Human Skin Temperature Detection (HTD) System

en Configuration and Licensing

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1 Configuration and Licensing for the HTD System by Bosch

A Human Skin Temperature Detection (HTD) system includes a decoder, a monitor, a keyboard, and one or more HTD cameras. The VIDEOJET decoder 7000 (VJD-7513) runs the application that allows users to manage and to control the cameras. This application is a standard feature of the decoder but must be configured accordingly. The algorithm to detect faces and to analyze their temperature spots also runs on the decoder.

2 Prerequisites

2.1 General Prerequisites

- One decoder can support a maximum of 4 HTD cameras.
- The decoder and the camera(s) must be connected to the same IP network as the PC running Configuration Manager (CM).
- For a stand-alone system, the decoder needs fixed IP addresses (no DHCP) for itself and for the connected cameras.
- Each HTD camera must have a license.
- All cameras must have the same user password.
- The decoder must run an IP matrix.

2.2 Prerequisites for Setup

- A PC running Configuration Manager 7.20 or later, connected to the decoder and the cameras
- License key inside the decoder package
- General password inside the decoder package

3 System configuration

3.1 Camera configuration

Using either the camera browser or Configuration Manager 7.20 or higher, complete the steps that follow to configure the camera:

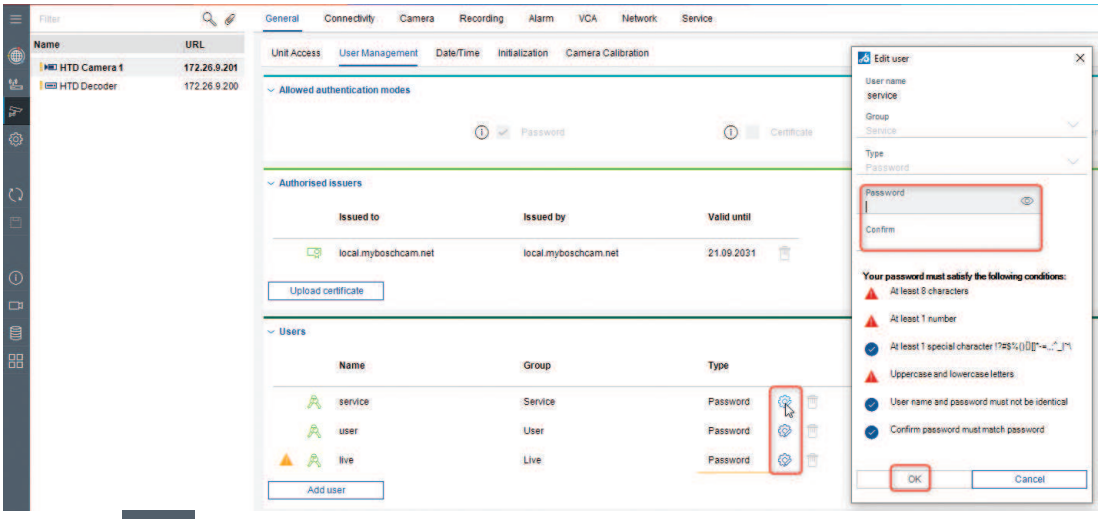
1. Set the camera passwords.
2. Upgrade the camera firmware.
3. Set session authentication.
4. Configure the static IP address.
5. Set the device name.
6. Set video authentication.
7. Set the signature interval.

Refer to each subchapter that follows for the substeps to complete each of these steps.

3.1.1 Set passwords for the service account, the user account, and the live account on the camera

Make sure that the user password of all cameras is the same. The decoder uses one general password to access all cameras and accounts.

1. In Configuration Manager, select the device.
2. Go to **General** > **User Management**.
3. In the **Users** section of the page, click to the right of Service. The dialog box **Edit user** opens.
4. Enter a password that satisfies the password conditions. Click **OK**.

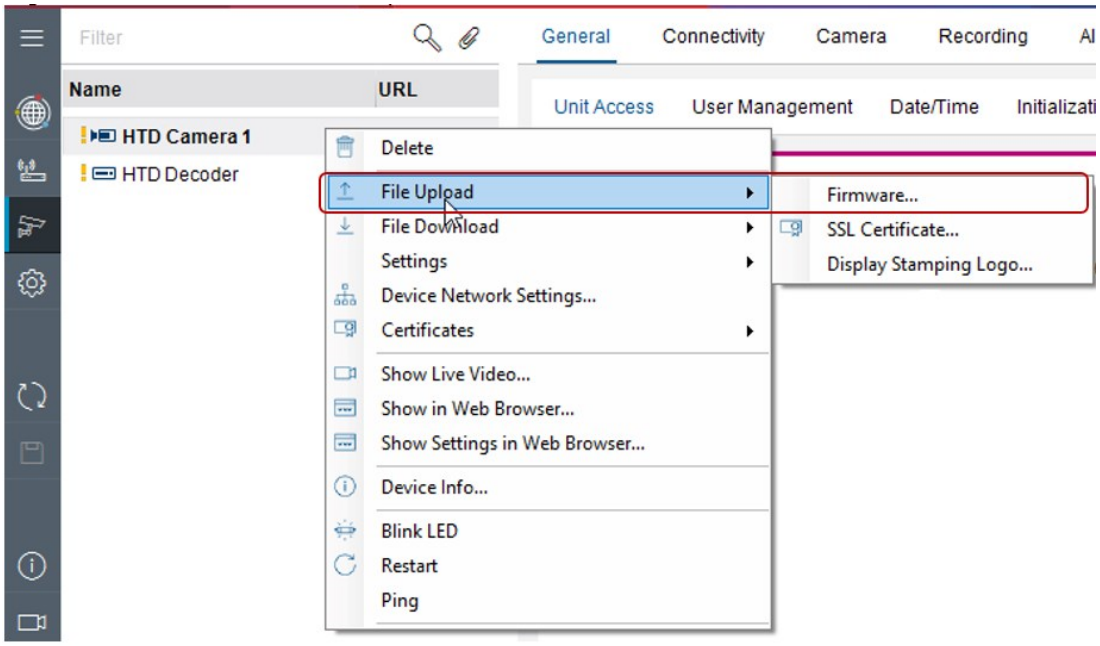


5. Click .
6. Repeat the previous 3 steps for the next 2 passwords.

3.1.2 Upgrade the camera firmware

You must upgrade the camera firmware to 7.70 or higher to use the HTD system properly.

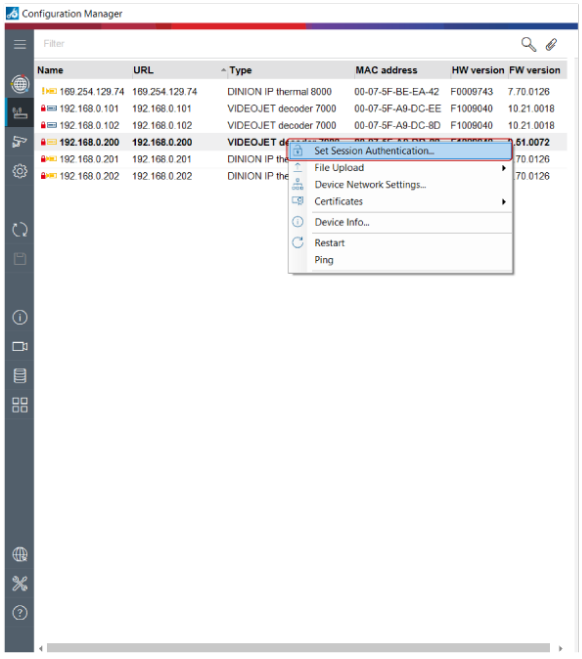
1. Right-click the camera.
2. Select **File Upload > Firmware**.

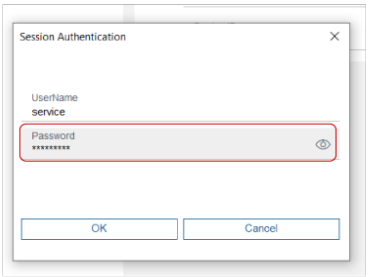


1. Select the FW to upload. Click **Open**.
2. Click **Start**.

3.1.3 Set session authentication of the camera

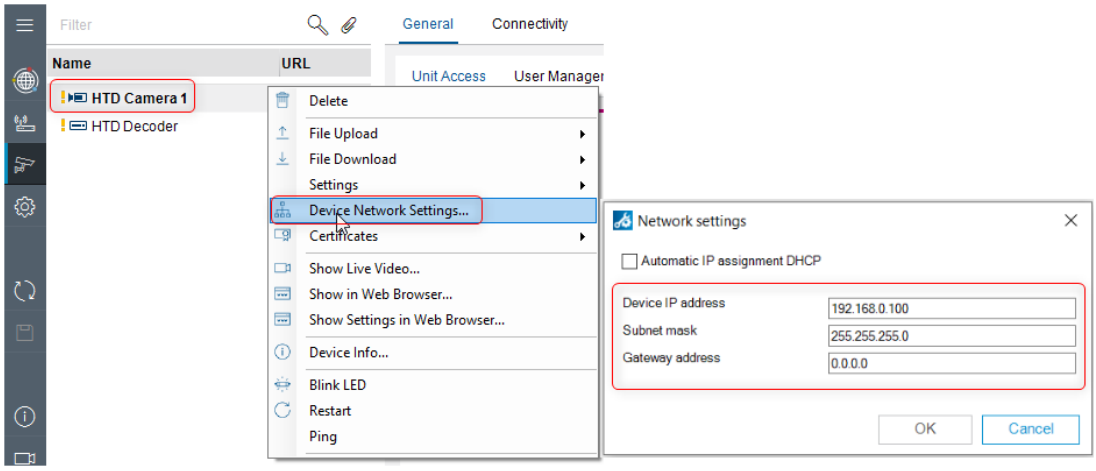
1. Right-click the camera. Select **Set session authentication**. The dialog box **Session Authentication** opens.
2. Enter the password. Click **OK**. The camera will be unlocked so that you can upgrade the firmware.





3.1.4 Configure the static IP address of the camera

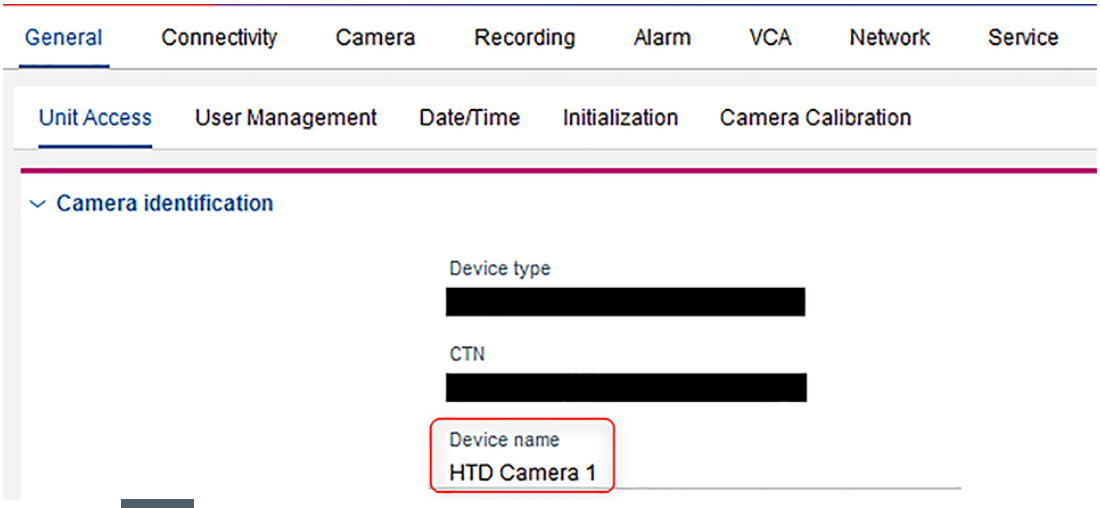
1. Right-click the device. Select **Device Network Settings**. The dialog box **Network settings** opens.
2. Deactivate DHCP. Deselect the checkbox **Automatic IP assignment DHCP**.
3. Fill in the following fields:
   - **Device IP address**
     Enter an IP address in the same subnet as the decoder IP address. (Refer to the note that follows.)
   - **Subnet mask**
     Enter the subnet mask.
   - **Gateway address**
     Enter the gateway address.



4. Click **OK**.
5. Note that Bosch recommends that you match the camera number to the last digit of the IP address (for example, 192.168.0.101 for camera 1, 192.168.0.102 for camera 2).

3.1.5 Set the device name

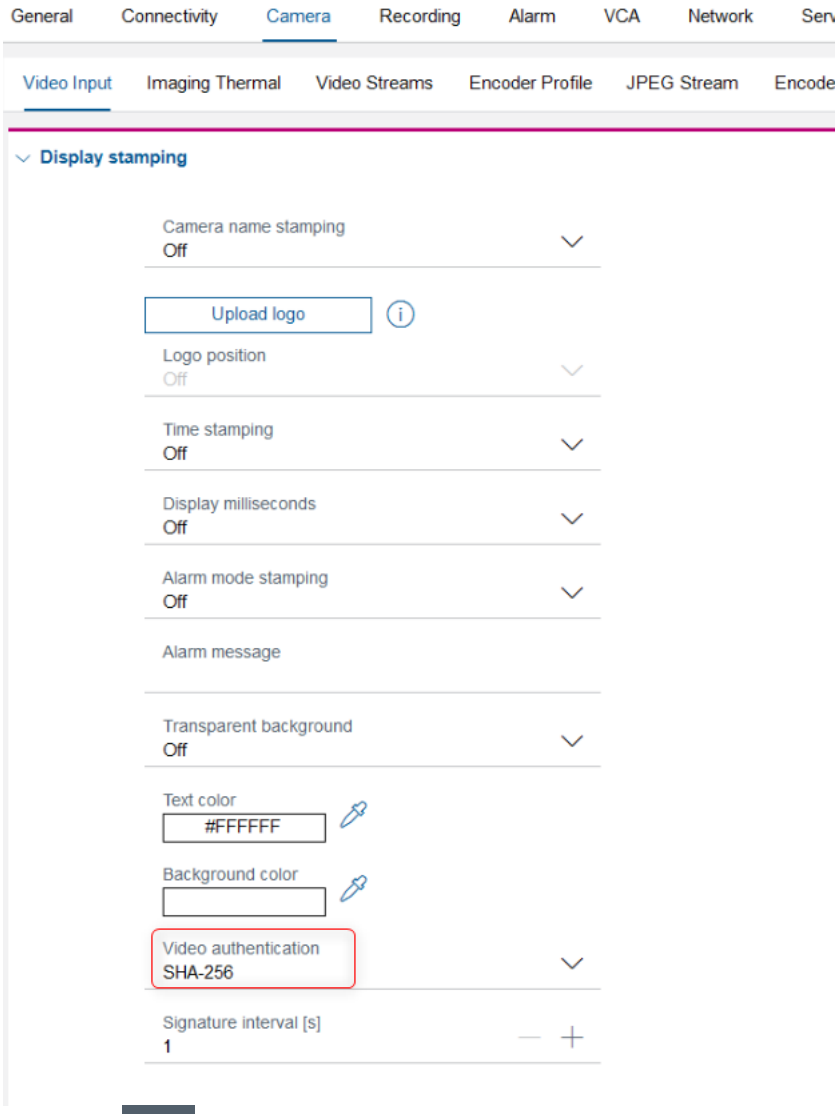
1. Select **General > Unit Access > Camera identification > Device Name**.
2. Enter the device name (for example, HTD Camera 1).



3. Click .

3.1.6 Set video authentication

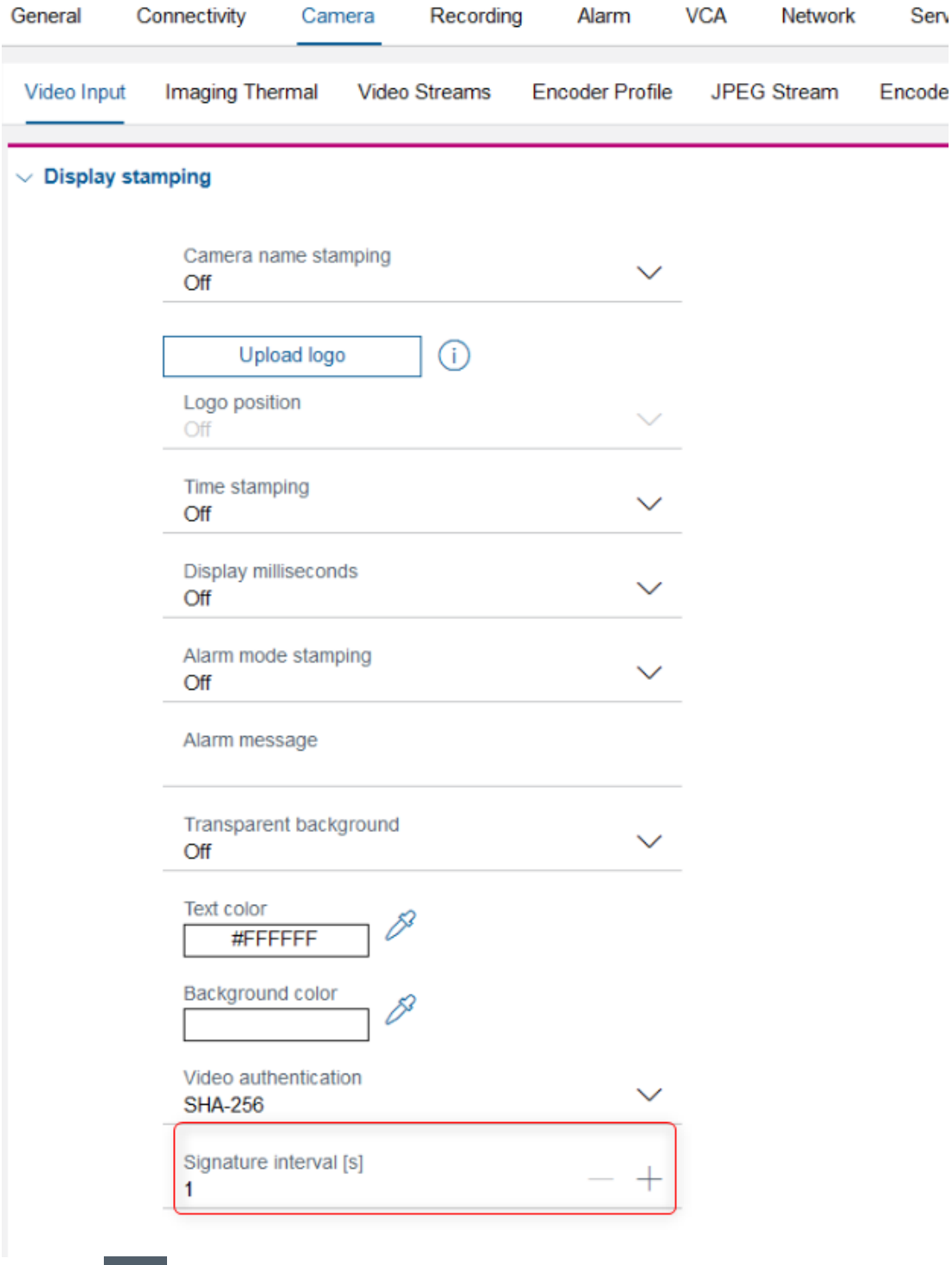
1. Select **Camera > Video Input > Display stamping > Video authentication**.
2. Set the video authentication to SHA-256.



3. Click .

3.1.7 Set the signature interval

1. Select **Camera > Video Input > Display stamping > Signature interval [s]**.
2. Set the signature interval (in seconds) to 1.



3. Click .

3.2 VIDEOJET decoder configuration (part 1)

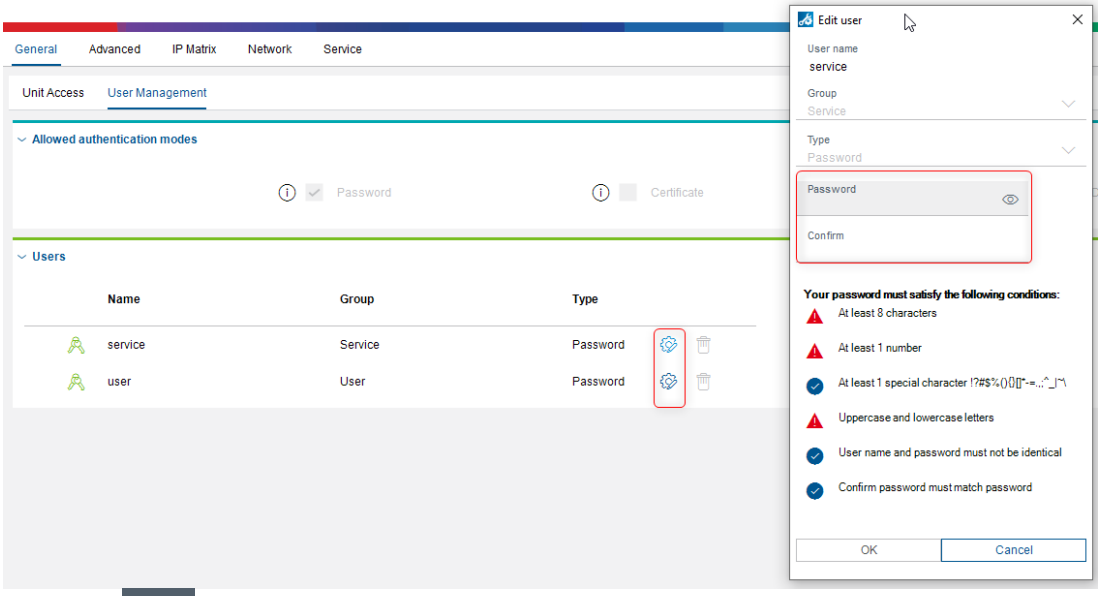
The decoder and the camera(s) must be connected to the same IP network as the PC running Configuration Manager (CM).
Using Configuration Manager 7.20 or higher, complete the steps that follow to configure the decoder:

1. Set passwords for the service account and for the user account.
2. Set session authentication.
3. Upgrade the decoder firmware.
4. Set the device name.
5. Check the HTD license.

Refer to each subchapter that follows for the substeps to complete each of these steps.

3.2.1 Set passwords for the service account and the user account

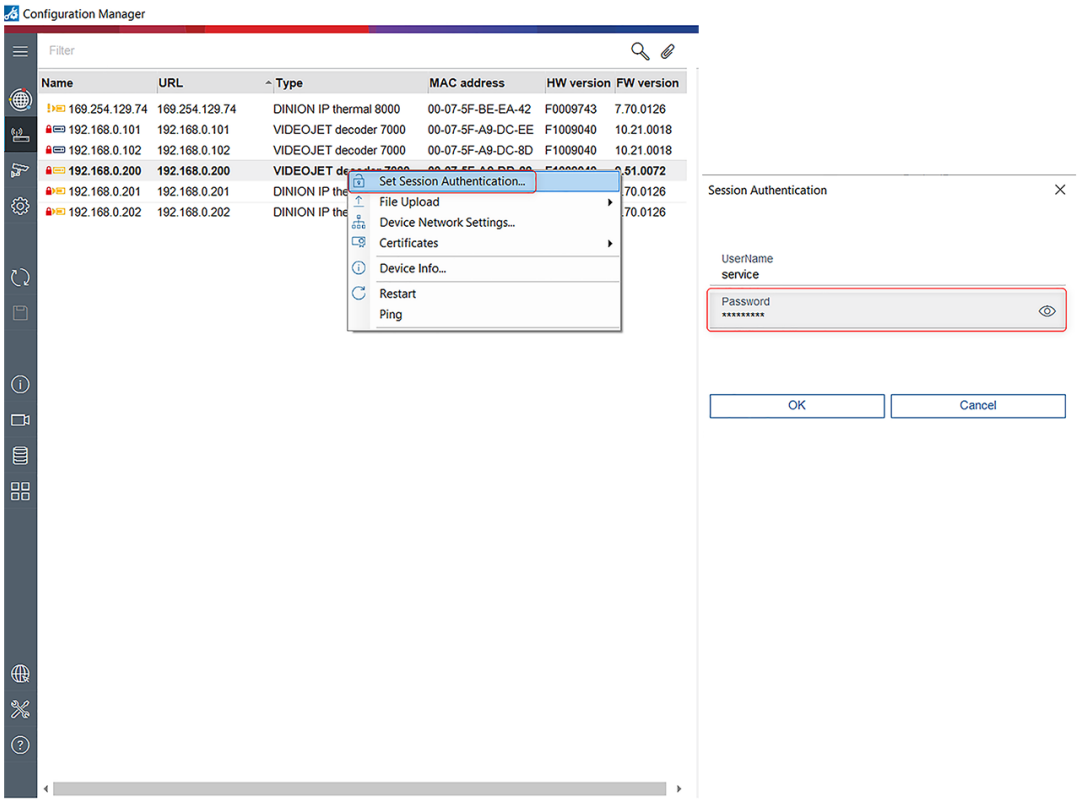
1. Select **General > User Management**.
2. In the section **Users**, click in the **user** line. The dialog box **Edit user** opens.
3. Set the passwords appropriately.
4. Click **OK**.



5. Click .

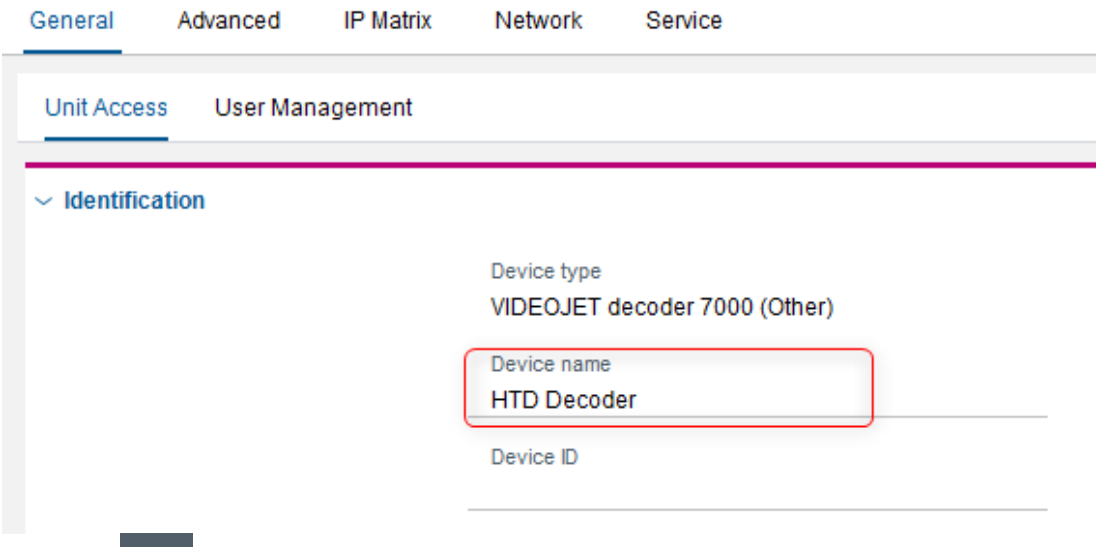
3.2.2 Set session authentication of the decoder

1. Right-click the decoder. Select **Set session authentication**. The dialog box **Session Authentication** opens.
2. Enter the password. Click **OK**. The decoder will be unlocked so that you can upgrade the firmware.



3.2.3 Set the device name

1. Select **General > Unit Access > Device name**.
2. Enter the device name (for example, “HTD Decoder”).



3. Click .

3.3 VIDEOJET decoder configuration (part 2)

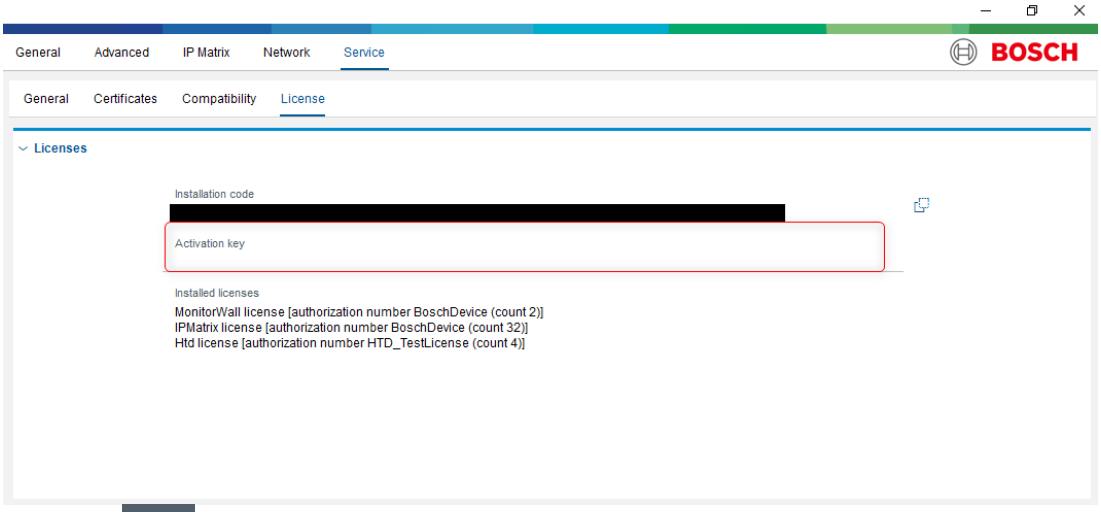
Using Configuration Manager 7.20 or higher, complete the steps that follow to complete the configuration of the decoder:

1. Check the HTD license.
2. Configure a static IP address.
3. Set the decoder password.
4. Set resolution to 1920x1080.
5. Set the decoder as the master in the IP matrix.
6. Configure all HTD cameras as IP Matrix cameras and as the first cameras of the IP Matrix.
7. Set additional parameters.
8. Set the appropriate aspect ratio.
9. (AMEC region only) Change the temperature unit to Fahrenheit.

Refer to each subchapter that follows for the substeps to complete each of these steps.

3.3.1 Check the HTD license

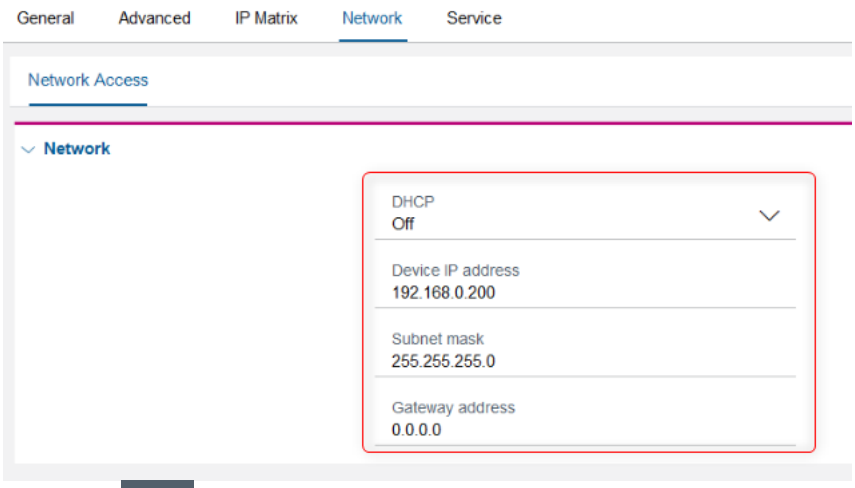
1. In the decoder, select **Service -> Licenses**.
2. Proceed depending on the presence or absence of the :
   - If the HTD license exists, proceed to the next subchapter.
   - If the HTD license is missing, complete the steps that follow:
3. Find the license key in the decoder package.
4. Enter the activation key in the field **Activation Key**.



5. Click .

3.3.2 Configure a static IP address

1. Select **Network > Network Access**.
2. In the field **DHCP**, select **Off**.
3. Enter the IP address (in the same subnet as the camera), or keep the default setting.

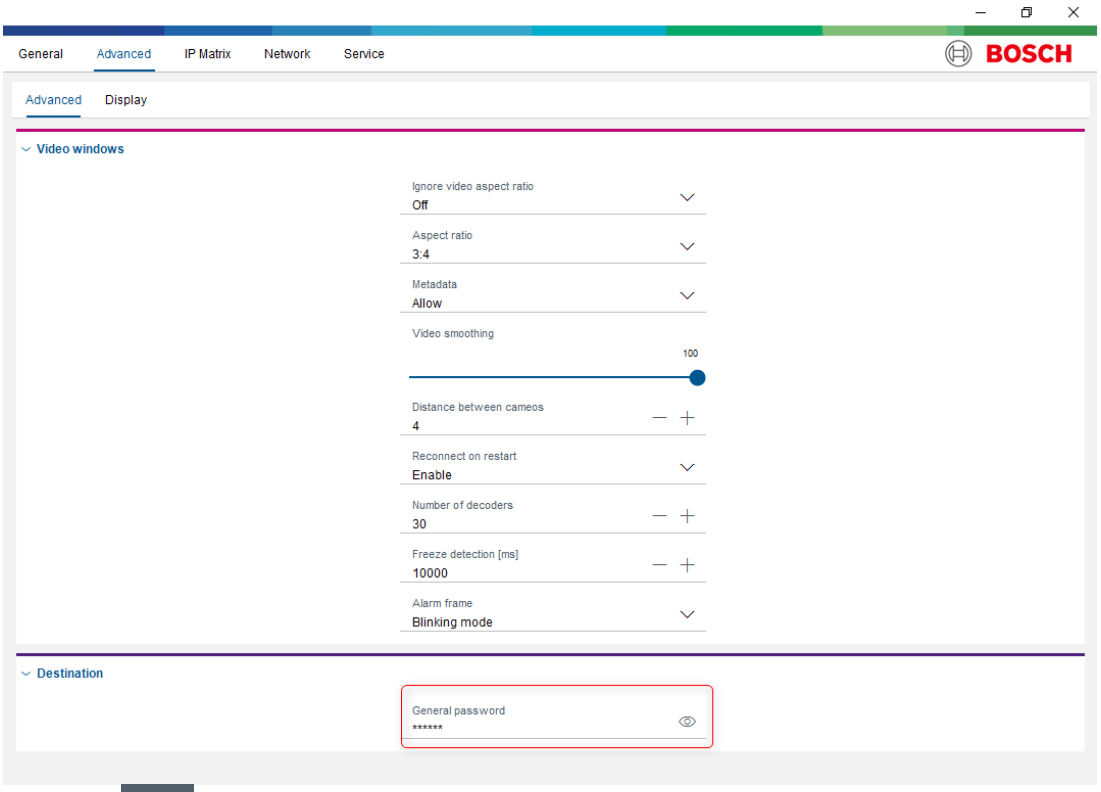


4. Click .

3.3.3 Set the decoder password

Set the general password of the decoder to the user password of the camera.

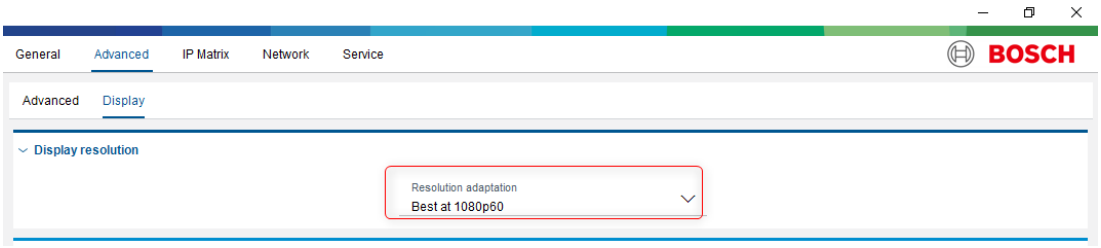
1. Select **Advanced > Advanced > Destination > General password**.
2. In the field **General password**, enter the camera password.



3. Click .

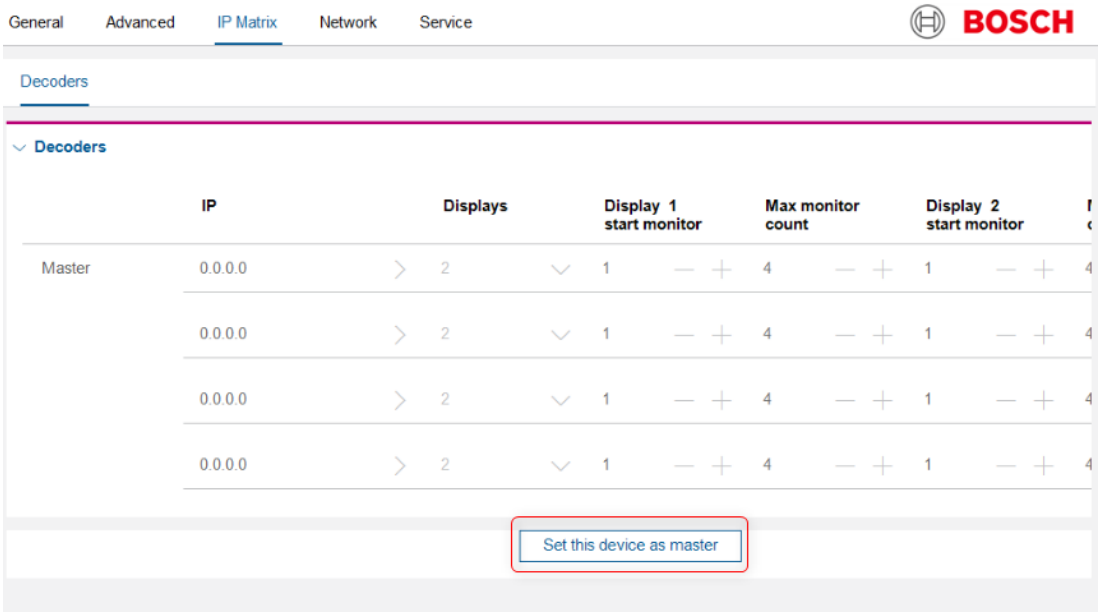
3.3.4 Set resolution to 1920x1080

1. Select **Advanced > Display > Display resolution**.
2. Expand the section **Display resolution**.
3. In the field **Resolution adaptation**, select Best at 1080p60.



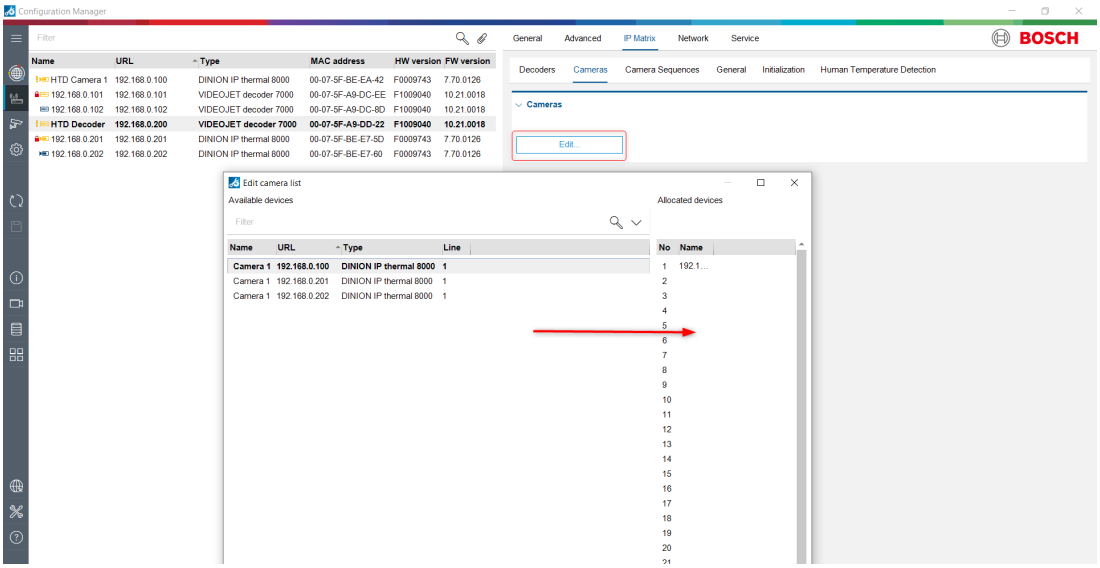
3.3.5 Set the decoder as the master in the IP matrix

1. In Configuration Manager, select **IP Matrix > Decoders**.
2. Select the decoder.
3. Click “Set this device as master”.

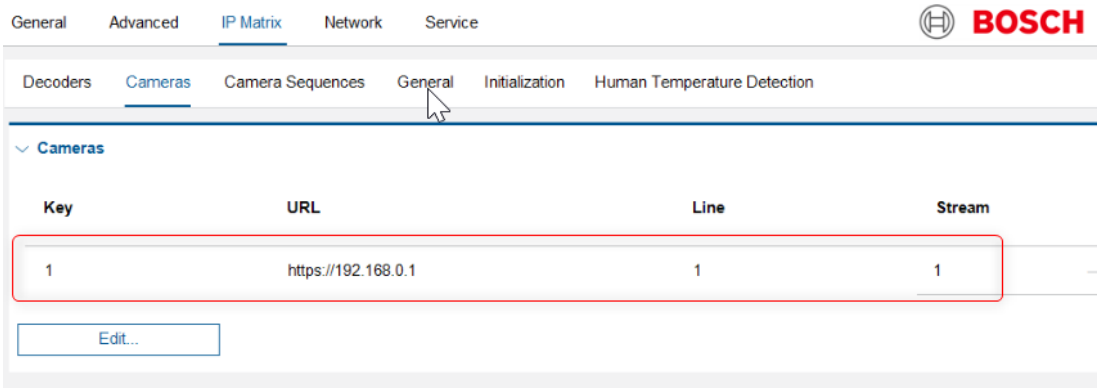


3.3.6 Configure all HTD cameras as IP Matrix cameras

1. Select **IP Matrix > Cameras**.
2. Click **Edit**. The dialog box **Edit camera list** opens.
3. In the column **Available devices**, select the thermal camera(s) with key values that are less than or equal to the number of licensed HTD channels. With your mouse, drag the cameras to the column **Allocated devices**.
4. Add to the IP matrix by “dragging” the cameras to the respective keys on the right. The HTD system applies the algorithm automatically to the camera with the first keys, for the cameras with available HTD licenses.

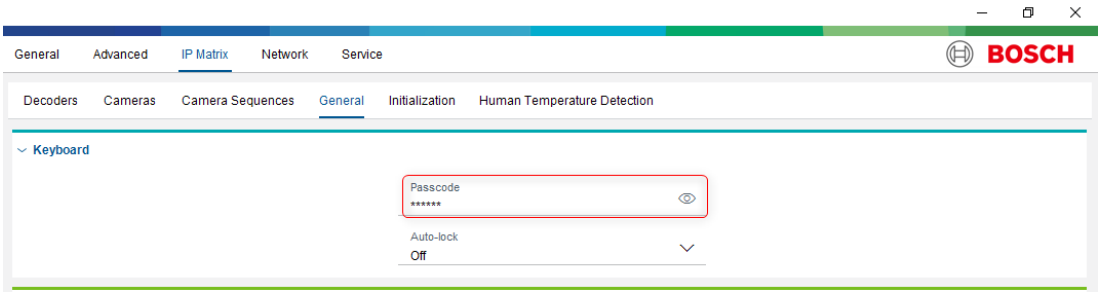


5. Close the dialog box. Note the list of cameras with keys in the section **Cameras**, as in the figure that follows.

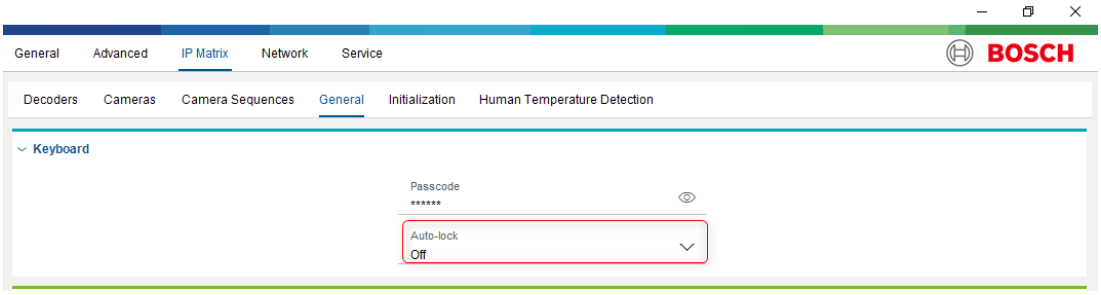


3.3.7 Set additional parameters

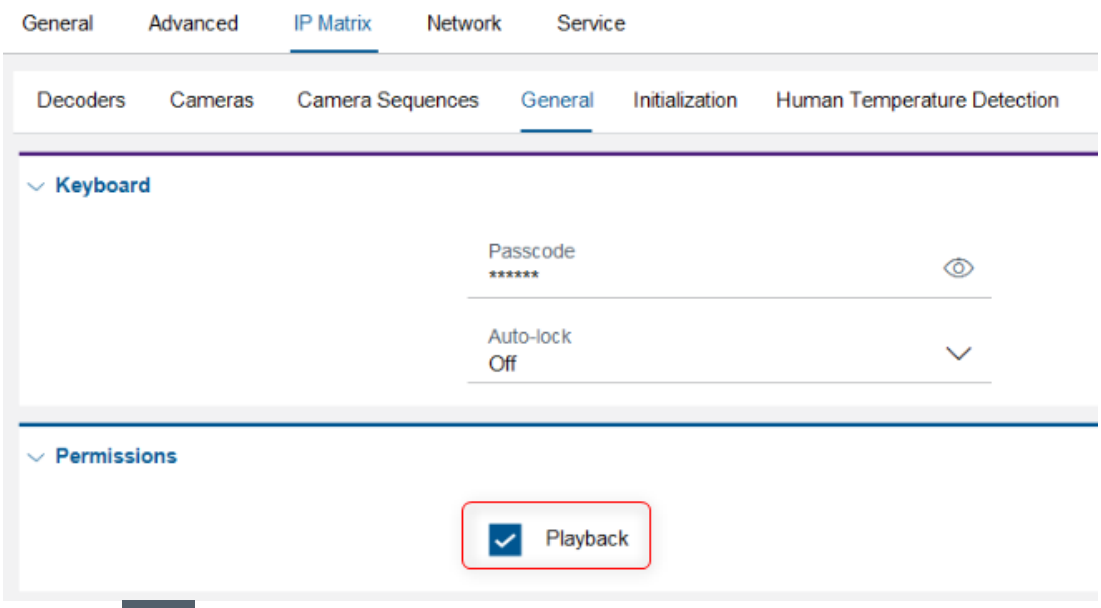
1. Select **General > Keyboard**.
2. In the field **Passcode**, delete the entry to clear the passcode for the IP matrix keyboard.



3. In the field **Auto-lock**, set the auto-lock for the IP matrix keyboard to **Off**.



4. Select the checkbox **Playback**.

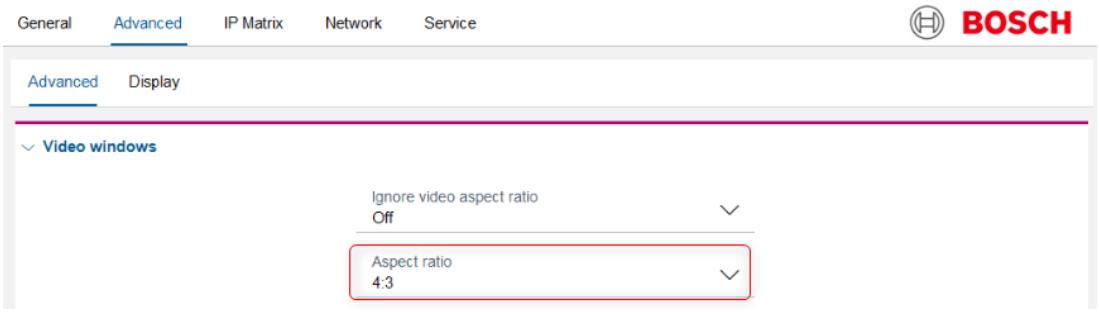


5. Click .

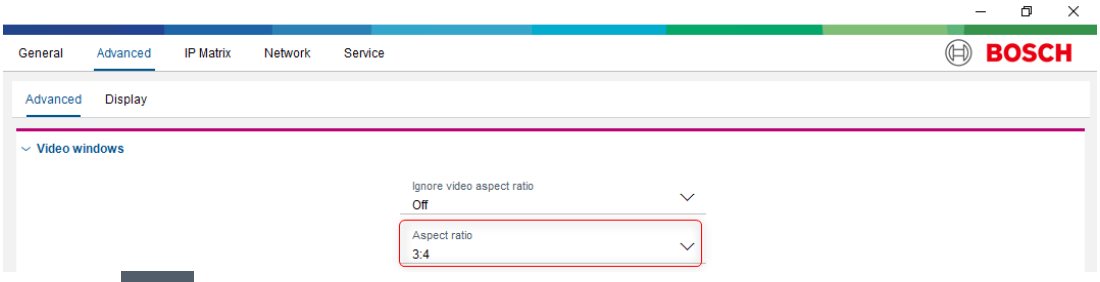
3.3.8 Set the aspect ratio

Set the appropriate aspect ratio for the number of cameras in your HTD system.

1. In Configuration Manager, select **Advanced > Advanced > Video windows > Aspect ratio**.
   - For a one-camera, a three-camera, or a four-camera system, set the aspect ratio to **4:3**.



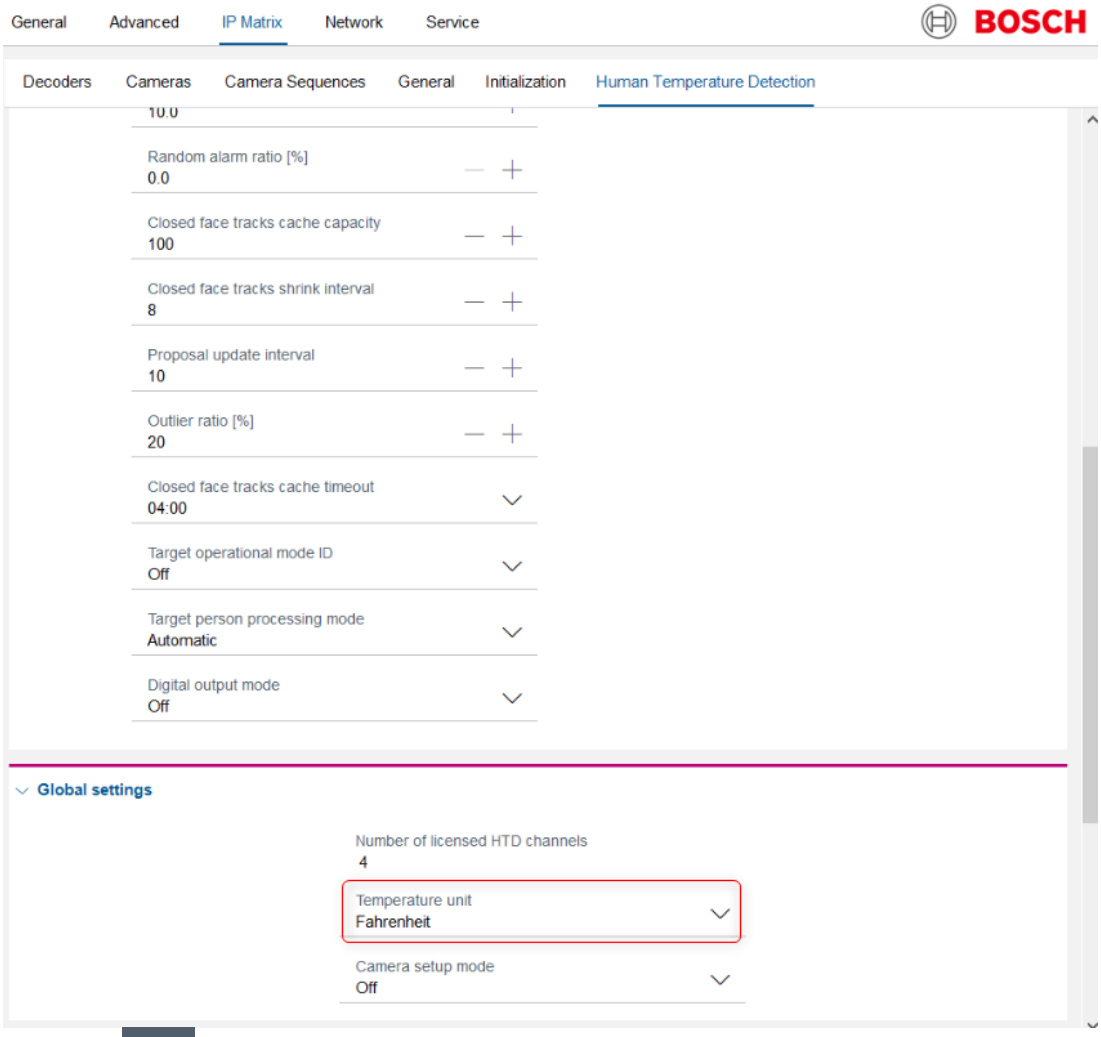
   - For a two-camera system, set the aspect ratio to **3:4**.



2. Click .

3.3.9 Change the temperature unit

1. Select IP **Matrix > Human Temperature Detection > Global settings**.
2. Select **Temperature unit**.
3. Select the temperature unit (Celsius, Fahrenheit).



4. Click .

3.4 Monitor configuration

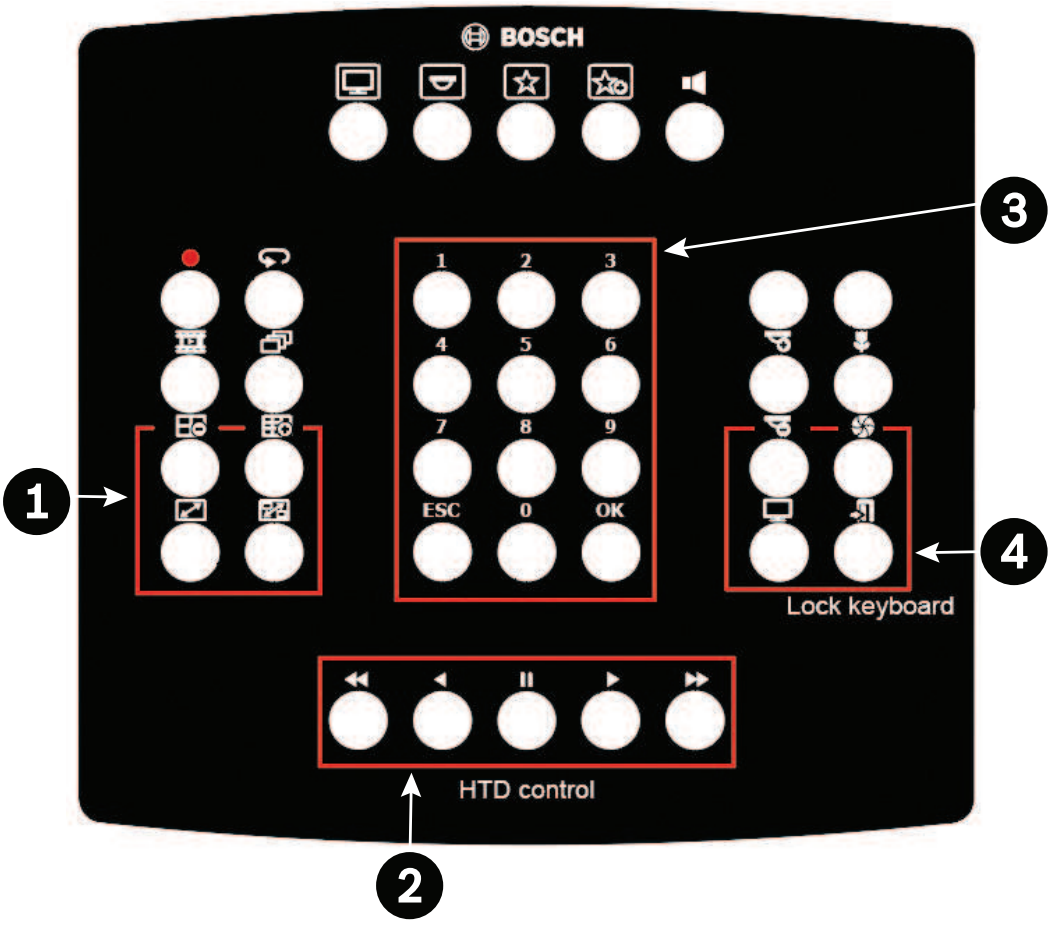
3.4.1 Overview of the keyboard

The graphic that follows shows the user input controls of the keyboard (KBD-UXF). Operators use the jog dial, the shuttle ring, and the PTZ joystick, plus the keyboard buttons, for control in the HTD system.

Figure 3.1: User input controls for KBD-UXF

1	Shuttle ring
2	Jog dial
3	PTZ joystick

KBD-UXF buttons used in HTD system



Number	Button Function
1	Change the view on the monitor
2	Select messages and alarms in the HTD system
3	Open, select, and close menu options in the HTD system
4	Lock the keyboard

The table that follows identifies the functions of the primary keys of the KBD-UXF keyboard that the HTD system uses.

Key label	Function
	Toggle
ESC	Clear
	Previous
	Previous control
	Pause; Hot spot area configuration
OK	Accept
	Lock the keyboard
	Next
	Next control

3.4.2 One-camera configuration

In this configuration, you select 1x1 layout (for a default 4:3 screen).

1. On the PTZ keyboard, press . The monitor shows a 1x1 layout, as in the figure that follows.

2. Connect the HTD camera 1 to the monitor. On the PTZ keyboard, press **1** and then **OK**. Wait some seconds. The HTD camera 1 comes on-line, as in the figure that follows.

3. Access the profile menu. Press **ESC** 6 times. The profile menu is set, as in the figure that follows.

4. Pre-configuration is complete.

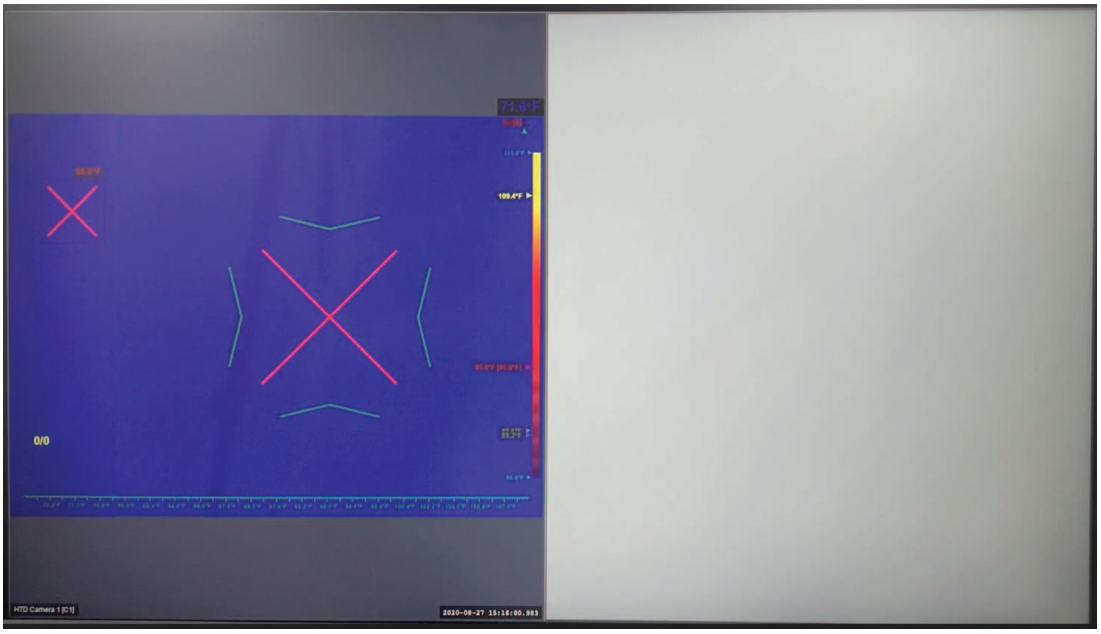
3.4.3 Two-camera configuration

In this configuration, you select 1x2 layout (for a default 3:4 screen).

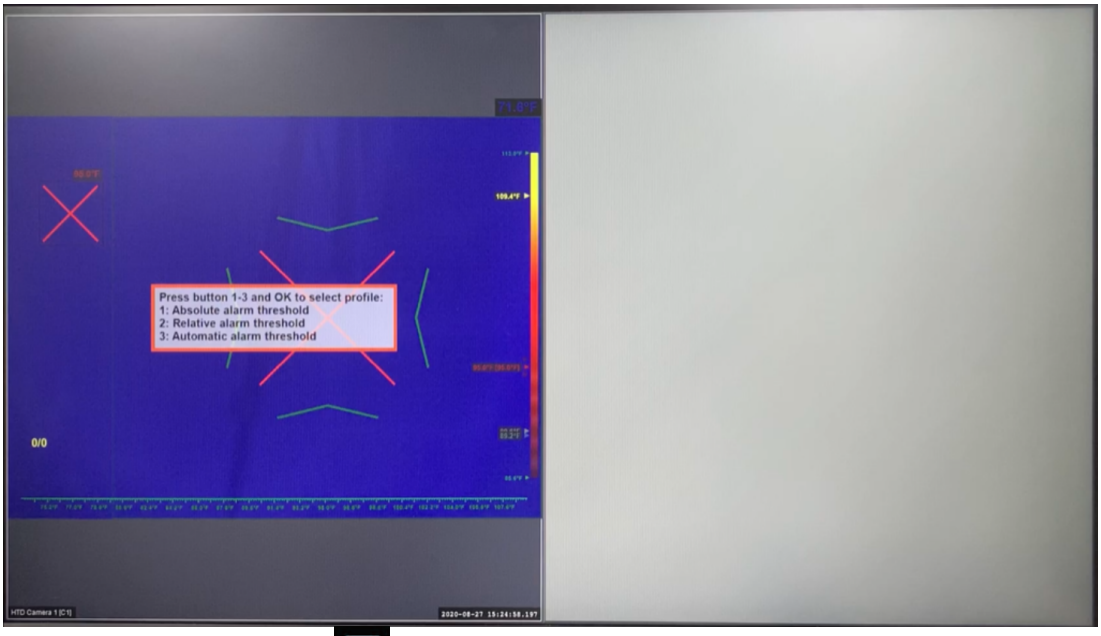
1. On the PTZ keyboard, press . The monitor shows a 1x2 layout, as in the figure that follows.

2. Select monitor 1 by pressing -> **1** -> **OK** on the PTZ keyboard, or rotate the jog dial, until a white frame is on the left monitor, as in the figure that follows.

3. Connect the HTD camera 1 to the selected monitor 1. On the PTZ keyboard, press **1** -> **OK**. Wait some seconds. The HTD camera 1 comes on-line, as in the figure that follows.

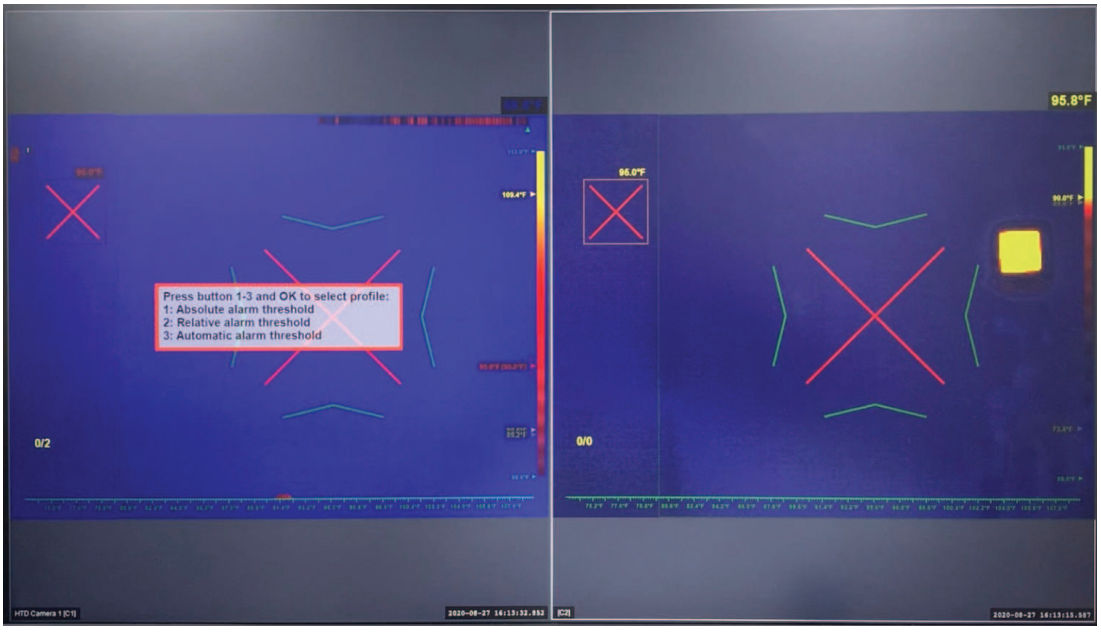


4. Access the profile menu. Press **ESC** 6 times. The profile menu is set, as in the figure that follows.

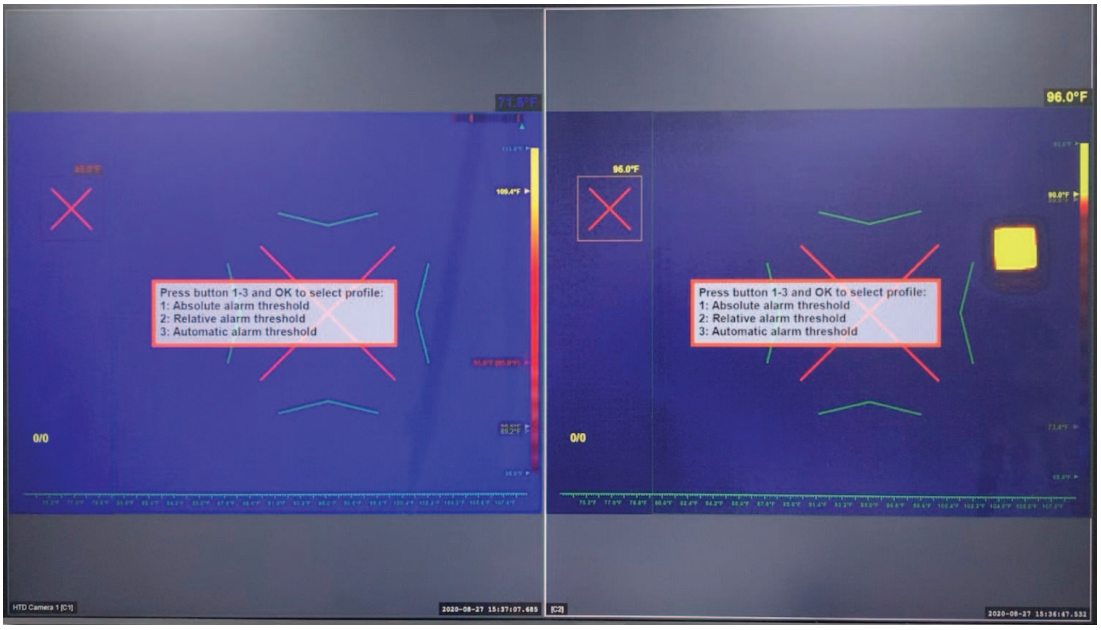


5. Select monitor 2. Press -> **2** -> **OK** on the PTZ keyboard, or rotate the jog dial, until a white frame is on the right monitor, as in the figure that follows.

6. Connect HTD camera 2. On the PTZ keyboard, press **2** -> **OK**. Wait some seconds. The HTD camera 2 comes on-line, as in the figure that follows.



7. Access the profile menu. Press **ESC** 6 times. The HTD camera 2 profile menu is set, as in the figure that follows.



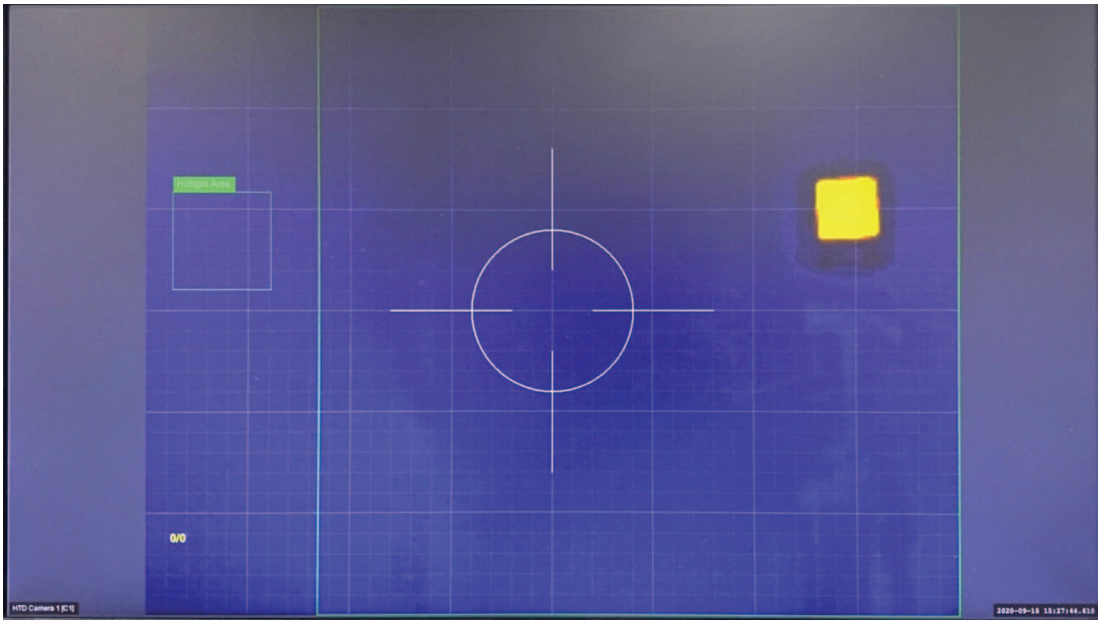
8. Pre-configuration is complete.

4 Hot spot area configuration

Note: The graphics that follow show one-camera configuration. Hot spot area configuration is also available for two-camera configuration.

1. If you do not see the profile menu in the profile selection screen, as in the figure that follows, press **ESC** 6 times.

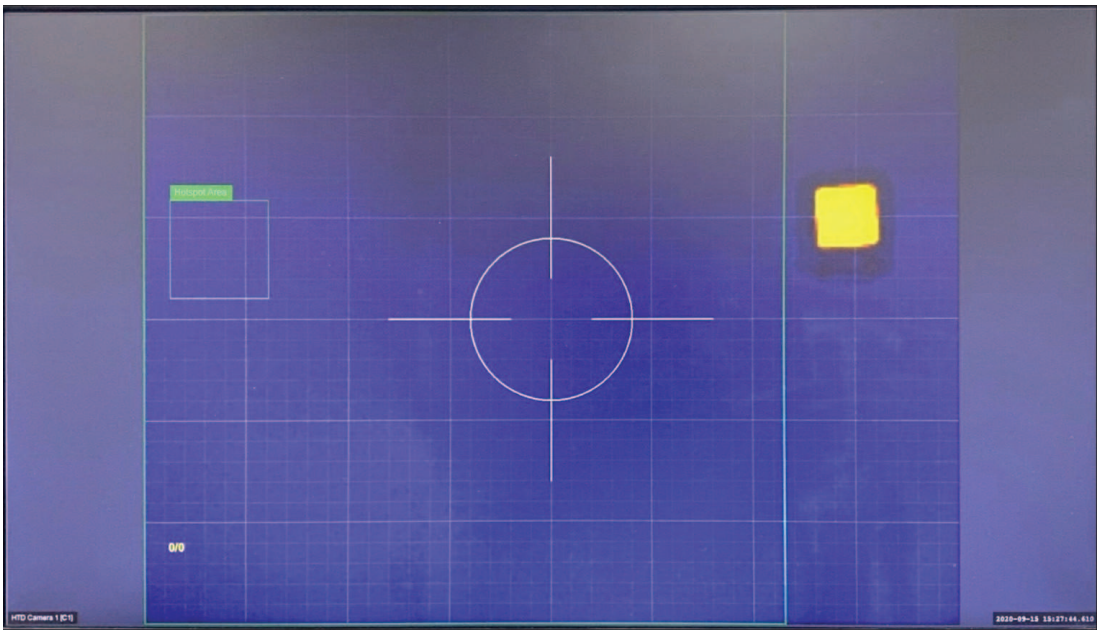
2. Press ⏸ to start hot spot area configuration. The hot spot area (with a small green square) and a larger green border, comes into view, as in the figure that follows.



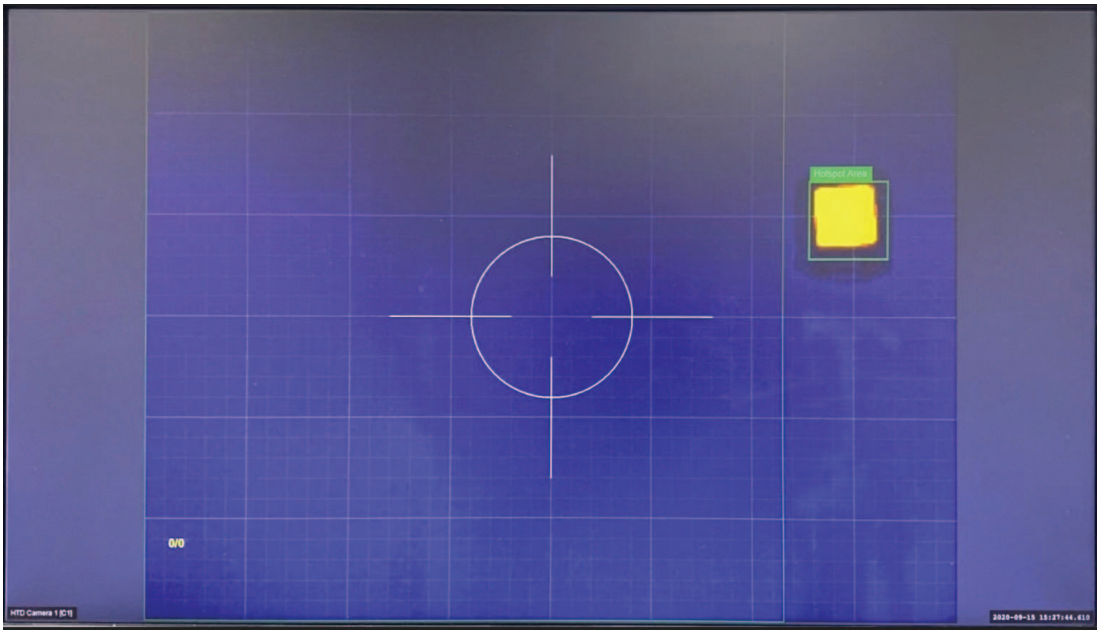
3. Configure the detection hot spot area. Use the joystick to move the detection hot spot area (up/down/left/right), to increase or to decrease the dimensions of the hot spot area.

   Use the shuttle ring to change the aspect ratio. If necessary, press ⏩ or ⏪ to select the larger hot spot area.

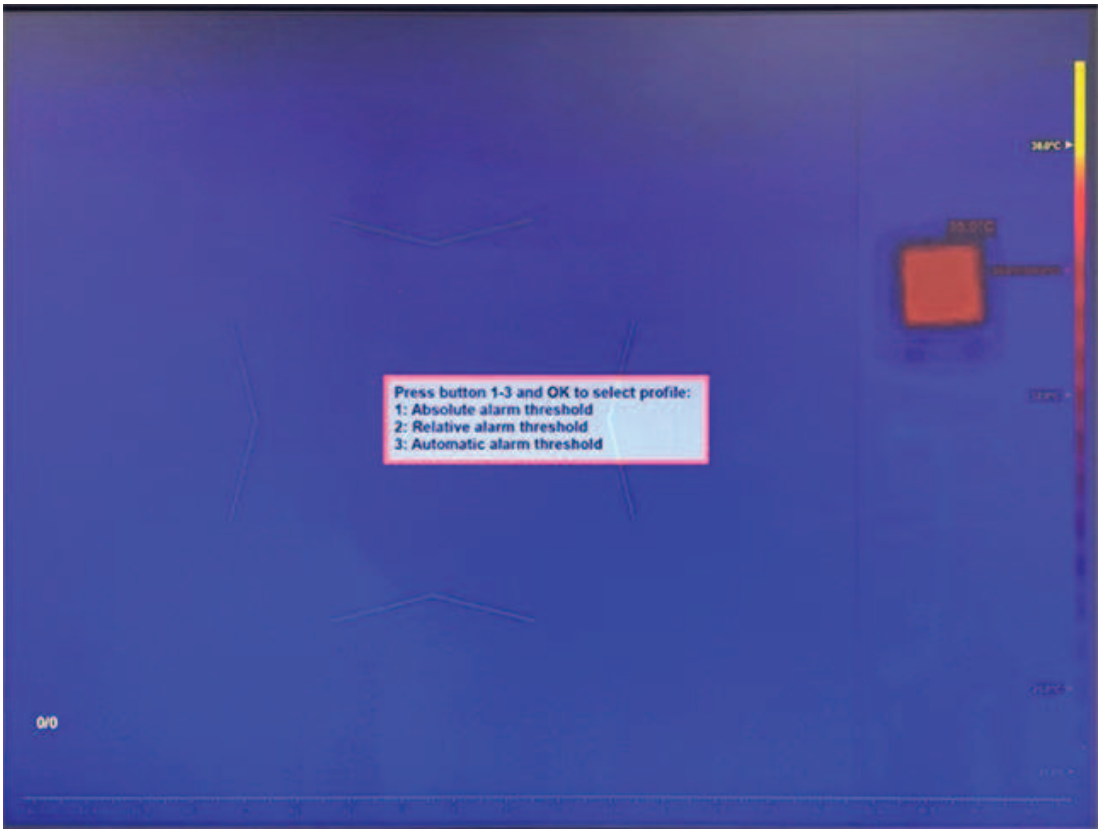
4. Make sure that the detection hot spot area does not have an overlap of the area of the temperature reference device (Blackbody) (which is in yellow in the figure that follows).



5. Configure the hot spot area of the temperature reference device (Blackbody). Press ▶▶ or ◀◀ to select the smaller hot spot area.
6. Use the joystick to move the hot spot area of the temperature reference device (Blackbody) (up/down/left/right) to cover the blackbody device, to increase or to decrease the dimensions of the hot spot area. Use the shuttle ring to change the aspect ratio. In the figure that follows, the small green square is around the hot spot area and of the temperature reference device.
7. Make sure that the detection hot spot area does not have an overlap of the area of the temperature reference device (Blackbody) (which is in yellow in the figure that follows).



8. Press ⏸ to finish hot spot area configuration. Hot spot area configuration is complete, as in the figure that follows.



5 Absolute alarm threshold profile

1. If you do not see the profile menu in the profile selection screen, press **ESC** 6 times.

2. Press **1** and then **OK** to enter the Absolute alarm threshold profile.

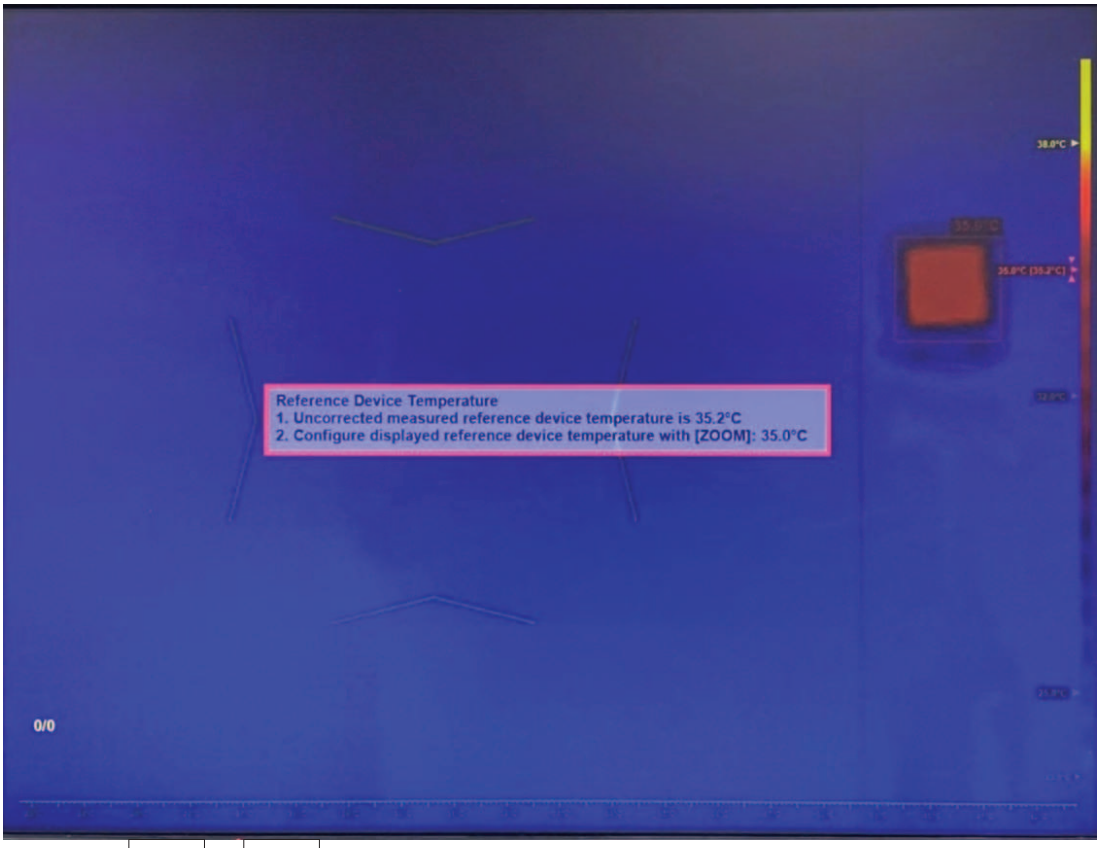
5.1 Configure the alarm threshold for absolute temperature

1. Press ▶▶ or ◀◀ to select the alarm threshold message box.
2. Use the joystick to adjust the alarm threshold temperature (up/down).

1. Press **OK** or **ESC** to close the text box, or continue to the next step.

5.2 Configure the temperature reference device

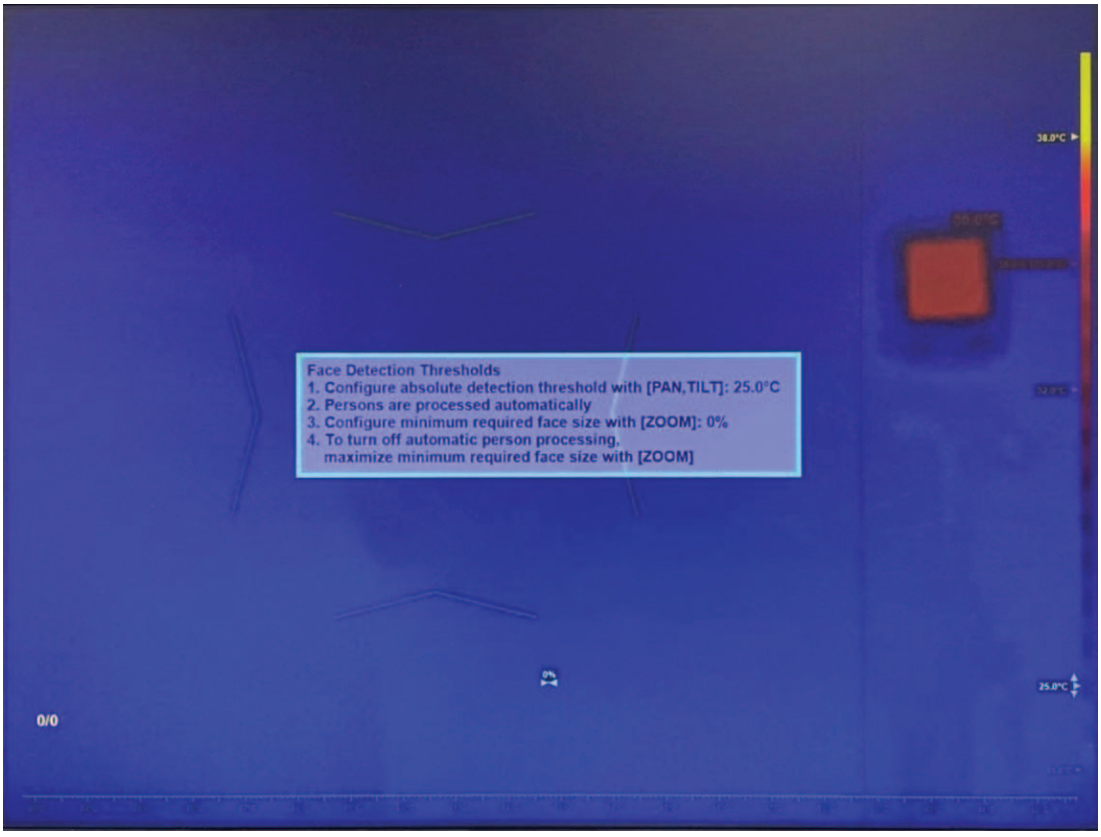
1. Configure the temperature of the temperature reference device (blackbody).
   Note: The temperature of the blackbody device is set by default at 35 °C (95 °F). If you do not need to change the default temperature, continue to step 6.



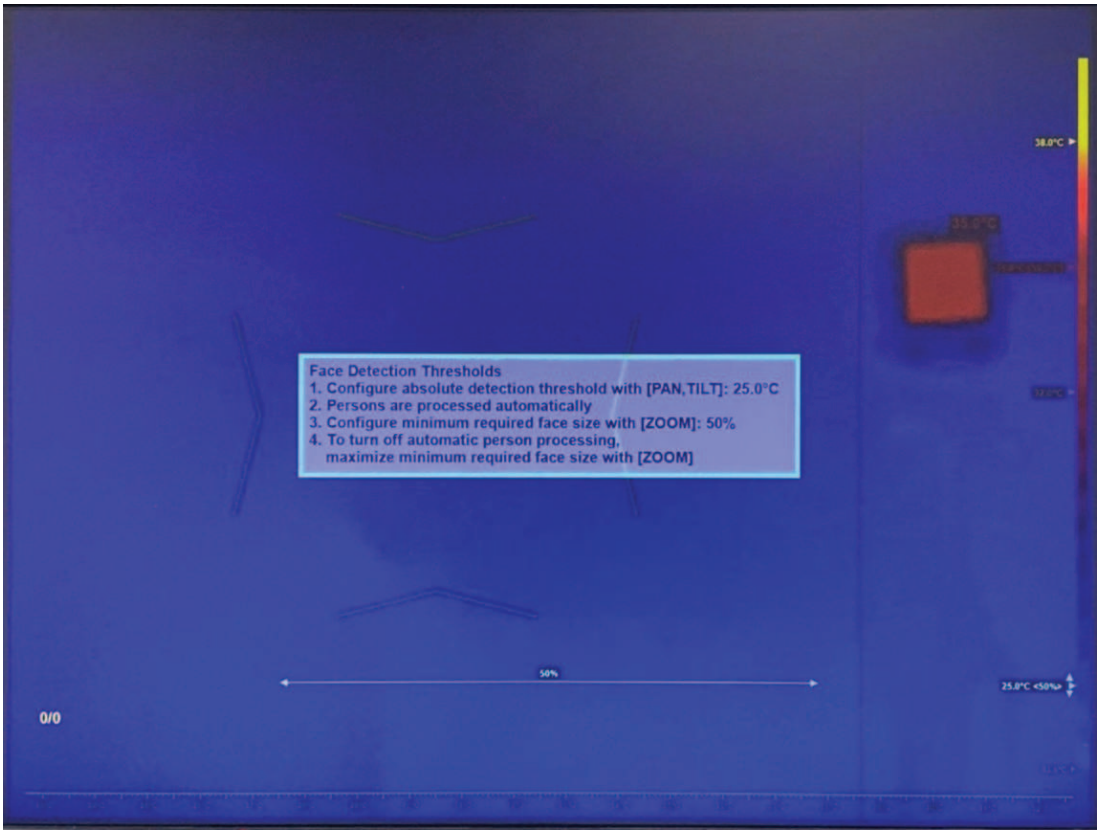
2. Press ▶▶ or ◀◀ to select the message box of the temperature reference device.
3. Use the joystick to adjust the temperature of the temperature reference device.
4. Press **OK** or **ESC** to close the text box, or continue to the next step.

5.3 Configure the face detection threshold

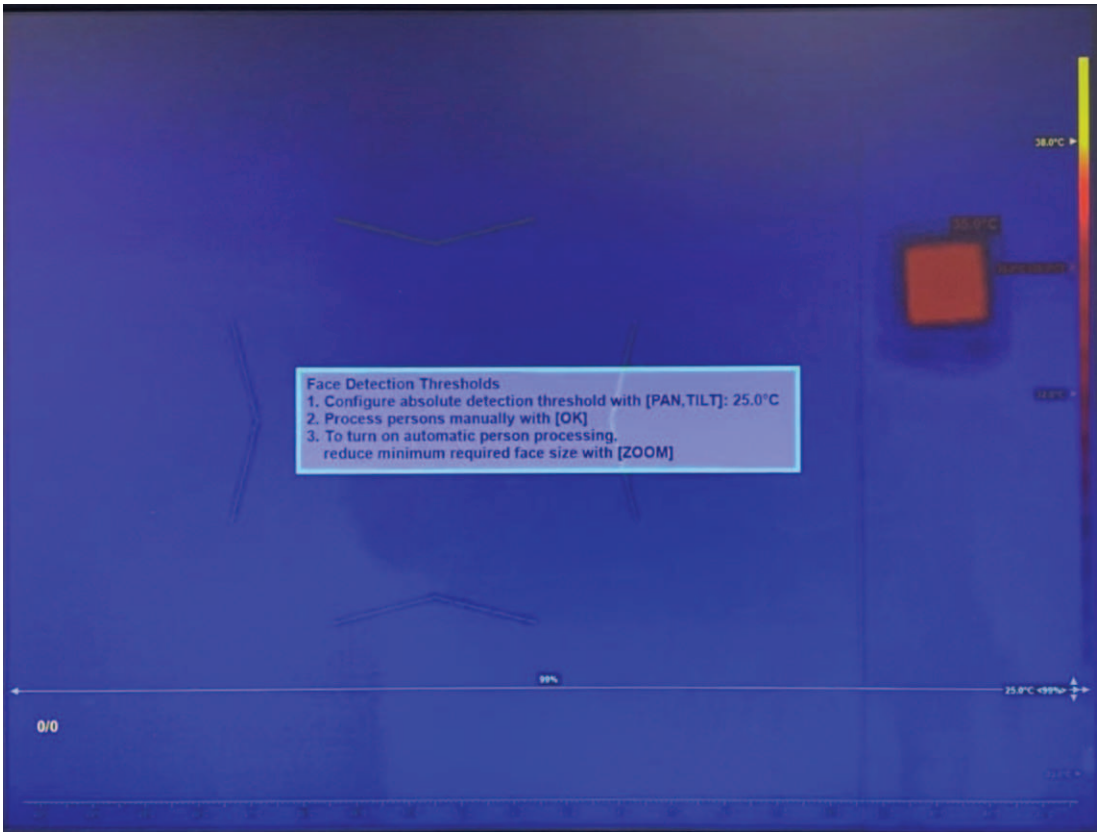
1. Press ▶▶ or ◀◀ to select the message box of the face detection threshold.



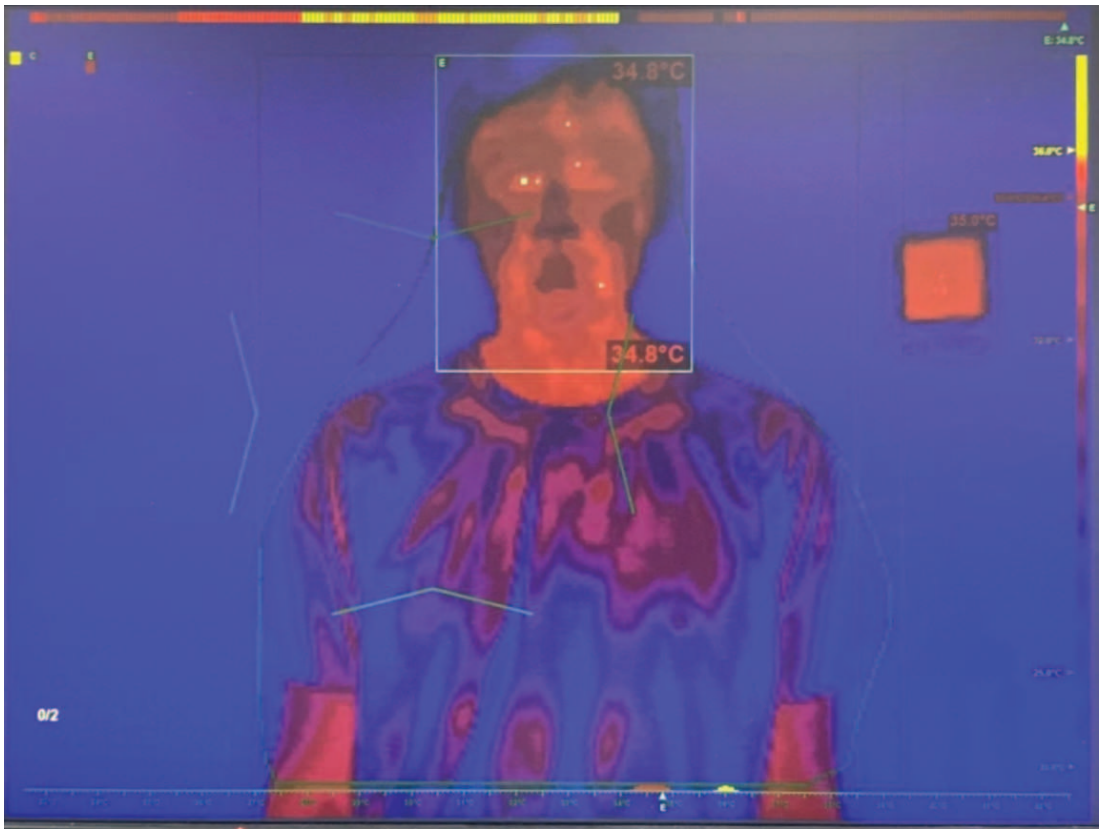
1. Use the joystick to adjust the absolute detection threshold (up/down). When the target temperature is lower than the threshold, the face detection mechanism will ignore it.
2. Turn the joystick to configure the minimum required size for the face. When the target is smaller than the minimum face size, the face detection mechanism will ignore it.



3. To disable the auto face detection and tracking, turn the joystick to maximize the minimum face size.
   Note: Auto face detection and tracking is the default and is recommended for most applications.



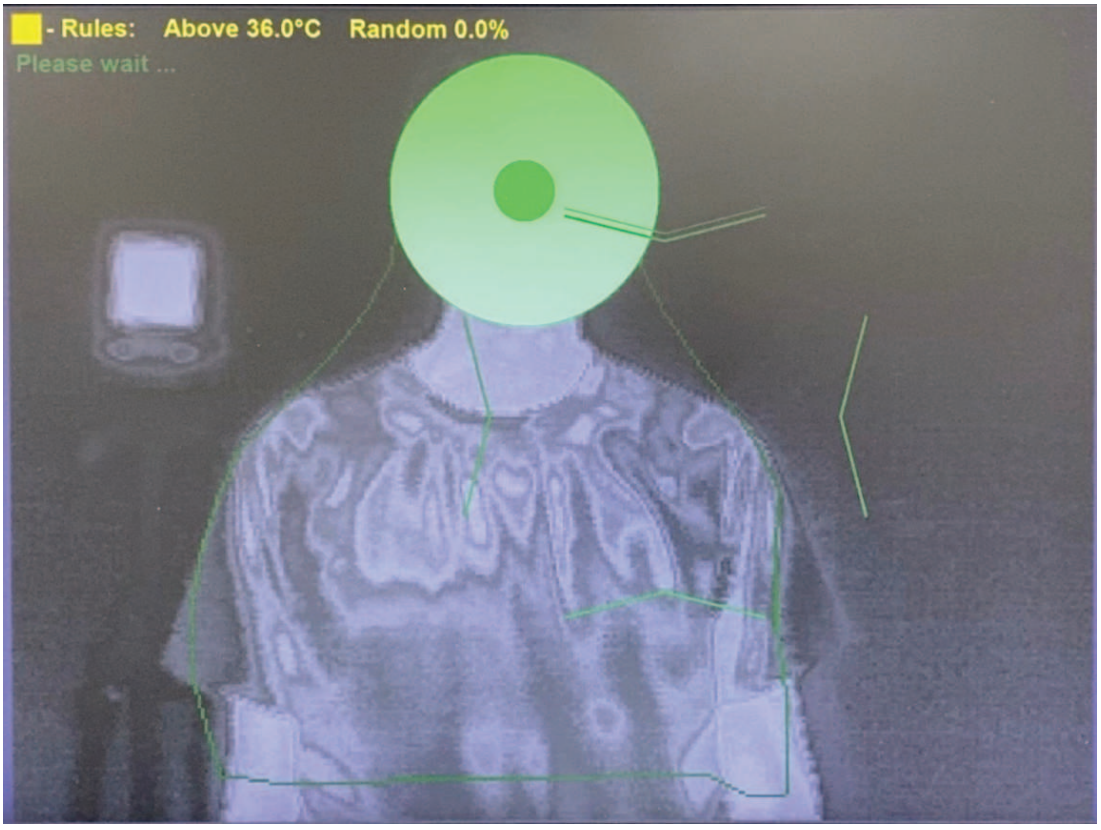
4. Press **OK** or **ESC** to close the text box. Configuration of the absolute temperature threshold profile is complete.



Note: Configuration changes are possible at any time.

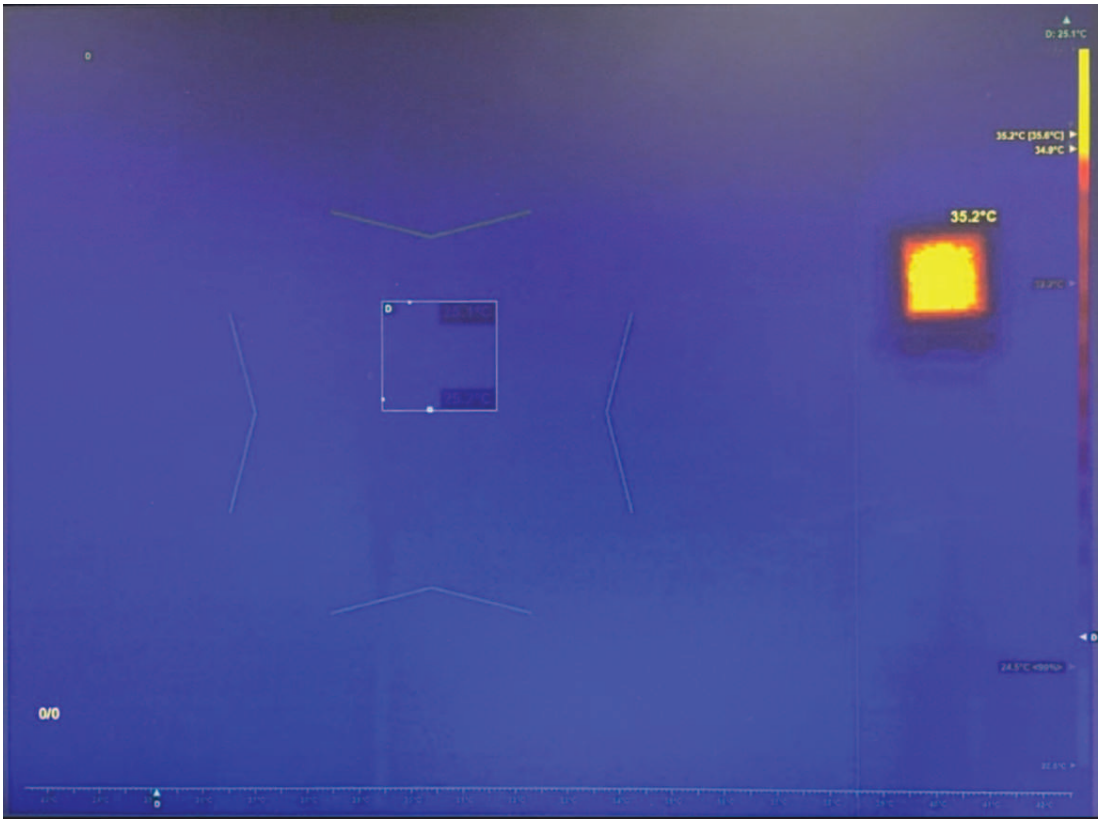
5.4 Activate self-service mode

– If necessary, complete this step. Press to activate the self-service mode. This mode is only supported when automatic face tracking is active.



5.5 Activate manual measurement

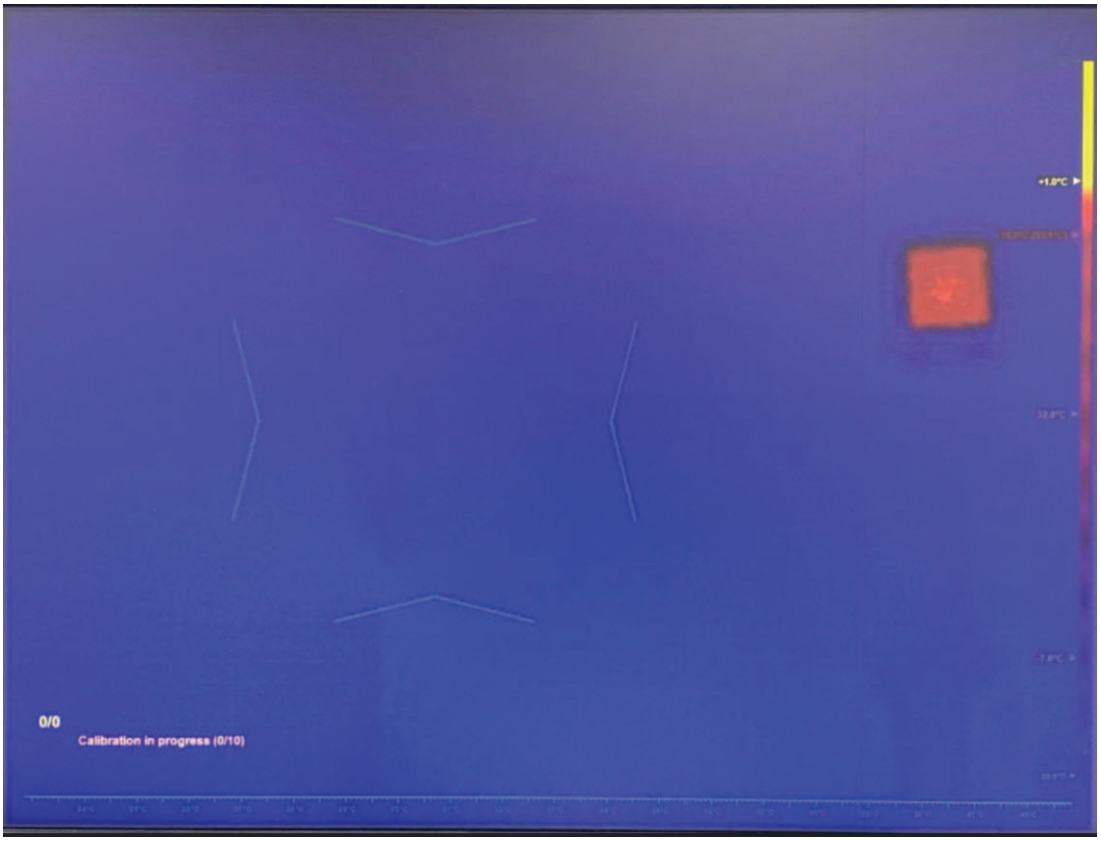
- Use the joystick to move the focus area (up/down/left/right) to cover all of the target face, or a specified segment of the target face.
- Turn the joystick to increase or to decrease the dimensions of the hotspot area.
- Move against a border to change the aspect ratio.



6 Relative alarm threshold profile

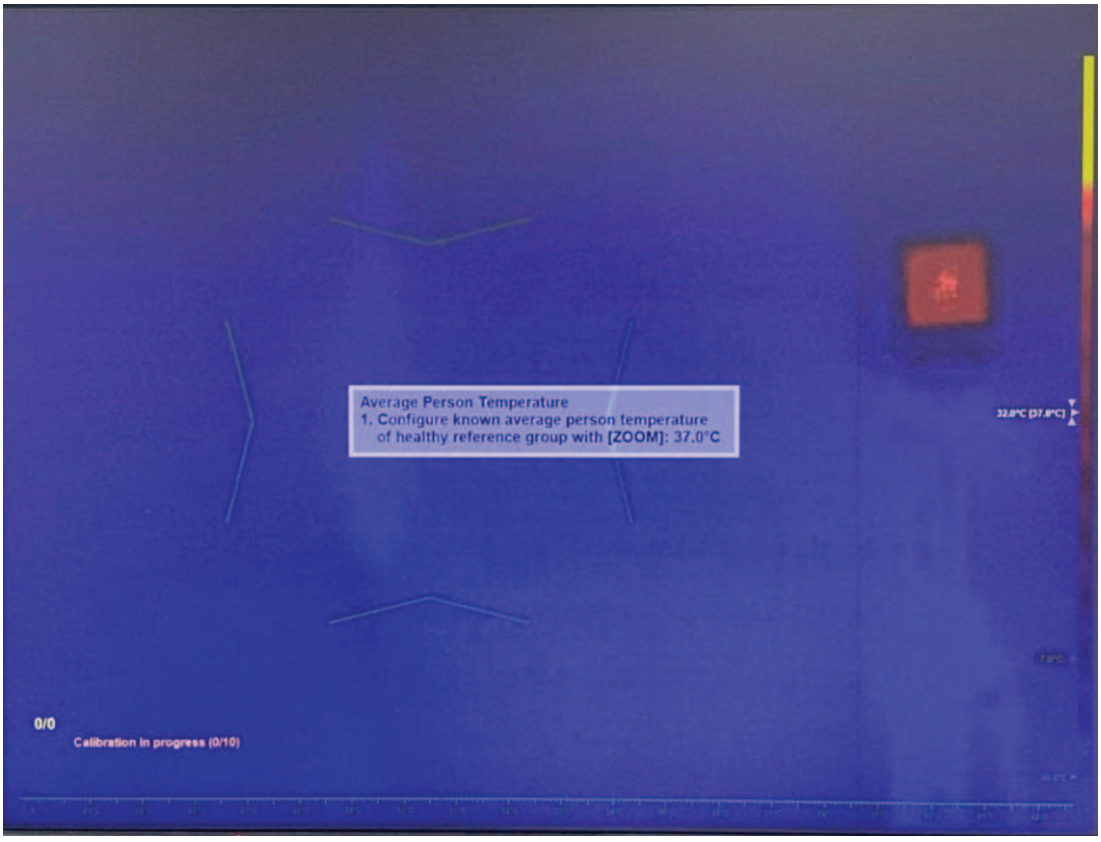
1. If you do not see the profile menu in the profile selection screen, press **ESC** 6 times.

2. Press **2** and **OK** to enter the Relative alarm threshold.

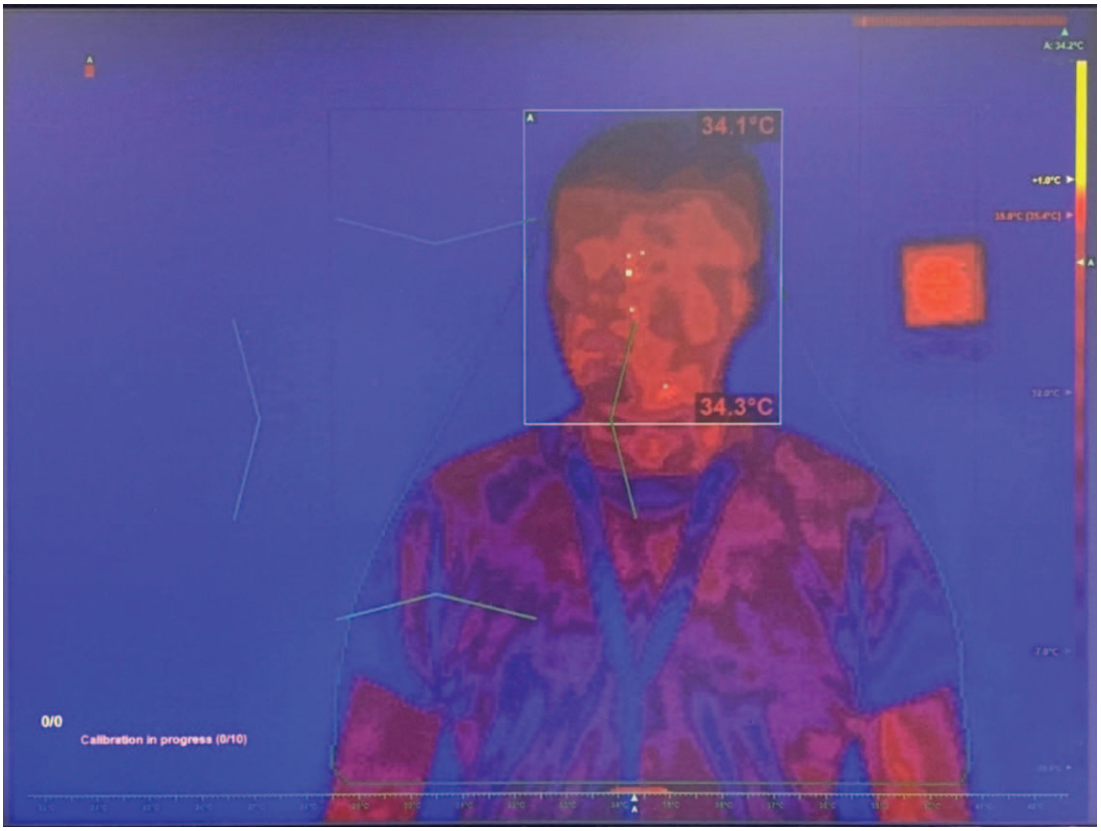


6.1 Configure the average person temperature

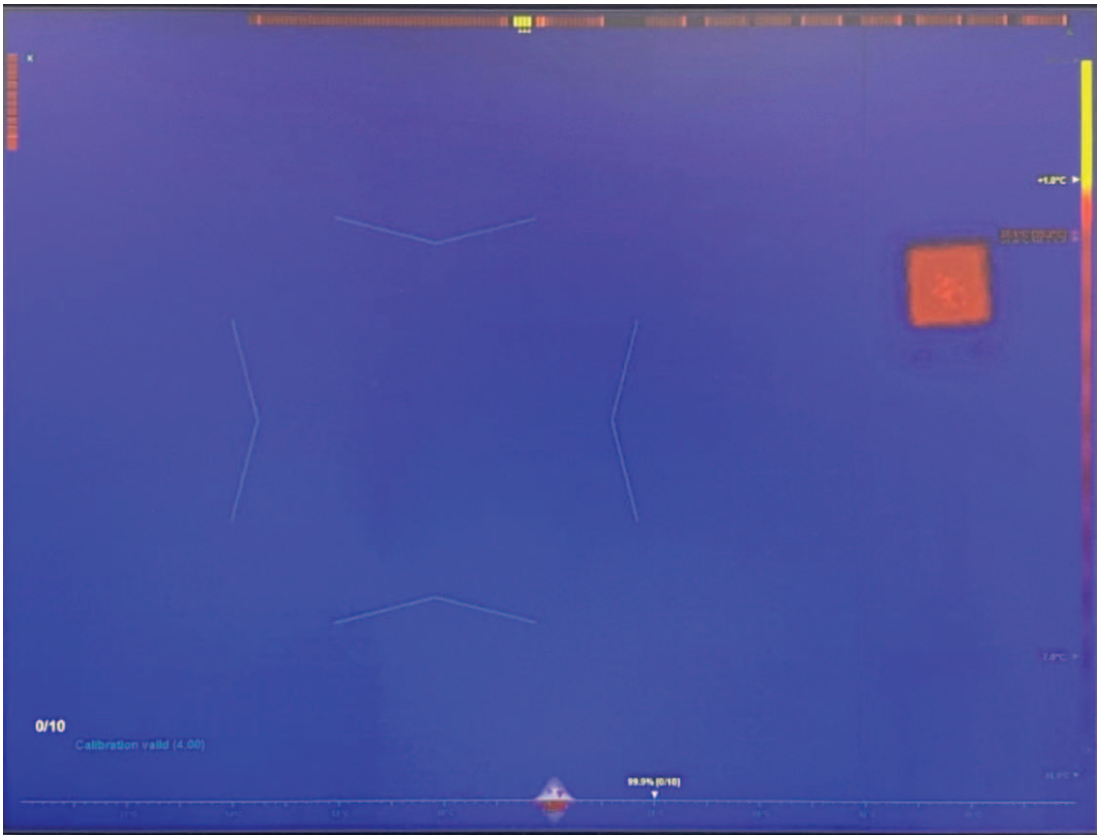
1. Press ▶▶ or ◀◀ to select the average person temperature message box.



2. Use a clinical-grade temperature measurement device to measure 10 healthy persons.
3. Calculate the mean temperature of the 10 persons. In the HTD system, complete one of the steps that follow:
   - Turn the joystick to adjust the temperature, to match the mean temperature value of the 10 healthy persons.
   - Keep the default of 37 °C (if absolute temperature accuracy is not important).
   - Use a different preferred value within the supported range.
4. Press **OK** or **ESC** to close the text box, or continue to the next step.
5. Start calibration. Ask each of the 10 healthy persons to go in front of the camera one by one. Each person must stay in the target area for approximately 2 seconds. The yellow progress indicator in the bottom left of the screen updates the progress of calibration some seconds after a person has gone from the field of view of the camera.



6. Calibration is complete. The yellow indicator becomes green. The HTD system calculates the mean temperature of the 10 healthy persons, and compares the mean temperature with the average person temperature that the operator selected in step 5. The HTD system then adjusts the absolute temperatures (the offset) showing on the screen.



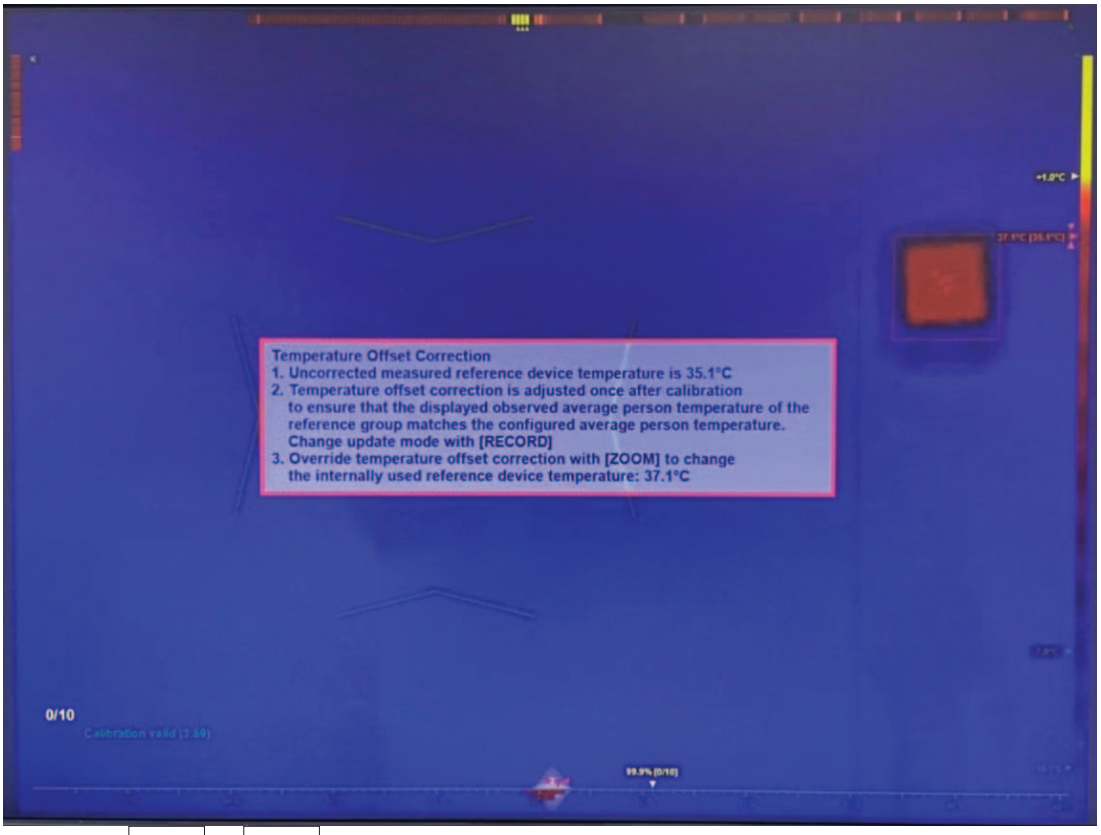
6.2 Configure the relative alarm threshold

1. Press ▶▶ or ◀◀ to select the alarm threshold message box.
2. Use the joystick to adjust the alarm threshold temperature (up/down).

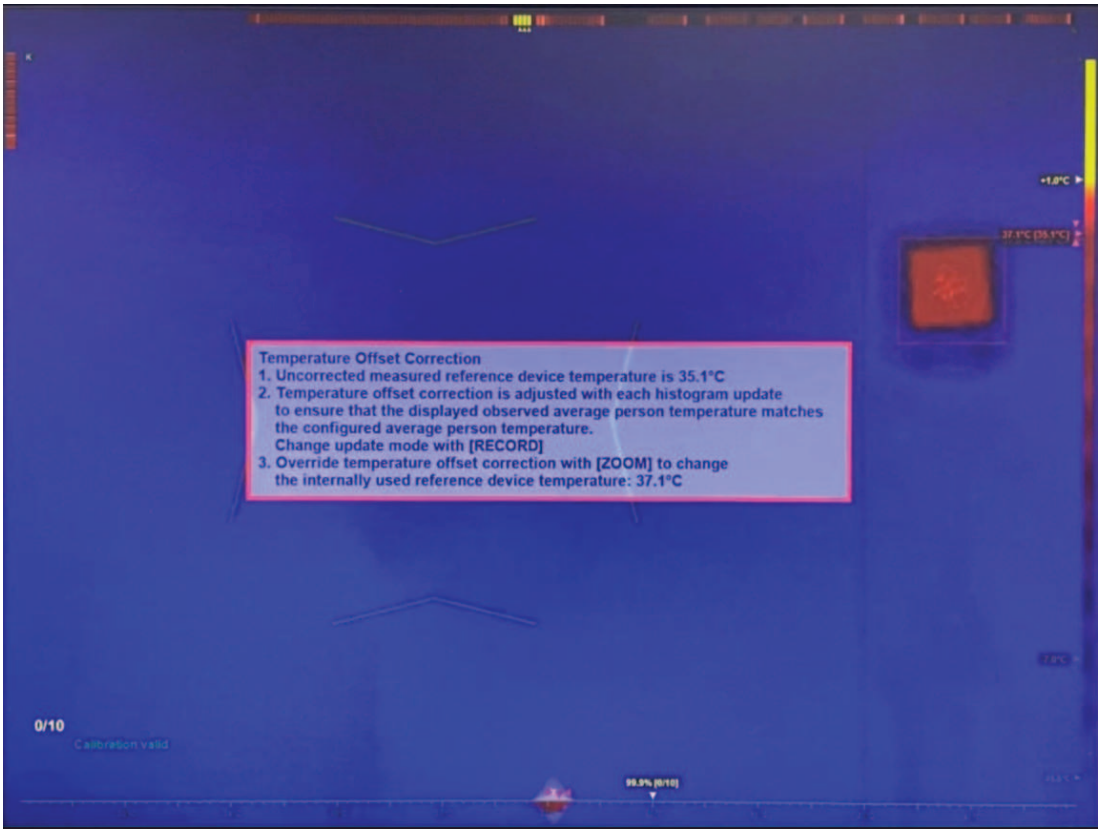
3. Press **OK** or **ESC** to close the text box, or continue to the next step.

6.3 Configure the mode for temperature offset correction

1. Configure the mode for temperature offset correction.
   Note: The default is to adjust (offset) temperature one time, only after calibration with the mean temperature of the 10 healthy persons is complete.



2. Press ▶▶ or ◀◀ to select the temperature offset correction message box.
3. Complete one of the steps that follow:
   - (Recommended method) Press ● to set the offset mechanism to continuous adjustment after every 10 persons scanned, based on the full set of saved temperatures.



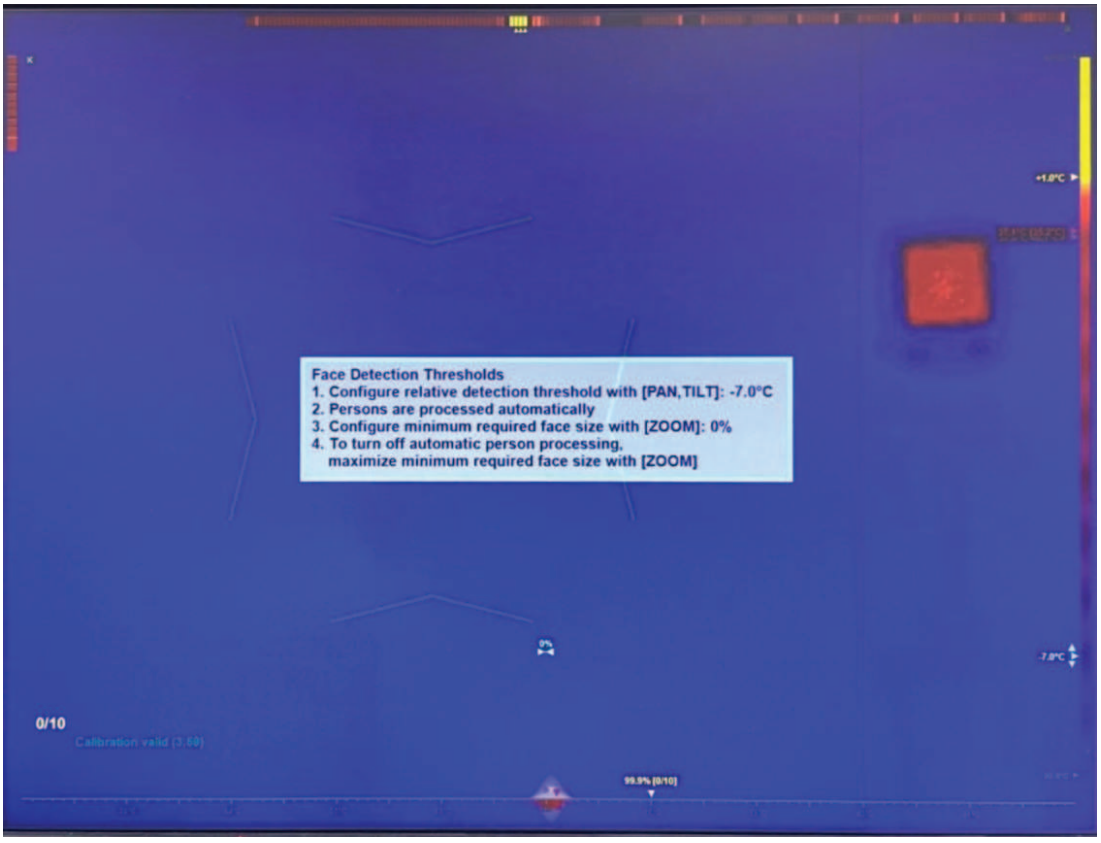
– (Optional method) Turn the joystick to adjust the offset temperature manually. To see a higher temperature on the screen, adjust the temperature to a higher value. To see a lower temperature on the screen, adjust the temperature to a lower value.
Note: The next automatic adjustment will override the manual adjustment.

4. Press **OK** or **ESC** to close the text box, or continue with the next step.

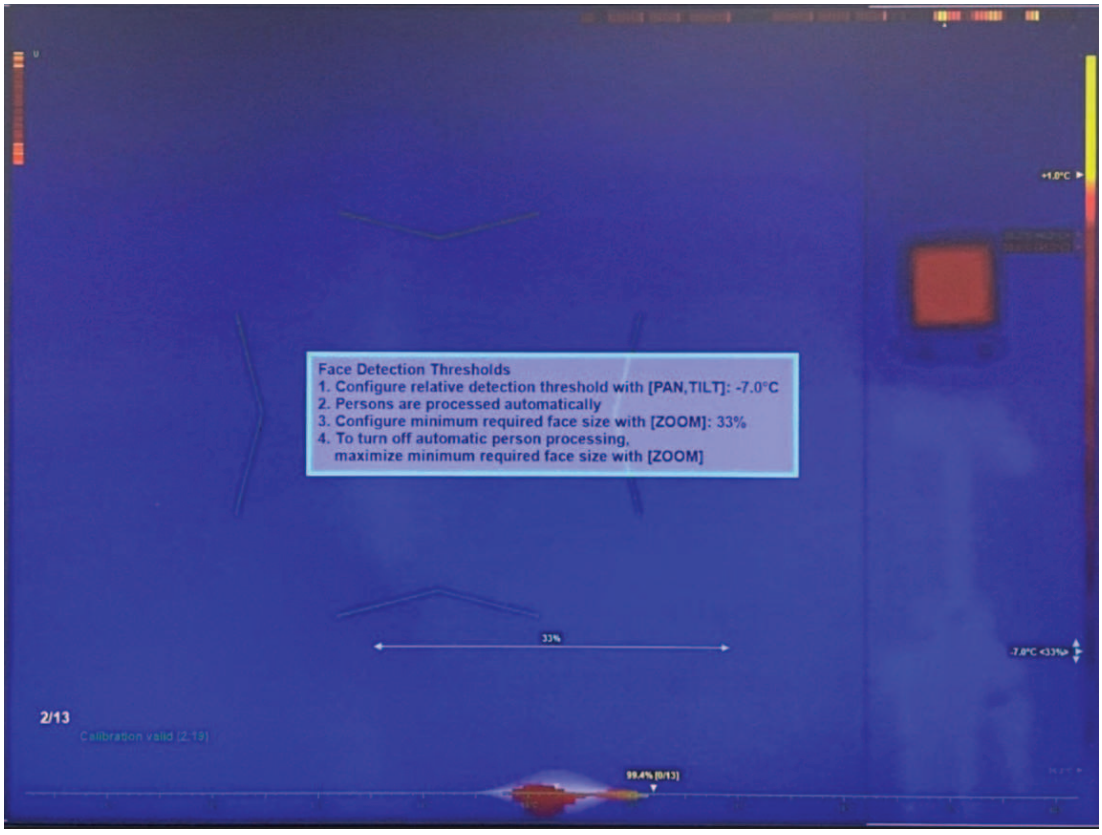
Note: The temperature showing on screen will not influence the alarm mechanism.

6.4 Configure the face detection threshold

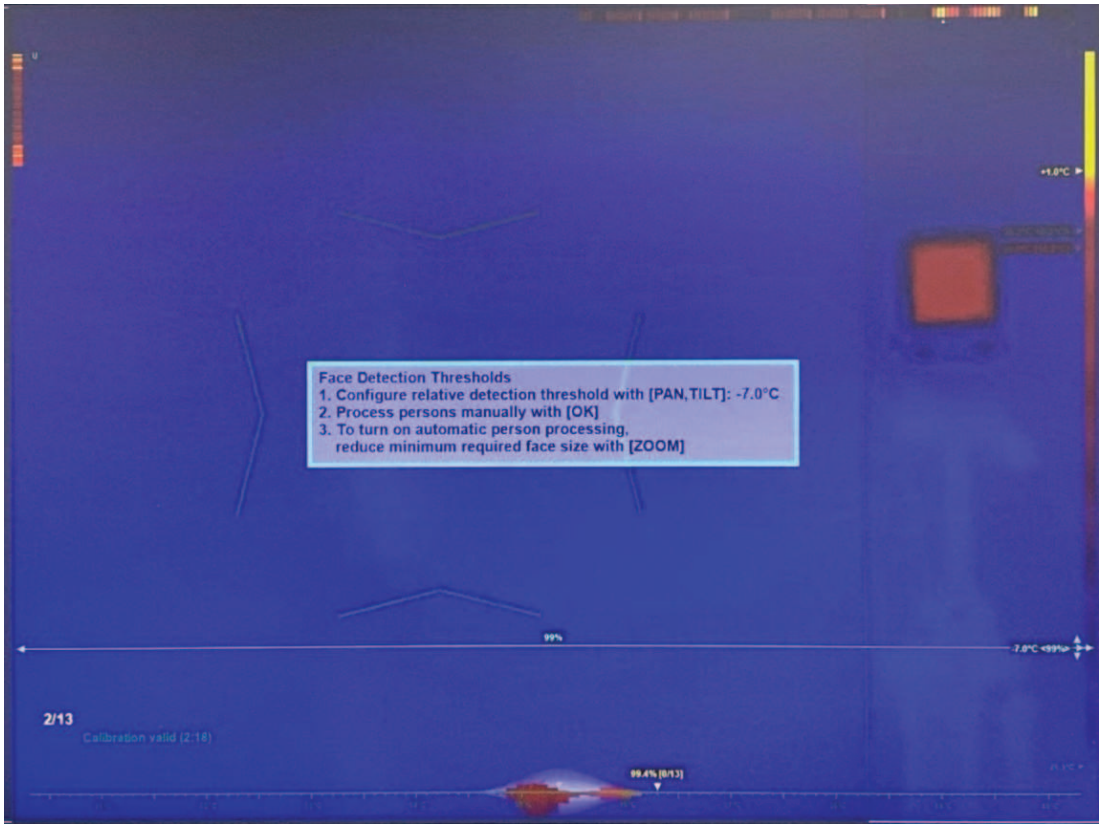
1. Press ▶▶ or ◀◀ to select the face detection threshold message box.



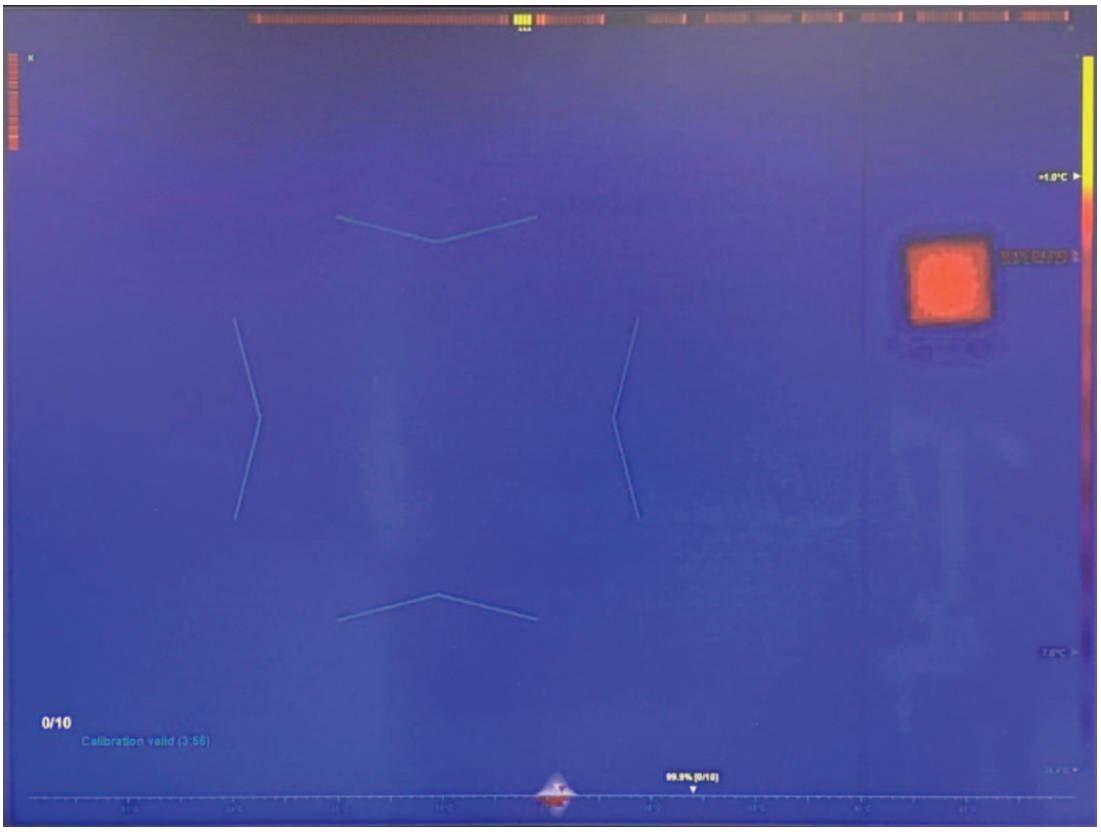
1. Use the joystick to adjust the relative detection threshold temperature (up/down). When the target temperature is lower than the threshold (current mean temperature + the relative detection threshold value), the face detection mechanism will ignore it.
2. Turn the joystick to configure the minimum face size. When the target is smaller than the minimum face size, the face detection mechanism will ignore it.



3. To disable the auto face detection and tracking, turn the joystick to maximize the minimum face size.
   Note: Auto face detection and tracking is the default and is recommended for most applications.

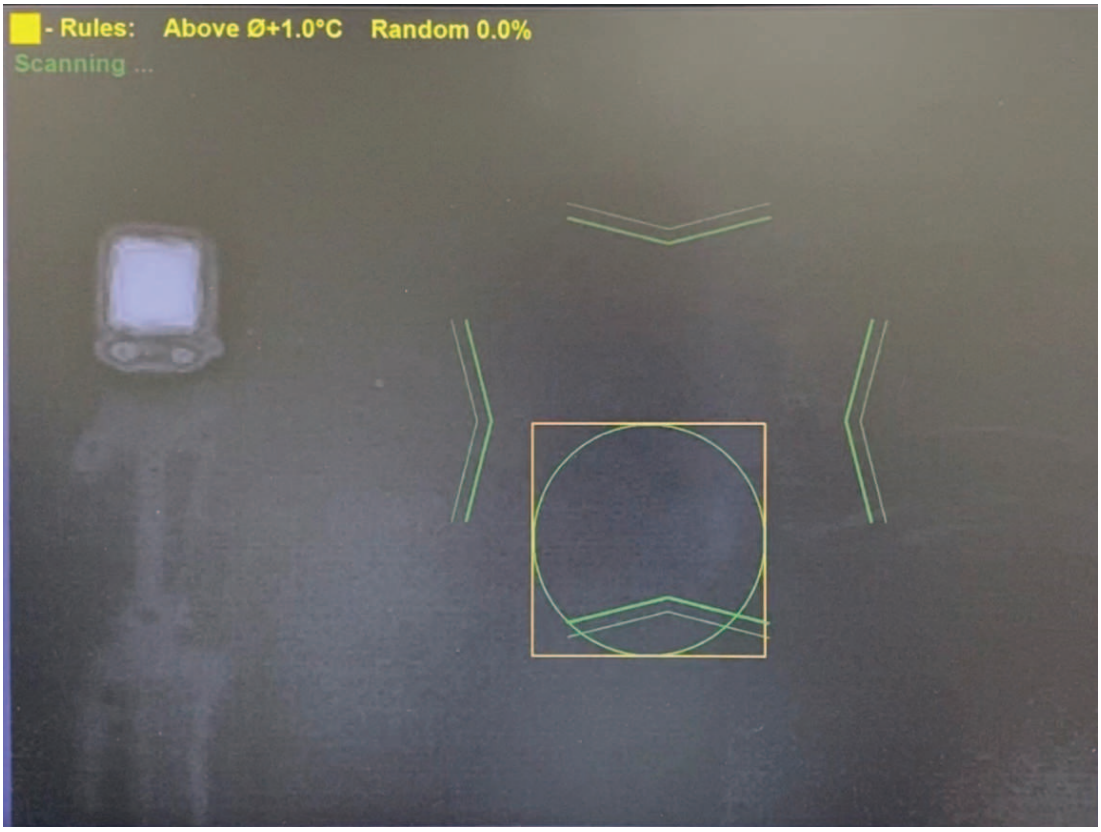


4. Press **OK** or **ESC** to close the text box. Configuration of the relative temperature threshold profile is complete.



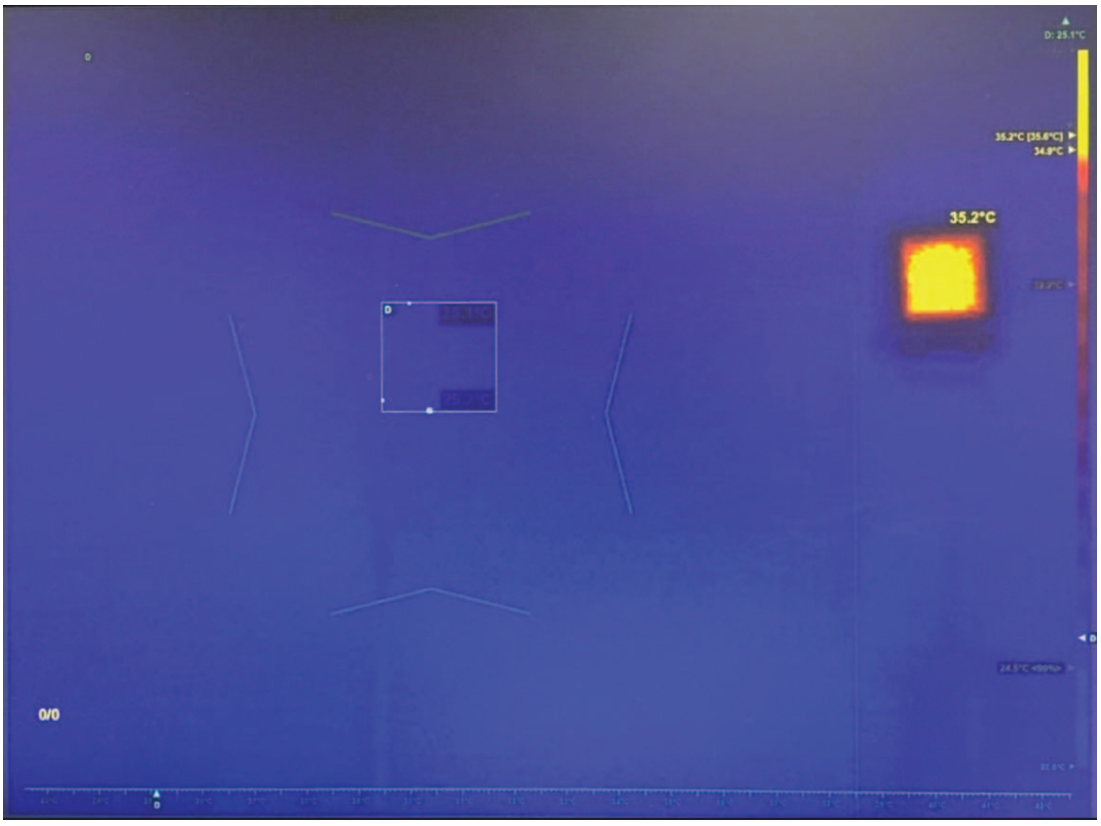
6.5 Activate self-service mode (if necessary)

– If necessary, complete this step. Press to activate the self-service mode. This mode is only supported when automatic face tracking is active.



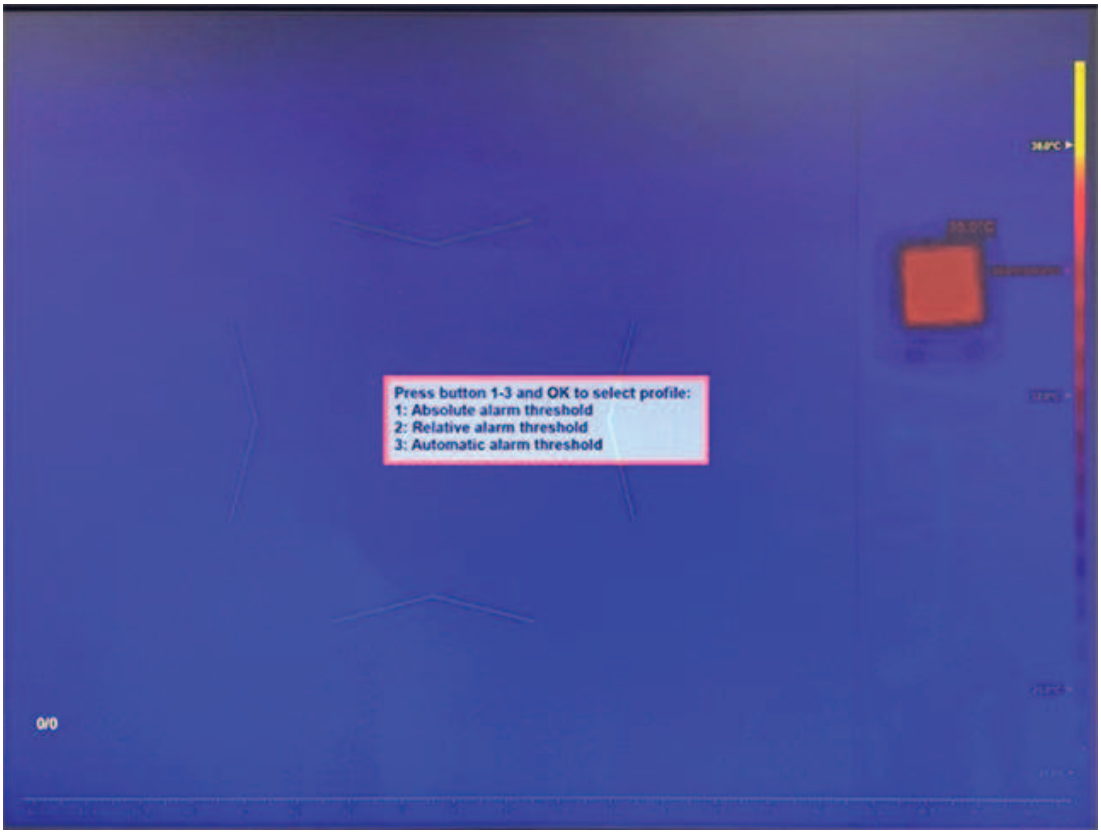
6.6 Activate manual measurement

– Use the joystick to move the focus area (up/down/left/right) to cover all of the target face or a specified segment of the target face.
– Turn the joystick to increase or to decrease the dimensions of the hotspot area.
– Move against a border to change aspect ratio.



7 Automatic alarm threshold profile

1. If you do not see the profile menu in the profile selection screen, press **ESC** 6 times.

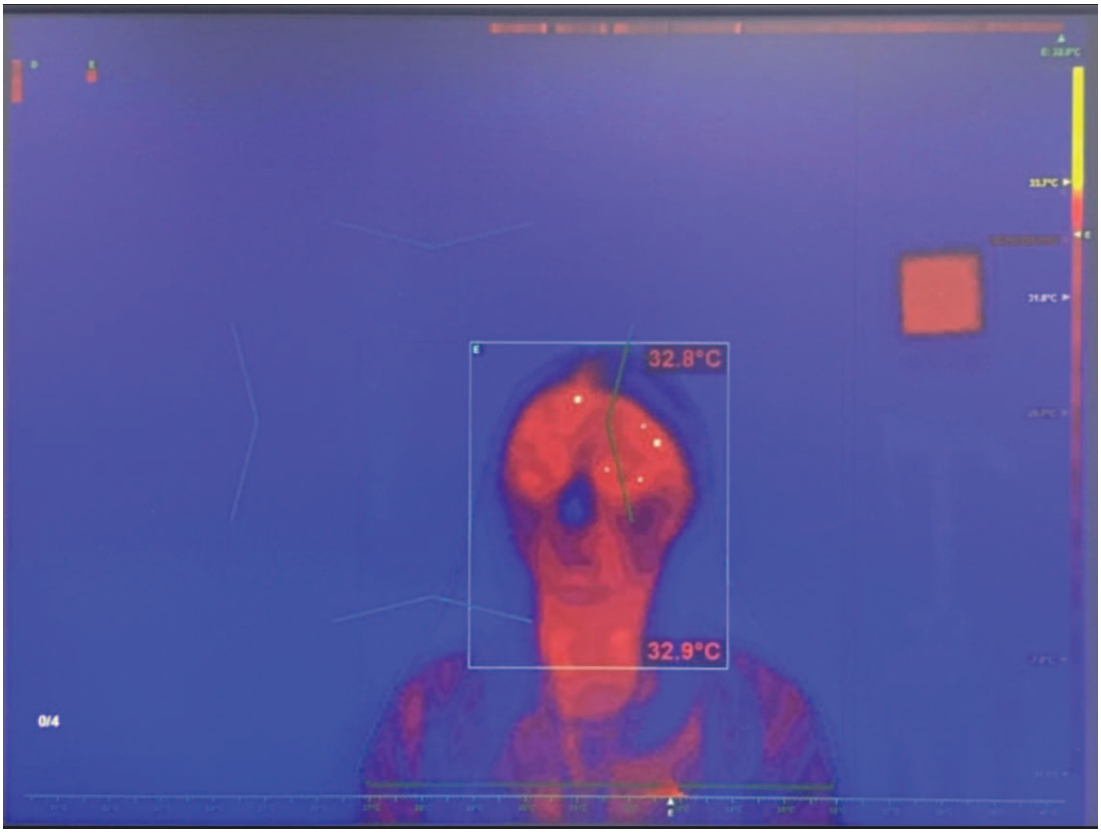


2. Press **3** and **OK** to enter the Automatic alarm threshold.

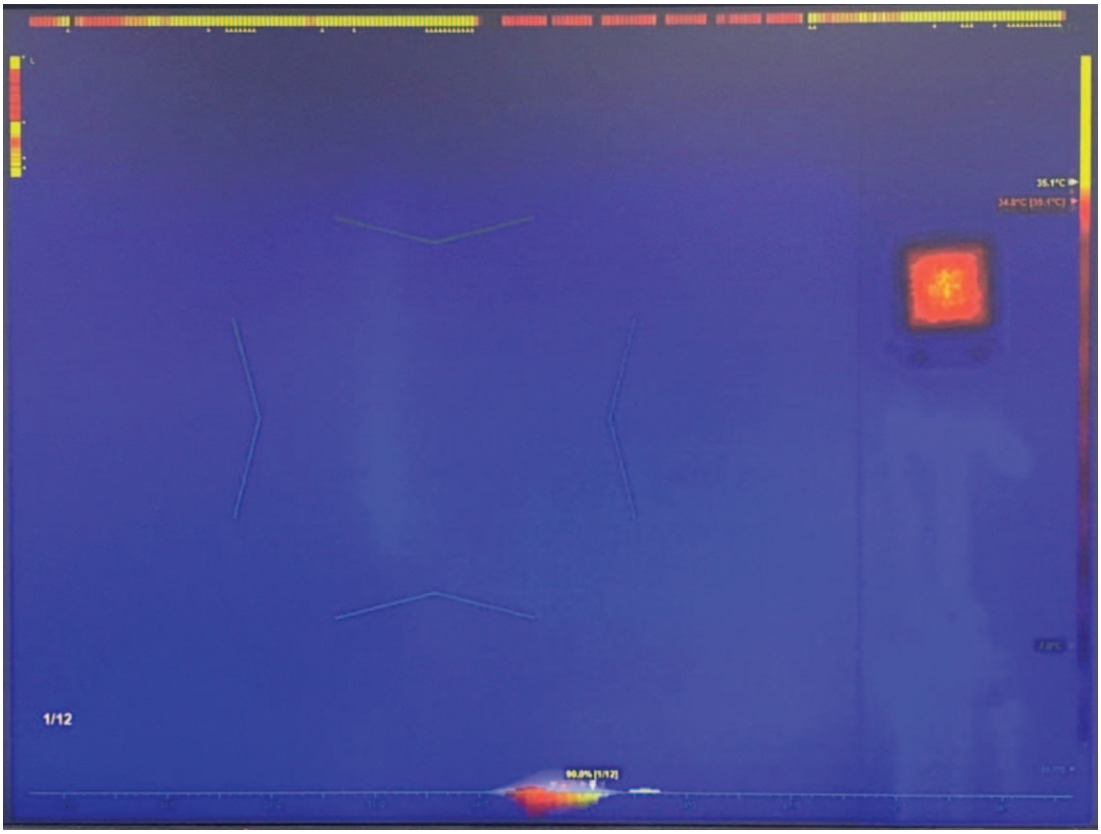
7.1 Configure the average person temperature

1. Press ▶▶ or ◀◀ to select the average person temperature message box.

2. Enter the measured or preferred average person temperature as input for the temperature offset adjustment mechanism, analogue to profile 2.
3. Press **OK** or **ESC** to close the text box, or continue to the next step.
4. (Optional) Start calibration. Calibration may give a better starting point for the continuous temperature offset adjustment. Ask each of the 10 healthy persons to go in front of the camera one by one. Each person must stay in the target area for approximately 2 seconds. The yellow progress indicator in the bottom left of the screen updates the progress of calibration some seconds after a person has gone from the field of view of the camera.

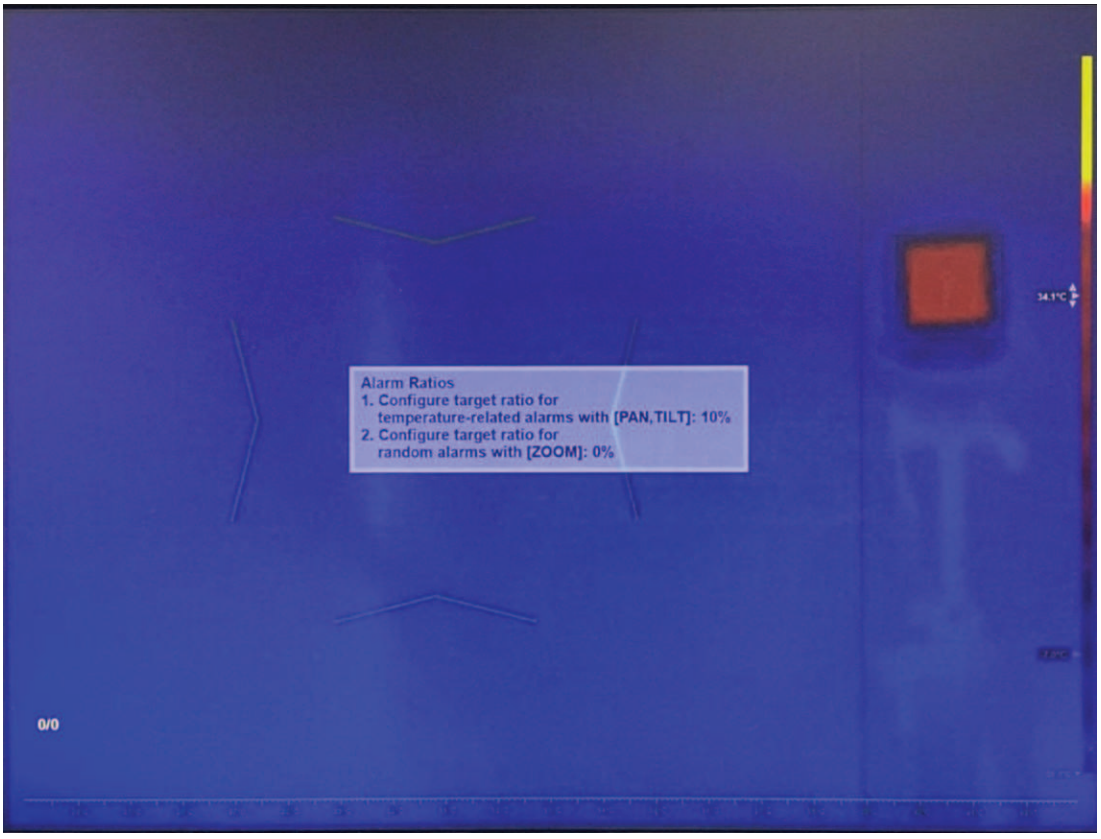


5. Calibration is complete. The HTD system will adjust the temperature offset correction and the alarm threshold with every 10 persons scanned. As in the relative alarm threshold profile, when the temperature offset correction mode is set to continuous, the effect of calibration will decrease continuously, and will stop after 100 persons scanned.



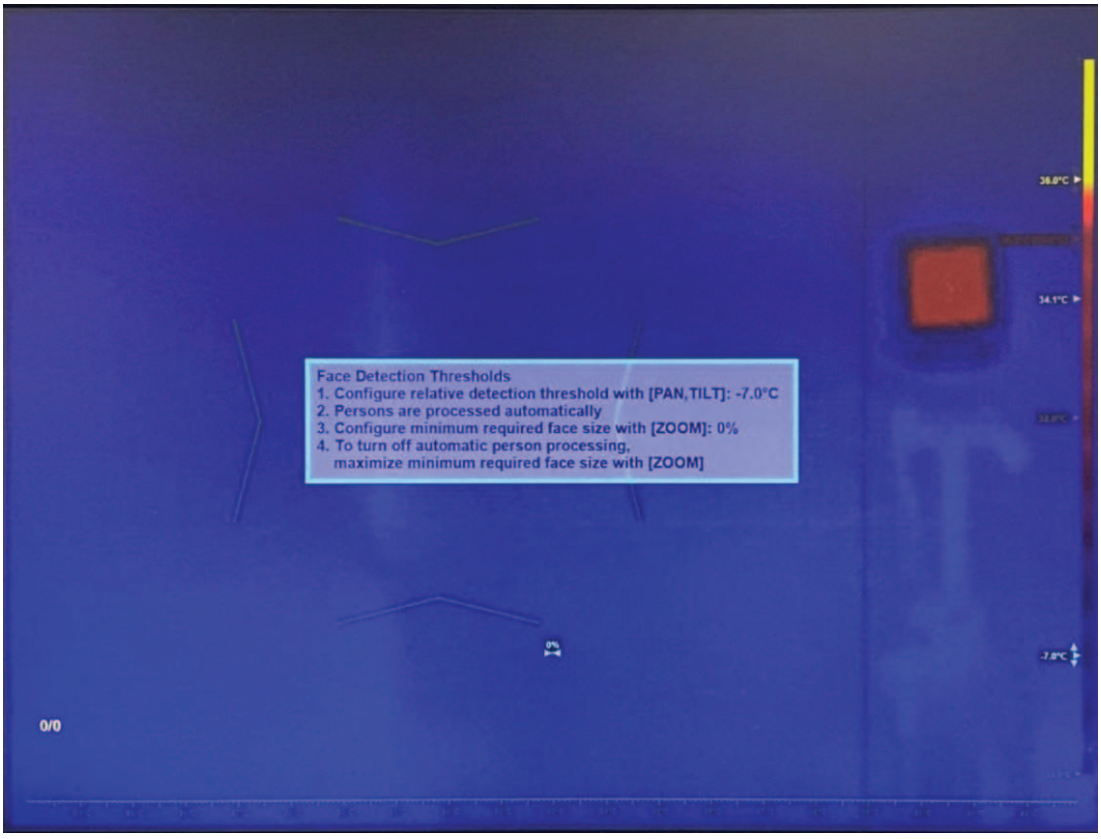
7.2 Configure the target alarm ratio

1. Press ▶▶ or ◀◀ to select the alarm ratio message box.
2. Use the joystick to adjust the alarm ratio (up/down).
3. Turn the joystick to adjust the random alarm ratio.
4. Press **OK** or **ESC** to close the text box, or continue with the next step.

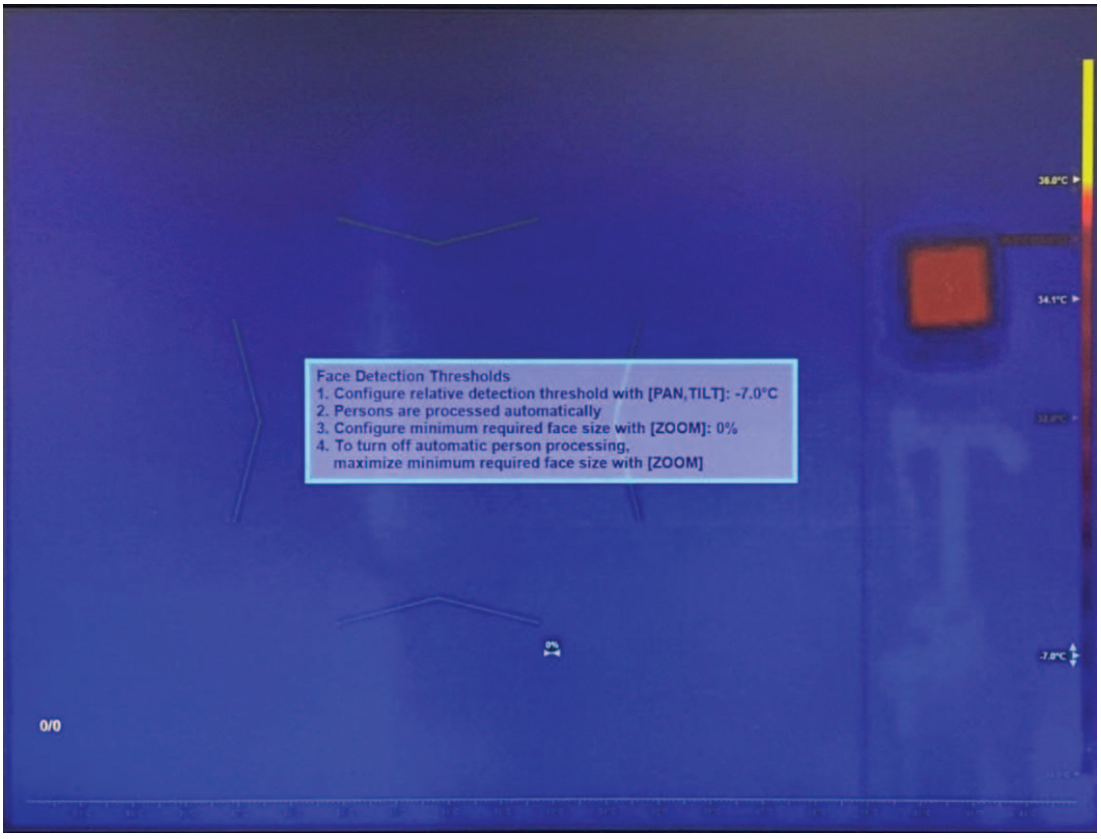


7.3 Configure face detection threshold

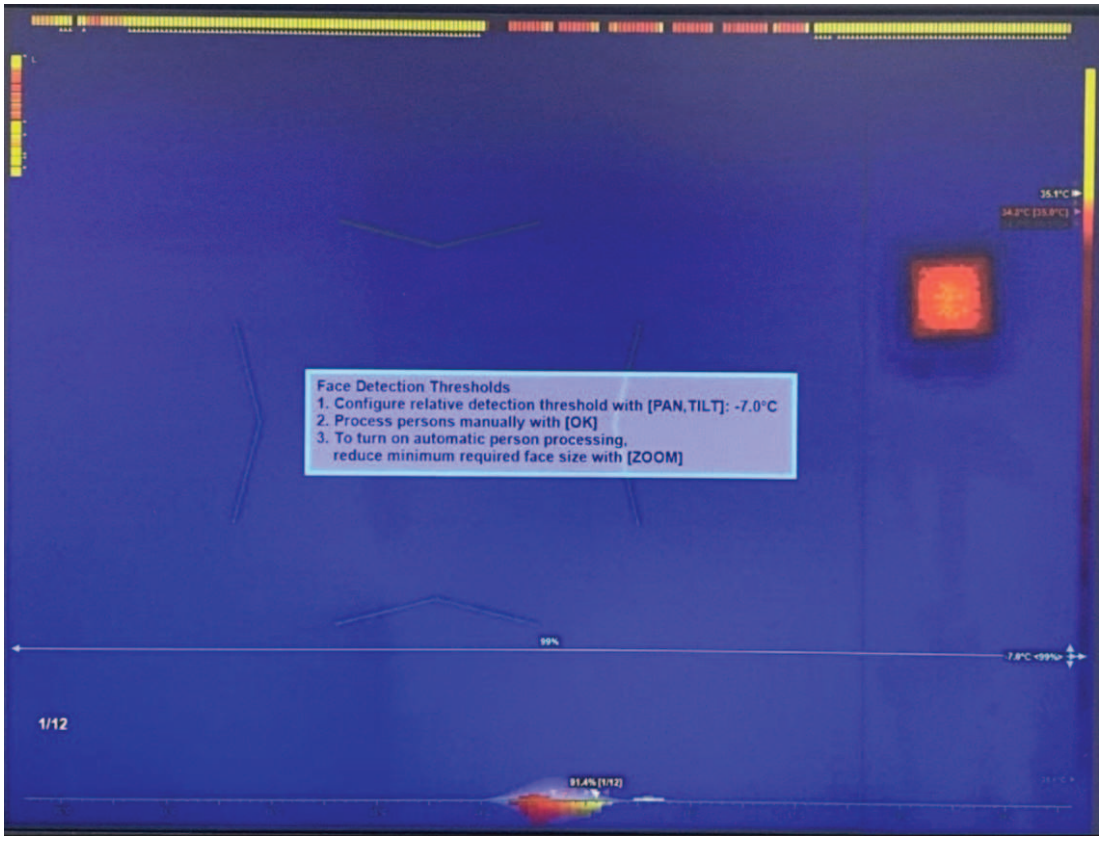
1. Press ▶▶ or ◀◀ to select the ace detection threshold message box.



1. Use the joystick to adjust the relative detection threshold temperature (up/down). When the target temperature is lower than the threshold (current mean temperature + the relative detection threshold value), the face detection mechanism will ignore it.
2. Turn the joystick to configure the minimum face size. When the target is smaller than the minimum face size, the face detection mechanism will ignore it.



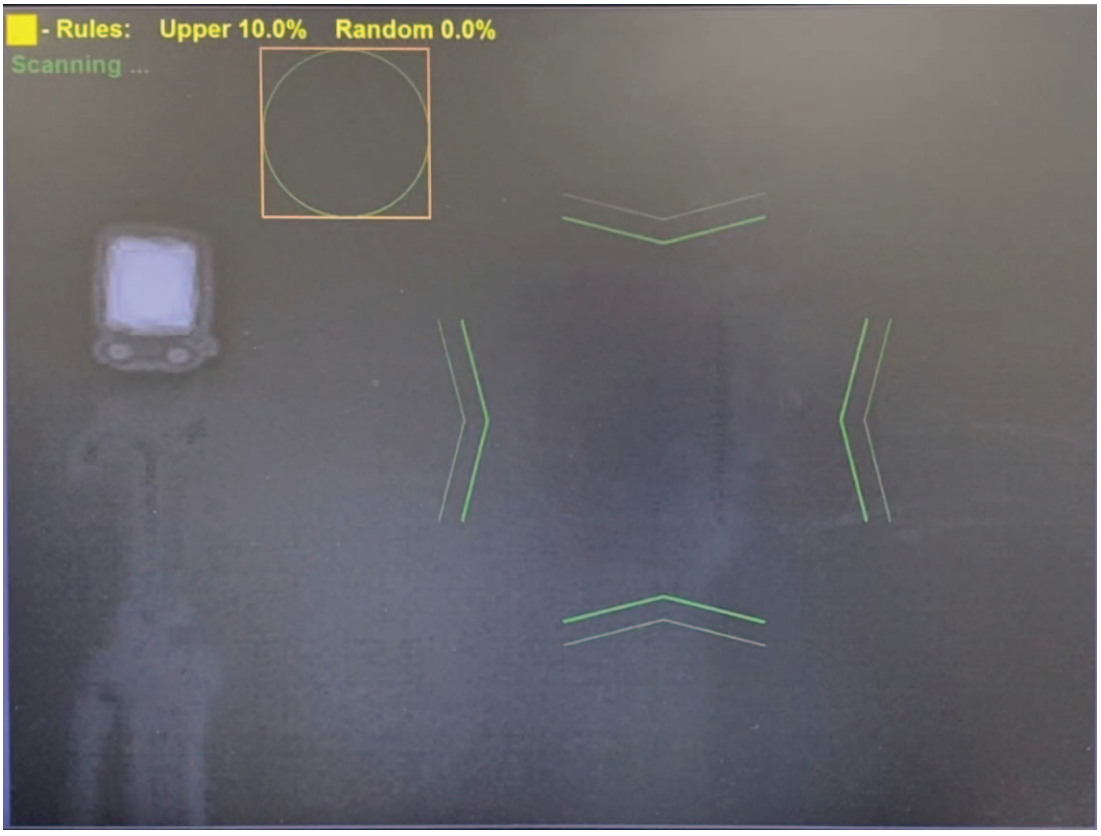
3. To disable the auto face detection and tracking, turn the joystick to maximize the minimum face size.
   Note: Auto face detection and tracking is the default and is recommended for most applications.



4. Press **OK** or **ESC** to close the text box. Configuration of the automatic threshold profile is complete.

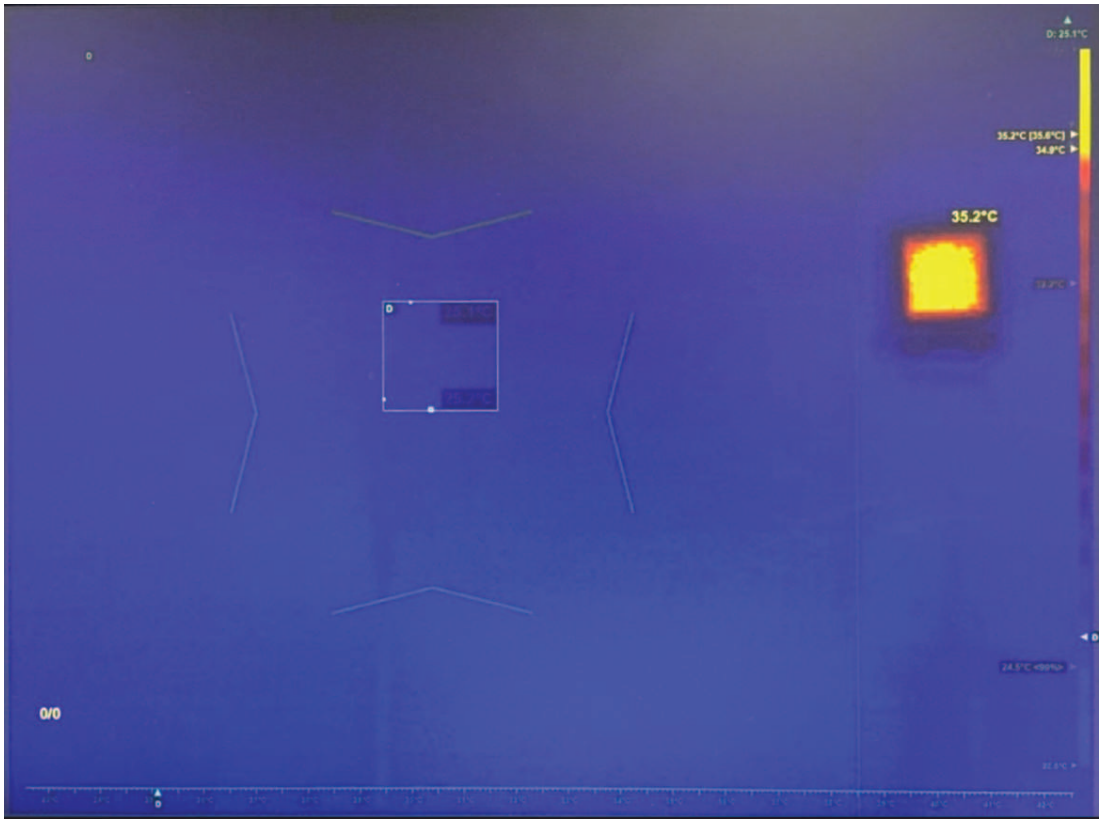
7.4 Activate self-service mode (if necessary)

– If necessary, complete this .step. Press to activate the self-service mode. This mode is only supported when automatic face tracking is active.



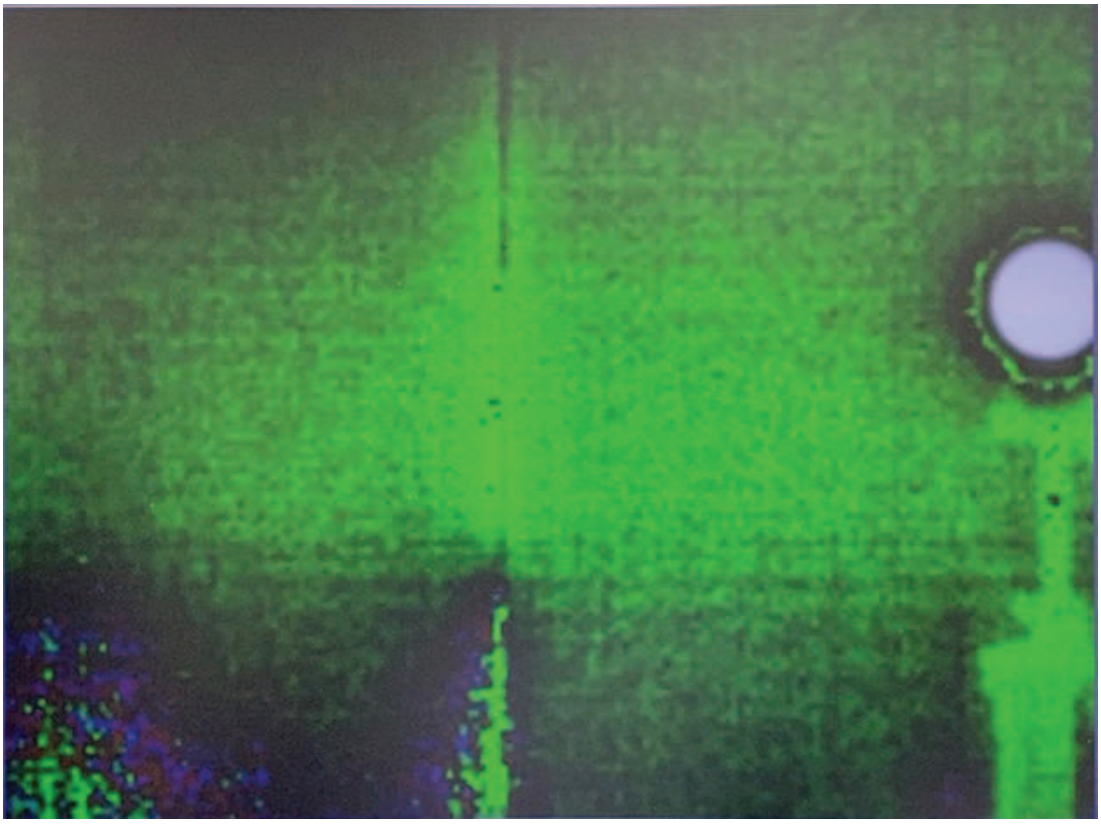
7.5 Activate manual measurement

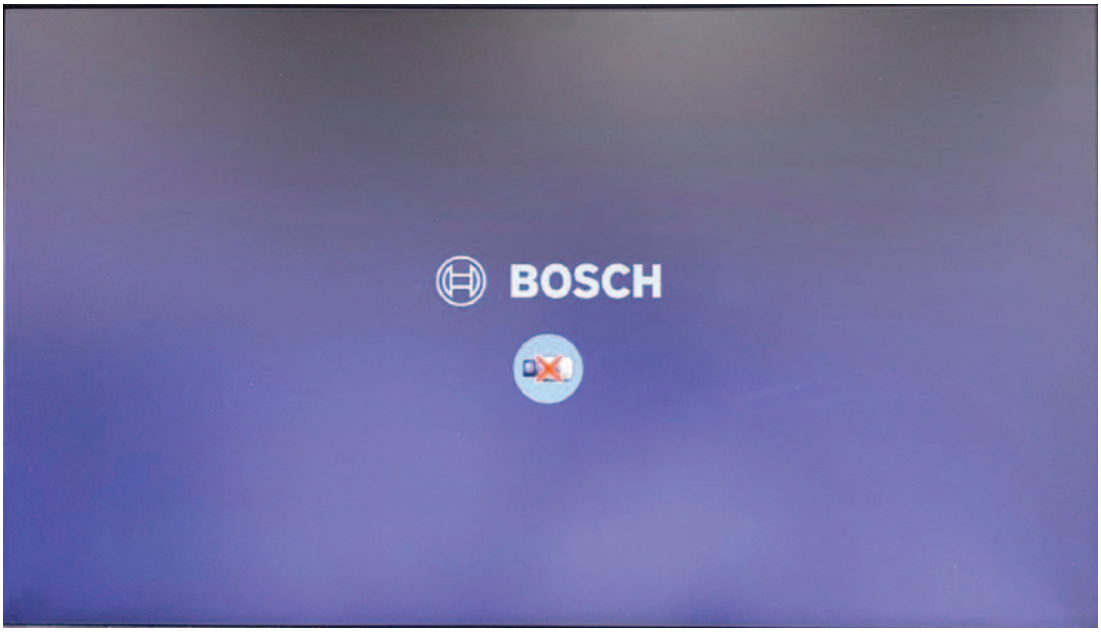
- Use the joystick to move the focus area (up/down/left/right) to cover all of the target face or a specified segment of the target face.
- Turn the joystick to increase or to decrease the dimensions of the hotspot area.
- Move against a border to change aspect ratio.



8 Troubleshooting the camera connection

When either the IVA overlay connection or the camera connection is lost, you must disconnect the camera and re-connect the camera again. The three photos that follow are examples of lost connections.





1. Select the camera (If there are more than one) by pressing > “selected camera number” > OK, or turn the jog dial until the selected camera has a white frame around it.
2. Disconnect the camera by pressing 0 > OK. Wait some seconds.
3. Re-connect the camera by pressing “selected camera number” > OK. Wait some seconds.
4. The IVA overlay and the camera should be connected successfully.

9 Other controls

9.1 Clear historical data

Clear historical temperature data (for example, to repeat calibration). Press **ESC** 3 times.

9.2 Reset profile configuration

Reset profile configuration and go back to profile selection. Press **ESC** 6 times.

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