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T7 Thermal Binoculars

operation manual

v1.1



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Chapter 1: Introduction	
Description	2
What is Infrared?	2
Chapter 2: System Components	
Standard Configuration	3
Optional Accessories	3
Chapter 3: Operating Instructions	
Power Source	4
Activation (IR/pull Position)	4
Reset/OFF-ON-IR/pull Position	4
Focus Adjustment	
White-Hot/Black-Hot button switch	4
2X Digital Zoom	4
Head Mount Assembly with Brow Pads	4
Chapter 4: Deactivating, cleaning and storing the system	
Deactivation	5
Battery Removal	5
Cleaning Outer Unit	5
Cleaning Optics	5
Purging	5
Storage	5
Inspection	5
System Specifications	5
Performance Specifications	5
Chapter 5: Specifications	
Detector	5
Performance	5
Physical Features	6
Additional Features	6
Chapter 6, Troubleshooting guide	
Discrepancy, Probable Cause And Suggested Action	5
Warranty	6
Export Restrictions	6

magnetic radiation that travels in a straight line through space, the same as visible light. Although infrared shares some of the properties of visible light, its different wavelength has several unique characteristics. For instance, materials that are opaque to visible light may be transparent to infrared, and vice versa. An example of this difference is the ability of light intensification devices to see through glass and plastic while thermal detection devices cannot. Unlike visible light, given off by ordinary objects only at very high temperatures (e.g. light bulbs), long wavelength infrared (7-14 mm) is emitted by all objects at ordinary temperatures. This means infrared is all around us all the time, even in the dark. Different objects give off varying amounts of infrared, depending on the temperature of the object. The T-7 is designed to sense differing amounts of long-wavelength infrared and display the scene in real time for the user.



WARNING!



DO NOT POINT THE T7 THERMAL DEVICE AT EXTREMELY HOT OBJECTS OR THE SUN TO AVOID DAMAGING THE UNIT!

Chapter 1: Introduction

Description:

The T-7 Thermal Goggle/Binocular is a rugged, lightweight and powerful Infrared optic that can be hand-held, helmet mounted, or mounted on a head harness. By using the 2X internal digital zoom and adding an optional afocal germanium optical lens, the T-7 provides potent 6X long range thermal surveillance and acquisition.

The sensitive uncooled thermal detector and high resolution display provides crisp “white hot” or “black hot” images regardless of ambient conditions. A colorized capability is available at user request. While night vision technology relies on amplification of ambient light or assisting illumination, thermal devices are completely passive, sensing extremely minute temperature differentials. The T-7 Thermal Goggles therefore acquire targets in daylight and complete darkness while “seeing through” obscuring agents such as smoke and haze which often hinder image intensification devices.

Designed for law enforcement, military and commercial use, the T-7 is ideal for reconnaissance and surveillance, perimeter security, wildlife observation and control, locating oil spills, and geothermal event monitoring in addition to a wide variety of other applications.

The T-7 combines a highly sensitive, uncooled, thermal detector with the new 640 X 480 LED display integrated into the familiar AN/PVS-7D housing, ensuring accurate images and compatibility with accessories such as the Mil Spec Head Harness and Helmet Mounts. The comfortable, light weight T-7 provides a powerful advantage during both day and night operations.

What is Infrared?

Infrared energy, often referred to as “infrared” or “IR”, is electro-

Chapter 3: Operating Instructions

The T-7 is easy to operate. See below instructions for operation. Contact SPI Corp. for additional information or assistance at (702)369-3966 or email sales@x20.org .

Power source:

The electronic circuit is powered by three (3) replaceable CR123 batteries. For installation in darkness, be aware that the positive (+) end (nipple end) of each battery must be inserted first into the battery compartment.



Ensure that the switch is in the OFF position before installing or removing batteries!

Activation (IR/pull position):

To turn the unit on, pull the switch out (switch is partially spring-loaded) and rotate two clicks clockwise (CW) to the IR position. The circuit will energize, wait a few seconds, the thermal image will then be displayed. This time delay is used to cycle-start the sensor circuits.

Reset/Off-ON-IR/pull Power Switch:

When the switch is in the OFF position, the T-7 is not energized.

Focus adjustment:

First, carefully rotate objective lens clockwise or counterclockwise to sharpen focus. The user should be able to focus at a minimum three feet (3 ft) to a maximum of infinity. Typically, the infinity

Chapter 2: System Components

The T-7 is shipped with the following standard components:

Standard configuration:

T-7 Thermal Acquisition Goggle System	(1)
Soft Carrying Case	(1)
CR123 Batteries	(3)
Demist Shield	(2)
Shoulder Strap	(1)
Head Harness with Brow Pads (sm, med and lg)	(1)
Lens Tissue	(1)
Eye-Cups	(2)
Lens Cap	(1)
Lanyard	(1)

Accessories:

Video out/external power cable <i>(Image transfer port-RCA type, external power)</i>	(1)
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Optional Accessories:

2x or 3x Magnifier Lens
Mil Spec Carrying Case
Tripod Mount (detachable)

Chapter 4: Deactivating, cleaning and storing the system

Deactivation:

Turn off the system by rotating the switch two clicks counterclockwise (CCW) to the OFF position. View through the eyepiece to confirm the system is indeed off.



CAUTION!



Ensure that you turn the knob two clicks, otherwise the screen will be off but the T7 will still be energized.

Battery removal:

Unscrew the battery compartment hatch, remove all three CR123 batteries, and store these in the carrying case or bag. Close the battery compartment. If disposal of the batteries is required, please follow your organization's hazardous material disposal procedures.

Clean outer unit:

Use a moistened clean cloth to wipe the outside of the T-7, EXCEPT FOR THE OPTICAL SURFACES. A very dilute detergent solution is permissible. Dry with a soft clean cloth, or allow unit to air-dry before storing it.

Clean optics:

Use a moistened lens tissue, if necessary, to wipe the optical surfaces, using a light, circular motion. Discard each lens tissue after one use, to avoid transferring grit or foreign matter onto the lens surfaces. Dry with a clean, unused tissue.

setting covers all focus from 15 feet to infinity. Next, focus each eyepiece, in accordance with your specific optical correction, from -6 to +2 diopter. Look for the sharpest image you can achieve of the scene you can see on the screen. Rotate the eyepiece as necessary for sharpest image. Finally, slide either or both of the eyepieces towards or away from your nose so that one distinct image is viewed.



CAUTION!



Do not touch the lens face

White-Hot/Black-Hot button switch:

The T-7 always starts in the white-hot mode. The T-7's white hot/black hot polarity is selected by using the bottom spring-loaded momentary button on the front-right side of the unit. Briefly press the bottom button to switch between WHITE-HOT and BLACK-HOT polarities.

2X Digital Zoom:

The 2X switch is a digital zoom that switches the unit from 1X to 2X to 3X when the top button is depressed. When going from 1X to 2X to 3X the objective focus will need to be adjusted slightly for optimal performance. The unit starts in the 1X mode.

Head Mount Assembly with Brow Pads:

Adjustable head assembly that secures the T-7 to the operator's head providing hands free operation.

Chapter 5: System Specifications

Detector

- FPA Format: Uncooled Focal Plane Array / Maintenance Free
- Type and Material: ASi US Made
- Cooling: Uncooled
- Spectral Response Sensitivity: 7 – 14 μ m
- NETD (Thermal Sensitivity): < 50mK
- Refresh Rate: Real-time
- Temperature measurement : Center Point at crosshair / real-time

Performance:

- Detect Stationary Man: 475+ meters
- Optics: 25mm, 2X, f1.0 Germanium
- Magnification (standard): 2X
- Magnification (with 2X / 3X E-zoom): 3.0X (6X with 3X zoom engaged)
- Continuous Operation: 4 hours

Physical Features

- Diopter Adjustment: -6 to +2
- Eye Relief: 17mm
- Weight: 17.1 oz (485 g)
- Dimensions: 6in x 6in x 4in
- Power Requirement: (3) CR123 batteries
- Lens: High Grade Germanium
- Output: Video output NTSC Composite
- Eyepiece Adjustment: Individual Focus and Interpupillary distance

Additional Features

- Polarity Control: Black Hot/White Hot
- Display: 640 X 480 pixels OLED COLOR
- Temperature Reading: Yes / readout at top right hand corner of display
- Colorization: Gray Scale
Color available on request
- Video Output: NTSC (STD) PAL (on request)

Purging:

The housing of the T-7 goggle is filled with dry nitrogen and sealed to prevent dirt and moisture from degrading performance during use.



Purging is not a user level maintenance procedure. Contact SPI CORP or Direct Support Maintenance.

Storage:

Replace lens caps, as required. Wrap the lanyard around the T-7, and store in the carrying case.



Do not store the T-7 with the batteries installed.

Inspection:

Conduct an inventory of the case and its contents, and report missing or damaged items, for replacement. Once the components are clean, dry and inventoried, close the case and place it in secure storage, the Mil Spec storage case is recommended.

original product or replace it with a like product at the sole discretion of the manufacturer.

This limited warranty does not cover:

1. Any product on which the serial number has been defaced, modified, or removed.
2. Any product that has experienced deterioration or a malfunction from: accidents, misuse, neglect, fire, water, lightning or other acts of nature, unauthorized product modification or failure to follow instructions supplied with the product, repair or attempted repair by anyone not authorized to do so, use of supplies or parts not meeting manufacturer’s specifications, normal wear and tear, and/or extreme wear and tear caused by battlefield conditions or other extreme environments.

No other warranties, expressed or implied, are valid without an agreement in writing provided by the manufacturer.

All shipping involved in warranty work/ replacement is the sole responsibility of the purchaser.

Limitations of Liability:

SPI CORP. will not be liable for any claims, actions, suits, proceedings, costs, expenses, damages or liabilities arising out of the use of this product. Operation and use of this product are the sole responsibility of the

Customer. SPI CORP’s sole responsibility is limited to providing the products and service outlined herein in accordance with the terms and conditions of this Agreement. The provision of products sold and services

performed by SPI CORP to the Customer shall not be interpreted, construed, or regarded, either expressly or implied, as being for the benefit or creating any obligation toward any third party of legal entity outside SPI CORP and Customer; SPI CORP’s obligations under this Agreement extend solely to the Customer. SPI CORP’s liability hereunder for damages, regardless of the form or action, shall not exceed the fees or other charges paid to SPI

Chapter 6: Troubleshooting guide

The operator of the T-7 is restricted to the simple cleaning of the exterior body and optical surfaces; exchange of batteries; and replacement of the objective lens-cap, eyepiece and neck lanyard. Refer all other discrepancies to direct support. If the equipment malfunction is not listed or actions listed do not correct the fault notify your next higher echelon of maintenance or SPI Corp.

Following is a list of possible discrepancies, their possible cause, and suggested procedures:

Discrepancy	Probable Cause	Corrective Action
Unit will not turn on	Discharged batteries	Replace and discard old batteries
Unit will not turn on	Batteries installed backwards	Reinstall with proper orientation
No display through eyepiece	Objective lens-cap still on	Remove
Partial scene	Mud or debris on objective lens	Remove/clean per cleaning procedure.
Foggy or fuzzy picture	Dirty or greasy eyepiece	Clean with wet & dry lens paper Recommend using Demist Shield Scene out of focus
Scene out of Focus	Incorrect lens/diopter setting(s).	Refocus objective then diopter settings
Undefined scene	Moisture in system	Return to maintenance facility for nitrogen purging. Recommend using Demist Shield
Optics hard to turn, or grinding	Dirty threads	Return to maintenance facility for repair/cleaning/purging.

WARRANTY

The T-7 is covered by a limited 1 year warranty from time of sale. The warranty is valid only for the original purchaser. The manufacturer warrants its products to be free from defects in material and workmanship during the warranty period. If the product proves to be defective during this period, the manufacturer will repair the

CORP. by the Customer or the Customer's dealer. SPI CORP. shall not, in any event, be liable for special, indirect, incidental, or consequential damages, including, but not limited to, lost income, lost revenue, or lost profit, whether such damages were foreseeable or not at the time of purchase, and whether or not such damages arise out of breach of warranty, a breach of agreement, negligence, strict liability, or any other theory of liability.

EXPORT RESTRICTIONS

Export of Thermal devices is subject to United States Export rules and regulations.

