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**DOSIMETER**  
**MKS-85B «Schoolboy»**

Operation manual

СУДЕ.233.000.00 РЭ

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The following manual, going with a passport (hereinafter referred to as a manual), is designed to study the device – dosimeter MKS-85B «Schoolboy» (hereinafter - the dosimeter), its design and maintenance. The manual contains basic technical specifications and information necessary for proper maintenance of the dosimeter and the way of its verification.

Some changes in electric circuit, software, and dosimeter design can be made during its manufacturing that do not affect technical and metrological characteristics, and therefore are not reflected in this manual.

The dosimeter is a mean of measurement to be used by a wide range of specialists whose work requires continuous radiation control and record of accumulated dose. The dosimeter is also recommended to everyone who is concerned about the state of the environment in the places of residence, work and rest, or in different circumstances, may be exposed to ionizing radiation.

*Attention! The device does not enable to measure equivalent dose and dose rate of x-ray radiation of medical x-ray devices, as medical x-rays in order to reduce the damaging effects on biological tissues have a range of energies of gamma-quanta from 20 Kev, that is outside of MKS-85B measurement capabilities. Please, use special equipment to measure “soft” x-ray radiation to research radiation levels of medical x-ray devices.*

The device allows to evaluate the radiation safety of working places, habitation, ar-  
ea. The device is easy to use, has only two management bodies (buttons).

Check the package contents, integrity of the seal on the back cover and operation in all modes during the purchase of the device.

Protect the device from blows and mechanical damage, corrosive media, organic solvents, fire sources, magnetic and electric fields. It is not recommended to place the device near mobile phones and other sources of high-frequency electromagnetic radiation, as this may lead to wrong readings.

## **1 GENERAL DESCRIPTION AND OPERATION FEATURES**

### **1.1 Use and application**

Dosimeter-radiometer-clock-thermometer MKS-85B «Schoolboy» is designed for:

- continuous measurement of individual equivalent dose (hereinafter - ED) of external gamma and x-ray (hereinafter - photon) radiation;
- continuous measurement of ED accumulation time;

- measurements of individual ED rate of external photon radiation (hereinafter - EDR);
- transmission of data on measurements to personal computer (PC) via USB.
- Time and temperature indication.

The dosimeter is recommended in the sphere of state regulation of ensuring the uniformity of measurements:

- activities in the environmental protection area;
- activities to provide security in emergency-situations;
- activities to exercise production control over observance of industrial safety requirements (established by the legislation of Russian Federation) when using dangerous production;
- work to provide safe conditions and labour protection.

The dosimeter is a portable tool to measure and has «pocket» dimensions.

The dosimeter has bilingual (Russian/English) built-in menu settings.

The dosimeter is powered with a lithium-polymer battery, rechargeable via USB port.

## 1.2 Technical specifications

EDR measurement range	from 0,10 to $2 \cdot 10^6$ mcSv/h
ED measurement range	from 0,01 to 999 Sv
Discontinuity of time indication of ED accumulation	1 h
Limits of basic relative accuracy	$\pm 25$ %.
The range of photon energy during dose rate level measurement	from 0,04 to 10 MeV
Energy dependence of readings does not exceed	$\pm 30$ %
Number of preset threshold levels for EDR	3
Adjustment range of threshold levels	from 0,1 to 999 mcSv/h

Instability of dosimeter readings for 24 hours of continuous operation  $\pm 10\%$ .

Duration of continuous operation from fully charged battery (when measuring the level of natural radiation background, without the use of backlight LCD) Over 100 h.

The dosimeter is powered with a lithium-polymer battery nominal voltage of 3.7 V, or through a miniUSB connector when connected to a PC or any charger with USB output.

Volume of archive 483 recordings (time since startup of the dosimeter - in seconds, the EDR in mcSv/h)

Full charging time Not longer than 4 h.

Additional relative accuracy with changes in temperature from minus 20 up to +50 °C  $\pm 10\%$ .

Additional relative accuracy with changes in humidity from normal to 98% at 35 °C  $\pm 10\%$

Operating conditions

- temperature of ambient air from minus 20 to plus 50 °C;
- relative humidity not more than 98 % at temperature + 35 °C;
- atmospheric pressure from 84 to 106.7 kPa.

Overall dimensions 110x33x17 mm.

Weight of the dosimeter with battery Not more than 45 g

### 1.3 Design and operation

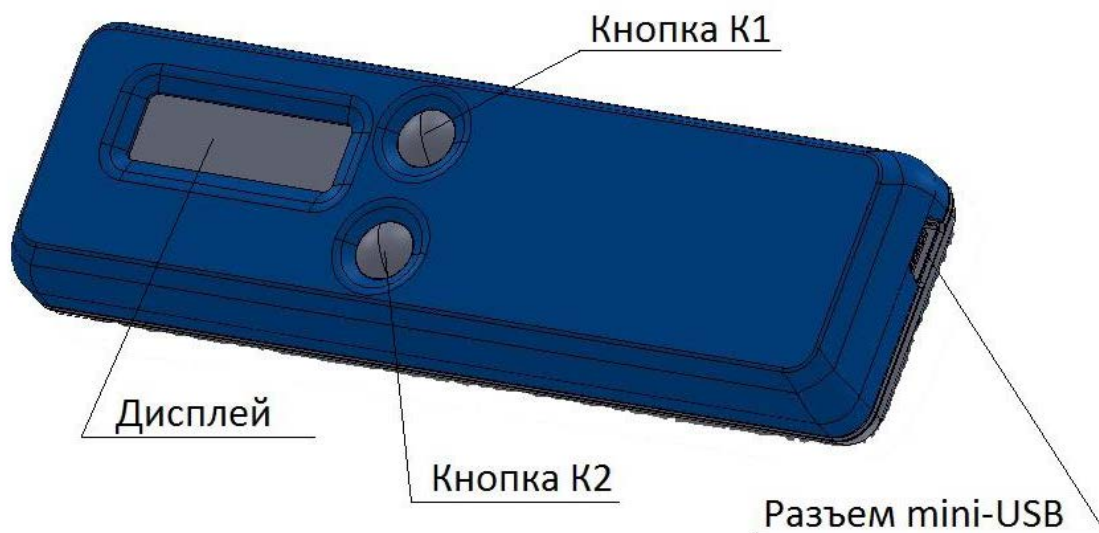
The dosimeter as a radiation detector is applied with a semiconducting detector with built-in power supply. The detector converts a flux of gamma-rays into a sequence of electric impulses. These impulses are amplified and fed to a microcontroller providing the accumulation and processing of data, operation of modes of the dosimeter, sound signalling device and the liquid crystal display (hereinafter - LCD).

The algorithm of readings processing provides the adaptation to the dose rate level, automatically sets the minimum measurement time and fast reaction on abrupt change of EDR (10-30 seconds).

The dosimeter has the internal nonvolatile memory, which allows to save custom settings when swithching off the dosimeter. At the next start up settings will be restored.

On the housing of the dosimeter (Picture 1) there are:

- the display;
- control buttons;
- the mini-USB connector.



Picture 1 - General look of the dosimeter

Display

Button K1  
Button K2

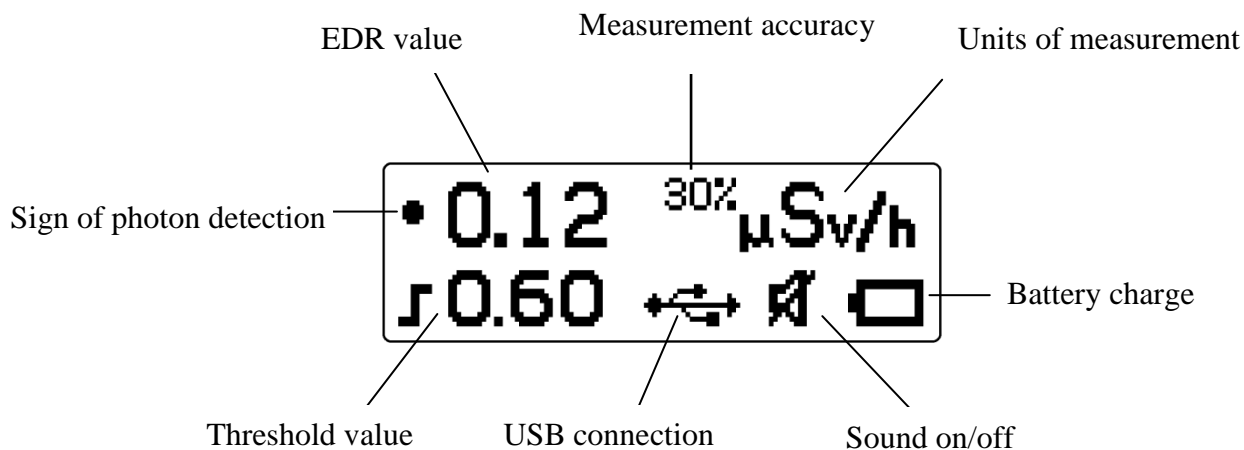
Mini-USB connector

The dosimeter has a graphical display, which shows all the necessary information. There are five main information modes on the display:

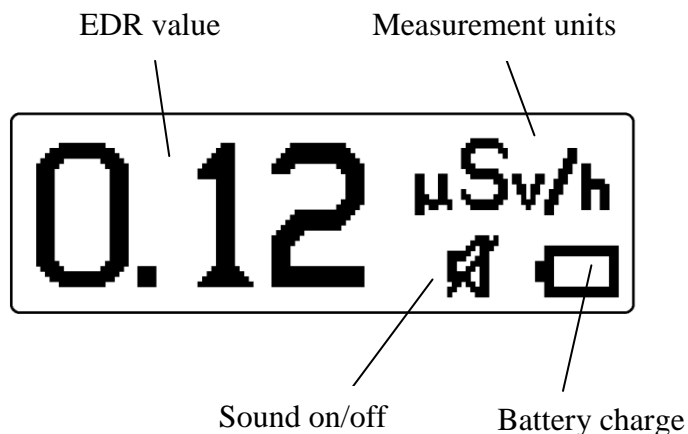
- EDR display mode, in detail, finely;
- EDR display mode, briefly, coarsely;
- ED display mode, in detail, finely;
- ED display mode, briefly, coarsely;
- Mode menu.

In the modes «in detail» the following information is shown on the display:

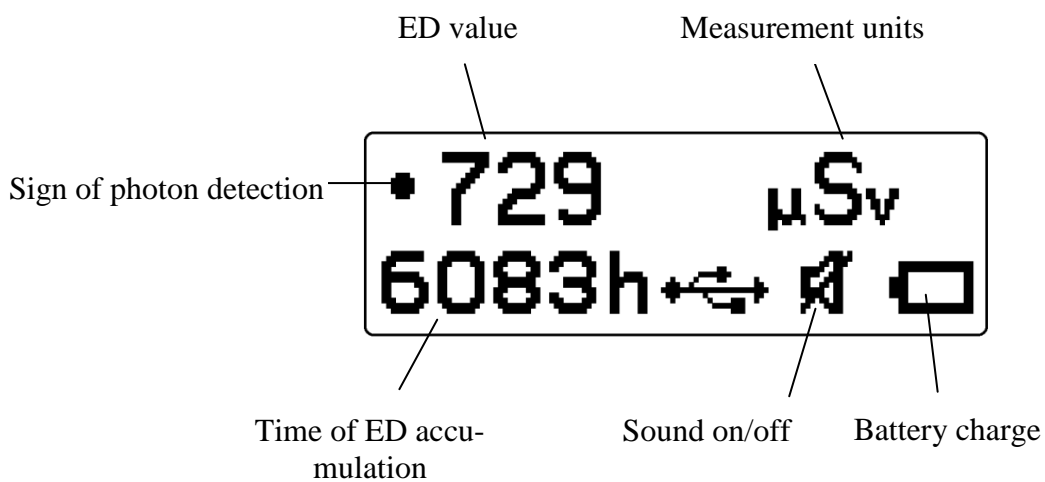
- value of a measurand (EDR or ED, depends on the selected display mode);
- the unit of measurement;
- the statistical accuracy of the measurement (in EDR display mode);
- sign of characteristic photon detection;
- value of the current threshold alarm when exceeding the level of dose rate in Sv/h (in EDR display mode);
- time of dose accumulation in hours (in ED display mode);
- sign of the USB cable connection;
- the charge of the battery;
- status beeper.



Picture 2 - Location of data on the dosimeter display in EDR display mode, in detail;

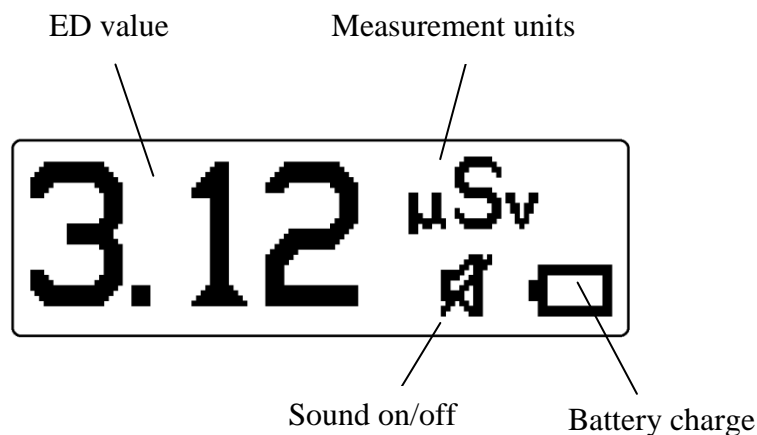


Picture 3 - Location of data on the dosimeter display in EDR display mode, briefly;



Picture 4 - Location of data on the dosimeter display in ED display mode, in detail;





Picture 5 - Location of data on the dosimeter display in ED display mode, briefly;

In modes «briefly» the measurement result is displayed in large print, while the threshold value, the sign of USB cable connection and the measurement accuracy (see Pictures 3, 5) do not appear.

The dosimeter is operated by two multifunction buttons that have different functions depending on the specific situation. When you enter the menu, icons (in front of the buttons) facilitate navigation through the menu structure.

## 2 MAINTENANCE

### 2.1 Working limits and safety precautions

2.1.1 It is necessary to study the present Manual before using the dosimeter.

2.1.2 Keep the dosimeter against mechanical impacts, dust and dampness. Do not spill water on housing and inside.

2.1.3 Charge the battery in time.

2.1.4 Background readings may increase if radioactive substances get on the housing of the dosimeter. Make sure there is no overestimated background, having measured background readings of the dosimeter in various places on the site, or in different rooms. Produce the decontamination of the dosimeter housing without its diving into decontamination solutions.

2.1.5 It is not recommended to place the device in the immediate vicinity of mobile phones and other sources of high-frequency electromagnetic radiation, this can lead to wrong results of measurement.

2.1.6 Do not expose the dosimeter to high temperatures in order to avoid the damage of lithium-polymer battery.

2.1.7 When using the dosimeter on the site contaminated by radioactive substances, specialists should use personal protective equipment to minimize the possibility to get infected, and to pollute the housing of the dosimeter. During the measurement of deliberately contaminated objects, it is recommended to place the dosimeter into a disposable plastic bag.

### 2.2 Getting started

2.2.1 Click and hold button K1 for 5 seconds (Picture 1) in order to switch on the dosimeter. If it is not on, you must charge the battery in accordance with p. 2.2.2. When the dosimeter is on, it begins the measure and first evaluation result appears in 10...40 seconds.

2.2.2 The battery is charged when the dosimeter is connected to a PC or any adapter with a mini-USB connector (cable is attached). Sign of battery charging appears on the display. When charging is finished the battery icon becomes completely filled.

## 2.3 Change of the parameters and modes

### 2.3.1 Switching display modes

Click button K1 briefly to switch between EDR and ED display modes. In EDR or ED display mode the dosimeter display (Pictures 6, 7) looks as follows:



Picture 6 – The dosimeter display in EDR and ED display modes, in detail;



Picture 7 – The dosimeter display in EDR and ED display modes, briefly;

### 2.3.2 Menu.

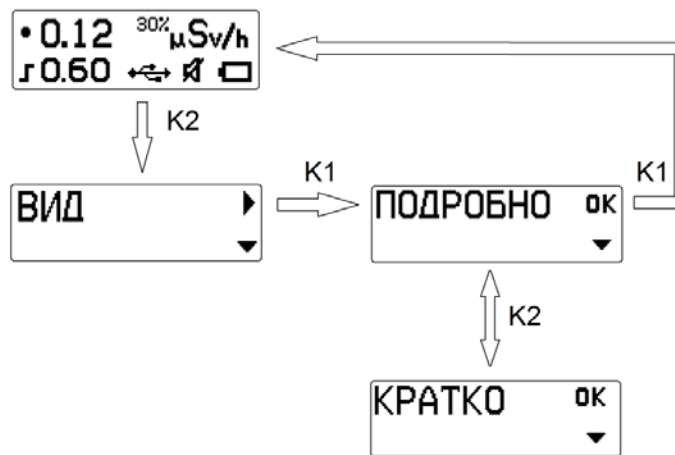
Click button K2 to enter the menu. The menu consists of the following sections:

- select the display mode briefly/ in detail;
- settings (sound, backlit, language);
- set threshold alarm;
- reset the accumulated dose;
- temperature indication.

### 2.3.3 Changing display modes

Click button K2 (in a measurement mode) to select the display mode briefly/in detail. Click K1 in the display mode submenu, and select the desired display mode with K2. Confirm the selection by clicking K1.

After that the dosimeter switches to the mode of measurement automatically.



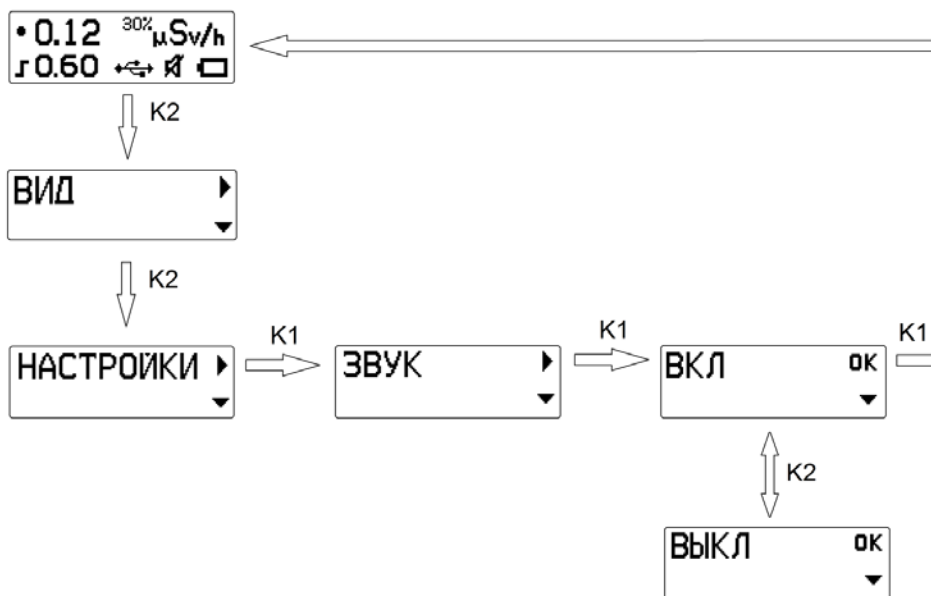
Picture 8 – Select the display mode

type

in detail  
briefly

### 2.3.4 Sound control

To switch on/off the sound alarm, you must go to the «Settings» submenu, by double-clicking K2 from the main mode, then click K1 and move to the «Sound» (Picture 9). Click K1 in the sound mode and switch on or off the sound alarm with K2. Confirm your choice with K1. After that, the dosimeter automatically goes to the principal measurement mode.



Picture 1 - Algorithm of sound alarm control

type

settings

sound

on

off

### 2.3.5 Backlit control

To turn on/off and select the color of the display backlit, double-click K2 from the measurement mode and move to the «Settings» submenu by clicking K1, then click K2 to move to the backlit control submenu (Picture 10). Click K1 and choose one of the three colors of the display backlit (green, blue, white) or switch it off with K2. Confirm your choice with K1. After that the dosimeter goes to the principal measurement mode.

*NOTE: Use of the backlit reduces battery life, and will require more frequent re-charging.*



Picture 10 - Algorithm of switching on/off the display backlit

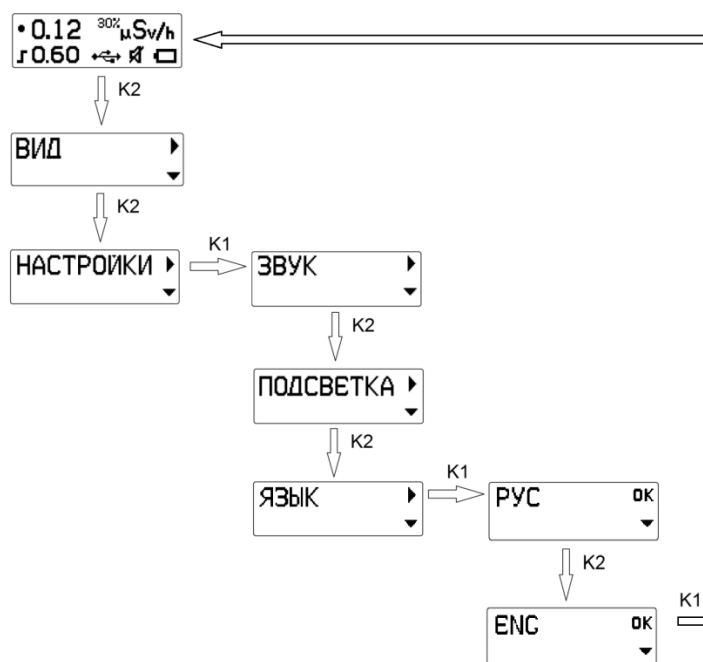
type  
settings

sound  
backlit

off  
green  
blue  
white

### 2.3.6 Language selection

To choose a language, double-click K2 from the measurement mode and move to the «Settings» submenu by clicking K1, then double-click K2 to go to the language selection submenu (Picture 11). Click K1 and choose English or Russian language menu with K2. Confirm your choice with K1. After that the dosimeter goes to the principal measurement mode.



Picture 11 - Algorithm of language selection

type  
settings

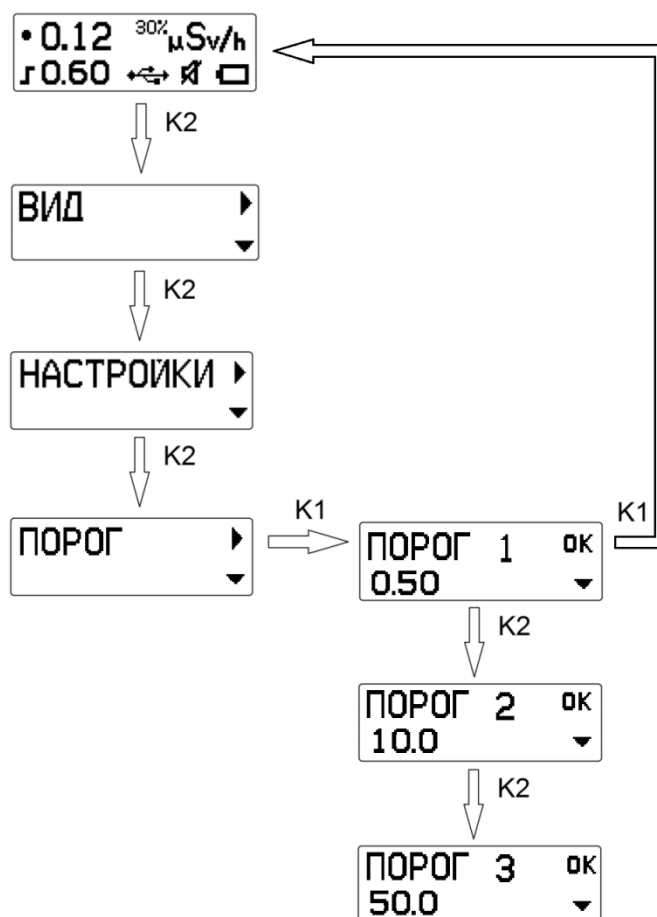
sound  
backlit  
language

Russian  
English

### 2.3.7 Setting the alarm threshold

The dosimeter has three alarm threshold levels of dose rate.

To select the alarm threshold for EDR, click K2 three times from the measurement mode and move to the threshold choice submenu. Click K1 and choose the desired threshold (Picture 12) with K2. Confirm your choice with K1. After that the dosimeter goes to the principal measurement mode.



Picture 12 - Algorithm of setting the alarm threshold

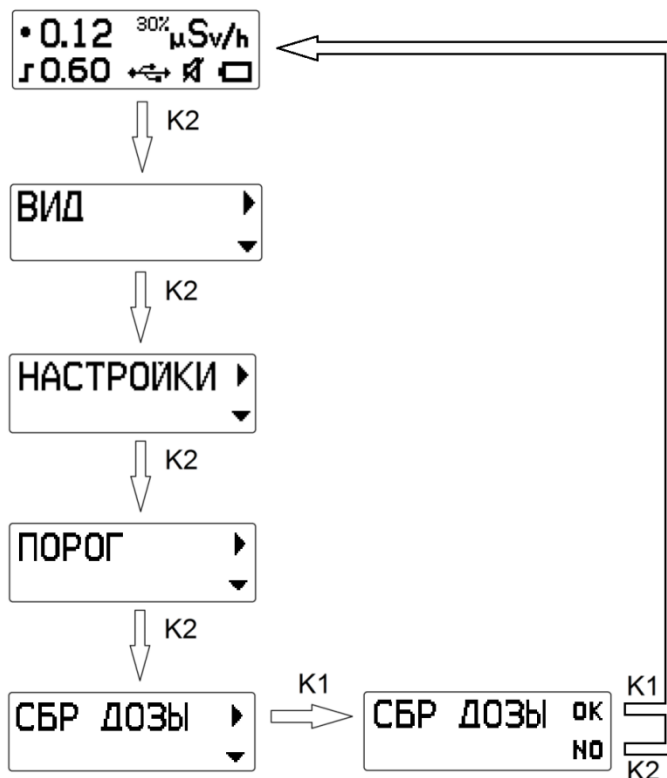
type  
settings  
threshold

threshold 1  
threshold 2  
threshold 3

### 2.3.8 Reset the accumulated dose

To reset the dose and the time it is set, it is necessary to click K2 four times from the measurement mode and move to the reset dose submenu with K1 (Picture 13). Click K1 or K2 to choose whether to reset dose and time (K1) or not (K2).

After that the dosimeter goes to the principal measurement mode.



Picture 13 - Algorithm of dose reset

type  
settings  
threshold  
dose reset

dose reset ok  
no



### 2.3.9 Temperature display

To learn the ambient air temperature, it is necessary to click K2 five times from the main mode and move to the ambient air display mode (Picture 14). In this mode K2 returns the dosimeter to the «Settings» menu, to select numeral size display mode; K1 moves the dosimeter to the main measurement mode.



Рисунок 2– Алгоритм вывода индикации температуры

type  
settings  
threshold  
dose reset  
temperature

### 2.3.10 Reset statistics

Click two buttons simultaneously to reset the statistics of collected EDR measurement. This flushes the buffer with measurement results and measurements start again.

## 2.4 Connection to PC

The dosimeter is connected to a computer by USB 2.0 cable - miniUSB (in a set). Exchange of information is carried out with the help of «Service-information program for dosimeter MKS-85B», available on the website of the manufacturer [www.betagamma.ru](http://www.betagamma.ru). Use of the software during maintenance is not required, the software is provided by the manufacturer as an additional tool for advanced users.

Link to the page with description of dosimeter MKS-85B:

[http://betagamma.ru/product\\_info.php?products\\_id=439](http://betagamma.ru/product_info.php?products_id=439)

Read the help file MKS-95B.hlp to connect the dosimeter to the computer.

When connected to a computer dosimeter provides the following functions:

1) reading data:

- EDR and ED;
- time of ED accumulation;
- battery charge;
- temperature;
- number of measurements from the moment you turn on the dosimeter;
- time of current measurement;
- number of registered photons for the current measurement;
- alarm threshold;
- parameters of the dosimeter;
- archive of measurements (483 records - elapsed time, EDR) and displaying

the data in a graph;

2) recoding data:

- parameters of the dosimeter;
- threshold values of EDR;

## 2.5 Measurement of equivalent rate of gamma-radiation

2.5.1 For EDR measurement indoors or in the open area, one should:

- switch on the dosimeter;
- place the dosimeter on a minimum distance of 1 meter from the surface of the floor (the ground) and any surrounding objects;
- no longer than in 40 seconds the dosimeter will determine the EDR value in microsieverts per hour with an accuracy shown on the display (the accuracy is displayed only on the display panel EDR/detail).

If you need more precise EDR measurements, continue to measure until the accuracy (on the display of the dosimeter) reach 25% or less.

## 2.6 Measurement of equivalent dose rate of gamma-radiation

The dosimeter (when it is on) measures the equivalent dose constantly, for the period of time from the previous reset of the value of the accumulated dose (reset is performed in accordance with p. 2.3.8).

If the reset was not carried out, the value of the accumulated dose includes the dose from the moment of the first turn on.

To measure ED, accumulated over a certain period of time, one should either reset ED in accordance with p. 2.3.8 or subtract the value of ED measurement at the beginning of the period from the value of the ED at the end of the period.

*NOTE: The dosimeter suspends the process of measurement when one enters the menu and when one switches it off.*

## 2.7 Research and monitoring of items or samples contaminated with radioactive nuclides

Research and monitoring of items or samples for contamination by radioactive substances is conducted with the purpose to detect specific objects (for example, building materials, banknotes and other) or samples (soil, food, agricultural products and other), contaminated with radionuclides. The work should result in sorting of controlled items or products in accordance with normative levels of radioactive contamination (accepted for them). Contamination levels of gamma-emitting radionuclides are given in SanPiN 2.6.1.2523-09 (full document can be found here: <http://betagamma.ru/img/nrb.doc>) and are as follows:

0.15 mSv/h (15 micro/h) - approximate value of equivalent (exposure) dose capacity due to natural background radiation, depending on local conditions may vary within a wide range (up to 1 mSv/h). Accepted as a normal background radiation.

0.3 mSv/h (30 microR/h) - valid value of equivalent (exposure) dose capacity in the premises. It can be significantly exceeded when some materials (such as granite or crushed granite in the composition of the concrete) are applied.

Measurements, associated with mentioned work, should take into account specifics and physical characteristics of objects of verification, as well as tasks that appear during the organization of such verification.

### 3 SERVICE

#### 3.1 Safety precautions

Study the operation manual before maintenance. The consumer, using the dosimeter, is not allowed to open it or to carry out the repair work. The repair work must be carried out by the organization - manufacturer.

All work on the setting up, testing, repair, maintenance and verification of the dosimeter, connected with the use of radioactive sources, should be conducted in accordance with the requirements of the "Main sanitary rules of work with radioactive substances and other sources of ionizing radiation OSP-72/87 do and "Norms of radiation safety NRS-99/2009".

#### 3.2 Service procedures

Maintenance service of the dosimeter is performed to ensure its effectiveness during operation and is performed by people working with the device, taking into account the security measures in p. 3.1.

Preventive works (conducted during maintenance service) include the check of the package contents, the inspection of the external condition of the dosimeter and its functional test. During the inspection of the external condition of the dosimeter make sure there are no chips or cracks on the housing of the instrument, there was no prolonged exposure on control elements (buttons) during storage.

### 4 POSSIBLE FAILURES AND WAYS OF THEIR ELIMINATION

The list of possible failures of the dosimeter and ways of their elimination is given in table

Typical failures	Possible reasons	Ways of elimination
The dosimeter is not switched on during a long press of K1 button	Discharge of the battery	Charge the battery in accordance with p. 2.2.2
The dosimeter is not switched on when you connect it to a PC or a charger	Dosimeter is defective	Contact the manufacturer

## 5 VERIFICATION

### 5.1 General data

The following section sets the methods and means of initial and periodic verification of the dosimeter.

The initial verification or factory calibration (depending on modification) is conducted after the dosimeter is issued and after its repair.

The dosimeter is verified every 2 years during its maintenance.

### 5.2 Verification operation

The following activities should be carried out during verification:

- external inspection of the dosimeter (p. 5.8.1);
- testing (p. 5.8.2);
- metrological characteristics (p. 5.8.3).

Primary and periodic verification is conducted in the same volume.

### 5.3 Means of verification

The list of main and secondary means of verification:

- The dosimetric verification setup with a source cesium-137 satisfies the requirements of GOST 8.087-81 and provides a range of exposure dose rate from 0,7 up to 50 Mr/H. Certified accuracy of the dosimetric verification setup should not be over 6 %.

Other means of verification (not on list) may be applied, on condition they provide the definition (control) of metrological characteristics of verified dosimeters with the required accuracy.

### 5.4 Skill requirements for the verification officers

People, certified as state verification officers in the established order, and also admitted to work with sources of ionizing radiation, are allowed to conduct measurements for verification and (or) to process of measurement results.

### 5.5 Safety requirements during verification

The requirements of «Norms of radiation safety NRS-99/2009» (Moscow, the Ministry of health, 2009) and «Basic sanitary rules for radiation safety assurance (OSPORB-99)» (Moscow, the Ministry of health, 2000) must be followed during verification.

Verification of the dosimeter should be allocated to the work under special working conditions.

The requirements of safety during the operation of the dosimeter (p. 2.1) must also be followed during verification.

## 5.6 Verification conditions

Verification should be carried out in normal conditions with the following values of the influencing factors

ambient air temperature	(20±5) °C;
relative humidity	(65±15) %;
atmospheric pressure	(100 ±4) kPa; ((750 ±30) mm Hg);
the level of external natural radiation	not more than $3,0 \cdot 10^{-9}$ SV·h <sup>-1</sup> .

## 5.7 Preparation for verification

Study p. 2 and 3 of the operational manual before verification.

## 5.8 Verification

### 5.8.1 External inspection

The dosimeter must meet the following requirements during external examination:

- the mark of initial verification (during periodic verification) or certificate of the last periodic verification in the passport;
- absence of dirt, mechanical damage affecting the operation of the dosimeter.

### 5.8.2 Testing

It is necessary to check the operation of the dosimeter in accordance with p. 2.2 during testing.

### 5.8.3 Detection of metrological characteristics

5.8.3.1 When determining metrological characteristics, it is necessary to determine the basic relative measurement accuracy of EDR and ED in accordance with MI 1787-87 methodical guidelines on the dosimetric verification setup in testing points of  $X_{oi}$  (Hoi), shown below. The transition from the exposure dose of  $X_{oi}$  (Mr/h) to the equivalent dose of Hoi (mSv/h) is calculated by the formula (for <sup>137</sup>Cs):

$$H_{oi} = 10,35 \cdot X_{oi} \quad (1)$$

### 5.8.3.2 Determination of the basic relative accuracy of EDR measurement

- 1) Set EDR mode.
- 2) Determine the average background value, fixing at least 5 EDR values of  $H_{\phi i}$ , mSv/h, and calculate the average background value of  $H_{\phi}$ , mSv/h, by the formula:

$$H_{\phi} = \frac{1}{5} \sum_{i=1}^5 H_{\phi i} \quad (2)$$

3) Set the dosimeter on the instrument table of gaging installation so that the effective center of the detector (located on the back side of the indicator at a depth of 7 mm) coincided with the central axis of the collimated beam of gamma radiation.

4) Create EDR in the centre of the dosimeter alternatively, corresponding to the values of  $0,5 \cdot 10^{-6}$ ,  $0,5 \cdot 10^{-5}$ ,  $0,5 \cdot 10^{-4}$ ,  $0,5 \cdot 10^{-3}$ ,  $0,5 \cdot 10^{-2}$ ,  $0,5 \cdot 10^{-1}$ , 1,5 Sv/h.

5) Fix 5 readings of the dosimeter  $H_{ji}$  for each installed EDR value not later than in 1 min after the beginning of radiation and calculate the average value by the formula:

$$H_j = \frac{1}{5} \sum_{i=1}^5 H_{ji} \quad (3)$$

6) Calculate the relative accuracy of  $Q_j$  measurement for each EDR value in percentage by the formula:

$$Q_j = \left| \frac{(H_j - H_\phi) - H_{gj}}{H_{gj}} \right| \cdot 100 \quad (4)$$

7) Determine the value of the basic relative accuracy of  $\Delta$  in percentage by the formula:

$$\Delta = 1,1 \sqrt{(Q_0)^2 + (Q_{j\max})^2} \quad (5)$$

where  $Q_0$  – the accuracy of testing settings, %;

$Q_{j\max}$  – the maximum value of the relative accuracy of measurement, received in accordance with p. 5.8.3.2.6.

Consider the results of verification positive if  $\Delta$  does not exceed 25 %.

### 5.8.3.3 Determination of the basic relative accuracy of ED measurement

1) Set ED mode.

2) Perform operations in accordance with p. 5.8.3.2.3 in the absence of sources of ionizing radiation (with closed shutter).

3) Create EDR  $H_{gj}$  in the centre of the dosimeter, corresponding to the value of  $0,5 \cdot 10^{-6}$  Sv/h and fix the D1 reading of the dosimeter, mSv. Open the shutter and turn on the stopwatch (timer). Fix the second D2 reading of the dosimeter, mSv, in 1 hour. Calculate the measured ED D value, mSv, by the formula:

$$D = D2 - D1 \quad (6)$$

4) Perform the measurement in accordance with p. 5.8.3.3.3 if EDR  $H_{gj}$  is equal 1.5 Sv/h.

5) Consider the results of verification positive if D values are within:

$$0,75 \cdot H_{gj} \cdot T < D < 1,25 \cdot H_{gj} \cdot T \quad (7)$$

where T – the time of radiation in hours.

## 5.9 Registration of verification results

5.9.1 In case of positive results of the initial verification, a signature, a stamp of the state verification officer, a stamp of the organization which produced verification and the verification date are put in the passport.

5.9.2 In case of positive results of the periodic verification, a certificate of verification in the established form is filled.

5.9.3 In case of negative verification results, dosimeters are not permitted for use. A notice of unfitness, stating the reasons, is given. The imprint of the verification stamp is to be liquidated, and the verification certificate is cancelled.

## 6 STORAGE

6.1 Dosimeter should be stored in packaging at the temperature of ambient air from +5 to +40 °C and relative humidity up to 80 %.

6.2 Dosimeter should be stored without packaging at ambient temperature from +10 to +35 °C and relative humidity up to 80 %.

6.3 The storage room must be free of dust, vapors of acids and alkalis, corrosive gases and other harmful substances.

## 7 TRANSPORTATION

7.1 Transportation of the dosimeter in packaging may be performed by all kinds of covered transport for any distance at the temperature from minus 25 to + 50 °C.

7.2 In case of transportation by sea, dosimeters in packaging must be placed into a plastic hermetic case with desiccant silica gel in accordance with GOST 3956-76.

7.3 In case of transportation by air, dosimeters in packaging must be placed into sealed compartments.

**ATTENTION! THE DOSIMETER MUST BE SWITCHED OFF WHEN IT IS PREPARED FOR TRANSPORTATION BY ANY TYPE OF MAIL OR DURING TRANSPORTATION.**



## 8 PASSPORT DATA

### 8.1 Package contents

Package contents of the dosimeter is given in the table.

Name	Quantity,PCs
Dosimeter MKS-85B «Schoolboy»	1
USB cable	1
Software CD	1
Operational manual	1

### 8.2 Warranty

Average lifetime of the dosimeter until its capital repair, installed by the manufacturer, is at least 6 years.

The manufacturer guarantees the operability of the device if the owner follows the rules of maintenance described in the manual.

Address of the manufacturer is given in the Certificate of acceptance.

Warranty period of the dosimeter maintenance is 24 months from the date of its purchase (in case it is sold to the buyer through the trade network). Guarantee, post guarantee and capital repairs are conducted by the manufacturer.

Warranty period does not include the time the dosimeter is in warranty repairs. Claims are not accepted and warranty repairs are not carried out in case the consumer handles the dosimeter carelessly, in case of physical or chemical damage to housing and internal components, display, connectors and controls, electrical damage to the input circuits of USB channel, absence or violation of the seal of the dosimeter.

## 9 CERTIFICATE OF ACCEPTANCE

Dosimeter MKS-85B «Schoolboy», serial number \_\_\_\_\_ corresponds with TC 4362.002.69745044.2013 and is suitable for operation.

Date of issue \_\_\_\_\_

Packer \_\_\_\_\_

M.П.

Dosimeter MKS-85B «Schoolboy», serial number \_\_\_\_\_, is subjected to initial verification, and is suitable for operation as a working mean of measurement.

Verification officer \_\_\_\_\_

Date of verification «\_\_\_» \_\_\_\_\_ 20\_\_\_.

Stamp of the verification officer

Address of the manufacturer:

LLC «Axelbant», 125475, Moscow, Zelenogradskaya st., 35-4-395.

Tel +7 495 5066869,

32239@mail.ru

www.betagamma.ru

Trade enterprise fills

Date of sale \_\_\_\_\_

Seller \_\_\_\_\_

Stamp