OMRON

# Thermal Condition Monitoring Device
## K6PM-TH

## Startup Guide

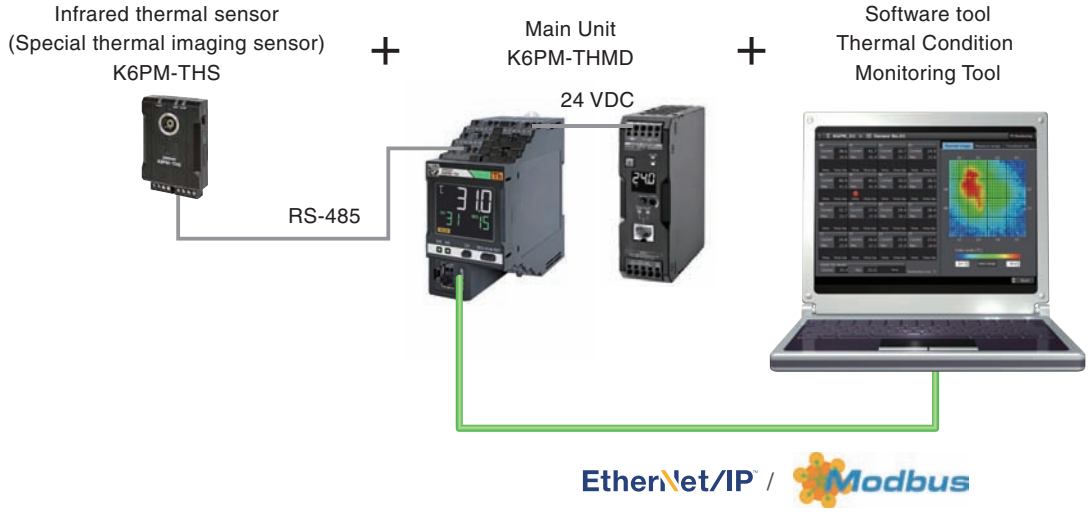


Thank you for purchasing this product. This guide explains simple procedures for starting the product, and methods for its operation.
For more detailed explanations, please refer to the included Operation Manual and the User's Manual can be downloaded from OMRON website. (http://www.omron.com)

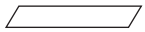
⚠ Ensure you read and employ "Safety Precautions", "Precautions for Safe Use", and "Precautions for Correct Use" in the Operation Manual.

## Step*0* Purpose of this guide

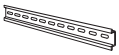
This guide explains procedures for starting the Thermal Condition Monitoring Device K6PM-TH for its operation.
For details of functions, refer to the "Thermal Condition Monitoring Device K6PM User's Manual (H231-E1)".
As minimum configuration, one unit of K6PM-TH (hereinafter referred to as "Main Unit") and 1 unit of K6PM-THS (hereinafter referred to as "sensor") are configured.



## Step1 Confirmation of details

- ☐ K6PM-TH Main Unit 1 
- ☐ LAN port cover 1 
- ☐ K6PM-THS sensor 1 
- ☐ Operation Manual (JP/EN, A4 size) 1 
- ☐ IP address label (for IP address input) 1 
- ☐ Push-in Plus Terminal Blocks erroneous insertion prevention label 1 

## Step2 Preparation of necessary items

- ☐ PC (Requires LAN port)* 
- ☐ LAN cable (Category 5 or above, straight type or cross type acceptable) 
- ☐ DIN rail or M3 screws 
- ☐ Push-in Plus Terminal Block wiring 
- ☐ Unit power supply 100 VAC to 240 VAC or 24 VAC/DC 
- ☐ Startup Guide (This Document) 1 
- ☐ Dedicated tool “Thermal Condition Monitoring Tool” can be downloaded from the OMRON website. (http://www.omron.com) 

* Prepare a PC that meets the following conditions.

| Item | Description |
|---|---|
| OS | Windows 7, Windows 8.1, Windows 10 (32 bit/64 bit) (JP/EN) |
| CPU | 2.4 GHz or more, 32 bit or 64 bit processor |
| Memory | 4 GB |
| Disk reserved area capacity | 64 GB |
| Monitor resolution | 1024 × 768 (XGA), High Color 16 bit or more |
| .NET Framework | .NET Framework 4.7.2 |
| Others | LAN port: For network connection |

# Step3 Installation of dedicated tool

The procedure for installing the software tool is explained below.

### Precautions for Correct Use

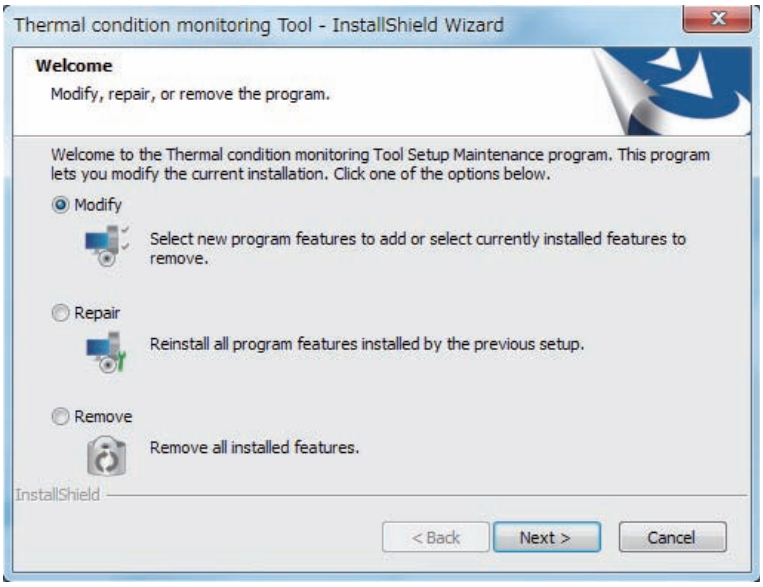
Your computer may be set to show a User Account Control message box during installation.
If there is no problem, click the [Yes] Button.

(1) Download the software tool from our website.
https://www.ia.omron.com/k6pm_tool

(2) Run "setup.exe" in the downloaded software.
The Select Language dialog box appears.

### Precautions for Correct Use

If the following dialog box appears, the same version of the software tool as the installer you ran has been installed on your computer. If you do not need to reinstall or uninstall the software tool, click the Cancel Button to close the installation window.

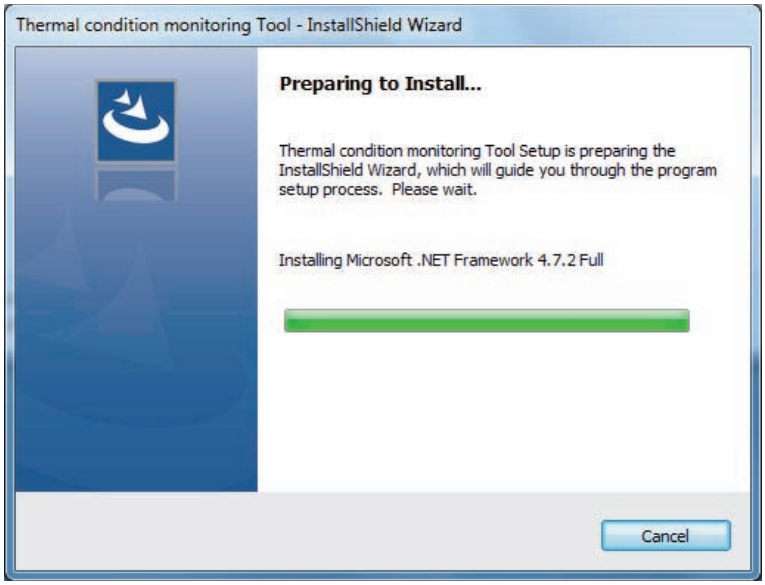



- Explanation of option buttons
  Change: Select to change the functions that are installed. Do not use this option because it is for future use.
  Modify: Select to reinstall the software tool.
  Delete: Select to uninstall the software tool.

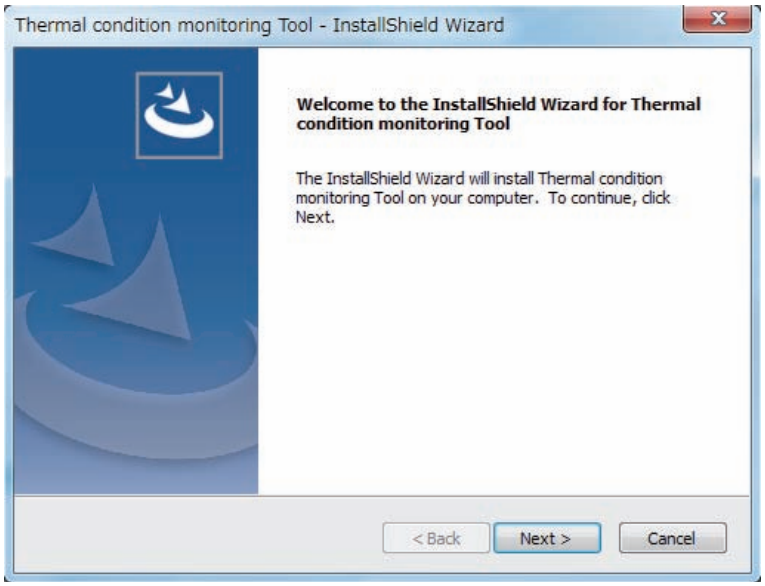
(3) Select Japanese or English, and click the [OK] Button.


Note. If you select Japanese on a computer whose operating system is not Japanese, text may not display correctly during installation or the software tool may not operate correctly.

(4) Install Microsoft .NET Framework 4.7.2. (If already installed, go to step 5.)



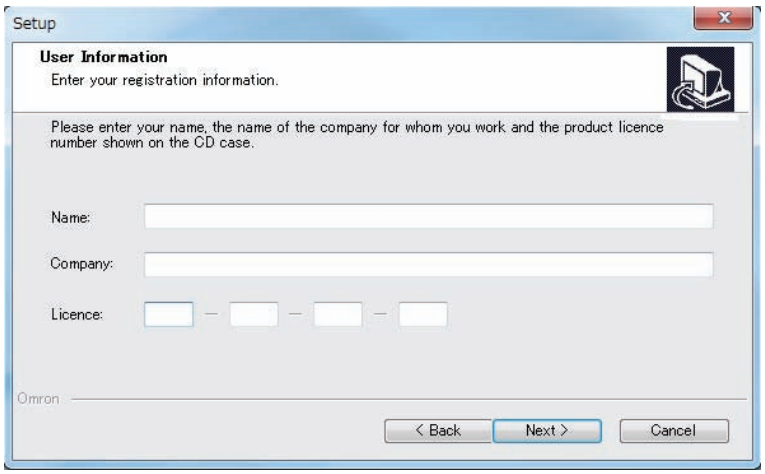
(5) Click the [Next] Button, read the Product license agreement, and if you agree to all terms of the agreement, select the I agree to all terms check box and click the [Next] Button.





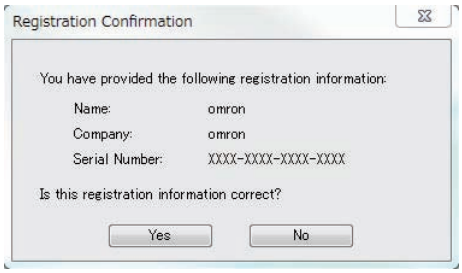
The User Information dialog box appears.

(6) Register your user information, enter the license key, and click the [Next] Button.
The license key is included with the K6PM-THMD-EIP (Main Unit).



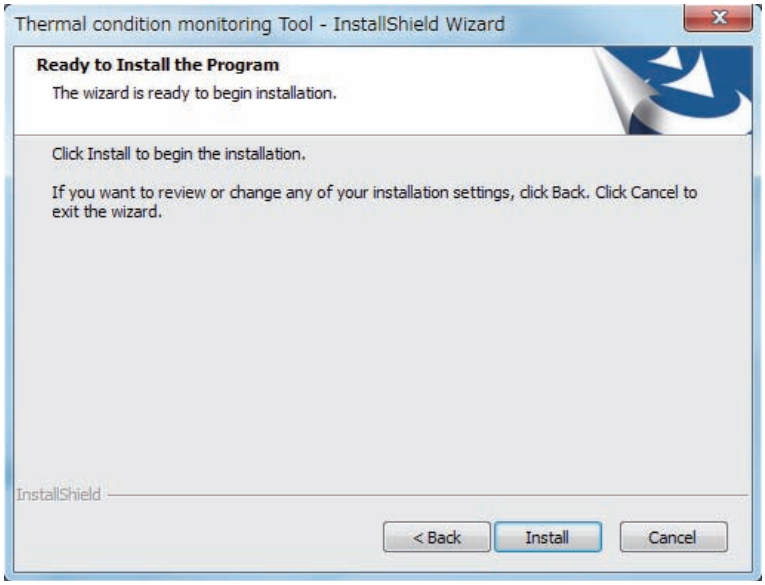

The Confirm Registration message box appears.

(7) Make sure the registered information is correct, and click the [Yes] Button.



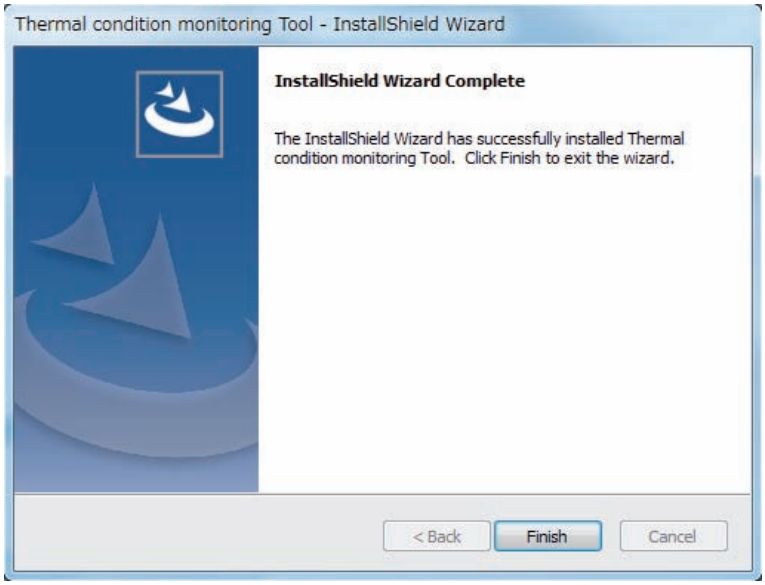

The Ready to Install dialog box appears.

(8) Click the [Install] Button.




Installation of the software tool starts.
When installation is completed, the message below appears in the Installation Wizard.

(9) Click the [Finish] Button.




This completes installation of the software tool.

# Step4 PC IP address setting

Set the PC IP address.
Set the IP address to which of the same segment as the K6PM Main Unit.

**Windows 7**

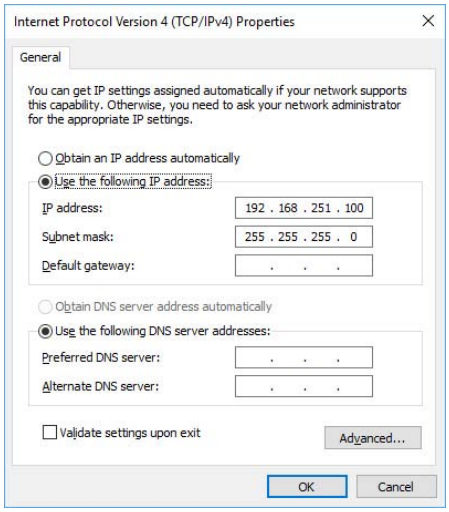
(1) Select [Start] | [Control Panel] | [Network and Internet] | [Network and Sharing Center] | [Change Adapter Settings].
(2) Right-click [Loca Area Connection] and select [Properties].
(3) Select [Internet Protocol Version 4 (TCP / IPv4)] and click [Properties].
Check "Use next IP address" and manually set the IP address address of the computer.

**Windows 10**

(1) Click [Start] and select [Windows System Tools] | [Control Panel].
(2) Select [Network and Internet] | [Network and Sharing Center] | [Change Adapter Settings].
(3) Right-click [Ethernet] and click [Properties].
(4) Select [Internet Protocol Version 4 (TCP/IPv4)] and click [Properties].
Check "Use next IP address" and manually set the IP address of the computer.

The PC IP address is "192.168.250.100", since IP address of K6PM is "192.168.250.30" (the default value).

The following is the setting screen in Windows10.

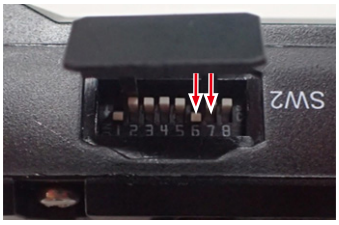


# Step5 Hardware SW setting

K6PM-THS sensor has DIP switch to set the following contents. K6PM-TH Main Unit does not have hardware SW.

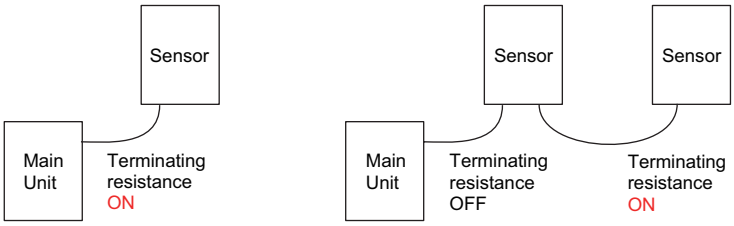
| SW | Setting contents | Value |
|---|---|---|
| 1 to 5 | K6PM-TH sensor number setting | Set in binary with ON as 1 and OFF as 0 (Pin 1: Least significant bit, Pin 5: Most significant bit)<br>00001 to 11111: K6PM-TH sensor number 1 to 31<br>00000: Not used.<br>Factory default: 00001 |
| 6 | RS-485 terminating resistance | OFF: Without terminating resistance (factory default)<br>ON: With terminating resistance |
| 7 | The detection of the K6PM-TH sensor angle deviation | OFF: No detection (factory default)<br>ON: With detection |
| 8 | Reserved. | ---- |

As the device configuration in this guide, the number of K6PM-THS sensor to connect is one unit. Set SW6 to "ON: With terminating resistance".
Also, set SW7 to "ON: With detection" for use of function which detect the sensor angle deviation.

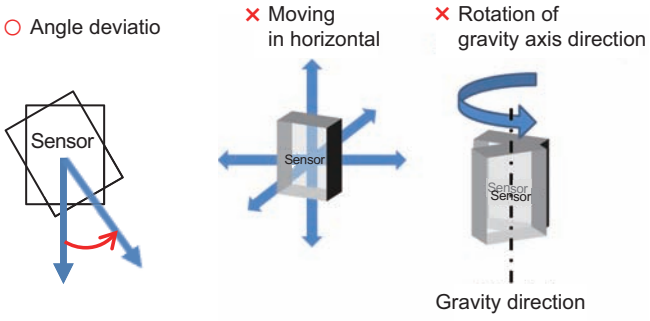



The sensor number is "00001" in the default state. In this guide, the setting is explained by default.

● RS-485 terminating resistance: Set it to the sensor which is the most far from Main Unit.

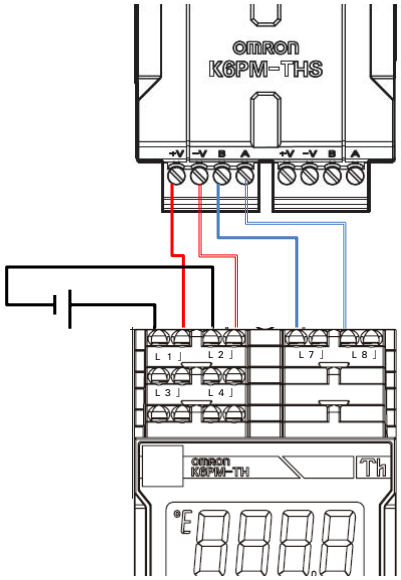



● Detection of sensor angle deviation: The function which detect the angle deviation after installing the sensor.



## Step 6 Connection

● Connect the power supply, K6PM-TH Main Unit and K6PM-THS sensor as follows.



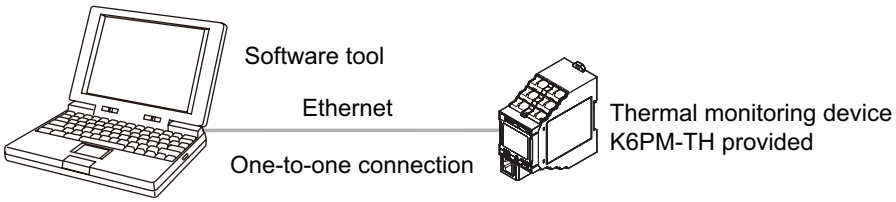

The length of the RS-485 wiring between the Main Unit and infrared thermal sensors is 500 m max.
Use commercially available communications cables with one shielded twisted-pair cable (stranded wire, 2-conductor) and AWG24 to AWG16 (0.25 to 1.5 $mm^2$) as the standard.

- Recommended cable for use between the Main Unit and infrared thermal sensors

| Models | Manufacturer |
|---|---|
| 2464C BIOS series | Bando Densen Co., Ltd. |

Example) If you use the cables bundling RS485 and power cable (AWG 22, 2 pairs, length 6 m), select "2464C BIOS-CL3-AWG22-2P-6".

● Connect the PC and the Main Unit by Ethernet cables.

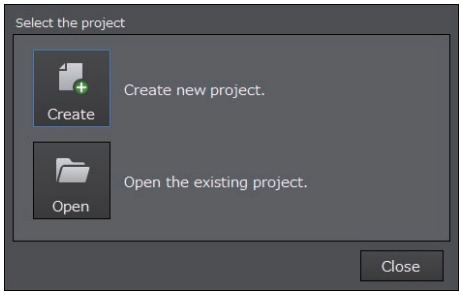


# Step7 Device setting with dedicated tool

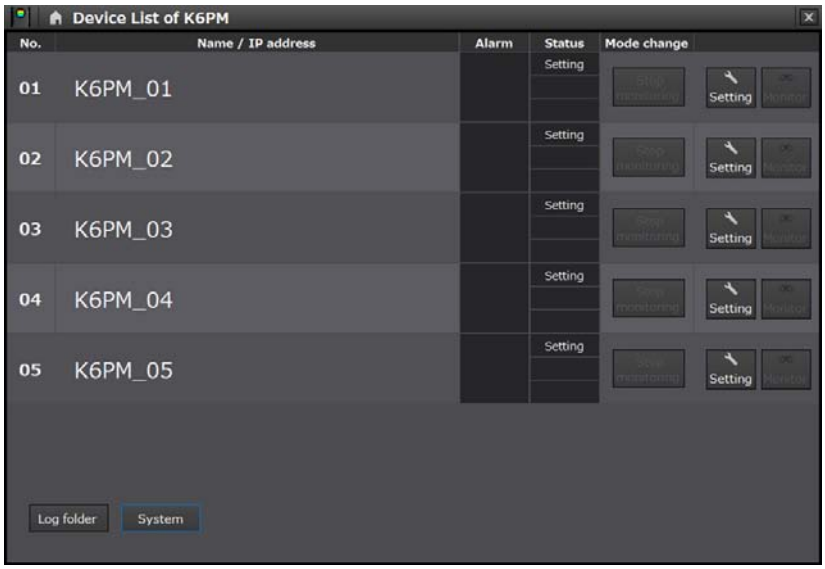
Turn ON the power supply in the state described "Step6 Connection". The procedure of setting the Device IP address is explained as follows.

(1) Start the software tool with the following method.
Select All Programs - OMRON - Thermal condition Monitoring Tool from the Windows Start Menu. Or double-click the shortcut icon of the Thermal condition Monitoring Tool on the desktop.

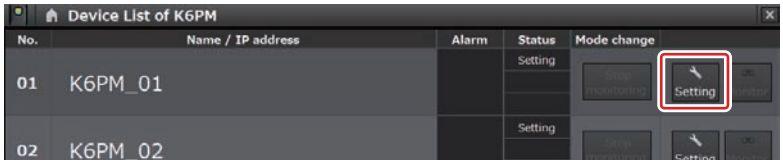
(2) When the software tool starts, the following Select the project Dialog Box is displayed.




(3) Click the [Create] Button.
[Device List of K6PM] Screen is displayed.



(4) Click the [Setting] Button to display [K6PM_01] Screen.



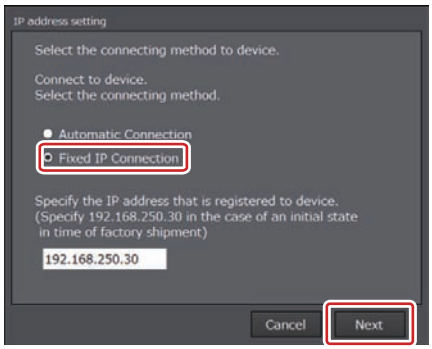

● When the IP Address Is Not Set

When the IP address of the target Main Unit is not set, the following dialog box appears. In this case, only the [Set IP] Button and [Device List] Button are enabled.

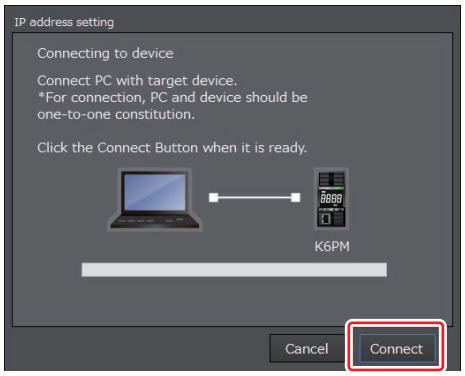

(5) Click the [IP setting] Button.


(6) Click the [IP setting] Button on [K6PM setting] Screen, the following screen is displayed.

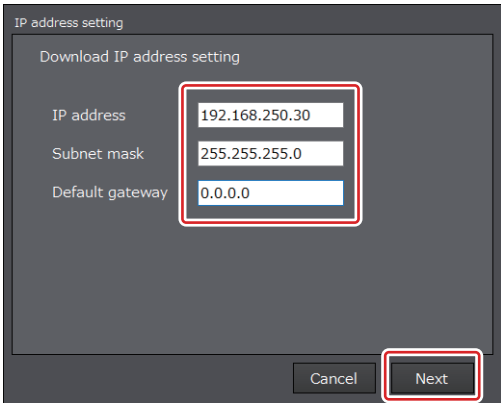
Select "Fixed IP Connection", and click the "Next" Button.



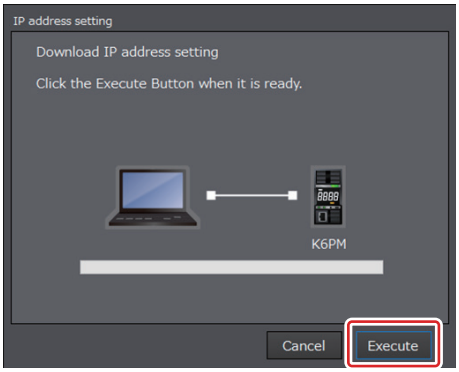

(7) Make sure that the PC and Main Unit are connected by Ethernet cable, and click the "Connect" Button.

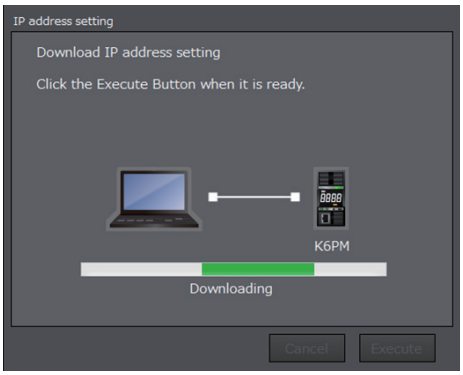


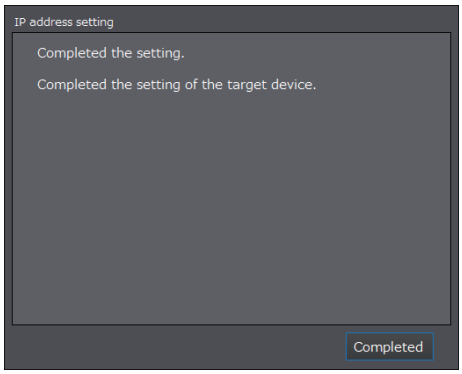
(8) Set as follows on IP address setting screen.
After setting, click the "Next" Button.




(9) Click the [Execute] Button.



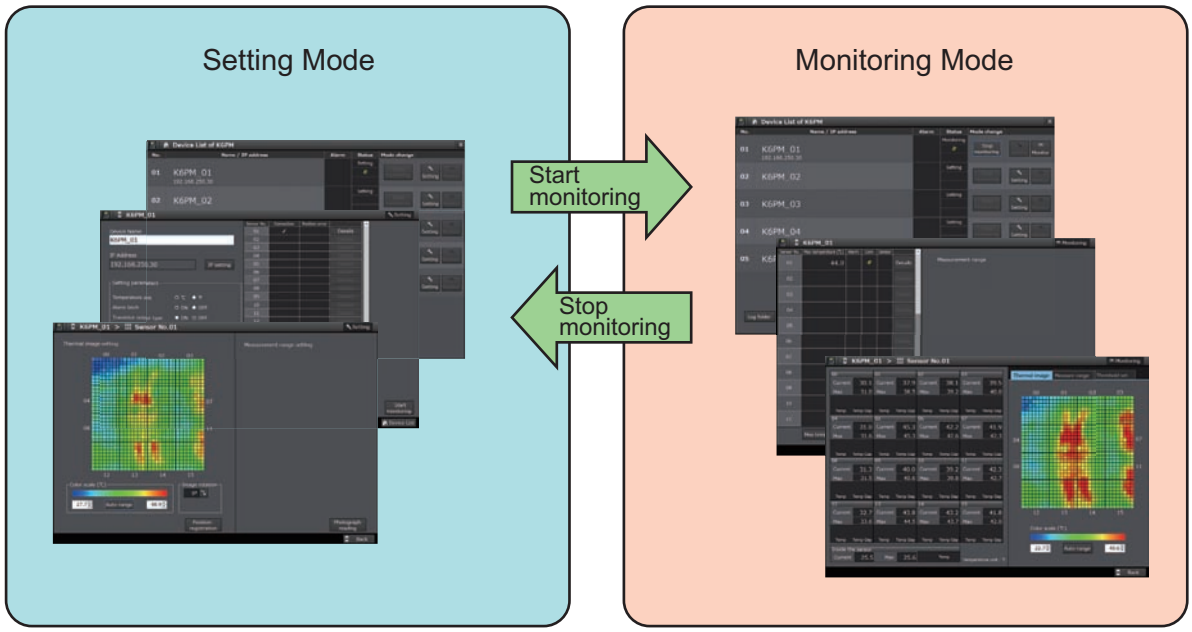



# Step8 How to use dedicated tool

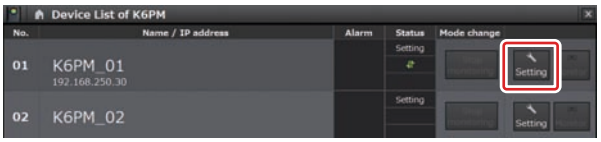
At first, the configuration of dedicated tool is explained as follows.
The dedicated tool mainly has two mode "setting mode" and "monitoring mode".
"Setting mode" is that set the K6PM-TH Main Unit and adjust the sensor position. And then, actually operate by "monitoring mode".

| Mode name | Setting, Monitor information | Reference on user manual |
|---|---|---|
| Setting Mode | · Write the setting value to any K6PM-TH Main Unit. Temperature unit, Alarm latch, Output inversion, Use running time, Use arrival prediction<br>· Determine the sensor position according to the thermal image which is updated at 1 s cycle, and register the sensor position. | *3-3 Registering the Sensor Position (Setting sensor screen)*<br>*3-4 Registering the Initial Settings and Sensor Configuration of the Main Unit* |
| Monitoring Mode | · The information of Multiple K6PM-TH Main Unit can be confirmed on monitor screen at once.<br>· The information of sensor connected any K6PM-TH Main Unit can be confirmed on monitor screen at once.<br>· The information per 16 segments of one unit of target sensor can be confirmed on monitor screen at once. The thermal image in this case is updated at 10 s cycle per one unit of sensor which connected.<br>· Set the threshold value for temperature alarm. The threshold value has an auto calculation function. | *4-1 Method of Monitoring the Temperature in the Control Panel*<br>*4-3 Alarm Threshold Setting* |

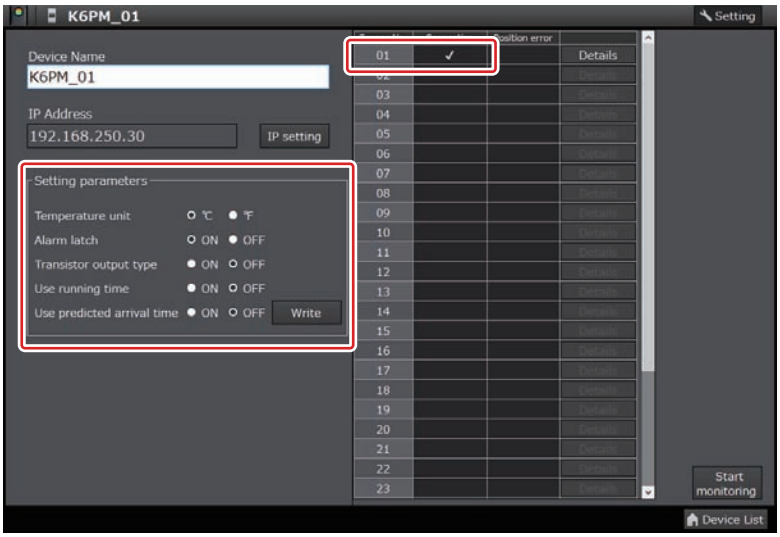


## 1 Confirmation of the sensor connection and Main Unit setting [Setting Mode]

(1) Click the below [Setting Mode] Button.




(2) If the target sensor No. is confirmed to be connected, "✓" is attached.
Select the item of "Set value" and click the [Write] Button, it will be saved in K6PM Main Unit.



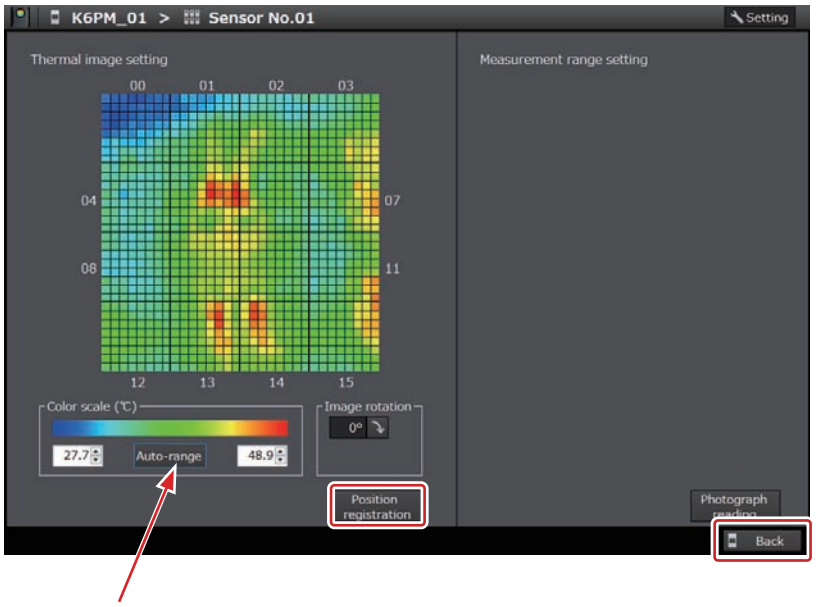

| Item | Description | Value | Reference destination of function details |
|---|---|---|---|
| Temperature unit | On the Main Unit front-panel, select whether to display the temperature in °C or °F. | °C (default), °F | --- |
| Alarm latch | Select whether to use the function for latching the alarm status of the comprehensive alarm (threshold 1 or 2). | ON: Use (default)<br>OFF: Not used | *Alarm Latch of the Main Unit* on page 4-16 of 4-2-1 *Functions of Monitoring the Temperature in Control Panel with the Main Unit and the Software Tool* on page 4-13 |
| Output inversion | Set the logic of the transistor output method of the comprehensive alarm. | ON: Normally open<br>OFF: Normally closed (default) | *Transistor Output Type of the Main Unit* on page 4-15 of same as above |
| Use Running Time | Select whether or not to use the Notification of the Main Unit Replacement Timing. | ON: Use<br>OFF: Not used (default) | *Maintenance Forecast Monitor Function on page* 4-17 of same as above |
| Use arrival prediction | Select whether or not to use the Temperature arrival prediction. | ON: Use<br>OFF: Not used (default) | *Arrival Prediction* on page 4-15 of same as above |

## 2 Sensor position adjustment [Setting Mode]

(1) Click the below [Details] Button.


If the angle deviation is occurred and the position is not registrated, is occurred.

(2) The thermal image is displayed. It is updated at 1 s cycle.
Adjust the sensor position according to the thermal image which indicates the "relationship between measurement surface and distance" described the next page.
After ending position adjustment, click the [Position registration] Button to register the sensor position. And then, click the [Back] Button.

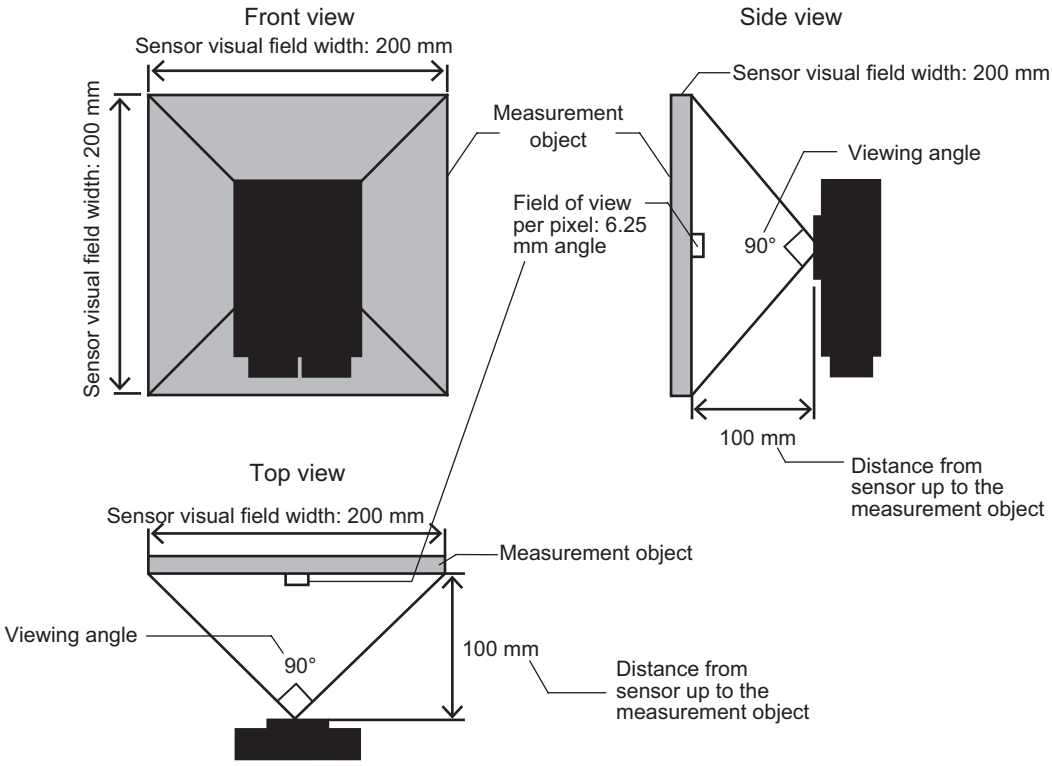



Click the [Auto-range] Button to set the color scale within the Upper- and lower-limit range which is currently read.
If the color of temperature difference cannot be clearly appear and the adjustment is difficult, click the [Auto-range] Button.

## Reference

### Relationship between the Measurement Surface and Measured Distance

In order to measure the temperature more correctly, as shown in the figure below, install the infrared thermal sensor at a distance where the measurement object can be captured as a large image, as far as possible at the center of the field of view.
The relationship between the sensor visual field width and the distance from the infrared thermal sensor to the measurement object is as shown below.
Sensor visual field width = 2 × (Distance from infrared thermal sensor up to the measurement object)
Example: When the distance from the infrared thermal sensor up to the measurement object is 100 mm

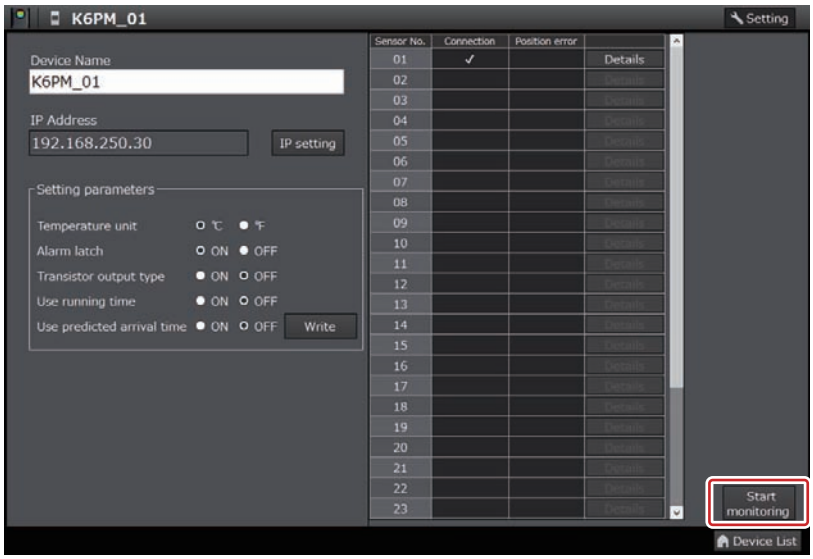



## Precautions for Correct Use

- Measurement objects:
  Metals and transparent resin materials cannot be properly measured.
- Set the distance up to the measurement object in view of the occurrence voltage of the measurement object and the safety certifications, etc.

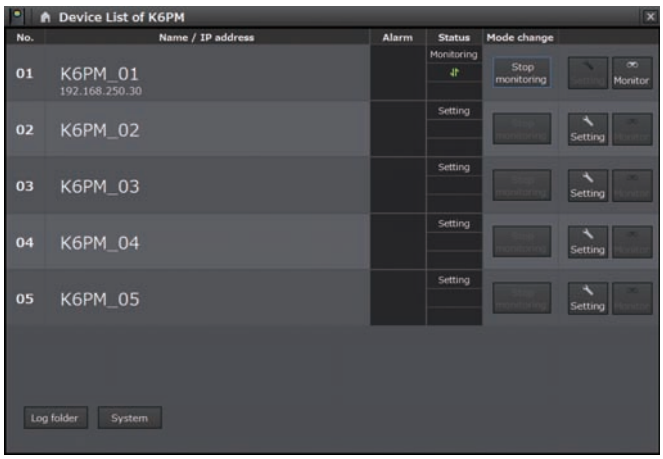
## 3 Switch to Monitoring Mode [Setting Mode]

Click the [Start monitoring] Button in the lower light corner.

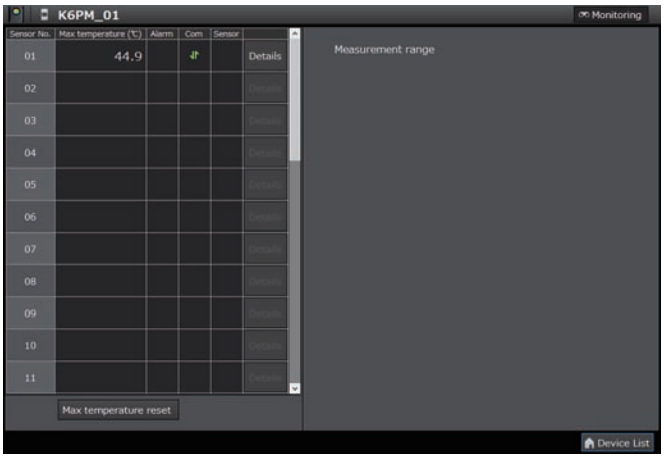


## 4 Monitoring screen configuration [Monitoring Mode]

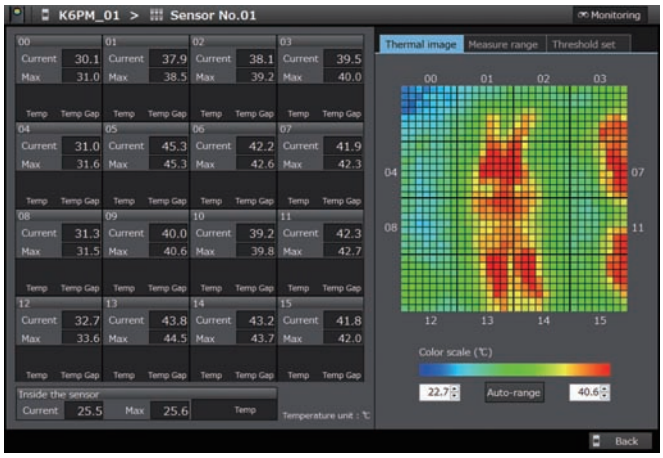
Monitoring Mode has three screens as follows.




"Device List of K6PM" Screen
The information of multiple K6PM-TH Main Unit can be confirmed at once.




"Monitoring K6PM" Screen
The information of sensor connected any K6PM-TH Main Unit can be confirmed at once.

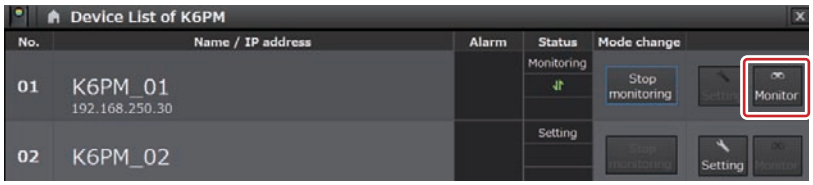



"Monitoring sensor" Screen
The information of target sensor can be confirmed.

## 5 Alarm Threshold Setting [Monitoring Mode]

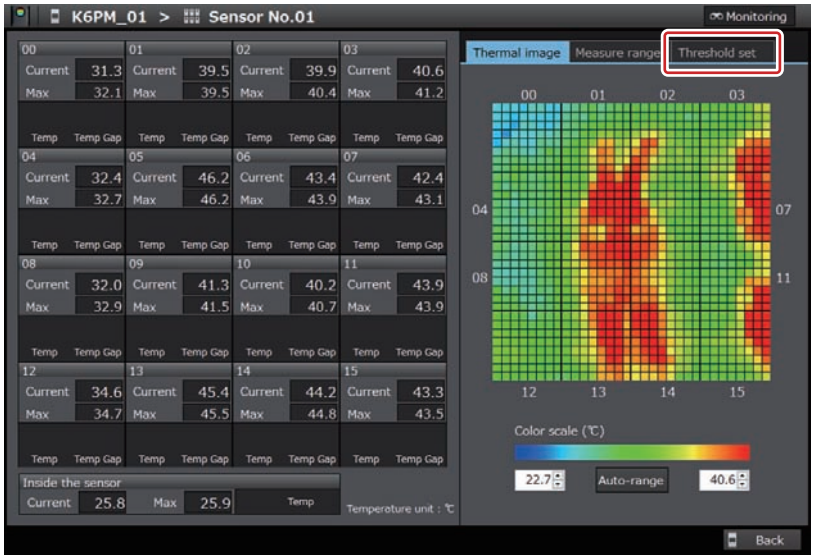
The threshold value is set in "Monitoring sensor" Screen.

(1) Click the below [Monitoring Mode] Button to switch "Monitoring K6PM" Screen.

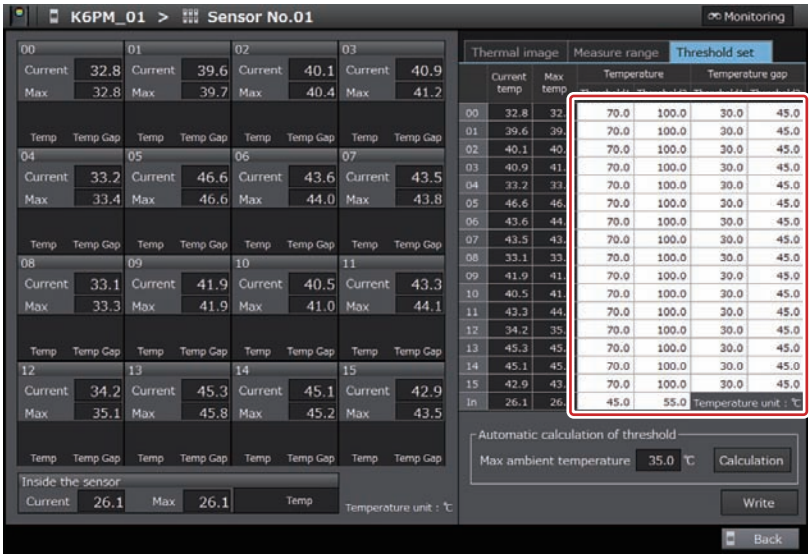



(2) Click the below [Details] Button to switch "Monitoring sensor" Screen.


(3) Select the below [Threshold set] Tub.



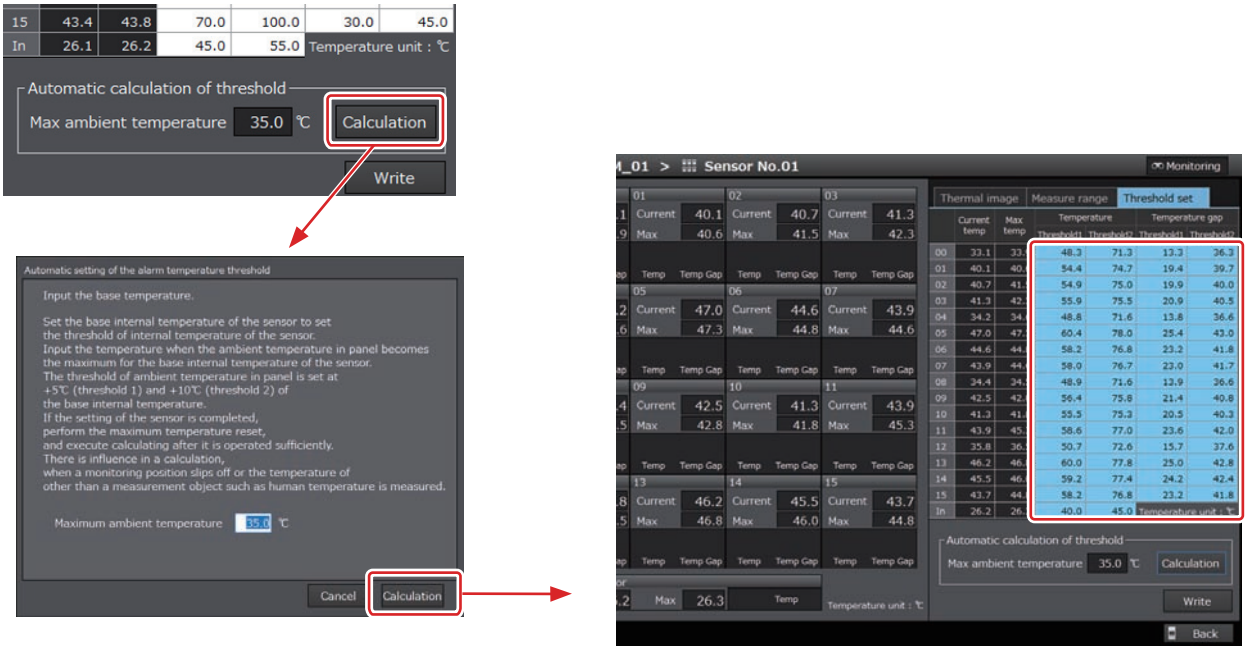
(4) The below area flamed by red square is where the threshold is set.




Enter the threshold value, the background color of the cell will change to blue. During this state, click the lower right [Write] Button to set the threshold value to K6PM Main Unit.

The threshold value can be set automatically. This "Automatic calculation of threshold" automatically calculates using the Max. temperature per segment.

Therefore, the calculation after operating in steady state at a certain period and recording its max. temperature is recommended.




Set the max. ambient temperature, and click [Calculation] Button.

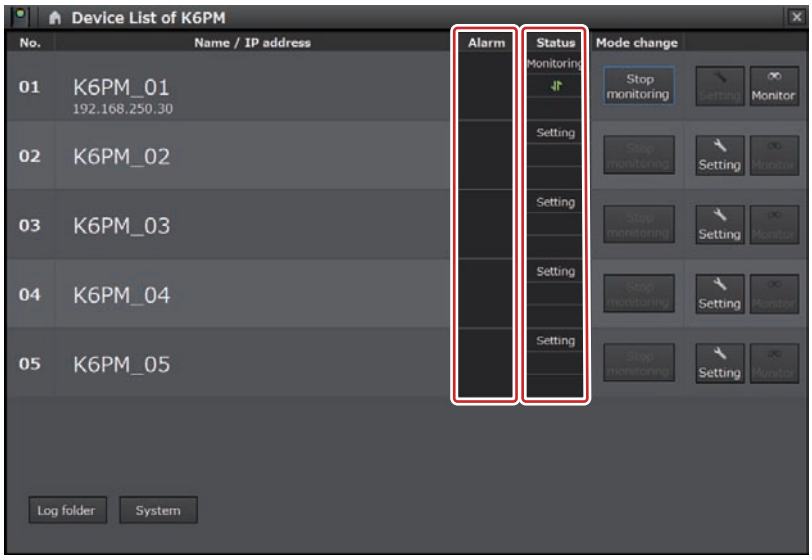
Enter the max. ambient temperature which is the highest internal temperature.

Example) If the temperature varies in the morning or night, summer or winter, set the internal temperature of the midday in summer.

Automatically calculated value is reflected, click [Write] Button to write it to K6PM Main Unit.

## 6 Monitoring [Monitoring Mode]

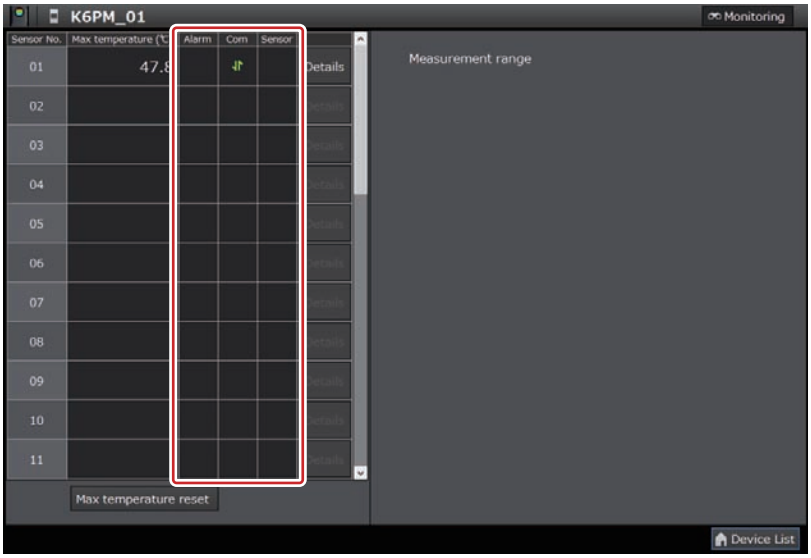
(1) Confirm whether the error is occurred or not on "Device List of K6PM" Screen".
Confirm which error is occurred on “Alarm” and “Status”.




| | |
|---|---|
| Alarm | Comprehensive alarm occurrence (Threshold 1 exceeded or threshold 2 exceeded.)<br>: Threshold 1 exceeded, : Threshold 2 exceeded |
| Status | The top three of the following are displayed.<br>• Any one of during monitoring, during setting, or during interruption<br>• During monitoring: Registration state<br>• Setting: Unregistered state<br>During interruption: During measurement interruption due to the input of an external trigger<br>• Communications status with the Main Unit<br>: Normal, : Error<br>• K6PM-TH sensor error occurrence state<br>: Sensor type error, : Temperature measurement range exceeded,<br>: K6PM-TH sensor angle deviation detected, : K6PM-TH sensor communications error |

If there is the error, click [Monitoring] Button to confirm the details.

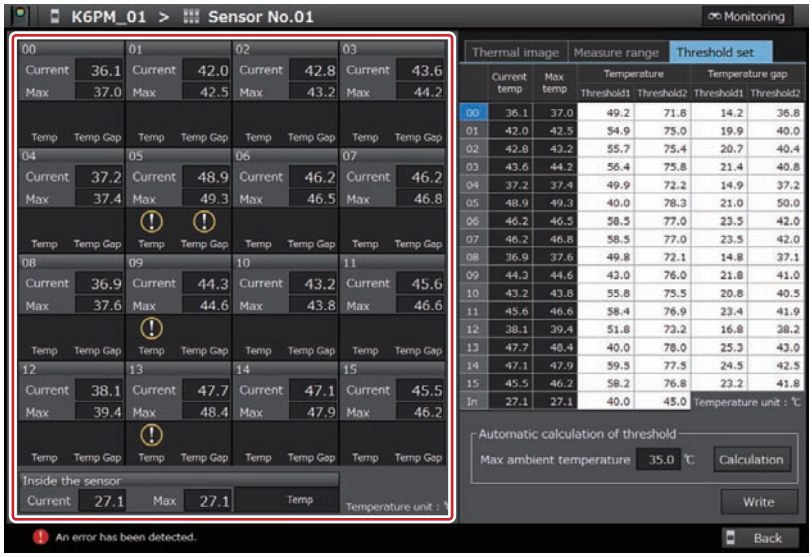
(2) Confirm whether the error per segment is occurred or not on "Monitoring K6PM" Screen".
Confirm which error is occurred on "Alarm", "Status" and "Sensor".




| | |
|---|---|
| (Status of each sensor) | Indicates the following for each sensor.<br>• Max. temperature: The past maximum value of the current temperature (of each infrared thermal sensor)<br>• Alarm: The alarm level is displayed as follows when any of the individual alarms of the corresponding sensor occur<br>: Threshold 1 exceeded, : Threshold 2 exceeded<br>• Communications: Communications status of the Main Unit and the infrared thermal sensor<br>: Normal, : Error<br>• Sensor: The K6PM-TH sensor error occurrence state is displayed by any of the following icons.<br>: Sensor type error, : Temperature measurement range exceeded,<br>: K6PM-TH sensor angle deviation detected |

If there is the error, click [Details] Button to confirm the details.

(3) Confirm whether the error per segment is occurred or not on "Monitoring sensor" Screen.
Confirm which segment the error is occurred.



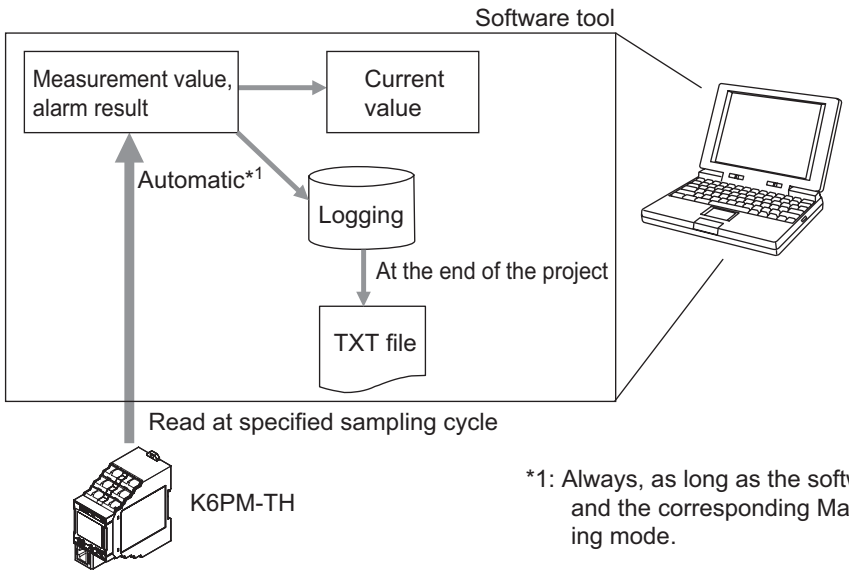

| | |
|---|---|
| Temperature and alarm occurrence state of each segment | The following is displayed for each segment:<br>• 00 to 15: Segment number in the field of view of each infrared thermal sensor.<br>• Current temperature: The current temperature value per segment<br>• Max. temperature: The past maximum value of the current temperature in the past per segment<br>Below this, each alarm occurrence state of the current temperature and differential temperature for each segment is displayed.<br>: Threshold 1 exceeded, : Threshold 2 exceeded |
| Temperature inside the sensor and alarm occurrence state | Sensor internal temperature<br>• Current temperature: The current temperature value inside the sensor<br>• Max. temperature: The maximum value of the current temperature inside the sensor<br>On the right, the alarm occurrence state of the temperature based on the sensor internal temperature is displayed.<br>: Threshold 1 exceeded, : Threshold 2 exceeded |

# Appendices Auto saving of log file

The software tool saves the following data acquired from the Main Unit to be monitored in each sampling cycle in a tab-delimited text file (.txt file).

- Current temperature per segment and maximum temperature per segment
- K6PM-TH sensor internal current temperature and maximum temperature
- Infrared thermal sensor status
- Main Unit status
- Date time

The timing of executing save is "Always", as long as the software tool is operating and the corresponding Main Unit is in the monitoring mode.




*1: Always, as long as the software tool is operating and the corresponding Main Unit is in the monitoring mode.

For the details about log file save location, save timing and specifications of log file, refer to 4-2-3 *Automatic Saving Log Files*.

MEMO

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