



User's manual FLIR Screen EST

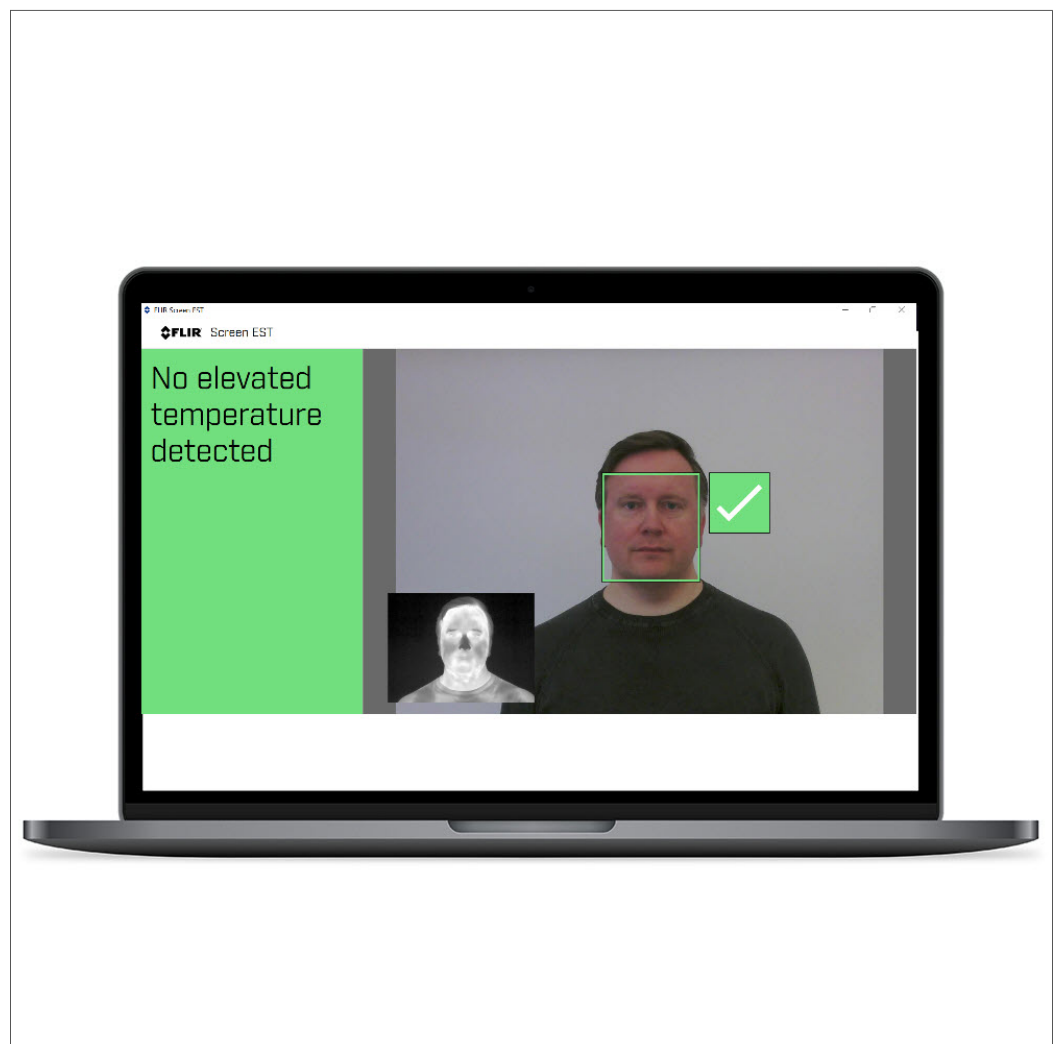


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1.1 Legal disclaimer

For warranty terms, refer to <https://www.flir.com/warranty>.

1.2 Quality assurance

The Quality Management System under which these products are developed and manufactured has been certified in accordance with the ISO 9001 standard.

FLIR Systems is committed to a policy of continuous development; therefore we reserve the right to make changes and improvements on any of the products without prior notice.

1.3 Usage statistics

FLIR Systems reserves the right to gather anonymous usage statistics to help maintain and improve the quality of our software and services.

1.4 Third-party licenses

Information about third-party licenses is available in the user interface of the product.

1.5 Copyright

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2.1 User-to-user forums

Exchange ideas, problems, and infrared solutions with fellow thermographers around the world in our user-to-user forums. To go to the forums, visit:

<http://forum.infraredtraining.com/>

2.2 Training

For training resources and courses, go to <http://www.flir.com/support-center/training>.

2.3 Documentation updates

Our manuals are updated several times per year, and we also issue product-critical notifications of changes on a regular basis.

To access the latest manuals, translations of manuals, and notifications, go to the Download tab at:

<http://support.flir.com>

In the download area you will also find the latest releases of manuals for our other products, as well as manuals for our historical and obsolete products.

2.4 Software updates

FLIR Systems regularly issues software updates. Depending on the software, the location of the update service will vary. Refer to the documentation of the software you are using.

2.5 Important note about this manual

FLIR Systems issues generic manuals that cover several software variants within a software suite.

This means that this manual may contain descriptions and explanations that do not apply to your software variant.

2.6 Note about authoritative versions

The authoritative version of this publication is English. In the event of divergences due to translation errors, the English text has precedence.

Any late changes are first implemented in English.

3.1 General

For customer help, visit:

<http://support.flir.com>

3.2 Submitting a question

To submit a question to the customer help team, you must be a registered user. It only takes a few minutes to register online. If you only want to search the knowledgebase for existing questions and answers, you do not need to be a registered user.

When you want to submit a question, make sure that you have the following information to hand:

- The camera model
- The camera serial number
- The communication protocol, or method, between the camera and your device (e.g., SD card reader, HDMI, Ethernet, USB, or FireWire)
- Device type (PC/Mac/iPhone/iPad/Android device, etc.)
- Version of any programs from FLIR Systems
- Full name, publication number, and revision number of the manual

3.3 Downloads

On the customer help site you can also download the following, when applicable for the product:

- Firmware updates for your infrared camera.
- Program updates for your PC/Mac software.
- Freeware and evaluation versions of PC/Mac software.
- User documentation for current, obsolete, and historical products.
- Mechanical drawings (in *.dxf and *.pdf format).
- CAD data models (in *.stp format).
- Application examples.
- Technical datasheets.

FLIR Screen EST is an application for detection of elevated skin temperatures using thermal cameras. By using face detection and automatic calibration of average skin temperatures, the application detects individuals that diverge with an elevated skin temperature.

The FLIR Screen EST application in combination with a FLIR thermal camera can be used in public spaces—such as airports, train terminals, office buildings, factories, warehouses, sport events, and concerts—to detect persons with elevated skin temperatures, which may indicate the presence of a fever.

No thermal cameras can detect or diagnose a virus infection, but the FLIR Screen EST application makes it possible to identify individuals with elevated skin temperatures (EST). If the temperature of the skin in key areas (especially the corner of the eye and forehead) is above average temperature, then the individual may be selected for further evaluation. We recommend that you set up a suitable process where medically trained personnel will do a full examination.

Key features:

- Detect elevated skin temperatures.
- Control a connected camera remotely.
- Set the alarms.
- View thermal images in live mode.
- Edit thermal images.
- Create image snapshots, on detection.
- Face detection with automatic scanning.
- Separated operator and user interfaces.
- Automatic calculation of average temperature.
- Configurable alarm levels.

This chapter describes the system requirements of the FLIR Screen EST application, and how the application is installed and activated.

5.1 System requirements

Operating system	Microsoft Windows 10 (32-bit and 64-bit)
Hardware requirements	RAM: Minimum 2 GB Disk space: Minimum 100 MB
Additional requirements	Screen resolution: Minimum 1024 x 768

5.2 Installation

Note To complete the installation, the computer may need to be restarted. Follow the instructions on the screen.

To install FLIR Screen EST application, follow this procedure:

1. Download the FLIR Screen EST installer package from <https://support.flir.com/screenest>.
2. To start the installation, double-click the executable installer file.
3. Read and accept the license terms and conditions.
4. Click *Install*.
5. Click *Finish*.
6. Run the application from the Start menu or by double-clicking the desktop icon.
7. The *FLIR Screen EST* dialog box appears where you can activate your license key.

5.3 License activation

The first time you start FLIR Screen EST you will be prompted to activate your license key. Do this either as an *Online activation* (internet access) or as an *Offline activation* (no internet access).

5.3.1 Online activation

1. Run the application from the Start menu or by double-clicking the desktop icon. The *FLIR Screen EST* dialog box appears.
2. Click *Online activation*.
3. In the *Software license key* text box, type the license key obtained at the time of purchase.
4. Type your contact details in the *Customer name* and *Customer e-mail* text boxes.
5. Click *Validate*.
6. The activation is completed and FLIR Screen EST is started.

5.3.2 Offline activation

1. Run the application from the Start menu or by double-clicking the desktop icon. The *FLIR Screen EST* dialog box appears.
2. Click *Offline activation - no internet access*.
3. Copy the information in the *Machine identifier* text box.
4. Go to the FLIR Screen EST product page, <https://support.flir.com/screenest>, and then click the link *Offline activation, FLIR Screen EST*.
5. Click the link of your preferred language.
6. Type your contact details in the *Name* and *E-mail* text boxes.
7. In the *Serial number* text box, type the license key obtained at the time of purchase.

8. In the *Machine code* text box, paste the *Machine identifier* that you copied in an earlier step (step 3 above).
9. Click *Request activation code*.
10. Copy the generated activation code that appears at the top of the page.
11. Return to the *FLIR Screen EST* dialog box, and then paste the copied code into the *Activation code* text box.
12. Click *Validate*.
13. The activation is completed and FLIR Screen EST is started.

The FLIR Screen EST application consists of two windows; the screening window and the operator window.

6.1 Screening window

The screening window is what the screened person sees.

The graphics in the screening window guide the person into the correct position for the screening and then displays a result. See also section 9 *Screening procedure*.

6.2 Operator window

The operator window is used by the operator for setup, control, and monitoring.

The operator window has two main pages, *Library* and *Live*, and a *Settings* page. There is also an image editor where you can edit thermal images.

6.2.1 Library page

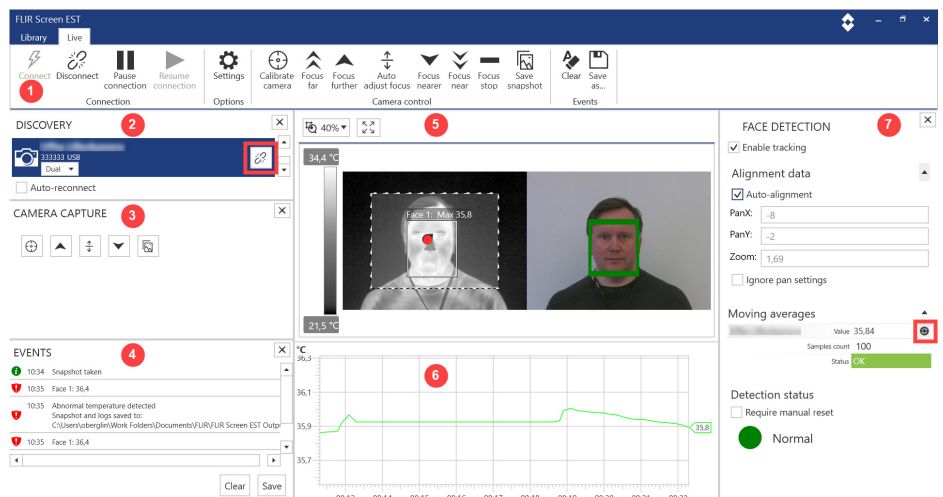
The *Library* page shows the File Explorer of the computer. Here you can navigate to any folder where you have saved your thermal images, both locally on your computer and on any connected network shares.

When you click a folder, the images in that folder are presented in the center pane. When you click an image in the center pane, information about that image is shown in the pane to the right.

6.2.2 Live page

The *Live* page is where you connect to and control the camera(s) and monitor the screening.

This image shows what the user interface looks like when a camera is connected.



1. Toobar

The toolbar includes options for connection and live streaming, settings, camera control, and events.

2. Discovery pane

This pane displays all available cameras. Use the button to the right to connect or disconnect to a camera. Use the dropdown menu to select the type of video stream.

3. Camera capture pane

This pane includes buttons for remote camera control.

4. Events pane

This pane displays all events and operations performed to a connected camera. Use the buttons to clear or save the logs to a file.

5. Camera image pane

The live image from the camera is displayed here. If available, both thermal and visual images are displayed. Use the buttons for zooming and full screen viewing.

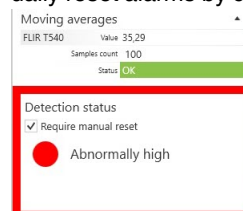
The system detects and measures the temperature of the hottest spot within the face detection box. The dotted box indicates the region-of-interest for the face detection box, meaning that the system will only look for faces within the dotted box. The size and position of the region-of-interest box can be changed by a drag-and-drop operation.

6. Live plot

The live plot is a time line of the average temperature.

7. Face detection pane

- When the *Enable tracking* check box is selected, the face detection and screening functionality is enabled. To temporarily stop the screening, clear the check box. When the check box is cleared, the screening window shows the idle mode graphics even when a person is in front of the camera.
- The alignment controls are used to align the thermal and visual images. For dual streaming cameras, the alignment is done automatically when the *Auto-alignment* check box is selected. When a separate camera is used for the visual image, the alignment must be done manually. To manually align the images, first clear the *Auto-alignment* check box and then align the images using the *PanX* and *PanY* controls.
- *Moving averages*: *Value* shows the current average. *Samples count* is the number of samples that are included in the average calculation. *Status* shows the sampling status; red when there are no samples, yellow when the system is collecting samples, green when the number of registered samples is according to the samples count setting. Hovering over the *Value* field displays a reset button. Click the button to reset the average value. After a reset, new samples have to be collected before screening is possible.
- *Detection status* shows the screening result; green when the temperature is normal, red when an elevated temperature is detected, grey when no result is available. When the *Required manual reset* check box is cleared, alarms are automatically reset when the screened person moves away from the camera. When the *Required manual reset* check box is selected, the operator must manually reset alarms by clicking inside the red *Detection status* box.



6.2.3 Settings page

You access the *Settings* page via the toolbar on the *Library* and *Live* pages. To exit the *Settings* page, click *Close* in the bottom right corner of the page.

6.2.3.1 Face detection

The system calculates a moving average temperature value based on a specified number of samples. Only temperatures between specified minimum and maximum temperatures are included in the average calculation. Persons with elevated temperatures do not contribute to the average calculation.

The system detects and measures the temperature of the hottest spot within a face detection box. An alarm will trigger when the measured temperature is higher than the alarm limit. The alarm limit is the sum of the average temperature and a specified allowed deviation.

The face detection box is looking for faces in a part of the image which is called the region-of-interest. The size and position of the region-of-interest can be changed on the *Live* page.

Moving average

- The *Default samples count* is the number of samples that are included in the average calculation.

Face detection status

- Only temperatures between the *Human skin maximum temperature* and *Human skin minimum temperature* will be included in the average calculation.
- The *Allowed deviation* value is the allowed deviation from the average temperature. If the measured temperature of the screened person is more than the sum of this value and the current moving average temperature, the elevated skin temperature alarm will trigger.

Alarm

- When the *Log alarms to output folder* check box is selected, an image and a data file (*.csv) will automatically be saved when the system detects an elevated temperature.
- When the *Use sound alarm* check box is selected, there will be a sound when an elevated temperature is detected.

Expected face size

- The system will only measure temperatures when the face covers a specified percentage of the so called region-of-interest. The *Minimum value* and *Maximum value* settings are used to specify this percentage. If the size of the region-of-interest is changed, which is done on the *Live* page, the *Minimum value* and *Maximum value* may have to be adjusted.

Custom status messages

- Use these fields to change the messages displayed in the screening window.

Message font size

- Select the font size for the messages displayed in the screening window.

Swap video streams (applicable to the screening window)

- Select the *Swap video streams* check box to change the display of the thermal and visual video streams.
- Select the *Mirror image horizontally* check box to mirror (flip) the image.
- Select the *Swap direction animations* check box to change the direction of the arrows that indicate that the person shall move closer or further back.

6.2.3.2 General

When the *Log alarms to output folder* check box on the *Face detection* tab is selected, an image and a data file (*.csv) is automatically saved when an elevated skin temperature is detected. It is also possible to save images manually on the *Live* page.

Save dual snapshot separately

- When this check box is cleared, a combined thermal and visual image will be saved.
- When this check box is selected, a separate visual image will be saved in addition to the combined thermal and visual image.

When the *Open output folder after saving snapshot* check box is selected, the folder with the saved image will open when the saving is completed.

To change the file path to the folder where you want to store saved images, click *Browse* and then select the folder.

6.2.3.3 Updates

Select how you want to manage updates of the FLIR Screen EST application.

When the *Check if updates are available* check box is selected, a check for updates will automatically be performed every time the application is started.

When the *Prompt to install updates* check box is selected, you will be asked to install any available updates. The *Check if updates are available* option must also be enabled.

If updates need to be downloaded via a proxy service, an additional configuration is needed. In the *Proxy settings* dialog box, select the *Use proxy* check box, and then enter the requested information. Click *OK* to save.

6.2.3.4 Theme

Change the theme of the user interface. Restart is required to apply new settings.

6.2.3.5 File explorer

Select if you want to show hidden files and folders previews.

6.2.3.6 Editor

Change the file path to the folder where your custom palettes are located.

6.2.3.7 Regional settings

Select the language and units to be used in the user interface. Restart is required to apply new settings.

6.2.4 Image editor

You open the image editor by double-clicking a thermal image on the *Library* page.

The image editor includes functions such as zooming, adding measurements, changing palettes, and controlling isotherms and the color distribution. For more information, see chapter 10.3 *Editing images*.

7.1 Screening station

The following equipment is needed at the screening station:

- A FLIR thermal camera.
- Optionally: A web camera.
- One or two displays.

If the thermal camera does not support dual streaming, a web camera is needed for the display of visual video. One display is needed for the screened person. It can also be useful to have a separate display for the operator, to monitor the screening.

For accurate screening results, the following is important:

- The thermal camera shall be mounted directly under the display used for the screened person.
- The optional web camera shall be mounted next to the thermal camera, as close as possible and with the camera lenses horizontally aligned.
- The distance between the camera and the screened person shall always be the same. The fixed distance shall be within the range 1–2 m (3–6 ft.).
- Make sure that the camera is not directed towards any glass windows or doors. The windows can cause reflections and incorrect temperature measurements.
- Make sure there are no heat sources near the screened person, including hot lamps, sun light, electrical equipment, etc. This can increase the skin temperature.
- Make sure that no beams from intensive energy sources go into the thermal camera. This includes devices that emit laser radiation, or the sun. The beams can have an unwanted effect on the accuracy of the camera. They can also cause damage to the camera.

7.2 Thermal camera settings

For safety reasons and for accurate screening results, some important settings are needed in the thermal camera. For detailed instructions, refer to the camera manual.

- If the thermal camera is equipped with a laser, the laser must be disabled. The laser beam can cause eye irritation.
- The camera temperature range shall be set to the temperature range that includes human skin temperatures; 30 to 45°C (86 to 113°F).
- Continuous autofocus shall be disabled. The focus shall be adjusted manually before starting the screening and must not be changed.

7.3 FLIR Screen EST settings

For most settings in the FLIR Screen EST application, it is recommended to use the default settings.

On the *Face detection* tab on the *Settings* page, these are the settings you may want to change:

Face detection status

- You may need to adjust the *Allowed deviation* setting. This value is the allowed deviation from the average temperature. If the measured temperature of the screened person is more than the sum of this value and the average temperature, the elevated skin temperature alarm will trigger.

Alarm

- Select the *Log alarms to output folder* check box to automatically save an image and a data file (*.csv) when the system detects an elevated temperature. By default, this check box is cleared and no images are saved automatically.
- Select the *Use sound alarm* check box to have a sound when an elevated temperature is detected.

Expected face size

- For accurate measurements, it is important that the screened person is at the correct distance from the camera. If the person is too far, the face will be too small for an accurate measurement. If the person is too close, the camera focus will be incorrect. To make sure the person is in a correct position, the system will only measure temperatures when the person's face covers a specified percentage of the so called region-of-interest. The *Minimum value* and *Maximum value* settings are used to specify this percentage.

Depending on factors such as the distance to the camera and the type of camera lens, you may have to adjust the *Minimum value* and *Maximum value* settings.

Note On the *Live* page you can change the size of the region-of-interest. If you do that, you may have to adjust the *Minimum value* and *Maximum value* settings.

Custom status messages

- You can change the text that the screened person sees on the display. You may, for example, want to add instructions for what the person shall do in case of a detected elevated temperature.

Swap video streams (applicable to the screening window)

- Select the *Swap video streams* check box to change the display of the thermal and visual video streams.
- Select the *Mirror image horizontally* check box to mirror (flip) the image.
- Select the *Swap direction animations* check box to change the direction of the arrows that indicate that the person shall move closer or further back.

7.4 Camera connection and setup

1. Turn on the thermal camera.
2. Connect the thermal camera to the computer using a USB cable.
3. In the operator window, go to the *Live* page.
4. In the *Discovery* pane, select the type of video stream:
 - If dual video streaming is supported by the camera, select *Dual*.
 - If radiometric but not dual video streaming is supported, select *Radiometric*.
 - If only non-radiometric video streaming is supported, select *Rgb*.
5. In the *Discovery* pane, click the button to the right to connect to the thermal camera.
6. If a web camera is used for the visual video, do the following:
 - 6.1. In the *Discovery* pane, click the button to the right to connect to the web camera.
 - 6.2. In the *Face detection* pane, use the alignment controls to align the thermal and visual images.
7. For accurate temperature measurements, it is very important that the thermal camera focus is correct. To adjust the focus, do the following:
 - 7.1. Make sure continuous autofocus is deactivated. Refer to the camera manual.
 - 7.2. Place a person in the correct position for screening.
 - 7.3. Adjust the focus on the face by using the focus controls on the *Live* page. You can also use the autofocus and/or manual focus functions in the camera. Refer to the camera manual.
8. The setup of the screening station is now completed.

Before the start of a new screening session, the operator must prepare the system. During the screening, no operator interaction is normally required.

To prepare the system for a new screening session, do the following:

1. Start the FLIR Screen EST application.
2. Turn on the camera(s).
3. In the *Discovery* pane on the operator window, click the button(s) to the right to connect to the camera(s).
4. Adjust the thermal camera focus, by doing the following:
 - 4.1. Place a person in the correct position for screening.
 - 4.2. Adjust the focus on the face by using the focus controls on the *Live* page. You can also use the autofocus and/or manual focus functions in the camera. Refer to the camera manual.
 - 4.3. Once the focus is correctly adjusted, make sure the focus is not changed.
5. The thermal camera should be allowed to warm up for about 20 minutes before performing the screening. This will help ensure the best results.
6. To build up an accurate reference temperature data series, screen a healthy person first before starting the public screening. The status indicator on the *Face detection* pane shows the number of registered samples. When the status indicator is green (OK), the system is ready for screening.

Note

- You can temporarily stop the screening by clearing the *Enable tracking* check box.
- To reset the average value, hover over the *Value* field to display the reset button and then click the button.

Screening procedure

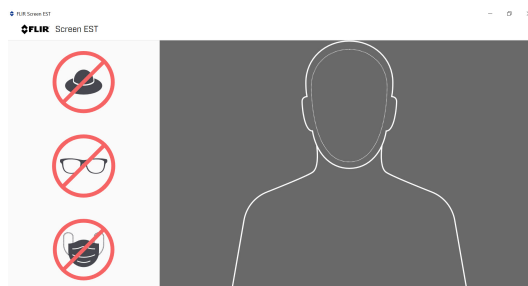
The screening of a person is performed in a few steps.

The person stands in front of the screening station, looking at the display. When the system detects a face, live video is shown on the display. The display graphics guide the person into the correct position for the screening. When the system has measured the temperature, the screening result is shown on the display.

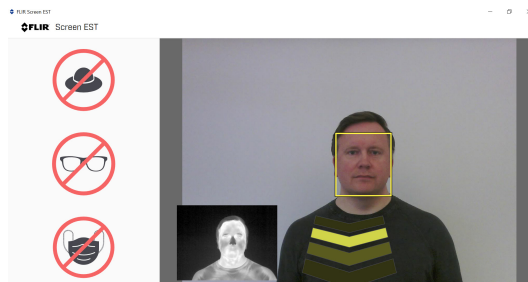
For those individuals where the system has indicated an elevated temperature, a process for further examination using other screening tools or diagnostic tests is required.

Screening procedure:

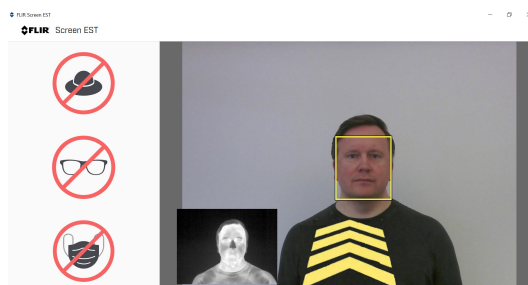
1. The system is in idle mode. Go forward and stand in front of the display. Make sure your eyes are not covered by eyeglasses, hair, or other items.



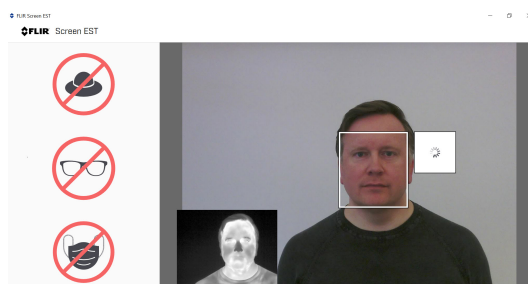
2. You are too far from the camera. Move closer.



3. You are too close to the camera. Move further back.

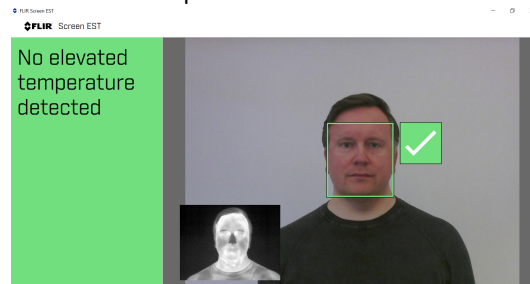


4. You are in a good position. The system is measuring and evaluating your temperature.

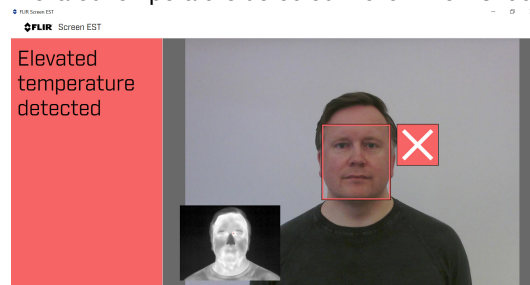


5. The screening is completed and your result is displayed.

No elevated temperature detected.



Elevated temperature detected. Follow the instructions from the staff.



The system can be set up to automatically save an image when an elevated skin temperature is detected. You can also save images manually. It is possible to edit saved images using the image editor.

10.1 Saving images automatically

To automatically save an image when an elevated skin temperature is detected, go to the *Face detection* tab on the *Settings* page and select the *Log alarms to output folder* check box. By default, this check box is cleared and no images are saved automatically.

10.2 Saving an image manually

To save an image, click the *Save snapshot* button on the toolbar or in the *Camera capture pane* on the *Live* page.

10.3 Editing images

You open the image editor by double-clicking a thermal image on the *Library* page.

10.3.1 Measurement tool

You can add one or more measurement tools to the image:

- spotmeter
- line
- rectangle
- ellipse

Each measurement tool has its own settings, which are shown in the *Measurements* section of the properties pane.

10.3.1.1 Add a measurement tool

1. In the image editor, click *Add measurement*, and then click the preferred tool.
2. Move the tool pointer over the image and into position.
Note that the pointer shows the temperature as it is moved around the image.
3. Click to place the tool in the image. Click to place the start point, drag the pointer to the desired size, and then click to place the end point.
4. Click the measurement tool.
The properties for the tool are shown in the *Measurements* section of the properties pane.

10.3.1.2 Edit a measurement tool

To move the measurement tool, follow this procedure:

1. In the image editor, move the pointer to the center of the measurement tool.
2. Click and hold the measurement tool, and then move it into position.

To change size of the measurement tool, follow this procedure:

1. In the image editor, move the pointer to the outline of the measurement tool.
2. Click and hold the outline, and move it to the desired size and shape.

10.3.1.3 Change the settings of a measurement tool

1. In the image editor, move the pointer to the center of the measurement tool.
2. Right-click the tool.
A dialog box appears with the current settings of the tool.

-
3. Change the settings by selecting and deselecting the available check boxes. Any changes are immediately presented in the *Measurements* section of the properties pane.
 4. To close the settings dialog box, click anywhere on the screen.

10.3.1.4 Delete a measurement tool

1. In the image editor, move the pointer to the measurement tool.
2. Right-click the tool, and then click *Remove*.

10.3.1.5 Export to a csv file

Use the *Export to csv* functionality to export detailed temperature information. The export will include the temperature values of every pixel within the selected measurement tool.

1. In the image editor, right-click the measurement tool.
A dialog box appears with the current settings of the tool.
2. Click *Export to csv*.
3. In the *Save as* dialog, browse to the folder where you want to store the exported file, and then click *Save*.

10.3.1.6 Use coverage

Use the *Coverage* functionality to see, as a percentage, the number of pixels in the image that are above or below a certain temperature.

1. In the image editor, right-click the measurement tool.
A dialog box appears with the current settings of the tool.
2. Click the *Use coverage* check box.
Use the *Above* and *Below* boxes to change the temperature. Any changes are immediately presented in the *Measurements* section of the properties pane.
3. To close the settings dialog box, click anywhere on the screen.

10.3.2 Palette

You can change the palette that is used to display the temperatures within an image. A different palette can make it easier to analyze the image.

The FLIR Screen EST application comes with a set of predefined palettes, but custom palettes can also be used.

10.3.2.1 Change the palette

1. In the image editor, click *Select palette*.
2. Select one of the predefined palettes, or click *From file* to select a custom palette.

10.3.2.2 Export the palette

1. In the image editor, click *Select palette*.
2. Click *Export palette*.
3. In the *Save as* dialog, browse to the folder where you want to store the exported palette, and then click *Save*.

10.3.3 Isotherms control

Use the isotherm tool to apply a contrasting color to all pixels with a temperature *Above* or *Below* a certain temperature, or within a certain temperature *Interval*.

Using isotherms is a good method to easily discover anomalies in a thermal image.

10.3.3.1 Add isotherm

1. In the image editor, click *Isotherms control*.

-
2. Select one of the following options:
 - Above
 - Interval
 - Below
 3. Select a color that will be applied to the areas that meet the temperature settings.
 4. In the *Isotherms* section of the properties pane, either set the temperature *Limit* for the *Above* and *Below* options, or set the *High* and *Low* temperatures for the *Interval* option.

10.3.4 Color distribution

Use the *Color distribution* option to change the distribution of colors in the image. A different color distribution can make it easier to analyze the image more thoroughly. The following distributions are available:

- Histogram equalization
The color information is distributed over the existing temperatures of the image. This method of distributing the information is especially successful when the image contains few peaks at very high temperature values.
- Signal linear
The color information in the image is distributed linearly with respect to the signal values of the pixels.
- Temperature linear
The color information in the image is distributed linearly with respect to the temperature values of the pixels.
- Digital Detail Enhancement (DDE)
The high-frequency content in the image, such as edges and corners, are enhanced to increase the visibility of details.

10.3.4.1 Change color distribution

1. In the image editor, click *Color distribution*.
2. Click one of the available color distributions.

10.3.5 Auto-adjust control

When you auto-adjust a thermal image, you adjust it for the best image brightness and contrast. This means that the color information is distributed over the existing temperatures of the image.

In some situations the image may contain very hot or very cold areas outside your area of interest. In such cases you might want to exclude those areas and use the color information only for the temperatures in your area of interest. You can do so by defining an auto-adjust region. Note that the defined regions will not be saved in the image.

10.3.5.1 Auto-adjust an image

1. In the image editor, click *Auto-adjust control*.
2. Select the *Enable scale auto-adjust* check box.

10.3.5.2 Define an auto-adjust region

1. In the image editor, click *Auto-adjust control*.
2. Select the *Enable scale auto-adjust using defined rectangle* check box.
A dotted rectangle is added to the image.
3. Move and change the size of the rectangle to suit your area of interest.
Note how the image changes as you make your changes.
4. To exit, click one of the icons in the bottom right corner of the rectangle:
 - To confirm the change, click the check mark.
 - To cancel the change, click the cross.

10.3.6 Crop an image

Use the *Crop image* option to trim the image.

10.3.6.1 Crop an image

1. In the image editor, click *Crop image*.
2. Select the *Show crop rectangle* check box.
A dotted rectangle is added to the center of the image.
3. Move the pointer to the outline of the rectangle—either one of the sides or one of the corners.
4. Click and hold the outline, and then change the shape of the rectangle to the desired size.
5. To exit, click one of the icons in the bottom right corner of the rectangle:
 - To confirm the change, click the check mark.
 - To cancel the change, click the cross.

10.3.6.2 Revert to the uncropped image

Note Provided that the cropped image has not been saved, it is possible to revert to the original image size.

1. In the image editor, click *Crop image*.
2. Click *Reset image*.

10.3.7 Image rotation

Use the *Image rotation* option to rotate the image.

10.3.7.1 Rotate an image

1. In the image editor, click *Image rotation*.
2. Move the *Image rotation* slider to rotate the image to the desired angle, or click one of the available predefined angles.
As an alternative, type the desired angle in the *Angle* text box.

10.3.8 Zoom

Use the mouse scroll button to zoom in or out the selected image.

10.3.9 Show a profile plot

The plot shows the temperature profile along a drawn measurement line in the image.

1. In the image editor, click *Show profile plot*.
An empty plot is added under the image.
2. In the image editor, click *Add measurement*, and then click *Line*.
3. In the image, draw a measurement line of interest.
The plot now shows the temperature profile along the drawn measurement line.
4. If necessary, click the end points of the line and move them into new positions.
Note how the profile plot changes as you change the position of the line.
5. To change the temperature unit (Celsius, Fahrenheit, or Kelvin) or color of the plot, click *Settings* (the icon is located to the right of the plot).

Note To get extra help with profile plot editing, push the F1 button on the keyboard.



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