

1 YEAR
WARRANTY

Ω OMEGA™ **User's Guide**



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TI-120GTS-Series **Group Temperature Screening Thermal** **Imaging with Face Detection**



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Safety Information

Definitions

! WARNING: Represents a hazardous situation or behavior that could result in personal injury or death.

! CAUTION: Represents conditions or actions that could result in damage to the instrument or permanent loss of data.

! Note: Represents useful information for users.

Hardware Installation

Mount the camera to a tripod or other support device. (Tripod not included)

Connect the device to the computer with a USB cable, and plug the USB cable of the Logitech camera into the USB port of the computer.

Connect the external power supply to the camera.

Hold the camera power button until the green light is illuminated.

Activate the face detection function by connecting network. Please refer to Section 5.1 for details.

Connect WLIR to the IR Camera and the DC Camera. Please refer to Section 5.2 for details.

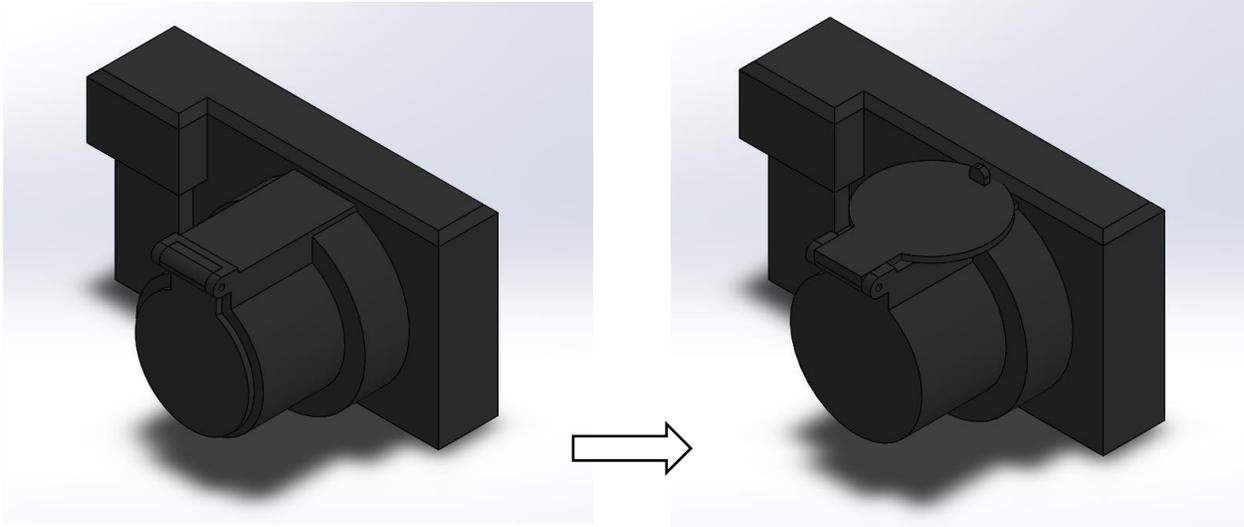
Adjust the focus of the IR Camera and align the IR image with the visible light image. Please refer to Section 5.3 for details.

Set whether to capture photos after alarms and select the photo storage location. Please refer to Section 5.6.6 for detail.

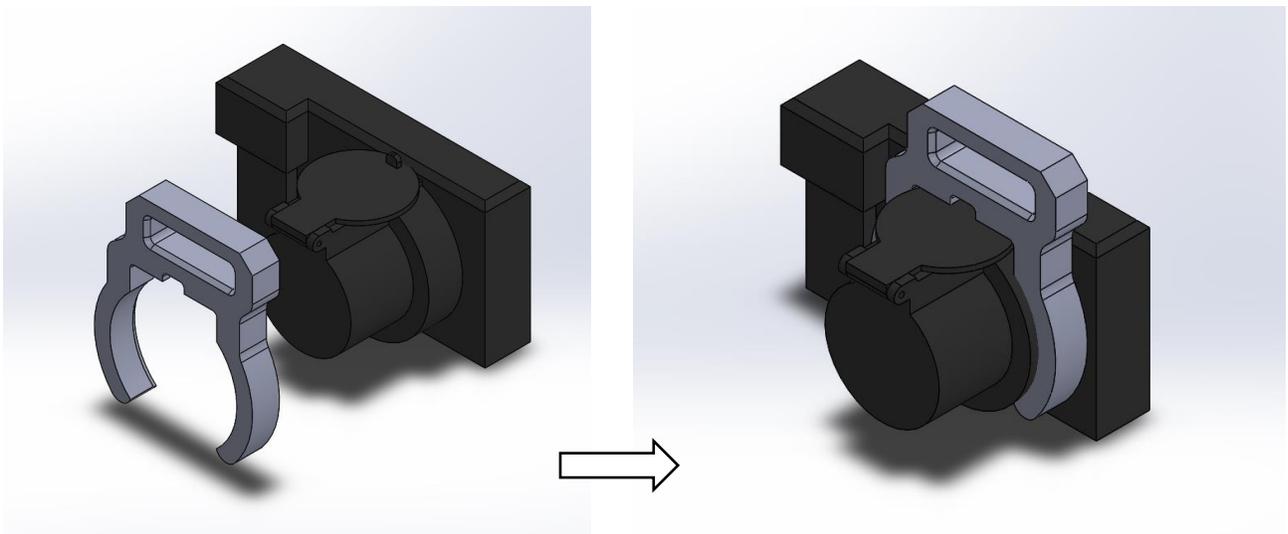
When screening is in operation, an alarm will be triggered if an individual present abnormal temperature.

Assembling IR Camera with Webcam Mount (TI-120GTS-A Models Only)

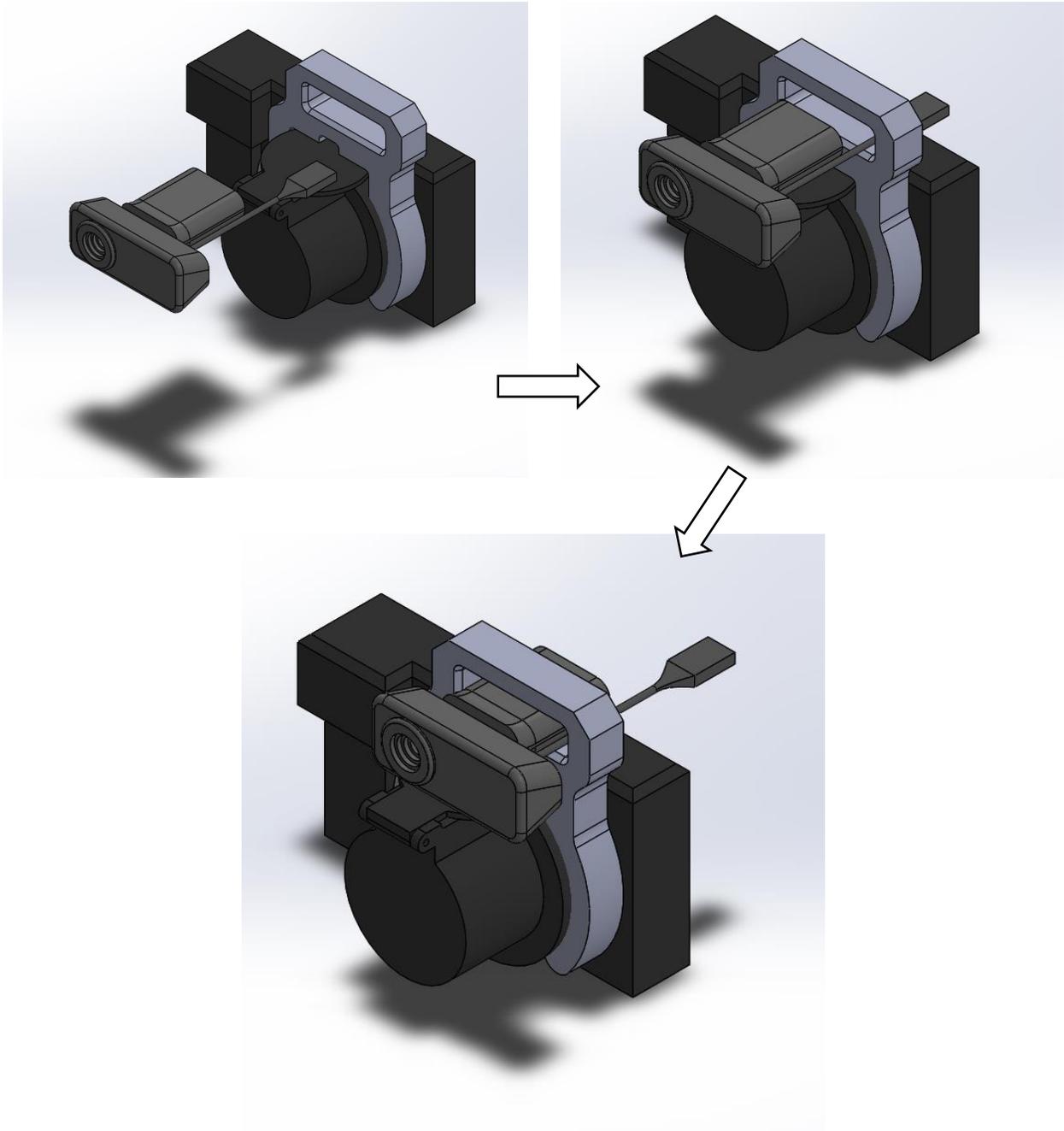
1. Flip camera lens cover back all the way.



2. Orient webcam mount as seen in picture and press mount onto lens.



3. Route webcam cord through opening in mount and press folded webcam legs into mount as shown.



Field Setup



Figure: The distance between the device and the person being inspected is 10.5 ft

1. The installation location should be in an indoor and brightly lit area to avoid backlighting. (It is not recommended to install outdoors. The unstable outdoor environment will affect the temperature measurement accuracy).
2. The distance between the device and the person being inspected is recommended to be within 2.6-10.5 ft.
3. Set up the temperature measurement area. It is recommended to set the temperature measurement area around the person being tested with a 1.5 ft distance from the front, back, left and right.
4. The crowd control route is recommended to be L-shaped.



Operating Environment

3.1 Operating System

Microsoft Windows 7, 32-bit (User must install NET Framework4.0 to allow proper running of the program).

Microsoft Windows 7, 64-bit (User must install .NET Framework4.0, to allow proper running of the program).

Microsoft Windows 10, 32-bit professional edition

Microsoft Windows 10, 64-bit Professional Edition

3.2 Hardware Configuration

Personal computer with Core i3 7020 equivalent or above.

Memory: at least 4GB or more.

USB 3.0 port.

Available hard disk space: 20GB.

Super VGA (1024 × 768) display (or higher resolution).

Discrete graphics card recommended.

Audio output.

Internet connection capable to perform necessary activation and plug-in upgrade installation.

Keyboard and mouse, or compatible pointing device.

Software Installation

! Caution: Before installing WLIR professional IR image analysis software, please close all programs on the PC.

To install WLIR automatic infrared temperature screening software, please follow the steps below:

4.1 Precautions Before Software Installation

Please make sure that the operating system you are using is Windows 7, Windows 8, or Windows 10. The operating system needs to have .NET Framework 4.0 installed and confirm that the operating system you are using is 32-bit or 64-bit (used to confirm the installation of the corresponding USB port driver file).

You must be an administrator or a user with administrator's access to install the program. Find the WLIR.exe file in the installation directory, right-click on it and go to Properties and select the Compatibility tab, check the box for Run this program as an administrator", apply changes and press Ok.

Default Installation directory:

64-bit operating system C:\ProgramFiles(x86)\IR\WLIR-N\

32bit operating system C:\ProgramFiles\IR\WLIR-N\

During the installation process, Microsoft® at times repeatedly warns that the software has not passed the Windows® logo test or trust option. In all cases, select "Continue Anyway" or "Always Trust". If you are prompted by antivirus software, please choose "Always allow it to run" or choose to trust this software.

A complete installation consists of multiple subprogram installations, some of which come from third-party vendors. Do not abort these subprogram installations, as they are required for a complete installation.

It is recommended to turn off the firewall on the PC and other anti-virus software when the software is connected to the IR imaging instrument, you also may add this program to the trust list. Otherwise, problems such as connection failure and image loss may occur.

Connecting the product for online use requires the installation of the driver. Windows 8/10 system must be set to "Disable driver signature enforcement" prior to installation. For specific operations, please refer to 5.4. Driver Installation Instructions.

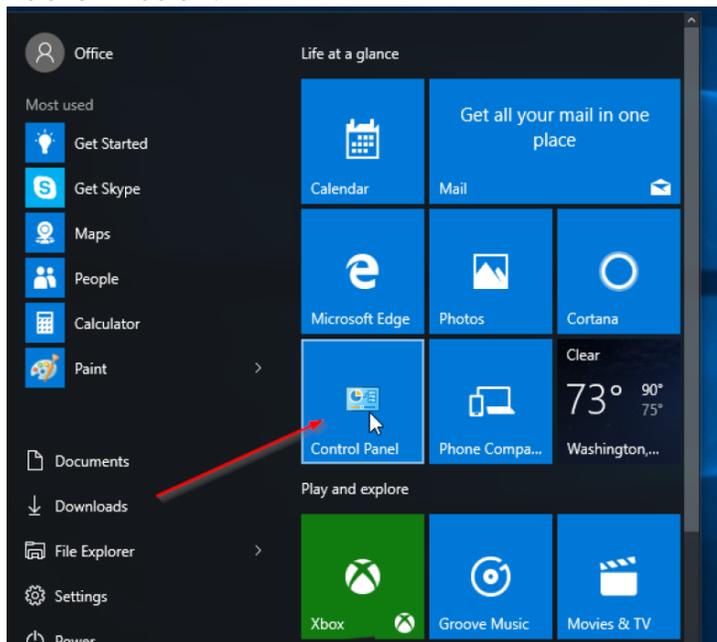
4.2 Install.NET Framework 4.0

Win7 defaults to .NET Framework 3.5. You need to install .NET Framework 4.0 or higher. Find it via any search engine, download and install.

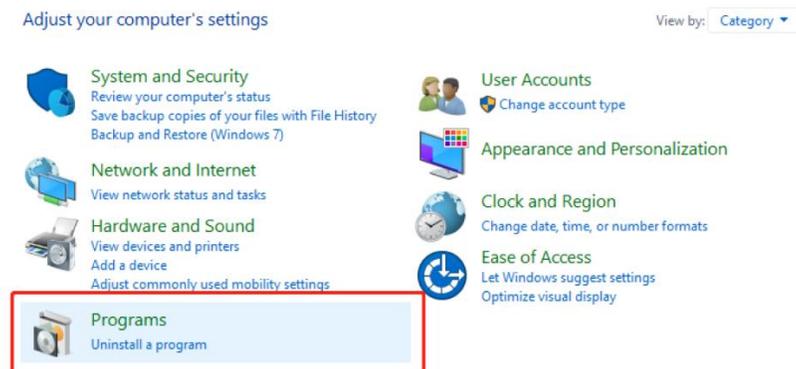
1. • .NET Framework 4.0 is enabled by default in Windows 10/8. If you need to enable it, please do as follows:

1. Connect your PC to the Internet.
2. Click the "Start"  button in the lower left corner of the PC desktop and click "All Applications"->"Windows System"->"Control Panel". Or just click on the search bar and search for "Control Panel". 

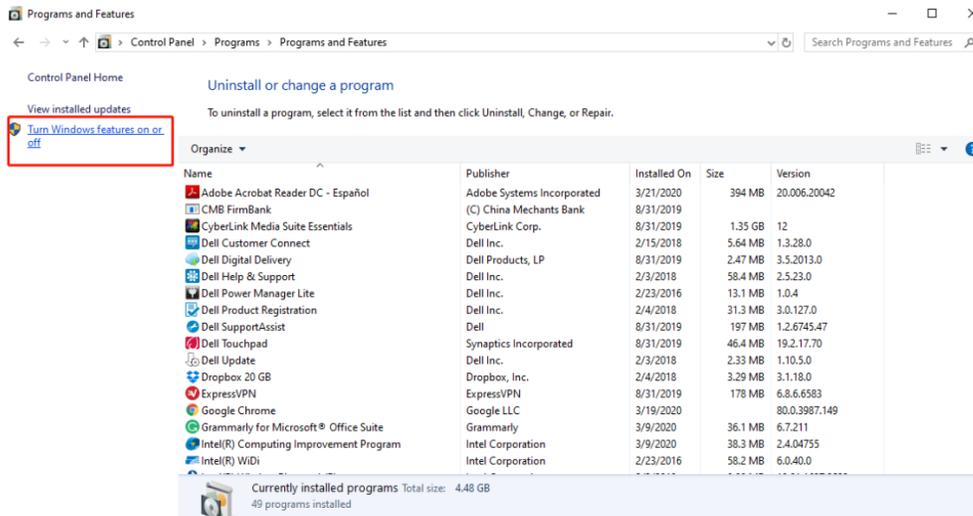
As shown below:



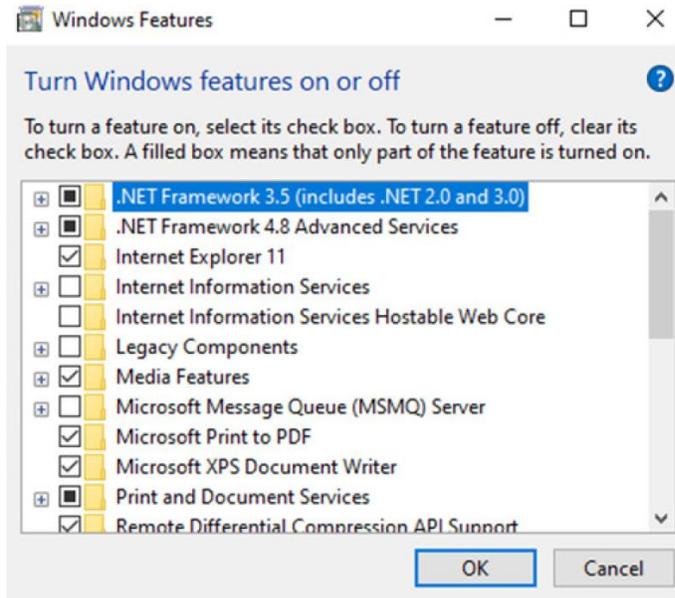
3. Select "Programs" in "Control Panel" (or click "Uninstall a program" in "Programs"), the following interface will appear:



4. Click "Turn Windows features on or off" to enter the following interface:



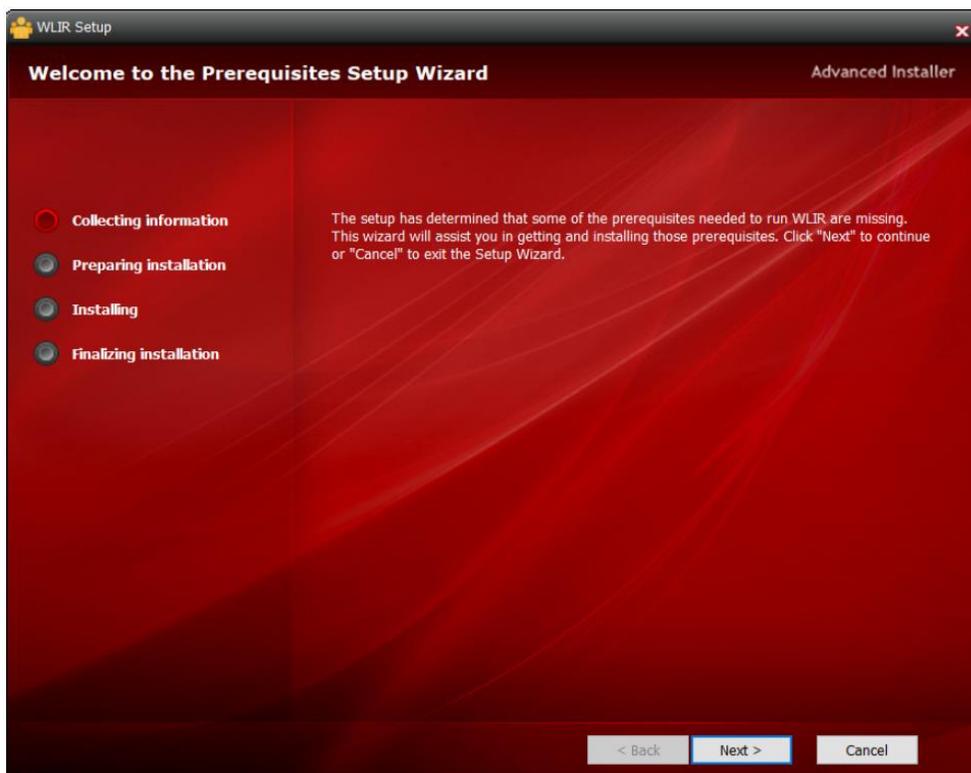
5. Click to turn on the ".NET Framework 4.0" feature (or change the version)



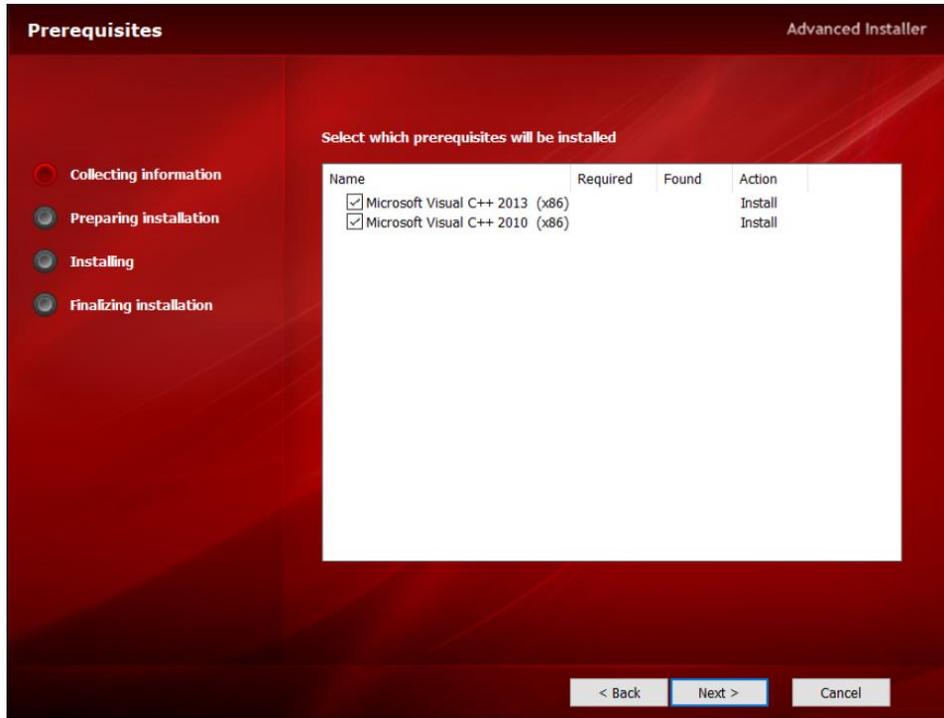
3.3 Installation steps for WLIR Automatic Infrared Temperature Screening Software

To install WLIR Automatic Infrared Temperature Screening Software on PC, please follow the steps below:

1. Log into Windows using the administrator account and close any other applications.
2. Double click the installation file of WLIR Automatic Infrared Temperature Screening Software.
3. Do the operations step by step according to the instructions in the Setup Wizard.



4. When installing this software for the first time, please install MSVBCRT in the meantime. When re-installing the software, if the MSVBCRT in the screenshot below has already been installed, you can cancel it. (In general, this MSVBCRT is installed by default in copyrighted software.)



5. Find the WLIR.exe file under the installation directory (C:\Program Files (x86)\WLIR), then click the right button to select "Properties", click on "Compatibility" tab in dialogue window, and check the box "Run this program as an administrator" and save.
6. Double click the shortcut icon for the WLIR Automatic Infrared Temperature Screening Software on the PC desktop to start the software, and you'll see the following interface.



3.4 How to install the driver file for USB interface

3.4.1 Disable Driver Signature Enforcement

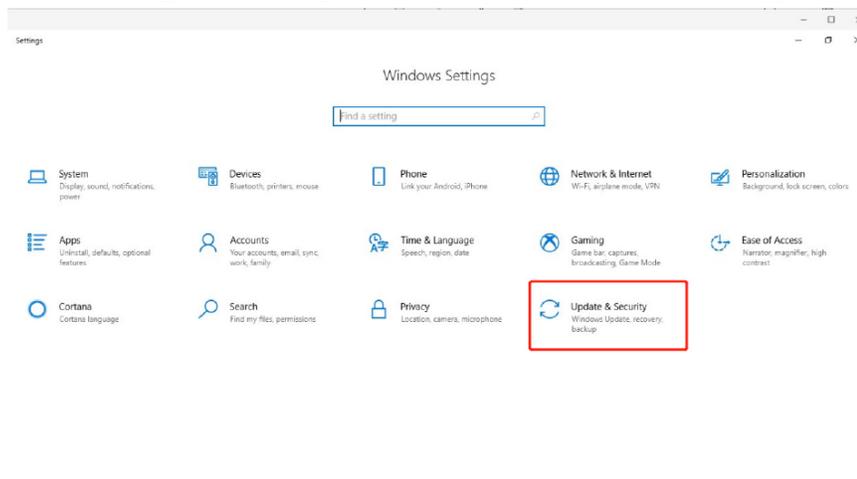
If your PC operating system is Windows 8 or Windows 10, please disable the driver signature enforcement following the steps below before installing the driver file for USB interface.

!Note: If you use Windows 7 operating systems, you can install the USB interface driver directly without the step to disable the driver signature enforcement.

4. Click the "Start" button at the left bottom of PC desktop, then click the "Settings" button as shown below:

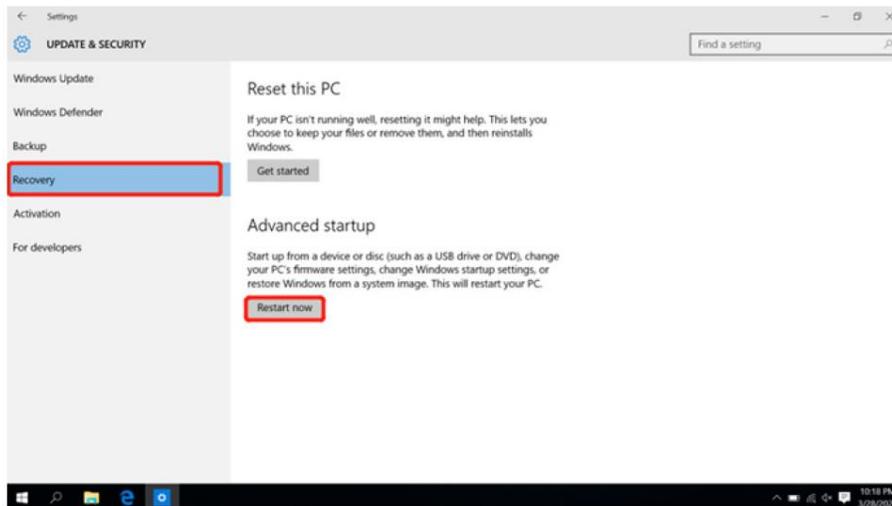


5. After entering the "Settings" interface, click "Update & Security";

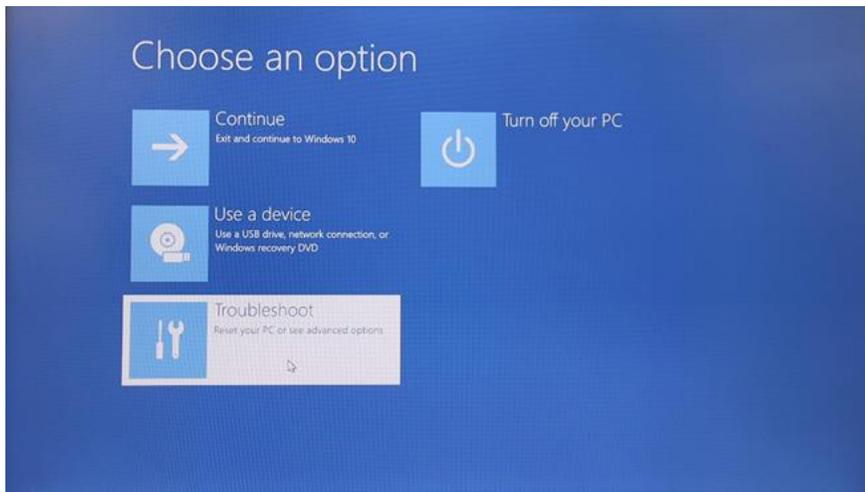


6. Click "Recovery" to select "Advanced startup" and click "Restart now" as shown below:

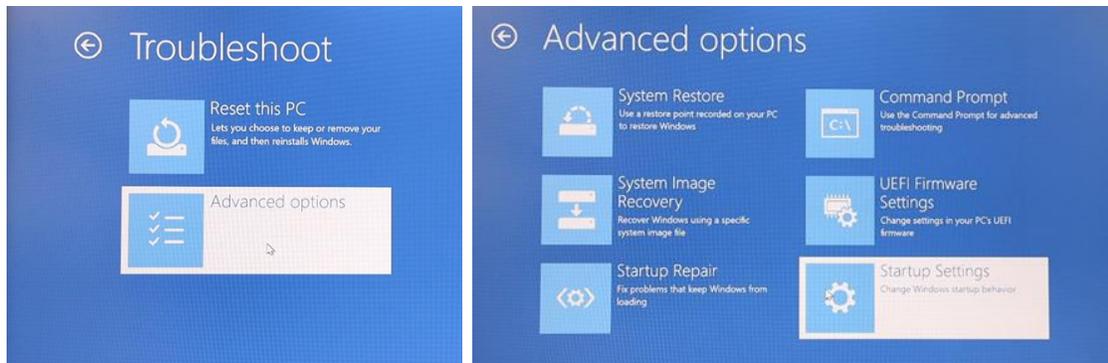
!Note: if you cannot find "Recovery", restart the computer and press the "Shift" button continuously during the startup procedure.



7. The following interface is displayed after restart. Please select "Troubleshoot";



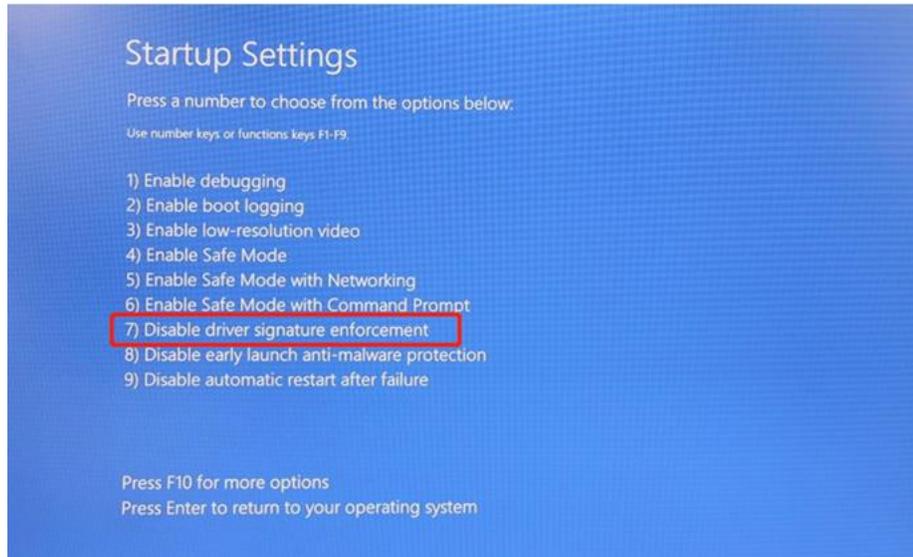
8. "Advanced options" is shown after entering the "Troubleshoot" interface. Click "Startup Settings";



9. Click "Restart" after entering the "Startup Settings" interface;



10. The following interface is displayed after restarting the PC; Press "F7" (for some computer models you might need to press "Fn+F7" or "7") Please follow the interface prompts to select "Disable driver signature enforcement";



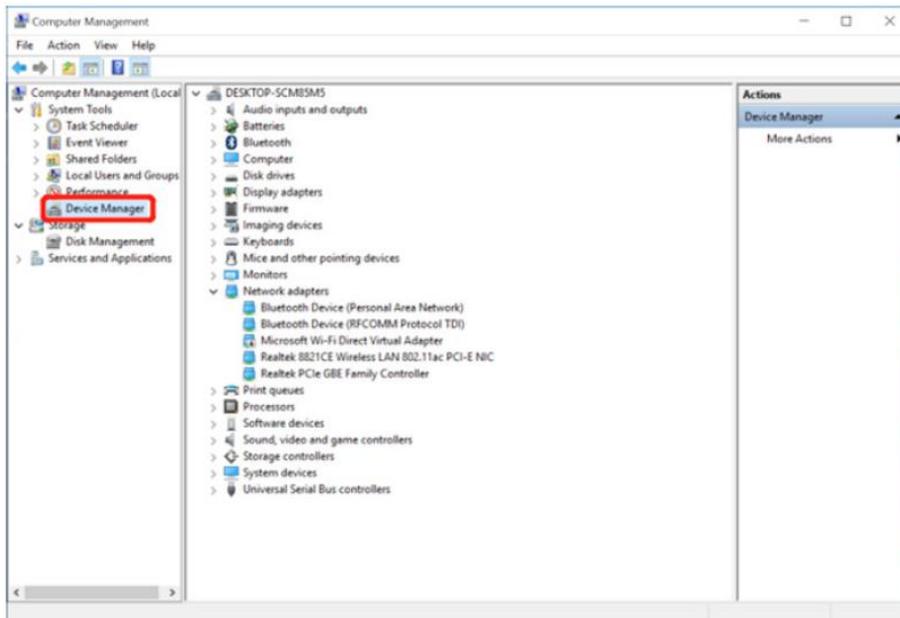
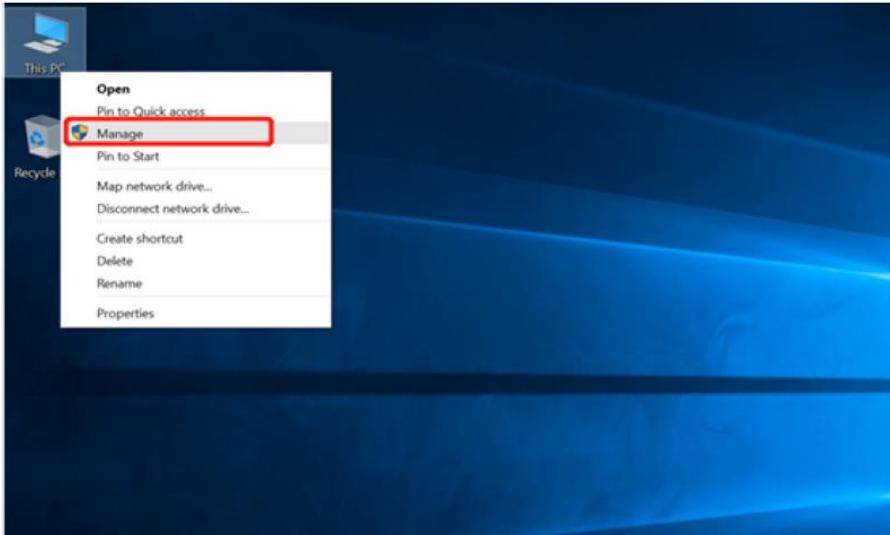
11. After restarting the PC, the driver signature enforcement will be disabled, allowing you to install the driver file for the USB interface.

3.4.2 Installation Steps for USB Driver

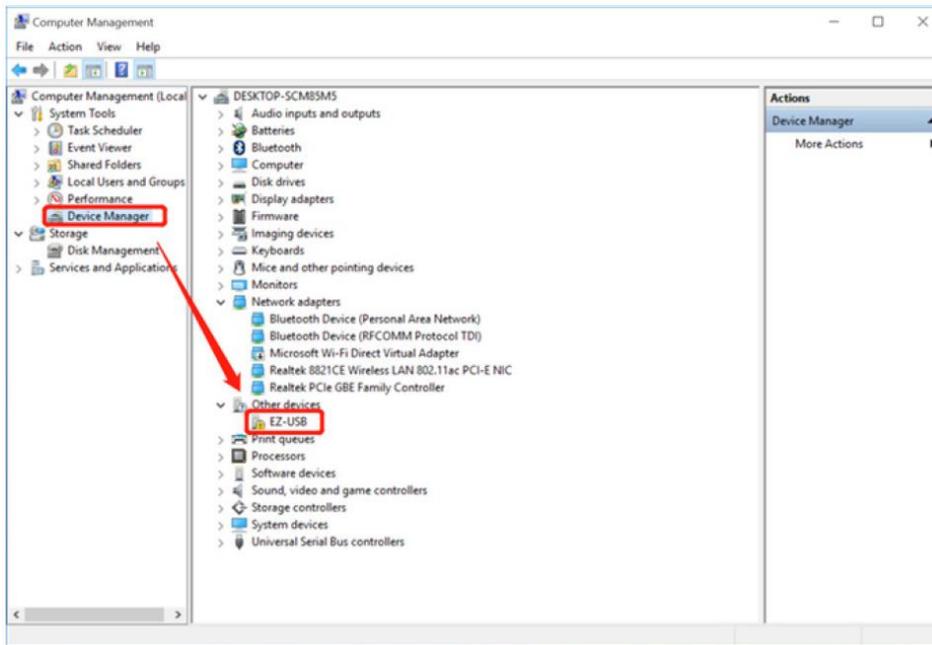
!Note: It is necessary to power on the screening device and connect it to the computer in order to install the USB interface driver file.

!Note: If your computer runs Windows 8 or Windows 10, please set "Disable driver signature enforcement" first. (Please see the detailed descriptions of "Disable driver signature enforcement" in 5.4.1 for specific steps), and then install the driver file for USB interface.

1. Power on the screening device and connect it to the computer. Click "This PC" with the right button, and click "Management" to show the interface below:

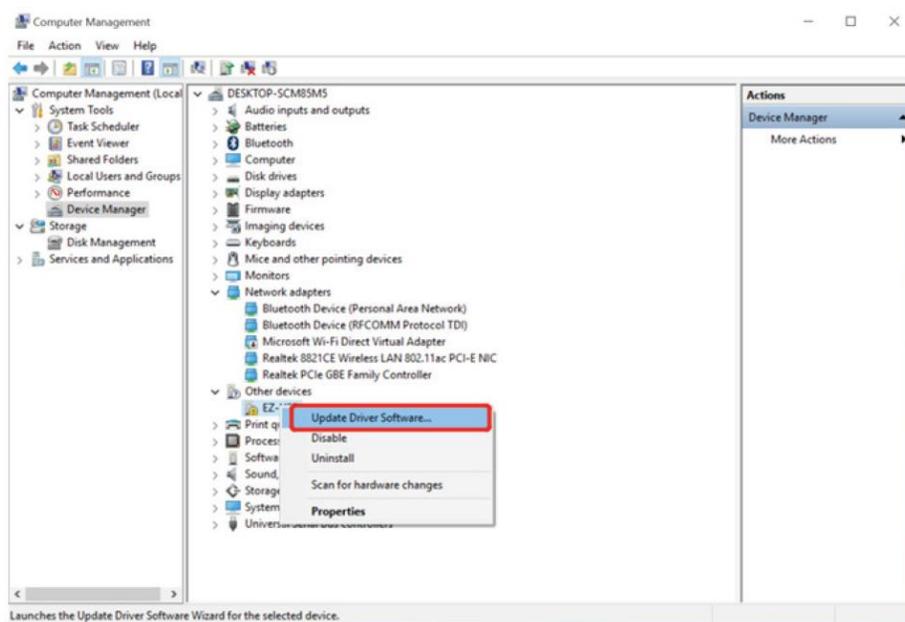


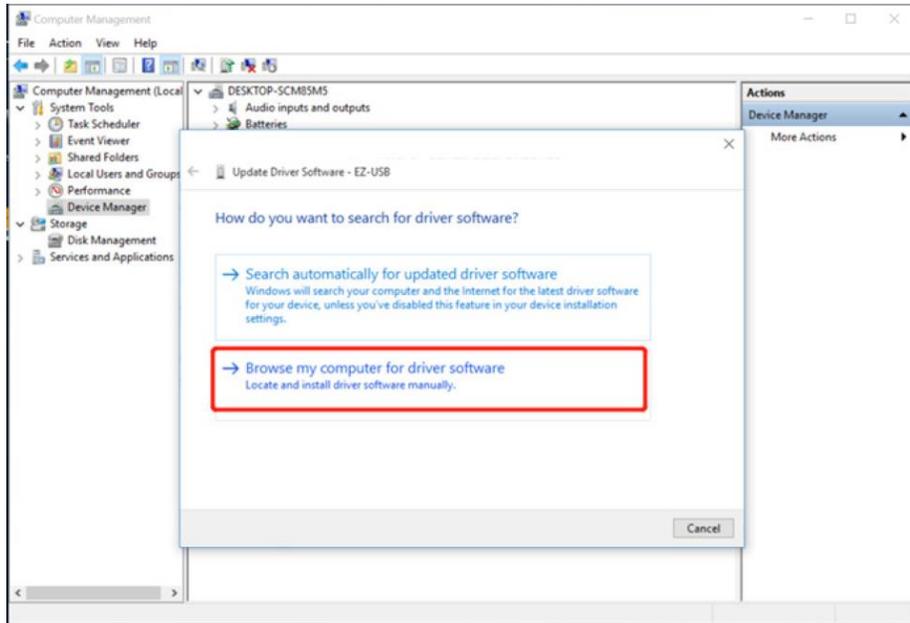
2. Click "Device Management" in the left column, confirm that the device is powered on and connected to the computer through USB. The interface below will be displayed:



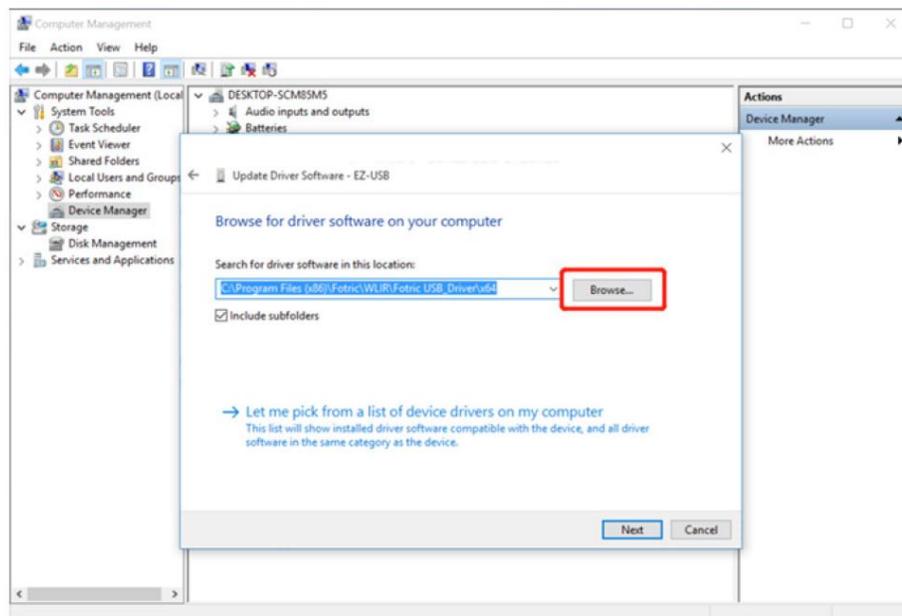
If "EZ-USB" appears in "Other devices", it indicates that the driver has not been installed.

3. Select "EZ-USB" and click the right button. Select "Update Driver Software" enter the interface below

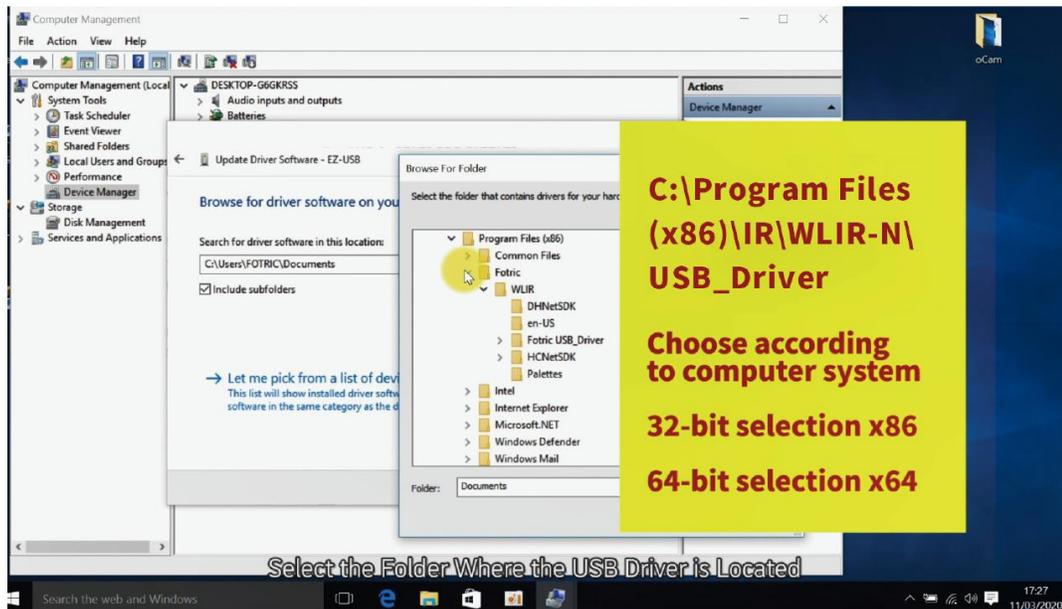




4. Click "Browse my computer for driver software" to enter the interface below:

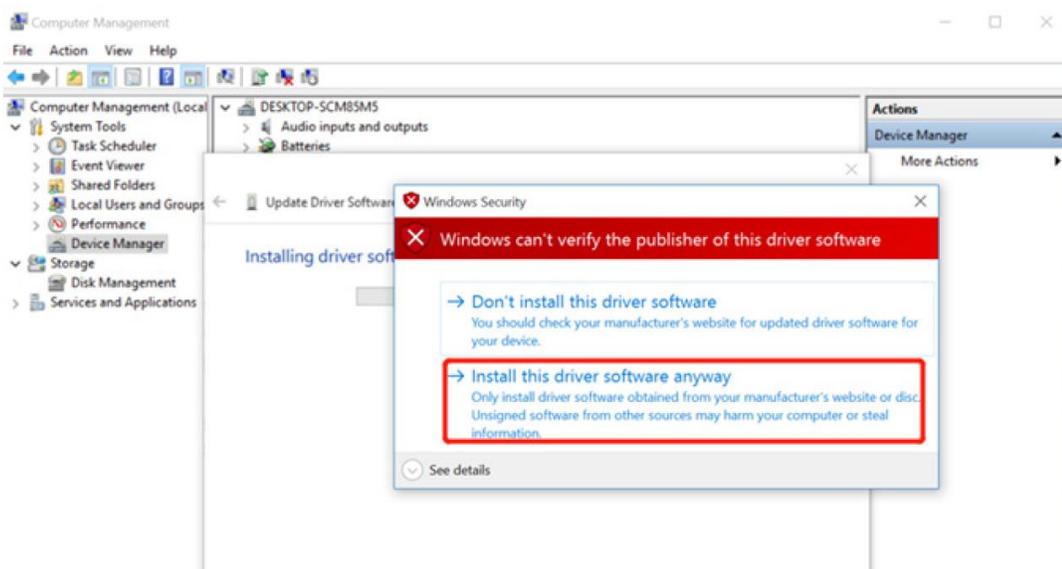


5. Open the software installation directory "C:\Program Files (x86)\IR\ WLIR-N\" and find the folder "USB Driver". Select the x86 folder for 32-bit Windows system or the x64 folder for 64-bit Windows system.

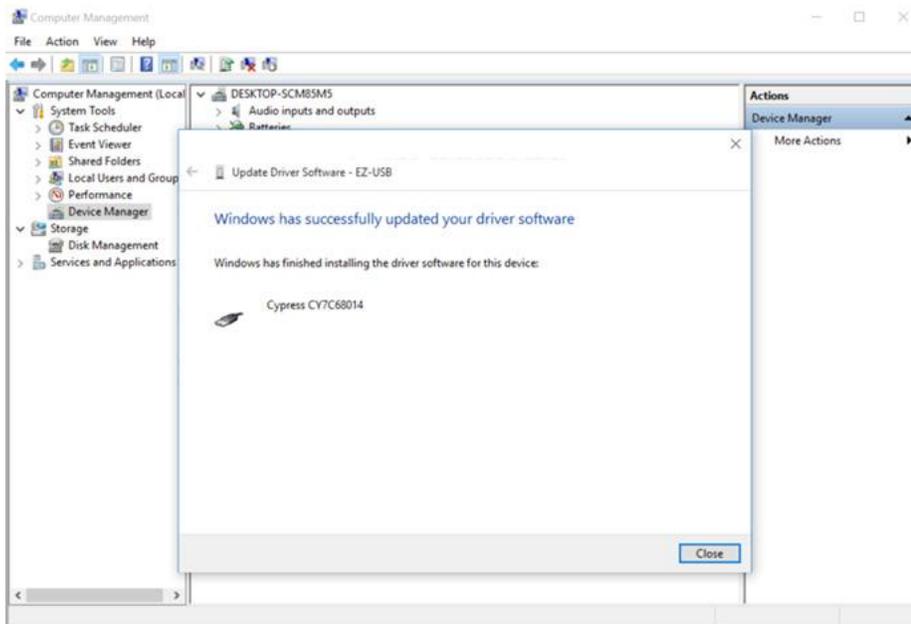


! Note: to determine whether the system is 32-bit or 64-bit, right-click on "Computer", select "Properties" and check "System type".

6. After selecting the driver folder, click on "Next" and the following prompt will appear:

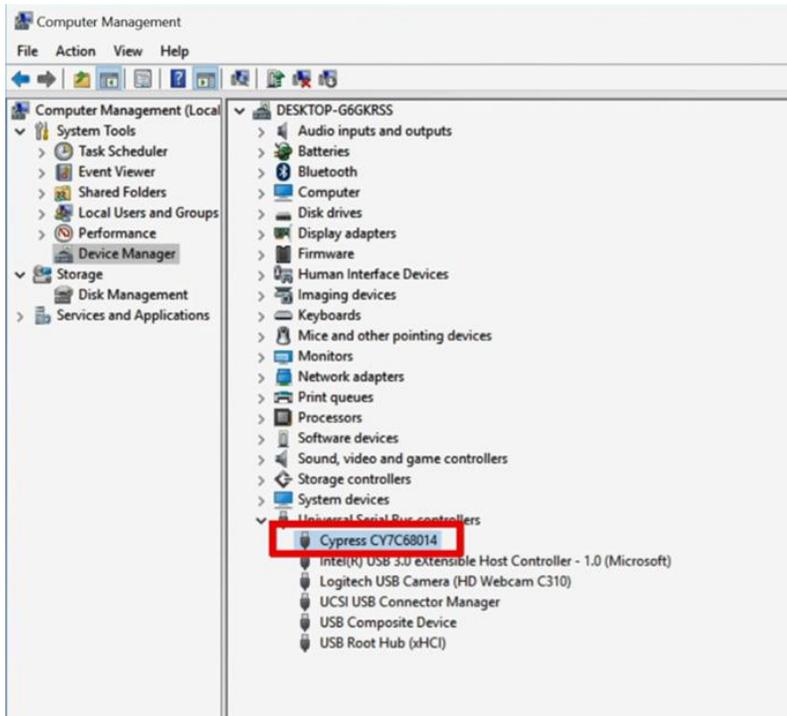


- Click on "Install this driver software anyway". The following prompt indicates the success of the driver installation.



! Note: Please refer to the above steps and try again if you encounter any installation error. Make sure to follow the instructions step by step.

- After the installation of the USB interface driver and connect the device to the PC, the following prompt will appear in the Device Manager:

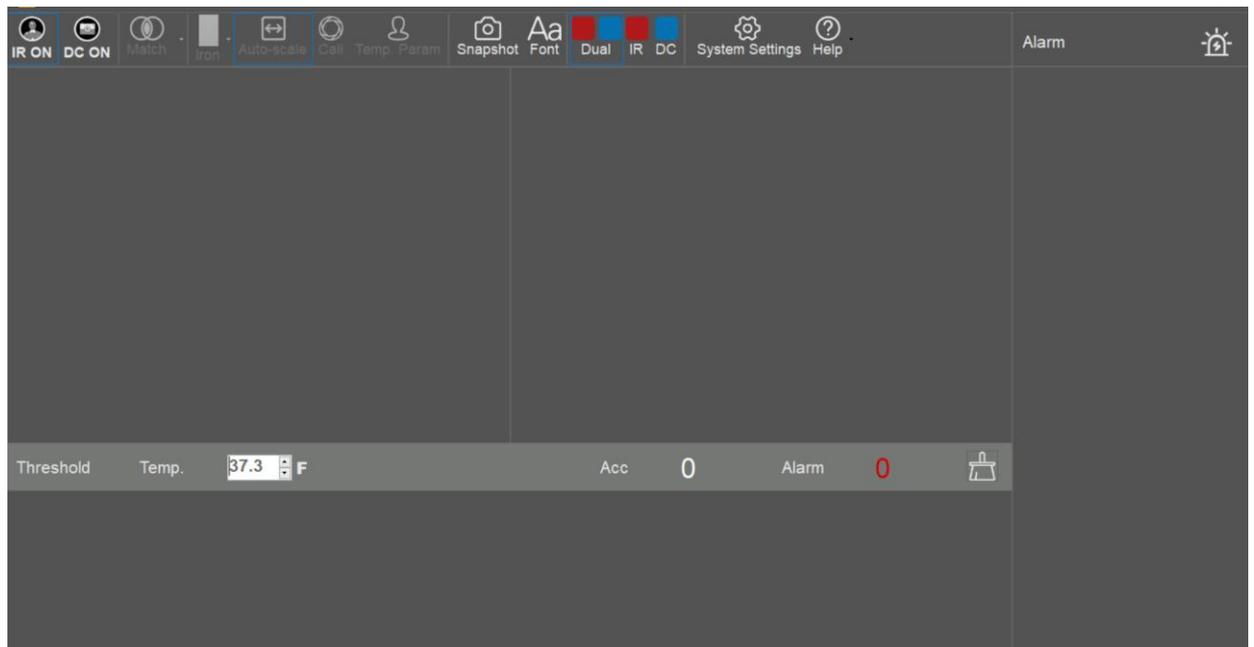


! Note: If an exclamation mark appears before the Cypress CY7C68014 option, it indicates that the driver is installed incorrectly. It is possible that a 32-bit driver (x86) or a 64-bit driver (x64) is installed on a 64-bit or 32-bit system, respectively.

! Note: When reinstalling the USB interface driver, the installed driver needs to be uninstalled and the USB plug of the device needs to be unplugged. Then reconnect the USB plug of the device to the PC and perform the installation of the USB interface driver as above.

! Note: If "EZ-USB" is still displayed under "Other Devices", it indicates that the driver is not installed successfully and needs to be reinstalled.

Software Use

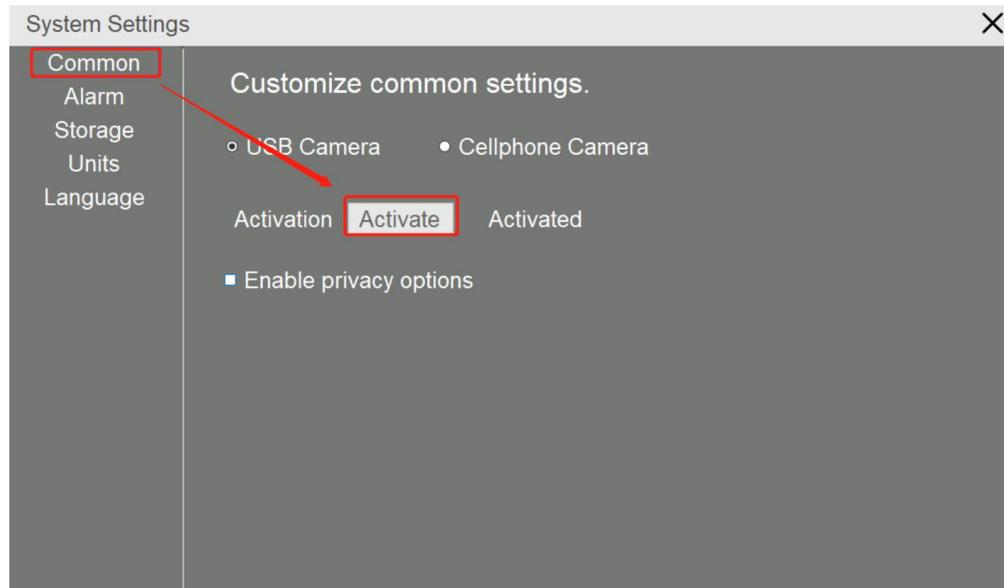


1.  IR camera connection: Connect / disconnect IR imaging device;
2.  Visible light camera connection: Connect / disconnect visible light imaging device;
3.  Match the IR image and visible light image;

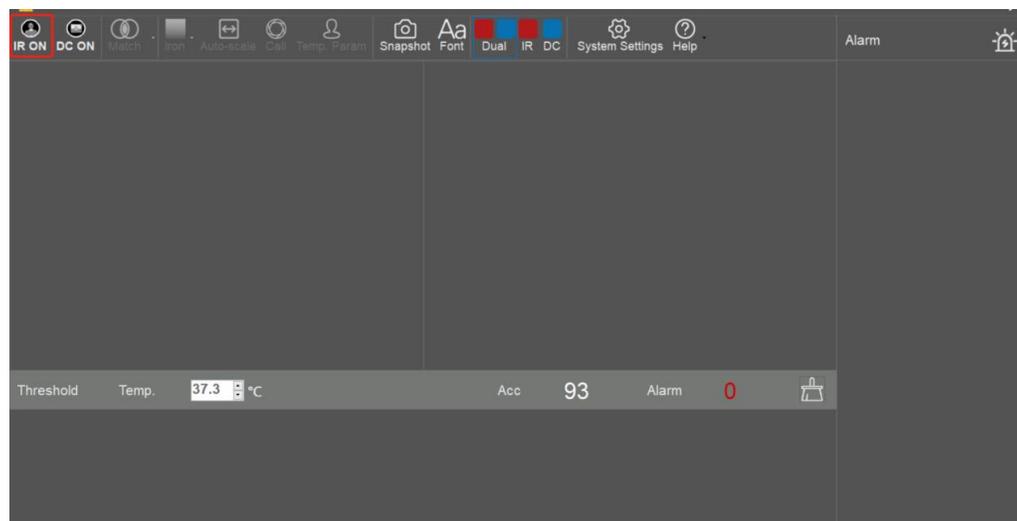
4.  Color palette: Change the color of the IR image display;
5.  Auto-scale Temperature Range: Modify temperature and width mode settings;
6.  Cali Calibration: Manually calibrate the device;
7.  Temp. Param Temperature measurement parameters: This function appears in the threshold mode, where the users can modify the emissivity, transmittance and temperature compensation parameters;
8.  Snapshot Capture: Capture a real-time photo;
9.  Font Font: Modify the font of the contents displayed on the interface, such as temperature, etc.;
10.  Dual Dual view mode: The interface displays both IR and visible light images;
11.  IR IR image mode: The interface only displays IR image;
12.  DC Visible light mode: The interface only displays visible light image;
13.  System Settings Settings: System settings for alarm capture, alarm modes, storage path, activation, etc.;
14.  Help About: View the user manual and software version.
15.  Temp. 37.3 °C Alarm temperature: Modify the alarm temperature.
16.  Clear: Clear total and abnormal detection counts.

5.1 Activate Face Recognition Function

1. Make sure that the computer is connected to the network;
2. Click on System Settings – Common – Activate. This function needs to be activated only for the first time, and then network connection is not needed afterwards.

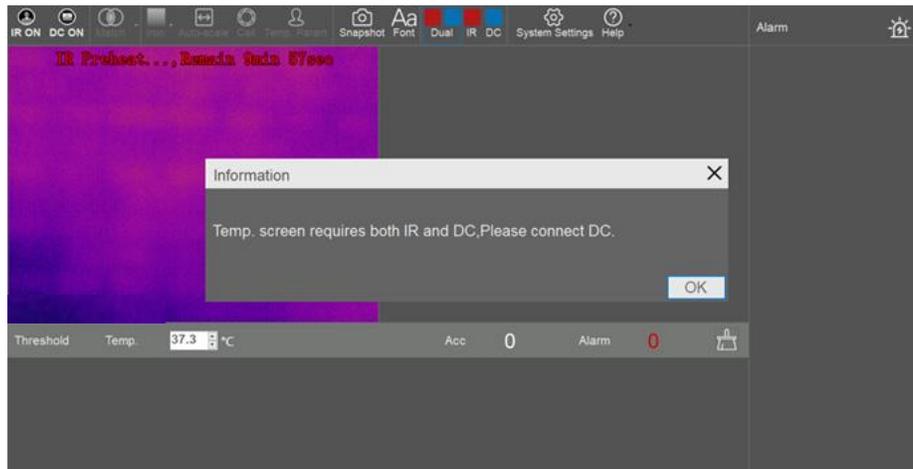


5.2 Device Connection



! Note: Before enabling the device connection, please make sure that the device is connected to the computer via the USB cable and Power on.

1. Click on  in the upper left corner, the following prompt will appear:



2. Click on "OK";
3. Click on  to connect to the Logitech camera, the following prompt will appear:



4. Select the camera (generally Logitech HD Webcam C310, Logitech HD Webcam C270 or USB Video Device) and click on "OK".



! Note: For stable operation, the device needs to preheat for 10 minutes after powering on. Sampling, detection and alarm can be performed after preheating.

5.3 IR and Visible Light Image Match

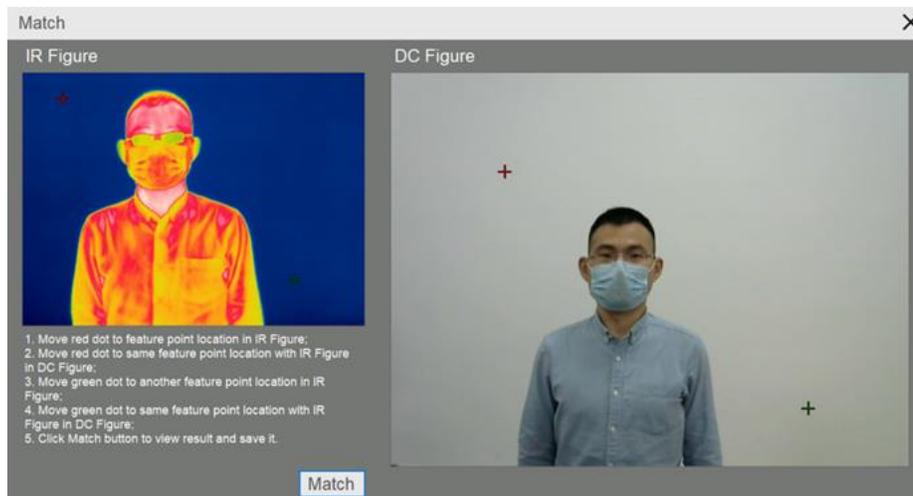
1. The device must be aligned before its first use, otherwise the visible light image and the infrared image will not correspond, causing a temperature measurement error.

2. Click on the drop-down menu on 



3. Select one of the three default options to the distance between the camera and the testing object/individual. The current image matching will be assigned to the selected distance. Next time the system is launched it will automatically load the last option chosen.

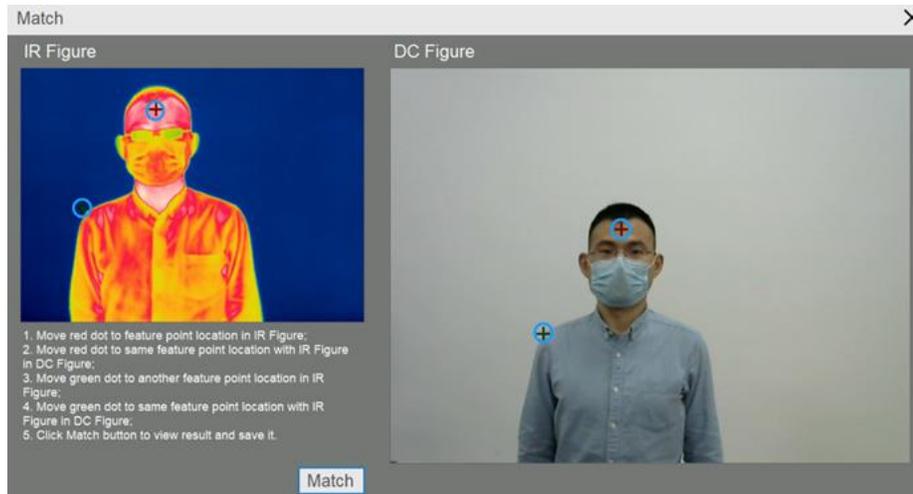
4. Click on  "Match" to enter the Match interface.



! Note: Before alignment, please focus the IR image. It is recommended to find a vertex or intersection point for easy identification within the actual measurement distance for alignment.

! Note: If the focus is not clear or the alignment is not precise, it will cause deviation during the temperature measurement, and the measure of the face temperature will be inaccurate.

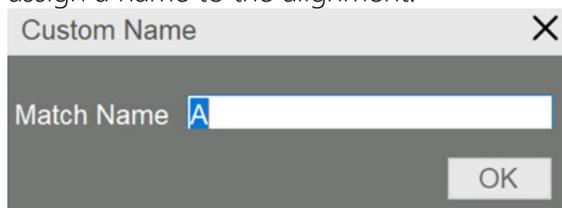
- Adjust the two red crosses to aim at a same point in both images. It is recommended to find an object that is easy to identify. Repeat the procedure with the green crosses as shown below:



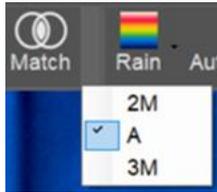
- Click Match and the following image will appear:



- Check the Match, click on  to fine-tune the position. If the alignment is not precise, click  to re-match. Once successfully matched Save and assign a name to the alignment.



8. If you need to recall the Match information, you can click on the triangle next to the Match button and select from the drop-down menu.

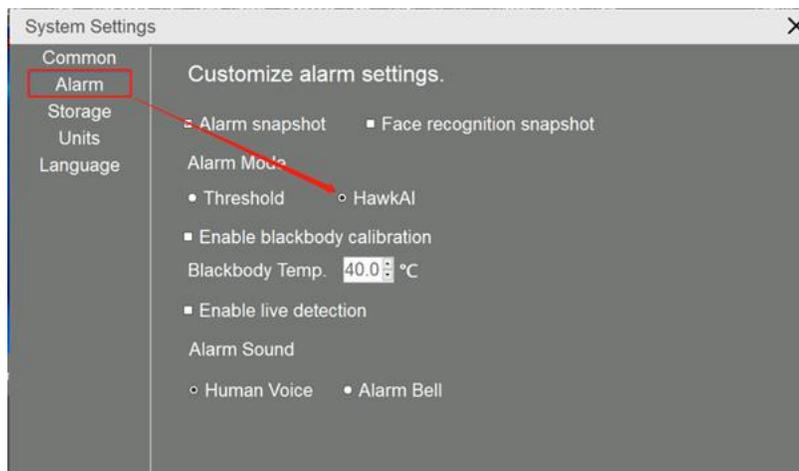


5.4 HawkAI Mode

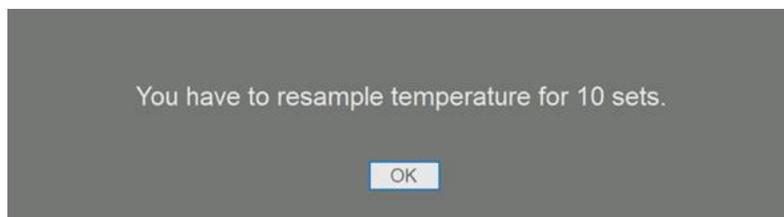
The HawkAI alarm mode automatically collects 10 forehead temperature samples and calculates the compensation temperature converting forehead surface temperature into human body temperature. As the inspected individuals enter and get sampled continuously, the compensation temperature is calibrated in real time, which is more suitable for locations with constant change of ambient temperature.



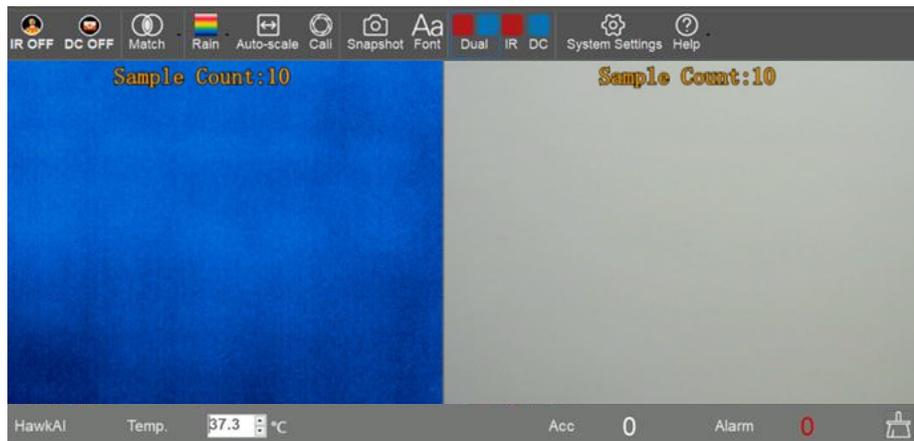
1. Click on  and select "HawkAI", as shown below:



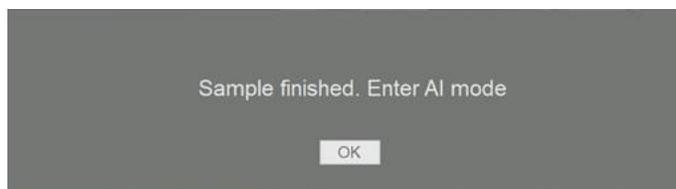
2. Close this interface to start AI sampling, as shown below:



3. Click on OK. As each inspected individual enters, a headshot and temperature value are captured, as shown below:



4. After sampling 10 times, you will be suggested to enter the HawkAI alarm mode. Click "OK" to enter the HawkAI alarm mode, as shown in the following figure:



5. The default temperature alarm in AI alarm mode is 37.3 degrees Celsius, which is recommended to use. It can be adjusted if necessary, as shown in the following figure:



! Note: Accurate temperature measurement requires clear focusing of the screening instrument. The device has a manual focusing ring that can be used to adjust the focus.

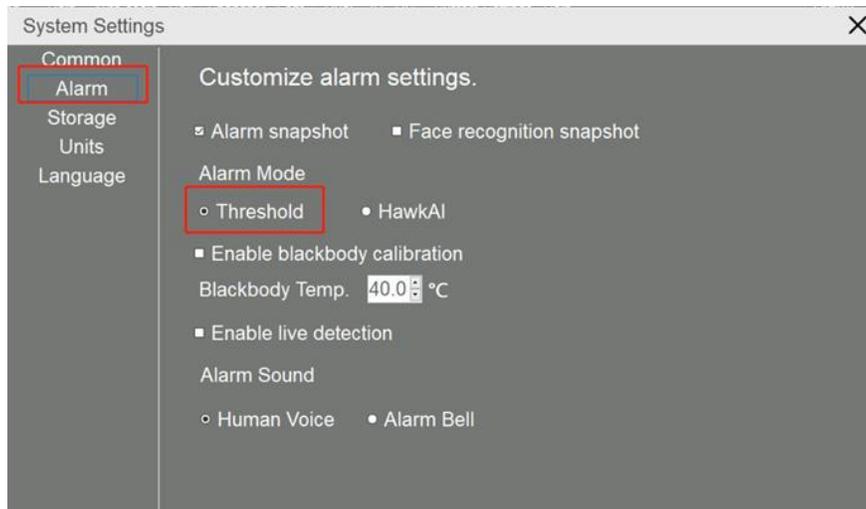
! Note: Accurate temperature measurement requires a good match between the IR image and the visible image. Poor matching will result in inaccurate sampling and temperature measurement.

! Note: The preheating of IR imager should be completed before data collection. No data collection can be made during the preheating process; neither the screening and alarm will be available (More detailed information in the FAQs section).

5.5 Threshold alarm mode

In the threshold alarm mode, it will be measured the real temperature of the surface of the forehead. The temperature and alarm parameters can be manually adjusted.

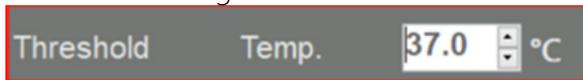
1. Click on  option, select "Alarm", and then "Threshold" mode, as shown in the following figure:



2. Click on Temperature Parameter option ; emissivity, transmission and temperature compensation can be set, as shown in the figure below:



3. Emissivity: Default setting is 1
Transmission: Default setting is 1
Temp.Comp: You can manually enter the compensation temperature value, if 1 is typed in, 1 will be compensated. The maximum allowed input number is 10.
4. For the alarm triggering temperature setup it is recommended to measure 5-10 persons, then set the alarm temperature according to the measured temperature, as shown in the diagram below:



! Note: Accurate temperature measurement requires clear focusing of the screening instrument. The device has a manual focusing ring that can be used to adjust the focus.

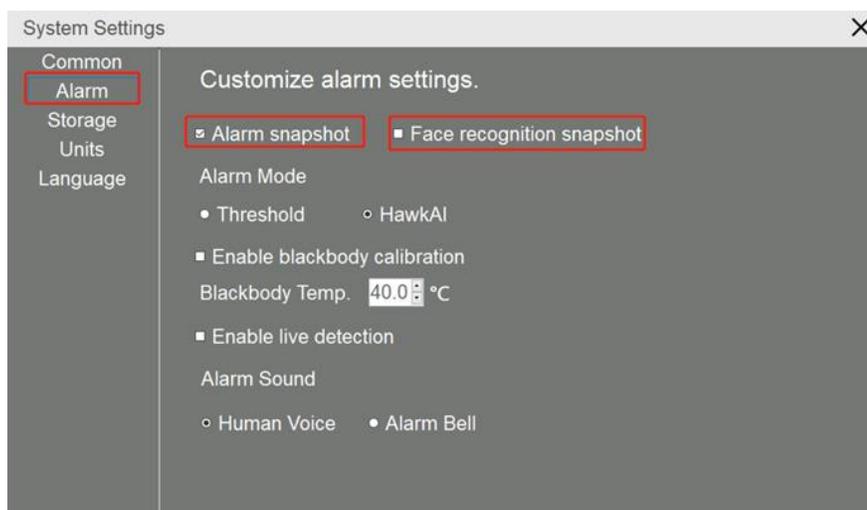
! Note: Accurate temperature measurement requires a good match between the IR image and the visible image. Poor matching will result in inaccurate sampling and temperature measurement.

! Note: The preheating of IR imager should be completed before data collection. No data collection can be made during the preheating process; neither the screening nor alarm will be available (View FAQs section for more details).

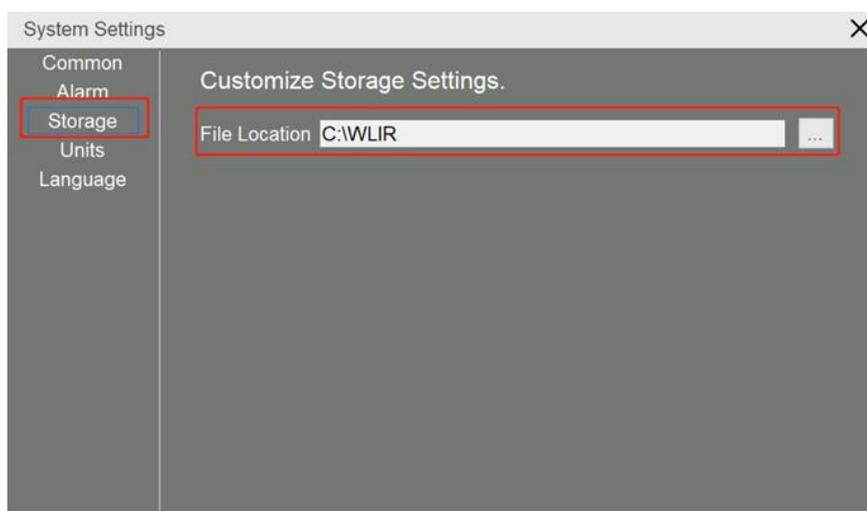
5.6 Snapshot and Storage Settings

Two types of alarm snapshot can be set. Alarm snapshot (snapshot is taken once alarm is triggered) and detection snapshot (snapshot is taken once human beings are detected).

1. Click on , enter the following interface and check "Alarm snapshot" to set Alarm snapshot; Check "Face recognition snapshot" to set the detection snapshot. Click "Close" after setting.



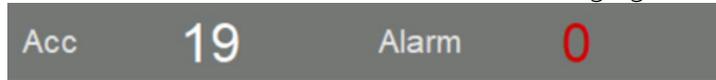
2. Click on , and select storage to set the save path for snapshot photos, as shown in the following figure:



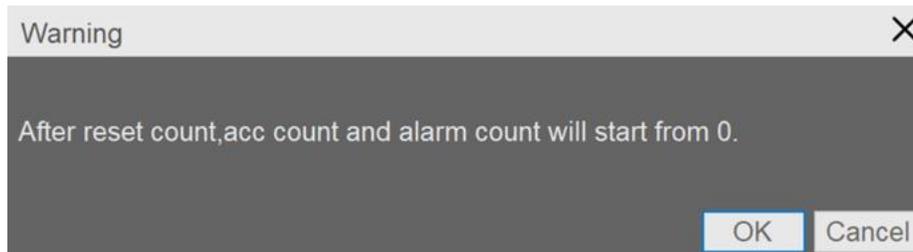
3. Open the snapshot picture; you can check the head bar at the bottom or the right side of the alarm head bar, right click at blank space, open the folder;

5.7 Headcount Statistics

1. The system automatically counts the number of detected people and the number of abnormal detections, as shown in the following figure:



2. Accumulative and abnormal counts can be reset by clicking on 



3. After the face portrait is captured and the temperature is measured, they will appear at the bottom. If the "Face recognition snapshot" function is enabled, double-click the face to zoom into the picture; Or right-click on the face portrait to view a larger image by selecting "Open".
4. When an alarm sets off, the captured image and temperature will appear on the right side. If the alarm snapshot is turned on, double-click the image, or right-click on the image to select the file to view a larger image.



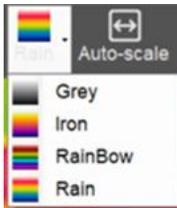
5. Right-click on the face portrait to clear the selected face portrait or right-click on the blank area to clear all face portraits.

5.8 Introduction to More Functionalities

5.8.1 Palette

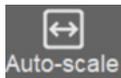


Click to modify the infrared image palette



! Note: This function will only modify the visualization effect, not the temperature measurement itself.

5.8.2 Temperature Range Mode



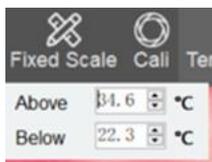
1. **Auto-scale** For automatic temperature range adjustment, the system sets the temperature range according to the highest and lowest temperatures in the picture.



2. **Smart Scale** For intelligent temperature range adjustment, the system intelligently sets the temperature range after discarding extreme high/ low temperature interference to avoid affecting other parts of the display.



3. **Fixed Scale** It allows to manually set the upper and lower limits of the temperature range, as shown below.



! Note: This function only affects the visual effect, not the temperature measurement results.

5.8.3 Calibration



It makes the device to calibrate itself the moment it's clicked. The equipment automatically calibrates itself by default; this function only adds a manual calibration and does not affect the automatic calibration.

5.8.4 Snapshot

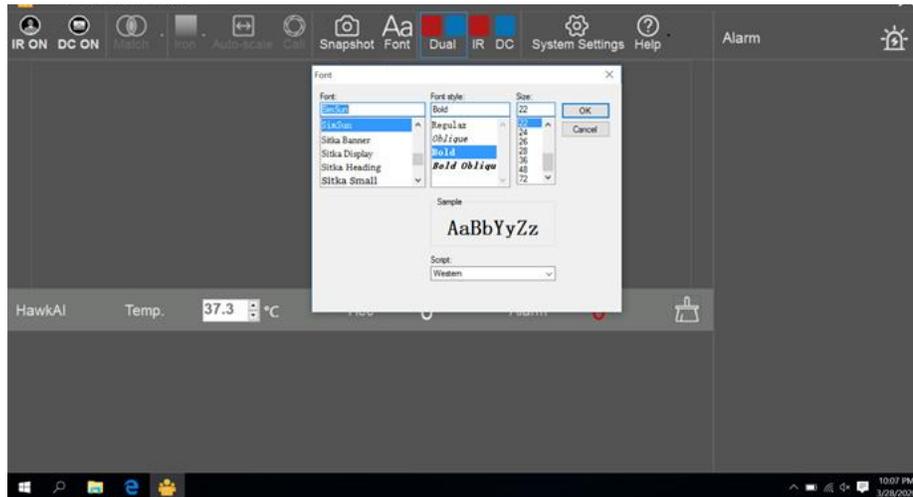


Click to take a screenshot of the interface. See 7.6 Snapshot and Storage Settings for the storage location.

5.8.5 Fonts



Click to access the following interface to adjust the font and size of temperature prompts.



5.8.6 Display Settings

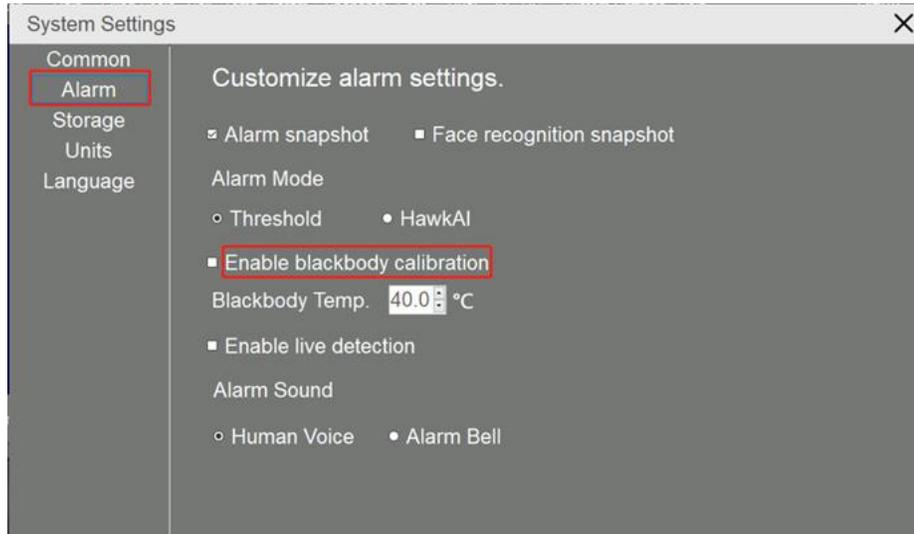


Click on **Dual IR DC** to switch screen display mode;
Right click on the IR image or/visible image to display the corresponding full screen.
Press Esc or right click to exit the full screen.

5.8.7 Enabling Blackbody Calibration



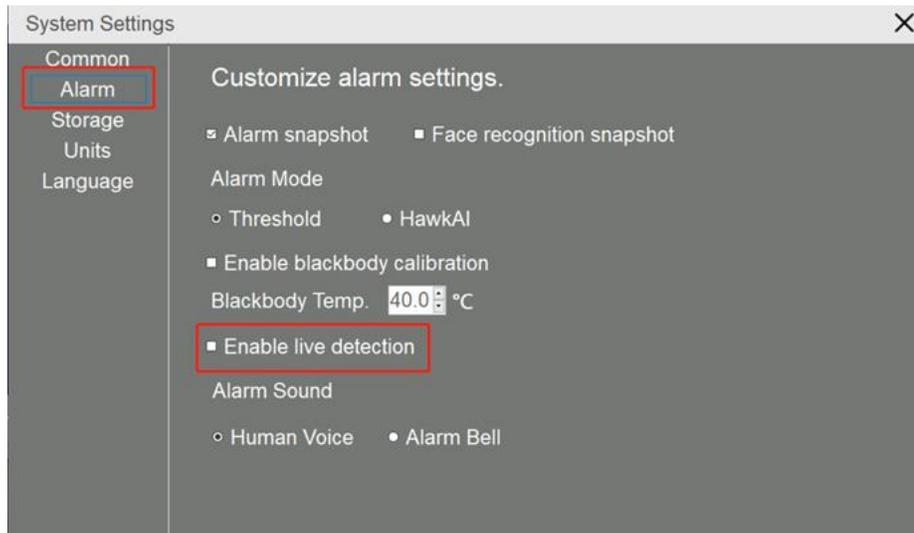
Click on , to enter the "alarm" menu to enable the Blackbody temperature calibration. Before enabling this option, it is necessary to preheat and stabilize the Blackbody at the set temperature, then place it on the edge of the IR image picture within the detection distance.



5.8.8 Live Detection



Click on , to access the "alarm" menu where the live detection can be enabled. This option will cause the software to tell if any face (real or in pictures) captured by the camera is a live person. If it is not a live person, the software will not compensate for the temperature.



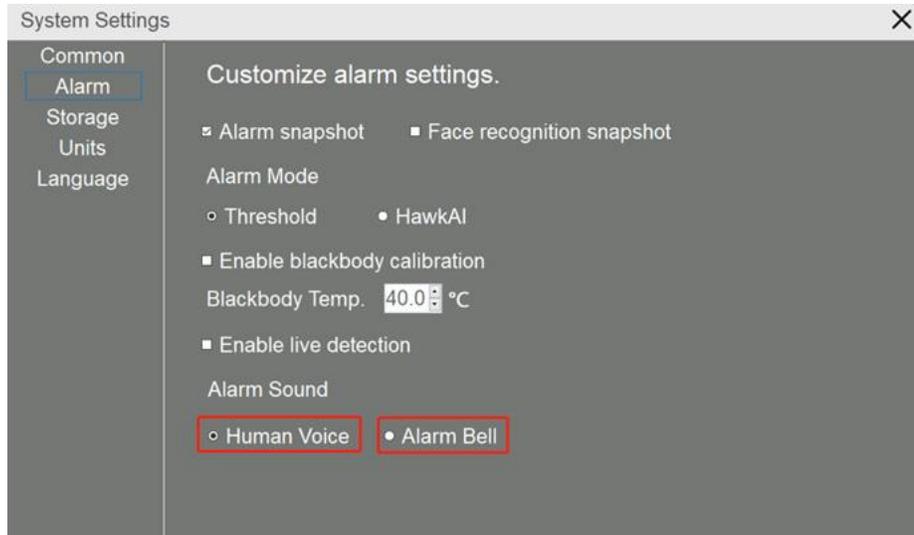
5.8.9 Alarm Sound



Click on **System Settings**, to enter the "alarm" menu to set up the alarm sound;

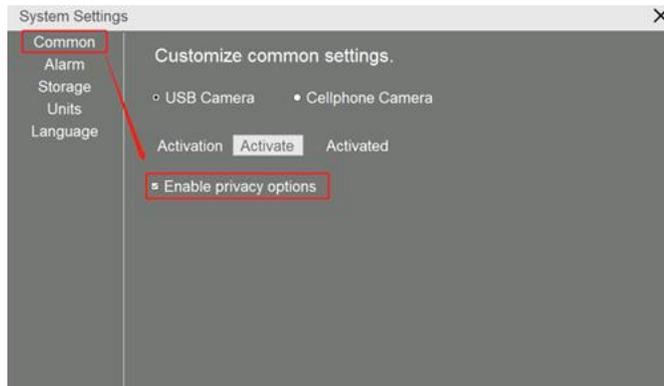
Human Voice: When the alarm is set off, a voice will announce "Caution, abnormal!"

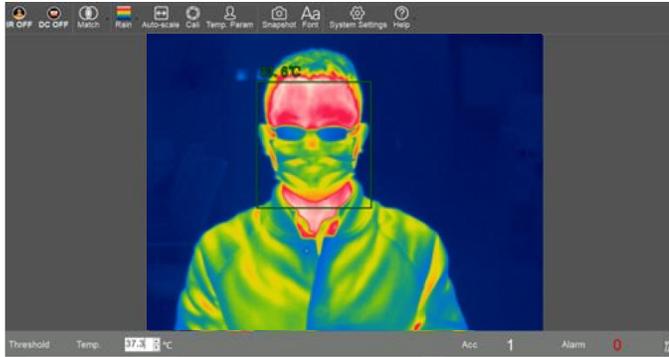
Sound alarm: Beeping sound is emitted when the alarm is set off.



5.9 Privacy Features

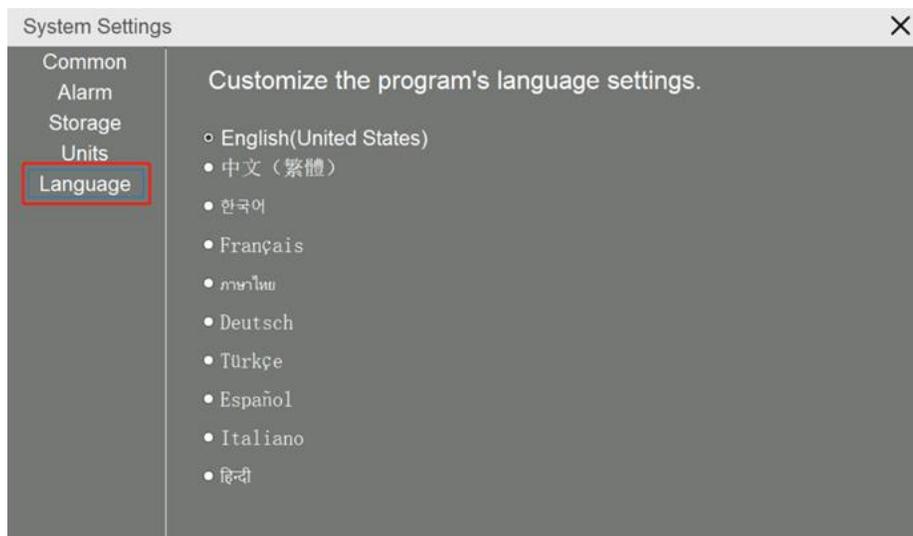
When the Privacy Option is enabled, only the infrared image will be displayed on the screen and auto snapshot is disabled. Full screen mode can be activated by right-clicking on the infrared image as shown in the figure below:





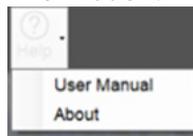
5.10 Language

The software is available in multiple languages. Click on  , to enter the "language" menu to set up the language.



5.11 Help

Click on  for help and to see the user manual and software version information.



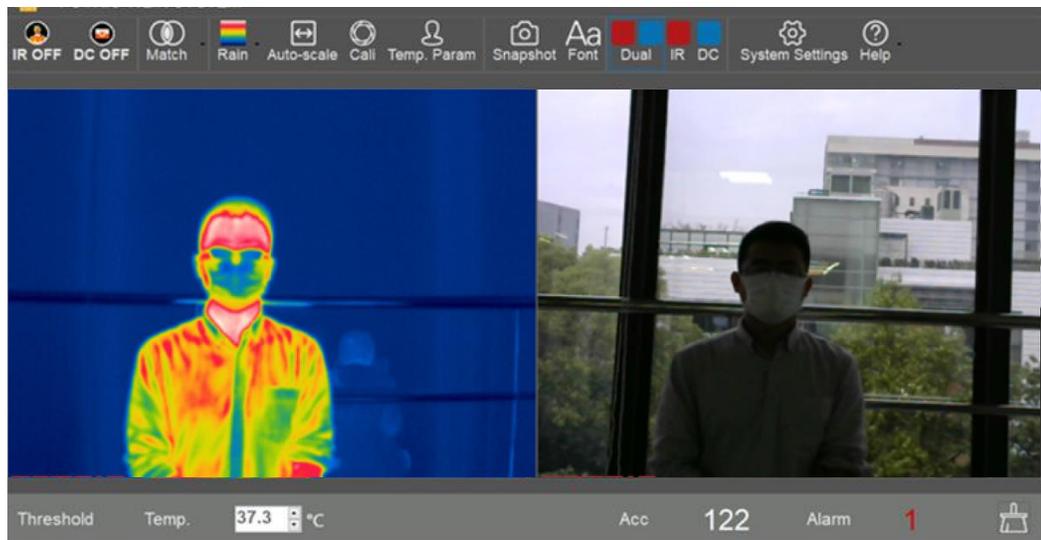
In the "About" section, available online software updates can be detected.

FAQS

1. Backlighting problem (cannot recognize human face)

The recommended installation environment for the device is indoors with good lighting. Try to avoid a backlit environment, which can affect the accuracy of face recognition or even result in detection failure.

When the device is facing a door or window, the facial recognition failure in the figure below may occur.

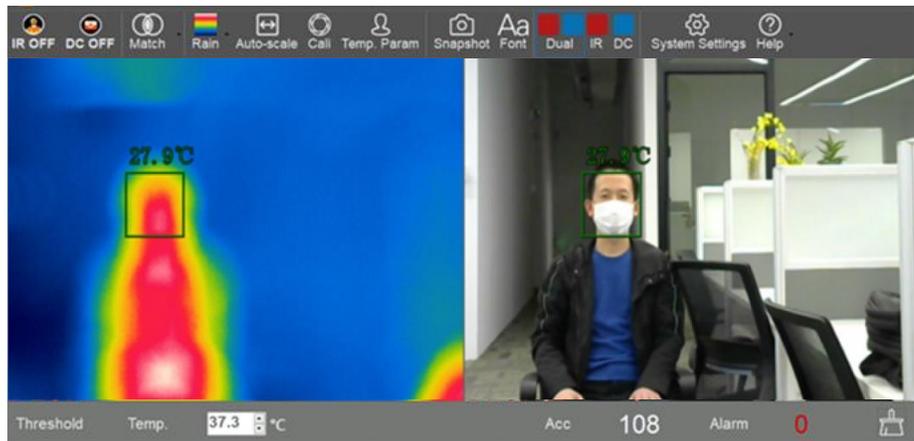


It is recommended to change the orientation of the device or turn on the indoor lights to reduce the effect of backlighting.

2. Accurate focus

The device uses manual focus adjustment, and it can only correctly measure temperature if its focus is accurate. If the focus is not accurate, the infrared image can be blurred, and the corresponding measured temperature can also result in a large error.

Blurred focus and inaccurate temperature



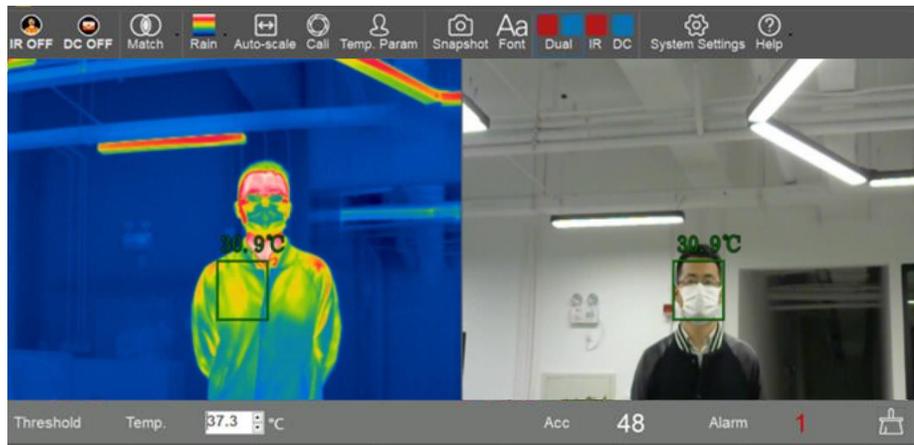
Accurate focus and accurate temperature



3. Matching

To use the device correctly, the visible and infrared images must be matched.

The picture below shows an unmatched photo. The visible light recognition frame (right) is positioned to the face, while the infrared recognition frame (left) does not match the face position. The temperature test result obtained is incorrect, as it has not read a human face temperature.



After matching, the face recognition frame of the infrared photo and the visible light photo are in the same position, so the measured result is accurate



4. Threshold mode

The threshold mode directly displays the human body surface (face) temperature. The body surface temperature is greatly affected by the environment.

In threshold mode, the temperature compensation can be performed manually, and the compensation temperature value is ≤ 10 ° C.

5. Recommended Screening Mode

The working principle of the HawkAI mode is that the device first collects the human body surface (face) temperature, and then automatically calculates the compensation temperature through the AI algorithm to convert the human body surface temperature into the real body temperature. HawkAI mode can adjust the compensation temperature value in real time according to the flow of people continuously passing the temperature measurement point, to adapt to the change of ambient temperature.

Please note: The AI mode is designed with caution. The goal is to screen out people with a high body temperature in the crowd, and then perform a second temperature measurement. Body temperature varies from person to person; the biggest difference can be as high as 1-2 °C. With careful consideration, please have the screened person to stabilize for 5-10 minutes, and then perform a second temperature measurement. If their temperature is still high, it is recommended to use a medical thermometer to repeat the measurement.

6. Recommended Screening mode data sampling

When using AI mode, the software will prompt: "You have to resample temperature for 10 sets". We recommend sampling the temperature of 10 different people with variations, so that the temperature compensation value of the AI algorithm can fit most people.

7. No alarm above 40 °C

When the measured temperature of the human face exceeds 40 °C, the software will not emit an alarm. The software's upper limit of the alarm temperature is 40 °C. If the temperature of the human body exceeds 40 °C, the person would feel unmistakably ill and should go to the hospital for treatment immediately. If the person keeps appearing in some places, he or she may use many methods to reduce his or her face temperature to prevent being detected by infrared thermal imaging devices.

8. The effect of distance on temperature measurement

First, we recommend that the location of the temperature measurement point is fixed, and the distance from the device to the measurement point is also fixed. Then the device is focused and matched under this premise. Therefore, when the person to be inspected reaches the temperature measurement point, the focal length is appropriate, and the measured temperature is accurate.

If the person being inspected continues to walk towards the IR imaging camera, he/she will be closer to the infrared camera, the focal length of the infrared image changes, and the measured temperature may increase.

Therefore, when the equipment is installed, we recommend that the temperature measurement route to be arranged in an "L" shape. After reaching the determined temperature measurement point, the channel turns left or right by 90°.

9. Face recognition

This function needs to be activated online for first-time use. Then the network connection is no longer needed after activation. Please note: The network can be disconnected after activation, but do not disable the network, otherwise the software will prompt that it cannot connect to the visible light camera and the face recognition function needs to be activated again. Please also make sure that the computer time is consistent with the local time.

10. Cannot display visible light image

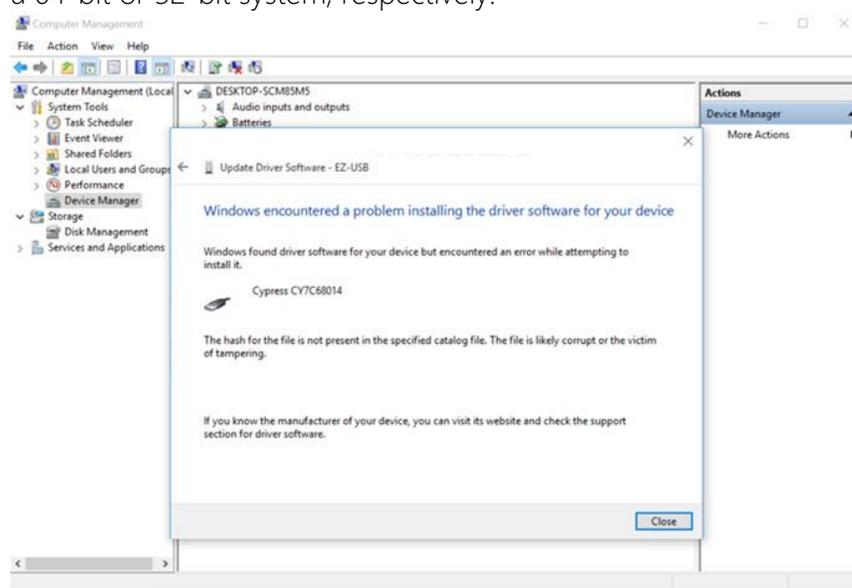
There may be several reasons when the software prompts that the visible light (DC) image connection fails: 1. The USB cable connection of the visible light camera is faulty. Please reconnect or try again with a different USB port on the computer; 2. The computer may not have a camera driver installed. Please go online (Logitech official website: <https://www.logitech.com>), download and install the relevant driver. 3. Please check if the network is disabled. Disabling the network may cause the visible light image to fail.

11. Cannot display infrared thermal image

First, please make sure that the device is power on, and the status light is green. Second, make sure that the device driver is installed correctly. Third, make sure the USB connection between the device and the computer is stable.

The Windows 8 / 10 version of the driver cannot be successfully installed

Please check whether the driver signature enforcement is disabled (Disable driver signature enforcement) . If this step is not performed, the prompt below will appear. The second possibility is that a 32-bit driver (x86) or a 64-bit driver (x64) is installed on a 64-bit or 32-bit system, respectively.



12. Live detection

Live detection is a new feature that can verify whether the measured object is a real living body, which can exclude the effects of photos, videos, and screen recordings, etc. Please note that this function will be continuously upgraded and may have a certain error rate.

13. Shutdown

To manually shut down, press and hold the power button for about 6 seconds. If the device is disconnected from the software (software has been closed or the computer is in sleep), the device will automatically shut down after 5 minutes.

14. Unable to recognize faces

The face recognition rate of the software cannot always be completely accurate. It is necessary to pay attention to these situations in which faces may not be successfully recognized: people with black masks; people with long hair covering their foreheads; people with hats; people with less hair; people walking too fast, etc. Additionally, misidentification may occur where other

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