MSA
Engineering
the future

"NPK Morsvyazavtomatica" LLC

UNICONT

UNIVERSAL DIGITAL REPEATER
DR-209, DR-209W

Operating manual

26E, Kibalchicha Str., St Petersburg
Russia, 192174

Tel.: 8 (800) 100-67-19
Fax: +7 (812) 362-76-36

info@unicont.com
www.unicont.com

Table of contents

INTRODUCTION

This operating manual (hereinafter referred to as the OM) covers the Universal digital repeaters DR-209 and DR-209W (hereinafter referred to as the Product or the Repeater).

The OM is intended to describe operating principles, technical specifications and rules for the safe Product operation.

Only those who have had general education in the area of electronic devices, and those who have read and understood this document shall be permitted to operate with the Repeater.

In addition to the instructions given in this document, the safety regulations and rules applicable in the field shall be observed.

Terms and abbreviations:

LCD – liquid crystal display;

SPTA – spare parts, tools and appliances;

OM – Operating manual;

TS – Technical service;

NMEA – textual communication protocol NMEA 0183;

CL – Check list.

1 DESCRIPTION AND OPERATION OF THE PRODUCT

1.1 DESCRIPTION

The Product displays the digital data received in NMEA 0183 (NMEA) sentences format and retransmits them in the same format through the communication channels.

The Product is designed for sea- and river-going vessels, and general industrial application.

1.2 TECHNICAL SPECIFICATIONS

The Product ensures:

a. data interface with equipment via four asynchronous, serial, galvanically isolated ports RS-422 with NMEA standard support;

b. reception of data received via each of four ports in NMEA format;

c. data display (received through all ports) in graphic and digital view on the LCD monitor in “Highway” mode, herewith data storage and presentation in graphs, providing the following capabilities:

- setting measurement units and correction values;
- setting intervals to monitor parameters (for graph representation mode, time period 5 minutes to 120 hours);
- correction of parameter values for the specified time interval;
- display of the required parameters (from the received ones) both in full screen (a single parameter is displayed on the whole screen in any mode) and in multi-screen mode;

d. continuous transmission/retransmission of received data to the external ship systems via the selected ports;

e. data display in English/Russian (as selected);

f. prior configuration of up to 4 data display patterns (with various combinations of displayed parameters);

g. control using the relevant buttons on the front panel;

h. manual adjustment (using buttons on the front panel) of the screen backlight brightness level;

i. individual settings for every port (stop bit, parity bit, reception/transmission baud rate);

j. alarm notifications in case the maximum and minimum range of the set values is exceeded.

The Product's detailed specifications, environment conditions, overall and installation dimensions are represented in Technical description of the Product.

1.3 STRUCTURE AND OPERATION OF THE PRODUCT

The Product receives the NMEA signals through four serial interfaces RS-422, then processes them according to the settings and displays the data on the built-in LCD.

Figure 1 shows the Product's functional diagram.

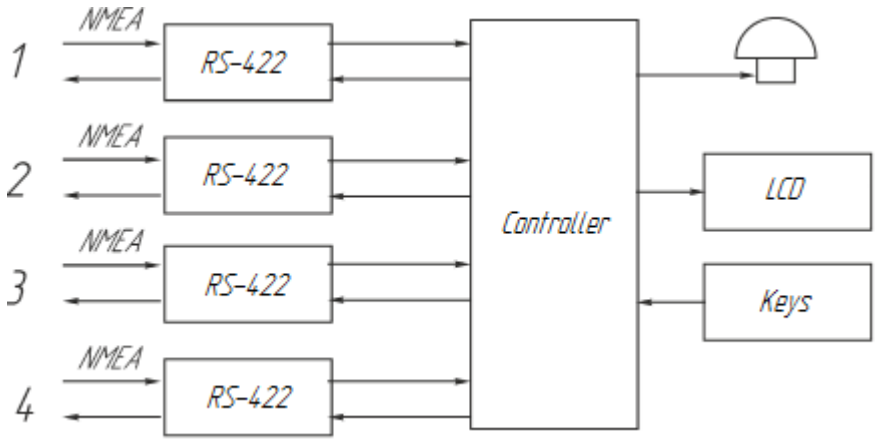

Figure 1 – The Product's functional diagram

The Product can be also used as a repeater. The controls and LEDs are represented in Figure 2, for the detailed description see Table 1.

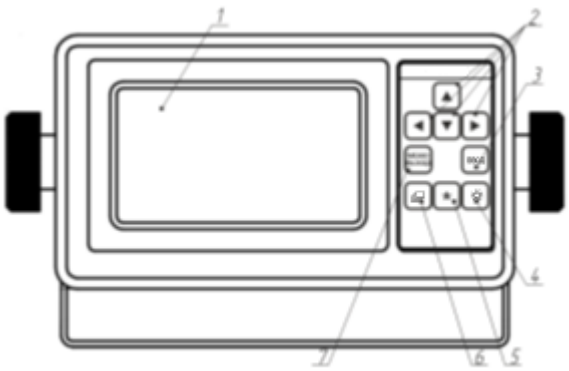

Figure 2 – The Product's controls and LEDs

Table 1 – The Product's controls and LEDs

№	Name	Description
1	LCD	To display NMEA data
2	Navigation buttons	To select menu items (submenus)
3	Button "Enter"	To access the submenu; to select the parameters
4	Button "☼"	To control brightness and contrast ratio
5	Button "*"	To access data display screen
6	Button "⧉"	To change the displays
7	Button "Menu/Exit"	To access the main menu; To exit the submenus

1.4 MEASUREMENT INSTRUMENTS, TOOLS AND APPLIANCES

Operability control of the Product is carried out using integrated controls and LEDs.

The technical service (TS) of the Product is carried out using tools and consumables listed in Table 2.

Table 2 – Amount of consumables required for the TS

Name and identifier of consumables	Weight of consumables	Note
Cleaning cloth	0.1 kg	1 To clean surfaces and parts of the system – use clean cloth 2 To clean severe contamination – use alcohol-soaked cloth
Rectified hydrolytic technical ethyl alcohol	0.05 *l*	To soak cloth while cleaning the screen
Varnish	0.05 kg	To cover surfaces of the unit in case of paint coating damage
Abrasive cloth	0.06x0.06 m	To polish surfaces of the unit in case of paint coating damage

1.5 MARKING AND SEALING

The nameplates, where the user can find a serial number, date of manufacturing, weight, IP rating, input voltage and power consumption are located on the Product's casing.

The sealing of the Product and package is not provided.

1.6 PACKAGING

The Product is packed in a corrugated board box and inner packaging ensuring its transportation and storage at the warehouse.

Transport packaging is also used as a returnable packaging for transportation of the Product to the repair location and back.

The sealing of the Product and package is not provided

2 USAGE OF THE PRODUCT

2.1 OPERATIONAL CONSTRAINTS

The Product shall have proper grounding, all cables shall be insulated; non-insulated/bare ends shall be absent.

2.2 USAGE PREPARATIONS

2.2.1 Safety features

After transportation store the Product in the package in the premises of future operation for 12 hours.

After unpacking provide a visual test and check the absence of any mechanical damage.

Before the Product's operation the user shall:

a. train staff to use the Product and checkout equipment, as well as occupational safety applicable in the field;

b. follow "Rules for Operation of Customers' Electrical Installations" and "Safety Rules for Operation of Customers' Electrical Installations" while testing electrical circuits and insulation resistance of the Product.

2.2.2 Method of the Product's visual check

Before powering the Product on the user shall:

a. check visually the integrity of control elements on the front panel;

b. clean any contamination or dust from the front panel with clean soft cloth, if present;

c. if the Product is waterproof the user shall:

- check reliable fastening of the wires in the terminals;
- check reliable fastening of the cable in every cable gland.

2.2.3 Switching the Product on instructions

Once the power is supplied, the Product automatically switches on.

2.3 USAGE OF THE PRODUCT

2.3.1 The Product is delivered with factory settings; the settings may be changed if necessary.

2.3.2 Select of active screen

The Product enables to use max. 5 screens; each screen can be configured to represent the required NMEA data in one of five available display modes: digital, graphical, represented in graphs, “Highway” and “GNSS”.

Change of screens is carried out by pressing “” button; the screens have the same order as they were configured.

2.3.3 Settings of data display modes

In “Digital” mode max. four data types can be displayed on one screen at the same time; the user can select the type of data and set the data layout on the screen.

In “Graphical” mode the data are displayed as a pointer indicator, compass card, etc., depending on the data type.

Displaying data in “Graph” mode is a user-friendly way to show a parameter variation (changes) for a time period; the user can set the required time range of graph and select the data for processing.

“Highway” and “GNSS” modes cannot be set by the user.

2.3.4 Select of data display mode

Press “Menu” button to access the main menu of the Product, see Figure 3. Figures 3–16, 18–21, 25–28, 31, 32, 34–42 show two display modes of the menu, in English and Russian.

Using navigation buttons select “User display setup” and press “ENTER”. The digits in the left column mean a number of display mode, text – a type of display mode, figure – screen layout, see Figure 4.

Using navigation buttons select the display with the relevant number and press “ENTER”, see Figure 5.

Select necessary display mode “Digital”, “Graph”, “Graphical”, “Highway”, “GNSS”, “OFF” and press “ENTER”.

Figure 3 – The Product's menu

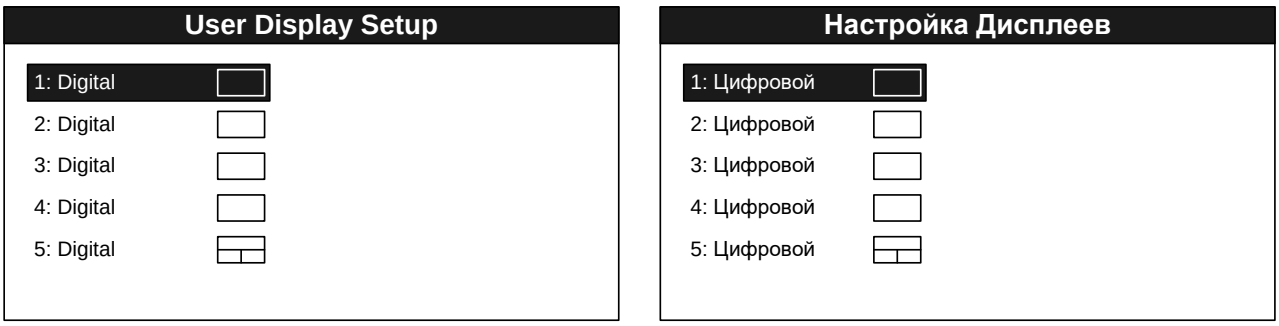

Figure 4 – "User display setup" menu item

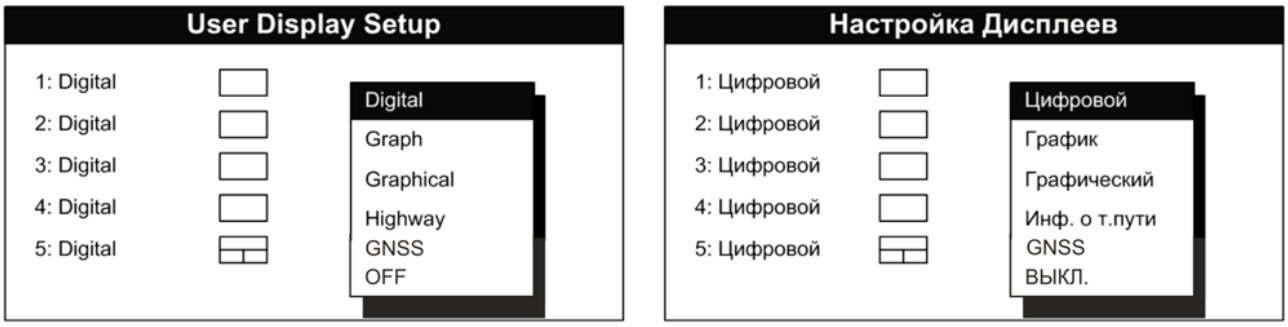

Figure 5 – Select of the display mode

2.3.5 Settings of "Digital" display mode

Select "Digital" display mode, see Figure 6.

This mode ensures presentation of all available NMEA data types:

- water temperature;
- atmospheric pressure (temperature);
- humidity;
- depth;
- true ground speed (water);

- course over ground, cross-track error;
- wind speed and direction (ship's turn);
- date and time;
- odometer;
- XTE (travelled distance);
- waypoint (selected on navigator);
- alarm interval (time);
- current speed and course;
- heading, pitching, roll;
- latitude and longitude position.

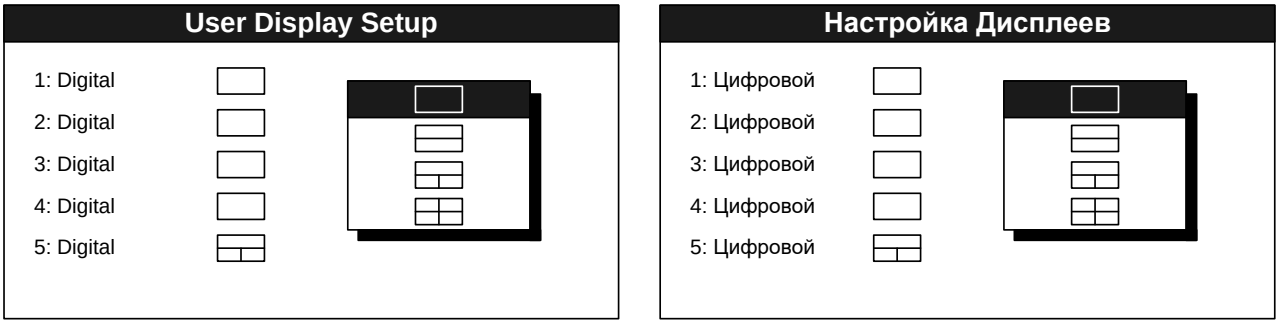

Figure 6 – Select of "Digital" display mode

In the drop-down list select necessary screen layout, see Figure 7. Each part of the screen will display particular type of data. Press "ENTER".

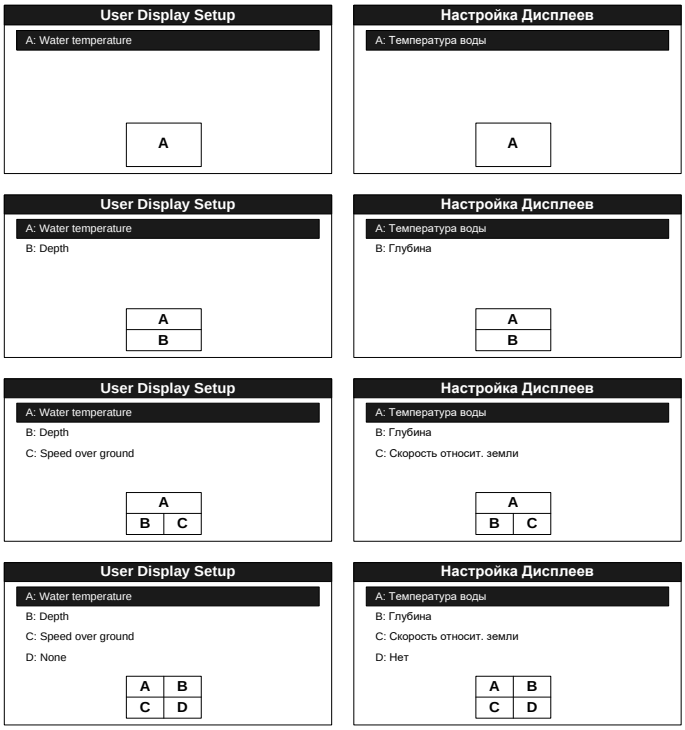

Figure 7 – Select of screen layout

Depending on the selected configuration, one of the layouts above will be displayed. Use navigation buttons to select necessary part of the screen (according to the screen layout at the bottom) and press “ENTER”.

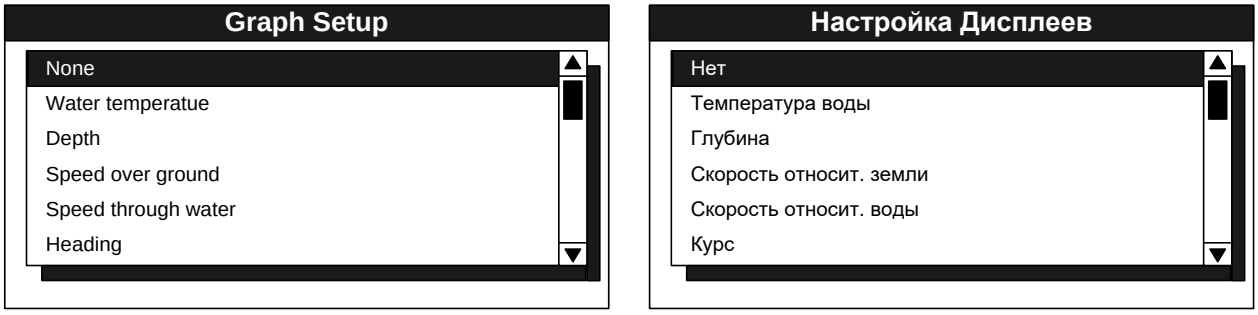

Figure 8 – Select of the displayed parameters type

Use navigation buttons to select the required type of data, see Figure 8 and press “ENTER”. Then the Product will return to the previous menu to continue and select the next part of the screen.

2.3.6 Settings of “Graph” display mode

Select “Graph Setup”.

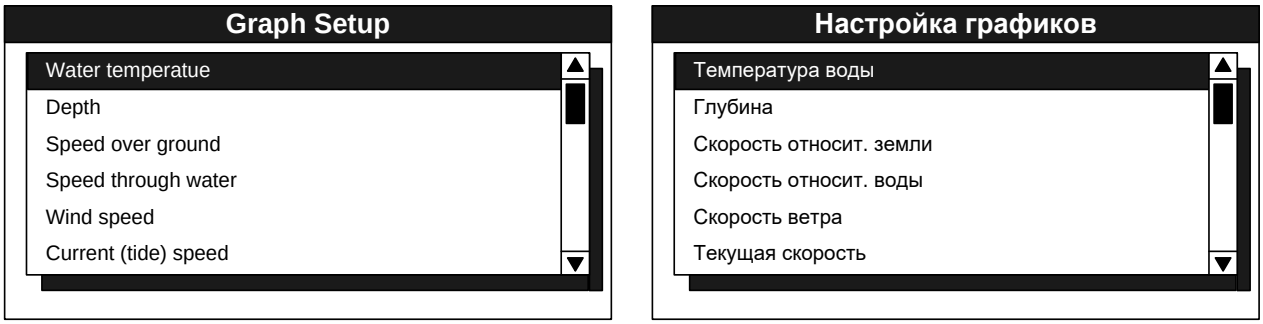

Figure 9 – Select of the data for “Graph Setup” display mode

Use navigation buttons and select a type of data to create the graph, see Figure 9, then press “ENTER”. The further view of the screen will depend on the selected data type, see Figures 10–16.

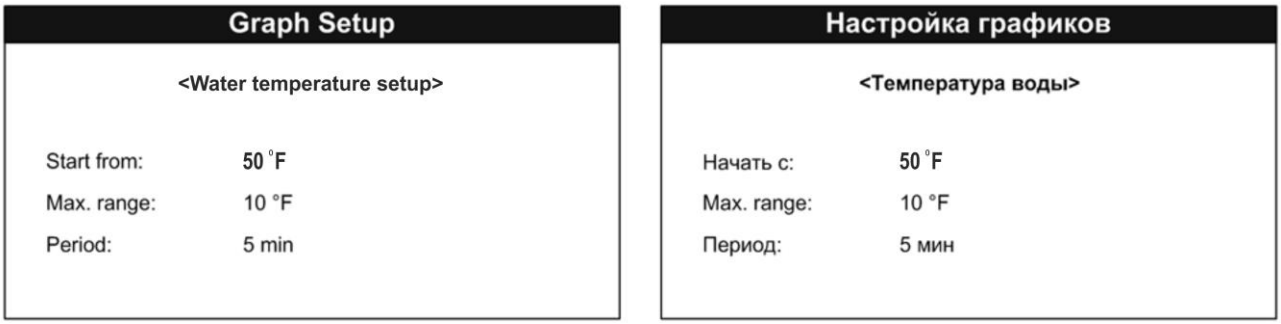

Figure 10 – Settings of “Water temperature” graph

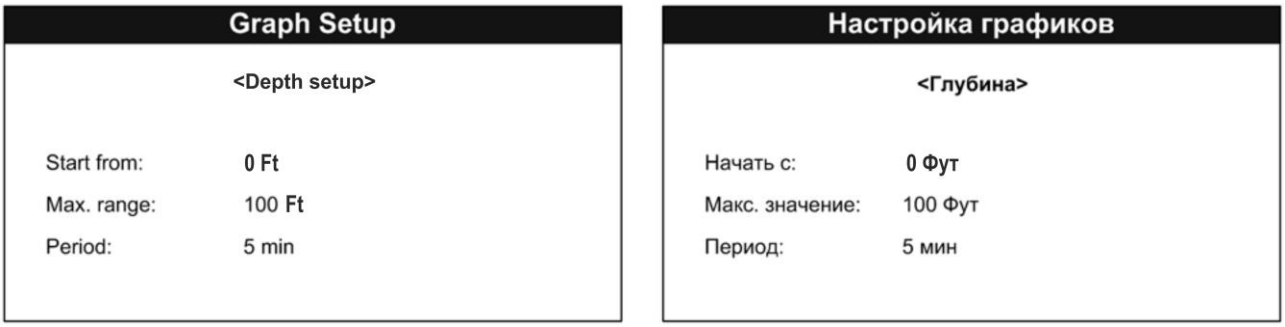

Figure 11 – Settings of “Depth” graph

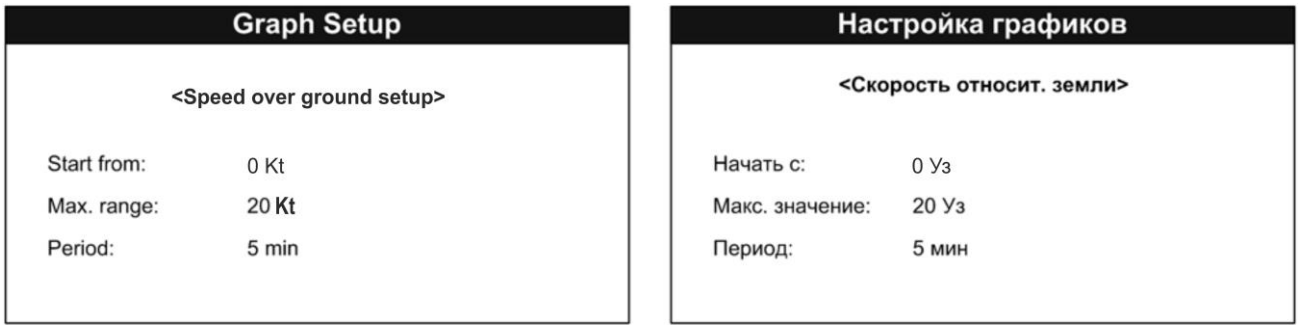

Figure 12 – Settings of “Speed over ground setup” graph

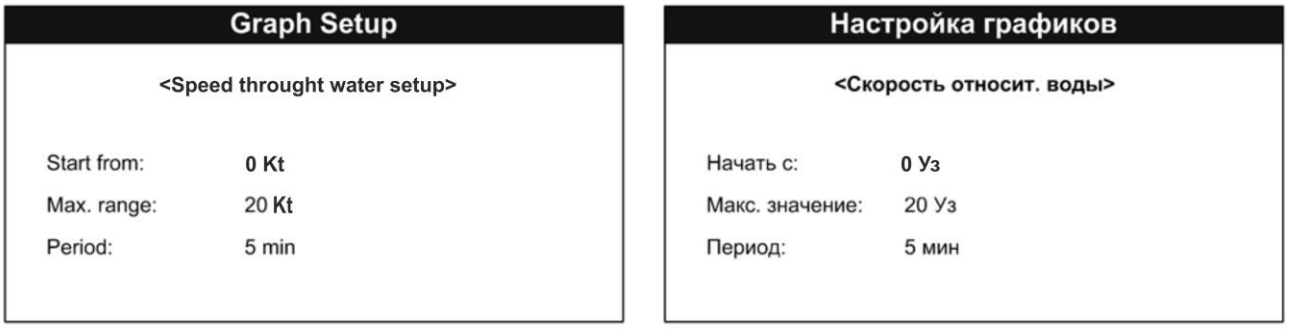

Figure 13 – Settings of “Speed through water setup” graph

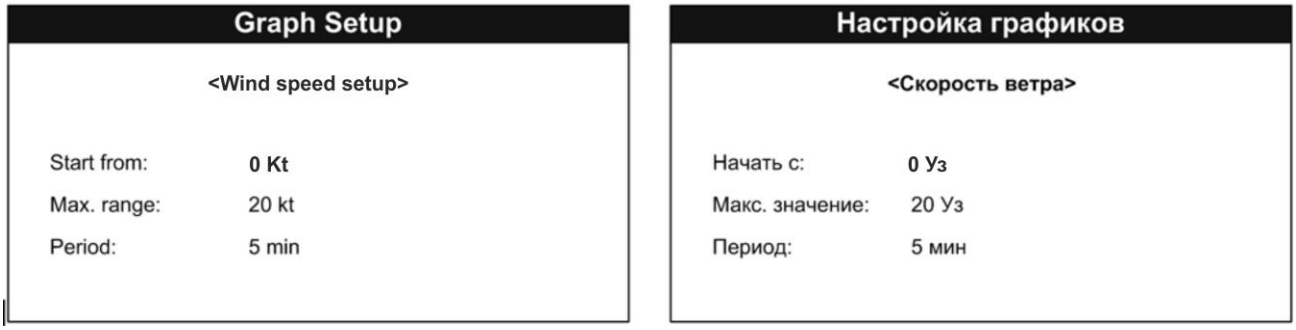

Figure 14 – Settings of “Wind speed” graph

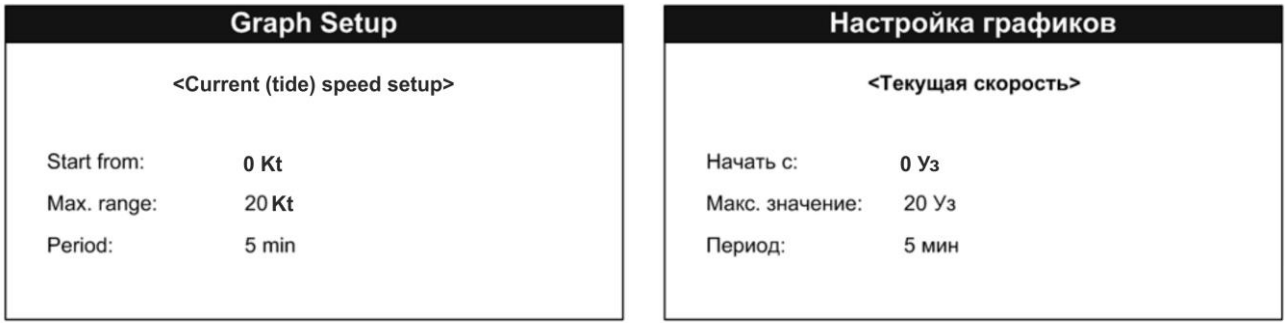

Figure 15 – Settings of “Current speed” graph

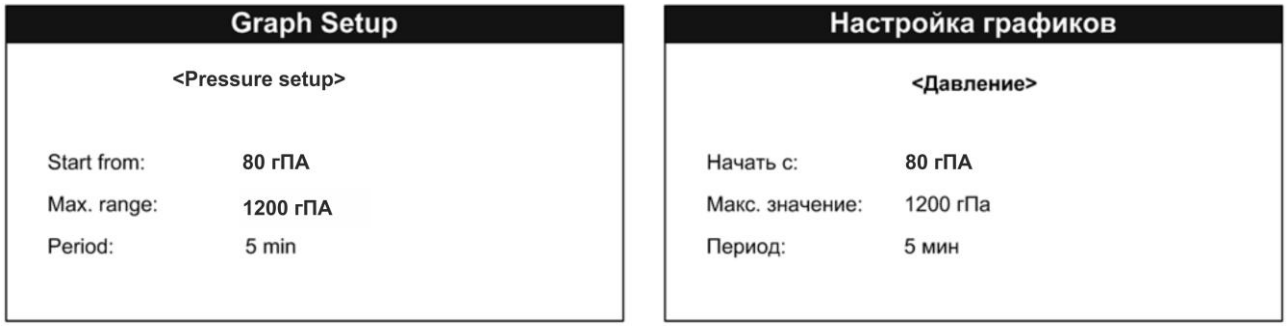

Figure 16 – Settings of “Pressure setup” graph

Select necessary parameters using “▼” and “▲”, use “◄” and “►” to change their values.

Configurable parameters define the following characteristics of the graph, see Figure 17.

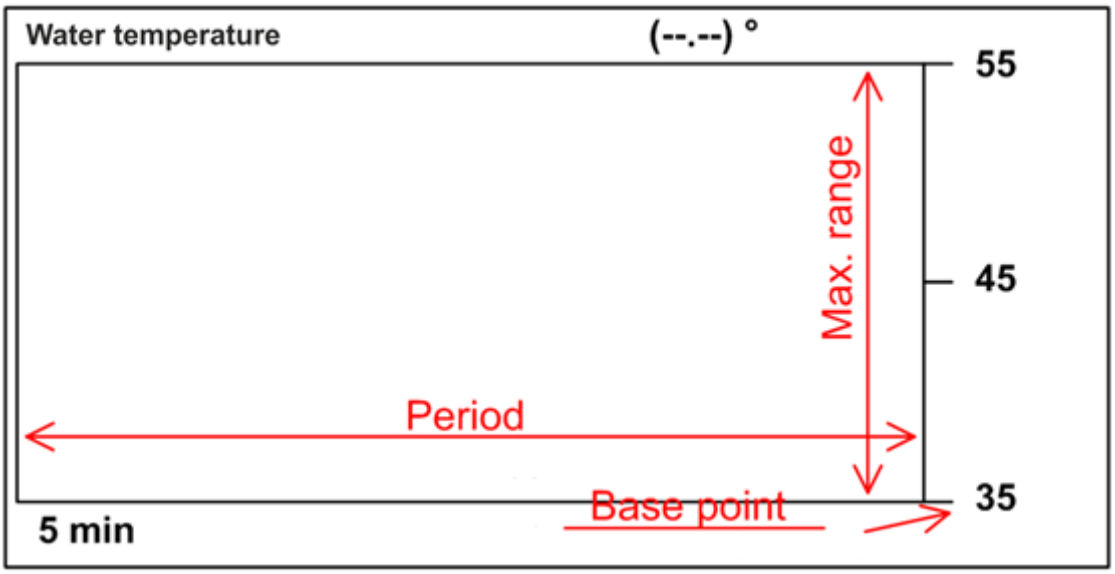

Figure 17 – Graph type

Permissible values for different data types are represented in Table 3.

Table 3 – Permissible values for different data types

Data	Base point values (“Start from”)	Maximum range values (“Max. Range”)
Temperature	– 99 to + 999	1 to 900
Depth	0 to 9999	1 to 9999
True ground speed	0 to 998	1 to 30, max
True water speed	0 to 998	1 to 30, max
Wind speed	0 to 998	1 to 30, max
Speed	0 to 998	1 to 30, max
Pressure	800 to 1199	801 to 1200

Permissible values of graph period: 5 minutes, 30 minutes, 1 hour, 3 hours, 6 hours, 12 hours, 24 hours, 48 hours, 72 hours, 120 hours.

Press “MENU” button to exit the graph settings menu.

2.3.7 Settings of “Graphic” display mode

Select “Graphic” display mode.

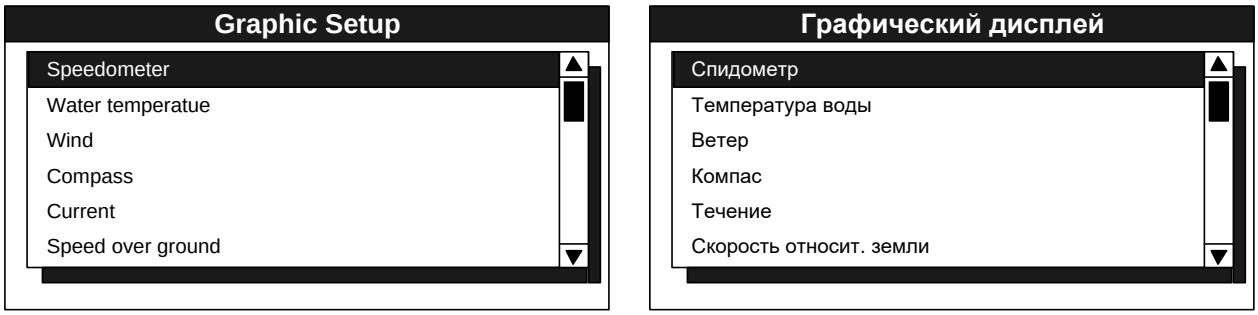

Figure 18 – Settings of “Graphic” display mode

Use navigation buttons to select a type of graphical display. Press “ENTER”.

Several screens do not require additional settings; once such screen is selected, the Product returns to the previous menu. The settings are required for the following screens, see Figures 19, 20, 21.

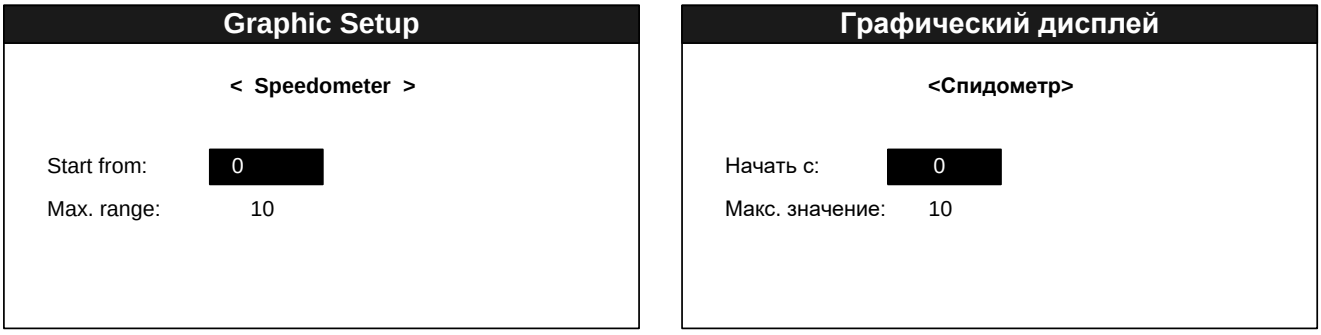

Figure 19 – Settings of “Speedometer” parameters

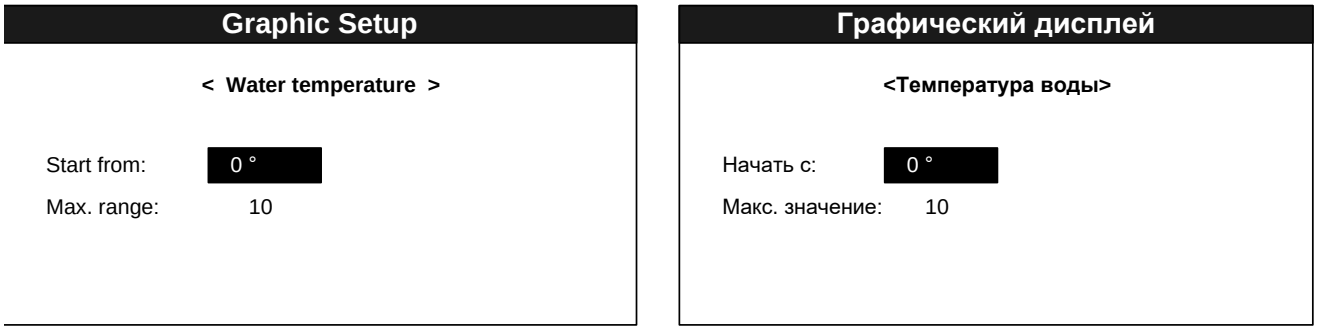

Figure 20 – Settings of “Water temperature” parameters

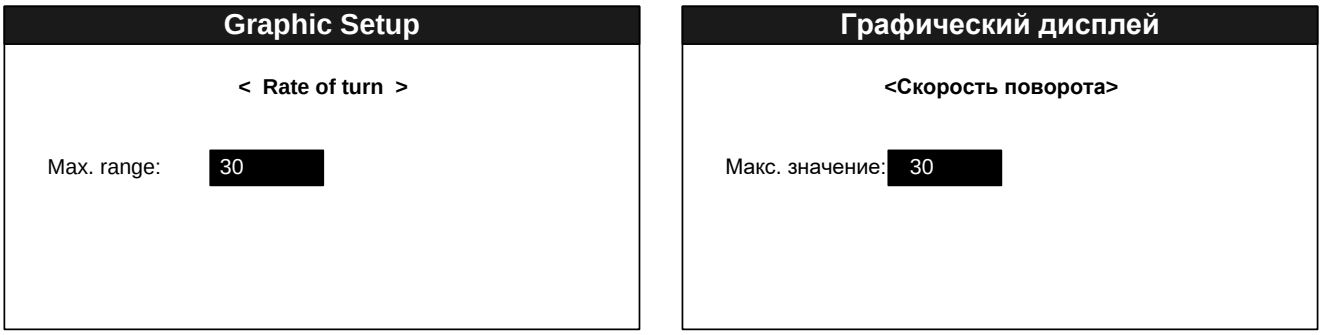

Figure 21 – Settings of “Rate of turn” parameters

Use “▼” and “▲” buttons to select the required parameters; change their values using “◄” and “►”.

Description of the configurable parameters is shown in Figures 22 and 23.

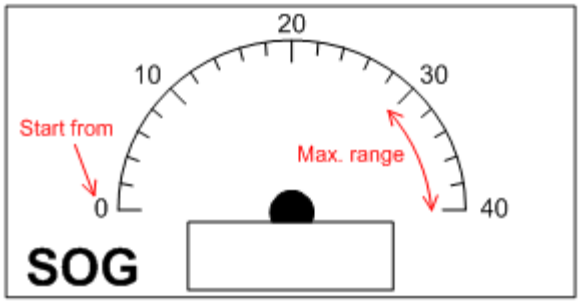

Figure 22 – Parameters of “SOG” speedometer data display mode

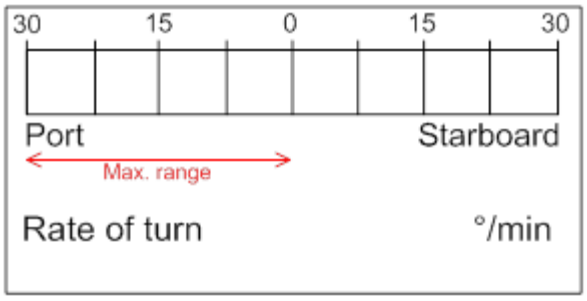

Figure 23 – Parameters of “Ship’s rate of turn” data display mode

2.3.8 Display of input data

To display input NMEA sentences on the screen, press “*” button in the main operation mode, see Figure 24.

COM1	
COM2	
COM3	$TENDT,0.00.T*03 $TEVTG,0.00,T,0,00,M,0,00,N,0,00,..
COM4	

Figure 24 – Data displayed on the screen in the main mode

Each screen segment displays data received through the relevant port. When there isn't enough space to display sentences on the screen, they are automatically shortened; symbol "…" is added at the end.

Time (in seconds) since the last reception of data is displayed under the name of each port.

2.3.9 Built-in alarm "Alarms"

The Product allows for using a built-in alarm, which can be set according to ten conditions. The alarm can be activated by the following data types: speed, water temperature, arrival/anchor, cross-track error (course deviation), travelled distance, timer, time.

The Product ensures both sound and light alarm for each data type.

2.3.10 Select of sound alarm type

To provide the settings for the sound alarm type:

- press "MENU" button in the main display mode;
- select menu item "Alarm #1" and press "ENTER", see Figure 25;

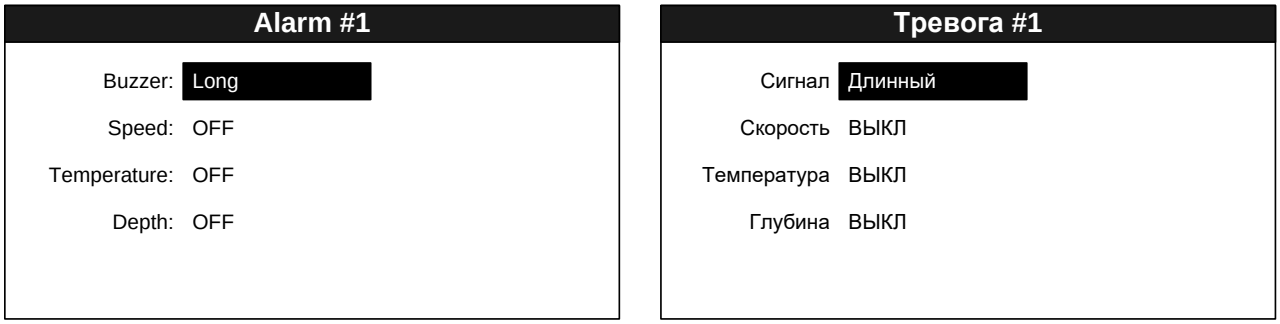

Figure 25 – Select of alarm type

- use navigation buttons to select "Buzzer", see Figure 26 and press "ENTER";

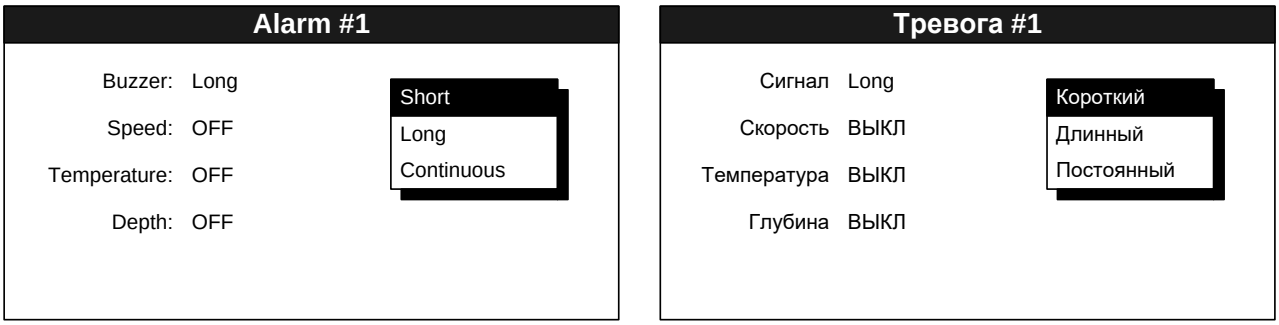

Figure 26 – Select of signal parameters

– use “▼” and “▲” buttons to select a sound alarm type, see Figure 26 and press “ENTER”. Press “MENU” to exit the alarm settings menu and access the main menu.

Available types of sound alarm are represented in Table 4.

Table 4 – Types of sound alarm

Name	Description
Short	Short sound signals
Long	Long sound signals
Continuous	Continuous sound signal

2.3.11 Alarm activated by the depth, temperature and speed values

To provide settings for the sound alarm type:

– press “MENU” in the main display mode;

– select the menu item “Alarm #1” and press “ENTER”;

– use “▼” and “▲” buttons to select the required parameter: speed, temperature, depth and press “ENTER”, see Figure 27;

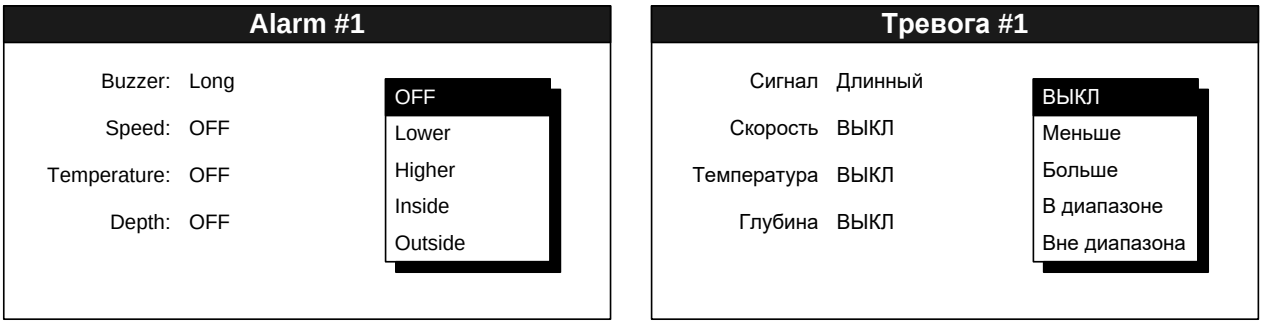

Figure 27 – Alarm activated by the depth, temperature and seed values

– on the drop-down menu select a condition and press “ENTER”. The brief description of conditions is represented in Table 5;

Table 5 – The brief description of conditions

Name	Description
OFF	The condition is not set. The parameter alarm is not used.
Lower	The alarm activates if the current parameter value is lower that the set value.
Higher	The alarm activates if the current parameter value is higher that the set value.
Inside	The alarm activates if the current parameter value is inside (within) the set range.
Outside	The alarm activates if the current parameter value is outside the set range.

– once “Lower” and “Higher” are selected, the field to set parameter value will appear on the right, see Figure 28. Select the value using “◄” and “►” buttons, then press “ENTER”;

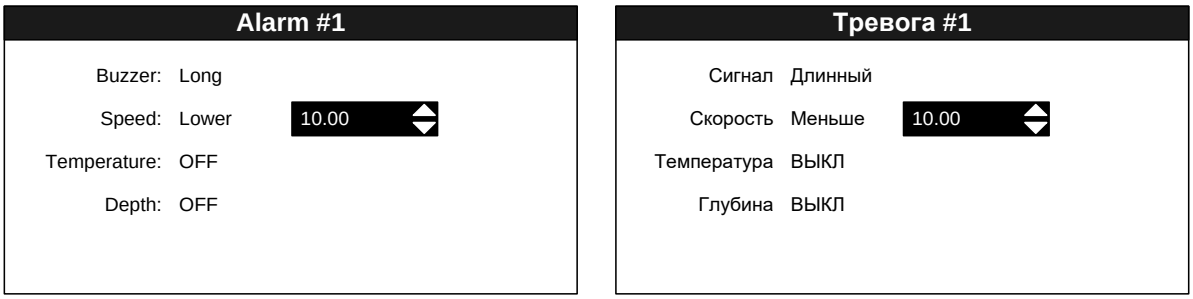

Figure 28 – Settings of alarm parameters

– use “◄” and “►” buttons to provide coarse value settings (with a high speed of changes);

– use “▼” and “▲” buttons to provide fine settings;

– press “ENTER” to confirm the changes or press “MENU” button to cancel;

– once “Inside” and “Outside” are selected, two fields to set lower and higher range values will appear on the right. Change the settings similarly to “Lower” and “Higher”.

2.3.12 Alarm activated by arrival/anchor to set point

This alarm is activated if the distance between the ship and destination point is lower than the specified values. Alarm activation zone is detected by a circle radius of which is equal to the value specified by the user; the centre is at the destination point, see Figure 29.

Arrival/anchor alarm is activated if the distance between the alarm set point and ship’s current position exceeds the set value. Alarm activation zone is out of the circle,

radius of which is equal to the value specified by the user; the centre is at the alarm set point, see Figure 30.

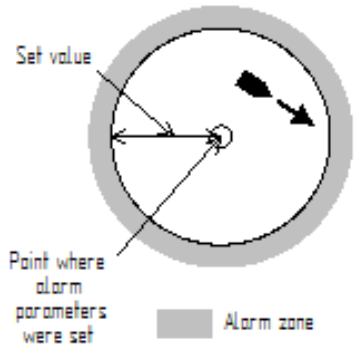

Figure 29 – Alarm of arrival to destination point

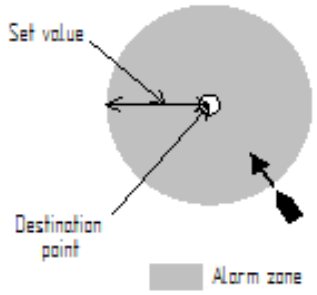

Figure 30 – Alarm of anchor from set point

To provide settings of arrival/anchor alarm follow the instructions:

- press “MENU’ in the main display mode;
- select menu item “Alarm #2” and press “ENTER”;

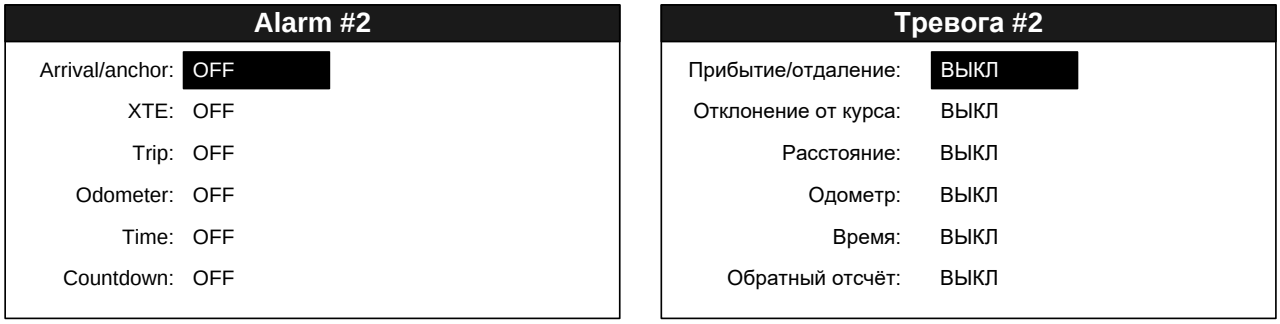

Figure 31 – Settings of arrival/anchor alarm

- select “Arrival/anchor” using “▼” and “▲” buttons, see Figure 31 and then press “ENTER”;

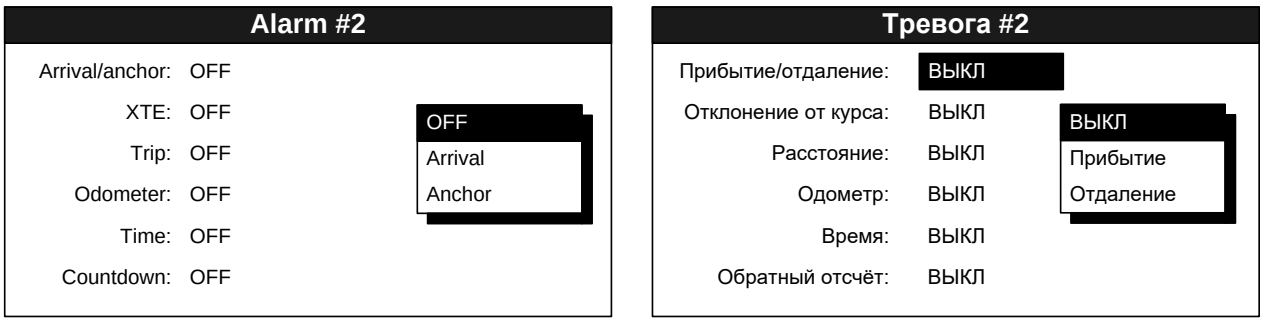

Figure 32 – Selection of alarm type

– select the required alarm type using ▼ and ▲ buttons, see Figure 32 “Off”, “Arrival”, “Anchor” and press “ENTER”;

– set the distance in the field on the right.

2.3.13 Alarm activated by XTE

The alarm is activated if the ship’s cross-track error (course deviation) is more than the specified distance, see Figure 33.

To set the alarm provide the following steps:

– press “MENU” in the main display mode to access the main menu;

– select “Alarm #2” item and press “ENTER”;

– using “▼” and “▲” buttons select “XTE” menu item and press “ENTER’;

– in the drop-down list select “ON” and press “ENTER”;

– set the value of alarm activation in the field on the right .

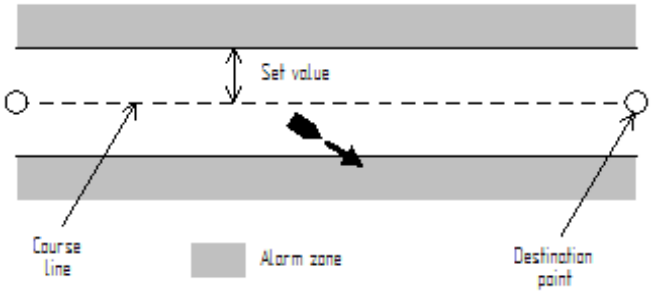

Figure 33 – XTE Alarm (course deviation)

2.3.14 Alarm activated by travelled distance (“Trip” and “Odometer”)

The Product has two alarm types activated by the travelled distance: 1) the alarm based on distance data received from NMEA sources; 2) the alarm based on the travelled distance data calculated by the Product itself. The first type of the alarm is called “Trip”, the second one – “Odometer”.

To set the alarm provide the following steps:

– in the main display mode press “MENU” to access the main menu;

– select “Alarm #2” item and press “ENTER”;

– using “▼” and “▲” buttons select “Trip” or “Odometer” depending on the required alarm type; then press “ENTER”;

– in the drop-down list select “ON” and press “ENTER”;

– set the values for alarm actuation in the field on the right.

2.3.15 Time alarm

The time alarm is activated when the time value received from the NMEA source complies with the one set by the user.

To set the time alarm provide the following steps:

– in the main display mode press “MENU” to access the main menu;

– select “Alarm #2” item and press “ENTER”;

– using “▼” and “▲” buttons select “Time” menu item; then press “ENTER”;

– in the drop-down list select “ON” and press “ENTER”;

– move the cursor on the field (appeared on the right) and press “ENTER”;

– use “◄” and “►” buttons to change the hours, to change the minutes - use “▼” and “▲”. Press “ENTER” after the time is set.

2.3.16 Timer alarm

Timer alarm is activated as soon as the set time period expires (i.e. count down alarm).

To set the timer alarm:

– in the main display mode press “MENU” to access the main menu;

– select “Alarm #2” and press “ENTER”;

– using “▼” and “▲” buttons select “Countdown” menu item; press “ENTER”;

– in the drop-down list select “ON” and press “ENTER”;

– move the cursor on the field (appeared on the right) and press “ENTER”;

– select one of three possible values (5, 10 or 15 min) and press “ENTER”.

2.3.17 Alarm/warning messages

As soon as the alarm is actuated, it starts sound signaling (pre-selected by the user); an alarm message appears at the top of the screen. To mute the sound signaling, press “ENTER’; herewith the visual notification is still working unless the reason of alarm actuation is eliminated.

The user can review current alarm messages in the relevant submenu, see Figure 34.

To review the messages provide the steps as follows:

– in the main display mode press “MENU” to access the main menu;

– select “Messages” and press “ENTER”;

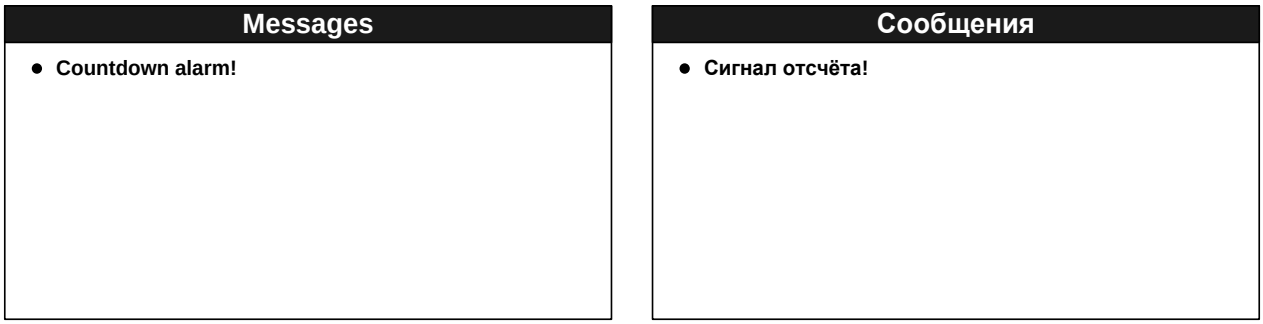

Figure 34 – Alarm messages

– to exit “Messages” window, press “MENU”.

2.3.18 The Product’s data reset

The user can reset timer and odometer data and delete graph’s data, see Figure 35. To reset the abovementioned data, provide the following steps:

– in the main display mode press “MENU” to access the main menu;

– select “Reset” and press “ENTER”;

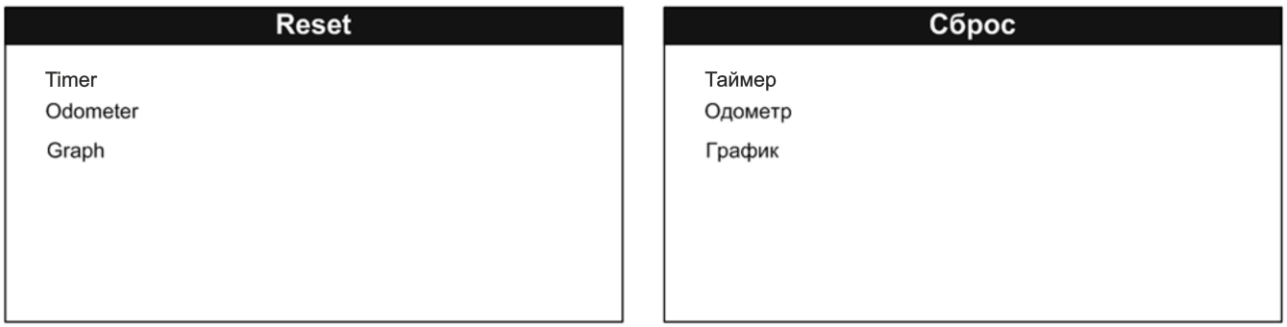

Figure 35 – Select of a parameter to reset

– using “▼” and “▲” buttons select “Timer”, “Odometer” or “Graph” menu item. Press “ENTER”;

To confirm data reset, select “Yes” using “◄” and “►” buttons, then press “ENTER”, see Figure 36.

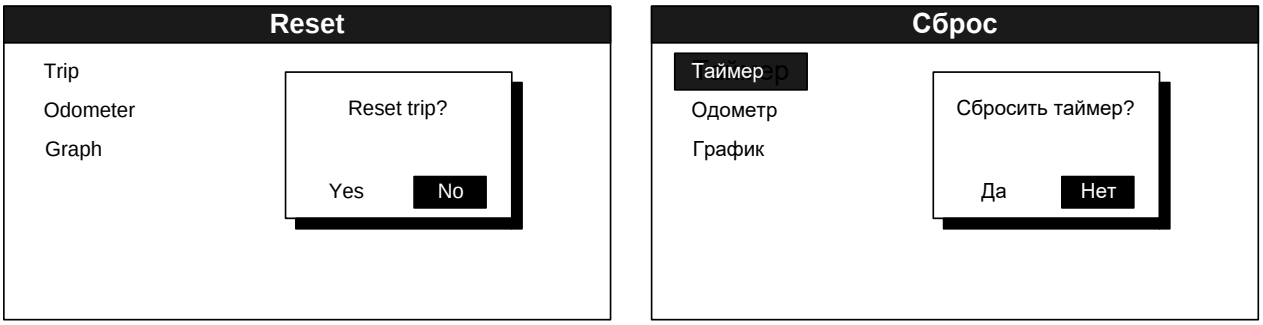

Figure 36 – Confirmation of data reset

Once the user selects “Graph” menu item, additional menu will appear, see Figure 37.

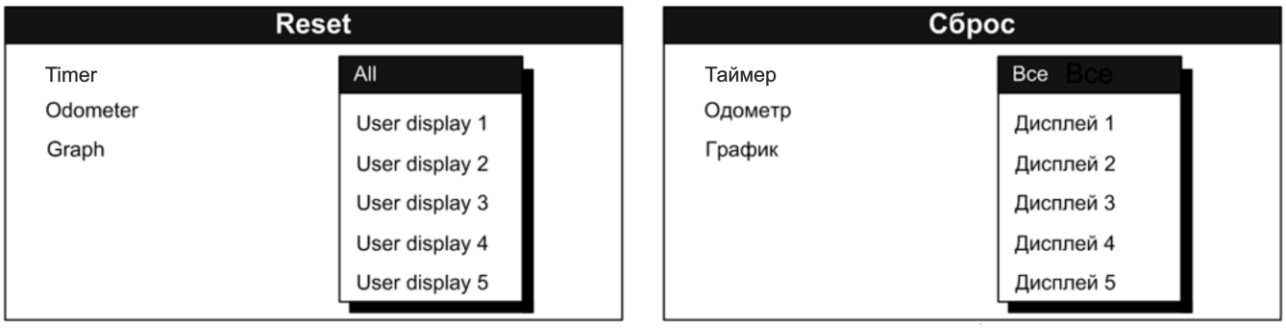

Figure 37 – Select of a display to reset

Using “▼” and “▲” select the required display with a graph or “All” (to reset all displays), and press “ENTER”.

2.3.19 Select of measurement units

The Product displays received data in different measurement values, see Figure 38. To set up convenient measurement values provide the following steps:

- in the main display mode press “MENU” to access the main menu;
- select “Units” and press “ENTER”;

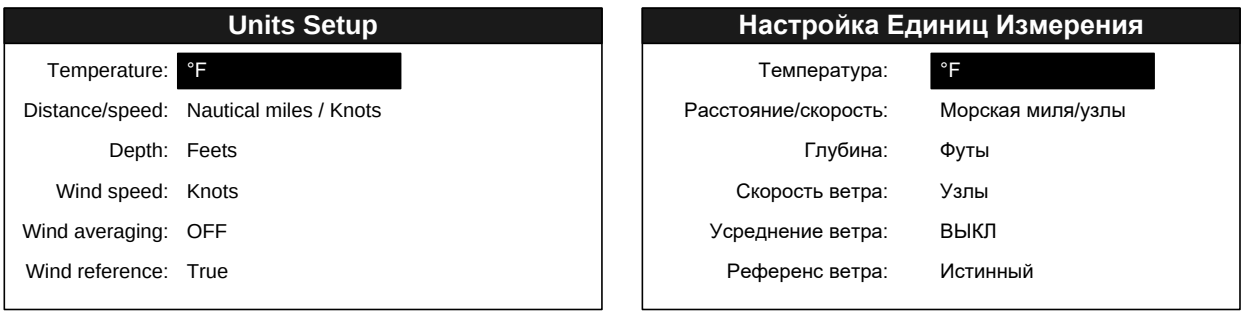

Figure 38 – Select of measurement units

- select a type of data; press “ENTER”;

– one of the represented below drop-down menus will appear depending on the selected data type, see Table 6;

Table 6 – Menu of measurement units

Data type	Menu	
Temperature	°F °C	°F °C
Distance / speed	Nautical miles / Knots Kilometers / Km/h	Морская миля/Узлы Километры / Км/ч
Depth	Feets Fathoms Meters	Футы Морская сажень Метры
Wind speed	Knots Kilometers per hour Meters per second	Узлы Километры в час Метры в секунду
Wind averaging	OFF 1 min 5 min 10 min	ВЫКЛ 1 мин 5 мин 10 мин
Wind reference	True Apparent	Истинный Видимый

– select measurement units and press “ENTER”.

2.3.20 Data correction (offsets)

The Product ensures correction of data received from NMEA signal sources, see Figure 39. Correction variables are reset to zero by default, and the Product displays data without changes.

The following data types can be corrected: time difference, speed through water, speed over ground, temperature, depth, wind speed and direction.

To ensure data correction, provide the following steps:

– in the main display mode press “MENU” to access the main menu;

– select “Offsets” and press “ENTER”;

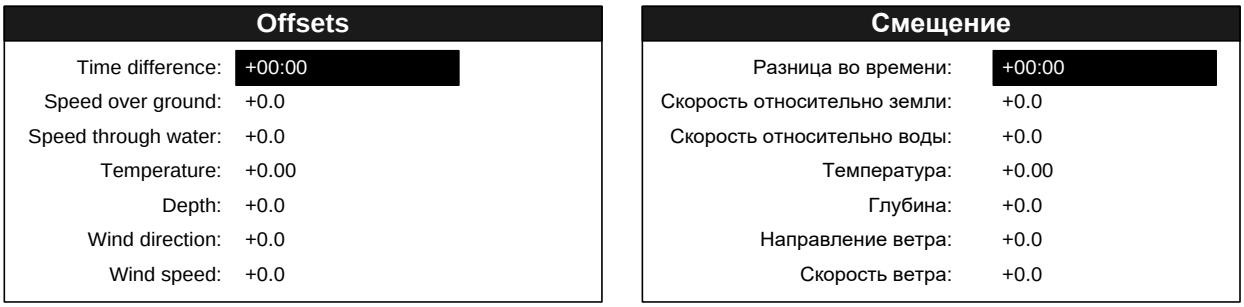

Figure 39 – Data correction

– select data type for correction (offsets) and press “ENTER”.

2.3.21 Change of time display format

The Product can display information both in 24-hour time and 12-hour time. To select the convenient format, act as follows:

– in the main display mode press “MENU” to access the main menu;

– select “System Setup” and press “ENTER”;

– select “Time display” menu item and press “ENTER”, see Figure 40;

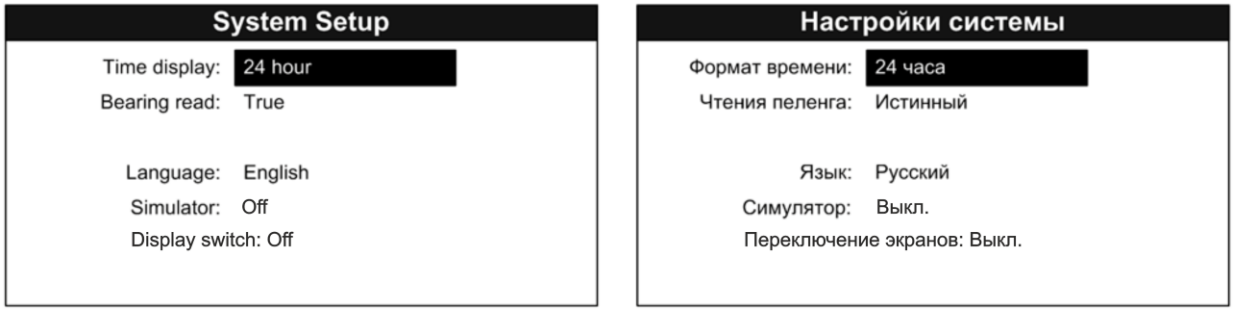

Figure 40 – System setup

– select time format in the drop-down menu (12 hours or 24 hours). Press “ENTER”;

– to return to the main menu, press “MENU”.

2.3.22 Change of screens

To set up automatic change of screens, select “ON”. Interval of screen change is 3 sec.

2.3.23 Select of data input language

The Product ensures data display in English and Russian language. To select a language, act as follows:

- enter “System Setup” menu;
- select “Language” menu and press “ENTER”;
- in the drop-down menu select data display language “English” or “Russian” and press “ENTER”;
- to return to the main menu, press “MENU”.

2.3.24 Simulator mode

Provide convenient settings using special operational mode – simulator. In this mode the Product ignores received data and displays navigational data which are generated by the Product itself.

To switch on simulator mode, act as follows:

- enter “System Setup” menu;
- select “Simulator” and press “ENTER”;
- in the drop-down menu select “ON” and press “ENTER”;
- to return to the main menu, press “MENU”.

Note! – Switch the simulator mode off after the Product’s settings! To switch it off follows all the above mentioned steps, but select “OFF” in the drop-down menu.

2.3.25 Settings of input/output ports

Set up parameters of ports, types of received NMEA sentences and patterns of data input/output in the menu “I/O Setup”.

Caution! The volume of the Product’s input buffer is limited; therefore, it can be overloaded if receiving large sentences which result in data loss. To avoid this, it is highly recommended to connect each NMEA signal source to separate port NMEA.

To set up input/output ports, act as follows:

- press “MENU”;
- select “I/O Setup” and press “ENTER”;
- select a port using “◄” and “►” buttons; select a parameter using “▼” and “▲”. Press “ENTER”, see Figure 41;

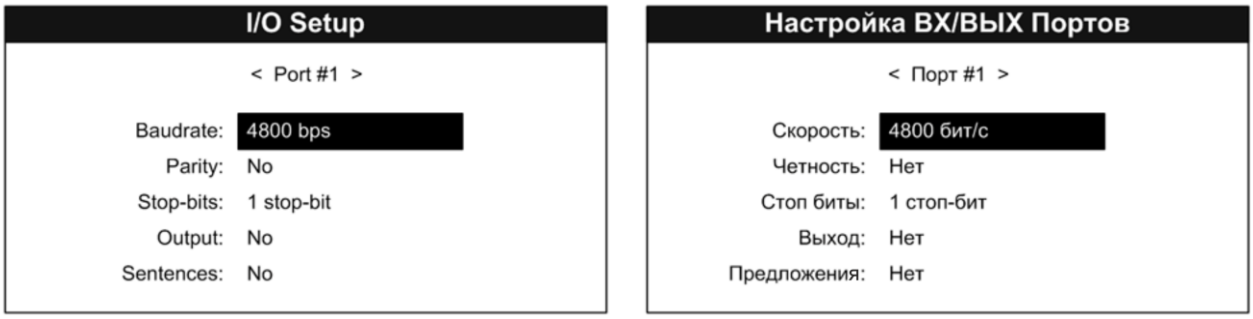

Figure 41 – Settings of input/output ports

– in the drop-down list select a value for parameters “Baudrate”, “Parity”, “Stop-bits” and press “ENTER”, see Table 7.

– “Output” parameter sets up data reception from ports and transmits them through current (selected) port. For example, if current port – #1, parameter “Output” is set on the mode “2+3”, then port #1 will output data received from ports #2 and #3;

– to select a port use “▼” and “▲” buttons in the drop-down menu, to switch on/off data reception from the port, press “ENTER”, see Figure 42.

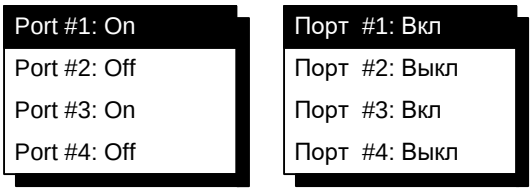

Figure 42 – Data reception from ports

– to exit the drop-down menu, press “MENU”.

Table 7 – Menu of port settings

Parameter	**Value**	
Baudrate	4800 bps 9600 bps 19200 bps 38400 bps 57600 bps	4800 бит/с 9600 бит/с 19200 бит/с 38400 бит/с 57600 бит/с
Parity	No Even Odd	Нет Чет Нечет

Parameter	Value	
Stop bits	1 stop-bit 2 stop-bits	1 стоп-бит 2 стоп-бит
Sentences	APG BWC BWR DBK DBS DBT DPT GGA GLC GTD GNS HDT HDG HDM MDA MTW MWV RMB RMC ROT VBW VDR VHW VTG VLW VWR VWT XTE ZDA XDR	APG BWC BWR DBK DBS DBT DPT GGA GLC GTD GNS HDT HDG HDM MDA MTW MWV RMB RMC ROT VBW VDR VHW VTG VLW VWR VWT XTE ZDA XDR

3 TECHNICAL SERVICE OF THE PRODUCT

3.1 GENERAL DESCRIPTION

TS shall be provided by the staff acquainted with the Product's composition, structure and operation features.

In order to provide safe and reliable operation of the Product, the staff shall maintain a schedule of the TS:

- technical service №1 (TS-1) – semi-annual TS;
- technical service №2 (TS-2) – annual TS.

TS-1 is organized and controlled by a person in charge and carried out by the staff on the running equipment.

TS-2 is organized and controlled by a person in charge and carried out by the staff.

The recommended amount of consumables to provide TS is represented in Table 2.

3.2 SAFETY FEATURES

While carrying out the TS follow the instructions given in 2.1 of this OM.

3.3 MAINTENANCE ROUTINE

The list of works for all types of the TS is given in Table 8. Maintenance routine procedure is given in the CL, represented in Tables 9–12.

Table 8 – The list of TS works

CL №	Work	TS type	
		TS-1	TS-2
1	Visual check of the Product	+	+
2	Operability check	–	+
3	Check of completeness, SPTA kit and operational documents	–	+
Notes 1 "+" – work is obligatory. 2 "–" – work is not obligatory.			

Table 9 – CL № 1. Visual check of the Product

To be done	Routine	Man-hours per 1 Product
Visually examine the Product	1 check completeness and appearance of the Product; mechanical damage, paint defects must be absent; legends are to be read easily; 2 clean all surfaces by clean cloth; 3 remove severe contamination, parts of corrosion, oil spots: – from metal surfaces: by suds, avoiding its penetration inside the device; all surfaces clean dry by clean cloth and dry up; – from LCD: by alcohol soaked cloth; Do not use hard cloth, paper, glass cleaning liquids or chemicals; Do not press hard on the surface while cleaning; Do not spray liquid directly to the surface of the Product. 4 in case of varnish damage clean it with abrasive cloth, then alcohol soaked cloth, cover with varnish and let dry	1 person 5 minutes
Check reliability of cable and bus connection to the unit	Make sure that connectors and attaching screws are fastened tight, provide further fastening if needed	1 person 5 minutes

Table 10 – CL № 2. Check of the Product operability

To be done	Routine	Man-hours per 1 Product
Check the Product's operability	1 supply power to the Product; 2 check that LEDs are glowing on the front panel	1 person 5 minutes

Table 11 – Check list № 3. Completeness and condition of SPTA kit and operational documents

To be done	Routine	Man-hours per 1 Product
Check the completeness and condition of SPTA kit and operational documents	1 check presence of SPTA kit and operational documents are compliant with those listed in section "Completeness"; 2 check every item in SPTA kit and storage time; if the kit has been used, check its completeness; 3 recomplete SPTA kit	1 person 10 minutes

3.4 PRESERVATION

The Product and set of operational documents are stored in preserved condition in Manufacturer's packaging boxes.

The time of represervation – 2 years from the Manufacturer's commissioning.

The Product's preservation is done in full terms, for 2 years, according to the relevant regulatory documents.

The represervation is done in heated rooms in the same order as the preservation.

The represerved Product, SPTA kit and documents are placed in package. The time of storage – 2 years.

4 CURRENT REPAIR OF THE PRODUCT

4.1 GENERAL DESCRIPTION

The Repeater's operability is controlled by the LEDs on the front panel.

To provide diagnostics of the problems and defects, use information in Table 12.

Please contact the Manufacturer's service centre in case of other defects, which are not represented in the above mentioned table.

Within the terms of warranty coverage the opening of package is done with the witness of the manufacturing company representative, who makes the Act of opening.

4.2 SAFETY FEATURES

Any repair works must be provided by personnel examined and received proper qualifications in the area of the occupational safety.

Check the Product's grounding before providing any repair works.

It is PROHIBITED to put a poster "DO NOT switch on! Under Operation!", when power supply switch is in OFF position.

Replacing damaged parts, boards, modules **is PROHIBITED** if power supply of the repaired unit is on

Installation, aligning and repair works are **PROHIBITED** in the room, where less than 2 people are present

4.3 CURRENT REPAIR

The personnel can only eliminate defects which are listed in Table 12.

All other defects shall be carried out only by the Manufacturer's specialists or the Manufacturer's representatives.

The possible reasons of Product's malfunctions and possible solutions are represented in Table 12.

Table 12 – Possible problems/defects and troubleshooting

Problem/defect	Possible reasons	To do
The Product doesn't switch on	Ship power supply is absent	Provide the ship power supply
	Fuse's malfunction	Replace the fuse
	The power cable is not connected	Connect the power cable

5 STORAGE

The Product must be stored in packaging inside areas complying with the required storage conditions (+5 °C to +40 °C) with the concentration of dust, oil, moisture and aggressive impurities in the air within the required limits for the working areas of production facilities.

After storage or transportation of the Product below +10 °C, it must be unpacked only in heated premises and left in normal climate conditions for 12 hours beforehand.

6 TRANSPORTATION

The Product must be transported in the Manufacturer's transportation package in closed means of transport.

Types of shipment:

– motor vehicle and railroad transportation in closed means of transport (covered cars, multipurpose containers);

– air transportation (in sealed and heated compartments);

– sea transportation (in dry service premises).

The Product must be transported in compliance with transportation rules applicable for each means of transport.

During loading/unloading operations and transportation, the requirements indicated on warning labels on the boxes/packaging must be observed, and no impacts are permitted since they can affect the safety and performance of the Product.

Inside the means of transport, the packed device must be firmly secured/fastened.

7 DISPOSAL

New equipment, the parts of the Product damaged during operation, and any overage equipment must not be disposed as standard household wastes, since they contain the materials suitable for re-use.

Decommissioned and non-used components of the Product must be delivered to a special waste disposal center licensed by local authorities. You can also send an overage equipment/unit to the manufacturer for its further disposal.

Proper disposal of the Product components allows avoiding possible negative environmental and health impacts, and it also allows for proper restoration of components with substantial energy and resources savingсов.

During operation and upon completion of its service life, the equipment is not hazardous for health and environment

This unit must be disposed according to the rules applied to electronic devices

	**Any products marked with a crossed trash bin must be disposed separately from standard house-hold wastes**

8 WARRANTY

The Manufacturer shall have warranty obligation in case of the Product's proper use, according to OM. In case of misuse of equipment the Manufacturer shall not accept damage claims.

For more warranty details visit our website www.unicont.com, section Support.

Address and contacts of Manufacturer's service centre:

NPK MSA LLC

26E, Kibalchicha Str., St Petersburg, Russia, 192174

Tel.: + 7 (812) 602-02-64, 8-800-100-67-19; fax: +7 (812) 362-76-36

e-mail: service@unicont.com