FevIR Scan 2

Skin Temperature Measurement System

Operation Manual
Part No - GC010006
August 2023 - Version 6.3

About this Manual
The Manual includes instructions for using and managing the product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons.

Please use this user manual under the guidance of professionals.

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Regulatory Information

1. FevIR Scan 2 skin temperature measurement system lacks FDA clearance, approval or authorization.
2. Skin temperature measurement from the FevIR Scan 2 skin temperature measurement system should not be solely or primarily relied upon to diagnose or exclude a diagnosis of COVID-19, or any other disease.
3. Elevated body temperature in the context of use should be confirmed with secondary evaluation methods (e.g., a non contact infrared thermometer (NCIT) or clinical grade contact thermometer).
4. Public health officials, through their experience with the device in the particular environment of use, should determine the significance of any fever or elevated temperature based on the skin telethermographic temperature measurement.
5. The technology should only be used to view and measure the temperature of one person at a time directly facing the camera.
6. Visible thermal patterns are only intended for locating the points from which to extract the thermal measurement.
7. For use instructions, device performance specifications and the methodology, and frequency of any calibration needed to maintain the labelled specifications please refer to the documentation and labelling supplied with the system.
8. The equipment should be used with the Blackbody reference source supplied with the system. This is used to compensate for thermal drift and is vital to obtain an accurate temperature measurement.
9. Automatic face detection software will identify the region of interest for temperature measurement (typically the inner canthus (inner angle of the eye socket)). Software compensation is available to correlate with oral, otic, temple temperature.
10. The system should be set up in accordance with the directions provided in this Manual with particular regard to environmental factors such as screening background, ambient temperature and humidity, and airflow and camera and blackbody temperature reference location within the field of view.
11. It is important that subjects are provided with sufficient time to equilibrate to the environment where scanning is performed, particularly following entry from external extremes of environmental temperature.
12. FevIR Scan 2 skin temperature measurement system must be operated in accordance with ISO/TR 13154: 2017: Medical electrical equipment — Deployment, implementation and operational guidelines for identifying febrile humans using a screening thermograph. See IMPORTANT NOTICE on page 13.

Labelling Description Reference.

QSG = Quick Start Guide

Ref	Description	Section
1	Device performance specifications and the methodology and frequency of any calibration needed to maintain the labelled specifications.	4.2, 11, 16.1.1
2	How to use the thermal image to make a temperature measurement to within the stated device accuracy	1, 2, 4.3 and QSG
3	A description and purpose of the blackbody reference source (used for thermal drift compensation) and its importance in obtaining an accurate temperature assessment.	1, 6 and QSG
4	The reference body site used for temperature estimation, including any calibration or correction needed to estimate the temperature at that location, and the accuracy of the measurement at the reference site (e.g., oral, tympanic membrane).	1, 2, 4.3, 7.1, 8.1.1, 16.1.1
5	How different environmental and system setup factors can affect the measurement, including the body site chosen for measurement, the condition of the screening site (e.g., screening background, ambient temperature and humidity, airflow).	2, 5, 7.1 and ISO standards 2.1
6	Different factors to consider in the design of the facility protocol (e.g., installation, viewing angle, blackbody temperature reference source).	5, ISO standards 2.1 and QSG
7	The installation procedures and qualification testing that should be performed during installation or when imaging equipment is being relocated.	1, 2, 5 and QSG
8	The appropriate imaging distance based on the spatial resolution and performance of the camera.	2, 16.1.1 and QSG

FCC Information
Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
FCC Compliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
FCC Conditions
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
• This device may not cause harmful interference.
• This device must accept any interference received, including interference that may cause undesired operation.

EU Conformity Statement

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the EMC Directive 2014/30/EU, the RoHS Directive 2011/65/EU.

2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info

2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info

Symbol Conventions
The symbols that may be found in this document are defined as follows.

Symbol	Description
 WARNING	Indicates a hazardous situation which, if not avoided, will or could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
 NOTE	Provides additional information to emphasize or supplement important points of the main text.

Safety Instructions

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss.

Laws and Regulations

- Use of the product must be in strict compliance with the local electrical safety regulations.

Transportation and Storage

- Keep the device in original or similar packaging while transporting it.
- Keep all wrappers after unpacking them for future use. In case of any failure occurred, you need to return the device to the factory with the original wrapper. Transportation without the original wrapper may result in damage on the device and the company shall not take any responsibilities.
- Do not drop the product or subject it to physical shock. Keep the device away from magnetic interference.
- Storage and transportation environmental conditions; 0-50°C (32-122°F), relative humidity <90% and atmospheric pressure 700-1100 millibars (mbar).

Power Supply

- Only use the power adapters which are provided with the system.
- To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.
- Make sure the plug is properly connected to the power socket.

- DO NOT connect multiple devices to one power adapter, to avoid over-heating or fire hazards caused by overload.

Battery

- Improper use or replacement of the battery may result in explosion hazard. Replace with the same or equivalent type only. Dispose of used batteries in conformance with the instructions provided by the battery manufacturer.
- Do not charge other battery types with the supplied charger. Confirm there is no flammable material within 2 m of the charger during charging.
- For long-term storage of the battery, make sure it is fully charged every half year to ensure the battery quality. Otherwise, damage may occur.
- DO NOT place the battery near heating or fire source. Avoid direct sunlight.
- DO NOT swallow the battery to avoid poisoning and chemical burns.
- DO NOT place the battery in the reach of children.

Operating Environment

- The system must only be operated indoors.
- DO NOT expose the system to extremely hot, cold, dusty, corrosive, saline-alkali, or damp environments. Make sure the running environment meets the requirement of the device. An environmental temperature between 20-24°C (68-75°F), relative humidity between 10-50% and atmospheric pressure between 700-1100 mbar are recommended for optimum system performance.
- This system can only be safely used in the region below 3000 meters above the sea level.
- Avoid equipment installation on vibratory surface or places subject to shock (neglect may cause equipment damage).
- DO NOT aim the lens of the camera at the sun or any other bright light.
- DO NOT position the system so that access to disconnection of the power supplies is impeded.

Maintenance

- If the product does not work properly, please contact your point of sale or Thermoteknix. Thermoteknix shall not assume any responsibility for problems caused by unauthorized repair or maintenance.
- Any unauthorised modification to the system will void the warranty and risks personal injury.
- The system requires annual recalibration, please contact Thermoteknix to arrange service.

Emergency

- If smoke, odour, or noise are emitted from the device, immediately turn off the power, unplug the power cable, and contact Thermoteknix.

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1 FevIR Scan 2 product information

FevIR Scan 2 is a telethermography system intended to perform initial skin temperature measurement of any part of the body for triage use. The system is able to measure the skin temperature of the face and in particular, the temperature of the inner canthus of the eye, or forehead which correlate with, but are typically 1˚C (1.6˚F) below body core temperature. The detection of an elevated body temperature measurement must be confirmed by the use of a secondary evaluation method (e.g. clinical grade contact thermometer).

A normal skin temperature can occur in the presence of a fever (raised core temperature) and conversely, a raised skin temperature can occur in the absence of a fever. Absence of a raised skin temperature does not exclude a raised core temperature (fever).

A statement of measurement accuracy and calibration are included with each camera and thermal reference unit.

The temperature measurement uncertainty (accuracy), is less than 0.2˚C (0.36˚F) between the temperature range of 34-39˚C (93.2-102.2˚F).

An accurate, calibrated ThermaRef blackbody temperature reference, traceable to UK National Physical Laboratory (NPL), is included with each system to ensure accuracy of measurement and correction/compensation of any system drift. It must be installed in direct line of sight and in the same horizontal plane with the camera, visible within the thermal image at all times, equidistant to the subject inspection point and set to a temperature of 35˚C on its controller. The ThermaRef is continually monitored during system operation, see section 6.

The FevIR Camera and ThermaRef should be left for 15 minutes after power on to enable both units to stabilise before use. Both stability and drift are less than 0.2˚C (0.36˚F) within an 8-hour time frame as measured and tested by Thermoteknix Systems Ltd.

The FevIR Camera and ThermaRef have been tested and certified to CE and FCC certification including electrical safety and the Low Voltage directive.

The system is supplied with FevIR Scan software installed on a laptop computer. The software should be operated in accordance with the guidance in this manual.

2 IMPORTANT NOTICE

Temperature measurements made using the FevIR Scan system should not be solely or primarily relied upon to diagnose or exclude a diagnosis of COVID-19 or any other disease. An elevated body (core) temperature in the context of use must be confirmed by a suitably trained person with secondary evaluation methods (e.g. a clinical grade contact thermometer). FevIR Scan is for adjunctive use only.

The system must only be operated by personnel trained properly to operate the system and to ensure the environment the system is operated is in accordance with guidance to increase accuracy.

Operation of the system must only be carried out with the ThermaRef correctly installed and placed at the same distance from the camera as the subject inspection point to comply with system accuracy and performance. The inspection point is recommended to be between 1-3m (3.2-9.5ft) from the camera, based on the spatial resolution and performance of the camera. The system self-check and continuous self-test will show a "System Not Ready" on screen message and a warning triangle which will prevent system operation if the ThermaRef is not present, operational or within the field of view. Only one person at a time should be presented to the camera at the inspection point.

The FevIR Scan system has an automatically operated, self-calibrating, Non-Uniformity Correction (NUC) calibration shutter fitted in front of the thermal lens which, is immediately inside the front face of the camera. Do not insert any object into this opening or attempt to interfere with the operation of the shutter. Any interference to the operation of the shutter may cause permanent damage to the unit and render the Manufacturer's Warranty invalid.

The FevIR Camera and the ThermaRef must be recalibrated annually from the last date of calibration. This date is shown on the certificates supplied with the equipment. Please contact Thermoteknix for assistance.

The equipment must be set up for subject inspection in a temperature controlled indoor environment. The location should be free from draughts, heater or air conditioning ducts, reflective surfaces, direct sunlight and away from doorways. An environmental temperature between 20-24°C (68-75°F), relative humidity between 10-50% and atmospheric pressure between 700-1100 millibars (mbar) are recommended for optimum system performance.

Instructions for arranging the FevIR Camera, ThermaRef and screening distance are detailed in this manual and should be observed. It is important that the subject screening point is aligned with the location of the ThermaRef blackbody to ensure both are at the same distance from the camera (1–3m, 3.2–9.5ft).
In the event that the equipment must be moved from one location to another, close down the software on the computer first, then power off each item individually, disconnect all cables and return them safely to the heavy-duty transport case provided with the system. When relocating the system, the new installation and procedure must be carried out as per section 5.

2.1 INDICATIONS FOR USE

The FevIR Scan Series IR Camera(s), which provides capture of skin surface temperature of any part of the body, and the FevIR Scan software which provides visualization and reporting functionalities, are intended for use as an adjunct to other clinical diagnostic procedures in the diagnosis, quantifying, and screening of absolute and relative skin surface temperature.

System is applicable for ambulatory, adult subjects.

The environment of use is: public areas i.e. airport, foyers, places of employment and education.

NOTE: these guidelines are in accordance with ISO Standards

BS (EN) IEC 80601-2-59:2019

"Safety an essential performance of screening thermographs for human febrile temperature screening."

Users should operate the system in accordance with the operating guidelines to maintain full ISO compliance. These guidelines are given in:

PD ISO/TR 13154:2017

"Deployment, implementation and operational guidelines for identifying febrile humans using a screening thermograph."

3 Terminology

The FevIR Scan system employs two key components:

- FevIR Scan Camera FSD01; MC031843: referred to throughout this manual as the “FevIR Camera”.
- ThermaRef Blackbody 35B1; MC031856: referred to throughout this manual as the “ThermaRef”.

4 Introduction

4.1 Package checklist

You need to make sure that you have everything for your FevIR Scan system.

Check that you have:

1. FevIR Scan Camera FSD01, MC031843 (inc. visible & thermal) with power supply
2. USB cables (2m)
3. ThermaRef Blackbody 35B1 MC031856 with power supply
4. FevIR Scan software and manual on USB stick

Optional items:

1. Laptop
2. Tripods for FevIR Camera and ThermaRef
3. Ceiling mounts for FevIR Camera and ThermaRef
4. Customer supplied second HDMI monitor

4.2 FevIR Camera technology

Thermoteknix FevIR Scan systems are able to deliver an improved accuracy of ±0.2°C. This is accomplished by using a highly accurate blackbody temperature calibration reference source, the ThermaRef, permanently positioned within the field of view of the system camera.

When used in isolation, thermal measuring devices are extremely sensitive to difference in temperature, but even the very best are only accurate to ±2°C. This relatively low level of accuracy makes most devices wholly unsuitable for fever screening applications. Thermoteknix FevIR Scan systems are able to deliver an improved accuracy of ±0.2°C. This is accomplished by using a highly accurate temperature calibration reference source, the ThermaRef, permanently positioned within the field of view of the system camera. The ThermaRef emits a highly accurate and stable reference temperature of 35°C allowing the rest of the system to continually adjust to maintain accuracy. The level of accuracy achieved is such that it can highlight very small changes in skin temperature, making it essential as a fever screening tool. The ThermaRef is therefore an integral part of the screening system. As such, FevIR Scan software constantly monitors the relationship between the ThermaRef and the FevIR Camera. If the system becomes misaligned or some other issue is detected that could affect accuracy the system is inhibited (and a warning displayed) until the issue is resolved.

The Thermoteknix FevIR Scan software does not allow the system to be operated without the ThermaRef in the field of view at all times and with the ThermaRef measurement tool (yellow circle) correctly in position over the centre of the ThermaRef.

4.3 Skin temperature measurement

The detector in the thermal imager is sensitive to infrared radiation. Everything in the world radiates infrared according to natural laws and in proportion to temperature and emissivity. The emissivity is a measure of a body's radiation efficiency and is strongly influenced by surface texture. The detector measures the radiation after it has passed through the atmosphere and the FevIR Camera's objective lens. Both of these attenuate the signal and affect the efficiency of detecting the radiation. This affects the system's ability to measure temperature remotely.

Your thermal imager is based on the latest microbolometer technology. All thermal imagers in this class exhibit a degree of "pixel to pixel drift". This must be corrected using an internal paddle with an even (uniform) temperature which is situated in front of the detector. This is referred to as "Non Uniformity Correction" or "NUC".

Periodically the paddle is moved for a second or two into its calibration position in front of the lens and detector and the image will freeze during this period. No thermal imaging will take place while this occurs. The data obtained during the NUC operation is used to correct for non-uniformities caused by thermal drift due to the warming of components inside the FevIR Camera and substantially improves the image quality and is essential for accurate temperature measurement. You may notice that periodically the image freezes and you may hear a clicking sound. This is the NUC process operating automatically.

When the imager is first turned on the NUC process is frequent but as the imager approaches thermal equilibrium after 10 or 15 minutes then the period between NUCs extends.

The ThermaRef blackbody reference unit supplied with the FevIR Scan system provides a constant reference temperature within the scene and is viewed by the FevIR Camera. It has a known emissivity and its temperature is controlled very precisely. This is then used to remove calibration uncertainties and sensor instability to provide excellent absolute temperature measurement.

The emissivity of human skin has a value of 0.98 and is not affected by skin colour, and therefore has little person to person variation. The same is not true for variations in a person's skin temperature which is affected by weather, draughts, humidity, food, alcohol, metabolism and many individual factors throughout the day.

A person's core body temperature, in health, is much more stable and less affected by those factors and is used to identify the presence or absence of fever. While the normal variation in skin temperature can be as much as 10°C, normal core temperature typically varies by less than 2°C. Febrile conditions lead to an elevated core temperature. However, slight elevations in core temperature in one person may correspond to normal temperature in another. It should also be noted that cosmetics affect skin temperature measurement as does sweating which both lower the measured temperature value.

Accordingly, non-contact thermography using an infrared camera cannot guarantee that subjects detected with raised skin temperatures will have a fever (raised internal body/core temperature) nor that subjects with a fever will have a raised skin temperature.

This means that the system is a triage tool for remotely sensing surface skin temperature and temperature patterns. It is not a medical instrument and it is not a diagnostic tool for identifying the presence or incubation of any disease.

Operators should use FevIR Scan as an aid for selecting people for additional monitoring where febrile conditions can be confirmed or excluded by a trained/qualified person using a clinically approved thermometer.

 WARNING: do not modify this equipment without authorization of the manufacturer.

5 Site installation

Decide where you want to perform fever monitoring. You need to choose a place where your subjects can be directed to pass through the FevIR Camera field of view. It should be possible to move subjects identified by FevIR Camera who have triggered an alarm from the primary scanning zone to a private area for confirmation of core temperature by measurement by a trained person with a clinically approved thermometer and access to possible isolation.


CAUTION: DO NOT position the system so that access to disconnection of the power supplies is impeded.

The inspection site should be free of draughts, direct sunlight, or radiation from adjacent hot or cold surfaces. If vents or air conditioning outlets are nearby they should be screened by suitable non-reflective material. Glass will reflect thermal radiation so this should be covered with a non-reflective cloth. Ambient temperature should be maintained at a uniform temperature of 20-24°C (68-75°F), a relative humidity between 10-50% and in regions below 3000 meters above the sea level (700 - 1100 mbar). This is to avoid sudden changes of ambient conditions which can cause sweating or cutaneous vasodilation/vasoconstriction which affect skin temperature and uniformity.

The inspection site should be at a reasonable distance from the exterior of the building to avoid sudden changes in ambient temperature for subjects entering from a hot environment to a cold one or vice versa as this causes rapid changes in blood flow and changes in skin temperature.


NOTE: subjects should be requested to remove hats, headgear and eyewear before proceeding through the checkpoint.

Ropes or gating should be used to keep subjects within the primary scanning zone. Subjects should approach the monitoring point in single file and inspected individually as they face the camera, pausing momentarily for the operative to confirm the absence of an alarm temperature.

The ThermaRef needs to be at a distance of between 1-3m (3.2-9.5ft) from the FevIR Camera in the same horizontal plane. Subjects should be measured at the same distance as the ThermaRef, directly facing the camera. The system can be configured so that the face detection distance (and temperature measurement) can be constrained to the scanning location point, ensuring single subject scanning whereby subjects closer or further than that distance from the camera are ignored, see section 8.1.2.2.

It is recommended to make a mark on the floor that is the same distance from the FevIR Camera to the ThermaRef so that subjects can be checked at a consistent distance. It is essential that the ThermaRef is positioned in direct line of sight to the camera and placed such that people entering the scanning area do not impede the view of the blackbody reference.

To ensure that the ThermaRef is always in the FevIR Camera's field of view the ThermaRef can be mounted above the height of the subjects' heads using a Thermoteknix ceiling mount or a third-party product. The FevIR Camera must be aligned to view directly into the draught shield fixed to the front surface of the ThermaRef.

Alternatively, the ThermaRef can be table or tripod mounted with the direct line of sight roped off to prevent any person passing between the FevIR Camera and its direct view of the ThermaRef.

The ThermaRef is supplied with a DC power supply for connection to 110-240VAC mains power. It must be mounted in a location with a stable ambient temperature, free from draughts and direct sunlight. It is important to ensure that nothing obstructs the cooling fan located on the side of the device.

6 System setup

Setting the system up is straightforward. The laptop (when supplied with the system) has been pre-configured with the FevIR Scan monitoring software and your complete system has been connected and tested in the factory before shipping to you. Systems supplied without laptop are supplied with FevIR Scan software for installation on a USB memory stick. Installation instructions are supplied separately.


WARNING: to avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

Before the system can start monitoring, the ThermaRef measurement tool (yellow circle) must be repositioned so that it is entirely within the circular area of the ThermaRef, see section 7.1.

It is essential that the ThermaRef is mounted at a fixed location within the field of view of the thermal camera. The on-screen ThermaRef measurement tool (yellow circle) must also be aligned with the ThermaRef, as described in the Quick Start Guide. This is necessary to ensure that the FevIR Camera temperature measurement accuracy and stability are maintained at all times. A software function “Auto System Monitor” (available on the “Setup” menu) will check continuously that the FevIR Camera and ThermaRef are stable and that the ThermaRef measurement tool is correctly aligned with the ThermaRef. If either of these parameters are not met (e.g. if the ThermaRef or FevIR Camera have been accidentally moved), a warning triangle and message will be shown on screen and scanning will not be available. This message will be displayed during start-up. The maximum time to reach stability in an office environment is less than 20 minutes.

Installing (or re-installing) the software should not be necessary but is described later in this document. Software updates when available will be supplied with user instructions to step through the process.

The equipment should be turned on for approximately 20 minutes prior to use. The ThermaRef needs time to stabilise at the required temperature and reach thermal equilibrium. This ensures reliable and reproducible temperature measurement.

6.1 Introduction to the FevIR Scan software

To start the FevIR Scan software, double-click the desktop icon. The application will start and assuming the FevIR Camera is connected you will see visible and thermal pictures appearing on the screen. The software starts in operator mode, identified by the word “Operator” in the upper left corner of the screen.

(a) Temperaure palette bar
(b) System status
(c) “Operator” or “Setup” mode
(d) “Skin Temperature” or “Core Temperature” measurement
(e) Alarm enabled icon
(f) Face detection icon
(g) Gallery

6.1.1 Temperature palette bar

A temperature palette bar is located on the right-hand side of the image and illustrates the scale of colours used to display the thermal image. The bar is a typically graduated scale of either black (cold) through to white (hot), or a user selectable colour palette available for selection on the “Setup” menu, explained in section 8.4.5.

All temperatures measured by the system which are at or below the low point of the temperature scale are shown in black, or the bottom scale colour, similarly all temperature at the top or above the top scale value are shown in white, or the top scale colour. However, all temperatures above the Alarm threshold temperature, which in this case has been set to 99.5°F (37.5°C), to the hot upper temperatures are highlighted with a red isotherm to signify that the temperature represented has reached or exceeded an alarm condition.

6.1.2 System status

Underneath the readout temperature is the status display:

Blue for system ready

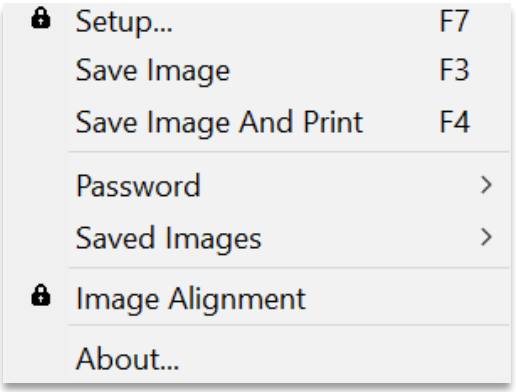
Green for subject detected - normal condition

Red for subject detected - alarm condition

A warning triangle is displayed if the system is not ready. This will be shown if the ThermaRef temperature is not yet at its operating temperature and stable, if the FevIR Camera is not ready, or if the view of the ThermaRef is obscured or interrupted.

6.1.3 Operator or Setup mode

This label identifies which user mode the system is operating in. The mode can be changed by pressing F7 (or “Fn F7”), or right mouse clicking within the image window. See section 6.2.



6.1.4 “Skin Temperature” or “Core Temperature” measurement

This mode is selectable in the “Measurement” tab, see section 8.1.

6.1.5 System status when alarm enabled

When an alarm is triggered an audible alert is played and a red box is drawn around the person’s face who has a temperature above the alarm threshold. This helps the monitoring staff to identify and isolate the potentially febrile subject for further tests.

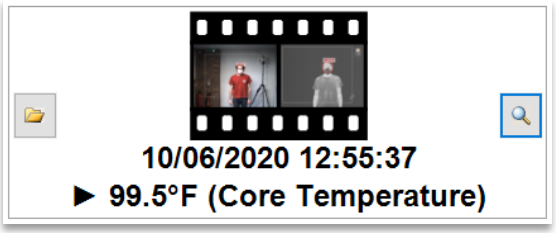
The alarm information is displayed at the top, and any temperatures on the thermal image measured above the alarm value will be coloured red. The actual temperature is shown in a red box adjacent to the subject’s face and will move with them as they move position within the scene.

Alarm text will also be overlaid on the thermal image, stating “Check subject with an approved thermometer”. Skin may be unusually hot for reasons other than a fever (see section 5). Core temperature must be measured to confirm a fever. This must be taken by a trained individual using a clinically approved thermometer, e.g. a tympanic membrane or oral temperature measuring thermometer.

When the measured temperature is below the alarm temperature it is displayed in a green font by default, this colour can be changed, see section 8.4.5.

6.1.6 Gallery

The software is typically set up to capture a still thermal and visible image when each alarm condition occurs. These are shown in the pair of thumbnail images in the lower part of the screen. The most recent images captured are shown. Warning text is not overlaid on the stored still images when they are recalled.



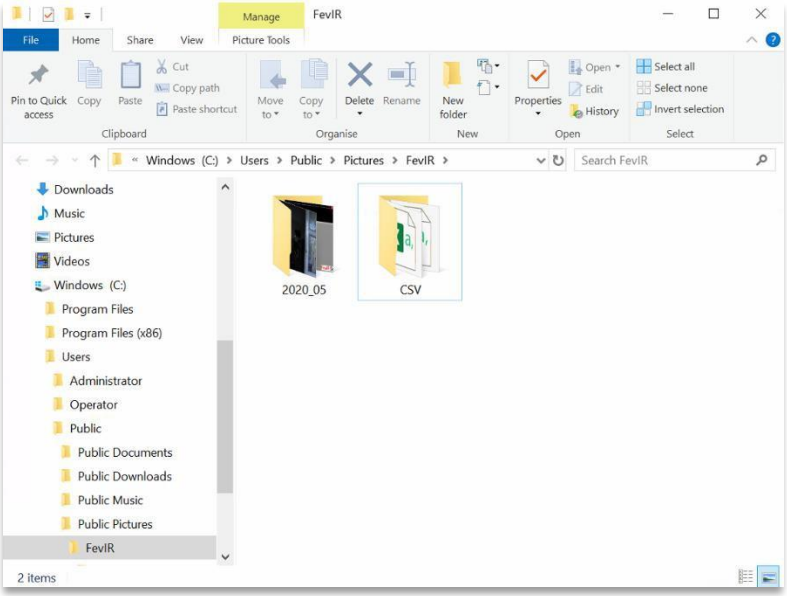
Selecting the magnifying glass icon opens a window showing one capture at a time.

To review previous alarm image captures, click on either the folder icon (on the left of the thumbnail images), or the magnifying glass icon (on the right). This will open a gallery window showing you the saved alarm images. Use the left and right arrow keys to scroll back or forwards to earlier/later alarms.

The top left and right arrows scroll through captures sequentially. The time, date and operating mode are also shown.

The right two icons allow image printing and saving for hard copy or digital storage. Images not specifically filed will be sequentially overwritten by new images after the image buffer is full (typically 20,000 images). Alternatively, user preferred saving and deletion strategies can be set (see “Saved Image Deletion Policy” on the “Recording” tab).

The folder icon opens the FevIR Scan image gallery, see next page.



This is more convenient if you need to review many images at a time, or search for a specific time and date record. Folders are generated on a per month basis. In addition, if you have enabled "CSV Alarm Data" (Comma Separated Variables) under the "Recording" tab you will also see a CSV folder. Two files are generated daily which log system events, see section 8.3.5.

Image files are automatically named according to the following protocol:

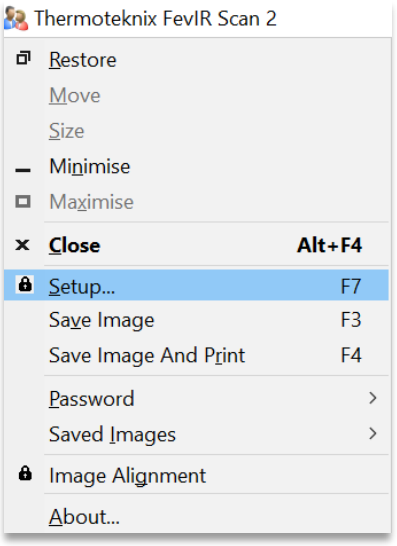
FevIR_2020-03-10_10-51-29_+0000_V.jpg

The date and time format identifies their order in time. The "+nnnn" indicates any time offset, and the "_V" indicates a visual image. "_I" indicates an infrared (thermal) image.

CSV filenames take the format "FevIR_yyyy_mm_dd" and have the .csv file extension.

6.2 Setup mode

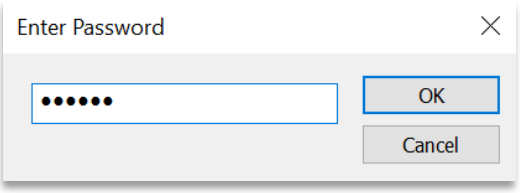
It is straightforward to set up the system using the dedicated “Setup” mode and the “Setup” menu. To access the menu, right click anywhere on the application or press F2 (or “Fn F2”). To display the “Setup” menu directly press F7 (or “Fn F7”). This shortcut is useful in full screen mode. See section 8 for further details on the “Setup” menu.

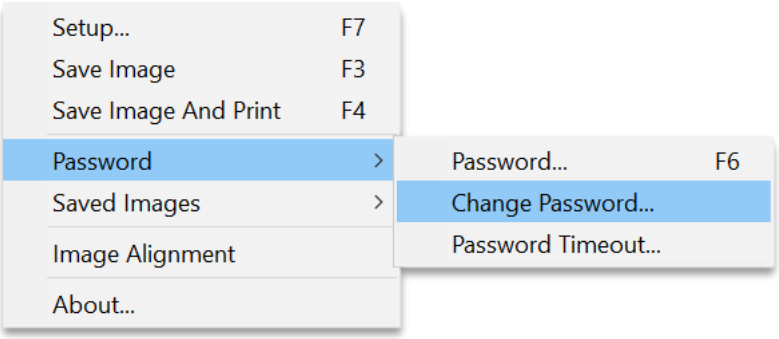


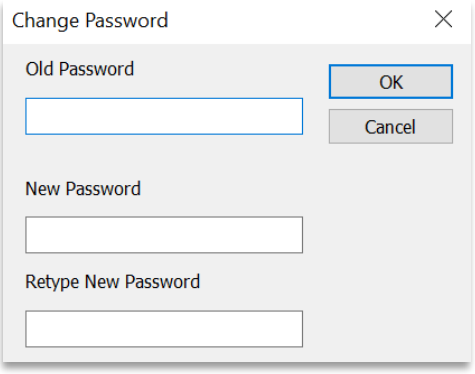
The system is designed to run without supervisor intervention once it has been setup correctly. To set the monitoring conditions, the operator first has to enter into “Setup” mode by entering the password. Once this has been correctly entered the “Setup” menu can be accessed by right clicking on the display.

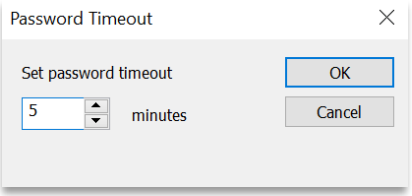
6.3 Password

FevIR Camera uses a password protection system to stop casual or unauthorised changes to the setup parameters. To enter the password press F6 (or “Fn F6”). The default password is 000000 (six zeroes) but this can be changed to a stronger and more secure password of your choice using the “Change Password” menu selection.









The password is hidden from view as it is entered by displaying a series of dots. This prevents accidental disclosure. There are just two password levels, “Operator” and “Setup”.
The Operator level does not allow access to the setup functionality but provides full system operation; The “Setup” password level is accessed by entering the correct password and the system will remain at this level in the absence of keystrokes for a pre-determined timeout period. The Password Timeout menu option allows this timeout period to be changed from the default period of 5 minutes. This feature prevents leaving the software inadvertently in the setup mode.

7 Defining the screen parameters

To ensure the correct operation of the system, the system operator must configure two regions of the display.

7.1 Defining the ThermaRef measurement tool

The first region is to locate the ThermaRef measurement tool over the centre of the ThermaRef. It is not important whether the ThermaRef is above or to the side of the active scanning area. Typically, this will depend on whether the unit is ceiling or floor mounted. It is essential that the FevIR Camera's view of the ThermaRef cannot be obscured by persons walking through the scanning area. The ThermaRef measurement tool is drawn in yellow and should be positioned so that it is entirely within the central heated area of the ThermaRef. This identifies the pixels that are at the calibration temperature of the ThermaRef and enables the system software combined with the FevIR Camera factory pre-calibration to ensure ± 0.2°C accurate temperature measurements.

The ThermaRef is set to a midscale value of 35.0°C (95.0°F) and should not be changed. Unlike the internal body temperature which is very carefully maintained by the body at 37.0°C (98.4°F), skin temperature is usually lower than internal body temperature and varies with many factors, but typically will also be raised in the presence of fever.

A common consideration is that head temperature is generally lower than core body temperature. The area around the inner aspect of the orbit of the eye (Canthic fold, adjacent to the tear duct) is served by a small artery which is just below the surface and provides a close approximation to core (inner) body temperature. This is a better indicator of core temperature than the forehead which can have a raised surface temperature due to many non-fever causes, whereas the temperature of the inner aspect of the orbit is much more closely related to core temperatures.

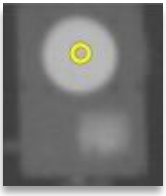
The system can be configured to display either the directly measured skin temperature or a computed core temperature based on a proprietary algorithm.

The ambient temperature will have a significant impact and you may want to change the “Alarm Temperature” to be higher or lower, depending on predominant skin temperature values obtained in the location of use.

7.1.1 Example ThermaRef measurement tool alignment

Yellow circle correctly sized and positioned

Yellow circle too big



Yellow circle too small

Yellow circle not aligned and too big

7.2 Defining the scanning area

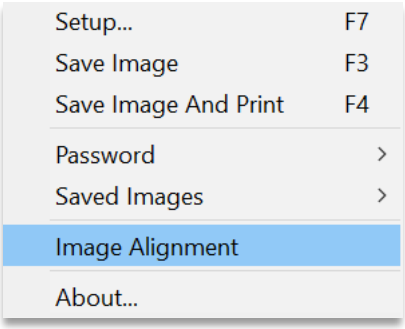
The second region to be defined is the active scanning area. This is outlined by a white rectangle and should be positioned to enclose the screen area in which target subjects will be monitored. A high temperature threshold (typically set at or above 45°C, 113°F) will exclude any objects at this temperature or above from the scanning area measurement. This is to ensure that any hot objects (lights, coffee cups, transformers etc.) do not trigger the monitoring region alarm.

Use the mouse cursor on the boundary to change the area size, hold the left mouse button down anywhere inside the area to move the whole area from place to place.

NOTE: the ThermaRef area can be included in the area to be scanned.

7.3 Aligning visible camera with the thermal image ("Image Alignment" F2)

The FevIR Scan 2 system displays temperature measurement details on both the visible and the thermal image. The temperature measurements are calculated in the thermal image and so the user will need to calibrate the spatial offset caused by parallax error between the two cameras for the details to be aligned. To carry out this calibration select F2 (or "Fn F2") and then "Image Alignment".



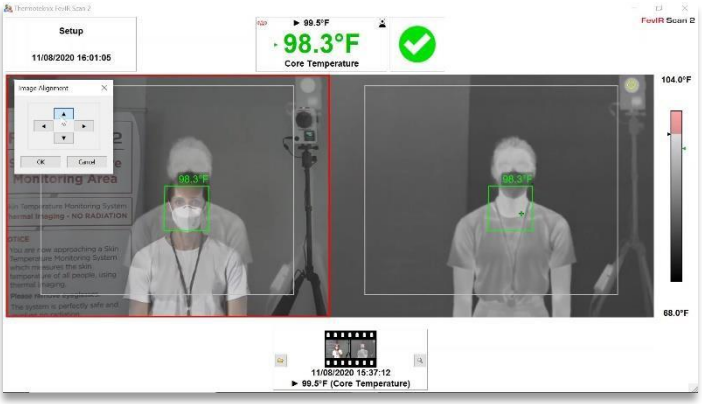
This will allow you to align the visible image to the fixed thermal image.

Ensure the thermal reference is visible and correctly positioned in the thermal image before starting alignment.

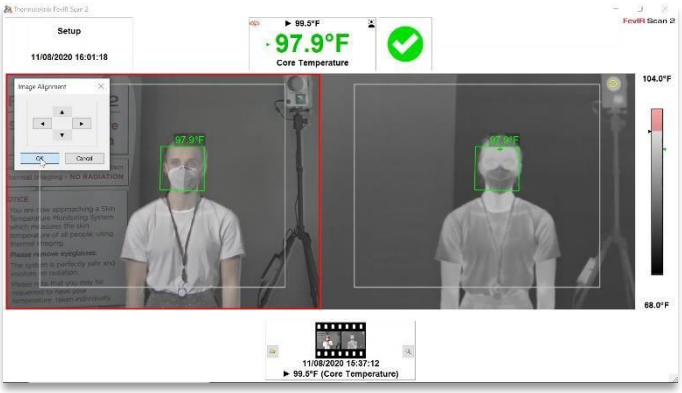
The system will now display a thermal image overlaid on the visible image. A red border around the visible image will appear and a pop-up window titled “Image Alignment” will also appear.

Visible image needs to be moved to the right and up.

The field of view of the visible image is larger than the thermal. To move the visible image, you can either click on the “Image Alignment” arrows or the arrow keys on the keyboard. The user may now move the visible image to line up with the overlaid thermal image. This may take several attempts until the two images are aligned and the settings can be saved.

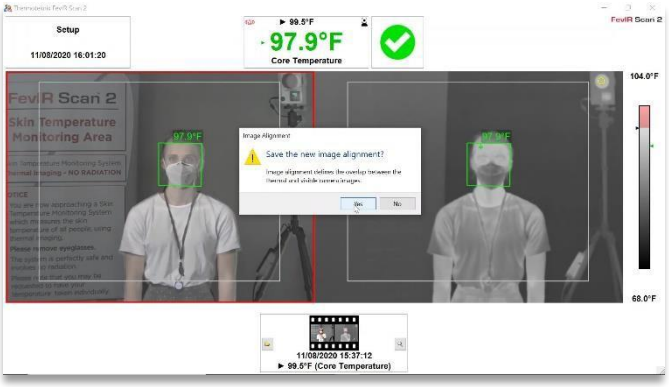


Visible image has been moved to the right, it now needs to be moved upwards.



Visible image aligned.

When the visible image is aligned with the thermal overlay, click “OK”. If you want to exit image alignment without saving the alignment click “Cancel”.



Save the alignment.

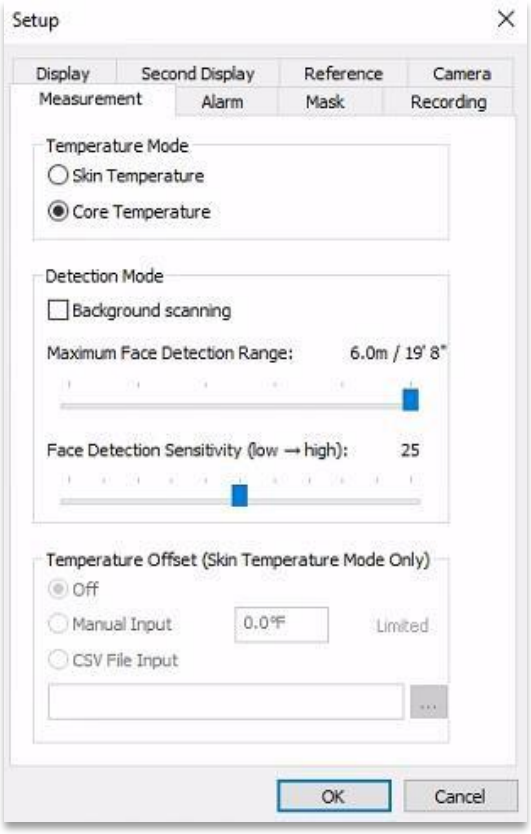
To save the alignment click “Yes” and you will exit image alignment. Clicking “No” will exit image alignment without saving any changes to the alignment. The red border around the visible image will disappear after exiting.

This alignment process is required to correct for parallax error as the cameras are side by side. The alignment should be setup with subjects at the inspection distance.

8 Setup menu

The FevIR Scan software has one settings dialog box with seven tabs, each relating to the system's functions. Settings can be changed in any of the seven tabs and they will all be saved when "OK" is selected and discarded when "Cancel" is pressed. Saved values will be restored to the system when the FevIR Scan application is re-started.

8.1 Measurement tab



8.1.1 Temperature Mode

The FevIR Scan system employs non-contact thermal imaging to measure the surface skin temperature of scanned subjects. This raw surface temperature can be displayed when in “Skin Temperature” mode. Alternatively, the system uses a proprietary algorithm to calculate the core (oral or tympanic membrane) body temperature and display “Core Temperature”. The current mode is reflected in the on-screen status box. Different alarm threshold settings are required depending on the mode selected. The default mode is “Core Temperature” when the system is first started.

8.1.2 Detection Mode

FevIR Scan uses face detection to increase the accuracy of subjects’ measurement.

8.1.2.1 Background Scanning

The “Background Scanning” feature enables the system to identify any object at a temperature between the “Tracking Temperature” and “Upper Temperature Limit”, see section 8.2. “Background Scanning” can be enabled if a large number of faces are not being detected, for example where lighting conditions are poor (too dark).

When an object is above tracking temperature and below alarm temperature the system status will change to the green state, a tracking box will not appear in the scene. When an object is above alarm temperature and below upper temperature limit the system status will change to red alarm state and a red tracking box will be shown over the object in the scene.

8.1.2.2 Maximum Face Detection Range

Face detection range can be set between 1m (3.3ft) and 6m (19ft 8in). Any person at a distance from the camera that is greater than the detection range will not be detected. This allows the system to only detect people at a set distance from the camera, allowing single person scanning and automation with access control systems.

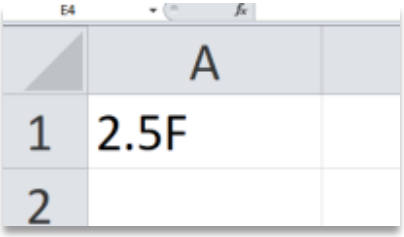
8.1.2.3 Face Detection Sensitivity

The sensitivity of the system to detect faces can be altered between the lowest (least sensitive) setting of 0 on the left of the slider bar and the highest (most sensitive) setting of 50 on the right of the slider bar. A higher sensitivity allows the system to detect faces quicker and in low lighting conditions, however false positives may be detected. False positives are when the system has identified a face when a face is not present. Reducing the sensitivity reduces the false positives but faces may be detected slower or missed if people are moving quickly or in low lighting.
The default position with a sensitivity of 25, as shown above, is recommended.

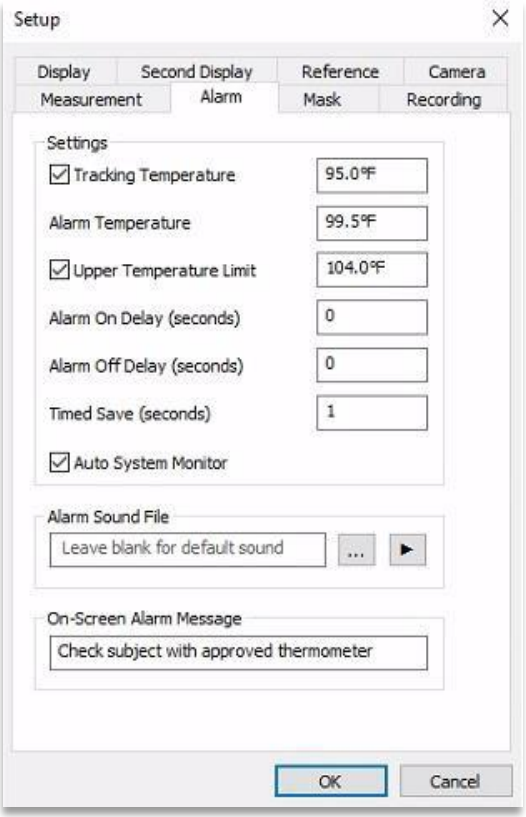
8.1.3 Temperature Offset

For advanced users this feature enables a fixed temperature offset to be added to the skin temperature measurement. This can be used to accommodate extreme ambient conditions. This feature can be automated through the use of a CSV file to input the temperature offset figure. The data within the CSV file format must be in the format:

X.XC or X.XF



8.2 Alarm tab



8.2.1 Tracking Temperature

The “Tracking Temperature” function can be used to identify subjects below the “Alarm Temperature” threshold. This feature can be enabled or disabled by ticking the box. This value is typically set 2-5°C (3.6-9°F) lower than “Alarm Temperature”. Subjects with skin temperatures exceeding the tracking temperature will be identified by a green box and the temperature displayed adjacent to the box.

8.2.2 Alarm Temperature

The “Alarm Temperature” is used to set the alarm temperature value. Temperatures detected at this level and above will activate the alarm.

Selecting an appropriate value threshold is not an exact science because of the variability and range of human skin temperature and ambient conditions. Too high a threshold and a feverish person may not trigger an alarm. If the threshold is set too low, then the system will generate false alarms by triggering on subjects with normal temperatures rather than with a raised skin temperature.

The objective is to set the threshold so that a small minority of subjects with a normal temperature will trigger an alarm. These 'false' alarms can be quickly discounted using a ‘clinical thermometer' and will provide confidence that subjects with an abnormally high temperature should not be missed. A threshold of 37°C (98.6°F) could be usefully selected as a starting threshold but adjusted according to local conditions.

When an alarm is triggered, a red box is overlaid on the subject’s face. This will identify the subjects who need secondary testing with an approved clinical thermometer.

8.2.3 Upper Temperature Limit

When face detection mode is not enabled, temperatures above the upper limit are not drawn in red or used to trigger alarms. This useful feature means that hot articles that are irrelevant to fever monitoring do not cause spurious alarm conditions.

8.2.4 Alarm On/Off delay and Timed Save

The alarm on and off delay affects the alarm hysteresis and when set correctly these values will avoid alarms flicking on and off for temperatures near to the threshold temperature value. Once an alarm has been triggered it will stay active for the time set before the Alarm Off time expires (1 second in the illustration shown).

FevIR Scan automatically saves a thermal and visible image when an alarm is triggered. When “Timed Save (seconds)” is set to zero (the default) only one image pair is saved. A positive value for this field forces images to be saved at the selected time interval during an active alarm.

8.2.5 Auto System Monitor

The system relies on stable operating conditions to maintain accuracy. To ensure this is the case, the temperature stability of camera and the ThermaRef are constantly monitored. If the temperature of either unit is unstable a “System not ready” alarm is displayed, and system measurements are inhibited. This will typically be displayed when the system is first switched on or if the environmental conditions are upset by hot or cold draughts, or if someone walks between the FevIR Camera and the ThermaRef to interrupt its line of sight.

8.2.6 Alarm Sound File

The alarm sound field allows you to select a different alarm sound to play when an alarm is triggered. Browse to the appropriate directory and select an alternative sound file.

8.2.7 On-Screen Alarm Message

The text entered in this box will appear on the screen during activation of the temperature alarm. Text in different languages can be entered if required. If a message is not required during alarm operation the message box can be left blank.

8.3 Mask tab

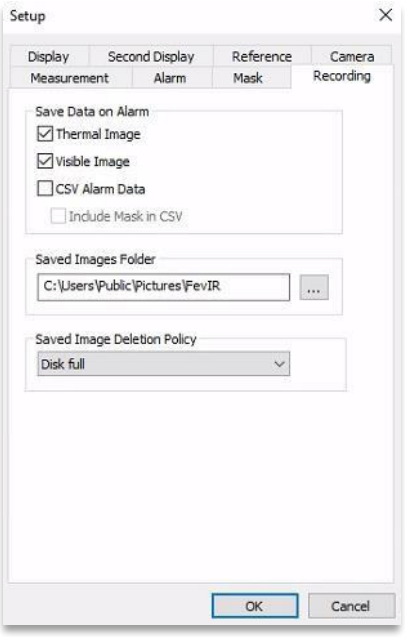
8.3.1 Mask detection

To enable mask detection, select the check box. Once enabled the system will identify if the subject is or is not wearing a mask and display an icon next to their face. If mask detection is enabled the option of triggering the alarm when the subject is not wearing a mask becomes selectable. The on-screen alarm message is configurable by entering text into the dialogue box.

8.3.2 Glasses detection

To enable glasses detection, select the check box. Once enabled the system will identify if the subject is or is not wearing glasses and display an icon next to their face. If glasses detection is enabled the option of triggering the alarm when the subject is wearing glasses becomes selectable. The on-screen alarm message is configurable by entering text into the dialogue box.

8.4 Recording tab



8.4.1 Save Data on Alarm

The FevIR Scan system includes the ability to record images when an alarm is triggered. The default condition is that the first two boxes are ticked, and images will be saved on the system.

8.4.2 Saved Images Folder

The “Saved Images Folder” field allows you to store the images in a different folder to the default. This can be to a network drive if appropriately connected and configured.

8.4.3 Saved Image Deletion Policy

This box allows the user to select from several pre-determined image deletion strategies. By default, this is set to “Disk full” and will result in no image deletion until the disk size used is approaching its capacity. Alternative short-term deletion properties will reduce disk storage and improve data privacy.


NOTE: the system will check this setting at 5-minute intervals so any changes will not take immediate effect.


NOTE: in the event that the system has a large number of images saved and the strategy is changed to a very short retention, such as 8 hours, the system will slow whilst the images are deleted from the disk. This may persist for some time depending on how many images need to be deleted.

8.4.4 Enhanced privacy

In some countries GDPR and other privacy laws may preclude saving subject images, particularly in public areas where consent may not be feasible. In these cases, the user can choose to save either or neither images by un-ticking these boxes.

Where this feature is used it may be necessary to encrypt the disk of the PC to fully comply with local legislation. Microsoft Windows operating system includes a feature called BitLocker; more information can be found here:

https://support.microsoft.com/en-gb/help/4028713/windows-10-turn-on-device-encryption

This feature is not enabled by Thermoteknix as many companies have local policies for passwords and recovery keys for encrypted drives. Please consult your IT department for assistance with this feature.

The default location for the image files is: **C:/Users/Public/Pictures/FevIR**

Users can also select alternative locations for the files via the “Recording” tab and by selecting an alternative path in the “Saved Images Folder”.

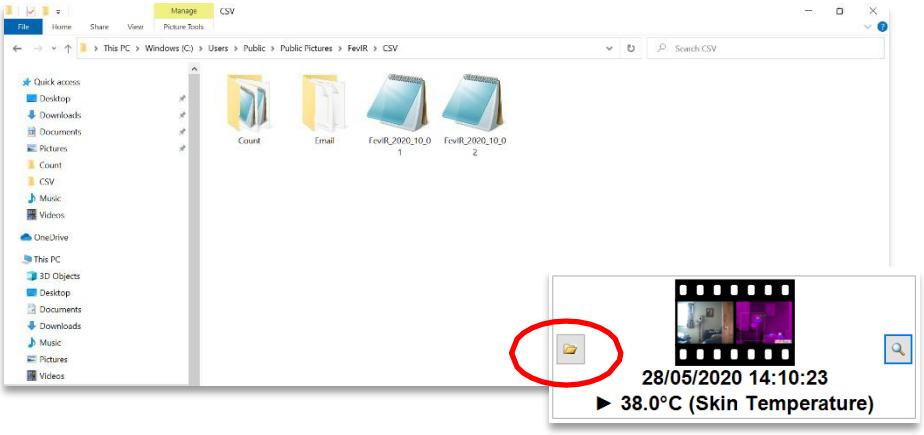
8.4.5 CSV Alarm Data

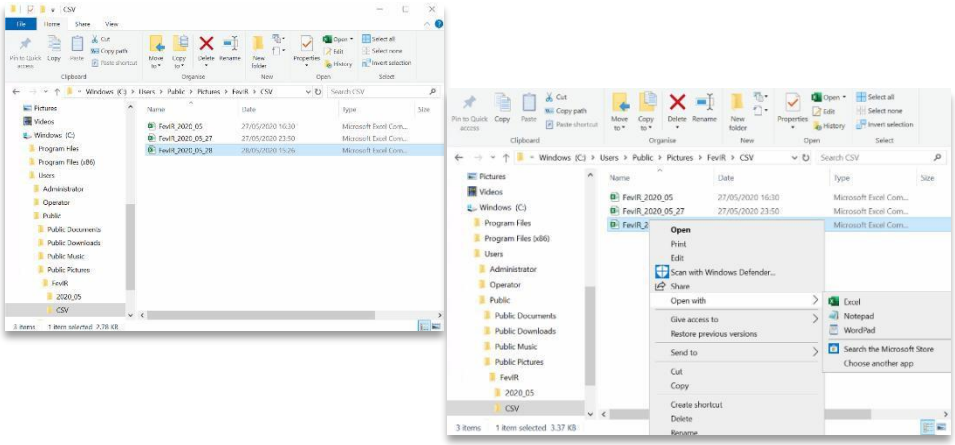
There is a separate option to generate two daily CSV files.

The first CSV file logs the details associated with each alarm activation, these files are saved in the root CSV folder.

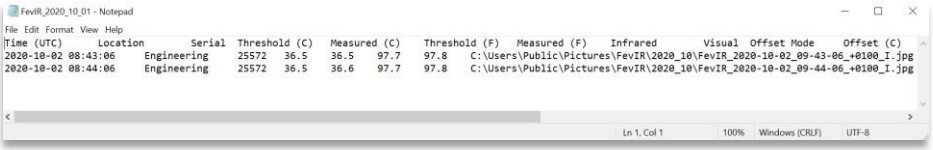
The second CSV file logs every event when a person above “Tracking Temperature” is measured by the system, these files are saved in a subfolder of the CSV folder labelled “Count”.

The shortcut from within FevIR Scan software to view the files is to click the folder icon (in record box) and then select the folder “CSV”. To view files, right click and select “Open with” and then “Notepad”.

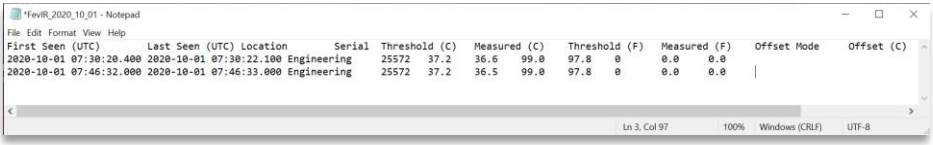




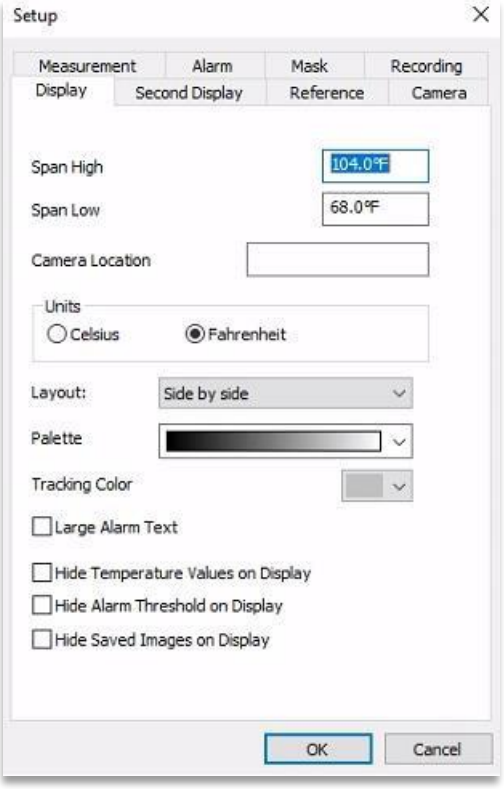
Example Alarm CSV File opened in Notepad.



Example Count CSV File opened in Notepad.



8.5 Display tab



The Display tab sets the temperature span for the thermal image. If the displayed image is black, then the low setting has probably been set too high and all temperatures are below the set value.

Conversely an image that is completely white or red would indicate that the high temperature and/or the alarm threshold temperature values have been set too low and all the temperatures in the image are higher than the top scale value. Increase the value of the “Span High” and/or alarm values.

8.5.1 Camera Location

The Camera Location field allows the user to input free text to identify the system location to the operators and in any stored imagery. The text appears at the top left corner of the screen window.

8.5.2 Units

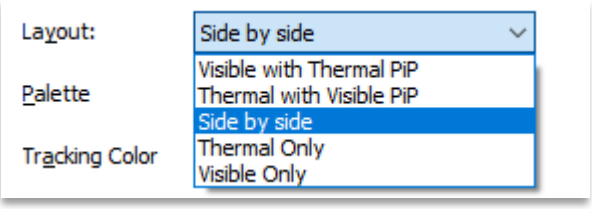
The temperature units that the system displays can be either Celsius (Centigrade) or Fahrenheit.

8.5.3 Layout

The Layout control allows the user to present the screen in a number of predefined formats.

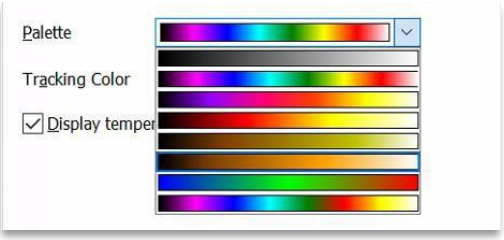
PIP (picture in picture) arrangement allows the thermal or visible picture to be displayed larger with a smaller inset thermal or visible image.

“Visible Only” allows a full size visible image to be shown. Temperature measurements can be overlaid once the alignment process has been completed, see 7.4.



8.5.4 Palette

The “Palette” drop down allows users to select one of a number of monochrome and colour pre-defined palettes. Temperatures in the thermal image are shown in the corresponding “pseudo” colour.



8.5.5 Tracking Colour

“Tracking Colour” defines the colour used for text annotation display for the “Tracking Temperature”. This feature allows contrast with the selected colour palette.

8.5.6 Large Alarm Text

When checked, the alarm text displayed on screen is larger in size.

8.5.7 Hide Temperature Values on Display

When checked, no temperature values will be displayed on either the thermal or visible image and subjects’ temperatures are not shown adjacent to the system status box.

8.5.8 Hide Alarm Threshold on Display

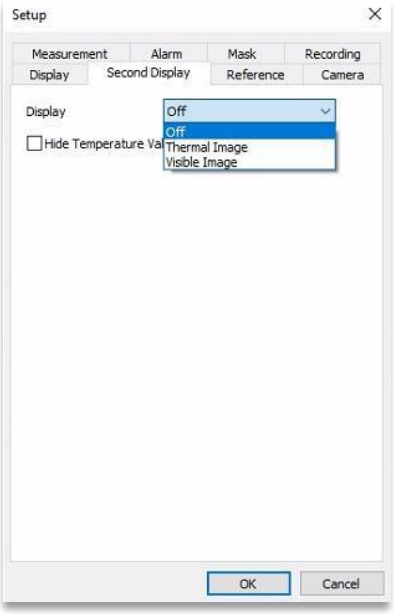
When checked, no temperature value will be shown in the alarm threshold display within the system status box as shown in 5.1 (e).

8.5.9 Hide Saved Images on Display

When checked the gallery will not be visible, as shown in 5.1 (g).

8.6 Second Display tab

The Fever Scan 2 system is designed to operate on a laptop computer and all setup, monitoring and supervision functions can be completed using the single laptop display. A second monitor (not supplied by Thermoteknix) can also be connected to the HDMI output on the laptop. This is most often used as a second larger display facing the subjects being scanned. From the display drop down selection there are three options:

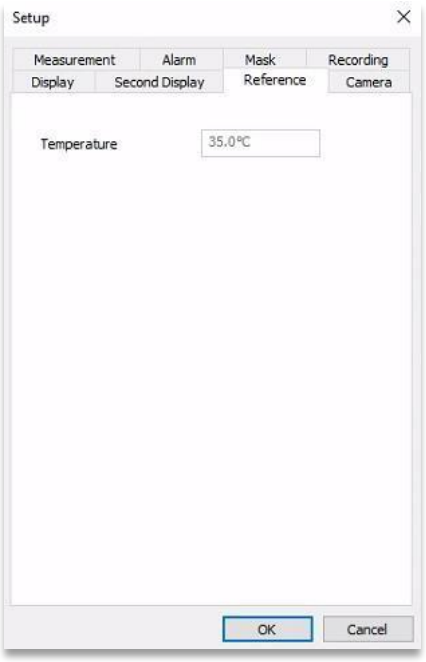


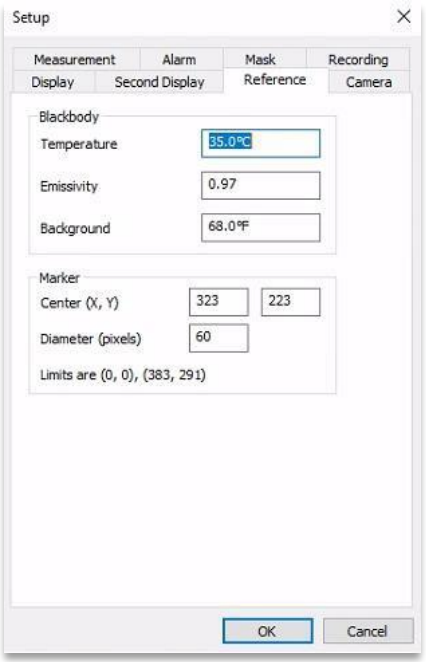
- Off: no image on HDMI output
- Thermal Image: full screen thermal image
- Visible Image: full screen visible image

“Hide Temperature Values on Display” removes the temperature data from the image.

8.7 Reference tab

This tab provides feedback on the pre-configured settings used by the system. By default no data entry or manipulation is possible on this tab. To enable this tab and edit the data fields, use the shortcut key sequence “CTRL-ALT-T”. This is not recommended and should not be done without guidance from Thermoteknix support.





CAUTION: the system software is pre-set to work with the ThermaRef set at 35°C. The controller should not be adjusted by the user unless under the instruction from Thermoteknix support staff.

8.8 Camera tab

This shows the unique serial number of the FevIR Camera and the version number of the firmware in the camera. The visible camera Exposure (msec) provides feedback on the brightness of the lighting conditions. Values less than 50 are acceptable and will be lower in brighter conditions. Please ensure that this number is quoted in any correspondence or calls to Thermoteknix customer support.

support@thermoteknix.com

9 Fault finding

9.1 Thermal image blank

If the thermal image is uniform without any image texture or definition, the scale setting is probably incorrect. If the image is uniformly black it may be that the low span is set too high, i.e. all the measured temperatures are lower than the low span setting. The reverse may be true if the image is white: the high temperature may be set too low. If the image is all red, increase the “Upper Temperature Limit”.

9.2 Continuous system warning alarm

- Ensure the ThermaRef measurement tool (yellow circle) is correctly positioned over the ThermaRef and entirely within the circular area.
- Ensure the ThermaRef is directly aligned with the FevIR Camera.
- Ensure the site is free from draughts and ambient conditions are stable.
- Ensure that subjects do not cross between the FevIR Camera and the ThermaRef to interupt the line of sight.

9.3 Thermal reflections

Cover glass or highly reflective surfaces with soft fabric or matt paper.

9.4 Default values (in core mode)

“Alarm” tab

- Tracking Temperature 35.0°C (95.0°F)
- Alarm Temperature 37.5°C (99.5°F)
- Upper Temperature Limit 40.0°C (104.0°F)
- Alarm On Delay (seconds) 0.1
- Alarm Off Delay (seconds) 2
- Timed Save (seconds) 0

“Display” tab

- Span High 40.0°C (104.0°F)
- Span Low 20.0°C (68.0°F)

10 Shortcuts

Here is a list of shortcuts to help you use FevIR Scan software more quickly:


NOTE: some laptops require the “Fn” and Function key combination.

Shortcut	Action
F2	Toggles the system menu
F4	Save an image
F6	Toggles the “Enter Password” dialog
F7	Display the “Setup” menu, inputting the Password if necessary
F11	Toggles the full screen mode
Esc	An alternative to F11 for exiting full screen mode

11 Calibration

The FevIR Camera and ThermaRef should be returned to Thermoteknix or to a Thermoteknix approved re-calibration and test facility at 12-month intervals in order to ensure camera and blackbody reference are operating within the manufacturer's specifications.

Certificates showing the calibration dates are supplied with each system and subsequent annual calibration labels are affixed to the underside of each instrument.

12 Software installation

You have purchased a turnkey system and the laptop should have the FevIR Scan software pre-installed. If you need to re-install, or to install the software onto another computer you will need to use the supplied USB memory stick. Software updates issued by Thermoteknix will be accompanied by release and installation notes.

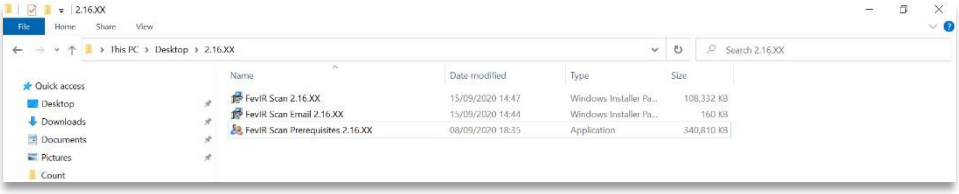
NOTE: if you are also using the Email on Alarm functionality you will need to separately install this as it is a separate application.

12.1 Installing FevIR Scan software

Insert the Thermoteknix memory stick provided with the system into a USB port on the PC.

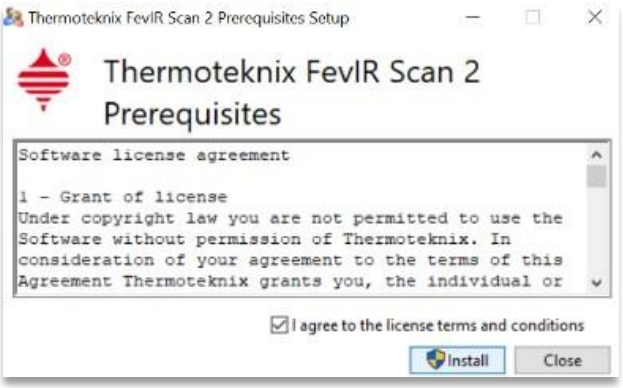
The install process requires two files to be executed in order. Navigate to the root of the USB drive and open the folder “FevIR Scan V2.17.8”.

First install “FevIR Scan Prerequisites 2.17.6” by double clicking on the application.

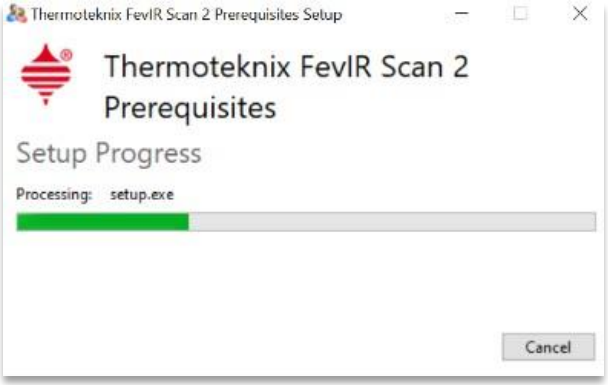


The installer will now start and the usual installer dialogs will allow you to direct where the software should be installed. It is not necessary to have the FevIR Camera connected during software installation.

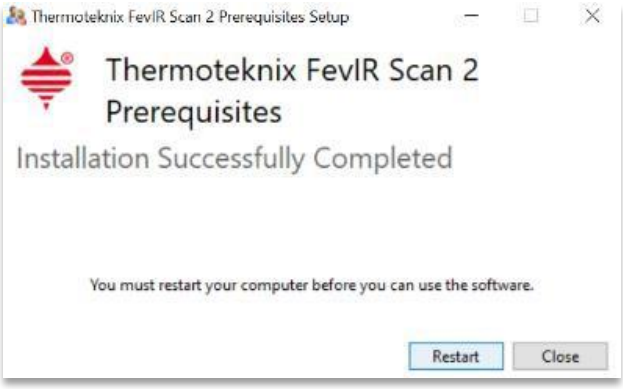
Read the Software licence agreement and then agree to the licence terms and conditions and select “Install”:



Setup in progress:

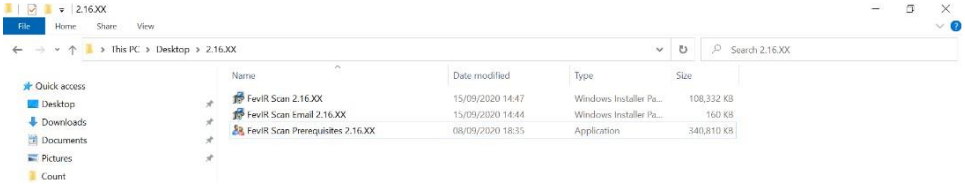


Setup complete and computer restart required:

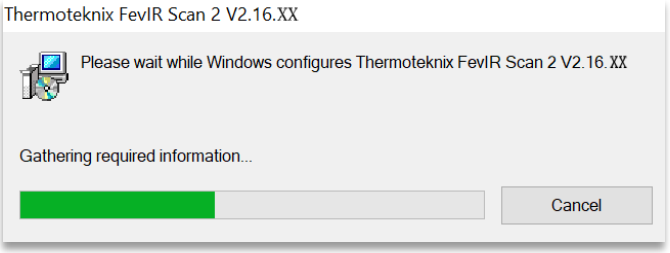


After computer has restarted, navigate to the root of the USB drive and open the folder “FevIR Scan V2.17.8”.

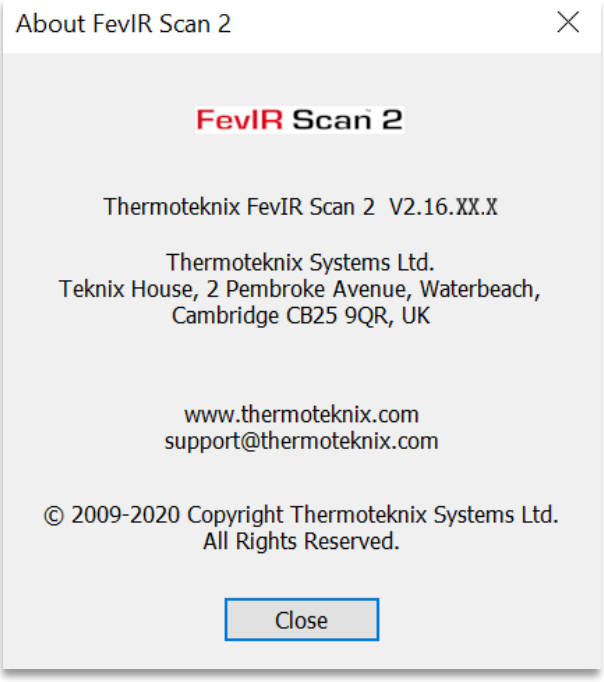
Double click “FevIR Scan 2.17.8”



Setup in progress



The installer will add a desktop icon and a menu item for you to access the software.



13 Optional items

13.1 FevIR Scan Email on Alarm - GC010007

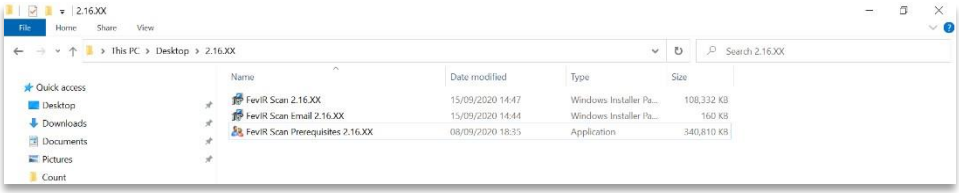
13.1.1 Introduction

FevIR Scan 2 has the option to provide an automated “Email on Alarm” service. When a temperature alarm is triggered an email containing the thermal and visible images (if selected) together with the time and alarm information will be sent to pre-configured user(s). This service is provided as a separate software application which runs as a background service and scans the CSV file created by the system to populate the default Email template.

13.1.2 Installation

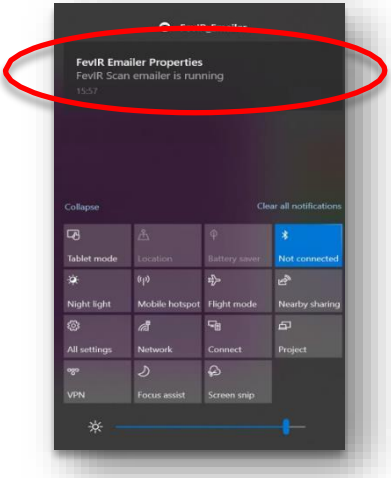
The software will either be provided on an USB stick or you will be provided with a link to download the installation file.

Click on the “FevIR Scan Email 2.XX.XX.msi” file to run the installer.



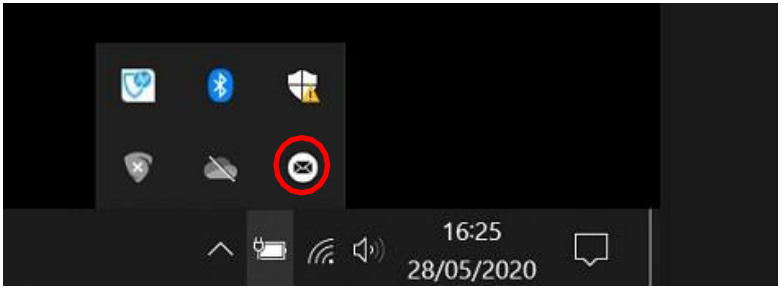
The installer will install FevIR Scan Email on Alarm without requiring any prompts.

Once the emailer is installed you will get a Windows notification that the service is running.



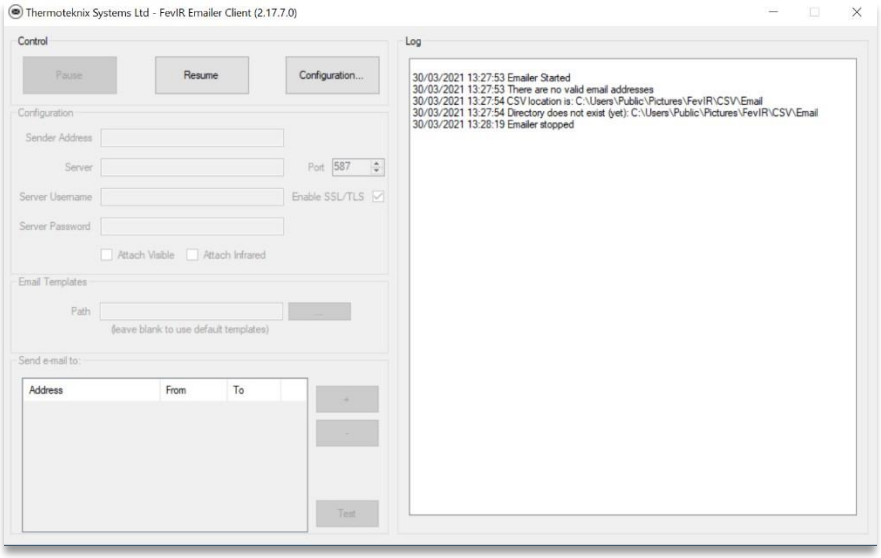
As soon as the service is running it can be accessed from the system tray by clicking on the “Show hidden icons”.

This will display the application as a small black envelope in a white circular icon.



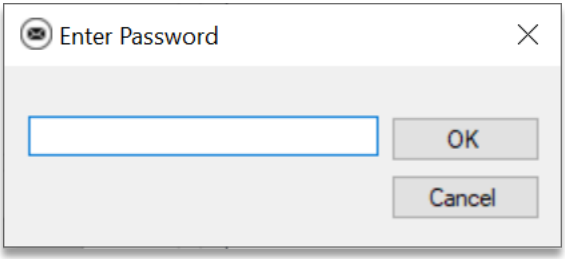
Double clicking this icon will launch the Emailer application User Interface.

13.1.3 "FevIR Emailer Client" user interface

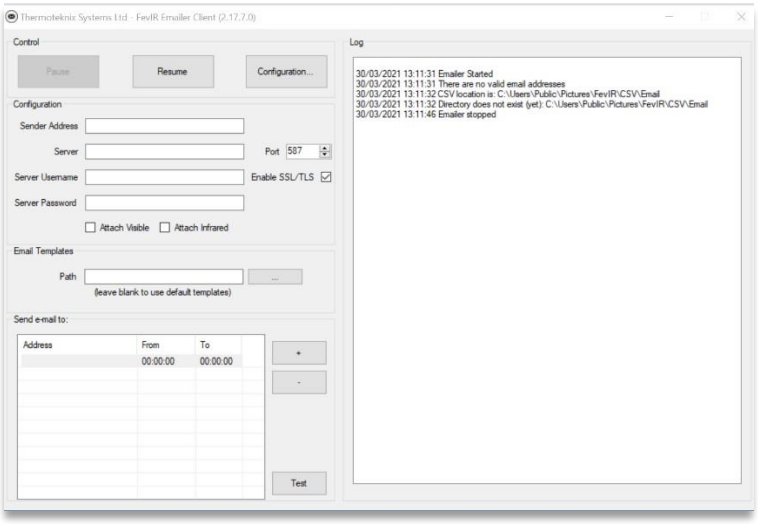


This display shows the software in "Paused" mode with the configuration details greyed out. If the "Configuration" button is greyed out, click "Pause" to enable configuration.

To configure the system click "Configuration" and enter the password, this is the same password as set on the FevIR Scan software, default password: **000000**



After entering the password the configurations details will be unlocked and the software can be configured as required.



Once you have entered the correct credentials for your own mail server, click "Resume" to start the service. This will then lock the configuration and it can only be edited by clicking "Pause", "Configuration" and entering the password.

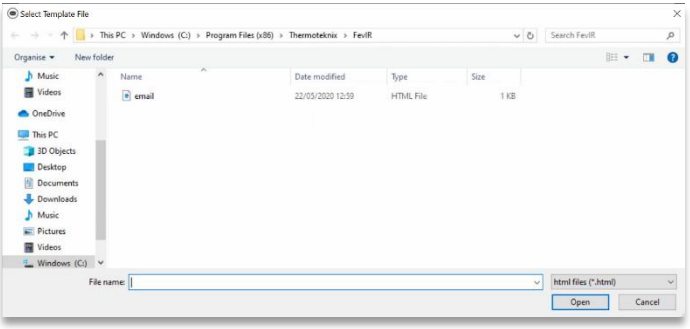
Options are present to select attachment of either or both the images (Visible/Thermal) to the email.

For internal Email servers you may find the SSL/TLS security is not required and can be unticked. This is typically the case when Port 25 is selected. If in doubt consult your local IT department for advice on mail server settings.

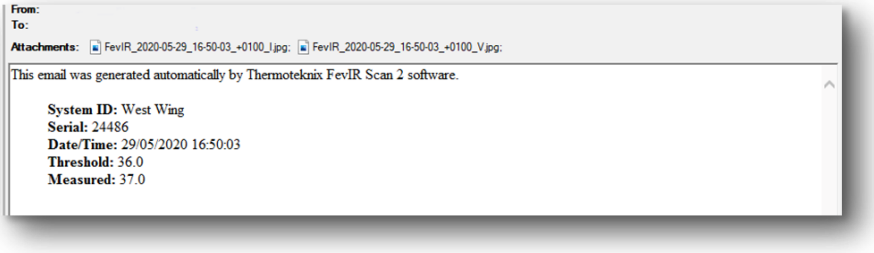
Under "Email Templates" the "…" button will display a folder with the Email templates in HTML format. To edit the template and generate your own format right click and "open with" notebook.

To add an addressee, click the "+" icon and type in the email address. A period of time that the software sends emails can be configured by entering times in the "From" and "To" fields.

NOTE: If times are entered into the "From" and "To" fields, emails will only be sent between these times and when the FevIR Scan software is running. Any alarms triggered outside of these times will not be emailed.

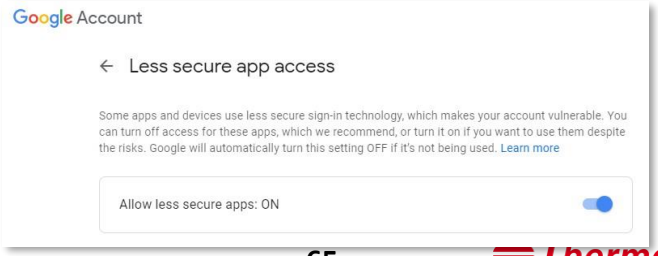


Example of Email template:



This template generated the following Email (with both images attached).

NOTE: because this is a new source of email some systems will be unwilling to accept mail from FevIR Scan 2. This is true of Gmail for example. You may need to set your mail preferences to accept mail from less secure apps (Less secure app access = ON).



14 Disposal

The FevIR Scan system does not contain hazardous substances or exhibit any medical bio hazards during normal operation.

Disposal and recycling of the electronic components contained within the system can be a carried out in accordance with the Waste Electrical and Electronic Equipment (WEEE) Recycling Regulations.

The PC may contain images of individuals and should be disposed of in accordance with local guidance and regulations regarding privacy (Such as GDPR within EU). In many jurisdictions you will need to have certified evidence that the data contained on the hard disk has been disposed of in accordance with these regulations.

15 Support

This product is supported according to the terms of your purchase agreement. To raise a support issue please contact Thermoteknix by email at:

support@thermoteknix.com

A member of our support team will contact you.

16 Appendices

Appendix

16.1.1 FevIR Scan 2 Specification

FevIR Scan Camera MC031843	
Weight	950g
Dimensions	90x70x110mm
Mounting	¼”-20 UNC (Tripod) top and bottom
Thermal Field of View (FoV)	26˚
Thermal spectral response	7 to 14µm
Accuracy	±0.2˚ C
Thermal sensitivity (NETD)	<0.05˚ C
Measurement range	15˚ C to 40˚ C
Thermal resolution	384x288 pixels, 17µm
Frame rate	9Hz (default) or 60 Hz (licensable)
Response time	120 mSec
Thermal lens focal length	15mm
Spatial resolution ≥1mm	At 880mm from camera
Throughput	Up to 20 persons per minute
Visible camera resolution	1.3M pixel
Visible Field of View (FOV)	32˚
Power supply	5V DC
Environmental protection	IP40
Certification	CE: EN 55011 Class A and FCC
ThermaRef 35B1 Temperature reference, MC031856	
Weight	1.8kg
Dimensions	132x187x127mm
Mounting	¼”-20 UNC (Tripod) top and bottom
Setting resolution	0.01˚ C
Accuracy	±0.2˚ C
Temperature range	20˚ C to 40˚ C
Stability (1 Hour)	<0.2˚ C
Power Supply	24V DC
Environmental protection	IP20
Certification	CE and FCC
Laptop computer	
Screen size	14”
Operating System	Windows 10 Pro
Software	FevIR Scan 2 application
Second monitor output	HDMI
System Parameters	
Operating temperature range	15˚ C to 35˚ C
Applicable subjects	Ambulatory adults

Appendix

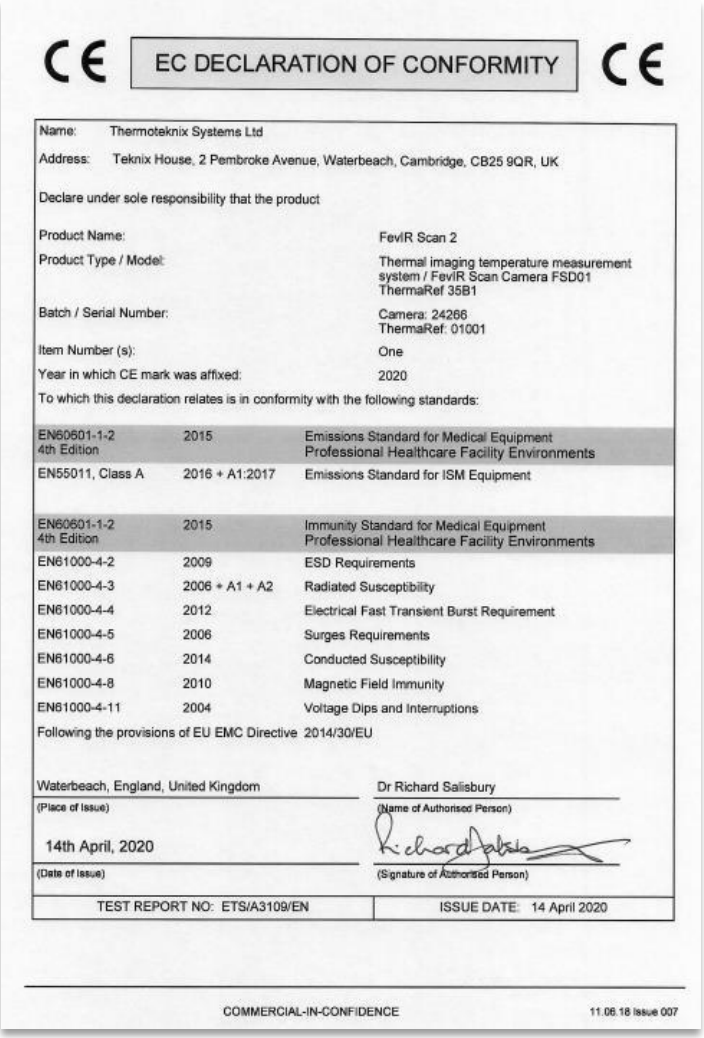
16.2.1 Revision history

Date	Version	Notes
28/04/2021	6.2	Regulatory information updated
01/08/2023	6.3	Removed reference to FDA enforcement policy for telethermographic systems. This policy will be obsolete on November 7, 2023

For detailed change log please contact Thermoteknix.

16.71 Appendix

16.3.1 CE compliance certificate



CE EC DECLARATION OF CONFORMITY CE

Name:	Thermoteknix Systems Ltd
Address:	Teknix House, 2 Pembroke Avenue, Waterbeach, Cambridge, CB25 9QR, UK

Declare under sole responsibility that the product

Product Name:	FevIR Scan 2
Product Type / Model:	Thermal imaging temperature measurement system / FevIR Scan Camera FSD01 ThermaRef 35B1
Batch / Serial Number:	Camera: 24266 ThermaRef: 01001
Item Number (s):	One
Year in which CE mark was affixed:	2020

To which this declaration relates is in conformity with the following standards:

EN60601-1-2 4th Edition	2015	Emissions Standard for Medical Equipment Professional Healthcare Facility Environments
EN55011, Class A	2016 + A1:2017	Emissions Standard for ISM Equipment
EN60601-1-2 4th Edition	2015	Immunity Standard for Medical Equipment Professional Healthcare Facility Environments
EN61000-4-2	2009	ESD Requirements
EN61000-4-3	2006 + A1 + A2	Radiated Susceptibility
EN61000-4-4	2012	Electrical Fast Transient Burst Requirement
EN61000-4-5	2006	Surges Requirements
EN61000-4-6	2014	Conducted Susceptibility
EN61000-4-8	2010	Magnetic Field Immunity
EN61000-4-11	2004	Voltage Dips and Interruptions

Following the provisions of EU EMC Directive 2014/30/EU

Waterbeach, England, United Kingdom (Place of Issue)	Dr Richard Salisbury (Name of Authorised Person)
14th April, 2020 (Date of Issue)	(Signature of Authorised Person)

TEST REPORT NO: ETS/A3109/EN	ISSUE DATE: 14 April 2020

COMMERCIAL-IN-CONFIDENCE 11.06.18 Issue 007

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Email: support@thermoteknix.com

Web: www.thermoteknix.com

Thermoteknix FevIR Scan is not subject to US ITAR control.
However it may require a UK export licence as provided by the UK Department for Business, Innovation and Skills (BIS), depending on the end-user country and specification.