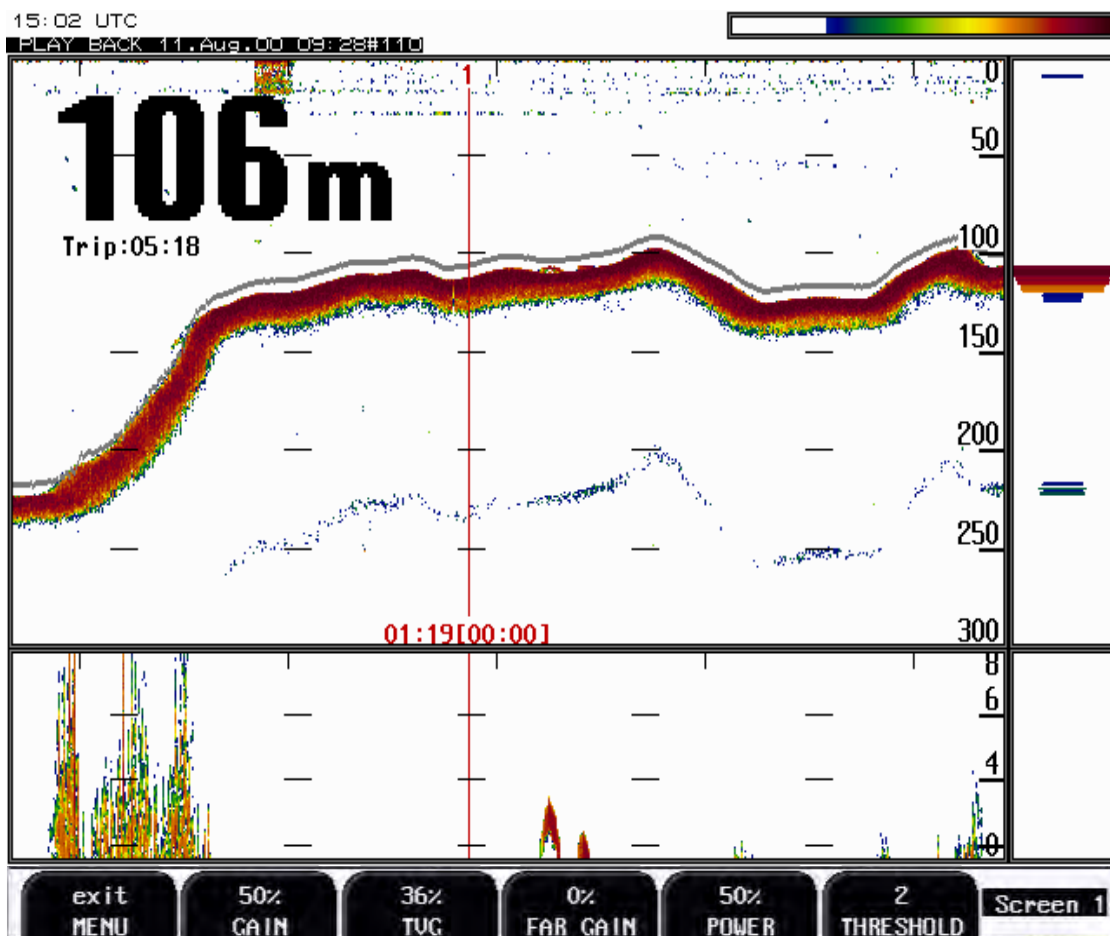


# SKIPPER

## Graphic Depth Sounder/Fish Finder

### GDF201

# Operation and Installation Manual



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# Important

**Before activating the system, please read the power settings instruction in chapter 14. Correct power setting is very important. It is possible to damage the transducer if you run the sounder with wrong output power limits.**

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## Contents

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<b>1. Introduction</b>	<b>6</b>
System Summary	6
Transducers	6
Main unit	6
Hand controller	6
<b>2. Interfaces</b>	<b>7</b>
Outputs	7
Inputs	7
Alarms	7
History Memory	7
Sound Speed Calibration	7
A Scope	7
Bottom Expansion	7
Repeaters	7
Auto Range	7
<b>3. Operation</b>	<b>9</b>
Parameter entry	9
<b>4. Principal Functions</b>	<b>10</b>
Bottom detection	10
Ping to Ping filtering	10
Bottom Search Range	10
Power ON/OFF	10
Alarm acknowledgement	10
Auto Range	10
<b>5. Fixed Key Functions</b>	<b>11</b>
Depth Range	11
Threshold key	11
Menu (select)	11
Contrast/brightness adjustment	11
Day/Night and back light adjustment	11
Screen 1, Primary Operation screen	12
Screen 2, 2nd Operation screen	13
Screen 3, 3rd Operation screen	14
Screen 4, 4th Operation Screen	15
Screen 5, Frequency and number size selection	16
Screen 6, Sound speed and alarm setting	17
Screen 7, Calendar and clock setting	18
Screen 8, Language and measurement setting	19
Screen 9, bottom signal level, ana upper and lower	20
Screen 10, Screen history memory control	21
Screen 11, Screen History Memory Control	22
Screen 12, NMEA Status Control	23
Screen 13, Status Screen	24
Screen 14, Scope Screen	25
<b>6. Soft Key Functions</b>	<b>26</b>
Gain	26
Far Gain	26
TVG	26
Digital indication	26

Frequency .....	26
Draught .....	26
Printer Operation .....	26
Alarm settings.....	26
Clock and Calendar Settings.....	27
History Memory .....	27
Status Screen.....	27
Oscilloscope Screen.....	27
Non-volatile Parameter Memory .....	27
Sound speed calibration.....	27
<b>7. Options .....</b>	<b>28</b>
Repeaters/Slaves .....	28
<b>8. User Maintenance .....</b>	<b>29</b>
Transducer Maintenance.....	29
Operator Unit Maintenance .....	29
<b>9. Trouble Shooting .....</b>	<b>30</b>
Typical Status Screen (13) Contents.....	30
<b>10. Installation .....</b>	<b>31</b>
Transducer Installation Location .....	31
Operator Unit Installation.....	32
Transducer Connection.....	34
Hand Controller Cutout .....	35
External printer, screen and NMEA connections .....	36
Back-up Battery Jumper .....	36
<b>11. Interfacing.....</b>	<b>39</b>
Alarm relay .....	39
External Printer Control input (Note: Not activated) .....	39
Hand controller connection .....	39
Transmitter and Bottom Pulse outputs .....	39
Analogue interfaces .....	40
Temperature input (Note: Not activated).....	40
Transducer connection 50 kHz .....	40
Transducer connection 38 kHz .....	40
Transducer connection 200 kHz .....	40
<b>12. Start-up and system adaption .....</b>	<b>42</b>
System Adaption.....	42
Analogue Output.....	42
Calibration, Sound Speed .....	42
Language and Units of Measure.....	42
<b>13. NMEA Setup.....</b>	<b>43</b>
<b>14. Configuration of transmitted power limits.....</b>	<b>45</b>
<b>15. CPU Board PCA-6742 Setup Procedure.....</b>	<b>46</b>
<b>16. Software Upgrade Procedure.....</b>	<b>47</b>
<b>17. Specifications .....</b>	<b>48</b>
Dimensions .....	48

---

Environmental .....	49
<b>18. Service .....</b>	<b>50</b>
<b>19. Appendix, Misc Installation Drawings .....</b>	<b>51</b>
Fig 19.1 Cable Gland Connection .....	51

# 1. Introduction

## System Summary

GDF201 is a Echo Sounder unit (black box) with possibility for connection to a LCD/VGA screen. The display graphics is shown on the screen along with complete fishery details. Printer can be connected when a hard copy of the recordings is required. Comprehensive interfaces are available including NMEA 0183 input and output. (See fig. 2.1).

## Transducers

GDF201 is prepared for connection of the following transducers: 38, 50 and 200 kHz. One or more of the transducers may be connected at the same time, and the desired transducer may be selected from the operator panel.

## Main unit

The main unit (black box) is normally mounted hidden. Power supply options are 115/230 V AC and/or 24 V DC. The power consumption is app. 70 W at 115/230 V AC or 50 W at 24 V DC.

## Hand controller

The function of each soft key button depends on the selected screen. Active buttons are labelled on the lower rim of the external screen. The display contrast/brightness may be adjusted by the user. (See fig. 1.1).

## Data Entry

Several screens may be selected to enter various settings and calibration parameters. Each screen has a selection of soft key buttons. Screens 1 through 4 are primary operation screens with appropriate operator controls. Screens 5 through 14 are calibration set-up and system supervision screens. The various screens will be described in detail later.

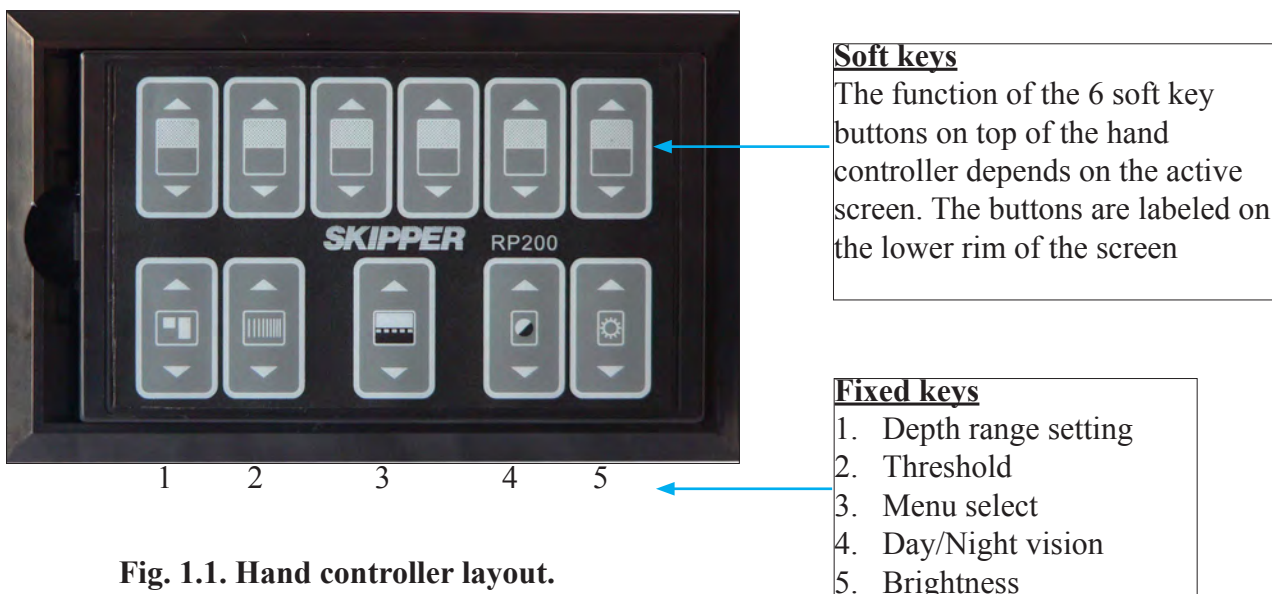


Fig. 1.1. Hand controller layout.

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## 2. Interfaces

---

### Outputs

- Transmitter and bottom pulse.
- Analogue output 0 - 10 V or 4 - 20 mA.
- NMEA 0183.
- External alarm relay.
- Printer.
- VGA screen.

### Inputs

- NMEA 0183.

### Alarms

Shallow and deep water alarms may be selected from screen 6. A potential free relay contact is provided in GDF201 for interface to external alarm systems.

### History Memory

GDF201 has a 24 hour history memory. Depth, time and all available navigation data are stored continuously.

### Sound Speed Calibration

Enable adjustment of the sound speed value used for depth calculations.

### A Scope

Possible to adjust A SCOPE width in the screens right side.

### Bottom Expansion

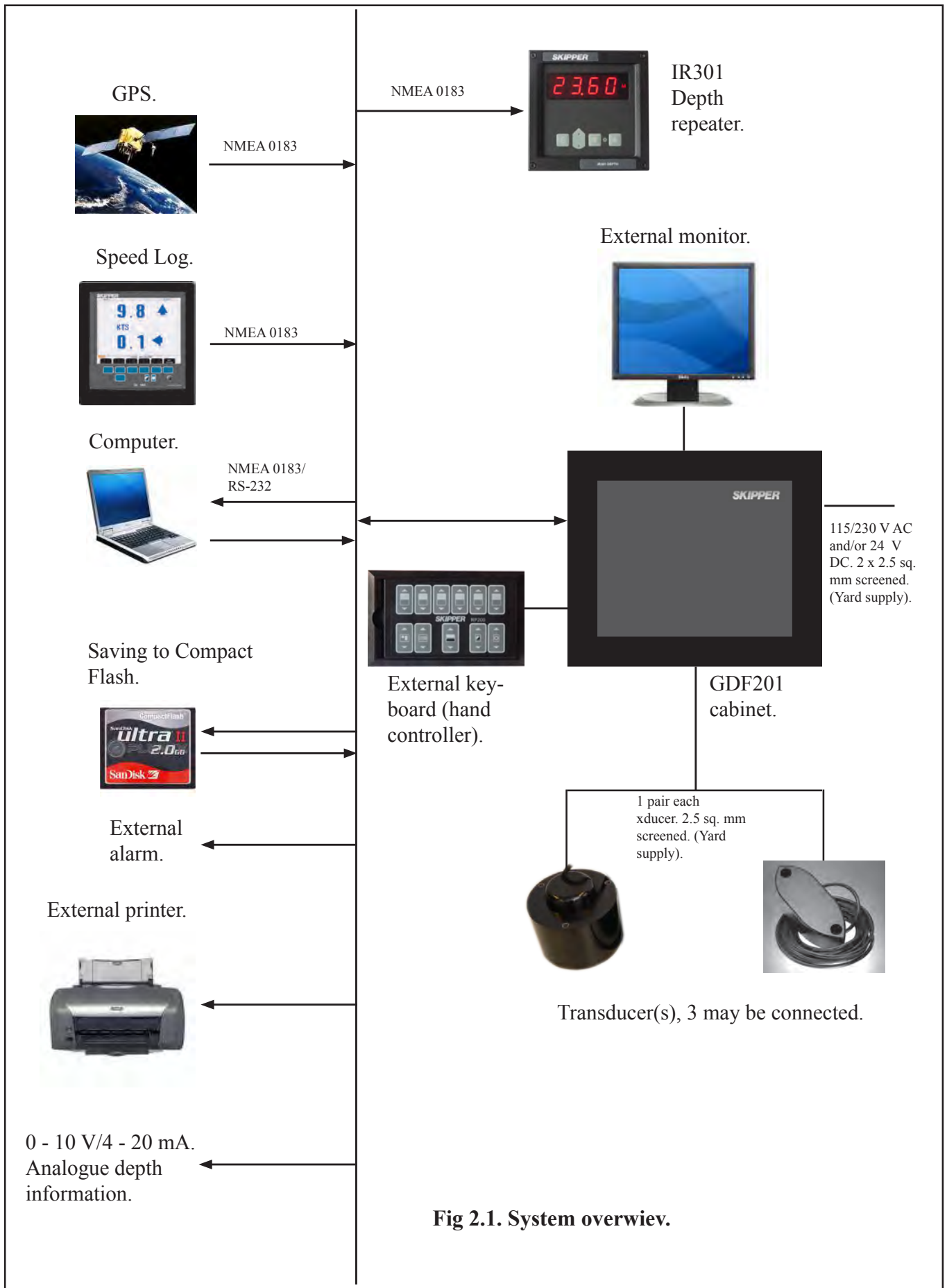
Possible to adjust bottom expansion size on the screens bottom or top side.

### Repeaters

A digital depth repeater may be connected to the system.

### Auto Range

Will automatically adjust the depth range to maintain the bottom contour within the middle half of the screen.



**Fig 2.1. System overview.**



---

## 3. Operation

---

When the installation is completed, and power is connected to the operator unit, the system is switched on-off by power switch(es) inside the cabinet. The unit is switched off by pressing the SYSTEM off soft key on screen 4.

### Parameter entry

The fixed function buttons and the soft key buttons of the various screens, facilitates entry of parameters, setpoints and other data. The various screens are shown in detail in the operation section. Each of the screens contains a graphic picture and a selection of up to 6 soft key buttons. The various screens are selected by pressing the MENU select button on the hand controller. On screen 4, to get access to screen 5, hold the MENU select button pressed a little longer. The screen layouts are outlined in chapter 5. The various soft key functions are described with each screen.

---

## 4. Principal Functions

---

### Bottom detection

GDF201 employ a bottom detection algorithm that will try to extract the bottom signal from all kinds of noise and secondary echoes. When GDF201 is tracking the bottom normally, a thick black line is shown, and below that, a ribbon with a hatched pattern. This pattern has two levels of hatching. The darkest represent strong and unambiguous bottom echoes. The lighter hatching represents weaker signals possibly occasional detection misses. If the software can detect no bottom for several pings, the hatched ribbon disappears. During normal bottom tracking, a digital value is shown by the bottom contour at the right side of the screen. If the software algorithm loses track of the bottom altogether, a warning beep is heard and the black line and hatching band disappears. A warning message: "Lost bottom" is shown in the screen's lower right corner.

### Ping to Ping filtering

Part of the bottom detection algorithm is the ping to ping filtering. The next bottom is searched for in a time and strength window based on the strength and timing of the previous bottom echoes. This procedure reduces the probability of tracking schools of fish or secondary echoes as bottom. If no bottom is detected in the calculated window, the window is gradually increased in size until the full time and strength window is used.

### Bottom Search Range

The FIX RANGE function in screen 4 is used to control the search range for the bottom detection algorithm. When this function is on, bottom is only searched for within the selected display range. When the function is off, bottom is searched for within the entire functional range of the echo sounder.

### Power ON/OFF

During normal daily operation, the system may be switched off from screen 4. This operation does not disconnect the system from the power supply, but all power consuming components are switched off. The system may be switched on again by pressing any button. Do not run the sounder for a long time without a submerged transducer connected.

### Alarm acknowledgement

When the depth alarm is activated, the alarm may be acknowledged by pressing any button.

### Auto Range

This option will automatically adjust the depth range to maintain the bottom contour within the middle half of the screen height.

---

## 5. Fixed Key Functions

---

### Depth Range

The Depth Range button can be used to set the depth limit between 10 and 1600 m.

### Threshold key

This function allows low level signals to be cut off (for removing noise).

### Menu (select)

The MENU button facilitates selection of one of the 14 screens and soft key layouts. The 4 primary operation screens may be cycled by repeatedly pressing the MENU button. Access to the remaining screens is done by holding and pressing the MENU button.

### Contrast/brightness adjustment

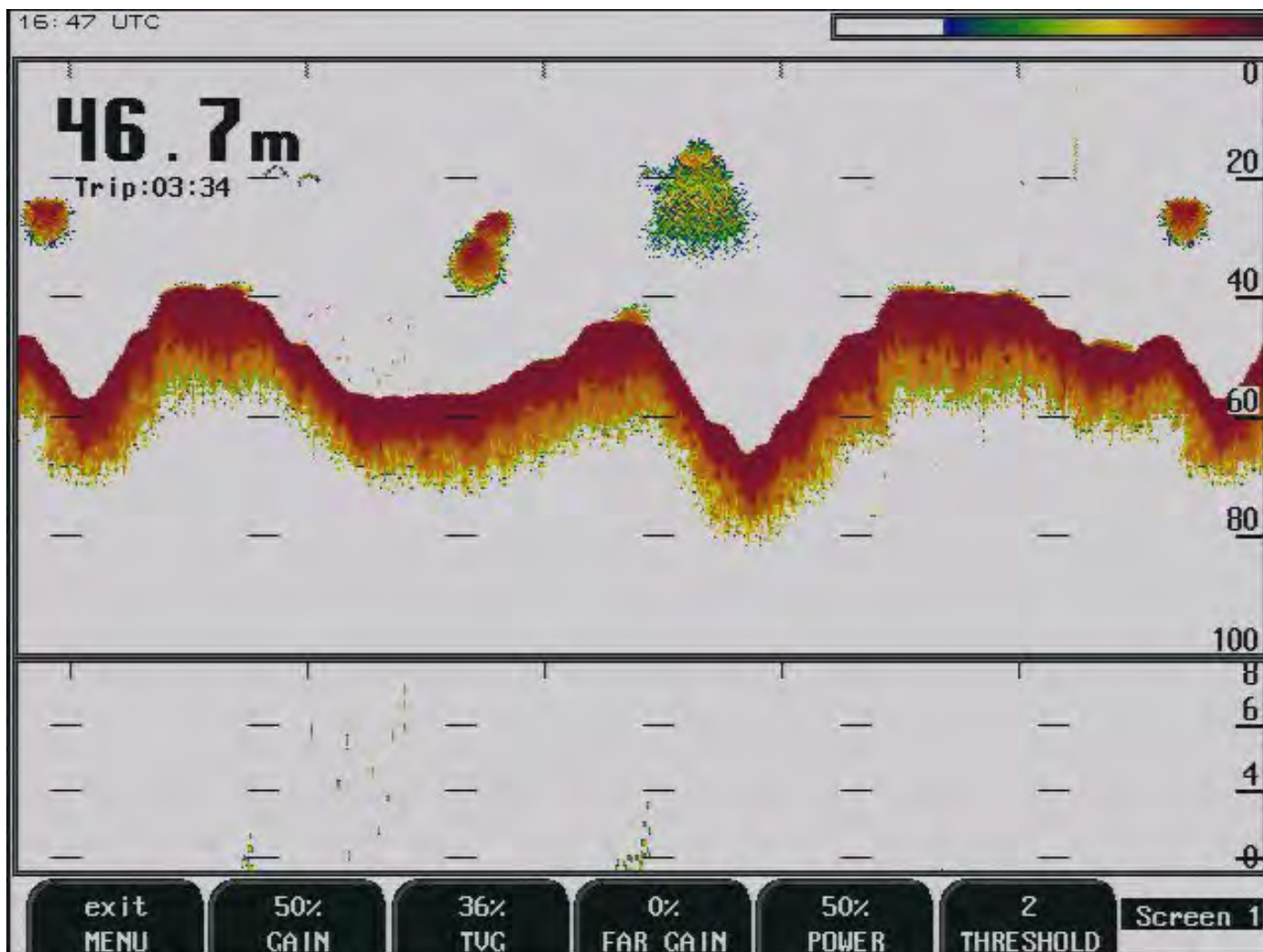
Contrast button, for selecting between Day/ Night colour.

### Day/Night and back light adjustment

Back light and Day/Night vision can be controlled by using the appropriate buttons on the hand controller. Press the button(s) until a satisfactory setting is obtained, then release the button. Day/ Night vision may be changed by pressing the DAY/NIGHT button. The settings are maintained in the nonvolatile memory, and the last settings are restored on power up.

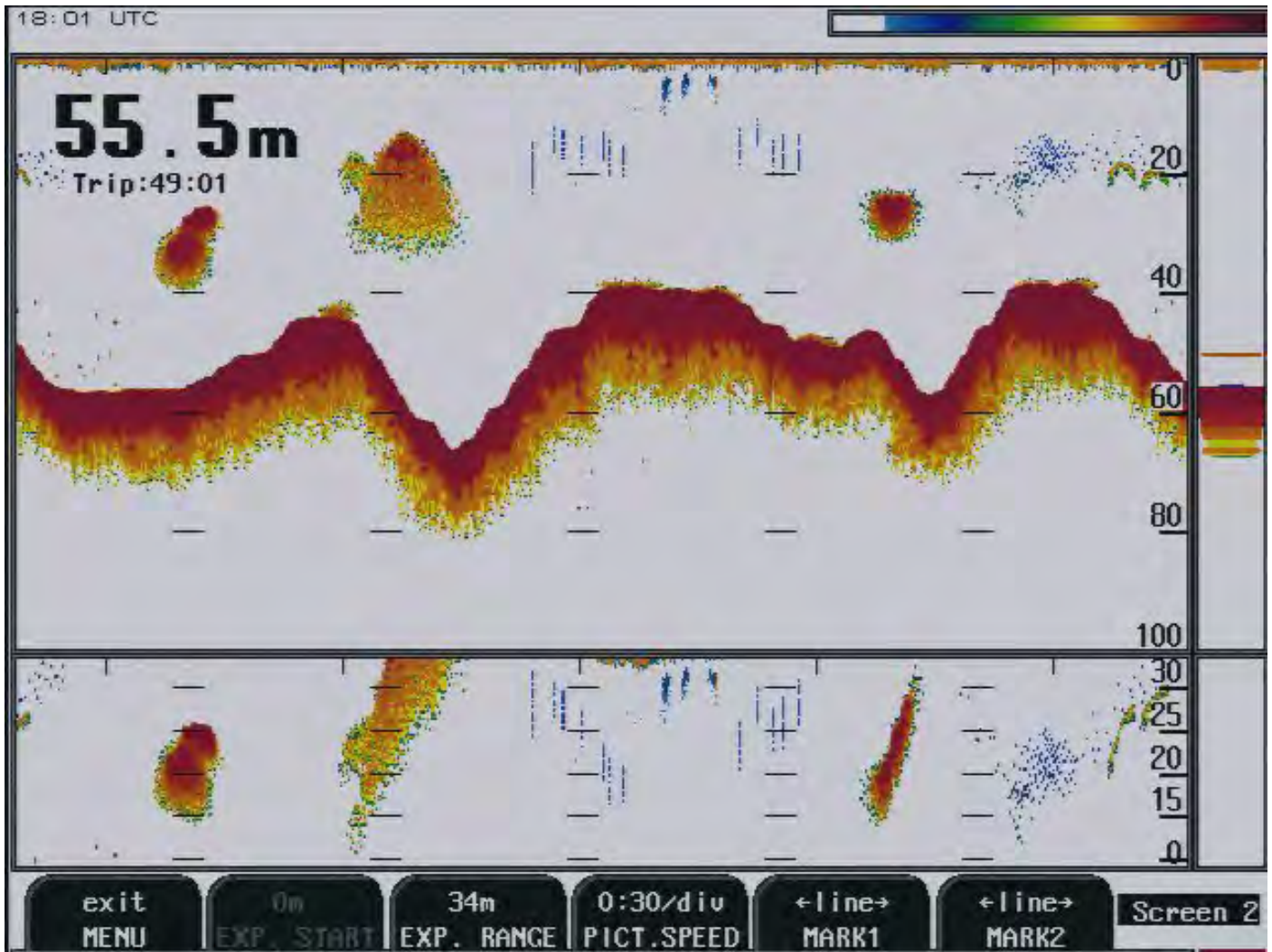
It is also possible to cycle through 3 standard back light/picture settings by repeatedly pressing the BRIGHTNESS button. The 3 settings are:

1. Minimum backlight, Day/Night vision.
2. Half backlight, Day/Night vision.
3. Maximum backlight, Day/Night vision.



Screen 1, Primary Operation screen.

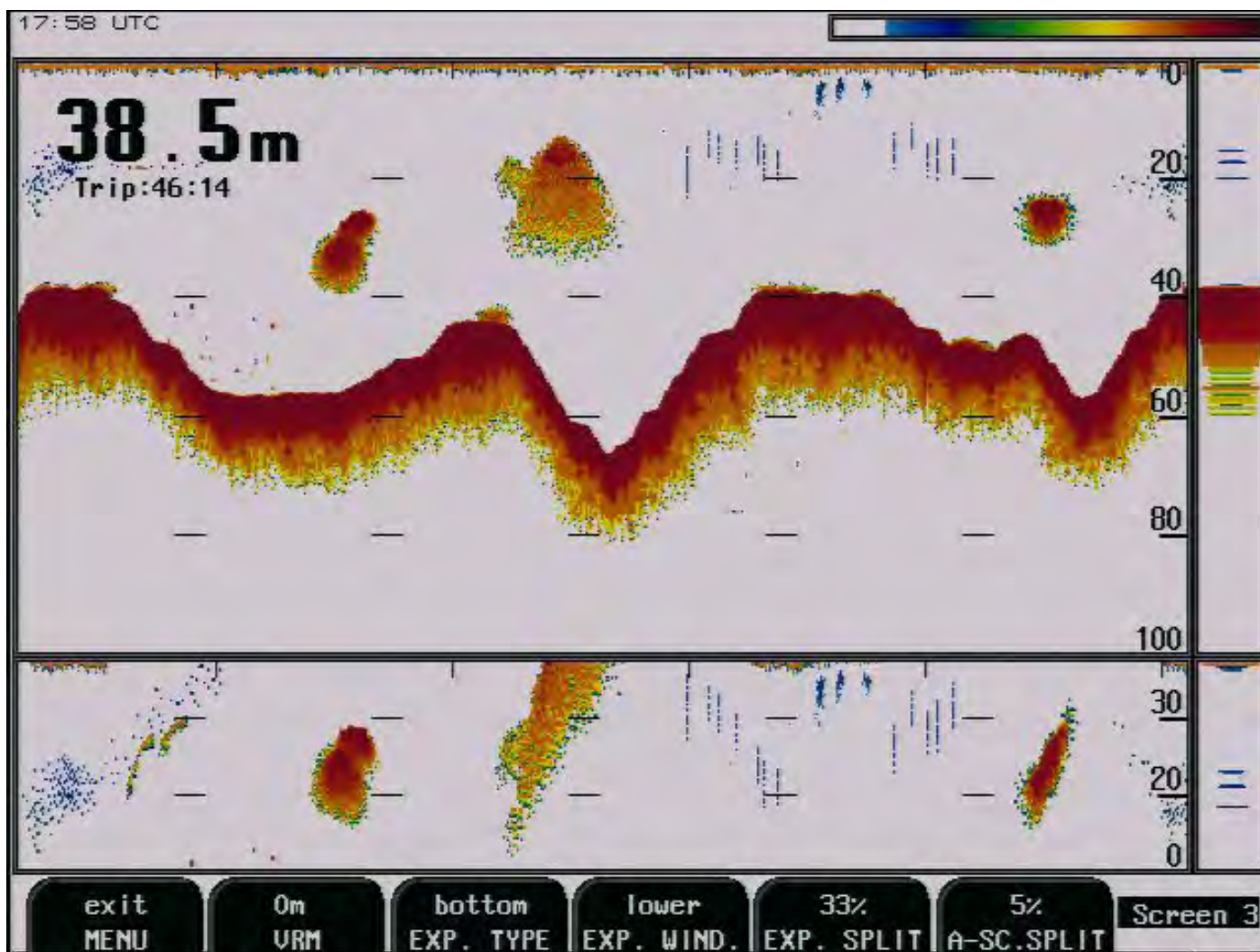
Soft key	Name	Range/value	Default value	
1	MENU	Exit		Exit MENU.
2	GAIN	Auto/0 - 100 %	50 %	Gain adjustment
3	TVG	0 - 100 %	36 %	Time variable gain adjustment.
4	FAR GAIN	0 - 100 %	0 %	Deep water absorption compensation
5	POWER	1 - 100 %	50 %	Transmitter power adjustment.
6	THRESHOLD	0 - 8		



Screen 2, 2nd Operation screen.

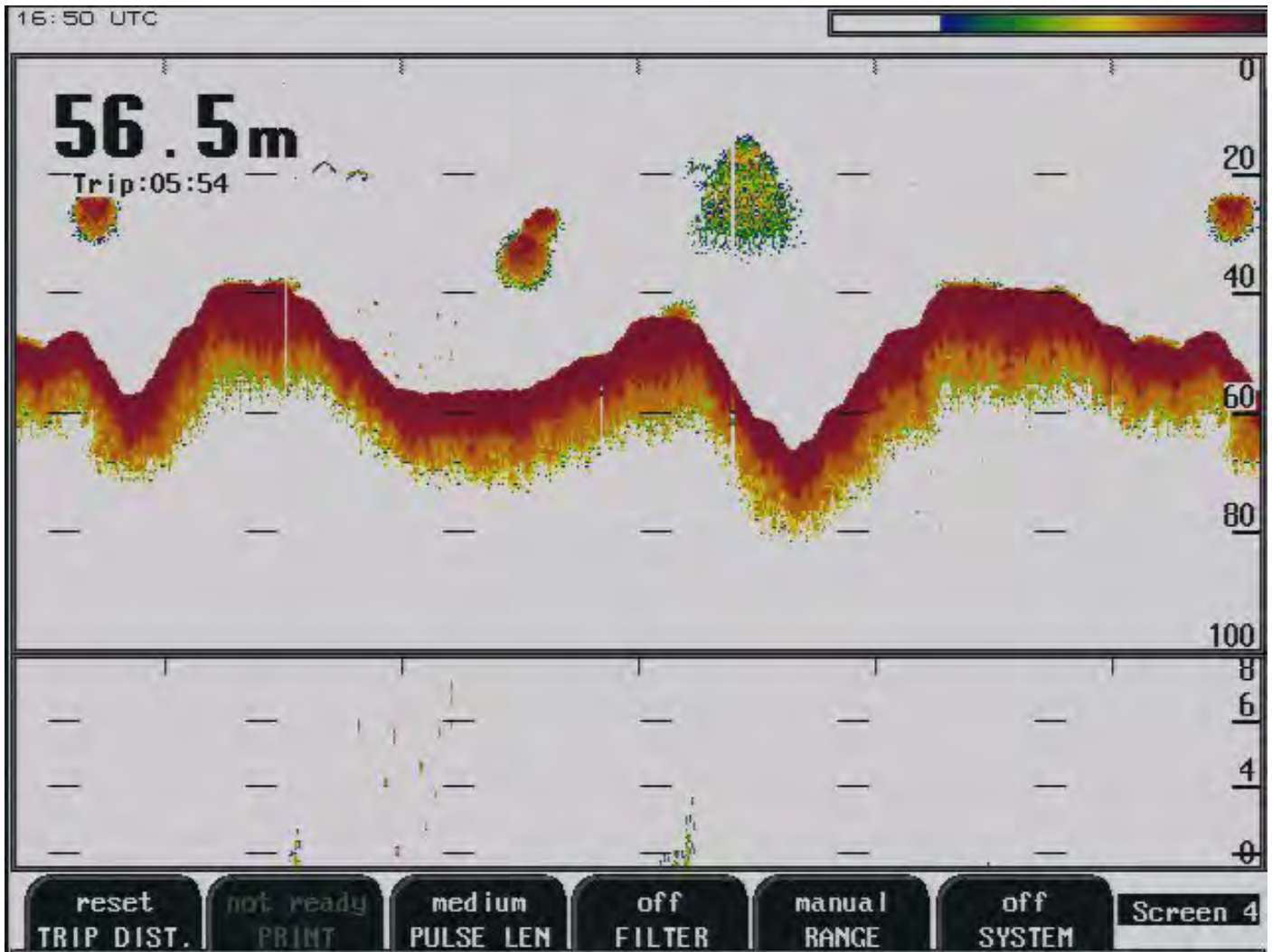
Soft key	Name	Range/value	Default value	Description
1	MENU	Exit		Exit MENU.
2	EKSP.START	0 - 99 m	0 m	Activate with pelagic, see screen 3.
3	EXP. RANGE	1 - 100 m	8 m	Indicates chosen expansion range.
4	PICT.SPEED	Auto/0:30 - 15:00/div	0:30/div	Picture speed adjustment.
5	MARK1	Line		
6	MARK2	Line		

Soft key 5 and 6: Distance between vertical marker lines is calculated and displayed in the echogram window. If vessel speed is provided from GPS, distance is measured in meters, otherwise - in time units.



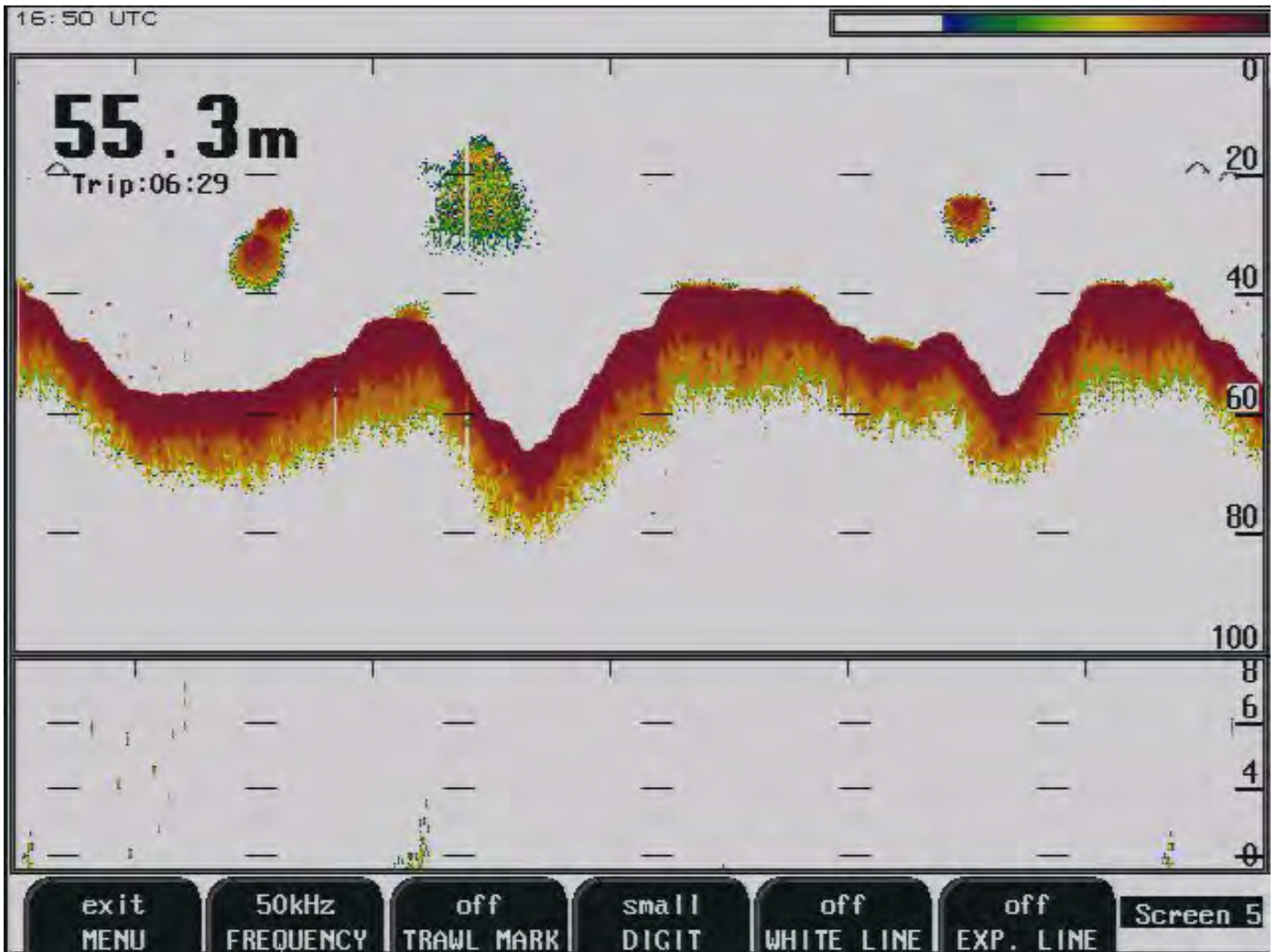
Screen 3, 3rd Operation screen.

Soft key	Name	Range/value	Default value	Description
1	MENU	Exit		Exit MENU
2	VRM	0 - 100 m	0 m	Variable Range Marker Line, shows depth.
3	EXP. TYPE	Pelagic, bottom, hardness.	Bottom	Expansion type.
4	EXP. WIND	Lower/upper/left/right	Lower	Placement of expansion window on screen
5	EXP. SPLIT	0 - 80 %	33 %	Size of expansion split.
6	A-SC. SPLIT	0 - 15 %	0 %	Size of A-Scope on right side



Screen 4, 4th Operation Screen.

Soft key	Name	Range/value	Default value	Description
1	TRIP DIST.	Reset		Reset trip distance counter.
2	PRINT	On/off	Off	Hard copy printout, printer must be connected.
3	PULSE LEN	Short, medium, long	Medium	Pulse length.
4	FILTER	On/off	Off	Noise reduction.
5	RANGE	Autorange A, Autorange B, Autoshift, Manual,	Manual	
6	SYSTEM	On/off	On	Switch off system



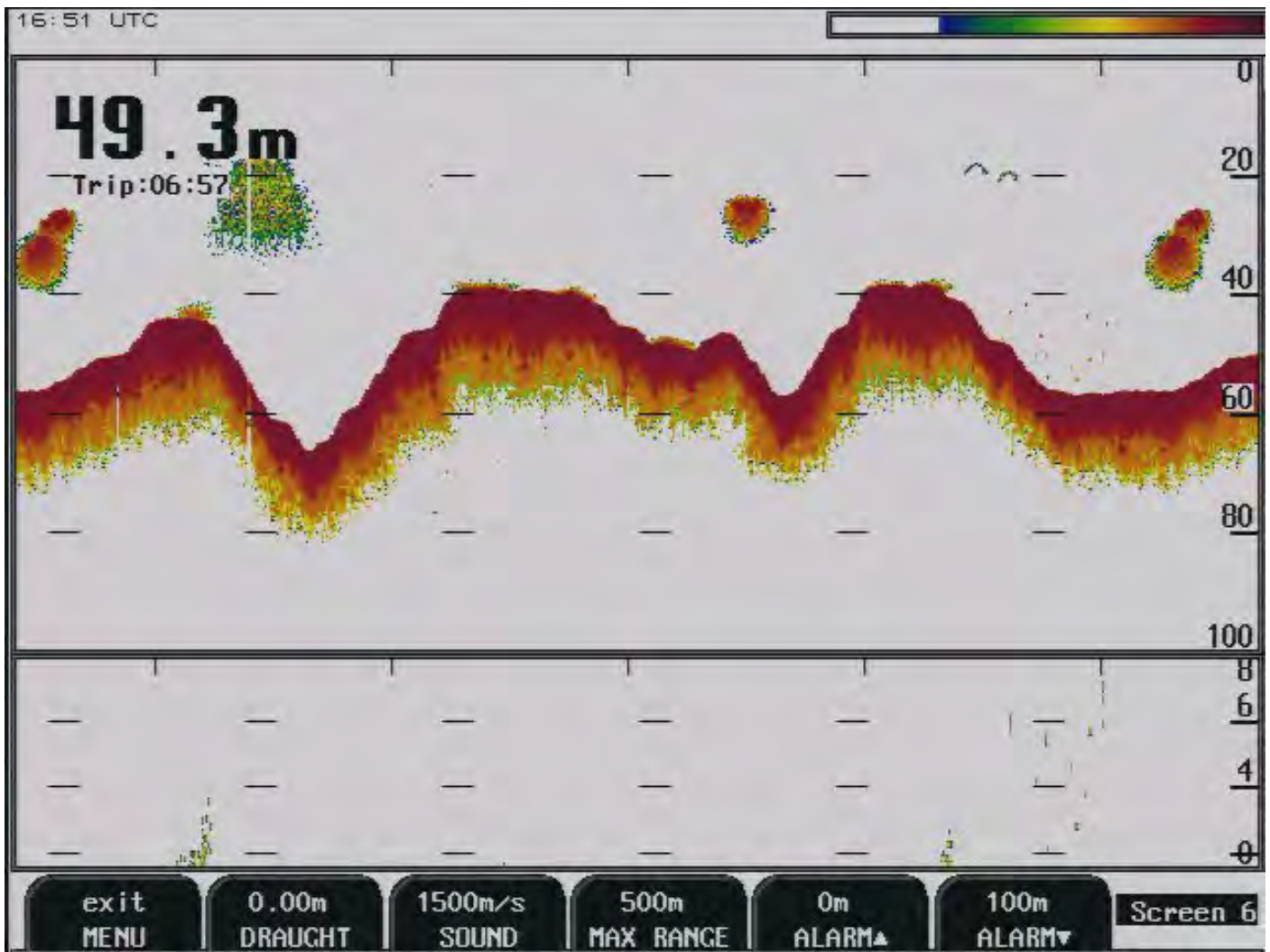
**Screen 5, Frequency and number size selection.**

Soft key	Name	Range/value	Default value	Description
1	MENU	Exit		Exit MENU.
2	FREQUENCY	38, 50, 200 kHz	50 kHz	Frequency selection.
3	TRAWL MARK	On/off	Off	See note below.
4	DIGIT	Small/large	Small	Depth number size.
5	WHITE LINE	On/off	Off	Discriminate bottom from fish close to bottom
6	EXP. LINE	On/off	Off	Line shows expanded area.

**Soft key 3:** Trawl depth horizontal marker is implemented.

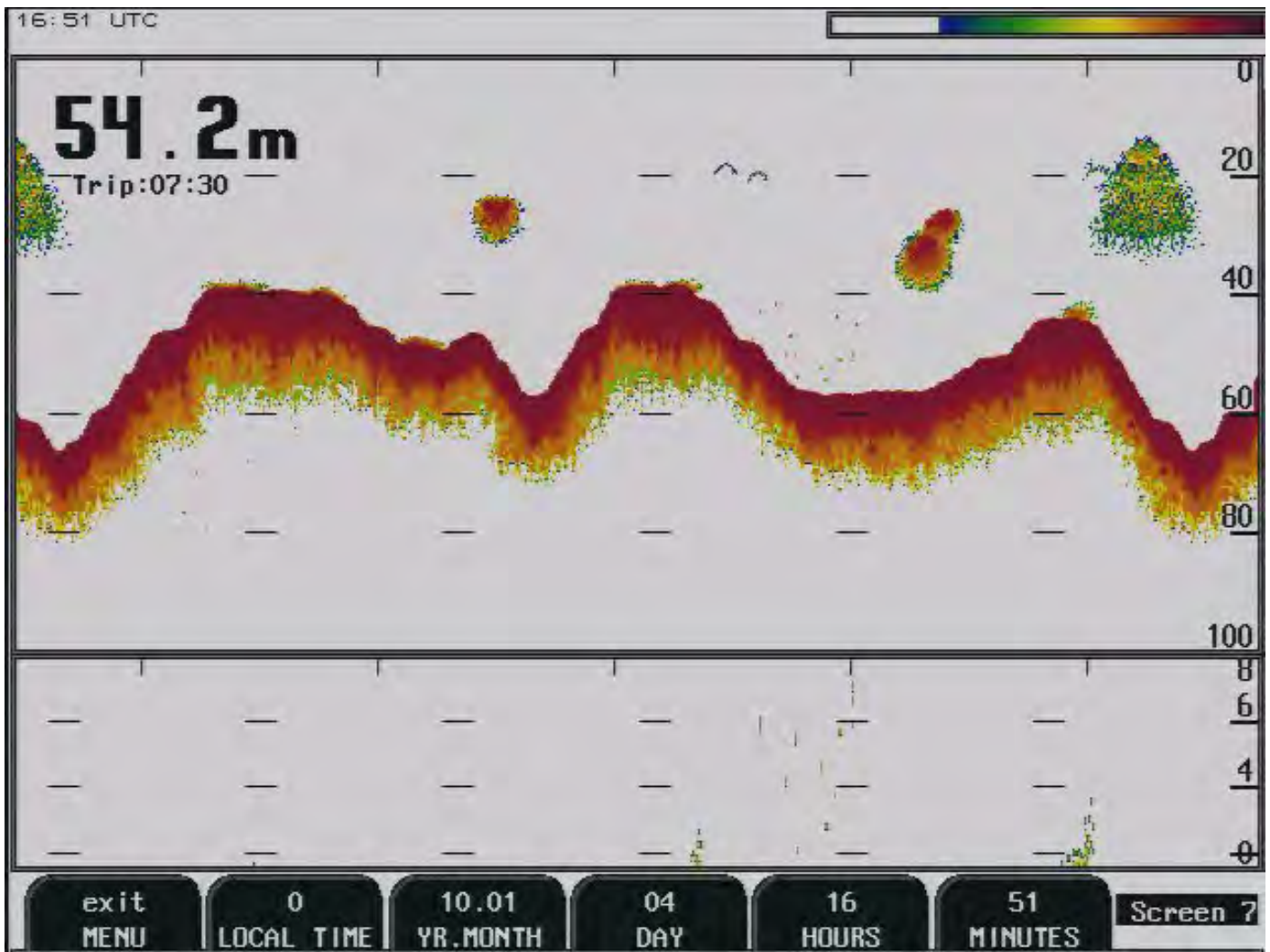
If trawl-processing unit (SIMRAD ITI, IMAGENEX TS331/333) is connected, xxDBS message is processed by GDF201 software. Trawl position in water column is indicated as a horizontal line across echogram window. This option is enabled/disabled by TRAWL MARK [on/off] button.





**Screen 6, Sound speed and alarm setting.**

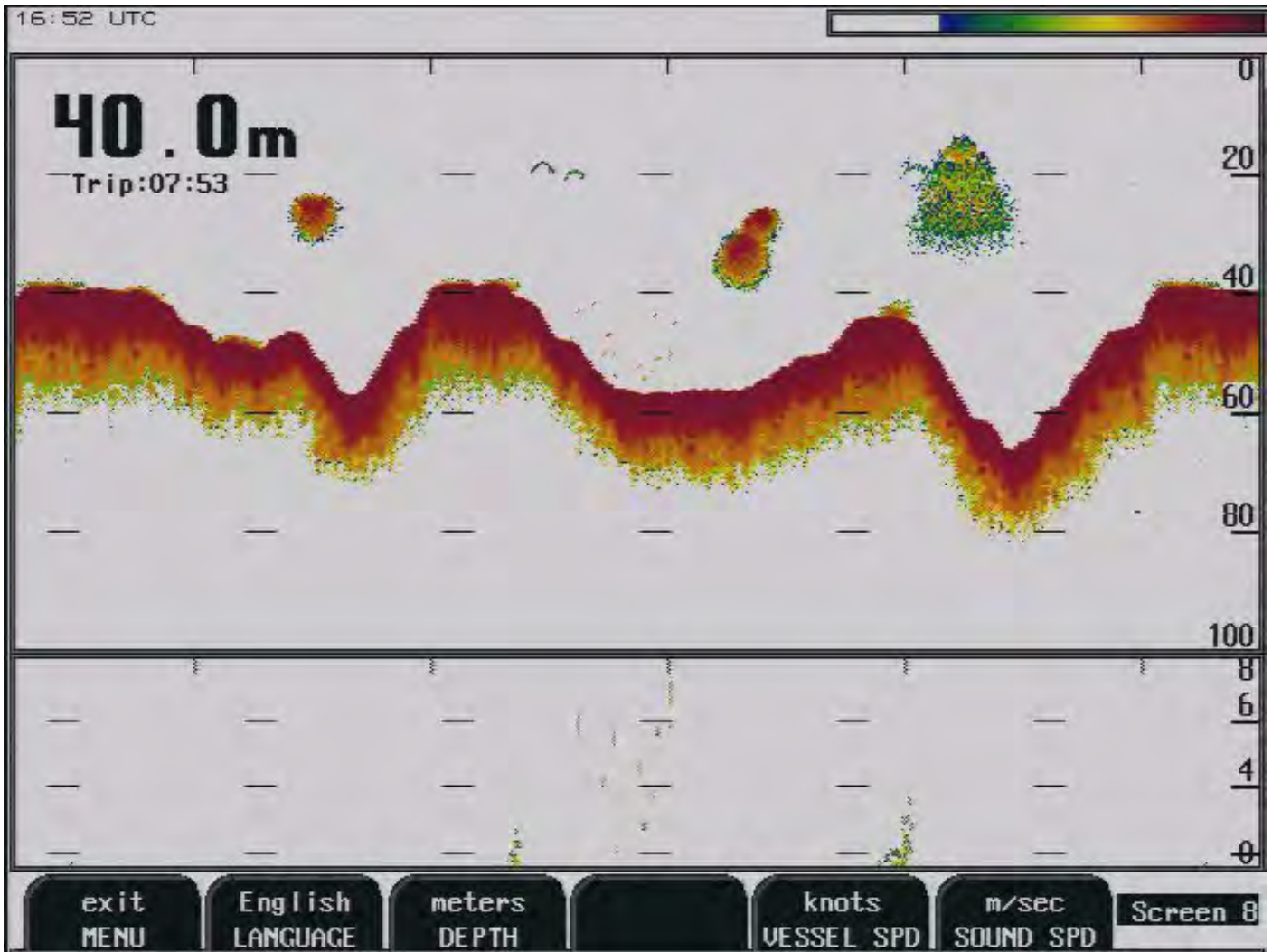
Soft key	Name	Range/value	Default value	Description
1	MENU	Exit		Exit MENU.
2	DRAUGHT	0.00 - 99.9 m	0.00 m	Displayed offset of transducer.
3	SOUND	1400 - 1550 m/s	1500 m/s	Sound speed setting.
4	MAX RANGE	100 - 1600 m	500 m	
5	ALARM ▲	0 - 100 m	0 m	Shallow water alarm.
6	ALARM ▼	0 - 1600 m	100 m	Deep water alarm.



**Screen 7, Calendar and clock setting.**

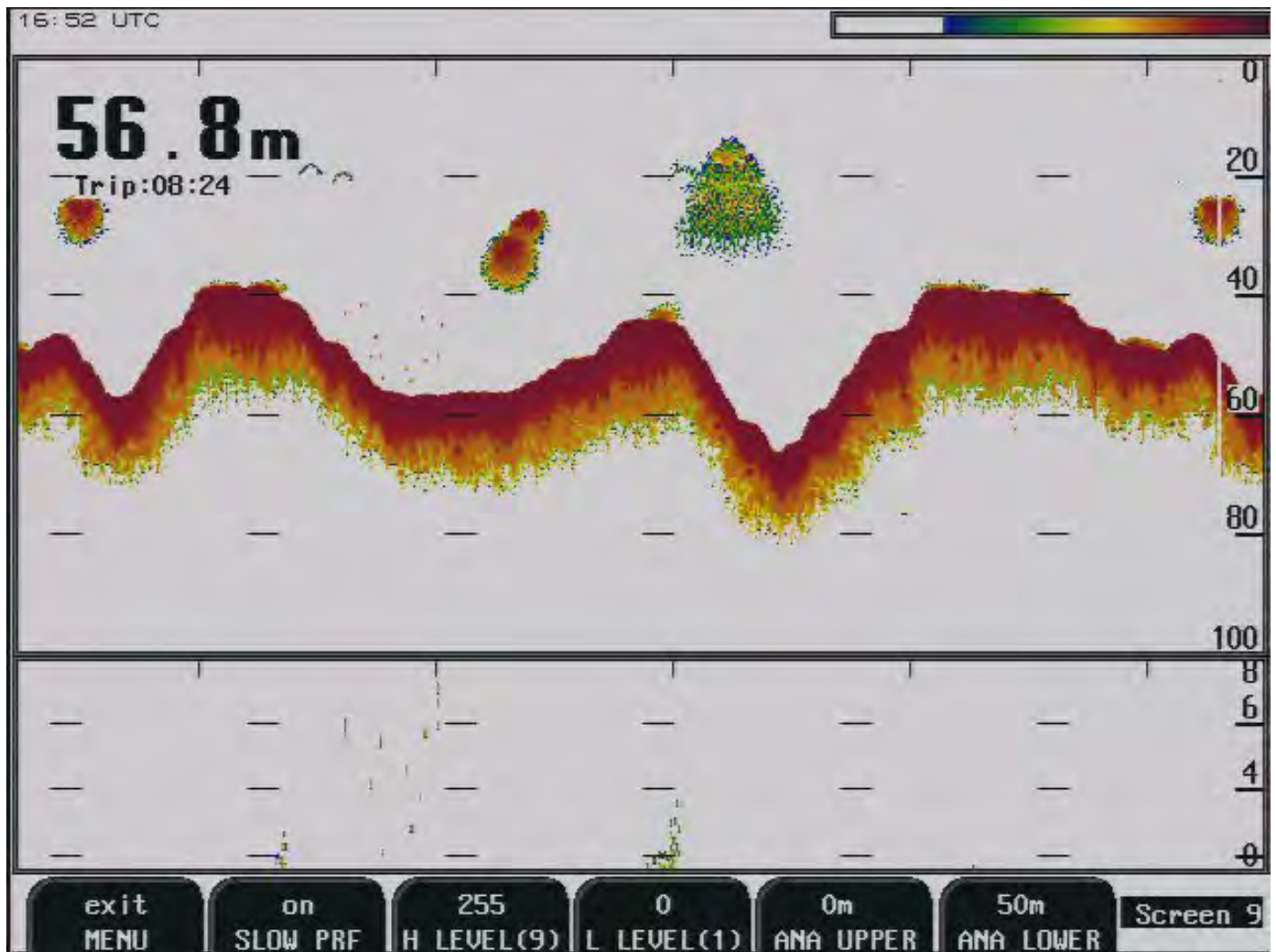
Soft key	Name	Range/value	Default value	Description
1	MENU	Exit		Exit MENU.
2	LOCAL TIME	-13 - 13	0	Possible to adjust for local time.
3	YR.MONTH	97.01 ->		Calendar setting, year and month.
4	DAY	1 - 31		Calendar setting, date.
5	HOURS	0 - 23		Real time clock setting, hours.
6	MINUTES	0 - 59		Real time clock setting, minutes.

**Soft key 2:** Local time (LT) indication option has been implemented. The local time zone in whole hours is adjustable at screen 7, soft key 2. If local time zone parameter is set to 0, UTC is indicated, else LT is indicated.



**Screen 8, Language and measurement setting.**

Soft key	Name	Range/value	Default value	Description
1	MENU	Exit		Exit MENU.
2	LANGUAGE	English, french, spanish, norwegian.	English	Screen language selection.
3	DEPTH	Meters, feet, fathoms, braccias	Meters	Unit of measurement for depth.
4				Not used.
5	VESSEL SPD	Knots, km/h, mi/h,	Knots	Unit of measurement for vessel speed.
6	SOUND SPD	m/sec, knots, km/h, mi/h, ft/sec .	m/sec	Unit of measurement for sound speed.

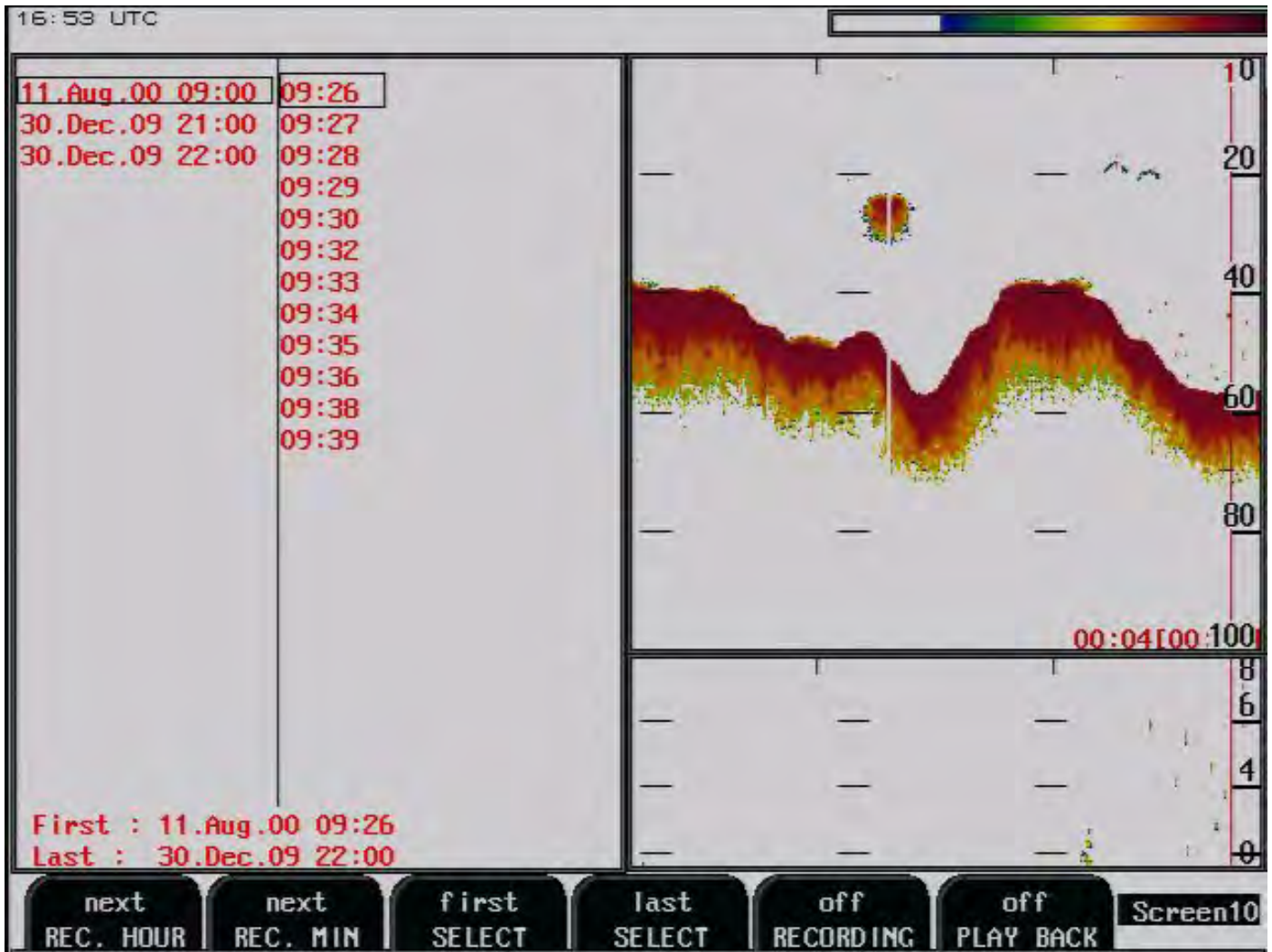


**Screen 9, bottom signal level, ana upper and lower limits.**

Soft key	Name	Range/value	Default value	Description
1	MENU	Exit		Exit MENU.
2	SLOW PRF	On/off	On	Slow pulse repetition frequency. See comments below.
3	H LEVEL(9)	1 - 255	255	Bottom signal level. See comments below.
4	L LEVEL(1)	0 - 254	0	Bottom signal level. See comments below.
5	ANA UPPER	0 - 1599 m	0 m	Analogue output shallow limit = 0 V (4 mA)
6	ANA LOWER	1 - 1600 m	50 m	Analogue output deep limit = 10 V (20 mA)

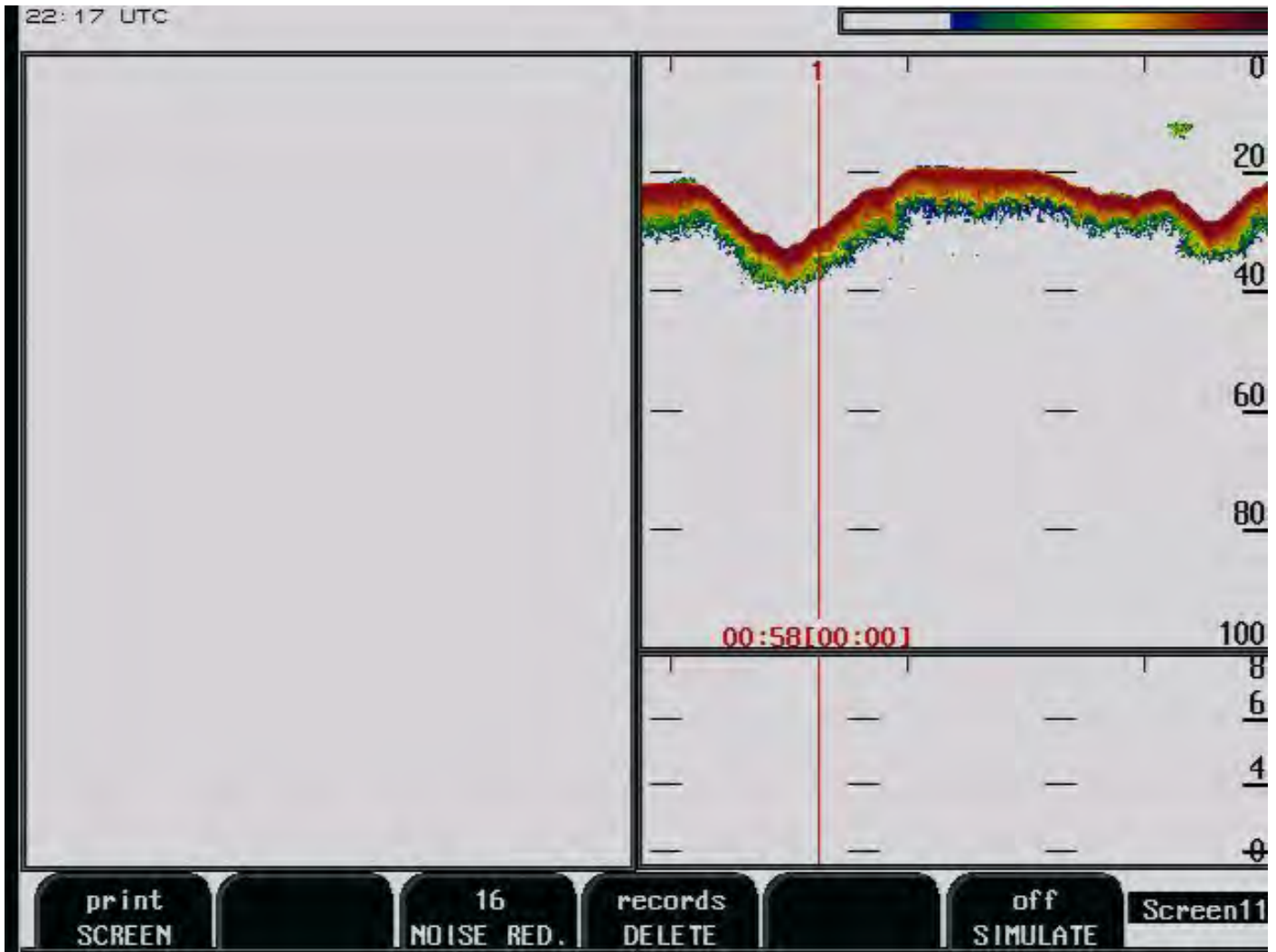
**Soft key 2:** Slower PRF option is implemented to avoid secondary bottom reflection indicated in the upper part of the echogram. If this phenomenon is observed (at certain combination of water depth and range setting), one should set SLOW PRF [on].

**Soft key 3 and 4:** Bottom signal level (hardness) message is implemented on the serial output. It can be activated on NMEA screen 12 by setting MESSAGE DBS\* [on]. The format is: \$SDDBS,,x.x,M,,F,s<cr><lf>. Where x.x, is depth value in meters and s is a signal strength value(hardness) in a range of 1-9. Current hardware provides 8-bit digitized range. L LEVEL button allows adjusting signal amplitude (in the range of 0-255), which corresponds to value 1, while H LEVEL defines amplitude value, corresponding to level 9.



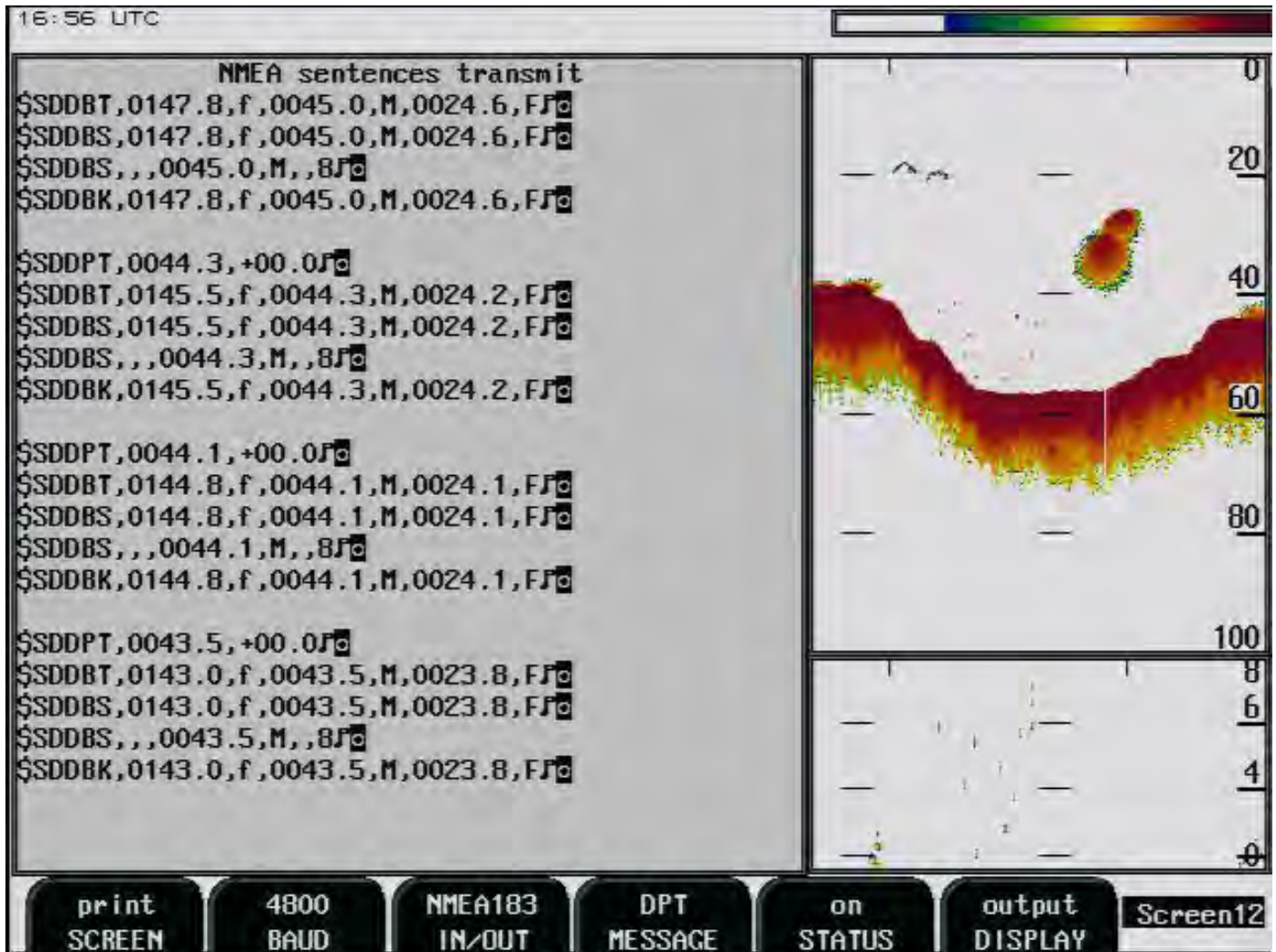
**Screen 10, Screen history memory control.**

Soft key	Name	Range/value	Default value	Description
1	REC. HOUR	Next		Select hour on the list.
2	REC. MIN	Next		Select minute on the list.
3	SELECT	First		Select playback of history.
4	SELECT	Last		Select playback of history.
5	RECORDING	On/off	Off	Recording of history.
6	PLAY BACK	On/off	Off	Play back of recorded history.



**Screen 11, Screen History Memory Control.**

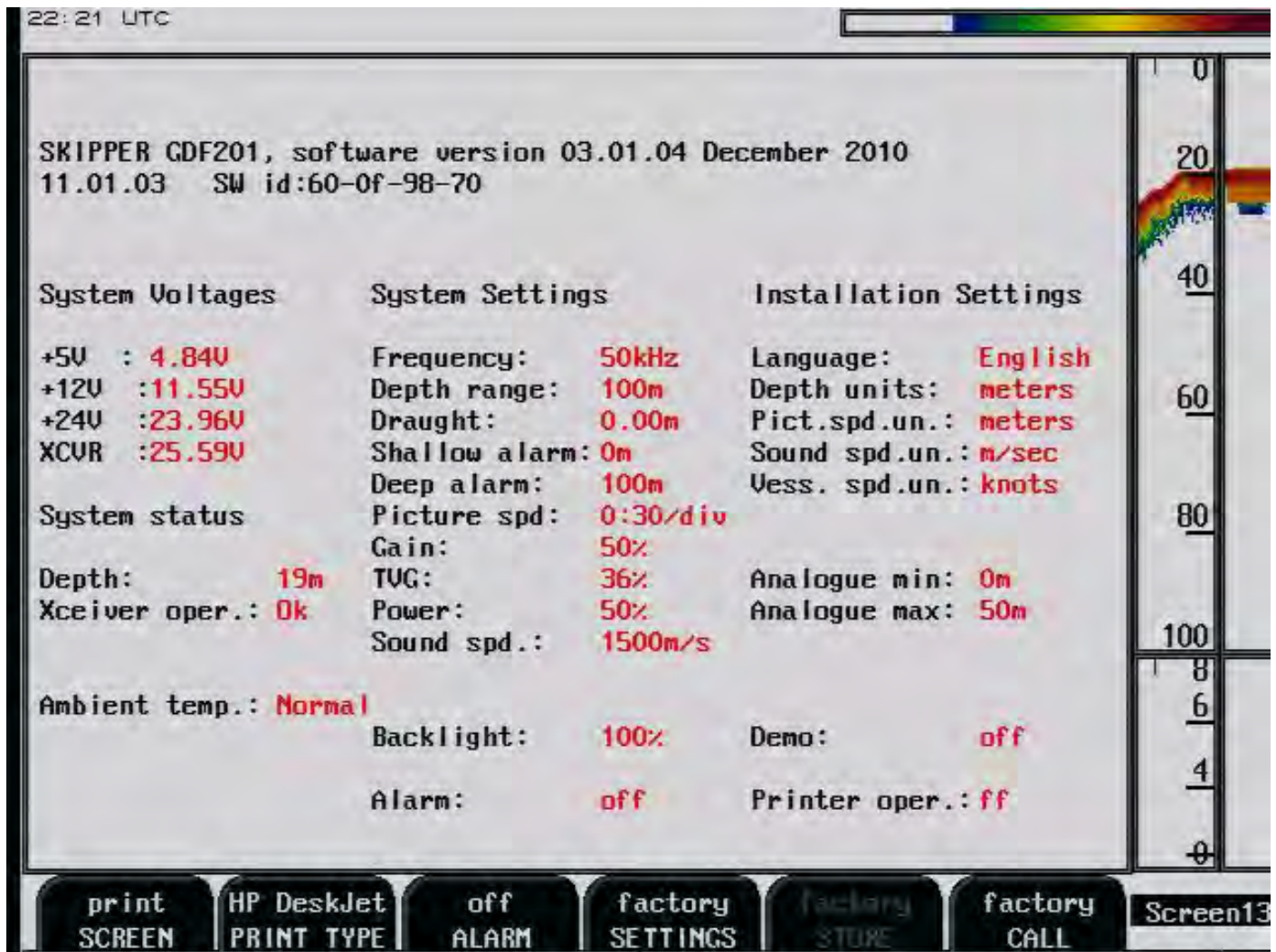
Soft key	Name	Range/value	Default value	Description
1	SCREEN	Print		Print screen.
2				Not in use
3	NOISE RED.	0 - 200	16	Recording noise select.
4	DELETE	Records		Deletes recorded history.
5				Not in use.
6	SIMULATE	On/Off	Off	Built-in simulator control.



### Screen 12, NMEA Status Control.

This screen shows list of received and transmitted NMEA messages and half screen echo-gram.

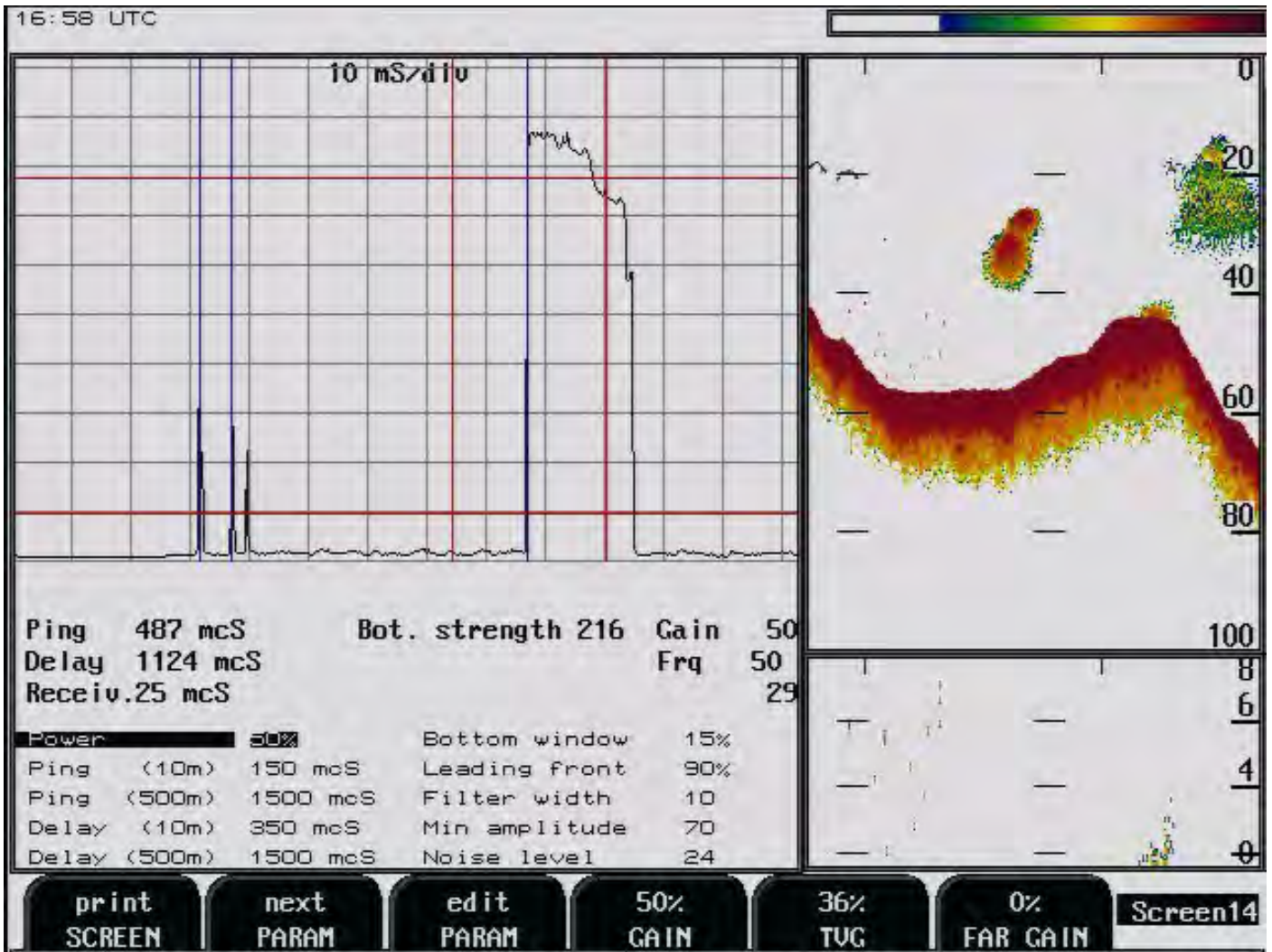
Soft key	Name	Range/value	Default value	Description
1	SCREEN	Print		Print screen.
2	BAUD	4800/9600	4800	Baud rate selection.
3	IN/OUT	NMEA 0183/RS 232	NMEA 0183	NMEA 0183/RS 232 choice.
4	MESSAGE	DPT, DBS, DBT, DBK, DBS*		
5	STATUS	On/off	DPT = On DBS = On DBT = On DBK = On DBS* = On	MESSAGE status.
6	DISPLAY	Input/output/off	Input	<b>Input:</b> Shows received NMEA messages. <b>Output:</b> Shows transmitted NMEA messages. <b>Off:</b> No messages are shown.



Screen 13, Status Screen.

Soft key	Name	Range/value	Default value	Description
1	SCREEN	Print		Print screen.
2	PRINT TYPE	BJC HQ, BJC HS, HP Deskjet	HP Deskjet	HP / BJC printer type.
3	ALARM	On/off	Off	Internal alarm on / off.
4	SETTINGS	Factory/user 1 - user 5	Factory	
5	STORE	Factory/user 1 - user 5		Save settings you have made.
6	CALL	Factory/user 1 - user 5	Factory	Back to factory settings.





Screen 14, Scope Screen

Soft key	Name	Range/value	Default value	Description
1	SCREEN	Print		Print screen.
2	PARAM	Next		Jump to next parameter.
3	PARAM	Edit		Change parameter settings.
4	GAIN	0 - 100 %	50 %	Change of gain settings.
5	TVG	0 - 100 %	36 %	Change of TVG settings
6	FAR GAIN	0 - 100 %	0 %	Deep water absorption compensation

## 6. Soft Key Functions

---

### Gain

**Gain** may be adjusted from 0 to 100 % to allow for optimal echo levels from bottom and other objects. The GAIN setting affects signals from all depths.

### Far Gain

The power of the sound wave is absorbed at a certain rate when traveling through water. The higher the frequency, the higher the rate of absorption. Use the FAR GAIN soft key to counteract the absorption effect by increasing received echo signal of deep echoes.

### TVG

**Time Variable Gain** may be adjusted from 0 to 100 % to allow for detailed echo control in shallower depths. A low setting will reduce the gain in the area near the surface to suppress noise and unwanted echoes from this area.

- TVG 100 % is min TVG
- TVG 0 % is max TVG

### Digital indication

On screen 5, two sizes of large digital depth indicators may be selected.

1. "Small" digits.
2. "Large" digits.

### Frequency

The frequency selector toggles among 38, 50 and 200 kHz, corresponding to the installed transducers.

### Output Power

Power may be adjusted from 1 to 100 % in case of difficult shallow water conditions. Too high power in such cases will possibly saturate the receiver or cause detection of unwanted secondary bottom or surface echoes.

### Draught

Draught may be compensated to allow real depth from surface to be shown on the screen and printout. Negative draught values may be entered to compensate for transducers fitted above the keel. This setting also affects the NMEA transmitted values. Draught compensation is indicated on the screen by a flashing number to alert the operator to the fact that the shown depth value is adjusted.

### Printer Operation

The printer is started and stopped by the Print buttons. The Print buttons switches continuous printing on and off.

## Alarm settings

Depth alarm settings are performed from screen 6. Alarm limits are referred to the indicated depth. The local alarm buzzer may be disabled from screen 13, but the external alarm relay will always operate. The only way to disable the alarms completely, is to reduce the shallow alarm to zero depth and increase the deep alarm to maximum range. An active shallow alarm limit must be less than an active deep alarm limit. Alarm limits are enforced with hysteresis.

## Clock and Calendar Settings

Manual clock and calendar adjustments are carried out in screen 7. If a GPS navigator giving UTC messages is connected to the NMEA input, the clock and calendar will be automatically updated and manual adjustment is not required.

## History Memory

If installed, (default and recommended) history data will be recorded on the external Compact Flash. If the external Compact Flash is not installed, the history data will be recorded on the “program” Compact Flash located on the rear side of the CPU board.

## Status Screen

The status screen, screen 13 shows a list of various system parameters useful for documenting system set-up and operating status. The contents of this screen will be valuable information in situations where manufacturer support is required.

## Oscilloscope Screen

The oscilloscope screen, screen 14 is useful when monitoring transducer performance. The oscillogram shows the signal returned from the transceiver plotted against time and will enable service personnel to evaluate system performance and facilitate any troubleshooting.

## Non-volatile Parameter Memory

The system contains non-volatile memory to maintain installed user parameters and settings. These parameters are kept in memory and are automatically restored on power up. If the user parameters have never been set, default values are used.

## Sound speed calibration

This option will enable adjustment of the sound speed value used for the depth calculations. The standard value is 1500 m/s, but the user may set values from 1400 to 1550 m/s to accommodate accurate propagation speed in known water conditions.

## **7. Options**

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### **Repeaters/Slaves**

Repeaters may be connected to the system.

## **8. User Maintenance**

---

### **Transducer Maintenance**

The transducers are virtually maintenance free, but occasional cleaning may be necessary depending on sea water conditions.

### **Operator Unit Maintenance**

The operator unit contains no user serviceable parts, and requires no maintenance apart from occasional cleaning. Please use a soft cloth and no chemicals except cleaning alcohol.

## 9. Trouble Shooting

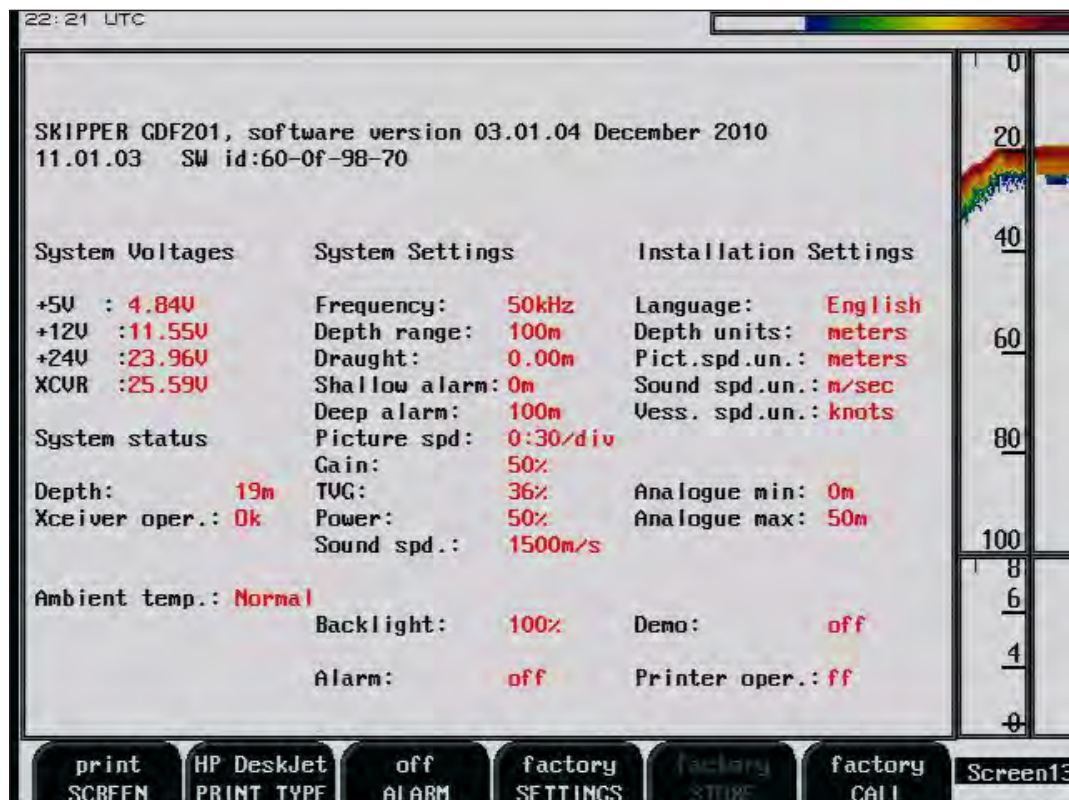
### Typical Status Screen (13) Contents

The status screen (13) contain information that will facilitate analysis and correction of several problems. A printout of the status and oscilloscope screens should be sent by E-mail/fax with any report about functional disturbances. This will greatly facilitate remote failure analysis.

If it is at all possible to cycle through the screens and observe this information, several assumptions may be made regarding operation of the GDF201 system. Although some of the subsystems necessary for this basic system operation may still suffer from minor or intermittent operation disorders, the fact that it is possible to select and observe this screen, indicate correct operation of the following GDF201 subsystems:

- The CPU board is operating.
- The power supplies on the terminal board are basically working.
- The I/O board is operating

The other information on the status screen is a collection of information which may be observed and manipulated with the various screen soft key selections. As a reference, it is more convenient to observe the various settings together on this screen than to cycle from screen to screen to check on the soft key texts.



## 10. Installation

A basic GDF201 system consists of the following units. See fig. 10.1:

- Operator unit/GDF201 cabinet (black box)
- Handcontroller
- External monitor.
- Transducer (s)
- External printer

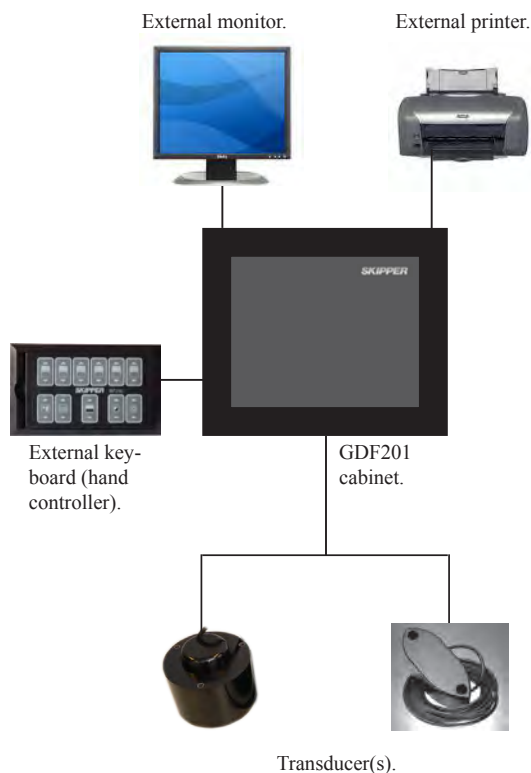
### Transducer Installation Location

Single transducers are normally installed in the foreship. Larger vessels are often fitted with two transducers, one fore and one aft. Different frequencies can give extra information about the fish type as well as allowing deeper fish school detection

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 horizontal. On vessels with a deep keel, if the transducer must be fitted higher than the keel, it should be fitted towards the side, as far from the keel as possible to avoid false keel echoes.

Do not mount transducers close to the propeller or aft of other hull installations (outlets, vents or other protruding details). It is of course 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.

Protect the active element of the transducer and do not paint the surface.



**Fig. 10.1 Basic System configuration.**

### Operator Unit Installation

Select a position to provide free view of the panel as well as easy access during operation and service. The operator unit may be mounted flush in a panel or directly onto a bulkhead. Fig. 10.2 shows the operator unit along with the main installation dimensions. If the unit is to be flush mounted, the shown cut-out and recession depth dimensions must be observed. Remember to leave room in front of the unit to open the door a full 90°.

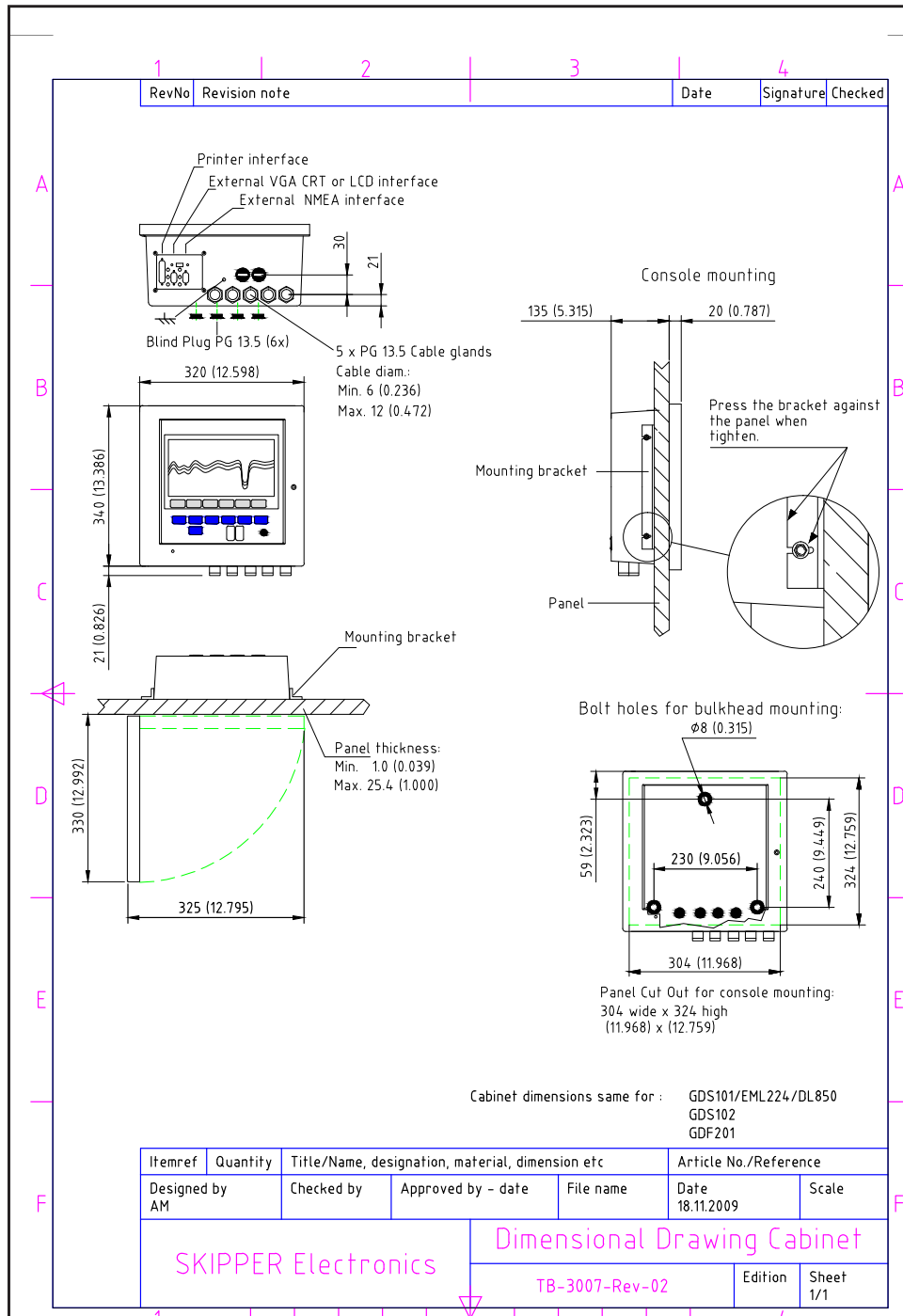


Fig 10.2. Operator Unit, dimensions.

**Do not perform installation work with system power applied!!**



Cables are led through the appropriate cable glands as follows:

- The cable from the transducer(s) should normally occupy the left gland.
- The right gland is used for power supply connection.
- The centre ones are used for any interface signals connected.

Power supply may be either 115/230 V AC and/or 24V DC. Power consumption is app. 50 W at 24 V DC and app. 70 W at 115/230 V AC.

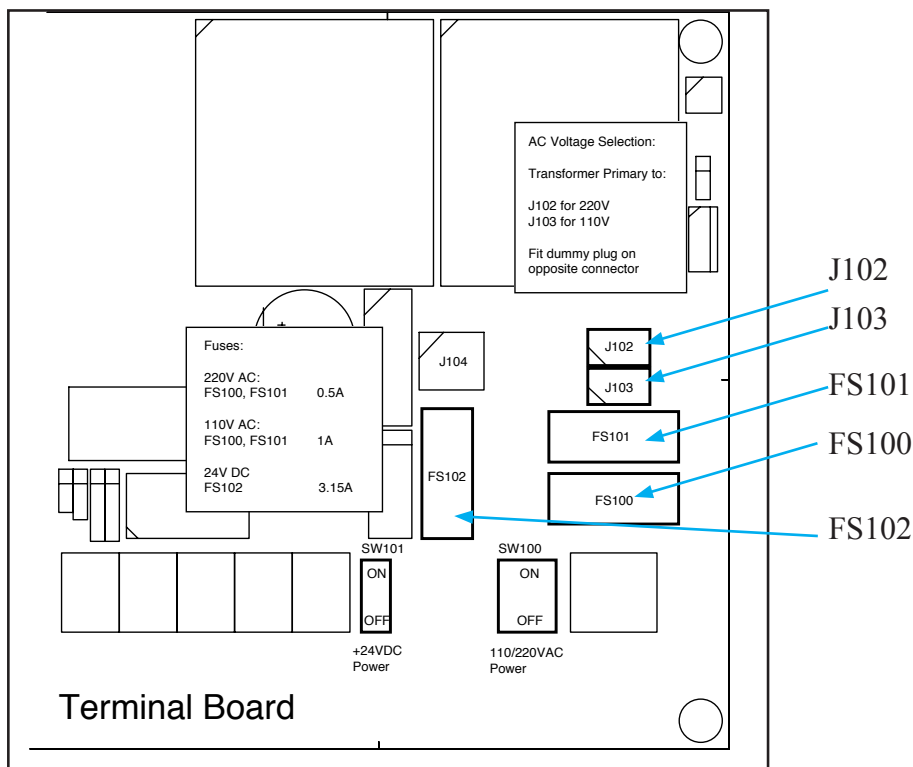
The transducer is always connected with 1 pair plus screen. See fig 10.10.

### 115/230 V selection on Power Terminal board

If the AC power system is 115 V, GDF201 may be prepared for 115 V AC by re-connecting the connectors J102, J103 as shown in fig. 10.3 This diagram also shows position of fuses for 115/230 V AC and 24 V DC. These fuses are normal 5 x 20 mm glass fuses.

AC supply:	FS100 FS101	115 V 230 V	1 A 0.5 A
DC supply:	FS102	24 V	3.15 A

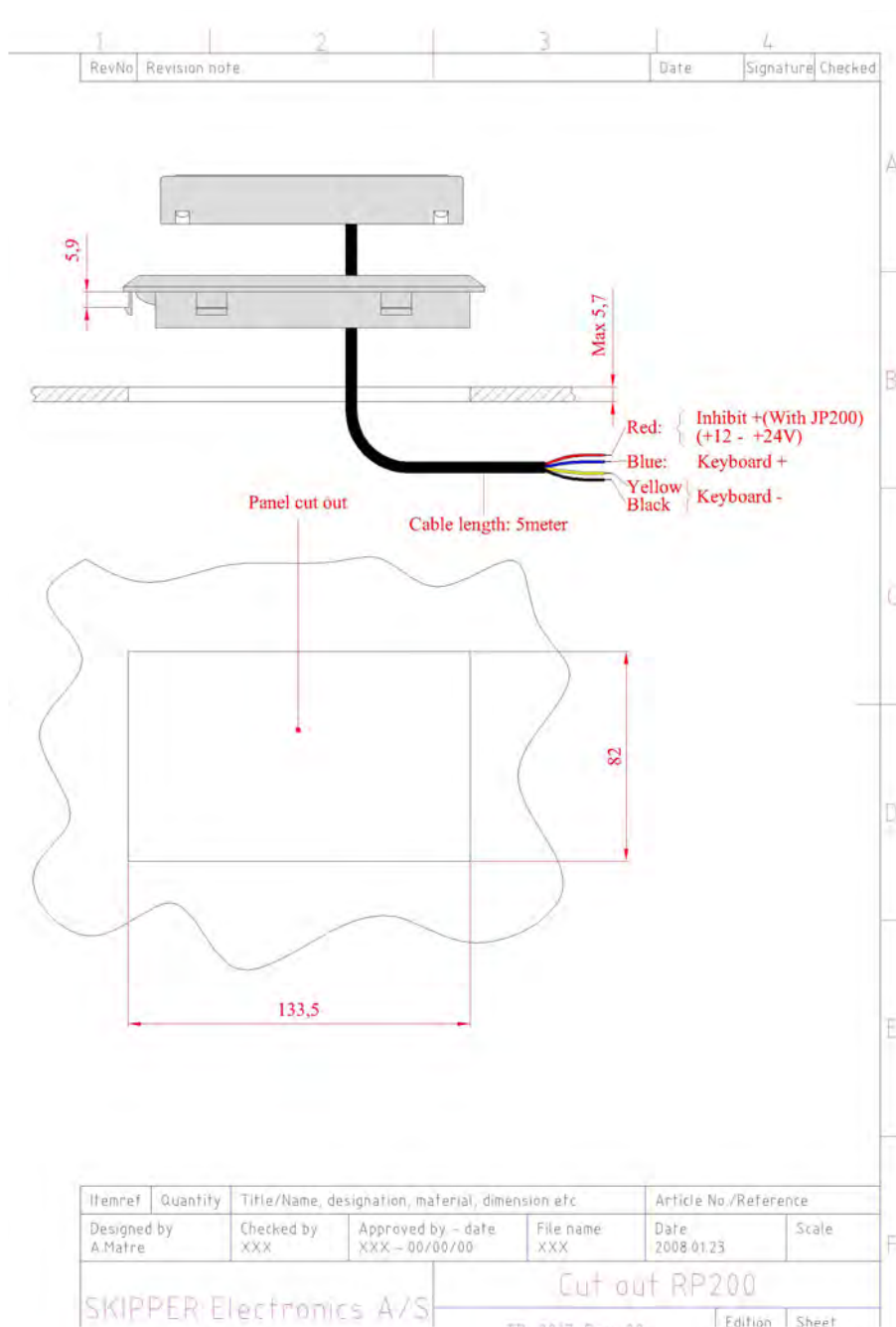
When the installation is complete, and power is connected to the operator unit, the appropriate power switch by the power terminals is switched on. For daily operation, these switches may stay on and the unit is switched off by pressing the “SYSTEM off” button on screen 4. The unit is switched on by pressing any button.



**Fig. 10.3. Voltage selection connectors and fuses, terminal board**



### Hand Controller Cutout



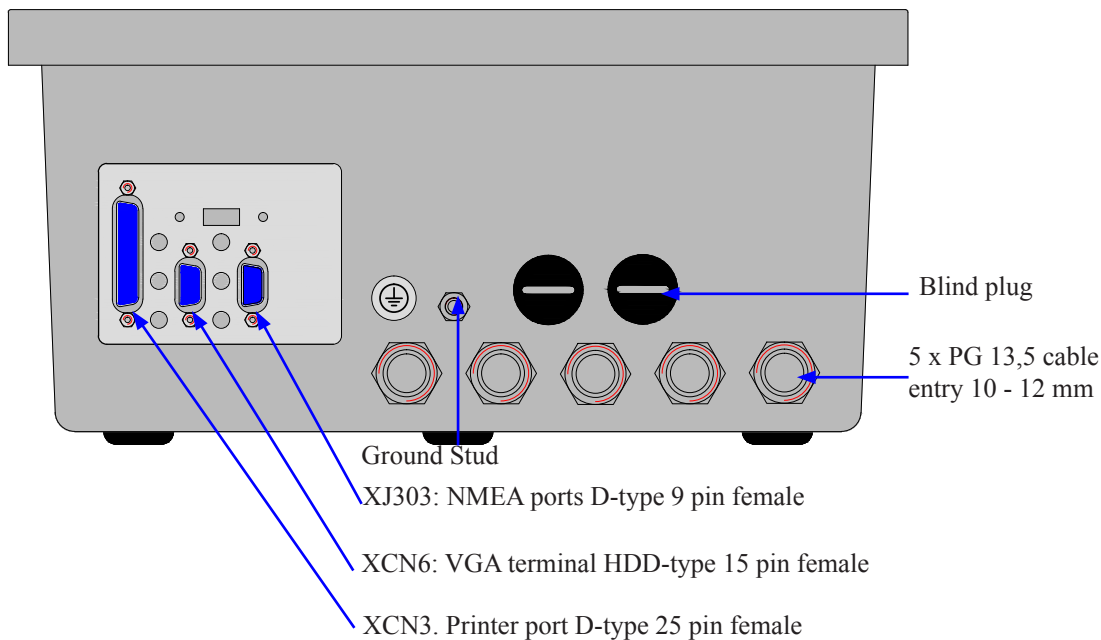
**Fig 10.5. Hand controller cut out.**

Connect the hand controller to connector J100 on the terminal board according to the table below.

Name	J100 Pin nr	Cable colour
Keyboard +	10	Blue.
Keyboard -	11	Yellow and black.
+24 V	12	Red.

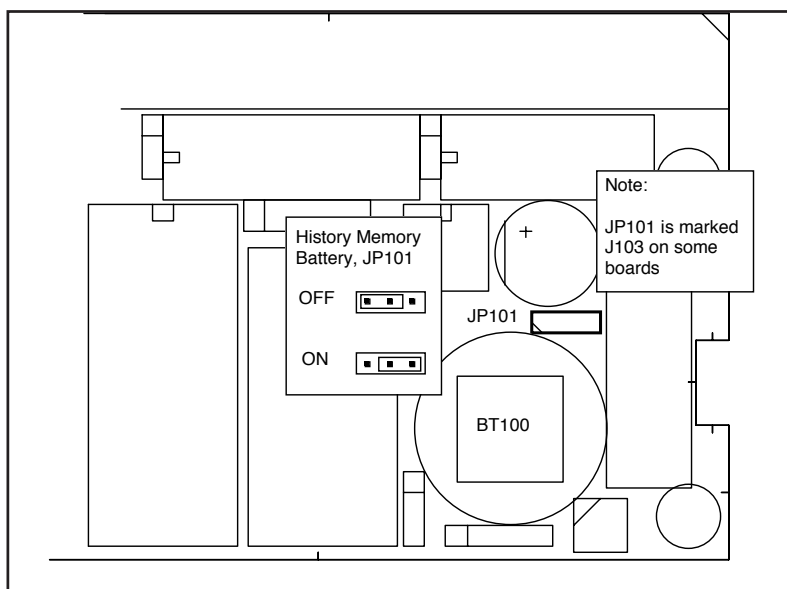
The hand controller can be mounted to the control panel, and can be removed from its housing to have elsewhere. In this case room should be left behind the mounting for the excess cable.

### External printer, screen and NMEA connections



**Fig. 10.6 External printer, screen and NMEA connection**

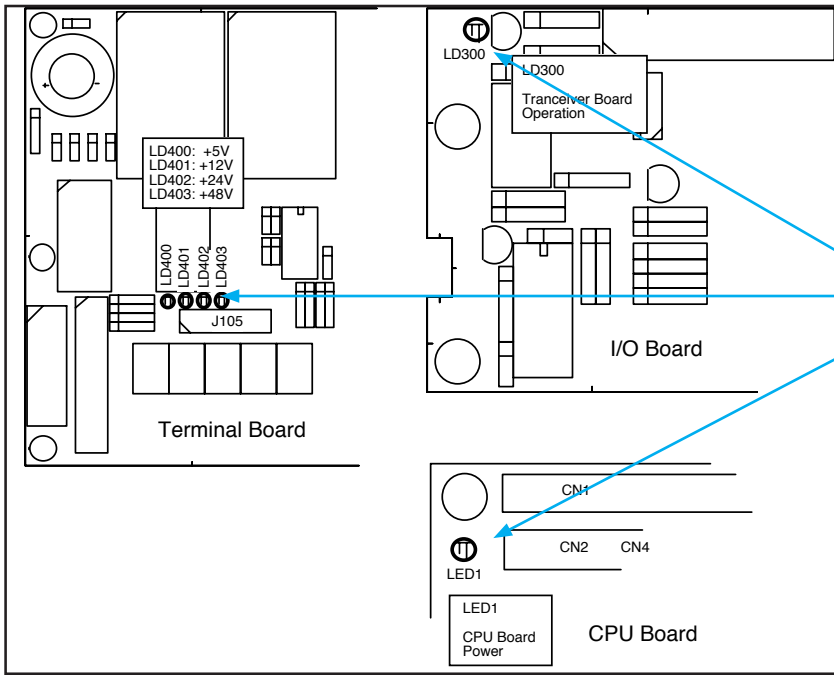
- **Printer:** Use standard parallel printer cable when connecting a external printer.
- **Screen:** Connection through a 15-pins standard screen cable.
- **NMEA:** This connection gives the opportunity to receive information concerning position, course, speed and UTC from external sources through the NMEA 0183 protocol



**Fig. 10.7. History memory battery jumper, I/O board.**

### Back-up Battery Jumper

**Note:** In the latest GDF201 versions, CMOS memory for storing “history” is not used. Here all values are stored on the Compact Flash. The jumper and battery is present only for backward compatibility.



**Fig. 10.8. Function LEDs on terminal, I/O and CPU board**

The following LEDs are located on the terminal board:

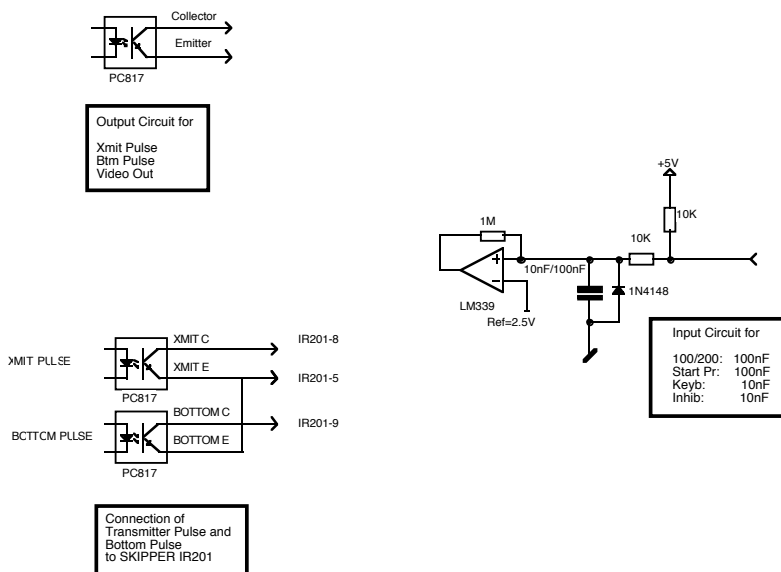
LD400	+5 V
LD401	+12 V
LD402	+24 V
LD403	+48 V

The following function LED is located on the I/O board:

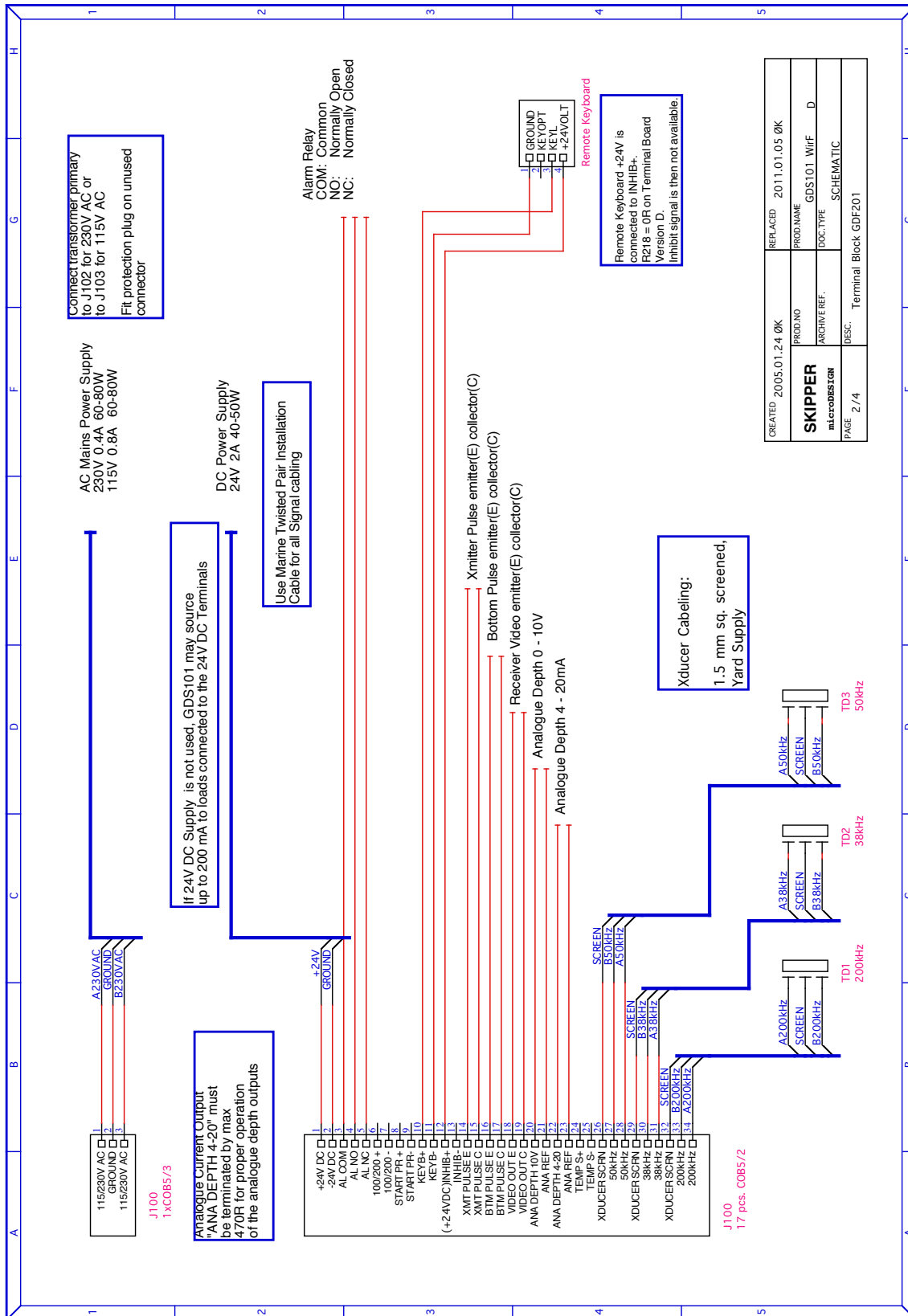
LD300	Transceiver board operation
-------	-----------------------------

There is one function LED on the CPU board

LED1	CPU board power
------	-----------------



**Fig. 10.9. Input/Output circuitry.**



**Fig. 10.10. Main Wiring Diagram.**

## 11. Interfacing

### Alarm relay

An alarm relay is provided for interconnection to external alarm systems. This relay is normally energised, and is released by alarm conditions or power failure/power off. See fig. 10.10. The terminals have the following significance:

Name	J100 Pin nr	Description
ALCOM	3	Common terminal.
ALNC	5	Normally closed contact (Normal = "No alarm" condition)
ALNO	4	Normally open contact

### External Printer Control input (Note: Not activated)

Name	J100 Pin nr	Description
STPRINT +	8	Printer control input +.
STPRINT -	9	Printer control input -.

### Hand controller connection

Name	J100 Pin nr	Cable colour
Keyboard +	10	Blue.
Keyboard -	11	Yellow and black.
+24 V	12	Red.

### Transmitter and Bottom Pulse outputs

See fig. 10.10. Pulse output terminals are as follows:

Name	J100 Pin nr	Description
XMIT C	15	Collector of output optocoupler, transmitter pulse.
XMIT E	14	Emitter of output optocoupler, transmitter pulse.
BOTTOM C	17	Collector of output optocoupler, bottom pulse.
BOTTOM E	16	Emitter of output optocoupler, bottom pulse.

## Analogue interfaces

GDF201 is equipped with analogue outputs to supply equipment with analogue inputs. The signals are galvanically connected to the GDF201. Standard range is 0 - 10 V or 4 - 20 mA corresponding to shallow max, deep max settings. These settings may be accessed on screen 9. See fig. 10.10.

### ANA 0 - 10 V/4 - 20 mA

Name	J100 Pin nr	Description
ANA 10 V	20	Positive analogue voltage output.
ANA REF	21	Negative analogue reference.
ANA 20 mA	22	Positive analogue current output.
ANA REF	23	Negative analogue reference.

### Temperature input (Note: Not activated)

Name	J100 Pin nr	Description
TEMP S+	24	Temp sensor pos.
TEMP S-	25	Temp sensor neg.

### Transducer connection 50 kHz

Name	J100 Pin nr	Description
SCRN	26	Transducer ground.
50 kHz	27	50 kHz .
50 kHz	28	50 kHz .

### Transducer connection 38 kHz

Name	J100 Pin nr	Description
SCRN	29	Transducer ground.
38 kHz	30	38 kHz .
38 kHz	31	38 kHz .

### Transducer connection 200 kHz

Name	J100 Pin nr	Description
SCRN	32	Transducer ground.
200 kHz	33	200 kHz .
200 kHz	34	200 kHz .

### NMEA interface

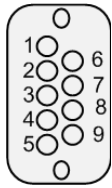
The NMEA outputs provides IEC 61162-1:2007(E) (NMEA 0183) format depth information to other equipment with NMEA 0183 inputs. Baud rate is 4800 or 9600, 8 bit, no parity. Several messages may be selected on screen 8 and the enabled messages are transmitted every second. The NMEA inputs accept position, speed, heading and UTC time messages from various navigators, compasses or speed logs.

The two inputs provided may be connected to different talkers, and both data streams will be received.

There are two outputs that will drive each minimum of 10 standard NMEA 0183 inputs. **Note:** Screen 12, NMEA control screen, shows in the text window received or transmitted messages on the presently selected channel (NMEA 0183 or RS-232).



The NMEA 0183 outputs and inputs are available on the XJ303 9 Pin connector according to fig. 10.6, 11.1 and 11.2. See section 14, NMEA Setup for a complete list of transmitted and received messages.



NMEA IN: Pin 1-2, RCV1 A, B  
 NMEA IN: Pin 6-7, RCV2 A, B  
 NMEA OUT: Pin 4-5, XMT1 A, B  
 NMEA OUT: Pin 8-9, XMT2 A, B

Fig. 11.1. 9 Pin D-Type NMEA connector XJ303 in cabinet front (seen from outside).

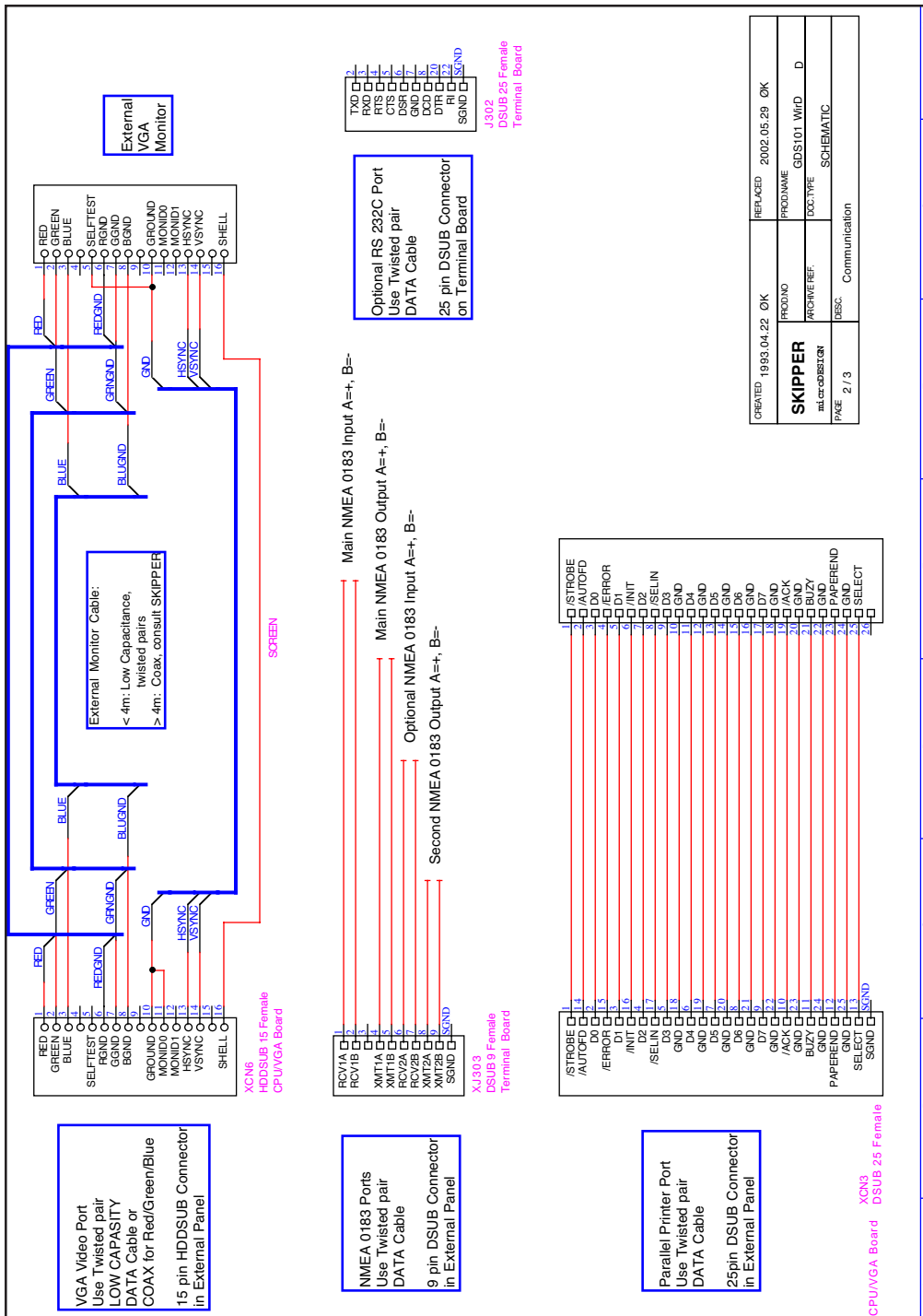


Fig. 11.2. Data communication Interfaces.

## 12. Start-up and system adaption

---

### System Adaption

#### Analogue Output

From Screen 9 it is possible to set shallow and deep range limits for the analogue output.

- 50 m corresponding to 10 V or 20 mA
- 0 m corresponding to 0 V or 4 mA.

#### Calibration, Sound Speed.

Sound speed will vary depending on water temperature and salinity. A general average of 1500 is default however colder or less salty water will result in lower values. Adjusting this will fine tune the depth information

#### Language and Units of Measure

From screen 8 it is possible to select different languages and units of measure for the screen and printer character strings. The available languages are: English, French, Spanish, German and Norwegian.

Units of measure may be selected for:

Depth	meters, feet, fathoms, braccias.
Picture speed	min:sec, nm/div, km/div, miles/div.
Vessel speed	knots, km/h, miles/h.
Sound speed	m/s, feet/s.

## 13. NMEA Setup

Screen 12 is used for verification of received NMEA messages and control of transmitted NMEA depth messages. The baud-rate may be set to 4800 or 9600, 4800 being the more common. When a NMEA talker is connected to one of the GDF201 inputs, all received messages will be displayed on the screen. If no messages are displayed, check the signal polarity and the baud-rate. The following messages are accepted for input to GDF201 and interpreted by the program. The talker identifier is ignored:

### Time

Universal Time	ZZU,xxxxxx
Universal Time & Local	ZLZ,xxxxxx,xxxxxx,-xx
Day, Month, Year	ZDA,xxxxxx,xx,xx,xxxx,-xx

### Position

Geographical Lat/Lon	GLL,xxxx.xx,N,xxxx.xx,W
Geographical Fix, present	GXP,xxxxxx,xxxx.xx,N,xxxx.xx,W,cccc,x
Omega Fix, present	GOP,xxxxxx,xxxx.xx,N,xxxx.xx,W,cccc
Loran C Fix, present	GLP,xxxxxx,xxxx.xx,N,xxxx.xx,W,cccc
GPS Position	GGA,xxxxxx,xxxx.xxx,N,xxxx.xxx,W,x

### Heading

Heading, true, present	HDT,xxx.,T
Heading, magnetic, present	HDM,xxx.,M
Heading, compass	HCC,xxx.

### Speed

Dual Doppler Vector	VBW,uxx.xx,uxx.xx,a,uxx.xx,uxx.xx,a
---------------------	-------------------------------------

### Composite

Loran C specific	RMA,a,xxxx.xx,N,xxxx.xx,W,,xx.x,xxx.,*xx
GPS, Transit specific	RMC,xxxxxx,a,xxxx.xx,N,xxxx.xx,W,xx.x,xxx.,xxxxxx.,*xx
Vessel Identification	IMA,aaaaaaaaaaaa,aaaxxxx,xxxx.xx,N,xxxx.xx,W,xxx.x,T,xxx.,M,xx.x,N
Track & Ground speed	VTG,xxx.,T,xxx.,M,xx.x,N,xx.x,K
Heading & Water speed	VHW,xxx.,T,xxx.,M,xx.x,N,xx.x,K

Two digital communication channels are provided:

- Primary NMEA 0183, (XJ303, RCV1A/B-XMT1A/B)
- Secondary NMEA 0183/RS-232 C, (XJ303 NMEA: RCV2A/B-XMT2A/B) and J302 (RS-232C).

See fig. 11.1 for details.

Each channel can be programmed individually with respect to the baud rate and scope of transmitted messages. Before configuring of the required channel, it must be selected by using the soft key IN/OUT. Primary channel is called NMEA, while secondary marked RS-232 (both RS-232 and NMEA outputs are available on different connectors). Note, that text window will represent information, which corresponds to the currently selected channel.

The type of displayed messages received from external talker (if connected) or transmitted by the sounder, is selectable by using the soft key DISPLAY input/output. For more easy analysis of the window contents, display can be prevented from continuous update, if “DISPLAY off” is selected. The baud rate may be set to 4800 or 9600, 4800 being the more common.

Transmitted messages are enabled individually by soft keys MESSAGE and STATUS. To enable/disable particular message, select it from the list by pressing MESSAGE button until required message appears on the same button and then select the status of this message (on/off) by pressing STATUS button. It is advisable at this stage to set display in “output” mode, to be able to observe current scope of transmitted messages.

The following messages may be transmitted (selected from screen 12 and dependant on the DRAUGHT setting). The messages are enabled individually. Transmitted talker identifier is SD, Sounder **D**epth:

Depth & Draught	SDDPT,xxxx.x,xxxx.x
Depth below surface	SDDBS,xxxx.x,f,xxxx.x,M,xxx.x,F
Depth below transducer	SDDBT,xxxx.x,f,xxxx.x,M,xxx.x,F)
Depth below keel	SDDBK,xxxx.x,f,xxxx.x,M,xxx.x,F

## 14. Configuration of transmitted power limits.

Some transducers will not tolerate the transmitter output power (voltage levels) given by the GDF201. Units with software version 3.01.02 and higher, have a facility to adjust the maximum power settings and therefore reducing the risk of causing damage. If this software is not installed, software upgrade is required.

### Note:

Please note, that if there is more than one software files existing on the flash card, you will be asked to chose the version. Select the latest one and go further to the power settings procedure.

Software requirements:

- GDF201 sw version from 3.01.02, and STARTUP.EXE utility version from 1.01.12
1. To enter GDF201 configuration mode:
    - Switch off the mains inside the cabinet.
    - Press “Brightness” key on the remote keyboard, switch on the mains and keep the brightness key pressed until you see the message “You may release upgrade button” on the screen.
  2. After few diagnostic messages, 6 soft keys will appear in the lower part of the screen. Five soft keys (1-5) allow setting the maximal transmitted power at each of 3 transceiver channels (38/50/200 kHz).



3. The soft keys on the screen correspond to the push buttons in the upper row of the remote keyboard (hand controller). Note, that it does not matter which key (“up” or “down”) is pressed.
4. By setting ON “-3 db” soft key, the maximal transmitted power, will be reduced by the factor of 2 (50 % of maximal). By setting ON “-6 db” soft key, the maximal transmitted power will be reduced by the factor of 4 (25 % of maximal). By setting ON both “-3 db” and “-6 db” soft keys, the maximal transmitted power will be reduced by the factor of 8 (12.5 % of maximal). Note, that by maximal transmitted power is meant the power, which corresponds to 100 % setting on GDF201 operator panel.

-3dB	-6dB	% of full power
OFF	OFF	100 %
ON	OFF	50 %
OFF	ON	25 %
ON	ON	12.5 %

5. Note, that for channel 38 KHz only “-6 db” selection is available.
6. After the power limits have been set as desired, press “Continue” button. Power limit settings will be written into the executable file and will not be changed by Master Reset procedure.

## 15. CPU Board PCA-6742 Setup Procedure

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- Connect a PC keyboard and a VGA screen to the CPU board.
- Switch “On” the unit while pressing “Delete” key on the PC keyboard.
- Do not release the “Delete” key before the “Setup” picture is present on the screen.

(Bios version 1.12). The PCA-6742 has the default settings with the following changes. Start by loading the optimized defaults, and then change the following:

### STANDARD CMOS FEATURES

Date: Change to todays date

Time: Change to time now

Halt on: No errors

### Advanced BIOS Features

- a. Hard Disk priority [Press enter] – Press enter
  - i. 1 should be ch.1 M.
  - ii.2 should be ch 0 M.
- b. First Boot Device[Hard Disk]
- c. Second Boot Device [Hard Disk]
- d. Boot other device [Disabled]

### Advanced Chipset features

- a. SMI712 VGA Settings [Press Enter] – Press enter
  - i. SMI712 VGA Monitor [Simul monitor]
  - ii. Panel resolution Mode [640x480 TFT]
- b. USB Device Setting [Press Enter] – press enter
  - i. USB1.0 emulation [Disabled]

### Integral Peripherals

- a. Onboard serial Port 3 [enter]
  - i. Change to [2E8/IRQ9]
- b. Onboard serial Port 4 [enter]
  - i. Change to [3E8/IRQ5]
- c. Parallel Port Mode [EPP]
- d. EPP Mode Select [EPP1.9]

### PnP/PCI Configurations

- a. Resources Controlled By [Manual]
- b. IRQ Resources [Enter]
  - i. IRQ – 7 assigned to [Legacy ISA]
  - ii. IRQ – 10 assigned to [Legacy ISA]
  - iii. IRQ – 11 assigned to [Legacy ISA]
- c. NO DMA

### PC Health Status

- a. Case Open Warning [Disabled]

SAVE SETTINGS AND EXIT

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## 16. Software Upgrade Procedure

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- 1) Note the current user settings and installation configuration before continuing.
- 2) Switch off the GDF201 and remove the CF card by pressing the small lever.
- 3) Insert the CF card into a card reader connected to a suitable computer.
- 4) Download the latest software version from the Skipper Website and copy on to the CF card. There is no need to delete any files on the CF card.
- 5) Check if the installed Startup.exe utility is up-to-date and download the latest Startup.exe file from the Skipper website if necessary. Copy this file across to your computer, then rename as Startup.exe. Now copy the file to the CF card. You will be asked if you want to overwrite the existing Startup.exe file. Select Yes.
- 6) The CF card can now be re-inserted into the GDF201 cardholder.
- 7) To enter the GDF201 set up menu press the BRIGHTNESS button on the remote keypad, and keep the button pressed while you turn on the power. After a few seconds, you should see a message saying that you can release the upgrade/hidden button.
- 8) Ignore the warning "Check BIOS setup or insert another Flash memory card" by pressing any button on the remote keyboard.
- 9) At the bottom of the screen, two boxes with the old and new software names will appear and you will be asked to select one. Follow the instructions and the new software version should be copied to the GDF201 memory.
- 10) You will then be asked to confirm dB settings which set the maximum power level of the GDF201 to match different transducer models. If this function is not required, select Continue and the sounder should then start up. To verify if the GDF201 is running on the new software, go to screen 13 where the current software version is confirmed at the top of the screen.

## 17. Specifications

### Dimensions

Operator unit cabinet	Height, front	340 mm
	Width	320 mm
	Depth	170 mm
	Weight	App.10 kg
Hand controller	Height, front	87 mm
	Width	147 mm
	Depth	26 mm
	Weight	App.0.2 kg
Operator unit cabinet, Cut-out for flush mounting	H x W	322 x 302 mm
	Corner radius	4 mm

### Functional Properties

A-Scope	A-Scope on the right side.
Bottom expansion	Bottom expansion on the screen.
Depth alarms	Deep and shallow limits.
Sound speed	Sound speed calibration.
Calendar/clock	Year-Month-Day / Hours-Minutes-Seconds (24 hour system).
Interface outputs	Trigger- and bottom-pulses.
	Analogue 4-20 mA and 0 - 10 V for depth. Detected video.
	NMEA 0183.
	Alarm relay.
	Output for VGA repeater.
	RS-232 C.
	External printer.
Interface inputs	NMEA0183 for speed, position, heading and time.
Languages	English, French, Spanish, German and Norwegian.
Options	SKIPPER IR301 digital remote depth Indicator.
	LCD repeater.
	Remote keyboard for use with repeater.
Supply voltage	115/230 V AC and/or 24 V DC



## Performance

Depth Range	10 - 1600 m
Graphic resolution	0.5 % of range
Digital screen resolution	<10 m: 0.01 m
	≥10 m <100 m: 0.1 m
	≥100 m: 1 m
Max. power	App. 1 kW (transducer dependant).
Transducer, 38 kHz	Effective range 1600 m
Transducer, 50 kHz	Effective range 1000 m
Transducer, 200 kHz	Effective range 350 m

## Environmental

### Transducer

Operating temperature	-15 - 55 °C
Storage temperature	-20 - 70 °C
Protection, transducer	6 bar
Protection, parts inside hull	IP66

### Operator Unit Cabinet

Supply voltage	24V DC (20-32V), 115/230 V AC
Power consumption	50 W at 24 V DC, 70 W at 115/230 V AC
Alarm relay	Change-over contact, max. 24 V 300 mA
RS-232 port	Standard 25 pin D-Sub Connector.
NMEA port	9 pin D-Sub. 2 Inputs, 1 Output.
Operating temperature	15 - 55 °C
Storage temperature	-20 - 70 °C
Humidity	10 - 90 % relative, no condensation.

## **18. Service**

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All service requests should be made to the local SKIPPER representative.

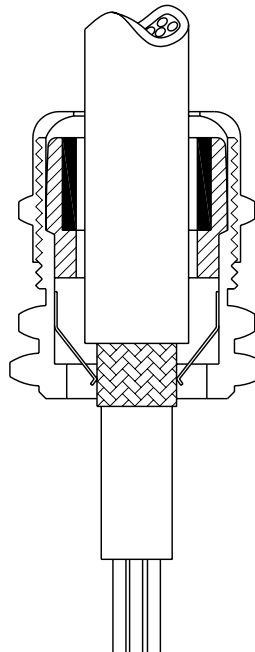
Adjustments and repairs should only be performed by qualified service engineers, and unqualified repair attempts will void the warranty.

Please find your local dealer at **[www.skipper.no](http://www.skipper.no)**.

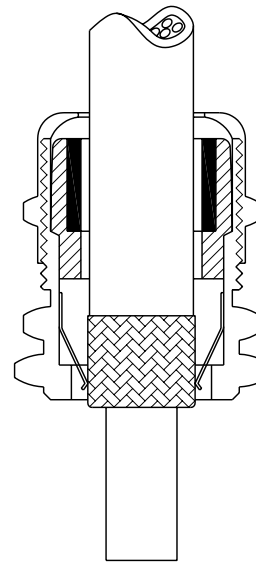
**19. Appendix, Misc Installation Drawings**

1		2		3		4
RevNo	Revision note			Date	Signature	Checked

**1. Straight braided screen**



**2. Twisted backward .....braided screen**



*The assembly of cable gland is quick and easy:*

1. Partially expose the braided screen by removing the outer sheath of the cable at a length of approx. 10 mm
2. Insert the cable through the dome nut and the gland body until the contact spring is pressed against the braided screen.
3. Firmly screw on dome nut .

*Cable glands play an important part in safeguarding EMC requirements where cables and leads enter into a shielding system. They have to ensure a permanent connection with very low ohmic or inductive resistance between the cable shield and the housing potential.*

Itemref	Quantity	Title/Name, designation, material, dimension etc	Article No./Reference		
Designed by AM	Checked by VF	Approved by - date VF - 2006.12.18	File name	Date	Scale
SKIPPER Electronics AS			EMC Cable Gland Connection		
			TB-3015-Rev-00	Edition	Sheet 1/1

**Fig 19.1 Cable Gland Connection**