ISG
INFRASYS

OPERATING MANUAL

Contents

WARNING

Read and understand all instructions prior to using this product. Any tampering and/or disassembly of the thermal imager will void all warranties and could cause equipment failure.

Maintenance and/or repairs beyond those described herein shall only be performed by ISG / INFRASYS. Failure to observe this information could result in death or serious injury.

COMPANY BACKGROUND

ISG / INFRASYS is the world leader in the design and development of innovative thermal imaging technology for firefighters. ISG / INFRASYS is one of the only manufacturers in the world who build their own thermal imaging engine/core from the ground up. Using the latest technology in focal plane arrays we design our thermal imaging cameras for use specifically in firefighting environments. As a result, users of ISG / INFRASYS imagers enjoy the best image quality and the best high-temperature endurance for use in the harshest and most challenging firefighting environments.

ISG / INFRASYS is one of the largest providers of firefighting thermal imaging products in the world.

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⚠ WARNING

Thermal imaging is not a technology designed to replace current firefighting tactics.

Thermal imaging is a tool that allows a firefighter to be more effective and make better decisions. Failure to observe this information could result in death or serious injury.

WARNING

Users of thermal imagers, regardless of brand or type, are required to read the operating manual prior to using the imagers.

The XRHR Thermal Imager is not life support equipment and should not be used as such.

1. All users must be thoroughly trained on the proper operation of the XRHR, its features and full functionality prior to use. This includes understanding thermal images and how they are interpreted. Improper use of the equipment in a hazardous atmosphere could result in death or serious injury.

2. The XRHR Thermal Imager must only be used by personnel familiar with the uses, proper operation, and features and full functionality of the XRHR, including training in simulated fire conditions such as controlled live burn simulations. Use of the XRHR by unauthorized, unfamiliar or untrained persons could result in death or serious injury.

3. The XRHR is a complex electro-optical device, and just like any other machinery, electronic systems are subject to potential failures. If a failure occurs, the user will no longer have access to the thermal images provided by the XRHR. Tactical use of this equipment must not deviate from standard operating procedures used by personnel who do not have the benefit of the equipment.

4. Failure to follow your fire departments standard operating procedures in a hazardous atmosphere could result in death, serious injury or disorientation should equipment failure occur.

5. The XRHR must be serviced only by ISG / INFRASYS authorized personnel. The XRHR includes high voltage components. Removing the cover exposes the user to potential shock hazard which could result in death or serious injury. There are no user-servicable components.

6. The XRHR will not provide images through glass, water, or shiny objects. These surfaces act like mirrors to the camera.

7. The XRHR will not provide thermal images underwater.

8. Users should be conscious of the battery life. Only enter a hazardous environment when a full battery charge is indicated on the battery charge icon and the XRHR is confirmed as fully operational.

9. Repeated exposure to high temperature environments without adequate periods for the unit to self-cool may result in degradation or loss of the thermal image or damage to the internal components. Be sure to allow adequate cool-down periods between high temperature exposures.

WARNING

10. Exposure to high temperature environments for an extended period of time may result in degradation or loss of the thermal image. Be sure not to overexpose or heat saturate the equipment beyond the design tolerances of the system.

11. The service life of the XRHR depends in part on how it is used and the environmental conditions in which it is used. Under heavy usage, or under extreme environmental conditions, the service life of the equipment may vary.

12. Batteries supplied with the XRHR have been designed based on specific performance values. Replacement batteries must be obtained ONLY from an Authorized ISG / INFRASYS Service Center.

13 The XRHR incorporates electric temperature control systems. Run time on each battery may decrease when used in extreme temperature environments.

14. It is important to test the XRHR and any other associated accessories often to ensure that the equipment is functional before entering a hazardous environment. Always perform a visual and functional check on the equipment to validate that it has not been damaged or degraded prior to use.

15. Never use the XRHR as the sole source of navigation. If system failure occurs, you may become disoriented or lost in a hazardous environment which could result in death or serious injury.

16. Failure to exit a hazardous environment immediately on observation of the low battery warning may result in system failure in a hazardous environment which could result in death or serious injury.

17. The XRHR is a navigational tool which provides a thermal image in conditions where vision is impaired. The user should follow safety precautions and protocols, and stay within communications range of the incident command structure. Failure to do so could result in death or serious injury.

18. While every effort has been made to ensure that your XRHR is both tough and reliable, the camera is a sophisticated electro-optical system that will fail if it is abused or exposed to environments beyond its design envelope.

19. The XRHR is not intrinsically safe and caution should be used while operating the imager in all non-fire environments.

Failure to observe these warnings could result in death or serious injury.

1. SPECIFICATIONS

Physical Characteristics

Weight (nominal):	2.6 lbs.
Dimensions:	5.4 x 6.5 x 4.5 inches
Shell Material:	Radel R
Handstrap Material:	Kevlar
Water Resistance:	IP 67, 3' 3" (1.0m) depth
Contaminant Resistant:	Yes
Drop:	6 feet

Infrared Characteristics

Detector	Super-High Resolution Microbolometer
Detector Array Format	384 X 288
Sensor Resolution	110,592 Pixels
Display Resolution	>110,592 Pixels
Spectral Response	8-14µm
NEdT	50 mk Nominal
Effective Temperature Range	Over 2,000°F
IR Protection Window	Germanium
Field of View	54°
Update Rate	5,529,600 Scene Elements per Second

Electrical Characteristics

Video Standard:	NTSC
Controls:	Power On/Off
	Transmitter or VC+ On/Off (if fitted)
Sleep Mode:	Not Required
Start Up Time:	Under 10 Seconds
Battery Technology:	Rechargeable NiMH
Recharge Time:	2 Hours (nominal)
SuperCell Battery	~6 Hours
Extended SuperCell Battery	~8 Hours
Sub-zero Start Up:	Below 32°F (0°C)

Display Characteristics

Size (Diagonal):	3.5" (90mm)

Warranty

Base Warranty	1 Year
Extended Warranty	Up to 2 Additional Years

2. SYSTEM COMPONENTS

Your XRHR comes complete with the following:

- XRHR Thermal Imager
- 2 SuperCell Batteries
- Battery Conditioning Charger
- Operating Manual on CD
- Shipping Container

In the event that any of the above items are not supplied, please contact ISG / INFRASYS.

3. OPTIONAL ACCESSORIES

The following (optional) accessories are available.

- Extended SuperCell Battery
- Fast Attack Plus Truck Charger
- Hard Shell Carrying Case
- Retractable Lanyard
- Laser Assist Handle

Fast Attack Plus Charger with Spare Battery

4. CHARGING THE BATTERIES

Note: This procedure applies to both the SuperCell and Extended SuperCell Batteries.

Note: For first time use, allow new batteries to remain in the charger for approximately 14-16 hours.

1. Plug the AC adapter into a 110V AC wall outlet.
2. Insert the 2.1mm plug into the charger base. The charger will be in standby mode and the RED LED will flash continually.
3. Align the battery with the battery receptacle as illustrated. Firmly insert the battery into the charger. The GREEN LED will flash indicating the battery is charging.

Note: If the RED LED continues to flash with the battery installed in the charger, this is an indication that either the battery is not making connection or that the battery is not capable of holding an adequate charge to operate the camera for any length of time. Check the battery and charger contacts for damage and cleanliness.

ISG / INFRASYS batteries and chargers have a 90 day warranty. In the event that the batteries are not charging, call ISG / INFRASYS immediately (877-733-3473).

4. When the battery is fully charged, the GREEN LED will stay illuminated indicating that the battery is charged and is in maintenance mode.

Note: Maintenance mode – should battery voltage drop while in charger, charger will restart and charge to full capacity.

Note: You cannot overcharge the battery.

5. Firmly insert the battery into the camera until a 'click' is heard and pull on the battery to ensure proper seating.

4.1. Removing the Battery

Simultaneously and firmly press the battery release catches located on both sides of the camera. This action will release the battery pack and the pack will partially eject from the camera body. Remove the pack by gripping and sliding it out of the camera body.

4.2 AA Battery Adapter

1. Push button to eject battery cell holder.
2. Remove existing batteries cells and insert new cells as per markings on cell holder.
3. Slide battery cell holder into cassette body until it clicks into position.

Note: Use ONLY brand new, high quality, AA alkaline cells of the same manufacturer.

⚠CAUTION

Failure to install new or replace old cells per the instructions may result in minor or moderate injury and/or product damage.

The AA Battery Adapter is NOT a sealed unit. After each use, immediately remove all batteries from the holder and verify no moisture is present. Clean and dry as necessary. Failure to observe these instructions may result in minor or moderate injury and/or equipment damage.

5. FAST ATTACK PLUS TRUCK CHARGER (OPTIONAL)

5.1. Mounting

The Fast Attack Plus Truck Charger (FAP) is designed to be mounted to a solid, flat surface inside of a vehicle using the 6mm hex bolts, nuts and washers provided with the unit. The mounting holes should be about 7mm or ¼" in diameter. All three mounting points must be secured with hardware. The unit can be mounted on the floor of the vehicle as well as on a vertical surface.

5.2. Connecting Power

The FAP should be connected to standard vehicle power 12 to 24VDC. Attach the positive RED wire from the FAP power cable to 12-24VDC POSITIVE and the BLACK wire to 12-24VDC NEGATIVE (GROUND). The unit is protected by a 6A reset circuit breaker. If the unit's amber "POWER" light isn't on, be sure the button on the circuit breaker is pushed all the way in. If the button on the circuit breaker pops out, there is a problem with the wiring or the unit itself. Contact ISG / INFRASYS for help.

5.3. Charging Batteries

Insert the camera and/or spare battery into the FAP as shown. Be sure the straps are properly adjusted and secured. ALWAYS SECURE THE CAMERA AND BATTERY IN PLACE! Proper fastening of the camera and battery will secure them in the event of a roll-over. The green LEDs should flash indicating that the batteries are charging. When the batteries are charged, the green LEDS should stop flashing and stay on. If the red LED turns on there is a problem with the battery. If the red and green LEDs are flashing, the charger contacts are shorted. Contact ISG / INIFRASYS for further assistance (877-733-3743).

6. OPERATOR CONTROLS

6.1. Switching the Thermal Imager On and Off

To switch the unit On, click the POWER button. Observe the Green LED light located below the right side of the screen come on. The ISG / INFRASYS logo appears on the thermal imager display. Observe or check for the following indicators on the screen: Overheat Warning; DDT; Battery Charge State; Color Reference Bar/Heat Indicator; Sense Mode Indicator; and, Crosshair. Should the Overheat Warning not appear, do not use the imager.

To switch the unit Off, press and hold the GREEN power button. Continue holding the GREEN power button until the shutdown indicator, , is displayed on the left side of the display. When the shutdown indicator appears, release the GREEN power button and the camera will shut down. Camera shutdown sequence will be aborted if the GREEN power button is not released within three seconds of the shutdown indicator appearing. A GREEN X will appear next to the shutdown indicator.

If you are recording video using the optional VC+ feature avoid data loss by being sure to STOP recording prior to powering down the camera or removing the battery.

7. DIGITAL DIRECT TEMPERATURE (DDT)

The DDT provides the average relative (or " observed") temperature of an object, or objects within the crosshairs. The relative temperature is displayed in numerical form in the lower right hand corner of the viewing screen.

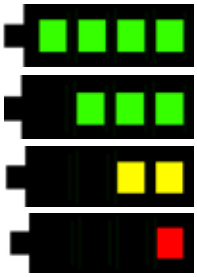
DDT is operational at all times and cannot be switched on or off.

The accuracy of the relative temperature is affected by many factors, including the "emissivity" of the object. An object's emissivity is its ability to either absorb or reflect heat energy. The better the object absorbs heat (the higher the emissive value), generally the more accurate the temperature reading.

8. WARNING AND INFORMATION SYMBOLOGY

8.1 Battery Charge State

The charge state of the battery is indicated by a symbol representing a battery with four individual bars inside the battery. As the battery charge decrease, the indicator bars within the battery decrease. See illustration.



= BATTERY CHARGE IS 100%

= BATTERY CHARGE IS 75%

= BATTERY CHARGE IS 50%

= BATTERY CHARGE IS 25%

"FLASHING" CAMERA IS ABOUT TO TURN OFF.

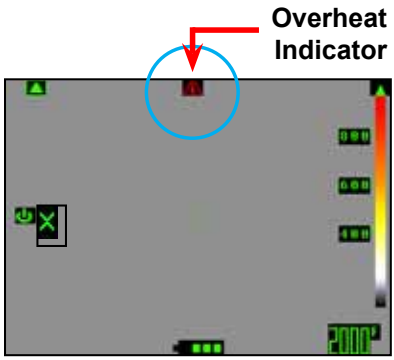
Note: Never assume a correlation between the % remaining and actual minutes of charge left. As a battery ages, the estimated charge life will decrease from the charge life designated when new.

⚠ WARNING

Failure to observe any of the low battery warnings and egress to a safe location upon notification, could result in death or serious injury.

8.2 Overheat Warning

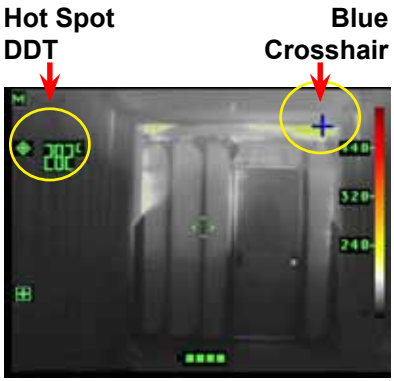
The XRHR is equipped with an internal electronics overheat indicator, . See illustration. This indicator will activate when internal electronics have reached temperatures beyond their safe operating range. The over temp indicator will begin flashing at least 30 seconds before the camera shutdown sequence begins. Operator should immediately plan their egress using proper firefighting tactics



8.3 Hot Spot Tracker

Hot Spot Tracker identifies the hottest object in the scene, tracks it, and displays its relative temperature. To activate Hot Spot Tracker, click the YELLOW button.

When active, a BLUE crosshair will appear on the display and automatically track the hottest point in the scene. As the dynamics of the scene or the location of the camera changes, the Hot Spot Tracker will automatically update identifying the hottest object in the scene with the BLUE crosshair.

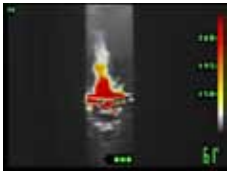


The standard DDT readings in the lower right corner will turn OFF when Hot Spot Tracker is activated. A new temperature reading appears on the upper left side of the screen providing the relative temperature of the object highlighted by the BLUE Hot Spot Tracker crosshair.

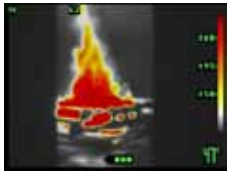
To turn off, push and release yellow button.

8.4 2X / 4X Zoom

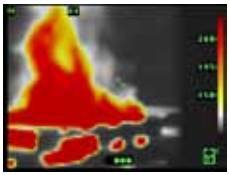
Click the RED button to activate 2X zoom. Once in 2X zoom, click the RED button again to activate 4X zoom. Once in 4X zoom, click the RED button again to return back to normal view.



Normal View



2X Zoom



4X Zoom

9. COLOR REFERENCE BAR / HEAT INDICATING COLORATION

9.1 Heat-indicating Colorization

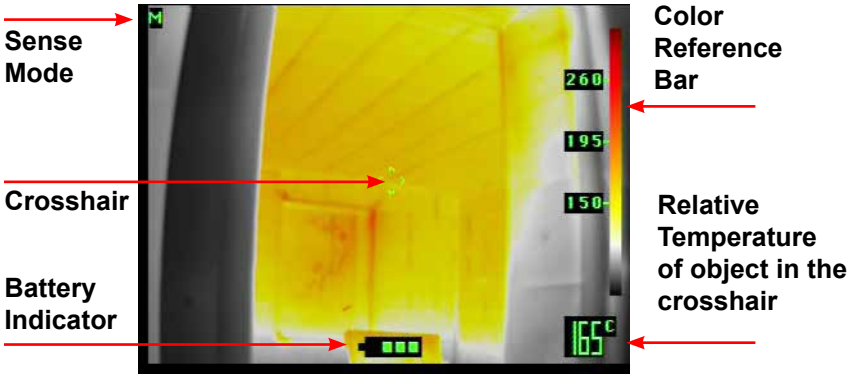
The XRHR is equipped with heat-indicating colorization and a color reference bar. Heat-indicating colorization overlays over the thermal images and in conjunction with the color reference bar, is designed to assist users approximate the relative temperature of objects in the scene.

1. The coolest objects in the scene are depicted in the black to white color band with black being the coldest and white being the hottest.
2. Yellow starts immediately following the hottest (white) temperature. Light yellow is displayed to depict the lowest temperature within the yellow temperature band. The hue changes to a darker yellow to depict hotter temperatures within the yellow band.
3. Orange starts immediately following the hottest temperature in the yellow temperature band. Light orange is displayed to depict the lowest temperature within the orange temperature band. The hue changes to a darker orange to depict hotter temperatures within the orange band.
4. Red starts immediately following the hottest temperature in the orange band. Light red depicts the lowest temperature within the red temperature band, and the hue gradually changes to a darker red to depict hotter temperatures within the red temperature band.

9.2 Color Reference Bar

Depending on the sense mode the camera is operating in, the color reference bar incorporates three numeric anchor temperatures that corresponds to the heat-indicating colorization. The anchor temperatures indicate the temperature that corresponds to the color referenced. The numeric anchor temperatures change based on the sense mode detected by the camera to help users approximate the relative temperature of objects within the colorized region.

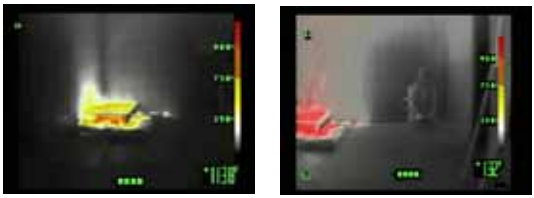
Note: the user must be aware of the sense mode the camera is in at all times to better utilize the heat indicating colorization and its corresponding temperature based on the Color Reference Bar numeric anchor temperatures.



10. INTELLIGENT FOCUS OVERRIDE FEATURE

10.1 Summary Explanation of Sense Modes:

The Intelligent Focus feature increases the usefulness of a thermal imager by giving the firefighter control over the camera's default sensitivity (sense) mode settings, given certain conditions (explained below). A trained and experienced firefighter can enhance his vision by forcing the camera to operate in what he feels is the most appropriate sense setting for a specific environment at a specific time.



A sense mode (sometimes called a sensitivity mode, or gain mode) in a thermal camera is similar to the exposure compensation controls in a typical digital photographic camera. A digital photographic camera automatically adjusts itself to compensate for the level of brightness (or exposure) in its field of view. It does this by either

increasing or reducing its sense (or gain) setting. In extreme cases where there is too much light in the field of view for the automatic systems to control, an advanced digital photographic camera allows the user to manually select a new sense mode thereby allowing images to be optimized for that particular environment.

In this manner, the XRHR thermal camera is similar to an advanced digital photographic camera. Except that the XRHR senses heat instead of light. The XRHR will automatically select what it thinks is the most appropriate sense mode - unless a firefighter forces the XRHR to select a different sense mode than what it automatically selected. The firefighter selects a sense mode by merely pointing the camera's crosshair. No buttons or manual switches need to be selected.

The XRHR is equipped with three sense modes:

High Sense Mode: This mode is automatically activated by the XRHR when objects in its field of view are at room temperature or cooler. For example, when you activate your XRHR and look around the fire station, it will most likely be operating in High Sense Mode. Likewise, High Sense Mode is automatically selected when you are searching or navigating in a cold smoke-filled basement.

Mid Sense Mode: This mode is automatically activated by the XRHR when the temperature of objects in its field of view is elevated. This mode is automatically activated when there are objects in the field of view that are generally greater than 300°F.

Thousand Plus Mode: This mode is automatically activated whenever the crosshair in the center of the viewing screen is directed to objects that are generally greater than 400°F. While operating in this mode, the XRHR is capable of imaging objects that are in excess of 2000°F. Likewise, this mode is automatically selected when the entire field of view exceeds 400°F.

Intelligent Focus enables firefighters to manually select between Mid Sense and Thousand Plus Modes. In the example below, we burn oak palettes to achieve the high temperatures that might typically be present at the ceiling of an involved structure. An advanced firefighter can toggle between Mid Sense and Thousand Plus modes by using the crosshair to manipulate the gain settings of the camera. See example below.

High Sense **Mid Sense** **Thousand Plus**

⚠ WARNING

Manipulation of sensitivity mode settings described in this Intelligent Focus Override Feature section should only be attempted by firefighters who are 1) experienced in fire ground operations; 2) experienced in the usage of thermal imagers in firefighting environments; and 3) have received training specifically on the usage of the camera's Intelligent Focus Override feature.

Firefighters who do not qualify on all three conditions should not attempt to use the Intelligent Focus Override Feature.

11. EMISSIVITY AND ITS EFFECTS ON DDT

The accuracy of the relative temperature is affected by many factors, including the "emissivity" of the object. In short, an object's emissivity is its ability to either absorb or reflect heat energy. The better the object's characteristic to absorb heat (i.e. a high emissive value), generally the more accurate the temperature reading.

The DDT installed in the XRHR assumes an emissivity of 0.95. That is, for objects with emissivity of 0.95, the DDT will return temperature readings accurate to within 10% of the actual temperature. The value of .95 was chosen because most objects found in normal, traditional structural firefighting environments will have an emissivity value close to 0.95. This will give the firefighter the most accurate average temperature possible, under these conditions.

However, when looking at shiny objects such as chrome, unpainted aluminum, unpainted stainless steel, and other metals, the DDT temperature readings can be significantly distorted. (For painted objects, the emissivity of the paint, rather than the emissivity of the actual material should be considered.) When the temperature of metal objects are being estimated using DDT, it is important to note that painted metal objects generally return a much more accurate temperature readout than unpainted metals.

The cross-tabulation in the tables following will give the user a general idea of the effective (real) temperature versus the observed temperature, given varying emissivity levels. The higher the material's emissivity, the more accurate the DDT reading will be.

Actual vs. Displayed Temperatures for Differing Emissivity

Temperature of Surrounding 70°F

Displayed temperature, °F

Actual Source Emissivity	0	20	40	60	80	100	150	200	300	400	500	600	800	1000
0.1					104	231	423	563	793	996	1187	1373	1736	2093
0.2				-32	88	166	306	416	602	769	929	1084	1388	1688
0.3			-110	10	82	139	251	344	507	656	798	938	1211	1481
0.4		-155	-40	27	79	124	218	300	446	583	714	843	1096	1348
0.5	-172	-72	-11	36	77	114	196	269	403	530	653	774	1013	1250
0.6	-89	-37	6	43	76	108	179	246	371	490	606	721	949	1175
0.7	-53	-16	16	47	75	103	167	228	345	458	569	678	897	1114
0.8	-31	-3	24	50	75	99	157	214	324	431	537	643	853	1063
0.9	-16	7	30	52	74	96	149	202	306	409	511	613	816	1019
1	-5	15	34	54	74	93	143	192	291	389	488	587	784	981

11.1 Typical Emissivity Values

Material (metal)	Emissivity	Material (non-metal)	Emissivity
Aluminum		Asbestos	0.95
Un-oxidized	0.02 – 0.1	Asphalt	0.95
Oxidized	0.2 – 0.4	Brick	0.90 – 0.98
Roughened	0.1 – 0.3	Ceramic	0.95
Brass		Clay	0.95
Burnished	0.3	Concrete	0.95
Oxidized	0.5	Cloth	0.95
Copper		Glass (plate)	0.85
Polished	0.03	Gravel	0.95
Roughened	0.05 – 0.1	Ice	0.98
Oxidized	0.4 – 0.8	Limestone	0.98
Iron		Paint	0.90 – 0.99
Un-oxidized	0.05 – 0.2	Paper	0.95
Oxidized	0.5 – 0.95	Plastics (opaque)	0.95
Rusted	0.5 – 0.7	Rubber	0.95
Steel		Sand	0.90
Cold-rolled	0.7 – 0.9	Snow	0.90
Ground sheet	0.4 – 0.6	Soil	0.90 – 0.98
Polished	0.1	Skin (human)	0.95 – 0.98
Oxidized	0.7 – 0.9	Water	0.93
Stainless	0.1 – 0.8	Wood (natural)	0.90 – 0.95

WARNING

When looking at shiny objects such as chrome, unpainted aluminum, unpainted stainless steel, and other metals, the DDT temperature readings can be significantly distorted. It should be noted that when viewing a fire scene, DDT is measuring the temperature of an object and NOT the air temperature. Failure to observe this warning could result in death or serious injury.

15. CLEANING AND MAINTENANCE

Following use, the XRHR should ALWAYS be cleaned and inspected for damage.

1. Inspect all lenses for soot / dirt buildup. Clean if necessary.
2. Normal “intended use” scratches on the high efficiency aspheric lens do not degrade picture quality, however chips may affect lens transmission. Inspect IR lenses for chips.
3. Inspect the unit for structural, heat, and/or chemical damage.
4. Inspect all battery contacts for damage.
5. Inspect battery charger.
6. Inspect all batteries and battery adapters for damage or leakage.
7. Check all switches including the battery charger for proper indication that systems are running correctly.
8. Inspect battery charger contact points for corrosion or damage.
9. Make sure battery charger is charging.
10. Inspect all lenses for heat or chemical damage, cracks and breaks.
11. Inspect the mechanical hardware to make sure no screws have loosened or are missing.
12. Store your Thermal Imager in the optional Fast Attack Plus or in the delivery case provided.
13. The thermal imager should be cleaned using warm soapy water and nonabrasive cleaners. Allow the thermal imager to completely dry before replacing in its carrying case. **Note: Do not use solvents and abrasive cleaners.**
14. It is recommended that the display is treated with anti-fog solutions as used on SCBA/BA facemasks.
15. To ensure long service life, it is recommended that the thermal imager and its accessories are stored in temperate environment (58°F - 95°F, moderate humidity) at all times.

⚠ WARNING

Failure to observe these instructions may result in minor or moderate injury and/or equipment damage.

⚠ WARNING

In the event that any damage is detected (for example, cracked or broken window or housing) the imager should be IMMEDIATELY withdrawn from service and returned to an authorized service center for repair. Failure to observe this warning could result in death or serious injury.

16. SERVICE PROCEDURE

Should any ISG / INFRASYS Thermal Imager or Fast Attack Plus ever need repair, see instructions below.

Note: Prior to returning the thermal imager, the device should be fully decontaminated. ISG / INFRASYS reserves the right to send the unit back to the user for decontamination.

1. First, locate the **SERIAL NUMBER (SN)**. Camera SNs are located inside the battery compartment. Fast Attack SNs are located on the bottom of the unit. *Keep these numbers available on file should the imager be in use.*
2. Call ISG / INFRASYS to obtain an **RETURN AUTHORIZATION NUMBER (877) SEE-FIRE** or **(678) 442-1234 - US**

   +44 1268 527700 - UK.

Please have all of the following information readily available when calling:

- The unit's Serial Number (i.e.. K1K...; FA...; etc.)
- Department name
- Primary contact person
- Best available contact (cell or email)
- Physical shipping address (all cameras are shipped and tracked via FedEx)
- Detailed description of problem

When shipping a product back to ISG / INFRASYS, if possible, place it inside its original shipping container. Be sure it is sealed appropriately. It is recommended that all accessories (batteries, charger) are returned as well for inspection.

Clearly mark the container with the RA Number on the OUTSIDE for proper processing.

Ship directly to ISG / INFRASYS, the Authorized Repair Center:

ISG / INFRASYS
305 Petty Road, Ste B
Lawrenceville, GA 30043
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Note: ISG / INFRASYS will not be responsible for damages or losses incurred during shipping.

17. WARRANTY INFORMATION

ISG /INFRASYS warrants the XRHR thermal imager to the original owner to be free of defects in material and workmanship under intended use and service for one year from the date of purchase. ISG / INFRASYS' obligation under this warranty is limited to the replacement or repair, at ISG / INFRASYS' option, of articles if returned to ISG / INFRASYS in Georgia, or an authorized distributor, with shipping charges prepaid by the owner, and which, upon inspection by ISG / INFRASYS, shall prove to have been defective in normal, "intended use" and service. Maintenance and field replaceable items (batteries, battery chargers, AC/DC adaptors, straps, display covers and all accessories), if defective, are covered under warranty for a ninety (90) day period.

This warranty does not apply to equipment malfunction or damage resulting from accident, alteration, misuse, or non-intended abuse of the equipment including, but not limited to, power surges, over exposure to heat, defective power supply, abnormal wear and tear or other perils outside the design tolerances of the system. In addition, this warranty does not apply to elastomer or rubber components since they can be adversely affected by undue exposure to heat, sun, water, ozone, or other deteriorative elements. The decision as to what constitutes normal use shall be made solely by ISG / INFRASYS.

To maintain this warranty, the purchaser must perform maintenance and inspections as prescribed in the operation and maintenance manual which shall include prompt replacement or repair of defective parts.

This warranty is expressed in lieu of all other warranties, expressed or implied, and all other obligations and liabilities on ISG / INFRASYS' part. ISG / INFRASYS neither assumes nor authorizes any other firm or person to assume on ISG / INFRASYS' behalf any liability in any way connected to the sale of ISG / INFRASYS Products.

IMPORTANT EXPORT INFORMATION

This infrared camera is considered dual-use military equipment and is export controlled under DOC CCL 6a003.

It is a criminal act to export this camera and any of its components thereof outside the United States without obtaining an approved export license.

If you wish to export these items, please notify ISG / INFRASYS for assistance in obtaining the proper export documentation.

NOTES

APPENDIX A

Optional Features

A. Lanyard

Attach the lanyard by pushing inward on the carabiner gate and placing the open end through the camera's 'D' ring on the rear of the camera. Be sure the carabiner gate closes and is secure. Before use, be sure the carabiner is working properly and is not damaged or bent.

B. Side Straps

The side-straps are adjusted by peeling back the Velcro® fold-over flap. Pull the end of the strap away from the camera until the Velcro is completely separated. Adjust the strap to the desired length or comfort and secure in place by folding the strap over securing the strap via the Velcro. Close the fold-over flap for additional security.

C. Laser Grip

To install an optional Laser Grip, match the male attachment of the Grip with the rear or back attachment port on the bottom of the camera. Slide the Grip into the locked position. While holding the camera in the normal operating position, turn the blue screw attachment counter-clockwise until tight.

IMPORTANT: DO NOT use the handle unless you've determined you have positively locked it in place.

Laser Grip

⚠ CAUTION

Failure to install the Laser Grip handle per the instructions may result in minor or moderate injury and/or product damage during camera use.

D. Video Capture (VC+)

To view recorded video or images, first turn the camera off (see 6.1). Then, remove the camera battery and locate the USB connector located inside the battery compartment. Shown in Figure A.

A 

B 

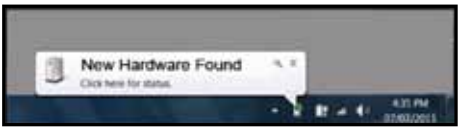
C 

Using the supplied USB, plug the small USB connector into the connector located in the battery compartment. See Figure B. Plug the opposite end of the USB cable into an available USB port on a computer. See Figure C.

A. 1. Download and Delete Images

The computer will recognize the device and display a message reading “New Hardware Found”. *Shown in Figure D*.

Figure D



The computer will automatically install the required drivers to operate the Video Capture Plus. Once the drivers have installed, a message will appear will appear stating, *“Your Device is now ready to use”*.

Depending on the configuration of the computer, you may need to:

1. Locate the drive by accessing “My Computer”
2. Click on the Removable Disk drive
3. Click on “View Files Icon”

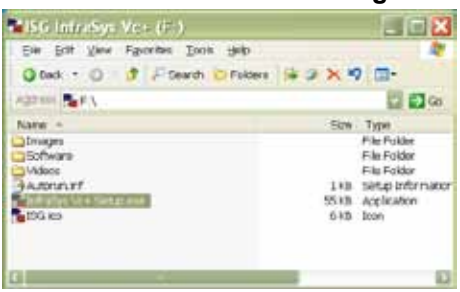
The contents of the Video Capture Plus device will be displayed. *Shown in Figure E*.

Initial setup may be required in order to view recorded video or captured images. Video Capture Plus is compatible with the following Microsoft Windows Operating systems:

Windows 2000 **Windows Vista**

Windows XP **Window 7**

Figure E



For Windows 7, no codec is required. For earlier versions of Windows, the codec should be installed automatically by the software provided on the drive that appears when the USB is connected (if the codec is not already present).

The user must click on the ISG Infrasys SETUP option provided on the drive to start the process. The setup process will automatically begin running.

Note: Administrative rights may be required to install programs on some computers. If you receive an error due to account privileges, please contact your network administrator.

Once you select Infrasys VC+ Setup.exe, follow the install wizard will guide you through the install process as shown below.

B. WIRELESS VIDEO TRANSMISSION - OPTION

If fitted, the Video Transmitter is OFF by default. To switch the Transmitter ON, click the YELLOW button and the transmitter icon will appear on the display screen. (See illustration) To switch the Transmitter

Off, click the YELLOW button and the transmitter icon will disappear or just turn the camera off and back on.

B.1 Connecting the Receiver to a Monitor

NOTE: The video monitor typically used is a small TV or TV/VCR combination. The unit must have an RCA "Video IN" connector.

It is not possible to use the "Cable" or "Antenna" input connector.

1. Plug the AC wall adapter or the 12 volt cord into the receiver.
2. Connect one end of the 10 ft. antenna cable to the antenna, the other end to the receiver. The ends have different connector types and are not interchangeable.
3. Connect the supplied video cable to the receiver (BNC jack) and the video monitor (TV). Be sure the video cable's RCA connector is fitted to the "Video IN" jack of the monitor.
4. Plug the AC wall adapter into a suitable 120V AC wall outlet, or plug the 12 volt car cord into a 12 Volt DC accessory jack (cigarette lighter). The red LED should illuminate indicating power on.
5. The video monitor/TV should have the proper input selected. (It will not be channel 3 or 4, etc.) Typically it is "LINE", "LINE IN", "AUX", "L1", "R1", etc.
6. Power up the thermal imager and activate the video transmitter. Select the proper channel on the receiver and video should be displayed.

Your XRHR Thermal Imager may have optional features installed at time of order. These options may also be purchased and installed at any time after delivery.

Please call ISG / INFRASYS to schedule any option upgrade.

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