LEO Series
GigE LWIR Temperature
Measurement Camera
User Manual

V2.4.0, Apr. 2024

Preface

Purpose

This Manual is a basic description of LEO series GigE LWIR Temperature Measurement Cameras, which mainly includes the product description, quick installation guide and Simple introduction of SDK(iDatum). This manual may be updated due to product upgrades or other reasons. If you need, please contact the sales engineer for the latest version of this manual.

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Disclaimer

The information and specifications described in this manual are subject to change without notice.

Latest Manual Version

For the latest version of this manual, see the Download Center on our web site at： http://www.visiondatum.com/service/005001.html

Technical Support

For technical support, e-mail： support@visiondatum.com.

Warranty

To ensure that your warranty remains in force, adhere to the following guidelines:

Do not remove the camera's serial number label
If the label is removed and the serial number can't be read from the camera's registers, the warranty is void.

Do not open the camera housing
Do not open the housing. Touching internal components may damage them.

Prevent ingress or insertion of foreign substances into the camera housing
Prevent liquid, flammable, or metallic substances from entering the camera housing. If operated with any foreign substances inside, the camera may fail or cause a fire.

Avoid electromagnetic fields
Do not operate the camera in the vicinity of strong electromagnetic fields. Avoid electrostatic charging.

Clean with care
Avoid cleaning the sensor if possible.

Handle this camera with care
Do not abuse the camera. Avoid striking, shaking, etc. The camera could be damaged by improper handling.

Read the manual
Read the manual carefully before using the camera.

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CHAPTER 1 ## PRODUCT DESCRIPTION

Product Introduction

LEO LWIR temperature measurement camera is a thermal imaging device that uses high-sensitivity VOx uncooled detector and uses GigE interface to transmit data in real time. Supports temperature measurement, region drawing/alarm, multiple pseudo-color modes and other functions, and can display temperature characteristic information by image overlay.It supports remotely acquiring data and setting parameters via client software or SDK.

LEO series industrial cameras compatible with GigE、10GigE、USB3.0、Cameralink and CoaXPress data bus standards, support GenICam、USB3 Vision® and GigE Vision®, Smoothly connect with third-party software, like HALCON and Vision Pro, not need for secondary development. LEO series cameras with excellent cost performance and very suitable for various inspections measurement and high-speed imaging applications. This series cameras won customers high praise because its outstanding performance in cellphone and tablet PC screen inspection, LED automatic packaging, defect inspection, and electronic components manufacturing, wafer positioning and other applications.

With this variety of sensors and interfaces, combined with the extensive features offered, LEO series cameras are fit for a wide range of vision applications.

Product Features

■ Adopts high-sensitivity vanadium oxide uncooled detector with 0.3 MP.

■ Adopts GigE interface and max. transmission distance of 100 meters without relay.

■ Supports multiple temperature measurement functions of point, line and polygon, and the cross cursor highlights the temperature characteristic information;

■ There are two optional temperature measurement ranges, which support single-region and multi-region setting temperature measurement alarms;

■ Compatible with GigE Vision Protocol, GenlCam Standard, and third-party software based on the protocol and standard.

＊ The camera functions may differ by camera models,please refer to actual functions.

Status LED Description

Status LED	Description
Slow Flashing Red (the interval between on and off is 2000 milliseconds)	The camera wiring exception occurs.
Red light is always on	The camera exception occurs.
Blue light is always off	The camera is in idle status.
Fast Flashing Blue (the interval between on and off is 200 milliseconds)	The camera is acquiring images normally.
Slow Flashing blue (the interval between on and off is 1000 milliseconds)	The camera is acquiring images in trigger mode.
Flashing Alternately Red and Blue	The firmware is updating.

Mechanical Dimensions

The dimensions is in millimeters:

The cameras are interfaced to an external circuity via connectors located on the back of the housing.
The Industrial camera rear appearance contains standard RJ45 GigE interface, 12 pin power, I/O input connector and camera working status indicator light.
There are two M2 screw holes on both side of GigE interface, which used to fix cable to reduce the loosening caused by vibration.
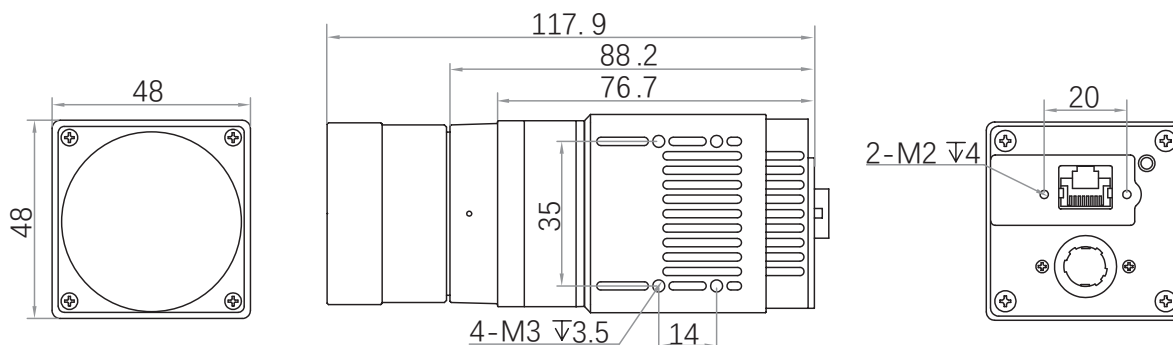
Camera Housing and Base Mounting Hole Size(mm):

Fig. 1-1: Mechanical Dimensions (in mm) of the GigE Cameras housing (The installation uses M2 and M3 screws).

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POWER AND
I/O IENTERFACE DEFINITION

I/O Connection Definition and Assignments

The device has a 6-pin P7 connector as the power and I/O connector that provides power and I/O signals. Read the table below to get its pin definitions.
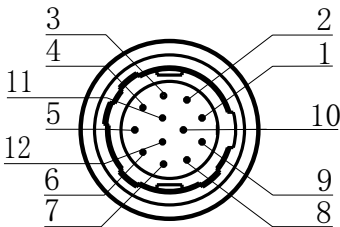
Table 2-1:
Numbering and assignments for 12pin Power and I/O Input Connector:

Color	Pin	Signal	Signal Source	Designation
Black	1	GND	Line 2-	Camera Power Supply Ground
Red	2	DC_PWR	-	DC Camera Power
Brown	3	NC	-	NC
Orange	4	OPT_IN-	Line 0-	-
Yellow	5	OPT_OUT-	Line 1-	Opto-isolated Signal Ground
Green	6	NC	-	NC
Blue	7	NC	-	NC
Purple	8	232_RX	-	RS232 Received Data
Gray	9	232_TX	-	RS232 Transmitted Data
White	10	GPIO2	Line 2+	Can be Configured as Input or Output
Pink	11	OPT_OUT+	Line 1+	Opto-isolated OUT
Light green	12	OPT_IN+	Line 0+	Opto-isolated IN

The wire color of this user manual is the color of Vision Datum. If you use other manufacturers' cable color definitions may be different, random connection may cause the camera to burn out, please connect according to the I/O port type and pin definition or contact our technical staff for advise.

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CHAPTER 3   # INSTALLATION AND SETUP

You should perform the software installation procedure first and the hardware installation procedure second.

Software Installation

■ iDatum Installation

If you use a firewall on your computer, disable the firewall for the network adapter to which your camera is connected.

Close the Firewall

In order to ensure the camera software keep running and image transmission stability, please close the firewall before using the software.

System Requirements

LEO Camera Software Suite for Windows requirements that one of the following operating systems is installed on your computer：

- ■ Windows XP (32 bit)
- ■ Windows 7 (32 bit or 64 bit)
- ■ Windows 10 (32 bit or 64 bit)

Installation Steps

1.You can download the iDatum software（LEO Series Industrial Cameras SDK For xxx）from：

http://www.visiondatum.com/service/005001005.html

2.Double click iDatum installation package to install the client.

3.Follow the instructions on the screen. The installer will guide you through the installation process.

Environment Testing

After successful installation, please connect the camera and turn on iDatum client software to check the result of camera connection and image preview. You can start secondary development base on the SDK when all environment testing is normal.

You should notice follow items when using GigE Camera：
- ■ FrameRate   Whether the frame rate is consistent with the actual set frame rate.
- ■ Errors   If not 0, it means there is a frame skip, it is abnormal.
- ■ Lost Packets   If not 0, it is abnormal.

Hardware Installation

■ Camera Installation

The installation procedures assume that you will be making a peer-to-peer connection between your camera and a computer.

Make sure that the following items are available before starting the installation：

■ LEO GigE LWIR Temperature Measurement camera

■ Applicable power supply or a Gigabit Ethernet Switch

■ The computer with a GigE network adapter installed

■ The computer must be equipped with appropriate operating system

■ Standard Ethernet cable (CAT6 or above).

Steps：

■   Connect the camera to the computer and power
   Direct supply:

   ● Use the 12-pin power and I/O cable to connect the camera to a power adapter.

Network Settings

Before using the camera, you need to configure IP is in the same network segment with the computer. You can modify it in"Local Connection" to ensure network communication is normal.

Local Network Configuration :

● Click "Control Panel"> "Network and Internet"> "Network and Sharing Center"> "Change Adapter Configuration. "Then select corresponding network card to configure it automatically obtain IP address or manually assign it as same network segment address with the camera. Shown as below:

● Open "Advanced" in the properties, set "Jumbo Frame" as its maximum value:9014bytes, both of transmit buffer and receive buffer set as 2048bytes, the Interrupt Throttle Rate set as extremum value. These maximum values mentioned above depend on the specific network card. Shown as below:
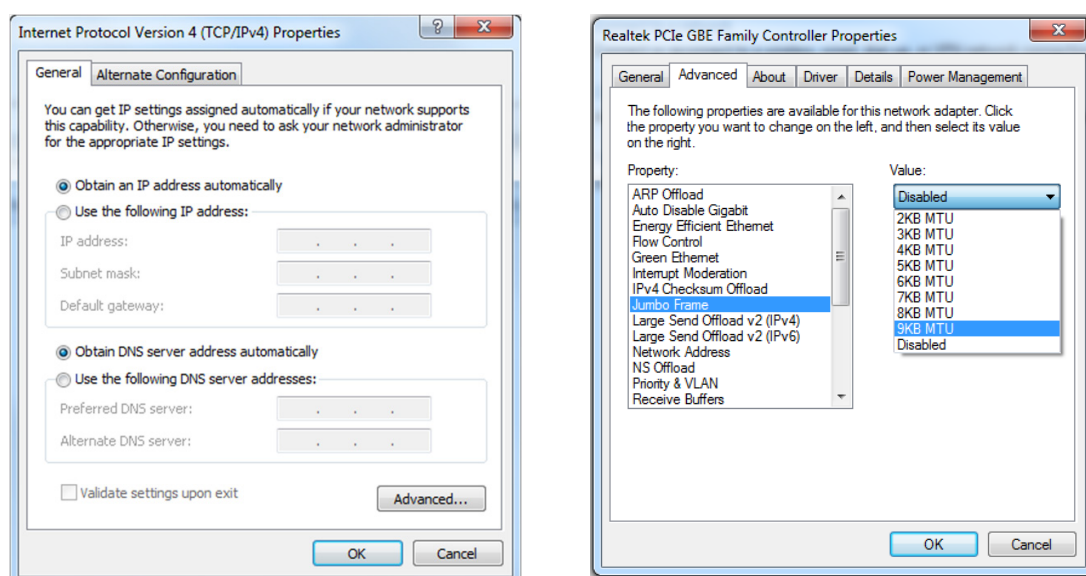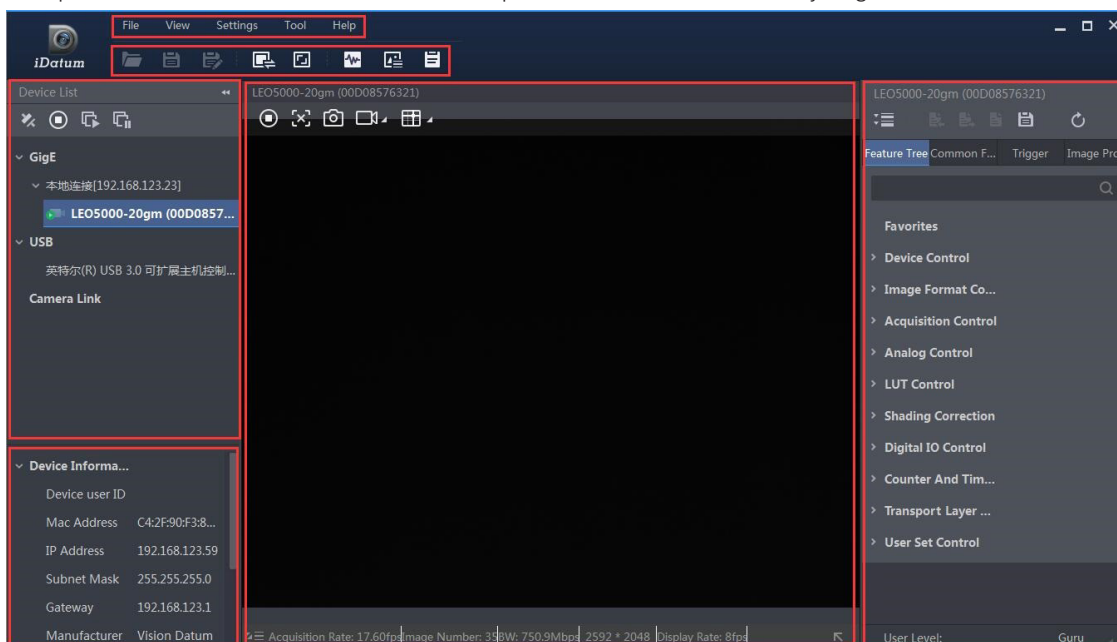
Software Operation

■ iDatum Operation

1、Double-click the iDatum shortcut on the desktop to open up the client software.
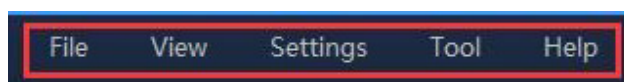
■ Main interface

For specific main window of the client software, please refer to the actual one you got.
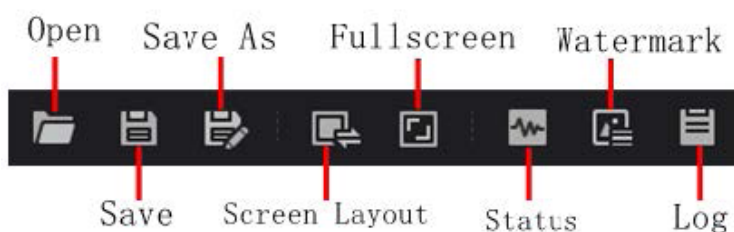

■ Menu Bar

The menu bar for iDatum client provides following functions: File, View, Settings, Tool and Help, as shown in the figure below.
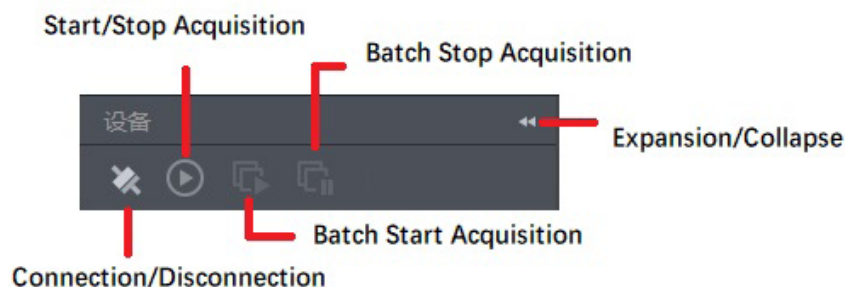

■ Control Toolbar

The control toolbar provides quick operations for the device. the icon meaning is shown in the figure below. The operation buttons in the tool bar can quickly and conveniently edit camera images.

Software Operation

The meaning of shortcut icons in Device List is shown as below.

■ Connection/Disconnection: After you selecting the camera, click "Connect" to connect the camera; click "Disconnect "to disconnect the camera.

■ Start/Stop Acquisition: For current connected camera, click "Start Acquisition "to acquire image data; click "Stop Acquisition "to stop image data acquisition.

■ Batch Start Acquisition: click "Batch Start Acquisition "to start image data acquisition for all currently connected camera by iDatum.

■ Batch Stop Acquisition: click "Batch Stop Acquisition "to stop image data acquisition for all currently connected camera by iDatum.

■ Expansion/Collapse: This function can be used to expand or collapse the Device List and Device Information which list on the left side of iDatum, and the default state is expansion. In the"Collapse"state，the iDatum left side only display the searched cameras.

2、Click in device list 🔁 to search the device.

3、Select a device to be connected.

4、Right click the device, and click Modify IP.

5、Set the IP address of the device in the same network segment with the PC

6、Click OK.

Click ">" in the camera's feature panel to unfold the specific camera parameters, and set them according to actual demands. Please see the table below for the introduction of each attribute classification.

Attribute	Description
Device Control	You can view the device's information, edit its name and reset it.
Image Format Control	You can view and set the device's resolution, pixel format, etc.
Acquisition Control	You can view and set the device's acquisition mode, frame rate, trigger mode, etc.
Infrared Control	You can set the pseudo-color mode of the image, gamma, brightness, sharpness, perform various correction functions on the image, etc.
Infrared Arithmetic Control	You can set configuration parameters for temperature measurement (such as external optical transmittance, temperature measurement range, target distance, etc.)
Temperature Control	You can set the temperature rule control, single-area alarm control, multi-area alarm control and OSD overlay function, provide the execution parameters for loading the corresponding configurations, etc. This attribute allows you to set the temperature rule control, single-area alarm control, multi-area alarm control and OSD overlay function.
Temperature Region Rule Control	You can draw points, polygons, line and other temperature measurement rules and configure corresponding temperature measurement parameters
Temperature Region Alarm Rule Control	You can use it to set corresponding alarm conditions and detect alarm events in corresponding regions according to the drawn temperature measurement rules.
Multi Temperature Region Alarm Rule Control	You can use it to set the corresponding alarm conditions according to the drawn temperature measurement rules, and detect the temperature difference alarm events between regions
Over Screen Display Control	You can use to display the set temperature measurement rules, maximum temperature, minimum temperature and other image overlay functions
File Access Control	You can view and set the device's file access control related parameters.
Event Control	You can view and set the device's event control related parameters to let the device generate an event and transmit a related event message to the computer.
Chunk Data Control	You can view and set the device's chunk data control related parameters to generate supplementary image data and append that data to every image that you acquire.
Digital IO Control	You can set the different input and output signals.
Transport Layer Control	You can view and set parameters of the device's transport layer.
User Set Control	You can save or load the device's parameters.

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IMAGE ACQUISITION

Trigger Mode

The camera has 2 types of trigger mode, including internal trigger mode and external trigger mode.

Internal trigger mode(acquisition modes), including SingleFrame mode and Continuous mode;external trigger mode, including software trigger, hardware trigger.

Trigger Mode	Parameter	Parameter Value	Principle
Internal trigger mode	Acquisition Control > Trigger Mode	Off	The camera acquires images via its internal signals.
External trigger mode		On	The camera acquires images via external signals. These signals can be software signal and hardware signal, including software trigger, hardware trigger, counter trigger, etc..

■ Internal Trigger Mode
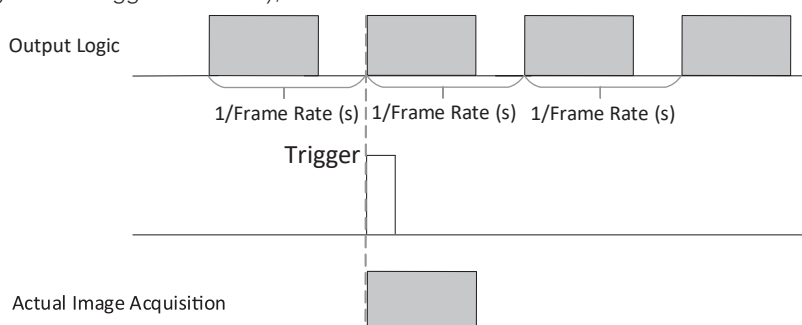
Their principle and parameter setting are shown below.

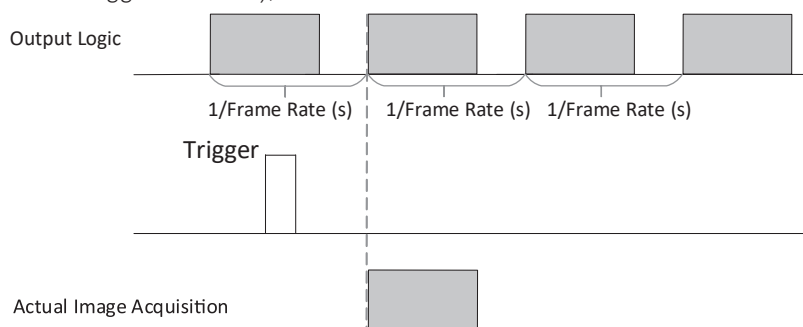| Internal trigger mode	Parameter	Parameter Value	Principle
SingleFrame mode	Acquisition Control > Acquisition Mode	SingleFrame	When camera starts image acquisition, it acquires one image only, and then stops.
Continuous mode		Continuous	When camera starts image acquisition, it acquires images continuously. Real-time frame rate decides the acquisition frame number per second. You can stop camera image acquisition manually.
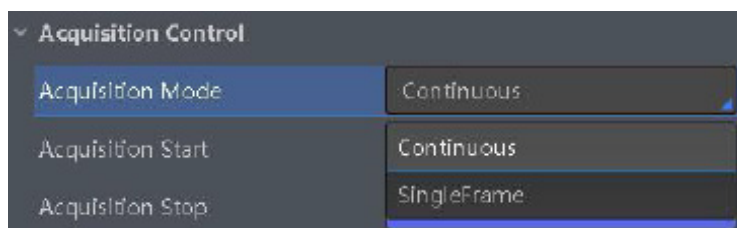
■ External Trigger Mode

In the external trigger mode, you can select different trigger sources to trigger the device to acquire images, and the device outputs images at a fixed period 1/frame rate (s).

If the device receives the trigger signal at the beginning of outputting each frame of image, it will output the current frame of image,(uses the rising edge as the trigger activation), as shown below:

If the device receives the trigger signal during the output of each frame of image, the device will acquire images at the next frame,(uses the rising edge as the trigger activation),   as shown below:

Output Logic

1/Frame Rate (s)   1/Frame Rate (s)   1/Frame Rate (s)

Trigger

Actual Image Acquisition

■ External Trigger Source

There are 3 types of external trigger sources, including software trigger, hardware trigger and Free Trigger. Their principle and parameter setting are shown below.

| External trigger mode	Parameter	Parameter Value	Principle
Software Trigger	Acquisition Control >Trigger Source	Software	The software sends trigger signal to the device via GigE interface to acquire images.
Hardware Trigger		Line 0 Line 2	External device connects to the device via I/O connector. External device sends trigger signal to the device to acquire images.
Free Trigger		Anyway	The device can receive software trigger and hardware trigger to acquire images.

> ℹ These four external trigger sources are valid only when the Trigger Mode is On.

■ **Software Trigger**

For the camera support software trigger mode, when user set software trigger, the client software can send commands to camera to acquires and transfer images via Gigabit Ethernet.

1.Click Acquisition Control > Trigger Mode, and select On as Trigger Mode.

2.Select Software as Trigger Source, and click Execute in Trigger Software to send trigger commands.

Trigger Mode	On
Trigger Software	Execute
Trigger Source	Software
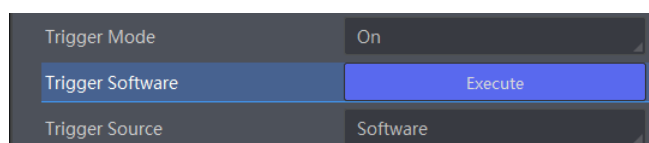
■ **Hardware Trigger**

If set "Hardware" as "Trigger Source" can switched to hardware external trigger mode.

The camera has 1 Opto-isolated input (Line 0), and 1 bi-directional I/O (Line 2) that can be configured as input signal,

The setting of Line 2 as input signal is as shown below:

1.Click Digital IO Control.

2.Select Line 2 as Line Selector, and Input as Line Mode to set line 2 as input signal.

∨ **Digital IO Control**	
Line Selector	Line 2
Line Mode	Input
Line Status	Input
Line Status All	Strobe
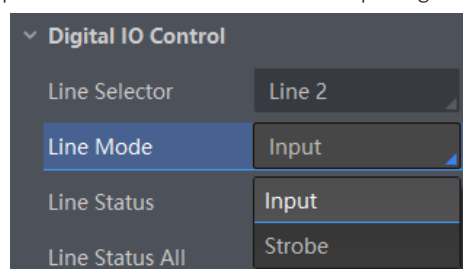
Trigger Mode

3.Click Acquisition Control, select On as Trigger Mode, select Line 0 or Line 2 as Trigger Source as shown in the figure below. The command to trigger the photo is given to the camera by the external device.

Trigger Mode	On
Trigger Source	Line 0
Trigger Activation	Rising Edge
Trigger Delay(us)	0.00
Trigger Cache En...	

> ℹ️ For details about the electrical characteristics and wiring of the IO interface, please refer to Chapter I/O Electrical Characteristics and Wiring.

■ Free Trigger

In free trigger mode, the camera can receive soft trigger signals and hardware trigger signals.

When Anyway is selected for Trigger Source, the camera can be controlled by sending soft trigger and hardware trigger signals to acquire images, and the related parameters are shown as below.

Trigger Source	Anyway
Trigger Activation	Rising Edge
Trigger Delay(us)	0.00

■ Trigger Related Parameters

In external trigger mode, you can set three related parameters, including acquisition burst frame count, trigger activation, trigger delay, trigger cache, and trigger debouncer. Different trigger sources can set various trigger parameters, and their relation is shown below.

Trigger Source / Trigger Parameter	Software Trigger	Hardware Trigger	Anyway
Trigger Delay	√	√	√
Trigger Cache Enable	√	√	√
Trigger Activation	×	√	√
Trigger Debouncer	×	√	×
Burst Frame Count	√	√	√

Trigger Delay

The trigger delay function allows the device to add a delay between the receipt of trigger signal and the moment the trigger becomes active. Go to Acquisition Control → Trigger Delay, and enter Trigger Delay, and the unit is µs.
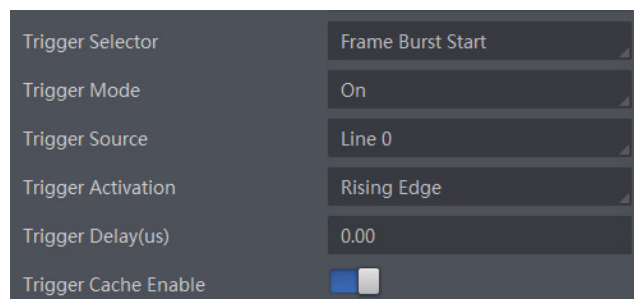
Trigger Software	Execute
Trigger Source	Software
Trigger Delay(ms)	0
Trigger Cache Enable	

> ℹ️ The maximum value of the Trigger Delay parameter must not exceed 16000 ms.
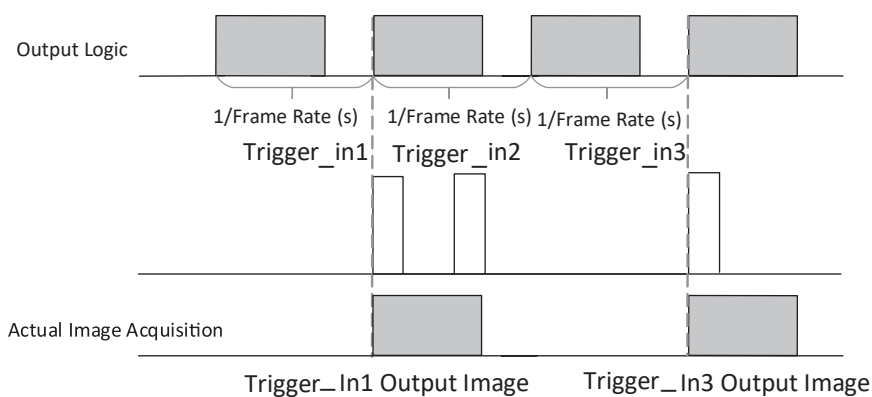
Trigger Mode

Trigger Cache

The trigger cache function allows the device to save and process new signal during trigger stage, and the device can save and process three trigger signals at most. Go to Acquisition Control → Trigger Cache Enable, and enable Trigger Cache Enable.

Trigger Selector	Frame Burst Start
Trigger Mode	On
Trigger Source	Line 0
Trigger Activation	Rising Edge
Trigger Delay(us)	0.00
Trigger Cache Enable	

For example, if the device receives the 2nd trigger signal when it is processing the 1st trigger signal, and the result will be different depending on whether Trigger Cache Enable is enabled or not.

The 2nd trigger signal will be filtered without processing if Trigger Cache Enable is disabled.

The 2nd trigger signal will be saved if Trigger Cache Enable is enabled.
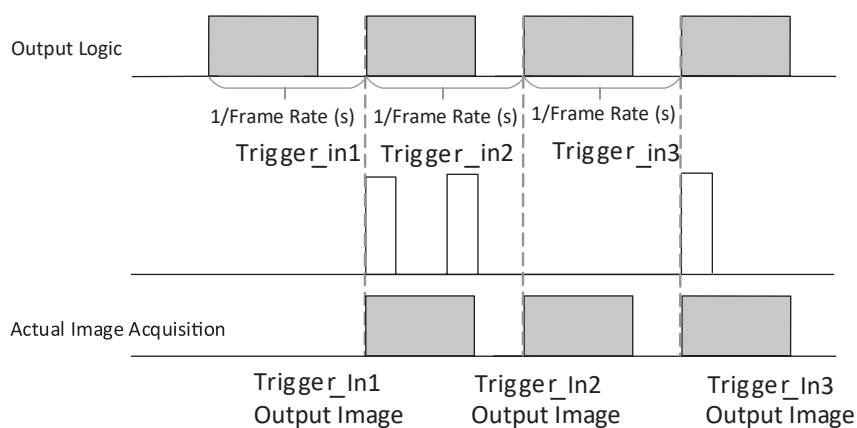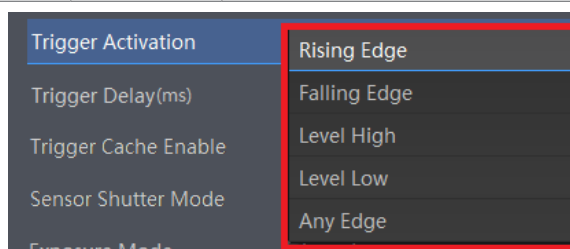
Trigger Mode

Trigger Activation

The camera supports trigger acquisition in the rising edge, falling edge, level high, or level low of the external signal.

The principle and parameter of trigger activation are shown below.

> ℹ️ When "Anyway" is selected for external trigger mode, only rising edge, falling edge and any edge are supported, please refer to the actual interface.

| Trigger Activation	Parameter	Parameter Value	Principle
Rising Edge	Acquisition Control > Trigger Activation	Rising Edge	It means that when the level signal sent by external device is in rising edge, the device receives trigger signal and starts to acquire images.
Falling Edge		Falling Edge	It means that when the level signal sent by external device is in falling edge, the device receives trigger signal and starts to acquire images.
Any Edge		Any Edge	It means that when the level signal sent by external device is in rising edge,falling edge, level high or level low, the device receives trigger signal and starts to acquire images.
Level High		Level High	The level high of the trigger signal is valid. As long as the trigger signal is in level high, the device is in image acquisition status.
Level Low		Level Low	The level low of the trigger signal is valid. As long as the trigger signal is in level low, the device is in image acquisition status.

> ℹ️ Different models and firmware versions of devices have different Trigger Activations that can be selected in different trigger modes.

Acquisition Burst Frame Count

In external trigger mode, you can set acquisition burst frame count. Go to Acquisition Control → Acquisition Burst Frame Count, and enter Acquisition Burst Frame Count according to actual demands.


If Acquisition Burst Frame Count is 1, the device is in single frame trigger mode. If Acquisition Burst Frame Count is larger than 1, the device is in multi-frame trigger mode. If Acquisition Burst Frame Count is n, when input 1 trigger signal to the device, the device stops acquiring images after exposing n times and outputting n frame images.
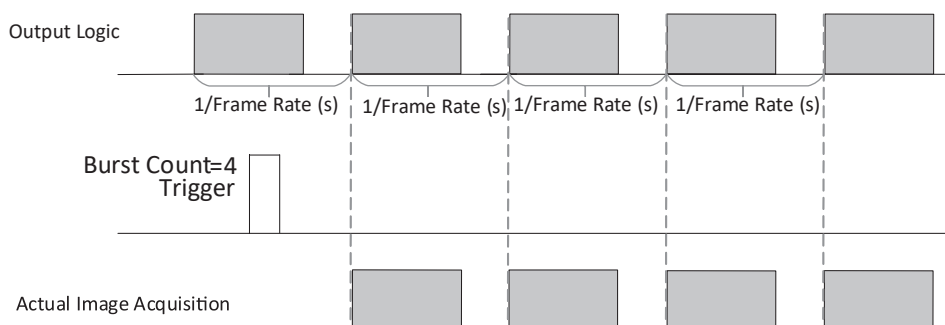
Trigger Mode

Trigger Debouncer

The trigger debouncer function allows the device to filter out unwanted short external trigger signal that is input to the device. Go to Digital IO Control → Line Debouncer Time, and enter Line Debouncer Time according to actual demands. The range of Line Debouncer Time is from 0 µs to 1000000 µs.
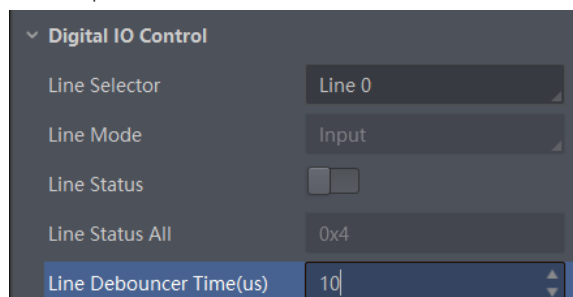
If the Line Debouncer Time you set is greater than the time of trigger signal, this trigger signal will be ignored.
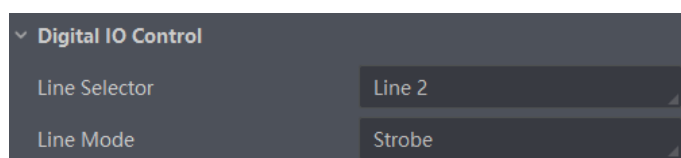
5
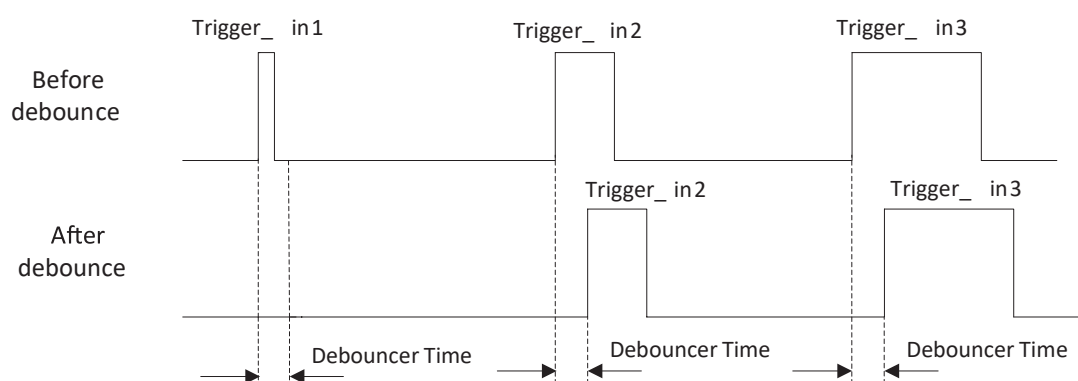
CHAPTER 5   I/O OUTPUT

Select Output Signal

The device has one opto-isolated output (Line 1), and one bi-directional I/O (Line 2) that can be configured as output signal. The steps for configuring Line 2 as output signal as follows.

Steps

1. Go to Digital IO Control and select Line 2 as Line Selector.

2. Select Strobe as Line Mode.

ℹ️ For details about the electrical characteristics and wiring of the IO interface, please refer to Chapter I/O Electrical Characteristics and Wiring.
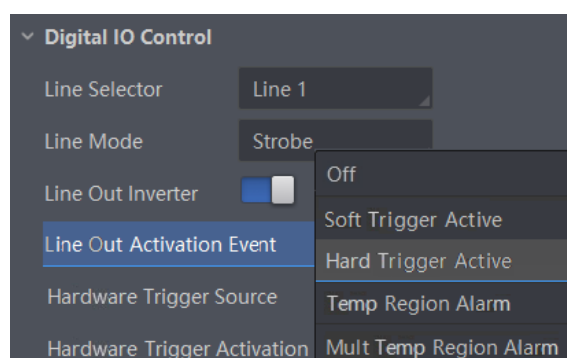
Set Output Signal

The output signal of the device is switch signal that can be used to control external devices such as light source, PLC, etc. There are two ways to set output signal, including line inverter and strobe signal.

Steps

1. Select the trigger output signal in the Line Selector, Line 1/2.

2. (Optional) If you need to output a signal opposite to the actual output, turn on the Line Out Inverter.
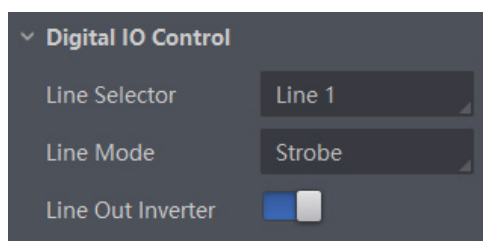
3. In the Line Out Activation Event parameter drop-down, select the corresponding event source according to the actual use requirements, and set the corresponding event source trigger parameters. The description of the event source and its parameters is shown in the following table.

Set Output Signal

The specific description of each event source.

Event Source	Type	Description
Off	Close Event Source	Close the trigger event source
Soft Trigger Active	Software Trigger Source	Soft trigger event source commands can be sent manually Click "Execute" at the Line Trigger Software parameter to output the signal to an external device
Hard Trigger Active	Hardware Trigger Source	Hardware Trigger Source and Hardware Trigger Activation can be set to output signals to external devices ■ Hardware trigger signal source, namely Hardware Trigger Source, can choose Line 0/2 or Line 0 ■ Hardware trigger response method, namely Hardware Trigger Activation, optional Rising Edge and Falling Edge
Temperature Region Alarm	Single-region alarm trigger source	When the alarm is triggered, a high level indicates that an alarm is initiated, and a low level indicates that there is no alarm event. The alarm event source command can be sent according to the drawn temperature measurement region and the single-region alarm trigger response method, and the output signal can be sent to an external device ■ Select the drawn temperature measurement rule at the Temperature Region Alarm Source parameter ■ The single-region alarm trigger response method is Temperature Region Alarm Activation, which can choose Rising Edge and Falling Edge. That is, the rising edge is valid from the normal state to the alarm state; the falling edge is valid from the alarm state to the normal state.
Multi Temperature Region Alarm	Multi-region temperature difference alarm trigger source	When the alarm is triggered, a high level indicates that an alarm is initiated, and a low level indicates that there is no alarm event. The alarm event source command can be sent according to the set multi-region temperature difference alarm rules and the multi-region temperature difference alarm trigger response method, and the output signal can be sent to the external device ■ In the Multi Temperature Region Alarm Trigger Activation parameter, select the set multi-region temperature difference alarm rule ■ Multi Temperature Region Alarm Trigger Activation can choose Rising Edge and Falling Edge, that is, the rising edge is valid from the normal state to the alarm state; the falling edge is valid from the alarm state to the normal state

ⓘ Temperature Region Alarm and Multi Temperature Region Alarm event sources can only be displayed when there are one or more temperature measurement rules. For details on configuring temperature measurement rules, see the section on temperature measurement rules.

4. Turn on the Strobe Enable parameter to enable the configured trigger output signal.
At the same time, the trigger output signal can also set the output delay and duration, which can be set according to actual needs.

ⓘ The Strobe Enable parameter needs to be turned off when setting the line out delay and duration.

Set Output Signal

Line Out Delay Time

The camera can set an output delay for the output signal to meet the application requirements of external devices that require a delayed response in some scenarios. The delay time of the signal output can be set by the Line Out Delay Time parameter, and the unit is ms. The relevant parameters are shown in the figure below.
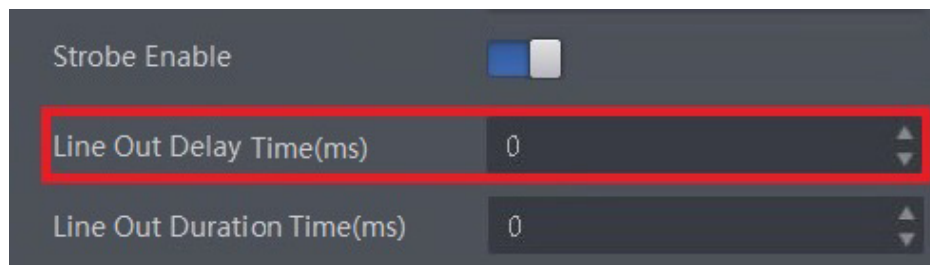
Line Out Duration Time

The camera can set the duration when the output signal is triggered, which can be set through the Line Out Duration Time parameter, the unit is ms, as shown in the figure below.

6
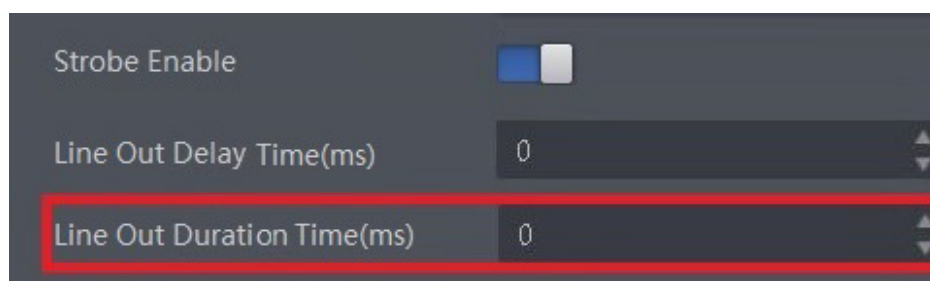
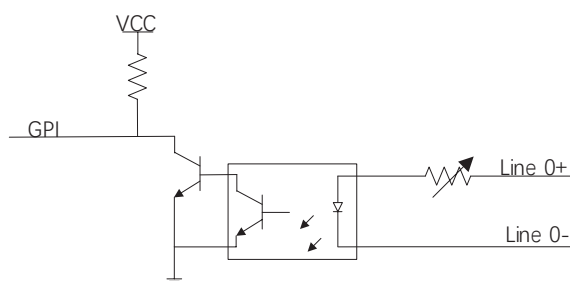## CHAPTER 6

I/O ELECTRICAL FEATURE AND WIRING
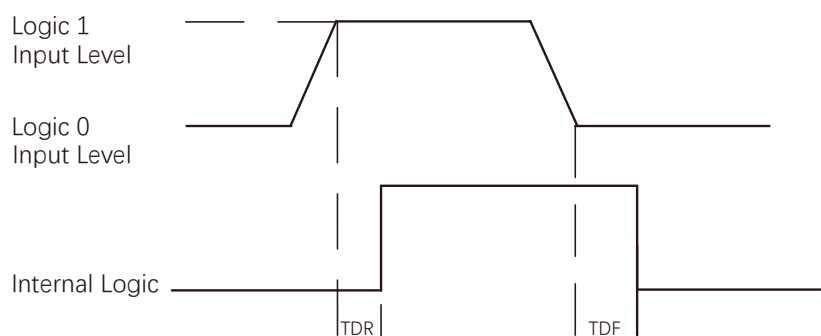
I/O Electrical Feature

■ Line 0 Opto-isolated Input Circuit

The device's Line 0 is opto-isolated input signal, and its internal circuit is as follows.

The maximum input current of Line 0 is 25 mA.

Input Logic Level:

Input Electrical Feature:

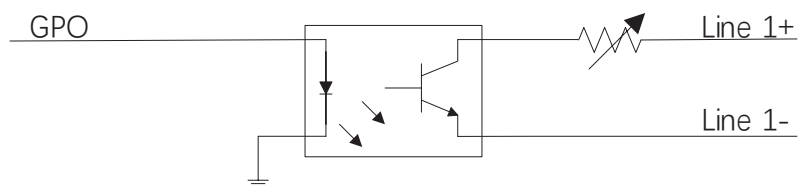| Parameter Name	Parameter Symbol	VALUE
Input Logic Level Low	VL	0 ~ 1 VDC
Input Logic Level High	VH	1.5 ~ 24 VDC
Input Rising Delay	TDR	1.8 ~ 4.6 µs
Input Falling Delay	TDF	16.8 ~ 22 µs

> ⓘ ● Make sure that the input voltage is not from 1 VDC to 1.5 VDC as the electric status between these two values are not stable.
> ● The breakdown voltage is 30 VDC. Keep voltage stable.
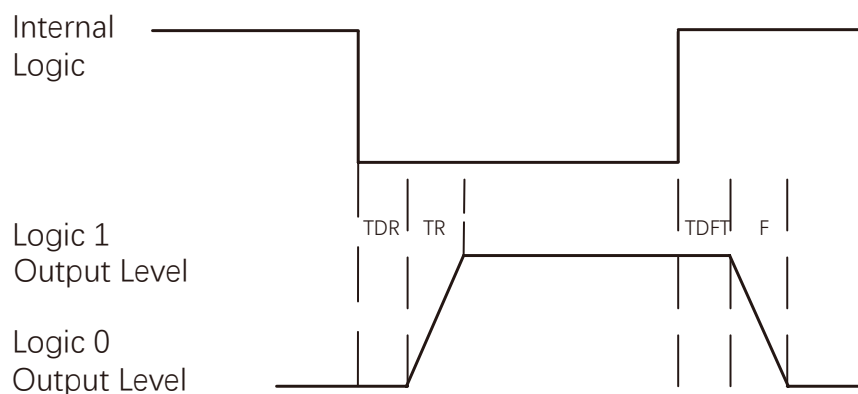
I/O Electrical Feature

■ Line 1 Opto-isolated Output Circuit

The device's Line 1 is opto-isolated output signal, and its internal circuit is as follows.
The maximum output current of Line 1 is 25 mA.

Output Logic Level:

Opto-isolated output electric feature is shown in below (when the external voltage is 3.3 VDC and the external resistance is 1 KΩ).

| Parameter Name	Parameter Symbol	Value
Output Logic Level Low	VL	575 mV
Output Logic Level High	VH	3.3 V
Output Rising Time	TR	8.4 µs
Output Falling Time	TF	1.9 µs
Output Rising Delay	TDR	15 ~ 60 µs
Output Falling Delay	TDF	3 ~ 6 µs

With different external voltage and resistance, the corresponding current and the parameter of output logic level low are shown below.

External Voltage	External Resistance	VL	Output Current
3.3 V	1 KΩ	575 mV	2.7 mA
5 V	1 KΩ	840 mV	4.1 mA
12 V	2.4 KΩ	915 mV	4.6 mA
24 V	4.7 KΩ	975 mV	4.9 mA

I/O Electrical Feature

■ Line 2 Bi-Directional Signal

The device has one bi-directional non-isolated I/O signal (Line 2), and you can set it as input signal or output signal according to demands. Its internal circuit is as follows.
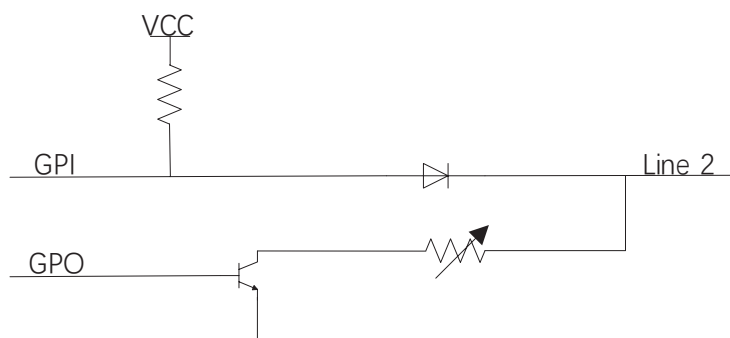
Configured as Input Signal

With the condition of 100 Ω resistance and 5 VDC voltage, the logic level and electrical feature of configuring Line 2 as input signal are shown below.

Input Logic Level:
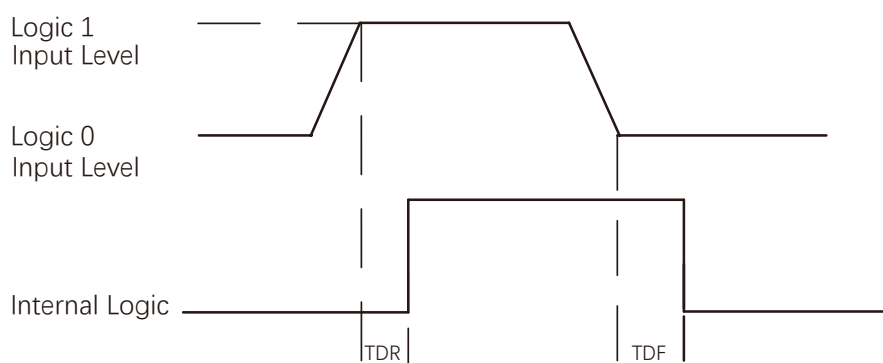
Electrical Feature of Line 2 Input:

Parameter Name	Parameter Symbol	Value
Input Logic Level Low	VL	0 ~ 0.3 VDC
Input Logic Level High	VH	1.5 ~ 24 VDC
Input Rising Time	TDR	< 1 μs
Input Falling Time	TDF	< 1 μs

> ℹ️ ■ Make sure that the input voltage is not from 0.5 VDC to 1.5 VDC as the electric status between these two values are not stable.
> ■ The breakdown voltage is 30 VDC. Keep voltage stable.
> ■ To prevent damage to the GPIO pin, please connect GND first and then input voltage in Line 2.
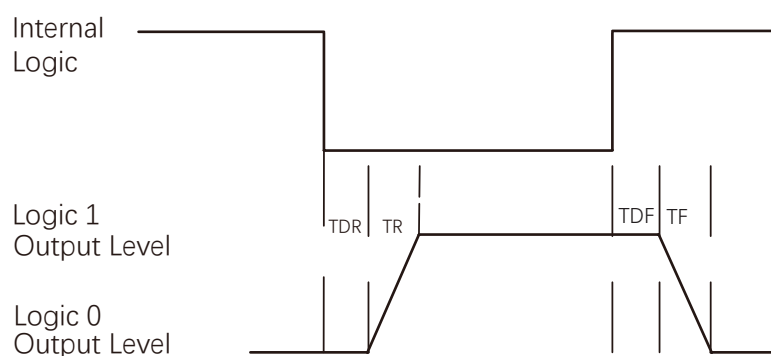
I/O Electrical Feature

Configured as Output Signal

The maximum current is 25 mA and the output impedance is 40 Ω.

The relation among external voltage, resistance and the output level low is shown below.

External Voltage	External Resistance	VL(GPIO2)
3.3 V	1 KΩ	160 mV
5 V	1 KΩ	220 mV
12 V	1 KΩ	460 mV
24 V	1 KΩ	860 mV
30 V	1 KΩ	970 mV

When the voltage of external resistance (1 KΩ) is pulled up to 5 VDC, the logic level and electrical feature of configuring Line 2 as output are shown below.

Output Logic Level:

Electrical Feature of Line 2 Output:

| Parameter Name	Parameter Symbol	Value
Output Logic Level Low	VL	220 mV
Output Logic Level High	VH	4.75 V
Output Rising Time	TR	0.06 μs
Output Falling Time	TF	0.016 μs
Output Rising Delay	TDR	0 ~ 4 μs
Output Falling Delay	TDF	< 1 μs

I/O Wiring

Here we take type with LWIR camera as an example to introduce I/O wiring. Other cameras can be analogized according to the cable definition in the wiring diagram, combined with the power supply and I/O interface definition chapter.
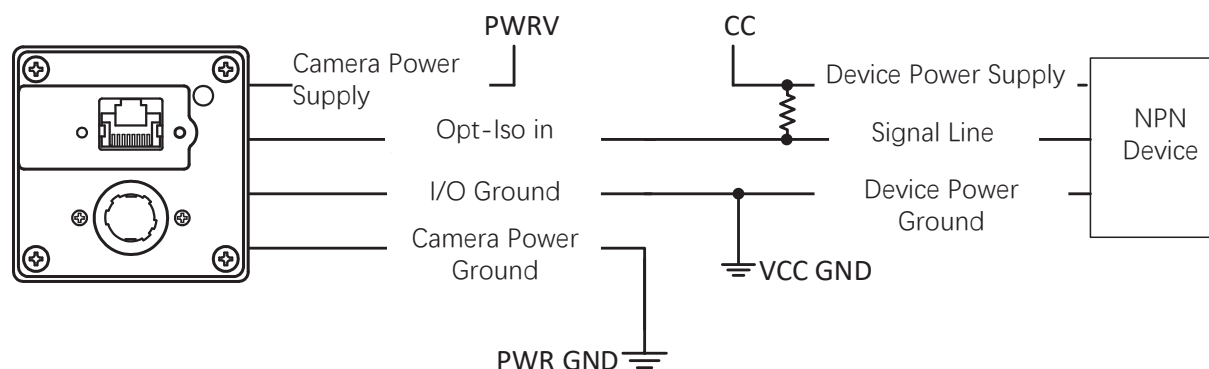
■ Line 0 Wiring

The input signal wiring is shown below when the device uses Line 0 as trigger source in external trigger mode.

Input Signal Connects to PNP Device
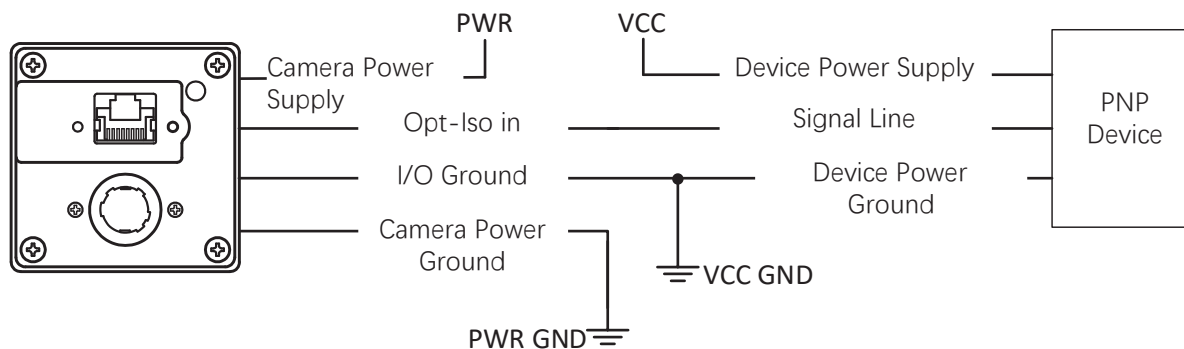
Input Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

Input Signal Connects to Switch
If the VCC of switch is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ resistor to protect circuit.

I/O Wiring

■ Line 1 Wiring

The output signal wiring is shown below when the device uses Line 1 as output signal.
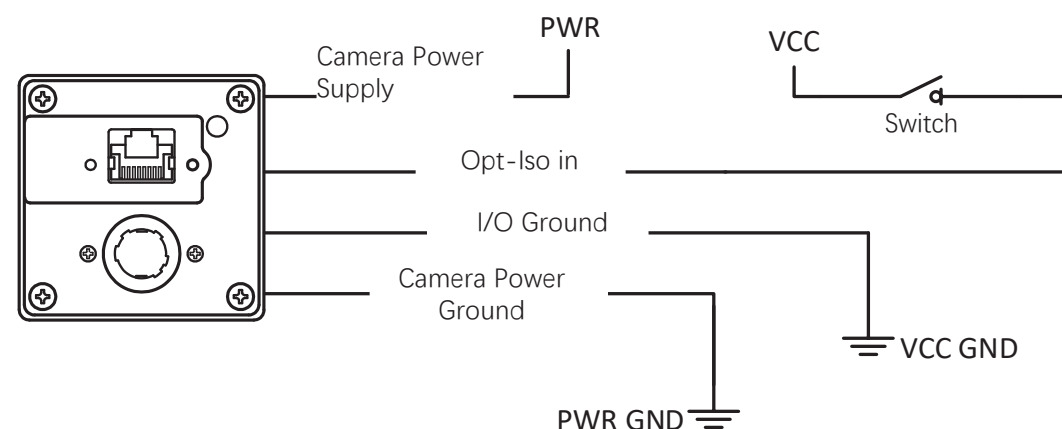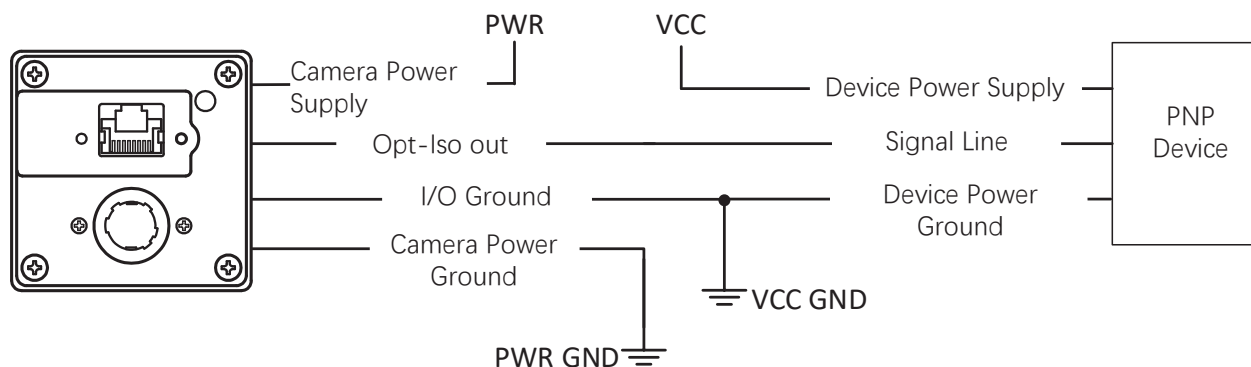
Output Signal Connects to PNP Device

Output Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

I/O Wiring

◼ Line 2 Bi-Directional Signal Wiring

The device's Line 2 can be used as input signal and output signal.

Line2 Configured as Input Signal

The input signal wiring is shown below when the device's Line 2 is configured as input signal.

Input Signal Connects to PNP Device
It is recommended to use 330 Ω pull-down resistor.
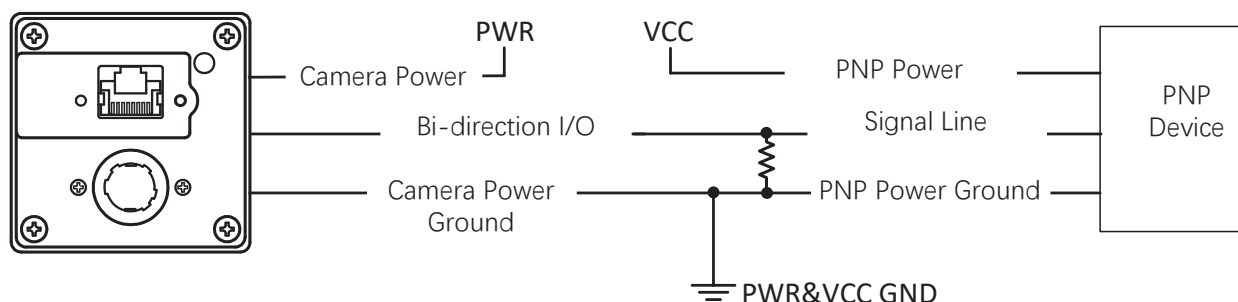
Input Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

Input Signal Connects to Switch
The switch value can provide low electrical level to trigger line 2.

I/O Wiring

Line2 Configured as Output Signal

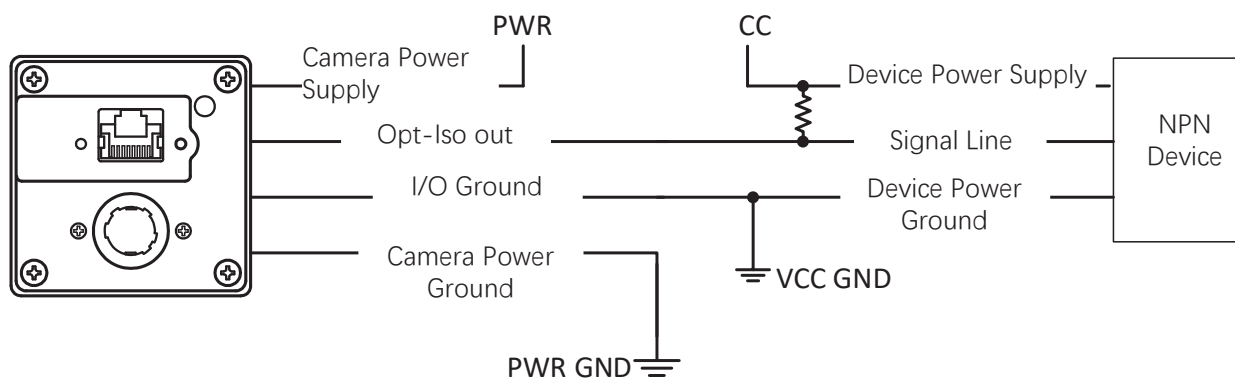The output signal wiring is shown below when the device's Line 2 is configured as output signal.

Output Signal Connects to PNP Device
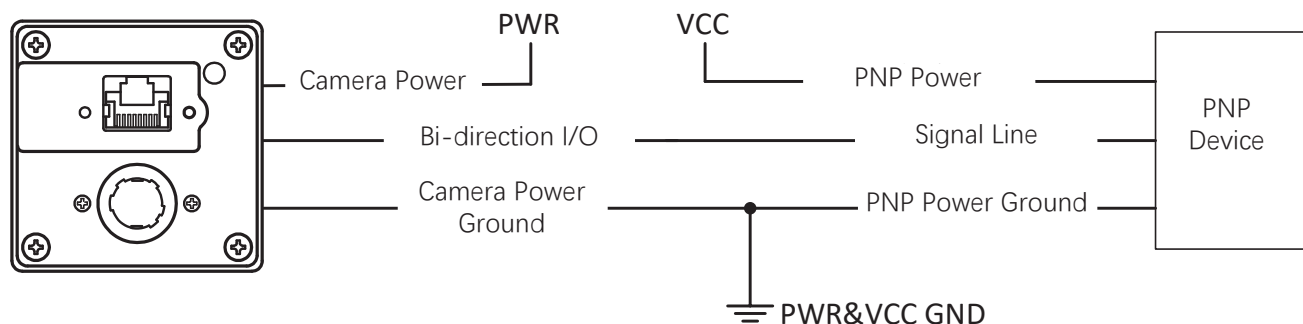
Output Signal Connects to NPN Device
_ If the VCC of NPN device is 24 VDC, it is recommended to use 1 KΩ to 4.7 KΩ pull-up resistor.
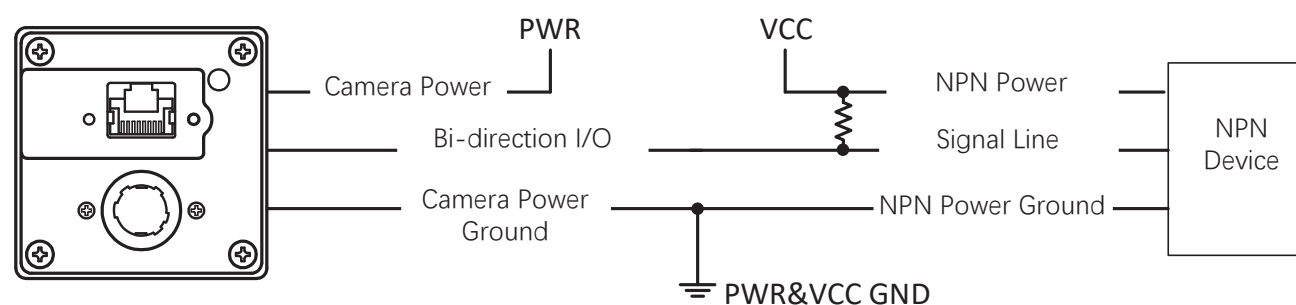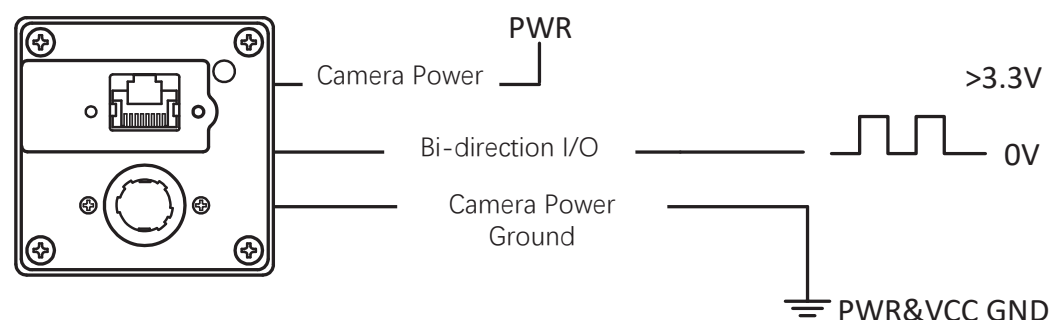_ If the VCC of NPN device is 12 VDC, it is recommended to use 1 KΩ pull-up resistor.

7
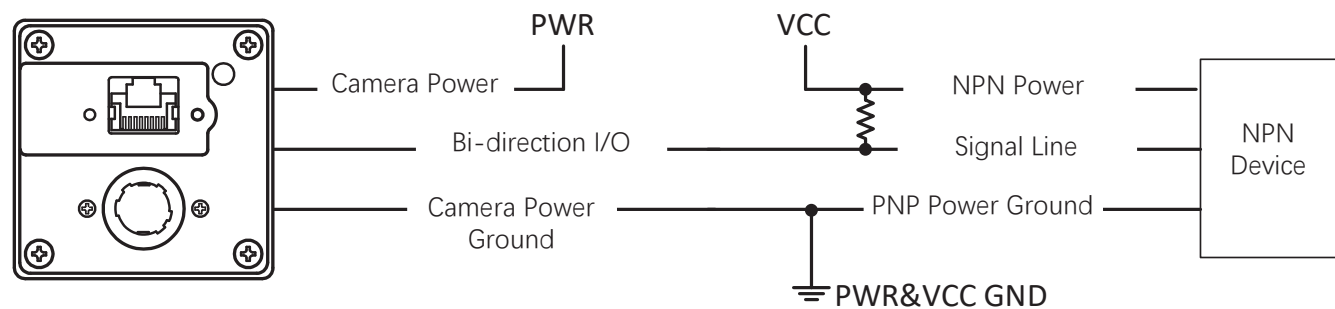
CHAPTER 7   # IMAGE PARAMETER

Palettes Mode

The palettes mode improves the recognizability of the image content in some occasions by overlaying grayscale value of images collected by the device.
The palettes mode has 14 types, including White Hot, Black Hot, Fusion 1, etc. Go to Infrared Control → Palettes Mode, and set Palettes Mode according to actual demands.
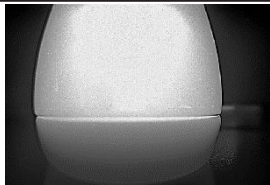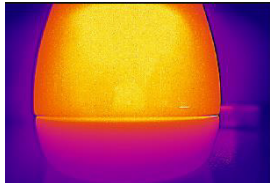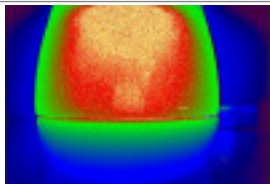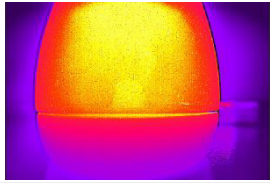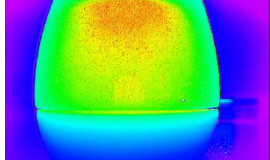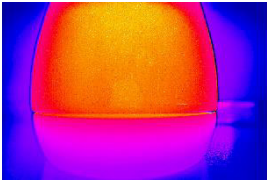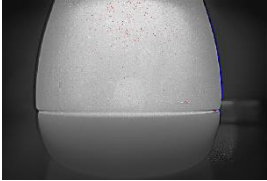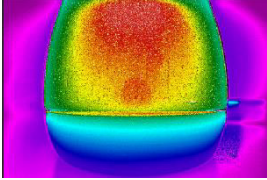
ℹ	The grayscale value of the image captured by the device is related to the acquisition distance from the device to the object. Different grayscale values will present different pseudo-color images. Please refer to the actual display for specific pseudo-color images.

Palettes Mode

Here we take 100 ° C hot water as the target object to introduce different palettes modes and pseudo-color images.

No.	Palettes Mode	Pseudo-Color Images
1	White Hot , The default palettes mode of the device is White Hot.	
2	Black Hot	
3	Fusion 1	
4	Rainbow	
5	Fusion 2	
6	Ironbow 1	
7	Ironbow 2	
8	Sepia	
9	Color 1	

Palettes Mode

No.	Palettes Mode	Pseudo-Color Images
10	Color 2	
11	Ice Fire	
12	Rain	
13	Green Hot	
14	Red Hot	

Gamma

The camera supports Gamma correction function. Generally, the output of the camera's sensor is linear with the photons that are illuminated on the photosensitive surface of the sensor. Gamma correction provides a non-linear mapping mechanism as shown below. Can be set under the Infrared Control property.

i	Gamma is disabled by default.

Gamma Curve
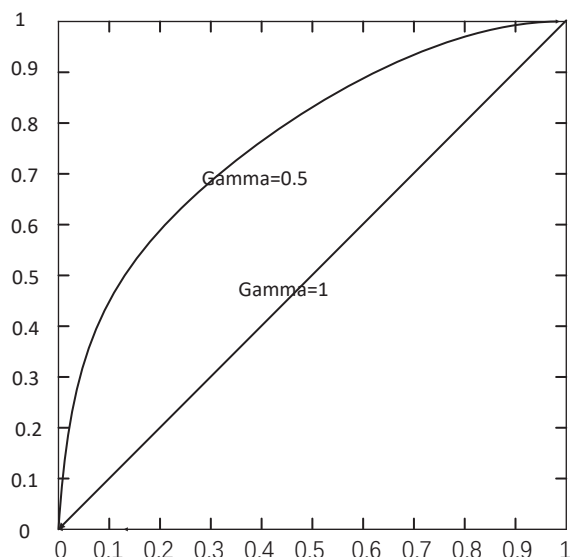
Steps:
1.Enable Gamma Enable.
2.Enter Gamma according to actual demands, and its range is from 0 to 1.
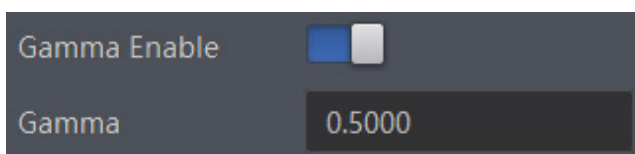
Brightness

The camera can adjust the brightness of the preview image. the higher the brightness value, the brighter the image will be, which can be set under the Infrared Control property as shown in the image below.
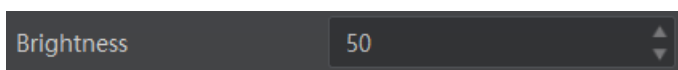
Sharpness

The camera supports sharpness function that can adjust the sharpness level of the image edge.Can be set under the Infrared Control property.

i	This function is disabled by default.

Steps:
1. Enable Sharpness Enable.
2. Enter the value to be set in the Sharpness parameter, the parameter range is 1 ~ 100, as shown in the figure below.
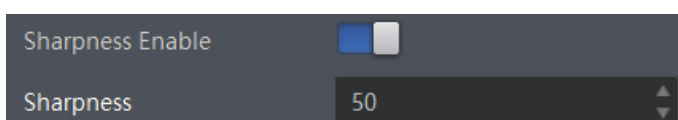
Noise Reduction

Noise Reduction effectively removes noise from the image to improve image quality and clarity and can be set under the Infrared Control property.
Enable the Noise Reduction Enable parameter to perform automatic noise reduction on the inspection screen.

降噪前   降噪后
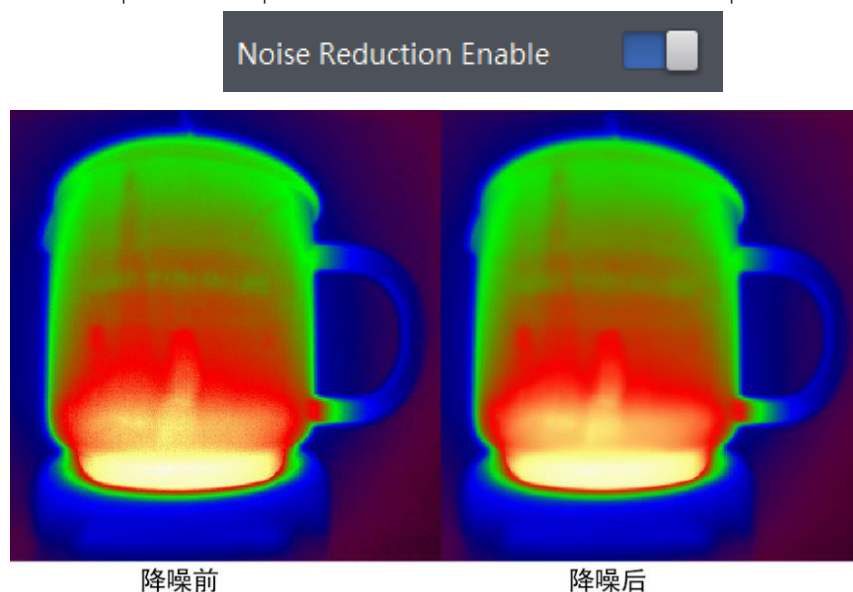
Resolution and ROI

The camera displays the image with max. resolution by default. Click Image Format Control, and view Width Max and Height Max.
Width Max stands for the max. pixels per inch in width direction and Height Max stands for the max. pixels per inch in height direction.
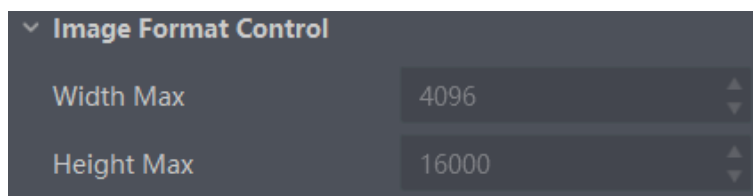
If you are only interested in a certain region of the image, you can set a Region of Interest (ROI) for the camera. Setting Region of Interest can reduce the bandwidth of the image being transmitted. Thus increasing the frame rate to some extent.

> ⓘ   The camera currently supports 1 ROI only, that is, there is Region 0 for Region Selector parameter only.

Click Image Format Control > Region Selector, and enter Width, Height, Offset X, and Offset Y.

- ■ Width：it stands for horizontal resolution in ROI area.
- ■ Height：it stands for vertical resolution in ROI area.
- ■ Offset X：it refers to the horizontal coordinate of the upper left corner of the ROI.
- ■ Offset Y：it refers to the vertical coordinate of the upper left corner of the ROI.
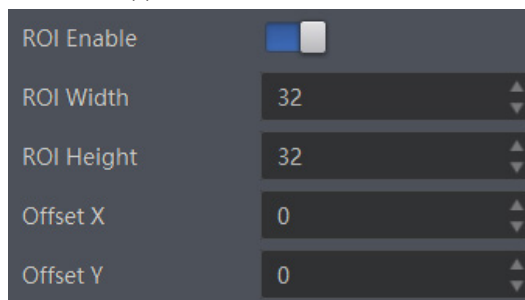
> ⓘ   The Width value plus Offset X value should not be larger than Width Max parameter value, Height value plus Offset Y value should not be larger than Height Max parameter value.

Pixel Format

This function allows you to set the pixel format of the image data transmitted by the device. Go to Image Format Control → Pixel Format, and set Pixel Format according to actual demands.

| ℹ️ | The maximum frame rate of different pixel formats is also different, please refer to the actual test for details. |

Pixel Format	Pixel Size(Bits/Pixel)
Mono 16、YUV 422 (YUYV)Packed 、YUV 422 Packed	16
Float 32	32

Click Image Format Control > Pixel Format, and set Pixel Format according to actual demands.
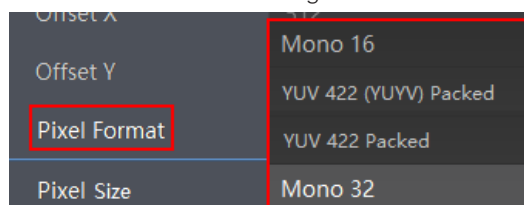
| ℹ️ | In the pixel format, YUV 422 (YUYV) Packed、YUV 422 Packed transmits image data; Mono16 transmits grayscale data; Mono32 transmits temperature data. |

Image Correction

The camera supports various correction methods to solve the image problems in the actual preview process, which can be set under the Infrared Control property.

Shutter Control

Shutter control is when a degraded image (such as noise, light spots, etc.) appears in the process of capturing images, you can choose automatic shutter control conditions or perform manual shutter control to quickly correct the image. It can be set through the Shutter Release Auto-Switch parameter under the Infrared Control property, as shown in the figure below. The parameter options and working principle are shown in the following table.

When performing shutter correction, the shutter will fall between the infrared lens and the detector, and the camera will make a "Click" sound, and the captured image will freeze instantly, completing the image correction.
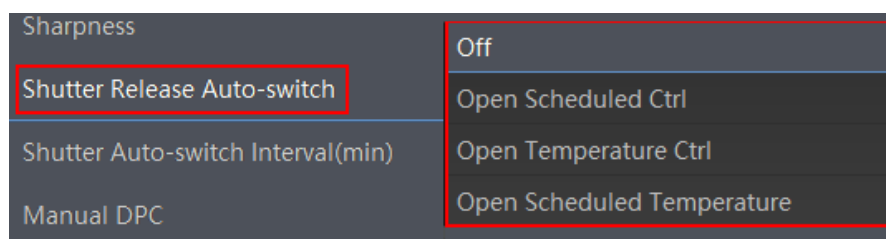
Shutter Control	Parameters	Working Principle
Manual Shutter Control	Off	When the camera starts to acquire images, click "Execute" at the Manual Shutter Correction parameter, the camera will make a "Click" sound instantaneously, and the camera will complete the image correction.
Auto Scheduled Control	Open Scheduled Ctrl	When the camera starts to acquire images, set the timing time in Shutter Autoswitch Time Interval(min). Whenever the set timing time is reached, the camera will make a "Click" sound instantaneously, and the camera will complete the image correction.
Auto Shutter Temperature Control	Open Temperature Ctrl	Whenever the temperature of the acquired image changes by 1° C up or down, the camera makes a "Click" sound instantaneously, and the camera completes the image correction.
Auto Scheduled and Temperature Control	Open Scheduled Temperature	When the camera starts to acquire images, set the timing time in Shutter Autoswitch Time Interval(min), and whenever the set timing time is reached or the temperature of the acquired images changes by 1° C, the camera will instantly emit a "Click" sound, and the camera will complete the image. Correction.

Dead Pixel Correction

A single pixel in the camera sensor cannot respond to infrared radiation normally, which is called an invalid pixel. It is reflected in the infrared image to form a light and dark pixel whose coordinates do not change with the target. These light and dark dead pixels can be eliminated by dead pixel correction. This can be set under the Infrared Control property, as shown in the image below.

Manual DPC	On
Reset Cursor	Execute
Dead Pixel X Position	319
Dead Pixel Y Position	255
Add Dead Pixel	Execute
Del Dead Pixel	Execute

Steps

1. Select "On/off" from the drop-down menu of Manual DPC parameter.
"off" means to automatically correct the dead pixel, "On" means to manually correct the dead pixel.
2. When "On" is selected, place the mouse cursor on the dead pixel of the screen, and you can view the coordinates of the dead pixel at the bottom of the client interface, as shown in the following figure.

If the coordinate position is not displayed at the bottom of the client, you can click ☰ at the bottom of the client and check "Location" to enable the display of pixel coordinates.

Errors: 0 | Packets Lost: 0 | Display Rate: 30fps | Location: 226, 385

3. Enter the coordinates of the pixel in Dead Pixel X Position and Dead Pixel Y Position, and you can view the input pixel more clearly through the 3×3 zoom area of the interface, as shown in the figure below.

ℹ️ If the ROI area changes, the pixel coordinates will change accordingly, please set it according to the actual display.

| Dead Pixel X Position | 270 |
| Dead Pixel Y Position | 391 |

pixel   zoom area

4. (Optional) Click Execute at the Reset Curror parameter to return to the center point.

5. Repair or restore dead pixels.

_ Repair dead pixels: Set dead pixels and click the "Execute" button at the Add Dead Pixel parameter to repair the selected dead pixels.

_ Restore dead pixels: Click the "Execute" button at the Del Dead Pixel parameter to restore the repaired dead pixels.

8

TEMPERATURE MEASUREMENT SETTING

CHAPTER 8

Global Temperature Measurement

Global temperature measurement can set parameters such as external Atomospheric Transmissivity, Temperature Measurement Range, Target Distance, Full Screen Emissivity, etc., which can avoid abnormal data caused by environmental influence and distance influence when the target object is measured for temperature. It can be set under the Infrared Arithmetic Control property. The global temperature measurement parameters are shown in the figure below, and the parameter descriptions are shown in the table below.

ℹ️ If the expert temperature measurement is not enabled for the corresponding temperature measurement rule, the global temperature measurement parameters are used for the temperature measurement rule.

Parameter	DESCRIPTION
Atmospheric Transmissivity	If germanium glass needs to be added in front of the lens, the transmittance of germanium glass needs to be set at the Atmospheric Transmissivity parameter ℹ️ NOTE If no germanium glass is required, it can be set to 100
Temperature Measurement Range	Optional -20℃ ~ 150℃ , 0℃ ~ 550℃ . Select the temperature measurement range according to the actual needs. When the measured target object exceeds the selected temperature range, the measured temperature will display abnormality. ℹ️ NOTE To ensure measurement accuracy, please select -20° C ~ 150° C if measuring objects below 150° C; if measuring objects above 150° C, please select 0° C ~ 550° C
Target Distance	Set the straight-line distance from the object to be measured to the device, in m
Full Screen Emissivity	Set the emissivity of the target object. The emissivity values of different objects are different. For details, please refer to the emissivity table of common substances in the appendix

Temperature Control

The Temperature Control property allows you to set the temperature measurement rules, zone alarms (single/multiple zones) and image overlay function. If the parameters in this property are modified, you must click Execute on the Temperature Control Load parameter to load the set temperature measurement parameters, as shown in the following figure.
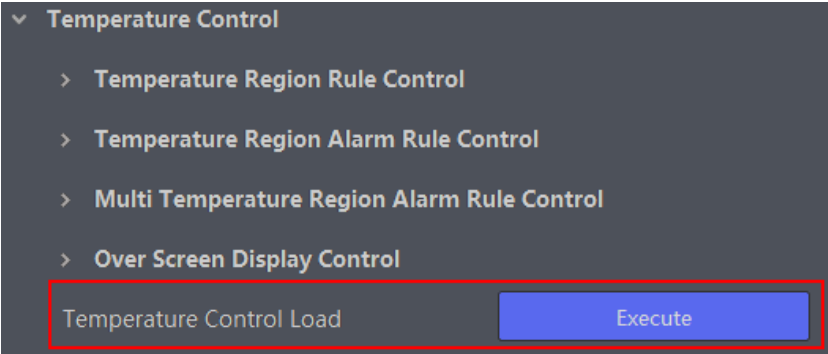
Temperature Measurement Rules

The camera supports drawing a total of 21 temperature measurement rules, including 10 point temperature measurement, 1 line temperature measurement, and 10 polygon temperature measurement three types of temperature measurement. It supports two methods: setting coordinate points and manually drawing, which can be based on actual needs. Choose whether to enable expert mode, each temperature measurement rule can set independent expert temperature measurement parameters.

■ Expert Mode

Expert Mode allows you to set individual temperature measurement parameters for each temperature rule, which can be set at Temperature Region Rule Control > Temperature Measurement Expert Mode Parameters. To enable the Temperature Measurement Expert Mode parameter when configuring any rule, the Expert Mode parameters are shown in the following figure and described in the table below.

> ℹ️ If expert temperature measurement is not set, the enabled temperature measurement rules use the global temperature measurement parameters.
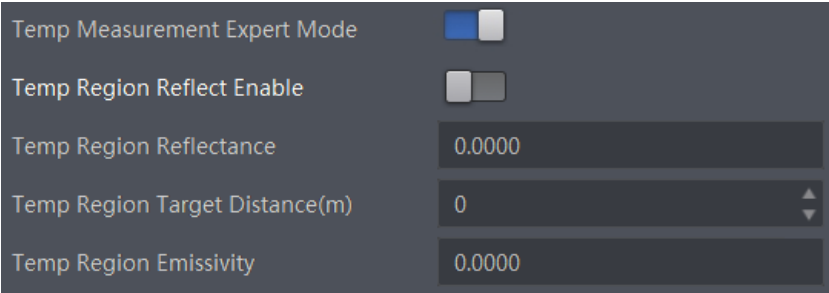
Parameter	Parameter Description
Temperature Region Reflectance	When there is a high temperature target in the scene, if the emissivity of the target under test is small and the target under test reflects the high temperature target, you need to enable Temperature Region Reflect Enable reflectivity enable and set the value of the reflection temperature at the Temperature Region Reflectance parameter. 📒 NOTE The reflected temperature value needs to be consistent with the temperature value of the high temperature target.
Temperature Region Target Distance（m）	Set the straight line distance from the measured target object to the device in m
Temperature Region Emissivity	Set the emissivity of the target object in %, the emissivity values of different objects are different, please refer to the table of emissivity of common substances in the appendix.

Temperature Measurement Rules

■ Temperature Measurement Rules Setup

The coordinate point temperature measurement rules can be selected according to the actual needs of point temperature measurement, line temperature measurement and polygon temperature measurement, which can be set under the Temperature Region Rule Control property.

Point Temperature Measurement

Set the coordinate point of any image in the scene, automatically measure the temperature of the point, and draw up to 10 points.

Steps:
1. Set the temperature measurement point to be drawn at the Temperature Region Selector parameter, and select Point Region 0 ~ Point Region 9.
2. Enable the Temperature Region Enable parameter to enable the set temperature measurement point.
3. Set the abscissa and ordinate of the temperature measurement point at the Temperature Region Point Position X and Temperature Region Point Position Y parameters.
4. Click "Execute" at the Temperature Region Load parameter to load the point temperature measurement parameter setting function, as shown in the figure below.

> ● All point temperature measurement parameter settings take effect only after the Temperature Region Load parameter is executed.
> ● After the temperature measurement rules for point temperature measurement are completed, you need to set the temperature measurement rules to be displayed in the Region Display Selector parameter of the image overlay function and enable them. For details, see the Image Overlay chapter.

Temperature Measurement Rules

Polygon Temperature Measurement

Set the coordinate points of any number of images in the scene to form an area, the temperature of the area can be automatically measured, and a maximum of 10 polygons can be drawn.

Steps:
1. Set the temperature measurement polygon to be drawn at the Temperature Region Selector parameter, and select Polygon Region 0 ~Polygon Region 9.
2. Enable the Temperature Region Enable parameter to enable the set temperature measurement polygon.
3. Set the number of coordinate points that make up the polygon at the Temperature Region Point Num parameter.

> **i** The default number of coordinate points for polygon temperature measurement is 3, and a maximum of 10 can be set.

4. In the Temperature Region Point Selector parameter, drop down to select the coordinate points that make up the polygon.
   _ When Point 0 is selected, set the abscissa and ordinate of Point 0 at the Temperature Region Point Position X and Temperature Region Point Position Y parameters;
   _ When Point 1 is selected, set the abscissa and ordinate of Point 1 at the Temperature Region Point Position X and Temperature Region Point Position Y parameters.
   _ When Point 2 is selected... and so on, set according to the above until the region is drawn.

5. Click "Execute" at the Temperature Region Load parameter to load the polygon temperature measurement parameter setting function, as shown in the figure below.
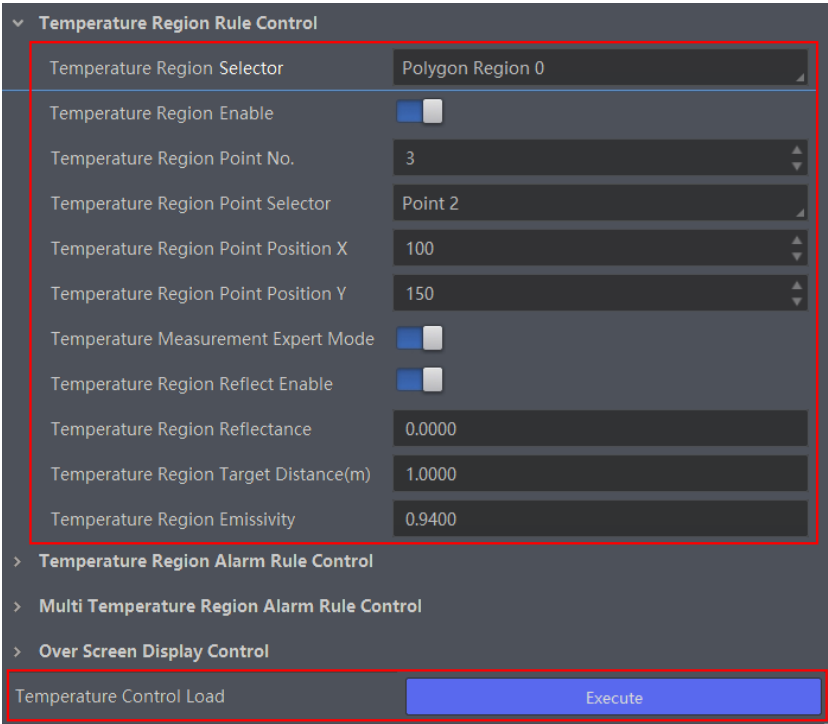
> **i** ● All polygon temperature measurement parameter settings take effect only after the Temperature Region Load parameter is executed.
> ● After completing the temperature measurement rules for polygon temperature measurement, you need to set the temperature measurement rules to be displayed in the Region Display Selector parameter of the image overlay function and enable them. For details, see the Image Overlay chapter.

Temperature Measurement Rules

Line Temperature Measurement

Set the coordinate points of any two images in the scene to form a line segment, the temperature of the line segment can be automatically measured, and only one line can be drawn.

Steps:
1. Set the temperature measurement line to be drawn at the Temperature Region Selector parameter, and select Line region 0.
2. Enable the Temperature Region Enable parameter to enable the set temperature measurement line.
3. Pull down the Temperature Region Point Selector parameter to select two coordinate points of the temperature measurement line segment.
  _ When Point 0 is selected, set the abscissa and ordinate of Point 0 at the Temperature Region Point Position X and Temperature Region Point Position Y parameters;
  _ When Point 1 is selected, set the abscissa and ordinate of Point 1 at the Temperature Region Point Position X and Temperature Region Point Position Y parameters. At this time, the temperature measurement can be performed according to the line segment formed by the two coordinate points.

4. Click "Execute" at the Temperature Region Load parameter to load the parameter setting function of line temperature measurement, as shown in the figure below.

✓ **Temperature Region Rule Control**	
Temperature Region Selector	Line Region 0
Temperature Region Enable	▮▯
Temperature Region Point No.	2
Temperature Region Point Selector	Point 1
Temperature Region Point Position X	332
Temperature Region Point Position Y	336
Temperature Measurement Expert Mode	▮▯
Temperature Region Reflect Enable	▮▯
Temperature Region Reflectance	0.0000
Temperature Region Target Distance(m)	1.0000
Temperature Region Emissivity	0.9400
> **Temperature Region Alarm Rule Control**	
> **Multi Temperature Region Alarm Rule Control**	
> **Over Screen Display Control**	
Temperature Control Load	Execute

> ℹ ● All line temperature measurement parameter settings take effect only after executing the Temperature Region Load parameter.
> ● After the temperature measurement rules for line temperature measurement are completed, you need to set the temperature measurement rules to be displayed in the Region Display Selector parameter of the image overlay function and enable them. For details, see the Image Overlay chapter.

Temperature Measurement Rules

Circle Temperature Measurement

Set the horizontal/vertical coordinates of the center of the circle in the scene and the radius of the circle to form a circle, the temperature of the circle segment can be automatically measured, and only one line can be drawn.

Steps:
1. Set the temperature measurement circle to be drawn at the Temperature Region Selector parameter, and select Circle Region 0.
2. Enable the Temperature Region Enable parameter to enable the set temperature measurement circle.
3. Set the horizontal/vertical coordinates of the center of the circle in the Temperature Region Center Point Position X and Temperature Region Center Point Position Y parameters, and set the radius of the circle in the Temperature Region Radius parameter.
At this point, temperature measurement can be performed based on the line segment formed by the two coordinate points.

ℹ️	After the temperature measurement circle is set up, you can view the number of vertices that make up the circle by using the Temperature Region Point No. parameter. By pulling down the Temperature Region Point Selector to switch between different vertices, you can view the specific coordinates of the vertices in the Temperature Region Point Position X and Temperature Region Point Position Y parameters.

4. Click "Execute" at the Temperature Region Load parameter to load the parameter setting function of circle temperature measurement, as shown in the figure below.
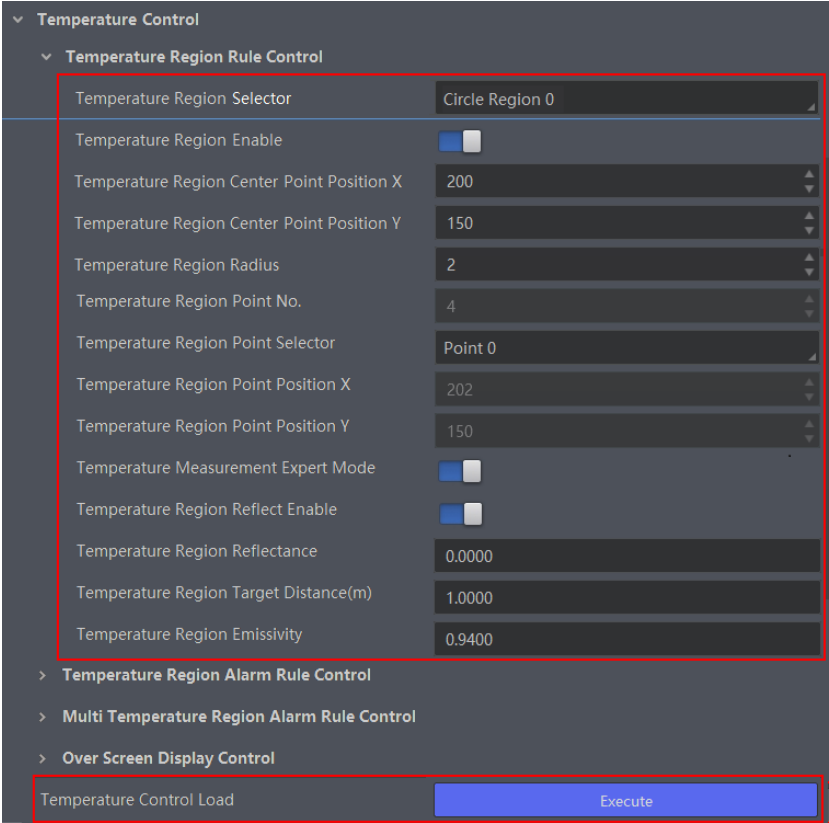
ℹ️	● All circle temperature measurement parameter settings take effect only after executing the Temperature Region Load parameter. ● After the temperature measurement rules for circle temperature measurement are completed, you need to set the temperature measurement rules to be displayed in the Region Display Selector parameter of the image overlay function and enable them. For details, see the Image Overlay chapter.

Set Region Alarm

For regional alarms, you can set corresponding alarm conditions according to the drawn temperature measurement rules to realize single-region temperature alarms and multi-region temperature difference alarms.

> **i** The Temperature Region Alarm Rule Control and Multi Temperature Region Alarm Rule Control properties are only displayed when there are one or more temperature measurement rules.

■ Single Region Alarm

Single-region temperature alarm can set alarm rules for the 22 drawn regions, and perform real-time alarm event detection according to the corresponding alarm conditions such as the selected temperature characteristic information (ie, the maximum temperature, the minimum temperature, the average temperature, and the temperature variation). Set it under the Rule Control property.

Preconditions

The temperature measurement rules have been drawn, and the corresponding image overlay function has been set.

> **i** For the drawing of temperature measurement rules, please refer to the chapter of temperature measurement rules, and for the setting of image overlay function, please refer to the chapter of Image Overlay.

Steps:

1. In the Temperature Region Alarm Rule Selector parameter, select the alarm rule for which the alarm condition needs to be set, which corresponds to 22 temperature measurement rules including point temperature measurement, polygon temperature measurement, and line temperature measurement.

2. Enable the Temperature Region Alarm Rule Enable parameter to enable the set alarm conditions.

3. Select the alarm temperature source type from the pull-down of the Temperature Region Alarm Rule Source parameter, and select "Maximum Temperature", "Minimum Temperature", "Average Temperature", and "Temperature Variation", as shown in the figure below.

  _ Region Maximum Temperature: The maximum temperature of the detected target object.
  _ Region Minimum Temperature: The minimum temperature to detect the target object.
  _ Region Average Temperature: The average temperature of the detected target object, average temperature = (maximum temperature + minimum temperature)/2.
  _ Region Temperature Variation: Detect the temperature variation of the target object, temperature variation = maximum temperature - minimum temperature.

4. Pull down the Temperature Region Alarm Rule Condition parameter to select the alarm temperature condition type, select ">" or "<", as shown in the figure below, when the alarm temperature source type (maximum temperature, minimum temperature, average and temperature variation) is greater than or less than the set temperature threshold, an alarm is issued.

5. Set the temperature threshold for the alarm at the Temperature Region Alarm Reference Value parameter, as shown in the figure below.
If the alarm temperature source type is set to "Maximum temperature", the alarm temperature condition type is selected to be greater than, and the Temperature Region Alarm Reference Value (alarm temperature threshold) is set to 50° C, an alarm will be generated when the detected target temperature is greater than 50° C.

6. In order to prevent temperature oscillation from affecting the alarm result, it is necessary to set the tolerance temperature at Temperature Region Alarm Recovery ABS Value, as shown in the following figure. When the tolerance temperature is set to 5° C, the alarm temperature is 50° C. The alarm is generated when the detected target object is 50° C, and canceled when the detected target object is less than or equal to 45° C.

7. Click "Execute" for the Temperature Region Alarm Load parameter to load the single region alarm function.

> **i** All alarm function parameter settings take effect only after the Temperature Region Alarm Load parameter is executed.

Set Region Alarm

■ Multi Temperature Region Alarm

The multi-region temperature variation alarm can compare the temperature feature information between the two regions. By configuring the corresponding alarm conditions, the temperature of the two regions can be determined according to the output signal of the trigger event. A total of 4 multi-region alarm rules can be set. Set it under the Multi Temperature Region Alarm Rule Control property.

> **i** The image overlay display function does not support the display of multi-region temperature variation alarm information. The corresponding alarm information can be viewed through the trigger event. For details, see the chapter on I/O Output settings.

Preconditions

The temperature measurement rules have been drawn, and the corresponding image overlay function has been set.

> **i** For the drawing of temperature measurement rules, please refer to the Temperature Measurement Rules chapter, and for the image overlay function settings, please refer to the Image Overlay chapter.

Steps:

1. Select the multi-region temperature difference alarm rule to be set at the Multi Temperature Region Alarm Rule Control parameter, and select Multi Temperature Region Alarm Rule 0 ~ Multi Temperature Region Alarm Rule 3, as shown in the following figure.
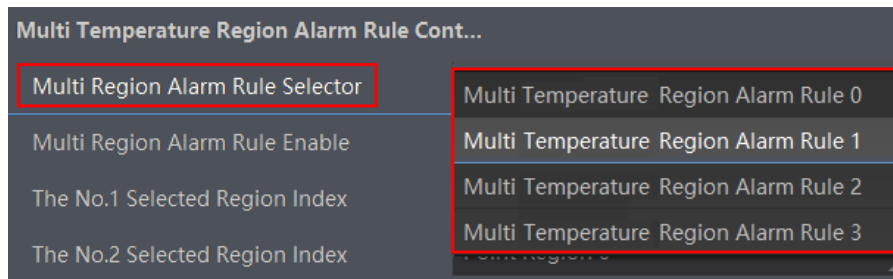
2. Enable the Multi Region Alarm Rule Enable parameter to enable the set variation temperature alarm condition.
3. Set the source temperature measurement rule at The No.1 Selected Region Index parameter to be the compared region.
4. In The No.2 Selected Region Index parameter, set the target temperature measurement rule, that is, the comparison area.
5. Select the type of the alarm temperature source in the drop-down area of the Multi Region Alarm Rule Source parameter, and select "Maximum Temperature", "Minimum Temperature", "Average Temperature", and "Variation Temperature", as shown in the figure below.

_ Maximum Temperature Difference: Detect the maximum temperature of the target object.
_ Minimum Temperature Difference: The minimum temperature of the detected target object.
_ Average Temperature Difference: The average temperature of the detected target object, average temperature = (maximum temperature + minimum temperature)/2.
_ Variation Temperature Difference: Detect the temperature difference of the target object, Variation Temperature=maximum temperature - minimum temperature.
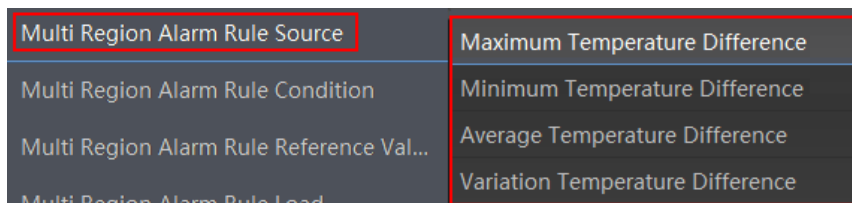
6. In the Multi Region Alarm Rule Condition parameter, drop down to select the alarm temperature condition type, select ">" or "<", as shown in the following figure. When the alarm temperature source type (maximum temperature, minimum temperature, average value and temperature variation) of The No.1 Selected Region Index (source temperature measurement rule) is greater than the alarm temperature source of The No.2 Selected Region Index (target temperature measurement rule) When the type (maximum temperature, minimum temperature, average value, and temperature variation) is greater than or less than the set temperature threshold, an alarm is issued.
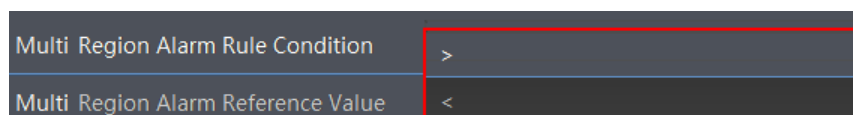
Set Region Alarm

7. Set the temperature threshold for the temperature variation alarm at the Multi Region Alarm Rule Reference Value parameter, as shown in the following figure.

If the temperature source type of the temperature variation alarm is set to "Maximum temperature", the alarm temperature condition type is set to ">", and the Multi Region Alarm Rule Reference Value (temperature variation alarm temperature threshold) is set to 10° C. When the maximum temperature of The No.1 Selected Region Index (source temperature measurement rule) is greater than the maximum temperature of The No.2 Selected Region Index (target temperature measurement rule), an alarm is generated.

Multi Region Alarm Rule Reference Value	4.0000

8. Click Execute at the Multi Region Alarm Rule Load parameter to load the multi-region temperature variation alarm function.

> **i** All temperature variation alarm function parameter settings take effect only after the Multi Region Alarm Rule Load parameter is executed.

Image Overlay

Image overlay can display the temperature bar of the current screen on the basis of the original image, and draw the temperature characteristic information such as the highest temperature and the lowest temperature with a cross cursor in the temperature measurement region and the temperature alarm information of a single region, which is convenient for users to obtain when previewing the image. Temperature information, which can be set under the Over Screen Display Control properties.

	● The image overlay display function does not support the display of multi-region temperature difference alarm information. ● Parameters such as temperature measurement region selection, temperature measurement region enable, and maximum temperature enable are displayed only when one or more temperature measurement rules are set.

Steps:
1. Turn on Legend Display Enable to display the temperature measurement bar, as shown in the figure below.
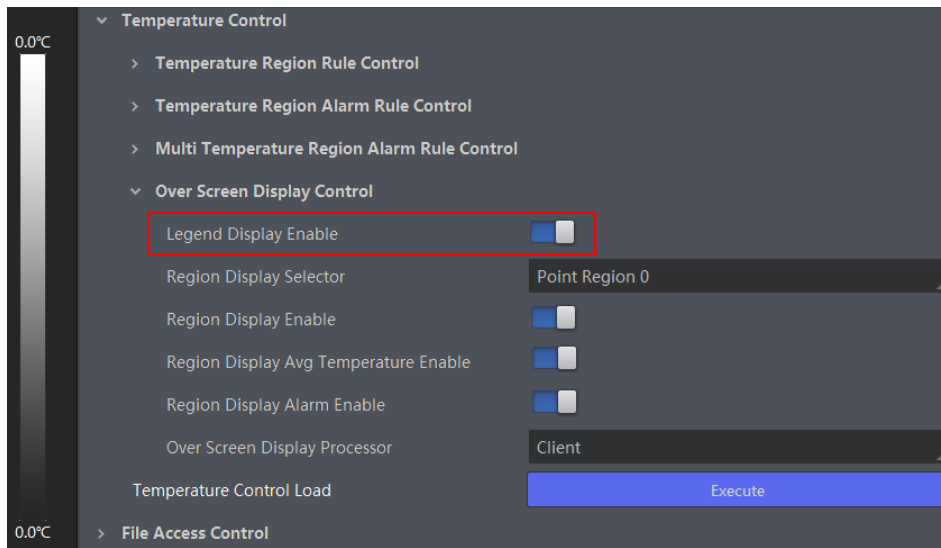
2. Set the temperature measurement rules to be displayed at the Region Display Selector parameter.
3. Set the image overlay enable of the related functions of the temperature measurement region. Only after it is turned on can the data information corresponding to the measurement target object be displayed, as shown in the following figure.
   _ Region Display Enable: enable the drawing and display of the temperature measurement region.
   _ Region Display Max Temperature Enable: Enables the display of the maximum temperature.
   _ Region Display Min Temperature Enable: Enable the minimum temperature display.
   _ Region Display Alarm Enable: Enable temperature alarm display. When the detection target reaches the set alarm condition, the red alarm pattern will be displayed after the enable is enabled; the normal temperature characteristic information will be displayed after the enable is disabled.
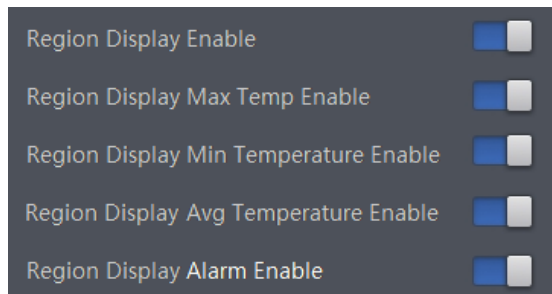
4. Select the overlay method in the Over Screen Display Processor parameter drop-down, as shown in the figure below.
   _ None: Cancel the image overlay information function.
   _ Camera: The temperature and warning information are superimposed on the camera.
   _ Client: Send temperature and alarm information to the client.
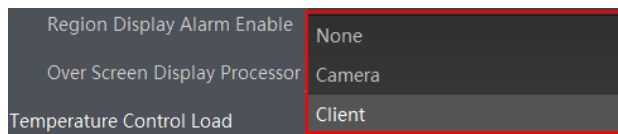
5. Click "Execute" at the Temperature Region Over Screen Display Load parameter to load the image overlay function.

	All image overlay function parameter settings take effect only after the Temperature Region Over Screen Display Load parameter is executed.

Quick Setup

Quick setup provides users with convenient temperature measurement operations. Through the temperature measurement area setting interface, you can complete the corresponding action of temperature measurement requirements, can quickly and intuitively manage the temperature measurement rules, set the temperature measurement related parameters, create area alarms and set the basic display and temperature window.

Click 🌡 in the image preview window to enter the temperature measurement area setting interface, as shown in the figure below, see the following table for the description of the temperature measurement area. After all the configurations are completed, click OK at the bottom of the interface to save the temperature measurement configuration and exit the temperature measurement area setting interface, and then enter the temperature measurement area interface is automatically loaded with the configured temperature measurement rules.

> ℹ️ Verify that the camera status is Connected and in Acquisition.

No.	Name	Description
1	Area Drawing	You can manage and set the temperature rules, please refer to the section of Area Drawing.
2	Preview Window	The preview window allows you to manually draw temperature rules and view the results of the area alarms in real time.
3	Temperature measurement parameters	The parameters required for temperature measurement can be set, including Palette mode, camera parameter, global screening, and expert mode. • Palette mode：For details, please refer to the section on Palette Mode; • Camera parameter：Brightness, gray factor (Gamma correction), sharpness and noise reduction can be set, please refer to Brightness, Gamma correction, Sharpness and Noise Reduction chapters for details; • Global screening：See the Global Temperature Measurement chapter for details; • Expert mode：you need to enable the expert mode for the temperature measurement area under global temperature measurement, and then select the temperature measurement rules you need to configure in the area drawing, and each temperature measurement rule can be configured with independent expert mode, please refer to the chapter of Expert Mode for specific parameter settings and descriptions.
4	Alarm	You can set alarms for single area and multi-area of the set temperature measurement rules, please refer to the chapter of Alarm Setting for specific operation.
5	Display	The display settings include the basic display and the temperature window, please refer to the chapter of Display Settings for details.

Quick Setup

■ Area Drawing

Area drawing can manually draw 4 kinds of temperature rules, namely point, box, line and circle, and according to the set temperature source type, the corresponding temperature data information can be displayed in the preview window in real time, and the drawn temperature rules can be displayed individually, multiple or all.

1. Draw the temperature measurement area. At the top of the screen, click on the type of area to be plotted, you can choose from dots, boxes, lines and circles, see the table below for instructions.
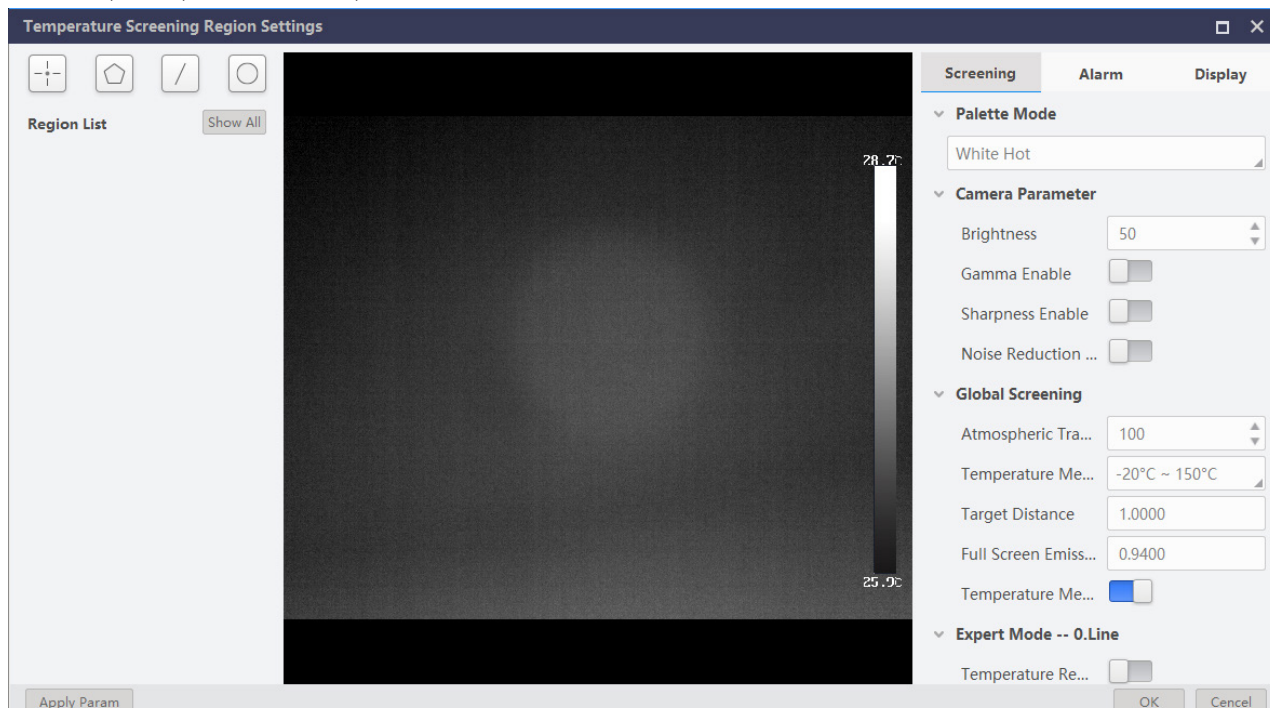
Icon	Rule Type	Drawing Method	Number of Supports
-¦-	Point	Click -¦- , find the created point at the list of areas and draw it directly by clicking the left mouse button at the preview screen.	10
⬠	Frame (polygon)	Click ⬠ , left mouse button to start drawing, double click left mouse button to finish drawing, up to 20 vertices of the box can be drawn.	10
/	Line	Click / , Find the created line in the list of areas and draw one vertex of the line in the preview screen. Click the left mouse button to start drawing, move the mouse to another vertex and click the left mouse button to finish drawing.	1
○	Circle	Click ○ , Find the created circle at the list of areas and find the center point of the circle to be drawn at the preview screen. Click and hold the left mouse button and pull left and right until you reach the size of the circle area you need to measure the temperature, release the left mouse button to finish drawing.	1

> ℹ ● Click 🗑 on the right side of the region list to delete the temperature measurement rule.
> ● After clicking the region icon, the created temperature measurement rules are displayed at the bottom of the region list, and the region number is incremented according to the type of rule created.
> ● Select a temperature rule in the region list and find the drawn region in the preview screen, click the box of the temperature measurement region to adjust the size and shape of the region, and you can only adjust the box, line and circle. Box rules can also be deleted by clicking the right mouse button at the box, as shown in the following figure.

2. Select the type of temperature source according to the actual needs. Spot temperature support average, box, line and circle can choose the maximum value, minimum value, average value, the rules can be drawn to display the selected temperature type in real time.

> ℹ Click Show All to turn on all temperature measurement types.

3. All the above operations need to be clicked on the setup parameters at the bottom left of the interface to take effect. After loading, you can view the plotted temperature measurement rules and temperature values in the preview interface.

Quick Setup

■ Alarm

Alarm setting can set single-area and multi-area alarm conditions for the completed area rules, and can monitor the temperature alarm events of target objects in real time.

In the list of alarm settings, you can set single-area and multi-area alarms for the drawn temperature measurement rules, and configure the corresponding parameters such as alarm temperature source type, alarm temperature condition type, temperature threshold and tolerance temperature according to the actual needs, as shown in the figure below.
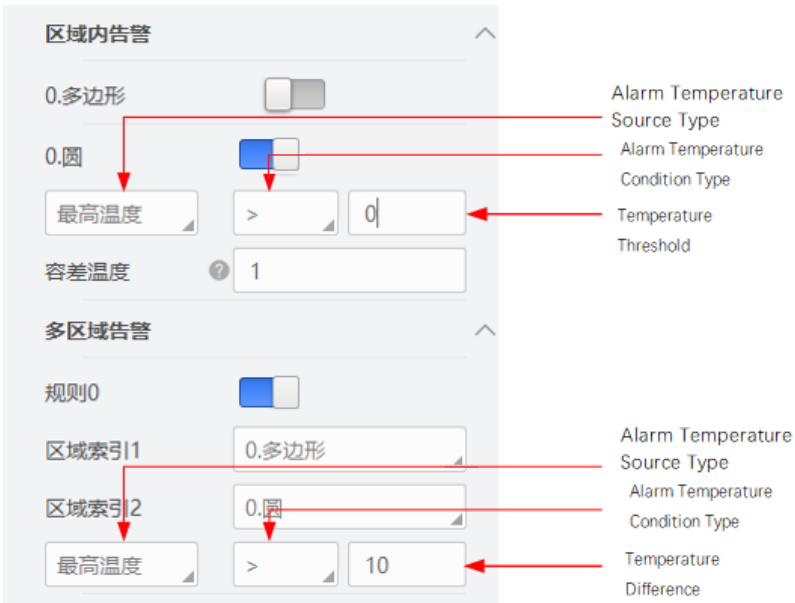
● Single-area alarm: Turn on the temperature measurement rule for which alarm conditions need to be set, set the corresponding temperature measurement parameters, and then the temperature monitoring can be carried out for the temperature measurement rule, please refer to the following table for specific instructions.

Temperature Measurement Parameters	Description
Alarm Temperature Source Type	Select the type of temperature source for a single zone, with options for maximum temperature, minimum temperature, average temperature, and temperature variance. ● Max/ Min Temperature: Detects the max/ min temperature of the target object; ● Average Temperature: the average value of all coordinates in the area, the temperature values of all points are summed up and divided by the number of coordinate points. ● Temperature Difference: the temperature difference of the detected target object, Temperature Difference = Max Temperature - Min Temperature.
Alarm Temperature Condition Type	Optional > or < to initiate an alert when the alert temperature source type (maximum temperature, minimum temperature, average temperature, and temperature difference) of the detection target is greater or less than the set temperature threshold.
Temperature Threshold	Set the temperature threshold for detecting the target object. If the maximum temperature is selected for the alarm temperature source type, > is selected for the alarm temperature condition type, and the temperature threshold is set to 50° C, an alarm is generated when the detected target temperature is greater than 50° C.
Tolerance Temperature	To prevent temperature oscillation from affecting the alarm result, the tolerance temperature needs to be set. When the tolerance temperature is set to 5° C, the alarm temperature condition type is <, and the alarm temperature is 50° C. The alarm is generated when the detected target object is 50° C, and canceled when the detected target object is less than or equal to 45° C.

Quick Setup

● Multi-region alarm: open the multi-region alarm rule to be configured, set the region index 1/2, and set the corresponding temperature measurement parameters, then the temperature between two temperature measurement rules can be alarmed and monitored, and up to 4 multi-region alarm rules can be set, please refer to the following table for details.

Temperature Measurement Parameters	Description
Alarm Temperature Source Type	Select the type of temperature source to be monitored for both zones, with options for maximum temperature, minimum temperature, average temperature, and temperature difference. ● Max/ Min Temperature: Detect the max / min temperature of the target object; ● Average Temperature: the average of all coordinates in the area, the temperature values of all points are summed up and divided by the number of coordinate points. ● Temperature Difference: detects the temperature difference of the target object, Temperature Difference = Maximum Temperature - Minimum Temperature.
Alarm Temperature Condition Type	Optional > or < to initiate an alarm when the alarm temperature source type for area index 1 is greater or less than the set temperature difference than the alarm temperature source type for area index 2.
Temperature Difference	Set the temperature difference between area index 1 and area index 2. If you select Maximum Temperature for Alarm Temperature Source Type and > for Alarm Temperature Condition Type, the temperature difference value is set to 10℃ . The alarm is generated when the maximum temperature of area index 1 is greater than 10℃ than the maximum temperature of area index 2.

Quick Setup

■ Display

The display settings include the basic settings and the temperature window. The basic settings can display the image data overlay information of the preview interface, and the temperature window can be visualized in the client interface, which is convenient to view the temperature information of the temperature measurement rules and the temperature curve.

● Basic settings: you can set up the temperature bar and area information overlay function, as shown in the figure below.
The temperature bar can be turned on or off, and when it is turned on, the temperature bar will be superimposed in the preview window; the area information superimposition can be selected according to the actual needs of the area information superimposition, and can be selected from the raw image, camera superimposition and client superimposition.
_Raw Image: cancel the image overlay information function, the camera does not display the temperature measurement area and temperature information when it collects the image and outputs the image screen.
_Camera Overlay: Temperature and alarm information is superimposed on the camera, and the camera output screen contains temperature measurement area and temperature information.
_Client overlay: Temperature and alarm information is overlayed to the client, and the camera output screen does not contain temperature measurement area and temperature information.

● Temperature Window: The set temperature rules can be deployed in the Temperature Window property of iDatum client, and 4 numerical values and 1 curve information can be set. The temperature value displays the name of the corresponding temperature measurement area and real-time temperature information, while the temperature curve displays the name of the corresponding temperature measurement rule and the temperature curve information of the last 12 hours. As shown in the figure below.
Open the temperature window to be displayed, select the temperature rule at "Number 1", and select the temperature source type at "Number 2".

In the preview interface, click Properties area > Temperature Window to view the information of the set temperature window, only the client supports the temperature window display, as shown in the upper right figure.

> ℹ️ When this temperature rule generates an alarm event, the zone box and temperature information are displayed in red.

Temperature Measurement Settings

The temperature measurement setting can customize the color box of the normal temperature measurement rule and the alarm state. You can choose to enable the output log function according to the actual needs, and you can view the client log file through the local path.

ℹ️	The color box configuration only supports the image overlay function, that is, when Client is selected as the Over Screen Display Processor.

Steps:

1. On the client interface, click Settings > General to configure temperature measurement settings.
2. You can customize the normal area color, alarm area color 1 and alarm area color 2, as shown in the figure below.

ℹ️	Alarm area colors 1 and 2 are the alarm states of the single-area temperature measurement rule, and can be set to the same color or different colors. When different colors are set, the single-area alarm color box flashes in two colors, which can enhance the alarm effect.
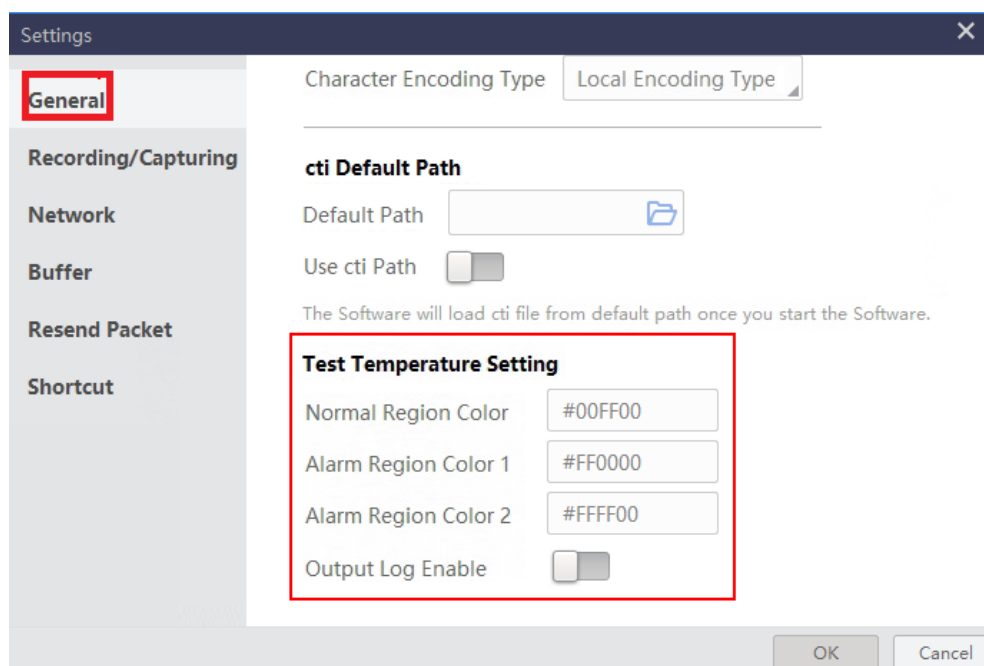
3. (Optional) To output system logs, enable log output. The log viewing path is: C:\Users\XXX (username)\iDatum\iDatum_Log.
4. Click "OK" to complete the setting.

8

CHAPTER 8   OTHER FUNCTIONS

Device Control

In the Device Control attribute, you can view device information, edit device name, reset device, etc. The specific parameters in Device Control attribute are shown below.

Parameter	Read/Write	Description
Device Info	Read only	It is the device manufacturer information
Device Scan Type	Read only	It is the scanning method of the device Sensor
Device Vendor Name	Read only	It is the device manufacturer's name
Device Model Name	Read only	It is the device model.
Device Manufacturer Info	Read only	It is the device manufacturer information
Device Version	Read only	It is the device version.
Device Firmware Version	Read only	It is the device firmware version.
Device Serial Number	Read only	It is the device serial number.
Device User ID	Read and write	Device name and it is empty by default. You can set according to your preference. ● If User ID is empty, the client software displays the device model. ● If you set it, the client software displays the User ID you set.
Device Uptime(s)	Read only	It is the device runtime
Board Device Type	Read only	It is the device model
Device Temperature	Read only	It is the device cavity temperature
Device Reset	Read only	Software reboots the device

> ℹ️ Device management related functions are related to the device model and firmware version, please refer to the actual device parameters.

File Access Control

The file access function can import or export the device's feature files and save them in mfa format. The supported feature files include User Set 1/2/3, DPC, LUT Luminance 1/2/3, and License Notice.

Steps:

1. Select a camera in the device list.Click to open the File Access interface.

2. In the File Access dialog box that pops up, select the properties of the camera that you need to access, and then click Import or Export; if you need to export an open source file, select License Notice and click Export, as shown in the following figure.

_ Using the Import Function: In the pop-up window, select the properties to be imported, click Import and then select the mfa file that needs to be imported to open it. After importing, the parameters are saved in the user parameter group selected by the user, and if you need to use them, you need to load the corresponding user parameter group to make them effective.

_Use the export function: select the attributes to be exported in the pop-up window, click Export, select the path to save the file in the pop-up window and fill in the file name and save it. After successful saving, a prompt window will appear on the client side, prompting "Saving properties successfully" and providing a file view portal.

ℹ️	● The file access control function may differ by device model. ● Importing and exporting the device feature among the same model of devices are supported.

Event Control
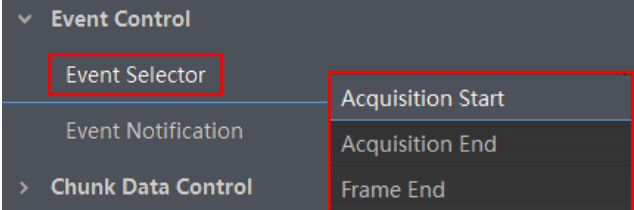
ℹ️	The event control function may differ by device model.

The event control can record events happen to the device and allow you to view them.

Steps

1. Click Event Control > Event Selector, and select Event Selector according to actual demands.

■ Acquisition Start
■ Acquisition End
■ Frame End
■ Line0 Rising Edge
■ Line0 Falling Edge
■ Temperature Alarm Rule

2. Set the parameter Event Notification to Notification On as shown below.
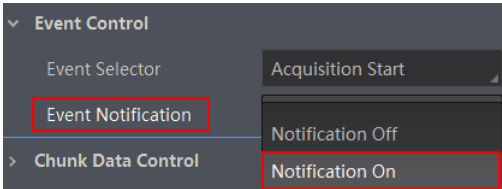
3. At the connected camera, right-click the menu and select Event Monitor.

4. In the Event Monitor screen, check Message Channel Events. You can view the response event information when the camera previews, as shown in the following figure.

_Set Storage Path: Click 🔍 to manually select the event log storage path, check Auto Storage to automatically save the event log information to the default path.

_Empty Log: Click Empty Log to empty the displayed channel events.

ℹ️	The Event Monitor function requires support from the imager's firmware. If the imager's current firmware does not support the Event Control function, the Event Monitor function cannot be used. Please refer to the actual function.

Chunk Setting

The camera supports embedding image information into image data. Image embedding information is only supported with All On or All Off, and cannot be set individually; it can be set under the Chunk Data Control property.

1. Click Chunk Data Control>Chunk Mode Active, and Chunk Mode Active.
2. Select Chunk Selector according to actual demands.
3. Enable Chunk Enable to embed information into the image.
4. (Optional) Repeat steps above to add multiple Chunk information types.

Once the settings are complete, the information can be viewed using the Watermark tool in the iDatum shortcut toolbar.

Image Embedding Information	Description
Image	Transmission Image Data
Width	Transmit Image Width
Height	Transmit Image Height
Offset X	Transmit Image Horizontal Offset
Offset Y	Transmit Image Vertical Offset
Pixel Format	Transmit pixel format
Infrared Outcome List	Transmission of area temperature measurement characteristics, including all 22 temperature measurement areas drawn point, frame, line, circle temperature measurement type, maximum/minimum/average characteristic temperature coordinates, etc.
Infrared Alarm Info Upload	Transmission of area temperature measurement alarm information, including the detection results of 22 area temperature measurement alarm rules and 4 inter-area temperature difference alarm rules. Transmission of full-screen temperature characterization information, supporting full-screen maximum/minimum temperature, as a temperature reference bar markers
Infrared Full Screen Info	Transmission of full-screen temperature measurement feature information, supporting full-screen maximum/ minimum temperatures, as temperature reference bar markers.
Infrared OSD Info	Transmission of regional temperature measurement image overlay feature information, including all temperature measurement rules maximum temperature, minimum temperature, average temperature and alarm switches.

Transport Layer Control

You can go to Transport Layer Control attribute to view the camera's load size, GEV version, etc.

| Parameter	Read/Write	Description
Paylode Size(B)	Read only	It is the device's load size.
GEV Version Major	Read only	It is the major version in GEV version.
GEV Version Minor	Read only	It is the minor version in GEV version.
GEV Device Mode Is Big Endian	Read only	It is the endianness in device's register.
GEV Device Mode Character Set	Read only	It is the character set in device's register.
GEV Interface Selector	Read only	It sets which physical network interface to be controlled.
GEV MAC Address	Read only	It is the MAC address of the network interface.
GEV Supported Option Selector	Read and write	It selects the GEV option to interrogate for existing support.
GEV Supported Option	Read only	It indicates whether the selected GEV option is supported or not.
GEV Current IP Configuration LLA	Read only	It indicates whether the Link Local Address IP configuration scheme is activated on the given network interface.
GEV Current IP Configuration DHCP	Read and write	It indicates whether the DHCP IP configuration scheme is activated on the given network interface.
GEV Current IP Configuration Persistent IP	Read and write	It indicates whether persistent IP configuration scheme is activated on the given network interface.
DEV PAUSE Frame Reception	Read and write	It adjusts the device's transmission bandwidth automatically.
GEV Current IP Address	Read only	It is the current IP address of the given interface.

Transport Layer Control

Parameter	Read/Write	Description
GEV Current Subnet Mask	Read only	It is the current subnet mask of the given interface.
GEV Current Default Gateway	Read only	It is the default gateway IP address to be used on the given network interface.
GEV First URL	Read only	It is the first choice of URL for the XML device description file.
GEV Second URL	Read only	It is the second choice of URL to the XML device description file.
GEV Dictionary URL	Read only	It is the URL of the XML translation dictionary.
GEV Number Of Interfaces	Read only	It indicates the number of physical network interfaces supported by this device.
GEV Persistent IP Address	Read and write	It indicates the persistent IP address for this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Persistent Subnet Mask	Read and write	It indicates the persistent subnet mask associated with the persistent IP address on this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Persistent Default Gateway	Read and write	It indicates the persistent default gateway for this network interface. It is only used when the device boots with the persistent IP configuration scheme.
GEV Link Speed	Read only	It indicates the speed of transmission negotiated by the given network interface in Mbps.
GEV Message Channel Count	Read only	It indicates the number of message channels supported by this device.
GEV Stream Channel Count	Read only	It indicates the number of stream channels supported by this device.
GEV Heartbeat Timeout(ms)	Read and write	It indicates the current heartbeat timeout in milliseconds.
GEV Heartbeat Disable	Read and write	It disables the GEV Heartbeat.
GEV GVCPPending ACK	Read only	It is GEV GVCP waiting for confirmation.
GEV GVCPPending Timeout	Read only	It is GEV GVCP wait timeout .
GEV Timestamp Tick Frequency(Hz)	Read only	It indicates the number of timestamp ticks in 1 second (frequency in Hz).
Timestamp Control Latch	Read and write	It latches the current timestamp value of the device.
Timestamp Control Reset	Read and write	It resets the timestamp value for the device.
Timestamp Control Latch Reset	Read and write	It resets the timestamp control latch.
Timestamp Value	Read only	It is a read only element. It indicates the latched value of the timestamp.
GEV CCP	Read and write	It controls the device access privilege of an application.
GEV SCP Host Port	Read and write	It is the host port for the flow channel .
GEV MCDA	Read and write	It sets the destination IP address of the message channel.
GEV MCTT(ms)	Read and write	It is the transmission timeout data in milliseconds .
GEV MCRC	Read and write	It is to set the number of retransmissions allowed after a message channel transmission timeout .
GEV MCSP	Read only	It is the source port of the message channel .
GEV Stream Channel Selector	Read only	It selects the stream channel to control.
GEV SCP Interface Index	Read only	It is the network interface that uses the index.
GEV SCP Host Port	Read and write	It is the host port of the channel.
GEV SCP Direction	Read only	It is the sending or receiving direction of the channel.
GEV SCPS Fire Test Packet	Read only	It is sending a test packet for every time it is enabled.
GEV SCPS Do Not Fragment	Read and write	It is parameter status is displayed in the unsegmented bits in the first IP segment of each flow packet.
GEV SCPS Big Endian	Read only	It is the byte order of the device flow channel.
GEV SCPS Packet Size(B)	Read and write	It is the packet size during camera transmission (B) Note: Industrial LWIR cameras do not support jumbo frames.
GEV SCDA	Read and write	It is the destination IP address of the flow channel.
GEV SCSP	Read only	It is the source UDP port address of the flow channel.

Save and Load User Set

The camera supports 4 sets of parameters, including 1 default set and 3 user sets. You can save parameters, load parameters and set user default as shown below.

_Save Parameters： Click User Set Control, and select a user set in User Set Selector. Click Execute in User Set Save to save parameters.
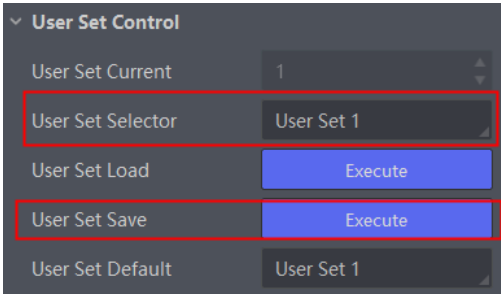
_Load Parameters： Click User Set Control, and select a user set in User Set Selector. Click Execute in User Set Load to load parameters to the camera, as shown below.
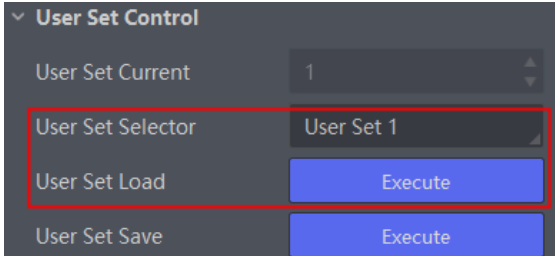
_Set User Default： You can also set default parameter by selecting parameter from drop-down list of User Set Default.

Multicast

The multicast function enables multiple PCs to access the same device at the same time. At the same time, the same device can only be connected by one client in controller and data receiver mode or controller mode, but can be connected by multiple clients in data receiver mode. The multicast mode of each device within the client is controlled individually. The description of three multicast modes is shown below.

Modes	Description
Controller and Data Receiver	This mode allows you to read and edit the camera's parameters, and get its image data.
Controller	This mode allows you to read and edit the camera's parameters, but you cannot get its image data.
Data Receiver	This mode allows you read the camera's parameters and get its image data, but you cannot edit the camera's parameters.

When the multicast function is enabled, the device icon on the client software of other PCs will become , and you can connect the device via the data receiver mode.

You can set multicast function for both the available device and connected device in the device list, but the specific settings are different.

■ Set Multicast (Available Status)

Follow steps below to set multicast function if the device is in available status.
Steps
1. Right click the available device, and click Multicast Settings.
2. Select Role, and enter the IP Address and Port.
● The available status device can use multicast function in Controller and Data Receiver mode or Controller mode.
● The IP address should be class D IP address, and the port ranges from 0 to 65535.
3. Click OK.

■ Set Multicast (Connected Status)

Follow steps below to set multicast function if the device is in connected status.
Steps
1. Right click the available device, and click Multicast Settings.
2. Enable the multicast function, and edit the IP Address and Port.
● The connected status device can use multicast function in Controller and Data Receiver mode only.
● The IP address should be class D IP address, and the port ranges from 0 to 65535.
3. Click OK.

Camera Parameter Index

Since there are many camera parameters and the corresponding functions of each parameter are different, the user can quickly locate the camera parameters to the corresponding chapters through the table below to better understand the function of each parameter.

Attributes	Parameters	Chapter
Device Control	Device Type	Device Control
	Device Scan Type	
	Device Vendor Name	
	Device Model Name	
	Device Manufacturer Info	
	Device Version	
	Device Firmware Version	
	Device Serial Number	
	Device User ID	
	Device Uptime(s)	
	Board Device Type	
	Device Temperature	
	Device Reset	
Image Format Control	Width Max	Resolution and ROI
	Height Max	
	Wight	
	Height	
	Offset X	
	Offset Y	
	Pixel Format	Pixel Format
	Pixel Size	
Acquisition Control	Acqusition Mode	Acqusition Mode
	Acqusition Start	
	Acqusition Stop	
	Acquisition Burst Frame Count	Frame Rate
	Acqusition Frame Rate	
	Acqusition Frame Rate Control Enable	
	Trigger Selector	External Trigger Mode
	Trigger Mode	
	Trigger Software	
	Trigger Source	
	Trigger Activation	
	Trigger Delay(ms)	
	Trigger Cache Enable	
Infrared Control	Temperature Unit Type	
	Palettes Mode	Palettes Mode
	Gamma Enable	Gamma
	Gamma	
	Brightness	Brightness

Camera Parameter Index

Attributes	Parameters	Chapter
Infrared Control	**Sharpness Enable**	**Sharpness**
	Sharpness	
	Noise Reduction Enable	Noise Reduction
	Auto Shutter	Shutter Control
	Shutter Auto-switch Interval(min)	
	Manual Shutter Correction	
	Manual DPC	Dead Pixel Correction
	Reset Cursor	
	Defective Pixel X Position	
	Defective Pixel Y Position	
	Add Defective Pixel	
	Del Defective Pixel	
Infrared Arithmetic Control	Atmospheric Transmissivity	Global Temperature Measurement
	Temperature Measurement Range	
	Target Distance	
	Full Screen Emissivity	
Temperature Control	Temperature Control Load	Temperature Control
Temperature Control > Temperature Region Rule Control	Temperature Region Selector	Temperature Measurement Rules
	Temperature Region Enable	
	Temperature Region Point No.	
	Temperature Region Point Selector	
	Temperature Region Point PositionX	
	Temperature Region Point PositionY	
	Temperature Region Center Point Position X	
	Temperature Region Center Point Position Y	
	Temperature Region Radius	
	Temperature Region Point No.	
	Temperature Measurement Expert Mode	
	Temperature Region Reflect Enable	
	Temperature Region Reflectance	
	Temperature Region Target Distance (m)	
	Temperature Region Emissivity	
Temperature Control > Temperature Region Alarm Rule Control	Temperature Region Alarm Rule Selector	Single Region Alarm
	Temperature Region Alarm Rule Enable	
	Temperature Region Alarm Rule Source	
	Temperature Reigon Alarm Rule Condition	
	Temperature Region Alarm Reference Value	
	Temperature Region Alarm Recovery ABS Value	

Camera Parameter Index

Attributes	Parameters	Chapter
Temperature Control > Multi Temperature Region Alarm Rule Control	Multi Temperature Region Alarm Rule Selector	Multi-region Temperature Variation Alarm
	Multi Region Alarm Rule Enable	
	The No.1 Selected Region Index	
	The No.2 Selected Region Index	
	Multi Region Alarm Rule Source	
	Multi Region Alarm Rule Condition	
	Multi Region Alarm Rule Reference Value	
Temperature Control > Over Screen Display Control	Legend Display Enable	Image Overlay
	Region Display Selector	
	Region Display Enable	
	Region Display Max Temperature Enable	
	Region Display Min Temperature Enable	
	Region Display Avg Temperature Enable	
	Region Display Alarm Enable	
	Over Screen Display Processor	
File Access Control	File Selector	File Access Control
	File Operation Selector	
	File Operation Execute	
	File Open Mode	
	File Operation Status	
	File Operation Result	
	File Size(B)	
Event Control	Event Selector	Event Control
	Event Notification	
Chunk Data Control	Chunk Mode Active	Chunk Data Control
	Chunk Selector	
	Chunk Enable	
Digital IO Control	Line Selector	Trigger Output Signal Selection
	Line Mode	
	Line Inverter	Trigger Output Signal Setting
	Line Status	
	Line Status ALL	
	Line Source	
	Line Trigger Software	
	Hardware Trigger Source	
	Hardware Trigger Activation	
	Temperature Region Alarm Source	
	Temperature Region Alarm Activation	
	Multi Temperature Region Alarm Source	
	Multi Temperature Region Alarm Trigger Activation	
	Strobe Enable	

Camera Parameter Index

Attributes	Parameters	Chapter
Digital IO Control	Strobe Line Duration(ms)	Trigger Output Signal Setting
	Strobe Line Delay(ms)	
Transport Layer Control	Payload Size(B)	Transport Layer Control
	GEV Version Major	
	GEV Version Minor	
	GEV Device Mode Is Big Endian	
	GEV Device Mode Character Set	
	GEV Interface Selector	
	GEV MAC Address	
	GEV Supported Option Selector	
	GEV Supported Option	
	GEV Current IP Configuration LLA	
	GEV Current IP Configuration DHCP	
	GEV Current IP Configuration Persistent IP	
	GEV PAUSE Frame Reception	
	GEV Current IP Address	
	GEV Current Subnet Mask	
	GEV Current Default Gateway	
	GEV First URL	
	GEV Second URL	
	GEV Dictionary URL	
	GEV Number Of Interfaces	
	GEV Persistent IP Address	
	GEV Persistent Subnet Mask	
	GEV Persistent Default Gateway	
	GEV Link Speed	
	GEV Message Channel Count	
	GEV Stream Channel Count	
	GEV Heartbeat Timeout(ms)	
	GEV Heartbeat Disable	
	GeV GVCPPending ACK	
	GeV GVCPPending Timeout	
	GEV Timestamp Tick Frequency(Hz)	
	Timestamp Control Latch	
	Timestamp Control Reset	
	Timestamp Control Latch Reset	
	Timestamp Value	
	GEV CCP	
	GEV MCP Host Port	
	GEV MCDA	

Camera Parameter Index

Attributes	Parameters	Chapter
Transport Layer Control	GEV MCTT(ms)	Transport Layer Control
	GEV MCRC	
	GEV MCSP	
	GEV Stream Channel Selector	
	GEV SCP Interface Index	
	GEV SCP Host Port	
	GEV SCP Direction	
	GEV SCPS Fire Test Packet	
	GEV SCPS Do Not Fragment	
	GEV SCPS Big Endian	
	GEV SCPS Packet Size(B)	
	GEV SCDA	
	GEV SCSP	
User Set Control	User Set Current	Save and Load User Set
	User Set Selector	
	User Set Load	
	User Set Load Status	
	User Set Save	
	User Set Default	

Common Substance Emissivity Table

When measuring the temperature of an object, you need to set the emissivity of the object to be measured. The emissivity values of different materials, temperatures, surface luminosity, and colors are different. The higher the emissivity, the greater the radiant energy. In order to compensate for the measurement error caused by different emissivity, it is necessary to set the corresponding emission rate according to the material of the measurement target object. rate value, please refer to the table below for details.

Material	Emissivity	Material	Emissivity	Material	Emissivity
Human Skin	0.98	Enamel	0.9	Copper (199℃)	0.18
Ice	0.97	Wood	0.9	Aluminium Sheet	0.18
Asphalt (Paving)	0.97	Granite (Polished)	0.85	Tinned Iron (Shell)	0.13
Plywood	0.96	Carbon	0.81	Copper (Shiny Non-Reflective)	0.07
Asbestos Paper (23℃)	0.96	Brick (Unglazed, Rough)	0.8	Lead (99.9% Pure Unoxidized)	0.06
Paper (White)	0.95	Copper (Heavy Oxidized Board)	0.78	Aluminium (Rough Plate)	0.06
Water	0.95	Iron Oxide	0.74	Aluminum (98.3% Plate @ 527° C)	0.06
Formica Board	0.94	Iron Plate (Rusted)	0.69	Aluminum Foil	0.04
Wrought Iron	0.94	Gold Foil Coated Steel Sheet	0.66	Tin (Bright Tinned Iron Sheet)	0.04
Concrete	0.94	Steel (599℃)	0.57	Nickel Wire	0.1
Glass (Smooth)	0.94	Steel (199℃)	0.52	Brass (Polished Wire)	0.04
Asbestos Paper (38℃)	0.93	Molten Iron	0.29	Aluminum (98.3% Plate @ 227° C)	0.04
Brick (Red, Rough)	0.93	Tinned Iron Sheet (Glossy)	0.23	Brass (Highly Polished)	0.03
Marble (Polished Grey)	0.93	Top Polished Aluminum	0.22	Gold	0.02
Frozen Soil	0.93	Copper (599℃)	0.19	Copper (Polished)	0.02
Plastic (White)	0.91	Aluminum (Oxidized @ 599° C)	0.19	Household Aluminum (Flat)	0.01

Trouble Shooting

Trouble:

◼ No camera found when running the iDatum

Possible Reason1:	Camera is not started up normally
Solution1:	Check camera power wiring (observe the indicator)
Possible Reason2:	Network cable connection error
Solution2:	Check network connection

◼ Camera connection error

Possible Reason1:	Camera and client software are not in the same network segment
Solution1:	Edit its IP address
Possible Reason2:	The camera has been connected by another program
Solution2:	Reconnect after disconnecting the camera from other programs

◼ Live view is black

Possible Reason:	Camera exception occurs
Solution:	Reboot the camera.

◼ Live view is normal, but the camera cannot be triggered.

Possible Reason1:	Trigger mode is not enabled
Solution1:	Check whether the camera trigger mode and related trigger signal input are normal in the current environment.
Possible Reason2:	Incorrect wiring
Solution2:	Check whether the wiring is correct under corresponding triggering mode.

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CHAPTER 9   # TECHNICAL SUPPORT

If you need advice about your camera or if you need assistance troubleshooting a problem with your camera, it's highly recommended to describe your issue in details and contact us via E-mail at support@visiondatum.com

It would be helpful if you can fill-in the following table and send to us before you contact our technical support team.

Camera Model:		Camera's SN:	
Describe the issue in as much detail as possible:			
If known, what's the cause of the issue?			
How often did/does the issue occur?			
How severe is the issue?			
Parameter set	Please connect the camera directly to PC and use iDatum to make note of the parameter when the issue occurred.		

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