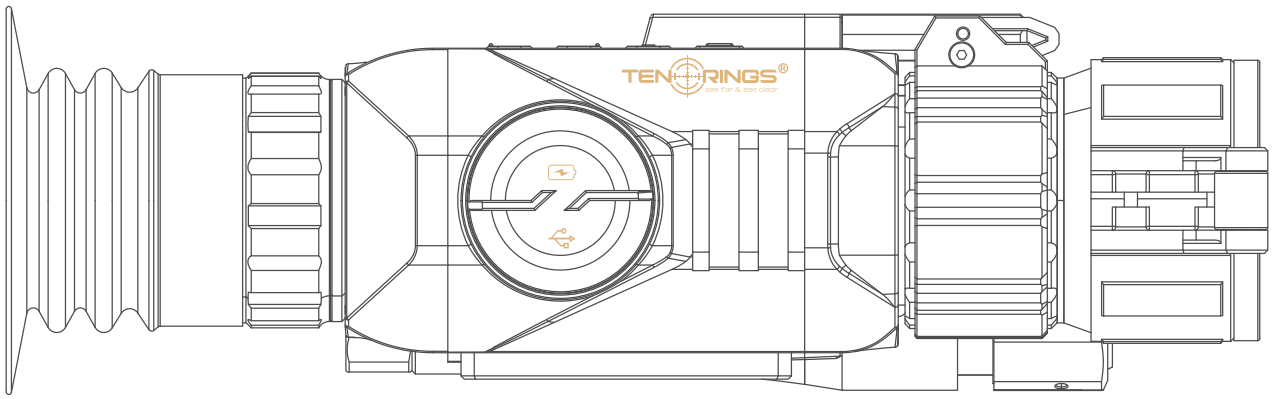
TEN RINGS®
see far & see clear



User Manual

TR-IR-LRF NV501 / 501Pro

Show you a farther world clearly

see far & see clear

DIGITAL DAY & NIGHT VISION SCOPE

TR-IR-LRF NV501 / 501Pro

Contents

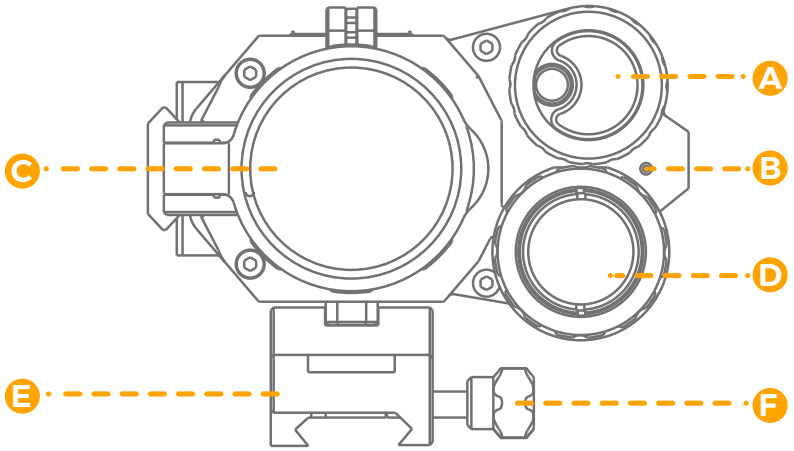
Overview

TR-IR-LRF NV501/501Pro adopts low illumination at night, Sony dynamic CMOS sensor, external IR flashlight. You can obtain excellent observation results both day and night. The novel structure patent design greatly improves the observation effect and observation experience, and the built-in infrared color filter greatly improves the observation effect of the equipment during the day, reduces the overexposure under natural light and restores more realistically. The built-in light brightness detection sensor can automatically switch between day and night modes according to the light intensity of the environment. TR-IR-LRF NV501/501Pro integrates the laser ranging finder to accurately grasp the target distance while observing or shooting and the ranging distance can reach 1000m.

TR-IR-LRF NV501/501Pro strengthens the waterproof design and reaches the protection level of IP67. Using a single built-in rechargeable battery with a low power consumption design, the model can continuously work up to 8 or 4 (501Pro) hours. In addition, it has advanced fast start-up performance, fast imaging in 3 seconds after booting, which significantly improves the user's quick response ability. The high refresh rate design enables the users to observe fast-moving targets effectively. At the same time, equipped with high-quality and high-performance objective lens, it ensures safety and reliability without fear of strong light. When installed on a tripod for long-distance night observation, the night observation distance can reach 300 meters, and it can be connected to cameras, video cameras, and wireless image transmission equipment. At the same time, it integrates the ranging function, and realizes the accurate grasp of the target distance while observing.

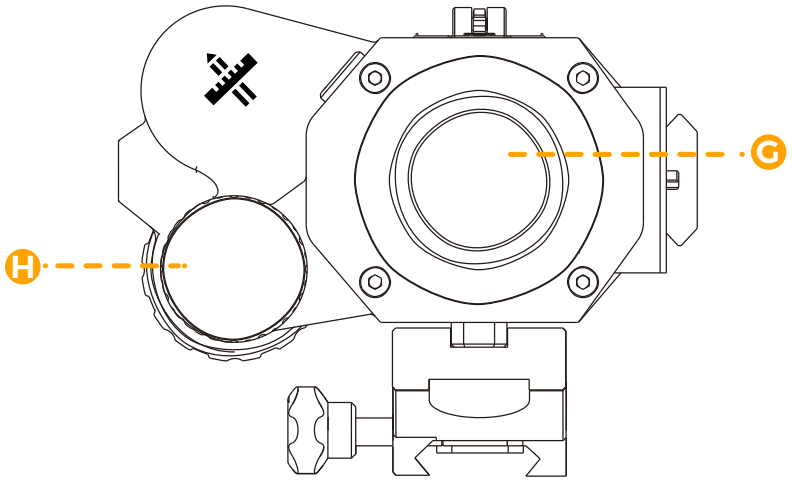
TR-IR-LRF NV501/501Pro is designed with a 3.5x-17.5x(5x)35mm digital rifle scope, equipped with a detachable 905nm infrared rangefinder module, which can provide accurate testing of the target distance. The built-in WiFi module allows users to record and share videos, and comes with a Type-C interface for external power supply and data copying at the same time. It supports video recording and exporting. It is mainly used in outdoor night shooting, hunting, outdoor adventure, search and rescue, and can be used instead of sniper scope to complete night hunting.

Interfaces



Front View

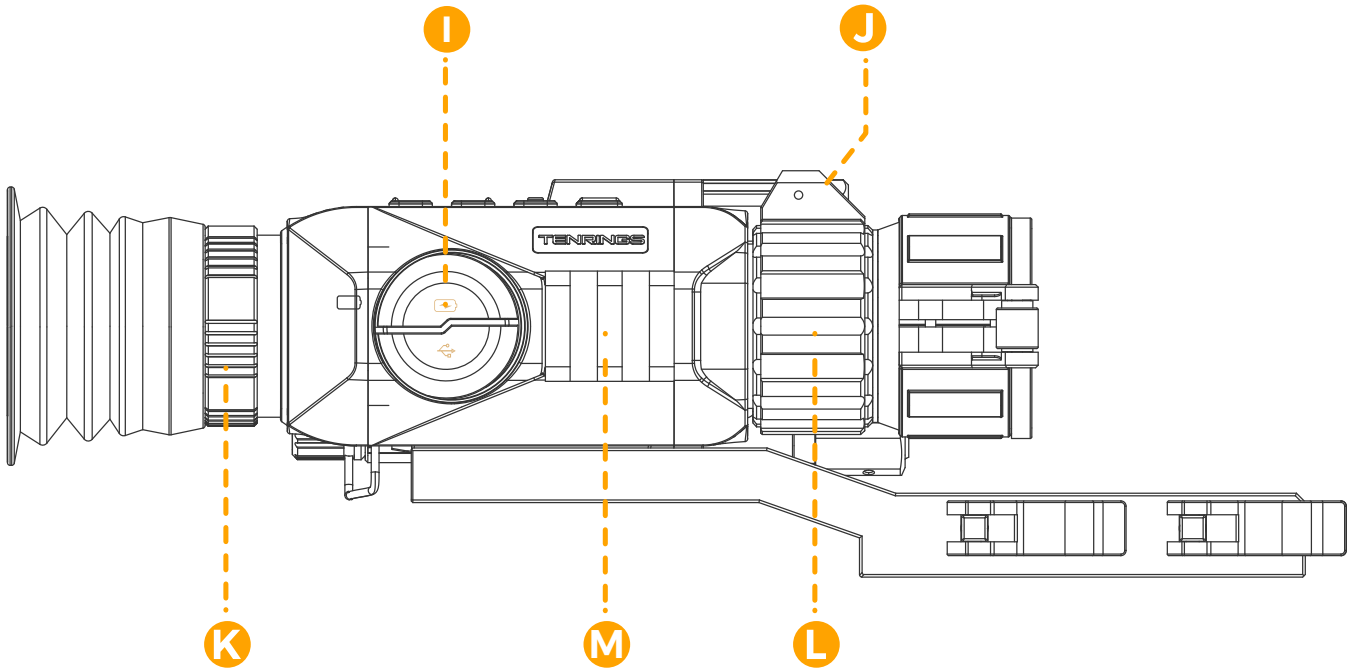
- **A** Laser range finder, to measure the distance from the target;
- **B** Laser red dot for fast positioning targets at close range;
- **C** The objective lens dust cover, to prevent dust from entering the objective lens and affecting the imaging effect;
- **D** IR Illuminator for observation at night to make the image clearer;
- **E** Picatinny rail, for the installation of firearm;
- **F** Lock nut, to tighten clockwise when the Picatinny rail is loaded into the firearm rail.



Back View

- **G** Eyepiece lens, observe the imaging on the OLED screen;
- **H** Battery holder.

Interfaces



Left View

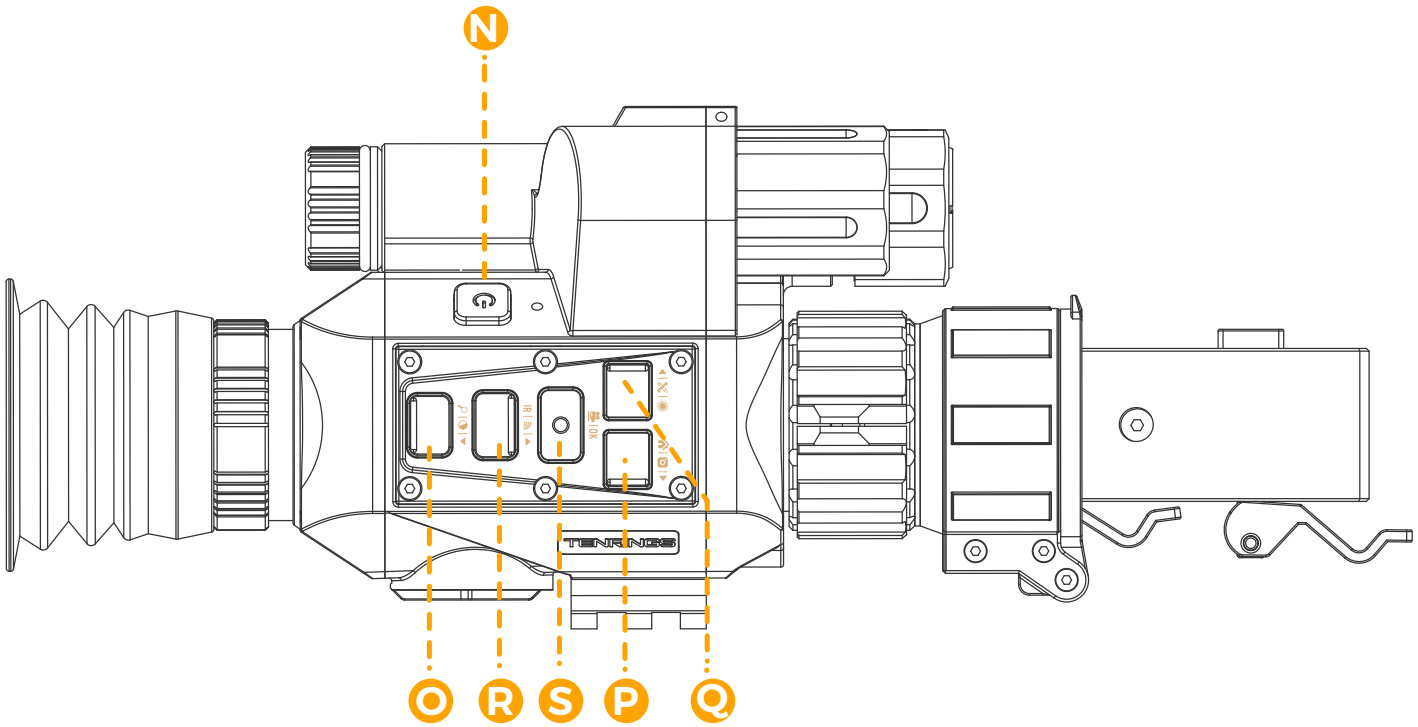
I TF card slot / HDMI interface/ Type-C power & data interface;

J Paddle, to assist in adjusting the focus of the objective lens;

K Eyepiece lens focusing rotation ring;

L Objective lens focusing rotation ring.

M Picatinny rails, used for the installation of another IR flashlight.



Top View

- N Power button, power on / off the device;
- O Zoom (+) or (-)/Black & White or Color Mode Switch/Downward;
- P Menu/Photo/Rightward;
- Q Leftward /Ranging button/laser red dot switch;
- R IR Illuminator/WiFi Switch/Upward;
- S OK button / Video.

Working principle

The TR-IR-LRF NV501/501Pro digital day & night vision scope collects external light through the objective lens, and then converts the optical signal into electrical signal through the digital CMOS sensor module. This signal is then transmitted to the CPU chipset for processing in the format of MIPI signals. Finally, the electrical signal is transmitted to the OLED screen, allowing users to view the image on the OLED screen on the eyepiece.

The TR-IR-LRF NV501/501Pro features a powerful high-brightness dimmable IR LED that helps to image object clearly and display on the OLED screen in low light and total darkness scenery. The OLED display screen has high resolution and adjustable brightness. The image display adopts digital zoom, and the displayed image can be magnified by 1x, 2x, 3x, 4x and 5x (optional).

The infrared laser ranging module emits a very thin laser beam to the target during operation, and the photoelectric element receives the laser beam reflected by the target. The timer measures the time from the launch to the reception of the laser beam, and calculates the distance from the observer to the target. Finally, it is displayed on the OLED screen.

Installation Instructions

Battery Installation

First screw the locking slotted screw of the battery cover to a horizontal position. Then open the battery cover and put in one 3.7V 18650 Li-ion battery with a rated voltage of 3.7V. Please make sure to set the positive polar towards to the direction inward. Put the cap back and screw it until tight.

Adjustments

After the battery is installed, firstly adjust the diopter of the eyepiece, rotate eyepiece lens focusing rotation ring until the four-corner text icon on the screen is clearly displayed (no need to see the image clearly), and then adjust the objective lens focusing rotation ring until the target can be seen clearly.

Calibration

TR-IR-LRF NV501/501Pro is calibrated by the "freeze" method. And the night vision device should be calibrated according to the following methods at working temperature.

1. Fix the scope (night vision device) on the weapon, set a target at a distance, such as a cross target ring; adjust the scope according to the instructions in point 2;

2. Press the ⌂ button, select the zeroing menu, press the OK button to enter the secondary menu, press the OK button to select any group in the pop-up menu Zeroing A/Zeroing B/Zeroing C. In the pop-up menu, select the 100m section to enter zeroing interface.

3. A reticle will be displayed in the center of the screen.

   1) Shoot at the bullseye with the center of the reticle, then keep the firearm still, short press the OK button to freeze the screen;
   2) Observe the location of the actual impact point. If the impact point does not coincide with the aiming point (the center point of the reticle), press the ▲ or ▼ button to move the reticle up and down in the Y coordinate direction, and press the ◀ and ▶ button to move the reticle left and right in the X coordinate direction respectively until the center of the cross-sight coincides with the impact point, and then press the OK button to return to the calibration interface;
   3) Use the center position of the reticle to shoot at the bullseye again, if the landing point coincides with the center of the reticle, it means that the calibration is completed. Then press and hold the OK button to pop up with the "XY/Reset/Exit" menu, press the ▼ button to select the "Exit" option, then press the OK button to return to the

distance selection interface, then press the OK button to select other distances, and repeat steps 1-2 until the impact point coincides with the center of the reticle.

4) After the 100m/150m/200m/250m/300m data is saved, press the button to return to the "Zeroing A", "Zeroing B", "Zeroing C" interface. Press ▼ button to select other groups, and repeat steps 1-3 until all the required data calibration is completed.

Menu Operation Instructions

1. Zeroing

Press the button, and press the OK button to enter the "Zeroing" option. A menu with Zeroing A/Zeroing B/Zeroing C will pop up. Press the OK button to select any group. In the pop-up menu 100m/ 150m/ 200m/ 250m/ 300m, press the OK button to select the distance that needs to be calibrated, then enter into the calibration interface. Shoot at the bullseye with the center of reticle, then keep the gun still, short press the OK button to freeze the screen. Then press the ▲, ▼, ◀ and ▶ button, allowing the reticle to move in the X and Y directions respectively until the center of the reticle coincides with the impact point. Then short press the OK button to return to the firearm interface, and then use the center of the reticle to shoot at the bullseye again. If the impact point coincides with the bullseye of the reticle, it means that the calibration is completed. And then press and hold the OK button to pop up with the "Reset/Save" menu. Then press the OK button to save the data and return to the distance selection interface, and then press the OK button to select other distances.

2. Reticle Shape

Press the button firstly and press the button to select the option "Reticle Shape", then 6 options pop up. Choose one according to your needs, and when finished, press the OK button to return to the previous menu.

3. Language

Languages, include "Chinese / English / Spanish / Portuguese / French / German / Italian / Polish / Turkish / Russian". After confirmation, the system can realize the switch of the corresponding language.

4. Picture in Picture

Press the button firstly and press the button to select the option "Picture in Picture", and press the OK button to enter the "PIP" option, then pop up with options such as "Off/2x/4x/6x". When finished, press the OK button to return to the previous menu. You can choose 2x/4x/6x magnification according to the actual observation requirements, or turn off this function. This function is turned off by default.

5. Ranging

Press the button firstly and press the button to select the option "Ranging", and press the OK button to enter the"Ranging"option, and then pop up with the "Off/Single Ranging/Continuous Ranging/Ranging unit". Users can choose the appropriate ranging mode according to actual needs."Off": Turn off the ranging mode; "Single Ranging": Press the OK button to select it and return to the first-level menu interface. Press the button again to return to the menu, and "0.0ft" will pop up in the lower right corner of the crosshair. Aiming at the target, short press the

Menu Operation Instructions

button to carry out a single ranging, and press and hold the button until the ranging data in the lower right corner of the reticle disappears, and exits the ranging mode; "Continuous Ranging": After pressing the OK button to select, the prompt interface "Battery life will be shortened" will pop up, press "OK" to enter the "Continuous Ranging Mode" to return to the menu. At the same time, "0.0ft" will pop up in the lower right corner of the cross sight. Aiming at the target, short press the button to carry out continuous ranging, the distance value of the test will be updated in real time. The update frequency is 1Hz, press and hold button until the ranging data in the lower right corner of the reticle disappears and exit the ranging mode; The "Ranging unit" option can be used to set the distance measurement unit, press the ▲ and ▼ to select the distance unit "m/ft", and then press the OK button to select and exit.

6. G Sensitivity

Press the button firstly and press the ▼ button to select the option "G sensitivity", and press the OK button to enter the "G sensitivity" option, and then pop up with three options such as "high/medium/low". Press the OK button to select the desired items, and return to the previous menu. Users can choose options according to actual needs.

7. Pitch Angle

Press the button firstly and press the ▼ button to select the option "Pitch Angle", and press the OK button, select the "Pitch Angle" option, and then pop up with the "off/on" option, press the OK button to select the desired item, and return to the previous menu. Users can choose to turn the pitch angle on or off according to the actual needs of the real-time display.

8. Default Color

Press the button firstly and press the button to select the option "Default Color", and press the OK button to enter the sub-menu, and press the button to select the "Default Color" option, then press OK button to select the required color mode.

9. LCD Brightness

Press the button firstly and press the button to select the "LCD Brightness" option, then adjust the brightness on the pop-up sub-menu, including "1(Super Dark)", "2(Dark)", "3(Normal)", "4(Bright)", and "5(Super Bright)".

10. IR Illuminator

Press the button firstly and press the button to select the "IR Illuminator" option, and press the OK button to enter the sub-menu. The sub-menu will pop up with "Off", "Auto" and other 3levels of fill light intensity selection switch: "IR1", "IR2", "IR3", then press the button to select the "IR Brightness" option. To save battery power, this switch is not saved by default and will be turned off after restarting. However, in black & white mode, it can be adjusted and turned off by adjusting the IR button.

Note: The "Auto" option is related to the light sensor. After choosing “Auto” option, the IR Illuminator will be automatically on when the environment light is low and automatically off when the environment light is bright.

Menu Operation Instructions

11. Exposure

Press the button firstly and press the button to select the "Exposure" option, and press the OK button to enter the sub-menu, and press the button to select the "Exposure " option, and then select "+2/3" or "+1/3", "+0.0", "-1/3"or other parameters on the pop-up sub-menu. After confirmation, the system can realize the corresponding exposure compensation intensity.

12. Automatic Recording

Press the button firstly and press the button to select the "Automatic Recording" option, and press the OK button to enter the sub-menu, and press the button to select the "Automatic Recording" option, and then select "On" or "Off" on the sub-menu that pops up. After confirmation, The system will automatically enter the recording mode to record the external scenery in real time.

13. Loop Recording

Press the button firstly and press the button to select the "Loop Recording" option, and press the OK button to enter the sub-menu, and press the button to select the "Loop Recording" option, and then select one of the options of "Off", "3 minutes", "5 minutes", "10 minutes" on the pop-up sub-menu. After confirmation, the system will automatically enter the loop recording mode to record the external scenery in real time and in a loop.

13. Playback

A. Press the button to enter the playback;B. Delete: short press the OK button, click the button, then pop up with"Delete Current/Delete All" option; Exit: long press OK button(3s) to return to exit

14. Audio Synchronization

Press the ⌂ button firstly and press the ▼ button to select the "Audio Synchronization" option, and press the OK button to enter the sub-menu, And press the ▼ button to select the "Audio Synchronization" option, and then select "On" or "Off" on the pop-up sub-menu to select whether to record video with voice input.

15. Date Stamp

Press the ⌂ button firstly and press the ▼ button to select the "Date Stamp" option, and press the OK button to enter the sub-menu, then press the ▼ button to select the "Date Stamp" option, and then select "On" or "Off" on the pop-up sub-menu to select whether to show the date label for videos and photos.

16. WiFi

Press the ⌂ button firstly and press the ▼ button to select the "WiFi" option, and press the OK button to enter the sub-menu, and press the ▼ button to select the WiFi option, and then select "On" or "Off" on the sub-menu. After confirmation, the system can realize the On / Off of the WiFi.

Note: WiFi starts with "Ten Rings" and the default password is 12345678. You need to download the corresponding "TenRings Shots" software from APP store. The password can be changed on the APP.

17. Date/Time

Press the ⌂ button firstly and press the ▼ button to select "Date/Time" option, and press the OK button to enter the sub-menu, and press the ▼ button to select "Date/Time" option. Cursor choice in the year position, press ▲ or ▼button to adjust the year. After the adjustment, press the OK button to jump to the month setting, press the ▲ or ▼ button to adjust the month. After the adjustment, press the OK button to jump to date setting, press the ▲ or ▼ button to adjust the date. After the

OK button to jump to the month setting, press the ▲ or ▼ button to adjust the month. After the adjustment, press the OK button to jump to date setting, press the ▲ or ▼ button to adjust the date. After the adjustment, press the OK button to jump to hour setting, press ▲ or ▼ button to adjust the hour. After the adjustment, press the OK button to jump to minute setting, press ▲ or ▼ button to adjust the minute. After the adjustment, press the OK button to jump to second setting, press ▲ or ▼ button to adjust the second. After the adjustment, press the ▲ button to jump to date display format. Press up or down to select three display formats: "YY/MM/DD", "MM/DD/YY", "DD/MM/YY". After confirmation, you can press the ⌂ button to exit.

18. Format

Press the ⌂ button firstly and press the ▼ button to select "Format" option, and press the OK button to enter the sub-menu, and then select "TF Card"on the pop-up sub-menu, press the OK button to confirm. After confirmation, "Cancel" and "OK" options will pop up, press ▼ button again to select "OK" option, and finally press OK button to format the memory card. Please choose carefully because the data cannot be recovered after deletion!

19. Default Setting

Press the ⌂ button firstly and press the ▼ button to select the "Default Setting" option, and press the OK button to enter the sub-menu, and then select "OK" or "Cancel" on the pop-up sub-menu . Press ▼ button to select "OK" option, and press the OK button to restore the system to the factory default settings. Please operate carefully!

20. Version

Press the ⌂ button firstly and press the ▼ button to select the "Version" option, then software version information will be displayed on the screen by pressing the OK button.

Instructions for Shortcut Button Operation

1. ◂ | ✕ | ✺ Button

   Short press (<1s) to turn on or off the laser red dot, long press (≥3s) to enter the ranging mode then short press(≥1s)to start ranging

2. ⌂ | ◎ | ▸ Button

   Short press (<1s) to the menu option, and long press (≥1s)to take a photo;

3. 🎥 | OK Button

   Short press (<1s) to do item select, long press (≥1s) to open the video recording function;

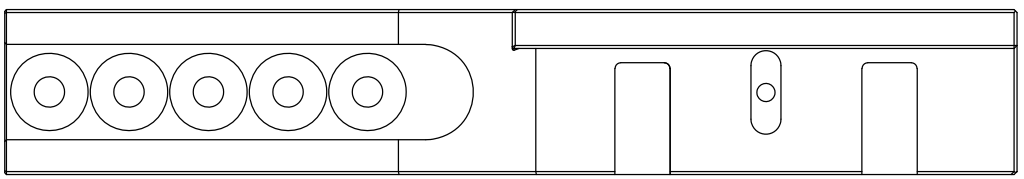
4. IR |))) | ▲ Button

   Firstly, long press the ◒ (>1s) to switch to black & white mode, then short press(<1s) the IR button to adjust the IR Illuminator (IR1-3/Off) long press (≥1s) to turn on & off WiFi;

5. ⚲ | ◑ | ▾ Button

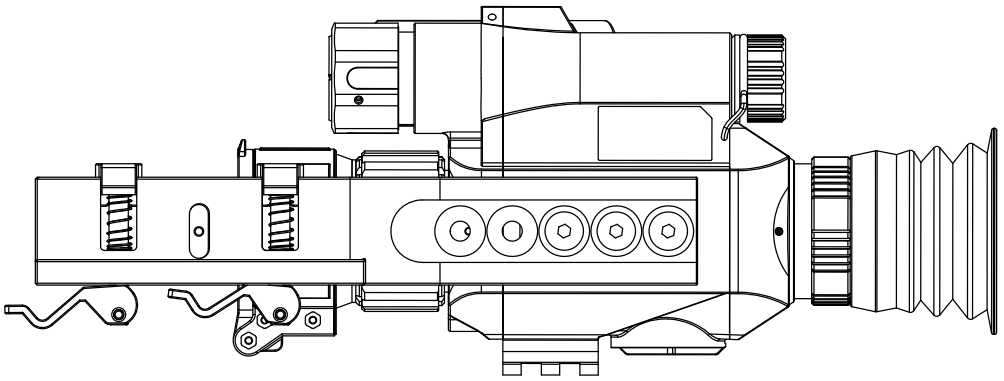
   Short press (<1s) to realize Zoom (+) or (-), long press (≥1s) to switch to black & white or Color mode.

Installation Diagram



1. Take the mounting rail out of the box and use the M5*8 countersunk screw screw to install the rail and the digital day & night vision scope together. Use 3pcs of screw to fix the device with rail.

Installation Diagram



2. Fix the Picatinny rail to the rails of the firearm, and then lock the screws tightly. Then installation is complete.

⚠ Warning

1. Do not look directly at the IR Illuminator in a short distance, otherwise it will cause damage to the eyes!
2. The infrared light of this product will gather a lot of energy when it is on. It is strictly prohibited to aim at combustible objects at close range, otherwise it may cause fire. Please turn off the infrared light or go to sleep mode when it is not in use!
3. Due to the design of optical path, some telescopes may not be suitable for this product!
4. Never look at the sun through this night vision device (or any other optical instrument). It may permanently damage your eyes and equipment!
5. Do not walk, run, or use any form of transportation (bicycle, motorcycle, car etc.) when viewing through TR-IR-LRF NV501/501Pro. Doing so may prevent you from fully understanding your surroundings, including any potential obstacles or other hazards in your path!

Maintenance

When using the TR-IR-LRF NV501/501Pro digital day & night vision scope, please follow the following recommendations, guidelines and precautions:

1. Keep the device away from any heating, direct sunlight and moisture, air conditioning vents or other heating equipment,
2. Always store the device in a suitcase in a dry, well-ventilated space with a temperature above +15℃ (60℉) and below +48℃ (118℉). Do not store near heating equipment, in direct sunlight or high humidity (above 70%).
3. Clean the optical lens with camera lens cleaning products, and clean the outside of the device with a clean soft cloth.
4. If the device is not used for more than a few weeks, please remove the battery.
5. Do not drop or shake the device in other ways. Although it has a rugged shockproof design for outdoor use, the device contains complex digital circuitry that can be damaged in extreme circumstances.
6. Do not open the device or attempt to repair the device in other ways.
7. Do not pour alcohol or any other liquid directly onto the lens surface.
8. Do not use paper products (such as newspaper, textbook paper, etc) to clean the surface of the lens and unit, because it may damage the coating.
9. Do not attempt to remove the eyepiece, as the LCD display may be damaged.
10. Do not place the device in direct sunlight or rain. The device is waterproof, but not suitable for prolonged use which exposed to moisture and cannot be immersed in water.

Maintenance

11 Wait at room temperature for at least 3 hours after the equipment is operated at temperatures below zero degrees Celsius to avoid the accumulation of condensed water on the internal surface of the lens and the consequent atomization temperature difference due to extreme conditions.

Troubleshooting

1. The device does not turn on

1 Reinstall the battery and ensure that the polarity (+/- terminal) direction is correct. Please refer to the silkscreen instructions on the battery installation direction on the cover.

2 Replace the battery.

3 Clean the battery compartment, especially the contact points.

2. Image Fuzzy

1 Refocus by adjusting the objective lens focusing adjustment ring.

2 Adjust the diopter setting by rotating the eyepiece as necessary until the display icon is clear.

3 Check the condition of the objective lens surface and eyepiece, and clean it if necessary.

3. In low-light conditions, the image disappears or degrades in quality.

First make sure you are in night mode and activate infrared lighting, while bright light sources (such as street lamps at night) may cause

reducing visibility or contrast. Keep the device away from the light source and the visibility will be restored immediately.

4. Images viewed or recorded at night appear black & white.

This is a normal phenomenon and color cannot be reproduced in dim conditions when infrared lighting is used as the primary source of light.

5. When taking photos or recording videos, it is prompted that "please insert TF card".

1. Check if the insertion method of the TF card is correct.
2. Press the menu button and format the TF card.

Technical Specifications

Product Model	TR-IR-LRF NV501 I TR-IR-LRF NV501Pro
Product Name	Digital Day & Night Vision Scope
Power Supply	
Power Supply Mode	3.7V Li-ion battery
Voltage Range	3.5-4.2V
Power Consumption	1.8W(IR is not turned on)
Working Time with Battery	⩽8h
Objective Lens Parameters	
Magnification	3.5x

Technical Specifications

Pixel	5M
Focal Length	35mm (fixed focus), manual focus
Objective Lens Size	Φ35mm(Φ50mm optional)
View(ft@100yds)	10.7°×8.0°

Eyepiece Lens Parameters

Entrance Pupil Diameter	6mm
Magnification Power	14X
Eye Relief	35mm/50mm
Focusing Angle Range	−5D~+5D
Operation Control	Manual focus

System Parameters

Sensor Resolution	1080P (1920×1080)	4K (3840×2160)
Internal RAM	2Gb	4Gb
Measurement Range	5-1000m	
Video Resolution	1080P (1920x1080@30fps)	4K (3840X2160@30fps)
Image Format	JPG	
Display Resolution	1024x768	
Display Size	OLED 0.39"	
WiFi	802.11b/g/n	
Storage Type	TF Card (support 4G~128G)	
Infrared Power/Wavelength	2W/3W/5W three gears, 850nm/940nm	

Geomagnetism	3-axis Gyroscope
Reticle Shape	Six Types
Picture-in-Picture Enhanced Magnification	Support
Video Transmission	HDMI/WiFi
Type-C Interface	Battery charge and data transfer
Language	Chinese / English / Spanish / Portuguese / French / German / Italian / Polish/ Turkish / Russian

Mounting Rails

Size	Picatinny rails, 20mm/21mm

Reliability

Mean Time Between Failures	＞50000h

Mechanical

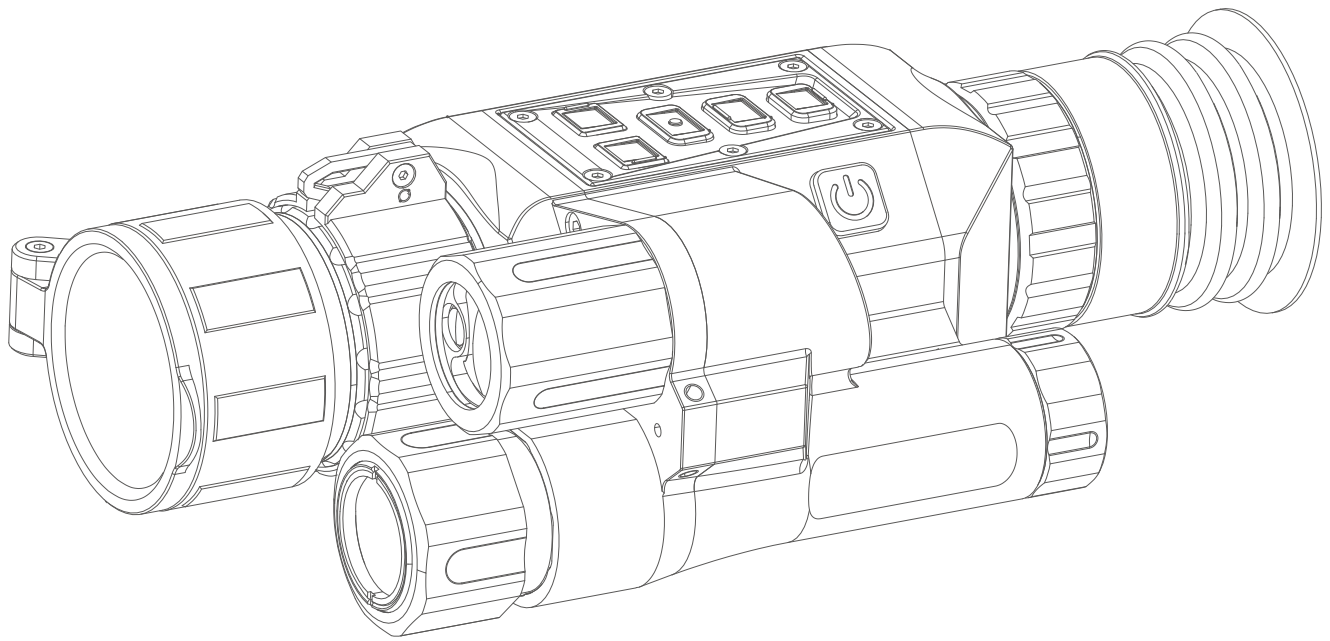
Dimensions (L*W*H)	191mm×94mm×50mm
Housing	Plastic & aluminium alloy
Body Color	Black
Net Weight	≈560g

Environmental

Operating Temperature	-25℃~50℃
Storage Temperature	-30℃~75℃

Package Contents

1. TR-IR-LRF NV501/501Pro: 1pc
2. USB Type-C Power & Data Cable: 1pc
3. User Manual: 1pc
4. Warranty Card: 1pc
5. Battery Charging Stand: 1pc
6. Quick Start Guide: 1pc
7. Mounting Rail: 1pc
8. Rail Screw: 4pcs
9. Battery Cover seal: 1pc
10. Screwdriver: 1pc
11. Velvet Pouch: 1pc



Shenzhen Ten Rings Optics Co., Ltd.

E-mail: info@tenrings.cn Web: www.tenrings.cn

Note: Design and specifications are subject to change without prior notice.