New Vision
Dedal-NV



“Dedal-490”
Hunting Night Vision Riflescope

Operation Manual

www.dedalnvoptics.com

Please read this manual carefully before using this device!

Ignoring adaptation, operation and storage procedures described in this manual may void your warranty.

Features

- *4x or 6x magnification*
- *Image Intensifier Tube of 3 generations or XR-5*
- *Ability to withstand strong recoil on large calibres (.375 H&H, .416Rigby)*
- *Highlighted Mil-Dot reticle with brightness adjustment*
- *High image quality through the entire field of view*
- *High-contrast fast objective lens*
- *Internal focusing of the objective lens (from 15 meters to infinity for the 4x version)*
- *Manual image brightness adjustment*
- *Automatic brightness control*
- *Protection against high illumination*
- *Built-in powerful (75 mW) eyesafe (not laser) infrared illuminator that is adjusted by spot size and beam vertical angle*
- *Ability to use remote control*
- *Ability to perform high quality photo and video shooting*
- *Adaptation to different types of hunting rifles*
- *Hermetically sealed*
- *Long battery life*
- *Lightweight*

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Device Appearance

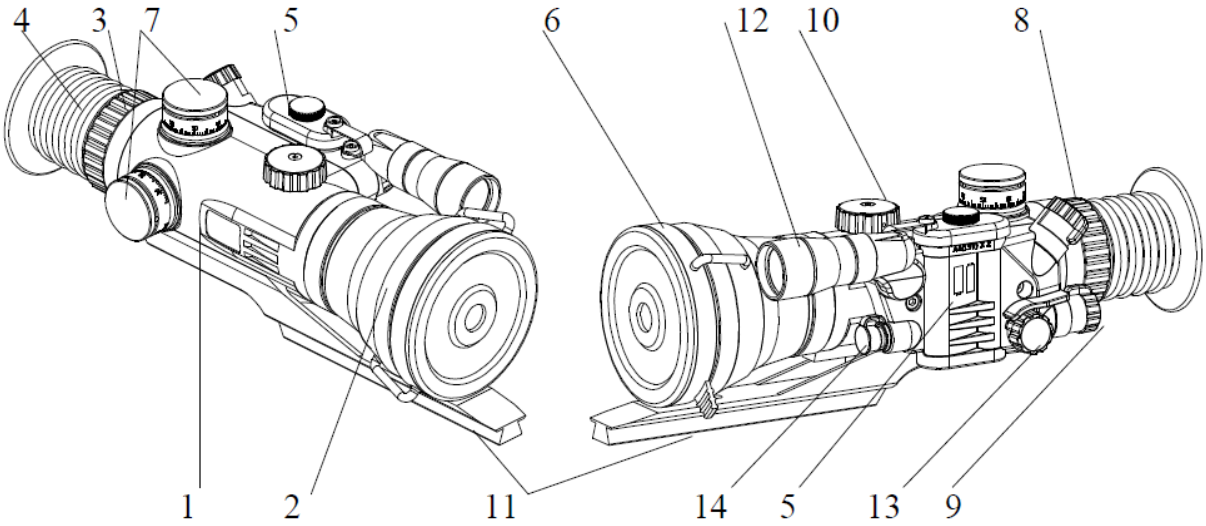


Figure 1
Riflescope “Dedal-490-xxx(100)”

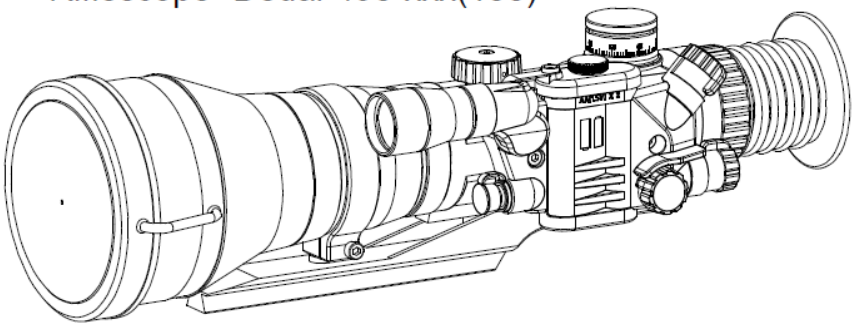


Figure 2
Riflescope “Dedal-490-xxx(165)”

1 - Body of the Device
2 - Objective Assembly
3 - Eyepiece
4 - Eyepiece Rubber
5 - Battery Compartment
6 - Objective Lens Cap
7 - Windage and Elevation Adjustment Knobs
8 - ON/OFF, RETICLE ON and IR ON Switch
9 - Reticle Brightness Adjustment Knob
10 - Objective Focus Adjustment Knob
11 - Weapon Mount
12 - IR Illuminator
13 - Image Brightness Adjustment Knob
14 - Remote Control Connector

Brief Description

"Dedal-490" is a multifunctional night vision device designed for the wide range of professional and amateur purposes such as:

- night hunting;
- night surveillance;
- night patrolling and objects protection;
- night photo and video shooting.

"Dedal-490" incorporates Image Intensifier Tube that belongs to generation 3 or XR-5, which provides many thousands of times light amplification in visible and close infrared zones of light spectrum. The riflescope is produced in different modifications depending on the installed IIT and objective lens parameters.

Technical Parameters

	Dedal-490-xxx(100)	**Dedal -490-xxx(165)**
General:		
Magnification	3.7x	6.0x
Objective lens	100mm F/1.5	165mm F/2.0
Field of view, degrees	10	6.3
Focus range	From 15 m to infinity	From 30 m to infinity
Diopter adjustment range	-3 … +4	
Eye relief, mm	45…90	
IR illuminator	IR diode 75 mW, 805 nm	
Power supply, V	3	
Batteries	2xAA	
Battery life, hours, not less In passive mode In active mode	 60 5 (with IR illuminator set to the maximum power)	
Dimensions, mm (without eyepiece rubber and mount)	235x98x80	310x98x90
Weight (without mount), kg	0.9	1.1
Environmental conditions		
Operating temperature range	From -40 °C to +50 °C	
Relative humidity, %	98	
Image Intensifier Tube (IIT)		
IIT type (photocathode sensitivity (μA/lm), resolution (lp/mm), screen colour)		
Dedal-490-DEP_XR-5(yy) Dedal-490-DK2(yy) Dedal-490-DK3(yy) Dedal-490-DK3(yy)/bw	XR-5 (minimal 700, minimal 64) Gen. 3 (minimal 1800, minimal 57) Gen. 3 (minimal 1800, minimal 64) Gen. 3 (minimal 1800, minimal 64, black&white)	

1. Small black dots or groups of dots, which are allowed by technical conditions of the IIT manufacturers, may be present on the screen.
2. Technical parameters of the device can be improved without prior notice.
3. The logo marking of the device can be changed from "Dedal-490" to "D-490".
4. “xxx” denominates model variations determined by the IIT type.
5. “yy” denominates model variations determined by the objective lens size.

Delivery Set

Standard Delivery Set:

- "Dedal-490" Night Vision Riflescope (with Objective Cap, Eyepiece Rubber and IR Illuminator) - 1 pc.
- Photo/Video Adapter Ring M52/37 - 1 pc.
- Cleaning Cloth - 1 pc.
- Allen Wrench for setting the Windage/Elevation Adjustment Knobs to zero position (S2.0) - 1 pc.
- Operation Manual - 1 pc.
- Warranty Card - 1 pc.
- Soft Bag - 1 pc.

Optional Accessories:

(not included into the standard delivery set)

- Standard Prism Mount (SP480);
- 7/8” Weaver Rail Mount (WP480-01);
- Side Mount (SM480) for rifles similar to the “Tiger” type;
- Mounts produced by MAK company;
- Mounts produced by EAW (Apel) company;
- Wired Remote Control Switch to control the scope ON/OFF and IR ON/OFF functions (RC-01);
- Two AA Batteries

Battery Installation

“Dedal-490" Night Vision Riflescope is powered by two AA batteries.

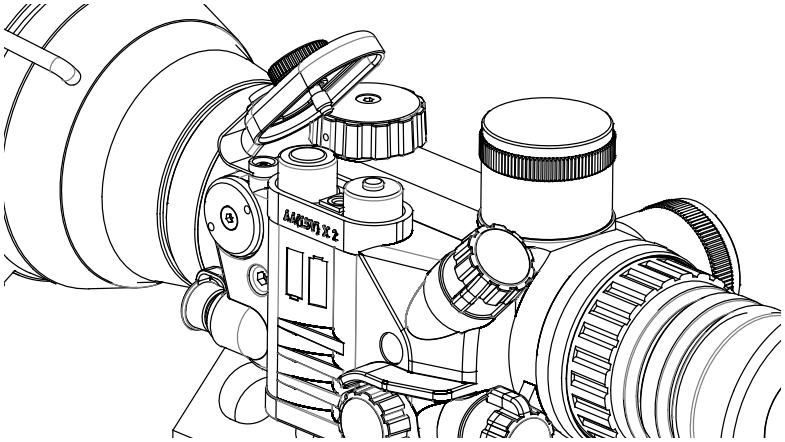


Figure 3

Make sure that the batteries are in good condition and installed in accordance with the drawing on the battery compartment (Fig. 3).

To replace the batteries unscrew the battery compartment cap and install new batteries, observing correct polarity.

NOTE:

◄For more continuous uninterruptable operation time from a single battery set it is recommended to use only Alkaline batteries, which provide the most stable current during discharge.

Testing in the Daytime

You can turn the device on with closed objective lens cap in the daylight to test it. The objective lens cap has a pinhole that is sufficient to test device workability. A yellowish-green image will appear on the screen after you turn it on with switch 8 (Fig. 1).

NOTE:

◄The device will not be damaged even if you open the objective lens cap. If the ambient brightness is high enough, the automatic brightness control will shut down the tube, and the image will become dark. After the ambient illumination falls to appropriate levels (when the cap is closed), the image will be restored. However, the life time of the tube significantly decreases after each light-striking.

WARNINGS:

◄ NEVER aim an active device at intense light sources, such as bright lights, headlamps, fire, welding equipment, the Sun, etc.

◄NEVER keep an active device with the open objective lens cap under high illumination (day, dusk, dawn) for more than 30 minutes. This will lead to fast degradation of the tube.

Operation at Night

- Open the Objective Lens Cap (8)
- Turn the Switch (8) (Fig.1) of the device into the ON position. You should see a yellowish-green light seen through the eyepiece (the device works in passive mode).
- Use the Ocular Knob (3) to achieve maximum sharpness of the reticle. Make sure that the Reticle Brightness Adjustment Knob (9) is in the middle position. Adjust the reticle brightness higher or lower if needed.
- Choose an observation object and obtain maximum focus by rotating the Focus Adjustment Kob (10).

NOTE:

◄ *Detection and recognition ranges provided by the device depend on ambient light illumination, type of the objective lens, transparency of the atmosphere and contrast ratio between target and background. When natural illumination is high, i.e. under full moon or with external illumination, and if the target is located against bright background (sand, snow), detection range increases. When natural illumination is low, the air is not transparent, and if the target is located against dark background (plough-land, trees, grass, etc.), detection range decreases.*

ATTENTION!

◄*To avoid traumas during shooting locate your eye at the proper distance. The eyepiece rubber must not be deformed when the shooter's head is comfortably positioned. If you use a large calibre rifle (the muzzle energy is over 4500 J), the riflescope must be positioned so that the distance between the edge of the eyepiece rubber and the closest point of the shooter's face is at least 10-15 mm.*

- Rotation of the knob (13) allows changing of the screen brightness to achieve the best contrast between the object and background depending on the ambient illumination.
- If it is necessary to highlight the object, turn on the IR illuminator by using the Switch (8) (active mode). You can set one of three power positions: 10, 25 or 75 mW. Position of the light spot relatively to horizon can be adjusted by rotating the illuminator in a vertical plane. Rotation of the IR lens shifts the spot in the riflescope field of view. Several turns in the same direction increase/decrease the spot.
- Set the switch (8) into the OFF position after work is over.
- Close the objective lens cover.

RECOMMENDATION:

◄ *Remove batteries from the battery compartment when the device is not in use for a long time to avoid damaging the product in case of electrolyte leakage.*

DO NOT FORGET TO TURN OFF THE DEVICE AFTER USE!

Adaptation to a Hunting Rifle

Your Night Vision Riflescope “Dedal-490” can be used for night shooting.

RECOMMENDATION:

◄"Dedal-490" belongs to Night Vision Riflescopes class of night vision devices. Use of night vision riflescopes may be restricted or prohibited by national or local regulations. Please consult with local authorities as to whether you are allowed to use the Night Vision Attachment on your weapon in your area.

The hunting rifle industry does not implement universal standards regarding exact position and mounting method of optical riflescopes and, therefore, a standard mount that would fit any rifle does not exist. Consequently, the mounting rail supplied with “Dedal-490” is **WITHOUT** hard fixation to the riflescope body, thus allowing special adaptation of the riflescope to each particular weapon.

Address the "Dedal-NV" company or a specialized arms workshop to adapt the riflescope (to install the mounting adapter and fix it with screws and glue for comfortable and correct positioning in relation to the shooter's head). The workshop should be experienced in adaptation of “Dedal" riflescopes. You can also perform the adaptation yourself following the rules explained in the handbook "Rules of Adaptation of "Dedal" Riflescopes on Hunting Rifles". This handbook can be obtained from the "Dedal-NV" head office.

ATTENTION!

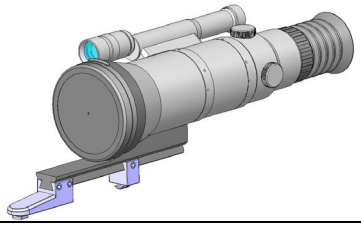
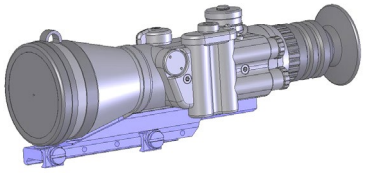
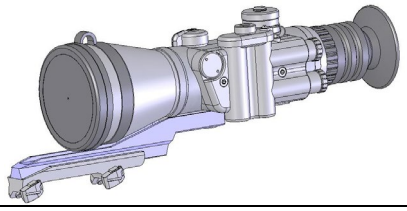
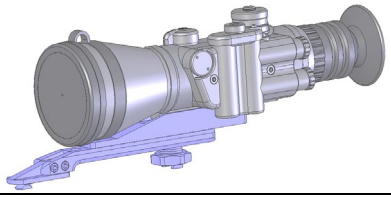
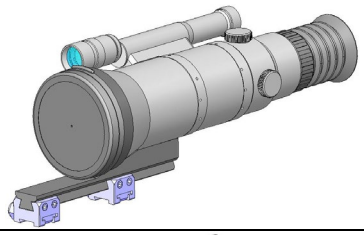
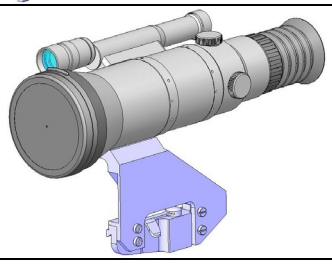
◄ When adapting the riflescope, mount it in such a way that the eyepiece rubber will not be deformed when the shooter's head is comfortably positioned.

◄ If you use a large calibre rifle (muzzle energy over 4500 J), the riflescope must be positioned so that the distance between the edge of the eyepiece rubber and the closest point of the shooter's face is at least 10-15 mm.

◄ Improper mounting, and/or the use of a mount that is not certified by the "Dedal-NV" company can lead to a permanent shift of the mean point of impact while shooting.

Your Night Vision Riflescope “Dedal-490” can be used with different types of mounts that ensure reliable fixation of the device on your particular weapon.

Examples of the weapon mounts:

	EAW (Apel) Company mount
	Weaver Rail mount (WP480-01).
	Blaser Company mount
	MAK Company mount
	11 mm Prism mount (F11)
	Side mount for the “Tiger” weapon (SM480).

Reticle Type

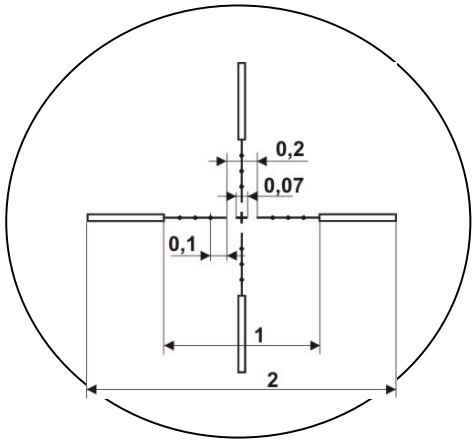


Figure 4

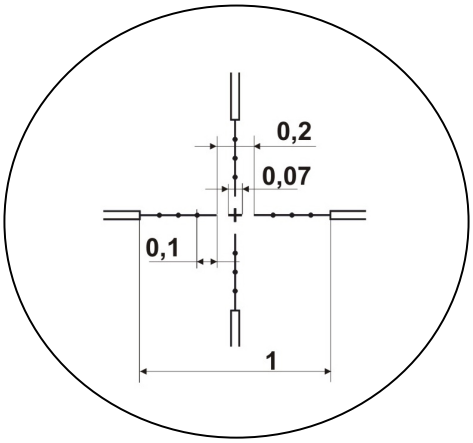


Figure 5

Figures 4 and 5 present the reticle appearance for two riflescope modifications:
Figure 4: “Dedal-490-xxx(100)”
Figure 5: “Dedal-490-xxx(165)”
Dimensions are given in meters per 100 meters range. The reticle type is Mil-Dot.

Reticle brightness can be adjusted by turning the knob (9) from zero to maximum.

Determining Distance to Target

By using the Mil-dot reticle and knowing the size of the target, it is possible to determine distance to the target with enough accuracy to acquire the target (or make windage adjustment to compensate for the bullet drop).

Procedures:

- Estimate real horizontal (or vertical) dimension of the target, to which you want to determine distance;
- Locate the cross hair of the riflescope so that one side of the target is visible through the Mil-dot reticle (see example on the Fig. 6);
- Count number of divisions in length (or height) of the target;

Distance can be determined by the following formula:

$$L = (H \times 1000) / h,$$

where L is the distance to the target, m;
H is the real length (or height) of the target, m;
h is the number of the segments of the reticle that cover the chosen target dimension.

The Figure 6 shows an example of distance estimation to a boar, which is 1.5 meters in length for the modification “Dedal-490-xxx(100)” with 4x magnification using the Mil-Dot reticle (5, 10 and 15 segments respectively).

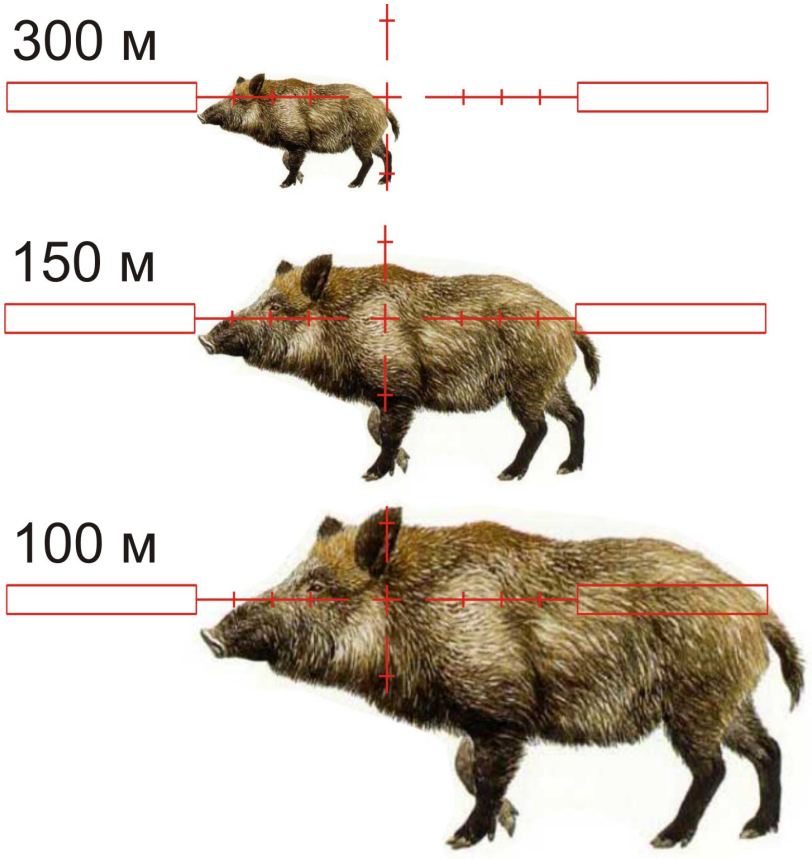


Figure 6

For the device “Dedal-490-xxx(165)” with 6x magnification the edges of the Mil-Dot reticle are cut. Therefore, distance determining should be made with the central 10 segments.

It is also possible to determine distances to targets with size of the target from 1m to 2 m using the following table:

Distance to the target, m					
	Length (or height) of the target, m				
QTY of reticle segments	1.00	1.25	1.50 (the boar from the above example)	1.75	2.00
2.0	500	625	750	875	1000
3.0	333	417	500	583	667
4.0	250	313	375	438	500
5.0	200	250	**300 (*)**	350	400
6.0	167	208	250	292	333
7.0	143	179	214	250	286
8.0	125	156	188	219	250
9.0	111	139	167	194	222
10.0	100	125	**150 (*)**	175	200

(*) – See correspondence in Figure 6.

Adjustment on Weapon

The riflescope is equipped with internal windage and elevation adjustment mechanisms that move the reticle. The adjustment step value is engraved on the adjustment knobs (see the table below):

Modification	Adjustment step of a single click
Dedal-490-xxx(100)	10mm at 100m range
Dedal-490-xxx(165)	10mm at 100m range

Before you start the zeroing procedure, the riflescope must be focused on a distant object (to infinity) in the night with the objective lens cap open.

Zeroing can be performed during the daytime with closed objective lens cap or in dusk using a remote point of aim or a shooting target.

Adjustment on the weapon is performed as follows:

- Fix the riflescope on the weapon;
- Lock the weapon on the shooting stand;
- Place a target or choose a point of aim;
- Aim the weapon at the target using iron sight installed on the weapon (if possible). At this stage you can use a laser boresighter (LBS, for example manufactured by the Dedal-NV company and supplied separately), which is inserted in the barrel and points to the geometrical extension of the barrel;
- Unscrew the protective caps of the reticle adjustment knobs. Rotating these knobs, achieve overlapping of the reticle crosshair with the point of aim indicated by the iron sight or LBS;

NOTE:
◄The riflescope is equipped with knobs that allow you to determine exact number of adjustment steps (clicks).

- Take the weapon from the stand and remove the LBS;
- Make 3-4 single shots, carefully and in the same manner aiming at the target or the point of aim;
- Determine the grouping of shots and position of mean impact point. Enter the required correction of mean impact point. For example, to shift the mean impact point downwards and to the left, the knobs should be rotated in the “Left” and “Down” directions accordingly.

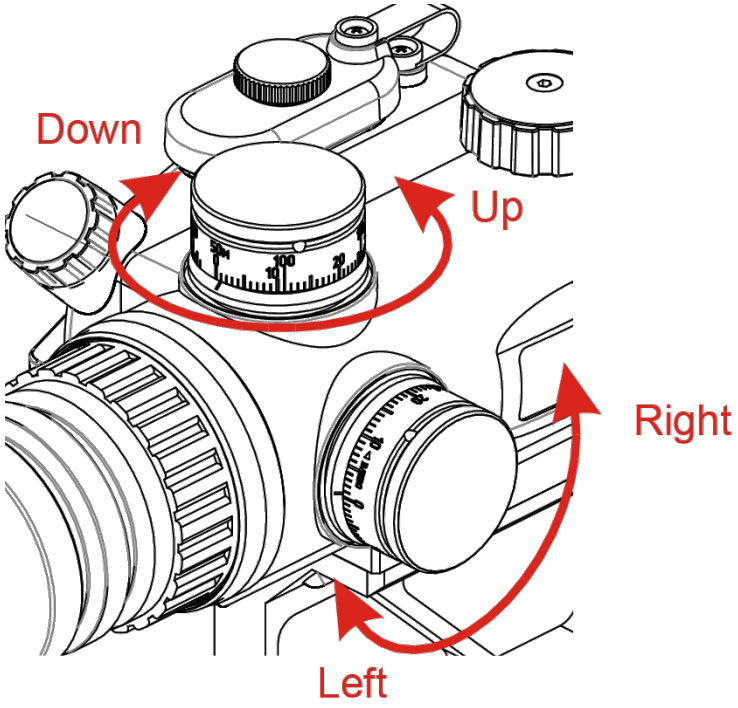
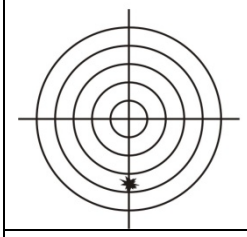
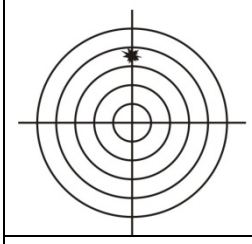
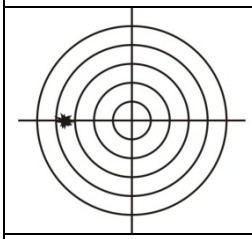
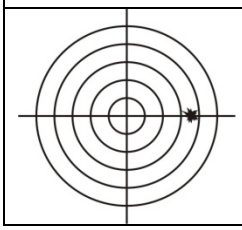


Figure 7

When the mean impact point is below the point of aim:	
	Rotate the top knob in the “Up” direction (counter clockwise).
When the mean impact point is above the point of aim:	
	Rotate the top knob in the “Down” direction (clockwise).
When the mean impact point is to the left of the point of aim:	
	Rotate the side knob in the “Right” direction (counter clockwise).
When the mean impact point is to the right of the point of aim:	
	Rotate the side knob in the “Left” direction (clockwise).

- Make the control shots and ensure that the point of aim coincides with the mean impact point. Make the adjustment one more time, if necessary;
- The determined zero position of the knobs can be fixed (“set to zero”). Use the allen wrench to loosen three fixating screws of the knob. Rotate the knob without clicks until the “0” mark on the scale coincides with the hairline on the riflescope body. Fix the knob in the new position with the three fixating screws.
- Screw the protective caps of the adjustment knobs. The device is ready for operation

RECOMMENDATION:

◄ *Due to peculiarities of production technology and IIT design, the quality assurance of the IIT supplier cannot exclude hidden defects that may appear as sequence of recoil during shooting. Therefore, it is recommended to make 10-15 shots with the mounted Night Vision Riflescope before practical use in field conditions. This will work as the additional test of the device’s reliability before its real use.*

Operation with Remote Control

The "Dedal-490" Night Vision Riflescope has the capability of operation with the external remote control (RC-01) that turns the device itself and its IR illuminator on and off.

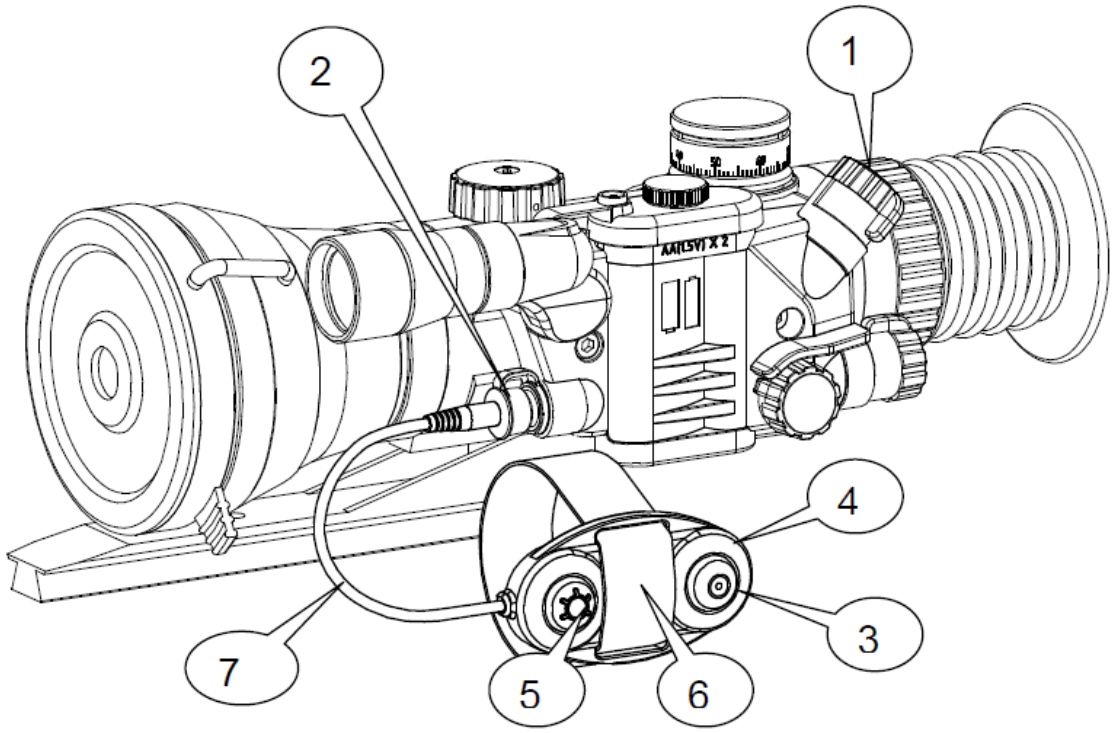


Figure 8

1 – On/Off and IR-On Switch
2 – Female Connector for the Remote Control
3 – Start Button of the Remote Control
4 – RC-01 Remote Control Body
5 – Start Button of the IR Illuminator
6 – Fixating Band with Velcro
7 – Remote Control Cable

Operation procedure:

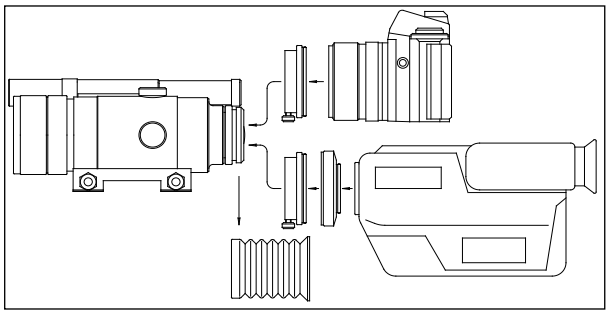
- Insert the jack of the remote control into the Female Connector (2) (Fig.6).
- Fix the Remote Control (4) on the weapon with the Fixating Band (6) in a comfortable position.
- Press and release the button (3) to turn the device on.
- Press and release the button (5) to turn the IR Illuminator on.
- IR Illuminator power is determined by position of the switch (1) and is maximal when this switch is in the closest position to the battery compartment.
- Next press and release of the buttons (3) and (5) toggle the controlled functions.

Taking Photos and Video Shooting

Your “Dedal-490” riflescope is adapted for night photo/video shooting.

The easiest way to use Riflescope “Dedal-490” for night shooting is to use it with digital cameras.

Preparation for camera shooting:



- Rotate the eyepiece until it stops and remove the eyepiece rubber;
- Set the eyepiece in the middle position;
- The adapter ring, which is included in the standard delivery set, is screwed in the eyepiece with one side. The other side has the photo thread 52 mm or 37 mm, which is screwed into the camera or camcorder objective thread that is used for the light filter. If the objective lens of your camera has another thread size (for example, 49 mm or 58 mm), you should purchase an appropriate step-up / step-down photographic ring in a camera store or order this ring from the "Dedal-NV" company;
- Turn on the riflescope, choose a distant object and focus the assembled system with objective lenses of the riflescope and camera. If you cannot obtain a sharp image, remove the camera with the ring and rotate the riflescope eyepiece. Assemble the system back and check the focusing again. After one or two iterations the system will be focused well. For the next shootings use only the riflescope objective lens for focusing;
- Set the camera aperture to 2.8-4.0. It is possible to take pictures at lower aperture values such as 2.0 (if your camera allows such value), but the resulting resolution will be worse. The fully opened aperture is justified only if you take images of fast moving objects.

NOTE:

◄*Use ISO 400 or above.*

◄*Use automatic shutter speed setting.*

◄*Use a tripod for better picture quality.*

Storage and Transportation Rules

- Store and carry the Night Vision Attachment in the closed bag with the protective objective lens cap on.
- Avoid impacts, moisture and sharp changes of temperature. The optics should be protected against dust, snow, rain and direct sun rays.
- Store the device in dry conditioned premises without battery inserted away from sources of heat, such as heating appliances or central heating.
- Do not store the Night Vision Riflescope at temperatures lower than 10ºC (50ºF) or higher than 60ºC (140ºF).
- Remove the batteries from the Night Vision Riflescope during extended periods of non-operation to avoid batteries leakage.
- The Night Vision Riflescope does not require special technical service.
- Clean optical surfaces with the optical cloths that are included in the delivery set only.

Troubleshooting

"Dedal-490" does not turn on
Check whether the battery is installed properly. Check the charge of the battery. Replace it if it is weak.

The target does not appear in focus
If the image cannot be focused as described in this manual, clean the lenses. They could be foggy or dusty.

Low-contrast or dark image
Bright light source or overabundant power of the IR illuminator can be a reason for losing image quality or complete IIT shutdown. This mechanism is known as automatic brightness protection. When the device is placed under normal low-light illumination condition, the image will be restored.

Condensation accumulates on the parts
In order to avoid misting of the eyepiece lens in cold conditions use a special protective cover (like the one for eyeglasses).

Black dots on the screen
Some blemishes in the IIT, which do not affect the performance or reliability of a night vision device, are allowed by IIT manufacturers. Most of them can be observed in daytime only and become practically invisible during night.

A “ghost” image on the screen

The device was used for a long time under high light illumination.

For Notes

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