ESN200
Operation and Installation Manual

Dual channel multi frequency Echo sounder

Display unit ESN200-SB
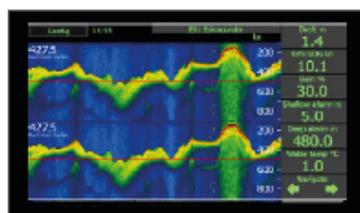
24 V DC

LAN communication with Display
(Multiple displays available)

Electronic / Transceiver unit
JB70E2-SA

24 V DC - 115/230VAC

Repeaters

VDR

Alarm

Conning
Display (also
dimming)

Radar
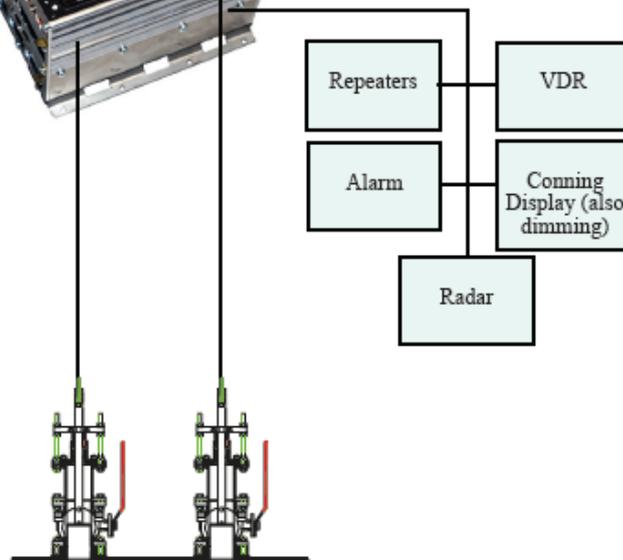
IMPORTANT

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

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

Contents

Table of abbreviations

Symbol/abbreviation	Explaination
TVG	Time variable gain
FWD	Forward position
AFT	Aft position
PORT	Portside
STBD	Starboardside
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
DPTH	Depth
M	Meters
ft	Feet
fm	Fathoms
m/s	Speed in meters / second
kHz	kilohertz (Frequency)
hr	hour
min	minute
(A)	Automatic mode (system self adjusts range and gain)
(P)	Primary Channel
ALF	Alarm method according to IEC61924/62288 / 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 (see options section)

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 IEC61192-450
UDP	Data sent on the LAN ports
MAC	Unique system identifier for LAN system
IP	Internet protocol address, unique in the network

Introduction

The SKIPPER ESN200 is a dual channel echosounder. Each channel is frequency programmable. It is made to fulfill all ISO/IMO standards, as well as the modern IEC standards for maritime equipment and alarm handling.

Features

The ESN200 is a navigational echo sounder system that is made to fulfil the needs of a modern SOLAS vessel. Its aim is to be automated, so that the user does not need to adjust settings. But it also allows the user to adjust if they feel the need.
The ESN is part of the SKIPPER Multi family, allowing the use of LAN to interconnect systems and use multiple screens.

Features include:

- Easy and logical operation via a touch display, with fully automatic settings

- Possibility of multiple control units

- Fully integratable and frequently updated with the latest integration standards

- Remotely accessible

- Internal diagnostics and Built in test

- 2 simultaneous channels, each of which is frequency controllable

- 8 available frequencies. 24, 30, 33, 38, 50, 100, 200, 210kHz

- 3 IMO approved frequencies. 38, 50, 200kHz

Overview

Display unit ESN200-SB
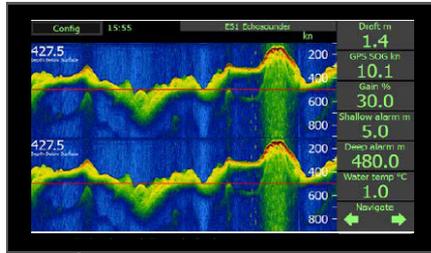
24 V DC

LAN communication with Display
(Multiple displays available)

Electronic / Transceiver unit
JB70E2-SA

24 V DC - 115/230VAC

Repeaters

VDR

Alarm

Conning
Display (also
dimming)

Radar
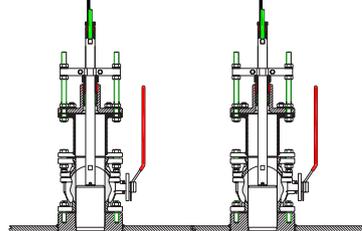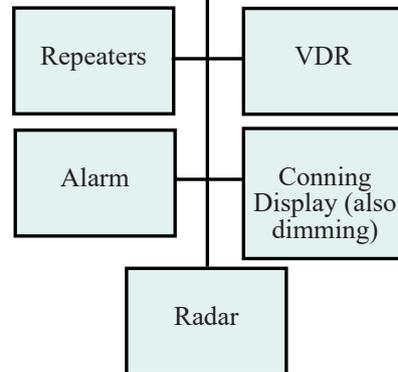
Options for tank,
sea valve (single and double hull)
and retrofit.

Specification

SKIPPER ESN200
Navigation Echo Sounder

Specifications

| Channels	Dual channel echo sounder
Transducer connectors:	2 Transducer connectors in Electronic / transceiver unit.
Frequencies	8 set frequencies 24,30, 33, 38, 50, 100, 200, 210 kHz
Power Supply	DC: 20 - 32 V and/or 115/230VAC
Power Consumption	Display unit. Nominal 6W Electronic unit 20W
Display ESN200-SB	9" Resistive touch. 400NITS Dimensions: 242 x 158mm Weight:1.1kg 1 x LAN 2 x NMEA 0183 Outputs (IEC61192-1) 3 x NMEA 0183 Inputs (IEC61192-1)
Electronic unit JB70E2-SA	Dimension: 115x115x180mm Weight:1.5kg 2 x LAN (IEC61192-450) 5 x NMEA 0183 Outputs (IEC61192-1) 3 x NMEA 0183 Inputs (IEC61192-1) 1 x AUX in 2 x AUX out 1 x Relay out
Ranges	Selectable from 0 - 5 m to 0 - 5000 m
Approved SKIPPER transducers with expected depth limits	50/200kHz ETS50200T/G 1m-750m 200kHz ETN200T: 1m - 350m 200kHz ETN200ST/G: 1m - 250m 50kHz ETN050T/G: 1m - 750m 38kHz ETN038T/G: 2 m- 1200m
Non-approved SKIPPER transducers expected limit	24kHz ETN024T/G: 2m - 2100m

Measuring Accuracy	1-10m: Accuracy 0.1m
	          Resolution=0.1m
	10m-100m Accuracy 1%
	          Resolution 0.1m
	100m-5000m: Accuracy 1%.
	          Resolution Display=1m NMEA=0.1m

Output power	Nominal 700W. Max >1000W
User functions	Auto mode (for all settings) Manual control: Gain, Power, TVG, Frequency Transducer setup by part number Diagnostic screens / BIT Dimming (remote or local)
Print/Archive function	Printers: By use of EPSON 350, OKI 280Elite, Network printers / Review: Service software via LAN Extended Internal Logging, by USB or SD
Depth alarms	BAM compatible (IEC62923) ALF or ALR. Internal sounder. Relay output and AUX in/out
Options	IR31Dim Remote/Automatic dimming unit CD401MR-SB Multi-repeater ESN200-SB Extra Displays
Classification	MED B approved

Overview

Display unit ESN200-SB
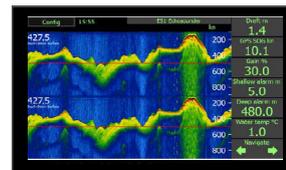
24 V DC

LAN communication with Display
(Multiple displays available)

Electronic / Transceiver unit
JB70E2-SA

24 V DC - 115/230VAC

Repeaters   VDR

Alarm   Conning Display (also dimming)

Radar
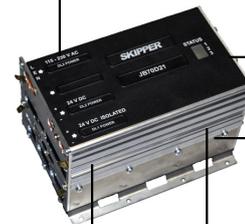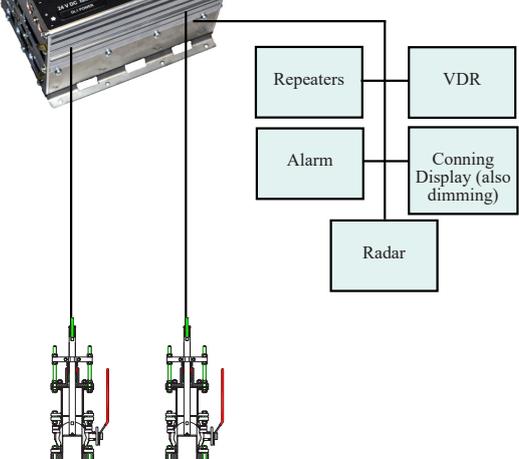
Options for tank,
sea valve (single and double hull)
and retrofit.

SKIPPER

SKIPPER Electronics AS
Norway
E-mail: sales@skipper.no
www.skipper.no
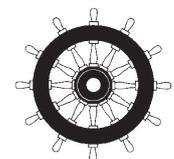
Version: 2020-01-03

Software setup

Transducer

Once connected the system requires the installer to identify which transducer is connected to which of the 2 connectors. System required 1 approved transducer to be installed (currently 200/50/38 kHz), the second can be any transducers.

The approved transducer should be set to primary, and this is the transducer that reports the standard DPT output messages.

Both connectors can have a transducer fitted. To select the correct fixture, start the system and go to the config menus, and then the ES setup.
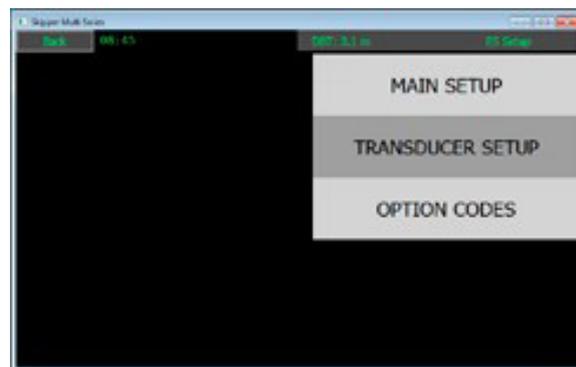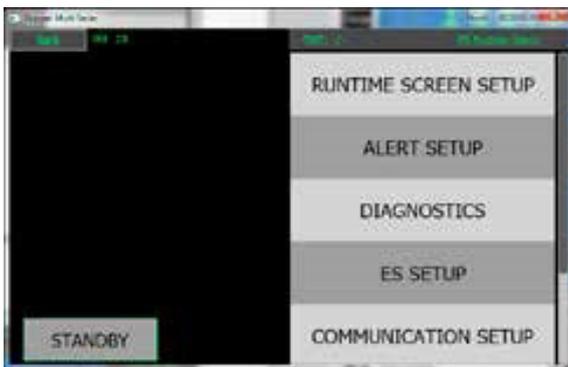
Here you can select the transducer menu and by clicking on the transducer connector port you can move the transducer to the appropriate area of the vessel, and select the transducer, by part number. This will change the parameters to match your transducer.
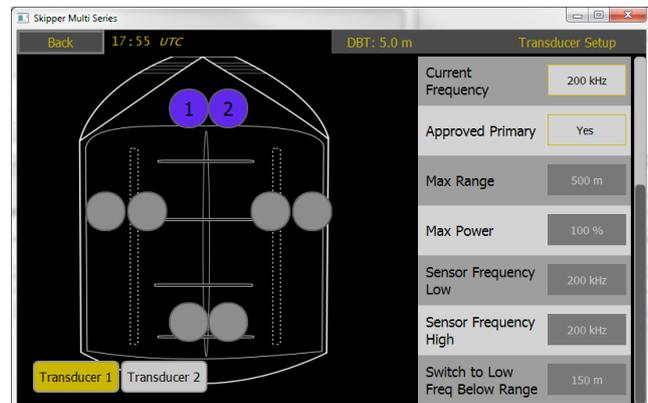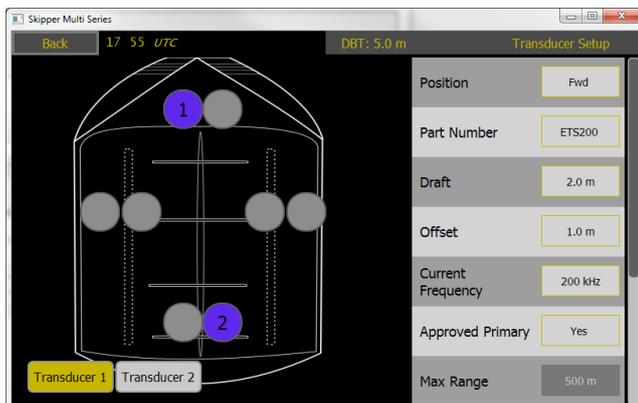
Transducer settings and output settings are password protected for changes.

The password for all units is 'service'. The password will be remebered for 1 hour, or until reboot of the system.

If you are not using a standard transducer, then select other, and the frequency, max power and max expected range can be set for that

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
ETN50200	Combined 50 and 200kHz of types ETN50200(X)G and N50200(X)T	Yes
ETN038	38 khz	Yes
8B-200	Furuno 200kHz Transducer	Yes**
Other	Any other	No
ETN024	24kHz	No

** Transducers not manufactured by Skipper should be tested using the ETT985 Tester to prove the transducer is within specification (The named transducers have BV reviewed tests, proving they work to specification with the system).

Standard transducers have the required values set. These can be changed in the settings of 'Other' See section 'Other Transducers' At least 1 installed transducer should be within the SKIPPER approved list.

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

For options, see the options appendix

Communications

Outputs

The communications menu allows the NMEA messages to be selected for the output.
On this system there are 7 NMEA outputs. 5 in the Electronic unit JB70E2-SA
NMEA1 OUT x 2
NMEA2 OUT x 2
NMEA3 OUT x 1
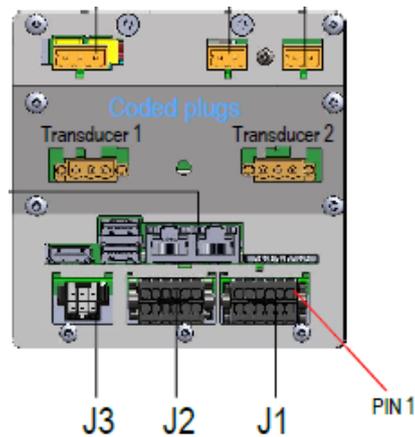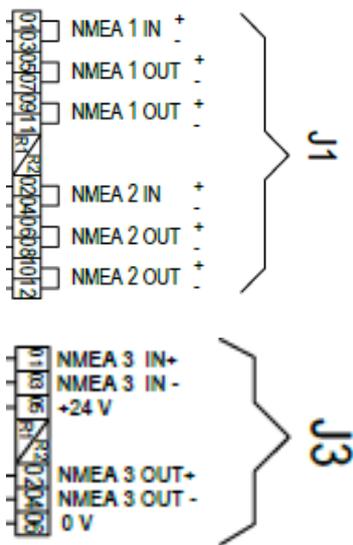
2 NMEA outputs on the display ,
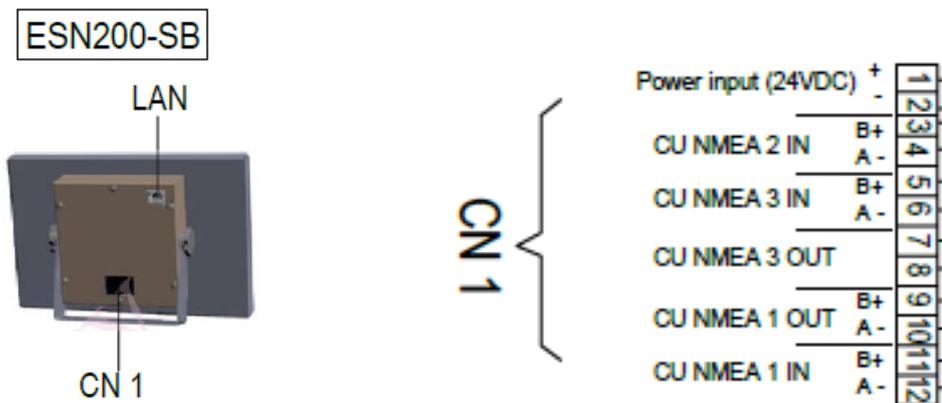
NMEA style sentences will be shown as the 3 letter mnemonic when the sentence is sent or received. There are 2 channels

1. Output for NMEA

2. LAN input and output for IEC61162-450 messages

    This port can provide communication both by TCP/IP V4.0 and using IEC61162-450. If being used it requires a network that does not exceed 60kbits/second directed to the system. The system will exert/receive a maximum load of 40 datagrams/second. The network load should not exceed 20Mb/s, The LAN ports on this system support IEC61162-450 V1, and V2 and IGMP V1 to 3.

The Baud rate output 4800, 38400 or 115200. System reports at 1Hz.

 The left side show a terminal emulator that shows the input or output messages of the selected channel. Pressing 'Message headers' will show the full message.
Exact formats for these sentences can be found in the relevant IEC standards.

Back	14 56	DBT: 3.1 m	ES Communications Setup

NMEA 1 output message headers:

$SDDBK,9.8,,3.0,,1.6,*71

$SDDBS,16.4,,5.0,,2.7,*5F

$SDDBT,10.2,,3.1,,1.7,*5C

$PSKPDPT,3.1,-0.1,2000.0,,2,STRB*4F

$SDDPT,3.1,-0.1,2000*57

$PSKPDPT,,,1000.0,,1,PORT*6F

$SDDBK,9.8,,3.0,,1.6,*71

$SDDBS,16.4,,5.0,,2.7,*5F

$SDDBT,10.2,,3.1,,1.7,*5C

$PSKPDPT,3.1,-0.1,2000.0,,2,STRB*4F

Output	Full messages

Valid message   Unrecognized message
Message with invalid data   Message with error

Channel	NMEA 1
DPT	ON
PSKPDPT	ON
DBS	ON
DBK	ON
DBT	ON
Alarm	off

DPT (default ON)	$SDDPT Depth below Transducer, offset to keel, Max range
PSKPDPT (default ON)	$PSKPDPT Depth below Transducer, offset to keel, Max range, position frequency ,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"

Default is ALARM outputs set to the ALF version of the standard

PSKP sentences are proprietary for SKIPPER and has the following format.

$PSKPDPT,x.x,x.x,x.x,xx,xx,c-c*hh\<CR>\<LF>	
| | | || | |_____	Check sum, possible to turn on/off (see screen 8)
| | | || |_____	Transducer location AFT, FWD, PORT, STB
| | | | |_____	Echo sounder channel number (1/2)
| | | |_____	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,,3,FWD*11

Accepted NMEA inputs

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)
$__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, Speed	GPS Speed Logged in history
$GPGGA	GPS Position Logged in history
$GPRMC	Position and speed logged in history
ACN,102104.00,,230,<1-999999>,s,c*hh	Silence alarm for 30 seconds ALF
ACN,102104.00,,230,<1-999999>,q,c*hh	Request/Repeat ALF info ALF
ACK,xxx*hh<CR><LF>	Acknowledge alarm ALR(B).
ACK,xxx*hh<CR><LF>	Silence alarm ALR(A)
Internal UDP	The System can also take information from other SKIPPER devices within the same network for display on screen or for logging

The Communications on NMEA are 4800, 8 data bits, 1 stop bit. Baud rate can be changed to 32400 or 115200

Auxiliary set

Menu – Auxilliary config
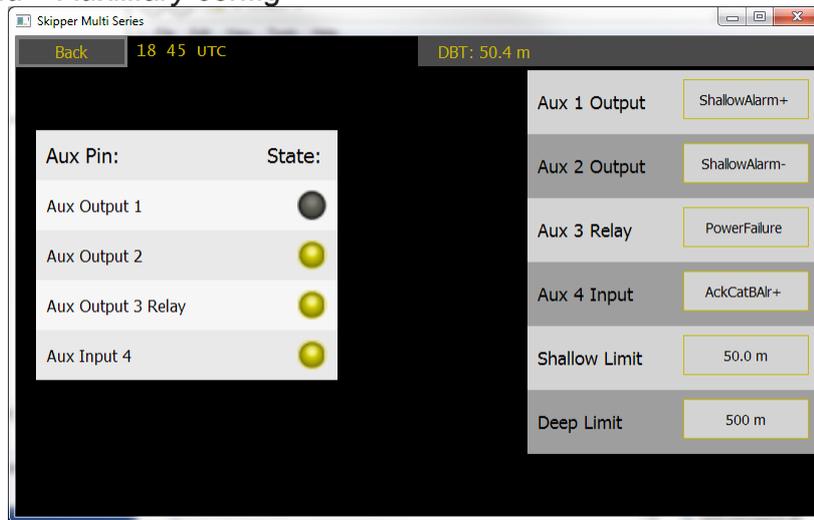
The ESN200 system has 1 isolated auxiliary input, 2 optoisolated auxiliary outputs and one relay output on connector J2. The state of these can be seen on this screen on the left and the functions are selected on the right.

Aux 1,2 output: An opto-isolated output with the following options:
- ShallowAlarm+/- Changes on shallow alarm

- ShallowAlrBeep+/- 3changes every 10 seconds as defined in standard. To be connected to external beeper

- DeepAlarm Changes when deeper than limit

- DeepAlrBeep+/- 2changes every 10 seconds as defined in standard. To be connected to external beeper

- ShallDeepAlr+/-both alarms

- DeepAlrBeep+/- beeps for both alarms

- ShallDeep limit+/- Use the buttomns below to set a depth range where the output changes

- Sync Out +/-

- Mute confirm +/-

- Disabled

- Power failure, changes when no power on JB70

- Ping +/- Changes when a ping is being sent (for synchronization)

Aux 3 As above except ping
Aux 4 input:

- AckCatBAlr+/- Acknowledge and alarm (Not shallow water)

- AckAllAlr+/- Acknowledge and alarm (Option)

- SilenceAlr+/- Silence an alarm

- Ping now - Synch with other system

- Disabled

Shallow limit
Deep limit

The opto-isolated input and outputs need a voltage between 5V and 30V to operate. If isolation is not important, this 5v can be taken from the connector, otherwise it should be supplied from an external source. Connection is as follows
Connection diagrams

Expected waveforms
The function of these can be selected in the AUX config menu from the following options

Display adjustment

The information shown is programmable and can be made to show what the user wishes. It comprises of 5 information's on the right, and 3 on the bottom. These information's can show parameters of the system or parameters being sent into the system from other equipment. These parameters can be made to, after a short time, slide off screen.
Touching the screen will make them return.
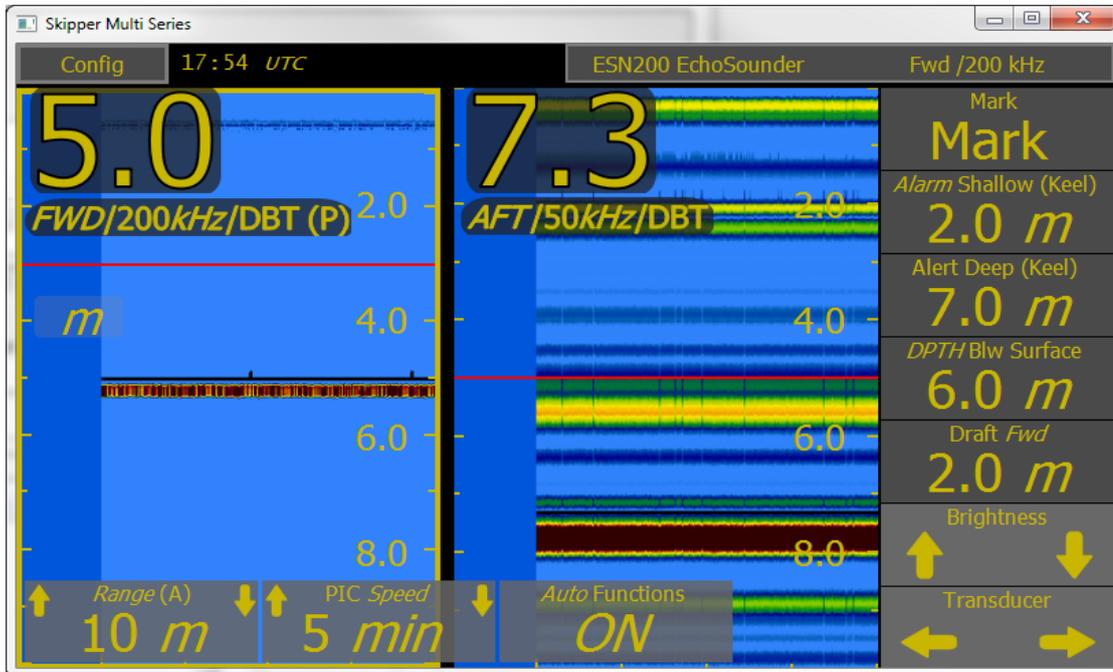
All these parameters are selected by default, but can be changed to show whatever the user chooses. See the User guide Runtime screen setup

Display setup

The Display setup menu gives access to the system parameters the dimming set up and the Network parameters.
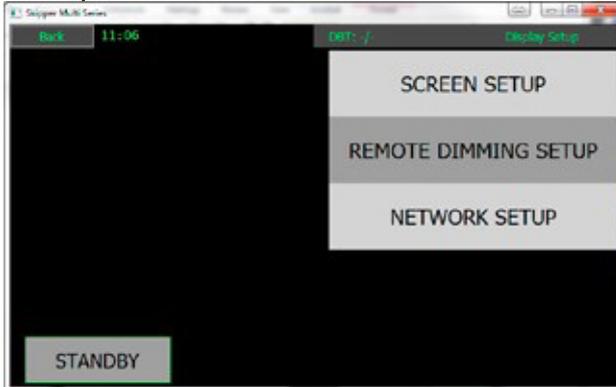
Screen setup

Language: Only English currently available
Alarm sounder: Internal alarm sounder is allways on in ALF mode
Button click: Sound feedback on touching the screen
NMEA loop test: Testing of NMEA ports in JB70E2-SA with loop feedback on ports
Sounder test: This will beep at full volume
Calibrate touch screen: Will start touch calibration. If touch screen is totally off then calibration may be initiated by the SKIPPER service software.
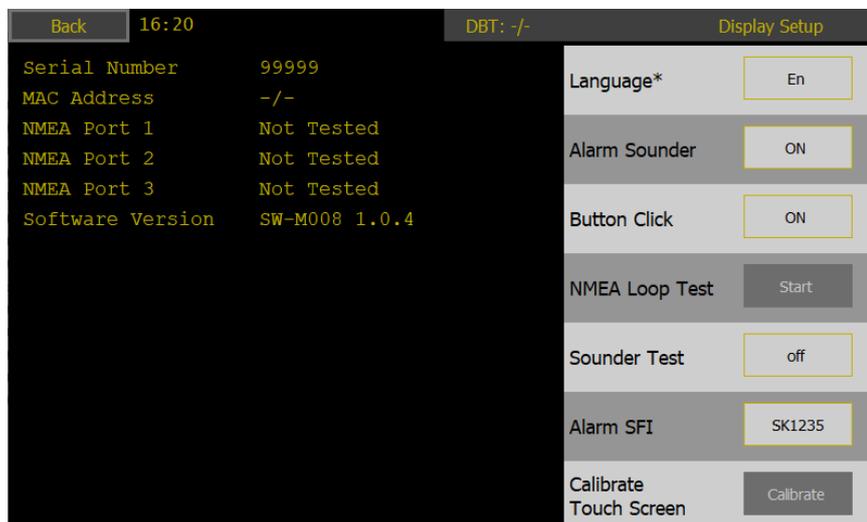
Remote dimming setup

The Dimming levels can be set up on this screen. The user can select dimming and color choices for the 4 preset levels that can be sent remotely (using DDC NMEA command). When the user uses the on screen dimming, the color scheme will change when the dimming level passes the set % value.
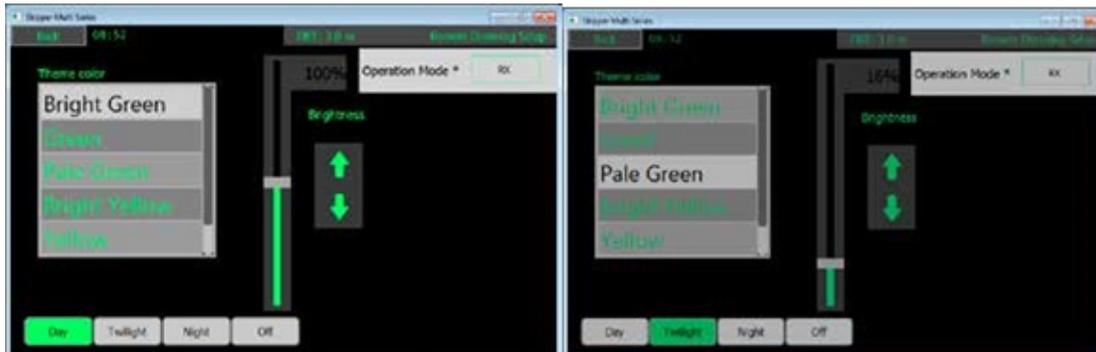
Alert setup and usage

Echosounders are safety critical instruments and should be configured such that the user must view the echogram screen to acknowledge a shallow water alarm. This is so that the history of the water getting shallower is seen. This is classed as a category A alarm. The other alerts are warnings or alerts that can be centrally acknowledged. (Category B or warning)
The ESN200 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

| Back	16:11		DBT: 2.6 m	ES System Setup
		RUNTIME SCREEN SETUP		
		ALERT SETUP		
		DIAGNOSTICS		
	STANDBY	ES SETUP		
		COMMUNICATION SETUP		

Back	16 07		DBT: 2.6 m	ES Alert Setup
Alarm Shallow (Keel)	2.0 m		Alarm Shallow (Keel)	2.0 m
Alert Deep (Keel)	off		Alert Deep (Keel)	off
Alert Type	CAT A ALF		Alert Type	CAT A ALF
Escalation Time	4 min		Escalation time	4 min
Alarm Shallow ID	230		Alarm Shallow ID	230
Alert Deep ID	10456		Alert/Warning Deep ID	10456
Alert System ID	10457		Alert/Warning System ID	10457
Alarm Power Failure ID	231		Warning Power Fail/Reduction ID	231
Alarm SFI	SK1235		Alarm SFI	SK1235
			Alert/Warning Deep and System Error Escalation type	W-W

Buttons:

Alarm shallow	The value at which the alarm sounds as the vessel approaches shallow water
Alert Deep	a second warning or alarm sounding if the vessel goes deeper than the specified value - Setting value to zero will deactivate them.
Alert type	The Alarms can be made to follow older or new protocols. Depending on the CAM system in use, the following options are available - CAT A ALF/ACN/ALC: The newer IEC61924 standard allowing the system to connected to a central alarm management (CAM) system. Allowing the alerts (Deep water, system failure, system power) to be acknowledged remotely or taken over by the CAM, but forcing the user to acknowledge locally on the echosounder for shallow water - CAT B ALF/ACN/ALC: The newer IEC61924 standard allowing the system to connected to a central alarm management (CAM) system. Allowing all alarms and alerts to be handled by the CAM. This assumes the presentation of the depth is on the INS and is approved for this usage - CAT A ALR/ACK: The user may not acknowledge the shallow water alarm except by acknowledging on the Echosounder Display (Forcing the user to look at the history of the depth. - CAT B ALR/ACK: User can select the traditional way of using NMEA alarms where the user uses ACK to acknowledge the alarms.
Escalation type	The Deep water and system alarm are by default CAT B or warnings, this option allows the user to decide what to do if the alert is not handled within a fixed (Escalation time) period W-A Alert starts as warning and escalates to alert after the escalation time W-W The Alerts are warnings and will continue as warnings
Escalation time	The amount of time a warning can remain unhandled.
Alarm Shallow ID	The unique identity of the Shallow water alarm (default 230) can be changed here
Alert Deep ID	The unique identity of the Shallow water alarm (default 10456/456) can be changed here
Alert system ID	The unique identity of the system alarm (default 457) can be changed here
Alarm Power Fail/reduction ID	The unique identity of the power reduction alarm (default 231) can be changed here
Alarm SFI	The System identification number of a LAN based Alarm system

The system has an internal alarm sounder, that can be disabled for CAT B Usage on the display menu. The ESN200 has the following default alarms and alerts.

Alert type	Alert ID*	Alert text on output	Description
Shallow	230	Shallow water	The Vessel has entered an area of water shallower than the user defined depth.
Deep	10456 /456	Deep water	The vessel has entered an area of water deeper than the user defined depth
System	10457 / 457	System	The system has an internal error
Power Failure	231	Display-Voltage Sensor-Voltage Sensor-Comms	All, or part of Systems power supply is out of specification (21V-32V), also displayed on screen if power is present on screen. • The voltage to the display is out of spec • The voltage to the transceiver is out of spec • The communications to from display to transceiver is not correct Also triggers relay in JB50E1 unit

Power failure alarm:

If the power to the unit fails, this state must be indicated to the bridge in an audible form. If no other method is available, a beeper can be connected to the power failure relay (auxiliary output), and on failure the beeper will sound. In the case of just the JB70 Electronic unit failing the Display will give an alert.

Alarm/Alert states

Alarm Shallow	Value for shallow water alarm (usually also available on informations)
Warming Deep	A second alert that can indicate when the vessel passes into deep water

The Following symbols indicate the current Shallow water alarm status

Symbol	Symbol warning	Alarm/Alert Status	Sound for Shallow water (Alarm)	Sound for other warnings
		Unrectified, unacknowledged	3 beep	2 beep
		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

If responsibility is transferred, the transferred alarm will remain passive in this system for the escalation time set in config-alert setup screen.

Examples
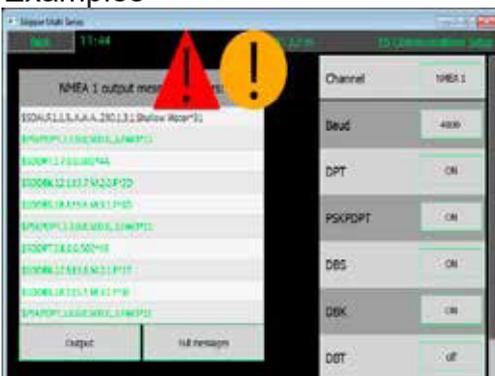
The system has a relay to indicate power failure in the JB50 Transceiver unit. This will indicate failure in all or part of the system. This should be used if there is no other indication that the system has failed. This should be connected to a buzzer such that an audible signal is given in the case of power failure of the system

Connection between JB70E2 and Display units

The system is setup to communicate by default. Each unit has an IP address and and SFI. These must be different.
IP address: The IEC61162-450 standard allows ranges of 172.16.X.X (2011) and 192.168.0.X
SFI: This is set default to SD, but the value after this can be changed.

Service software

To change the values of these the skipper service support software can be connected to the system and using the Tools- Com setup option The IP can be changed
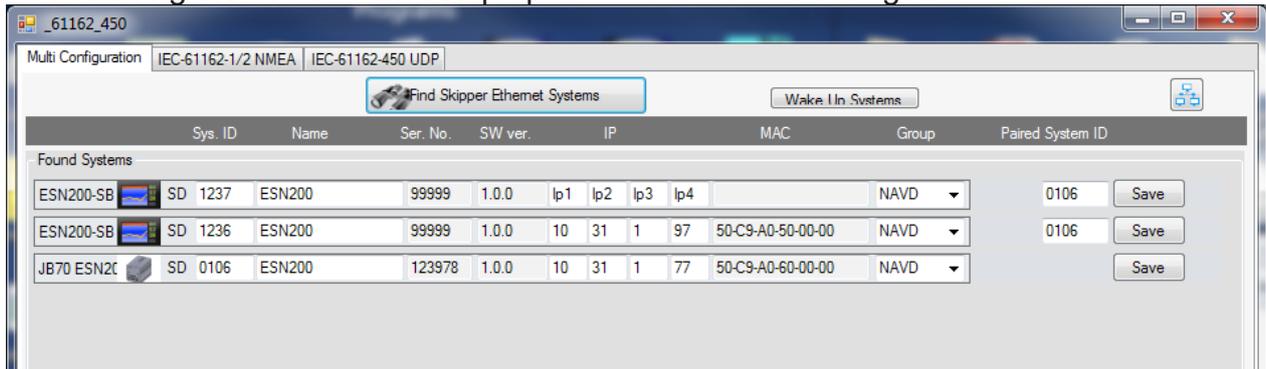
The Connected screens need to be paired to the JB70E2 electronic unit as shown.

These values can also be changed on the screen menu/ Network settings

Display Unit setup – Network settings

|	
	IP: The screen IP can be set up. Approved ranges are 172.16.X.X and 192.168.0.X The IP address must be unique for each unit.
	Local SFI This is the unique identifier of this display. If more than one display is in use this must be different
	Paired SFI: The display has to be paired to the JB/0 Electronic unit, as it is possible to have multiple systems on the same network.
	Group: The complete system belongs to a group of systems (default NAVD) This can be changed, but all units must be on the same group

JB70 setup

JB70 unit can only be changed by display if it is already connected.

Skipper Multi Series Back 15:56 DBT: 32.6 m JB70 Setup IP Address 10.31.1.77 Local SFI SD0106 Group NAVD System Name ESN200 Serial Number 123978 MAC Address 50-C9-A0-60-00-0 Software Version SW-M010_1.0.0 Hardware Version Unknown Firmware Version Unknown Transceiver Serial Unknown Internal Logging Memory N/A USB Logging Memory N/A SD Logging Memory N/A IP 10.31.1.77 Local SFI SD0106 Group NAVD System Name ESN200 Printer None Print Channel Channel 1 Print Echogram and/or Marks Echogram	**IP:** The screen IP can be set up. Approved ranges are 172.16.X.X and 192.168.0.X The IP address must be unique for each unit.
	Local SFI This is the unique identifier of this display. If more than one display is in use this must be different
	Group: The complete system belongs to a group of systems (default NAVD) This can be changed, but all units must be on the same group. Groups available are MISC, TGTD, SATD, NAVD(default), VDRD, RCOM, TIME, PROP
	System Name: The name to be reported on the LAN applications
	Printer: The connected printer OKI ML280 EPSON350 LAN – using service software to print from a local printer None
	Print channel: Which channel to print (1/2/primary/both)
	Print Echogram and or marks: (Echo/marks(text)/both)

Upgrading software

Both Display and JB70 unit have their own software. It is always wise to upgrade both units if software is to be upgraded. To do this the skipper service software is used. Selecting the ESN200 app, will allow you to search for the units, and then upgrade using a file downloaded from www. skipper.no, or sent from your service hub. JB70E2-SA uses software SW-M010, ESN200-SB Display uses software SW-M008. These sofwares are in a compressed format .tar and should not be decompressed before loading.
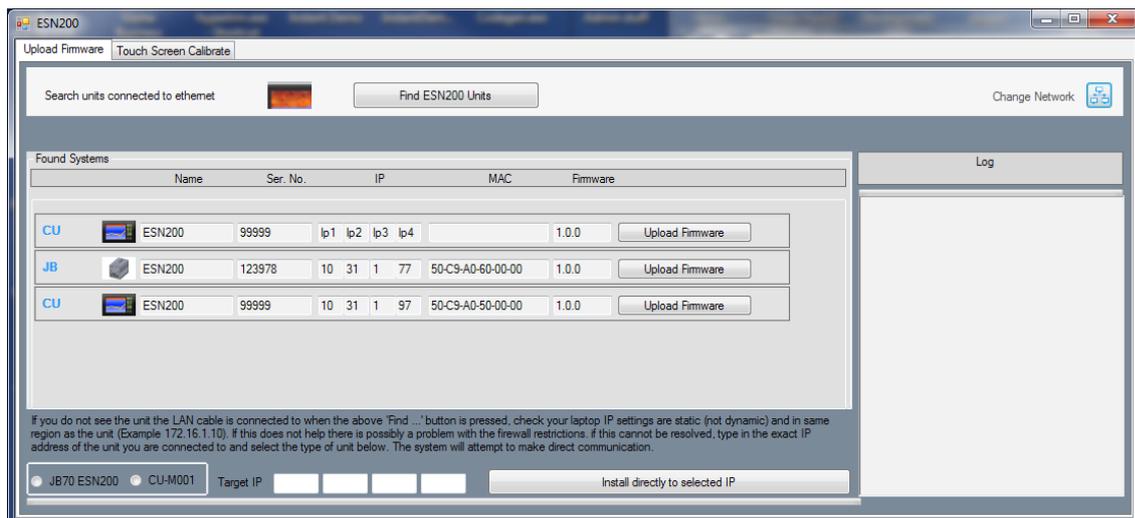
It is also possible to find which software is loaded in the Display on display setup
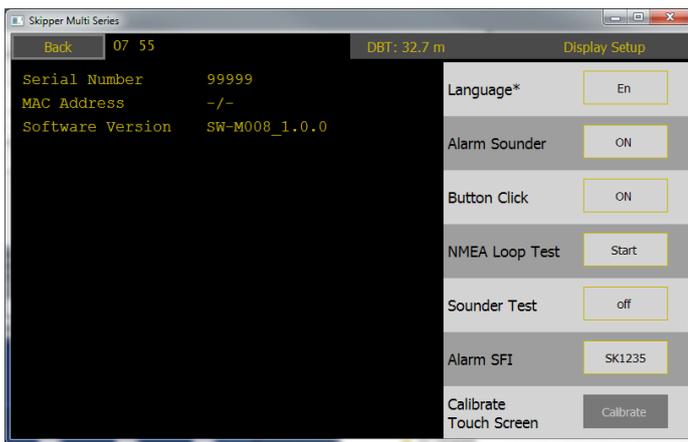

On the JB70E2 unit on JB70 setup
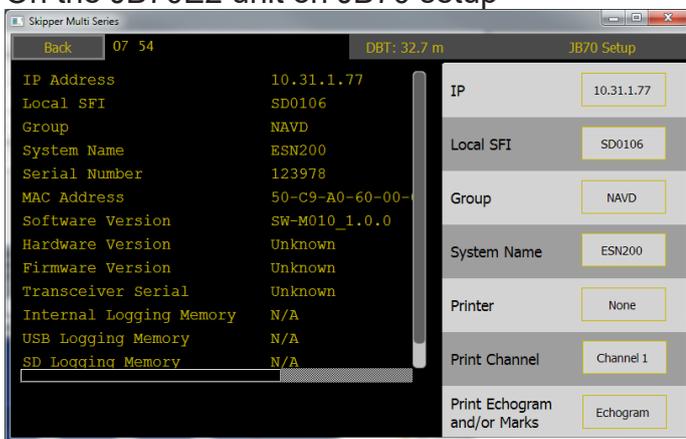
Other transducers

If other transducers are selected then the following parameters may be changed

Screen	Function
	Transducer connector number, Selected by pressing or touching the green position
	Position (FWD,AFT,PORT,STRB)
	Part number, or other Approved part numbers, are ETN050 (50kHz) ETN200/ETS200 (200kHz) ETN200S/ETS200 (200kHz for valve) ETS50200 (combined 50/200kHz) ETN38 (38 kHz)
	Draft of this sensor, can be changed on main screens
	Offset. Distance from transducer to keel
	Current Frequency 200 or 50kHz
	Approved Primary: Any of the above transducers can be primary, if a non approved transducer is used as the second transducer, this must not be primary
	In the case Part number is 'other'
	Max range (set automatically for part number, adjustable for 'other')
	Max Power: This system is up to 1kW Peak power, and this can be limited if required
	Sensor frequency low: if the sensor is a dual frequency then this is s the low frequency or main frequency if not (available frequencies are 24, 30, 33, 38, 50, 100, 200, 210 kHz)
	Sensor frequency high: If dual frequency this is the high frequency
	Switch to low Freq below Range: At this depth a dual frequency transducer will switch between low/high
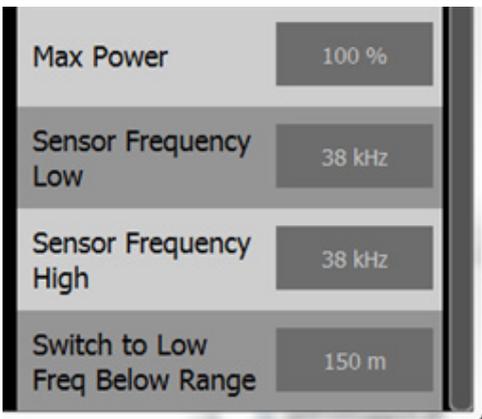
Options

Some settings are not changed as standard, but can be accessed by entering a code.
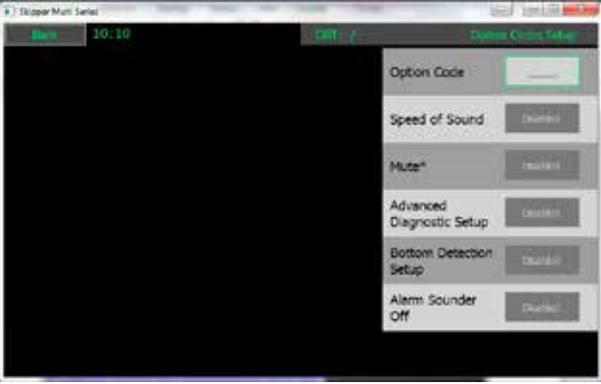
OPTIONS	
	Codes can be entered to allow the options to be activated
	Speed of sound, is activated by unique code from SKIPPER
	Mute, a function to stop all pinging, after a period an alarm will activate. A 'M' Symbol will show on screen, This mode is not approved for ISO9875.
	Advanced diagnostic features can be shown by activating this option
	Automatic features can be changed when this setup is activated
	The alarm sounder can be disabled if this option is activated

Printing

Printers

The ESN200 is programmed to use the following printers
- EPSON LQ350 ; for continuous and page printing

- OKI ML280 for continuous and page printing

- LAN printers; using the SKIPPER service software via the network, the system can be made to printer on the remote machine.

If printing is used often, an information on the screen can be changed to activate printing

Saving to disk

Both the USB and SD disks can be used to save data. Inserting the disk will start the logging of data marks and input information. This can be processed in the service software
The system logs up to 4MB per 24 hours, and will there for use XX GB per year.

Continuous saving,

Each competed echogram is converted to a PDF file and can be extracted using the service software on a separate PC via LAN.

USER Information

Introduction

The ESN 200 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 200kHz aft. With this system it is also possible to install any of 8 frequency transducer both forward and aft and if dual frequency transducersare used, the system can be made to select the best frequency at any particular time.

Presentation

The user presentation screen is a single screen .
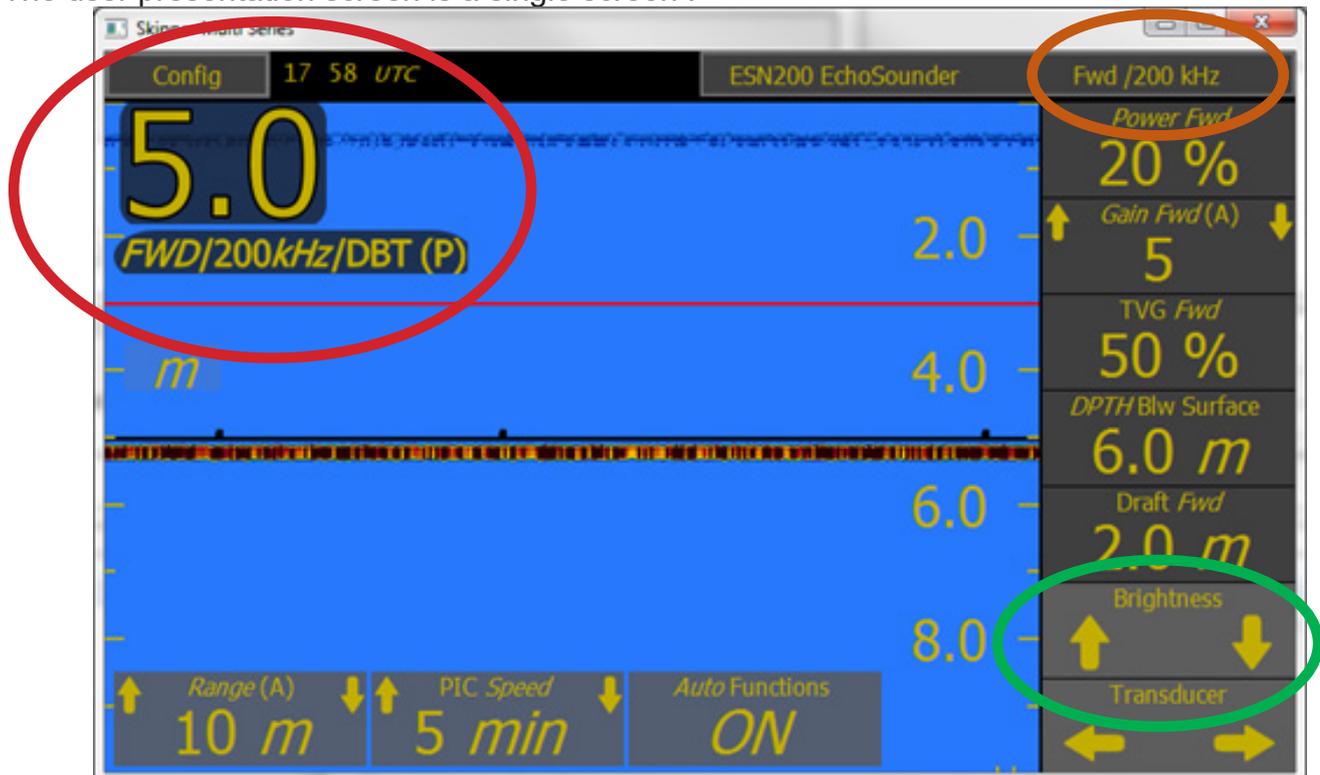
Selected Transducer and frequency (orange circle)

The selected transducer is seen on the top right as position and frequency. If 2 are installed the Transducer selection on the bottom right switches between these.

Depth and units (red circle)

The Depth is shown numerically on the left, and the Echogram shows the variation of depth over time. The units can be changed by touching the unit sign, or in the menus

Dimming level (Green circle)

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

Selectable Information

All the buttons on the side and bottom can be selected (Except Range which is permanent) And this information can be made to disappear after a short time (selection made in menu 'Runtime screen setup' using option Info buttons, or bottom bar: fix or slide). The information/options can be recalled by touching the screen

Auto Functions

If the system is in Auto mode then the system 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 then 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.

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. When in auto off mode the top 3 right side information's Will show power, Gain and TVG.
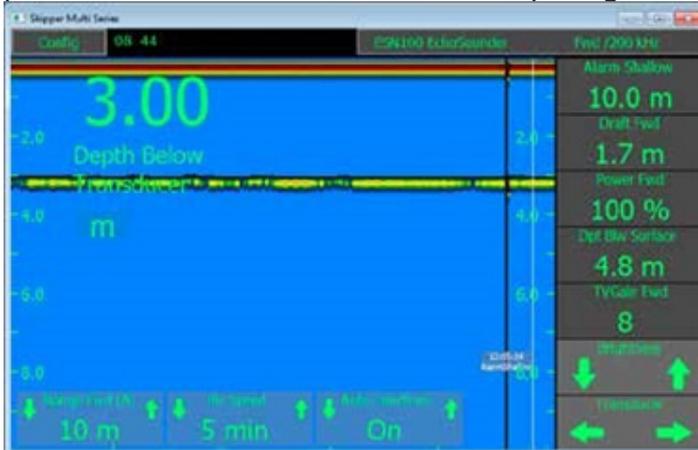
The system can be made to show the information/ options, or to hide it until the user touches the screen. (in Runtime screens)

Screen Configuration

The main screen can be set up to show numerous informations on the right and below 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 the 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 **500 m**	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 ***The value can be changed by pressing***
Gain Gain Ch1 **1 V/V**	Gain is the amount the signal, reflected from the bottom, is amplified. This should be adjusted such that the signal strongly visible at the bottom and below, but not above the bottom. **Manual** : Gain can be adjusted between 1 and 12 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 menu ES Setup* ***The value can be changed by pressing and holding***
TVG TVGain **20**	Time variable gain Predicts how much the sound will fades 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 menu ES Setup* ***The value can be changed by pressing and holding***

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.
(Pic Speed — 15 min)	*If not on screen this is available in menu Runtime setup* The value can be changed by pressing and holding
Alarm shallow ' *(Alarm Shallow — 50.0 m)*	The Shallow water alarm is obligatory, 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 menu Alarms* The value can be changed by pressing and holding

A vertical mark will be made on the screen when this option is active, when 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 menu Runtime setup
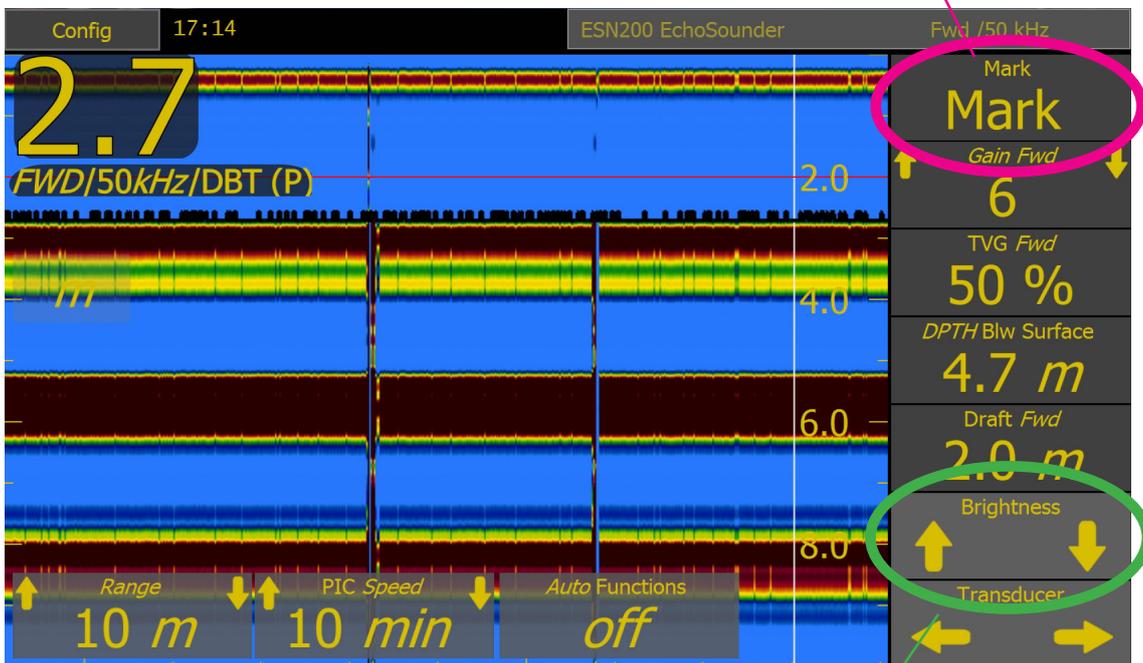
Dimming up and down is available using the up and down arrows, or the slider that pops up when a dimming arrow is touched. IF the system is dimmed tooo far down, press and hold the screen, and it will return to a 'visible level'.

The screen will not dim fully down if an alarm is active. If an alarm becomes active when fully dimmed, the screen will return to the 'visible level'. And return after acknowledgement

This is always available, but can be adjusted in Display setup

The position and frequency of the currently active transducer is displayed on the top banner

If dual frequency transducers are installed then the frequency button will allow the user to change between the available frequencies.

Manual: 50kHz / 200kHz

AUTO: The system will change frequency at a predefined depth. Default 0-200m 200kHz, below 200m 50kHz
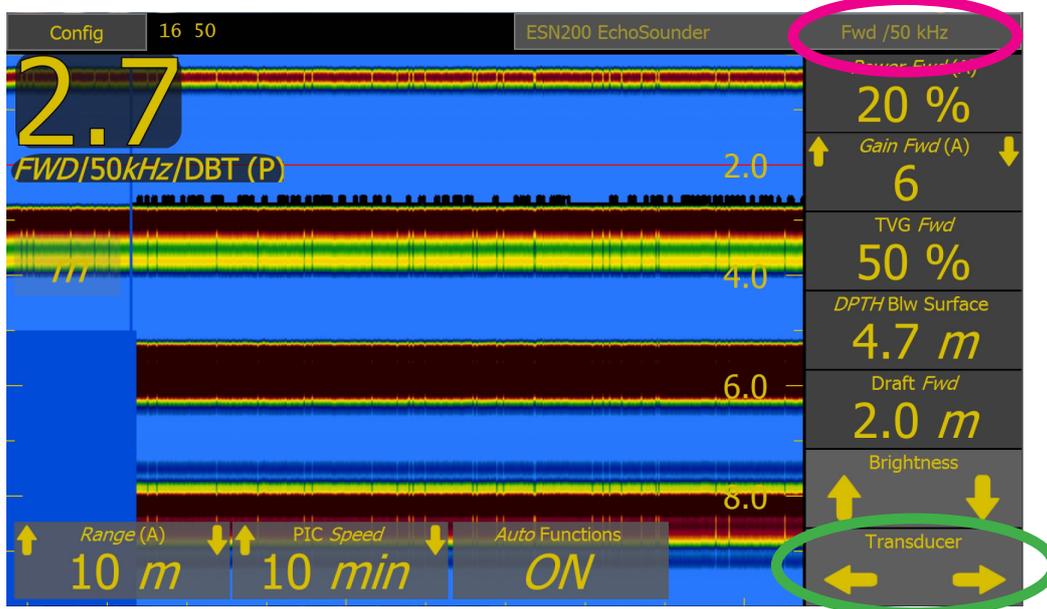
The left right button will allow the user to change the transducer displayed. Each of these may have up to 2 frequencies.

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 wirning 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 transdcucer
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.
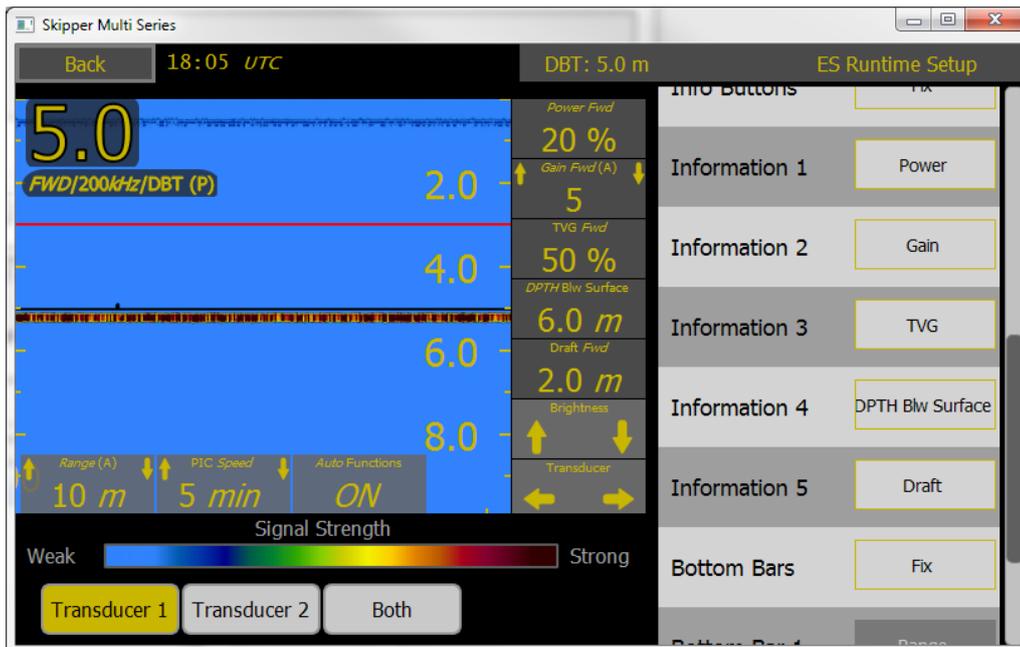
To change a value on one of the information bars go to config Runtime setup, select the transducer screen to be changed and change the information value. A long (3 second) press will show a menu of the available options. RANGE is always available in the bottom left position with a single touch.
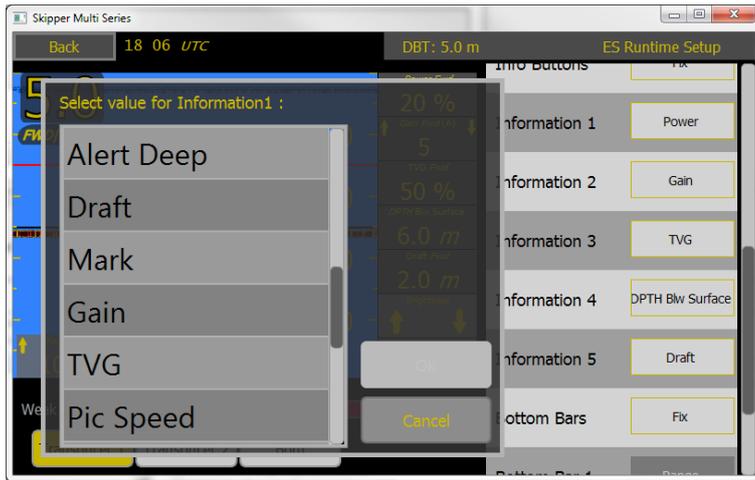
Changing the look of the screen

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 echogram colour scheme is seen under the display picture.
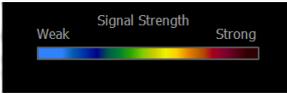
|	
	Brown
	Orange
	Yellow
	Grey

This can be selected using the Echogram colour option
The main text colour can be changed in the dimming screen.

Dimming and remote dimming

It is also possible to change the screen so that at particular dimming levels the colour theme and light levels will change. This is done in Display setup – remote dimming setup.
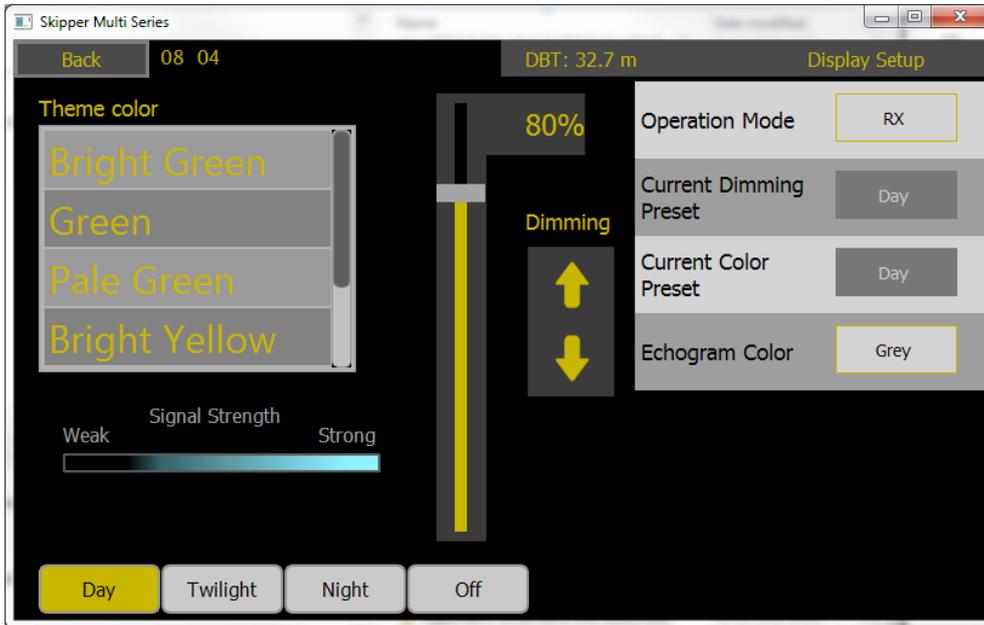
By changing to Day, Twilight, Night , and OFF Text colours can be selected and echogram colour for that level. As the dimming is changed, these colours will change as the dimming level passes through the set level, or if a remote (DDC) command is sent. This allows the user to decide what dimming level is required for this particular display (This may be different in different areas of the Bridge/Control room)

Show Page	ON
Show Marks	Lines
Mark Type To Show	Alert
Digital Font Size	Extra Large
Depth Value	Blw Transducer
Echogram Colour	Grey
Picture Speed	5 min

ES Runtime Setup	
Info Buttons	Fix
Information 1	Power
Information 2	Gain
Information 3	TVG
Information 4	DPTH Blw Surface
Information 5	Draft
Bottom Bars	Fix

Button	Description
Transducer 1	The Transducer connected to transducer connector 1 (if this is a dual frequency transducer it will show the low or high frequency)
Transducer 2	The Transducer connected to transducer connector 2 (if this is a dual frequency transducer it will show the low or high frequency)
Both	Show both transducer on the screen (select the transducer with active information by pressing the echogram (a yellow border will show)
Show page	Activate this transducer display
Show marks	Show changes in the system as vertical line with minimal information (lines, info, full, none)
Mark type to show	Alert / Basic / other / all
Digital Font size	Adjusts the size of the depth text on the left. Small – 1m viewing distance Medium – 3m viewing distance Large – 5m viewing distance
Depth value	The reference point from which the depth is measured (Surface/Transducer/Keel)
Echo colour	Grey / brown / orange / yellow
Picture speed	The amount of information shown on screen (5mins to 24 hrs)
Info buttons	The information on the right can be made fixed or to disappear after a time, recalled by touching the screen
Information 1-5	Select the information/parameters to be shown on each information. Press to change or press and hold to get all options. Information available are: Dpth below surface, Dpth below keel, dpth below Transducer, SOG from GPS, SOG from log, STW from log, heading,ROT, Depth from log, alarm shallow, alert deep, draft, mark, gain, TVG, pic speed, range, show marks, power, frequency, auto functions, print
Bottom bars	The information on the bottom can be made fixed or 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)
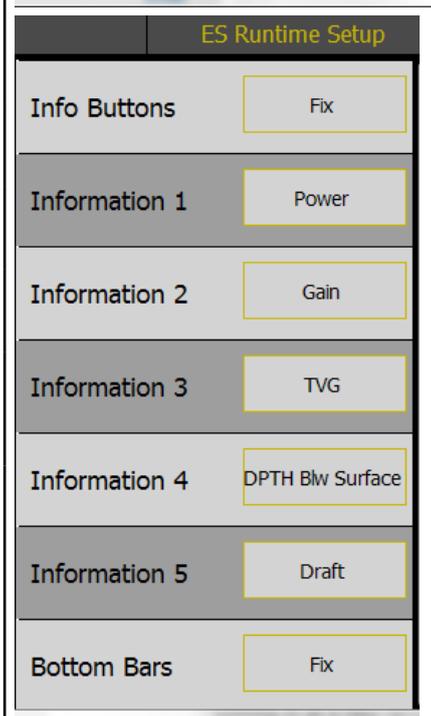
Saved depth / History

The IMO requirements for saving depth information is 12 hours and data 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. The system will always save 12 hours of data, including the relevant input s such as GPS, Heading, other depth measurements. This can be viewed on the history page as a picture or table.
It is possible to view all changes made manually or automatically by the system, all alarms and acknowledges, or just depth and position data.

|	
	Show marks, On the graphic display show a vertical line and information when something changes (Full, none, lines, info, alarms)
	Mark type to show: Alr and Man: Alarms and manual marks Basic, all changes shown as 1 letter G=gain, P=power,R=range,M=mark Other, just manual changes All, All changes
	Range: Range to show on history screen
	Show Channel: Which channel to show on screen (1/2)
	History logging: Which channel to log (1/2/both)
	Echogram PDF logging: Save echogram and data to pdf (none/1/2/both)
	Marks PDF Logging: Which channel to record the system changes on (none/1/2/bath
	Logging mode: 12 hours is always logged, but extended logging is available, until the selected disk is full, and then the system will loop or stop
	Raw Data Logging: If raw data is selected, all relevant dat will be logged, again until the disk is full or the system wil loop overwriting the oldest data.
	Log to: Selection of the media to log to, (SD, USB,Internal)

Diagnostics

If the system has problems or a system error occurs. 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
Depth	The value to be sent, a value, changing or from a file.
Test alarm	Send all known alarms to the output. (These can be acknowledged/ silenced/ changed as a normal alarm/alert)

Self test (to follow) performs the following tests

- Check voltages within the system

- Check check the IO

- Check the output of the system.

Results are presented on screen after the test.

Each ping is plotted in the Scope screen

Here you can see the pings and the parameters in use to detect it, The red dot is the position of the located bottom echo. In this case Auto range is for the graph vertical axis, not the system depth range.

Lost bottom or input information

If the system cannot locate the sea bed, for a period of time it will go into lost bottom mode. This is normal once it is too deep (depending on transducer frequency and sea/sailing situation) This will normally occur if there is lots of air under the transducer (sailing aft, being tugged or use of thrusters in shallow water) it can also occur if the water is very dirty, blocking the sound, or the sea bed is very absorbant (very soft mud)

In this situation the depth number will disappear from both the display and outputs. In its place on screen the following symbol will be shown -.-
If the information panels are set to show input parameters these will also show -.- if there is no, or invalid information on these inputs.
If the system is in AUTO mode the system will start changing parameters every few seconds to try to refind the bottom. In this case the displayed echogram range will lock until the bottom is refound, but the Range value, gain and power will change every few seconds

Diagnostics of the ESN200 using an ETT985

The ETT985 echosounder and transducer tester has been updated with tests for the ESN200 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 JB70E2-SA unit and then running the ESN200 noise test for the appropriate frequency will allow the user or service technician to check the signal output and noise characteristics of the system.

Using the transducer tester, the connected transducers can be analysed to see if their resonance impedance is as expected.
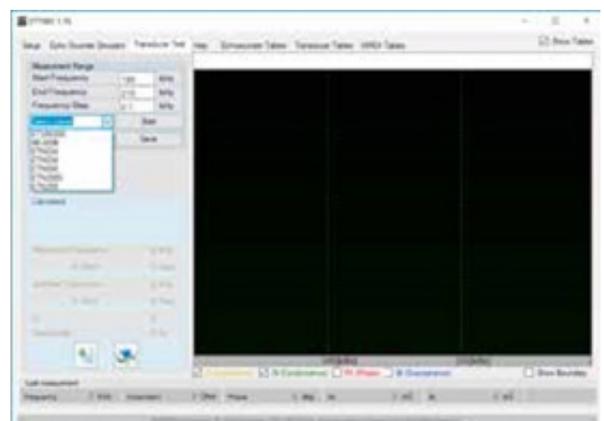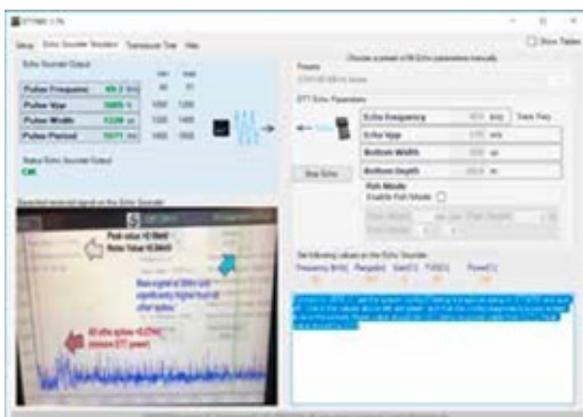
Installation

The ESN200 comprises of 2 units and up to 2 transducers

ESN200-SB Display unit: Contains a 2 NMEA outputs and 2 NMEA inputs used solely for dimming, or normal DPT outputs. An RJ45 connector is used for LAN communication (IEC61162-450) to the Electronic/transceiver unit. Power input 24VDC

JB70E2-SA Electronic and transceiver unit; This unit is the echosounder producing the acoustic signals and processing the returns to give the appropriate outputs for depth. It contains connections for 2 transducers, 2 LAN ports for connection to the bridge or control units, auxiliary inputs and outputs, 5 NMEA outputs and 3 inputs, and power input 24VDC and 110-230VAC. This unit is mounted on or close to the bridge, with long cables coming from the transducers.

If 7 outputs is not enough, the NMEA will typically be sent to a splitter/Expander such as the SKIPPER NE108-SA to give the information to the bridge/alarm system and VDR.

Mechanical installation

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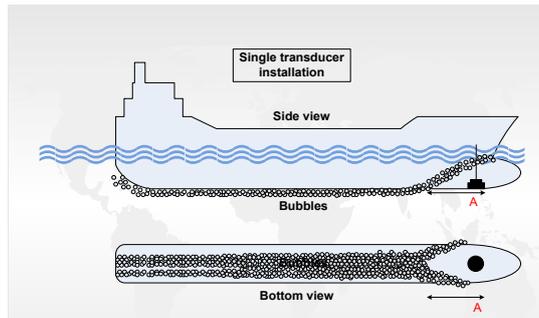
Do not mount transducers close to the propeller or aft of other hull installations (outlets, vents or other protruding details). It is necessary to select a part of the hull that is submerged under all load and speed conditions, and to avoid positions where air is trapped in heavy weather.

If a flat, horizontal section is not available for transducer fitting, the shipyard must construct a suitable bed.

Larger vessels are often fitted with two transducers, one fore and one aft (see fig.)
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.
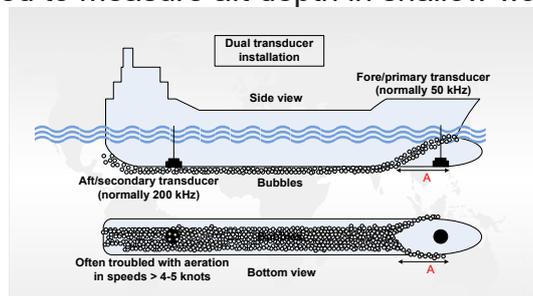
Installation Details

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

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.

Transducers should be positioned as close to the bow as possible within the first 3rd of the ship. 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 5 degrees tilt. If this is not possible a blister should be assembled. This should have at least 0.3m of flat area in front of the transducer, and be tear drop shaped.
Generally there should be nothing in front of the transducer that can cause turbulence within 2m. and 0.5m to the side.

Positioning/wiring of the units

Length	Transducer cable type: Twisted shielded pair
25/40m	Connected transducer cable
40-100m	1.5mm
100 – 300m	2.5mm

Connectors supplied with the system

ZZN-01126   Relief Housing, 3 pole snap-on. WAGO: 232-633
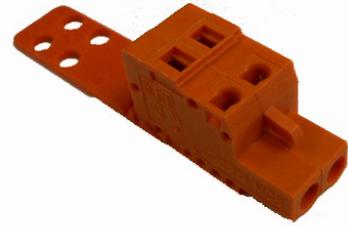
ZZN-01124   Plug, Female 2 pole, 231-302_032-000

ZZN-01136 Plug, Female 3 pole with locking levers, 231-303/037-000

ZZN-01136 Plug, Female Coded and labeled for transducers. 3 pole with locking levers, 231-303/037-000

ZZN-01130   Connector, Female w/ejectors 3x2 pole, black WAGO 713-1103/037-000

ZZN-01120   Connector Female w ejectors 6x2 pole, black WAGO 713-1106/037-000

ZZN-01123   Strain relief plate, 6x2 pole, width 11 mm WAGO 713-126

ZZN-01123   Strain relief plate, 6x2 pole, width 11 mm WAGO 713-126

Wiring diagram for ESN200
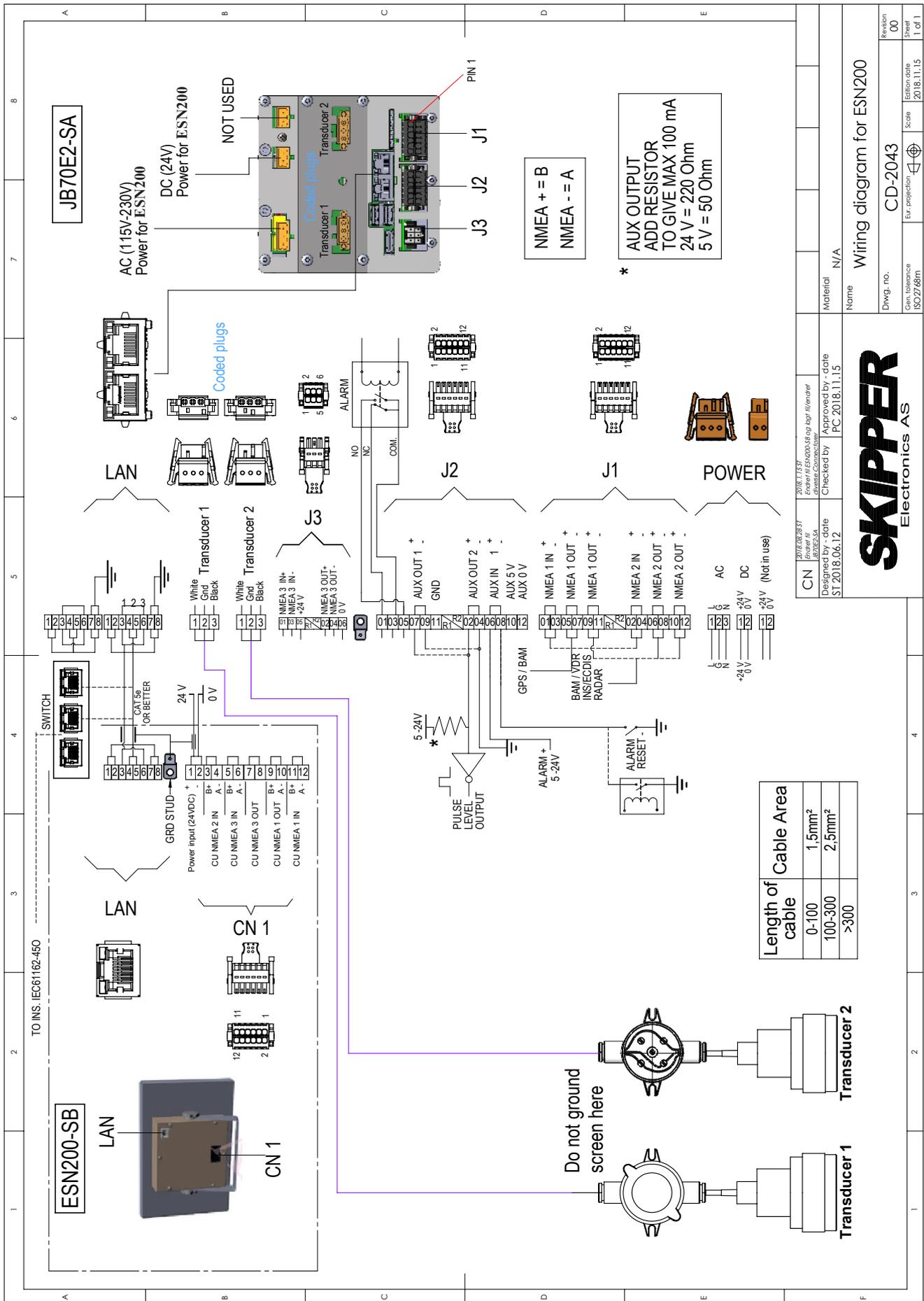
Appendix 1: Installation drawings

The display is designed for flushmount installation

CUT-OUT
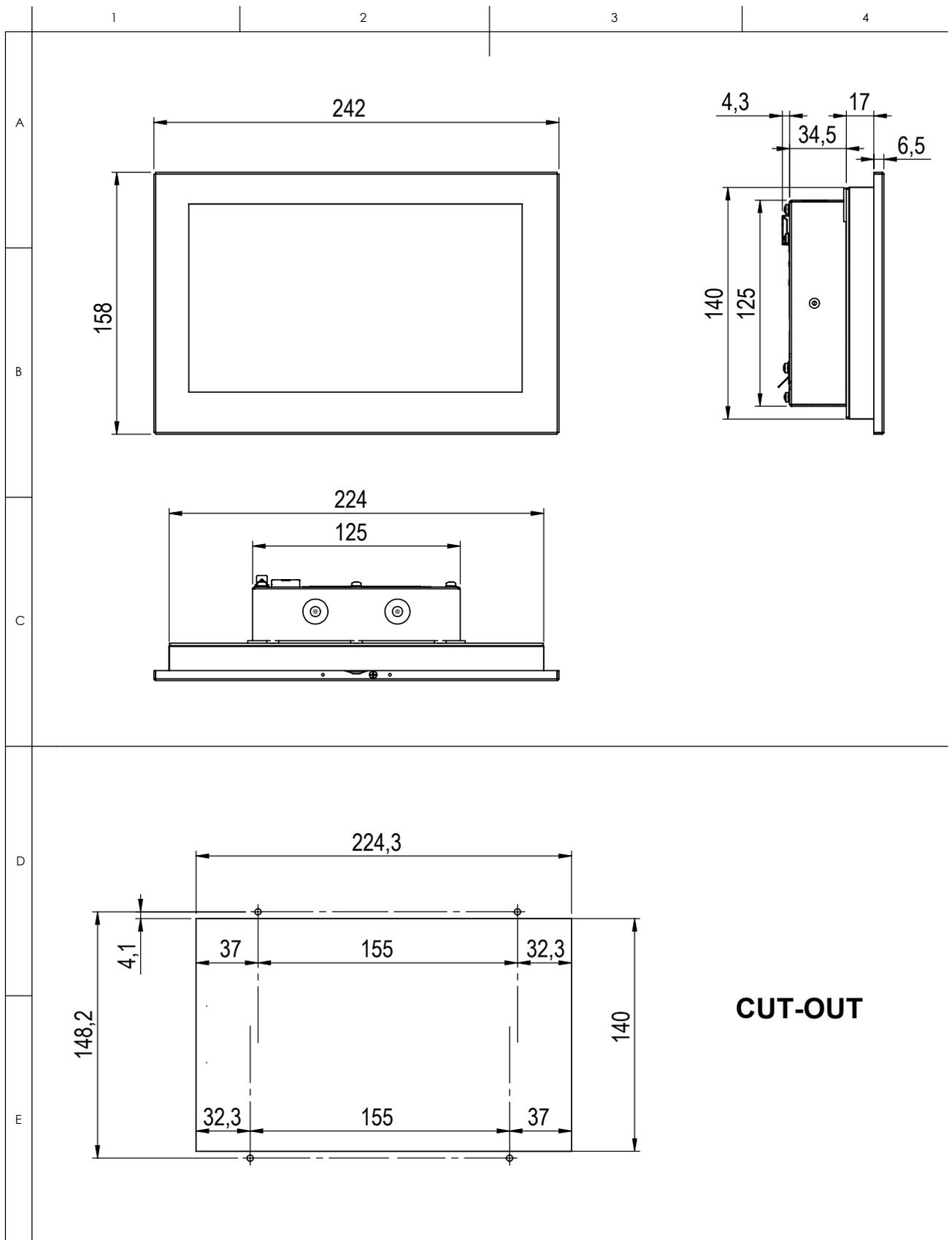
Optional wallmount/desktop bracket.Part number: MG-0002. Mounting bracket for 9inch display
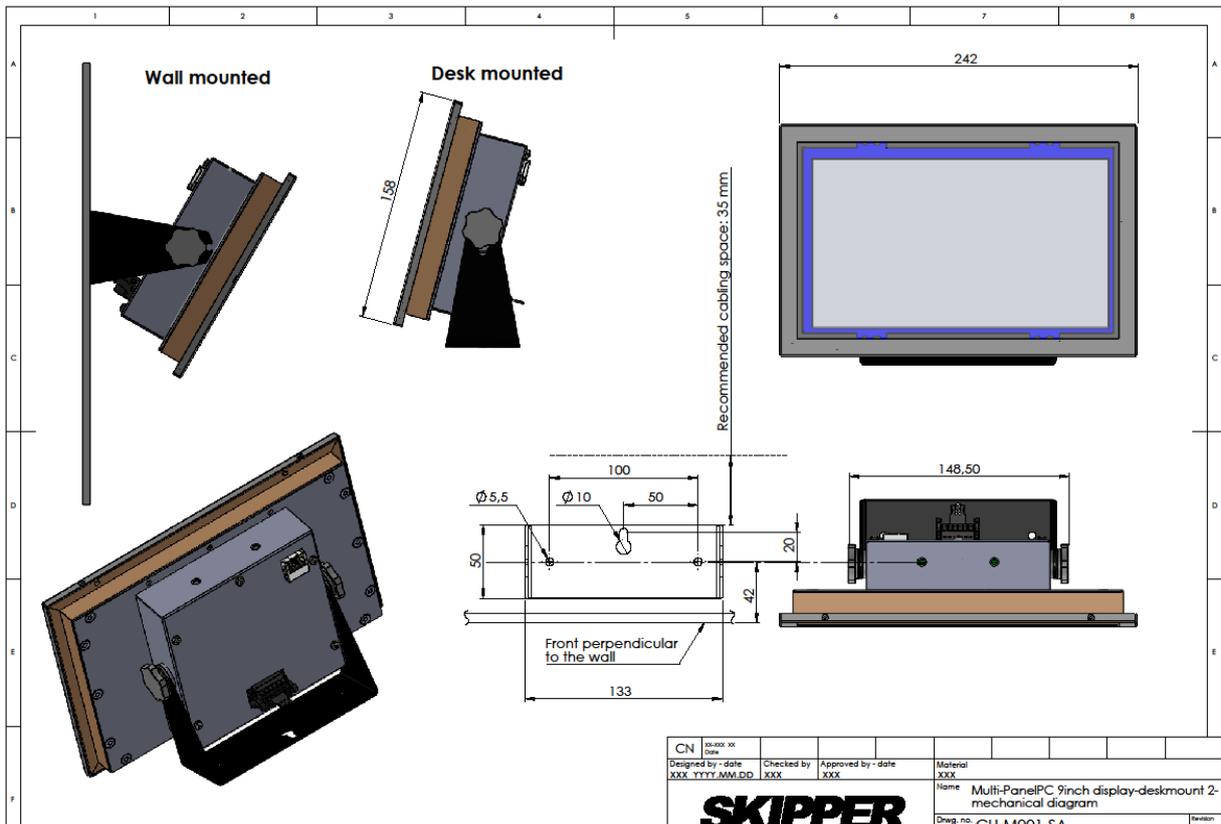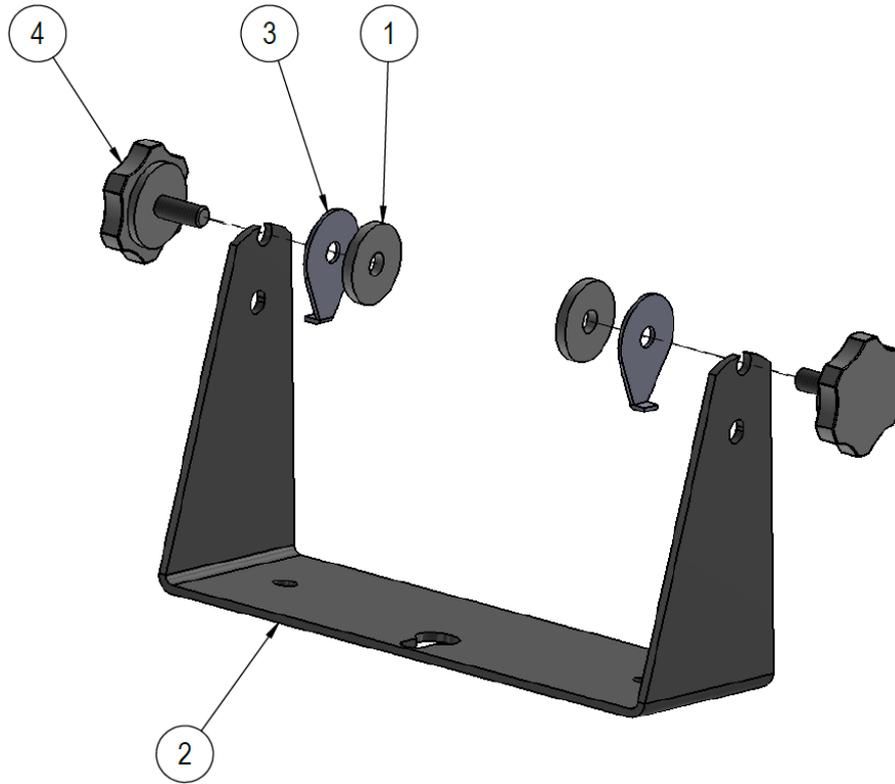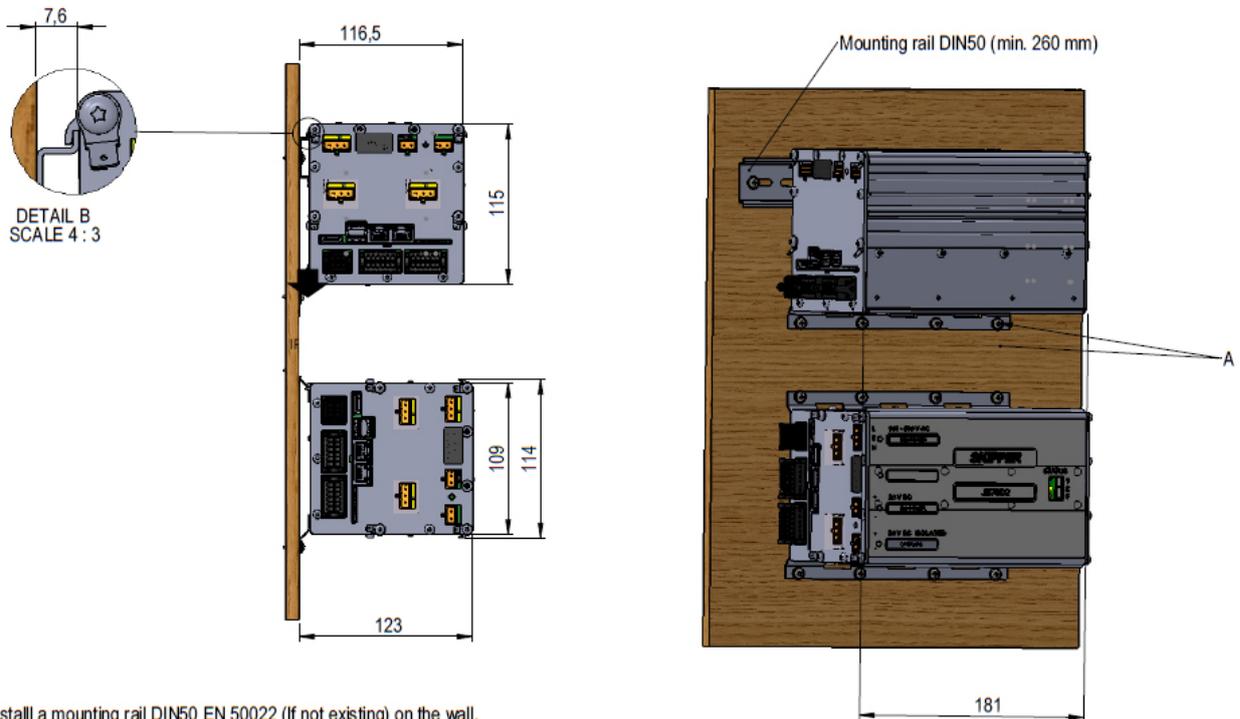
1. Installl a mounting rail DIN50 EN 50022 (If not existing) on the wall.

2. Mount the JB70E2-SA on the rail (Be sure that the unit is properly mounted, see detalil B)

3. Mark the 4 centerpoints for the drill in the wall (A). NB! The drilling holes diam. depends on thickness and material of the wall.

4. Use self tapping screws ST3,5 DIN7981-C pozidrive (A) (The screw length depends on the wall thickness).

Recommended minimum free space for cabling: 134mm