

## Temperature Measurement

### Purpose :

This section explains how to measure the actual temperature of the spot being monitored. The device alarms when temperature exceeds the temperature threshold value.

### ①Basic Parameter

#### Steps:

1. Set the temperature measurement configurations.
  - Enable: Enable temperature measurement function.
  - Alarm Mode: Select the desired alarm mode. In temperature measurement alarm mode, the device outputs alarm if the detected temperature is higher than the alarm threshold. In interval temperature measurement alarm mode, the device outputs alarm if the detected temperature is within the set temperature range.
  - Alarm Interval: Set the alarm interval between two alarms.
  - Normal Rule Color: Set the rule color in non-alarm status.
  - Enable Color-Temperature: Display temperature pallet in live view.
  - Display Temperature Info. on Stream: Display temperature information on the stream.
  - Display Temperature in Optical Channel: Display temperature information in the optical channel.
  - Display Max.Temperature: Display maximum temperature information in thermal view when the temperature measurement rule is line or area.
  - Display Min.Temperature: Display minimum temperature information in thermal view when the temperature measurement rule is line or area.
  - Display Average Temperature: Display average temperature information in thermal view when the temperature measurement rule is line or area.
  - Display Position: Select the position of temperature measurement information showed on the live view interface. Select Top Left to display the information on the top left of screen. Select Near Target

to display the information around the temperature measurement rule.

- Display Rule Name: Display the rule name rather than the rule ID on the live view. You can set the name in expert temperature measurement mode for the rule.
- Temperature Unit: Display temperature with Degree Celsius (°C)/ Degree Fahrenheit (°F)/ Degree Kelvin (K) .
- Temperature Range: Set the temperature measurement range. When in Auto mode, the device will automatically switch its temperature range according to the highest temperature measured.
- Atmospheric Temperature: Set the atmospheric temperature.
- Atmospheric Humidity: Set the atmospheric humidity.
- Atmospheric Transmissivity: Set the atmospheric transmissivity from 0 to 1.

2. Click **Save**.

## 📌Rule

### **Before you start:**

The temperature measurement function is usually used together with alarm function. You can set the alarm linkage so that any alarm/pre-alarms can trigger the connected alarm.

### **Purpose:**

This function is used for measuring the temperature of detected spot/line/area, or the device can compare temperature of selected areas and alarms.

Normal Mode

### **Steps:**

1. Select the configuration mode as **Normal**.
2. Set temperature parameters.
  - Emissivity: Set the emissivity of your target. **Note:** Refer to the emissivity table for reference in the manual or online.
  - Distance to Target: The straight-line distance between the target and the device.

- Tolerance Temperature: The triggered alarm does not stop until the temperature/temperature difference is lower/higher than rule temperature by tolerance temperature.

**Example:** Set tolerance temperature as 3°C, set alarm temperature as 55°C. It alarms when its temperature reaches 55°C and only when the temperature is below 52°C will the alarm be cancelled.

3. Set alarm parameters.

### Temperature Measurement Alarm Mode

Click **Set** to set temperature measurement alarm parameters.

**Note:** You should select **Alarm Mode** as **Temperature Measurement Alarm** first in basic settings.

- Pre-Alarm Parameters: When the temperature of target exceeds the **Pre-Alarm Temperature**, and this status keeps not shorter than the **Pre-Alarm Filtering Time**, it triggers the pre-alarm.
- Alarm Parameters: When the temperature of target exceeds the **Alarm Temperature**, and this status keeps not shorter than the **Alarm Filtering Time**, it triggers the alarm.
- Filtering Time: It refers to the duration time after the target temperature reaches or exceeds the pre-alarm temperature/alarm temperature.
- Check **Pre-Alarm Output** to link the pre-alarm with the connected alarm device. You can also check **Pre-Alarm HTTP Order** to send alarm via HTTP order.
- Check **Alarm Output** to link the alarm with the connected alarm device. You can also check **Alarm HTTP Order** to send alarm via HTTP order.
- Temperature Sudden Change Alarm: It will triggers an alarm when the temperature change exceeds **Sudden Change Alarm Value** during **Cycle**. **Note:** Certain models support temperature sudden change alarm.
- (Optional): Check **Enable** in **Offsite**, and in **Alarm Parameters** you can set the offsite pre-alarm/alarm specially during off-hours when there are less causes of false alarms. You can set the lower alarm threshold to improve the efficiency of quick alarm.

- Offsite Pre-Alarm Temperature: When the temperature of target exceeds the **Offsite Pre-Alarm Temperature** during the **Offsite Arming Schedule**, and this status lasts not shorter than the **Pre-Alarm Filtering Time**, the pre-alarm is triggered.
- Offsite Alarm Temperature: When the temperature of target exceeds the **Offsite Alarm Temperature** during the **Offsite Arming Schedule**, and this status lasts not shorter than the **Alarm Filtering Time**, the alarm is triggered.
- Offsite Arming Schedule: In **Offsite**, click **Set** and click on the time bar and drag the mouse to select the arming off-hours.

**Note:**

- When you enable the offsite alarm function, you can adjust the **Pre-Alarm Temperature** and **Alarm Temperature** specially for working hours.
- The function varies according to different camera models.

### **Interval Temperature Measurement Alarm Mode**

**Note:** You should select **Alarm Mode** as **Interval Temperature Measurement Alarm** first in basic settings.

- Alarm Rule: Select the alarm rule for interval temperature measurement.
- Alarm Type: If you select **Temperature Range**, the device triggers an alarm when the highest temperature in the scene is not higher than the max. temperature, or when the lowest temperature in the scene is not lower than the min. temperature. If you select **Out of Temperature Range**, the device triggers an alarm when the highest temperature in the scene is higher than the max. temperature, or when the lowest temperature in the scene is lower than the min. temperature.
- Click **Set** to set alarm area rule.
  - Name: Edit the interval name.
  - Temperature Range: The device outputs an alarm if the detected temperature is within the set temperature range.
  - Alarm Rule Color: Set the rule color in alarm status.

4. Click **Save**.

After the settings, you can view the current temperature and humidity on the top of this interface.

Expert Mode

**Steps:**

1. Select the configuration mode as **Expert**.
2. Select the temperature measurement rule and configure the parameters in the list, you can set up to 21 rules.
  - Enable: Check to enable the rule.
  - Rule Name: Set the rule name.
  - Rule Type: Select point, line, or area as rule type to detect temperature of a spot/straight line/area.
  - Emissivity: Set the emissivity of your target. **Note:** Refer to the emissivity table for reference in the manual or online.
  - Distance to Target: The straight-line distance between the target and the device.
  - Reflective Temperature: If there is any object reflecting to the target, e.g., a mirror, enter the background temperature value/the reflecting object's temperature value. If not, skip the step.
  - Alarm Rule: Check to enable the alarm rule.

**Note:** To view the information of all temperature measurement rules at the same time, you can click **View All**.



3. Set alarm parameters.

**Temperature Measurement Alarm Mode**

Check **Alarm Rule** to allow the rule for temperature measurement alarm.

**Note:** You should select **Alarm Mode** as **Temperature Measurement Alarm** first in basic settings.

**1) For Point/Line/Area Rule:**

i. Draw the point by clicking  in live view. Draw the line or area by clicking  in live view.

ii. Click **Set** to set temperature measurement alarm parameters.

iii. Select alarm rule type.

iv. Set Tolerance Temperature: The triggered alarm does not stop until the temperature/temperature difference is lower/higher than rule temperature by tolerance temperature.

**Example:** Set tolerance temperature as 3°C, set alarm temperature as 55°C. It alarms when its temperature reaches 55°C and only when the temperature is below 52°C will the alarm be cancelled.

v. Set Pre-Alarm Parameters: When the temperature of target exceeds the **Pre-Alarm Temperature**, and this status keeps not shorter than the **Pre-Alarm Filtering Time**, it triggers the pre-alarm.

vi. Set Alarm Parameters: When the temperature of target exceeds the **Alarm Temperature**, and this status keeps not shorter than the **Alarm Filtering Time**, it triggers the alarm.

vii. Check **Pre-Alarm Output** to link the pre-alarm with the connected alarm device. You can also check **Pre-Alarm HTTP Order** to send alarm via HTTP order.

viii. Check **Alarm Output** to link the alarm with the connected alarm device. You can also check **Alarm HTTP Order** to send alarm via HTTP order.

ix. (Optional): Check **Enable Reflect Light Filter** and **Enable Forklift Filter**.

x. Temperature Sudden Change Alarm: It will trigger an alarm when the temperature change exceeds **Sudden Change Alarm Value** during **Cycle**. **Note:** Certain models support temperature sudden change alarm.

xi. (Optional): Check **Enable** in **Offsite**, and in **Alarm Parameters** you can set the offsite pre-alarm/alarm specially during off-hours when there are less causes of false alarms. You can set the lower alarm threshold to improve the efficiency of quick alarm.

- Offsite Pre-Alarm Temperature: When the temperature of target exceeds the **Offsite Pre-Alarm Temperature** during the **Offsite Arming Schedule**, and this status lasts not shorter than the **Pre-Alarm Filtering Time**, the pre-alarm is triggered.
- Offsite Alarm Temperature: When the temperature of target exceeds the **Offsite Alarm Temperature** during the **Offsite Arming Schedule**, and this status lasts not shorter than the **Alarm Filtering Time**, the alarm is triggered.

- Offsite Arming Schedule: In **Offsite**, click **Set** and click on the time bar and drag the mouse to select the arming off-hours.

**Note:**

- When you enable the offsite alarm function, you can adjust the **Pre-Alarm Temperature** and **Alarm Temperature** specially for working hours.
- The function varies according to different camera models.

**2) For Area Temperature Comparison:** *Make sure you have enabled the areas for comparison.*

xii. Click **Set** in **Area's Temperature Comparison**.

xiii. Check **Area's Temperature Comparison**.

xiv. Select the areas.

xv. Set the comparison rule as **Above (Max. Temperature)** or others.

xvi. Enter the temperature difference threshold value.

xvii. Set the Alarm Output with the connected alarm device.

**Example:** E.g., select area 1 and area 2, and set the comparison rule as **Above (Max. Temperature)**, and set the temperature difference threshold to 20 °C. The device alarms when the difference of two areas' maximum temperature is above 20 °C.

### **Interval Temperature Measurement Alarm Mode**

**Note:** You should select **Alarm Mode** as **Interval Temperature Measurement Alarm** first in basic settings.

- Alarm Rule: Select the alarm rule for interval temperature measurement.
- Alarm Type: If you select **Temperature Range**, the device triggers an alarm when the highest temperature in the scene is not higher than the max. temperature, or when the lowest temperature in the scene is not lower than the min. temperature. If you select **Out of Temperature Range**, the device triggers an alarm when the highest temperature in the scene is higher than the max. temperature, or when the lowest temperature in the scene is lower than the min. temperature.

- Click **Set** to set alarm area rule.
  - Name: Edit the interval name.
  - Temperature Range: The device outputs an alarm if the detected temperature is within the set temperature range.
  - Alarm Rule Color: Set the rule color in alarm status.
  - Alarm Output: Select the alarm output channel.
- Click **Copy to...** to apply the settings to other rules.

4. Click **Save**.

**Note:** You can double click current screen to show full of it, and double click again to exit full screen.

#### Alarm Filter Configuration

Set alarm filter to avoid false alarm sources in temperature measurement alarm mode.

- Repeated Alarm Filter: Enable this function to avoid the repeated alarm of the same detection scene. The function is available during **Repeated Alarm Filtering Time**.
- Reflect Light Filter: Enable this function if there is strong reflect light from sun, or it may cause false alarm. Set the **Sensitivity** for the reflect light filter.
- Forklift Filter: Enable this function if there there are forklifts in the scene, or it may cause false alarm. Set the **Filter Level** to filter different objects in the detection scene.
  - **Low:** In this level, it only filters the complete forklift.
  - **Medium:** In this level, it filters the complete forklift and all moving objects, such as a partially covered but moving forklift in operation.
  - **High:** In this level, it filters the complete forklift, all moving objects, and still objects after movement whose temperature are higher than the pre-alarm temperature.
- Smoking Filter: Enable this function if there is smoking in the scene, or it may cause false alarm. Set the **Sensitivity** for the smoking filter. Click **Restart** to restart algorithm library.
- Sky Filter: Enable this function if there is sky scene in detection site to avoid abnormal low temperature display.

- Display Filtering Status: Enable this function to display the filtering status.
- Click **Restart** to restart algorithm library.

**Note:** Forklift and smoking filter vary according to different camera models.

### ③ Arming Schedule and Linkage Method

#### **Purpose:**

Set the linkage method of the alarm.

#### **Steps:**

1. Set the arming schedule and linkage method.
  - Arming Schedule: Click **Edit** and click on the time bar and drag the mouse to select the arming time period.

**Note:** When you enable the offsite alarm function, the **Arming Schedule** is specially for working hours.



- Linkage Method: Check to select the linkage method. Send email, notify surveillance center, upload to FTP/Memory Card/NAS, etc. are selectable. You can specify the linkage method when an event occurs.
2. Click **Save**.

### ④ Shield Region

#### **Purpose:**

The function enables you to shield certain areas from being detected.

#### **Steps:**

1. Check **Enable**.
2. Click .
3. Left click in the live view to draw the points of area, right click the mouse to finish drawing.
4. Drag the frame to adjust the position of the shielded area.
5. Select one area and click  to delete it.
6. Click **Save**.

**Note:** You are allowed to draw up to 4 areas on the same image. And each area can be set with 3-10 points.

## ⑤ Overlay & Capture

- **Display Pixel-to-Pixel Thermometry Data on Stream:** Add and save real-time pixel-to-pixel thermometry data to stream. The function requires higher network bandwidth.
- **Pixel-to-Pixel Thermometry Data Refresh Interval:** It means the refresh interval of thermometry data added to the stream.
- **Display Rule Info. on Alarm Picture:** Display all temperature measurement rules or only the alarm rule information on the alarm capture.
- **Display Radiometric Info. on Capture:** Check to add the radiometric information on the alarm capture.

### Notes:

- **Display Radiometric Info. on Capture** and **Add Original Data on Capture** cannot be enabled simultaneously. When both the two functions are enabled, only the function enabled later takes effect.
- You can go to **Maintenance > Device Debugging > Diagnosis Information Collection** to enable or disable Add Original Data on Capture.
- **Picture Quality:** Select picture quality from high, medium, and low.

## ⑥ Advanced Configuration

- **Temperature Measurement Algorithm Library:** View the version of current algorithm.
- **Calibration File Version:** View the version of calibration file.
- **Distance Mode:** Select the distance mode for temperature measurement. **Fixed Distance** and **Self-Adaption** are selectable. Fixed distance mode is suitable for fixed objects or objects move in a very small area. Self-adaption mode is suitable for moving objects. In this mode, device automatically adjusts parameters according to the distance to objects, so as to ensure temperature measurement accuracy.
- **Temperature/Humidity:** View the temperature and humidity of device and its surroundings.

## Integration

If you integrate the device to other devices, settings of certain parameters of the temperature measurement module is available in this part.

## Pixel-to-Pixel Thermometry

**Purpose:** Set the temperature measurement parameters for every working pixel.

- General Parameters
  - Emissivity: Set the emissivity of your target. **Note:** Refer to the emissivity table for reference in the manual or online.
  - Distance to Target: The straight-line distance between the target and the device.
  - Reflective Temperature: If there is any object reflecting to the target, e.g., a mirror, enter the background temperature value/the reflecting object's temperature value. If not, skip the settings.
  - Data Length: It stands for the data length of the detected temperature information of every pixel. 2 means the temperature information type of every pixel is "short", and 4 means the type is "float".
- Real-time Data Upload

Set the uploading parameters for pixel-to-pixel thermometry data.

- Max. Frame Rate: The max. frame rate of upload stream for further integration. High frame rate requires more upload bandwidth.
  - Refreshing Interval of Temperature Mapping Table: It stands for the frame interval of refreshing the temperature mapping table. Temperature mapping table tells the relation between detected data and the temperature of a pixel. For example, if you set it as 50 (means every 50 frames), and the frame rate as 25 fps, then the table refreshes every 2 seconds, which also means the displayed temperature data refreshes every 2 seconds.
- Capture Parameters
    - Display Thermometry Rule Info. on Picture: the set points, lines and frames for temperature measurement are overlaid on uploaded pictures.
    - Upload Thermal Picture: Check the item, then the thermal picture is uploaded together with the pixel-to-pixel thermometry data. The picture resolution is configurable.

- Upload Optical Picture: Check the item, then the optical picture is uploaded together with the pixel-to-pixel thermometry data. The picture resolution is configurable.

### **Integration Calibration**

- Optical Transmissivity: Set the optical transmissivity of external optical material (e.g. germanium window) to improve the temperature measuring accuracy.

**Note:** The function varies according to different camera models.

- Calibration Coefficient: Check **Enable Calibration Coefficient** and set the value of calibration coefficient to get the temperature of the external window or optical material automatically. The setting range is 0 to 30. You can get the setting value from SDK software.

**Note:** The function varies according to different camera models..

- External Optics/Window Correction: Set the temperature of the external window or optical material (e.g. germanium window) to correct the measured temperature.

**Note:** The function varies according to different camera models..

### **Persistent Connection Management**

This page shows the maximum connections that the device supported for real-time pixel-to-pixel thermometry data uploading and real-time rule thermometry data uploading, and the currently established connections and their parameters. The real-time pixel-to-pixel thermometry data is uploaded using SDK or RISP protocol, and the real-time rule thermometry data is uploaded using SDK or ISAPI protocol.

Click **Refresh** to update the list.