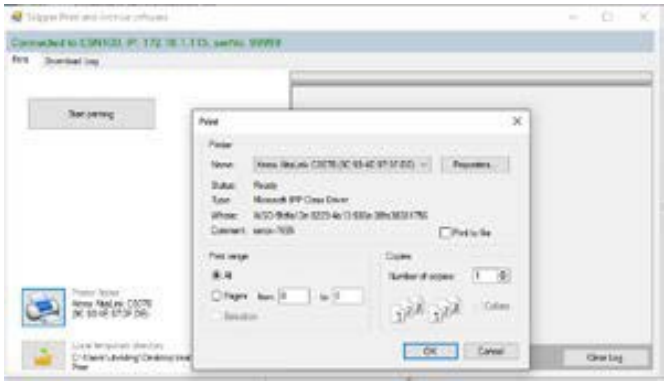
Both the PC connected to printer and the ESN100 must be set up correctly to be able to print.

In the SKIPPER service software:

1. Select ESN100 > Select the printer tab. (Software download available from www.skipper.no)



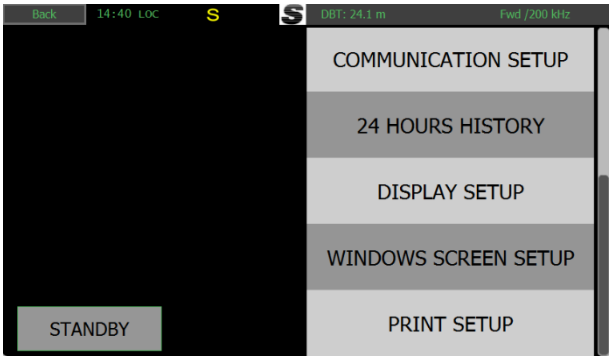
2. Search for the ESN100 system to be connected to.
3. Click on the “Show print / Logfile” button.



4. Select the printer to be used.
5. Select a temporary file if you do not wish to use the default.
6. Press “Start printing”.
7. Follow the connection and process details on the Log screen.

5.3.2 Printing setup on ESN100

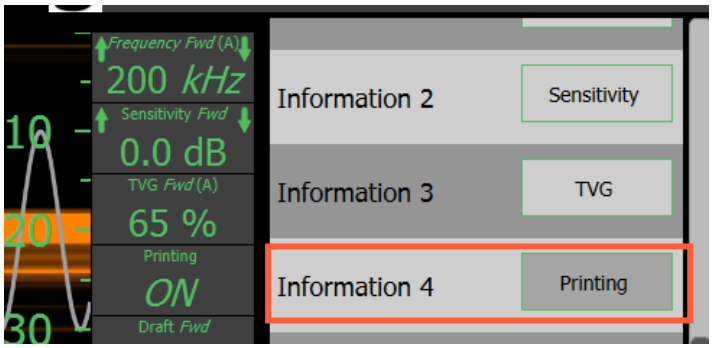
On the ESN “Config” display, the ‘Print Setup’ menu lets you choose what information will be printed.



Echogram with relevant information, or/and a table of marks, giving time and depth when changes have been made to the system, or alarms have been triggered.

When the printer is initially turned ON via the display, a Test/Title page will be printed. This can be used to test if the setup is correct.

You can also turn on and off the printer on this screen, or by setting up one of the information areas as a printer on/off button.



6 User information

6.1 Introduction

The ESN100 Echosounder system is an echosounder with 1 channel that can be switched between frequencies and transducers in various locations of the vessel.

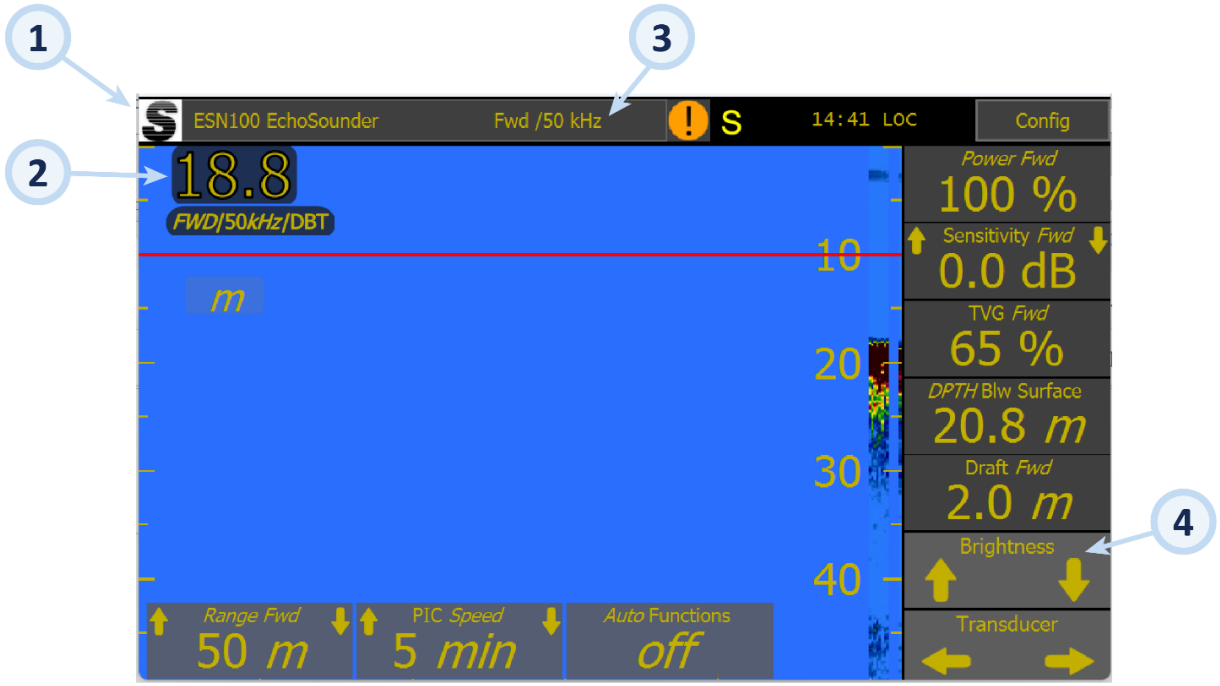
The screen can be setup to show the parameters that the user wishes to see or control, but it also has an automatic function that takes over the control of range, gain, frequency and power of the system to minimize the required amount of user interaction.

The system has 1 mandatory alarm (Shallow water) and a second deep water alert. In addition, it gives alerts of system failures.

The system will have 1 or 2 transducers installed, typically 50 kHz in the bow and 200 kHz aft. With this system it is also possible to install a dual frequency 50 / 200 kHz transducer both forward and aft, and the system can be made to select the best frequency at any particular time.

6.2 Presentation

The user presentation screen is a single screen.



1. **Top bar:** This shows the system type, selected transducer, alerts, the clock (if available), and configuration navigation button (in some software versions, the Config button may be placed on the left side of the screen; see the image in section 6.2.1). In configuration screens, the current depth will also be shown.
2. **Depth and units**: The depth is shown numerically, and the echogram shows the variation of depth over time. The units can be changed by touching the unit sign, or in the menus.
3. **Selected transducer:** The selected transducer is seen in the top bar as position and frequency. If 2 are installed, the Transducer selection on the bottom right switches between these.
4. **Dimming level:** The dimming can be controlled by touching the screen and adjusting the brightness parameter. Colour schemes will change as the dimming is adjusted, as set in the dimming menu. If the system is dimmed so deeply that the buttons cannot be seen, simply touch and hold the screen to lift the dimming level.

6.2.1 Selectable information

All the buttons on the side and bottom can be selected. The system can be made to hide this information until the user touches the screen.

6.2.2 Auto functions

If the system is in Auto mode, it will change the range and signal settings automatically, as the depth changes. If the user decides to take control of one of the auto parameters, the system will inform that it is taken out of Auto mode and the user has full control. The system can again be put into auto mode using on screen button (if selected), by pressing and holding a parameter, or within the menus.

6.2.3 Manual mode

In Manual mode, the user will typically be required to control the range and gain of the system, although it is also possible to control the power and time variable gain (TVG) to give a clearer picture.

The system can be made to show the information/options, or to hide it until the user touches the screen. (in Runtime screens)

6.3 Screen configuration

The main screen can be set up to show numerous pieces of information on the right and bottom of the screen.

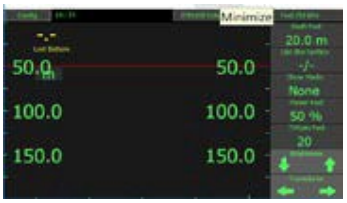
Buttons on the information and bottom bar can be adjusted to show the information the user required in the runtime setup. Press and hold the button to see all choices.

Press on the config button and runtime setup to access the general screen information options.

All button functions are available in the menus, so if a button is selected away, it can be accessed from the config menus.

Main adjustable features are:

Range 	Range is always available within a single press of the screen on the bottom left corner. **Manual:** Range can be set in 50m steps from 5m to the maximum the installed transducer can detect. Smaller steps are available below 50m. **Auto:** In this mode, the range will change based on the digital readout of the system. Auto range is part of the full range of auto functions and will cause other functions to become auto as well. ***Press to change the value.***
Gain 	Gain is the amount the signal, reflected from the bottom, is amplified. This should be adjusted such that the signal is strongly visible at the bottom and below, but not above the bottom. **Manual**: Gain can be adjusted between 1 and 100% and is most effective for areas deeper than 50m. **Auto**: Auto gain will, combined with TVG and range, adjust to give the most signal. *If not on screen this is available in the ES Setup menu.* ***Press and hold to change the value.***
TVG 	Time variable gain predicts how much the sound will fade in the water and compensates. **Manual:** Adjusting this will give stronger/weaker signal near the surface and can be used to reduce strong fish or bubble layers. **Auto:** This function works together with gain to provide an acceptable picture and continuous bottom detection. *If not on screen, this is available in the ES Setup menu.* ***Press and hold to change the value.***
Pic Speed 	Picture speed selects the speed at which the bottom will move across the screen. Units are the time to refresh the whole screen. A scale can be seen at the bottom of the screen. *If not on screen, this is available in the Runtime setup menu.* ***Press and hold to change the value.***

Alarm Shallow 	The Shallow water alarm is mandatory and is indicated on screen by a red horizontal line. When the depth is shallower than this, the alarm will sound, and an indication will show on the screen. Depending on the system configuration, the system may require acknowledgement on the control unit or may allow remote acknowledgement. *If not on screen, this is available in the Alarms menu.* ***Press and hold to change the value.***
Mark 	A vertical mark will be made on the screen when this option is active and an important setting is changed, or an alarm/alert is sounded. This mark will also be stored in the saved depth logs. If GPS is connected, the time and position will be recorded. *If not on screen this is available in the Runtime setup menu.* ***Press and hold to change the value.***
Picture colour 	The control unit is programmed with a number of colour schemes, some monochrome, others heat colour based. These colour schemes can be selected, or in the dimming menu, made to change at different dimming settings. *If not on screen, this is available in the Runtime setup menu.* ***Press and hold to change the value.***
Dimming 	Dimming up and down is available using the up and down arrows, or the slider that pops up when a dimming arrow is touched. IF the system is dimmed too far down, press and hold the screen, and it will return to a 'visible level'. The screen will not fully dim if an alarm is active. If an alarm becomes active when fully dimmed, the screen will change to the 'visible level' and return after acknowledgement. *This is always available but can be adjusted in the Display setup.*
Frequency 	If dual frequency transducers are installed, the frequency button will allow the user to change between the available frequencies. **Manual**: 50 kHz / 200 kHz **Auto:** High frequencies test to have a greater resolution than low, so in this mode the system will change the frequency when the range is set to the shallower settings. (A) Shows that the system is in auto mode for this parameter The position and frequency of the currently active transducer is displayed on the top banner. Touching this will change the frequency, if available. *If not on screen, this is available in the ES Setup menu.* ***Press and hold to change the value.***
Transducer 	The left/right button allows the user to change the transducer displayed. Each of these may have up to 2 frequencies. *This is always available if installed. To install go to ES Setup.*

Other information can be shown on the side parameter; these are from the NMEA inputs or from other systems connected via LAN. (e.g. DL2 speed sensor)

These include:

Auto	
Alert Deep	The value when a deep-water alert or warning will sound
Draft	The distance from the surface to the lowest point of the keel
Depth below surface	The depth value from surface to the bottom
Depth below keel	The depth value from the lowest point of the hull
Depth below transducer	The depth value to the bottom from the face of the transducer
Speed from GPS	Speed over ground from a connected GPS
Speed from LOG	Speed over ground from a connected log
STW from log	The Speed through water from a connected log
Rate of turn	The Rate of turn from a connected gyro
Depth from Log	The depth measured by the log sensor

All adjustments are available from the menus by pressing Config.

Depending on which transducers are connected, the user can switch between transducers or frequency using the navigate arrows. The current transducer frequency and position is shown in the text under the depth.

To change a value on one of the information bars, a short press on the information will move to the next natural value. A long (3 seconds) press will show a menu of the available options.

RANGE is always available in the bottom left position with a single touch.

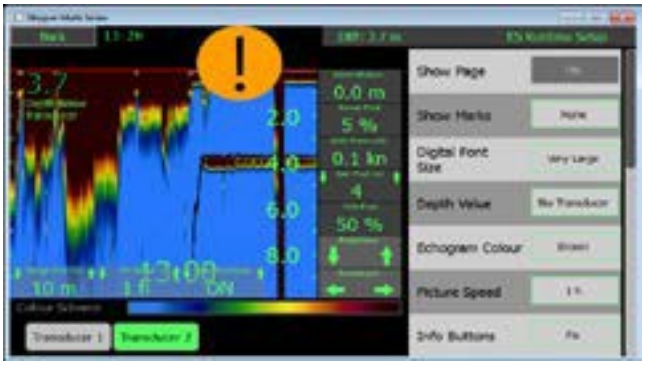
After 5 seconds, the information will slide off the screen. It can be set to remain fixed in the RUNTIME menu.

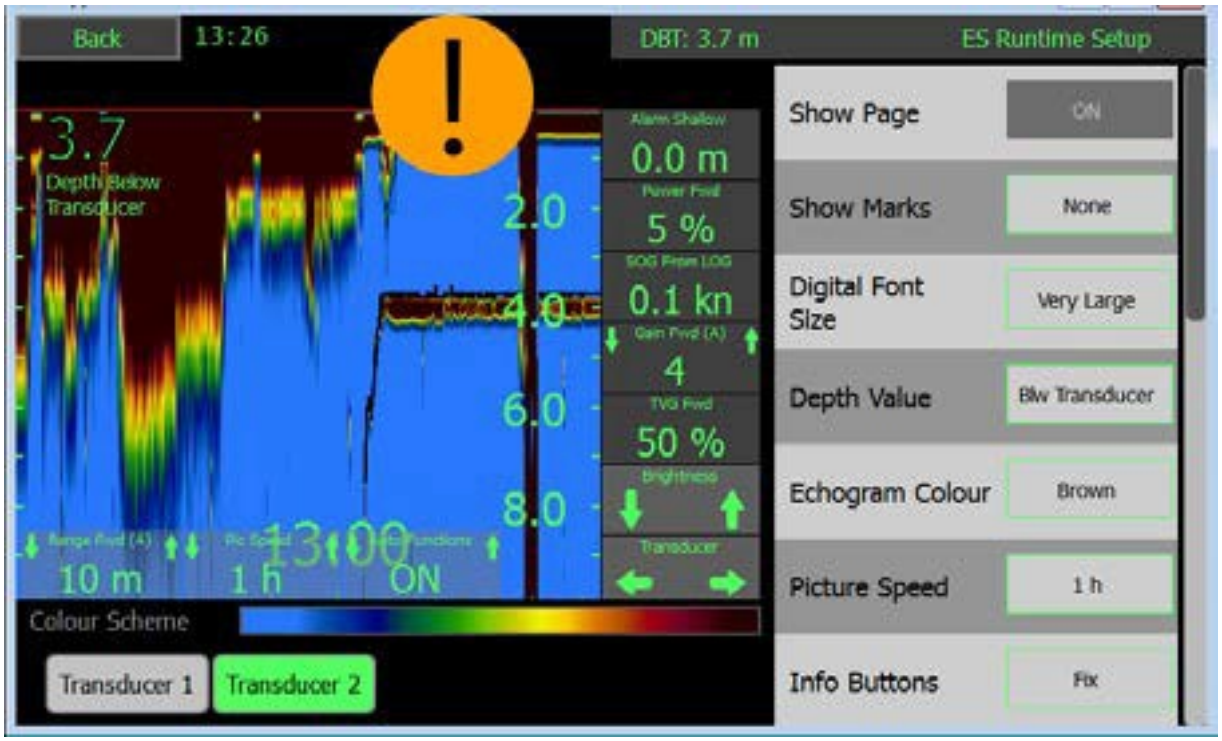
Normal operation, the red line shows where the alarm/alert level is.

6.3.1 Changing the look of the screen

Go to Runtime menu by pressing config in the top left. In this menu you will see the available Pages, and these can be individually tailored to show the information the user wishes.

The colour scheme is seen under the display picture.

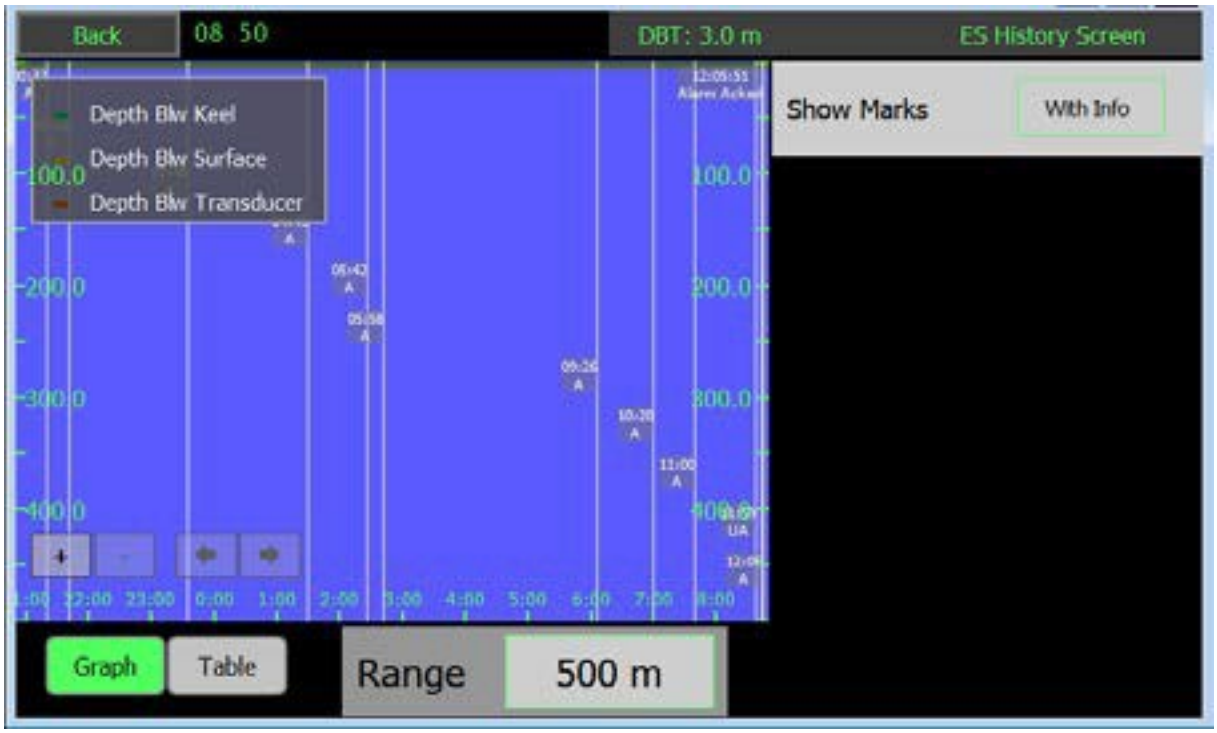
	Brown
	Orange
	Yellow
	Grey



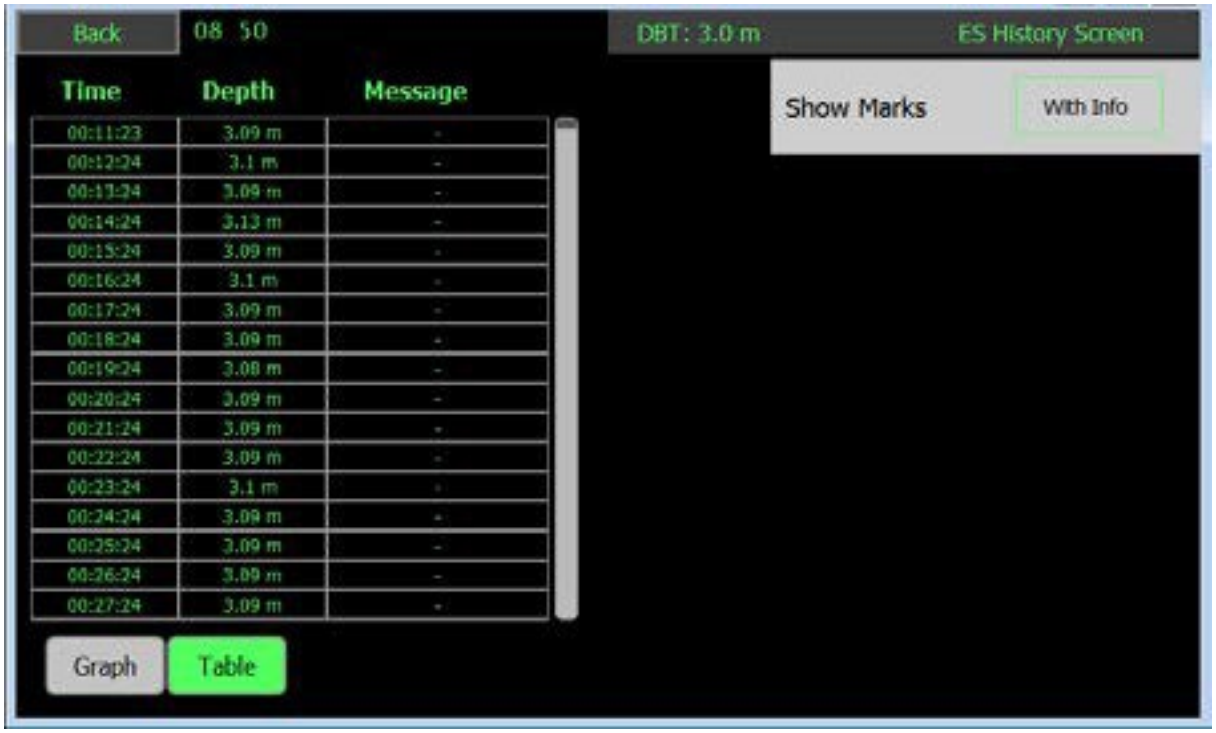
Button	Description
Page A (lo/hi)	The Transducer connected to transducer connector 1 (if this is a dual frequency transducer, it will show the low or high frequency)
Page B (lo/hi)	The Transducer connected to transducer connector 2 (if this is a dual frequency transducer, it will show the low or high frequency)
Digital Font size	Adjust the size of the depth text on the left. Small – 1 m viewing distance Large – 3 m viewing distance (default) Very Large – 5 m viewing distance Extra Large – 7 m viewing distance
Depth value	The reference point from which the depth is measured. (Surface/Transducer/Keel)
Info buttons	The information on the right can either remain fixed or be set to disappear after a time.
Information 1-5	Select the information/parameters to be shown on each information.
Bottom bars	The information on the bottom can either remain fixed or be set to disappear after a time.
Bottom bar 1-3	Select the parameter/information to be shown on the bottom bar. (1 is fixed to range)

6.4 Saved depth / History

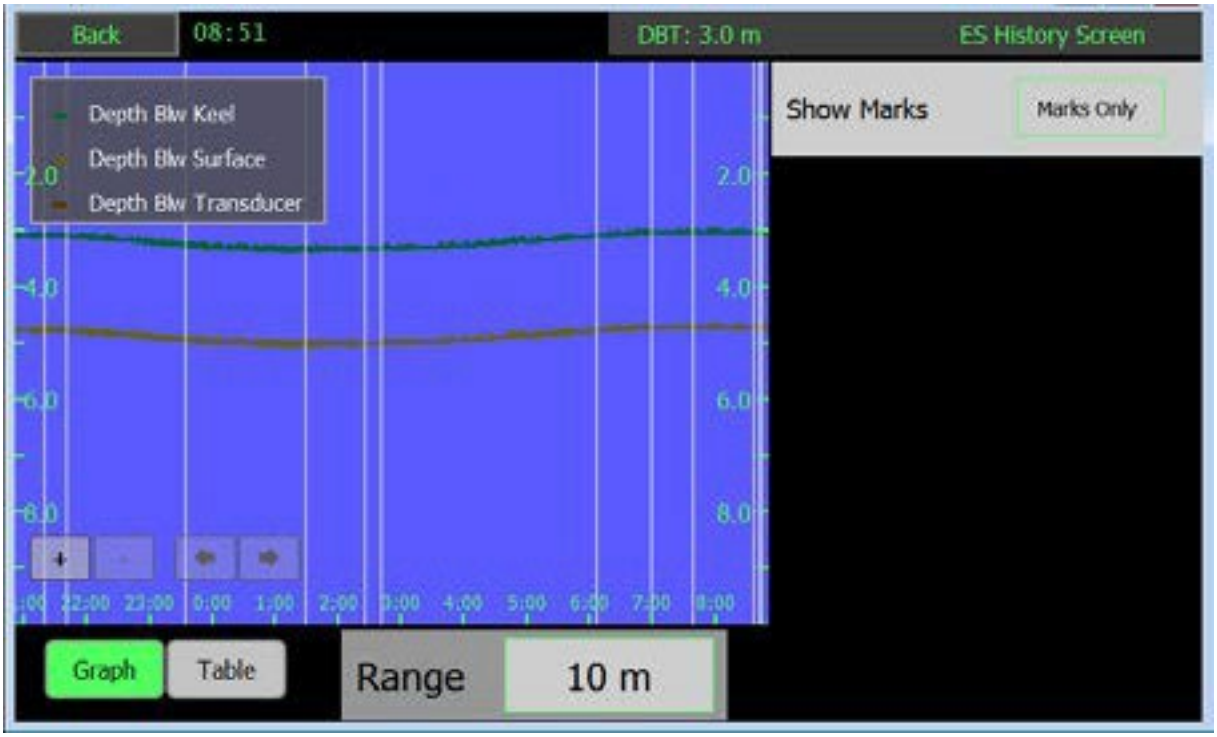
The ESN100 saves depth information for 24 hours, and data is recorded every 1 minute. This data can be shown on a single screen and is available in the History menu.



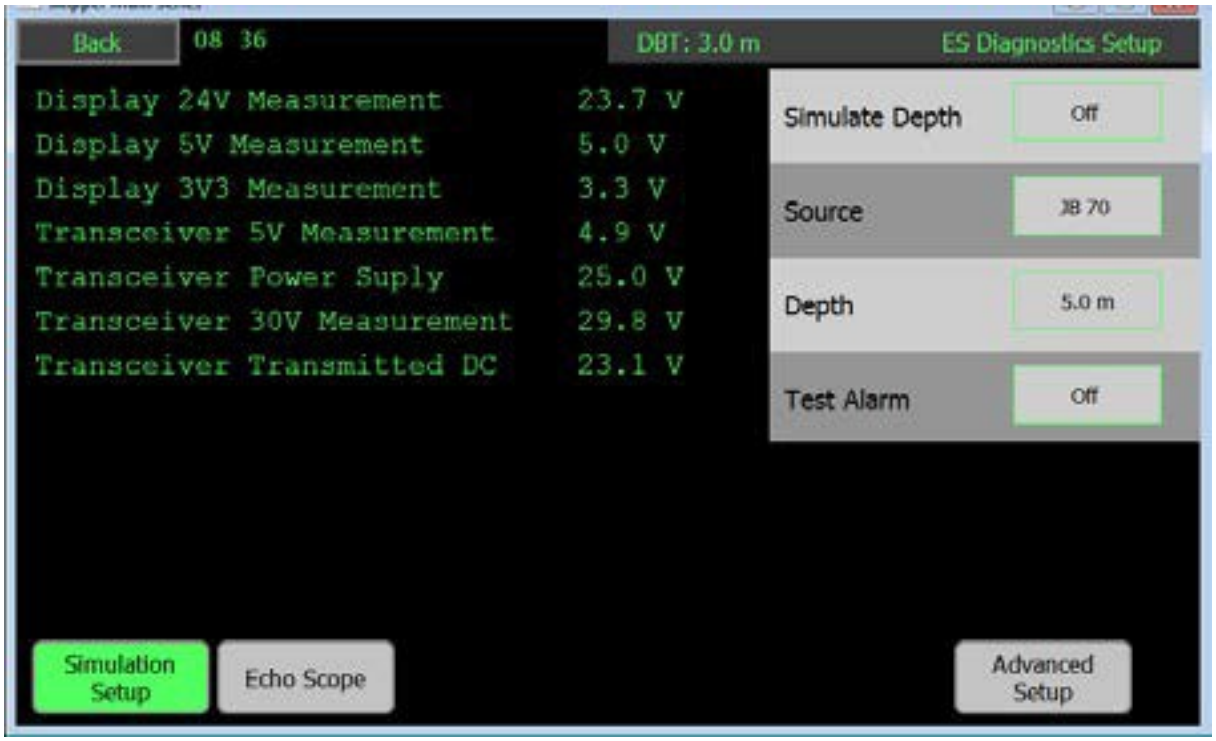
By selecting table, the depth of at least every minute and marks in between (indicating changes or highlighted events such as alarms or auto changes) are listed with time and position, if available.



By changing the range, more details of the echogram are shown.



6.5 Diagnostics



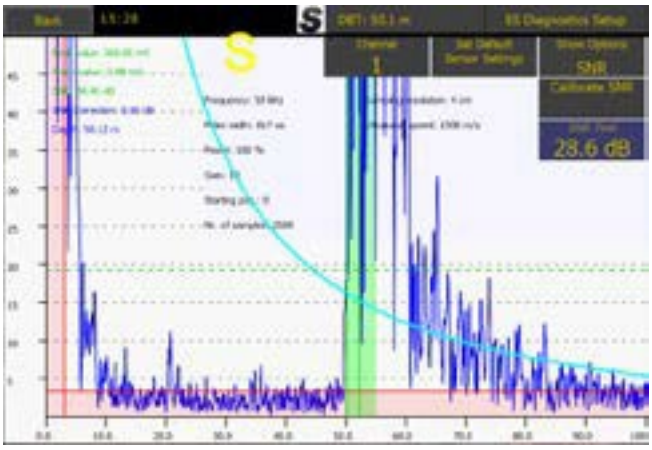
The ESN100 has a number of functions to allow the user to simulate, diagnose and optimize the system. The Diagnostics setup will help identify the problem.

Parameter	Description
Simulate Depth	Make a depth of the desired value (Depth button) to test outputs and alarms, alternatively have a moving depth, or run a simulation from file (preloaded by Jotron SKIPPER).
Depth	The value to be sent, or the value the moving depth will move above and below.
Test Alarm	Send all known alarms to the output. These can be acknowledged/silenced/changed as a normal alarm/alert.
Noise Self Test	Run this to check the noise levels of the system.
SNR Calibration	Run this calibration to tune the system once installed in the vessel.
Show Noise and Calib Results	Noise self-test will run a series of pings and measurements within the system to find the noise conditions. These can be inspected by pressing the Show Results button.

Once installed, the values should be below 20 mV, unless otherwise stated. High values can usually be reduced by improved cabling and/or adding filters to the power supply.

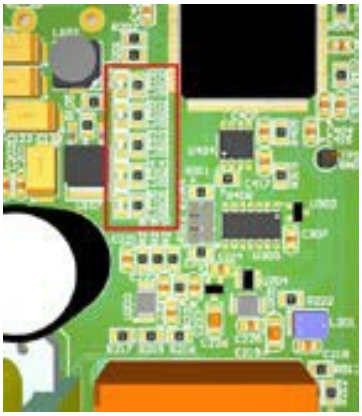
The mounting of the system can cause some changes from the default setup. This can influence the auto functions. To improve this, the SNR calibration can be performed, and the system will optimize itself.

Each ping is plotted in the Scope screen. In the example below, you can see the pings and the parameters in use to detect it. The green zone shows the detected depth, while the red zones are areas where the bottom detection will not have an effect. This is typically at low signal levels and in the ringing period after the system sends a pulse.



6.5.1 Transceiver unit JB50E1-SA diagnostics

There are 5 LEDs on the PCB giving the status of the transceiver unit.



LED1: Power ON

LED2: Communication transmit to display

LED3: Communication receive from display

LED4: Ping indication

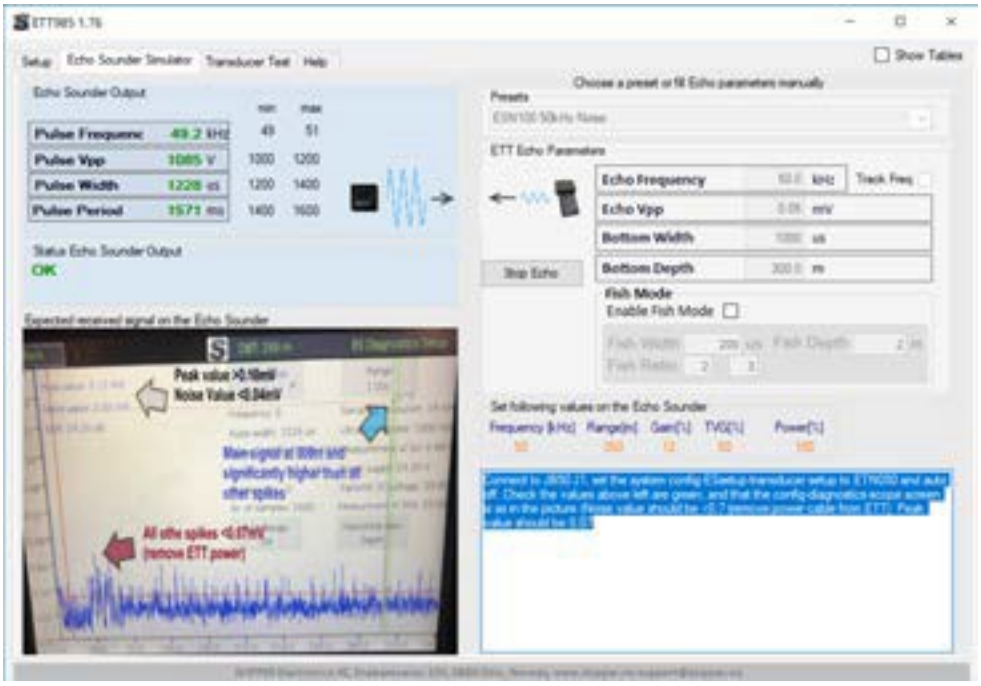
LED5: FPGA OK

6.5.2 Diagnostics of the ESN100 using an ETT985

The ETT985 echosounder and transducer tester has been updated with tests for the ESN100 echosounder and the new transducers ETS50200 and Furuno 8B-200B. These updates can be downloaded from the SKIPPER website when the ETT software is started.

Connecting the ETT985 to the transducer ports of the JB50E1-SA unit and then running the ESN100 noise test for the appropriate frequency will allow the user or service technician to check the signal output and noise characteristics of the system.

The transducer tester can be used to verify whether connected transducers exhibit the expected resonance impedance.



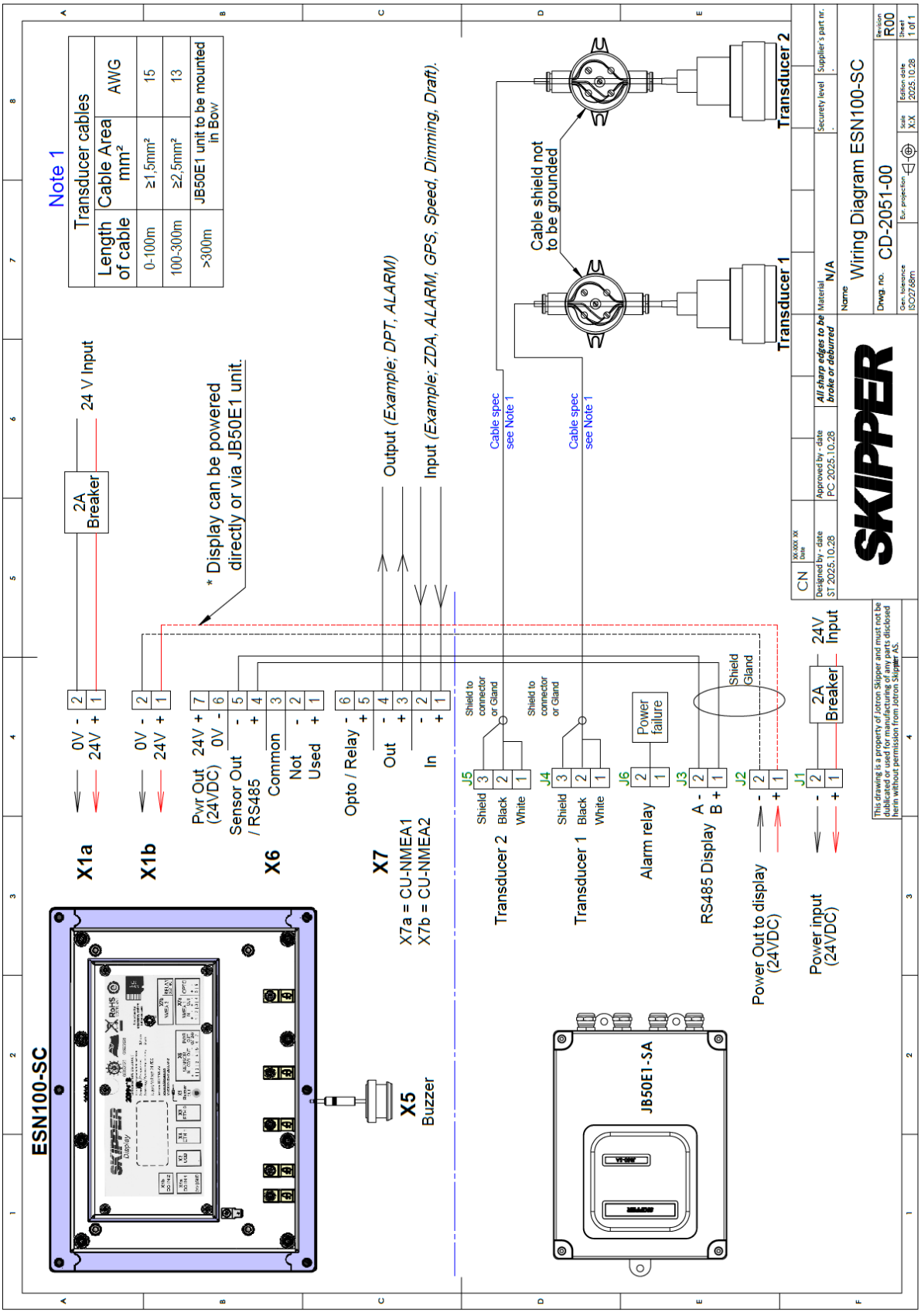
7 Abbreviations

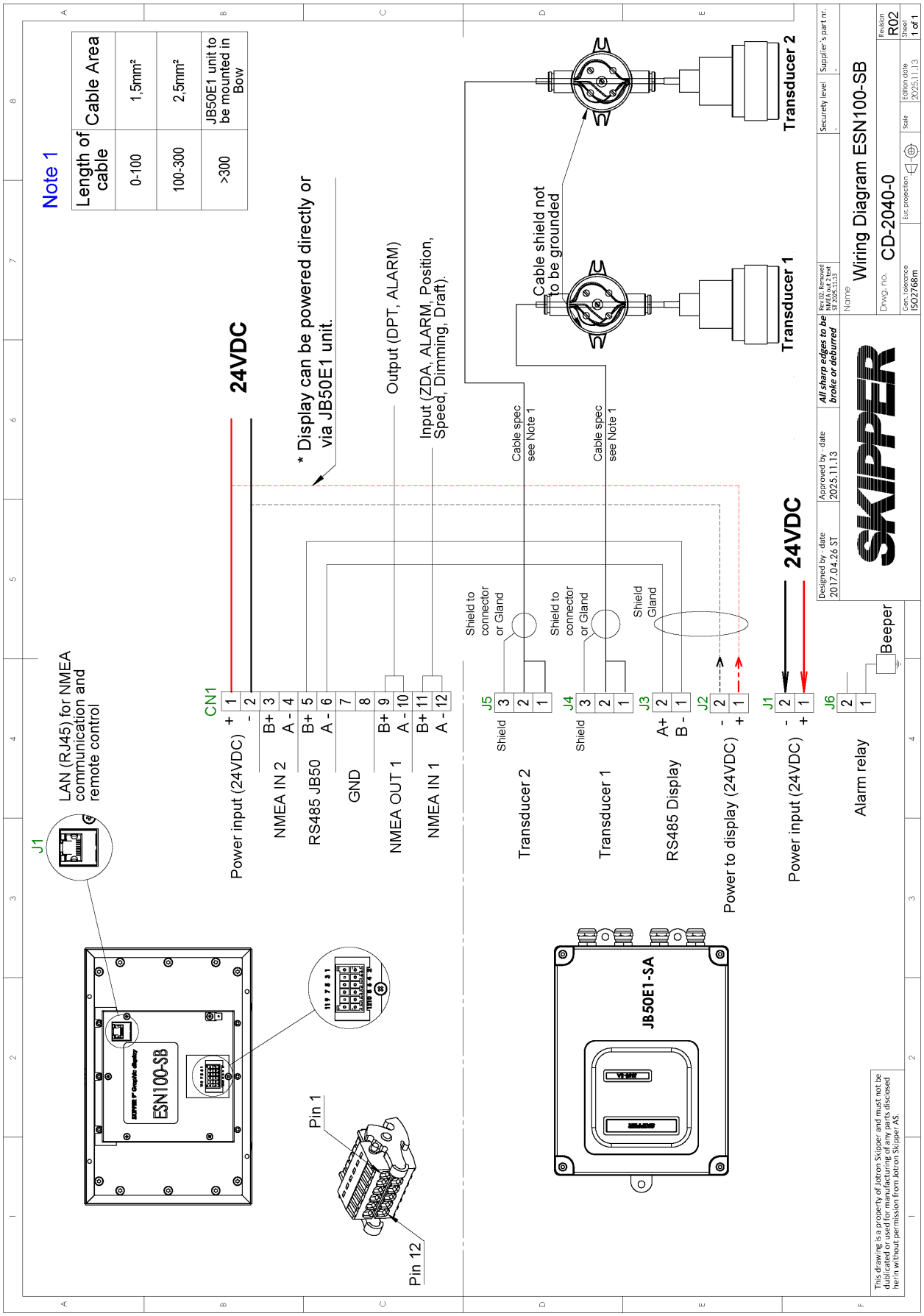
Symbol/abbreviation	Explanation
TVG	Time variable gain
FWD	Forward position
AFT	Aft position
Pic Speed	Picture speed. The amount of time presented on the screen
DBT	Depth below transducer
DBS	Depth below surface
DBK	Depth below keel
Draft	Depth from water surface to the lowest point of the vessel
Offset	Distance from Transducer to the lowest point of the vessel
M	Meters
ft	Feet
ftm	Fathoms
m/s	Speed in meters / second
kHz	kilohertz (Frequency)
(A)	Automatic mode (system self-adjusts range and gain)
ALF	Alarm method according to IEC61924 / MSC 302 with category (CAT) A – Alarm to be acknowledged on the display only B – Alarm may be acknowledged remotely To work with ACN – Alarm Acknowledge, request, transfer, silence
ALR	Older alarm standard to work with ACK Acknowledge
	Active Alarm/Warning unacknowledged alarm
	Active Alarm/Warning acknowledged Alarm
	Alarm/Warning rectified but unacknowledged
	Alarm/Warning responsibility transferred
	Alarm/Warning silenced for 30 seconds
S	Simulate mode
M	Mute Mode
min	Minutes
V	Volts
DC	Direct Current (for voltage)
CAM	Central alarm management
INS	Integrated navigation system
LAN	Local area network

SFI	System function identifier, from standard IEC61162-450
UDP	Data sent on the LAN ports
MAC	Unique system identifier for LAN system
IP	Internet protocol address, unique in the network

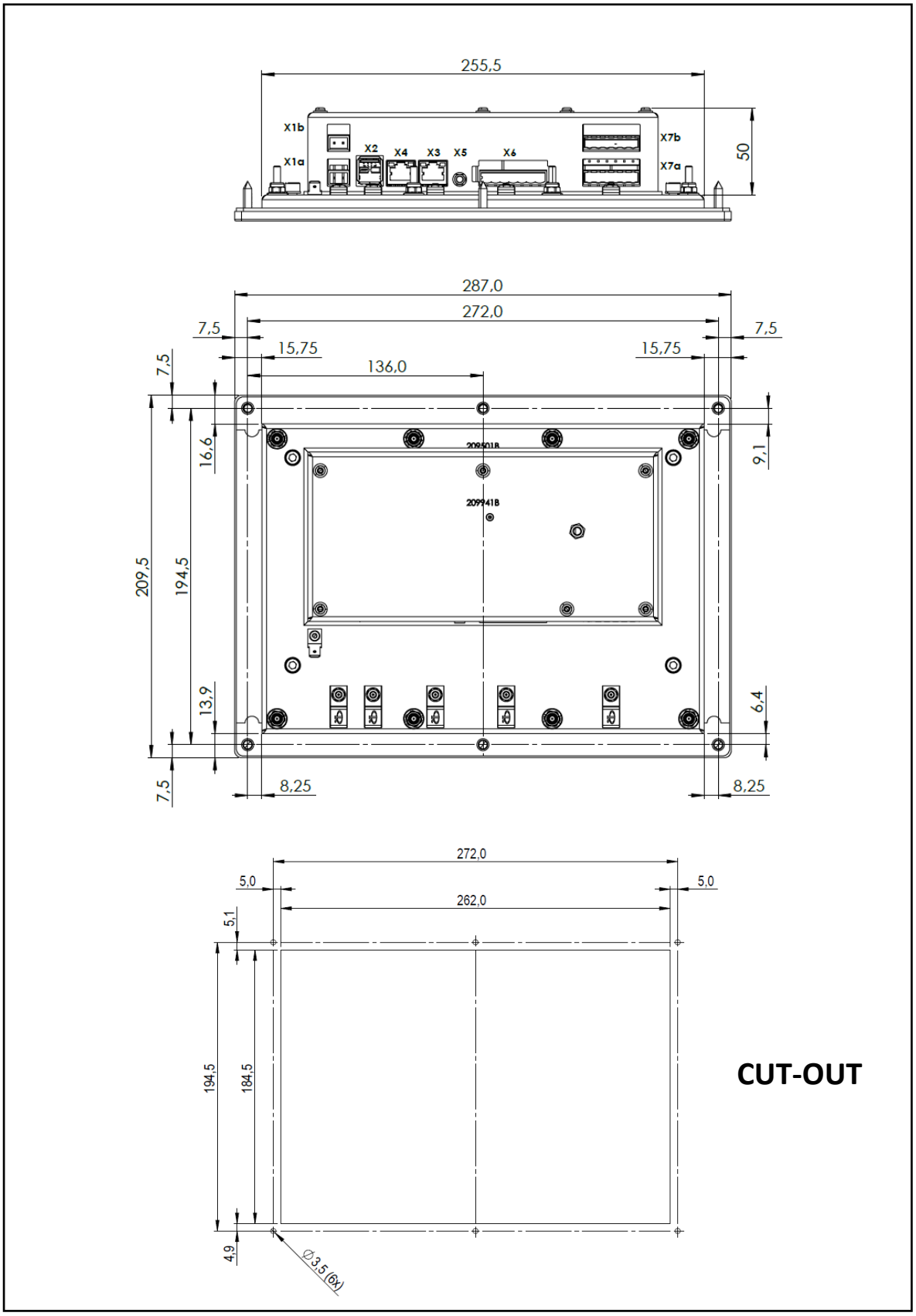
8 Appendix 1: Installation drawings

8.1 Wiring diagram

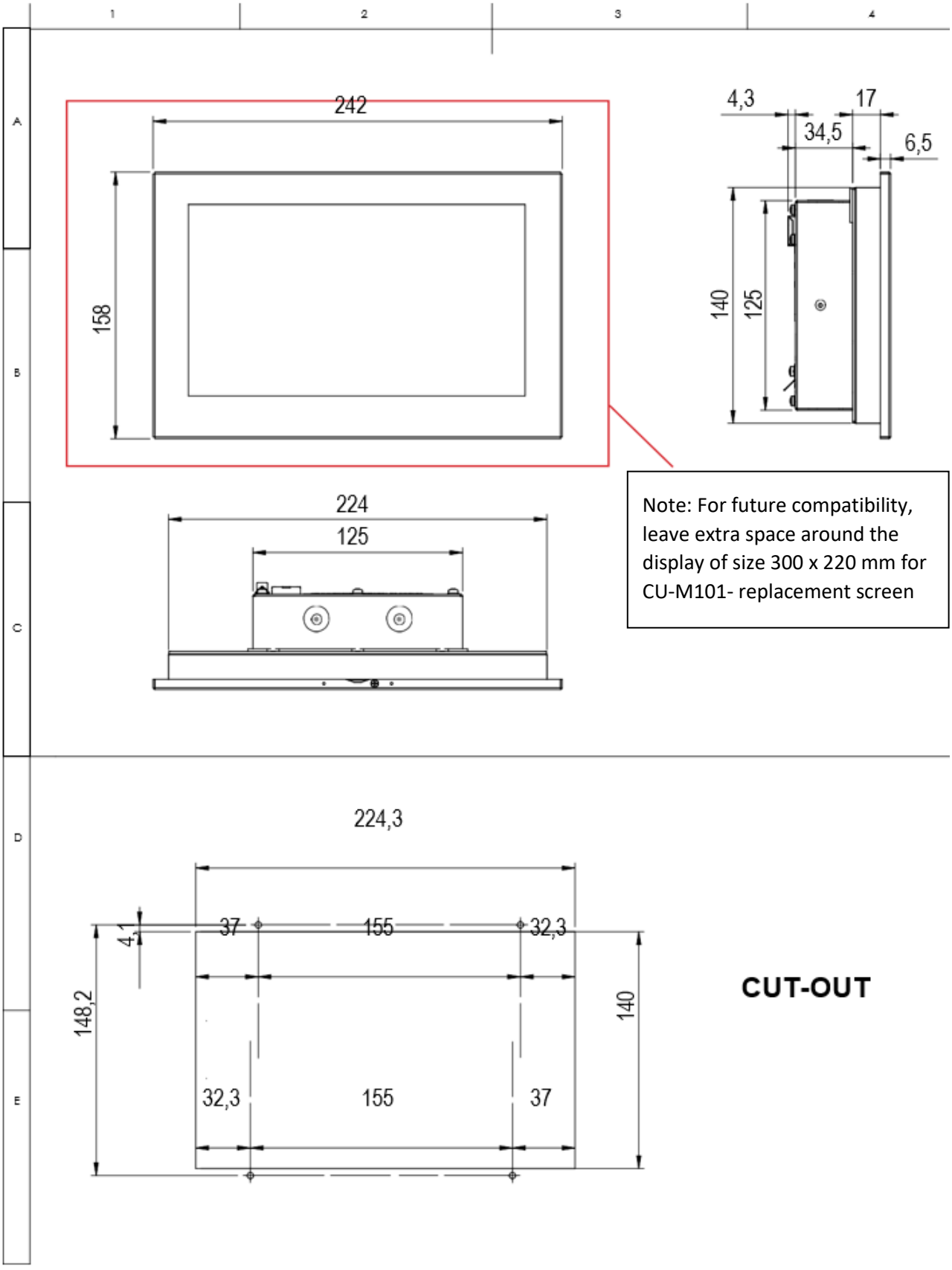



Note 1
Length of cable
Cable Area
0-100
1,5mm²
100-300
2,5mm²
>300
JB50E1 unit to be mounted in Bow
24VDC
* Display can be powered directly or via JB50E1 unit.
Output (DPT, ALARM)
Input (ZDA, ALARM, Position, Speed, Dimming, Draft).
Cable shield not to be grounded
Transducer 2
Transducer 1
Cable spec see Note 1
Cable spec see Note 1
LAN (RJ45) for NMEA communication and remote control
J1
CN1
Power input (24VDC)
NMEA IN 2
RS485 JB50
GND
NMEA OUT 1
NMEA IN 1
Shield to connector or Gland
Shield to connector or Gland
Shield Gland
J5
J4
J3
J2
J1
J6
Shield
Shield
A+
B-
Transducer 2
Transducer 1
RS485 Display
Power to display (24VDC)
Power input (24VDC)
Alarm relay
Beeper
ESN100-SB
JB50E1-SA
Pin 1
Pin 12
SKIPPER
Wiring Diagram ESN100-SB
CD-2040-0
Designed by - date
2017.04.26 ST
Approved by - date
2025.11.13
All sharp edges to be broke or deburred
Rev 02. Removed NMEA out 2 text SKPC 21131
Name
Dwg. no.
Gen. tolerance
ISO2768m
Eur. projection
Scale
Securety level
Supplier's part nr.
Edition date
2025.11.13
Revision
R02
Sheet
1 of 1
This drawing is a property of Jotron Skipper and must not be distributed or used for manufacturing of parts disclosed herin without permission from Jotron Skipper AS.

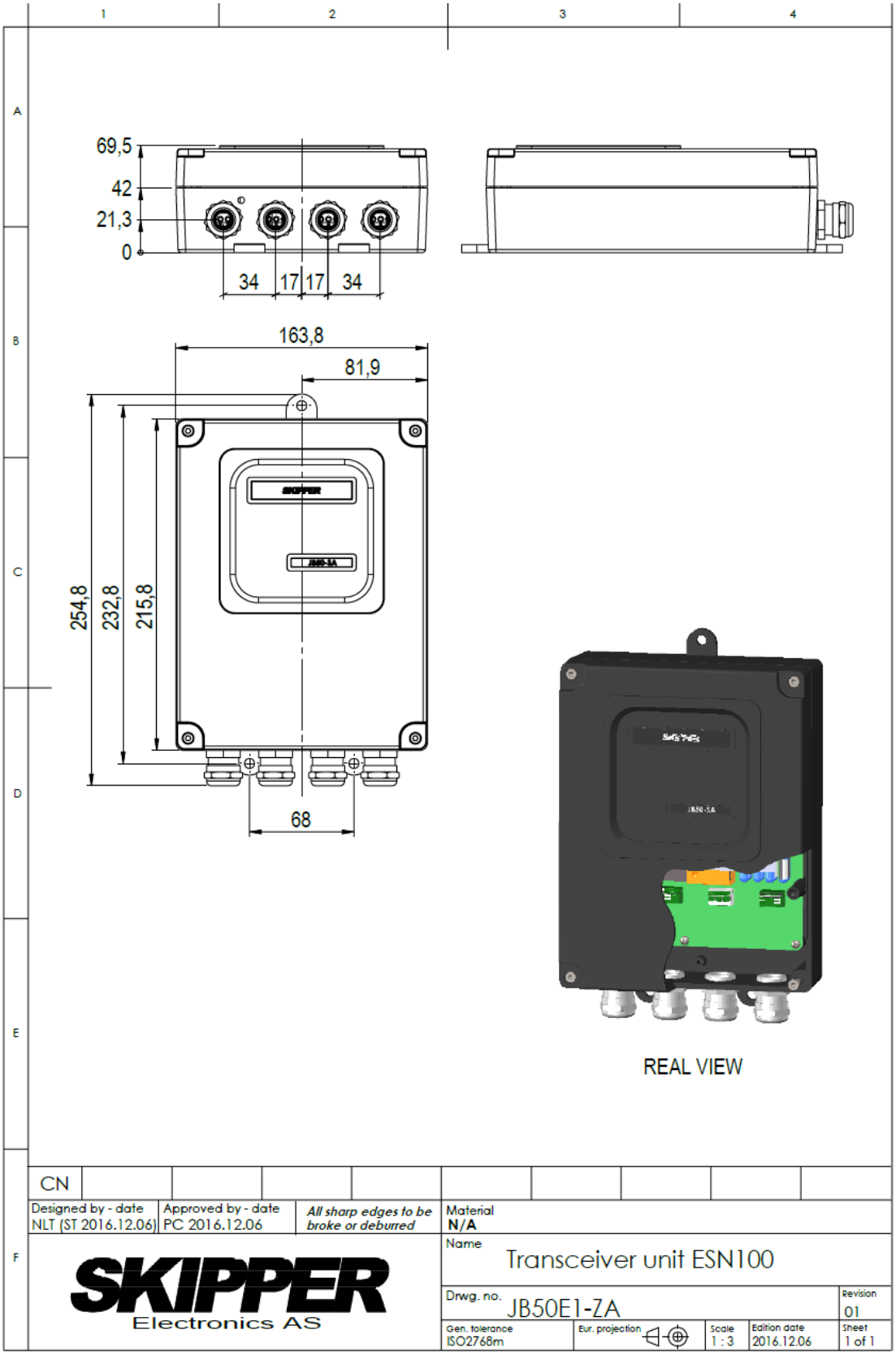
8.2 ESN100-SC Display outline drawings



8.3 ESN100-SB Display outline drawings



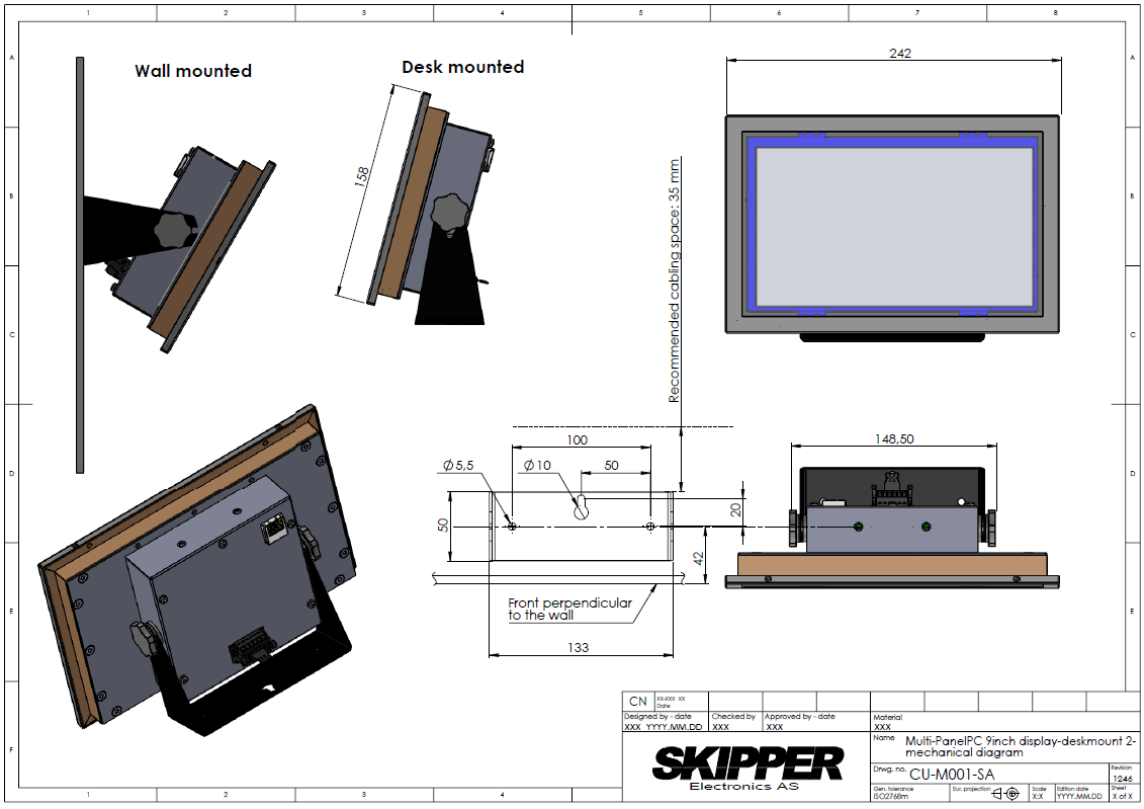
8.4 JB50E1-SA Transceiver unit outline drawings



8.5 Display mounting option

The display is designed for flush mount installation with an option to purchase a wall mount/desktop bracket.

Part number: MG-0002. Mounting bracket for 9-inch display, ESN100-SB.

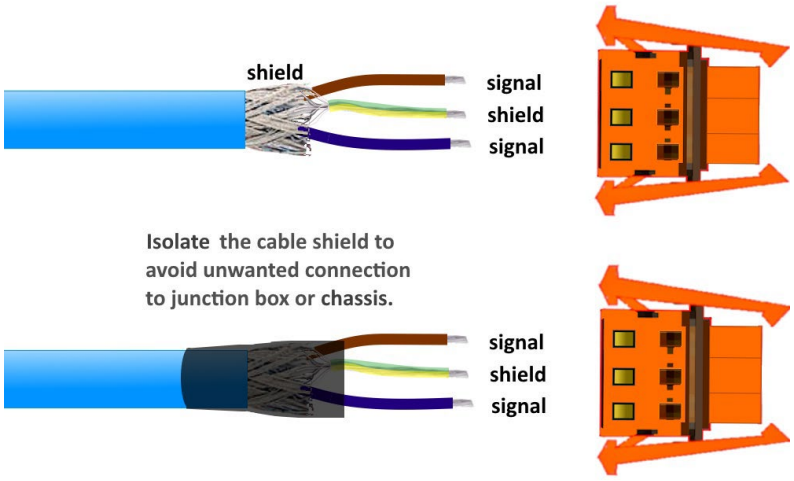


8.6 Correct connection of a transducer

Follow the instructions below to ensure correct connection of the transducer.

1. The shield of the transducer cable should go all the way, without breaking the shield, from transducer to the JB70 box, and without any connection to the junction box or ground of the ship.
2. The signal wires should be protected all the way with a shield around them.

The signal wires are shown in blue and brown color in the following pictures, and cable shield in yellow-green color:



Check point No. 1, transducer cable connection to the JB70 box:

Correct: shield is connected in the middle of the connector and unprotected part of signal wires (without shield around them) is as short as possible:

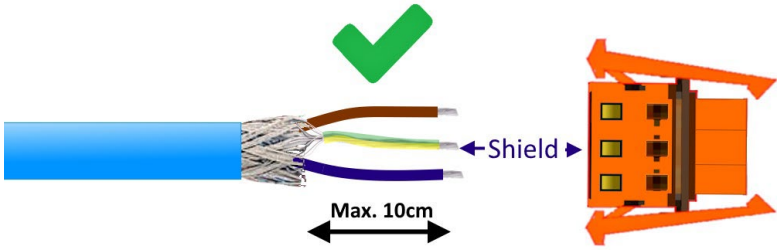


Figure 3 - Illustration of correct cable connection

Incorrect:

3. Do not use terminal strip for cable extension. The signal wires are unprotected, and other cables close to them could have an influence on measurements.
4. Do not use long and unprotected cables without shield around them.

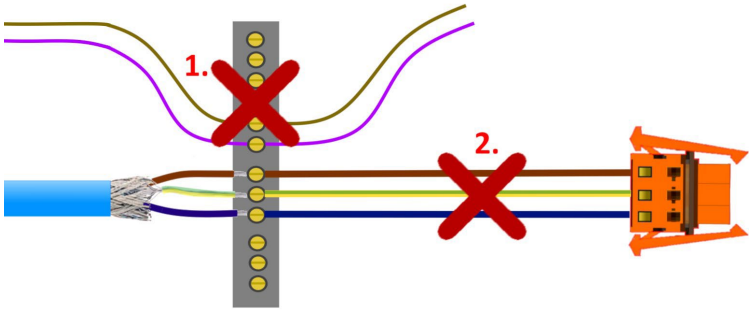


Figure 4 - Illustration of incorrect cable connection

Check point No. 2, junction box connection:

Correct:

5. Cabel shield is not connected to the junction box.
6. Cabel shield from one cable is connected to the cable shield of another cable.

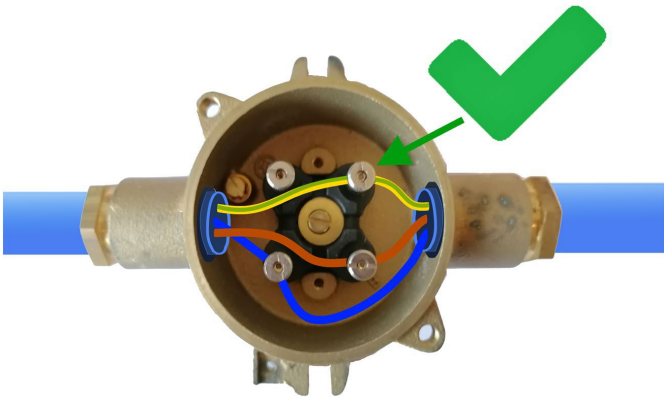


Figure 5 - Illustration of correct junction box connection

Incorrect (shield connected to junction box and probably to boat ground):

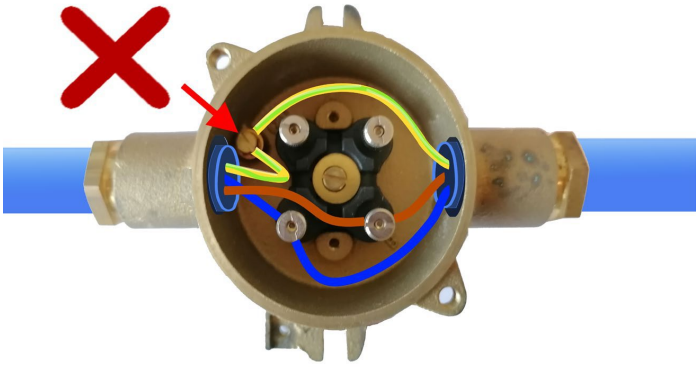
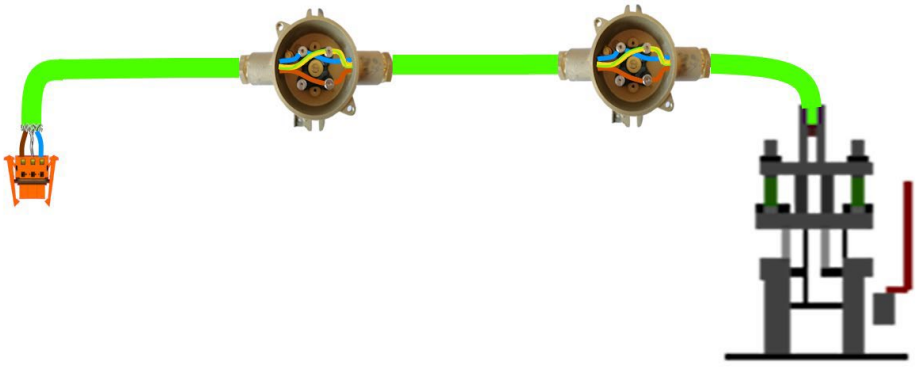


Figure 6 - Illustration of incorrect junction box connection

The following illustration shows a correct connection of the transducer.



For further support, please supply pictures of these critical points for review from Jotron skipper, including a picture of the Diagnostic-Scope picture for the 2 channels.

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