



# SPEAR

Thermal Imaging Scope



User Manual

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# Foreword

other problems caused by it, but NNPO will provide you with product related technical support in a timely manner.

When using this product, please strictly follow the applicable laws and regulations to avoid infringing the rights of third parties, including but not limited to the right of publicity, intellectual property, data rights or other privacy rights. You should not use this product for weapons of mass destruction, biological and chemical weapons, nuclear explosions or any unsafe use of nuclear energy or human rights violations.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful

interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

# Foreword

## · PREFACE

This Manual describes the operation methods and precautions of the thermal imager. Please read the Manual carefully before using the thermal imager, and use it in accordance with the standard operation methods to avoid danger or property loss in operation. Please keep this Manual properly for future reference.



After the laser is turned on, do not irradiate the eyes and skin. The laser emitted by the equipment may cause damage to the eyes and skin.

Description of icons used in the manual:



— Warning, the words involved in danger or harm.



— Tips, additional instructions, or helpful techniques.



— Notes, the explanation of the meaning of words.

# Safety Precautions For Using



## • DANGER

- In the process of equipment installation and use, the electrical safety regulations of the country and region where the equipment is used must be strictly observed. The power supply matching and conforming to SELV (safety extra low voltage) shall be used, and DC5V 2A shall be used for power supply.

- The power adapter provided by the regular manufacturer shall be used. Please refer to the product parameter table for the specific requirements of power adapter.

- During wiring, disassembly and other operations, the power supply of the equipment should be disconnected, and live operation is not allowed.

Do not place the battery near the heat source or fire source to avoid direct sunlight.

- Batteries of correct specifications should be used, as improper use may cause explosion hazard. After the battery is installed or removed, it is required to close the battery compartment safely.

- Do not swallow the battery to avoid chemical burns.

Do not place the battery within the reach of children.

In case of a laser equipment, do not direct the laser at human eyes to avoid possible damage.

- After the laser is turned on, it is strictly forbidden to align the laser at the objects with strong reflection such as glass and mirror, to avoid damaging the thermal imaging detector by laser reflection.



## • CAUTION

- Do not direct the thermal imager at high temperature targets, such as the sun, laser, electric welding machine, etc., otherwise the thermal imaging detector will be damaged.

- The time interval between switching on and off should be more than 20 seconds.

- Because the thermal imager combines precise optical instruments and electronic equipment sensitive to static electricity, it is necessary to avoid objects falling on the equipment or vigorously vibrating the equipment, and keep the equipment away from the place where there is magnetic interference.

- The equipment should not be installed in the place where the surface vibrates or is vulnerable to be impacted as far as possible (ignoring this may damage the equipment).

# Safety Precautions For Using

- It may cause damage to the thermal imager if it is used in the environment beyond the specification. Do not use the product in extremely hot, cold, dusty, corrosive, high salinity or high humidity environment. Please refer to the product parameter table for specific temperature and humidity requirements.

- When the thermal imager is not in use, and during transportation, remove the battery and place the thermal imager in a protective package.

- When the power is low during use, replace the battery in time to avoid damage caused by over discharge.

When the equipment is not in use, cover the lens cap to protect the image sensor.

- When it is necessary to clean the non optical surface of the thermal imager, do not use chemical solvents, diluents, etc. to scrub, but apply a clean, soft, dry flannel cloth to wipe the shell.

- The infrared lens of thermal imager is coated with a layer of anti-reflection film, which needs to be cleaned only when it is obviously dirty. Frequent scrubbing may cause wear of the lens coating. Please avoid touching the surface of the lens. The acid substance on the skin left by the fingerprint will damage the coating and the surface of the lens. Only use special lens cleaning wipes to clean the lens.

- If you connect your products to the Internet, you need to bear your own risks, including but not limited to network attack, hacker attack, virus infection, etc. NNPO will not be responsible for the abnormal operation of the products, information leakage and other problems caused by this, but NNPO will provide you with product related technical support in a timely manner.

Equipment access to the Internet may suffer network security problems, please enhance the protection of personal information and data security. When you find that the equipment may encounter network security risks, please contact us in time.

- Do not disassemble the thermal imager by yourself. In case of any failure, please contact the manufacturer in time, otherwise the warranty will not be granted.

- Keep all the original packaging materials of the equipment properly so that in case of any problem, the equipment can be packed with packing materials and sent to the service center for handling. NNPO shall not be liable for any accidental damage during transportation caused by the use of non original packaging materials.

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## • 1 Product Overview

The SPEAR Series is a superior single-camera, short-scan thermal imaging scope, compact and very lightweight. It is made of aerospace aluminum alloy, which is known for its robustness and resistance to high and low temperatures, thus ensuring stability and durability. The use of advanced thermal imaging night vision system enables SPEAR to provide clear images in a variety of lighting conditions, even in complete darkness or bad weather. A variety of colors and styles of cursor options can meet the preferences of different users and help them target more accurately. Supporting audio and video recording function ensures that every wonderful moment can be recorded. With SPEAR's WIFI function, data can be transferred to cell phone in real time for convenient monitoring and sharing. Whether for hunting or role enforcement, SPEAR can meet users' needs, and it is definitely a good partner for outdoor hunting expeditions or law enforcement.

## • 2 Product Features

- Advanced 12μm pixels for clearer images and longer viewing distances;
- Outstanding impact resistance, robust and powerful;
- APP remote control and real-time streaming display;
- Recoil automatic video recording, automatic recording of key moments;

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## • 3 Main Technical Parameters

|                       |                                                                                                                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Detector              | Uncooled Vanadium Oxide 256*192 / 384 * 288 / 640*512                                                                                                                             |
| Pixel Size            | 12μm                                                                                                                                                                              |
| NETD                  | ≤25mk                                                                                                                                                                             |
| Frame Frequency       | 50Hz                                                                                                                                                                              |
| Focal Length          | 19mm / 25mm / 35mm / 45mm                                                                                                                                                         |
| Optical Magnification | 256*192: 19mm 2.72~21.78X / 25mm 3.58~28.66X<br>384*288: 25mm 2.39~19.11X / 35mm 3.34~26.75X / 45mm 4.3~34.4X<br>640*512: 25mm 1.43~11.47X / 35mm 2.01~16.05X / 45mm 2.58~20.64X  |
| Field Of View (HxV)   | 256*192: 19mm @9.2°X6.9° / 25mm 25mm@7°X5.3°<br>384*288: 25mm @10.5°X7.9° / 35mm @7.5°X5.7° / 45mm @5.9°X4.4°<br>640*512: 25mm @17.6°X14.1° / 35mm @12.6°X10.1° / 45mm @9.8°X7.8° |
| Digital Zoom          | 1×, 2×, 4×, 8×                                                                                                                                                                    |
| Eyepiece Display      | 0.39 Inch 1024*768 (OLED)                                                                                                                                                         |
| Eye Relief            | 50mm                                                                                                                                                                              |
| Diopter               | ±6D                                                                                                                                                                               |
| Scene Mode            | Bird Mode, Jungle Mode, Recognition Mode                                                                                                                                          |
| Luminance             | 1~10                                                                                                                                                                              |
| Contrast              | 1~10                                                                                                                                                                              |

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|                                      |                                                            |
|--------------------------------------|------------------------------------------------------------|
| Palettes                             | White Hot, Black Hot, Red Hot, Green Hot, Fusion, Iron Red |
| Image Calib                          | Shutter Calib, Scene Calib, Automatic Calib                |
| Reticle                              | 5 Types With 5 Colors                                      |
| PIP                                  | Yes                                                        |
| Snapshot Capture<br>/Video Recording | Yes                                                        |
| Compass                              | Yes                                                        |
| Hot Track                            | Yes                                                        |
| Audio Sound                          | Yes                                                        |
| Recoil Video                         | Yes                                                        |
| Laser Rangefinder                    | Selectable                                                 |
| CVBS Output                          | UVC Video Output (TYPE-C Connector)                        |
| Local Storage                        | 8G / 16G / 32G                                             |
| SIR                                  | 256*192:Yes / 384*288:Yes / 640*512:No                     |
| Zeroing                              | Yes                                                        |
| Laser Distance Meter                 | Selectable                                                 |
| WIFI                                 | Yes                                                        |
| Gyroscope                            | Yes                                                        |
| Connector                            | USB Type-C Connector                                       |

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|                       |                                                                           |
|-----------------------|---------------------------------------------------------------------------|
| Working Temperature   | -20°C ~ 50°C                                                              |
| Protection Leve       | IP67                                                                      |
| Battery Type          | Single 18650 Replaceble                                                   |
| Operating Time        | Single Battery > 4 Hours                                                  |
| External Power Supply | TYPE-C Interface                                                          |
| Housing               | Aviation Aluminum Alloy                                                   |
| Dimensio              | 215mm*45mm*50mm                                                           |
| Weight                | 19mm: 580/660 LRF / 25mm: 600/680 LRF / 35mm:610/690 LRF/45mm:630/710 LRF |

Note: The SIR (Super Imaging Resolution) function is only available for these models (SP-219/ SP -219L/ SP -225/ SP -225L/ SP -325/ SP -325L/ SP -335/ SP -335L / SP -345/ SP -345L).

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## • 4 Packing Configuration

The configuration of the thermal imager is as followings.

| S/N | Item                           | Qty.         |
|-----|--------------------------------|--------------|
| ①   | Thermal Imaging Scope          | 1 piece      |
| ②   | 18650 Rechargeable Battery     | 2 (optional) |
| ③   | Charger                        | 1 piece      |
| ④   | Operation & Maintenance Manual | 1 piece      |
| ⑤   | Lens Cleaning Wipes            | 1 piece      |
| ⑥   | Tool kit                       | 1 piece      |

①



②



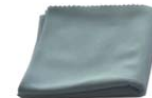
③



④



⑤



⑥



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## • 5 Operation

### • 5-1 Thermal Imager Components



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## • 5-2 Preparation Before Use

### • 5-2-1 Check

Check whether the lens, body, eyepieces and keys of the thermal imager are obviously damaged. Wipe the infrared objective lens with the lens cleaning wipes to ensure that the lens is clean.

### • 5-2-2 Install The Battery

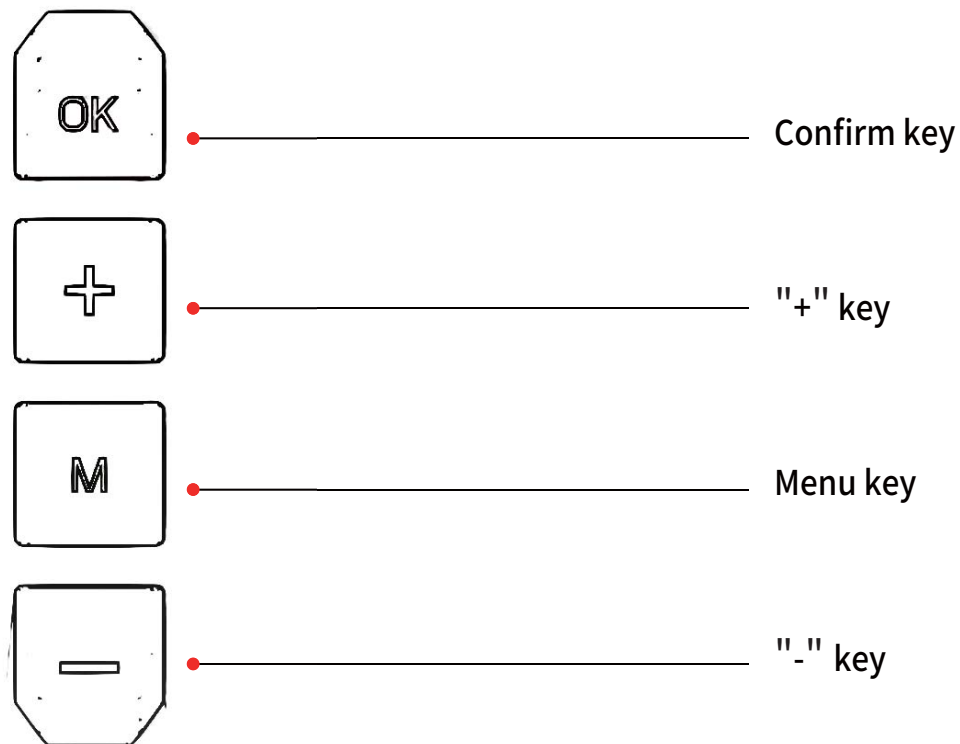
This product uses a single 18650 battery. Open the battery compartment cover and install the battery in the direction indicated by the positive and negative poles on the body.



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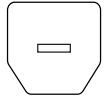
## • 5-3 Key Function Description

### • 5-3-1 Keys (The keys of the thermal imager are as follows.)



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The key description is as follows:

-  Power /Sleep Button: Power on/ Power off /Sleep mode switch,toggle main menu interface/quick menu interface;
-  Confirm Key: PIP, video recording, menu confirmation operations;
-  "+" Key: Zoom in+ (non-circular),photo taking, menu + operation;
-  Menu Key: Laser rangefinder on/off, enter or exit the menu;
-  "-" Key: Downsize - (non-circular),switching pallete color,menu-operation.

There are two operation modes: short press and long press (hold 2 seconds).

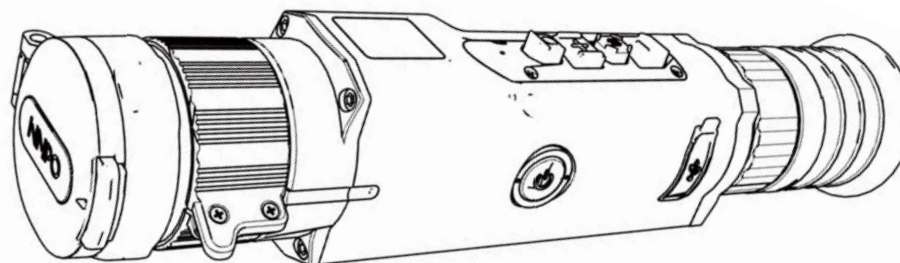
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There are two operation modes: short press and long press (hold 2 seconds) , as follows:

| Key                                                                                 | Trigger Conditions         | Short Press                        | LongPress (hold 2 seconds) |
|-------------------------------------------------------------------------------------|----------------------------|------------------------------------|----------------------------|
|    | Shutdown Status            | /                                  | Starting Up                |
|                                                                                     | Sleep Status               | Starting Up                        | Starting Up                |
|                                                                                     | Starting Up                | Sleep/Wake                         | Shutdown                   |
|                                                                                     | Starting up - Shortcut key | Switch Main Menu and Shortcut Menu | /                          |
|    | Observation Interface      | PIP                                | Shutdown                   |
|                                                                                     | Menu Screen                | Menu Confirmation Operation        | /                          |
|  | Observation Interface      | Amplify + (Recyclable)             | Take Photo                 |
|                                                                                     | Menu                       | Move Up Menu Option/Value+         | /                          |

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| Key                                                                               | Trigger conditions    | Short Press                | LongPress (hold 2 seconds) |
|-----------------------------------------------------------------------------------|-----------------------|----------------------------|----------------------------|
|  | Observation Interface | Laser Rangefinder ON/OFF   | Enter Menu                 |
|                                                                                   | Menu                  | Move Up Menu Option/Value+ |                            |
|  | Observation Interface | Downsize - (Recyclable)    | Switching Pallete          |
|                                                                                   | Menu                  | Move Down Menu Options     | /                          |



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## • 5-4 Power ON/OFF

When the device is not turned on, press and hold  the power key for 2 seconds until the start screen appears on the display and the thermal imager is powered on .

After the self-test, the image is on the display of the device.

When the device is turned on, press and hold  the power key for 2 seconds, The shutdown progress bar appears and automatically shuts down after the bar finishes in about 2 seconds.

For details of the main interface of the product, please refer to the following sections.

## • 5-5 Sleep Mode

Sleep mode is used to save battery power. In the view mode, short press  the power key. After a second, Display screen saver. Press  the button again to exit the Sleep Mode.

## • 5-6 Shortcut Key Operation Instructions

When the device does not enter the menu, some common functions can be operated quickly by pressing the keys.

• Zoom: Short press  + key; zoom ( $\times 1$ ,  $\times 2$ ,  $\times 4$ ,  $\times 8$  sequence switching, recyclable)

Short press  - key; zoom ( $\times 1$ ,  $\times 2$ ,  $\times 4$ ,  $\times 8$  sequence switching, recyclable)

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- PIP: Short press  the confirm key;
- Switching Palette: Long press  "-"key
- Laser Rangefinder ON/OFF: Short press  the menu key (valid for rangefinder version device)
- Take Photo: When it not video recording, long press  "+"key
- Video Recording: Long press  the confirm key
- Stop Video Recording: Long press  the confirm key

**Note: Shortcut key operation is only valid when the device does not enter the menu.**

## • 5-7 Thermal Imager Commissioning

### • 5-7-1 Eyepiece Focus Adjustment

In order to adapt to users with different vision, the thermal imager is designed with visibility adjustment. When the interface icon or text on the screen is blurred, it means that the visibility of the eyepiece does not match that of the user. Please adjust the visibility of the eyepiece.

Slowly rotate the visibility adjustment ring until the icon and text in the screen is clearly visible, it means that the visibility of the eyepiece has adapted to that of the user, and the visibility adjustment is completed.

### • 5-7-2 Lens Focusing Adjustment

The lens of the thermal imager is provided with a lens focusing ring at the front of the lens.

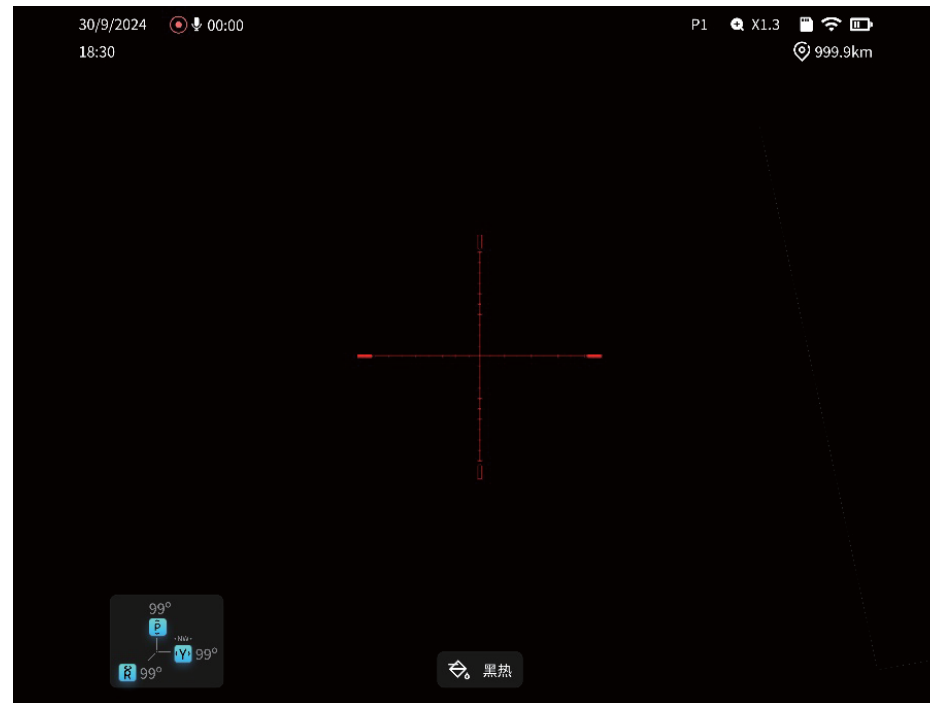
After the thermal imager is turned on, the thermal imager should be aimed at the observation target, and the lens focusing ring should be rotated until the image is clear. When the distance of the observation target changes, the image may be blurred. The lens focusing ring should be rotated to refocus until the target image is clear.

Clockwise rotation of the focusing ring is far focusing, and counterclockwise rotation is near focusing.

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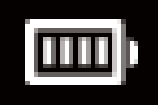
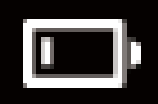
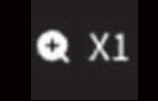
## • 5-8 Main Image Interface

When the thermal imager is in the view observation interface, the image interface is as shown in the figure below.

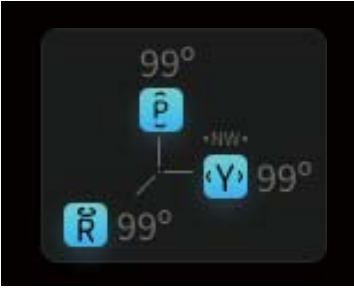


In view observation interface, shortcut key operations can be performed, and shortcut operations are detailed in related section;

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| Status Item     | Symbol                                                                              | Option          | Function                                                                        |
|-----------------|-------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------|
| Power Indicator |    | Full Charge     | The battery is sufficient and can be used with confidence                       |
|                 |    | Low-battery     | Pay attention to charging or replacing the battery soon                         |
|                 |    | Out of charge   | The machine is about to fail to work before charging                            |
|                 |    | Charging        | The machine can be used normally while charging                                 |
| Wi-Fi Hotspot   |   | Wi-Fi On        | In this state, you can use the APP software to connect to the WiFi named NVsion |
|                 |  | Wi-Fi Off       | This status indicates that the WiFi function is off                             |
| TF Card Status  |  | None            | Provides storage space for device photos and videos                             |
| Zoom            |  | No Digital Zoom | No digital zoom, wider field of view                                            |

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| Status Item               | Symbol                                                                              | Option                                  | Function                                                |
|---------------------------|-------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------|
| Zoom                      |    | 8x Digital Zoom                         | 8x digital zoom, bigger target                          |
| Target LRF Value          |    | No LRF Value                            | Disable LRF function                                    |
|                           |    | Real-time LRF Value                     | Enable LRF function and real-time ranging               |
| Compass, Pitch-roll Angle |  | Y- Compass                              | North-east/south-east /South-west/ North-west :0°~359°  |
|                           |                                                                                     | P- Pitch Angle                          | -90°~+90°                                               |
|                           |                                                                                     | R- Roll Angle                           | -90°~+90°                                               |
| Audio And Video Recording |  | Record Video And Sound At The Same Time | Playback with video and sound                           |
|                           |  | Record Video Without Sound              | Playback with video but no sound                        |
| Reticle                   |  | Current Reticle:1                       | Defaults the current cursor style of the shotlist group |

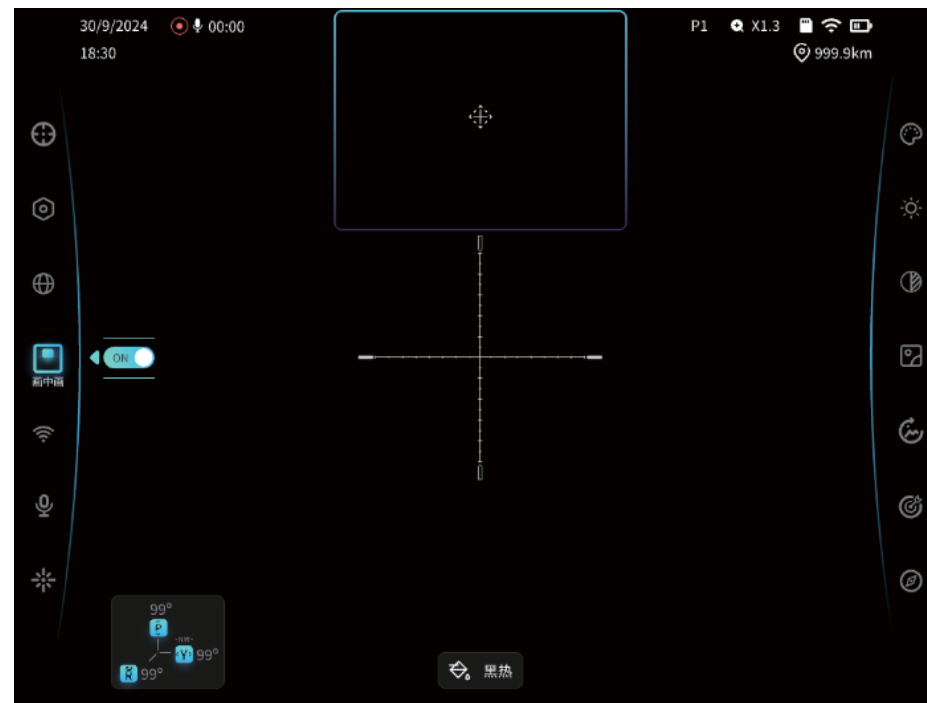
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|           |                    |                       |                                                       |
|-----------|--------------------|-----------------------|-------------------------------------------------------|
| Date/Time | 30/9/2024<br>18:30 | Current Date and Time | You can set the current date and time in the settings |
|-----------|--------------------|-----------------------|-------------------------------------------------------|

## • 5-9 Menu Operation Instructions

### • 5-9-1 Main Menu

Long press the menu button, The screen displays the main menu and shortcut menu, where the left side of the main menu.



In the menu operation interface, you can perform the operation of the menu bar.

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| Main Category     | Icon                                                                              | Subcategory   | Icon                                                                                  | Options                                   | Functionality                                                                                                                                                   |
|-------------------|-----------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laser Rangefinder |  | —             | —                                                                                     | Single、Continuous<br>Ranging: 15s、30s、60s | Switching between laser ranging modes                                                                                                                           |
| Zeroing           |  | Profiles      |    | 1-5                                       | Setting options can be saved as a group for each zeroed setting                                                                                                 |
|                   |                                                                                   | Reticle Type  |    | Off, 1-5                                  | Reticle off, 1-5 groups of cursor types                                                                                                                         |
|                   |                                                                                   | Reticle Color |    | White, Green, Yellow, Red, Black          | Reticle 5 colors of cursor                                                                                                                                      |
|                   |                                                                                   | Frozen        |   | Off/On                                    | Enable or disable LRF                                                                                                                                           |
|                   |                                                                                   | Zoom          |  | ×1、×2、×4、×8                               | Adjust screen zoom ratio                                                                                                                                        |
|                   |                                                                                   | Coordinate    |  | -253~511                                  | Press M to switch between X-axis and Y-axis, press + and - to increase and decrease the coordinate value respectively, long press con firm to exit the setting. |

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| Main Category | Icon                                                                                | Subcategory        | Icon                                                                                 | Options                                               | Functionality                                                |
|---------------|-------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------|
| Setting       |    | Screen Brightness  |   | 1-10 values                                           | Adjusting the image brightness level                         |
|               |                                                                                     | Automatic Sleep    |   | Off, 5 minutes, 10 minutes, 15 minutes                | Setting the time when the device automatically goes to sleep |
|               |                                                                                     | Automatic Shutdown |   | Off, 5 minutes, 10 minutes, 15 minutes                | Setting the time for automatic device shutdown               |
|               |                                                                                     | Time Setting       |   | Year, month, day and hour, minute and second settings | Setting the device display time                              |
|               |                                                                                     | Unit               |  | Metric/Imperial                                       | Switch between metric or imperial units                      |
| Language      |  | —                  | —                                                                                    | Chinese, English                                      | Switching the menu display language                          |
| PIP           |  | —                  | —                                                                                    | Off/On                                                | Picture-in-picture on/off                                    |
| WiFi          |  | —                  | —                                                                                    | Off/On                                                | Enable or disable Wi-Fi                                      |

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|             |                                                                                   |   |   |             |                                                          |
|-------------|-----------------------------------------------------------------------------------|---|---|-------------|----------------------------------------------------------|
| Audio Sound |  | — | — | Audio Sound | Turns on the button for recording during video recording |
|-------------|-----------------------------------------------------------------------------------|---|---|-------------|----------------------------------------------------------|

## • 5.9.2 Enter Main Menu

Press and hold  the menu key, The screen pops up with main menu and shortcut menu. After entering the operation menu interface, the key description is as follows:

1. Switch the menu item. Move the menu item up or down with  the "+" and  "-" keys.
2. Select the menu item. Select a menu item via  the Confirm key.
3. Modify the key value. Modify the key value with the  "+" key and  "-" key.
4. Short press  menu key to cancel OK or exit the menu.

## • 5.9.3 Laser Rangefinder

Select the appropriate laser rangefinder mode, single ranging, continuous ranging: 15s、30s、60s

## • 5.9.4 Zeroing

### • 5.9.4.1 Profiles

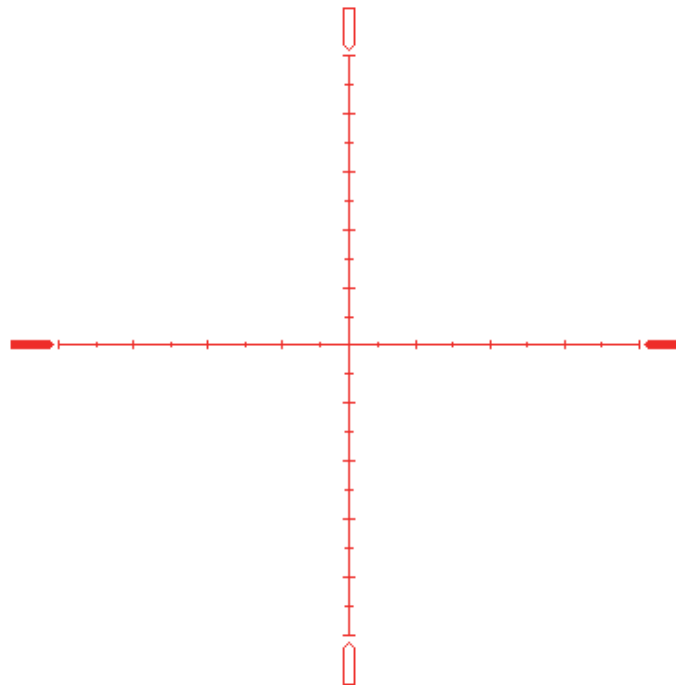
5 configuration groups, setting options can be saved as a set of configurations for each zeroing setting.

# SPEAR User Manual

## •5.9.4.2 Reticle Type

The thermal imager has 5 kinds of reticle types to choose.

Reticle Image Analysis



## •5.9.4.3 Reticle Color

The thermal imager has 5 kinds of reticle colors to choose. They are white, black, red, green and yellow.

# SPEAR User Manual

## • 5.9.4.4 Frozen

Screen frozen on/off

## • 5.9.4.5 Zoom

The current screen is electronically zoomed in  $\times 1$ 、 $\times 2$ 、 $\times 4$ 、 $\times 8$

## • 5.9.4.6 Coordinate

If the thermal imager is assembled on different equipment, the zero position will be different. When the assembly equipment of thermal imager is replaced, zero calibration is needed. We can make adjustments to the device calibration zero coordinates.

- X: Move the reticle left and right;
- Y: Move the reticle up and down.
- M Key: Short press to switch between X-axis and Y-axis;
- OK Key: Long press to exit settings.

## • 5.9.5 System Setting

### • 5.9.5.1 Coordinate

The brightness of eyepiece display screen can be increased or decreased by adjusting the screen brightness button.

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The thermal imager is designed with 1-10 levels of screen brightness, which ranges from the darkest to the brightest. Users can choose the appropriate screen brightness according to their viewing habits.

Note: If the screen brightness is too high, long-term use may cause damage to vision.

## • 5.9.5.2 Coordinate

The device's automatic sleep function has four options: Off, 5 minutes, 10 minutes, 15 minutes.;After the automatic sleep setting the sleep time, when the thermal imager has not been used for a long time and it is up to the automatic sleep time, the device will automatically enter the sleep status.

In the sleep status, most of the functions of the device will be turned off. After waking up, the device can be turned on quickly.

## • 5.9.5.3 Automatic Shutdown

The device's automatic shutdown function has four options: Off, 5 minutes, 10 minutes, 15 minutes.

After setting the shutdown time, the device will automatically shut down after the thermal imager has not been used for a long time to reach the automatic shutdown time.

## • 5.9.5.4 Time Setting

Setting the time on the screen of the device.

## • 5.9.5.5 Unit

Switch or metric unit or imperial unit.

# SPEAR User Manual

## •5.9.6 Language

Switch the operation language , Includes Chinese and English.

## •5.9.7 PIP

Turn picture-in-picture on or off

## •5.9.8 WIFI

WIFI On/Off

When the WIFI is turned on, Cell phones can connect to the device via Wi-Fi ,then displayed and operated on the mobile APP.

## •5.9.9 Audio Sound

Audio sound On/Off

Turn on the audio sound of recording, and the live sound will be recorded simultaneously into the video; turn off it, and the recorded video will have no sound.

## •5.9.10 Shortcut Menu

Press and hold the Menu key  to display the main menu, and press the Power button  briefly to switch to the shortcut menu on the right side of the screen.

# SPEAR User Manual



In the case of the menu screen, you can operate the menu bar.

The menu operation descriptions are shown in Table 6 below:

# SPEAR User Manual

| Status      | Icon                                                                                | Options                                                    | Function                                                                           |
|-------------|-------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------|
| Scene Mode  |    | Bird Mode, Jungle Mode, Recognition Mode                   | Select the scene mode that suits the current usage environment                     |
| Image Calib |    | Auto Calib/Shutter Calib /Scene Calib                      | Eliminates snow, jitter, streaks, etc. from images for clearer images              |
| Hot Track   |    | Off/On                                                     | Enable Or Disable Hot Spot Mark (marking the spot of highest temperature)          |
| Compass     |    | Off/On                                                     | The machine can be used normally while charging                                    |
| Palette     |  | White Hot, Black Hot, Red Hot, Green Hot, Fusion, Iron Red | Switch between 6 different color bands on the screen                               |
| Brightness  |  | 0-10                                                       | Increase or decrease the brightness of the scene image                             |
| Contrast    |  | 0-10                                                       | Increase or decrease the contrast of the scene image to make the target stand out. |

# SPEAR User Manual

## • 5.9.10.1 Shortcut Menu

Choose the scene mode suitable for the current use environment, jungle mode or recognition mode, to achieve better observation effect.

## • 5.9.10.2 Image Calib

Calibration can eliminate the snowflakes, jitters, fringes and so on, and make the image clearer.

In the process of using the thermal imager, the components of thermal imager will heat up due to long-time operation, which may cause snowflakes, jitters, stripes and so on in the infrared image, affecting the viewing experience. The user can correct the image and eliminate the abnormal image.

- Auto Calib: the product automatically performs shutter correction;
- Shutter Calib: Manual push-button triggered shutter compensation;
- Scene Calib: manual calibration is needed and external uniform scene is used for correction.

## • 5.9.10.3 Hot Track

- Hot spot track on/off

When hot spot track is turned on, a cursor appears on the screen to identify the hottest spot in the scene.

## • 5.9.10.4 Compass

The Compass information display on/off

When the electronic compass information is on: the values of the three items of compass, pitch-roll angle value displayed in a triangle in the lower left corner of the screen.

## • 5.9.10.5 Palette

The infrared image can display different colors by adjusting the image palette (the adjustment of palette color band), so as to facilitate the users to observe and identify the target.

The thermal imager has 6 kinds of palette for users to choose, which are white hot, black hot, red hot, green hot, fusion, hot iron.

## • 5.9.10.6 Brightness

The brightness of the scene image can be increased or decreased by adjusting the image brightness.

The thermal imager is designed with 1-10 levels of image brightness, which ranges from the darkest to the brightest. Users can choose the appropriate brightness according to their viewing habits and current environment.

## • 5.9.10.7 Contrast

The scene image can be increased or decreased by adjusting the image contrast to make the target more prominent.

The thermal imager is designed with 1-10 levels of image contrast, which ranges from the weakest to the strongest. Users can choose the appropriate contrast according to their viewing habits and current environment.

# SPEAR User Manual

Note: In the process of correction, the image will solidify for 0.5 seconds, which is not abnormal in the thermal imager.

## • 5-10 Defective Pixel Correction

“Defective pixel correction(DPC)” are persistent or often bright or dark pixel on the thermal imaging image, which may appear during use and can be corrected. Before you start switch the palettes mode to White Hot mode.

“On the observation interface, press and hold the  "Confirm" and  "-" key, enter the factory mode, select the third item of the factory "Bad spot calibration".

a) Short press the  "M" key to select Axis, and short press again to switch the moving direction of the axis.

b) In the X-axis adjustment item, short press the  "+" and  "-" keys to adjust the X-axis direction of the cursor.

c) In the Y-axis adjustment item, short press the  "+" and  "-" keys to adjust the Y-axis direction of the cursor.

d) When the center position of the cursor reaches the defective pixel , short press the  "Confirm" button to correct the current defective pixel.

# SPEAR User Manual

- e) Press the  "+" and  "-" keys simultaneously to cancel the current defective pixel correction
- f) After all the defective pixel have been corrected, long press the  "Confirm" button to exit the current defective pixel correction interface and return to the observation interface.

## • 5-11 Defective Pixel Correction

We recommend using the NNPO Connect software. Search the NNPO Connect software in App Store (iOS System) or Google PlayTM (Android System). Install the client software on your mobile phone first, and then connect your phone to the hotspot of the thermal device. Refer to related section for details of hotspot connection.

1. Run the app and connect the phone with the device.
2. If the device is inactivated, set the password and activate it. If the device is activated, enter the password to add it to the app.
3. When the device is added, the live view can be seen. You can view the interface of the monocular on the software. User can change such image parameters as brightness, contrast, zoom, palettes directly via phone as well as record video on phone/tablet memory.

## • 6 Common Fault Descriptions

If your instrument fails, first check the common faults shown in Table 7. If it is not caused by the following faults, please contact NNPO as soon as possible.

| Fault Detection                                                              | Options                                                                    | Function                                                                                                       |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| The thermal imager will not start up after the power key is pressed and held | Whether the battery is installed correctly                                 | Open the battery cover and check that the battery is installed in the opposite direction                       |
|                                                                              | Whether the battery is fully charged                                       | Take out the battery and charge it                                                                             |
|                                                                              | The battery cover is not tightened                                         | Tighten the lens cap                                                                                           |
| Image is poor and blurred after starting up                                  | Scene correction is not aligned with uniform temperature correction target | Cover the lens cap, or use other targets with uniform temperature distribution for compensation and correction |
|                                                                              | Lens are out of focus                                                      | Rotate the lens focus ring until the image is clear                                                            |

# After Service

| Fault Detection                                               | Options                                | Function                                              |
|---------------------------------------------------------------|----------------------------------------|-------------------------------------------------------|
| Bright line, black edge and flower screen appear on the image | Image correction is not performed      | Perform the compensation (correction) operation       |
| Image is blurred                                              | Lens are out of focus                  | Use special lens cleaning wipes to clean the lens     |
|                                                               | Infrared lens are contaminated         | Use special lens cleaning wipes to clean the lens     |
| Different distances were observed                             | Lens are out of focus                  | Rotate the lens focus ring until the image is clear   |
| The interface is not clear                                    | The visibility of eyepiece is improper | Adjust the visibility according to the Manual         |
| The thermal imager is shut down suddenly during use           | The battery compartment cover is loose | Tighten the battery compartment cover                 |
| The precision is decreased obviously during use               | The connecting seat is loose           | Check whether the connecting seat is fully locked     |
| It is unable to shut down normally                            | It is unable to shut down              | Press and hold the power button to force the shutdown |

# After Service

| Fault Detection                                               | Options                                                               | Function                                                                                                          |
|---------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Bright line, black edge and flower screen appear on the image | Is the memory card damaged                                            | Use a card reader to connect to the computer to check if the memory card is damaged                               |
|                                                               | Is the memory card correctly installed in the card slot               | Insert the memory card into the card slot with the metal sheet facing upwards                                     |
|                                                               | Install or remove the memory card while the thermal imager is working | Insert the memory card when the machine is turned off, and the memory card will work normally after turning it on |

## • 7 Maintenance And Service

After the observation is completed or if the target is not observed for a long time following the startup, it should be shut down in time to extend the effective utilization time of the thermal imager.

The lens of thermal imager is an important optical component. Therefore, in the process of installation and use, oil stains and various chemical substances should be avoided to contaminate and damage the lens surface. After use, please cover the lens cap.

# After Service

When the thermal imager is not in use, and during transportation, remove the battery and put the thermal imager in a safety box.

Do not use chemical solvents, diluents, etc. to scrub, but apply a soft, dry flannel cloth to wipe the thermal imager shell. The lens of thermal imager only needs to be cleaned when it is obviously dirty. Please avoid touching the surface of the lens. The acid substance on the skin left by the fingerprint will damage the coating and the surface of the lens. Only use special lens cleaning wipes to clean the lens.

When it is not used for a long time, it should be electrified for check and correction once every six months.

## • Warranty Service

Thank you for choosing this product. Please read the Product Warranty Card carefully and keep it properly to be fully entitled to the perfect after-sales service support.

We will provide you with after-sales service according to the standard product warranty commitment. Please check the official website for details of after-sales service policy. Some of the information is excerpted as follows:

1. The warranty period starts from the date of the first purchase of the product, and the purchase date is subject to the invoice date of the purchased product. If there is no valid invoice, the warranty period will be calculated from the date of delivery. If the invoice date is later than the actual delivery date of the product, the warranty period shall be calculated from the actual delivery date of the product.

# After Service

2. No warranty coverage (only some of the information is excerpted, please refer to the after-sales service policy for details)

- ① Exceeding the specified warranty period;
- ② Failure or damage caused by misuse, accident, modification, improper physical or operating environment, natural disaster, surge and improper maintenance or storage;
- ③ Failure or damage caused by the products, software, services or behaviors of a third party;
- ④ Normal decolorization, wear and consumption during the use of the product;
- ⑤ The product can run normally without interruption or error;
- ⑥ Data loss or damage;
- ⑦ Consumable parts, except for the failure due to material or process defects;
- ⑧ Failure to show valid warranty certificate and valid original purchase invoice or receipt, alteration, replacement or tear of original serial number label, absence of serial number or inconformity of product model or number on warranty certificate with actual product;
- ⑨ Any other circumstances in which the product is not used in accordance with the attached instructions or operation manual, or the product is not used in the intended function or environment, and it is confirmed that you have violated the operation manual.

3. NNPO will not be responsible for the additional promises made to you by the seller or any third party, and you should ask these third parties to fulfill them.

## Warranty Card

|                  |  |
|------------------|--|
| User Name        |  |
| Detailed Address |  |
| Tel              |  |
| Model            |  |
| S/N              |  |
| Date Of Purchase |  |
| Seller           |  |
| Tel              |  |

# After Service

**Note:**

1. You will be entitled to the free warranty within the warranty period and preferential service beyond the warranty period with this card.
2. This Warranty Card is only applicable to the products stated in it, which is valid after being sealed by the sales unit.
3. The warranty terms of special items shall be subject to the specific purchase and sale contract.
4. Specifications are subject to manufacturer revision in response to necessary circumstances without notice

|                         |                                                                                                                  |
|-------------------------|------------------------------------------------------------------------------------------------------------------|
| Brand:                  | NNPO                                                                                                             |
| Product model:          | SPEAR                                                                                                            |
| Service hotline:        | 0086-0755-27901239                                                                                               |
| Official website:       | WWW.NNPOTECH.COM                                                                                                 |
| E-mail:                 | info@nnpotech.com                                                                                                |
| Manufacturer's address: | 13F, Building 1, Xinweirun High-tech<br>Park, No. 162, Shajiang Road, Baoan<br>District, Shenzhen, China, 518105 |

