USER MANUAL

FEVER WARNING SYSTEM
KT-800M

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KT-800M Fever Warning System complies with current EU directives related to electromagnetic compatibility and safety.

All products of Sonel S.A. are manufactured in accordance with Quality Management System which is approved to ISO9001:2008 for the design, manufacturing and servicing.

Due the continuous development of our products, we reserve the right to introduce changes and improvements in the thermal imaging camera and in the software described in this manual without prior notice.

CONTENTS

1 Safety

The purpose of this content is to ensure that the user uses the product correctly to avoid danger or property damage. Before using this product, please read this instruction carefully and keep it for future reference.

Ignoring warnings shown below may cause death or serious injury:

- In the installation and use of this product, it is necessary to strictly abide by the various national and regional electrical safety regulations.
- Do not connect multiple devices to the same power adapter (exceeding the load of the adapter may cause excessive heat or cause a fire).
- Disconnect the equipment from the power supply during wiring, disassembly, etc.
- If the device emits smoke during use, produces a foul odor, or emits noise, immediately turn off the power and contact the distributor or manufacturer to deal with related matters.
- If the device does not work properly, contact the distributor or manufacturer. Do not disassemble or modify the device in any way.

Ignoring the precautions shown below can cause injury or property damage:

- Do not drop objects on the device or shake the device vigorously. Keep the device away from locations subject to magnetic interference. Avoid installing the device in a place subject to vibration or impact. Ignoring this may damage the device.
- In order to ensure the accuracy of human body temperature screening, do not use the device in the environment temperature above 35℃ or below 15℃, as well as high humidity (more than 85%). Try to avoid the lights in the scene and the passengers Interference from high-temperature targets.
- Do not forcefully pull the cable, which will cause the internal cable connection to break or fall off.
- Do not aim the device at strong light objects, such as the sun, electric iron, etc., otherwise the device will be damaged.
- Do not place the device in direct sunlight, poorly ventilated locations, or near heat sources such as heaters or heaters. Ignoring this may cause a fire hazard.
- Do not turn the machine on and off frequently. The restart interval after shutdown is not less than 30 seconds.

2 Description of the system

The full-automatic infrared thermal imaging temperature measurement alarm system can perform large-area monitoring in crowded public places. The system's non-contact preliminary screening of body temperature can quickly find and track over-temperature personnel to help troubleshoot human fever.

This system combines advanced technology such as infrared human body temperature measurement algorithm and AI intelligent face recognition. The temperature measurement is accurate and the operation is simple and convenient. Multi-target tracking can ensure that no targets are missed. Custom alarm temperature zones and high-temperature shielding settings can avoid interference from other high-temperature objects. People who find over-temperatures can automatically alarm and take pictures for storage. It is convenient for users to query and classify management. Ideal equipment for health and epidemic prevention in public places.

2.1 Product application site

The automatic infrared thermal imaging temperature measurement and alarm system can be applied to crowded public places such as government agencies, airports, stations, large factories, schools, and commercial centers. It is mainly installed and deployed at the entrances, passages, lobby, etc. Application scenario is shown below.

Small application scenario

2.2 Product configuration

IR Fever Warning System with Integrated delivery could be open to use on site. The main product configuration is shown below.

Standard set:

- Camera head + stand,
- Black body + stand,
- Switch,
- PC kit.

2.3 Deployment requirements

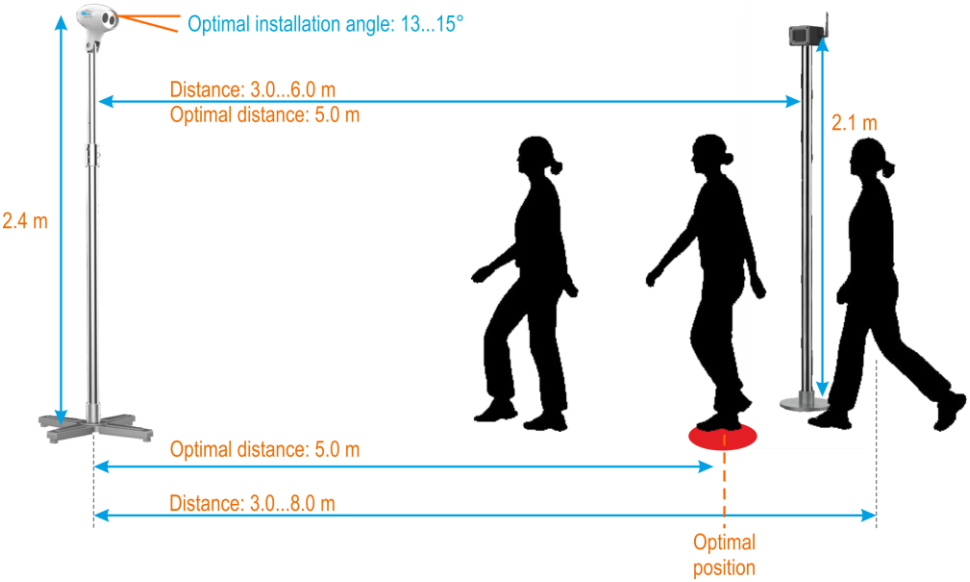
The KT-800M automatic infrared thermal imaging temperature measurement alarm system belongs to precision temperature measurement and imaging equipment, which has certain requirements for deployment applications. The precautions are as follows:

- Installation Environment
  - The device should be placed indoors and the ambient temperature should be kept relatively constant. If the actual application scene is outdoors, it's necessary to setup a tent or shelter, such as good sealing environment and keep the environment stable.
  - The position of the device head needs to be well-lit (illumination ≥100 lx), and it should be avoided in the position of backlight.
  - There should be no air-conditioning outlets within 3 meters of the location of the equipment head.
  - The field of view monitored by the device head must not be disturbed by strong external heat sources such as light and sun.

- Head layout
  - Reasonably arrange the position of the KT-800M head, and the downward plan angle is 13°-15°.
  - Reasonably arrange the detection position and range of personnel. The position of KT-800M camera from the forehead of the person under test is 3.0-8.0 meters, and the best test position is 5.0 meters.

- Black body layout
  - Reasonably arrange the position of the KT-800M black body, and generally place the black body horizontally, facing the camera.
  - Reasonably arrange the position of the black body. The position of the KT-800M black body from the head is 3.0-6.0 meters, and the optimal setting position is 5.0 meters.

- Tested person requirements:
  - After outdoor sun exposure or after strenuous exercise, test in an indoor environment for 5 minutes after peaceful adjustment;
  - When people enter indoors from outdoor scenes, it is recommended to walk through the corridor buffer for at least 10 seconds before stepping into the detection position. If the temperature difference between indoor and outdoor is large, it is recommended to stay indoors for 2-3 minutes before testing;
  - Make sure that the entire face of the person under test is in the field of vision of the device, and that the face and forehead cannot be blocked (hats, scarves, sunglasses, masks, antipyretic stickers and other objects that may block the face). It is recommended to remove them in advance and adapt for 0.5-1 minutes carry out testing.



Product deployment

Distance (m)	Horizontal observation range (m)
3	2.02
5	3.36
8	5.38

If the installation of the camera is restricted by the site, the installation height can be adjusted appropriately. It is recommended that the installation height of the camera is not lower than 2.0 m, and the height of the black body is not lower than 1.8 m.

3 Installation

3.1 Camera installation

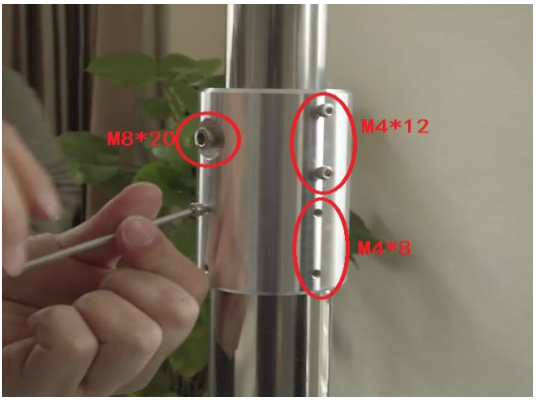
①

- Install the base.
- Assemble chassis + chassis adapter + counterweight.
- Fasten with 4 M6x25 screws.

2

- Install the pole and chassis adapter.
- Fasten it with 8 M4x10 screws.

3



- Install the middle connecting sleeve of the telescopic rod.
- Install the screws shown. Do not fasten first!

4

- Pass 2 long network cables and 1 power cable through the bottom of the support rod, and then from the movable rod of the telescopic rod.

5

- Fix the second section of the telescopic rod on the intermediate adapter.
- Use the positioning screws on the adapter to position the upper telescopic rod in the sixth hole.
- Tighten the screws installed in step (3).

6

- Insert the 2 network cables and 1 power cable from the top of the support rod into the card slot interface of the device's head.

7

- Fasten the device's head and the vertical rod.
- Fasten it with M10x60 screws (the head and the support rod have gaskets).

8

- Adjust the depression angle by about 15 degrees.

3.2 Blackbody installation

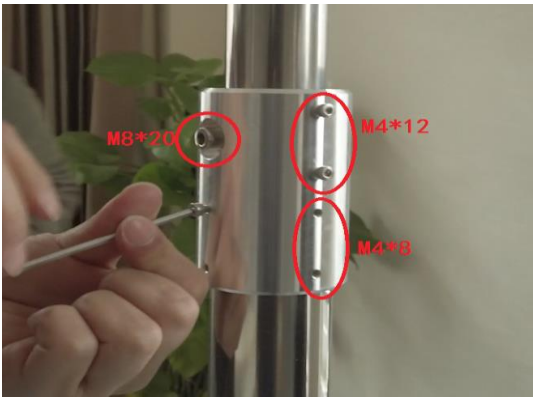
①

- Install the base.
- Assemble chassis + chassis adapter + counterweight.
- Fasten it with 4 M6x25 screws

2

- Install the pole and chassis adapter.
- Fasten it with 8 M4x10 screws.

3



- Install the middle connecting sleeve of the telescopic rod.
- Install the screws shown. Do not fasten first!

4

- Pass the power cord through the bottom of the support rod and out from the movable rod of the telescopic rod.

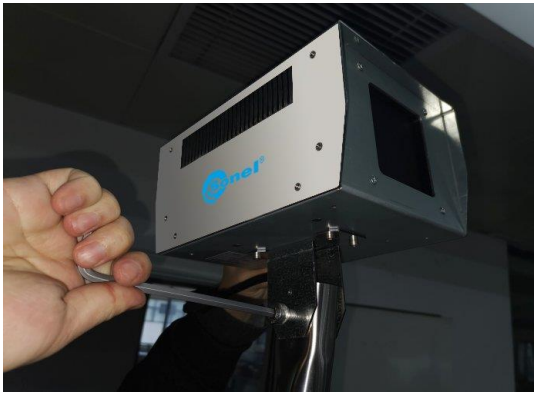
5

- Fix the second section of the telescopic rod on the intermediate adapter.
- Use the positioning screws on the adapter to position the upper telescopic rod in the fourth hole.
- Tighten the screws installed in step (3).

6

- Install the black body head and adapter.
- Fasten it with 4 M4x6 screws.

7



- Fasten the black body head and the vertical rod.
- Fasten it with M10x50 screws.

8

- Plug in the black body power connector and turn on the switch.

9

- Turn on the power of the black body and turn on the power switch. The black body displays the temperature as the current ambient temperature and will keep increasing.

10

- Click the up and down keys next to the setting key to set the black body temperature to 35 degrees.
- Click the setting key again to save the setting.

11

- Click the setting button SET as shown in the figure - the factory setting temperature will be displayed on the black body.

12

- Wait about 15 minutes, when the temperature of the black body is over, the temperature is stable at the set temperature and all the indicators in the indicator area are off.

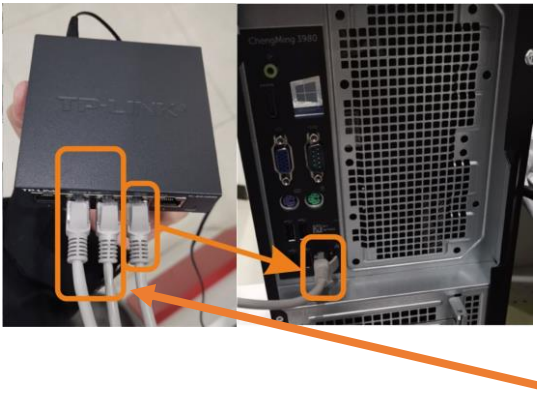
3.3 Assemble the computer and connect to power

1

- Assemble the display, connect the VGA cable and the DC power supply cable.

  Note: The display power adapter cannot be mixed with the power adapter of the camera

2

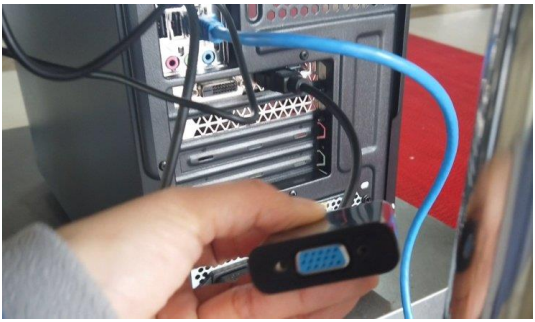


- Two long network cables on the camera are connected to the switch. The switch is connected to the network port of the computer with a short network cable.

  Note: The power adapter of the switch cannot be mixed with other adapters – otherwise there is a risk of burning the switch!

Two long network cables of the camera

3



- The computer's independent graphics card interface is connected to the VGA cable via the adapter cable, and the computer is connected to the speaker.

4

- AC/DC power adapter 12 V for KT-800M.

  Note: When the kit is compatible with multiple AC/DC adapters and the DC interface is the same, do not mix them, otherwise there is a risk of burning the camera.

4 Function introduction

The system can be configured through PC software after hardware installation and power on. The software is installed on the delivered computer.

4.1 Real-time preview

The main interface of the software can preview visible and infrared video images in real time once the software starts.

The main interface can preview visible and infrared images at the same time

The real-time temperature of the position can be displayed if you move the mouse cursor to the thermal image in any position.

Preview of the real time point temperature on main interface

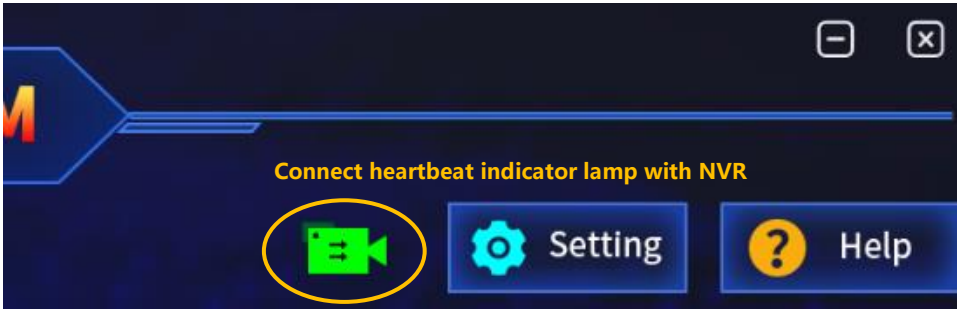
If there is no video image in the main interface or only 1 video is displayed, it is necessary to enter the equipment management interface for dvice search and addition. See **section 6.1** for details

4.2 History and processing

Click View all history >> to view alarm history and deal with them. Refer to “history” in **section 5** for detailed description.

4.3 NVR monitoring

This function is only for operation with NVR (Network Video Recorder). It can be ignored without NVR. Adding heartbeat indicator lamp to connect with NVR on software system in order to keep the user well known the status between NVR and software.



Connect heartbeat indicator lamp with NVR

Before the network hard disk video recorder starts to record, the client software must enable the streaming service. The detailed description of opening the streaming service is in **sec. 6.2.6**. When the service is off, the heartbeat light is gray. When the streaming service is enabled, the client software periodically detects the communication status of the NVR. If the communication between the two parties is normal, the heartbeat light is green, and the NVR is recording in real time. Once the heartbeat signal of the NVR is not detected, the communication is considered to be interrupted, the heartbeat indicator light is flashing red, and the NVR is not recording.

4.4 Settings

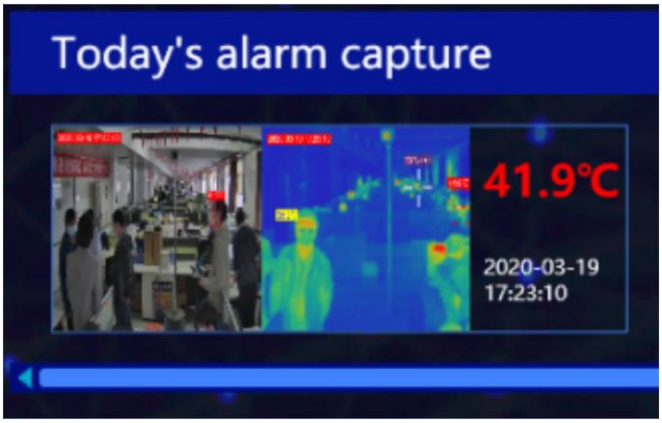
Clicking the **Settings** button will jump to the user login interface. The user permissions are divided into user mode and expert mode. The system will start the user mode interface or the expert mode interface according to the identity of the login user.
Compared with the user mode interface, the expert mode interface adds functions such as temperature measurement parameter settings. These settings are advanced settings and cannot be operated by ordinary users.
Settings interface includes "device management" and "system settings". "Device management" is used to determine the identity of the logged-in user to determine whether to open expert mode or user mode. “System settings" is used to set system parameters, including "alarm parameters" "Shielded area", "Bold body area", "Icon registration", "Temperature measurement parameter", "Other" and other parameters.

4.5 Help

Click the **Help** – the system will automatically jump out of the user manual. Users can query the specific functions and operation instructions of the software through this document.

4.6 Over temperature alarm screenshot display area

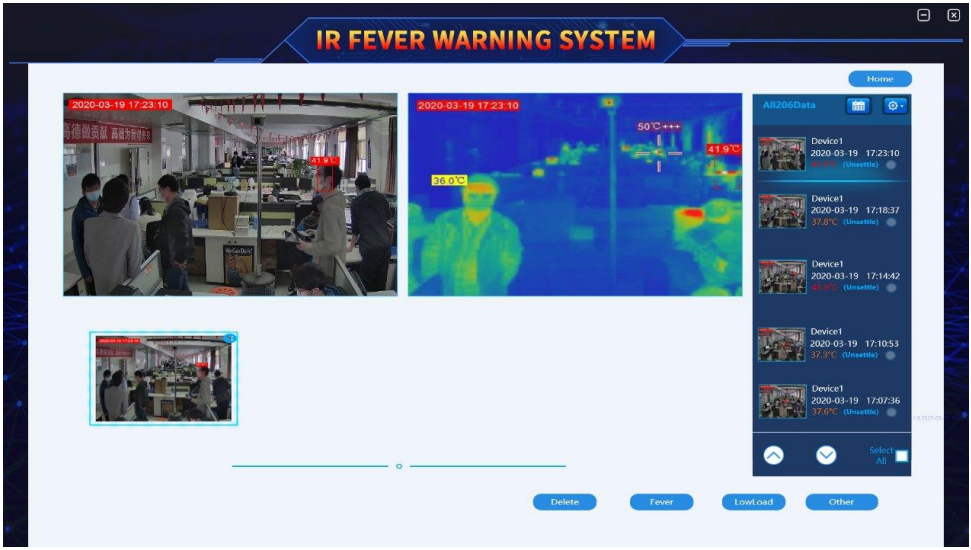
When an over-temperature alarm occurs, the system will have an audible and visual alarm prompt, the alarm snapshot of the day will be displayed in the alarm display box. The system will automatically frame the target face part and display its temperature information in the screenshot.



Over-temperature alarm snapshot

5 History record

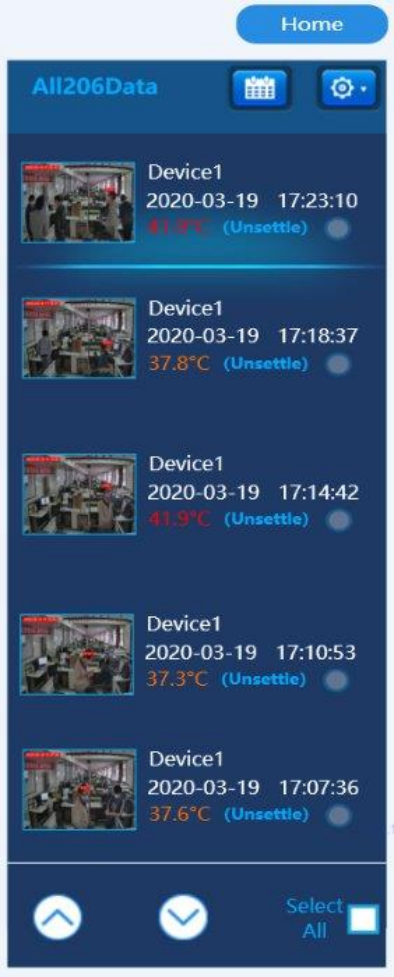
For the convenience of retrieval and retrieval after the event, the system can automatically store a series of visible and infrared images of the alarm to the computer. The temperature value and coordinates of the alarm target are marked in the pictures. Click **View all history** in the main interface to enter the history data view interface and view all alarm records.



History record interface

5.1 History record operation

After entering the history record interface, you can query the history record according to time and classification. The display area of the history record group shows the thumbnail, time, temperature and processing category of the history record.



History record information

1. Categorize the historical records

The history records can be queried by two sets of conditions, namely time control and classification options. The function of each button in the history records group is illustrated below.

Time control to select the time of history

The historical record query classification options include:

- untreated
- passenger fever
- low temperature carry-on
- other carry-on
- all

History selection button

Slip up the historical record

Slip down the history record

Selected from all historical records

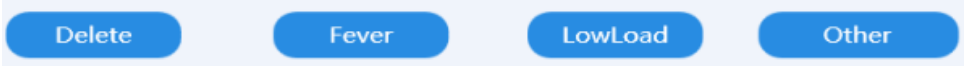
2. Operate on the history record

When new alarm records appear, the system shows by default that these alarm records are not processed. Users can categorize the historical records for the convenience of future query and management.

Default unprocessed history record

The specific operation is as follows:

- click the button  to select a record in the history group,
- click the button at the bottom of the history interface to delete the selected record and classify passengers' heat, low-temperature carry-on items and other carry-on items.



History record processing buttons

5.2 Single group history record

Single history record area showing the thumbnail of the selected single history record and selected infrared image and visual image.

Single group history record

1. Single record showing in details

Click the thumbnail, the recorded visual image and infrared image will showing in the center area of history record. Click in the image to delete the image.

2. Dual record showing

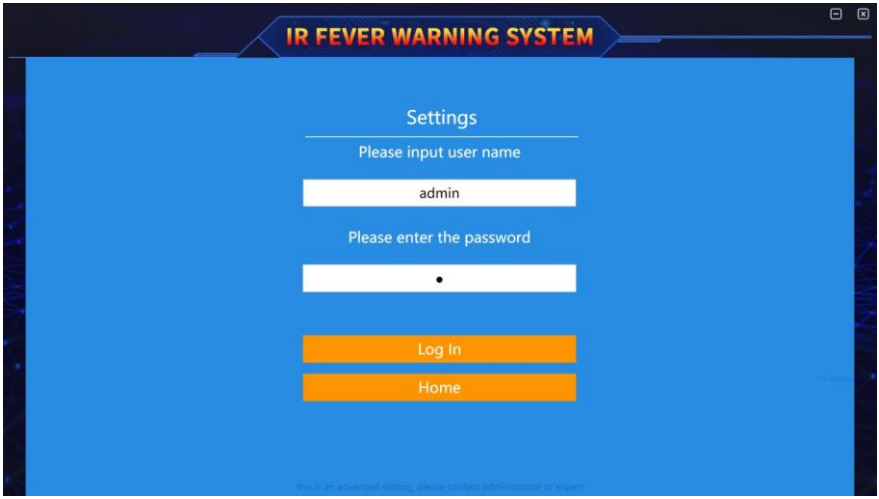
Thumbnail of single history record can maximum showing four records. Click to show the rest of the images.

6 Function setting

Click 

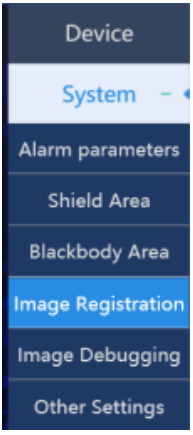
, login to the setting interface. This user name introduces the normal user mode. If you need expert mode, please contact the manufacturer for help.

The user name is **admin**, default password is **0**.



Login interface

The setting interface includes **Device** and **System**. **System** includes alarm settings, shield area, blackbody area, image synchronization, image debugging and other settings.



Sub-options of system settings

6.1 Device management

This function is used to search and display device status. If there is a device record in the database, the records will be synchronized in the sub-device list - just by choosing the device you want to add (IR or visible light device).If there is no record in the database, search it and add. After adding successfully, the device will be displayed in the list, including basic device info and status.

Interface of device management

Other device list is used to manually add other devices' IP address like NVR.

List of other devices

Device management interface specific operation instructions are as follows.

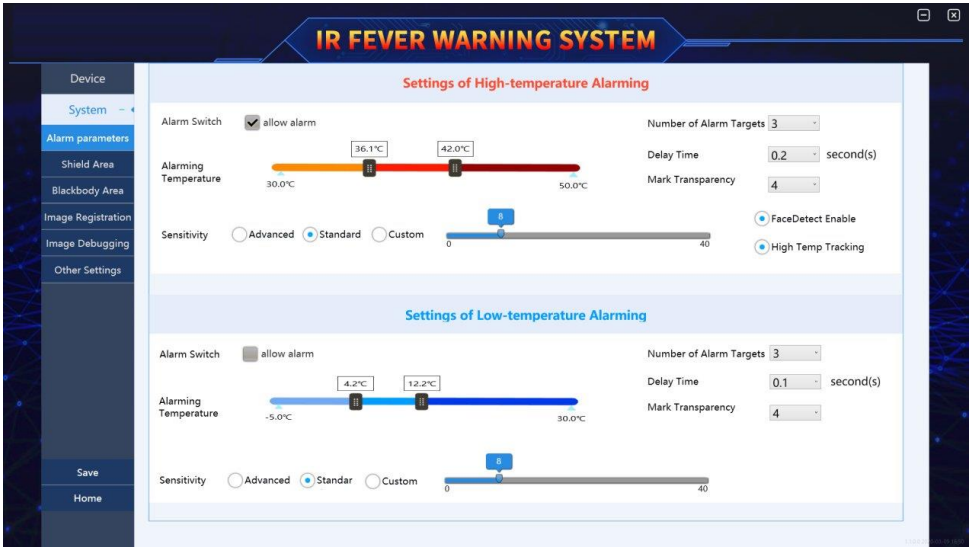
- **Search the device**: click this button to search online devices and display device info automatically.
- **Add the device**: after checking the device info, click this button to this device - record will be saved in the database.
- **Delete the device:** click this button to delete device info from database of chosen device.
- **Add the device to other device list**: used to input the IP address of NVR.

6.2 System setting

System settings include alarm setting, shield area, blackbody area, image synchronization and other, totally six settings to adjust the parameters.

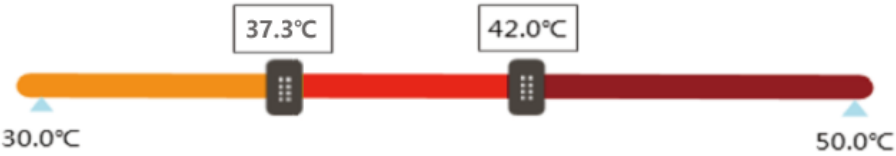
6.2.1 Alarm parameter setting

Click in the main interface **Settings ► System settings ► Alarm parameters**. There are two modes: high-temp alarm and low-temp alarm. High-temp alarm is used to alarm when there is higher temp than the set value (applies for human body temperature). Low-temp alarm is used to alarm when there is lower temp than the set value (for lower temp objects).



Alarm setting interface

1. **Alarm switch.** If you choose to allow the alarm, the system will issue a warning to remind the staff according to the set mode. If not checked, the alarm event occurs without any alarm processing. It is suggested that this item be checked.
2. **Setting of high temperature alarm interval.** When the measured target temperature is within the set temperature range (such as the following 37.3ºC…42.0 ºC), the alarm event is judged to have occurred. The maximum temperature range of high temperature alarm is 30.0 ºC …50.0 ºC.



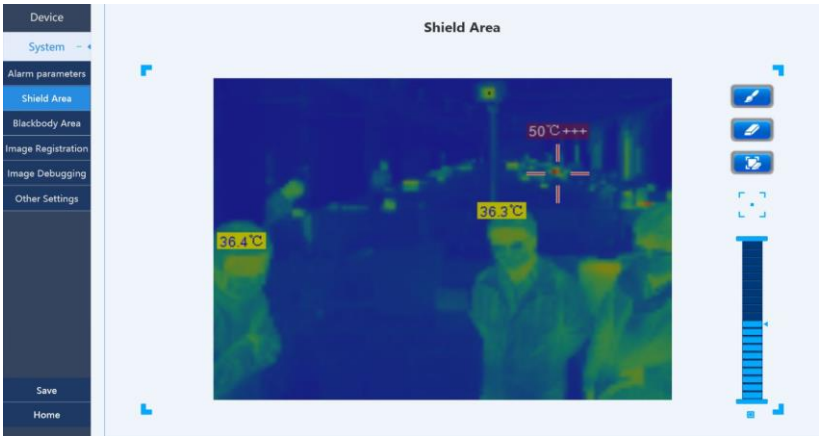
Heat level setting. High temperature alarm interval

3. **Alarm sensitivity.** Including modes: advanced, standard, and custom. In the first two modes, the minimum alarm targets are 4 and 8 pixels, respectively, and cannot be changed. When selecting the custom mode, the size of the minimum alarm target can be selected by dragging the left mouse button and the scroll wheel.
4. **Number of alarm targets.** Setting the number of alarm individuals displayed on the image. The maximum number is 8.
5. **Alarm delay time.** In order to avoid the alarm caused by accidental temperature difference, the delay time is set to collect the temperature change within a period of time, so as to reduce the alarm error.
6. **Transparency of temperature scale.** Set the transparency of the temperature mark, ranging from 0 to 9. 0 is full transparency.
7. **Face recognition switch.** The switch is on by default. When the preset hot object is detected, if the switch is turned on, the system will first determine whether the hot object is a face. If it is judged to be a face, it will grab the picture to alarm.
8. **High temperature tracking.** This switch is turned on by default. When a hot object is found in the detection area, the system will automatically track the hot object and the cursor will always follow.

6.2.2 Settings of shielding area

There are always some hot heat sources in the monitoring area, such as a light box, billboard, fast-food restaurants etc. The temperature of these heat sources is similar to human body, which can easily lead to false alarms in the system. In order to remove these disturbances, these heat sources can be shielded and the area is not alerted.

1. In the main screen Click **Settings ► System setting ► Shielding area,** enter the screen of shielding area.
2. By dragging the left mouse button to depict the rectangle method, the high temperature interference source from the infrared image shielding.
3. Click the button Save on the left side of the window to save.



Settings of shielding area

6.2.3 Black body area setting

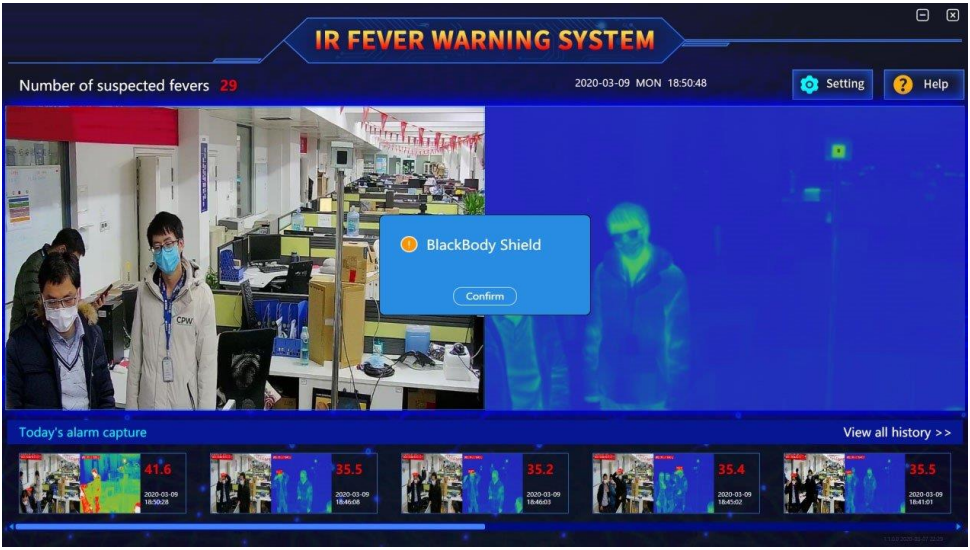
The black body temperature measurement uses the actual temperature of the black body as the reference temperature. In order to make the device measure temperature accurately, the black body target area must be framed. Do as follows:

1. In the main interface click **Settings ► System Settings ► Blackbody Area** to enter the blackbody area setting interface.
2. Select the **BlackBody Inner** option, move the mouse cursor to the infrared image, find the black body heating target surface in the infrared image, hold down the left mouse button and drag the frame to select the center heating area of the black body target surface, and then click the lower left corner of the window **Save** button.
3. Select the **BlackBody Outer Frame** option again, move the mouse cursor to the infrared image, find the black body heating target surface in the infrared image, hold down the left mouse button to draw a rectangular frame to just frame the black body target surface, and then click the bottom left of the window corner **Save** button.

Blackbody area setting

When the system is working, the user can choose whether to display the black body or not. If **allow to display the black body** is checked, the black body heating target surface can be seen in the infrared image.

As an important reference heat source for temperature measurement, the black body is not allowed to be blocked or moved. In order to prevent the black body from being blocked or moved, it is necessary to turn on the black body shielding function. Check the button of **Show black block prompt** and then click **Save** to complete the setting. When the black body is bumped or blocked, a prompt box will pop up automatically on the main interface of the software to remind the staff to deal with it.



Black block shift prompt

Ambient temperature setting (ambient temperature setting in the temperature measurement area) has a great influence on the accuracy of temperature measurement, so please input the ambient temperature accurately according to the actual situation.

6.2.4 Image registration

The system adopts the dual cursor synchronous display method of infrared video and visible video, but since the infrared temperature camera and visible video camera have different field angles, it is impossible to make the two cameras completely parallel in the installation, resulting in the position of the same target in the two videos looks inconsistent. In order to accurately find the corresponding relationship between the infrared image and the visible image, a video registration algorithm is added to the software. The mapping relationship between infrared region and visible region can be obtained by registering the three pairs of alignment points in visible region and infrared region. By this mapping relationship, the accurate coordinates of high temperature target coordinates in infrared image in visible video can be calculated.

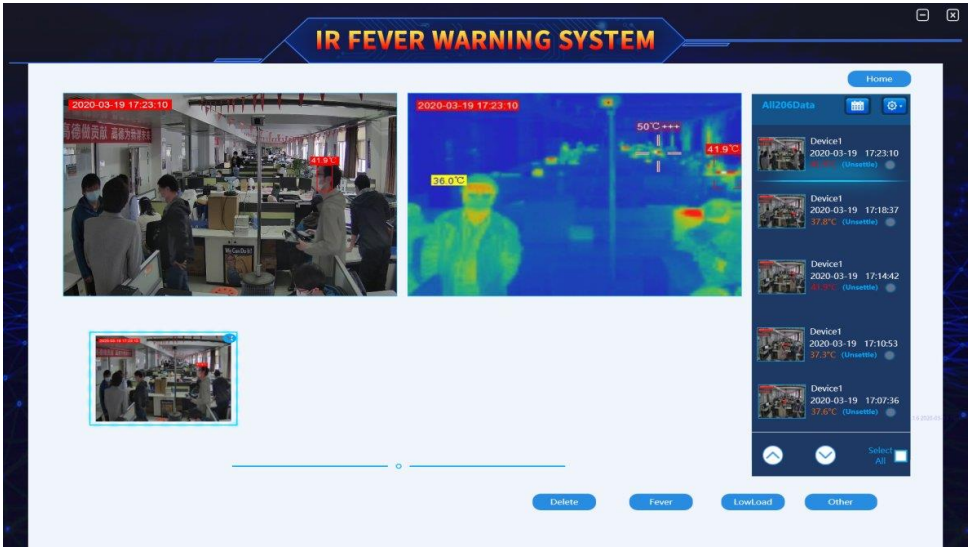


Image registration Settings

1. In the main interface click **Settings ► System Settings ► Image registration** to enter the registration setting interface. At this time, three cross cursors of the same color appear in the windows of "infrared image" and "visible image" on the interface.
2. Click the icon to adjust the first visible light spot, select a point on the visible light image, click to select the same position on the infrared image for registration. The registration process of the other two points is the same as that of the first point.
3. After registration is completed, click the **Save** button on the left of the window to save.

6.2.5 Image debugging

In the main interface click **Settings ► System Settings ► Image debugging**, enter the interface of image debugging and setting. You can adjust the functions of visible light far (near) focus and zoom.

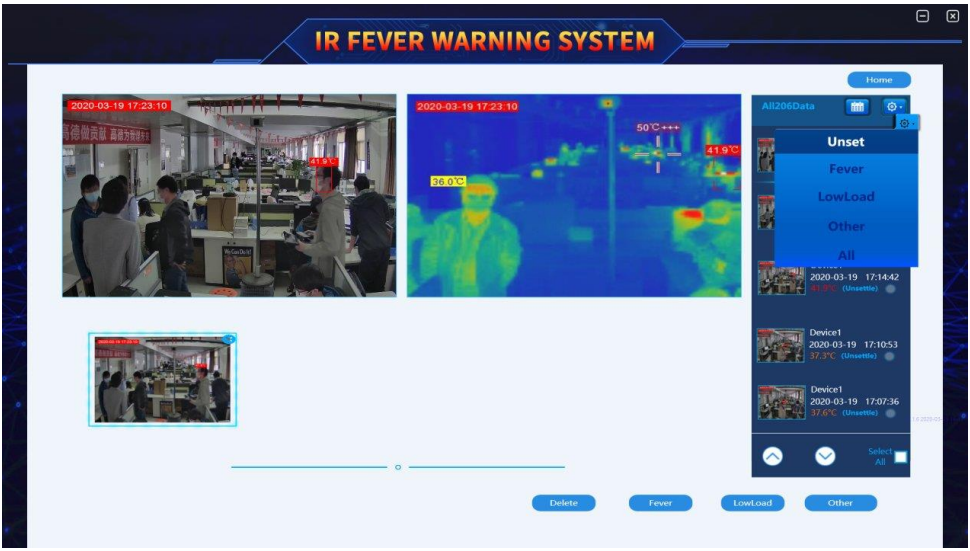


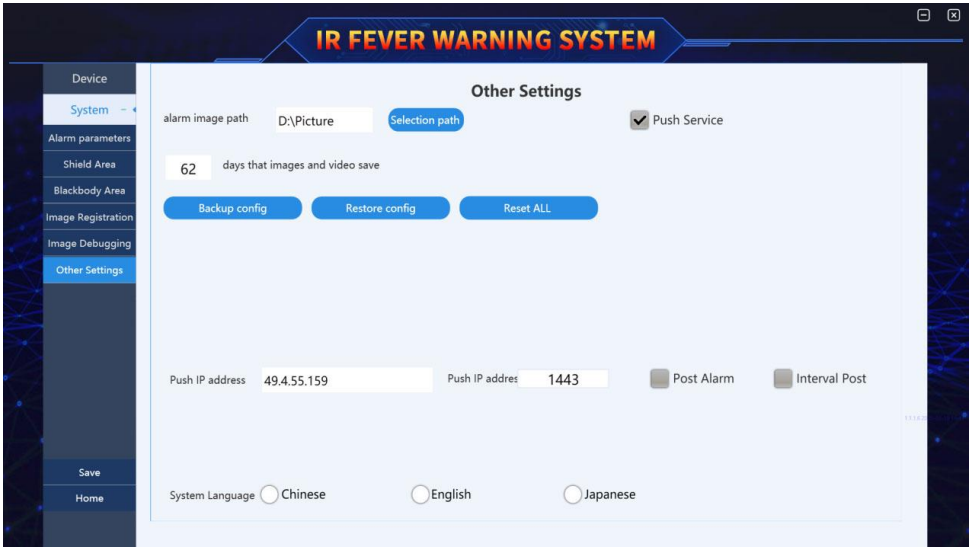
Image debugging Settings

1. **Infrared image setting**
   - Flip Switch. Manually adjust the infrared image flip.

2. **Visible image settings**
   - Visible light far (near) focus. Adjust the focal length to obtain a clear image.
   - Visible light zoom + (-). Increase (decrease) multiples to enlarge (reduce) the image.

6.2.6 Other settings

In the main interface click **Settings ► Alarm setting ► Other** to enter the setting interface.



Other parameter setting interface

1. **Save path of alarm information**: set the save path of alarm picture file in hard disk.
2. **Automatic deletion of alarm pictures**: set the time for the pictures recording alarm events to be kept on the hard disk, such as the set 62 days. The software will automatically clean the alarm directory 62 days before each startup.
3. **Streaming service**: this service can be used for network hard disk video recorder (NVR) to obtain video stream from the system, so as to record the storage.
4. **Backup configuration files** and **restore configuration files** are used to backup and restore all system settings. **Restore factory settings** are used to restore to the default configuration state.
5. **Alarm push service**: users who are not connected to the third-party software platform or the cloud service platform should ignore this function. The service is to push the alarm pictures and temperature measurement data to the third-party software platform or cloud service, and set the content including IP address, port and alarm push service switch, and push it regularly.
6. **System language** is used for customers to choose to switch familiar languages, so as to operate the equipment better.

7 Cleaning and maintenance

NOTE!

- Use the below specified methods of maintenance only.
- The KT series thermal imaging cameras do not comprise any parts serviceable by the user. Do not attempt to dismantle or modify the camera on your own. **Opening the instrument voids the warranty.**

Camera enclosure - all surfaces, except for optical elements of the camera, can be cleaned with a soft and moist cloth with generally available mild detergents. Do not use any solvents or cleaning agents that could scratch the enclosure (powder, paste, etc.). During cleaning, the camera must be turned off.
Due to the applied anti-reflective coating, optical lens are the most sensitive and at the same time the most expensive part of the camera (the lens is of key importance to radiometric capabilities of the infrared system). Optical surfaces should be cleaned only, when they are visibly fouled. Do not touch exposed surfaces of optical lens with fingers, be-cause fouling left with fingerprints can be harmful to coatings and glass of the lens.
Chemical agents must not be used for cleaning optics and accessories of the camera. Use a clean, dry and soft cloth for cleaning.

8 Storing

When storing the instrument, observe the following guidelines:

- make sure the camera and its accessories are dry,
- allowed are storage temperatures specified in technical specifications,
- in order to avoid complete discharging of rechargeable batteries during prolonged storage, charge them once in a while.

9 Dismantling and disposal

- Used-up electrical or electronic equipment must be collected selectively, i.e. must not be mixed with waste of other types.
- Used-up electronic equipment must be delivered to an appropriate collection center in accordance with regulations related to used-up electrical or electronic equipment.
- Before delivering the equipment to the collection center do not attempt to dismantle any of its parts.

NOTE!

Follow local regulations related to disposing of packaging, used-up batteries and rechargeable batteries.

10 Specifications

Thermal imager	
Detector resolution	400 x 300
Detector	17 µm
Frame rate	25 Hz
Sensitivity	≤40 mK
Lens (field of vision / focal distance)	38° x 28° / 9.7 mm
Accuracy	≤ ±0.3°C (ambient temperature 16...32°C)
Measurement range	-10...+50°C
Calibration	Built-in shutter and external black body, automatic calibration after selecting mode
Visual camera	
Resolution	2 MPix
Frame rate	25 Hz
Functions	
Parameter settings	Warning switch and warning threshold value, number of warning targets, warning photos automatic clearing, shielding fixed high temperature objects
Face tracking	Intelligent face tracking, Supported from V1.0.9.0
Real-time preview	Real-time preview of visible and thermal image
Real-time spot temperature detection	Real-time temperature monitoring at any point in the field of view
Automatic tracking	Support automatic tracking for elevated temperatures
Automatic warning	Automatic tracking, warning and photo capturing for storage when people with fevers are identified; Warning while the Black Body is blocked.
Historical records	Support query, classification and deletion of historical warning screenshots
Video recording	Support. The software needs to be upgraded to V1.1.0.9, and equipped with NVR (NVR standard 4T hard disk), support GB28181 protocol to access third-party platforms
Network communication protocol	HTTP, RTSP
Environmental adaptability	
Operating temperature	-10...+50°C (ambient temperature 16...32°C)
Storage temperature	-20...+60°C
Humidity	<90% (non-condensing)
Shock	30g 11 ms, IEC60068-2-27
Vibration	10 Hz ~ 150 Hz ~ 10 Hz 0.15mm, IEC60068-2-6
Black body	
Blackbody target surface uniformity	≤ 0.1°C
Temperature stability accuracy	≤ ±0.2°C (single point)
Camera head interface	
Network interface	Two-way, visible light 100M, infrared 1000M
Camera head power	
Input voltage	DC 12 V
Input power	≤12 W
Packaging specifications	
Camera head size	173 x 184 x 212 mm
Total height (incl. stand)	2200 mm
Camera head package	510 x 440 x 270 mm (subject to actual delivery)
Total weight	≤45 kg (subject to actual delivery)

11 Standard accessories

Standard bundle supplied by the manufacturer includes:

- Black Body – **WAADABBKT800M**
- Tripod – **WAADASTATYWKT800M**
- Cable set – **WAPRZKPLKT800M**
- Computer set – **WAZESTAWKOMPKT800M**
- User manual

The current list of accessories can be found on the manufacturer's website.

12 Manufacturer

The manufacturer and provider of warranty and post-warranty services for this instrument is:

SONEL S.A.
Wokulskiego 11
58-100 Świdnica
Poland
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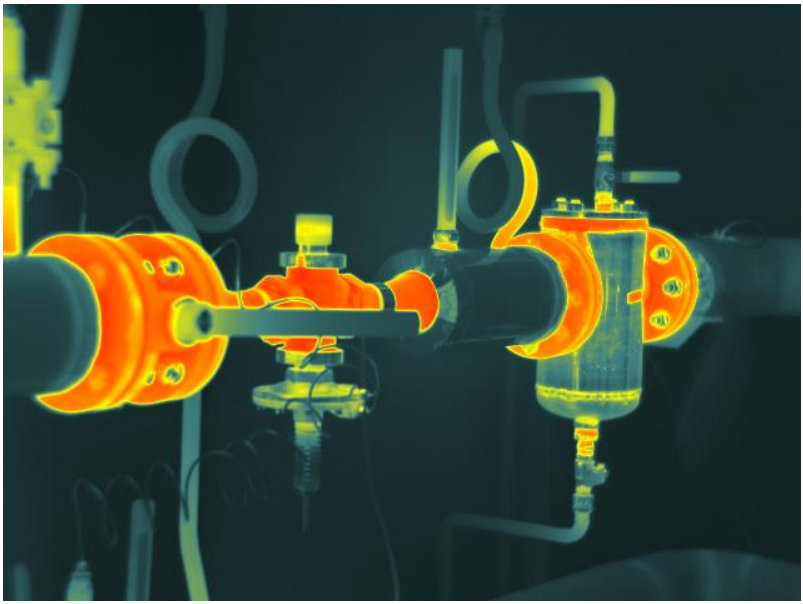
fax +48 74 858 38 09
E-mail: export@sonel.pl
Web page: www.sonel.pl

NOTE!

Only the manufacturer is authorized to perform service repairs.

NOTES

NOTES



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