



Pyrometer

User Manual


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About This Manual

The Manual includes instructions for using and managing the Product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons. Please find the latest version of this Manual at the HIKMICRO website (<http://www.hikmicrotech.com>).

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Symbols

The symbols that may be found in this document are defined as follows.

Symbol	Description
 Danger	Indicates a hazardous situation which, if not avoided, will or could result in serious injury.
 Caution	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
 Note	Provides additional information to emphasize or supplement important points of the main text.

Safety Instruction

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss. The device can only be operated by trained personnel in accordance with these instructions and local safety regulations.

Laws and Regulations

- The device should be used in compliance with local laws, electrical safety regulations, and fire prevention regulations.

Transportation

- Keep the device in original or similar packaging while transporting it.
- Do not drop the product or subject it to physical shock. Keep the device away from magnetic interface.

Electrical Safety

- The device external wiring connected to the hazardous live terminals requires installation by an instructed person.
- Make sure that the power has been disconnected before you wire, install, or disassemble the device.
- The device must be connected to an earthed mains socket-outlet.

- Make sure the plug is properly connected to the power socket.
- If the device is powered by terminals connected to the power cord, ensure correct voltage and wiring of the terminals for connection to mains supply.
- DO NOT expose the device to high electromagnetic radiation.

Maintenance

- DO NOT maintain the camera when it is powered on, or it may cause electric shock!
- If the product does not work properly, please contact your dealer or the nearest service center. We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.
- Wipe the device gently with a clean cloth and a small quantity of ethanol, if necessary.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.

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1. Overview

1.1 Description

The pyrometer (hereinafter referred to as pyrometer or device) is an intelligent 1-color or 2-color temperature measuring instrument. It receives infrared radiation through an infrared detector and converts it into temperature values. In this way, it achieves high-accuracy temperature measurement for medium-/high-temperature targets. The device is often used in various industrial sites with high demand for temperature control.

The pyrometer can meet the requirements for precise temperature measurement under unstable target conditions (changing emissivity and target size) in complex environments, such as high humidity and dusty environment.

The pyrometer can be applied in medium and high temperature measurement scenarios, such as wire rod, hot rolled sheet, cement kilns, heat treatment, inductive heating, monocrystalline and polycrystalline silicon, etc. It can also be used in super high temperature measurement of vacuum furnace, graphite furnace, high temperature furnace and so on.

1.2 Component

The pyrometer appearance is shown in the figure below.



Figure 1-1 Pyrometer Exterior Components



Note

For detailed technical data, please refer to the technical specifications of the product.

1.3 Basics

1.3.1 Infrared Radiation and Emissivity

The surface of an object emits infrared radiation, the intensity of which varies with the temperature of the object.

At the same time, according to the material and surface properties, the emitted radiation is roughly in the wavelength range of 1 to 20 μm . This fixed constant, which depends on the substance, is called emissivity. The emissivity of an object depends on the state of the object's surface, for example, the roughness, color, material type, etc. The amount of radiated energy emitted by an object is affected by the emissivity. The higher the emissivity, the greater the infrared radiated energy emitted by the object.

1.3.2 1-Color and 2-Color Mode

The pyrometer supports 1-color and 2-color temperature modes.

The 1-color mode determines the temperature by the radiation energy of a narrow wavelength range emitted from an object. The pyrometer measures the average temperature for a small detection area. Thus, the accuracy of measurement is affected by several factors, such as whether the target emissivity is stable, the measurement setting-up and the target is correctly arranged, and other environmental factors like background radiation. With proper installation and accessories to prevent the interference from the lens, the influence of external factors to the accuracy could be reduced.

The 2-color mode determines the temperature by the energy ratio of two wavelength bands. This mode is less affected by the changing conditions of the target and the environment. Because the detected energy on both wavelength bands decrease simultaneously, which does not affect to the energy ratio.

1.3.3 Targets Smaller Than Field of View

When the target size is smaller than the field of view of the pyrometer, or the target moves within the field of view, such as narrow cable rods or melted glass, the infrared radiation energy will be reduced. At this point, the 1-color mode cannot obtain the true target temperature. However, since the energy ratio is unaffected, the temperature readings in the 2-color mode remain accurate.

 **Note**

The relationship between the target size and the field of view of the device can affect the actual measurement distance in 1-color mode.

2. Installation

2.1 Positioning

2.1.1 Environment

Before determining the installation location of the device, it is necessary to clarify the ambient temperature, air quality, and electromagnetic interference at the site.



Note

For detailed technical data, please refer to the technical specifications of the product.

Ambient Temperature

Under no circumstances should the ambient temperature exceed the maximum allowable operating temperature of the device. Optional water/air cooled housing can reduce internal temperature and increase device adaptability.

Air Quality

If the lens is contaminated or obscured, the measurement accuracy of the pyrometer will also be affected, so the pyrometer should be kept as far as possible away from the heat source. Direct installation in scenarios such as water vapor and mist should be avoided. If necessary, install an air purge or a water/air cooled housing to remove possible contamination.

Electromagnetic Interference

The pyrometer should be installed as far away as possible from potential sources of electromagnetic interference, such as various motor equipment. The following measures are recommended to reduce electromagnetic interference:

- All I/O connections use shielded wiring. For all external wiring, use cable sleeves for protection. Solid tubes are superior to hoses in noisy environment.
- To avoid ground loops, make sure that the device or the external power supply terminal connected to the device is grounded at a single point.



Note

If you are unsure about the temperature measurement mode to use, it is recommended to select installation points that meet the requirements for both 1-color and 2-color modes. Refer to 6.1.1 Set Thermometry Mode.

2.1.2 Distance to Object

The distance to the object is equal to the linear distance from the device lens to the surface of the target being measured.

The actual distance may vary depending on device models. At the same time, due to the different principles of the 1-color and 2-color mode, the requirements for the state of the target, as well as the distance to the object, are all different between two modes.

1-Color mode

In 1-color mode, the focal length of the device lens and the required target size determine the optimal distance to the object. In order to obtain accurate readings, the actual measurement distance needs to meet the following requirements: device minimum focus distance \leq actual measurement distance \leq maximum measurement distance \leq maximum focus distance.

1. Refer to the specifications of the device for the minimum focus distance.
2. Calculate the maximum measurement distance based on the device optical resolution and the diameter of the target.

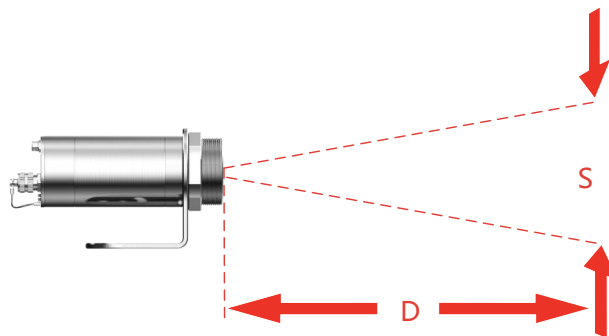


Figure 2-1 Optical Resolution (D:S) as Ratio Between Distance (D) and Spot Size (S)

Note

D represents the distance to object. S represents the diameter of the target spot size. D:S represents the fixed optical resolution. Refer to the technical specifications.

For example: spot size $S = 10$ mm, device $D:S = 200:1$, then the maximum measurement distance should be no more than 2000 mm.

3. Adjust the actual distance according to the field of view of the device. The target spot size must completely fill the entire field of view of the device.
- To avoid incorrect readings during actual installation, it is recommended that the installation distance be slightly less than the maximum measurement distance to

ensure that the target can fully cover the field of view, generally 20% greater than the field of view.

- Turn on the laser aiming light and observe the size of the spot and the target. The spot coverage can be considered an area of precise temperature measurement at the current distance.

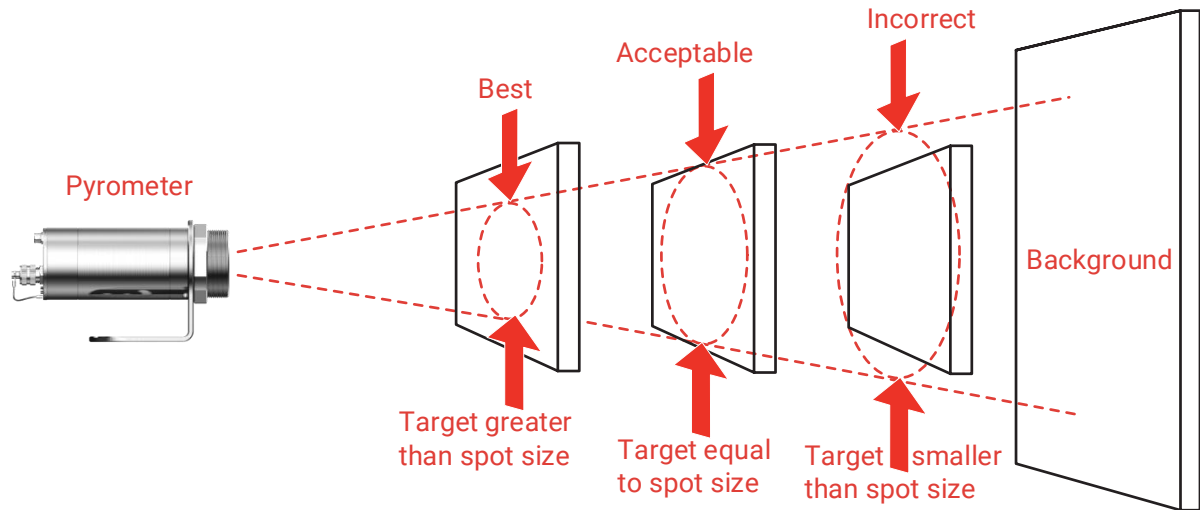


Figure 2-2 Device Placement in 1-Color Mode

2-Color mode

In 2-color mode, the device can be installed at a farther distance, without limitations of the target size and the device's field of view. Please select the actual measurement distance based on the device's focal distance, and refer to the technical specifications of the device to acquire device focal distance.

Note

The accuracy of the temperature reading will still be affected when the device receives a signal that is attenuated below the preset threshold. Refer to 6.1.7 Set Attenuation for attenuation threshold settings.

2.1.3 Viewing Angles

In 1-color mode, it is best for the measurement direction to be perpendicular to the target, with an allowable angle between the measurement direction and the target ranging from 30 degrees to 90 degrees.

In 2-color mode, it is best for the measurement direction to be perpendicular to the target, with an allowable angle between the measurement direction and the target ranging from 45 degrees to 90 degrees.

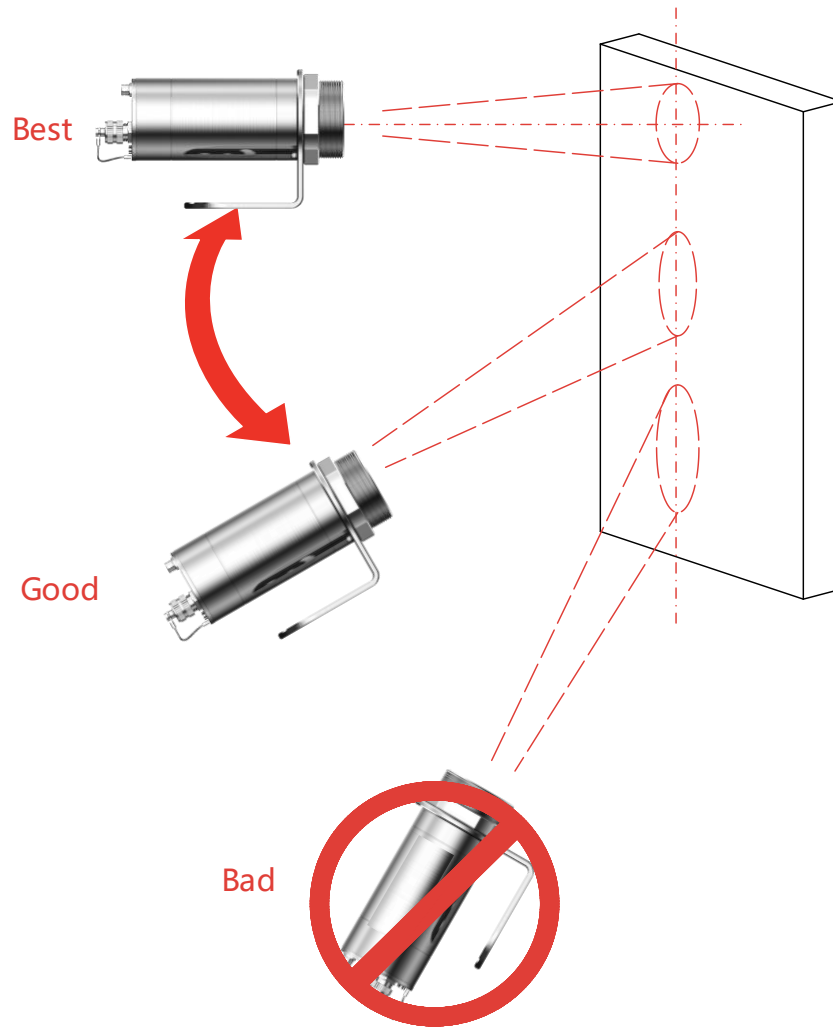


Figure 2-3 Acceptable Viewing Angles

2.2 Mechanical Accessories

The device has an M50 × 1.5 standard, 30 mm long thread on its front end, which can be installed with optional accessories such as the fixed bracket, adjustable bracket, air-purge, and water/air cooled housing.

2.2.1 Fixed Bracket (L-Bracket)

The fixed bracket enables the device to be mounted in a fixed location. For a correct horizontal device orientation, a swivel range within 60° is available.

- The fixed bracket is locked to the M72 × 1.5 threaded connection on the front of the pyrometer with the mounting nut.
- The fixed bracket has one 6.5 mm diameter hole and one 6.5 mm wide waist hole at the bottom, which can be mounted with the optional bracket.



Figure 2-4 Fixed Bracket



Note

If other optional accessories are required, loosen the mounting nut and remove the fixed bracket and store it securely.

2.2.2 Adjustable Bracket

The adjustable bracket enables the device to be mounted in a movable location. For a correct device orientation, you can pitch and swivel the sighting axis in a range of about 60° per axis.

1. Lock the adjustable bracket and fixed bracket using two 1/4UNC-20 screws.
2. Lock the fixed bracket to the M50 × 1.5 threaded connection on the front of the pyrometer using the mounting nut.
3. The adjustable bracket has one 6.5 mm diameter hole and two 6.5 mm wide waist holes at the bottom, which can be mounted with the optional bracket.

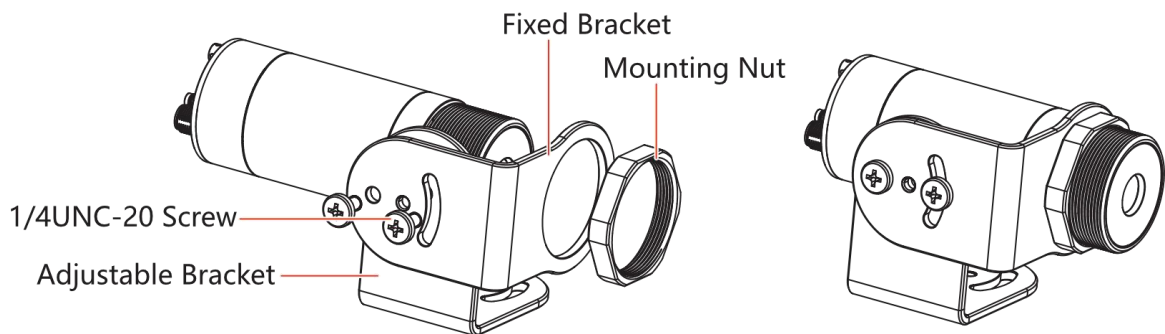


Figure 2-5 Adjustable Bracket

2.2.3 Air Purge

The air purge is used to remove dust, moisture, water vapor and suspended particles from the pyrometer lens and can be installed with the fixed-bracket.

1. Lock the purge onto the M50 × 1.5 threaded connection on the front of the pyrometer.

 **Note**

The air purge can be used to replace the mounting nut to secure the fixed bracket.

2. Optional bracket can be mounted via the M50 × 1.5 standard, 23.5 mm long threaded connection at the front of the purge.
3. Connect the external purge device via the purge connection (G1/4 pipe thread).

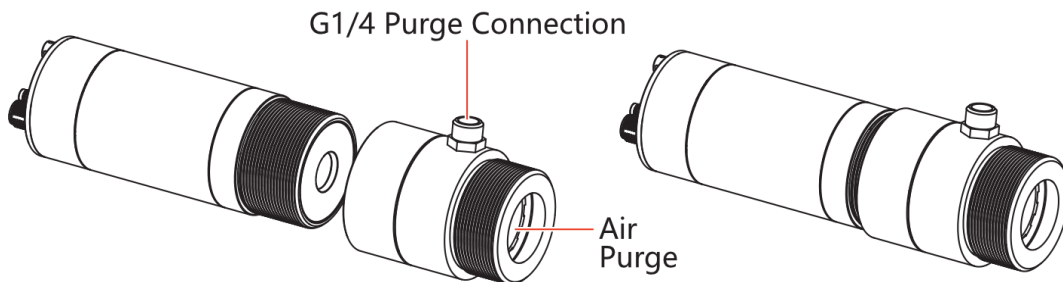


Figure 2-1 Air Purge

 **Caution**

- When measuring temperature in 1-color mode, the purge must always be supplied with clean and dry compressed air or nitrogen to avoid contaminating the lens area.
 - Do not purge with cold air at temperatures below 10 °C, and the purge input should follow the correct pressure flow. For detailed information about the pressure and flow, please refer to air purge specifications.
-

2.2.4 Water/Air Cooled Housing

The water/air cooled housing is used to keep the lens area clean and the interior of the device at a low operating temperature.

1. The housing has connections on the bottom bracket, which can be used with optional model bracket for fixed point mounting.
2. Connect the purge and water/air cooled device via the purge connection, water/air inlet, and water/air outlet. Self-selected connecting hoses, air compressors, and water pumps are available. For situations with higher safety requirements or where water cooling is not suitable, compressed air cooling or vortex coolers can be used for cooling.



Caution

- When measuring temperature in 1-color mode, the purge must always be supplied with clean and dry compressed air or nitrogen to avoid contaminating the lens area.
 - Do not purge with cold air at temperatures below 10 °C, and the purge input should follow the correct pressure flow. For detailed information about the pressure, please refer to water/air cooled housing specifications.
-

2.3 Electrical Connection

The pyrometer has 2 standard cables, which can be used for power connection, temperature and alarm signal transmission, etc.

Connect one end of the cable (male plug) to the corresponding female socket at the device end. Use the other end of the cable for network and terminal wiring.

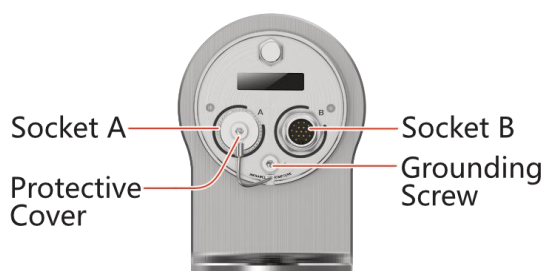


Figure 2-2 Interface



Caution

- When connecting the plug to the socket at the end of the device, insert it in line with the obturator and then tighten the plug to secure.
 - When socket A or B is free, tighten the protective cover to protect the socket outlet.
 - The device housing has a grounding screw, please ground it correctly.
-

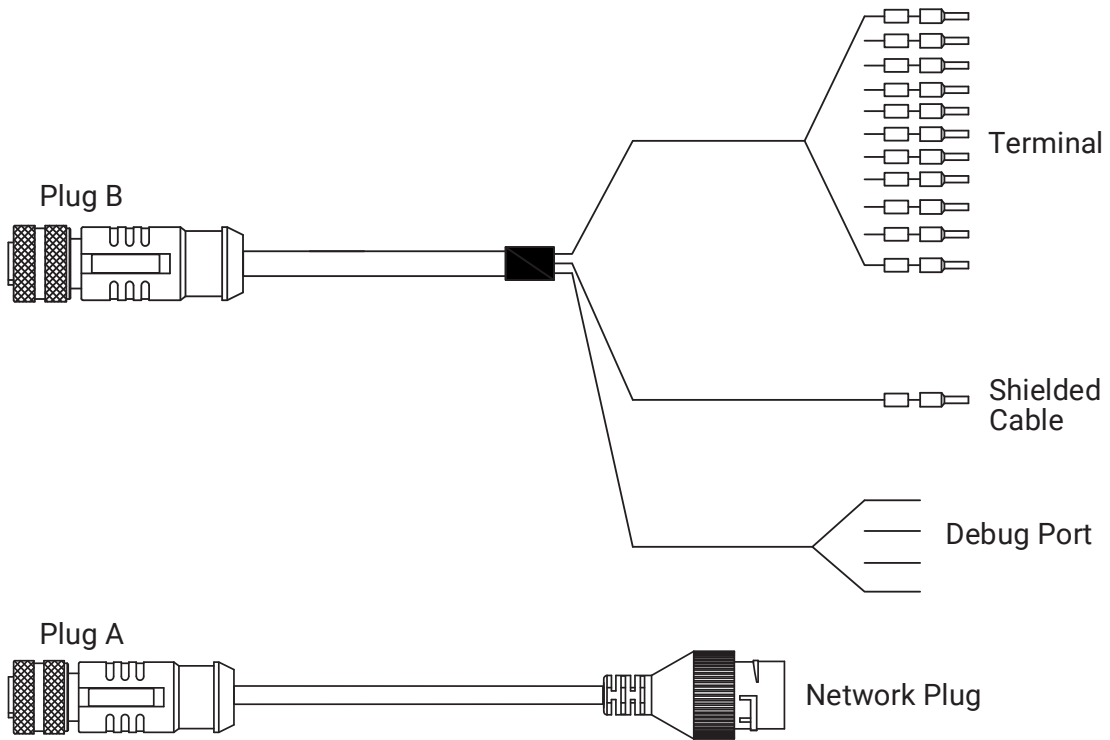


Figure 2-3 Cable

Network Connection

Connect the plug A to the socket A (red, 7 Pin) of the device and connect the network plug to a switch or router. Then connect the device to HIKMICRO Studio.

Terminal Connection

Connect the plug B to the socket B (black, 17 Pin) of the device and connect the terminals to the terminal strip for external system.

Table 2-1 Terminal Description

Silkscreen	VCC	GND	MA 1+ MA 1-	MA 2+ MA 2-	RS485 +	RS485- -	COM	NO/ NC	I/O
Color	Red	Black	1+ Gray 1- Purple	2+ Green 2- Brown	Yellow	Pink	Orange	Blue	White
Function	Power Input 10 to 30 VDC		Analog Output		RS-485 Communication		Switch Output	Alarm	Digital Output

- Power input: connects to power supply, 10 to 30 VDC, GND for grounding.



Note

- Analog output: two analog outputs for temperature output, selectable current mode including 4 mA to 20 mA, 0 mA to 20 mA, and more.
- RS-485 communication: for Modbus communication. Connect the device to the computer client via the adapter wire for RS-485 communication.
- Switch alarm output: built-in relay, connect to the load for temperature alarm, ambient temperature alarm, and other output and control. NC (Normally closed) and NO (Normally open) contacts are supported.
- Digital output: I/O digital signal, for temperature alarm, ambient temperature alarm, etc. Connect the digital output to an external relay.
- Shielded cable: prevents electromagnetic interference from the pyrometer's signal, connected to the earth ground
- Debug port: for debugging by technicians only.



Caution

- Connect the electrical connections according to the required functions. Use shielded cables for the connections, and configure a voltage converter for devices powered by AC.
 - When the device is used in environments with severe power interference, such as medium frequency furnaces, high frequency furnaces, and induction heating, avoid mixing the device's power supply with the power supply for driving. Make sure to use a clean power supply.
-

3. Client Connection

With the companion client, you can view real-time image of the device, analyze temperature curve and configure parameters to assist with temperature data management.

Download Address:

Go to the download center (<https://www.hikmicrotech.com/en/industrial-products/hikmicro-studio-software/>) to obtain and install HIKMICRO Studio Client (hereafter referred to as “client”) to your computer.



Caution


To ensure complete function of the client, make sure to install HIKMICRO Studio of V1.2.0 and above.

Instructions:

The device connects with the HIKMICRO Studio via IP or RS-485 serial port, and the client supports different configurations depending on the connection method.

- For information about connection over an IP network, refer to 3.1 Network Connection.
- For information about connection over RS-485 serial port, refer to 3.2 RS-485 Connection.

For more information:

Refer to the User Manual embedded in the client (Click the icon  on the top right corner in the client, and select **Help -> User Manual**) to obtain detailed instructions.



Note

Due to client upgrade, the functions described in the manual may not be consistent with actual functions, and actual functions shall prevail.

3.1 Network Connection

You can connect the device with network cable and then connect to the client.

3.1.1 Connect Cable

Connect the cable via network interface.

1. Connect the pyrometer and the computer to the same network.
 - Choice 1: Connect the device and computer to the switch with a network cable.
 - Choice 2: Connect the device to the router or switch first with a network cable, and connect the computer to the same router or switch via Wi-Fi.

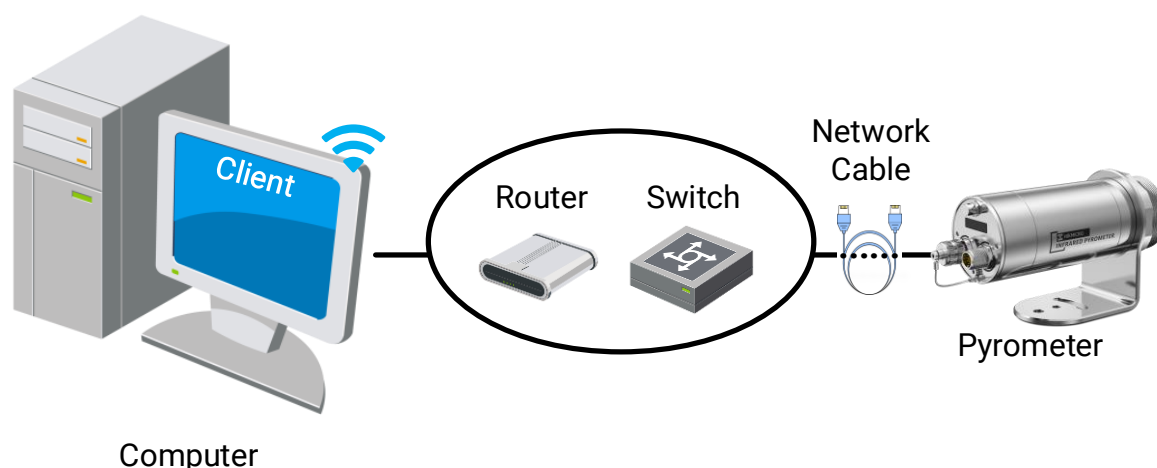


Figure 3-1 Pyrometer Network Connection

2. Set the computer IP address to be on the same network segment as the pyrometer.
3. Set IP address.

Set the IP Address:

Using the Windows 10 operating system of the computer as an example, the steps to set the IP address of the computer are as follows.

Prerequisites: Make sure you have obtained the pyrometer IP address. The factory IP address of the device: 192.168.1.64.

Note

Please enter the device IP address in your browser first. If you have normal access to the device, you can skip the following steps.

1. Open your computer's Control Panel and go to **Network and Internet -> Network and Sharing Center**.

2. Select **Ethernet -> Properties**, and double-click **Internet Protocol Version (TCP/IPv4)**.
3. Modify the local computer IP address, subnet mask, and default gateway information. Click **OK**. Make sure both the device and the computer IP address are on the same network segment.

Example: If the device IP address is 192.168.1.64, the computer IP address can be set to any IP address between 192.168.1.2 and 192.168.1.253, except 192.168.1.64.

3.1.2 Activate Device

To enhance system and data security, activate the device to initialize the device.

Note

Activation via the client is only supported by certain device models. When activating the device, make sure that the device is online and has not been activated before.

1. Open the client, and select **Device Management -> Devices** in the **Maintenance and Management** area of the home page.
2. Click **Online Devices**, and click **Refresh**. Then online devices are displayed in the list.
3. Select one or multiple devices, and click **Activate**.


Note

If you select multiple devices to activate at the same time, only one window will pop up. Typically, the account name and password for the selected devices are the same.

4. Enter the IP Login **Password** and **Confirm Password**.

Caution

- To better protect your privacy and improve product security, we strongly recommend that you set more complex passwords according to the following rules: Password length must be between 8 and 16 digits, and is combination of two or more types of numbers, upper and lower case letters or special characters.
- Please understand that it is your responsibility to properly configure all passwords and security settings of other relevant products.

-
5. Click **OK**.
 6. (Optional) In the list of online devices, click  to modify device information such as name, IP address, port number, and so on.

3.1.3 Add Device

Devices can be added to clients in a variety of ways, including via IP/Domain and IP segment, and online devices searching. After the device is added to the client, you can configure and manage the device remotely.

Add Online Device Automatically

Clients can automatically detect online devices that are on the same network segment as the current computer and obtain device-related information such as IP addresses. With this function, detected online devices can be quickly added to the client. When detected online devices use the same username and password, multiple devices can be selected at the same time and added to the client simultaneously.

When you add a device for the first time, refer to 3.1.2 Activate Device. After the device is activated, click **+Add** to add device.

Add Device via IP/Domain or IP Segment

After the device is activated, you can add the device to the client by entering information such as the IP address or domain name.

If the IP addresses of multiple devices to be added range in the same IP segment and have the same port number, user name, and password, you can add the devices via IP segments. You can quickly add devices to clients by specifying the starting and ending IP addresses of the devices.

1. In the **Maintenance and Management** area of client home page, select **Device Management- > Device**.
2. Click **+Add** to open the device adding interface.
3. Select **Add Mode** as **IP/Domain**.
4. Set the parameters in the interface.
5. Click **Add**, and close the interface, or click **Add and New** to continue adding additional devices in the interface.

3.2 RS-485 Connection

Add the device to the client via the RS-485 serial port.

3.2.1 Connect Cable

1. Connect the terminal interface of the device to the USB to RS-485 converter and connect to the computer via USB. Refer to 2.3 Electrical Connection for reference.



Note

The USB to RS-485 converter is not included in the package. Please purchase it separately.

2. Set RS-485 parameters for the pyrometer.

What to do next: Access the computer client to configure the device.

3.2.2 Set RS-485 Parameters

RS-485 can be used to access control signals, and you can configure parameters of the RS-485 serial port.

1. Start up the client. In the **Maintenance and Management** area of the home page, select **System Configuration -> RS-485**.
2. Set parameters such as baud rate, parity bit, data bit, and stop bit for the selected serial port.



Note

The RS-485 parameters on device end and client end need to be the same, otherwise the client cannot search and add devices for serial access.

3. Click **Save**.
4. (Optional) Click **Default** to restore to default settings.

3.2.3 Add Device

Add the device to the client via the RS-485 serial port.

Prerequisites:

- (1) The device has been connected to the computer via RS-485 serial port.
- (2) The RS-485 parameters on both the device and the client are configured to the same.

1. In the **Maintenance and Management** area, select **Device Management -> Devices**.
2. Click **+Add** to open the device adding interface.
3. Select **Adding Mode** as **RS-485**.
4. Click the refresh icon in the upper right corner to display the list of devices that have been connected to the computer via serial port and that match the RS-485 parameters.
5. Select the device.

6. Click **Add**, and close the interface, or click **Add and New** to continue adding additional devices in the interface.

4. Operation

Connect the device to HIKMICRO Studio, check if live view image displays normally and configure related parameters.

4.1 Power On and Self Check

When the device is powered on, live view interface displays, including real-time temperatures and temperature measurement mode.

If no message is displayed, check the power supply wiring and voltage input for compliance.

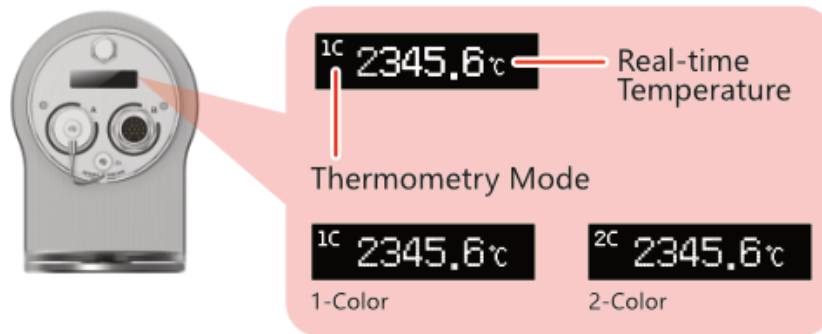


Figure 4-1 Local preview interface

Diagnostic Status Code

The device supports online self-diagnosis; when events occur, the live view interface will cycle through corresponding diagnostic status codes, enabling operators to pinpoint the root cause.

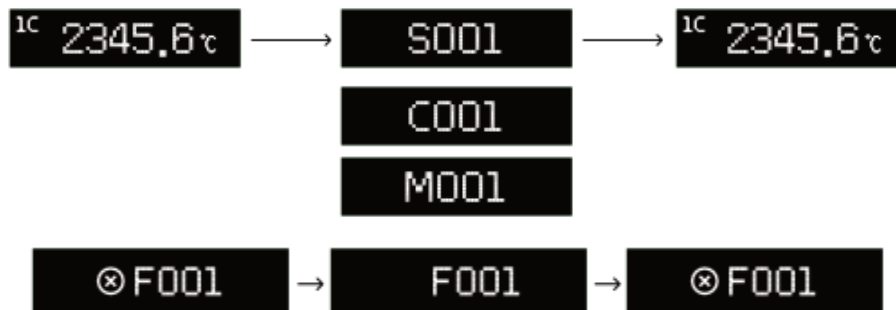


Figure 4-2 Status Code

Table 4-1 Status Codes

Status Code	Category	Description
C.	Functional Check	Measurements may be inaccurate. The device is in the process of a functional check or simulation test.
S.	Out of Specification	Measurements may be inaccurate. Operating outside device specifications may be detected, e.g., electronic component overheating.
M.	Maintenance Required	Measurements may be inaccurate. Device performance degradation caused by external factors, e.g., dirty lens, may lead to imminent failure, requiring immediate maintenance.
F.	Fault	Functional fault detected. The measured value is not displayed or the value is inaccurate.

 **Note**

- During C, S, or M status, diagnostic status codes alternate with temperature values. When multiple events are present, the status code with the highest priority is shown. In F (Failure) state, the device displays F status code continuously.
- For more details about status codes (e.g. F001), please refer to 9.1 Status Code.

4.2 Preview Description

After the device is connected to HIKMICRO Studio, you can preview the device's optical channel, monitor real-time temperatures and view temperature curves. For details on how to connect the device to the client, please refer to 3 Client Connection.

 **Note**

The illustrations in this manual are for reference only. The functions in the manual may be different from those in the client due to version updates. Please take the actual interface of the client for reference.

1. Click **Main View** to go to live view interface.
2. In the list of devices on the left, select the devices you have added to the group, and double-click to start live view.
3. Right-click on the preview image, select **Image Mode**, and choose between **Live View Mode** and **Temperature Mode**.

- **Live View Mode:** Displays optical channel preview and temperature. Devices that access the client via network connection support live view mode. Devices that access the client via RS-485 serial port do not support live view mode.
- **Temperature Mode:** Displays temperature information and detailed thermometry parameters instead of live view image.

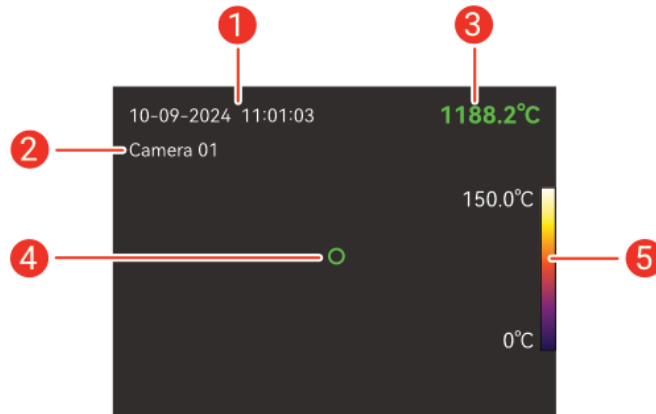


Figure 4-3 Live View Mode

Table 4-2 Live View Mode Interface

Number	Description
1	System time, factory calibrated.
2	Channel name, editable.
3	Temperature values and temperature units, normally displayed in green. <ul style="list-style-type: none"> ● When the temperature exceeds Target Max. Temperature, it is displayed in red; when the temperature is below Target Min. Temperature, it is displayed in blue. ● When the temperature exceeds the measuring range, greater-than sign or less-than sign is displayed, e.g. >3000.0°C or <700.0°C.
4	The device measures the temperature of areas within the circle.
5	Temperature scale.

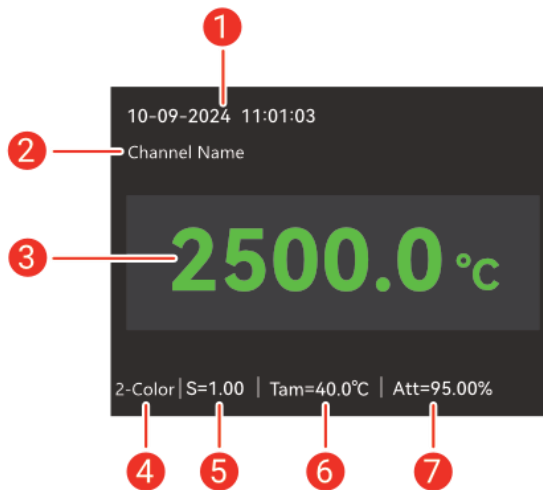


Figure 4-4 Temperature Mode Interface

Table 4-3 Temperature Mode

Number	Description
1	System time, factory calibrated.
2	Channel name, editable.
3	Temperature values and temperature units, displayed in green in all conditions. <ul style="list-style-type: none"> • Displayed in green when exceeds Target Max./Min. Temperature. • When the temperature exceeds the measuring range, greater-than sign or less-than sign is displayed, e.g., >3000.0°C or <700.0°C.
4	Temperature measurement mode, 1-color or 2-color.
5	ϵ : Emissivity (appears in 1-color mode); S: Slope (appears in 2-color mode).
6	Tam: Ambient temperature.
7	Att: 2-Color attenuation rate, not supported for 1-color devices.

4.3 Enter Menu

Go to the parameter configuration menu by doing the following:




1. Click **Main View** to go to live view interface.

2. Go to parameter configuration interface by choosing one of the following methods:
 - Right-click on the live view interface and select **Pyrometer Settings**.
 - In the left-side device list, select a device, and right-click to select **Pyrometer Settings**.
3. Refer to 4.4 Menu Description for detailed descriptions of the parameters.

4.4 Menu Description

Go to the **Pyrometer Settings** interface to set image, thermometry and advanced parameters.

Table 4-4 Pyrometer Settings

Parameters	Description	Instructions
 <p>Image Settings</p>	Sets the image quality of optical channel; adjusts OSD info. and image effect.	Refer to 5 Image Settings
 <p>Parameters</p>	Sets thermometry parameters such as basic thermometry parameters, analog output, alarm output, etc.	Refer to 6 Thermometry Parameters
 <p>General Settings</p>	Sets general parameters such as video/audio, modbus, maintenance management, etc.	Refer to 7 General Settings

5. Image Settings




You can adjust the image quality of optical channel and set OSD info.

5.1 Aiming and Focusing

Out-of-focus or misaligned targeting may affect temperature measurement accuracy. Before operating, please ensure the device is aimed at the target area and adjust focus until a clear image is obtained.

Note

Perform focus adjustment at the actual mounting place to ensure that the focus and parameter settings are consistent with actual application.

1. Go to **Pyrometer Settings -> Image Settings -> Display Settings**.
2. Align the device with the target in the installation area and observe the live view of optical channel.
3. Move the target to the green circle in the center of live view image (the actual measurement zone) and aim at the target.
4. Observe the live view and adjust focus.
 - Click  to initialize the lens. Before adjusting the focus for the first time, it is recommended to initialize the lens to eliminate errors.
 - Click or long press  to focus on the near point, and the nearby object gradually comes into focus.
 - Click or long press  to focus on the distant point, and the distant object gradually comes into focus.

Note

- Initialize the lens to reset focus parameters when the focus time is too long and the image is unclear.
- Each time the lens is initialized, the focus distance is maintained at approximately 0.6 m. Estimate the distance between the device and the target to determine how to adjust focus.

5.2 Display Settings

5.2.1 Exposure

Adjusts the brightness of live view image.

1. Go to **Pyrometer Settings -> Image Settings -> Display Settings**.
2. Set **Exposure Mode** to **Manual** or **Auto** and set related parameters.

Table 5-1 Exposure Mode

Exposure Mode	Description
Auto	<ol style="list-style-type: none"> 1. In Auto mode, the device automatically adjusts the brightness according to the environment. You can also manually input or move the slider to adjust brightness. 2. Select ISP Reference Area, and the overall exposure effect will remain close to the brightness of the selected area. You can select upper, lower, left, right, or central areas.
Manual	<ol style="list-style-type: none"> 1. Set Exposure Intensity. The higher the intensity, the brighter the image. 2. Select Filter Level to prevent the image from being overexposed due to excessive brightness. The higher the level, the greater the light reduction, and the darker the image.

5.2.2 Image Adjustment

You can adjust image display, including mirror, zoom, etc.

1. Go to **Pyrometer Settings -> Image Settings -> Display Settings**.
2. Set **Mirror** and **Zoom**.
 - **Mirror**: You can select **Center**, **Left-Right**, or **Top-Bottom**, or disable **Mirror**. When the image is inverted, you can use this function to flip the image.
 - **Zoom**: Enlarges the image.

5.3 OSD Configuration

You can configure OSD (On-Screen Display) on live view image, including the content, format and position.

1. Go to **Pyrometer Settings -> Image Settings -> OSD Configuration**.

2. Set **Display Content**. You can set channel name, date and time.
3. Set **Display Format** to adjust the font size of temperature values.
4. Click **Save**.

6. Thermometry Parameters

Set the temperature measurement, output, alarms, etc. of the pyrometer and the parameters associated with the temperature measurement.

6.1 Set Thermometry Parameters

Set temperature mode and configure the parameter before measurement.

6.1.1 Set Thermometry Mode

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.
2. Set thermometry **Mode**. Switch between **1-Color** and **2-Color**.

 **Note**

The mode switching is supported only for 2-color devices. For 1-color devices, 1-color is set as default.

3. Click **Save**.

Table 6-1 1-Color/2-Color Mode Scenarios

1-Color Mode	2-Color Mode
<ul style="list-style-type: none"> • The background temperature is higher than the target temperature. • Optical channel has little dust and vapor, and is not obstructed. • The surface of the target is flat and the physicochemical state is stable (emissivity is stable). • The target size is larger than the device field of view. 	<ul style="list-style-type: none"> • The working environment has water vapor and dust, and the optical lens is partially blocked, causing energy degradation. • The measured target size and distance will vary. • The target is changed frequently. • The target emissivity is unstable. • Measure small targets at a distance, and the target is smaller than the device field of view.

6.1.2 Set Emissivity

Every object has its emissivity, and the value varies with object surface material ranging from rough to smooth. The emissivity of almost all material in practical

applications is less than 1.000. Modify the emissivity of the target on the device to ensure measurement accuracy.

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.
2. Set **Emissivity**.
3. Click **Save**.

 **Note**

In 1-color mode, the target emissivity must be set. For more accurate target emissivity in 1-color mode, refer to the following methods:

- Use a resistance temperature detector (RTD) or thermocouple to detect the real temperature of the target and adjust the emissivity until the device displays the same value as the real temperature of the target.
- If part of the surface of the target is coated with dark black paint, the emissivity in 1-color mode can reach 0.98. Measure the area adjacent to the object and adjust the emissivity until to the same temperature, which is the correct emissivity for the object.

6.1.3 Set Slope

The emissivity of all real objects changes with wavelength and temperature. The slope is the ratio of the emissivity in two separate wavelength bands. It is to compensate for the difference between the emissivity over two wavelength bands. The factory default values can satisfy most measurements, and adjustments are also supported.

Slope is only supported in 2-color mode, and the default slope factor can be used.

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.
2. Set **Slope**.
3. Click **Save**.

 **Note**

- The following 2-color slope values are approximate values and vary with alloy material and surface finish and application. The data in the table is for reference only.

Table 6-2 Approximate 2-Color Slope for Some Materials

Material	Surface Status	Approximate Slope Factor
Cobalt, Stainless Steel, Nickel, Iron, Steel	Metal oxide surfaces	1.000

Cobalt, Rhodium, Platinum, Iron, Stainless steel, Tungsten, Molybdenum, Steel, Nickel, Tantalum	Smooth, clean, non-oxidized metal finish	1.030
Cast iron	/	1.000

- If you need to obtain an unknown 2-color slope for the target, use a reliable contact thermometer to measure the temperature of the target surface. For example, measure the temperature of several areas on the target and average the values. Adjust the slope until the temperature measured by the device is equal to the actual temperature of the target.

6.1.4 Set Unit

Set the displayed temperature unit, C for Celsius °C and F for Fahrenheit °F.

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.
2. Set **Unit**.
3. Click **Save**.

6.1.5 Set Transmissivity

Set transmissivity when the device has protective window in order to compensate energy attenuation. Please input the transmissivity of the window according to window material after proper measurement or data query to improve measurement accuracy.

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.
2. Set **Transmissivity**.
3. Click **Save**.



Note

Transmissivity settings only influence measurement in 1-color mode.

6.1.6 Set Distance

Temperature measurement distance is the distance from the lens of the device to the surface of the object. The accurate distance value increases the accuracy of the measurement.

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.

2. Set temperature measurement **Distance**.

3. Click **Save**.

6.1.7 Set Attenuation Threshold

The attenuation filter function can determine the attenuation of the energy emitted from the target to the device. When the actual attenuation exceeds the set threshold, temperature exception occurs in that the temperature reading is displayed as the lower limit of the temperature range of the device.

Note

The function is supported only in 2-color mode.

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.

2. Enable **Attenuation Threshold**.

3. Set threshold.

Note

- Take the device, whose temperature range is 700~3200 °C, for example. Setting the attenuation threshold to "95%" means allowing 95% attenuation of energy, and the temperature reading is fixed at 700 °C when the target attenuation is greater than 95%.
- The attenuation thresholds for some of the scenarios are listed below as a reference, which can be adjusted according to the site and target conditions.
 - Set the threshold to > 95% when measuring targets whose diameter is below 2 mm. For example, when measuring the temperature of the test rod, the temperature of tungsten wire is usually > 1500 °C, and the filament diameter is < 2 mm.
 - Set the threshold to 95% when measuring targets whose diameter is between 2 to 10 mm. For example, when measuring fast moving wire in a steel plant, the target is always shaking.
 - Set the threshold to 80% when measuring targets whose diameter is between 30 to 100 mm. For large targets, the threshold can be set to a smaller value to prevent signal interference from stray light when the target is close to the device.
 - Set the threshold to 70% when measuring targets whose diameter is > 100 mm. For example, when measuring steel plates in steel mill, much stray light is around the large target.

4. Click **Save**.



Note

To set attenuation alarm to trigger an alarm when the energy attenuation exceeds the threshold, refer to 6.3 Set Alarm.

6.1.8 Set Match

When the emissivity and the slope of the target is unknown or the measured temperature deviates from the actual target temperature, you can obtain the emissivity and the slope of the target by inputting the measured target temperature and actual target temperature.



Note

If a fixed offset is observed between multiple on-site temperature results and expectations, refer to 6.6 Set Temperature Recalibration to calibrate the temperature output.

1. Go to **Pyrometer Settings -> Parameters -> Basic Thermography Parameter**.
2. Click **Calculate**.
3. The device automatically acquires **Original Temp.** measured in the 1-color/2-color mode. You can click **Get** to read the original temperature again.
4. Input the actual **Calibration Temperature**.
5. Click **OK**. And the device adjusts emissivity and slope automatically according to temperature difference.



Note

If adjustment needed after matching, you can adjust emissivity or slope manually.

6.2 Set Time Function

Set the output time and mode of temperature data. The time function influences the recording and output of temperature data.

6.2.1 Set Temperature Filter

Set the temperature range of the measurement and the device will not record the value that is out of the range.

1. Go to **Pyrometer Settings -> Parameters -> Time Function**.
2. Enable **Temperature Filter**.
3. Select **Mode**.

Filter Mode	Description
Reset	When the target temperature is higher than the Max.T , the output value is the upper temperature limit (i.e., the Max.T). When the target temperature is lower than the Min.T , the output value is the lower temperature limit (i.e., the Min.T).
Hold	When the target temperature is out of the set temperature range, the output temperature remains at the last measured value that is within the temperature range until a new temperature value within the temperature range is measured.

4. Set maximum temperature and minimum temperature.
5. Click **Save**.

6.2.2 Set Output Time

Set the output time interval for the measured data, which means that the device performs a temperature recording and output the data at intervals.

1. Go to **Pyrometer Settings -> Parameters -> Time Function**.
2. Set **Output Time**.
3. Click **Save**.

6.2.3 Set Averaging

The measured temperature values are averaged over the specified time interval to obtain a smoother temperature value.

This feature is applicable to temperature measurement scenarios where there are intermittent extremes values. The averaging of temperature values can reduce temperature fluctuations, improve result stability and is suitable for most applications.

1. Go to **Pyrometer Settings -> Parameters -> Time Function**.
2. Enable **Averaging**.
3. Set **Averaging Number**.

 **Note**

For example, if the averaging number is set to "3", then the device calculates the average of the measured values over the three output times.

4. Click **Save**.

6.2.4 Set Peak/Valley

The output temperature value only selects the highest or lowest measured temperature. This function is suitable for measuring moving or partially obscured targets (e.g., a mill steel sheet partially covered with scales).

1. Go to **Pyrometer Settings -> Parameters -> Time Function**.
2. Enable **Peak/Valley**.
3. Select **Mode**.

Peak/Valley	Description
Peak	<p>When target temperature reaches its highest value, the device outputs this value within a designated time interval.</p> <p>Peak temperature measurement is suitable for measuring moving targets: When fast moving targets are measured, the passing duration through the detection area is short, e.g., less than 1s, the highest temperature needs to be measured. More accurate measurements can be obtained in this way.</p> <p>Peak Hold can also be used to measure the temperature of metal solutions or liquids.</p>
Valley	<p>When target temperature reaches its lowest value, the device outputs this value within a designated time interval.</p>

4. Set **Output Period**, and confirm **Max. Duration**.



Note

Max. Duration: The output time of temperature peak or valley value (output period × output time). For example, if the output period is set to 3, and the output time is set to 2 ms, the device outputs the peak/valley value and lasts for 6 ms.

5. Click **Save**.

6.3 Set Alarm

The alarm types include high, low, ambient temperature alarms, etc. When the temperature reaches the threshold, the alarm is triggered.

The device can connect with external alarm modules. You can refer to 2.3 Electrical Connection for wiring instructions.



Note

You can search and export alarm recordings in **Event Center -> Search Alarm Event**.

1. Go to **Pyrometer Settings -> Parameters -> Alarm Settings**.
2. Select alarm output mode, including **Relay Alarm** and **I/O Alarm**.
 - **Relay Alarm**: switch alarm output, built-in relay, connect to the load for temperature alarm. **Relay Mode** can be set to normally open, normally closed, permanently open or permanently closed.
 - **I/O Alarm**: digital signal alarm output.
3. Select alarm source and set alarm rule according to different alarm output mode.

Alarm Source	Description
Target Max. Temperature Exceeded	Set Target Max. Temperature . Alarm is triggered when the target temperature is greater than the max. temperature.
<Target Min. Temperature	Set Target Min. Temperature . Alarm is triggered when the target temperature is lower than the min. temperature.
Max. Ambient Temperature Exceeded	Set Max. Ambient Temperature . Alarm is triggered when the ambient temperature is greater than the max. temperature.
Dirty Lens	The device reports alarms when detecting lens smudges that affects detection accuracy.
F Fault	Alarm is triggered at the occurrence of F fault.
Max. 2-Color Attenuation Rate Exceeded	When the detected energy attenuates to a certain degree, the device cannot accurately measure the temperature. Set this value so that alarm is triggered when the actual attenuation exceeds the set threshold. You can adjust in a timely manner to ensure measurement accuracy.



Note

Example: Setting the Max. 2-Color Attenuation Rate to "95%" means to allow 95% attenuation of energy. The alarm is triggered when the value is greater than 95%.

4. Click **Save**.

6.4 Set Analog Output

The real-time temperature output is achieved through the analog output of the device, which supports 2 sets of outputs.

The analog output terminal should be connected. Wiring instructions can be found in 2.3 Electrical Connection.

1. Go to **Pyrometer Settings -> Parameters -> Analog Output**.
2. Enable **Analog Output**.
3. Set analog output parameters.

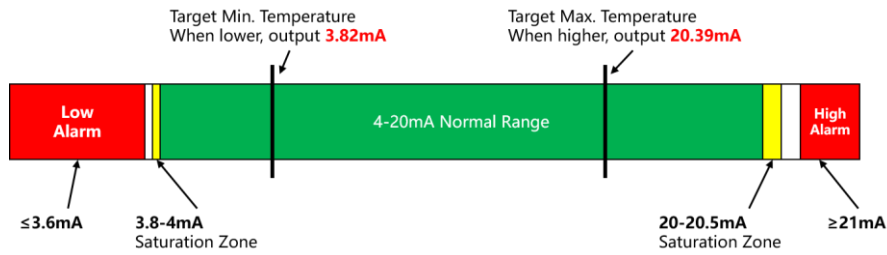
Analog Output Parameters	Description
Signal Sources	1-Color and 2-Color are available. 1-color devices only support 1-Color mode.
Mode	Four modes are available: 4 to 20 mA (Including Saturation and Alarm Zone) , 4 to 20 mA (Alarm Zone) , 4 to 20 mA , and 0 to 20 mA . *The different modes are described in the illustrations below.
Output Temp.	Set the temperature corresponding to the upper and lower limits of the analog current output (0 mA, 4 mA, or 20 mA).
Fault Alarm (F Code)	On detection of a Class F fault, the device outputs either low (3.6 mA) or high current (22 mA) to alarm. The function is only supported in 4 to 20 mA (Including Saturation and Alarm Zone) and 4 to 20 mA (Alarm Zone) .
Max./Min. Alarm Temperature	When the measured temperature is greater than or equal to the max. alarm temperature, the device outputs upper saturation zone current. When the measured temperature is less than or equal to the min. alarm temperature, the device outputs lower saturation zone current.

4. Click **Save**.

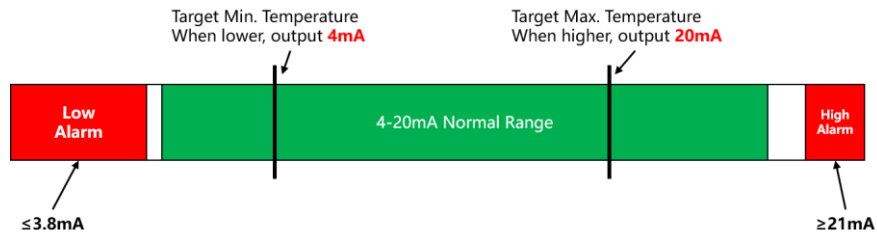
- **4 to 20 mA (Including Saturation and Alarm Zone)**

In this mode, when the measured temperature is out of output temperature range, the device can output current values beyond the normal range to flag abnormal temperatures.

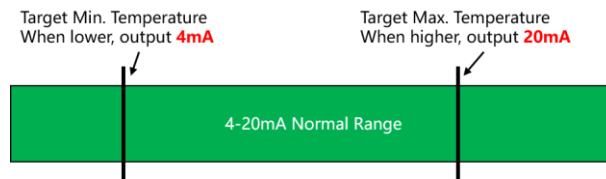
In the other modes, the device outputs upper and lower limit of current values when measuring out-of-range temperatures.



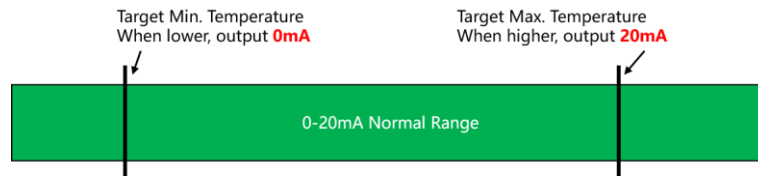
- 4 to 20 mA (Alarm Zone)



- 4 to 20 mA



- 0 to 20 mA



6.5 Set Simulation Settings

Output simulation value for device debugging.

1. Go to **Pyrometer Settings -> Parameters -> Simulation Settings**.

2. Select **Simulation Mode**, including **Temperature** and **Current**.

- **Temperature:** output corresponding current by mapping the simulation temperature value to the analog output range.

- **Current:** directly output simulation current value (0~22 mA).

3. Set simulation temperature or current value.

4. Click **Save**.



Note

Simulation mode only supports analog output for device debugging. The configuration in simulation mode is not saved to database. The device restores to analog output upon restart, power interruption and configuration reset.

6.6 Set Temperature Recalibration

The device has been calibrated prior to shipment. You can always recalibrate the device to improve detection accuracy. When measured results deviate from target actual temperature repeatedly, you can calibrate the device based on target actual temperature measured by correcting device.

1. Go to **Pyrometer Settings -> Parameters -> Temperature Recalibration**.
2. Enable **Temperature Recalibration**.
3. Select **Signal Sources**.
4. Select **Calibration Mode**. The parameters to configure varies with different modes.

Calibration Mode	Description
Single Point	<p>Input the measured result of the pyrometer for Original Temperature 1, and input target actual temperature measured by correcting device for Calibration 1. Click Save to start calibration.</p> <p>Single point calibration is applicable in the scenario where the temperature gain of the pyrometer and the correcting device are similar (with a default gain coefficient of 1), and there exists a fixed bias temperature.</p>
Two Point	<p>Input the measured result of the pyrometer for Original Temperature 1 and Original Temperature 2, then input target actual temperature measured by correcting device for Calibration 1 and Calibration 2. Click Save to start calibration.</p> <p>Two point calibration mode is applicable in the scenario where both the temperature gain (with the default gain coefficient not being 1) and the bias temperature of the pyrometer and the correcting device are different.</p>

Parameter	Adjust Gain and Bias Temperature until the thermometry curve of the pyrometer coincides with that of correcting device. You can use this mode when recalibrating devices of the same model (gain and bias Temperature have been obtained.) or manually adjusting gain and bias temperature.
------------------	--

5. Click **Save**.

7. General Settings

Set system parameters, such as video/audio, time, network, RS-485, etc. You can also perform device maintenance and security management.

7.1 Set Video/Audio

Set video, audio, and image parameters for optical channel live view.

1. Go to **Pyrometer Settings -> General Settings -> Video/Audio**.
2. Set video/audio parameters.

Table 7-1 Video/Audio Parameters

Parameters	Description
Video Stream	<p>Select Main Stream or Sub Stream.</p> <ul style="list-style-type: none"> • Main Stream: High clarity with larger stream sizes; Requires more bandwidth; Recommended for local storage. • Sub Stream: Smoother images with less bandwidth consumption, ideal for low-bandwidth networks or SD storage.
Video Type	Fixed as Video Stream.
Resolution	Determines video clarity. The higher the resolution, the more details the image shows. Higher resolution demands higher network bandwidth.
Bit Rate Type Max. Bitrate	Bitrate types include variable bitrate (VBR) or constant bitrate (CBR). Under constant bitrate, streams are transmitted at a fixed bitrate; while under variable bitrate, streams are transmitted at dynamic bitrate within the set limit.
Image Quality	Determines the overall image effect. Higher image quality provides more faithful reproduction of colors and better low-light performance with more details. However, it requires higher network bandwidth.
Video Frame Rate	The number of frames per second in a video. A higher video frame rate results in smoother and more realistic visuals, but requires higher bandwidth and storage. Please configure this parameter based on actual bandwidth availability.

Video Encoding	<p>H.264, MJPEG and H.265 are supported.</p> <ul style="list-style-type: none"> • Compared to H.264, H.265 offers higher compression efficiency, reduces bandwidth and storage requirements, and is suitable for ultra-high-definition video scenarios, though it demands higher hardware resources. H.264 provides better compatibility and can be used in most scenarios. • MJPEG uses frame-by-frame compression, making it inefficient for dynamic video compression. It is suitable for scenarios requiring high-quality single-frame images (e.g., snapshot capture).
Coding Complexity	<p>At the same bitrate, higher encoding complexity yields higher image quality, but simultaneously higher network bandwidth.</p>
I frame interval	<p>The number of frames between two consecutive keyframes. Shorter I-frame intervals result in lower compression efficiency but higher video quality; hence, shorter intervals are recommended for H.264 encoding. Conversely, longer I-frame intervals improve compression efficiency at the cost of reduced video quality. For H.265 encoding, the I-frame interval can be set slightly longer.</p>
SVC	<p>Scalable Video Coding (SVC) enables frame extraction recording to reduce storage space. The extracted video files remain decodable.</p> <p>When SVC is enabled, both storage and decoding devices must support this feature. In auto mode, devices self-adapt to network conditions to determine whether to extract frames during transmission, ensuring normal video streaming.</p>
Smoothing	<p>Enhances the stability and smoothness of video streams to prevent network congestion and stuttering. Drag the slider or input values to adjust Smoothing. Higher values increase transmission stability at the cost of reduced video clarity.</p>
VCA Info. Display	<p>Determines the display of VCA info. in video stream.</p> <ul style="list-style-type: none"> • Player: Provides more refined display. Parsing of VCA info. requires integration of player from our company. • Video: Standard format. VCA info. can be parsed directly from video streams.

3. Click **Save**.

7.2 Set Time Settings

You can set parameters such as time zone, synchronization, DST, etc.

1. Go to **Pyrometer Settings -> General Settings -> Time Settings**.
2. Set the time parameters.

Table 7-2 Time Configurations

Parameters	Description
Device Time	Device system time. Synchronized via NTP or manual configuration.
Time zone	Sets the time zone for the region where the device is located.
Time Zone Sync Mode	<p>NTP synchronization: To synchronize time using an accurate and reliable source, you can use NTP synchronization.</p> <ol style="list-style-type: none"> 1. Obtain the information of the deployed NTP server. 2. Enter the NTP server address and port. 3. Set the synchronization interval; the device will synchronize time periodically. 4. Click Test to check the connection between the device and the NTP server.
	<p>Manual Sync: You can choose to manually modify the time or synchronize with your computer's time and time zone.</p>
DST	<p>Daylight Saving Time (DST) configuration: If the device is located in a region observing DST, you can configure DST settings to synchronize the device with local time.</p> <ol style="list-style-type: none"> 1. Click Enable. 2. Select Start Time, End Time, DST Bias, and click Save.

3. Click **Save**.

7.3 Modbus Integration

You can set the network or RS-485 parameters of the device using HIKMICRO Studio. The device can be connected to hosts and clients for parameter configuration via Modbus-TCP or Modbus-RTU.

7.3.1 Set Network

The device supports network communication. Once network parameters are set, the device can connect to the host via Modbus-TCP. The host can then query temperature readings from the device and configure device parameters.

1. Go to **Pyrometer Settings -> General Settings -> Network**.
2. Set the network parameters.

Table 7-3 Network Parameters

Parameters	Description
Slave Mode	The default is slave mode. Host servers can read device data or write device parameters.
Register Mode	<ul style="list-style-type: none"> • Read Only: The host can only read the values in the registers. • Read/Write: The host can read the values in the registers or modify the device configuration via Modbus protocol.
Enable Authorized IP	Device access permissions are granted only to IPs added to the list. This authorized access enhances data security.

3. Click **Save**.

 **Note**

To configure device parameters, set the register mode to Read/Write.

7.3.2 Set Device RS-485

The device supports RS-485 communication, enabling remote configuration (e.g., parameters setting and temperature monitoring) via RS-485 serial port connection to the client. Device RS-485 parameters must match client settings.

 **Note**

For more details of serial connection and RS-485 parameter settings in Studio, refer to "3.2 RS-485 Connection".

1. Go to **Pyrometer Settings -> General Settings -> RS-485**.
2. Set the RS-485 parameters of the device.

Table 7-4 Device RS-485 Parameters

RS-485 Parameters	Description
Baud Rate	9600 by default. Within the selected baud rate range, no data loss occurs and real-time data transmission is achieved.
Data Bits	8 by default.
Stop Bit	1 by default.
Parity	Even by default.
Decoder Address	Range: 0~255; default: 1.
Decoder Type	Fixed as Modbus-RTU.

3. Click **Save**.


7.4 Maintenance and Upgrade

You can set device system parameters such as maintenance, upgrades, etc.

1. Go to **Pyrometer Settings -> General Settings -> Maintenance and Upgrade**.
2. Set maintenance and update parameters.

Table 7-5 Maintenance and Upgrade Parameters

Parameters	Description
Restart	Click restart to restart the device.
Restore to Default Settings	All settings except network parameters and user account information will be restored to default. The restoration completes after the device automatically reboots.

Restore to Factory Settings	All functions and parameters will be restored to default settings. The restoration completes after the device automatically reboots. *Use this function with caution.
Export Parameter	Exports device configuration file and obtains its parameters, which can be applied to other devices with identical configurations.
Import Device Parameter	Import device configuration file. Device parameters will be automatically configured upon device reboot.
Local: Upgrade	Upgrade the software version of the device. <ol style="list-style-type: none"> 1. Obtain the correct upgrade file and save it on your computer. 2. Click , and select the upgrade file. 3. Click Upgrade. <p>*Do not power off during the upgrade process. The device will automatically reboot after completion.</p>

3. Click **Save**.

7.5 Security

Functions described in this chapter can ensure access and information security.

7.5.1 Login Management

The device supports unauthorized access lockout. When incorrect passwords are entered consecutively up to the threshold number, the system will automatically lock.

1. Go to **Pyrometer Settings -> General Settings -> Login Management**.

2. Configure login management and click **Enable Illegal Login Lock**.

3. Set Illegal Login Attempts and Locking Duration.

The device will lock automatically when consecutive incorrect password entries exceed the preset threshold. It will automatically unlock after locking duration elapses.

4. Click **Save**.

7.5.2 Authentication Mode

You can set RTSP and WEB authentication to improve access security.

1. Go to **Pyrometer Settings -> General Settings -> Authentication Mode**.
2. Set authentication mode. **Digest** and **Digest/Basic** are supported, and authentication is required when sending RTSP or WEB requests to devices.
3. Click **Save**.

7.6 Device Information

You can view device model, serial number, version information, IP address, and more.

1. Go to **Pyrometer Settings -> General Settings -> Device Information**.
2. View device information. You can set device name and device number for distinguishing purposes.
3. Click **Save**.

8. More Frequently Used Features

Adding a device to HIKMICRO Studio via network/serial port allows you to remotely manage the device and perform more functions.

8.1.1 Searching History Temperature

After saving real-time thermometry data to client database, you can query history temperature based on time, visualize results displayed in the form of temperature curve, and export results.


1. In the **Maintenance and Management** area of the home page, select **System Configuration -> General**.
2. Check **Save Temperature Data** and set storage parameters.

Parameters	Description
Save Data For	The time for keeping the data. Once storage duration expires, the data will be deleted.
Temperature Auto-Save Interval	The temperature data is saved automatically according to the storage interval.

3. Click **Save**.
4. On the home page, select **Search History Temp**. Set searching criteria, and then click **Search** to display temperature report on the right.
5. (Optional) Click **Export** to export temperature data, or click **Export Original Record** to export raw temperature data.



Note

Refer to the User Manual in the client (Start up the client, and click  on the top right corner. Then select **Help -> User Manual** to get detailed instructions for more features.

9. Troubleshooting

9.1 Status Code

Class	Status Code	Event Type
Class F.	F001	Detector failure
	F002	Temperature calibration abnormal
	F003	DAC calibration exception
	F004	Serial port communication exception
	F005	Analog output drive chip exception
	F006	Datastore exception
Class S.	S001	Ambient temperature exceeded upper and lower limits
	S002	Data reset exception
Class M.	M001	Upgrade and maintenance exception
	M002	The lens is dirty
	M003	Signal attenuation filtering
	M004	Attenuation slice abnormality
Class C.	C001	Analog output simulation mode is on

9.2 Troubleshooting

During operation or operation of the device, if special conditions occur, perform self-test troubleshooting in the following directions, if the problem is not resolved properly. Please contact our technical staff.

Special cases	Possible causes	Resolution
No image input	The device is not properly plugged into power.	Check the power supply.
Incorrect temperature measurement results	Incorrect wiring.	Check and confirm wiring.
Incorrect temperature measurement results	The picture is masked.	Clean out obstructions.
Incorrect temperature measurement results	The lens is dirty.	Clean the lens.
Incorrect temperature measurement results	Incorrect emissivity or slope parameter setting.	Check and reset the pyrometer temperature parameters.

10. Regulatory Information



Note

These clauses apply only to the products bearing the corresponding mark or information.

EU Conformity Statement

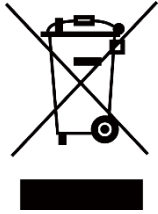


This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Directive 2014/30/EU (EMCD) and Directive 2011/65/EU (RoHS).

Note: The products with the input voltage of within 50 to 1000 VAC or 75 to 1500 VDC comply with Directive 2014/35/EU (LVD), and the rest products comply with Directive 2001/95/EC (GPSD). Please

check the specific power supply information for reference.

Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



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Regulation (EU) 2023/1542(Battery Regulation): This product contains a battery and it is in conformity with the Regulation (EU) 2023/1542. The battery cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), or lead (Pb). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

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