LUNA OPTICS®

QUALITY YOU CAN SEE…
EVEN IN THE DARK.®

LN-TCL1 & LN-TCL1-LRF

THERMAL IMAGING CLIP-ON MONOCULAR WITH OPTIONAL 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 17µm, 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 scope, 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 dark 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-TCL1 (shown) & LN-TCL1-LRF (same but with built-in Laser Rangefinder)

Glossary:

1 – Germanium Objective Lens
2 – Distance Focusing Knob
3 – Image Gain / Display Brightness Control
4 – SAVE Button
5 – Daylight Optic Attachment Clamp
6 – Power ON/OFF switch
7 – Invert Button
8 – Battery Compartment Cover
9 – External Power Supply Connection
10 – Accessory Mount
11 – Protective Lens Cover

INSTALLING THE BATTERIES:

Your night vision unit operates on commonly available 3V Lithium batteries, CR123-type. You need 2 batteries to operate the device.

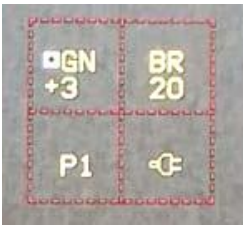
To install the batteries, unscrew the battery compartment cover (8) and install the batteries inserting the positive (+) end first. Once the batteries are inside, replace the cover.

ATTACHING THE MONOCULAR TO THE DAYLIGHT OPTIC:

To attach the thermal monocular to the daylight optic, such as monocular, binocular or riflescope you must attach the Attachment Clamp (5) onto the front of the daylight optic (use of plastic rings, included with your monocular, may be required in order to have a tight and precise fitting. Once fitted, tighten the lever of the clamp. To remove thermal monocular, repeat the process in the opposite order.

TURNING THE UNIT ON AND OFF:

Your thermal monocular has a power switch (6), which allows you to easily switch between OFF & ON 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 ocular – you should see INITIALIZING screen appear on the display. The unit will become operational within approximately 4-5 seconds. As the unit starts working the main menu palette will appear: indicating the current image inversion color setting, display brightness setting, image gain setting, power source setting and profile setting. The menu will disappear automatically after 3-5 seconds. To turn the unit OFF rotate the same switch backwards (clockwise) one dial to OFF position. 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 protective lens cover (11) after the unit is turned off and is no longer is in use.



FOCUSING PROCESS:

To obtain the sharp image, you must first rotate Distance Focusing Knob (8) in either direction, until you notice in which position the image is at its best. After that, you may need to adjust the daylight optic focusing ring to focus onto the image display. You may need to repeat the process several times during the initial adjustment, until the image is sharp and clear. Once the clear image is obtained, you will only need to rotate the Distance Focusing Knob to adjust the distance to the object you are viewing.

IMAGE GAIN / DISPLAY BRIGHTNESS CONTROL:

Your thermal monocular comes 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 GAIN switch (3) either clockwise or counterclockwise while viewing the image – you will see word **GAIN** and either positive or negative number appear in the lower left 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 onto the GAIN switch momentarily and letters **BRGT** will appear in the same lower left corner – you can now rotate the same switch and Display Brightness will change. There are multiple levels of display brightness. Please note that switch will return to the default GAIN mode if no action is taken within 2 seconds after momentarily pressing the switch.

IMAGE MAGNIFICATION

The standard (optical) magnification of your thermal monocular is 1x (real image) The monocular does not have a zoom function, so in order to increase the magnification you must utilize the daylight optical device that this monocular is attached to.

IMAGE INVERTION

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 (7) once and then heat signatures will appear in dark color on otherwise light color background. 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. In addition to WHITE HOT and BLACK HOT, the unit also has options of multiple color palettes, which highlight heat signatures in various colors. Once you choose the most comfortable color palette you may save your choice by pressing the SAVE button (4). This will also exit the image inversion mode. Please note that after you save the image color it will not change unless you activate the image inversion mode and manually change the color. 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 (MODEL LN-TCM1-LRF ONLY):

The optional fully integrated Laser Rangefinder allows 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. You will see the shutter box in the middle 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 "25m" which is displayed in Meters (1m=1.09yds), so 25m is approximately 27yds. Should you see <<ERR>> message it may be because you are measuring an object beyond 700m, or too close (closest accurate measurement is approximately 5m). 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 riflescope through the special connection (9) in order to

operate it for a longer periods of time, or during extreme cold temperature of minus 10 degrees C (14F) and lower. Please inquire about the external power supply availability from your local dealer or write to us at info@lunaoptics.com

BAD PIXEL CORRECTION:

Your thermal monocular comes with unique feature allowing you to manually correct any bad pixels that may develop during the course of time. To do that, press and hold SAVE button (4) for 3-6sec to enter the bad pixel correction mode. The title **Bad Pixel** will be displayed on the micro-display, as well as "X" "Y" "Save" "Exit" and crosshairs with flashing point in the center. Now you can rotate the GAIN switch (3) to direct the flashing point to the bad pixel (to change between horizontal movement (X-axis) and vertical movement (Y-axis) press onto the GAIN switch (3). Once the flashing point is over the bad pixel, sequentially press the GAIN switch to choose "Save" menu item, then rotate GAIN switch and the bad pixel will be restored. If you have another bad pixel, repeat these steps.

If you want to leave the bad pixel correction mode press and hold SAVE button(4) button (title «turn POWER OFF the device» will be displayed) and then turn off the device or choose "Exit" menu item by sequentially pressing GAIN switch (3) and then rotate GAIN switch (the title «EXIT» and main menu will be displayed for a moment).

TROUBLESHOOTING:

1. **Unit does not turn on:**
   a) please check if the batteries are inserted correctly and if they are fresh

2. **Unable to obtain sharp and clear image:**
   a) you may need to repeat the process of adjusting your daylight optic and distance knob of your thermal monocular 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

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. **NEVER POINT THIS THERMAL UNIT AT A SUN, OR ANY OTHER RADIATION SOURCE WITH TEMPERATURE OVER 500°C**
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. Leave the batteries inside the unit for a long period of time during extremely hot temperatures – the batteries may overheat, which may render the unit inoperable and will void the warranty
4. Submerse the unit into water or use during heavy rain.

TECHNICAL SPECIFICATIONS:

Imaging Sensor_____ **ULIS Pico384 384x288 17µm**
Frame Rate _____ **50 Hz (Shutter-free)**
Image Micro-display _____ **800x600 OLED**
Optical Magnification_____**1x**
Eye Relief _____ **22mm**
Focusing Distance_____ **3m - ∞**
Objective Lens _____**f1:1/50mm**
Field Of View_____ **7.5° x 5.6°**
Diopter Adjustment_____ **+/- 4**
Detection range (1.8m object)_____**1200m**
Power Supply_____ **2 x CR123 Lithium**
Working time _____ **2.5-3hrs**
Temperature Range_____**-10C / +50C (14F – 122F)**
Dimensions_____**209mm x 81mm x 81mm**
Weight_____ **780g (1,500g)**

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