

Tube Series User Manual

V1.0

InfiRay Technologies Co., Ltd.

Specifications

| Model | TH35 |
|--|--|
| Detector Specifications | |
| Type | Uncooled Vox |
| Resolution | 464×464 |
| Pixel size, μm | 12 |
| NETD, mk | ≤40 |
| Frame Rate, Hz | 50 |
| Optical Specifications | |
| Objective Lens, mm | 35 |
| Field of View, ° | 8.8×8.8 |
| Optical Magnification, × | 3.0~9.0 |
| Digital Zoom, × | 1.0~3.0 |
| Eye Relief, mm | 50 |
| Detection Range, m (Target Size: 1.7m×0.5m, P(n)=99%) | 1816 |
| Display Specifications | |
| Type | OLED |
| Dimension | 1.39" |
| Battery Power Supply | |
| Battery Type | Two built-in 18650 batteries + one replaceable 18500 battery |
| Operating Time (22 °C), h* | 11.5 |
| External Power Supply | 5V (Type C) |
| Physical Specifications | |
| Scope Diameter, mm | 30 |
| Max. Recoil Power, g/s ² | 1000 |
| Ingress Protection Rating | IP67 |
| Memory Capacity, GB | 32 |
| Operating Temperature, °C | -20~+50 |
| Weight (Without the 18500 Battery), g | <850 |
| Dimension, mm | 375×85×75 |

*Actual operation time depends on the density of Wi-Fi use and video recording functions;

Improvements may be made to the design and software of this product to enhance its features without prior notice;

The current version of the User Manual is available on our official website:

www.infirayoutdoor.com.

I. Package Contents

- Tube series thermal imager
- Eye cup
- Mounting for Picatinny rail
- IPB-3 portable bag
- USB-C cable
- Power adapter
- Lens cleaning cloth
- Calibration hot pad

II. Description:

Tube series thermal imagers are infrared scopes for outdoor hunting. Designed based on infrared thermal imaging principles, they require no external light sources during the day and at night, in all hard weather conditions (such as rain, snow, fog, and haze). They can be used without being affected by strong light and to observe even targets behind obstacles (such as branches, grass, and shrubs). The Tube series has a variety of battery-powered solutions with long operating hours, and can be widely used for hunting, observation and positioning in low visibility conditions. It adopts a 30mm standard pipe diameter to meet the requirements of the general clamp interface.

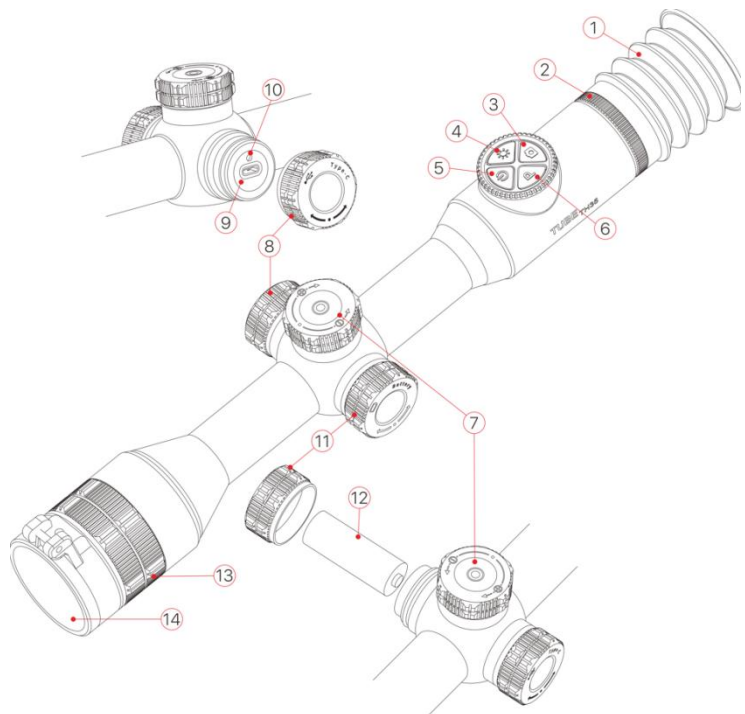
III. Product Features

- 12 μ m self-developed detector;
- High image quality;
- Infinite zoom;
- Dual power supply system, with long battery life;
- Standard 30mm pipe diameter;
- Stadiametric rangefinding;
- Long detection distance;

- 50Hz frame rate;
- Built-in memory card, supporting photo taking and video recording;
- Built-in Wi-Fi module, supporting app connection;
- Built-in digital magnetic compass and gravity sensor;
- PIP (picture-in-picture) function;
- Defective pixel calibration;
- Convenient operation interface;

IV. Device Composition

1. Eye cup
2. Eyepiece focusing ring
3. Camera button
4. Display brightness button
5. Power button
6. Image mode button
7. Rotary encoder
8. USB cap
9. Type-C interface
10. LED indicator
11. Battery holder cover
12. 18500 battery
13. Focusing ring of the objective lens
14. Lens cap



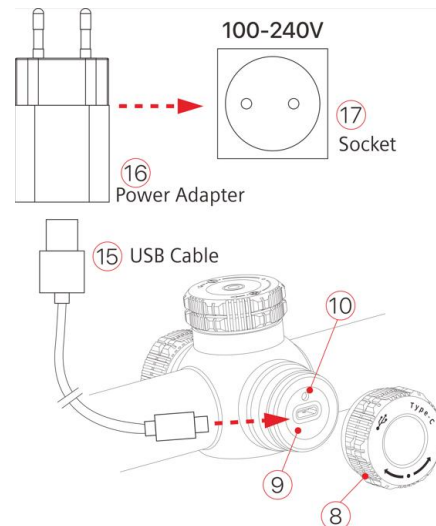
V. Button Operations

| Button | Device Status/Current Operation Mode | Press | Press and Hold | Rotate |
|---|---|---|--|---------------|
| Power button | Powered off | —— | Power on the device | —— |
| | Home screen | Calibrate the image | Power off the device/Standby | —— |
| | Standby | Wake up the device | —— | —— |
| | Main menu screen | Return to the upper menu without saving changes | —— | —— |
| | Pixel defect correction screen | Add/delete pixel defects | —— | —— |
| Image mode button | Home screen | Switch between image modes | Turn on/off the PIP function | —— |
| Display brightness button | Home screen | Adjust the display brightness | Turn on/off the stadiametric rangefinding function | —— |
| Camera button | Home screen | Photographing | Start/Stop video recording | —— |
| Image mode button + Display brightness | Home screen | —— | Enable/Hide the reticle and its functions | —— |


| button | | | | |
|-----------------------|---|--|-------------------------------------|---|
| Rotary encoder | Home screen | Open the shortcut menu | Open the main menu | Adjust image magnification |
| | Shortcut menu screen | Adjust specific parameters of a function | Save and go back to the home screen | Switch between menu options/move |
| | Main menu screen | Confirm the option parameters/Open the submenu | Save and go back to the main menu | reticle position: Clockwise: move to the left/down direction; |
| | Pixel defect correction and zeroing screens | Switch between the X axis/Y axis | Save and go back to the main menu | Anticlockwise: move to the right/up direction |

VI. Battery Charging


The Tube series adopts a dual power supply system (built-in chargeable Lithium-ion battery pack and a replaceable 18500 battery). The normal working time of the dual power supply system can be up to 11.5 hours. The battery should be fully charged before first use.



Charging the Built-in Battery Package

- Turn counterclockwise to open the USB cap;
- Insert the Type-C end of the attached data cable into the Type-C socket on the Tube;
- Connect the other end of the data cable to the power adapter, and insert the adapter into a 100-240V power socket to charge the battery pack;
- During charging, a lightning charging icon  appears on the right of the battery icon, and

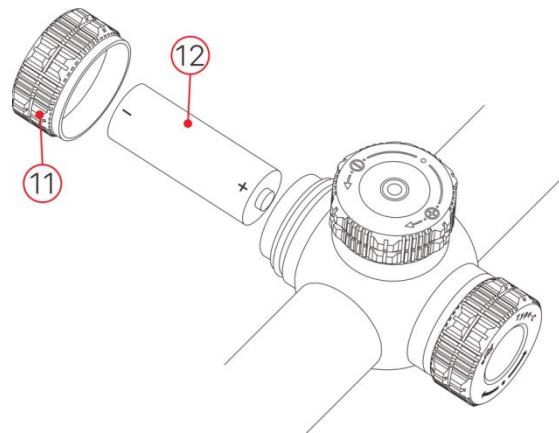
the LED indicator on the device is in red. When the indicator turns green, it indicates that charging is complete.

- During use, if the battery icon turns to , it indicates that the battery level is low. Please charge the battery in time to avoid reducing the service life of the device due to over discharge of the battery.

Note: The USB port can only be used for charging the built-in battery pack.

Installing 18500 battery

- Turn anticlockwise to open the battery holder cover (11);
- Install the 18500 battery (12) according to the indication label in the battery holder, that is, the positive pole faces inward and the negative pole faces outward;
- Close the battery holder cover (11) and turn clockwise to tighten it.



Safety Measures

- When charging, please use the 5V2A power adapter compatible with the device. Using any other type of adapter may cause irreversible damage to the battery or the adapter itself;
- If the device is not in use for a long time, the battery should be partially charged, not fully charged or discharged.
- Do not charge the device immediately after it is moved to a warm environment from a cold environment. Wait for 30 to 40 minutes for preheating.
- If the charger is modified or damaged, do not use it;
- The device should be charged at a temperature of 0 °C to +40 °C. Otherwise, the battery life will be significantly reduced.
- When charging, please do not leave the battery unattended;
- Do not connect the battery to the power supply for more than 24 hours after it is already

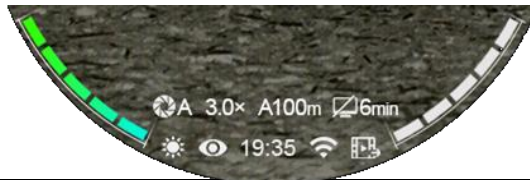
fully charged;


- It is not recommended to connect third-party devices that consume more energy than the allowed value.
- The device is equipped with a short circuit protection system, but conditions that may lead to a short circuit should be avoided.
- The recommended operating temperature for the device is -20 °C to +50 °C. Do not use the device beyond this temperature range, or else, it may shorten the battery life.
- When the device is used under sub-zero temperature, the battery capacity drops. This is normal and does not indicate a defect.

Switching between two types of batteries

The Tube series supports the dual power supply system: built-in Lithium-ion battery pack and replaceable 18500 battery, while supporting a USB power supply.

- If both batteries are installed in the Tube device, two battery icons are displayed on the right of the status bar below the image, with the replaceable battery icon on the left and the built-in battery icon on the right. Green indicates that the device is being powered, and gray indicates that the device is not powered on.



- If the replaceable battery is not installed, only the built-in battery icon is displayed in the lower right corner.
- If the replaceable battery is installed and fully charged, it will be preferred. When the replaceable battery is low, the device will switch to the built-in battery automatically.
- When the device is connected to a USB, it will switch to the external power supply USB automatically. At this time, a lightning charging icon is displayed on the right of the built-in battery icon , which indicates that the built-in battery is being charged.
- When the device is in use, the replaceable battery can also be replaced. At this time, it will switch to the internal battery automatically.

VII. External Power Supply

The Tube series supports external power supplies, such as the portable power source for a mobile phone (5V).

- Connect an external power supply to the USB port (9) of the Tube device;
- Then, the device automatically switches to the external power supply and charge the internal battery pack at the same time;
- When the external power supply is turned off, the device switches to the replaceable 18500 battery for power supply. If no replaceable 18500 battery is installed or the battery level is low, it will switch to the built-in battery pack, instead of shutdown.

VIII. Installation and Usage

Fixed installation

WARNING! The lens of the device must not be pointed at any sources of intense radiation energy, such as laser-emitting devices or the sun. This may damage the electronic components in the device. Damage caused by failure to comply with the operating guidelines is not covered under warranty.

To ensure firing accuracy, please fix the Tube at a proper position on the weapon.

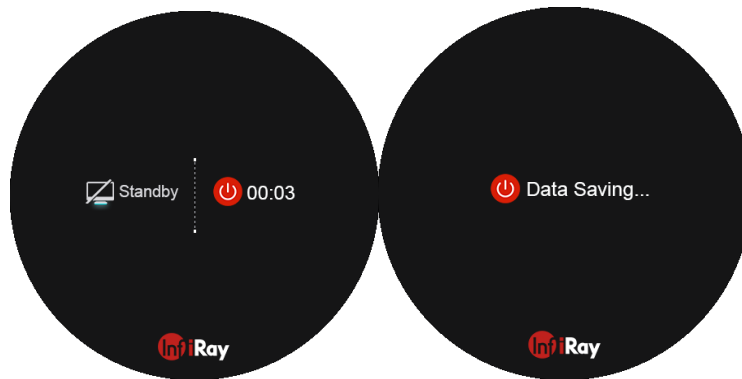
- The Tube series needs to be fixed with an adapter clamp, such as a simple Picatinny rail clamp provided in the package. The Tube series adopts a tubular body design with a diameter of 30mm, which is compatible with standard clamps with a diameter of 30mm, such as those of day scope. Proper tools can be used to install the Tube device according to the supplier's installation suggestions and steps.
- During installation, the installation position of the Tube device should be adjusted according to the distance between eye and eyepiece (eye relief) as specified in the specifications and the sense of use and comfort. If you fail to follow this suggestion, the eyepiece may hurt the shooter during the shooting.
- It is recommended to install the scope as low as possible, but keep it away from the barrel or other devices;
- Use the supplied torque wrench to tighten the screws of the installation clamps;

- When the scope is used for hunting, please carry out the zeroing operation first according to the instructions as specified in **Chapter IX "Zeroing"** in this manual;
- When using the scope at night or in a dark environment, it is recommended to use an eye cup to avoid being found.

Startup and Configuration

- Remove the lens cap (14);
- Press and hold the power button (5) for 2s to power on the device. Then, the home screen appears after 3s.
- Adjust the focus length by rotating the focusing ring (13) of the objective lens;
- Setting the image mode: On the home screen, press the P button (6) to set the image palette mode. The options are white hot, black hot, pseudo-color, red hot, and highlight, in sequence. The icon on the lower-left status bar is updated in real-time;
- Setting the display brightness: On the home screen, press the display brightness button (4) to set the screen brightness, which can be any level between level 1 and level 5. Meanwhile, a short prompt for the corresponding brightness icon appears on the left side of the display;
- Setting the image sharpness: Press the rotary encoder (7) to go to the shortcut menu, and set the image sharpness (refer to Chapter "**Shortcut Menu**" for details);
- Setting the image calibration mode: Select the desired calibration mode from the main menu. The options include: automatic shutter calibration (A), manual shutter calibration (M), and background calibration (B);
- On the home screen, press the power button (5) for image calibration. Before you can perform background calibration, cover the lens cap (14) for 2s;
- After using the device, press and hold the power button (5) for 3 seconds. Then, the shutdown countdown screen appears. When the countdown icon turns from 3 to 0, the device shuts down. When the button is released, a prompt interface "Data saving ..." is displayed. When the data is saved, the display turns black and the device is off. **When the device is powering off and saving data, do not disconnect it from the power source. Otherwise, the data cannot be saved.**
- After the countdown, release the button to let the device enter standby mode. To wake up

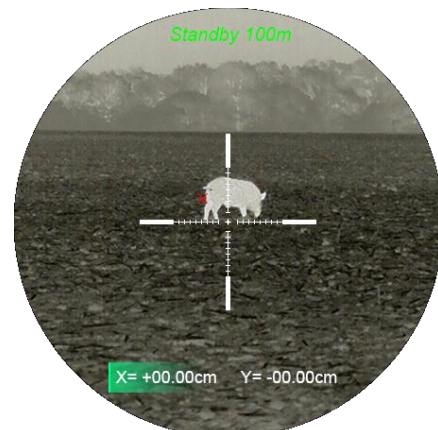
the device, press the power button (5).




IX. Zeroing

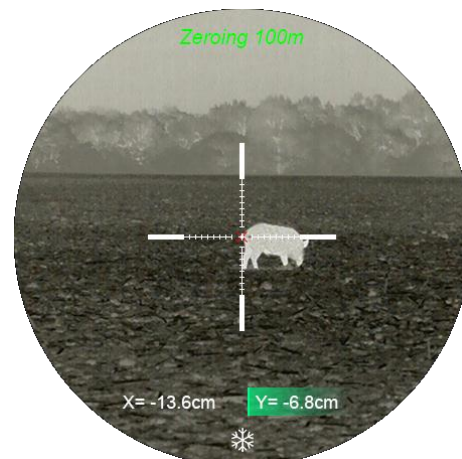
The Tube series uses the “freeze” zeroing method. It is recommended to perform zeroing in environments within the operating temperature range of the scope.

- Fix the scope on the weapon with a frock clamp. For details, refer to **Chapter VIII "Fixed Installation"**;
- When using the scope for the first time, press and hold the **display brightness button (4)** and the **image mode button (6)** for more than 15s to enable reticle and zeroing functions;
- Select a target at a certain distance, such as 100m, 200m, etc.;
- Adjust the scope according to the operating instructions as described in Chapter VIII **“Startup and Configuration”**;
- Select zeroing profile (refer to **"Reticle Setup-Zeroing Profile"** in the main menu function);
- Press and hold the rotary encoder (7) to enter the main menu screen, select the zeroing option, and press the rotary encoder (7) to enter the submenu of the zeroing function;
- According to the selected target distance, select or add the new zeroing distance (refer to **"Zeroing-Zeroing Distance-Set Zeroing Distance"** in the main menu);
- When the zeroing distance is set up, turn the encoder (7) to select the zeroing function, and press the encoder (7) to go to the zeroing screen (refer to **"Zeroing-Zeroing Distance-Zeroing Screen"** in the main menu). The coordinate



positions of the reticle (X axis and Y axis) are displayed in the lower middle of the display;

- Shoot at the target;
- Observe the position of the actual point of impact, and assume that the red mark × in the figure on the right is the position of the point of impact (This mark is only for illustration. It should actually be a bullet hole);
- If the point of impact and the aiming point (the center point of the reticle) do not match with each other, keep the aiming position still, and meanwhile, press and hold the P button (6) and the camera button (3) to freeze the picture, and then a snow-like freezing icon  appears in the lower middle of the display;
- Turn the rotary encoder (7) to move the image, rotate clockwise to move the image left or downward, and rotate anticlockwise to move the image right or upward;
- Press the rotary encoder (7) to switch between the X axis and Y axis, and the position of the shade indicates the currently selected item;
- When the reticle overlaps the actual point of impact, press and hold the rotary encoder (7) to save the current reticle position and return to the main menu;
- Repeat aiming and shooting, until the position of the point of impact is consistent with that of the aiming point.
- **Note:** After the zeroing position is set up, you can switch the options of **zeroing distance** in the shortcut menu.



X Calibration

When the image is degraded or uneven, it can be improved by calibration. Calibration can balance the background temperature of the detector and eliminate the defects in the image.

There are three calibration modes: automatic shutter calibration (A), manual shutter calibration (M), and background calibration (B).

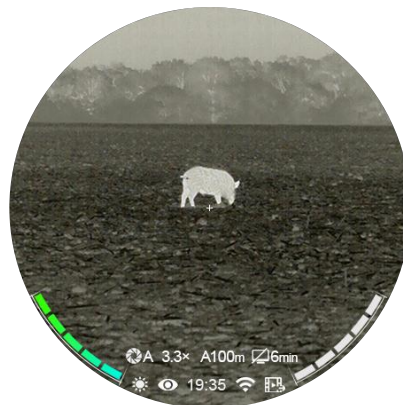
Select the required mode from the "**Calibration**" in the main menu.

- **Automatic shutter calibration (A):** The device conducts automatic shutter calibration through software algorithms with the lens cap removed (the sensor automatically closes the internal shutter). Before automatic shutter calibration, the device prompts a 5s countdown next to the shutter icon on the status bar. To cancel the calibration, press the **power button (5)** during the countdown. In automatic shutter calibration mode, you can also press the **power button (5)** to manually calibrate the shutter.
- **Manual shutter calibration (M):** On the home screen, press the **power button (5)** for manual shutter calibration with the lens cap removed (the sensor automatically closes the internal shutter).
- **Background calibration (B):** Cover the lens cap and press the **power button (5)**. The home screen then prompts: Cover lens during calibration. Background calibration will begin in 2s. After calibration, remove the lens cap.

XI. Digital Zoom

The Tube series Scope supports the continuously variable zoom function of 3.0–9.0, by which you can magnify an image by 1 to 3 times.

- On the home screen, turn the rotary encoder (7) to zoom in/out the image;
- Zoom in by rotating clockwise, and zoom out by rotating anticlockwise;
- The magnification is displayed in the lower middle of the display area in real time.
- Each time you rotate the rotary encoder, the image is zoomed in or out by 0.3 times.



XII. Photo Taking and Video Recording

The Tube series is equipped with a built-in 32GB memory space, which allows photo taking and video recording of an observed target. The image and video files will be named after time, so it

is recommended to set the system date and time in the main menu ("**Main Menu - Settings - Date/Time**"), or synchronize the system date and time on the Settings page of the app before photographing and video recording. For specific steps, see the Operating Instructions for the app, which can be downloaded from our official website.

Photographing

- On the home screen, press the **camera button (3)** to take a photo. A photo icon appears in the upper left corner of the display after the picture is stuck for 0.5s;
- The images taken are saved in the built-in memory space.

Video Recording

- On the home screen, press and hold the **camera button (3)** to start the video recording;
- A prompt box showing the recording time appears in the upper right corner of the display, with the time format as 00:00:00 (hours: minutes: seconds);
- During recording, you can also take a photo by pressing the **camera button (3)**;
- Stop the recording and save the video by pressing and holding the **camera button (3)**;
- The videos and images taken are saved in the built-in memory space.



Note:


- The menu can still be operated during video recording;
- The images taken and the videos recorded are stored in the built-in memory card in the format of IMG_HHMMSS_XXX.jpg (image) and VID_HHMMSS_XXX.mp4 (video), with HHMMSS indicating hours/minutes/seconds and XXX indicating the serial number of the three-digit multimedia file;
- The serial number of the multimedia files cannot be reset.

Note:

- The maximum duration of a video recording file is 5 minutes. When the duration is more than 5 minutes, the video will be automatically recorded onto a new file;
- The number of files is limited by the capacity of the built-in memory space of the device. You should check the remaining capacity of the memory card regularly, and transfer your videos and images to other media to free up the space on the memory card.
- The reticle is displayed on the captured videos/images, but interface icons are not.

Memory Access

When the device is powered on and connected to a computer, it will be recognized by the computer as a flash memory card. Then, you can access the memory of the device and copy images and videos.

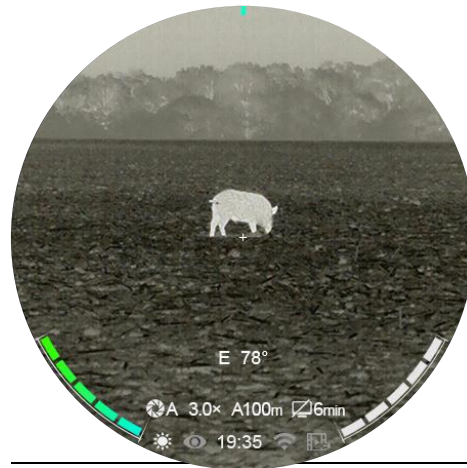
- Connect the device to a computer through the data cable;
- Start-up the device;
- Double-click "My Computer", double-click to open the device named "Infiray"  , and then double-click to open the device name "Internal Storage"











to access the memory;

- Open the memory file, and there are different folders named after time in the format of xxxx (year) xx (month) xx (day) in it;
- The folders stores the videos/images captured on the corresponding days. To copy or delete files or folders, select accordingly.

XIII. Status Bar



The status bar, at the bottom of the image interface, shows information about the device's current operations. In sequence, this includes:

1. Compass (not displayed when the compass is turned off)
2. Calibration mode: (In automatic shutter calibration mode (A), 5s before the calibration, a countdown icon appears next to the calibration icon 00:05, replacing the letter A.) Upon start, the device automatically performs continuous shutter calibration but does not prompt the countdown, which only appears when the device is in a stable state (about 10 minutes after the continuous operation).
3. Current optical magnification (e.g., 3.0×)
4. Current zeroing profile and zeroing distance (e.g., A100m)
5. Standby status and time (OFF by default)
6. Current image mode (: white-hot; : black-hot; : red-hot; : highlight; : pseudo-color;)
7. Ultra-clear mode status (, white - ON, gray - OFF)
8. Clock (Set it using the main menu or synchronize the time in the InfiRay Outdoor App)
9. Wi-Fi (, white - ON, gray - OFF)
10. Video output status (not displayed when the video output function is disabled)
11. The power status of the replaceable battery (18500 battery)
12. The power status of the built-in battery pack

Note: Colored battery icon indicates that the battery is supplying power. The levels of it show the remaining battery life. When the remaining battery is low, please charge it in time. The

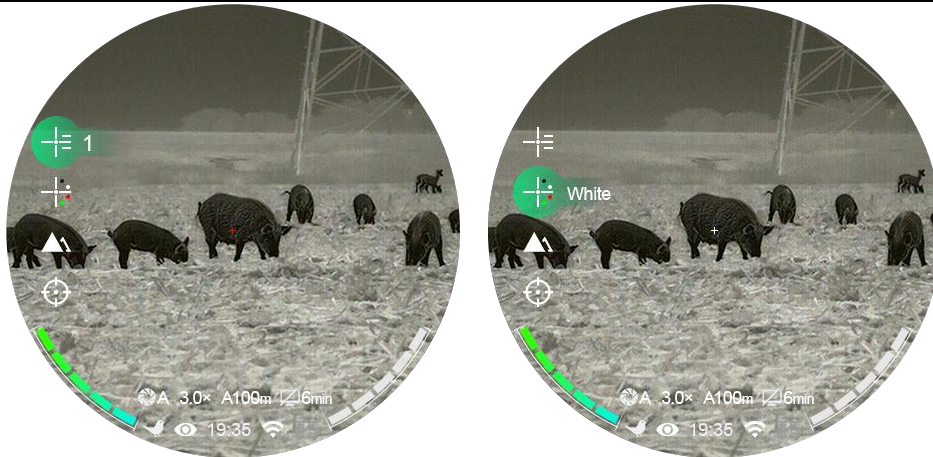
display of a lightning icon on the right of the battery signifies that an external power supply is working and charging the built-in battery pack.

XIV. Shortcut Menu

The shortcut menu can be used for a quick setup of the basic settings of some common functions, including reticle style, reticle color, image sharpness, and zeroing distance. Press and hold the **encoder (7)** to save the operation and return to the home screen.

- On the home screen, press the **rotary encoder (7)** to go to the shortcut menu screen;
- Turn the **rotary encoder (7)** to switch between the following function options, and the icon background of the selected option will be highlighted:
 - **Reticle Style:** Turn the **encoder (7)** to select the reticle style, and press the **rotary encoder (7)** to switch between 6 styles;
 - **Reticle Color:** Turn the **encoder (7)** to select the option, and press the **encoder (7)** to adjust the colors in the sequence of white, black, red and green;
 - **Image Sharpness:** Turn the **encoder (7)** to select the option, and press the **encoder (7)** to adjust the image sharpness from level 1 to 5;
 - **Zeroing Distance:** Turn the **encoder (7)** to select the option, and press the **encoder (7)** to switch between the distance values saved for the current zeroing type (e.g. For firearm type A, when you select the option, only the distance values saved for type A will be available);
- Press and hold the **rotary encoder (7)** to save the changes and return to the home screen.

Note: In the shortcut menu, if there is no operation within 5s, the device will automatically save the changes and return to the home screen.









XV. Main Menu


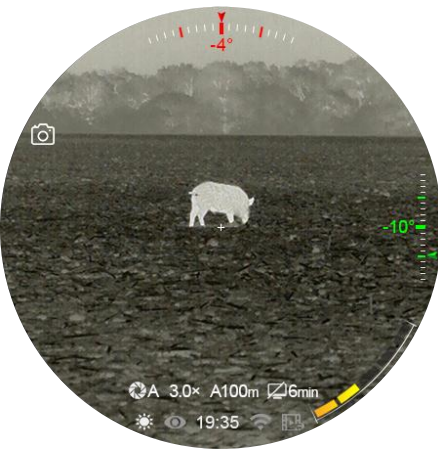

- On the home screen, press and hold the **rotary encoder (7)** for 3s to go to the main menu;
- Turn the **rotary encoder (7)** to switch between the function options in the main menu, rotate clockwise to move down and anticlockwise to move up;
- Press the **rotary encoder (7)** to modify the parameters of the current option or go to the submenu;
- The selected option's icon turns green from white;
- The operation of secondary and tertiary menus is the same as above;
- In any menu screen, press and hold the **rotary encoder (7)** to save the changes and return to the home screen. Press the **power button (5)** to return to the upper menu without saving the change;
- In any menu screen, the device will automatically return to the home screen without saving the changes when there is no operation within 15s.
- During the continuous operation of the scope, when exiting from the main menu, the selected option remains at the position before exiting. When you restart the scope and go to the main menu for the first time, the selected option stays at the first menu option.

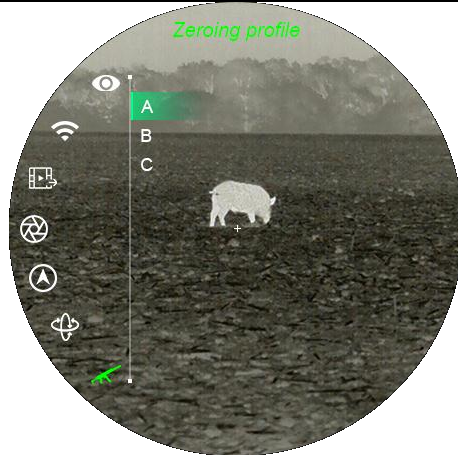


Main Menu Features and Descriptions

| | |
|--|---|
| <p>Ultra-clear Mode</p>  | <p>Turning on/off the ultra-clear mode</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Select "Ultra-Clear Mode" (selected by default on the menu after startup); ● Press the rotary encoder (7) to enable or disable ultra-clear mode, during which you will hear a click of shutter calibration; ● The icon in the status bar changes accordingly after this mode is turned on or off. |
| <p>Wi-Fi</p>  | <p>Enabling/Disabling Wi-Fi</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Turn the rotary encoder (7) to select the "Wi-Fi" function option; ● Press the rotary encoder (7) to enable/disable Wi-Fi; ● The icon in the status bar changes accordingly after this mode is turned on or off. |
| <p>Video Output</p>  | <p>Enabling/Disabling video output</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Turn the rotary encoder (7) to select "Video Output"; ● Press the rotary encoder (7) to enable/disable the analog video output function; ● After video output is enabled, a video output icon is displayed in the status bar at the bottom. |

| | |
|--|---|
| <p>Calibration</p> <p>Function</p>  | <p>Selecting calibration mode</p> <p>Three calibration modes are available: Automatic (A), Manual (M), and Background (B).</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Turn the rotary encoder (7) to select "Calibration"; ● Press the rotary encoder (7) to open the secondary menu of Calibration; ● Turn the rotary encoder (7) to select one from the following three: <ul style="list-style-type: none"> - Automatic: Parameters are defined by software algorithms and images are calibrated automatically in this mode. - Manual: Images are calibrated by the user according to the image effect. - Background: The camera must be covered with a lens cap in this mode. ● Press the rotary encoder (7) to confirm the selection. The icon in the status bar changes accordingly.  |
| <p>Digital</p> <p>Magnetic</p> <p>Compass</p>  | <p>Enabling/Disabling the digital magnetic compass function</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Turn the rotary encoder (7) to select "Digital Magnetic Compass"; ● Press the rotary encoder (7) to enable/disable the digital magnetic compass function; ● After the digital compass is enabled, its icon will be displayed in the upper center of the status bar at the bottom. |

| | |
|---|---|
| <p>Gravity Sensor</p>  | <p>Enabling/Disabling the gravity sensor</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Turn the rotary encoder (7) to select "Gravity Sensor"; ● Press the rotary encoder (7) to enable/disable the gravity sensor; ● After the gravity sensor is enabled, its functions will be displayed at the top and on the right of the screen; ● The upper curved ruler represents the tilt angle and the vertical ruler on the right represents the pitch angle.  |
| <p>Zeroing Profile</p>  | <p>Selecting Zeroing Profile</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Turn the rotary encoder (7) to select the "Zeroing Profile" function option; ● Press the rotary encoder (7) to open the secondary menu of "Zeroing Profile"; ● Turn the rotary encoder (7) to select one from the three zeroing profiles (A, B, C); ● Press the rotary encoder (7) to confirm the selection, and return to the main menu. |

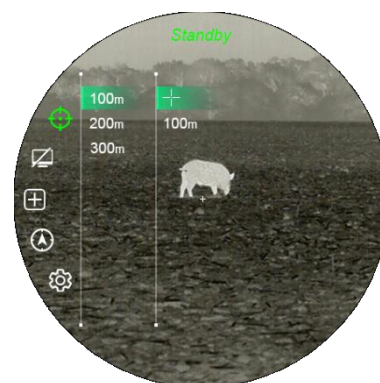
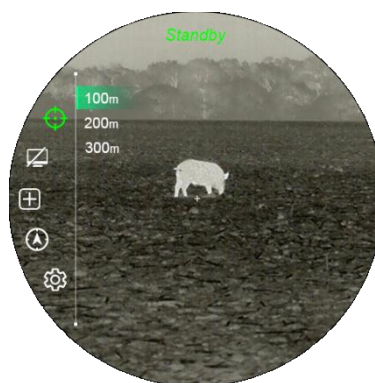


Please set up the zeroing profile and zeroing distance before carrying out any zeroing operation.

The Tube series supports any zeroing distance between 1 and 999 meters.

- Press and hold the rotary encoder (7) to open the main menu;
- Turn the rotary encoder (7) to select "Zeroing";
- Press the rotary encoder (7) to open the secondary menu of Zeroing, where displays the zeroing distances;
- Turn the rotary encoder (7) to select the zeroing distance according to the distance set for the target;
- Press the rotary encoder (7) to confirm the zeroing distance, and open the zeroing distance submenu, including two options, which are Zeroing and Zeroing Distance;


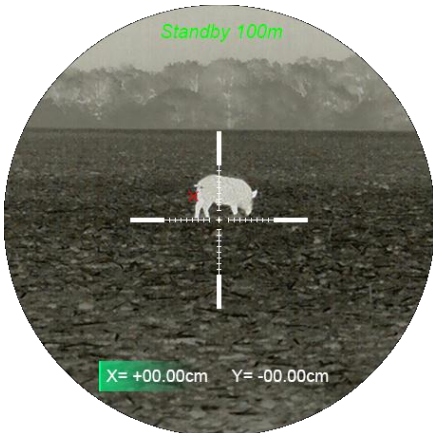
Zeroing

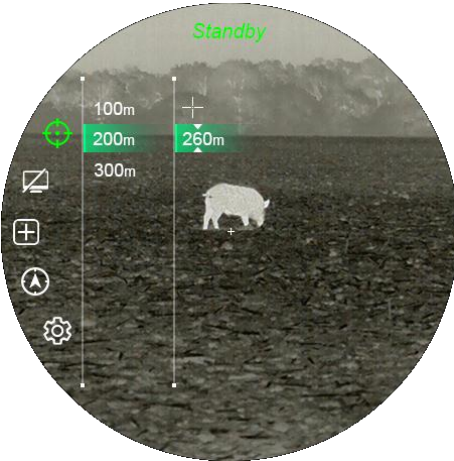



Zeroing

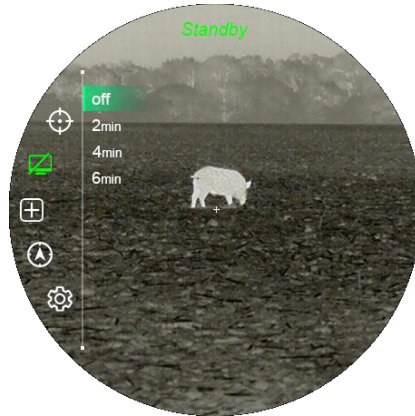


- If the preset zeroing distance is consistent with that displayed on the device, you can perform zeroing directly following the steps as below:

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| | | <ul style="list-style-type: none"> ● Turn the rotary encoder (7) to select Zeroing ; ● Press the rotary encoder (7) to go to the zeroing screen; ● The X axis and Y axis coordinates of the reticle are displayed at the bottom of the screen; ● Aim the reticle center of the scope at the bull's eye at the target distance and shoot, and then observe the position of the actual point of impact; ● Keep the aiming position still, and meanwhile press and hold the image mode button (6) and the camera button (3) to freeze the picture, and meanwhile, the freezing icon is displayed on the display; ● Turn the rotary encoder (7) to move the image position, until the reticle center aims at the position of the point of impact. For details, refer to Chapter IX “Zeroing”.  |
| | <p>Setting the Zeroing Distance</p> | <ul style="list-style-type: none"> ● If the zeroing distance is not consistent with the preset target distance, this option can be used for setting. ● Select an invalid zeroing distance, press the encoder (7) to open its submenu; ● Turn the encoder (7) to select the option "Setting the Zeroing Distance"; ● Press the rotary encoder (7) to activate the zeroing distance reset function, and then two small triangle symbols are |

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| | | <p style="text-align: right;">▼ 0 ▲;</p> <p>displayed above and below the number</p> <ul style="list-style-type: none"> ● Turn the encoder (7) to set the number value of the current position, which can be switched between 0 to 9; ● Press the rotary encoder (7) to switch between the positions of hundreds, tens and ones digits; ● After setting, press and hold the encoder (7) to save the setting and exit. The cursor returns to the zeroing option, and meanwhile the zeroing distance changes accordingly; ● Besides, the status bar updates to the new zeroing distance synchronously.  |
| <p>Standby</p>  | <p>Setting standby status and time</p> <ul style="list-style-type: none"> ● Press and hold the rotary encoder (7) to open the main menu; ● Turn the rotary encoder (7) to select "Standby"; ● Press the rotary encoder (7) to open the submenu for Standby, including four options, respectively 2min, 4min, 6min and off; ● Turn the rotary encoder (7) for selection; ● Press the rotary encoder (7) to confirm the selection, and then the selected option is displayed at the bottom status bar; ● If Off is selected, the standby function is disabled; <p>Note:</p> | |

- When the device is in the shooting status (horizontally positioned), the standby mode is disabled. The function is not yet supported?



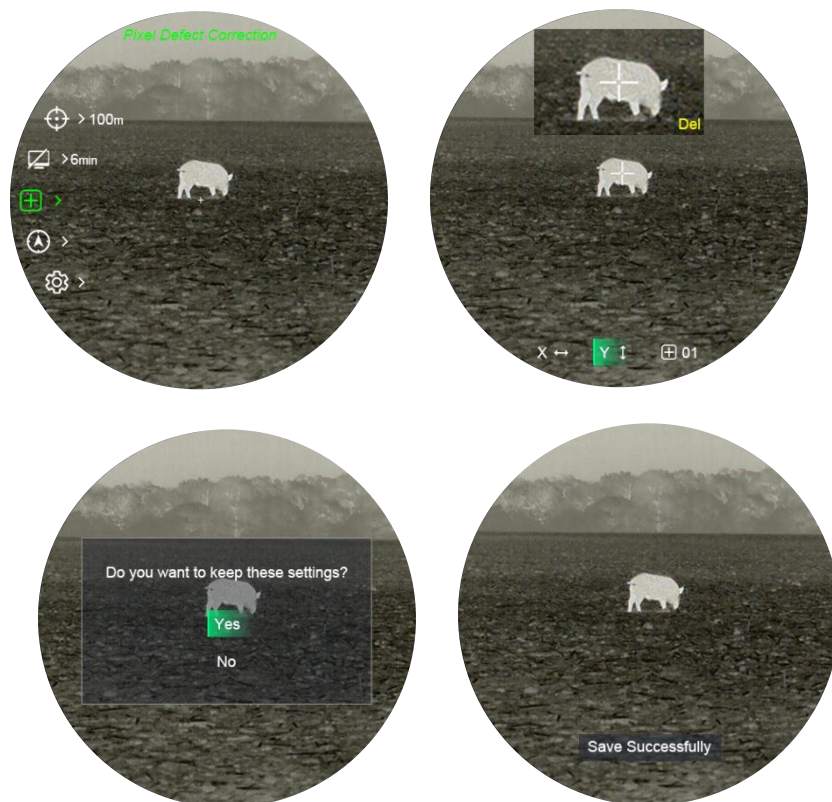
When using the scope, you may see pixel defects, such as visible light spots or dark spots with stable brightness. To address this problem, use the pixel defect calibration function to remove the pixel defects.

Pixel Defect Correction



- Turn the rotary encoder (7) to select "**Pixel Defect Correction**";
- Press the rotary encoder to go to the Pixel Defect Correction screen. A small cross cursor appears in the center of the screen and the PIP function is automatically on, which is displayed at the top of the screen by default;
- The cursor's moving directions are displayed at the bottom: X axis, Y axis, and number of pixel defects calibrated;
- Press the rotary encoder (7) to switch between the X axis and the Y axis;
- Turn the rotary encoder (7) to move along the direction selected, rotate it clockwise to move the cursor leftward or downward, or rotate it anticlockwise to move the cursor rightward or upward;
- Press the rotary encoder again to save the movement settings in this direction and switch to the other axis;
- You can repeat the preceding steps to change the cursor location until it reaches the position of the pixel defect;
- When the cursor moves to the position of the pixel defect, press the **power button (7)** to add and calibrate it. When Add is displayed in PIP, it indicates that the pixel defect has been added. This process can be repeated for calibrating other pixel defects;

- At the same position, you can revoke the pixel defect calibration by pressing the **power button (7)** again. Del is displayed in PIP;
- Each time you add or delete a pixel defect, the number of pixel defects changes accordingly;
- After calibration, press and hold encoder (7), and a prompt is displayed asking if you want to save the settings. Turn the rotary encoder (7) to select Yes or No to save it or not;
- Press the rotary encoder (7) to confirm the selection;
- After Yes is selected, the countdown message "Saving...5" is displayed. When **Save Successfully** appears, the operation is saved. You can then return to the home screen.







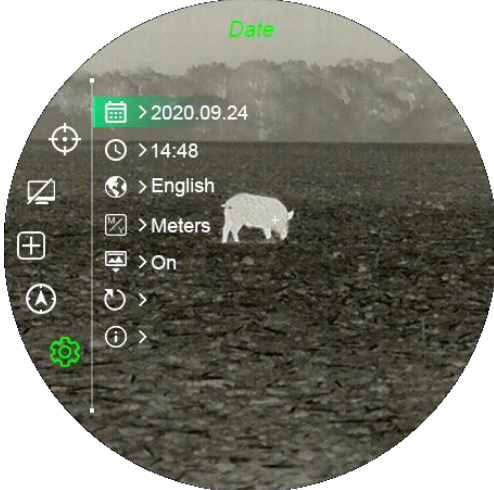

**Compass
Calibration**

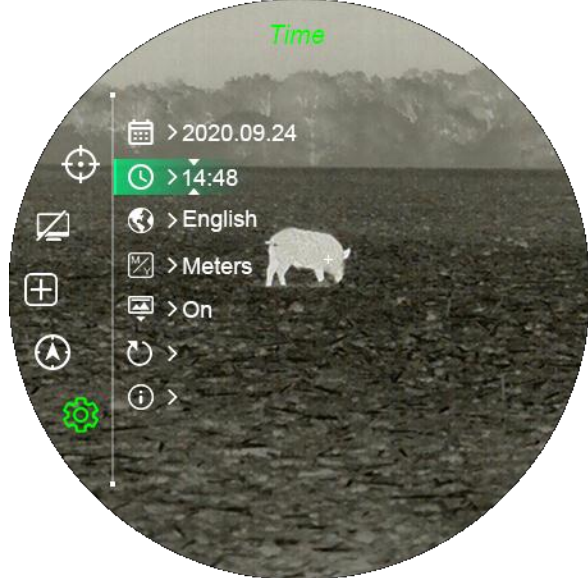





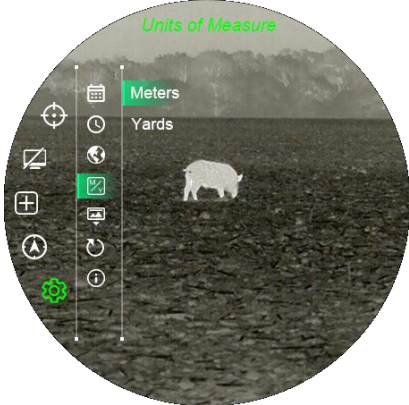


Calibrating the digital magnetic compass



- Turn the rotary encoder (7) to select "**Compass Calibration**" from the main menu;
- Press the rotary encoder to open the Compass Calibration screen. The calibration icon is displayed;

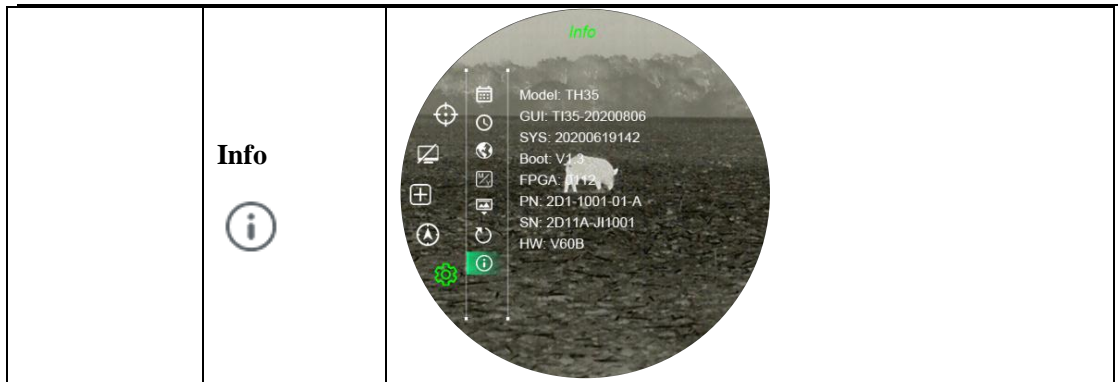
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| | <ul style="list-style-type: none"> ● Rotate the scope along the three axes indicated by the icon, with each axis rotating at least 360°; ● The calibration ends after 15s by default and the screen closes automatically;  |
| <p>General Settings</p>  | <p>This function is used to set the date, time, language, measurement unit, status auto hiding, factory reset, and device information query.</p>  |
| | <p>Date Setup</p>  <p>Setting the system date</p> <ul style="list-style-type: none"> ● Press the rotary encoder (7) to open the secondary menu of "Settings". ● Turn the rotary encoder (7) to select "Date"; ● Press the rotary encoder (7) to activate the date reset function, with the date in the format of YY/MM/DD; ● Turn the rotary encoder (7) to set the correct year, month and date; |

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| | | <ul style="list-style-type: none"> ● Press the rotary encoder (7) to switch between year, month and date; ● After setting, press and hold the rotary encoder (7) to save changes and exit the date reset function.  |
| | <p>Time Setup</p>  | <p>Setting the system time</p> <ul style="list-style-type: none"> ● Press the rotary encoder (7) to open the secondary menu of "Settings". ● Press the rotary encoder (7) to select "Time". The 24-hour system is used with the hour and minute displayed. ● Press the rotary encoder (7) to activate the time reset function; ● Turn the rotary encoder (7) to set the correct hour and minute; ● Press the rotary encoder (7) to switch between the hour and minute; ● After setting, press and hold the rotary encoder (7) to save changes and exit the time reset function; ● After setting time, the time in the status bar changes accordingly. |

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| <p>Language Selection</p>  | <p>Selecting language</p> <ul style="list-style-type: none"> ● Press the rotary encoder (7) to open the secondary menu of "Settings". ● Select "Language", and press the rotary encoder (7) to open the secondary menu for language selection; ● Turn the rotary encoder (7) to switch between English and Russian; ● Press the rotary encoder (7) to confirm and save the selection, and return to the menu screen; |  |
| <p>Units of Measure</p>  | | <p>Selecting the units of measure</p> <ul style="list-style-type: none"> ● Press the rotary encoder (7) to open the secondary menu of "Settings". ● Select "Units of Measure", and press the rotary encoder |

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| | | <p>(7) to open the secondary menu for units setup;</p> <ul style="list-style-type: none"> ● Turn the rotary encoder (7) to switch between meter and yard; ● Press the rotary encoder (7) to confirm and save the selection, and exit;  |
| | <p>Status Auto Hiding</p>  | <p>Enabling/Disabling status auto hiding</p> <ul style="list-style-type: none"> ● Press the rotary encoder (7) to open the secondary menu of "Settings". ● Select "Status Auto Hiding", and press the rotary encoder (7) to open the secondary menu for status auto hiding; ● Turn the rotary encoder (7) to select On or Off; ● Press the rotary encoder (7) to confirm the selection, and return to the main menu screen;  |
| | <p>Factory Reset</p> | <p>Restoring factory default settings</p> <ul style="list-style-type: none"> ● Press the rotary encoder (7) to open the secondary menu of |

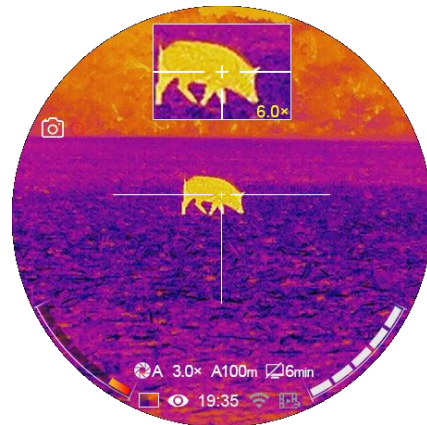
| | | |
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| |  | <p>"Settings".</p> <ul style="list-style-type: none"> ● Select "Factory Reset", and press the rotary encoder (7) to open the secondary menu for factory reset; ● Press the rotary encoder (7) to select "Yes" for restoring factory settings or "No" for canceling the operation; ● Press the rotary encoder (7) to confirm the selection; ● If "Yes" is selected, the scope will re-start automatically; ● If "No" is selected, the operation is canceled and return to the upper menu. <p>After the Factory Reset is selected, the following functions will be restored to default settings:</p> <ul style="list-style-type: none"> - Image Mode: White hot; - Zeroing Distance: A100 - Ultra-clear Mode: Off; - Optical Magnification: 3× - Shutter Calibration Mode: A; - Compass: Off; - Standby: Off - Analog Video: Off - Wi-Fi: Off - Gravity Sensor: Off - Language: English - Unit of Measure: Meter - Status Auto Hiding: Off <div style="text-align: right;">  </div> |
|--|---|--|



XVI. PIP

Picture-in-Picture (PIP) provides a floating window independent of the full screen. This window shows part of the image which is enlarged to 2× in a certain area centered on the reticle of the main image.

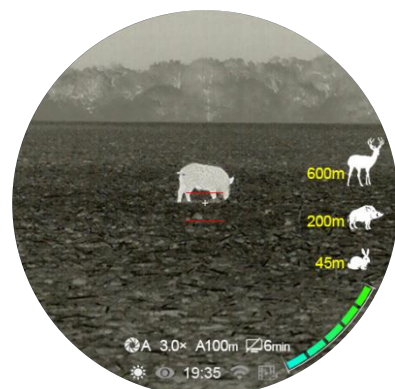
- On the home screen, press and hold the **image mode button (6)** to enable or disable PIP.
- After enlarging the image on the home screen by turning the **encoder (7)**, the image shown in the PIP window is also enlarged accordingly.



XVII. Stadiametric Rangefinding

The Tube series provides stadiametric rangefinding, which allows you to calculate the approximate distance from a target with a known size.

- On the home screen, press and hold the **display brightness button (4)** to enable or disable this function;
- After this function is enabled, two lines used for measuring appear in the middle part of the image, and three icons of pre-configured objects and the values of measurement distance are displayed on the right side.
- Three pre-defined target values are provided as follows:



- Deer: 1.7m high
- Wild boar: 0.9m high
- Hare: 0.2m high
- Adjust the device to move the target in the center of the display area. Turn the **rotary encoder (7)** clockwise to enlarge or anticlockwise to reduce the width of the measurement lines, so that the target is completely between the measurement lines. While adjusting the width of the measurement lines, the rangefinding values on the right change accordingly;
- The color and center position of the measurement line are synchronized with that of the reticle;
- If you want to change the measurement unit, please go to **Main Menu-Settings-Units of Measure** for modification;
- Press and hold the display brightness button (4) to exit this function.

XVIII. Status Auto Hiding

This function is used to hide the GUI automatically and save reticles only, so that there is no blocking on the image.

- Turn the rotary encoder (7) to select "Settings" on the main menu;
- Press the rotary encoder (7) to open the secondary menu of "Settings", and turn the rotary encoder (7) to select "Status Auto Hiding";
- Press the rotary encoder (7) to open the submenu of "Status Auto Hiding" and then select On or Off.
- After the status auto hiding is enabled, all GUI icons including the status bar will be automatically hidden and only the image and reticle are displayed if there is no operation within 8s.
- Press or press and hold any button to invoke the GUI information.
- You can operate the buttons and the menu only after the GUI information is displayed.

XIX. Wi-Fi


The Tube series has a built-in Wi-Fi module. The device can connect wirelessly to a mobile

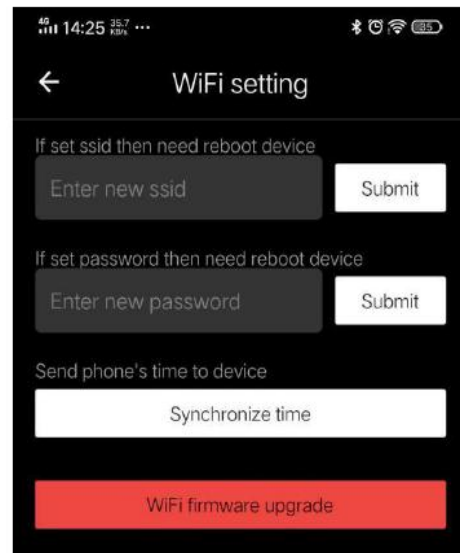
apparatus (laptop or smartphone) via Wi-Fi.

- On the main menu, enable Wi-Fi. For detailed operations, refer to "**Main Menu-Wi-Fi**".
- After the Wi-Fi of the scope is enabled, search for the Wi-Fi signal with the name "Tube_XXXXXX" on the mobile device, of which, XXXXXX is a 6-bit serial number composed of digits and letters.
- Select the Wi-Fi, enter the password and connect. The initial password is 12345678;
- After Wi-Fi access, you can control the scope via the mobile app.

Setting Wi-Fi name and password

The Tube series allows you to change the name and password of the device Wi-Fi in the app.

- After the scope is connected to the mobile device, locate the "Settings" icon  in the **InfiRay Outdoor** image screen and tap it to open the "Settings" screen;
- In the text box, enter and submit the new Wi-Fi name (SSID) and password;
- After submitting the change, reset the device to activate the settings.



Caution! After the device is restored to the

factory settings, the name and password of the Wi-Fi will also be restored to the default factory settings.

XX. Product Update and Description to APP

The Tube series thermal imager supports control with an app. You can transmit images in real time, operate the device, and update the program by connecting a smartphone or laptop via Wi-Fi.

You can download the user manual of InfiRay Outdoor at our official website (www.infirayoutdoor.com).

You can also test and update the firmware program of the product via the InfiRay Outdoor app or download it on our official website.

About InfiRay Outdoor

- You can download and install the InfiRay Outdoor app from the official website (www.infirayoutdoor.com) or an app store. Alternatively, you can scan the QR code below to download it for free.



- After installing the app, open it.
- If your device has been connected to a mobile device, enable mobile data on it. After the device accesses the Internet, an update prompt will be displayed automatically. Click Now to download the latest version immediately or click Later.
- InfiRay Outdoor saves the last connected device automatically. Therefore, once you open InfiRay Outdoor, it automatically detects an update in the background even when the scope is not connected to a phone or laptop. If an update is available and the mobile device accesses the internet, you can download the update first. After the download is completed, the scope will be connected to the mobile device, the version will be updated automatically.
- After the update is installed, the device will restart and enter the operation mode.

XXI. Technical Inspection

Perform a technical inspection to check the following items each time before you use the device:

- Exterior of the device (no crack on the enclosure).
- Lens and eyepiece (no crack, oil, stain, or other sediments)
- Status of the rechargeable battery (fully charged in advance) and electrical contact (no

salinization or oxidation).

XXII. Product Maintenance

The device must be maintained in the following ways at least twice each year:

- Wipe the surface of metal and plastic parts to clear off dust and dirt by using a cotton cloth.
Apply silicone grease if required.
- Use non-greasy organic solvent to wash the electric contact and slot of the battery.
- Check the glass surface of the eyepiece and lens. If necessary, clear off the dust and sand on the lens (preferably using a non-contact method). Use a specialized wiping tool and solvent to clean the optical surfaces.

XXIII. Troubleshooting

The following table lists all problems that are likely to occur during device operation. Check and address problems by referring to this table. If faults not included in this table occur or you cannot fix the fault, return the device to the vendor or supplier for troubleshooting.

| Faults | Possible Causes | Solutions |
|---|---|--|
| The scope cannot be started | The battery is out of charge | Charge the battery |
| The device cannot be powered by an external power supply | The USB cable is damaged | Replace the USB cable |
| | The external power supply is insufficient | If necessary, check the external power supply |
| Images are unclear, vertical lines are present, or the background is not even | Calibration is required | Calibrate the images as instructed in Section 9 of the user manual |
| Images are too dark | The display is not bright enough | Adjust the display brightness |

| | | |
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| Icons are clear but images are blurry | The lens is not focused | Rotate the lens focus ring to adjust the focus |
| | The inner or outer optical surface of the lens is dusted or iced | Wipe the outer optical surface by using a soft cotton cloth or leave the scope to dry in a warm and dry environment for more than 4 hours |
| The position of the reticle moves after shooting | The scope or the fixing clamp is not installed firmly | <p>Check whether the scope is installed firmly.</p> <p>Ensure that the bullet type and caliber you use are consistent with that used for zeroing.</p> <p>If you perform zeroing in summer but use the scope in winter (or vice versa), the zeroing point may move slightly.</p> |
| The scope cannot focus | Configuration error | <p>Set the scope according to the contents as specified in "Startup and Image Setup".</p> <p>Check the outer surface of the objective lens and eyepiece, and if necessary, wipe off any dust and frost on it.</p> <p>In cold weather, a special antifogging coating can be applied (such as those used on eyeglasses or car rearview mirrors).</p> |
| The device cannot connect to a smartphone or computer | The Wi-Fi password is incorrect | Enter the correct password |
| | There are too many Wi-Fi networks in the range of the | To enable stable network access, you are advised to move the device to an |

| | | |
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| | device, which may cause interference | area with a limited number of Wi-Fi networks, or an area without Wi-Fi coverage |
| Wi-Fi signals are lost or interrupted | <p>The device is beyond Wi-Fi coverage.</p> <p>There is blocking (such as concrete walls) between the device and the receiver.</p> | Move the device to a place where you can receive Wi-Fi signals. |
| The observed target disappears | You are observing the target through the glass | Observe the target directly without the presence of glass |
| The image quality is poor or the detection range shortens | These problems are likely to occur when you use the device in harsh weather (such as snow, rain, and fog). | |
| When the device is used at a low temperature, the imaging quality is poorer than that at normal temperature. | <p>At temperatures above 0 °C, the temperature rise varies with the observed objects (environment and background) due to different heat conductivity coefficients. As a result, high-temperature contrast occurs and the image quality is better.</p> <p>At low temperatures, the observed targets (background) usually cool down to a similar temperature because of reduced temperature contrast. Therefore, the image quality (details in particular) is poor, which is a characteristic of thermal imaging devices.</p> | |

FCC Warning

§ 15.19 Labeling requirements.

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.

§ 15.21 Information to user.

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

§ 15.105 Information to the user.

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.

Body-Support Operation

This device was tested for typical body-support operations. To comply with RF exposure requirements, a minimum separation distance of 0cm must be maintained between the user's body and the handset, including the antenna. Third-party belt-clips, holsters, and similar accessories used by this device should not contain any metallic components. Body-worn accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided. Use only the supplied or an approved antenna.