

# **ANTENNA HEATING SYSTEM SOA-1022**

Operating manual

## Table of contents

<b>1 DESCRIPTION AND OPERATION OF THE PRODUCT .....</b>	<b>4</b>
1.1 Description .....	4
1.2 Technical specifications .....	4
1.3 The System components .....	6
1.4 Structure and operation of the System .....	7
1.5 Measurement instruments, tools and appliances .....	8
1.6 Marking and sealing .....	8
1.7 Packaging .....	8
<b>2 DESCRIPTION AND OPERATION OF THE SYSTEM COMPONENTS .....</b>	<b>9</b>
2.1 Control switchboard of antenna heating system .....	9
2.2 Antenna heating unit .....	10
2.3 Multipurpose digital repeater DR-209M .....	11
2.4 Junction box KP-124PW .....	22
<b>3 INTENDED USE .....</b>	<b>23</b>
3.1 Operational limitations .....	23
3.2 Usage preparations .....	23
3.3 Intended use .....	23
<b>4 TECHNICAL SERVICE OF THE SYSTEM .....</b>	<b>25</b>
4.1 General description .....	25
4.2 Safety features .....	25
4.3 Maintenance routine .....	25
4.4 Long-term storage (preservation) .....	26
4.5 Installation and dismantling .....	28
<b>5 CURRENT REPAIR .....</b>	<b>29</b>
5.1 General instructions .....	29
5.2 Safety features .....	29
5.3 Current repair .....	29
5.4 Repair using SPTA .....	30
<b>6 STORAGE .....</b>	<b>31</b>
<b>7 TRANSPORTATION .....</b>	<b>32</b>
<b>8 DISPOSAL .....</b>	<b>33</b>
<b>9 WARRANTY .....</b>	<b>34</b>
<b>APPENDIX A (MANDATORY) OVERALL AND INSTALLATION DIMENSIONS OF THE SC .....</b>	<b>35</b>
<b>APPENDIX B (MANDATORY) CONNECTION DIAGRAMS OF THE PRODUCT .....</b>	<b>39</b>

This operating manual (hereinafter – OM) describes composition, structure, and operation of Antenna heating system SOA-1022 (hereinafter – the System), as well as instructions on safe and correct operation of the System (intended use, technical service (hereinafter – TS) and current repair), and information on disposal of the System components (hereinafter – the SC).

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

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

### **TERMS AND ABBREVIATIONS:**

AHS	Antenna heating system
AHU	Antenna heating unit
CL	Check list
CSAHS	Control switchboard of antenna heating system
KP	Junction box KP-124PW
OM	Operating manual
QCD	Quality control department
Repeater	Multipurpose digital repeater DR-209M
RF	Radio frequency
SC	System component
SPTA	Spare parts, tools and accessories
TH	Thermoelectric heater
TS	Technical service

## 1 DESCRIPTION AND OPERATION OF THE PRODUCT

### 1.1 Description

AHS is applied at onshore facilities, as well on sea- and river-going vessels.

The System ensures:

- automatic heating of antennae installed on open deck to protect them against low temperature using antenna heating units (hereinafter – AHU);
- main/standby power switching using CSAHS and additional KPs;
- temperature set up and control inside each AHU (dome) using a repeater via digital interface RS-422;
- connection of more than one AHU to one CSAHS applying KP. Maximum number of connected AHUs to one CSAHS – 20 pcs.

### 1.2 Technical specifications

Tables 1–5 describe technical specifications of the System and SC.

Table 1 – Main technical specifications of AHS

Parameter	Value
Main (standby) electric power supply: voltage, V	220
frequency, Hz	50
Max. power budget, kW	4.4
Operating temperature, °C	–52 to +60
Limiting temperature, °C	–60 to +70
Max. maintained temperature inside dome, °C (at ambient temperature –52 °C)	–6

Table 2 – Main technical specifications of AHU

Parameter	Value	
	with dome	w/o dome
Electrical power supply: voltage, V	220	
frequency, Hz	50	
Max. power consumption, W		
AHU-1	400	
AHU-2	600	
AHU-3	1000	
Operating temperature, °C	–52 to +60	
Limiting temperature, °C	–60 to +70	
Protection degree	IP56	–

Parameter	Value	
	with dome	w/o dome
Weight, kg		
AHU-1	7.4	6.0
AHU-2	11.4	9.3
AHU-3	22.8	17.2
Overall dimensions, mm	Ø x V	L x H x W
AHU-1	370.0 x 440.4	277.0 x 218.0 x 195.0
AHU-2	700.0 x 770.4	422.0 x 260.2 x 333.0
AHU-3	1133.1 x 1238.1	462.0 x 428.0 x 299.7

Table 3 – Main technical specifications of CSAHS

Parameter	Value	
	with repeater	w/o repeater
Electrical power supply: voltage, V frequency, Hz	220 50	
Max. power consumption, W	5	25
Operating temperature, °C	-15 to +55	
Limiting temperature, °C	-60 to +70	
Protection degree	IP56	IP22
Weight, kg	16.6	17.8
Overall dimensions (L x H x W), mm	380 x 190 x 517	

Table 4 – Main technical specifications of repeater

Parameter	Value
Rated input voltage, V DC	24
Max. power consumption, W	20
Processor	ARM Cortex-A8 (AM3359)
Portable memory card, GB	8
RAM, MB	512
Operating temperature, °C	-15 to +55
Limiting temperature, °C	-60 to +70
Protection degree	IP22
Weight, kg	1.6
Overall dimensions (L x H x W), mm	160.0 x 208.0 x 69.3

Table 5 – Main technical specifications of KP

Parameter	Value
Total number of terminals	8
Number of terminals to connect consumers	7
Max. permissible voltage, V	220
Max. permissible current, A	20
Operating temperature, °C	-15 to +55
Limiting temperature, °C	-60 to +70
Protection degree	IP56
Weight, kg	1.9
Overall dimensions (L x H x W), mm	278 x 148 x 52

### 1.3 The System components

Table 6 describes the list of SC included in the System.

Note – Exact quantity of AHU and KP is defined at delivery and depends on the customer's facilities.

Table 6 – The System components

Name	Description	Notes
CSAHS	Main/standby input voltage switching, 220 V AC, frequency 50 Hz per load	
AHU	Antennae heating. Antennae protection against atmospheric precipitation	With dome
	Antennae heating	W/o dome
Repeater	Temperature set up and control inside each AHU (dome). Visual control over AHU parameters and conditions	
KP	Connection of 2 to 20 AHUs to one CSAHS	To power AHU and CAN bus connection

Depending on the applied SC the System may have four types (Table 7).

Table 7 – The System types

Name	Quantity, pcs.
Antenna heating system SOA-1022. Type 1	1 set
Antenna heating unit AHU*	1 to 20 pcs.
Control switchboard of antenna heating system CSAHS	1 pc.
Multipurpose digital repeater DR-209M	1 pc.
Junction box KP-124PW	2 pcs.**
Antenna heating system SOA-1022. Type 2	1 set
Antenna heating unit AHU	1 to 20 pcs.
Control switchboard of antenna heating system CSAHS	1 pc.
Junction box KP-124PW	2 pcs.*
Antenna heating system SOA-1022. Type 3	1 set
Antenna heating unit AHU	1 to 20 pcs.
Multipurpose digital repeater DR-209M	1 pc.
Junction box KP-124PW	2 pcs.*
Antenna heating system SOA-1022. Type 4	1 set
Antenna heating unit AHU	1 to 20 pcs.

\* Type may change depending on size and availability of RF transparent dome.  
 \*\* Applied if more than two AHUs are connected. Define quantity of delivered KPs assuming that every seven AHUs require two KPs (to connect external power supply and data interface).

#### 1.4 Structure and operation of the System

The System includes metal cabinet CSAHS (Figure 1, position 1) that powers AHU (figure 1, position 2) with or w/o RF transparent dome (figure 1, position 3). Temperature set up and control inside each AHU (dome) is carried out using repeater (figure 1, position 4). Use KP to connect 2 to 20 AHUs to one CSAHS simultaneously (figure 1, position 5).

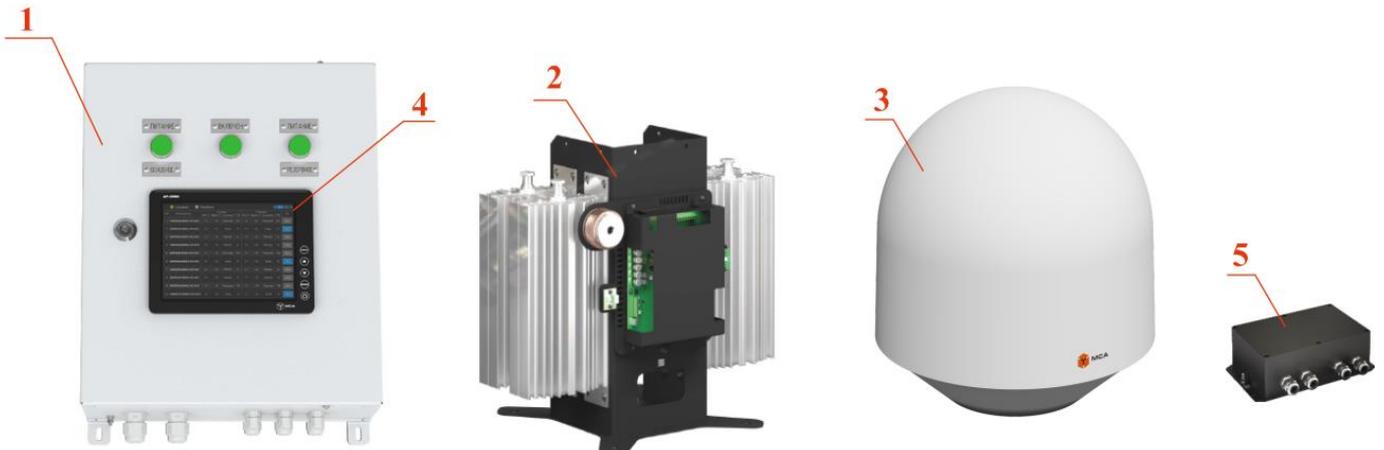


Figure 1 – The System components

## 1.5 Measurement instruments, tools and appliances

Control operation of the SC using integrated controls and LED light indicators. For more information on the controls and LEDs see section 2.

Table 8 describes amount of consumables required for the TS.

Table 8 – Consumables required for the TS

Name and identifier of consumables	Amount of consumables	Note
Cleaning cloth	0.10 kg	To clean surfaces of the SC – use clean cloth. To remove severe contamination – use cloth soaked in alcohol
Rectified hydrolytic technical ethyl alcohol	0.05 l	To soak cloth while cleaning the Product
Varnish	0.05 kg	To cover surfaces of the Product in case of paint coating damage
Abrasive cloth	0.06 x 0.06 m	To polish surfaces of the Product in case of paint coating damage

## 1.6 Marking and sealing

The SC have nameplates providing the following information:

- name;
- power supply voltage (switching voltage – for KP);
- protection degree (if present);
- power consumption (if present);
- weight;
- serial number;
- date of manufacturing;
- the manufacturer’s address and trademark.

Marking of transport packaging is carried out according to the applicable standards, and includes the following handling marks: “Fragile (goods). Handle with care”, “Keep dry”, “This side up”.

Sealing of the System and SC is not provided.

## 1.7 Packaging

AHU and CSAHS are packed in close-boarded boxes, repeater and KP – in corrugated board boxes. All packaging of the SC include inner packaging (air bubble film).

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

Packaging sealing is not provided.

## 2 DESCRIPTION AND OPERATION OF THE SYSTEM COMPONENTS

### 2.1 Control switchboard of antenna heating system

CSAHS is a painted metal cabinet. Figure 2 describes a general view of CSAHS with an integrated repeater.

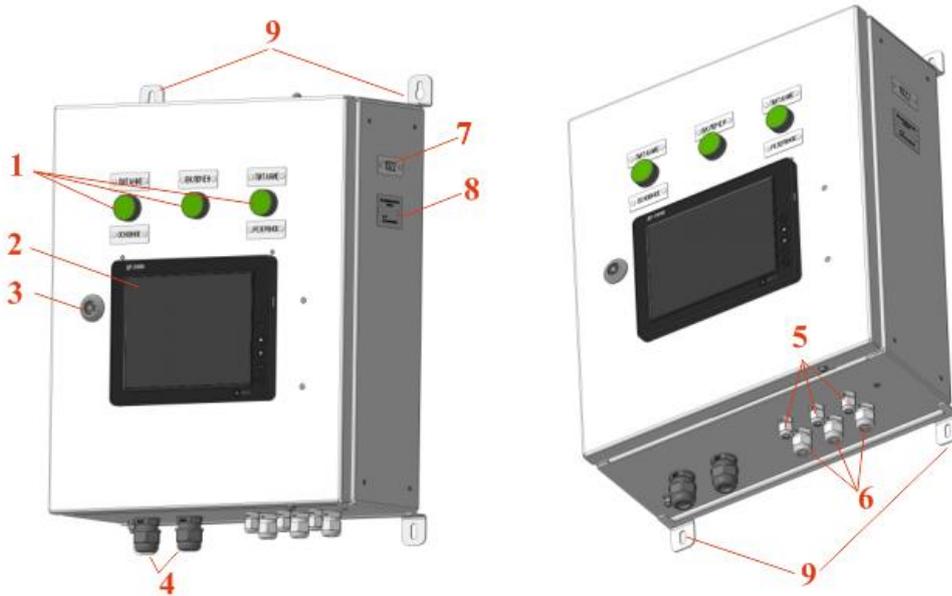


Figure 2 – CSAHS with an integrated repeater

CSAHS is mounted on the wall through the mounting holes (Figure 2, position 9).

Three LED light indicators (Figure 2, position 1) are located on the front panel displaying CSAHS operation status (on/off), main and standby power. Once the power is supplied, corresponding power LED is lighting up (green), when there is no power – LED is not lighting. “ON” LED is lighting (green) together with one of the power LEDs.

Repeater is installed into CSAHS front panel (Figure 2, position 2). Use a key to open the cabinet (Figure 2, position 3). Nameplates of the System (Figure 2, position 7) and CSAHS (Figure 2, position 8) are attached to the side panel.

Cable glands SKINTOP MS-M 25x1.5 ensure main and standby power connection to CSAHS (Figure 2, position 4). Use cable glands to connect KP: SKINTOP MS-M 16x1.5 (Figure 2, position 5) for CAN bus connection, and SKINTOP MS-M 25x1.5 (Figure 2, position 6) to connect AHU power supply.

## 2.2 Antenna heating unit

AHU is an RF transparent thermal insulating dome with TH and temperature sensors installed inside it. Figure 3 describes a general view of AHU (for example, AHU-1).

Depending on size (see Table 2 and Figures A.1–A.3) and quantity of TH, AHU may have three types:

- AHU-1 – small, two THs;
- AHU-2 – medium, four THs;
- AHU-3 – large, four THs.

From two to four THs ensure heating of each antenna (Figure 3, position 2). AHU may be delivered with a dome (Figure 3, position 5), and without it. Temperature sensors are located near THs to monitor current AHU temperature (Figure 3, position 4).

Use data connectors (Figure 3, position 3) and power input connectors (Figure 3, position 1) to connect KP.

If AHU is applied together with a dome, connect AHU through cable glands at the bottom of the dome (Figure 3, position 6), and mount it – using mounting studs (Figure 3, position 7).

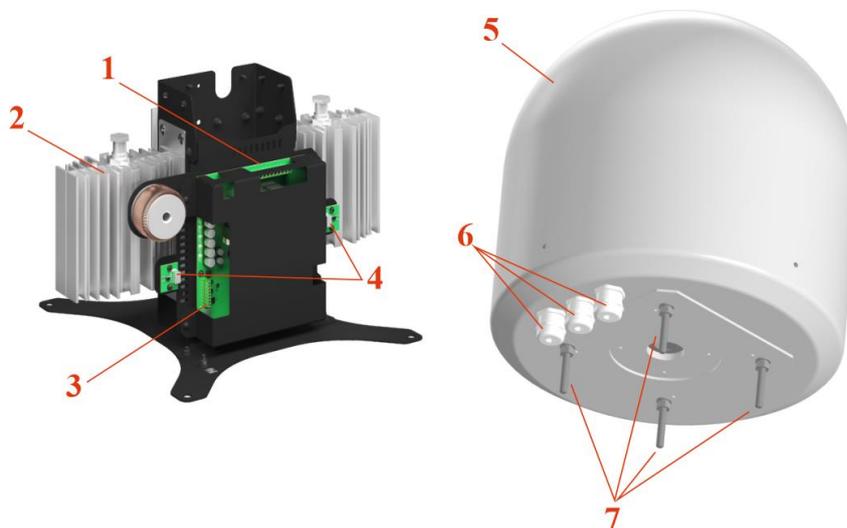


Figure 3 – AHU-1

Every AHU has an ID number, displayed on the nameplate and set using DIP-switch. Description of DIP-switch positions and ID number of AHU are shown in Figure 4.

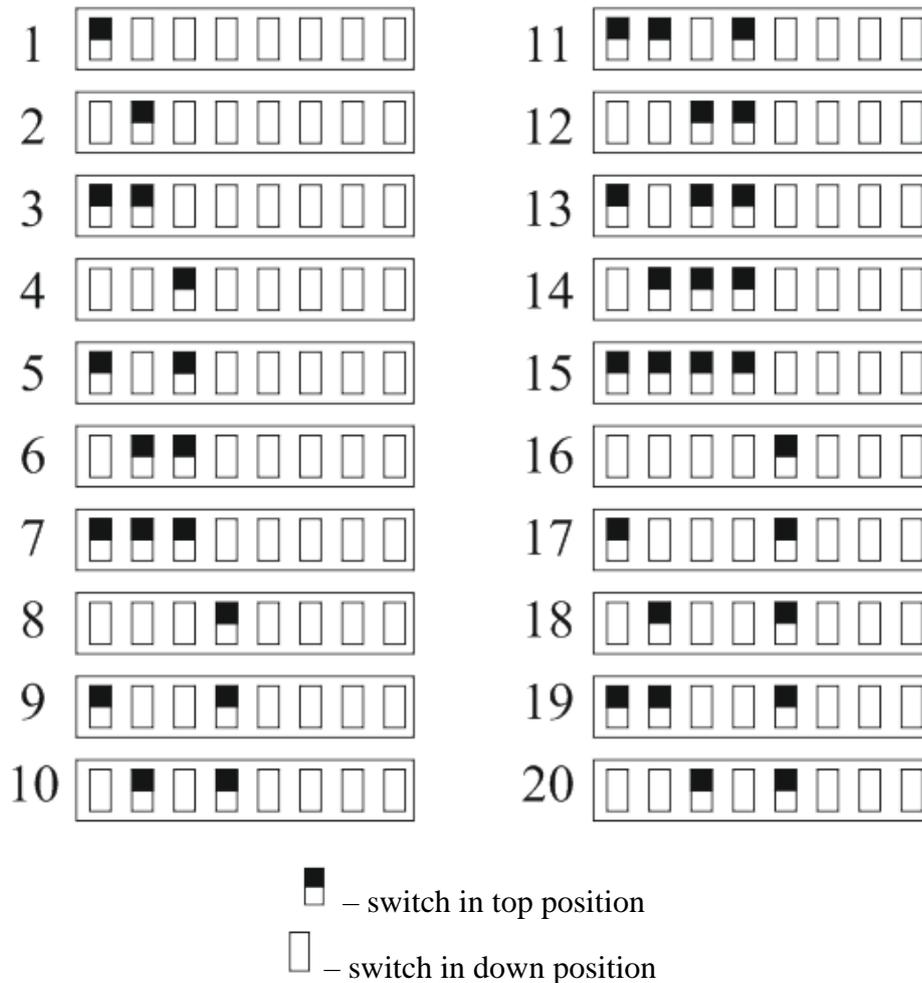


Figure 4 – DIP-switch and ID number of AHU

## 2.3 Multipurpose digital repeater DR-209M

### 2.3.1 Description

Repeater is manufactured in painted metal casing; a port to connect power cable (Figure 5, position 3), and interface RS-422 serial ports to connect data cables (Figure 5, position 1 and 2) are located on the rear panel under the protective cover. A USB port to connect data storage device (to update AHU and repeater software) (Figure 5, position 4) is on the right side panel. AHU software update is available only for manufacturer's representatives.

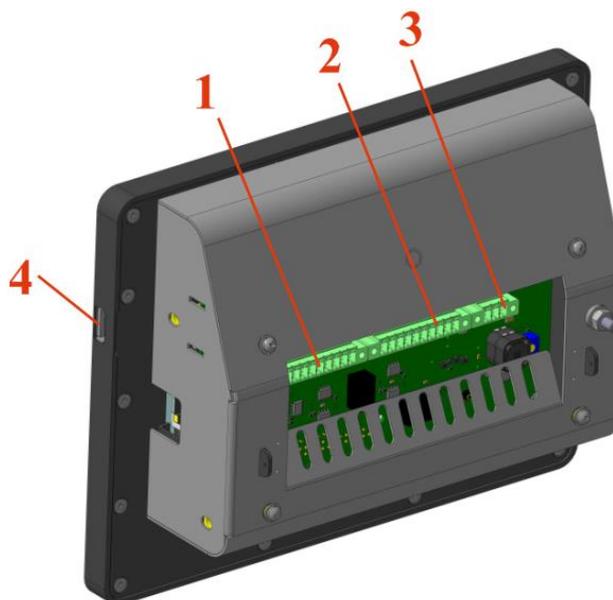


Figure 5 – Repeater’s rear panel

Controls and colour LCD screen 8" (resistive touch screen) to display visual data are on the front panel. Figure 6 describes a general view of the repeater’s front panel.

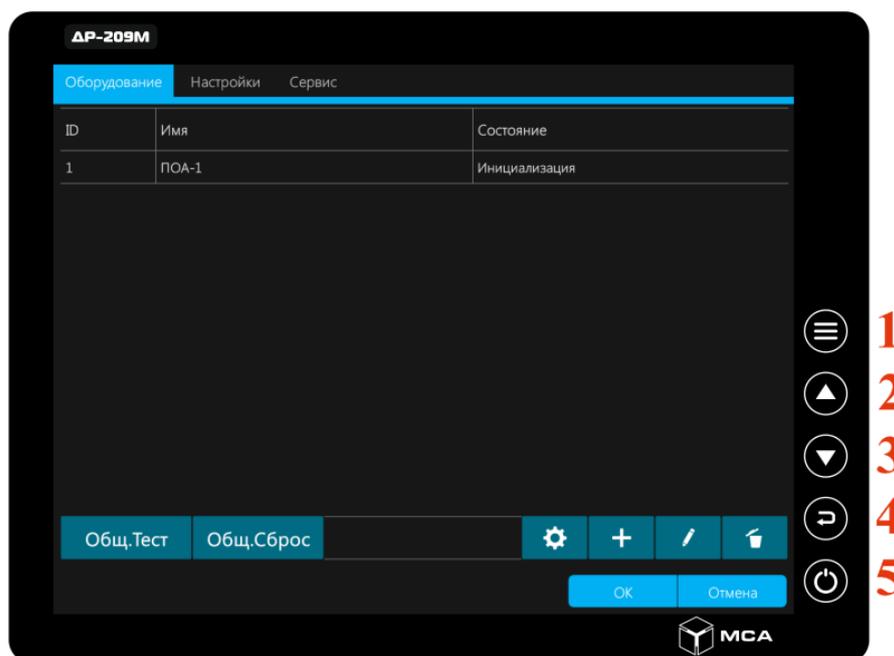


Figure 6 – Repeater’s front panel

Table 9 according to Figure 6 describes repeater’s controls.

Table 9 – Repeater’s controls

Position №	Control*	Description
1	☰ or Menu	To enter settings menu
2	▲	To increase backlight brightness
3	▼	To decrease backlight brightness
4	↶ or Exit	To exit settings menu
5	⏻	To turn on (off) power

\* Depends on a type of repeater.

Figure 7 describes connection diagram of the repeater.

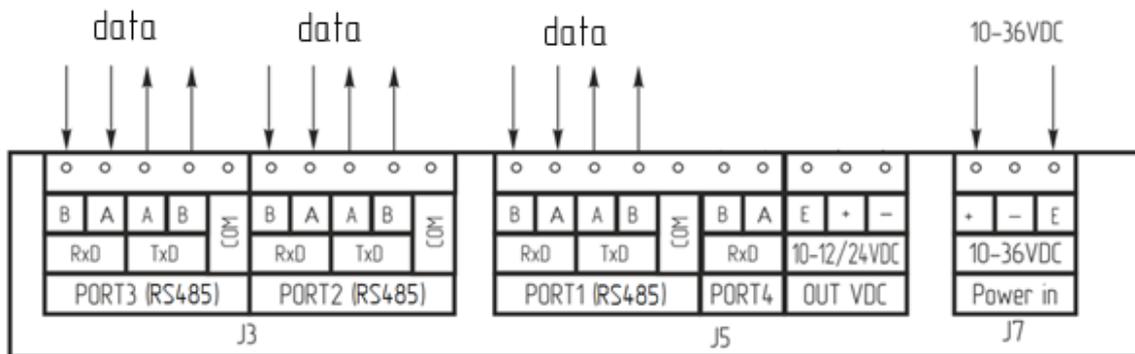


Figure 7 – Connection diagram of the repeater

### 2.3.2 Repeater’s software

#### Getting started

Once repeater is switched on, AHU initialization and operation test occur. If all connected AHUs are on the network and operate correctly, the display will take the main screen view, see Figure 8.

If an error occurs in AHU operation, the main screen will display “Тревога” on the red flashing background, and the line of faulty AHU will be highlighted with red (Figure 9,a), or “Предупреждение” on the yellow flashing background, and yellow line of faulty AHU.

If repeater is switched on at the moment of main or standby power failure, the main screen will display “Предупреждение” on yellow background (Figure 9,b).

Unitherm - 1022		Система исправна			21.08.2020 16:45:33
Имя	Текущая t°C	Подогрев	Задание t°C	Состояние	
ПОА-1	30.0	Вкл	32.0	В работе	

● Основное питание
● Резервное питание
www.unicont.com

Figure 8 – Main screen view

Unitherm - 1022		Тревога			21.08.2020 17:00:03
Имя	Текущая t°C	Подогрев	Задание t°C	Состояние	
ПОА-3	-	-	-	Тревога	

● Основное питание    ● Резервное питание    www.unicont.com

a)

Unitherm - 1022		Предупреждение			21.08.2020 16:45:33
Имя	Текущая t°C	Подогрев	Задание t°C	Состояние	
ПОА-1	36.0	Выкл	30.0	В работе	

● Основное питание    ● Резервное питание    www.unicont.com

b)

Figure 9 – Main screen view in case of error

You can see main “основное питание” and standby “резервное питание” power indication in the bottom left corner of the main screen. If circle indication on the left is green, power is available, if red – not available.

Press “☰” to open a screen with three tabs, see Figure 10. Active tab is illuminated with blue.

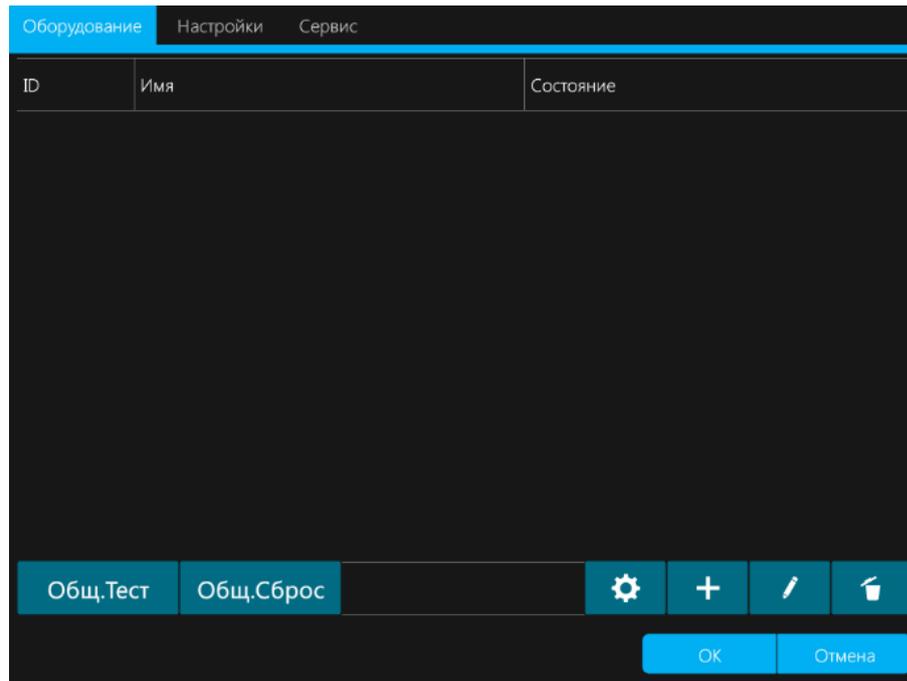


Figure 10 – Repeater’s main menu

### Меню «Оборудование»

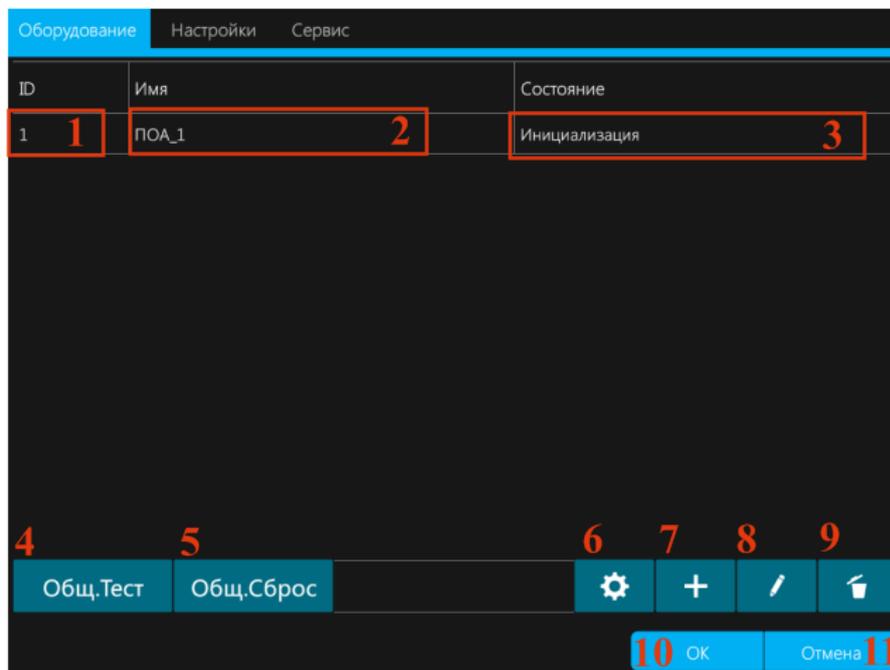


Figure 11 – Menu “Оборудование”

Table 10 according to Figure 11 describes boxes and buttons of “Оборудование” menu.

Table 10 – Menu «Оборудование»

Position №	Name	Description
1	ID	AHU network address
2	Имя	AHU name
3	Состояние	AHU status (“Инициализация” – initialization, “В работе” – operating, “Предупреждение” – warning, “Тревога” – alarm)
4	Общ.Тест	To test all connected AHUs for operation errors
5	Общ.Сброс	To reset all removed errors of connected AHUs
6		To set up default parameters for all connected AHUs
7		To set up name and ID number for a new AHU
8		To edit heating parameters of the selected AHU
9		To delete the selected AHU
10	ОК	To return to the main screen
11	Отмена	To return to the main screen

Table 11 describes parameters which are displayed after pressing “” button.

Table 11 – Description of parameters

Parameter	Default value	Описание
Имя	–	AHU name (this line appears only while editing one AHU)
Задание $t_{зад}$ , °C	20.0	To set up required temperature inside dome “ $t_{set}$ ”
Нижняя граница гистерезиса $-t$ , °C	0.0	Heating will switch on when the temperature falls lower than “ $t_{set} - 0.0$ ”
Верхняя граница гистерезиса $+t$ , °C	5.0	Heating will switch off when the temperature rises higher than “ $t_{зад} + 5.0$ ”
Нижняя допустимая граница $t_n$ , °C	-40.0	If the temperature is lower than the specified one, THs are switched on forcefully
Верхняя допустимая граница $t_b$ , °C	70.0	If the temperature is higher than the specified one, THs are switched off forcefully
Нижняя допустимая граница $I_n$ , А	0.1	If current values of THs are lower than the specified ones, alarm actuates
Верхняя допустимая граница $I_b$ , А	10000.0	If current values of THs are higher than the specified ones, alarm actuates
Время на нагрев $T_n$ , с	600.0	Time ( $T_n$ ) required for temperature increase inside dome when THs are switched on. If time is exceeded, alarm actuates

Parameter	Default value	Описание
Прирост температуры $t_{II}$ за время $T_{II}$ , °C	1.0	Temperature inside dome is to be increased by this value for the specified heating time $T_{II}$
Максимальное различие датчиков $ t1-t2 $ , °C	10.0	Max. difference between two temperature sensors, where $t1$ – readings of first sensor, $t2$ – readings of second sensor. If readings exceed the preset value, warning is displayed
Время выхода на постоянную мощность $T_{пс}$ , с	2.0	Time after start of heating to test TH power
Время на тест $T1$ , с	5.0	Time to test the System. Set 0.0 to disable this option
Период автоматического тестирования $T2$ , с	86400.0	Time for the System self-test (obligatory)
Коэффициент измерителя тока $K_{сиг}$	1.000	Coefficient to correct TH power values. Set up by the manufacturer's representative while providing primary settings
Датчик 1 (Д1) Датчик 2 (Д2)	On On	If one of the sensors has wrong readings, it may be disconnected. Calculations consider minimum value from the values of both sensors
Канал 1 Канал 2 Канал 3 Канал 4	On On On On	One channel corresponds to one connected TH
Текущая версия	V1.3.2	Software version of the selected AHU (this line appears only while editing one AHU)

Default parameters include button “Отправить параметры на все ПОА”; press this button to send the selected parameters to all connected AHUs. To change parameters of a single AHU, choose it in the list and press “”.

While editing, “Обновление прошивки” button that may be used only by the manufacturer's representative is active.

### Меню “Настройки”

Menu “Настройки” is used by manufacturer's representative while providing primary settings of the Product. Figure 12 describes this menu.

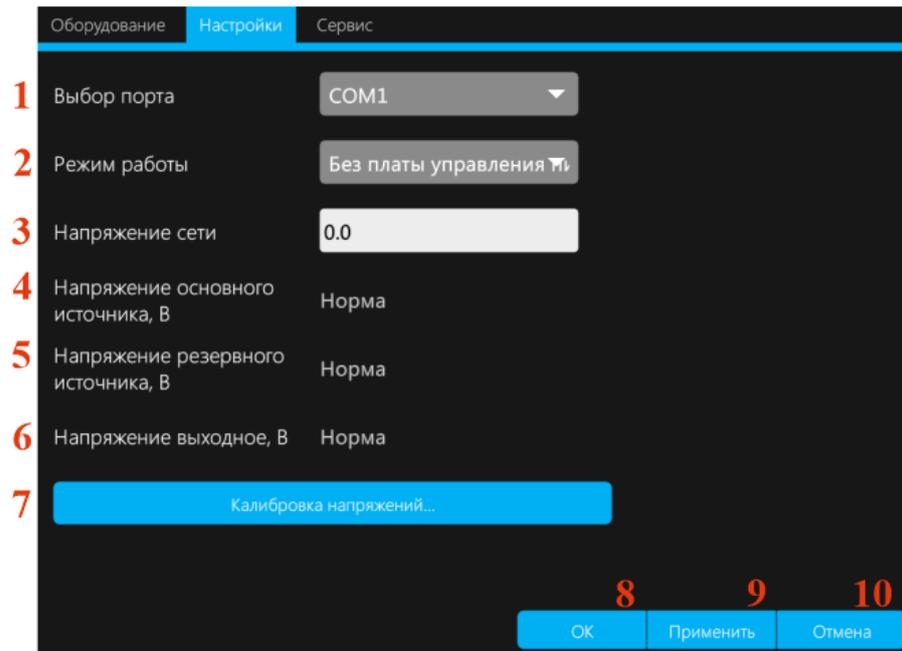


Figure 12 – Menu «Настройки»

If power control board is included in the System, select port (Figure 12, box 1) of connection, and operation mode “С платой управления питанием” (Figure 12, box 2).

If power control board is not used, select operation mode “Без платы управления питанием” (Figure 12, box 2) and set up supply voltage (Figure 12, box 3).

Boxes 4–6 in Figure 12 display “Норма” – when voltage complies with the preset range, or “Авария” when voltage exceeds the range.

Button “Калибровка значений” (Figure 12, position 7) is used only by the manufacturer’s representative while providing primary settings.

To save the provided changes in “Настройки” menu, press “OK” (Figure 12, position 8) to return to the main screen, or “Применить” (Figure 12, position 9) to continue operation in this menu.

To return to the main screen without saving changes – press “Отмена” (Figure 12, position 10).

### Меню «Сервис»

Use “Сервис” menu to set up date and time, and while updating software version. Figure 13 describes this menu.

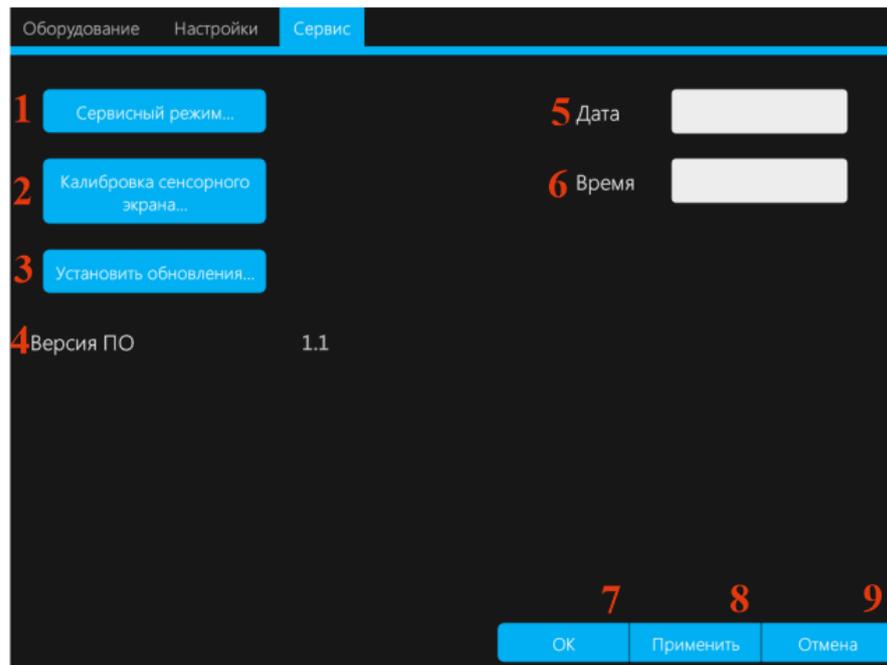


Figure 13 – «Сервис» menu

Button “Сервисный режим” (Figure 13, position 1) is used only by the manufacturer’s representative while providing primary settings.

After pressing “Калибровка сенсорного экрана” (Figure 13, position 2) the screen displays five calibration markers on the white background; tap the markers to ensure touch screen calibration.

Line 4 in Figure 13 displays current software version of repeater.

Lines 5 and 6 in Figure 13 are used to set up current date and time.

To save the changes in “Сервис” menu and then return to the main screen, press “ОК” (Figure 13, position 7); to save the changes in “Сервис” menu and continue working in this menu, press “Применить” (Figure 13, position 8).

To return to the main screen without changes – press “Отмена” (Figure 13, position 9).

### Description of errors

To view alarms and warnings, click any line of the detected error.

The screen will display box with a description of error (Figure 14, position 2) and AHU parameters with a detected error (Figure 14, position 2), where t1 and t2 – temperature sensors data, ТЭН 1 – ТЭН 4 – ТН power data.

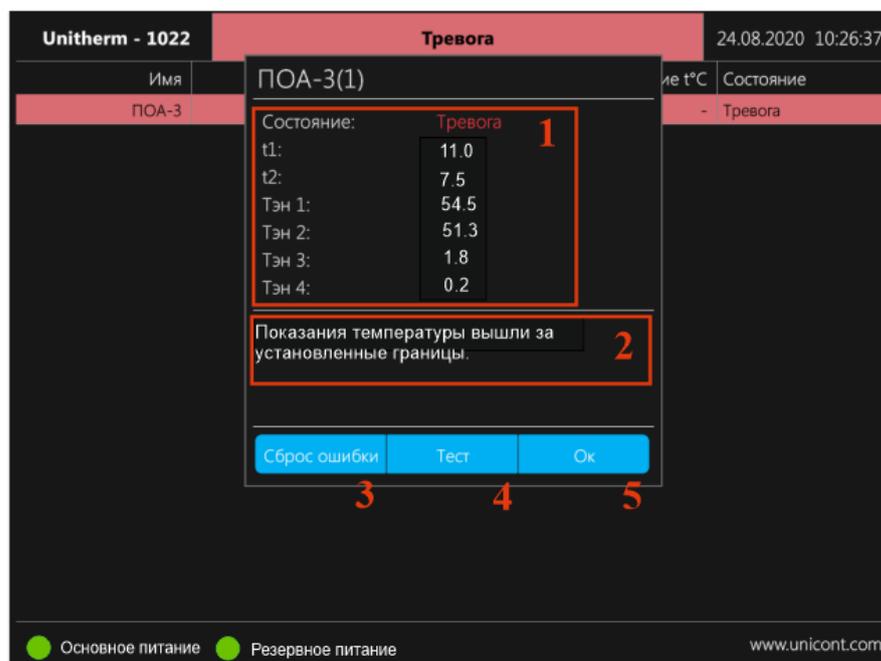


Figure 14 – Example of alarm

Table 12 describes potential problems leading to occurrence of “Тревога” and “Предупреждение” notifications.

Table 12 – Description of errors

Displayed notification	Description of error
<b>Тревога</b>	
Нет соединения с платой нагревателя	AHU power failure
	RS-422 interface cable is not connected or connection is faulty
Показания мощностей ТЭН вышли за установленные границы	All AHU heating elements are faulty or not connected
Неисправность температурного датчика: Д1-i2c, Д2-i2c	Both temperature sensors are faulty
Оба температурных датчика отключены пользователем	Both temperature sensors are disconnected
Показания температуры вышли за установленные границы	Temperature has fallen lower than permissible limit
	Temperature has risen higher than permissible limit
<b>Предупреждение</b>	
Main power circle LED is illuminated with red	No main power supply
Standby power circle LED is illuminated with red	No standby power supply

Displayed notification	Description of error
Показания мощностей тэна N вышли за установленные границы	Heating element is faulty or not connected
Неисправность температурного датчика: Д1-i2c (Д2-i2c)	Temperature sensor error
Неисправность температурного датчика: Д1 – выкл. (Д2 – выкл.)	Temperature sensors were switched off using software
Работоспособность датчиков восстановлена – нажмите кнопку сброс ошибки	Both temperature sensors were switched on using software
Разница показаний температурных датчиков больше заданного значения	Difference between readings of temperature sensors

## 2.4 Junction box KP-124PW

KP is manufactured in metal casing. A grounding stud is located on one side of the casing, nameplate – on the other. KP is equipped with one input power terminal CH1 and 7 outputs. Figure 15 describes a general view of KP. Power circuits are protected with a fuse.



Figure 15 – General view of KP

### **3 INTENDED USE**

#### **3.1 Operational limitations**

Select an installation place in compliance with operational limitations (operating temperature and protection degree).

All SC shall be grounded; all cables shall be insulated.

#### **3.2 Usage preparations**

##### **3.2.1 Safety features**

While preparing the SC for operation, check them visually and make sure there is no mechanical damage.

Connect the SC to power supply considering input power requirements.

Before connection, transfer all automatic circuit breakers of the SC and external power sources to “Off” position; the System shall be grounded.

While using the System 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 the SC on, the installer shall:

- observe visually integrity and initial position of automatic circuit breakers of CSAHS;
- clean the SC from dust and dirt by clean soft cloth, if necessary;
- check fail-safe cable connections to the SC and their proper grounding.

#### **3.3 Intended use**

To switch the System on, an installer shall follow the steps below:

- connect main and standby power supply to the Product;
- connect AHU to CSAHS (if there is one AHU);
- connect AHU to KP, then connect KP to CSAHS (if there are 2 to 20 AHUs);
- transfer automatic circuit breakers of main and standby power supply (CSAHS) to top position;
- wait for repeater software to download;
- make sure that the System is operating correctly.

---

Disconnect the Product in the following order:

- transfer automatic circuit breakers of main and standby power supply (CSAHS) to down position;
- disconnect external main and standby power supply;
- disconnect power cables.

## 4 TECHNICAL SERVICE OF THE SYSTEM

### 4.1 General description

Before performing the TS the staff shall familiarize with the Product structure and operation features, as well as observe this OM in full terms.

In order to provide safe and reliable operation for the Product, 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 equipment in operation. 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 equipment in operation. TS №2 results are registered to the System certificate.

### 4.2 Safety features

While providing TS the staff shall follow instructions, see 5.2.

### 4.3 Maintenance routine

The list of works for all types of the TS is given in Table 13.

Maintenance routine procedure is described in the CL, see Tables 14–15.

Consumables for the TS are represented in Table 8.

Table 13 – TS works

CL №	Type of work	TS	
		TS-1	TS-2
1	Visual check of the Product	+	+
2	Operation test	–	+
Notes “+” – work is obligatory. “–” – work is not obligatory.			

Table 14 – CL № 1. Visual check

To be done	Routine	Man-hours
Examine the Product	1) check completeness and appearance of the Product; mechanical damage, paint defects must be absent; marking plates shall be present; legends shall be read easily; 2) clean up the Product surfaces with clean cloth; 3) remove severe contamination, parts of corrosion, oil spots from the metal surfaces – using ethyl alcohol, avoiding its penetration inside the Product; all surfaces clean dry by clean cloth and dry up; 4) if varnish paint coating is damaged, polish it with sand paper, then clean with alcohol-soaked cloth, cover with varnish and dry up	1 person 15 mins
Check reliability of cable and bus connection to the Product	1) check that connectors and attaching screws are tightened; provide further tightening if necessary; 2) check the cable intactness (no mechanical damage) within visibility	1 person 5 mins

Table 15 – CL № 2. Operation test

To be done	Routine	Man-hours
Operation test of the Product	1) transfer automatic circuit breakers of CSAHS to top position; 2) make sure that main and standby power LEDs, as well as “Power On” LEDs are lighting up with green; 3) wait for repeater software to download; 4) make sure that there are no “Тревога” and “Предупреждение” notifications.	1 person 5 mins

#### 4.4 Long-term storage (preservation)

Preservation protects surfaces of metal parts (devices) against corrosion during long-term storage at the manufacturer’s warehouse and during transportation and storage at the customer’s facilities (warehouse). The SC surfaces intended for preservation (re-preservation) shall not have any corrosion damage; temperature of such SC surfaces shall not be lower than ambient air temperature.

Preservation includes a check for corrosion, surface cleaning and packaging.

Preservation and re-preservation shall be carried out in a clean room in normal climate conditions:

- ambient air temperature:  $+25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ ;
- relative air humidity: 45% to 75%;
- atmospheric pressure: 84.0 to 106.7 kPa (630 to 800 mm Hg).

The room where long-term storage operations are carried out shall not contain any acids, alkalis and other corrosive substances.

#### 4.4.1 Preservation

Before preservation, check that surfaces of metal devices do not have corrosion, clean the surfaces using brush or cloth; apply cleaning products if necessary. Time between cleaning and preservation shall not be more than two hours.

After cleaning, process rubber plugs (if present), inner surfaces of connectors' protective covers, connectors and displays with ethyl alcohol.

### **CAUTION!**

**Do not touch the preserved SC and parts with bare hands during preservation works. Use cotton or rubber gloves**

Use polyethylene film as packing material (cover).

Use fine porous silica gel (1 kg/m<sup>3</sup>).

Before placing the silica gel inside the packaging, bag it, and then mark its weight and brand. Weight of a single bag shall not exceed 1 kg.

After sealing the packaging joints, press out the cover manually to remove excess air from the packaging, make sure it is tight and seal the remaining holes.

Check visually that packaging is intact, and joints are sealed. Holes, unsealed spots, foreign inclusions, bulging and burnouts shall be absent in the sealing.

Time between placing the silica gel and end of sealing shall not exceed two hours.

Storage time without replacement of the silica gel is 2 years.

#### 4.4.2 Depreservation

Depreservation includes opening of polyethylene packaging and removing bags with silica gel.

After this, make sure that the surfaces of devices do not have corrosion, mechanical damage and defects and provide for disinfestation.

#### 4.4.3 Re-preservation

Re-preservation is carried out if polyethylene packaging was damaged or storage period of the Product is expiring without replacing silica gel.

If the Product storage period is expiring (without replacing the silica gel), provide re-preservation. Open (partly) polyethylene cover (or a sleeve if present),

---

replace dehydrating agent and then seal the cover.

If polyethylene packaging was damaged (before expiration of storage period), it is allowed to use silica gel bags that were not damaged. In this case, re-preservation is carried out in a similar way with preservation. Storage time remains the same with the silica gel bags.

#### **4.5 Installation and dismantling**

Use connection diagrams while installing the System.

All metal non-current conducting elements shall be grounded.

Take the SC out of the packaging.

Provide mounting of AHU and connect cables.

Dismantle the System in the reversed order.

## 5 CURRENT REPAIR

### 5.1 General instructions

Control operation of the System according to Table 15.

To provide diagnostics of the problems, see Table 16.

### 5.2 Safety features

Only qualified personnel, examined in occupational safety may perform repair works.

All SC shall be grounded before repair works.

#### **CAUTION!**

**Replacing defected fuses, parts, cables and modules when power of device under repair is switched 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.

### 5.3 Current repair

The service personnel can provide repair works as described in Table 16.

Repair of other defects/malfunctions shall be carried out only by specialists or authorized representatives of the Manufacturer.

Table 16 describes possible problems/defects and their troubleshooting.

Table 16 – Possible problems/defects and troubleshooting

<b>Problem / defect</b>	<b>Potential reasons</b>	<b>To do</b>
<b>Problems in CSAHS operation</b>		
CSAHS fails to provide output power 220 V AC, 50 Hz	No main and standby power	Provide main and standby power supply
	Automatic circuit breakers of main and standby power are in down position	Transfer the automatic circuit breakers to top position
<b>Problems in AHU operation</b>		
AHU is not heating air inside a dome	CSAHS power cable is not connected to AHU	Connect the power cable
	KP malfunction	Replace the KP
	Air temperature inside the dome is higher than the preset one	Wait for air cooling inside the dome

<b>Problem / defect</b>	<b>Potential reasons</b>	<b>To do</b>
	Wrong temperature settings	Check preset temperature values/settings
AHU is constantly operating (heating air)	Dome is damaged	Replace the dome
	Wrong temperature settings	Check preset temperature values/settings
<b>Problems in repeater operation</b>		
Repeater is not operating	The repeater is switched off	Press a button to switch on (off) the repeater on the front panel
	Power connector is not connected	Connect the power connector
	Fuse malfunction	Replace the fuse
	Screen brightness is set to min. level	Increase brightness using brightness key
Repeater displays all connected AHUs with “Тревога” status	No connection with power control board	Check connection with power control board
	No connection with AHU using KP by CAN bus	Check connection with KP
Touch screen does not respond to taps	Touch screen failure	Contact the Manufacturer
<b>Problems in KP operation</b>		
Repeater displays connected AHUs with “Предупреждение” or “Тревога” status	KP power cable is not connected to CSAHS	Connect KP power cable to CSAHS
	AHU power cables are not connected to KP	Connect AHU power cables to KP
	No connection between KP and repeater by CAN bus	Check the cable connecting KP and repeater
	No connection between AHU and KP by CAN bus	Check the cable connecting AHU and KP

## 5.4 Repair using SPTA

During operation, repair the SC by replacing the failed ones from SPTA kit.

To replace the SC from SPTA kit, provide the steps below:

- disconnect the Product from mains power;
- transport faulty SC from temporary storage place to repair facilities;
- remove / dismantle defected SC;
- install the SC from SPTA according to 4.5;
- deliver dismantled SC to temporary storage place.

## **6 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.

---

## **7 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 spaces).

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.

## 8 DISPOSAL

New equipment, the parts of the Product damaged during operation, and any outage 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 Product 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 household wastes**

---

## 9 WARRANTY

The Manufacturer is under warranty obligations in case of correct System exploitation according to the OM. The Manufacturer will not consider damage claims in case of case violation of operating conditions.

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:

“NPK MSA”, LLC

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

Tel.: + 7 (812) 602-02-64, 8-800-100-67-19

fax: +7 (812) 362-76-36

e-mail: [service@unicont.com](mailto:service@unicont.com)



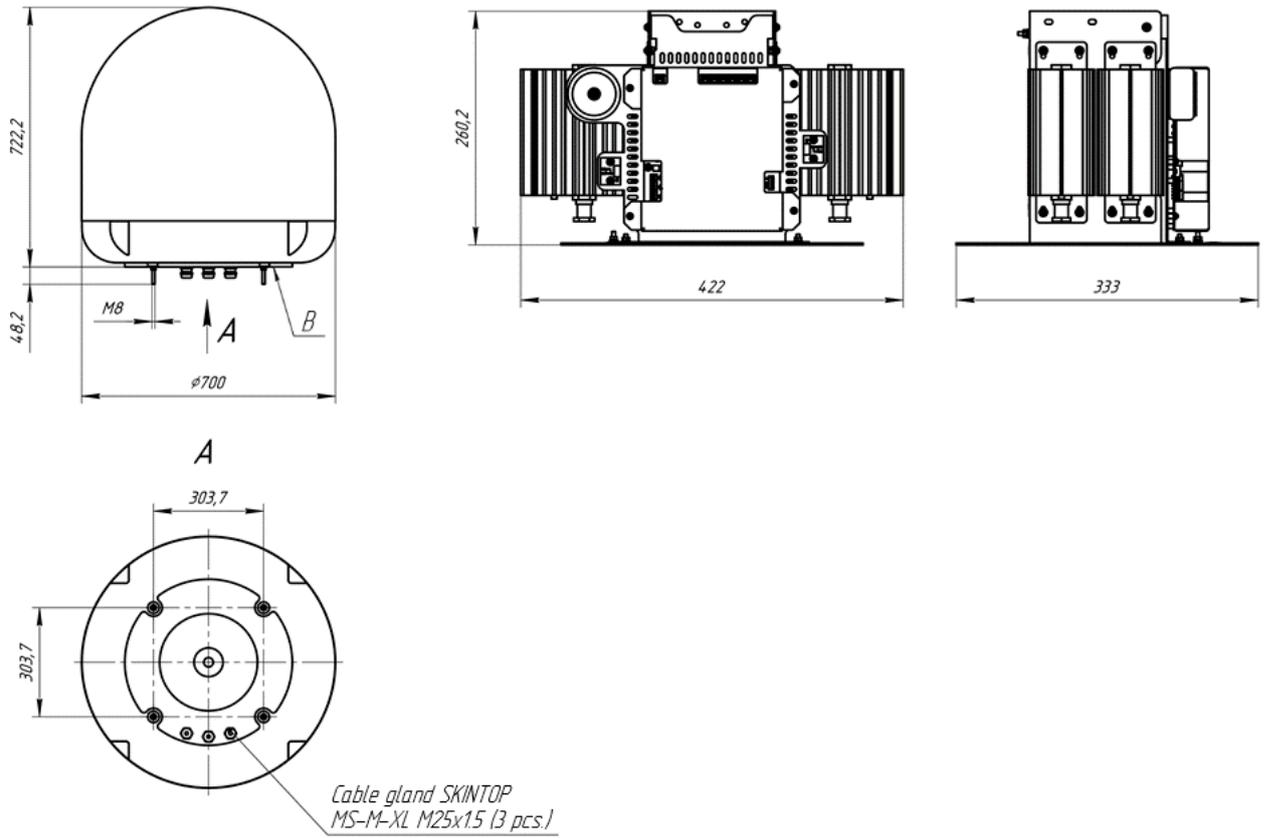


Figure A.2 – Overall and installation dimensions of AHU-2

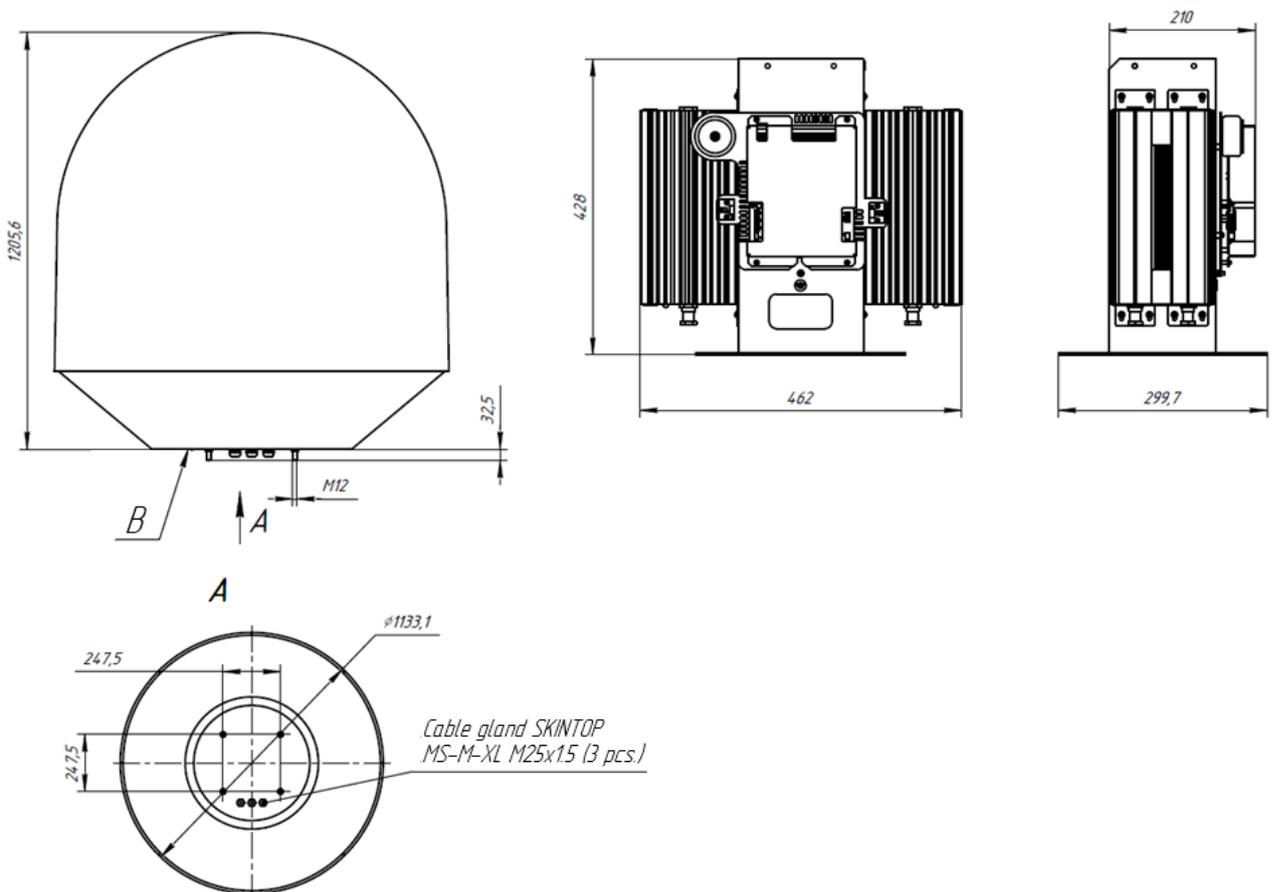


Figure A.3 – Overall and installation dimensions of AHU-3

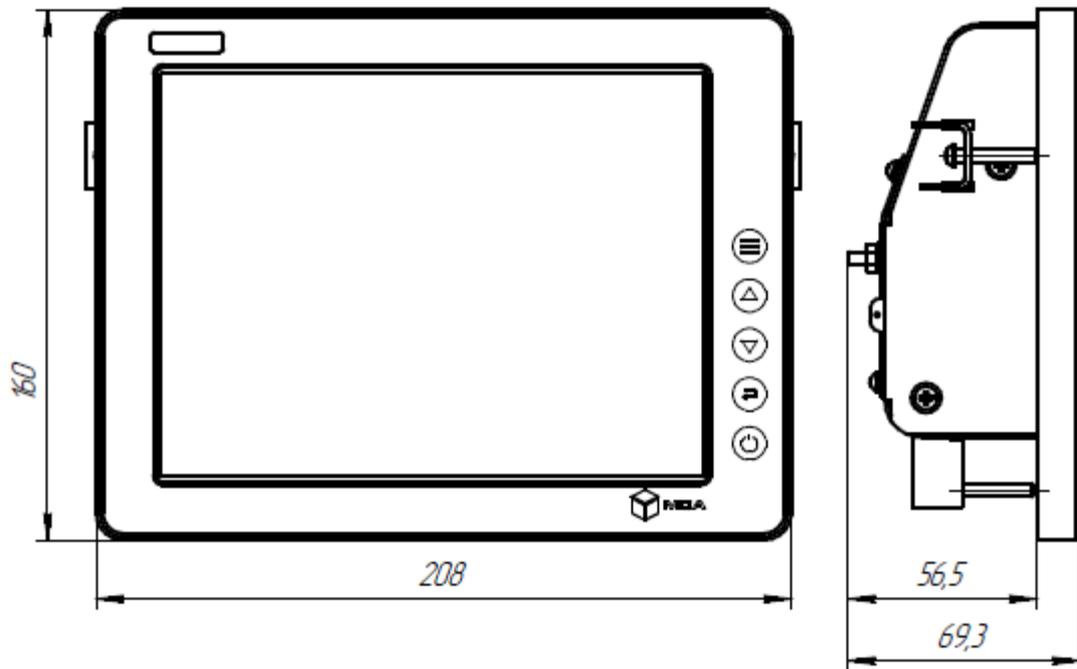


Figure A.4 – Overall dimensions of repeater

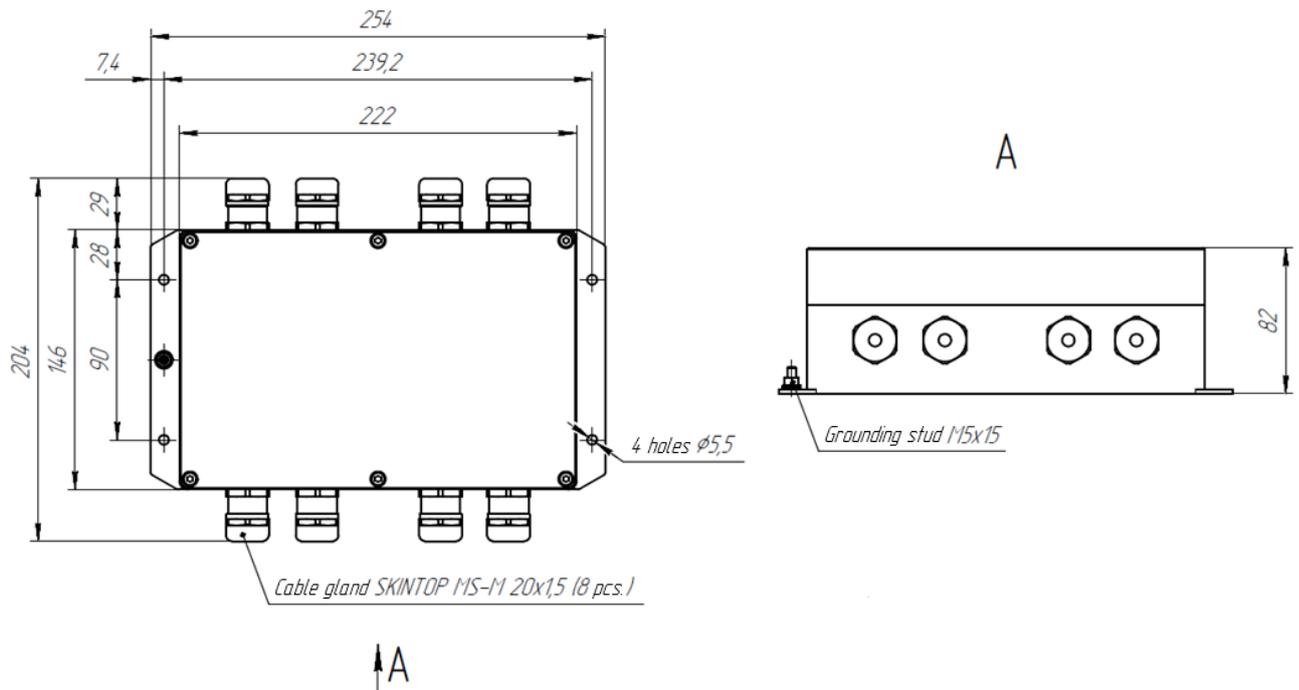


Figure A.5 – Overall and installation dimensions of KP

While installing CSAHS leave 120 mm free space from surface D to connect the Product.

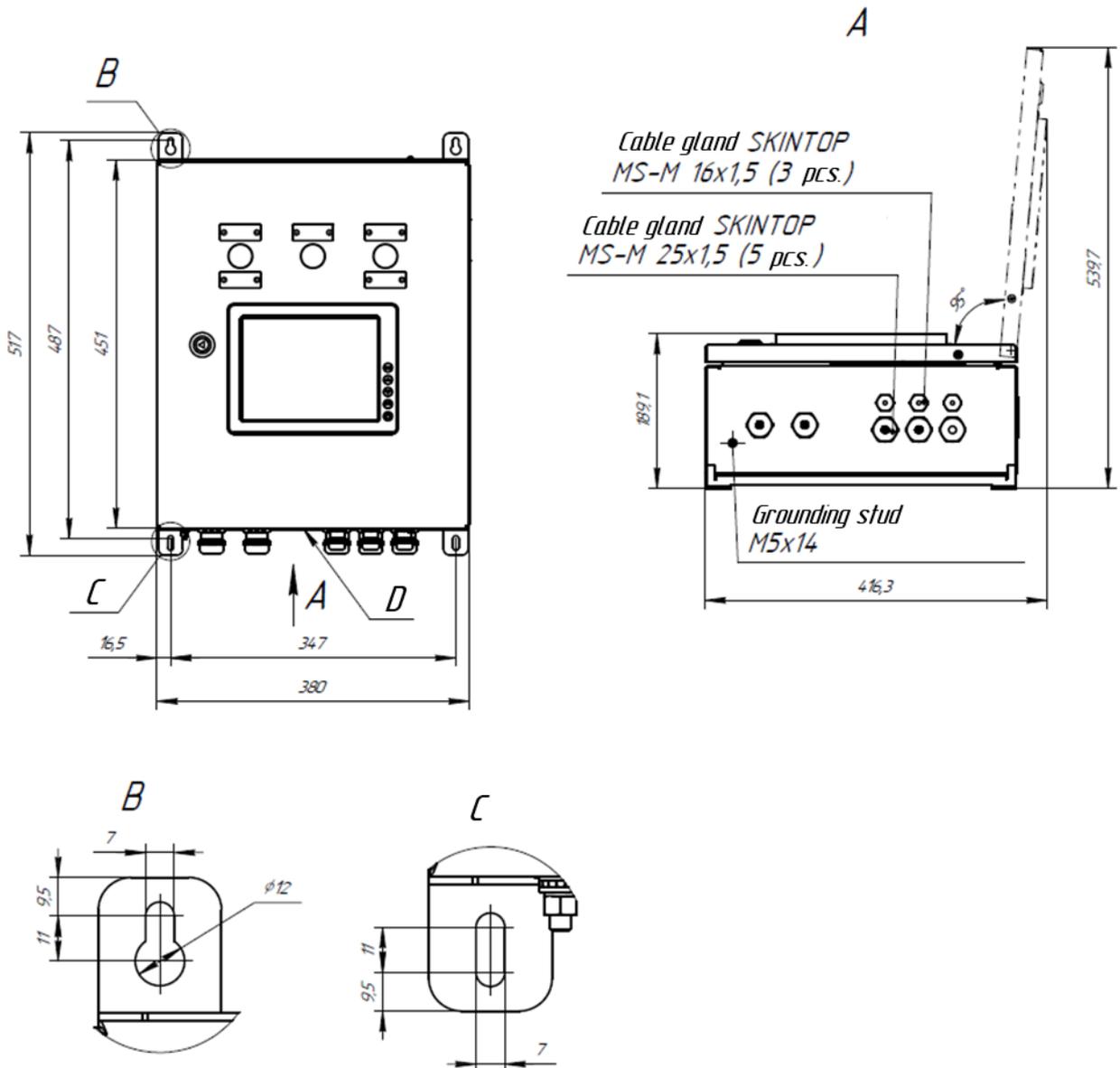


Figure A.6 – Overall and installation dimensions of CSAHS

## APPENDIX B (MANDATORY) CONNECTION DIAGRAMS OF THE PRODUCT

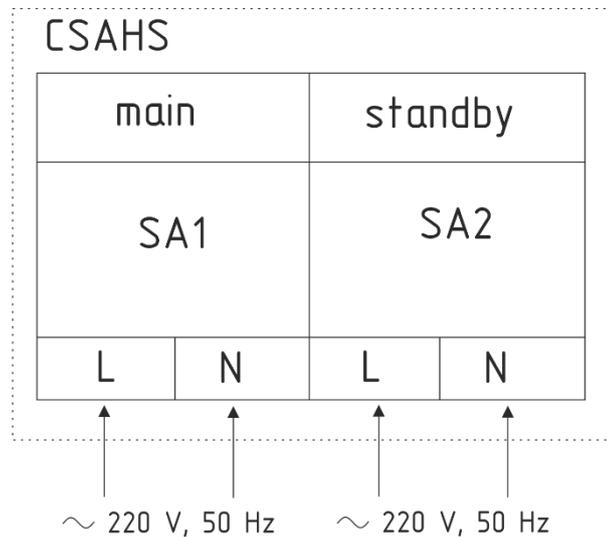


Figure B.1 – Connection diagram of CSAHS to main and standby power supply

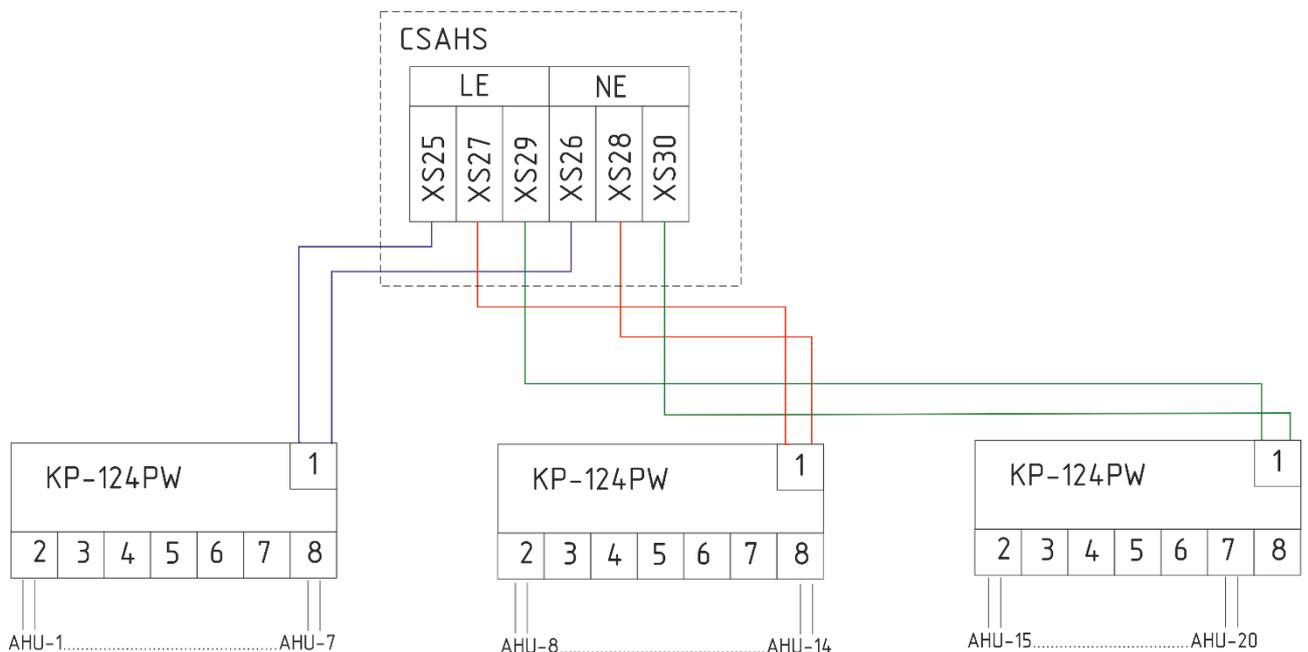


Figure B.2 – Connection diagram of two (and more) AHUs to power supply provided by CSAHS using KP

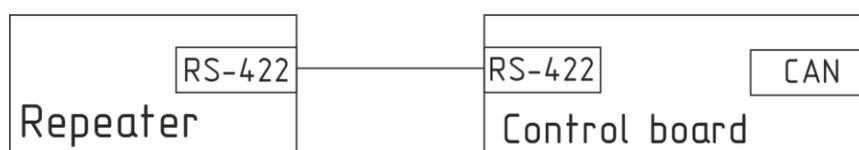


Figure B.3 – Connection diagram of AHU by RS-422

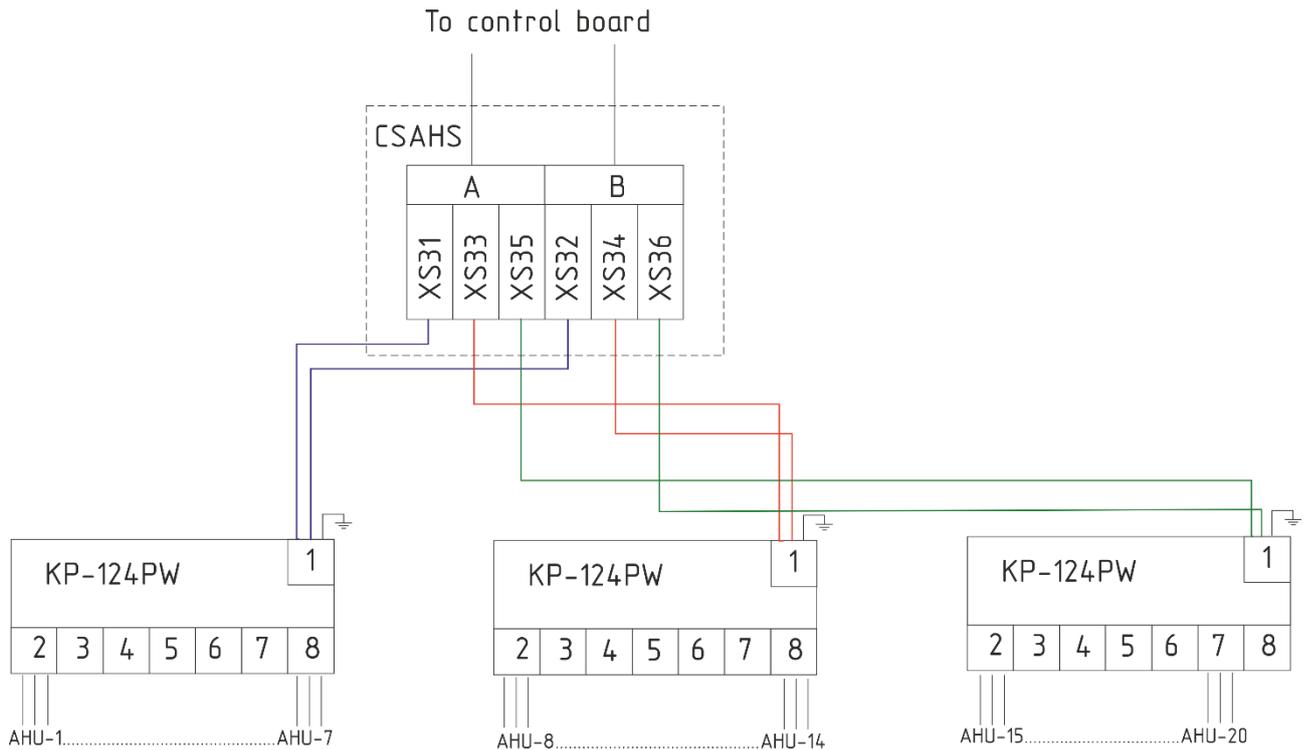


Figure B.4 – Connection diagram of two and more AHUs via CAN

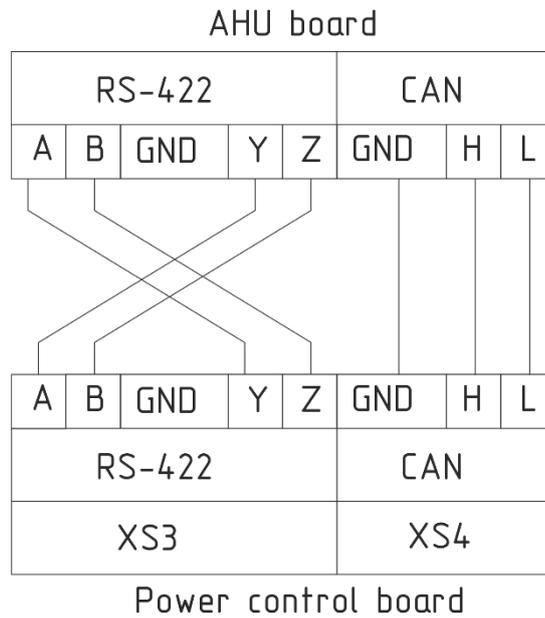


Figure B.5 – Connection diagram of AHU board to power control board

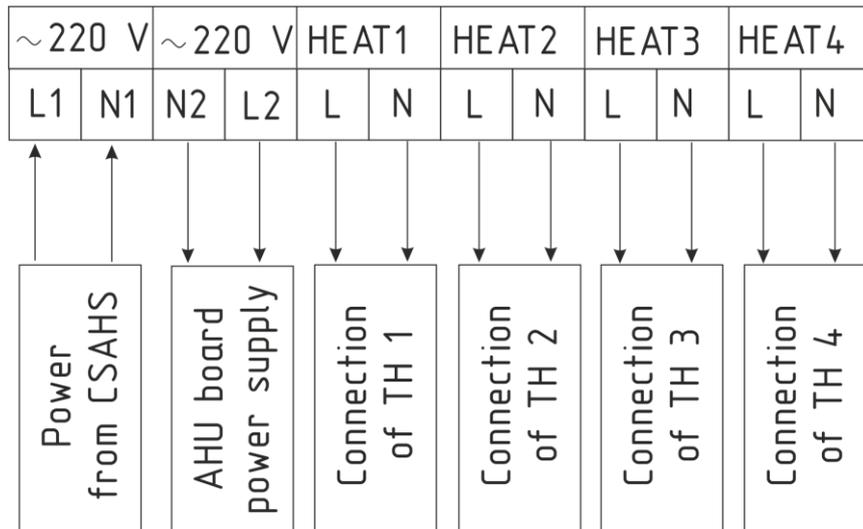


Figure B.6 – Connection diagram of AHU power supply

Table of connection																							
Main input 220 V				Standby input 220 V			CAN				RS-485				Output 220 V to AHU								
XS1	XS2	XS30	XS32	XS29	XS31	XS33	XS34	XS35	XS36	XS37	XS38	XS39	XS40	XS41	XS42	XS43	XS44	XS25	XS27	XS45	XS26	XS28	XS46
N	GND	L	N	GND	L	GND	H	L	A	B	GND	Y	Z	LE	LE	LE	NE						

Figure B.7 – Table of connection