

DIGITAL TALK-BACK SYSTEM ICB-131

Operating manual

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INTRODUCTION

This operating manual (hereinafter referred to as OM) is intended to describe DIGITAL TALK-BACK SYSTEM ICB-131 (hereinafter - the System).

OM describes the structure, operating principles, operating rules and specifications of the System components (hereinafter – the SC).

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

Only those who have read and understood this document and those who have had special training shall be permitted to operate with the System according to the applicable regulations.

TERMS AND ABBREVIATIONS

ATX	Automatic telephone exchange
UU	User unit
LS	Loudspeaker communication
SPTA	Spare parts, tools and accessories
CPAS	Command public address system
LFGS	Large fine porous granulated silica gel
VDR	Video data recorder
RMRS	Russian Maritime Register of Shipping
RRR	Russian River Register
OM	Operating manual
LED	Light-emitting diode (indicator)
SC	System components
TS	Technical service
CU	Central unit of the System
CCC	Central control console

TERMS USED IN THE OM

User unit – is a SC that supplies a call signal to the System users, accepts an incoming call and ensures communication with the System users. The user units include:

- substation panels;
- talk-back stations.

Initiator – is a user unit that attempts to connect a called user to the applied communication mode.

User – is a UU that an Initiator is connected to or attempts to be connected to.

Peripheral equipment – additional SC that enable to expand the System functionalities. The peripheral equipment includes:

- Circuit switching, connecting, distribution and switching devices;
- Amplifier;
- External commination devices (microphones, headsets);
- Loudspeakers;
- Alarm units.

1 DESCRIPTION AND OPERATION OF THE SYSTEM

1.1 DESCRIPTION

The System is designed to ensure talk-back communication between a wheelhouse and different ship rooms and premises.

The System may be used on sea and river-going vessels, as well as have an industrial application.

1.2 TECHNICAL SPECIFICATIONS

Main parameters and technical specifications of the System are shown in Table 1.

Table 1 – Technical specifications

Parameter	Value	
Operating specifications		
Max. number of channels (to connect substation panels and talk-back stations)	36	
Communication network (with system users)	ISDN two-wire line (digital)	
Communication type	Duplex, half-duplex, simplex	
External systems connection	– external CPAS (as operator) – external ATX (as user) – transmission of communication to VDR	
Bandwidth, Hz	100 ... 11000	
Electrical specifications		
Power supply voltage	24 V (18 ... 36 V) DC 220 V, 50(60) Hz (180...264 V) – at option, using power supply unit approved by RMRS and (or) RRR	
Power consumption	Defined by total power consumed by SC included in the scope of delivery.	
Operational specifications		
IP rating	IP22; IP44	IP56
Operating temperature	– 15°C ... + 55°C	– 40°C ... + 55°C
Note – the values in parenthesis are max. deviations from specified power supply values.		

Data on design characteristics, power consumption, full list of SC, operation conditions and other parameters are represented in Technical description.

1.3 SYSTEM COMPONENTS

Type and number of delivered SC depends on the System purpose.

The list of SC groups is represented in Table 2.

Table 2 – the list of SC groups

Name Code	Description
Central unit	
Central unit CU-0131	Ensures switching among the connected users, subsequent establishing of communication channels to conduct talk-back communication.
Substation panels	
Substation panel SP-18	Ensures a call and talk-back communication with other system users; max. 18 users.
Substation panel SP-18W	Ensures a call and talk-back communication with other system users; max. 18 users, waterproof.
Substation panel SP-36	Ensures a call and talk-back communication with other system users; max. 36 users.
Substation panel SP-36W	Ensures a call and talk-back communication with other system users; max. 36 users, waterproof.
Talk-back stations	
Talk-back station S1	Built-in microphone and speaker; ensures a call and talk-back communication with one system user.
Talk-back station S1W	Built-in microphone and speaker; ensures a call and talk-back communication with one system user, waterproof.
Talk-back stations S1-5 (S1-3)	Built-in microphone, speaker and 5 (3) call buttons; ensures a call and talk-back communication with other system users, max. 5 (3) users.
Talk-back station S2	Built-in speaker and connector for external microphone; ensures a call and talk-back communication with one system user.
Talk-back station S2-5 (S2-3)	Built-in speaker, connector for external microphone and 5 (3) call buttons; ensures a call and talk-back communication with other system users, max. 5 (3) users.
Talk-back station S3	Connector for headset, microphone or intercom helmet; external loudspeaker may be connected; ensures a call and talk-back communication with one system user; for humid and noisy premises.
Talk-back station S4	External loudspeaker to ensure talk-back communication with one user (in half-duplex mode) may be connected; for humid and noisy premises, as well as for open deck.
Talk-back station S4P	Portable; ensures communication with one system user (in half-duplex mode) using built-in speaker; equipped with a cable 10.0 m with a connector for socket CBP1.

Name Code	Description	
Bridge wing substation SW-1	Ensures talk-back communication with system users located in the bridge wing (remotely from substation panel); remote station has a connection to substation panel; waterproof.	
Circuit switching, connecting, distribution, switching SC		
Socket HS-CB	Designed for quick connection (using quick connector type) of headsets or microphones to UU, waterproof.	
Socket CBP1	Designed for quick connection (using quick connector type) of portable substation S4P to user system, waterproof.	
Socket SM-1	Designed for quick connection (using quick connector type) of microphone to main panels.	
Socket SM-2		
Socket SM-3	Designed for quick connection (using quick connector type) of microphones, headsets and intercom helmets to substation panels.	
Signal converter ST2	Designed to connect loudspeaker and public address systems (produced by «NPK MSA» LLC) to external analog ATX.	
Junction box KP-124PW	Splits input lines to 7 ways, waterproof.	
Junction box KP-124PW-4	Splits input lines to 3 ways, waterproof.	
Relay unit RB-139G-24	Switching voltage 24 V	Controls alarm units by signals received from UUs; ensures switching of external power supply to connected alarm devices, waterproof.
Relay unit RB-139G-220	Switching voltage 220 V, 50(60) Hz	
Matching transformer T-140B	Converts sound signal with amplitude 12, 24 and 48 V into sound signal with amplitude 100 V; wide range of frequency bandwidth 50...15000 Hz, waterproof.	
Cord CE	Extends standard cable of microphones, headsets, intercom helmets.	
Foot switch FB1	Controls a microphone of communication device (on / off switch) if manual control is not available; delivered with a standard cable 2 m to connect to substation panel.	
The System amplifiers		
Amplifier TPA-15	The power of audio signal received on the input from external microphone and user line is amplified and then reproduced through a connected loudspeaker; a sound recording device may be connected to user line (at option).	
External communication devices		
Microphone M1	To be connected to substation panels and talk-back stations as a communication device; gooseneck.	
Microphone M2	To be connected to substation panels and talk-back stations as a communication device; equipped with PTT switch and cable 1.5 m.	

Name Code	Description
Microphone M3-W	To be connected to substation panels and talk-back stations as a communication device; equipped with PTT switch and cable 3.0 or 10.0 m, waterproof.
Headset HS-4	To be connected to talk-back stations; ensures talk-back communication in premises with increased noise level; delivered with cable 3.0 m and PTT switch. Includes two headphones and microphone.
Headset HS-6	To be connected to talk-back stations; ensures talk-back communication in premises with increased noise level; delivered with cable 3.0 m and PTT switch. Includes one headphone and microphone.
Intercom helmet TH-4M	Ensures talk-back communication in premises with increased noise level; covers all head. Includes two headphones and microphone; delivered with cable 3.0 m and PTT switch.
Intercom helmet TH-4L	Ensures talk-back communication in premises with increased noise level; covers all head. Includes two headphones and throat microphone; delivered with cable 3.0 m and PTT switch.
Loudspeakers	
Loudspeaker LS-1	Ensures broadcasting and different acoustic signaling. Transmission line voltage 30 V and 100 V, power 6 W, ceiling-mounted.
Loudspeaker LS-2	Ensures broadcasting and different acoustic signaling. Transmission line voltage 30 V and 100 V, power 6 W, wall-mounted.
Loudspeaker LS-3	Ensures broadcasting and different acoustic signaling on open deck. Transmission line voltage 30 V and 100 V, max. power 15 W, horn type on a bracket, waterproof.
Loudspeaker LS-5	Ensures entertainment broadcasting, voice communication and acoustic signals transmission in crew cabins and corridors. Transmission line voltage 30 V and 100 V, max. power 6 W. Wooden casing, delivered with brackets for wall mounting.
Loudspeaker LS-6	Ensures entertainment broadcasting, voice communication and acoustic signals transmission. Transmission line voltage 30 V and 100 V, max. power 6 W. Aluminum casing, increased wear resistance, waterproof, wall-mounted.
Loudspeaker LS-7	Ensures broadcasting and different acoustic signaling inside the premises and on open deck. Transmission line voltage 30 V and 100 V, power 8 W, horn-type, compact, waterproof.
Loudspeaker LS-8	Ensures broadcasting and different acoustic signaling on open deck. Transmission line voltage 30 V and 100 V, max. power 25 W, horn-type on a bracket metal, waterproof.
Loudspeaker LS-12	Ensures broadcasting and different acoustic signaling inside the premises and on open deck. Transmission line voltage 100 V, max. power 6 W. Aluminum casing (in a shape of searchlight) with a bracket for wall mounting, waterproof.

Name Code	Description	
Loudspeaker LS-13	Ensures broadcasting and different acoustic signaling inside the premises and on open deck. Transmission line voltage 30 V and 100 V, max. power 10 W. Made of solid all-weather plastic (in a shape of searchlight), adjustable (two planes) bracket for wall or ceiling mounting, waterproof.	
Loudspeaker DSP (Ex)	Ensures broadcasting and different acoustic signaling inside explosion hazard premises. Transmission line voltage 100 V, max. power 25 W. Made of all-weather explosion proof plastic (in a shape of megaphone), bracket for wall-mounting, waterproof.	
Loudspeaker GVR-Prometey	Ensures broadcasting and different acoustic signaling inside explosion hazard premises. Transmission line voltage 100 V, max. power 30 W. Made of aluminum alloy (in a shape of megaphone), bracket for wall-mounting, waterproof.	
Signal units		
Howler HW1-24	Power supply voltage 24 V	Ensures loud warning, alarm or call signaling; wall-mounted; waterproof.
Howler HW1-220	Power supply voltage 220 V, 50(60) Hz	
Buzzer-howler BH1-24	Power supply voltage 24 V	Ensures loud warning, alarm or call signaling; wall-mounted; waterproof.
Buzzer-howler BH1-220	Power supply voltage 220 V, 50(60) Hz	
Sound signaling unit A-24	Power supply voltage 24 V	Ensures loud sound signaling on open deck and in noisy premises, waterproof.
Sound signaling unit A-220	Power supply voltage 220 V, 50(60) Hz	
Sound and light signaling unit AL-24	Power supply voltage 24 V	Ensures light and loud sound signaling on open deck and in noisy premises, waterproof.
Sound and light signaling unit AL-220	Power supply voltage 220 V, 50(60) Hz	
Light signaling unit L-24	Power supply voltage 24 V	Ensures light signaling on open deck and in noisy premises, impulse, waterproof.
Light signaling unit L-220	Power supply voltage 220 V, 50(60) Hz	
Rotating lamp RL-24	Power supply voltage 24 V	Ensures light signaling on open deck and in noisy premises, rotating, waterproof.
Rotating lamp RL-220	Power supply voltage 220 V, 50(60) Hz	
Flashing lamp FL-24	Power supply voltage 24 V	Ensures light signaling on open deck and in noisy premises, impulse, waterproof.

Name Code	Description	
Rotating flashing lamp RFL-24	Power supply voltage 24 V	Ensures light alarm signaling on open deck and in noisy premises.
Rotating flashing lamp RFL-220	Power supply voltage 220 V, 50(60) Hz	
Flashing lamp PGS-VSPYSHKA-24	Power supply voltage 24 V	Ensures light alarm signaling in explosion hazardous premises.
Flashing lamp PGS-VSPYSHKA-220	Power supply voltage 220 V, 50(60) Hz	
Light signaling unit ORBITA MK S	Power supply voltage 24 V	Ensures light alarm signaling in explosion hazardous premises.
Sound signaling unit ORBITA MK Z	Power supply voltage 24 V	Ensures loud sound alarm signaling in explosion hazardous premises.
Sound and light signaling unit ORBITA MK SZ	Power supply voltage 24 V	Ensures loud sound and light alarm signaling in explosion hazardous premises.
Sound signaling unit BExS110E24DC	Power supply voltage 24 V	Ensures loud sound alarm signaling in explosion hazardous premises.
Sound signaling unit BExS110E230AC	Power supply voltage 220 V, 50(60) Hz	
Wall mounted metal enclosures		
Wall mounted metal enclosure BO	Designed to house UUs and peripheral equipment in premises with increased humidity and on open deck; access door with a lock, waterproof.	

More information on SC characteristics is represented in Technical description.

1.4 DESCRIPTION AND OPERATION OF THE SYSTEM

1.4.1 General description

The System operation is based on dispatching communication system principle and includes the central unit, UUs and peripheral equipment. The System's structural diagram is shown in Figure 1.

Electric power supply is 24 V DC. Power supply 220 V AC, 50(60) Hz is allowed using external power supply unit approved by RMRS and (or) RRR.

The System includes the Central unit CU-0131 and connected UUs: substation panels, talk-back stations and amplifier.

The System's substation panels are dispatching communication stations that ensure voice communication with the System users.

The System's talk-back stations are user communication stations that ensure talk-back public address communication with pre-defined UUs. Depending on the type of talk-back station, communication may be established with 1 to 5 UUs.

Note – UUs assignment is carried out using software, for more details see Settings instruction.

The number of substation panels and talk-back stations connected to the CU is limited only by communication channels.

Substation panels and talk-back stations are connected to the CU using two-wire communication line.

Different peripheral equipment (microphones, loudspeakers, alarm units, etc.) may be connected to substation panels and talk-back stations to ensure operation in normal conditions and in conditions of increased noise and humidity level. For the description of operation conditions see relevant regulatory documents.

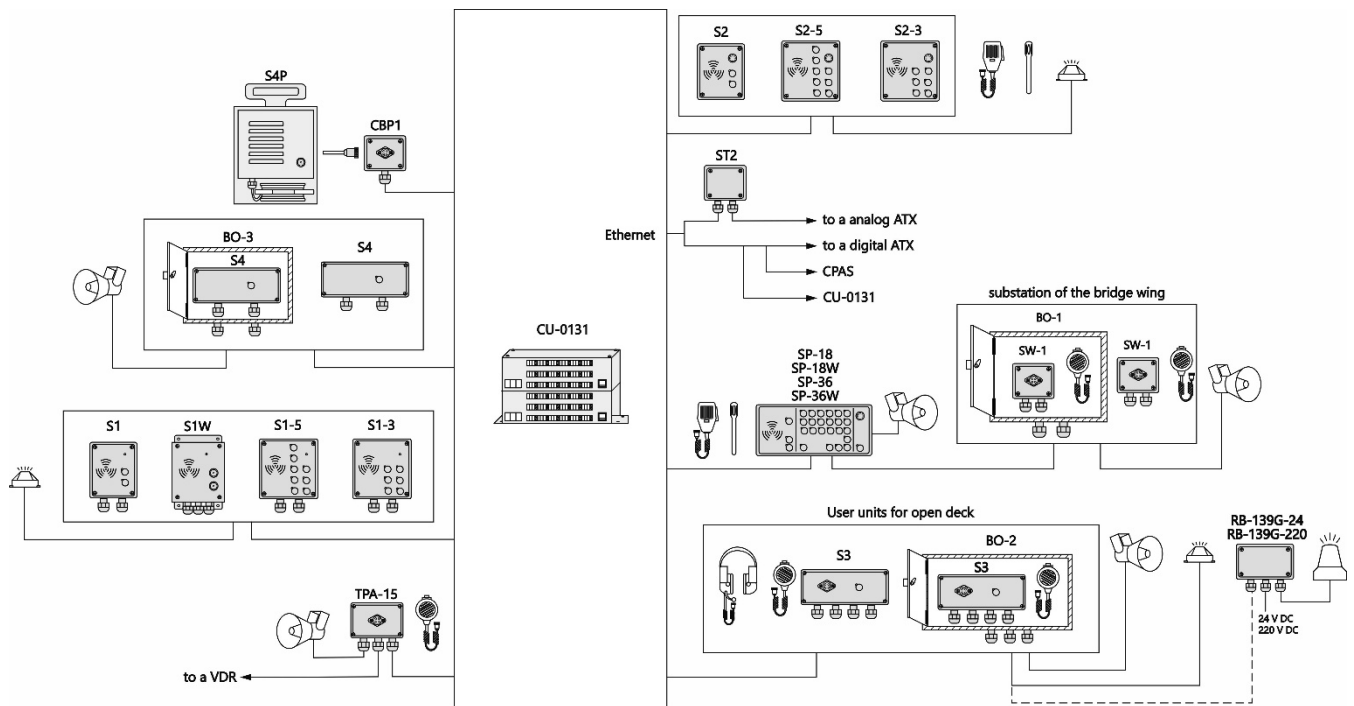


Figure 1 – The System's structural diagram

Note – The System may consist of several CUs interconnected via Ethernet network (for the description of System composition based on several CUs 1.4.3c); sample connection is shown in Figure 4.

1.4.2 External systems connections

On special request, CU (at option) may be equipped with additional ports to connect to the following external systems:

- command public address unit;
- automatic telephone exchange;
- VDR (using TPA-15).

For the description of System operation with the connected systems see 3.3.4.

1.4.3 Communication networking types

Depending on the inner configuration, the System may have the following networking types:

a) **Pair communication** – to organize direct communication (w/o CU) of two UUs interconnected according to «point-point» pattern (see Figure 2). This type is supported by S1, S1W, S2, S3.

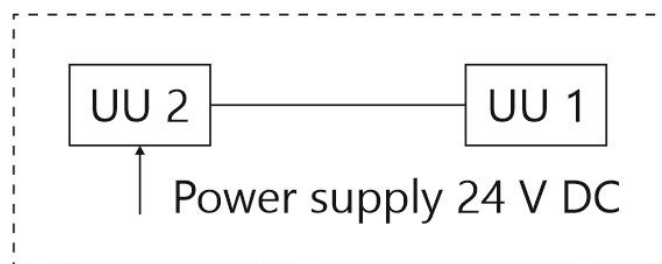


Figure 2 – Pair communication example of two UUs

UUs are powered from power source connected to one of the UUs. For settings mode of pair communication see 3.4;

b) **Multichannel communication based on one CU** – to organize communication among a group of users united in a single network. Communication is carried out using the CU (see Figure 3).

This type is recommended to ensure communication among ship's responsible stations.

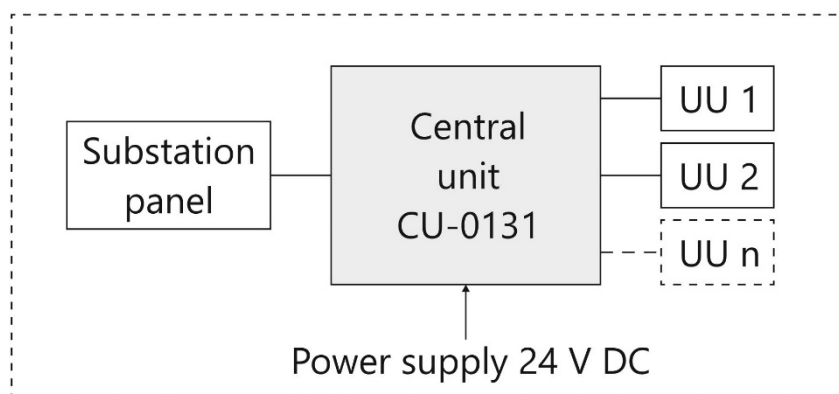


Figure 3 – Example of multichannel communication based on one CU

Note – UUs are powered from the CU; the number of connected UUs is limited by the number of communication channels;

c) **Multichannel communication based on several CUs connected via Ethernet** – to organize communication and unite two or more systems (different CUs) in a single one. Users are connected through the CU using Ethernet-connection (see Figure 4), forming shared user address space.

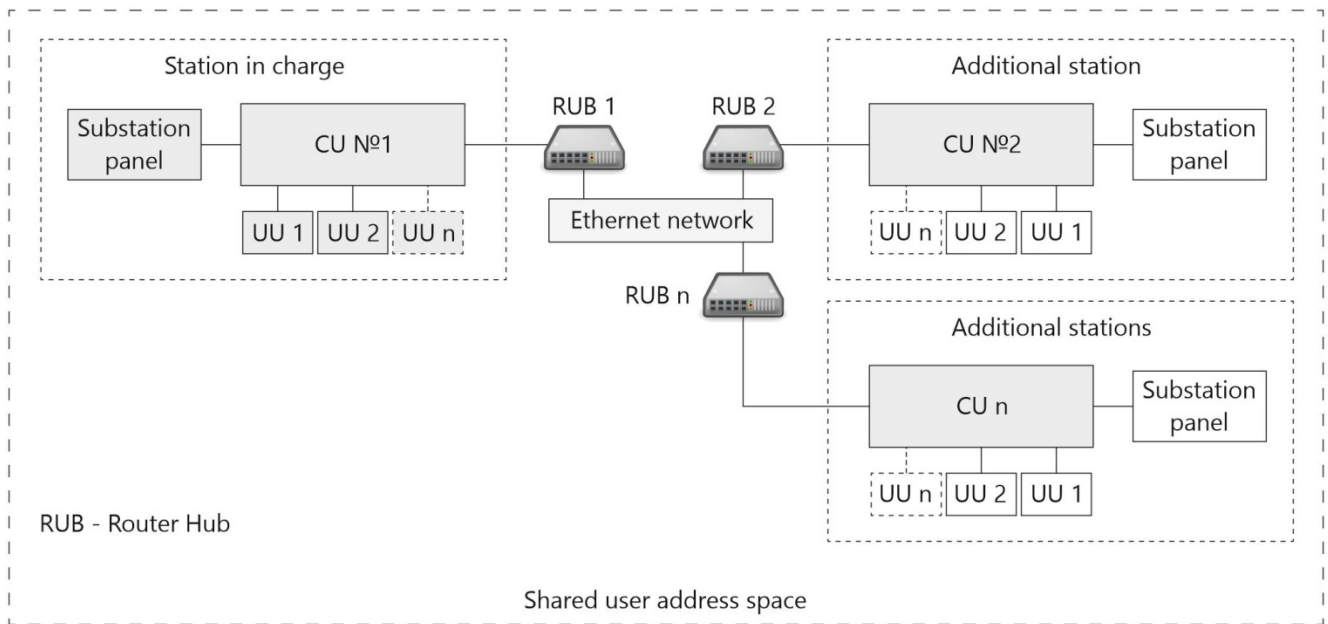


Figure 4 – Example of multichannel communication based on several CU connected via Ethernet

Notes

- 1 Each of the united systems is powered independently from its own CU.
- 2 Length of communication channel among united systems shall not exceed 100 m.
- 3 CU shall mandatory have address to create shared address space (for more details see Settings instruction).

1.4.4 System operation modes and their priorities

The System ensures loudspeaker communication in the following modes:

a) pair communication mode – two-way exchange of voice communication between two users.

Note – additional users may be added to communication in this mode. In this case, pair communication mode automatically transfers to selective conference call – only for substation panels and S1-3, S1-5, S2-3, S2-5;

b) general list mode – initiator transmits commands to all UUs of loudspeaker communication.

Note – This mode may be initiated only from substation panels;

c) selective conference call mode – simultaneous exchange of voice communication among several pre-defined users (for substation panels and S1-3, S1-5, S2-3, S2-5). This mode ensures:

- light indication of the selected mode on the initiator's station;

– the hierarchy of System priorities.

All substations and stations of LS ensure local (built-in) light and sound alarm signaling of incoming call (except talk-back stations S3 and S4), as well as connection of external signaling devices to repeat incoming call signaling (except talk-back stations S4 and S-4P).

Note – Alarm units are connected to substations S1, S1W and S2 using relay unit RB-139G-24 or RB-139G-220.

All substation panels, and talk-back stations S2, S3, S2-3, S2-5 have standard connector for external communication devices.

The System is operating all year round.

Damage or disconnection of one of the UUs does not interrupt operation of other SCs.

The System ensures standard order of priorities by communication modes and connection with external systems according to Table 3.

Table 3 – Communication modes priorities

Priority	Communication mode
1	General list (LS)
2	Selective conference call (including pair communication and transmission lines communication)
3	ATX (external telephony)

Note – Priority «1» has the highest priority level, priority «3» – the lowest.

The System also includes hierarchy of UUs priorities within the range «0»... «255», where «0» – no priority, «1» – the lowest priority, «255» – the highest.

Note – UUs priorities are set using special software, for more details see Settings instruction.

1.5 MEASUREMENT TOOLS, INSTRUMENTS AND APPLIANCE FOR TS

Technical service of the System is carried out using tools and consumables represented in Tables 4 and 5.

Table 4 – Tools and appliances for the TS

Name	Identifier
Strengthened screwdriver (cross)	PH-2, 100 mm
Screwdriver (cross)	PH-1, 80 mm
Open end wrench	7 mm

Table 5 – Amount of consumables required for the TS of one SC

Name and identifier of consumables	Amount of consumables	Note
Cleaning cloth	0.10 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	0.01 l	To soak cloth while removing contamination
Varnish	0.005 kg	To cover surfaces of the unit in case of paint coating damage
Abrasive cloth	0.06 x 0.06 m	To polish surfaces of the unit in case of paint coating damage

1.6 MARKING AND SEALING

The System's nameplate has information about the System's name, serial number, Manufacturer's details. The nameplate is located on the CU casing CU-0131.

The SC also have nameplates, indicating as a rule serial number, weight, IP rating, input voltage and power consumption. The nameplates are located on the SC casings.

Sealing of SC is not provided.

1.7 PACKAGING

To ensure transportation and storage at warehouse SC and SPTA kit may be delivered in the following packaging:

- corrugated board boxes according to the relevant regulatory documents;
- wooden boxes according to the relevant regulatory documents;
- SPTA kit on additional request may be delivered in metal boxes according to the relevant industry regulatory documents.

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

Packaging sealing is not provided.

2 DESCRIPTION AND OPERATION OF THE SYSTEM COMPONENTS

2.1 RECOMMENDATIONS ON SELECT AND INSTALLATION OF THE SC

2.1.1 Recommendations on select of the SC

The System consists of the SC listed in Table 2. For more details see Technical description.

Depending on the place of installation, the SC may have different types with IP22, IP44, IP56; types of mounting are shown in 2.1.2.

While selecting the SC consider the following:

a) select UUs (see 1.3) and set of peripheral equipment connected to them (select relevant operation and climate type), for more details see Technical description.

b) in general case:

- select required number of CUs considering communication networking type (1.4.3);
- select type of every CU considering required number of UUs;
- consider if you need to control broadcasting zones (2.2.1.1) and specify this information at order.

ATTENTION!

Only one CU shall be used to ensure communication between wheelhouse and responsible stations according to RMRS and RRR requirements. Additional CUs may be installed in the rooms not regulated by the requirements.

Note – If several CUs are used, provide additional settings to ensure their proper operation together, see 3.4.

Consider constraints specified in 1.4.2 in case of the System connection with external systems.

2.1.2 SC installation

Install SC according to overall and connection dimensions represented in Technical description.

Select a place for SC installation considering operation constraints (limiting temperature and protection rating – IP), represented in Technical description.

Depending on the type, SC have the following types of mounting:

- panel (into cutout);
- desk top (on a bracket);
- hinged (wall).

If SC are installed on open deck, it is recommended to use metal cabinets BO-1, BO-2, BO-3, BO-4.

ATTENTION!

Install loudspeakers on minimum distance of 3 m from microphones of communication devices in order to avoid self-excitation effect.

2.1.3 Recommendations on power source

To power the System, provide power source with relevant power and voltage, specified in Table 1.

The System's power source is selected considering total power consumption of all the SC including the CU. Information on SC power consumption is represented in Technical description.

Note – The System composition does not include main / standby power switching units. To provide this requirement, use additional devices approved by RMRS and RRR.

If required power is 220 V AC 50(60) Hz, use additional power supply unit approved by RMRS and RRR.

The UUS are powered directly from the CU.

Note – CU ensures data exchange and power supply to UUs via two-core shielded cable (two-wire communication line).

Light and sound signaling units require connection of additional external power supply 220 V 50(60) Hz AC or 24 V DC, depending on the type.

To ensure operation of alarm units, use power supply unit that powers the system or another power supply unit located at the installation place.

Note – Connection of alarm units to power supply unit (not SC) shall be approved by RMRS and RRR.

Once all SC are connected, provide the System settings according to 3.4.

2.2 DESCRIPTION AND OPERATION OF SC

2.2.1 Central unit

CU acts as a circuit switching device that ensures switching of all connected UUs and consequent organization of talk-back communication channels.

CU configuration is defined by particular area of use; the settings are defined by the number of user lines and a capability to connect to external systems.

2.2.1.1 CU types

CU type is selected due to required number of connected UUs within the System. The possible number of connected UUs: 6, 12, 18, 24, 30 or 36.

If the System ICB-131 is connected to other systems produced by «NPK MSA», LLC, the CU may be additionally equipped with external control board (position 7 in Figure 5), that controls public address zones.

After the select, form a code according to Technical description and specify it at order. If external control board is required, specify this information at order additionally.

2.2.1.2 Description of ports, controls and LEDs

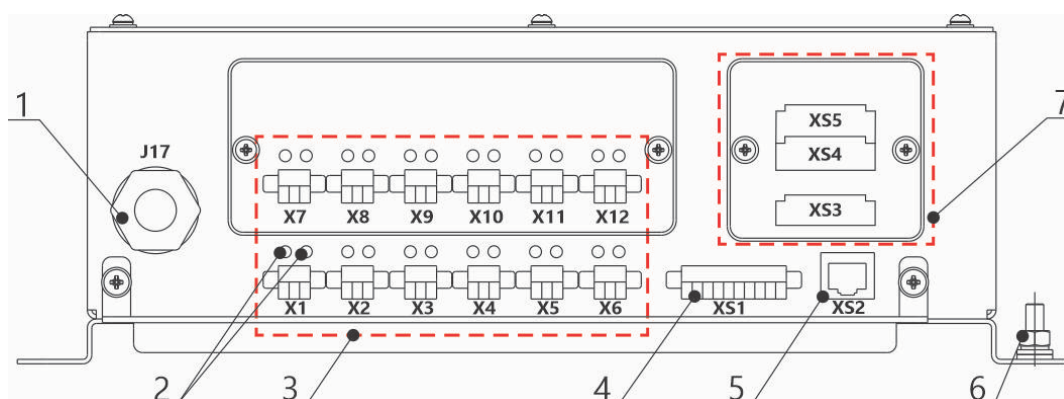



Figure 5 – Ports and LEDs layout of CU

Table 6 – Description of ports and LEDs of CU

Pos.	Name	Identifier	Function
1	Cable gland	J17	To connect power supply to CU
2	A pair of LEDs	—	To indicate integrity of user line
3	Ports to connect users	X1...X12	To connect substation panels and talk-back stations
4	Dry contacts outputs	XS1	To control external devices
5	«Ethernet» port	XS2	To connect Ethernet network, other CUs or ATX

Pos.	Name	Identifier	Function
6	«Grounding»		CU grounding stud
7	Ports of external control board	XS3	To connect line sound signal
		XS4, XS5	Dry contacts outputs to control public address zones using microphone panel CP-3 or combined control panel MS-18 (not included in the System composition)
Notes			
1 Each port from X1 to X12 corresponds to a pair of LEDs that indicate: data transmission (the right one) and power (the left one).			
2 Figure 5 shows position 3 conditionally. Ports numbering is carried out from left to right and from bottom to top not depending on CU type.			
3 Connector J17 is shown conditionally, it is located under the CU cover. Power cable is led into the CU through a cable gland and connected to the connector.			
4 External control board is delivered at option (not included in CU standard configuration).			

2.2.2 Substation panels

Substation panels SP-18, SP-18W, SP-36, SP-36W (for 6, 12, 18, 24, 30 and 36 lines of pair communication) are dispatching stations that ensure voice communication transmission among other System users. They are used in the wheel house, at central control console and other command stations.

The System includes one or several substation panels; having provided particular settings, one station may be assigned as the priority one and have the highest priority over other substation panels and UUs.

Types of substation panel mainly differ in the number of communication lines and IP rating; other characteristics are identical.

Substation panels operate in the following modes:

- a) Communication with the System users in pair and conference communication modes (see 3.3.1.1);
- b) Transmission of voice communication to all System users according to the general list mode (see 3.3.1.2).

One or two wing substations SW-1 may be connected to substation panel. If two wing substations are connected, and the relevant function is enabled, the stations will operate in parallel (see 3.3.1.3). However, when voice communication from two connected stations is transmitted simultaneously, they may overlay one on another leading to harder perception of transmitted messages by a user (users).





The diagram shows the SP-18 telephone control panel with the following components labeled by callout numbers:











- 1**: Speaker grille (top left)
- 2**: State indicator (top center)
- 3**: Subscribers indicator (top center)
- 4**: Subscriber 10 button (top center)
- 5**: END button (top right)
- 6**: MIC button (top right)
- 7**: MIC button (bottom right)
- 8**: MIC button (bottom right)
- 9**: BW button (bottom right)
- 10**: CALL button (bottom right)
- 11**: HOLD button (bottom right)
- 12**: PABX button (bottom right)
- 13**: CONF button (bottom right)
- 14**: LIST button (bottom right)
- 15**: Speaker grille (bottom left)
- 16**: Speaker grille (bottom left)

Figure 6 – Substation panel SP-18

Table 7 – Controls and LEDs of substation panel

Pos.	Name	Identifier	Description
1	Speaker	–	To ensure sound signal of incoming and outgoing call, voice communication reproduction.
2	Group of LEDs «State»	«Ready»	<i>Constant glowing</i> – power supply voltage is available and station is ready for operation. <i>No glowing</i> – no power supply voltage.
		«Fault»	<i>Constant glowing</i> – no connection with CU. <i>Flashing</i> in mode see Table 8, position 1 – CU lost connection with one or several UUs; Flashing of one or several LEDs correspond to the stations which lost connection to CU.

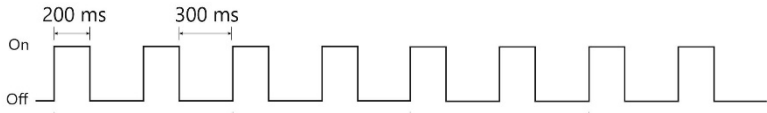
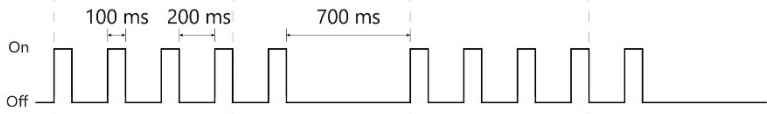
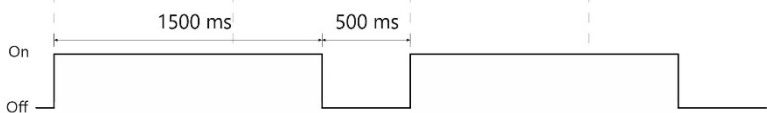
Pos.	Name	Identifier	Description
3	Group of buttons «1» ... «18» with LEDs	«1» ... «18»	<p>To select a UU to call (in LS mode) or to dial a number «0» ... «9» (in ATX mode).</p> <p>Functions of buttons in LS mode:</p> <ul style="list-style-type: none"> – press a button in operation mode – to call; – press the button second time during outgoing call – to stop outgoing call; – press the button in communication mode – terminate the connection; – press during incoming call – to accept a call. <p>Description of button LED operation mode:</p> <p><i>No glowing</i> – UU is not assigned to the relevant user line, or no connection with UU.</p> <p><i>Constant glowing</i> – connection with UU assigned to the relevant user line is established.</p> <p><i>Flashing</i> in mode see Table 8, position 1 – no connection with UU assigned to the relevant user line.</p> <p><i>Flashing</i> in mode see Table 8, position 2 – incoming call from UU assigned to the relevant user line.</p> <p><i>Flashing</i> in mode see Table 8, position 3 – outgoing call to UU assigned to the relevant user line.</p>
4	Button «*» with LED		To switch substation panel from tone mode to pulse mode and vice versa (in ATX mode).
5	Button «#» with LED		To enter service commands (in ATX mode).
6	Connector	–	To connect external communication device.
7	Button «END» with LED		<p>Press this button during connection with one or more UUs to stop communication with all active UUs.</p> <p>Press to reject incoming call.</p> <p>Once the connection is established with one or more UUs, and incoming call: press this button to stop communication with all active UUs. The incoming call is unanswered.</p> <p>Hold down at least 1.5 s to stop all established connections and reject incoming calls.</p>
8	Button «MIC» with LED		<p>To switch on a microphone.</p> <p><i>Constant glowing</i> – microphone is on.</p> <p><i>No glowing</i> – microphone is off.</p>

Pos.	Name	Identifier	Description
9	Button «BW» with LED		To activate wing substation. <i>Constant glowing</i> – wing substation is activated. <i>No glowing</i> – bridge wing substation is not active.
10	Button «CALL» with LED		«CALL» function: – supplies warning signal in case of any established connections.
11	Button «HOLD» with LED		<i>Reserved, not used in ICB-131.</i>
12	Button «PABX» with LED		To activate mode that allows for calling to ATX users.
13	Button «CONF» with LED		<i>Reserved, not used in ICB-131.</i>
14	Button «LIST» with LED		To activate general list mode (in LS mode).
15	Buttons  /  with LED		To turn up / down volume of built-in speaker during communication.
16	Button «DIM» with LED		To change (decrease) button and LEDs stepwise backlight brightness with step 20%.

Notes

- 1 Position 3, max. quantity of buttons to select users depends on substation panel type.
- 2 Position 4 and 5, the function is available only for the substation panel with 12 users and more.
- 3 Position 12, ATX mode is available only if connected to external ATX system and used by substation panels with 12 users and more.

Table 8 – Graphical representation of UUs indication

Pos.	Name of mode	Graphical representation of UUs indication
1	Loss of connection	
2	Incoming call from UU	
3	Outgoing call to UU	
Note – «Loss of connection» mode (position 1) is related to «Fault» LED of substation panels and switches on in case of connection loss between CU and one or several UUs; this mode is also related to LEDs of user select buttons, which switches on in case of connection loss with UU assigned to relevant user line.		

2.2.3 Wing substation

Wing substation SW-1 ensures talk-back communication with system users from the bridge wing. It is a remote station connected to substation panel.

Microphones M3-W, M3-10W and loudspeaker with input voltage 30 V may be connected to the wing substation.

External look of wing substation is shown in Figure 7.

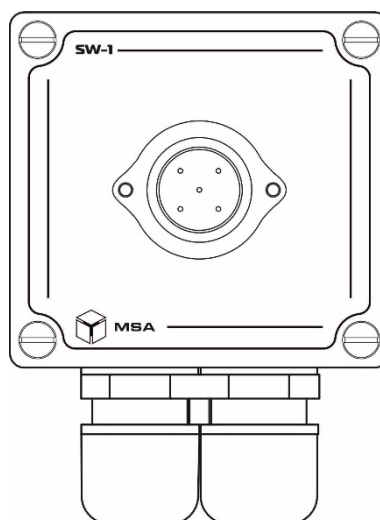


Figure 7 – Wing substation SW-1

2.2.4 Talk-back stations

The System's talk-back stations are ISDN-stations that use proprietary protocol for operation and ensure talk-back public address communication with one or several pre-defined users.

The System includes the following types of public address UUs:

- for living spaces: S1, S3 and S1-5;
- for service spaces and CCC: S2, S3 and S2-5 (external microphone may be connected);
- for noise spaces and decks: S1W (waterproof), S3 (external microphone and headset may be connected) and S4 (ensures talk-back communication only using connected loudspeaker in half-duplex mode);
- portable: S4P (waterproof, connected to socket CBP1).

Talk-back stations equipped only with one call button call one pre-defined user by default. Using a computer and special software the list of called users may be expanded if necessary. For settings see Settings instruction. In case of such changes the substation calls all users from the list. After the connection with the first user, the call of others will stop. The System transfers to pair communication mode.

The layout of main functional elements, controls and LEDs of UUs (using example of S1W, S2, S1-5) is shown in Figure 8. Functions of main control elements and functions available for talk-back stations are described in Tables 9 and 10, respectively.

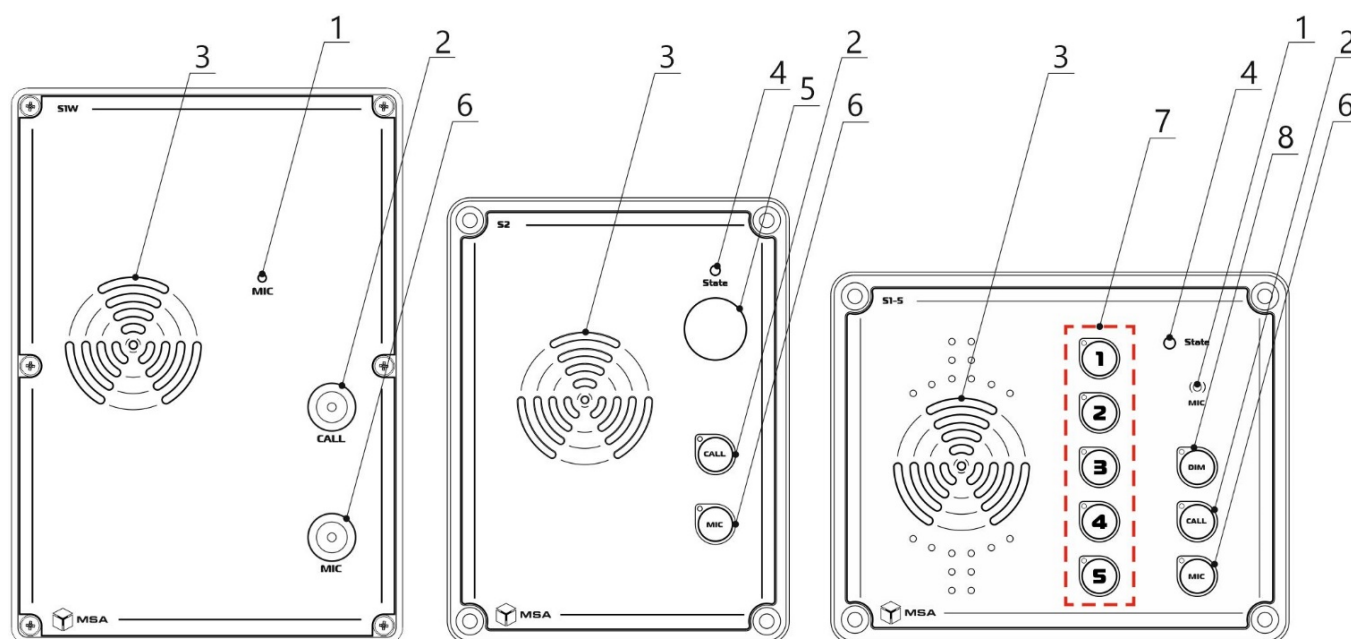






Figure 8 – Talk-back stations

Table 9 – Description of controls and LEDs of talk-back stations

Pos.	Name Identifier	Functional description
1	Built-in microphone	To receive voice communication.
2	Button «CALL»* 	Ensures a call to assigned UU**. Functions of button in LS mode: – press the button in standard operation mode – to make a call; – press the button second time during outgoing call – to stop outgoing call; – press the button in communication mode (during conversation) – to stop communication; – press the button during incoming call – to accept incoming call.
	Button «CALL» with LED 	Description of LEDs operation modes (next to button): <i>Constant glowing</i> – connection to assigned UU is established. <i>Flashing</i> in mode see Table 8, position 3 – outgoing call to UU assigned to the button. <i>Flashing</i> in mode see Table 8, position 2 – incoming call from UU assigned to the button.
3	Speaker	Supplies a sound call of incoming and outgoing call, reproduction of communication.
4	«State» LED	<i>Constant green glowing</i> – correct functioning and ready for operation. <i>No glowing</i> – no power supply, user line error. <i>Constant red glowing</i> – loss of connection or error.
5	Connector***	To connect external communication device (microphone, headset).
6	Button «MIC» with LED  	To switch on microphone. <i>Constant glowing</i> – microphone is on. <i>No glowing</i> – microphone is off.







Pos.	Name Identifier	Functional description
7	Buttons «1» ... «5» with LEDs	<p>Select called UU (in LS mode).</p> <p>Functions of buttons «1» ... «5» in LS mode:</p> <ul style="list-style-type: none"> – press the button in standard operation mode – to make a call; – press the button second time during outgoing call – to stop outgoing call; – press the button in communication mode (during conversation) – to stop connection; – press the button during incoming call – to accept incoming call. <p>Description of LEDs operation modes (next to button):</p> <p><i>No glowing</i> – UU is not assigned to the relevant user line, or connection with UU is absent.</p> <p><i>Constant glowing</i> – connection to UU assigned to the relevant user line is established.</p> <p><i>Flashing</i> - in mode see Table 8, position 1 – loss of connection with UU assigned to the relevant user line.</p> <p><i>Flashing</i> - in mode see Table 8, position 2 – incoming call from UU assigned to relevant user line.</p> <p><i>Flashing</i> - in mode see Table 8, position 3 – outgoing call to UU assigned to the relevant user line.</p>
8	Button «DIM» with LED 	To change (decrease) button and LEDs stepwise backlight brightness with step 20%.
<p>* Only talk-back stations S1W and S4P are equipped with this button.</p> <p>** Button «CALL» of talk-back stations S1-3, S1-5 and S2-3, S2-5 ensures only a warning signal supplied to user during current communication.</p> <p>*** Connector for microphone and headset of substation S3 is waterproof, and is visually different from the ones of substations S2, S2-3, S2-5</p>		

Table 10 – Controls and LEDs of talk-back stations

Pos.	Name Identifier	Available functions of talk-back stations							
		S1	S1W	S1-3 S1-5	S2	S2-3 S2-5	S3	S4	S4P
1	Built-in microphone	+	+	+	–	–	–	–	–
2	«CALL» button 	–	+	–	–	–	–	–	+
	button «CALL» with LED 	+	–	+	+	+	+	+	–
3	Speaker	+	+	+	+	+	–	–	+
4	«State» LED	+	–	+	+	+	+	+	+
5	Connector for external communication device	–	–	–	+	+	+	–	–
6	Button «MIC» with LED  	+	+	+	+	+	–	–	–
7	Buttons «1» ... «5» with LEDs	–	–	+	–	+	–	–	–
8	Button «DIM» with LED 	–	–	+	–	+	–	–	–
Notes 1 «+» – the function is available. 2 «–» – the function is not available.									

2.2.5 Amplifier

TPA-15 – amplifies audio signal power (received on the inputs) up to 15 W, and may operate from:

- external microphone or external source of audio signal 0 dB;
- microphone connected to waterproof connector on the front panel;
- digital user line;
- four-wire transmission line.

The amplifier is powered from user ISDN line or external power mains (18 ... 50 V DC). Amplifier's output ensures audio signal voltage of 30 V or 100 V (depending on the type) and designed to connect loudspeakers.

The unit may be also used to transmit audio signal containing all communication of one pre-defined user to the recording device: audio recorder, PC or VDR. This function is not a standard one, and it is configured additionally by the Manufacturer on the Customer request.

Layout of the main functional elements, controls and LEDs is shown in Figure 9, their description and functions are represented in Table 11.

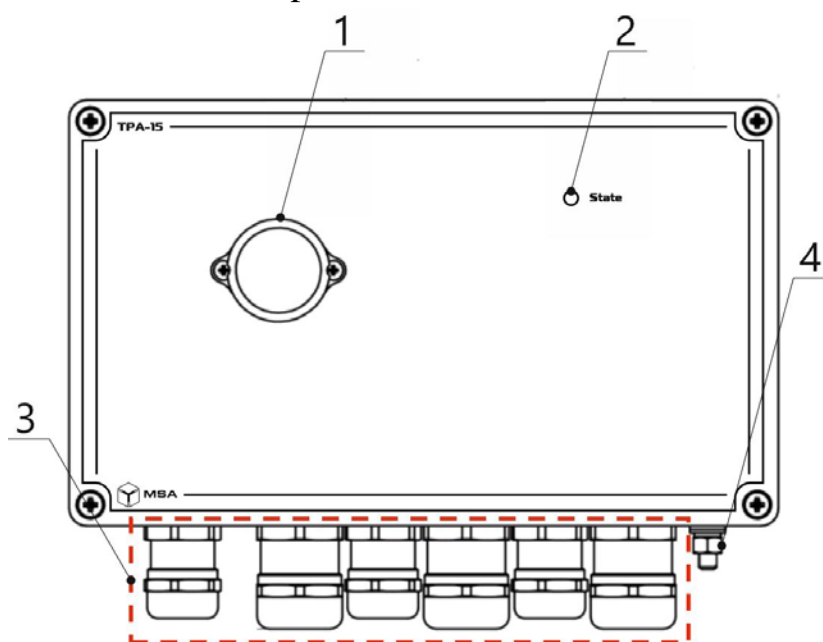



Figure 9 – Amplifier TPA-15

Table 11 – Description of controls and LEDs of amplifier TPA-15

Pos.	Name	Function
1	Waterproof connector	Connector for external microphone.
2	«State» LED	<i>No glowing</i> – device or user line error. <i>Constant glowing</i> – correct functioning and ready for operation.
3	Cable glands	Ensure air-tight cable input, as well as reliable fastening.
4	«Grounding» 	Grounding stud

Operation modes of TPA-15 are specified at order and configured by the Manufacturer.

In amplifier mode TPA-15 ensures the following order of priorities on input ports to output:

- priority 1: four-wire transmission line input;
- priority 2: ISDN input (from CU);
- priority 3: microphone input on the front panel of TPA-15;
- priority 4: microphone input on PCB.

Note – «1» has the highest priority, «4» – the lowest.

If the amplifier is connected to ISDN user line, it operates as System UU and may reproduce incoming calls from any UU through the connected loudspeaker.

If microphone and loudspeaker are connected to TPA-15, it may be used for voice announcement at the place of installation even without connection to the CU, but in this case it requires power supply 24 V DC to be connected.

In mode of audio signal transmission to audio recorder (tape recorder, PC or VDR), sound signals from pre-defined user are received via digital user line ISDN and transmitted to audio output for further transmission.

Select a user, whose voice communication will be transmitted to audio recorder, in the special program described in Settings instruction.

2.2.6 Circuit switching, connection, distribution and switching devices

2.2.6.1 Sockets. The System includes the socket HS-CB, designed to connect external communication device (headset) to UUs, and socket CBP1 (remote point), designed to connect portable talk-back stations S4P to LS network.

Sockets are wall mounted, waterproof type and equipped with protective cover, ensuring air-tight protection of contact parts against water. The sockets may be mounted in premises and on open deck.

The sockets are produced in painted metal casings. A quick connector is located on the front side; air-tight cable glands are located on the sides.

2.2.6.2 Signal converter ST2 connects external analog ATX with LS system ensuring communication with ATX users.

ST2 signal converter and description of controls are represented in Figure 10 and in Table 12, respectively.

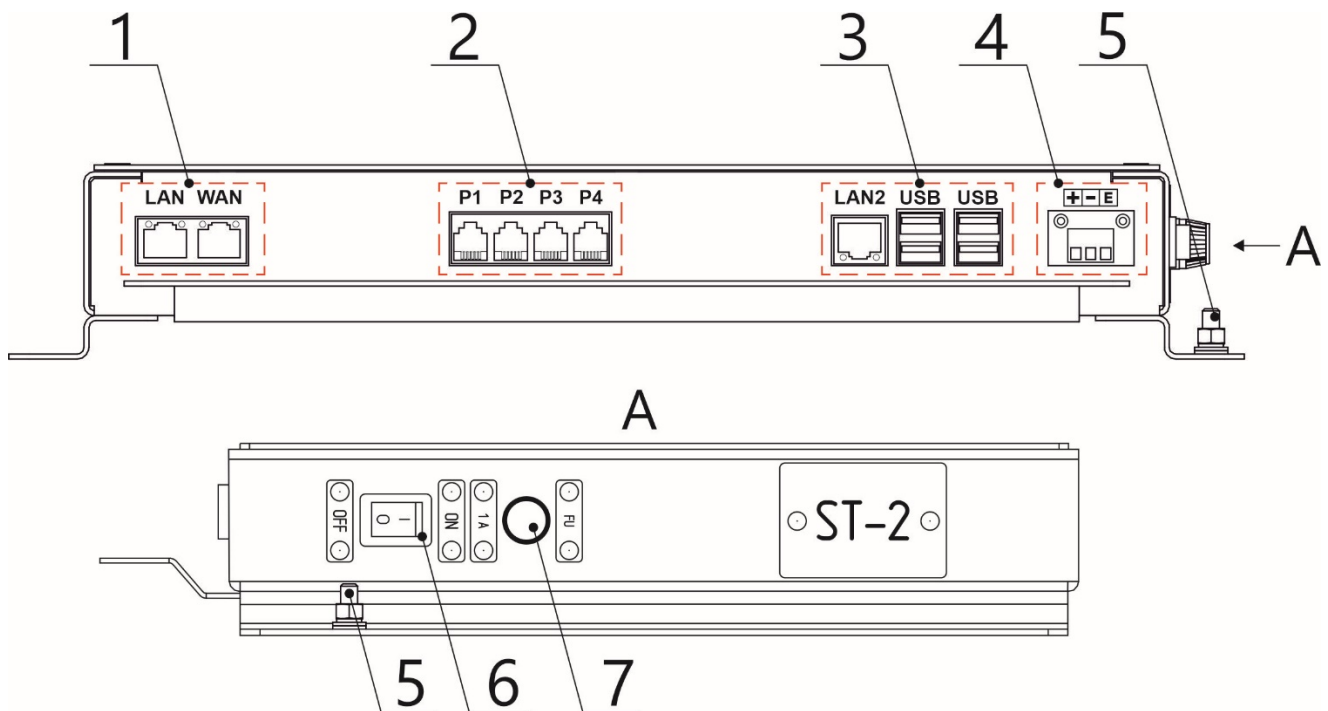




Figure 10 – Signal converter ST2

Table 12 – Description of signal converter ST2 controls

Pos.	Identifier	Description
1	LAN	Ethernet port to connect loudspeaker and public address systems produced by «NPK MSA», LLC.
	WAN	System port (not intended for connection from user end)
2	P1...P4	FXO ports to connect analog telephone lines from external ATX.
3	LAN2	System port (not intended for connection from user end)
	USB	
4		To connect external power 24 V DC
5		Grounding stud M5x15
6	–	Power button (on/off)
7	FU	Fuse holder

Note – WAN and LAN2 ports shall be interconnected.

2.2.6.3 Junction boxes KP-124PW and KP-124PW-4 split input signal to seven and three ways. The units are designed to increase number of power circuits and connect additional alarm units to UUs.

KP-124PW and KP-124PW-4 types are waterproof; designed for wall mounting in humid premises and open deck.

2.2.6.4 Relay units RB-139G-24 and RB-139G-220 control alarm units ensuring switching of external power to the connected devices of external alarm. The units ensure connection of light and sound alarm with supply voltage 24 V DC and 220 V 50(60) Hz AC to all substation panels and talk-back stations, except S4 and S4P. For additional information see Technical description.

RB-139G-24 and RB-139G-220 types are waterproof; designed for wall mounting in humid premises and open deck.

2.2.6.5 The System includes matching transformers T-140B-U1, T-140B-U2 and T-140B-U3.

These transformers allow for connecting loudspeakers with operating voltage 100 V and max. power 50 W to transmission lines with operating voltage 12, 24 or 48 V, respectively.

2.2.6.6 Cords are designed to extend standard cables of external communication devices of LS.

The cords have five lengths: 1.5; 3.0; 5.0; 7.0; 10.0 m.

The cords have three types:

- with two waterproof connectors (socket and straight plug) – type codes CE-1.5; CE-3; CE-5; CE-7; CE-10;
- with waterproof connector (socket and crimped ends) – type codes CE-1.5BE; CE-3BE; CE-5BE; CE-7BE; CE-10BE;
- with two waterproof connectors (socket and angle plug) – type codes CE-1.5AC; CE-3AC; CE-5AC; CE-7AC; CE-10AC.

2.2.6.7 Foot switch FB1 switches on (off) UU microphone hands-free (pressed by foot). The unit may be connected to all substation panels.

2.2.7 External communication devices

External communication devices ensure freedom to move and protects hearing organs against high level of noise (decrease of acoustic noise made by people working in one room or deck). The units are connected to UUs directly (using corresponding connectors) or a socket HS-CB.

2.2.7.1 Microphones convert acoustic signal (voice communication) into electric and transmit the converted signal via cable to UUs inputs (microphone may be connected).

The System includes the following types of microphones:

- Microphone M1 has a gooseneck and quick connector. M1 is used with SP-18, SP-36, S2, S2-3, S2-5;
- Microphone M2, manual with PTT switch (splash proof); equipped with a quick connector with cord length 1.5 m (stretched). The microphone M2 is used with SP-18, SP-36, S2, S2-3, S2-5;
- Microphone M3-W, manual with PTT switch (waterproof); equipped with a quick connector with cord length 3.0 or 10.0 m (stretched). The microphone M3-W is used with SP-18W, SP-36W, S3, SW-1.

2.2.7.2 Intercom helmets and headsets ensure talk-back communication in noisy conditions, as well as freedom to move within the length of cord.

The System includes intercom helmets TH-4M, TH-4L and headsets HS-4, HS-6, equipped with PTT switch with cord length 3.0 m (stretched); they may also be equipped with a quick connector.

Intercom helmets are divided into the following types:

- communication transmission: with microphone or throat microphone;
- seasonal: summer or winter.

For more information see Technical description.

Headsets types may have one or two headphones.

Intercom helmets and headsets have the following types based on types of cord end:

- crimped ends;
- straight plug connector;
- angle plug connector.

For more information see Technical description.

Intercom helmets TH-4M, TH-4L and headsets HS-4, HS-6 are used with SP-18W, SP-36W and S3.

2.2.8 Loudspeakers

Loudspeakers are designed to reproduce commands communication at LS stations, as well as reproduction of voice communication. The System includes the following types of loudspeakers:

- a) only for inside premises:
 - LS-1 has a metal casing, compact, built into ceiling / side ceiling, power 6 W;

- LS-2 has a metal casing, compact, wall-mounted, power 6 W;
- LS-5 has a wooden casing with brackets for wall mounting, max. power 6 W;

b) for deck and inside premises:

- LS-3 has a plastic casing, wall-mounted, max. power 15 W;
- LS-6 has an aluminum casing, waterproof, wall-mounted, max. power 6 W;
- LS-7 has a plastic casing, wall-mounted, compact, power 8 W;
- LS-8 has a metal casing, horn-type on a bracket, wall-mounted, max. power

25 W;

– LS-12 has an aluminum casing in a shape of searchlight with a bracket, wall-mounted, max. power 6 W;

– LS-13 has a plastic all-weather casing in a shape of searchlight with a bracket, wall-mounted or ceiling, max. power 10 W;

c) for explosion proof premises:

– DSP (Ex) has an all-weather explosion proof plastic casing in a shape of searchlight, max. power 25 W;

– GVR-Prometey has an aluminum alloy casing, horn-type, max. power 30 W.

Depending on the type of loudspeaker, the power may be constant or variable (by means of connection diagram).

Loudspeakers with input voltage 30 V are connected directly to UUs; Loudspeakers with input voltage 100 V, as well as 30 V – to amplifier.

The loudspeakers include structural elements for mounting:

- built-in – mounting holes;
- wall – brackets or clip.

For more information see Technical description.

2.2.9 Signal units

Signal units repeat a call of UUs with light and sound signaling, or both types.

Depending on type, signal units are powered from power mains 24 V DC or single-phase AC mains 220 V, 50(60) Hz.

The System includes the following signaling units:

a) light signaling unit for open decks and premises with increased level of noise:

– RL-24, RL-220 – rotating lamp (wall mounting on a bracket, only on vertical plane), orange, blue, red and green globes;

– L-24, L-220 – light signaling unit (beacons, wall mounting), with red, orange, white, green and blue globes;

– FL-24 – flashing lamp (beacon, wall mounting on a bracket, only on vertical plane) with red, orange, white, blue and green globes;

b) sound signaling units for open deck and premises with increased level of noise:

– A-24, A-220 – sound signaling unit to repeat UU call (wall mounting);

c) sound and light signaling units for open deck and premises with increased level of noise:

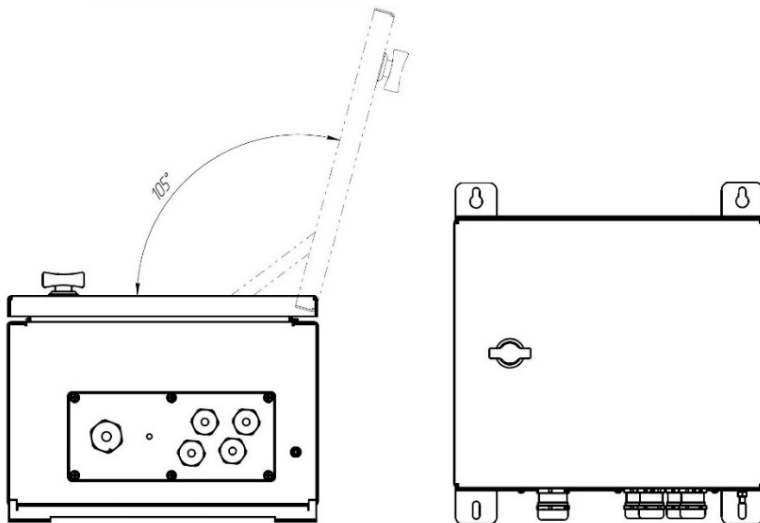
– AL-24, AL-220 – sound and light signaling unit with different colors of globe and variable tone of sound (wall mounting); red, orange, white, green and blue globes.

The signal units are powered from external power mains with voltage 24 V DC or 220 V 50(60) Hz (depending on unit type).

2.2.10 Wall mounted metal enclosures

Wall mounted metal enclosure (Figure 11) are designed to protect SC placed on open deck against atmospheric precipitation, water and accidental mechanical damage, as well as to store SC during breaks in operation and house peripheral equipment.

The System includes the following cabinet types: BO-1, BO-2, BO-3 and BO-4.



The System's cabinets differ in volume of housed equipment; equipped with hinges for wall mounting; door with a lock and a stopper to hold the door open (operating angle of opened door – 105°). Cables are led inside the cabinets through air-tight cable glands.

Figure 11 – Wall mounted metal enclosure

3 INTENDED USE

3.1 OPERATIONAL CONSTRAINTS

Place for SC installation shall be selected considering operational constraints, see 2.1.2 (operating temperature, IP rating).

All SC shall have reliable grounding, all cables shall be isolated, non-isolated ends shall be absent.

ATTENTION!

Installation site of SC must not be less than 1 m from a magnetic compass!

3.2 USAGE PREPARATIONS

3.2.1 Safety features

While preparing the SC to operation provide the visual check and make sure the mechanical damage is absent.

Connection of the SC to the power mains must be provided only considering input power requirements.

Before connection the SC must be switched off, all units must be properly grounded.

The staff shall follow «The technical rules for operation of electric installation» and «Safety rules for operation of electric installation» while testing electrical circuits and insulation resistance.

3.2.2 Visual check procedure

Before switching SC on, the staff shall:

- observe visually the cable integrity and initial position of the controls;
- clean the SC from dust and dirt by clean soft cloth, if necessary;
- check reliable cable connections to the SC and their proper grounding.

3.3 USAGE OF THE SYSTEM

For the description of SC controls and LEDs see section 2.

Along with priorities of communication modes, the System applies the hierarchy of UUs priorities (1.4.4).

Note – UUs priorities are set by means of computer and special software. For more information see Settings instruction.

While establishing a connection with UU, initiator's communication mode is compared to the user's. If they match, priorities are to be compared:

- If initiator's priority is lower, initiator will receive busy signal;
- If initiator's priority is equal, redial is activated;
- If initiator's priority is higher, user will be disconnected from the current communication and connected to the initiator's communication.

3.3.1 Use of substation panels

3.3.1.1 Communication modes – pair communication and conference call

To ensure operation of substation panels in pair communication and conference call, provide the following:

a) Initiator should:

- Using buttons «1» ... «X» (where X – maximum number of users, depending on substation panel type) select one user for pair communication or one by one press buttons for users to organize a conference call. Selected user (users) will receive a call. Wait for the user (users) to answer.

Note – If initiator's priority is higher than the user's, connection will be established immediately at the moment of pressing a button on the substation panel;

- to transmit voice communication to user (users), press and hold button «MIC» or PTT of external communication device and clearly announce the command;
- to stop communication, press the button assigned to user for the second time in pair communication mode or one by one press buttons for users to disconnect them from conference call;
- to stop communication with all users, use button «END».

Note – To supply a signal to users during current communication (if necessary), press «CALL». Signal is supplied since the button «CALL» is pressed until the button is released.

b) User should:

- to accept incoming call, press the button of calling user.

3.3.1.2 Communication mode – conference general list

To ensure operation of substation panel in general list mode, provide the following steps:

a) Initiator should:

- To activate the mode, press the button «LIST» and then button «1». All users will be connected to current communication session;

- To transmit voice communication, press and hold «MIC» button or PTT switch of external communication device and clearly announce the command to the microphone;

- To stop the connection, press «LIST» for the second time.

b) For user – the mode will be activated automatically.

Notes

1 Activation of «General list» mode is possible only if an initiator has no active connections.

2 All users of «General list» mode are not available for call from other users. They will receive a busy signal.

3 Self-disconnection from «General list» mode is not available.

3.3.1.3 Communication from bridge wing substation

As soon as connection with user (users) is established, press button «BW» on the substation panel and move to bridge wing substation. Use external communication unit and loudspeaker connected to bridge wing substation SW-1 to transmit or receive voice communication. Once communication is finished, move back to substation panel and press button «BW» for the second time to disconnect bridge wing substation SW-1.

3.3.2 Use of talk-back stations S1, S1W, S2, S3, S4 and S4P in pair communication mode

To ensure operation of the talk-back stations, provide the following:

a) Initiator should:

- To connect to the specified user, press «CALL» button. User will receive a call signal. Wait for the answer of called user.

Note – If initiator's priority is higher than called user priority, connection will be established as soon as button «CALL» is pressed;

- To transmit voice communication, press and hold «MIC» button (if present) or PTT switch of external communication device, and clearly announce a command to a microphone (or loudspeaker for S4 and S4P);

- To stop the connection, press «CALL» for the second time.

b) User should:

- To receive a call, press «CALL» button;

- To stop the connection, press «CALL» button for the second time.

3.3.3 Use of talk-back stations S1-3, S1-5 and S2-3, S2-5 in pair communication mode and conference call mode

To ensure operation of the talk-back stations in pair communication mode and conference call mode, provide the following:

a) Initiator should:

- Using buttons «1»...«5» select one user for pair communication or press buttons assigned for the required users one by one to organize a conference call. Selected user (users) will receive a call signal. Wait for user (users) to answer the call.

Note – If initiator's priority is higher than called user priority, connection will be established as soon as button is pressed on talk-back station;

- To transmit voice communication, press and hold «MIC» button or PTT switch of external communication device, and clearly announce a command to a microphone;

- To stop the connection, press the button assigned for pair communication user for the second time or one by one press the buttons assigned for conference call users for the second time.

b) User should:

- to receive an incoming call, press the button of calling user.

Note – To supply a signal to users during current communication (if necessary), press «CALL». Signal is supplied since the button «CALL» is pressed until the button is released.

3.3.4 Operation with external systems

If the System is connected to external command public address system (having a remote control port with discrete inputs), and includes substation panel with buttons for transmission lines - once the buttons are pressed, voice communication will be transmitted by relevant transmission lines.

If the System is connected to VDR via TPA-15, and corresponding CU settings are activated, the System will transmit all voice communication of selected UU to relevant linear audio output of TPA.

Note – The settings are carried out by the Manufacturer at delivery.

If the System is connected to external analog ATX via signal converter ST2, substation panels additionally become users of ATX; each station is assigned with user number of the relevant ATX line. In this mode substation panels may have talk-back communication with ATX users.

To make a call, press «PABX» button on substation panel, using buttons «0» ... «9» dial a number of called ATX user and press «CALL».

ATX users may also call to substation panels. To provide this, dial a number of relevant ATX user line on ATX units.

Note – Only substation panels with 12 and more users support «PABX» mode.

3.4 SYSTEM SETTINGS

ATTENTION!

Some settings require opening of SC casing which is considered to be an intervention into device structure. The Manufacturer is not liable for collateral damage and insistently do not recommend to provide settings on Customer's discretion. The settings shall be provided by «NPK MSA» engineers only or their authorized representatives in order to avoid faulty System operation.

The following SC shall be configured in order to provide System settings:

- CU;
- substation panels;
- talk-back stations;
- amplifiers.

The Manufacturer ensures setting according to Customer requests.

For information on SC settings see Settings instruction.

4 TECHNICAL SERVICE OF THE SYSTEM

4.1 GENERAL DESCRIPTION

The TS shall be provided by the staff acquainted with the System composition, structure and operation features.

In order to provide safe and reliable operation for the System, the staff shall maintain all types of TS:

- TS №1 – semi-annual TS;
- TS №2 – annual TS.

TS №1 is organized and controlled by a person in charge and shall be provided by the staff on the running equipment. The TS № 1 results are registered in log of operation (duty log).

TS №2 works organized and controlled by a person in charge and shall be provided by the staff on the running equipment. TS №2 results are registered to the System certificate.

4.2 SAFETY FEATURES

If the System is used outside its regular place of use, and SC failed, replacement of fuses and LEDs, etc. from portable SPTA kit is allowed without presence of the Manufacturer representative. Relevant record is made in the System Certificate.

Once the System is returned back to the regular place of use, a representative of the Manufacturer should be called in to draw up a damage claim.

Recomplete SPTA kit at regular place of use from basic SPTA kit.

4.3 MAINTENANCE ROUTINE

The list of works for all types of TS is given in Table 12. Maintenance routine procedure is given in checklists (hereinafter – CL), represented in Tables 13, 14, 15, 16. TS works are performed using consumables represented in Table 5.

Table 13 – List of works by TS types

CL №	Work	Type of TS	
		TS №1	TS №2
1	Visual check of the SC	+	+
2	Operability test of the SC	+	+
3	Test of public address modes	–	+

CL №	Work	Type of TS	
		TS №1	TS №2
4	Check of scope of delivery, SPTA kit condition and operation documentation	–	+
Note: «+» – work is obligatory. «–» – work is not obligatory.			

Table 14 – Checklist № 1. Visual check of the SC

To be done	Routine	Man-hours per 1 SC
Visually examine the SC	1) check completeness and appearance of the SC; mechanical damage, paint defects must be absent; marking plates shall be present; legends are to be read easily; 2) clean up the SC surfaces with clean cloth; 3) remove severe contamination, parts of corrosion, oil spots: – from front surfaces – using soap form preventing it against penetration inside the SC, then all surfaces clean dry by clean cloth and dry up; – from other surfaces – using alcohol soaked cloth. 4) if varnish paint coating is damaged, polish it with sand paper, then clean with alcohol-soaked cloth, cover with varnish AK-113 and dry up.	1 person 5 mins
Check reliability of cable and bus connection to the SC	1) check that connectors and attaching screws are fastened tight; provide further fastening if needed. 2) check the cable integrity (mechanical damage shall be absent) within visibility.	1 person 5 mins

Table 15 – Checklist № 2. Operability check of the SC

To be done	Routine	Man-hours per 1 SC
Test of System operability	Test user lines integrity by CU LEDs, see 2.2.1	1 person 10 mins

Table 16 – Checklist №3. Test of public address modes

To be done	Routine	Man-hours per 1 SC
Test of public address modes	Test public address modes according to 3.3	2 persons 1 hour

Table 17 – Checklist №4. Check of scope of delivery, SPTA kit condition and operation documentation

To be done	Routine	Man-hours per 1 SC
Check of scope of delivery, SPTA kit condition and operation documentation	1) Compare SPTA kit items to operational documentation represented in section 4 «The scope of delivery» of the System Certificate. 2) Check the quality of every SPTA kit item, storage time and full recompletion of SPTA kit in case of its use (according to 4.4). 3) Recomplete SPTA kit.	1 person 1 hour

4.4 INSTRUCTIONS ON USE OF SPTA KIT

SPTA kit is delivered together with the System and used to support operating condition of the System by replacing failure SC.

SPTA kit composition shall comply with the list represented in section 4 «The scope of delivery» of the System Certificate.

4.5 PRESERVATION

The System, SPTA kit and set of operational documents are stored in preserved condition in Manufacturer's packaging boxes.

The preservation is done in full terms, for 2 years, applying protection and pack-aging.

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

The represerved System, SPTA kit and set of operational documents are placed in package.

The storage time for the represerved System – 2 years.

5 CURRENT REPAIR

5.1 CURRENT SYSTEM REPAIR

5.1.1 General description

Within time of warranty the System is opened in the presence of the Manufacturer representative drawing up an Act of opening.

If the System is used outside its regular place of use, and SC failed, replacement of fuses and LEDs, etc. from portable SPTA kit is allowed without presence of the Manufacturer representative. Relevant record is made in the System Certificate.

Once the System is returned back to the regular place of use, a representative of the Manufacturer should be called in to draw up a damage claim.

Recomplete SPTA kit at regular place of use from basic SPTA kit.

5.1.2 Safety features

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

Check SC grounding.

Use rubber rug in front of power supply units and amplifiers.

Replacement of fuse links or defective parts, boards and modules when power is ON is **STRICTLY PROHIBITED**.

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

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

5.2 CURRENT REPAIR OF THE SC

5.2.1 The System equipment

The System operability is controlled by LEDs located on the front panels of the System's CUs.

The list of possible malfunctions and troubleshooting is represented in Tables 18 and 19.

Replacement of failed SC is carried out by the staff from SPTA kit.

ATTENTION!

All operations shall be performed only if power supply voltage is switched off!

Table 18 – The list of possible malfunctions and troubleshooting

Malfunction	Possible reasons	To be done
LED pairs located above connectors «X1» ... «X36» on CU do not operate	Power supply failure and (or) communication line with UU failure	If power LED do not operate, check power supply circuit for short circuit. If there is no short circuit replace a faulty fuse of the relevant power circuit.
		If LED responsible for communication line operability does not operate, check communication line (by a tester). If the line is faulty, check that end UU is switched on. If the end UU is switched off – switch it on. If the malfunction remains, replace end UU to a fully operational one of similar type.

Operability of talk-back stations, substation panels and amplifier is controlled by button backlight and glowing of relevant LEDs on the front panels (see section 2).

The list of possible malfunctions of talk-back stations, substation panels, amplifier and troubleshooting is represented in Table 19.

Troubleshooting is provided by staff using SPTA kit.

Table 19 – Possible malfunctions of talk-back stations, substation panels, amplifier and troubleshooting

Malfunction	Possible reasons	To be done
No connection to CU: – for substation panels: no glowing of «Ready» LED and constant glowing of «Fault» LED; – for talk-back stations and amplifier TPA-15 (except S1W): no glowing of «State» LED on the front panel.	Cable damage or rupture	Observe cable for damage (rupture). Replace the cable or restore the connection by soldering with further isolation of damaged place.

Malfunction	Possible reasons	To be done
System error: – for talk-back stations (except S1W): glowing of «State» LED is changed from green to red on the front panel.	Occurrence of System error	Restart the System by switching off and on the electric power to CU, wait for two or three seconds while the System is polling UUs. If LED colour changed to green, continue using the System in regular mode. If abovementioned instructions did not terminate a malfunction, contact «NPK MSA», LLC service center.

6 TRANSPORTATION AND STORAGE

The System must be stored in packaging inside areas complying with the required storage conditions (+5°C ... +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.

The System 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 System 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 System.

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

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

7 DISPOSAL

New equipment, the parts of the System 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 System 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 System components allows avoiding possible negative environmental and health impacts, and it also allows for proper restoration of components with substantial energy and resources saving.

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 is under warranty obligations in case of correct System exploitation according to the OM. In case of incorrect operation or service damage claims are not considered by the Manufacturer.

More information about warranty terms you can find on the official site of «NPK MSA», LLC, section **Support**.

Address and contacts of the Manufacturer's service centre:

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