

3.5×21П OPTICAL SIGHT

Operation Manual

7407.00.00.000-02 PЭ

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Annex A - User's Guide (7407.00.00.000-02PЭ1)	

Please read this Operation Manual (OM) before using the 3.5x21П optical sight (hereinafter referred to as – the sight).

For information about the sight operating procedures in the field, use the User's Guide 7407.00.00.000-02 PЭ1 (Annex A).

Due to the constant improvement of the design, nonessential discrepancies between the design of the sight and the text (figures) of the OM are possible.

1 PURPOSE

The sight is intended for aiming –the AK74 assault rifle or the ППК74 machine gun (the type of weapon is indicated on the sight reticle)– when conducting aimed fire in the daytime and at night (with reticle illumination). The reticle illumination is powered from a CR123A lithium cell with a nominal voltage of 3V.

2 GENERAL INSTRUCTIONS

The sight – is a complex optical-mechanical device that requires careful handling. Keep the sight clean, protect it from mechanical damage, moisture and sudden temperature changes. Avoid contamination of the optical surfaces. It is necessary to wipe the optical surfaces with cotton wool slightly moistened with alcohol GOST 18300-87, ether TU 7506804-97-90 (Technical Specifications) or an alcohol-ether mixture (10% of alcohol and 90% of ether).

ATTENTION! WHEN THE OPERATION WITH THE SIGHT IS FINISHED, ALWAYS RETRIEVE THE BATTERY AND PLACE THE SIGHT AND THE BATTERY IN THE CASE.

The sight is filled with nitrogen that protects optical surfaces from misting at temperature changes.

The sight in the package should be stored in a heated room with a temperature from plus 5 to plus 40° C, with a relative air humidity of no more than 80% at a temperature of plus 25° C, as well as in the absence of acid, alkaline and other aggressive impurities in the air. The operating temperature range of the sight is – from minus 50 to plus 50° C (when using the illumination –from minus 20 to plus 45° C).

3 SPECIFICATIONS

Visible magnification, ratio.....	3.5
Angular object-side field of view, angle of degrees.....	12
Objective lens clear aperture, mm.....	21
Exit pupil diameter, mm.....	6
Exit pupil distance from the last surface of the eye-box, mm.....	48
Range of boresighting in height and direction, not less than.....	± 0-10
Alignment scale division value.....	0-00.1
Range input ambit, m.....	100-1000
Lateral deflection range.....	± 0-15
Lateral deflection scale division value.....	0-01
Supply voltage, V.....	3.0
Overall dimensions (length, width, height), mm, no more than.....	195x94x166
Weight, kg, no more than.....	1.1
Weight of non-ferrous metals, kg:	
alloy D16 GOST 4784-74.....	0.490
brass L63 GOST 2208-91.....	0.000084
Service life, year, min.....	10

4 SCOPE OF SUPPLY

Sight.....	1 pc.
Lithium cell of CR123A type 3V*.....	1 pc.
User's Guide.....	1 pc.
Tissue.....	2 pc.
Screwdriver.....	1 pc.
Needle point file.....	1 pc.
Brush.....	1 pc.
Operation Manual.....	1 pc.
Case.....	1 pc.

* Replacement with any other lithium cell of standard size 123A is allowed.

5 SIGHT DESIGN

The appearance of the sight is shown in Figure 1.

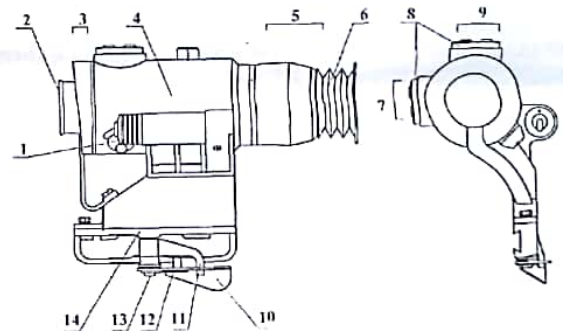
The sight consists of a body 4 with a clamping device, an object glass 3 with a cap 2, an eye-box 5 with an eye-cup 6, alignment mechanisms (adjusting the position of the aiming line and entering the director angles and lateral deflections) in height 9 and in direction 7. Adjustment mechanisms are closed with screwing -caps 8.

Adjustments in height and direction are carried out by turning the corresponding scales using the screwing caps 8.

The reticle illumination is switched on by a toggle switch located on the cover 1 of power compartment. The battery is installed in the battery compartment with observance of the polarity - in accordance with the marking on the body of the sight next to the cover 1.

ATTENTION! When installing and replacing the battery, the reticle illumination must be turned off.

The sight is mounted on the weapon using a clamping device, which consists of a bracket 14, a clamping screw 13, a plate 12, levers 10 and 11.



1 - power compartment cover; 2 - cap; 3 - object glass; 4 - body; 5 - eye-box; 6 - eye-cup; 7 - directional alignment mechanism; 8 - screwing caps; 9 - height alignment mechanism; 10, 11 - levers; 12 - plate; 13 - clamp screw; 14 - bracket.

Figure 1 - Sight overview

The sight reticle overview is shown in Figure 2. The marking on the reticle indicate the type of weapon to which the sight is mounted. The reticle has scales for aiming angles I, lateral deflections II and two range scales III.

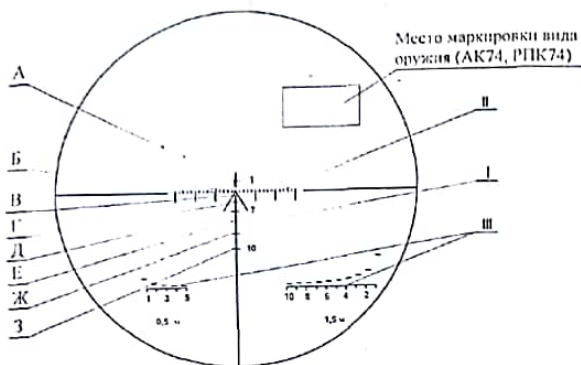


Figure 2 – Sight reticle overview

6 INSTALLATION PROCEDURE OF A SIGHT ON A WEAPON AND ALIGNMENT

The installation of the sight on the weapon and the alignment of the sight is carried out after checking for accuracy or setting up the weapon to normal combat with an open sight in accordance with the Shooting Manual for this type of weapon.

6.1 The dovetail groove of the bracket 14 serves as a seat for mounting the sight on a weapon (see Figure 1). For installation on a weapon, it is necessary to put the sight on the dovetail guide rail of the weapon from the butt-stock side and, pushing it forward till it stops, secure it by turning the lever 10 until it is completely fixed by the protrusion behind the bracket 14. The design of the clamping device allows you to change the clamping force, for this you need to remove the plate 12 and shift the lever 10 on the clamp screw 13 for such a number of teeth, which will provide sufficient clamping force to put the plate 12 in place.

6.2 Reference data required for adjustment of sighting and subsequent operation of the sight are listed in the User's Guide. Using these data is described below.

Figure 3 schematically shows the relative position of the sight and the barrel of the weapon and indicates the elements of the bullet's path: D – is the range; α – is the aiming angle; H_B – is the greatest height of trajectory of the bullet; X_B – is the distance to the highest point of trajectory of the bullet. Mean bullet trajectory excess altitude over the aiming line can be positive (+) or negative (-).

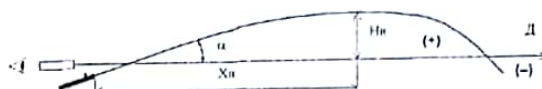


Figure 3 – Bullet trajectory elements

Reference data for adjustment of fire with sight and shooting for various types of weapons are listed in the firing table (Table 6.1):

S – sight – is an integer number of hundreds of meters at which the weapon is aimed;

$T.П.$ – distance from the center of the target to the aiming point at a range of 100m, cm;

α – sighting angle for sighting by the bore sight collimator, ang. min.;

H_B – is the greatest height of trajectory of the bullet corresponding to the specified sight S cm;

X_B – distance to the highest point of trajectory of the bullet, m

Exceeding the average trajectories for various ranges D (from 50 to 500m with an interval of 50m), cm.

Table 6.1 – Firing table

Type of the weapon	S	T.П.	α , ang. min	H_B , cm	X_B , m	Mean trajectory excess altitude (cm) for different D								
						50	100	150	200	250	300	350	400	500
AK74	4	22	16	39	217	9	22	32	37	36	32	20	0	-64
РПК74	4	18	13	34	216	9	18	27	31	31	27	16	0	-52

The target for sighting AK74, РПК74 is shown in Figure 4. The aiming point is in the center of the bottom edge of the target. For adjustment of fire of a specific type of weapon, the target is bent along the corresponding line – , depending on the installed sight S and the distance from the center of the target to the aiming point. (see Table 6.1).

To calculate the mean point of impact in the center of the target, it is necessary to consider the pitch of adjustment of the sight – 1cm per 1 click of the adjustment mechanism at a range of 100m.

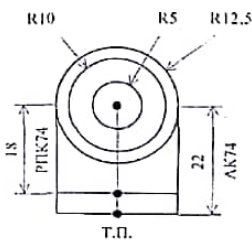


Figure 4 – Target (dimensions in centimeters) for sighting – range 100m. Sight 4.

Sighting criteria for single fire and burst fire are listed in Table 6.2.

Table 6.2 -Sighting criteria

Sighting criteria	AK74	PIIK74	Class of fire
Dispersion zone radius of holes on the target, cm	≤ 7.5	≤ 7.5	single
Deviation of the impact midpoint from the center of the target, cm	≤ 5	≤ 10	repeat fire (3 bursts)
		≤ 6	single

6.3. Sighting at the selected distance should be carried out by one of the methods: using the bore sighting tube (BST), using the bore sighting collimator (BSC), by the gradual sighting method.

Before sighting, make sure that the marking on the reticle correspond to the type of weapon on which the sight is mounted.

6.3.1 SIGHTING BY THE BST

Sighting by the BST should be done as follows:

- install the sight on the weapon;
- insert the BST in the barrel of the weapon;
- unscrew the screwing caps 8 from the alignment mechanisms 7, 9;
- secure the weapon in the bench and aim at the distant point by the BST reticle (according to the instructions for the BST);

- by rotating the scales of the alignment mechanisms 7, 9 of the sight, align the top of the sighting square with the aiming point;

- by rotating the scale with the "BBEPX-BHИЗ" (UP-DOWN) index give the aiming angle α according to the shooting table (Table 6.1). In accordance with the sight alignment pitch, the correction is 16 ang. min. correspond to 56 clicks of the alignment mechanism, 13 ang. min. - 46 clicks;

- close alignment mechanisms 7, 9 with screwing caps 8;
- remove the BST;

- accuracy of adjustment (see Table 6.2) shall be verified by shooting at a target (Figure 4) at the range of 100m,

6.3.2 SIGHTING BY THE BSC

Sighting by the BSC should be performed in accordance with the Operating Manual (7467.01.00.000 P3) for the bore sight collimator TU RB 14724552.050-97.

ATTENTION! By rotating the scale with the "BBEPX-BHИЗ" (UP-DOWN) index, move the top of the aiming square from top to bottom to the center of the BSC reticle. Starting from the center of the BSC reticle, set the elevation angle α , which corresponds to the type of the weapon and the installed sight S (see Table 6.1).

The view of the BSC reticle with the aiming reticle is shown in Figure 5.

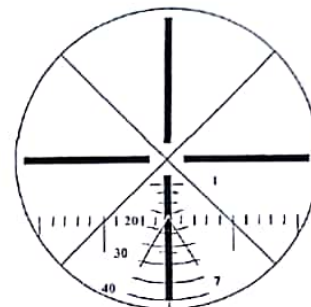


Figure 5- The view of the BSC reticle with the aiming reticle ($\alpha = 16$ ang. min.)

Accuracy of adjustment (see Table 6.2) shall be verified by shooting at a target (Figure 4) at the range of 100m. At the end of adjustment, close alignment mechanisms with screwing caps 8.

6.3.3 GRADUAL SIGHTING

Gradual sighting should be performed in 2-3 stages, starting from the range of 25m at a shield with min. dimensions of 50x50cm.

FIRST stage of sighting (25m range):

- mark the control point with a diameter of 1 to 2cm in the centre of the shield;
- make 3 shots from prone position or from kneeling position, aligning the top of the aiming square with the control point marked on the shield;
- estimate deflections (vertical and horizontal) of the mean point of impact from the control point (center of the shield) in centimeters. The obtained numbers multiplied by 4 and divided by 1cm (taking into account the adjustment pitch) correspond to the correction values required for sighting, expressed in the number of clicks of the adjustment mechanism.;

- unscrew the screwing caps 8 from the alignment mechanisms 7, 9;
- perform the calculated adjustments by rotating the scales of the alignment mechanisms;
- repeat shooting. Perform adjustment if necessary.

SECOND stage of sighting (50m range):

- mark the aiming point on the shield according to the Table 6.1-, depending on the weapon and the sight S. for the 50m range. For the AK74, PPK74, and the sight 4, the aiming point at 50m range is 9cm below the center of the shield;

- make 3 shots, aiming at the marked aiming point;

- estimate deflections (vertical and horizontal) of the mean point of impact from the control point (center of the shield) in centimeters. The obtained numbers multiplied by 2 and divided by 1cm (taking into account the adjustment pitch) correspond to the correction values required for sighting, expressed in the number of clicks of the adjustment mechanism;

- perform the calculated adjustments by rotating the scales of the alignment mechanisms;

- repeat shooting. Perform adjustment if necessary.

THIRD stage of sighting (100m range, at a target (Figure 4) or at a chest target):

- select the aiming point according to the Table 6.1 -, depending on the weapon and the sight S, for the 100m range. For AK74 and the sight 4, the aiming point at 100m range is 22cm below the center of the target, for PPK74- by 18 cm;

- make 4 shots, aiming at the selected aiming point;

- estimate deflections (vertical and horizontal) of the mean point of impact from the control point (center of the target) in centimeters. The obtained numbers divided by 1cm (taking into account the adjustment step) correspond to the correction values required for zeroing, expressed in the number of clicks of the adjustment mechanism;

- perform the calculated adjustments by rotating the scales of the alignment mechanisms;

- repeat shooting. Perform adjustment if necessary.

At the end of sighting, close alignment mechanisms 7, 9 with screwing caps 8.

7 OPERATING PROCEDURE

7.1 DETERMINING THE RANGE TO THE TARGET

To determine the range to the target, objects with certain (basic) dimensions are used. The basic dimensions are the human figure silhouette: 1.5 m - full-length figure, 0.5 m - chest figure.

When determining the range, place a target image (see Figure 2) between the solid and dotted lines of one of the III scales (0.5 m - scale for placing a chest figure, 1.5 m - scale for placing a full-length figure). Perform the placement precisely, without gaps and protrusions of the target image beyond the lines. Read off the scale at the point where the target is inscribed.

7.2 AIMING

When firing at a distance of 100, 400, 500, 600, 700, 800, 900, 1000m sighting should be carried out by aiming at the target of the corresponding aiming marks (A, Б, В, Г, Д, Е, Ж, З) of scale I (when firing without lateral deflection) or by moving the aiming point (when firing with lateral deflection).

Note - The scales of aiming angles I and range III are graduated in hectometres.

8 HANDLING AND STORAGE

8.1 The sight in the manufacturer's packaging can be transported by all types of transport in covered vehicles at temperatures from minus 50 to plus 50° C and the upper value of the relative air humidity of 100% at a temperature of plus 25° C in compliance with the rules for the carriage of goods by the appropriate mode of transport.

8.2 The sight in the manufacturer's packaging should be stored in a heated and ventilated room at temperatures from plus 5 to plus 40° C and the upper value of the relative air humidity of 80% at a temperature of plus 25° C, in the absence of acidic, alkaline and other aggressive impurities in the air.

During storage, the battery must be removed from the sight power compartment.

9 PRESERVATION CERTIFICATE

Date of preservation 09.06.2021

The shelf life without preservation under conditions of I (L) as per GOST 15150-69- is 10 years

Preservation material - is grease GDT-54 p GOST 3276-89

Preservation performed by _____

The device after preservation is accepted by _____

10 ACCEPTANCE CERTIFICATE

The 3.5x21П optical sight, serial number 21128, meets the technical specifications of TY PB 14724552.033-96 and is found fit for operation.

Date of manufacture 09.06.2021

Quality inspector _____

11 MANUFACTURER'S WARRANTY

The manufacturer guarantees that the sight meets the requirements of technical specifications of TY PB 14724552.033-96, while observing the conditions of transportation, storage and operation established by this Operating Manual.

Warranty period of the sight: - 12 months from the date of delivery.

Warranty storage term of the sight - is not more than 3 years.