

Spektr IK

Rapidly Deployable Surveillance Kit



OPERATION MANUAL

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This Operation Manual (OM) is intended for proper and safe operation of the Spektr-IK.

Rapidly Deployable Surveillance Kit (referred to as the Product or Kit) and the assessment of its technical condition when considering the necessity to send it for repair. Product maintenance does not require any special training of staff.

1 DESCRIPTION AND OPERATION

1.1 Product Operation

1.1.1 Purpose

1.1.1.1 Rapidly Deployable Surveillance Kit (RDSK)

Spektr-IK is designed to:

- provide security surveillance of temporary objects;
- provide security surveillance of military equipment sites and personnel locations in the field;
- equip personnel of the guard and duty units with portable surveillance equipment - thermal and television ones with additional optics detection functions as well as combined ones;
- temporarily expand the capabilities of security surveillance of stationary objects in specific conditions;
- as a backup means of security surveillance in case of failure of any stationary monitoring system elements - for the period of restoration of the main systems.

RDSK provides continuous monitoring and recording of information on high-security objects applying cameras of visible and infrared ranges, as well as portable surveillance tools with the option of further selection of the required fragment of the recording, its viewing and transmission to external media.

1.1.2 Technical Specifications

1.1.2.1 Maximum range of human detection at least 300 ± 10 m

1.1.2.2 Maximum range of human recognition at least (100 ± 10) m

1.1.2.3 Radio transmission distance in the line of sight:

- for portable camera units (CU) up to 1000 m;
- for portable surveillance tool (PST) up to 500 m;

1.1.2.4 Technical characteristics of thermal imaging CU channel:

- number of sensitive elements is at least 384×288 pixels (17 microns),
- spectral range of 8-14 microns;
- horizontal viewing angle of at least 15° .

1.1.2.5 Technical characteristics of television CU channel:

- number of sensitive elements 1920×1080 pixels (FullHD);
- minimum illumination of up to 0.1 Lux;
- horizontal viewing angle of at least 20° ;

1.1.2.6 CU battery continuous operation time from an autonomous power supply unit at least 24 hours

1.1.2.7 Protection class of CU at least IP65 according to GOST 14254-2015.

1.1.2.8 Technical characteristics of the operator control panel:

- number of received channels is at least 16;
- operating frequency of the transceiver from 4900 MHz to 5900 MHz;
- time of continuous operation from the network 220 V / 50 Hz is unlimited.
- time of continuous operation from the rechargeable battery is at least 3 hours.
- overall dimensions 500x400x200mm;
- weight not more than 20 kg.
- case protection class at least IP65 according to GOST 14254-2015.

1.1.2.9 Technical characteristics of the portable radio transmitter:

- operating frequency of the transceiver from 900 MHz to 1200 MHz;
- time of continuous operation from the rechargeable battery is at least 3 hours
- transmission power: at least 250 mW;
- video signal standard - PAL

1.1.2.10 Special functions and adjustments:

- digital processing of video information from CU and PST in real time with the option of a multi-screen observation mode on one monitor;
 - cyclic viewing of image sequence from CU and PST and programming of viewing cycles (sequence of turning television cameras on);
 - recording of video information from CU and PST and its storage in video archive;
 - recording time in continuous mode at least 360 hours;
 - playback and viewing of information with the option to search for a fragment and setting the sequence of video information sources for viewing;
 - the option to activate motion sensor;
 - option of flare compensation in CU and PST;
 - automatic output of video information to the monitor by a signal from motion sensor with the display of the area where the case occurred;
 - indication of the current state of the system (on, off, recording, battery discharge) and self-diagnosis of the system's operability;
 - providing video registration of moving objects and vehicles in the protected area;
 - information transfer via USB port to an external drive;
 - network connection using Ethernet technology;
- 1.1.2.11. Time to enter operating mode after power-up no more than 3 minutes.
- 1.1.2.12 Climatic operating conditions:
- relative humidity not more than 95% at a temperature of + 25 ° C;

- operating temperatures from -20 to + 50 ° C.
- limit temperatures from minus 40 to plus 60 ° C.

1.1.3. In Box

1.1.3.1 Product Delivery Set is specified in Table 1.

Table 1

Name	Pcs
1 Operator's AWS	1
1.1 Remote control of AWS operator	1
1.2 Tower	1
1.3 AWS receiver antenna	1
1.4 AWS transceiver	1
1.5 AWS mounting kit	1
1.6 Trunk	1
2 Observation Point (OP):	1
2.1 Portable camera unit (CU)	1
2.2 CU tripod	1
2.3 CU antenna	1
2.4 OP mounting kit	1
2.5 Autonomous power unit (APU)	1
2.6 OP Laying	1
3 SPTA Kit of OP	1
3.1 Universal Charger	1
3.2 Autonomous power unit (APU)	2
3.3 SPTA Kit	1
3.4 SPTA repair kit	1
3.5 Laying OP of SPTA	1
4 Radio transmitting set	1
4.1 Portable radio transmitter	1
4.2 Receiving and Encoding Unit	1
5 Portable surveillance equipment 1	1
6 Portable surveillance equipment 2	1
7 Operation Manual Set	1
7.1 Operation Manual	1
7.2 Data Sheet	1
7.3 List of operation papers	1

Note: * Kit composition and the number of supplied devices is determined by agreement with the Customer.

1.1.4 Product Design

1.1.4.1 The product consists of the following main parts (Figure 1):

- automated workstation (AWS) of the security surveillance operator (comprising: operator control panel (CP), transceiver, transmission reception tower) designed for continuous reception, visualization, recording and storage of video information from external sources both over the air and through wired connection.
- observation point (consisting of: portable camera unit (CU), autonomous power supply unit, a unit for receiving and encoding (REU) information), designed to collect and transmit video information from CU and portable surveillance tool (PST) to the workstation;
- portable security surveillance thermal imaging tool (PST 1) and portable surveillance tool with optical detection functions (PST 2), designed to perform special monitoring functions by mobile groups with the option y to transmit information to the workstation using wearable radio transmitters (NR) through the REU;
- a set of spare parts, tools and accessories (SPTA), designed for installation, configuration and ensuring continuous operation of the product.



Picture 1

1.1.5 Design and Operating Principle

1.1.5.1 The principle of the system's operation is based on the wireless transmission of video information from external sources with its subsequent storage to the operator's control panel (CP).

Mobile camera units can be removed from the AWS at a distance of up to 1000 m of direct visibility from the AWP, and the PST up to 500 m of direct visibility from the OP.

The number of CU and PST operating as part of the kit is determined by the features of the terrain, the characteristics of the object under protection, and the configuration of the protected areas. The use case for of protection is shown in Figure 2.

It is allowed to use PST via REU installed on both the OP and the AWS.

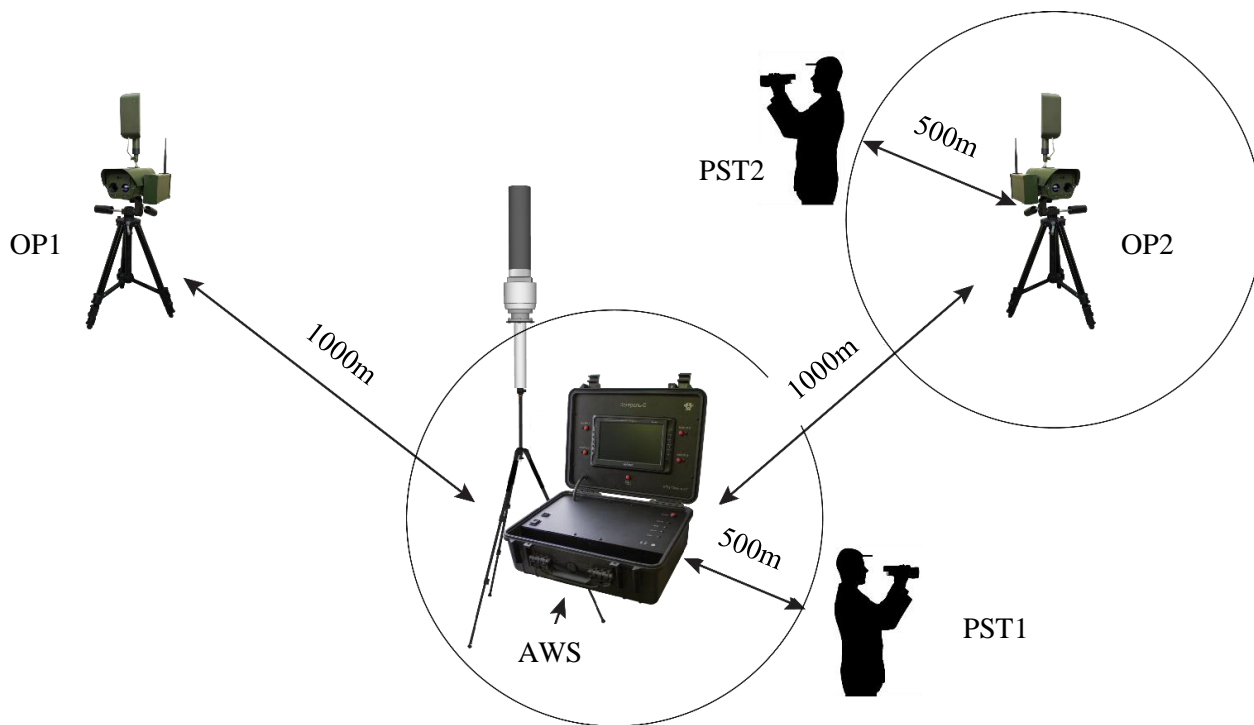


Figure 2

1.1.5.2 An automated workstation (AWS) is located in the place convenient for direct monitoring of remote objects and has the option to connect to both a 220V power supply network and to an information network via LAN connector.

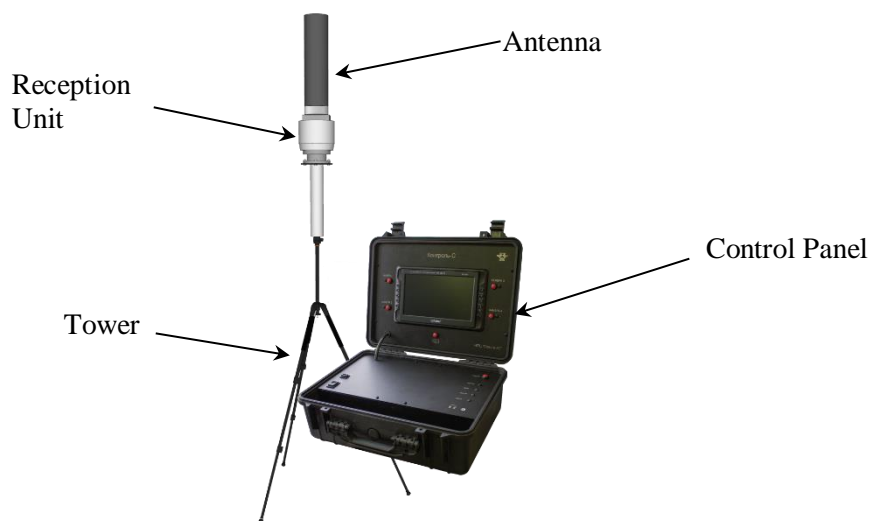


Figure 3

AWS includes (Figure 3):

- operator's control panel (CP);
- reception tower;
- reception unit;
- antenna;

1.1.5.3 The components of the installation of the control panel are shown in Figure 4.



Figure 4

The main components of the control panel and the layout of the controls are shown in figures 5 - 7.



Figure 5

The operator's control panel is made in a shockproof case.

On the monitor of the control panel, there is an option to display images from several cameras at once.

Information from all cameras is recorded and stored regardless of the image on the CP display.

On the top panel of the CP there is a manipulator mechanism of the monitor settings menu. To call the menu dialog box, briefly press the manipulator key. To select the desired menu item, turn the manipulator to the desired side. To confirm the selected item or action, briefly press the manipulator key.

On the bottom panel of CP there is a switchboard panel: network connector, 3.5 mm headphone jack, USB connectors, LAN1 to LAN5 connectors. The connector designations are shown in Figure 6.

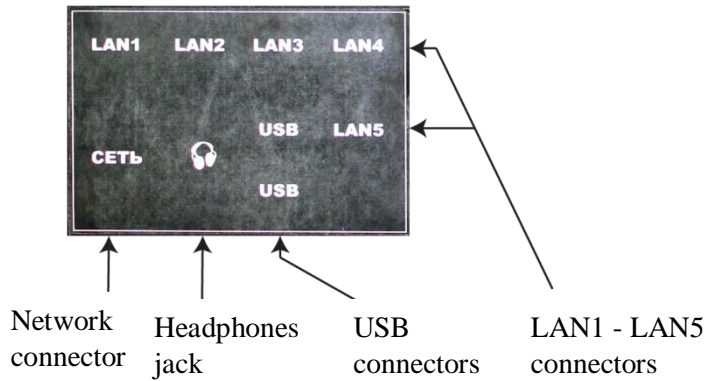


Figure 6

In the upper part of the CP bottom panel there is a power-on and indication panel.

The Power button serves to supply voltage to the CP devices, and the Start button - to run the system and exit. When CP is operating from a network with a charged battery, the NET / CHARGE indicator is green; when CP is operating from a network with a discharged battery, the NET / CHARGE indicator is red. Battery charge indicators will be if battery charge level is 5 and 20% (figure 7).

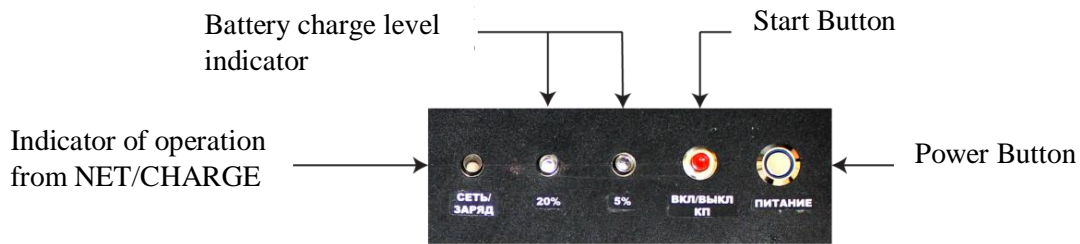


Figure 7

The system is controlled by a coordinate input device of the Mouse or Keyboard type. Keyboard device is not included in the delivery set.

1.1.5.4 The observation point of the complex is shown in Figure 8.

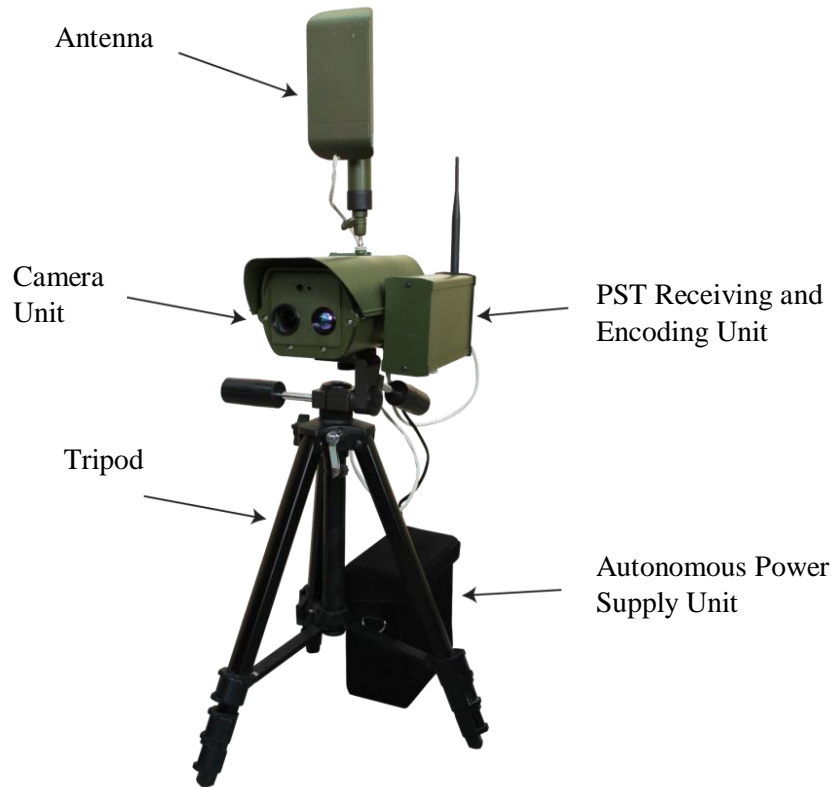


Figure 8

The components of arranging the observation point are shown in Figure 9.



Figure 9

1.1.5.5 Wearable radio transmitter (RT) to connect a wearable observation module is shown in Figure 10. Wearable radio transmitter is a module consisting of the following components:

- radio transmitting module;
- antenna;

RT power supplies are located in the radio transmitting module.

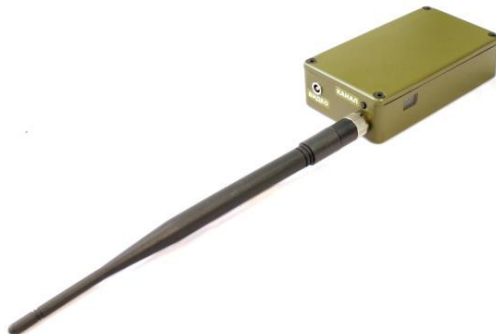


Figure 10

1.1.5.6 The components of the spare parts installation are shown in Figure 11.

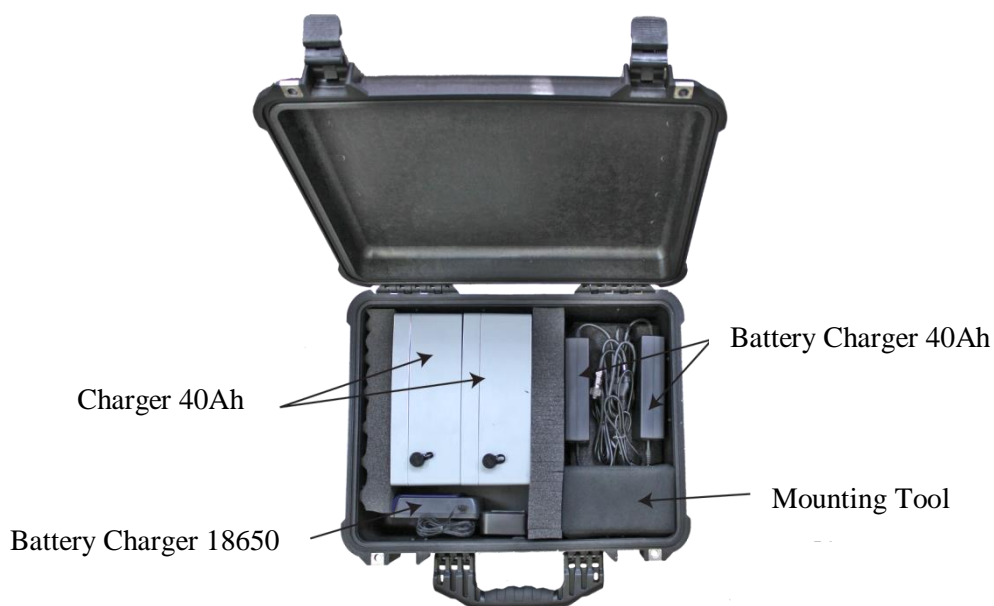


Figure 11

1.1.6 Marking and Sealing.

1.5.1. Marking of the product, which includes short name of the manufacturer, individual serial number, part number and year of manufacture is marked on the code plate on the case of the control panel and on the package (case).

1.1.6.2. The product is sealed (if needed) on a standard package (case). The product itself is not sealed.

1.1.7. Package

1.1.7.1. The control panel of the product is located in a plastic case.

1.1.7.2 The product in a standard package is packed in a matched transport packaging (cardboard box). The product is sealed and unsealed by the representative of the Quality Department.

1.2. Description and Operation of the constituent parts

1.2.1 Description and operation of portable surveillance tools PST 1 and PST 2 are specified in operation manuals 201219.002, 201219.004.

2 USING THE PRODUCT

2.1. Operational restrictions

2.1.1. Before starting, carefully read this Operation Manual

2.1.2 When finished, power off the device to prevent battery discharge during transportation and storage.

2.1.3. **Do not** open the product, replace batteries, or remove protective lid of the battery compartment

2.1.4 **Do not** immerse the product into water, do not power the product in case of water ingress, do not operate the product at temperatures beyond the limits specified in p. 1.2.12.

2.1.5. Replacement of battery should be carried out only when the device is powered off.

2.1.6 **Do not** power the device with other sources, including structurally similar, except for regular rechargeable battery and a standard power supply unit.

2.1.5. Do not direct the lens of the camera unit into the sun, open flame or extremely hot objects, including in the off state because long-time exposure to high intensity radiation can cause permanent damage to the radiation receiver.

2.1.6. Before using the product, it should be noted that the higher ambient temperature level, the lower detection characteristics by a thermal imaging module. Also direct solar radiation dramatically reduces product efficiency. Maximum efficiency is achieved in the dark, cold season or in cloudy cool weather.

2.2 Getting Started

2.2.1 To set observation points, perform the following actions.

Based on the tasks set, select observation sites that are remote from the command post by no more than 1000 m of direct line of sight and involving installation of tripods (or tripod mounts).

It should be noted that with a standard installation, the angle of view of the television channel of one camera unit is 90 °. Select the direction of observation, taking into account the overlapping zones from the camera blocks.

Remove the components of the OP from the case and make sure that there is no mechanical damage. Mount camera blocks on tripods or tripod mounts (Figure 12).



Figure 12

Install OP antenna as shown in Figure 13.



Figure 13

With the supposed use of PST in the OP area, install REU as shown in Figure 14



Figure 14

Connect antenna cable and the REU cable to the LAN connectors of the camera unit (Figure 15).
Connect APU cable to the 12V connector of the camera unit.
All cable connections through the OP connectors (CU, REU, antenna) should be made only when the power is off.



Figure 15

Mount the tripod on a flat, solid surface. If necessary, fix its position with a halyard using a tripod hook (Figure 16).



Figure 16

Note - If it is necessary to expand the surveillance zone of OP and not use PST, it is allowed to connect the second block of cameras to OP through free LAN connectors instead of the REU (Figure 17).

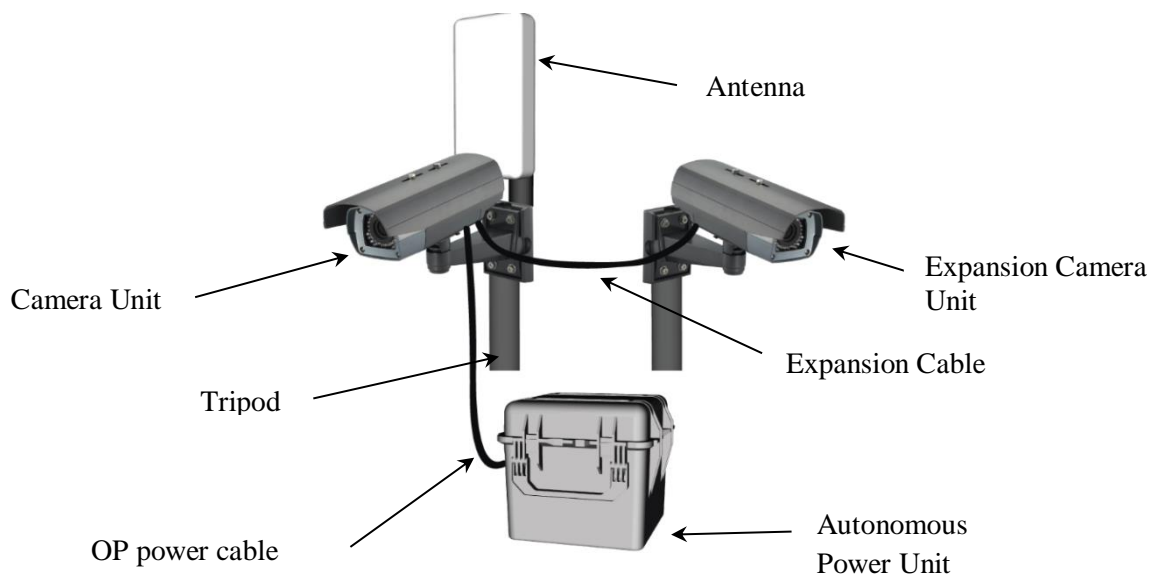


Figure 17

Point the camera block at the selected observation zones using tripod mechanisms, then securely lock it.

Orient the transmitter antenna towards the base station.

After installing the camera unit, it is allowed to mask the observation point (camouflage networks, vegetation, etc.) without blocking the entrance pupils of camera unit optics.

Turn on autonomous power supply using toggle switch on the CU case.

Red LED will be on to indicate the OP is ready for operation.

To charge the battery of the observation point, disconnect REU from CU, remove the battery from the case, connect charger 40A • h to the battery and carry out charging for 8 hours (Figure 18).



Figure 18

2.2.2 To set the base station (AWS) perform the below actions.

Select installation location of AWS based on the tasks (command post, security post, etc.). In a stationary installation, the AWS is connected to a 220 V network and information network (via LAN connector).

In case of an autonomous installation (temporary guard post), it must be taken into account that the autonomous operation of the control panel is 3 hours, after which the battery needs to be charged.

Remove the AWS components from the CP case and tower laying and make sure that there is no mechanical damage.

Select a location for the tower, taking into account the length of the connecting cable (15 m).

Install receiving unit and antenna on the top of the tower, as shown in Figure 19.



Figure 19



Figure 20

Secure the cables with a special screw.

Connect the antenna to the receiving unit (Figure 19).

Lift the tower and securely lock all connections.

Connect the connecting cable to the receiving unit and LAN connector of the control panel (Figure 6).

In the case of using PST in the area of the workstation, install REU on the tower (Figure 19). Connect the connecting cable (15 m) to the REU and the LAN connector of the control panel (Fig. 6, 20).

The required tower height can be adjusted during operation by the stability of the signal transmission from the camera units.

If possible, connect control panel to the 220 V network using a network cable via CP 220V connector (Figure 6). Charging CP battery pack occurs automatically when connecting CP to 220V network. Full charging takes 8 hours. Battery charge level is displayed on the CP Power-On and Display panel (Figure 7).

2.3. Operation in extreme conditions.

2.3.1. In case of fire on the device, power off the device and take measures to put out fire.

2.3.2. In case of emergency operating conditions (high temperature, humidity, vibration, etc.), take measures to reduce the impact of emergency factors on the product.

3 TECHNICAL MAINTENANCE OF THE PRODUCT

3.1 General Guidelines

3.1.1 This section defines the types, frequency and sequence of operations, as well as the methodology for the maintenance of the systems and elements of Spektr-IK RDSK.

3.1.2 To ensure reliable and trouble-free operation of the product, service personnel must monitor technical condition of Spektr-IK RDSK and conduct its maintenance on time.

3.1.3 If a violation of these rules or malfunctions that are dangerous to people are detected, service personnel must immediately power off the product and report to the supervisor about the malfunction and the measures taken.

3.1.4 Maintenance should provide:

- continuous technical serviceability and continuous systems and elements of Spektr-IK RDSK.
- elimination of the causes of premature wear, malfunctions and breakdown of parts, components and mechanisms;
- maximum extension of overhaul periods;
- operational safety.

3.1.5 Do not violate the periodicity and reduce the scope of maintenance work recommended in this Operating Manual.

3.1.6 During maintenance and troubleshooting, do not change the design of components, schematic diagrams, installation of blocks, butting of harnesses and cables.

3.1.7 After technical service has been carried out, entries should be made in the relevant sections of the data sheet (passport).

3.1.1 Characteristics of the adopted maintenance system

3.1.1.1 The basis of technical maintenance is a preventive system based on the mandatory performance of all maintenance work on the systems and elements of Spektr-IK RDSK KTSN during its operation.

3.1.1.2 The following types and frequency of maintenance are recommended:

- DTM - daily technical maintenance;
- TM-1 - monthly technical maintenance;
- TO-2 - seasonal technical maintenance.

4 STORAGE

4.1. Storage conditions.

4.1.1. The device must be stored packed at no vapors of acids, alkalis, and other chemically active substances.

4.1.2 It can be stored in a standard package when stacked (horizontally, with the lid up) on the shelves with up to 4 products. Stacking in a vertical position is not allowed.

4.2. Storage life

4.2.1. In heated rooms where the devices are stored, storage conditions 1 or 1.2 must be provided in accordance with GOST 15150-69. The average shelf life should be at least 5 years.

4.3. Terms of placing the product in storage and withdrawing it from storage.

4.3.1. When placing the product for storage, pack it in standard package and place on the corresponding cells. When withdrawing it from storage, the components of the product should be removed from the package and kept under standard climatic conditions for at least 12 hours.

5 TRANSPORTATION

5.1 Requirements for transportation and transportation conditions.

Transportation of the packaged product should be carried out by the following means of transport:

- air - no restrictions on range and height;
- railway - no restrictions on range of transportation;
- automobile - no range limitations (on highways with speeds up to 60 km / h, on unpaved roads - up to 40 km / h);
- sea and river - in the hold of vessels without restrictions on range and speed.

5.2. The procedure to prepare the product for transportation and methods of attachment during transportation.

5.2.1 When preparing for transportation, depending on the type of transport, the requirements set in the relevant regulatory documents must be met.

5.2.2 When transporting the product, its reliable fastening and the prevention of its movement during movement should be ensured.

5.2.3 When transporting at negative temperatures, the devices must be kept without packaging under normal conditions for at least 12 hours before switching on.

6. DISPOSAL

6.1 Product disposal must comply with environmental standards.

6.2 The batteries used in the product, after the end of life (or failure), must be disposed at a specialized enterprise in the prescribed manner.

6.3. Arrangements for preparation and shipment of the product for recycling include disassembly, disassembly into components and parts with homogeneous materials.

6.4. Materials are sent for recycling in the order established by the consumer.