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Part No. 6515

LASER[®]

Thermal Camera with UV Leak Detector

Instructions



recycle
When you have finished with
this bottle please recycle it



www.lasertools.co.uk

Guarantee

If this product fails through faulty materials or workmanship, contact our service department direct on: **+44 (0) 1926 818186**. Normal wear and tear are excluded as are consumable items and abuse.



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Introduction

This hand-held thermal imaging camera combines the function of a surface measuring infrared thermometer with real-time thermal imaging. The device translates thermal energy (heat) into visible light (on screen) to enable analysis of a particular object or area. Instead of just getting a number for the temperature, you get an on-screen image showing the temperature differences of a surface. This lets you see the heat so you know exactly where to target the measurement spot. Easily find unseen hot and cold spots for instant troubleshooting. The sensitive thermal imagery usefully shows component outlines to aid subsequent identification of problem areas or components.

Save images and data for documentation, and download your images quickly via the removable microSD card, or linked direct to a PC via the Mico USB port.

The Laser 6515 provides fast temperature readings without physically touching the object. It can safely measure hot, hazardous, or hard-to-reach surfaces without contaminating or damaging the object.

The Laser 6515 also features a UV leak detector function. For example, detecting leaks in cooling systems and air-conditioning systems when a suitable UV indicator dye is used.

Uses and applications are many and varied:

Automotive applications include: inspecting for irregular friction, overheating from mechanical misalignments, binding bearings or brake components, heated seat element malfunctions, checking vehicle heating and air-conditioning systems, engine radiator and thermostat function, exhaust manifolds, injector/cylinder malfunctions, diesel engine glow-plug malfunctions, high resistance in high-current wiring and hot electrical connection issues.

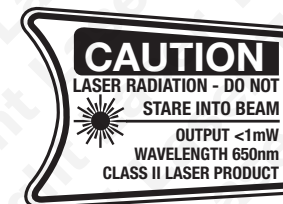
Building, electrical and maintenance applications include: missing, damaged or inadequate insulation, damp/moisture intrusion, radiators and under-floor heating, air-conditioning systems, identification of hot and cold pipework, heat loss from seals, frames or windows, high resistance in high-current wiring and hot electrical connection issues, etc.

Safety



CAUTION: Read all the safety information before using the product.

The 6515 uses a Class II laser that emits low levels of visible radiation which are safe for the skin but may not be safe for the eyes. **Class 2** lasers are limited to a maximum output power of 1 milliwatt (abbreviated to mW, one thousandth of a watt) and the beam must have a wavelength between 400 and 700 nm. A person receiving an eye exposure from a Class 2 laser beam, either accidentally or as a result of someone else's deliberate action (misuse) will be protected from injury by their own natural aversion response. This is a natural involuntary response that causes the individual to blink and avert their head thereby terminating the eye exposure. Repeated, deliberate exposure to the laser beam may not be safe.



- DO NOT look or stare into the laser beam as permanent eye damage could result.
- DO NOT direct the laser beam at any person's (or animal's) eyes as eye damage could result.
- BE AWARE that the reflections of the laser beam from mirrors or other shiny surfaces can be as hazardous as direct eye exposure.
- The user should be familiar with the 6515 Thermal Camera's operation, application, limitations and potential hazards. These instructions should be fully read and understood before using the 6515 Thermal Camera.

Controls

Refer to Figs 1, 2 and 3.

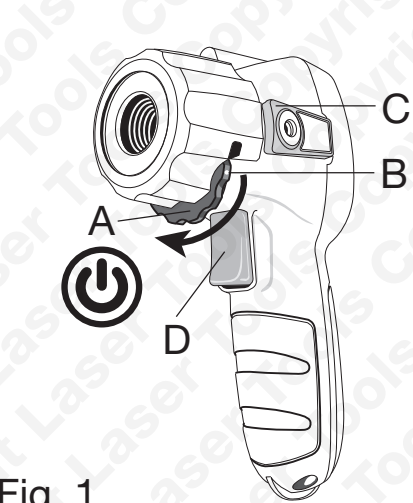


Fig. 1

Ref.	Description
A	Rotary ON/OFF switch + lens cover
B	ON indicator (light green spot)
C	Port cover
D	Trigger
E	MicroSD card port
F	Micro USB Port
G	Colour TFT Screen
H	Toggle control
I	Battery cover screw
J	Battery cover
K	Batteries (3 x AA 1.5V)

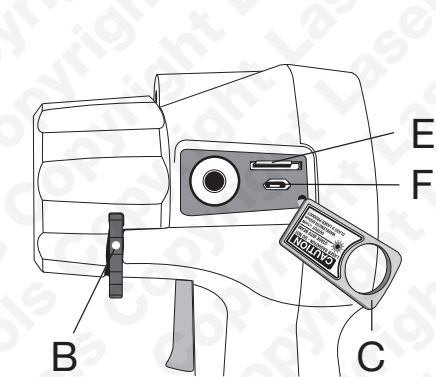


Fig. 2

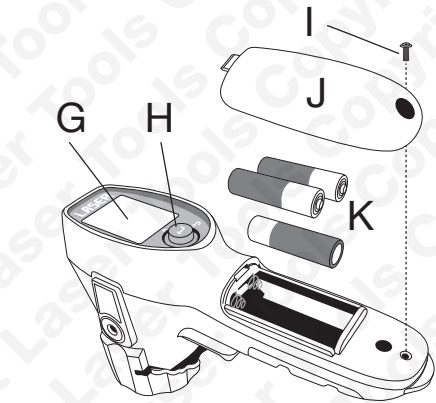


Fig. 3

Operation

- Install the batteries (refer to Fig. 3). Three AA 1.5V batteries are supplied.
- Switch device ON by turning the rotary ON/OFF switch **A** until it clicks to the ON position (light green indicator **B** visible).
- Once software has loaded (8-10 seconds), make yourself familiar with the toggle control **H**. The toggle control moves left, right, up and down to select the menu and scroll through associated functions, and is also pressed **in** to select and deselect various functions (see Fig. 4).

Using the Menu

Refer to Fig. 4

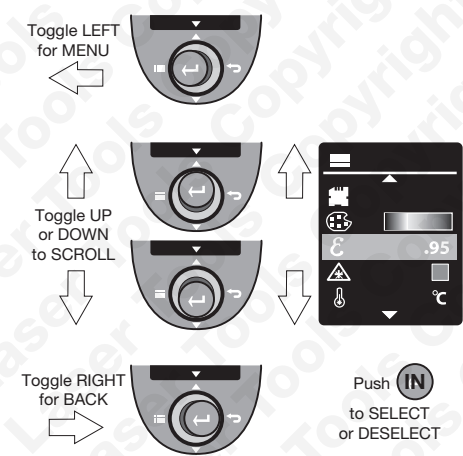


Fig. 4

Toggle **left** to enter the Menu, then toggle **up** and/or **down** to scroll through the available functions.

Using the Menu



Press toggle control **in** to select a function then, depending on the function, press **in** again to change the function parameters, switch the function on or off, or enter a sub-menu. (Refer to Fig. 5.)

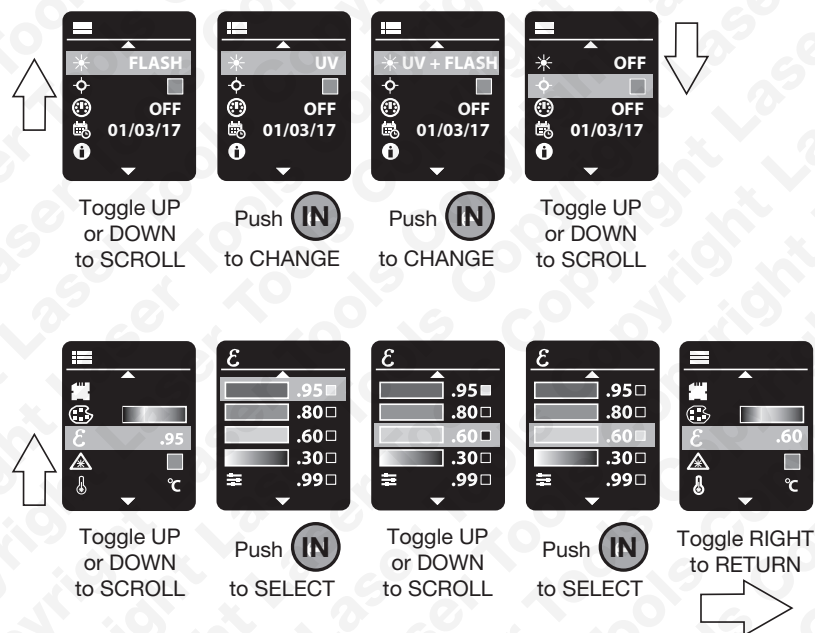


Fig. 5

Menu Functions



View saved images. These are saved on the microSD card provided (**E** in Fig. 2). From menu, press toggle control **in** to view image. Toggle up or down to access further images. This function does not work if the microSD card is not present. Toggle right to return to normal scanning function. Note: the microSD card port can accept up to 32GB cards.

Menu Functions



Colour Palette Selection. Press **in** to select one of three available colour palettes: Hot Iron, Rainbow and Greyscale. The Hot Iron palette is most commonly used, covering a useful range of hot/cold colour differentials; the Rainbow palette has the best thermal sensitivity for displaying the differences in temperature and the Greyscale palette is useful for identifying detail on an image. Once the desired palette has been selected, scroll up or down to save the selection.



Emissivity. Press **in** to enter the emissivity sub-menu (refer to Fig. 5). The amount of infrared energy radiated by an object depends on its emissivity and its temperature; the emissivity depends on the material and its surface characteristics. The emissivity of a material is the relative ability of its surface to emit energy by radiation. In general, the duller and blacker a material is, the closer its emissivity is to 1. The more reflective a material is, the lower its emissivity. For example, highly polished silver has an emissivity of around 0.02. Most (90% of typical application) organic materials and painted or oxidised surfaces have an emissivity of **0.95** and this is the pre-set default in the 6515 Thermal Camera. Refer to the Emissivity Chart below to choose a suitable emissivity figure for the chosen material being scanned. Once in the emissivity sub-menu scroll up or down to pick the desired figure; there are four pre-sets: .95, .80, .60 and .30. Press **in** to select, then toggle **right** to return to the main menu. Scroll down past the four pre-sets to the custom setting sub-menu; press **in** to activate menu, then toggle **up** or **down** to reach the desired emissivity value. Toggle **right** to set this value, then toggle **right** again to return to the main menu.



Laser crosshair indicator ON or OFF. Press **in** to select or deselect the laser crosshair function which pinpoints the target area.

Menu Functions



Temperature °C or °F. Press **in** to select, then scroll up or down to save the selection, or toggle right to save and return to the main menu.



FLASH and/or UV Functions. Press **in** to select FLASH (torch only), UV (UV only), UV + FLASH, or OFF (no UV or torch function). Then scroll up or down to save the selection, or toggle right to save and return to the scanning screen.



Screen crosshair indicator ON or OFF. Press **in** to select or deselect the screen crosshair function. **Note:** This does not disable the laser-projected crosshair (see section above) but disables the visual crosshair on the screen and on subsequently saved images.



Device Auto-OFF Timer. Press **in** to enter the timer sub-menu, then press **in** to select the desired time in minutes (1 minute to 10 minutes). Toggle right to return to the main menu. When not being used, but still switched on, the 6515 will switch itself off after the set time interval.



Time & Date Setting. Press **in** to enter the time & date setting sub-menu. Toggle **up** or **down** to select **time** or **date**. For example: press in again to set the time; then toggle **up** or **down** to reach the desired hour figure. Press **in** to save this figure and move to the minutes field. Set the minutes then toggle **right** to save. Toggle **down** to set the date in the same manner. When correct date has been entered, toggle **right** to save and return to main menu.

Menu Functions

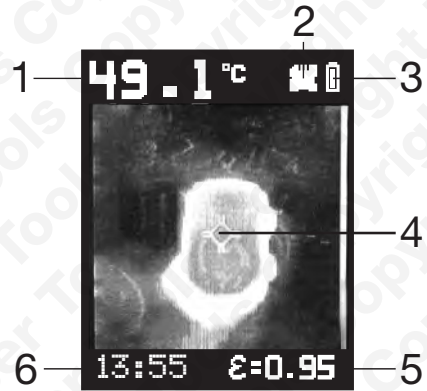


Information. Press **in** to display the current software version.

Nominal Surface Emissivity Examples

Material	Value	Material	Value
Default factory setting	0.95	Leather	0.78
Aluminium (oxidised)	0.30	Lead (oxidised)	0.50
Asbestos	0.95	Oil	0.94
Asphalt	0.95	Paint	0.93
Brass (oxidised)	0.50	Plastic (opaque)	0.95
Ceramic	0.95	Rubber	0.95
Concrete	0.95	Sand	0.90
Copper (oxidised)	0.60	Steel (oxidised)	0.80
Food (frozen)	0.90	Snow	0.83
Food (hot)	0.93	Skin (human)	0.98
Glass (plate)	0.85	Timber (oxidised)	0.90
Iron (oxidised)	0.70	Water	0.93
Ice	0.97	Wood (natural)	0.94

Measuring, Scanning and Saving Images



Ref.	Description
1	Temperature @ crosshair
2	microSD card present
3	Battery condition
4	Screen centre crosshair
5	Emissivity setting
6	Time

Fig. 6

- Switch device ON by turning the rotary ON/OFF switch **A** until it clicks to the ON position (light green indicator visible).
- Once software has loaded (8-10 seconds), press the trigger **D** to scan. Move the device until the desired hot (or cold) spot displays in the centre of the screen. If the **laser crosshair** is switched on, this will assist in positioning. The measured temperature of the centred hot or cold spot is displayed in the top left corner of the screen (**1** in Fig. 6).
- Releasing the trigger will freeze the image for approximately six seconds.

Measuring, Scanning and Saving Images

To save the image to the microSD card:

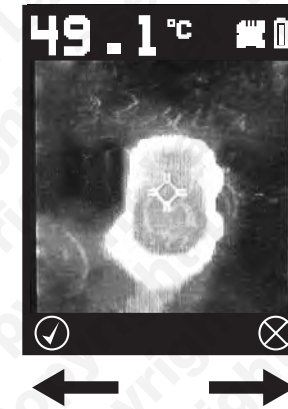


Fig. 7

- As over, move the device until the hot (or cold) spot displays in the centre of the screen.
- Release the trigger; to save the image toggle **left** to save, toggle **right** to discard (refer to Fig. 7).
- The image is saved in bitmap (.BMP) format and includes the measured temperature reading and emissivity setting information.
- Refer to **Menu functions: View saved Images** (page 6).

Connecting to a PC or Laptop

There are two methods of transferring the saved images to your PC or laptop; the microSD card can be inserted into a suitable port on the PC or laptop (usually via an SD card adaptor), or the 6515 Thermal Camera can be connected directly to the PC or laptop via a micro-USB to USB lead (not included).

To remove the microSD card:

- Refer to Fig. 2: pull away the rubber port cover **C** from the top left-hand corner and swing it down. (Do not pull from the right-hand side as this can damage the cover.)
- Press the microSD card (**E** in Fig. 2) **in** against the spring pressure to eject it.
- Insert the microSD card into a suitable adaptor and then insert this adaptor into the correct port in the PC or laptop.

Connecting to the PC or laptop via a micro-USB to USB lead:

- Switch the 6515 Thermal Camera off.
- Pull away the rubber port cover **C** from the top left-hand corner and swing it down. Plug the lead into the micro-USB port (**F** in Fig. 2), and connect the other end to a USB port on the PC or laptop.
- The PC or laptop will recognise the device; switch 6515 Thermal camera on.
- The camera will be recognised as a USB drive and the images can be accessed.

Note:

The micro-USB port (**F**) can also be used for future camera software updates.

UV Leak Detecting

With the UV function enabled (see **Menu Functions** on page 8), the 6515 can be used for leak detection in, for example, cooling systems and air-conditioning systems when a suitable UV indicator dye is used.

Specifications

Display:	1.77" colour TFT (128 x 160 pixels)
Temperature Range:	-30°C - 650°C (-22°F - 1202°F)
Accuracy: (calibrated at ambient temperature 23°C ± 2°C)	≥0°C: ±1.5°C or ±1.5% of reading, whichever is greater. (≥32°F: ±3°F or ±1.5% of reading, whichever is greater). ≥-10°C to <0°C: ±2°C (≥14°F to <32°F: ±4°F) <-10°C: ±3°C <14°F: ±6°F)
Response Time: (95%)	<125ms (95% of reading)
Spectral Response:	8 to 14 microns
Emissivity:	0.10 to 1.00
Temperature Coefficient:	±0.1°C/°C or ±0.1%/°C of reading, whichever is greater.
Repeatability: (% of reading)	± 8% of reading or ±1.0°C (2°F), whichever is greater.
Thermal Imaging Detector:	IR-EX™ Technology (Integrated IR Array Sensor with CMOS Sensor)
Imaging Resolution:	16,384 pixels (128 x 128 pixels - Interpolation)
Field of View: (H x W)	30°
Upper Sense Range:	650°C
Thermal Imaging Sensitivity:	150mK
Colour Palettes:	3: Hot Iron, Rainbow, Greyscale.
Saved Image Format:	Bitmap (.BMP)
Power	3 x 1.5V AA
Battery Life:	12 hours with laser and backlight on.
Weight:	300g
Size:	(185 x 54 x 104) mm (7.3 x 2.1 x 4.1) inches
Operating Temperature & Humidity:	0°C to 50°C (32°F to 122°F) 10% to 90% RH non-condensing @ 30°C (86°F)
Storage Temperature:	-20°C to 60°C (-4°F to 140°F), without batteries.
Operating Altitude:	2000 meters above mean sea level
Storage Altitude:	12,000 meters above mean sea level
Drop Proof:	1.2 meters (3.94 feet)
Vibration and Shock:	IEC 60068-2-6 2.5g, 10 to 200Hz, IEC 60068-2-27, 50g, 11ms.
EMC:	EN61326-1:2006 EN61326-2:2006

Standards & Agency Approval

Compliance:	IEC 61010-1; IEC 62472
Laser Safety (TG-301):	IEC 60825-1 Ed. 2 (2007); Class 2 Laser Product
Rated Wavelength:	650nm
Beam Divergence:	1mrad max
Maximum Output Power:	1mWmax

Disposal of device and batteries

As with most electronic devices, the thermal camera and/or the batteries must be disposed of in accordance with current local authority guidelines and regulations for electronic waste.

Precautions

- Read and understand the Class II Laser Safety Information section over.
- Keep the thermal camera clean and in good condition.
- Do not use solvents to clean the device.
- Store in case when not in use.
- Protect the thermal camera from high temperatures.
- Do not let the thermal camera get wet; do not use in damp or wet locations.
- Do not let children operate the thermal camera.
- Be aware of ambient temperature changes. For example, if the thermal camera is moved from location A (22° C) to location B (0° C), then wait for 30 minutes before using.
- Replace the batteries when the low battery indicator shows (3 in Fig. 6). Low voltage batteries can cause inaccurate measurement.
- Do not use the thermal camera if the casing is broken or cracked or there is other obvious damage.
- **Caution:** Emissivity — be aware that reflective objects can be **much** hotter than the displayed temperature measurement.
- Use the product only as specified in these instructions.



Safety First. Be Protected.