

# FLIR Ex-Series



## Easy-to-use point-and-shoot thermal imaging cameras

FLIR Ex-Series cameras are point-and-shoot thermal imaging cameras that give you access to a new dimension. A FLIR Ex-Series camera is an affordable replacement for a spot pyrometer. It provides a thermal image with temperature information on every pixel. The combined image storage of the new MSX<sup>®</sup>, thermal and visual formats make the cameras incomparably easy to use.



### Outstanding ease-of-use

The cameras are extremely easy to understand and operate, designed for entry-level users. The cameras are intuitive and come with a full manual.



### Fully automatic

FLIR Ex-Series produce instant, point-and-shoot JPEG thermal imagery with all required temperature data included.



### Focus free

The fixed focus free lens makes using the FLIR Ex-Series a snap.



### Compact and lightweight

FLIR Ex-Series weighs only 575 g, and is easy to store in a belt pouch.



### Visual camera

Visible light camera makes observing and inspecting faster and easier.



### Reporting and analysis software included

FLIR Tools software is available for free download for all Ex-Series users.



### Measure temperatures

Measures temperatures up to +250°C and detects temperature differences as small as 0.06°C (FLIR E6 / FLIR E8).



### Measurement functions

Spotmeter, area with max./min., color alarm; blue below / red above set temperature\*



### Picture-in-Picture (PiP)

With the PiP-function it is easy to locate areas of interest.\*



### Multi Spectral Dynamic Imaging (MSX<sup>®</sup>)

The innovative MSX<sup>®</sup> feature produces an image more rich in every detail than ever before.



### Multi Spectral Image storage

Combined image storage including MSX<sup>®</sup>, thermal, PiP and visual.

*\* Features dependant on camera model, please check technical specifications for more details.*



MSX<sup>®</sup> allows seeing even more detail on the thermal image.

## Save time and money in 3 steps:

- Detect hidden problems, make quick damage assessments and perform preventive inspections
- Identify energy losses and poor insulation
- Spot electrical faults before it is too late
- Produce instant thermal images of your findings
- Create reports, analyse and document your findings with the easy-to-use software



## FLIR Ex-Series camera model comparison

FLIR E4	FLIR E5	FLIR E6	FLIR E8
Thermal image quality: 80x60 pixels	Thermal image quality: 120x90 pixels	Thermal image quality: 160x120 pixels	Thermal image quality: 320x240 pixels
Thermal sensitivity: 0.15°C	Thermal sensitivity: 0.10°C	Thermal sensitivity: 0.06°C	Thermal sensitivity: 0.06°C
IR image, visual image, MSX <sup>®</sup> , thumbnail gallery	IR image, visual image, MSX <sup>®</sup> , picture in picture, thumbnail gallery	IR image, visual image, MSX <sup>®</sup> , picture in picture, thumbnail gallery	IR image, visual image, MSX <sup>®</sup> , picture in picture, thumbnail gallery
Center spot	Center spot, area with max./min.	Spotmeter, area with max./min., color alarm; blue below / red above set temperature	Spotmeter, area with max./min., color alarm; blue below / red above set temperature

# FLIR Ex-Series

## Technical specifications



\* After product registration on [www.flir.com](http://www.flir.com)

### Camera specific

	FLIR E4	FLIR E5	FLIR E6	FLIR E8
IR resolution	80 x 60 pixels	120 x 90 pixels	160 x 120 pixels	320 x 240 pixels
MSX resolution	320 x 240 pixels	320 x 240 pixels	320 x 240 pixels	320 x 240 pixels
Thermal sensitivity	0.15°C	0.10°C	0.06°C	0.06°C
Spatial resolution (IFOV)	10.3 mrad	6.9 mrad	5.2 mrad	2.6 mrad
Image modes	IR image, visual image, MSX®, thumbnail gallery	IR image, visual image, MSX®, picture in picture, thumbnail gallery	IR image, visual image, MSX®, picture in picture, thumbnail gallery	IR image, visual image, MSX®, picture in picture, thumbnail gallery
Color alarm	NA	NA	Blue below or red above set temperature	Blue below or red above set temperature

### General

<b>Imaging performance</b>	
Field of view/min focus distance	45° x 34° / 0.5 m
Spectral range	7.5 - 13 µm
Image Frequency	9 Hz
Focus	Focus free
Focal Plane Array (FPA)	Uncooled microbolometer
<b>Image Presentation</b>	
Display	3" 320 x 240 color LCD
Image adjustment	Automatic adjust/lock image
<b>Measurement</b>	
Object temperature range	-20°C to +250°C
Accuracy	±2 °C or ±2% of reading , for ambient temperature 10°C to 35°C and object temperature above + 0°C
<b>Measurement analysis</b>	
Spotmeter	Center spot
Emissivity correction	Variable from 0.1 to 1.0
Emissivity table	Emissivity table of predefined materials
Reflected apparent temperature correction	Automatic, based on input of reflected temperature
<b>Setup</b>	
Color palettes	Iron, Rainbow and Black/White
Set-up commands	Local adaptation of units, language, date and time formats
<b>Image Storage</b>	
Image storage capacity	Internal memory store at least 500 sets of images
Image storage mode	Simultaneous storage of images in IR, visual and MSX
File formats	Standard JPEG - 14 bit measurement data included
<b>Data communication interfaces</b>	
Interfaces	USB Micro: Data transfer to and from PC and Mac device
<b>Power system</b>	
Battery Type	Li-Ion rechargeable
Battery voltage	3.7 V
Battery operating time	Approx. 4 hours at +25°C ambient temperature and typical use
Charging system	Battery is charged inside the camera or in specific charger
Charging time	2.5 hours to 90% capacity in camera. 2 hours in charger
Power management	Automatic shutdown
AC operation	AC adapter, 90-260 VAC input, 5 VDC output to camera
<b>Environmental specifications</b>	
Operating temperature range	-15°C to +50°C
Storage temperature range	-40°C to +70°C
Humidity	IEC 60068-2-30/24 h 95% relative humidity
EMC	<ul style="list-style-type: none"> <li>• WEEE 2012/19/EC</li> <li>• RoHs 2011/65/EC</li> <li>• C-Tick</li> <li>• EN 61000-6-3</li> <li>• EN 61000-6-2</li> <li>• FCC 47 CFR Part 15 Class B</li> </ul>
Bump	25 g, IEC 60068-2-29
Vibration	2 g, IEC 60068-2-6
<b>Physical characteristics</b>	
Dimensions	244 x 95 x 140 mm
Weight	575 g, including battery
Shipping size	303 x 206 x 128 mm
Shipping weight	2.7 kg (FLIR E8: 2.95 kg)
<b>Standard package</b>	
FLIR thermal imaging camera, hard transport case, FLIR Tools™ download card, user documentation CD-ROM, printed documentation, battery (2x), power supply/charger with EU, UK, US and Australian plugs, USB cable, battery charger (FLIR E8 only)	

# FLIR Ex-Series



## Accessories

### Power



#### Car charger

[T198532]

This cable is used to power the thermal imaging camera from the 12V socket in a car.



#### Battery

[T198530]

Extra battery that will allow you to spend extra time in the field doing inspections.



#### Power supply incl. Multi-plugs

[T198534]

This power supply is used when powering the camera from the mains supply or to charge the batteries. It comes with different types of plugs.

### Accessories



#### Hard transport case

[T198528]

Rugged, watertight plastic shipping case. Holds all items securely. The case can be locked with padlocks and features a breather valve to prevent pressure build-up in airplane cargo holds.



#### Pouch

[T198529]

Soft pouch to protect the camera. Including shoulder strap.



#### Tool belt

[T911093]

Tool belt for thermal imaging camera pouches.



#### USB cable Std-A <-> Micro-B

[T198533]

USB cable to connect the camera.

# FLIR Exx-Series



## Accessories

### Power



#### Cigarette lighter adaptor kit, 12 V DC, 1.2 m

[1910490]

Can be used to power the camera from the cigarette lighter socket in a car.



#### Battery

[T197752]

High capacity battery for the camera.



#### Battery charger

[T198125]

Stand-alone 2-bay battery charger, including power supply with multi plugs.



#### Power supply incl. Multi-plugs

[T910814]

This power supply is used when powering the camera from the mains supply or to charge the batteries. It comes with different types of plugs.

# Software

## Turning tools into solutions

At FLIR Systems, we recognize that our job is to go beyond just producing the best possible thermal imaging camera systems. We are committed to enabling all users of our thermal imaging camera systems to work more efficiently and productively by providing them with the most professional camera-software combination.

Our team of committed specialists are constantly developing new, better and more user-friendly software packages to satisfy the most demanding thermal imaging professionals. All software allows fast, detailed and accurate analysis and evaluation of thermal inspections.



## FLIR Tools

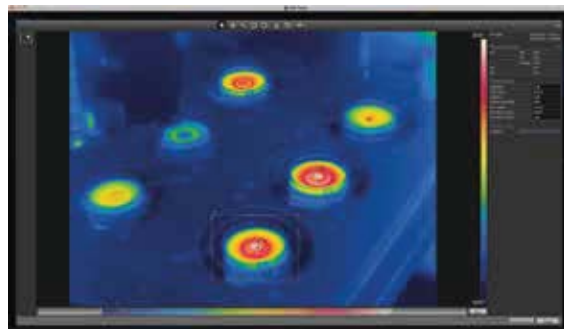
### Groundbreaking IR Reporting Software, included with every camera

Showing those who need to know the hidden problems that you've found with your FLIR thermal imager is just as important as uncovering them in the first place. And FLIR Tools is the powerful, free software solution to help you present those findings to decision makers most effectively.

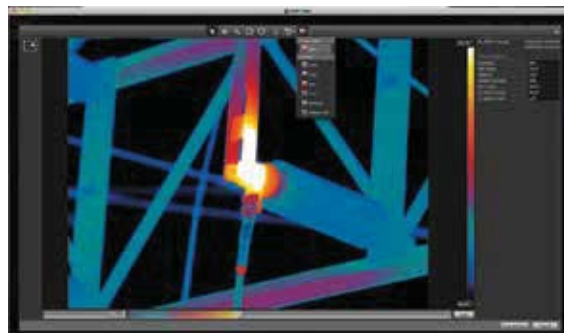
With the first IR software for Mac OS, FLIR Tools now gives both PC and Mac users the tools to quickly import, edit and analyze images, and turn them into convincing, professional PDF inspection reports, ready to print or email so you can get the "yes for repairs" fast.

#### Key features:

- Import, search, filter, and view FLIR JPEG images directly from your FLIR handheld camera via USB cable or by downloading from the imager's SD card
- Edit radiometric images to thermal tune level and span, change the palette, or adjust parameters such as emissivity, reflective temperature, and more
- Add measurement tools – spots, area boxes, circles, lines, Delta T
- Add text annotations and edit image descriptions
- Create professional PDF image sheets and reports
- Add headers, footers, and logos
- Create, import, edit and export templates
- Choose a report format: horizontal IR + DC or vertical IR + DC
- Edit MSX® images and "Sketch on IR/Visual" images
- Display stored compass and GPS information
- Perform updates on E-Series and T-Series cameras
- Switch between thermal, visual, MSX and PiP
- Export reports to print or email for easy sharing



FLIR Tools allows you to edit radiometric images. You can also add advanced measurement tools like spots, area boxes, circles, lines and Delta T.



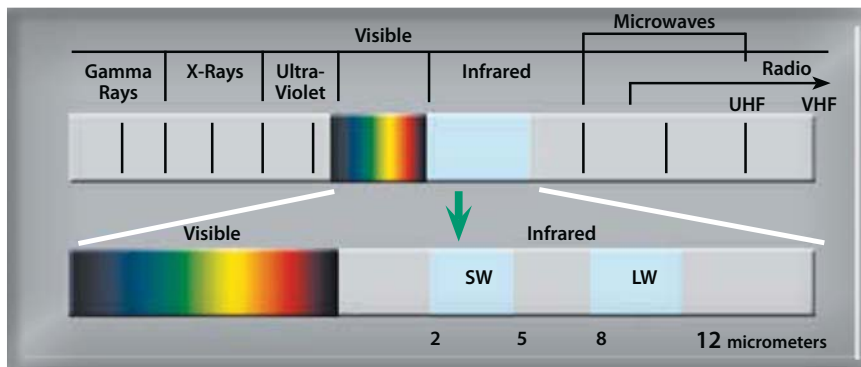
With FLIR tools you can adjust your images by changing the pallet and adjusting parameters such as emissivity, reflective temperature and more.

## INFRARED: more than meets the eye

### Infrared - part of the electro-magnetic spectrum

Our eyes are detectors that are designed to detect visible light (or visible radiation). There are other forms of light (or radiation) that we cannot see. The human eye can only see a very small part of the electromagnetic spectrum. At one end of the spectrum we cannot see ultraviolet light, while at the other end our eyes cannot see infrared. Infrared radiation lies between the visible and microwave portions of the electromagnetic spectrum. The primary source of infrared radiation is heat or thermal radiation.

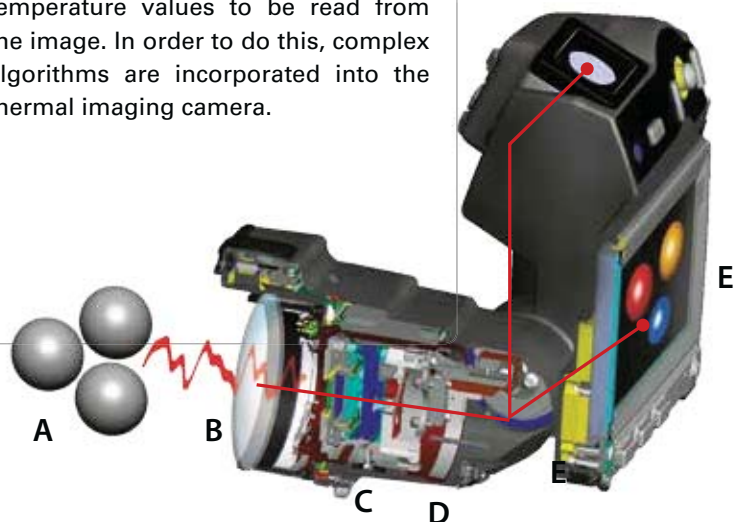
Any object that has a temperature above absolute zero (-273.15 degrees Celsius or 0 Kelvin) emits radiation in the infrared region. Even objects that we think of as being very cold, such as ice cubes, emit infrared radiation. We experience infrared radiation every day. The heat that we feel from sunlight, a fire or a radiator is all infrared. Although our eyes cannot see it, the nerves in our skin can feel it as heat. The warmer the object, the more infrared radiation it emits.



### The infrared camera

Infrared energy (A) coming from an object is focused by the optics (B) onto an infrared detector (C). The detector sends the information to sensor electronics (D) for image processing. The electronics translate the data coming from the detector into an image (E) that can be viewed in the viewfinder or on a standard video monitor or LCD screen.

Infrared thermography is the art of transforming an infrared image into a radiometric one, which allows temperature values to be read from the image. In order to do this, complex algorithms are incorporated into the thermal imaging camera.



## Why use thermal imaging cameras?

Why would you choose a FLIR thermal imaging camera? There are other technologies available to help you measure temperatures in a non-contact mode. Infrared thermometers for example.

### Infrared thermometers vs thermal imaging cameras

Infrared (IR) thermometers are reliable and very useful for single-spot temperature readings, but, for scanning large areas or components, it's easy to miss critical components that may be near failure and need repair.

A FLIR thermal imaging camera can scan entire motors, components, or panels at once - never missing any overheating hazards, no matter how small.

### Use thousands of infrared thermometers at the same time

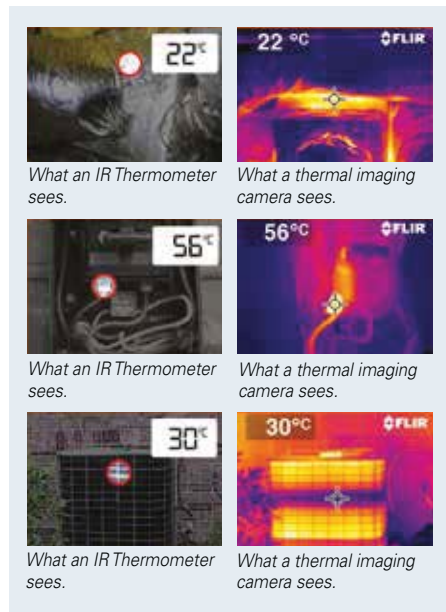
With an infrared thermometer you are able to measure the temperature at one single spot. FLIR thermal imaging cameras can measure temperatures on the entire image. The FLIR E4 has an image resolution of 80 x 60 pixels. This means that it is equal to using 4,800 IR thermometers at the same time. If we look at the FLIR T640, our top model, which has an image resolution of 640 x 480 pixels, this means 307,200 pixels or using 307,200 infrared thermometers at the same time.



IR thermometer, temperature measurement in one spot      FLIR E4, temperature in 4,800 spots

### Find problems faster and easier with extreme accuracy.

It's easy to miss critical problems with a spot IR thermometer. A FLIR thermal imaging camera scans entire components giving you instant diagnostic insights showing the full extent of problems.



# Multi Spectral Dynamic Imaging (MSX®)

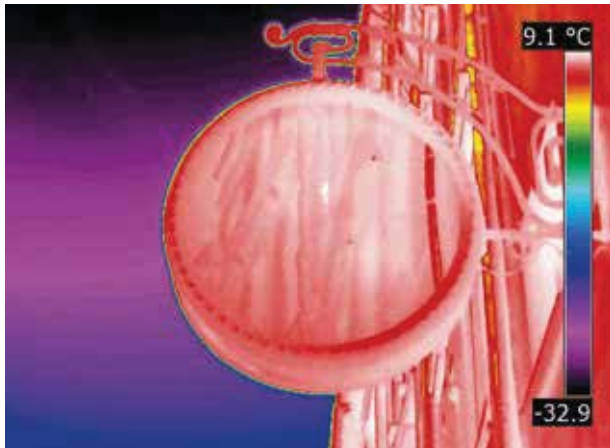
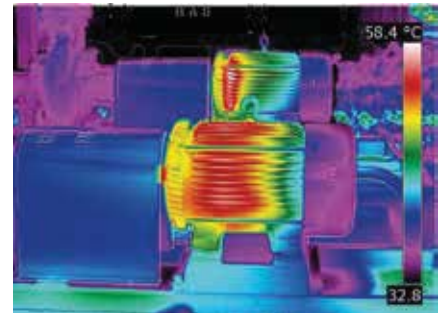
**A new, patent-pending technology based on FLIR's unique onboard processor that provides extraordinary thermal image details in real time.**

- Real-time thermal video enhanced with visible spectrum definition
- Exceptional thermal clarity to highlight exactly where the problem is
- Easier target identification without compromising temperature data
- Unrivalled image quality. No need for a separate digital photo for reports

Unlike traditional thermal fusion that inserts a thermal image into a visible-light picture, FLIR's new MSX® embosses digital camera detail onto thermal video and stills.

### Instant Results in real time:

- Sharper-looking thermal images
- Quicker target orientation
- Clutter-free reports
- Faster route to solutions



Thermal image without MSX®



Thermal image with MSX®: Although glass is not transparent for infrared radiation this thermal image clearly shows the hands of the clock behind the glass. This is only possible thanks to MSX® technology that overlays a part of the visual image over the thermal image. The result: thermal images on which the smallest details can be seen.

## Image sketch

This new FLIR Systems feature allows to clearly indicate on a saved image the location of the problem area both on the thermal and the visual image. This can be done immediately on the touch screen of the camera. The indications you make on the thermal image will automatically appear in your report.



## Continuous auto-focus

A solution with two digital cameras allows for continuous auto-focus of the thermal images. Continuous auto-focus makes the FLIR T640 the first fully automatic thermal imaging camera on the market.



## Thermal imaging cameras for electrical and mechanical applications

Thermal imaging has evolved into one of the most valuable diagnostic tools for electrical and mechanical applications. By detecting anomalies often invisible to the naked eye, thermography allows corrective action to be taken before costly system failures occur.

Thermal imaging cameras have become compact systems that look just like a normal video camera/digital camera, are easy to use and generate a real-time high-resolution image. Numerous industries worldwide have discovered the advantage of incorporating thermal imaging cameras in their maintenance programs.

### Applications

There are an endless number of applications for thermal imaging cameras in the Industrial area.



Poor connection and internal damage



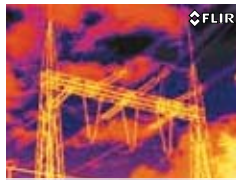
Internal fuse damage

### Low voltage inspections

Thermal imaging cameras are commonly used for electrical inspections. As electrical connections become loose, there is a resistance to current that can cause an increase in temperature. This can then cause components to fail, resulting in unplanned outages and injuries. In addition, the efficiency of an electrical grid becomes low prior to failure, thus energy is spent generating heat, causing unnecessary losses.



Incorrectly secured connection



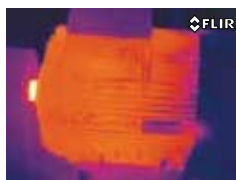
Inspection of high voltage power lines

### High voltage inspections

Power transformers are often checked with thermal imaging cameras. Temperatures of the cooling fins and the high voltage connections can be compared so that, if necessary, corrective action can be taken before real problems occur. Other high voltage installations that are checked with a thermal imaging camera include circuit breakers and switchers and high-voltage power lines. Potential problem areas will be clearly shown in the thermal image.



Suspected roller



Overheated motor

### Mechanical

In many industries, mechanical systems serve as the backbone of operations. Thermographic data can be an invaluable source of complimentary information to vibration studies in mechanical equipment monitoring.

District heating *Laboratories* Bench  
Manufacturing industries *Automot*  
Logistics & transportation  
Electrical companies *Service* *Elect*