



LN-TB35-LRF

LN-TB50-LRF

THERMAL IMAGING
BINOCULARS WITH BUILT-IN
LASER RANGEFINDER

INSTRUCTION MANUAL

IMPORTANT: Please read this manual in its entirety prior to using this device!

INTRODUCTION

Thank you for purchasing a quality LUNA OPTICS® product. With proper care and maintenance your device will provide many hours of operation and outstanding reliability. Please read this manual – it is your key to enjoying this exciting and hi-tech product!

THERMAL IMAGING

Without getting too technical and confusing, let's try to understand how this device works and what it can and cannot do:

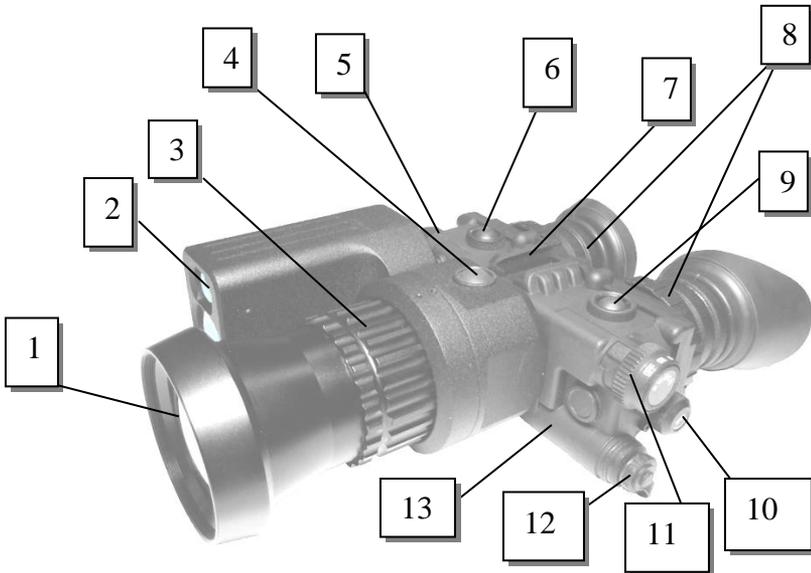
1. Your thermal device works on the principle of detecting infrared radiation, also known as energy. Instead of operating in a visible light spectrum of 400-700nm (such as regular binoculars or cameras), thermal imagers detect waves as high as 17,000nm or 17 μ m, which are beyond our capability to observe with naked eye. The infrared signal is received by the thermal device and is then converted into an electrical signal by the thermal sensor (called microbolometer), located inside the unit and that electrical signal is then displayed on the micro display located near the ocular (eyepiece).
2. Your device operates with batteries. Unlike a daylight binocular, where you see the image due to light traveling through the glass and the prisms, the thermal imaging device works by projecting the image onto a screen. While the thermal sensor is the crucial component of any thermal device, the optical parts of the unit are also very important, as they gather the light into the sensor and bring the projected image to your eyes. Since the image is projected on the screen, it has certain limited resolution...so please do not expect your night vision device to provide the same crystal clear image, as you see through your daylight binoculars – after all, you are using this device in the environment, where normally your vision would be very limited...

OPERATION:

Now that we've covered some of the basics of the technology behind the thermal imaging, let's learn how to operate your new device:

Please look below to identify all the parts of the unit.

LN-TB35-LRF (shown) & LN-TB50-LRF (same but with larger 75mm front lens) Lens and unit appearance may vary slightly.



Glossary:

1 – Germanium Objective Lens

2 – Laser Rangefinder

3 – Distance Focusing Ring

4 – Rangefinder Button

5 – Moisture Control Cartridge

6 – Zoom Button

7 – Accessory Mounting Plate

8 – Ocular Lens Focusing Rings

9 – Invert Button

10 – Image Gain / Display Brightness Control

11 – Power Switch

12 – External Power Supply Connector

13 – Battery Compartment

INSTALLING THE BATTERIES:

Your night vision unit operates on commonly available 3V Lithium batteries, CR123-type. You will need 3 batteries to operate the device.

To install the batteries, unscrew the battery compartment cover and install the batteries inserting the positive (+) end first. Once the batteries are inside, replace the cover.

TURNING THE UNIT ON, OFF & STANDBY MODE:

Your night vision unit has a power switch (11), which allows you to easily switch between OFF / ON & Standby modes. To turn the unit ON, first remove the objective lens cover and rotate the switch by one dial counterclockwise to



ON position. Look through the oculars – you should see INITIALIZING appear on the display. The unit will become operational within approximately 5 seconds after that. To turn the unit OFF rotate the same switch backwards (clockwise) one dial to OFF position. You may also have the unit on STANDBY position by first turning the unit to ON position and then gently pulling the Power Switch outwards and rotating it one additional dial counterclockwise. STANDBY mode allows you to quickly get operational in the field, eliminating the 5 second delay when turning the switch back to ON position. It is also used when viewing the image on external video source utilizing the video output located directly above the battery compartment cover (Yellow RCA type video plug). It is always recommended to turn the unit to OFF position if you are not planning to operate the unit for more than a few minutes in order to conserve battery power. Always replace the objective lens cover after the unit is turned off and is no longer in use.

FOCUSING THE UNIT:

To obtain the sharp image, you must first rotate each Ocular Focusing Ring (8) one-by-one in either direction, until you notice in which position the image is at its best. Since you are looking at a display, it will be easier to adjust them by simply focusing your attention on the displayed letters and numbers. After that, rotate the Distance Focusing Ring (3) also until the image is at its best. You may have to repeat the process again, until the

image is sharp and clear. Once the clear image is obtained, you no longer need to adjust the Oculars Focusing Rings, just rotate the Distance Focusing Rings to adjust the distance to the object you are viewing.

ADJUSTING DISTANCE BETWEEN EYEPIECES:

After you turn the power on and after you adjust the focusing to the best possible image, make notice of the image and see if it appears as one single complete display. If it does, then there is no need to adjust the distance



between the eyepieces. If the image appears as if parts of the display are covered, then you need to either pull apart the eyepieces or push them in together until the image appears as one complete display.

IMAGE GAIN / DISPLAY BRIGHTNESS CONTROL:

Your thermal binoculars come with Manual Gain Control allowing you to adjust the image to the best possible resolution even when atmospheric conditions change rapidly, especially during high humidity and/or rapid temperature changes.

- To adjust the Image Gain, rotate the switch (10) either clockwise or counterclockwise while viewing the image – you will see word **GAIN** and either positive or negative number appear in the upper right corner of the image display. There are 10 negative and 10 positive image gain levels and a Zero level. Lowering the Image Gain will allow for better facial and shape recognition. Increasing the Image Gain will allow for better recognition of surroundings, such as houses/buildings, trees and bushes and so on, allowing you to better see the surroundings and to better orient in the terrain.
- To adjust the Display Brightness level press the switch momentarily and letters **BRGT** will appear in the same upper right corner – you can now rotate the same switch and Display Brightness will change. There are 31 levels of display brightness. Please note that switch will return to the default GAIN mode if no action is taken within 2 seconds after pressing the switch.

ZOOM FUNCTION

The standard (optical) magnification of your thermal binoculars is either 3.5x or 5x (you will see the objects 3.5x or 5x closer than if looking with the naked eye). It is possible to increase the magnification by applying a digital zoom function. There are two zoom levels (2x and 4x) meaning your combined magnification will be either 7x or 14x. (10x or 20x on LN-TB50-LRF model). To utilize zoom function press the Zoom Button (6) once to achieve 2x zoom (7x/10x magnification) or twice to achieve 4x zoom (14x/20x magnification). To return to standard optical image press the Zoom Button once more. Please note the bottom left corner of the image display will show either 1x, 2x or 4x, depending on how many times you press the Zoom Button.

IMAGE INVERSION

It is possible to change the way the heat signatures are displayed – the default image is “WHITE HOT” meaning the heat signatures will appear in white color with most of the background appearing in black or dark color. You may switch (invert) this setting by pressing the Invert Button (9) once and then the signatures will appear in dark color on otherwise white background. In addition to WHITE HOT and BLACK HOT, the unit also has options of 5 color palettes, which highlight heat signatures in various colors. Generally, it may be better to have White Hot setting during daylight observation, especially outdoors, while having Black Hot setting may be preferable during nighttime outdoors. You may also try each color setting to see which one renders images best during various atmospheric conditions and humidity levels.

USING LASER RANGEFINDER:

Your thermal binoculars come with fully integrated Laser Rangefinder allowing you to accurately measure the distance to the viewing object up to approximately 700m (760yds) To measure the distance you must first activate the feature by pressing once the Rangefinder Button (3). You will see the shutter box in the middle and << --- >> appear on the center bottom of the display. At this point you can aim at the viewing object and press the Rangefinder Button once more while aiming – the distance will appear after a brief pause and it will look like this <<025>>, which is displayed in Meters (1m=1.09yds), so 25m is approximately 27yds. Should you see <<ERR>> message it may be because The rangefinder function will be disabled after several seconds of no activity.

IMPORTANT: just like any laser rangefinder, the ability to

accurately read distance will depend on the reflective characteristics of the object, as well as its size and ability to view it unobstructed. We suggest to measure distance 3 times for the same object to determine the most precise reading.

EXTERNAL POWER SUPPLY

It is possible to connect an optional external power supply to the binoculars in order to operate them for a longer periods of time, or during extreme cold temperature of minus 10 degrees C (14F). Please inquire about the external power supply availability from your local dealer or write to us at info@lunaoptics.com



MOISTURE CONTROL CARTRIDGE:

Your thermal binoculars are equipped with a special Moisture Control Cartridge (5), which allows removal of any moisture from the unit in the unlikely event of uncontrolled depressurization.

TROUBLESHOOTING:

1. **Unit does not turn on:**
 - a) please check if the batteries are inserted correctly
 - b) please make sure the batteries are fresh
2. **Unable to obtain sharp and clear image:**
 - a) you may need to repeat the process of rotating each ocular and distance ring several times until you get a good feel of it
 - b) You may be viewing an object that it too close – the minimum focusing distance is approximately 3m or 9 feet
 - c) You may be viewing image where no heat signatures are present and your gain level is too low to see any surroundings. Dial up the GAIN level.
3. **Unable to see heat signatures behind visible barriers, such as glass:**

PLEASE NOTE: THERMAL DEVICES ARE UNABLE TO SEE HEAT SIGNATURES IF THE OBJECT IS BEHIND ANY BARRIER THAT HAS REFLECTIVE NATURE, SUCH AS GLASS, THEREFORE

YOU WILL NOT BE ABLE TO SPOT PEOPLE INSIDE A VEHICLE UNLESS THE WINDOWS ARE LOWERED DOWN, OR A PERSON STANDING BEHIND THE WINDOW IN A HOUSE OR IN SIMILAR SITUATIONS. LIKEWISE YOU WILL NOT BE ABLE TO SEE ANY HEAT SIGNATURES WHILE OBSERVING FROM BEHIND A WINDOW – YOU MUST HAVE UNOBSTRUCTED VIEW.

NEVER:

1. **Point this device directly at the sun or any heat source over 500 degrees Celsius (930 degrees Fahrenheit)**
2. Try to disassemble the unit by yourself or by anyone who is not our authorized technician. Doing so may result in injury and will void any warranty claims.
3. Look at the sun through this unit.
4. Leave the batteries inside the unit for a long period of time – the batteries may overheat and may render the unit inoperable and will void the warranty.
5. Submerge the unit into water or use during heavy rain.

TECHNICAL SPECIFICATIONS:

Imaging Sensor _____ **ULIS Pico384 (384x288) 17µm**
Frame Rate _____ **50 Hz (Shutter-free)**
Optical Magnification _____ **3.5x (5.0x)**
Digital Zoom _____ **2x & 4x**
Focusing Distance _____ **3m - ∞**
Objective Lens Aperture _____ **50mm (75mm)**
Field Of View _____ **6.2° x 4.6°**
Diopter Adjustment _____ **+/- 4**
Eye base adjustment _____ **58mm – 72mm**
Detection range (1.8m object) _____ **1200m (1700m)**
Power Supply _____ **3 x CR123 Lithium**
Working time _____ **4.5-5hrs**
Temperature Range:
CR123 Batteries _____ **-10C / +50C (14F – 122F)**
Dimensions _____ **165mm x 139mm x 66mm**
Weight _____ **1400g**

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