Blackbody Scheme
For Fever Screening

General Parameters

➢ **Temperature Measurement Range**
   30.0-45.0 Degrees Celsius
➢ **Temperature Measurement Accuracy**
   ± 0.3 Degrees Celsius
➢ **Camera   Resolution**
   Thermal: 160 × 120
   Optical: 2688 × 1520
➢ **AI Face Detection**
   Multiple targets (up to 30) body temperature detection at the same time
   (wearing masks or not would not affect this detection)
➢ **Operating Environment**
   Indoor environment with calm air condition; 10-35 Degrees Celsius

Installation

Installation Cautions

The performance of this fever-screening scheme is greatly affected by environment. This scheme would apply only to those indoor environments, or the scenarios with calm air and consistent temperature. Besides, the relative installation location of devices and the ambient light (too bright or too dark) greatly affect the accuracy of face detection. In order to improve measurement accuracy and reach better performance of human face detection, the installation environment has to meet certain requirements:

1. Select installation environments with one-direction path to ensure that cameras capture the full faces of all passing persons.
2. Select installation environments with stable and sufficient lighting conditions. Supplementary light is required under backlight or insufficient lighting conditions to ensure the clear visibility of facial features.
3. Select indoor environments with calm air and consistent temperature condition. Outdoor environments with rapid temperature changes are not recommended.
4. If this scheme is used in entrance scenes that connect indoors and outdoors environments, It is suggested that the installation location should be kept at a

certain distance from the entrance (such as customs or security checkpoints). Persons coming in from outdoors should stay indoors for more than 5 min before the measurement. By these ways, the influence of outdoors temperature environment on measured body surface temperature could be reduced.

5. Avoid objects with high or low temperature placed in the scene.
6. The devices should be installed firmly, thereby avoiding face detection and temperature measurement errors caused by shaking.

Camera Installation

➢ The camera should be set right in front of the one-direction path, capturing the full faces of passing persons. The installation height is recommended to be set as 1.5-1.7m and not more than 2.5m for fixed installation normally.

➢ The recommended distance between the camera and measured objects is depended on the focal length of used lens. For cameras with 6mm lens, this distance is recommended to be set as 1.5m; at this distance, the covered width of monitored path is 0.92m. For cameras with 3mm lens, this distance is recommended to be set as 1m; at this distance, the covered width of monitored path is 0.67m.

Thermographic fever screening scheme cover range
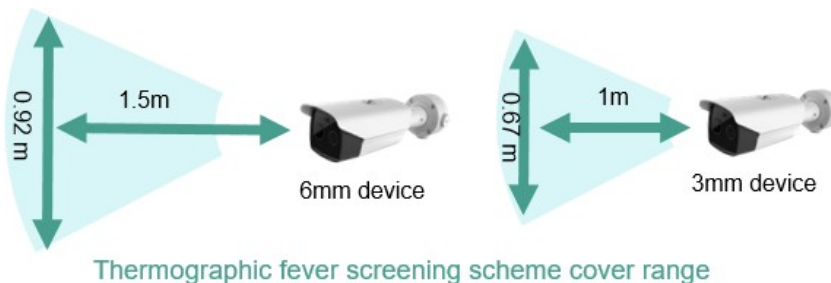
➢ There are tripods and tripod adapters for flexible placement, but these items require additional purchase. As domestic suppliers have not fully restored production capacity recently, there are multiple suppliers, and there may be slight differences under the same model, which will not affect the use. If you are concerned about this, we recommend that except the tripod adapters should

be purchased with products together, the tripods that meet the standards could be purchased locally.

Blackbody Installation

Installation location:

The recommended distance between the camera and the blackbody is recommended to be 1.2m. The blackbody is recommend to be installed at a height of 1.7m, with an elevation angle of 20°. Ensure that the black body appears in the upper left / upper right corner of the camera view. Make sure that the blackbody would not be blocked by any other target during temperature measurement.
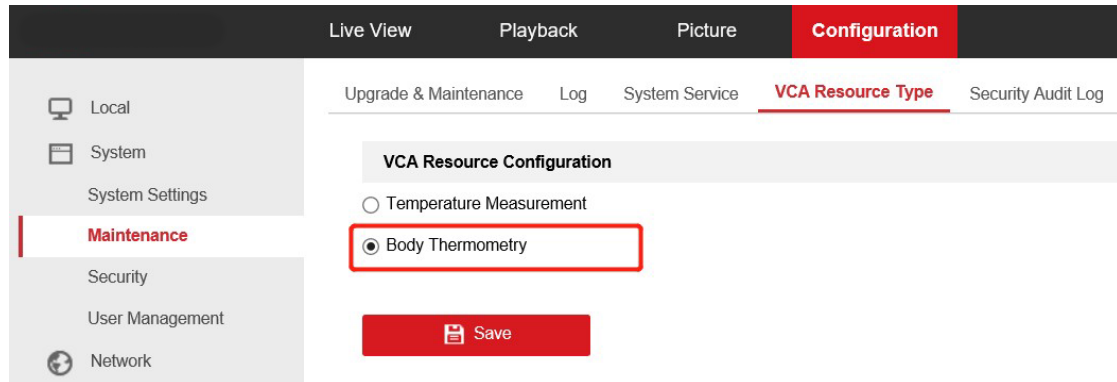

Configuration Steps:

1. Device start-up;
2. Press **SEL** for temperature setting, Press **UP** and **DOWN** to adjust the temperature of the blackbody as 40 Degrees Celsius;
3. Confirm your adjustment by pressing **SEL** again;
4. Wait until the displayed temperature value reaches 40 Degrees Celsius and remain unchanged.

Configuration

Select VCA Resource Type

Steps:
1. Enter VCA Resource Type interface: **Configuration** > **System** > **Maintenance** > **VCA Resource Type**.
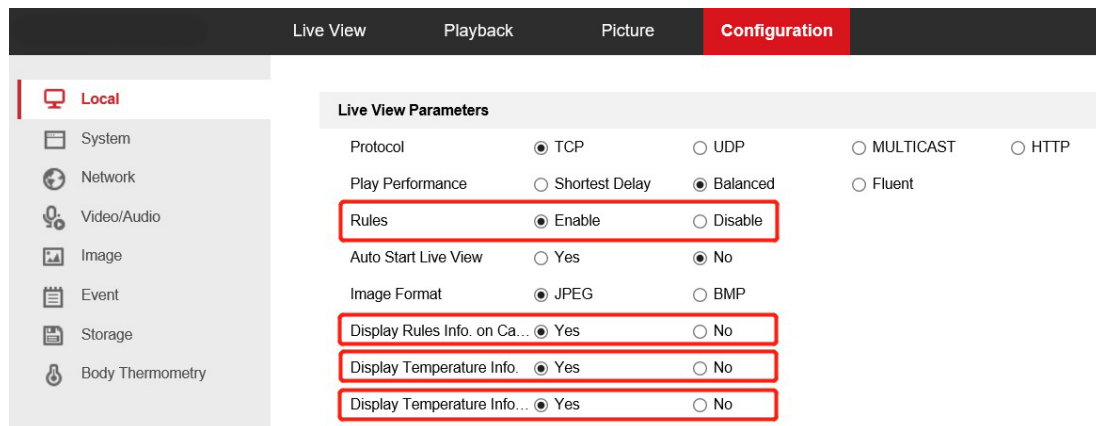

2. Select **Body Thermography** as VCA Resource Type.
3. Click **Save** and wait for device restart.

Set Local Configuration

Steps:
1. Go to the Local Configuration interface: **Configuration** > **Local**.
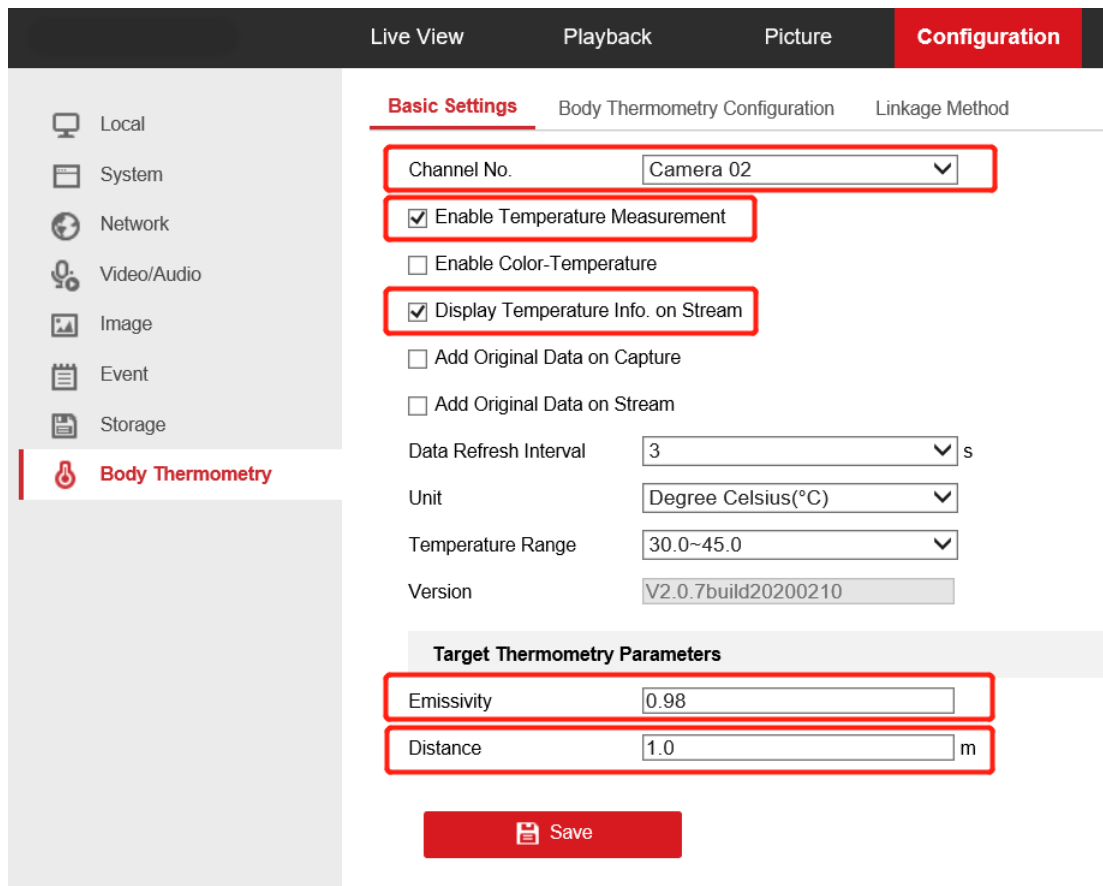

2. Click to enable the following settings:
➢ **Rules:** It refers to the rules on your local browser; select **Enable** to display the colored marks and temperature information when the face target is detected.
➢ **Display Rules Info. on Capture:** Select **Yes** Display rules information on the capture.
➢ **Display Temperature Info.:** Select **Yes** to display temperature information with

temperature measurement rule configured.

➢ **Display Temperature Info. on Capture:** Select **Yes** to display temperature information on the capture.

3. Click **Save**.

Settings of Body Thermography

Steps:

1. Go to the Body Thermography Settings interface: **Body Thermography** > **Basic Settings.**

2. Configure the following settings:

➢ **Channel No.:** Select the thermal camera channel (normally as **Camera 02**).

➢ **Enable Temperature Measurement:** Check this box to enable temperature measurement.

➢ **Display Temperature Info. on Stream:** Check this box to display temperature information on stream.

➢ **Emissivity:** The relative ability of material surface to emit energy by radiation. For human skin, this value is normally set as 0.98.

➢ **Distance:** The actual distance between the camera and measured object.

3. Click **Save**.

4. Go to the Body Thermography Settings interface: **Body Thermography** > **Body Thermography Configuration**

5. Select the optical camera channel (normally as **Camera 01**).
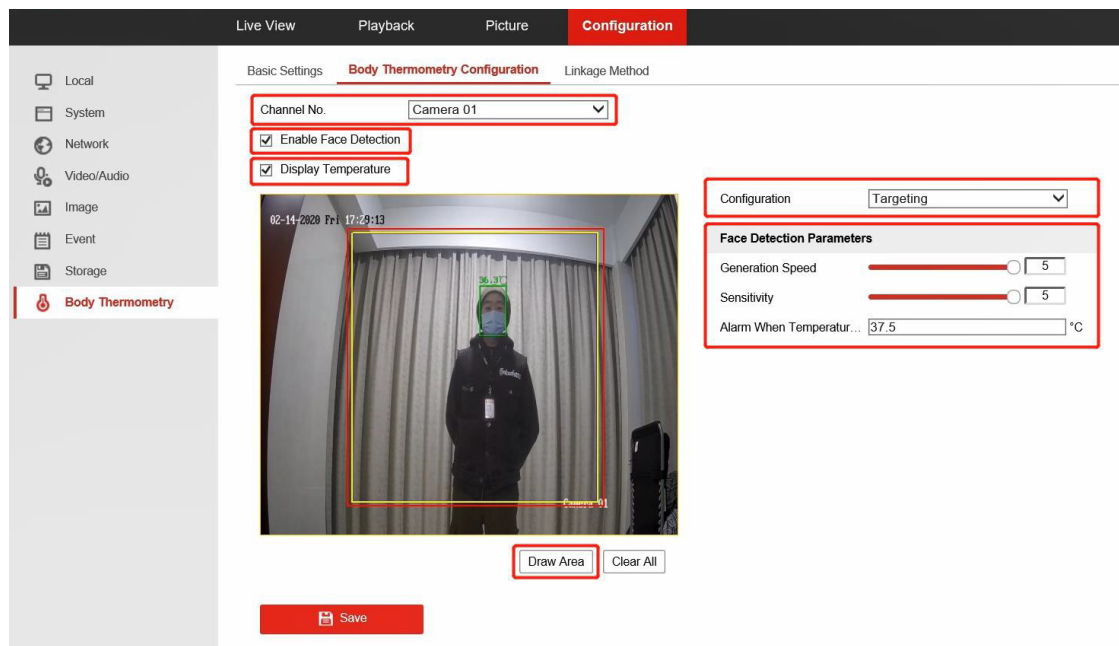
6. Configure the following settings:
- **Enable Face Detection:** Check this box to enable face detection function.
- **Display Temperature:** Check this box to display measured temperature.
- **Configuration:** Select as **Targeting**.
- **Face Detection Parameters:**
  - Set **Generation Speed** and **Sensitivity** both as **5** for best detection performance.
  - It is suggested to set **Alarm When Temperature is Below** as 37.5 degrees Celsius, or it could be adjusted to meet other requirements.
- **Draw Area:** Draw a rectangular area; only objects in this area would be detected as targets for temperature measurement.
7. Click **Save**.
8. Select the thermal camera channel (normally as **Camera 02**).
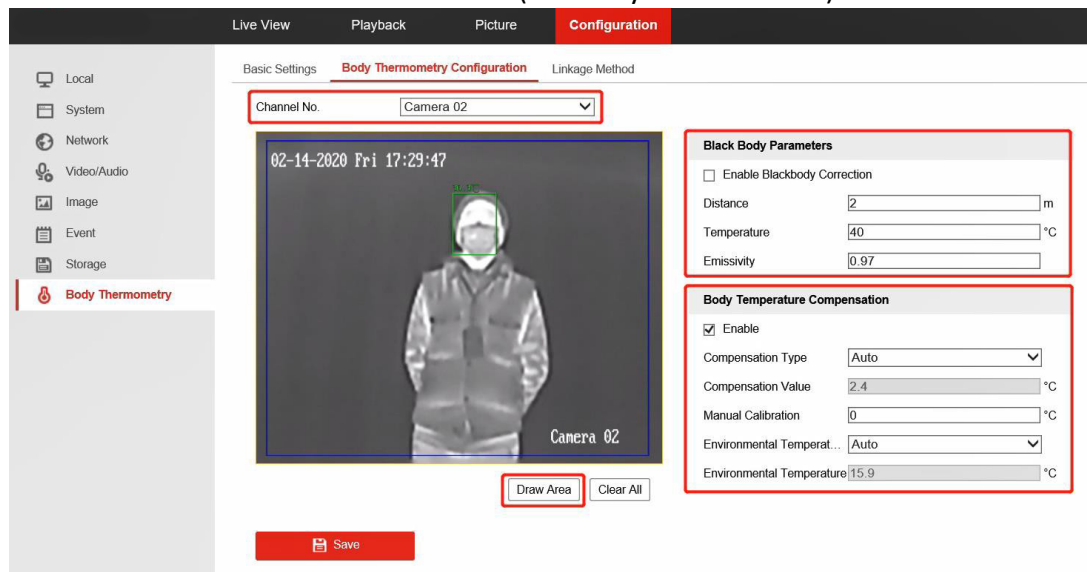
9. Configure the following settings:

➢ **Black Body Parameters:** If a blackbody is used for best performance of real-time body temperature measurement correction, the following settings should be configured.

- **Enable Blackbody Correction:** Check this box if a blackbody is used for temperature correction.
- **Distance:** The actual distance between the camera and the blackbody.
- Set **Temperature** and **Emissivity** with the actual parameters of the used blackbody.
- **Draw Area:** Put the correction point on the center of the blackbody. The blackbody should be placed outside the human face detection area (blue box in thermal channel, yellow box in optical channel) and inside the imaging range of thermal camera (red box in optical channel).
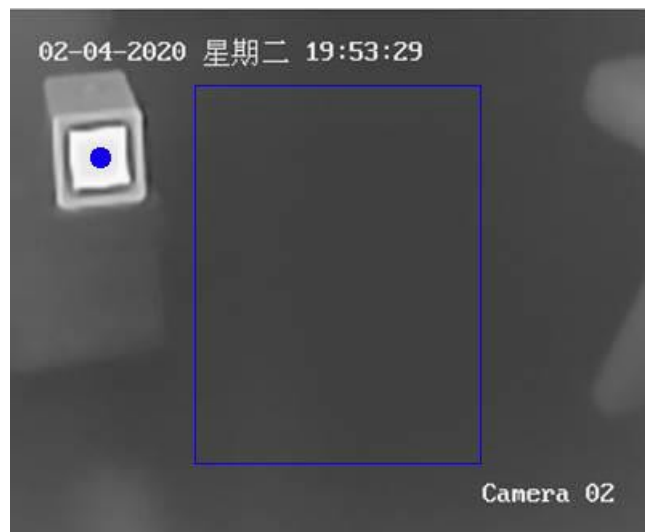
➢ **Body Temperature Compensation:** Compensate the measured value according to the real-time environment temperature.

- **Enable:** Check this box to enable body temperature compensation
- **Compensation Type:** Setting as **Auto** is suggested; in this way, auto compensation and manual calibration value would both added to the measured value.
- **Manual Calibration:** The set value would be added to the measured value. (If this value is set as 2 degrees Celsius and the measured value is 35 degrees Celsius, the displayed value would be 37 degrees Celsius). See *Manual Calibration* part in below for details.
- **Environment Temperature:** Setting as **Auto** is suggested; in this way, the environment temperature would be automatically measured.

10. Click **Save**.

Manual Calibration

Purpose:

The performance of this body thermography scheme would be affected by different actual working environments, and the affect factors in most stable environments could be regarded as a kind of system error. In order to reach the best performance, it is suggested to make a compensation through the manual calibration, the steps are as following.

Steps:
1. Device start-up; wait a period of time (more than 30 minutes) for preheating.
2. For 5 to 10 individuals, complete the following 3 steps one by one:
   ➢ Use the ear thermometer or other specialized thermometer to get the real body temperature, and record.
   ➢ Use the thermal camera to get the body temperature of the same individual, and record.
   ➢ Subtract these two numbers, and record the difference value.
3. Set **Manual Calibration** with the average value of these difference values in **Body Temperature Compensation**.

For example:
If data recorded during the calibration process are as the following table,

Real Body Temperature/℃	Measured Temperature/℃	Difference Value/℃	**Average Value (Manual Calibration)/℃**
36.8	36.3	0.5	
37.0	36.5	0.5	
36.8	36.2	0.6	0.5
36.9	36.4	0.5	
37.2	36.8	0.4	

thereby setting the **Manual Calibration** as 0.5 degrees Celsius.

Other Notes for Use

➢ Before the device is used in actual body temperature measurement, it should run for more than 30 minutes for preheating.

➢ This product is used for preliminary screening of people with fever. After alarm happens, specialized medical thermometer should be used in further body temperature check.