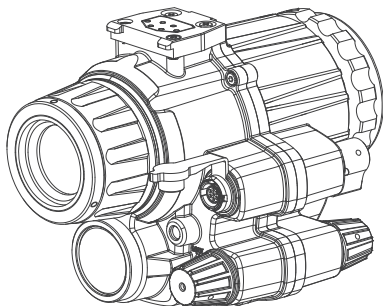




Jerry-F Enhanced Night Vision Goggle

User Manual V1.3



IRay Technology Co., Ltd.



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•Warnings, Cautions and Notes

This manual involves warnings, cautions, and notes. Their meanings are as follows:

•Warnings

Warnings are used to warn of a potentially dangerous situation. Serious injury or death may be caused if any of these warnings is neglected.

•Cautions

Cautions are used to warn of a potentially dangerous situation. Injury or equipment damage may be caused if any of these cautions are neglected.

•Notes

Basic information that helps you better use or operate the product.

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Chapter 1 Equipment Information and Description

1.1 Equipment Information

Equipment model and name:

Jerry-F Enhanced Night Vision Goggle

Equipment use:

Jerry-F Enhanced Night Vision Goggle is a device that can observe and search targets at night, in dim environments, darkness, harsh weather, or complex scenes. With a Tyke series thermal scope, the video of the scope can be precisely matched to the view of Jerry-F, so as to capture the target quickly and shoot the target covertly.

Jerry-F mainly consists of three parts, including the main body of the goggle, the battery holder, and the helmet support. The goggle is connected to the helmet support through the quick removal interface. The battery holder is connected to the helmet through the power cable.

Components of Jerry-F:

S/N	Component
1	Main body of the goggle
2	Battery holder
3	Helmet support
4	18650 lithium-ion battery
5	Eye cup
6	Video cable
7	User manual
8	Packing case

Note: Maintenance cable is optional and will be delivered if you have ordered one.

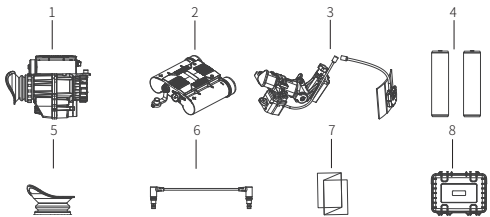


Figure 1.1 Components of

Components of the main body and their functions:

S/N	Component	Function Description
1	Objective lens hood	Protects the lens when the goggle is not used and protects the image intensifier from high light.
2	P objective lens	Collects visible light and focuses it on the focal plane of the P image intensifier. Rotate the handwheel to adjust the focal length.
3	Infrared objective lens	Collects infrared and focuses it on the focal plane.
4	Shell	For sealing.
5	Ocular lens	Displays infrared thermal images. Rotate the handwheel to adjust the diopter.
6	Eye cup	Adjusts the exit pupil distance and provides a sealing function.
7	Aviation plug	7-pin port (external power supply, video, maintenance over serial port).
8	Quick removal interface	Connects to the helmet support.
9	P switch/Adjusting knob	Switch: Enables or disables P imaging; Knob: Adjusts the brightness of P images; Short press: Switches integrated display mode (In Enhanced Night Vision Mode); Switches digital zoom (In Thermal Imaging Mode) Long press: Corrects the shutter.
10	Infrared switch/Adjusting knob	Switch: Enables or disables infrared imaging; Knob: Adjusts the brightness of infrared images; Short press: Switches between infrared thermal color palettes (white hot/black hot/orange hot). Long press: Enters the menu; In the menu: Short press to switch and long press to change the option.
11	Fill-in light switch	Switch: Enables or disables infrared light fill-in; Long press: Enables or disables high-light protection.
12	Infrared lens hood	Protects the infrared lens when it is not used.

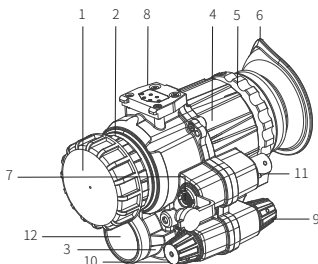


Figure 1.2 Components of the main body

Battery holder components and their functions

S/N	Component	Function Description
1	Battery	Two 18650 rechargeable lithium-ion batteries.
2	Battery compartment opening	Enables battery assembly and disassembly, and seals the compartment.
3	Quick removal interface	Connects to the interfaces for installing the hook-loop support.
4	Disassembly pull	Pull it out when disassembling the battery holder.
5	Master power switch	Powers on/off the equipment.
6	Image transmission power switch	Powers on/off the image transmission module.
7	Aviation plug	Video and signaling transmission.
8	Shell	Provides sealing and prevents water or dust.

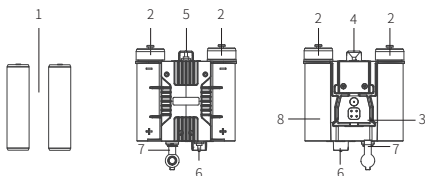


Figure 1.3 Components of the battery holder

Components of the helmet support and their functions:

S/N	Component	Function Description
1	Hook-loop support of the battery holder	Fixes the battery holder on the helmet.
2	Battery holder interface	Connects to the battery holder.
3	Goggle interface	Connects to the main body of the goggle.
4	Power cable	Provides power supply.
5	Helmet installation interface	Fixes the helmet support on the shroud.
6	Horizontal fine-tuning buckle	Adjusts the horizontal position of the goggle.
7	Pitch fine-tuning knob	Adjusts the pitch angle of the goggle.
8	Front-back tuning buckle	Adjusts the front and back position of the goggle.
9	Fixing screw for switching between eyes	Fixes the goggle either at the right or left eye.
10	Vertical tuning screw	Adjusts the vertical position of the goggle.

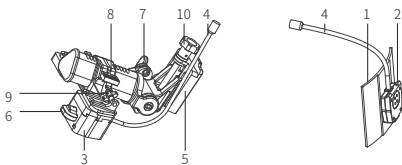


Figure 1.4 Components of the helmet support

1.2 Equipment Specifications

Equipment specifications:

Product Specifications	
Product Model	Jerry-F
Visual Amplification	1.0x
Exit Pupil Diameter	15 mm
Exit Pupil Distance	25 mm
Diopter	-3.5 ~ +2.5
Weight (Without Battery Pack)	≤380 g
Operating Temperature	-40°C ~ +60°C
Battery Life (Enhanced Display)	≥8 hours
Battery Life (I ² Only)	≥60 hours
Display Mode	White hot/Black hot/Orange hot, outline, highlighting, thermal image, breath
Infrared Image Digital Zoom	Supported
Azimuth Indication	Supported
Pitch/Inclination Indication	Supported
I ² Specifications	
I ² Focal Length	25 mm
Focal Length Range	0.25 m ~ +∞
I ² FOV	40°
Brightness Adjustment	Supported
Infrared Specifications	
Detector	12 μm 640×512
Infrared Focal Length	16 mm
Infrared FOV	25.8°×19.1°
Brightness Adjustment	Supported
Contrast Control	Supported

Recognition Distance Specifications:

Target	Type	Operating Distance
Human target 1.7m × 0.5m	Identification	200m
	Recognition	400m
	Detection	1500m
Vehicle target 4.6m × 2.3m	Identification	500m
	Recognition	1000m
	Detection	3000m

Chapter 2 Assembly and Power-up for Use

2.1 Assembly/Disassembly

You can use Jerry-F in two modes: handheld or mounted on a helmet. Assemble the equipment as instructed after you decide how to use it.

Before use, install the batteries. Jerry-F uses two 18650 lithium-ion batteries. The installation procedure is as follows:

Unscrew the two covers of the battery compartments.

Check the polarity of the batteries and place the batteries into the designated position with the correct polarity.

Tighten the covers of the battery compartments.

In handheld use, no helmet support is required. What you need are the main body of the goggle and the battery holder. The procedure for installing Jerry-F for handheld use is as follows:

Take out the main body of the goggle and the battery holder.

Install the ocular lens hood if needed.

Align the broad side of the battery holder with that of the goggle in the correct direction.

Press the battery holder until it clicks and the assembly is completed.

The procedure for disassembling handheld Jerry-F is as follows:

Turn off the infrared P switch of the goggle and the main power of the battery holder.

Pull out the disassembly pull of the battery holder and lift it upward.

Separated the battery compartment and the main body of the goggle.

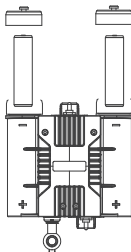


Figure 2.1 Installing the batteries for Jerry-F

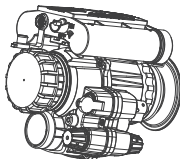


Figure 2.2 Jerry-F for handheld use

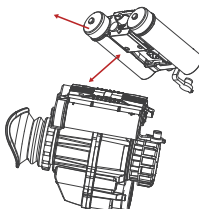


Figure 2.3 Disassembling handheld Jerry-F

When using this equipment on a helmet, you need to fix the helmet support on the helmet. Jerry-F is compatible with various multi-functional shrouds and hook-loop helmets. The procedure for installing a helmet-based Jerry-F is as follows:

Install the helmet support on the shroud. Attach the hook-loop support of the battery holder to the hook-loop fastener in the middle of the rear part of the helmet.

Align the broad side of the battery holder with that of the hook-loop support. Press the battery holder until it clicks.

Connect the power cable of the hook-loop support and the helmet support, with the female and male white points aligned.

Install the ocular lens hood on the main body of the goggle if needed.

Align the broad side of the quick removal interface with that of the goggle interface on the helmet support. Then lift the main body of the goggle upward until it clicks.

The procedure for disassembling helmet-mounted Jerry-F is as follows:

Turn off the power: Turn off the infrared I² switch of the goggle and the main power of the battery holder.

Remove the main body of the goggle: Turn the quick-removal knob on the helmet support and pull out the main body of the goggle downward.

Remove the battery compartment: Pull out the disassembly pull of the battery holder and lift it upward. The battery holder is removed from the hook-loop support.

Disconnect the power cable: Fix the female connector of the hook-loop support and pull out the male connector of the power cable of the helmet support.

Disassemble the hook-loop support.

Disassemble the helmet support: Press the snap ring of the holder and pull out the helmet support.

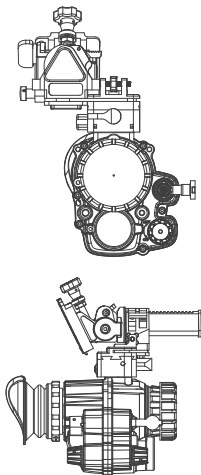


Figure 2.4 Jerry-F used on a helmet

2.2 Power-up and Use

Before powering up the equipment, turn on the main power of the battery holder. Then enable I² night vision, turn on the infrared switch, and enable infrared thermal image night vision. You will see fused images in the ocular lens.

Chapter 3 Operation Guide

3.1 I² Night Vision

3.1.1 Enabling I² Night Vision

After turning on the main power of the battery holder, turn the I² knob from OFF to MAX until you hear clicking. Then this function is enabled and you can observe I² images in the ocular lens. Continue turning the I² knob towards MAX to adjust the image brightness as required.

Caution: After enabling I² night vision, avoid exposing the equipment under direct high light. If you use it in scenarios with sufficient light, cover the I² objective lens with a hood so as to protect its components from damage.

3.1.2 Protection Against High Light

I² components are vulnerable under high light. Therefore, Jerry-F has added high-light protection. When detecting that I² components are exposed to high light for a long time, the equipment will automatically disable the I² night vision function.

When excessively strong ambient light is detected, you will see a red indicator blinking (interval: 1s) in the right corner of the screen through the ocular lens. If the high light persists, I² power will be turned off after 1 minute so that the components are not damaged.

To observe targets under high light or through the small hole of the I² objective lens cap, long press the fill-in light switch to disable high-light protection. The indicator then turns steady blue. To enable high-light protection, long press the fill-in light switch. Then the blue indicator turns off.

Note: Each time you enable I², high-light protection is enabled by default.

3.1.3 Power-off by Upturning the Support

When using Jerry-F by mounting it on a helmet support, you can power off the equipment by upturning the support. This reduces power consumption and possible damage to I² components due to direct exposure to sunlight or other light sources.

3.2 Infrared Night Vision

Turn on the main power of the battery compartment and turn the infrared knob from OFF towards MAX until you hear clicking. Then infrared night vision is enabled. You can see the start-up logo "Jerry-F" and observe infrared thermal images after 3-5 seconds in the ocular lens. Continue turning the infrared knob towards MAX to adjust the brightness of the infrared thermal image as required. In infrared night vision mode, you can short press the I² knob to zoom in on the infrared image.

Note: When the external video is connected, "PIP of external video" and "Full screen of external video" are available.

Note: You cannot switch to enhanced mode if only infrared night vision is enabled.

3.3 Shutter Correction

If infrared images experience noise, deterioration, or bright spots after you

enable infrared night vision, you need to correct the shutter manually. Long press the I² knob for 2s to manually correct the shutter. You can hear the shutter click during the correction. The correction time is less than 1s.

3.4 Enhanced Night Vision

When I² night vision and infrared night vision are enabled at the same time, you can observe enhanced night vision images from the ocular lens. You can switch among a variety of enhanced display modes as needed.

3.4.1 Switching Enhanced Night Vision Modes

In the enhanced night vision mode, short press the I² knob to switch the enhanced modes. Jerry-F has four enhanced display modes: Outline, Target highlight, Thermal image, and Breathing alert. Short press the I² knob to switch between the four display modes cyclically.

Caution: When the external video is connected, "PIP of external video" and "Full screen of external video" are available.

Note: The Outline mode is the default mode after the enhanced night vision is enabled.

3.4.2 Switching Thermal Polarity in Enhanced Night Vision Mode

In the enhanced night vision mode, short press the infrared adjusting knob to switch the infrared thermal polarity. That is, it switches among White-hot, Black-hot, and Orange-hot.

Note: There are only White-hot and Orange-hot polarities in Outline and Target highlight modes.

3.4.3 On/Off of Night Fill-in Light

In the totally dark scenario, the I² night vision should be used with the fill-in light turned ON. You can turn the switch from OFF to ON to turn on the fill-in light. Then, the red indicator is steady on, which can be seen in the ocular lens, reminding you that the infrared fill-in light has been turned on.

3.5 Interface Information

When infrared night vision or enhanced night vision mode is enabled, the interface of Jerry-F is shown in Figure 3.5 and the icon descriptions are shown in Table 3.1

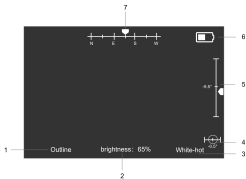


Figure 3.1 Jerry-F Interface

Table 3.1 Icon description of Jerry-F

S/N	Icon	Description
1	Enhanced display mode	Outline, Target highlight, Thermal image, and Breathing alert modes (When external videos are connected, "PIP of external video" and "Full screen of external video" modes are also available.)
2	Brightness of the infrared thermal image	Infrared brightness 0% to 100%.
3	Infrared polarity	White-hot, black-hot, and orange-hot.

S/N	Icon	Description
4	Inclination angle	-90°~+90°
5	Pitch angle	-90°~+90°
6	Battery level	0-4 levels: When the battery power reaches Level 0, it indicates that the power is below 10%, so you should recharge or replace the battery as soon as possible.
7	Azimuth	The scale arrow moves to indicate the direction the ocular lens is facing.

Note: The enhanced mode, brightness percentage, and polarity mode information will be automatically hidden after no operation for 8s.

3.6 Menu and Settings

3.6.1 Displaying the Menu

Long press the infrared adjusting knob for 2s. The menu is displayed. You can turn on or off the analog video output, compass calibration, azimuth angle, pitch angle, and inclination angle.



Figure 3.2 Menu of Jerry-F

3.6.2 Menu Operation

After the menu is displayed, short press the infrared adjusting knob to switch among menu options and long press the knob to enable/disable an option (in the mode shown in Figure 3.2, you can short

press and the arrow switch to the "Compass calibration" option, and long press it to turn on/off analog video).

When switching to the "Exit" option, long press the infrared adjusting knob to exit the menu.

3.6.3 Outline Threshold

The outline threshold specifies how much detail is displayed in the outline mode, and the range of threshold is 1-5. The higher the threshold, the more outline details are displayed. You can set it as required.

When the cursor $\Rightarrow$ points to the "Outline threshold" option, long press the infrared adjusting knob to set this option. At this time, the threshold in brackets is in an inverted color and can be adjusted among 1 to 5 (ascending). You can short press the infrared adjusting knob to select the required threshold. After selecting the required threshold, long press the infrared adjusting knob to exit the "Outline threshold" option.

Note: It is recommended to adjust the outline threshold in the outline mode, and observe the change of outline details corresponding to different thresholds in real time.

3.6.4 PAL Video

You can turn on/off the analog video (PAL) output of the goggle through this option. The analog video output needs to use the designated cable, and the infrared video can be displayed on the monitor connected by this cable. When switching to the "PAL video" option, long press the infrared adjusting knob to turn on/off the PAL video.

But it is recommended to turn it off if you don't need to output the analog video, thereby saving power and prolonging the service time.

3.6.5 Compass Calibration

The digital magnetic compass can indicate the azimuth angle, pitch angle, and inclination angle of the equipment. In view of the differences in different regions and altitudes, you need to calibrate the compass after you move to another place to ensure the indication accuracy of the compass.

Steps:

When the menu is displayed, switch to compass calibration.

Long press the infrared adjusting knob to enter the calibration state and the screen displays "Please keep the equipment level and rotate at a constant speed. Press again to start."

Horizontal calibration: Put the equipment horizontally and short press the infrared adjusting knob. Rotate around the equipment for 360° and short press the knob to end horizontal calibration.

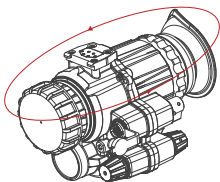
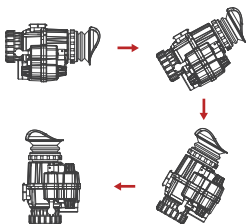


Figure 3.3 Horizontal rotation

After that, the screen displays "Please keep the equipment stable and erect downward at a constant speed. Press again to start."

Vertical calibration: Put the equipment horizontally on a table and short press the infrared adjusting knob. Erect the equipment at a constant speed (objective lens facing downward and ocular lens upward) and short press the knob again to end the calibration.



The screen displays "Calibration completed. Press again to exit." Short press the infrared adjusting knob and exit compass calibration.
Note: To ensure the accuracy of compass calibration, please perform the calibration in a stable environment in one time.

3.6.6 Interface Information

You can enable/disable the display of azimuth, pitch, inclination, and battery level on the screen by long pressing the infrared adjusting knob.

3.6.7 Language

Currently, Jerry-F supports Chinese and English. You can change the language of the interface by long pressing the infrared adjusting knob. See Figure 3.5 for the English menu.



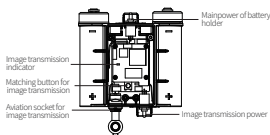
Figure 3.5 English Menu

3.7 Wi-Fi and Video Access

Jerry-F can be connected to a Tyke series thermal scope via Wi-Fi to provide video functions. Before connection, you need to match Tyke thermal scope with Jerry-F.

The matching method is as follows:

1. Loosen the four screws on the battery holder of Jerry-F, and you can see the matching button for image transmission near the aviation connector in the underlying PCB. Turn on the power of battery holder, then turn on the image transmission power, and the indicator on the image transmission plate is on. The indicator is solid for 8 s and then goes off if there is no image access.
2. Operate the thermal scope. Enter the menu of the thermal scope. Choose "Image Transfer > AV > On"; choose "Wi-Fi > On"; choose "RTA > On". Then you can see the "Connecting" countdown.
3. Press the connecting button (Jerry-F matching button for image transmission) for 5 s until the indicator blinks. Image transmission and the thermal scope start connecting.



4. When the image transmission indicator turns to be fast blinking or off, the match succeeds. Restore the power of battery holder. The indicator is solid and then changes to fast blinking, indicating matching success. Install the cover of the battery holder and tighten the four screws.

Caution: Jerry-F can only match one thermal scope at one time.

Caution: To reduce power consumption, AV and Wireless image transmission are disabled by default upon startup. After matching success, enable AV and Wireless image transmission, rather than Head-mounted Transmission.

Note: Jerry-F and the thermal scope are one-to-one. You only need to enable Head-mounted Transmission once and shall re-match only if a change is made to the thermal scope or Jerry-F.

After the battery holder of Jerry-F matches the Tyke series thermal scope, you can transmit videos and instructions via Wi-Fi. To observe the videos of the thermal scope from the main body of the goggle, connect the main body of the goggle with the battery holder by an aviation cable as follows:

1. Take out the aviation cable from the package;
2. Open the waterproof cap of the aviation socket on the battery holder and the main body of the goggle;
3. Insert the aviation cable to the aviation socket by aligning the end of the cable with a white dot with the white dot on the socket on the goggle;
4. Turn on the main power of the battery holder and then turn on the image transmission power.
5. On the Tyke series thermal scope, enable AV and Wireless image transmission. At this time, if you press the I^2 knob, PIP and full screen for thermal scope video will be available when you switch the display mode.

Chapter 4 Faults and Troubleshooting

The following table shows the common faults of Jerry-F during use. Please check and fix the faults according to the steps shown in Table 4.1. You should confirm whether the faults are fixed after troubleshooting. Not all possible faults are listed in Table 4.1. If the unlisted faults occur in Jerry-F or the faults cannot be fixed upon troubleshooting, please perform the higher level maintenance.

Table 4.1 Jerry-F Troubleshooting

S/N	Fault	Test or Check	Troubleshooting
1	The cover of battery holder cannot be screwed or keeps locked.	Check whether the battery is installed in the correct direction. Check whether there are sundries or chips around the knob of battery cover. Check whether the battery holder is damaged, worn or deformed. Check whether the battery holder is damaged or deformed.	Reinstall the 18650 battery. Clean the threads of battery cover and battery holder. Perform the high level maintenance. Perform the higher level maintenance.
2	Unable to power on	(a) Check whether the battery is installed, its direction is correct, and its power is sufficient. (b) Check whether the power supply switch of the battery holder is enabled.	(a) Replace a new battery and install it correctly according to the instructions in Chapter 2. (b) Switch on the main power of battery holder.
3	The I ² image fails to be displayed	(a) Check whether the I ² image is used in the completely dark conditions. (b) Check whether the I ² objective lens hood is opened. (c) Check whether the main power of battery holder is switched on. (d) Try to adjust the brightness of I ² image.	(a) Turn on the fill-in light when using the I ² image in the completely dark conditions. (b) Open or cover the objective lens hood as required. (c) Switch on the main power of battery holder. (d) Adjust the brightness of I ² image.
4	The infrared image fails to be displayed	(a) Check whether the infrared objective lens hood is opened. (b) Check whether the main power of battery holder is switched on. (c) Try to adjust the brightness of infrared image. (d) View whether the infrared lens is blocked by objects.	(a) Open or cover the objective lens hood. (b) Switch on the main power of battery holder. (c) Adjust the brightness of infrared image. (d) Remove the barriers.

FCC CAUTION

- **§ 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.