# FLIR LS-XR Handheld Thermal Imaging Monocular User Manual



Contents



**FLIR LS-XR Handheld Thermal Imaging Monocular**


**Proper Disposal of Electrical and Electronic Equipment (EEE)**

- The European Union (EU) has enacted Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE), which aims to prevent EEE waste from arising; to encourage reuse, recycling, and recovery of EEE waste; and to promote environmental responsibility.
- In accordance with these regulations, all EEE products labeled with the “crossed out wheeled bin” either on the product itself or in the product literature must not be disposed of in regular rubbish bins, mixed with regular household or other commercial waste, or by other regular municipal waste collection means. Instead, and in order to prevent possible harm to the environment or human health, all EEE products (including any cables that came with the product) should be responsibly discarded or recycled.
- To identify a responsible disposal method where you live, please contact your local waste collection or recycling service, your original place of purchase or product supplier, or the responsible government authority in your area.
- Business users should contact their supplier or refer to their purchase contract.
- 
- This product is protected by patents, design patents, patents pending, or design patents pending.
- If you have questions that are not covered in this manual or need service, contact FLIR OTS customer support for additional information prior to returning a camera.

1. **Phone:**1-888-959-2259
2. **Email:** OTS-support@flir.com

This documentation is subject to change without notice.

**Important Instructions and Notices to the User:**

Modification of this device without the express authorization of FLIR Systems, Inc. may void the user's authority under FCC rules to operate this device.

**Note 1:** 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 the 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 the receiver
- Connect the equipment to an outlet on a circuit different from that of the receiver
- Consult the dealer or an experienced radio/television technician for help.

**Industry Canada Notice:** This Class B digital apparatus complies with Canadian ICES-003. NMB-003 du Canada FLIR Systems, Inc. 9 Townsend West Nashua, NH 03063

- **Phone:** 1-888-959-2259 or (603) 324-7600
- **Fax:** 1-888-959-2260
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    - OTS-support@flir.com
    - www.flir.com

**Export Information**

Equipment described herein may require US Government authorization for export purposes. Diversion contrary to US law is prohibited. ©2020 FLIR Systems, Inc. Specifications are subject to change without notice, check our website: www.flir.com

## INTRODUCTION

### SCOPE

This manual covers the FLIR LS-X/R Series and all applicable components. It is recommended that you read and understand this manual to optimize the monocular's operation.

### INTRODUCTION

FLIR's LS-X/R Series thermal handheld monoculars give hikers, law enforcement professionals and first responders the ability to see clearly in total darkness, providing a wealth of information during any nighttime mission.

**FEATURES**

- Rugged design – built to withstand the demands of outdoor use.
- Microbolometer sensor for excellent image quality and clarity
- Palm-sized portability and lightweight – only 12 ounces
- Red laser pointer
- Battery charging via USB cable
- USB/Video adapter cable for video out
- Rechargeable internal li-ion battery – provides up to 5 hours of camera operation on a single chargege

**REGISTER YOUR LS-X/R**

In order to validate the warranty on your product, FLIRl Systems Inc. must register the product on **https://www.flir.com/support-center/support-hq/**

**INFRARED THERMAL VISION VERSUS IMAGE INTENSIFIED NIGHT VISION**

The FLIR LS-X/R makes images from heat, not light, a feat impossible for the naked eye or image intensified (I2) night vision devices. This allows you to see clearly without any visible light. People, animals, and objects all generate or reflect heat and are clearly seen by the FLIR LS-X/R in even the most adverse conditions.

**FLIR LS-X/R ENABLES THE OUTDOOR ENTHUSIAST TO:**

- See animals and difficult terrain in reduced visibility or total darkness
- See through smoke, dust, and light fog
- See camouflage and foliage in any lighting conditions
- See more – and see farther – than with low-light night vision goggles

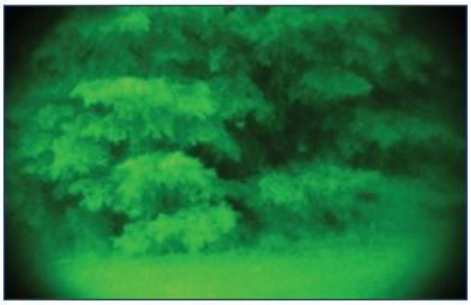


*IMAGE INTENSIFIED I²*


*THERMAL IMAGING*

### DETECTION, RECOGNITION, IDENTIFICATION

*DETECTION*
*I see something.*

*RECOGNITION*
*It's a four-legged animal.*

*IDENTIFICATION*
*I can tell it is an Elk.*

## GETTING STARTED

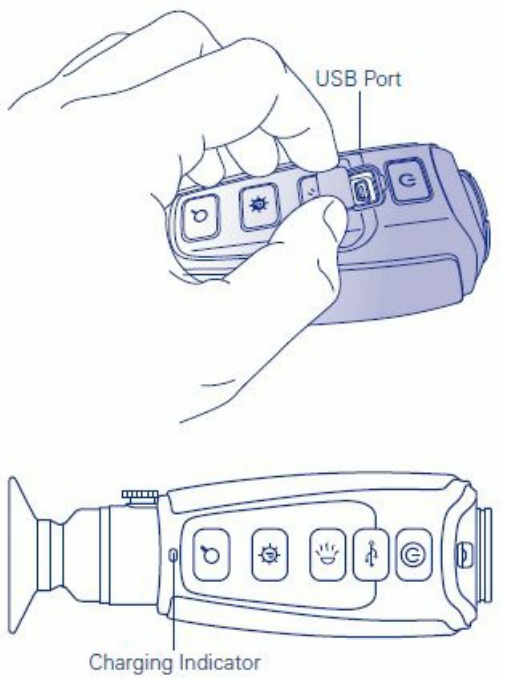
### UNPACKING AND INSPECTING


The FLIR LS-X/R Series monocular is available with the features, options, and accessories described in this manual. Refer to the packing list enclosed with your product to determine the actual contents of your product package. In addition to the product the following items are included in the product package:

- FCC Declaration of Conformity
- CE Declaration of Conformity

**CHARGING THE SYSTEM**

- To assure proper charging, LS-X/R Series monoculars should be turned OFF throughout the charging cycle. Charging MUST only be done when the camera temperature is from 0 to 40°C (32 to 104°F), or battery damage may occur.
- The monocular battery should be fully charged prior to use. To charge the monocular, lift the cover from the USB port, plug in the USB cable provided with the monocular, and plug other cable end into a USB power source.




- When charging the charging indicator will be lit orange.
- When fully charged, the charging indicator will light solid green. The initial charge time is approximately 5 hours.

**BATTERY**

Your LS-X/R Series monocular is equipped with a sophisticated power system that uses a rechargeable internal Li-Ion battery.

**BATTERY STATUS INDICATOR**

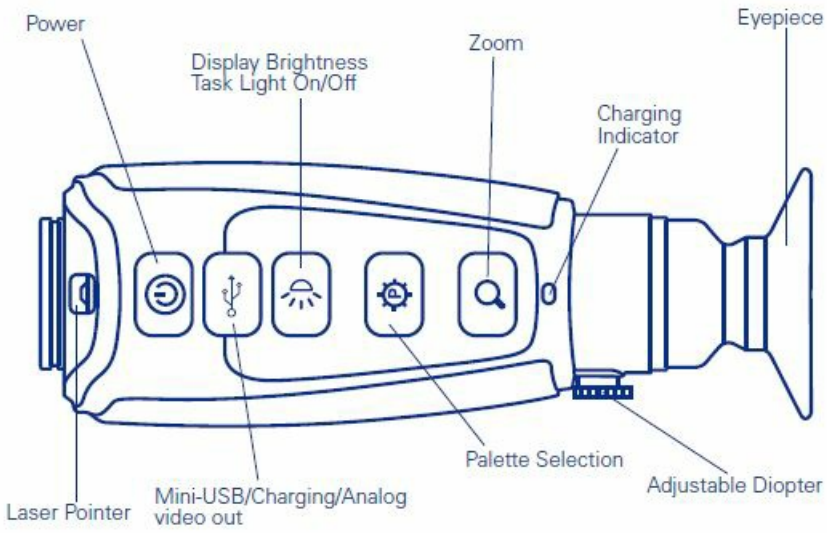
While the monocular is ON, a battery status indicator is always shown in the corner of the display image. This indicator provides an estimation of the remaining battery charge.


**BATTERY SAFETY INFORMATION**

The LS-X/R Series monocular is a sealed unit with sensitive electronics and contains no user-serviceable parts. Service or repair is to be performed only by the manufacturer. The monocular must never be opened or modified by the user. The monocular contains no user serviceable components. The battery used in this device may present a risk of fire or chemical burn if mistreated. Do not disassemble the monocular, store above 60°C, or incinerate. The battery is replaceable only in the factory. Return the product to the manufacturer for battery replacement.

## OPERATING THE SYSTEM

**SYSTEM CONTROLS AND BUTTONS**




**DIOPTER ADJUSTMENT**

While looking through the eyepiece, adjust the position of the diopter lever to optimize the sharpness of the image in the viewfinder.

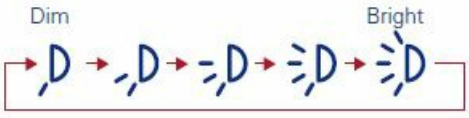
**POWER BUTTON**

The Power Button performs the following functions:

| **SYSTEM STATE** | **SHORT PRESS** | **LONG PRESS** |
|---|---|---|
| System OFF | Turns Power ON | N/A |
| System ON | Access User Menu | Turns Power OFF |

**DISPLAY BRIGHTNESS BUTTON**

Use this button to cycle through the five levels of display brightness. Each press of the button advances to the next level of brightness. When the highest brightness level is reached, subsequent button presses advance to the next lower brightness levels. When the lowest brightness level is reached, subsequent button presses advance to the next higher brightness level. One of the following icons is displayed for approximately 3 seconds after the button is pressed indicating the current brightness level:




| SYSTEM STATE | SHORT PRESS | LONG PRESS |
|---|---|---|
| System OFF | Flashes LED Task light | Turn on LED Task Light |
| System ON | Changes Current Display Brightness | N/A |

**COLOR PALETTES**

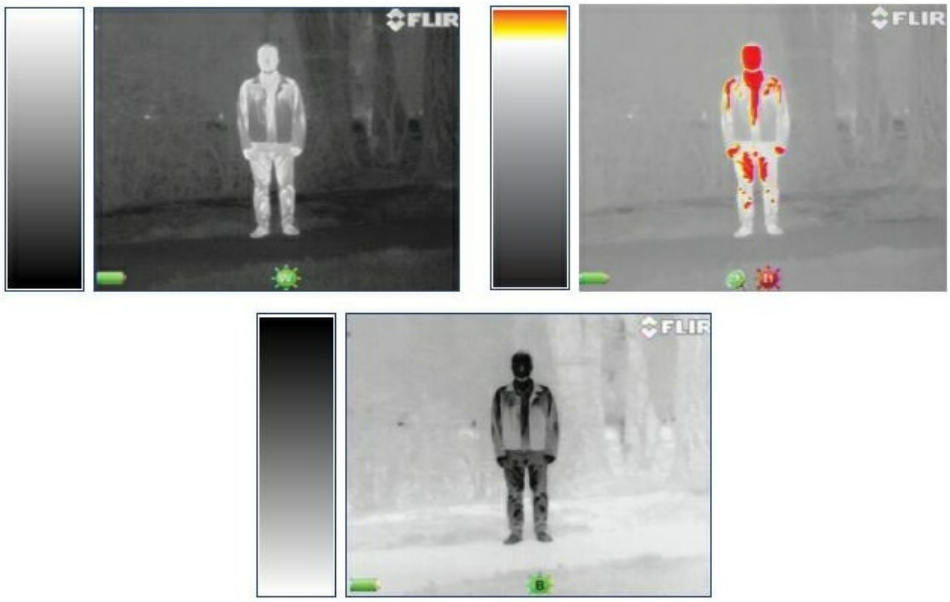
Use this button to toggle between the available color palettes. Please see the following images for examples of LS-X/R's color palettes.

- **WHITE HOT**

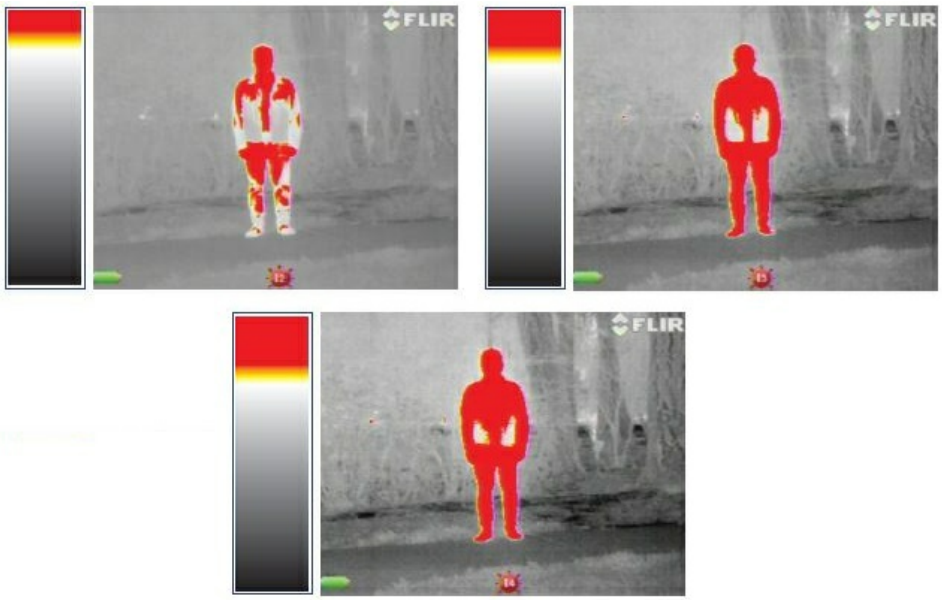
  Most commonly used palette. Hot objects appear white. Good for scenes with either high or low contrast.
- **BLACK HOT**

  Hot objects appear black. Scenes appear more lifelike than White-Hot, especially at night.
- **INSTALERT™ LEVEL 1**

  The hottest 5% of things in the image are colored and everything else is greyscale.



- **INSTALERT™ LEVEL 2**
  The hottest 10% of things in the image are colored and everything else is greyscale.
- **INSTALERT™ LEVEL 3**
  The hottest 15% of things in the image are colored and everything else is greyscale.
- **INSTALERT™ LEVEL 4**
  The hottest 20% of things in the image are colored and everything else is greyscale.



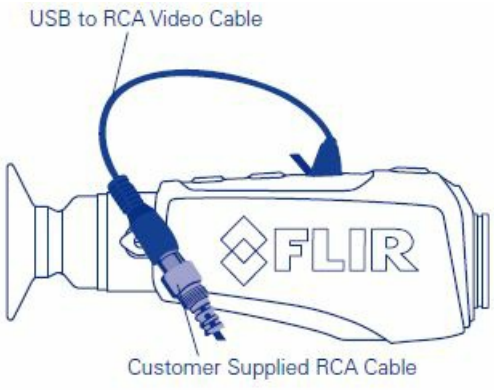
**ZOOM BUTTON**

- Use this button to switch the monocular between no zoom (full resolution), 2X and 4X (LS-X), and 2X, 4X, and 8X (LS-XR). The central part of the image is magnified by the zoom level selected. When zoom has been selected, the icon appears continuously in the display. See user menu section for additional details 3.2 USING USB/ANALOG

**VIDEO ADAPTER CABLE**

- To obtain analog video out, insert the adapter cable into the USB connector. The monocular will detect the

adapter cable and provide the video stream. Use an RCA cable to connect to a monitor or a video recorder.




When using the USB/Analog Video Adapter cable to record video or supply video to a remote monitor, it may be useful to turn off the Auto Power Off feature of the monocular. Set the video format using the LS-X/R/LS-X/LS-XR End User Tool.

**LS-X/R POWER MANAGEMENT**

Your LS-X/R Series monocular is equipped with a power management system that provides up to five hours of continuous operation. When left in the Off state the battery will hold a charge for up to two months. To use the product it is important to understand the basic power states of the product.

- When the monocular is turned on from the Off state, it takes about five seconds to become operational. During the boot up process, the FLIR splash screen is shown. Pressing the Power button will toggle the monocular between On and Off.
- The camera shuts down after about five minutes if no buttons are pushed.

| **SYSTEM STATE** | **HOW DO YOU KNOW?** |
|---|---|
| OFF | The display is off and the Task Light comes on when the Brightness button is pressed . |
| ON | The display is on and the LED Task Light is disabled. If the image appears blank, make sure the lens cover is removed. |

**AUTO POWER OFF OPERATION**

Auto Power Off is a feature of the LS-X/R Series monocular that helps to guard against draining the battery prematurely by inadvertently leaving the camera on.

**Auto Shutdown turns the camera off if the following conditions are met:**

- The product is On
- No buttons have been pressed for five minutes

Once these conditions are met, you will see the following message in the display: “Auto Power Off 30s.” After counting down for 30 seconds, the monocular will shutdown. Press any button during this countdown to terminate Auto Power Off and resume normal operation.

**AUTO FFC / CALIBRATION**

By design, the camera will periodically initiate a Flat Field Correction (FFC) cycle, also known as a Non-Uniformity Correction (NUC). A shutter activates inside the camera and provides a target of uniform temperature, allowing the camera to correct for ambient temperature changes and provide the best possible image. Just prior to the FFC, a small green square will appear in the upper left corner of the screen for two seconds. When the FFC occurs, the video image temporarily freezes.

**LS-X/R/LS-X/LS-XR END USER TOOL**

The SCOUT III/LS-X/LS-XR end user tool is a graphical user interface (GUI) that is used with the following FLIR handheld thermal imaging monoculars:

- SCOUT III Series
- LS-X/R Series

To get detailed information,software downloads, or product support for your LS-X or LS-XR visit the product page at: **www.flir.com/support-center/support-hq/**

## SYMBOLOGY

The LS-X/R user interface has a clear and simple on-screen symbology that allows the user to easily navigate through the settings, and optimize the image quality based on certain variables. From the zoom function to palette choice the symbology on-screen matches the button symbology so the user becomes instantly familiar with how to manipulate and operate all of LS-X/R’s functions. See the reference points below to get a solid understanding of the onscreen functionality.


## MAINTENANCE

- **SOFTWARE UPDATE**

  Software updates for your LS-X/R can be found at: [www.flir.com/support-center/support-hq/](www.flir.com/support-center/support-hq/).
- **BATTERY SERVICE AND REPLACEMENT**

  If the battery will not hold a charge and requires replacement, please contact FLIR Systems for details on returning the unit for service. For instructions on charging the battery refer to Section 2.3 Charging the system.
- **CLEANING THE LS-X/R**

  Wipe the housing with a damp cloth, as needed. Use a high quality lens wipe to remove dirt or smudges from the lens and display window. Do not use abrasives or solvents to clean the housing, lens, or display window.
- **CAUTIONS**
  - Do not disassemble the monocular enclosure. Disassembly can cause permanent damage. The battery is not user-replaceable
  - Do not point the monocular at high-intensity radiation sources, such as the sun, lasers, or arc welders
  - Do not leave fingerprints on the monocular's infrared optics. Clean only with low pressure fresh water and a lens cloth
  - All service must be provided by the manufacturer

## WARRANTY

- **GLOBAL LIMITED WARRANTY**

  Follow the link to **https://www.flir.com/support-center/warranty/** retrieve FLIR's warranty document.
- **PRODUCT REGISTRATION**

  In order to validate the warranty on your product, FLIR Outdoor & Tactical Systems must register the product on **https://www.flir.com/support-center/support-hq/**.
- **OBTAINING WARRANTY SERVICE**
  - 9 Townsend West Nashua, NH 03063 Phone: 1-888-959-2259 or (603) 324-7600
  - **Fax:** 1-888-959-2260
  - **E-mail:**
    - **OTS-support@flir.com**
    - **www.flir.com**

## SPECIFICATIONS

| | LS-X | LS-XR |
|---|---|---|
| **SENSOR SPECIFICATIONS** | | |
| Detector Type | 336 × 256 VOx Microbolometer | 640 × 512 VOx Microbolometer |
| Video Refresh Rate | 60Hz NTSC | 30Hz NTSC |
| Field of View (H x V) | 17° × 13° | 18° × 14° |
| Focal Length | 19mm Fixed Focus | 35mm Fixed Focus |
| Start up | < 1.5 seconds | |
| Image Processing | FLIR Proprietary Digital Detail Enhancement™ | |
| **USER INTERFACE** | | |
| Zoom Button | 2X Zoom | 2X, 4X Zoom |
| Video Detection Palettes | User Selectable: Black Hot, White Hot, InstAlert™ and Graded Fire | |
| Brightness | Multiple Brightness Levels | |

| | | |
|---|---|---|
| Laser Pointer | LED (operational when imager power off ) | |
| **SYSTEM SPECIFICATIONS** | | |
| Display | | |
| Video Output | NTSC / PAL composite video | NTSC composite video |
| **POWER** | | |
| Battery Type | Internal Li-Ion Cell | |
| Battery Life (Operating) | >5 hours, Auto-off after 5 minutes of non-use | |
| Battery Power | 3.7 V 2400mAh | |
| **ENVIRONMENTAL** | | |
| Rating | IP-67, Submersible | |
| Operating Temp. | -4°F to 122°F (-20°C to 50°C) | |
| Storage Temp. | -40°F to 140°F (-40°C to 60°C) | |
| **PHYSICAL** | | |
| Weight (incl. lens) | 12 oz (340 g) | |
| Size (L × W × H) | 6.70” x 2.31”x 2.44” | |
| Color (housing) | Black | |
| Country Of Origin | USA | |
| **RANGE PERFORMANCE** | | |
| Detect Man (1.8 m × 0.5 m) | 600yd (550m) | 1200yd (1140m) |

| PACKAGES INCLUDE |
| --- |
| Handheld Thermal Monocular, USB Power Adapter/Charger, Wrist Strap, Custom Video Out Cable, USB Cable, Quick Start Guide, Molle Bag |

**FLIR SYSTEMS, INC. 9 Townsend West Nashua, NH 03063**

- **Phone:** 1-888-959-2259 or (603) 324-7600
- **Fax:** 1-888-959-2260

**FLIR PRODUCT REPAIR CENTER**

- **email:** OTS-support@flir.com
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- **PRODUCT REGISTRATION** flir.com/support-center/support-hq/

**TECHNICAL SUPPORT**

- **email:**
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  - www.flir.com
- **NASDAQ:** FLIR



## FREQUENTLY ASKED QUESTIONS

What is the FLIR LS-XR Handheld Thermal Imaging Monocular?

The FLIR LS-XR is a handheld thermal imaging monocular designed for various applications, including surveillance, security, and outdoor activities. It allows users to see in total darkness by capturing thermal infrared radiation.

What is the thermal resolution of the LS-XR monocular?

The FLIR LS-XR Handheld Thermal Imaging Monocular typically has a thermal resolution that can vary. Thermal resolution determines the level of detail in thermal images. Refer to the product specifications for detailed information on thermal resolution.

What is the detection range of the LS-XR monocular?

The detection range of the FLIR LS-XR monocular can vary based on factors such as environmental conditions and the size of the target. It is designed to provide effective detection at a distance in various scenarios.

Can the LS-XR monocular be used in daylight?

Yes, the FLIR LS-XR Handheld Thermal Imaging Monocular can be used in daylight as well as in complete darkness. Thermal imaging technology allows it to capture thermal radiation, providing visibility in diverse lighting conditions.

What is the refresh rate of the LS-XR monocular?

The refresh rate of the FLIR LS-XR monocular can vary. It is designed to provide real-time imaging, and the refresh rate influences the smoothness of the thermal video feed. Check the product specifications for detailed information on refresh rate.

Is the LS-XR monocular resistant to water and dust?

Yes, the FLIR LS-XR Handheld Thermal Imaging Monocular is typically designed to be water-resistant and dust-resistant, making it suitable for use in various outdoor environments and challenging conditions.

What is the magnification range of the LS-XR monocular?

The magnification range of the FLIR LS-XR monocular can vary. It is designed to offer zoom capabilities, allowing users to observe distant objects with greater detail. Refer to the product specifications for information on magnification.

Can the LS-XR monocular record thermal images and videos?

Yes, the FLIR LS-XR Handheld Thermal Imaging Monocular is often equipped with recording capabilities. Users can capture thermal images and videos for analysis, documentation, or sharing. Check the product specifications for details on recording features.

What is the battery life of the LS-XR monocular?

The battery life of the FLIR LS-XR monocular can vary depending on usage and settings. It is designed to provide extended operational time, and users should refer to the product specifications for detailed information on battery life.

Is the LS-XR monocular tripod-mountable?

Yes, the FLIR LS-XR Handheld Thermal Imaging Monocular is often designed to be tripod-mountable, providing stability for extended observation sessions. Users can attach it to a tripod for hands-free use.

What is the weight and dimensions of the LS-XR monocular?

The weight and dimensions of the FLIR LS-XR monocular can vary. Check the product specifications for detailed information on the physical characteristics of the monocular.

Does the LS-XR monocular have built-in image and video playback?

Yes, the FLIR LS-XR Handheld Thermal Imaging Monocular typically has built-in image and video playback features. Users can review captured thermal images and videos directly on the monocular's display.

What is the temperature range the LS-XR monocular can detect?

The FLIR LS-XR monocular is designed to detect a wide temperature range, allowing it to capture thermal signatures in various environmental conditions. Refer to the product specifications for detailed information on the temperature range.

Is the LS-XR monocular suitable for wildlife observation?

Yes, the FLIR LS-XR Handheld Thermal Imaging Monocular is suitable for wildlife observation. It enables users to detect and observe animals in complete darkness, making it valuable for wildlife enthusiasts and researchers.

Can the LS-XR monocular be connected to a computer for data transfer?

Yes, the FLIR LS-XR monocular is typically designed to be connectable to a computer for data transfer. This allows users to transfer captured thermal images and videos for further analysis or storage.

What is the warranty coverage for the LS-XR monocular?

The warranty for the FLIR LS-XR Handheld Thermal Imaging Monocular typically ranges from 1 year to 3 years.



## References

- User Manual