

 HeatSeeker™
Instruction Manual










Safety Warning:

The equipment described in this document uses a Class 2 laser. Under no account should anyone look directly into the laser beam or the laser beam exit aperture, irreversible damage to the eye may occur. The laser should not be operated when there are personnel in the imager's field of view

Caution – use of controls or adjustments or performance of procedures other than those specified in this document may result in hazardous laser radiation exposure.



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Contents	Page
1. Contents of the Case.	3
2. Main Features and Controls.	4
3. Getting Started.	5
4. Thermal and Visible Image Blending.....	7
5. Menu Structure.....	10
5.1  Infrared Settings.....	11
5.2  Measurement Options.....	12
5.3  Camera Settings.....	13
5.4  Audio Settings.....	14
5.5  Image Browser.....	15
5.6  Date & Time Settings.....	15
5.7  Language Selection.....	16
6. Adding Captions when Saving Images.....	17
6.1 Voice message.....	17
6.2 Text Captions.....	18
Appendix.....	19
A1. Emissivity Look up tables.	19
A2. Full Icon list.....	20
A3. Technical Specification.....	22

1. Contents of the Case.



1. Case.
2. Camera.
3. PSU and International adaptors.
4. CD – User manual and Software.
5. USB cable (camera to PC).
6. Handle.
7. Quick Start Guide

2. Main Features and Controls.



3. Getting Started.

a) Switching the Camera on/off



Press the Power Button to switch the camera on. Press and hold for a few seconds to switch the camera off.

b) Charging the internal battery



The camera's built in battery is charged via the charging port. A fully charged battery will last approximately 6 hours. An LED indicates charging as described on the label.

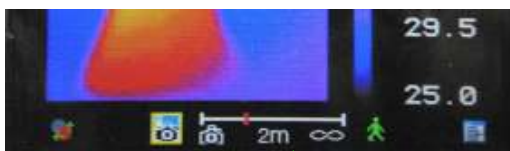
Note: When the camera is connected to a PC via the USB cable the camera will charge but extremely slowly.

c) Focusing

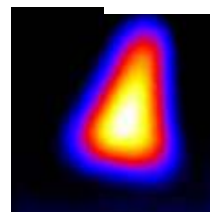


Gently rotate the lens clockwise and counter-clockwise to focus the image.

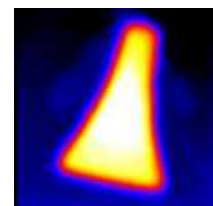
◆ Remember to remove the lens cap.



Focus bar



Out of focus




Focused

The focus distance bar appears on the screen when the lens is turned slightly. It indicates the approximate distance in meters or feet to the target.

Function Key Buttons



Icons or text displayed on the screen above the Function Keys describe the actions. These functions vary according to the options chosen by the user.

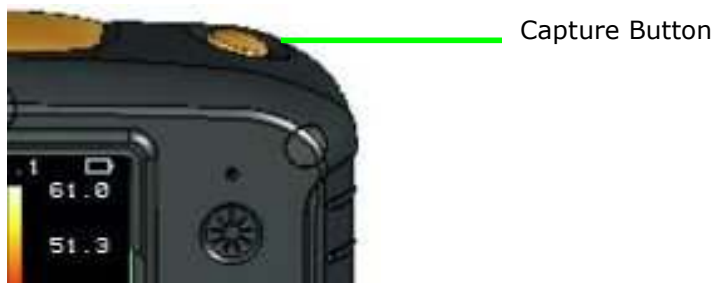
A yellow box  around the icon for Function Key 1 or Function Key 2 indicates that this option is selected and this defines the operation of the navigation and toggle buttons.

In normal imaging mode, Function Key 3 may be used to freeze the image; pressing it again returns the camera to live operation. Function Key 4 is used to enter and exit the menu. See appendix A2 for a full icon list.

d) Menu

Function Key 4 selects the Menu. Use the Navigation buttons to move around and use Function Key 3 to select a menu function. Full details of menus are listed in section 5.

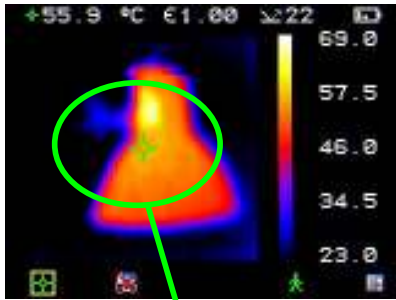
e) Saving an Image



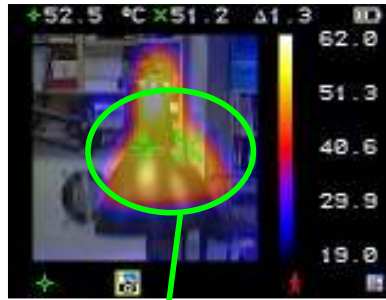
To save a live or frozen image, press the Capture Button once. If Caption Mode or Voice Annotation has been turned on, a text caption or voice annotation can be attached to the image (see section 6)

f) Temperature Measurement

Temperature readings are displayed at the top of the display. In the default mode, a single temperature in °C is of the centre point of the cursor. The other readings at the top of the display are Emissivity settings and reflected temperature setting. Two cursors or a measurement area may alternatively be selected from the measurement options menu (see section 5). A scale on the right hand side of the display indicates the temperature range within the scene.



One cursor

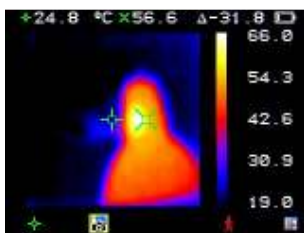


Two cursors

Temperature difference between cursors
Temperature range for the scene

4. Thermal and Visible Image Blending

The camera can show a thermal image or a visible image of the scene, or a mixed blend of both.



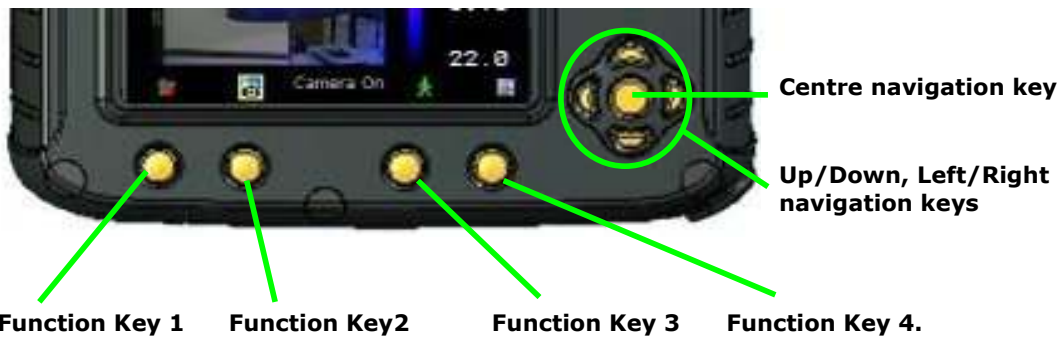
a) 100% Thermal only.



b) 100% Visible only.



c) 50% Thermal and 50% Visible



1. Press Function Key 2 until the camera on/off icon appears














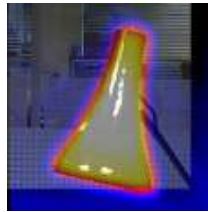
2. If off  press the centre navigation key  to toggle to camera on .
3. Use either the up/down, or left/right navigation keys  to blend the visible and thermal images. Blend options are 0%, 25%, 50%, 75% and 100%.

Image Alignment

As the visible and thermal camera lenses are not co-axial the visible and thermal image often need to be aligned. This is usually required when moving to view objects at different distances.

1. Press Function Key 2  to toggle through to the camera on/off icon 
. If off  toggle the centre navigation key  to turn the camera option on .
2. Press Function Key 1  to toggle through to the alignment option .
3. **Press centre navigation key again to select the closest preset alignment distances**
4. Use the up/down and left/right navigation keys  to fine-tune the alignment of thermal and visible images.
5. The alignment facility is only available when the camera is on and in live mode
 - ♦ **Note the visual image is moved during alignment.**
 - ♦ **The Thermal Image remains fixed**

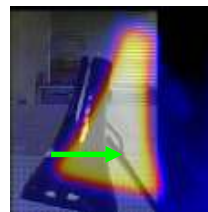
Examples of alignment:



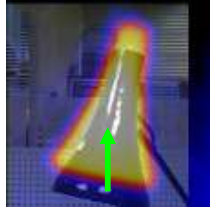
Fully Aligned



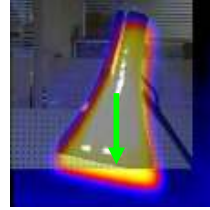
Align left



Align right












Align up



Align down

*Four pre-programmed alignment distances are included. These are at 0.5 metre, 1 metre, 2 metres and 4 metres. With the alignment option selected by Function Key 1, pressing the centre navigation key once aligns at 2 metres. Pressing the centre navigation key again allows you to cycle through to 4m, 0.5m and 1m.

5. Menu Structure.

- a) Select the menu  by pressing Function Key 4 .
- b) Navigate through the menu using the navigation keys  and press Function Key 3  to select the required option. The highlighted item will have a yellow box  around it.
- c) Use the up/down buttons  to move in the selected list and select the required item.
- d) Use the left/right keys  to change values and options for the specific item.
- e) Press Function Key 4  to exit or Function Key 1  to go back to the previous menu.

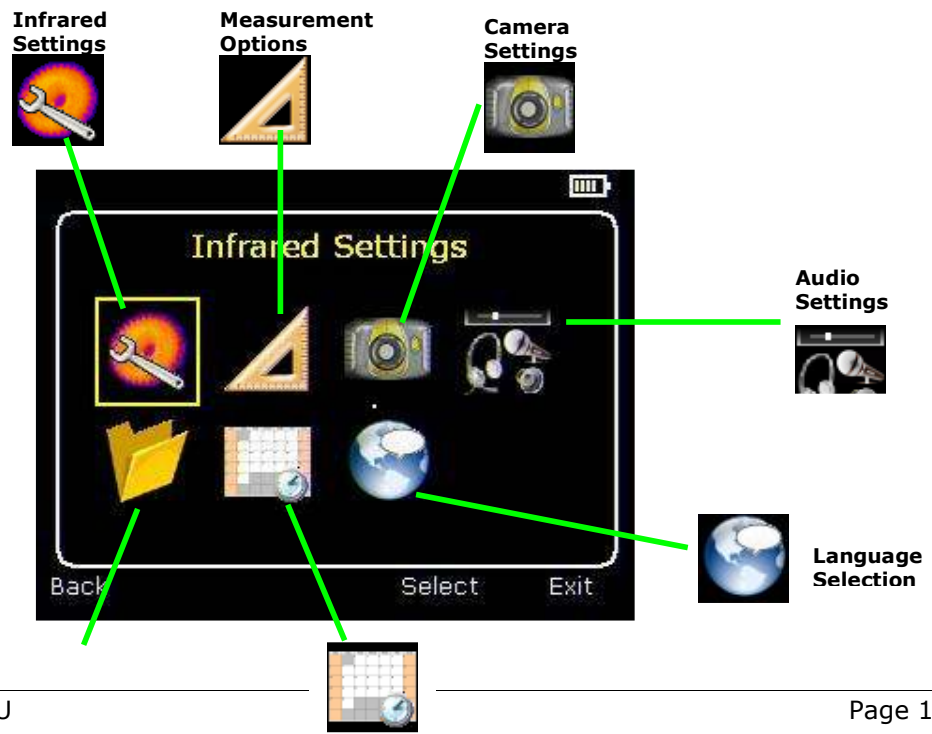
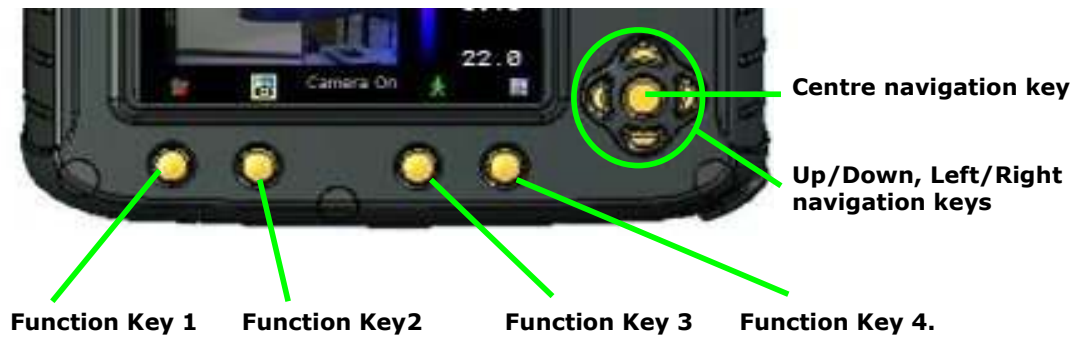
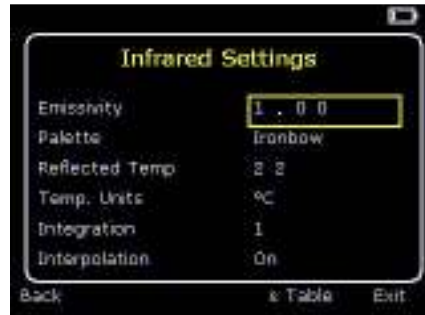










Image
BrowserDate & Time
Settings

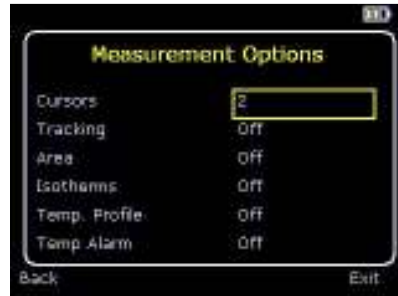
5.1. Infrared Settings



- ◆ Emissivity
Set emissivity value between 0.10 and 1.00 for measuring temperature.
Pressing Function Key 3 (ε Table) gives a table of emissivity values of common materials from which a selection can be made.
- ◆ Palette
Display image using different colour palettes.

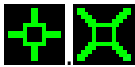
1. Ironbow		5. High Contrast	
2. Rainbow		6. Rainbow 16	
3. Isotherm Style		7. Black Hot	
4. Hot Metal		8. White Hot	
- ◆ Reflected Temp
Usually set to the ambient temperature, or room temperature.
Applies only when emissivity of less than 1 is selected.
- ◆ Temp units
Choose between °C and °F.
- ◆ Integration
Choose an integration period from 1 (fast) to 9 (slow).
This determines the trade off between display speed and noise.
- ◆ Interpolation
Choose Off or On.
This shows or hides the thermal image pixelation.

5.2. Measurement Options



This menu enables the selection of options for temperature measurements. The symbols shown below indicate the icons shown for Function Key 1 when the various options are selected.

- ◆ Cursors



Choose between one or two cursors. When two cursors are chosen, the temperatures at both cursors and the temperature difference between them will be displayed. Use Function Key 1 to select one of the cursors, which can then be moved around on the display by the navigation buttons.

- ◆ Tracking



Select "High", "Low", or "High & Low" in order to track and measure the hottest point, the coldest point, or both hottest and coldest points in the image.

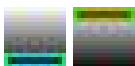
- ◆ Area



If this option is turned on, the highest, lowest, and average temperatures within the designated area will be displayed. Three different area size boxes can be selected via Function Key 1

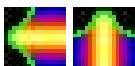
Note that the above three items are mutually exclusive, i.e. when one is turned on the other two are disabled.

- ◆ Isotherms



Select "High", "Low", or "High & Low" in order to highlight areas of the scene with temperatures within one or two temperature bands. The temperature bands are adjustable by means of Function Key 1 and the navigation keys.

- ◆ Temp. Profile



Select "Horizontal" or "Vertical" to enable a histogram of temperature values along a horizontal or vertical cross section to be displayed on the right hand side of the display. The position of the cross section is indicated by small arrows at the left and right or top and bottom of the image and can be adjusted by means of Function Key 1 and the navigation buttons.


- ◆ Temp alarms



Select "High", "Low", or "High & Low". Visual and audio alarms will be triggered if either cursor or a point within the designated area is higher or lower than a set temperature. The high and low set temperatures may be adjusted by means of Function Key 1 and the navigation keys.

5.3. Camera Settings



- ◆ LCD Brightness
Select from 1 (low) to 9 (high) to control the screen brightness to save battery power.
- ◆ Caption Mode
Select "On" to enable the addition of a text caption when saving an image. Options will then be displayed when saving an image, to be selected by means of Function Key 2 and Function Key 3.
- ◆ Auto Off
Select "5 Mins", "10 Mins", "20 Mins" to allow the camera to switch itself off after a defined period of inactivity in order to save power.
- ◆ Camera Reset
Select with Function Key 3  to restore the factory settings.

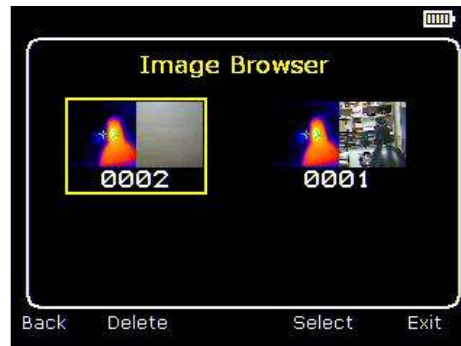
5.4. Audio Settings



- ◆ Imager Sounds
Select "Off" to mute all audible outputs.
- ◆ Voice Annotation
Select "Session" to add a voice message at the start of a set of images (A session ends when the imager is switched off).
Select "Individual" to add a voice message to each saved image.
Select "Ind. and session" to add a common voice message at the start of a set of images and add additional comments for each image.
- ◆ Voice Playback
Select "Speaker" or "Headset" for the desired method of audible outputs.
- ◆ Volume
Select the volume of the audible outputs from 0 to 9.

If session is selected the voice message is recorded in the audio settings by pressing Function Key 3. Pressing Function Key 3 again stops recording. Function Key 2 can be used to play back the recorded message. Function Key 3 can be used to re-record if necessary.

5.5 Image Browser



The saved images are shown on the screen with the most recently saved image first.

Select the desired image by means of the navigation Keys.



To display the selected image press Function Key 3.

To delete the selected image press Function Key 2, to confirm deletion press Function Key 3.

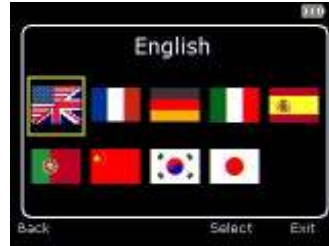
When a stored image is displayed, press Function Key 3 to return to live imaging.


5.6. Date & Time Settings



- a) Use the left/right keys  to navigate in this menu; the item that can be changed is highlighted in red. In the picture above the day (DD) 14 is highlighted.
- b) Use the up/down keys  to change the value.

5.7. Language Selection



a) When the language is highlighted (shown by a yellow box around it) press Function Key 3  to select.



French



German



Italian



Spanish



Portuguese



Chinese



Korean











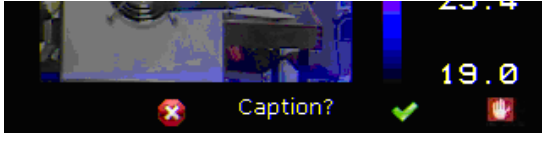



Japanese

6. Adding Captions when Saving Images

6.1 Voice message

When saving an image with Individual Voice Annotation turned on, there is the option of saving a voice message with each image. The screen shots below describe the procedure:

 <p>a) Do you wish to attach a voice message to this saved image? Function Key 2 for no . Function Key 3 for yes .</p>	 <p>b) Start voice recording?  Function Key 3 for yes.</p>
 <p>c) Stop Recording Function Key 3  to stop.</p>	 <p>d) Option to Re-record the voice message? Function Key 2 for Yes  Function Key 3 for No .</p>
 <p>e) If caption mode is selected this option will now be offered to save a text caption. (See 6.2)</p>	 <p>f) Image with voice message is being saved.</p>

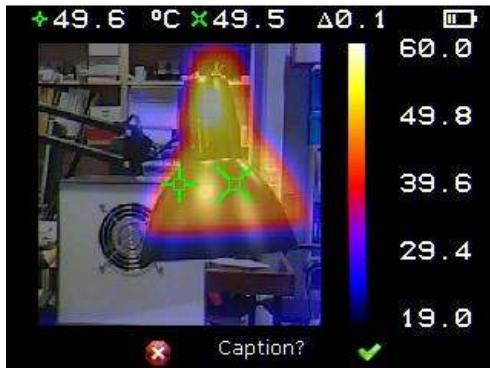
Playback



The voice recording can be played back when viewing saved images in the browser.

Note: *The abort icon  on Function Key4. Pressing Function Key 4 at any stage aborts the saving process.*





6.2 Text Captions

When saving an image with Caption Mode turned on, there is the option of attaching a text caption to each image. The screen shots below describe the procedure:



- a) Do you wish to attach a text caption message to this image?
 Function Key 2 for No  Function Key 3 for Yes 



1. Use the up/down arrow keys  to cycle through letters and numbers until the one required appears. The available symbols are:
 ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789
2. Use the left/right arrow keys  to move to the next space and repeat the above step until the caption is completed.
3. Press Function Key 2  to clear the whole message.
4. Press Function Key 4  to exit and save the image and caption.

◆ **Captions cannot be viewed with the saved images in the browser due to display constraints. The captions can be viewed using the PC software.**








Appendix

A1. Emissivity Look up tables.









0.98 = Carbon filed surface	0.79 = Steel oxidized
0.98 = Frost crystals	0.78 = Copper heavily oxidized
0.98 = Human skin	0.77 = Cotton cloth
0.97 = Slate	0.76 = Sand
0.96 = Water distilled	0.75 = Unglazed silica
0.96 = Ice smooth	0.74 = Oxidized iron at 100°C
0.95 = Soil saturated with water	0.73 = Coating No. C20A
0.95 = Carbon candle soot	0.72 = Basalt
0.94 = Glass polished plate	0.71 = Graphitized carbon at 500°C
0.94 = Paint, oil	0.70 = Red Rust
0.93 = Brick red	0.69 = Iron sheet heavily rusted
0.93 = Paper white bond	0.67 = Water
0.92 = Concrete	0.66 = Black Loam
0.92 = Soil dry	0.65 = White cement
0.91 = Plaster rough coat	0.64 = Iron cast oxidized
0.90 = Wood planed oak	0.63 = Lead oxidized at 1100°F
0.90 = Glazed earthenware	0.62 = Zirconia on inconel
0.89 = Snow, granular	0.61 = Cu-Zn, brass oxidized
0.88 = Glazed Silica	0.58 = Inconel sheet at 760°C
0.87 = Cuprous Oxide at 38°C	0.56 = Smooth white marble
0.86 = Emery Corundum	0.55 = Al anodized chromic acid
0.85 = Snow	0.21 = Iron cast polished
0.85 = Stainless oxidized at 800°C	0.20 = Brass rubbed 80 grit emery
0.84 = Oxidized Iron at 500°C	0.16 = Stainless steel 18-8 buffed
0.83 = Cuprous Oxide at 260°C	0.09 = Aluminum as received
0.82 = Snow, fine particles	0.07 = Steel polished
0.81 = Brass, unoxidized	0.05 = Aluminum polished sheet
0.80 = Glass, convex D	0.05 = Copper polished
	0.03 = Brass highly polished

A2. Full Icon list

Function Key One

 Cursor one.	 Isotherm low.
 Cursor two.	 Profile horizontal.
 Alignment.	 Profile vertical.
 Tracking.	 Alarm high.
 Area.	 Alarm low.
 Isotherm high.	 Playback.


Function Key Two

 Camera off.	 Light off.
 Camera on.	 Light on.
 Auto temperature range.	 No.
 Manual temperature range.	 Yes.









Function Key Three

 Live.	 No.
 Freeze.	 Yes.

Function Key Four

 Menus.	 Abort.
--	--

Other Icons

 Level Down.	 Span Out.
 Level Up.	 Span In.
 Level Maximum.	 Span Maximum.
 Level Minimum.	 Span Minimum.



#61-844EU



No Memory Card.

A3. Technical Specification

Performance

Temperature range:	-10°C to +350°C
Field of view (FOV):	20°x 20°
Spectral Response:	8µm to 12 µm
Sensitivity:	≤0.3°C @ 30°C
Detector:	47 x 47 pixel array
Frame rate:	8Hz
Focus Range:	0.5m to infinity

Image Storage

Number:	Up to 1000 images on SD card supplied
Medium:	Micro SD Card

Display

9 cm (3½") colour LCD with LED Backlight. 8 colour palettes. Blended or discrete thermal and visible images.

Laser Pointer

A built in Class 2 laser is supplied to highlight the centre of the thermal image. (Aligned at 2 meters or 6 feet)

Beam Divergence	<0.2mrad
Maximum Output	<1mW

Measurement

Temperature range:	-10°C to +350°C
Radiometry:	Two moveable temperature measurement cursors Temperature difference measurement
Emissivity Correction:	User selectable 0.10 to 1.00 in steps of 0.01 with reflected ambient temperature compensation
Accuracy:	The greater of ±2°C or ±2% of reading in °C

Imager Power Supply

Battery:	Lithium-ion field rechargeable.
Operation time:	Up to 6 hours continuous operation
AC operation:	AC adaptor supplied

Mechanical

Housing:	Impact Resistant Plastic with over-moulded soft plastic and detachable handle
Dimensions:	130mmx95mmx90mm (excluding handle)
Weight:	0.70kg
Mounting:	Handheld & tripod mounting 1/4" BSW

Settings and Controls

- On/Off soft power control
- User selectable span control
- User selectable level control
- Auto adjust span and level
- Laser trigger switch
- Readout in °C or °F
- User selectable image integration



-
- User selectable emissivity setting
 - User selectable reflected temperature
 - Two moveable temperature measurement cursors
 - Area analysis
 - X-Y profiles
 - Isotherms
 - Text annotation
 - Voice annotation
 - Image capture, time and date
 - Visual/audio alarm high and low

Optional Accessories

- 12V car charger
- Light shade.

Features

- Real-time image and temperature measurement display
- Visible/thermal/mixed image fusion (100%, 75%, 50%, 25%, 0%)
- Simple operation
- Multiple temperature measurement
- Image browser
- Battery Charge indicator
- Lightweight
- Laser Pointer
- Auto hot/cold seeker
- Languages

61-844EU Includes

HeatSeeker™ Thermal Imager incl. non-removable rechargeable batteries, Micro-SD card, removable handle, Power Supply, USB cable and carrying case including Quick Start Guide and CD with user manual and ThermalVision-PC software (Analysis and report writer)

Computer Requirements (for PC software)

PC: IBM compatible PC with a minimum of:
300MHz processor, MS Windows XP, VISTA, 128MB RAM
16-bit colour graphics with 1024x768 capability

Environment

Temp. operating range: -5°C to +45°C
Humidity: 10% to 90% non condensing
Temp. storage range: -20°C to +60°C
CE Mark (Europe)
IP rating: IP54
Operating temp for stated accuracy: 23 °C

Warranty – 2 years

Recommended Calibration Cycle – Every 2 years

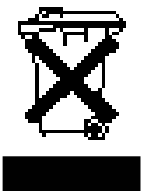
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Country laws vary, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country.



Dispose of waste electrical and electronic equipment.

In order to preserve, protect and improve the quality of environment, protect human health and utilise natural resources prudently and rationally, the user should return unserviceable product to relevant facilities in accordance with statutory regulations. The crossed-out wheeled bin indicates the product needs to be disposed separately and not as municipal waste.

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