



L1 Series 10Gb Optical Port Industrial Line Scan Camera Specifications

V2.1.0

Preface

Overview

This article briefly describes the content of the Gigabit electrical port Line Scan industrial camera, including product introduction, networking, basic parameters and quick operation of the application software.

Symbolic conventions

The following signs may appear in this document and they represent the following:

Identification	Description
 危险	Indicates a high potential hazard that, if not avoided, could result in personal injury or serious injury.
 警告	Indicates a moderate or low hazard potential that, if not avoided, could result in minor or moderate injury to personnel.
 注意	Indicates a potential risk that, if ignored, could lead to device damage, data loss, reduced device performance, or unpredictable results.
 防静电	Indicates an electrostatic sensitive device.
 当心触电	Indicates high pressure hazard.
 激光辐射	Indicates intense laser radiation.
 风扇警告	Indicates dangerous moving parts, please keep away from moving fan blades.
 当心机械伤人	It indicates mechanical injury of equipment components.
 窍门	Indicates that it can help you solve a problem or save you time.
 说明	The representation is additional information of the text, which is an emphasis and supplement to the text.

Notes on Safe Use



警告

- During the installation and use of the product, the electrical safety regulations of the country and the use area must be strictly observed.
- Please use the power adapter provided by the regular manufacturer. Please refer to the product parameter table for the specific requirements of the power adapter.
- To reduce the risk of fire or electric shock, do not expose the product to rain or moisture.
- Easy-to-use power-off equipment should be incorporated into the building installation wiring.
- When installing in the use environment, please ensure that the product is firmly fixed.
- If the product is not working properly, please contact the nearest service center and do not disassemble or modify the product in any way.
- (The company does not assume any responsibility for problems caused by unauthorized modifications or repairs).



注意

- Avoid installing the product in a vibration or shock environment, and keep the product away from electromagnetic interference. (Ignoring this item may damage the product).
- Do not directly touch the heat dissipation parts of the product to avoid scalding.
- Do not install indoor products in an environment where water or other liquids may be exposed.
- Please do not use the product in extremely hot, cold, dusty, corrosive or high humidity environment. Please refer to the parameter table of the product for specific temperature and humidity requirements.
- Avoid aiming the lens at strong light (such as lighting, sunlight or laser beams), otherwise the image sensor will be damaged.
- Do not touch the image sensor directly. If necessary, please moisten a soft clean cloth with alcohol and gently wipe off the dust. When the product is not in use, please add a dust cover to protect the image sensor.
- Please keep all the original packaging materials of the camera properly, so that when there is a problem, use the packaging materials to pack the camera and send it to the agent or return to the manufacturer for processing. The company does not assume any responsibility for accidental damage during transportation caused by non-original packaging materials.



说明

Quality requirements for installation and maintenance personnel:

- Have the qualification certificate or experience in the installation and maintenance of weak current system, and have the experience and qualification to engage in related work, in addition, must have the following knowledge and operation skills.

- Basic knowledge and operation skills of low voltage wiring and low voltage electronic circuit wiring.
- Have the ability to read the contents of this manual.



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Chapter1 Overview of products

1.1. Product Introduction

The Optical Port Ethernet Line Scan Industrial Camera is a highly reliable and cost-effective Line Scan industrial camera. It adopts high-performance photosensitive chip, transmits uncompressed image data in real time through 10Gb optical port Ethernet (XoF fiber), which can be compatible with any application development tools conforming to GigE Vision and GenICam standards, and the maximum transmission rate of 10Gb/s can satisfy the requirements of transmission rate in most of the industrial applications, and it can work stably in all kinds of harsh environments.

1.2. Product Features

- The maximum transmission distance of optical Ethernet interface can reach 300m.
- Support software trigger/hardware trigger/soft and hard mixed trigger/free collection and other modes.
- Support gamma correction, look-up table, black level correction, brightness, contrast and other ISP functions.
- The color camera supports interpolation, white balance, color conversion matrix, chroma, saturation, etc.
- Support multiple image data format output, ROI, mirror, etc.
- Meets GigE Vision 2.0 protocol and GenICam standards.
- Support DC 12V ~ 24V voltage power supply.
- EMC compliant, RoHS certified.

1.3. Typical networking

The most typical networking mode of industrial cameras is point-to-point connection, that is, there is no need for other network media between the host and the industrial camera, and the network cable can be used.

A host can also be connected to multiple industrial cameras through multiple network ports or switches, as shown in the following figure.

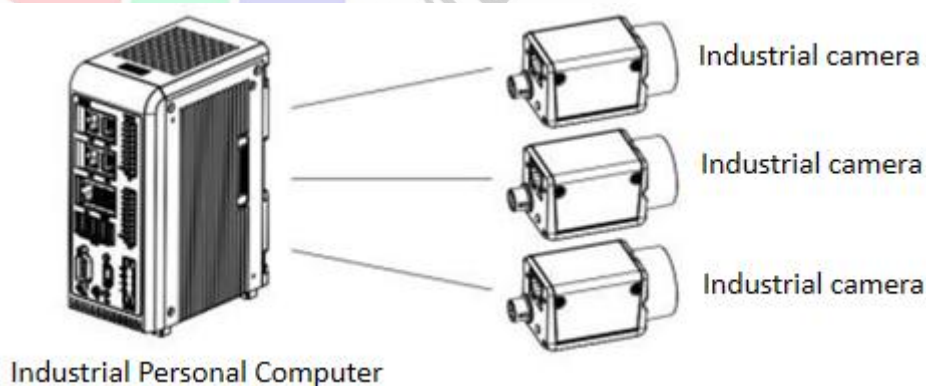


Figure 1-1 Typical Networking Mode

1.4. Main technical parameters and spectral curves

The main technical parameters of the Gigabit Ethernet Line Scan industrial camera are shown below:

Table 1-1 OPT-CL1-M4-XG3-02 Technical Parameters

4K 10 Gigabit Optical Port Linear Array Black and White		
Sensor	Sensor Type	CMOS
	Color	black and white
	Shutter Type	Global
	Resolution	4096H × 1V
	Pixel (μm) ²	7.00 × 7.00
	target surface	28.672mm x 14μm
	Bit depth	8/10/12
	Line frequency	196K
Image	dynamic range	65.6dB
	signal-to-noise ratio	> 44.3dB
	Exposure time	1us ~ 50ms
	Gain range	1.25~4.00
	Image Format	Black and White: Mono8/10/12packed
Physical Interface	Data Interface	10GbitGigE optical port
	IO Interface	12-core Hirose interface: 2 optocoupler isolation inputs, 1 optocoupler input ground, 2 optocoupler isolation outputs, 1 optocoupler isolation output ground, 2 encoder differential inputs, 1 power supply
	Lens interface	M42x1-6H ↓ 6
Power/Weight Dimensions/Specifications	Power supply	DC power supply through 12-core Hirose interface, voltage range 12V ~ 24V
	Power consumption (W)	7.3W@24V
	Temperature	Storage temperature:-30 °C ~ +80 °C; Working temperature: 0 °C ~ +50 °C
	Dimensions (mm) ³	76 x 76 x 68.1
	Weight (g)	4400g
	Specification	EMC Compliant, RoHS,GigE Vision 2.0 ,GenICam
	Software	OPT Camera Demo or third-party devices that support GenICam and GigE Vision

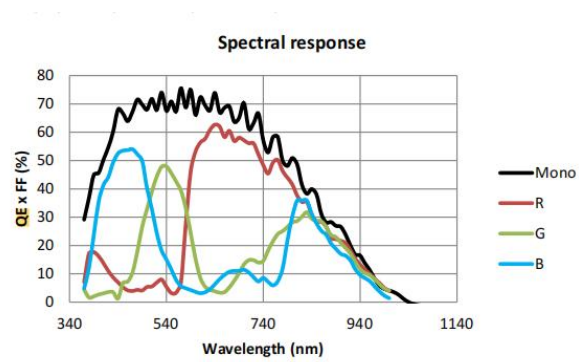


Figure 1-2 Spectral response curve (OPT-CL1-M4-XG3-02)

Table 1-2 OPT-CL1-M8-XG3-02 Technical Parameters

8K 10 Gigabit Optical Port Linear Array Black and White		
Sensor	Sensor Type	CMOS
	Color	black and white
	Shutter Type	Global
	Resolution	8192H × 1V
	Pixel (μm) ²	7.00 × 7.00
	target surface	57.344mm x 14μm
	Bit depth	8/10/12
	Line frequency	120K
Image	dynamic range	63.3dB
	signal-to-noise ratio	> 40dB
	Exposure time	5us ~ 50ms
	Gain range	1 to 15.5X
	Image Format	Black and White: Mono8/10/12packed
Physical Interface	Data Interface	10GbitGigE optical port
	IO Interface	12-core Hirose interface: 2 optocoupler isolation inputs, 1 optocoupler input ground, 2 optocoupler isolation outputs, 1 optocoupler isolation output ground, 1 power supply
	Lens interface	M72 × 0.75-6H ↓ 6
Power/Weight Dimensions/Specifications	Power supply	DC power supply through 12-core Hirose interface, voltage range 12V ~ 24V
	Power consumption (W)	6.7W@24V
	Temperature	Storage temperature:-30 °C ~ +80 °C; Working temperature: 0 °C ~ +50 °C
	Dimensions (mm) ³	76 x 76 x 75.2

8K 10 Gigabit Optical Port Linear Array Black and White		
	Weight (g)	455g
	Specification	EMC Compliant, RoHS, GigE Vision 2.0, GenICam
	Software	OPT Camera Demo or third-party devices that support GenICam and GigE Vision

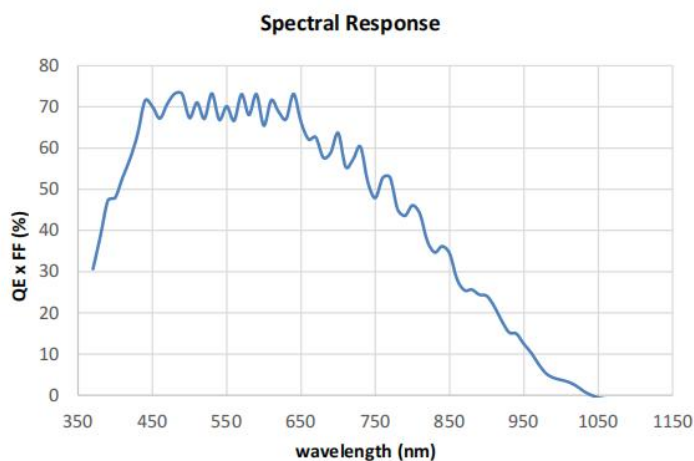


Figure 1-3 Spectral response curve (OPT-CL1-M8-XG3-02)

Table 1-3 OPT-CL1-M16-XG3-02 Technical Parameters

16K 10 Gigabit Optical Port Linear Array Black and White		
Sensor	Sensor Type	CMOS
	Color	black and white
	Shutter Type	Global
	Resolution	16384H × 1V
	Pixel (μm) ²	3.50 × 3.50
	target surface	57.344mm × 14μm
	Bit depth	8/10/12
	Line frequency	71.4K
Image	dynamic range	56.6dB
	signal-to-noise ratio	> 37.4dB
	Exposure time	5us ~ 50ms
	Image Format	Black and White: Mono8/10/12packed
Physical Interface	Data Interface	10GbitGigE optical port
	IO Interface	12-core Hirose interface: 2 optocoupler isolation inputs, 1 optocoupler input ground, 2 optocoupler isolation outputs, 1 optocoupler isolation output ground, 1 power supply

16K 10 Gigabit Optical Port Linear Array Black and White		
	Lens interface	M72 × 0.75-6H ↓ 6
Power/Weight Dimensions /Specifications	Power supply	DC power supply through 12-core Hirose interface, voltage range 12V ~ 24V
	Power consumption (W)	6.4W@24V
	Temperature	Storage temperature:-30 °C ~ +80 °C; Working temperature: 0 °C ~ +50 °C
	Dimensions (mm) ³	76 × 76 × 75.2
	Weight (g)	455g
	Specification	EMC Compliant, RoHS, GigE Vision 2.0, GenICam
	Software	OPT Camera Demo or third-party devices that support GenICam and GigE Vision

Spectral Response

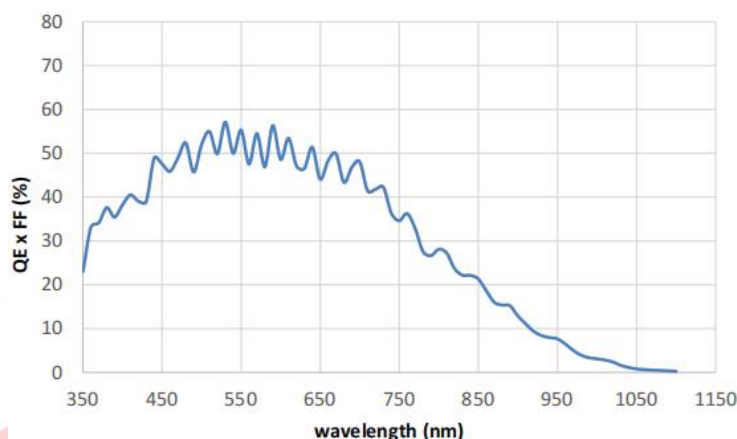


Figure 1-4 Spectral response curve (OPT-CL1-M16-XG3-02)

1.5. Environmental requirements

The environmental requirements for the Optical Port Ethernet Line Scan Industrial Camera are as follows:

- Temperature and Humidity

The ambient temperature should not exceed 50 °C, it is best to work in an air-conditioned environment.

 - ◇ Working shell temperature: 0 °C ~ 60 °C.
 - ◇ Ambient humidity at work: 20% ~ 80% without condensation.
 - ◇ Storage temperature:-30 °C ~ +80 °C.
 - ◇ Storage humidity: 20% ~ 80% without condensation.
- The equipment is installed indoors, the position is stable, and there is enough heat dissipation space left and right.
- Ensure a certain air flow.

Chapter2 Interface Description

2.1. Camera structure size

The structural dimensions of the product are as follows:

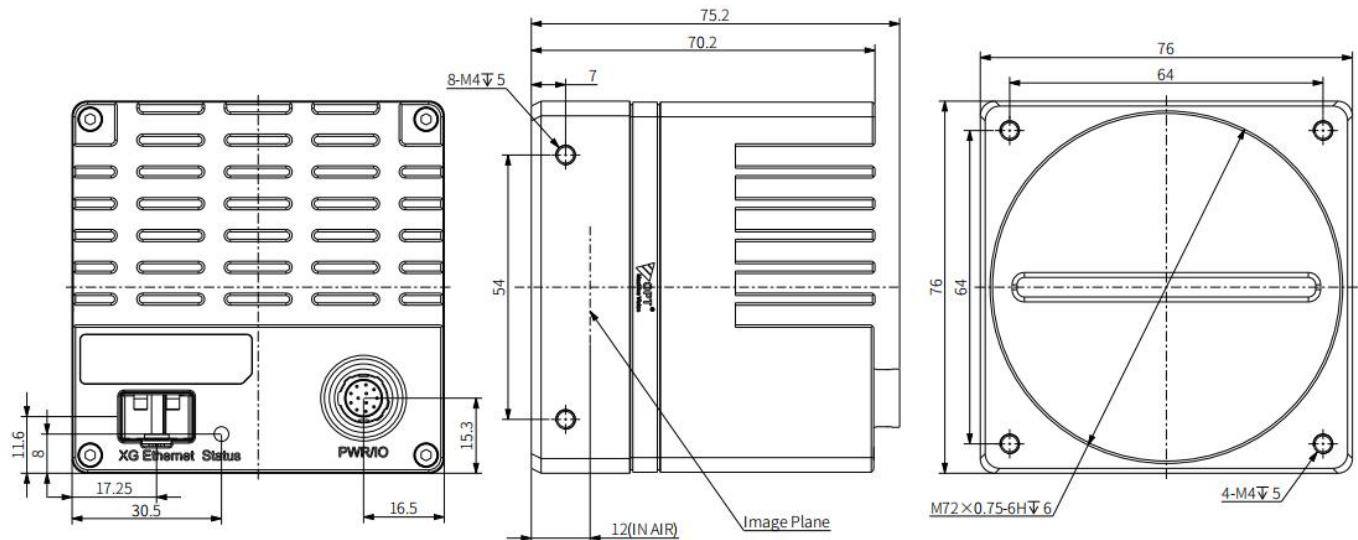


Figure 2-1 Dimensional Drawing of 10 Gigabit Optical Port Line Scan Camera

2.2. Interface Description

There are two interfaces on the back of the device, the network interface and the 12pin power supply and I/O interface, as shown in the following figure:

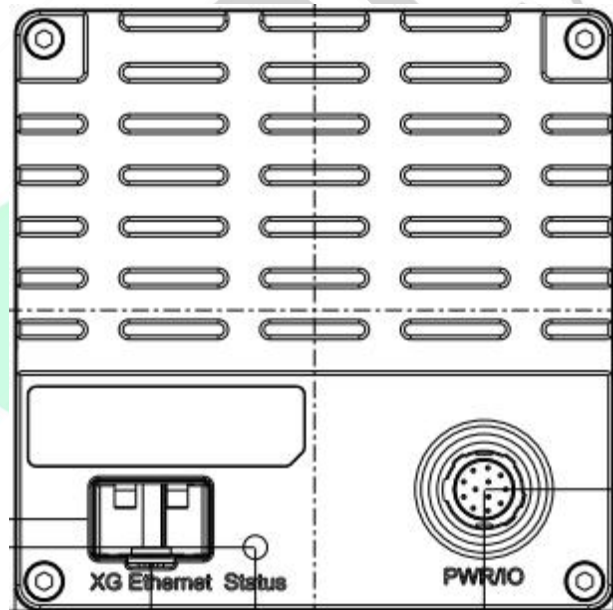


Figure 2-2 Dimensional Drawing of 10 Gigabit Optical Port Line Scan Camera

2.3. Network Interface

Network interface, namely optical fiber network port, Ethernet 10000Mbps transmission interface, used for camera control, data transmission.

In order to ensure the transmission quality, the network cable uses 10 Gigabit optical fiber line to prevent excessive data retransmission and data packet loss.

2.4.12PIN power supply and I/O interface

The I/O interface pin signals are defined as shown in Table 2-1.

Table2-1Pin Signal Definition

Pin	Signal	Description
1	GND	Power ground
2	PWR	DC 12V ~ 24V camera power supply
3	IN Line1+	Encoder input Encoder A +
4	IN Line1-	Encoder input Encoder A-
5	IN Line2+	Encoder input Encoder B +
6	IN Line2-	Encoder input Encoder B-
7	OUT GND	Optocoupler isolation output ground
8	OUT Line5	Optocoupler isolated output Line Out1
9	OUT Line6	Optocoupler isolated output Line Out2
10	IN GND	Optocoupler isolation input ground
11	IN Line4	Optocoupler Isolated Input Line2
12	IN Line3	Optocoupler Isolated Input Line1

12Pin female pin bit ordering and wiring definition (corresponding to wiring definition and I/O interface) are as follows:

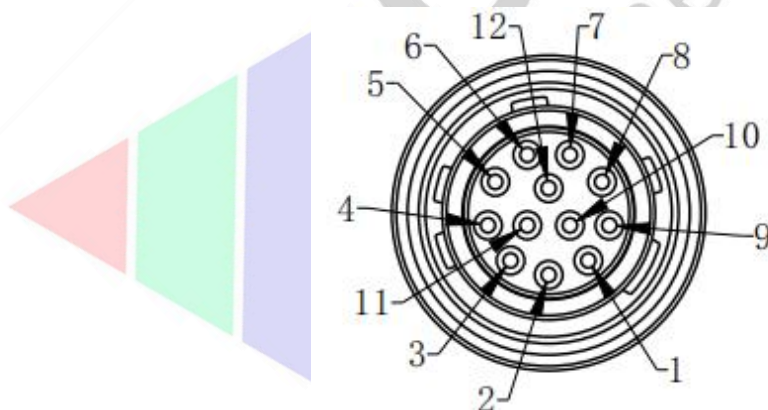


Figure 2-3 Pin Bit Ordering of 12pin Female

Table 1 2-2 12pin female pin wiring definition

Pin	Signal	Line color
1	GND	Black
2	PWR	Red
3	IN Line1+	White orange
4	IN Line1-	Orange
5	IN Line2-	Green
6	IN Line2+	White green

Pin	Signal	Line color
7	OUT GND	White
8	OUT Line5	White brown
9	OUT Line6	Brown
10	IN GND	Grey
11	IN Line4	Blue
12	IN Line3	White blue

2.4. Electrical Specifications

2.4.1. Electrical specifications for power and network ports

Table 2-3 Power Supply and Network Port Electrical Specifications

Parameters	Description
Camera Power Specifications	DC +12V ~ +24V, <1% ripple, powered by camera 12-core Hirose connector; A minimum of 26AWG cable is required.
EMI Standard	Radiated Interference (Radiation) QP: 30-230MHz, 40dBuV/m@10m; 230-1000MHz, 47dBuV/m@10m; Conducted interference (Conduction) 0.15-0.5MHz, 79dBuV-QP; 66dBuV-AV; 0.5-30MHz, 73 dBuV-QP; 60 dBuV-AV;
EMS Standard	Electrostatic Immunity (ESD) Contact Discharge: $\pm 4\text{kV}$ Air Discharge: $\pm 8\text{kV}$ Electrical fast compliant pulse group (EFT) $\pm 2\text{kV}$ Surge immunity (Surge) $\pm 2\text{kV}$ Conducted Immunity (Conducted Susceptibility) 0.15-80MHz, 10V, 80% AM(1KHz) Radiated Immunity (Radiated Susceptibility) 80-1000MHz, 10V/m; 1.4-2.0GHz, 3V/m; 2.0-2.7GHz, 1V/m;
EMC standard	Class A



说明

- Support DC +12V ~ +24V external power supply.
- The power supply must meet SELV and LPS specifications.

2.4.2. IO Interface Electrical Specifications

2.4.2.1. Optocoupler Isolated Input

Table 2-4 Optocoupler Isolation Input

Input voltage	Description
30V	Limit voltage, the input can not exceed this limit value, otherwise it will cause damage to the equipment
DC 0~24V	I/O input safe operating voltage range
DC 0~1.4V	Represents logical 0
DC >1.4V~2.2V	The input state is flipped here, and the logic state is indefinite within this voltage range.

Input voltage	Description
DC >2.2V	Represents Logic 1



注意

Isolated I/O input port pouring current 5mA ~ 15mA.

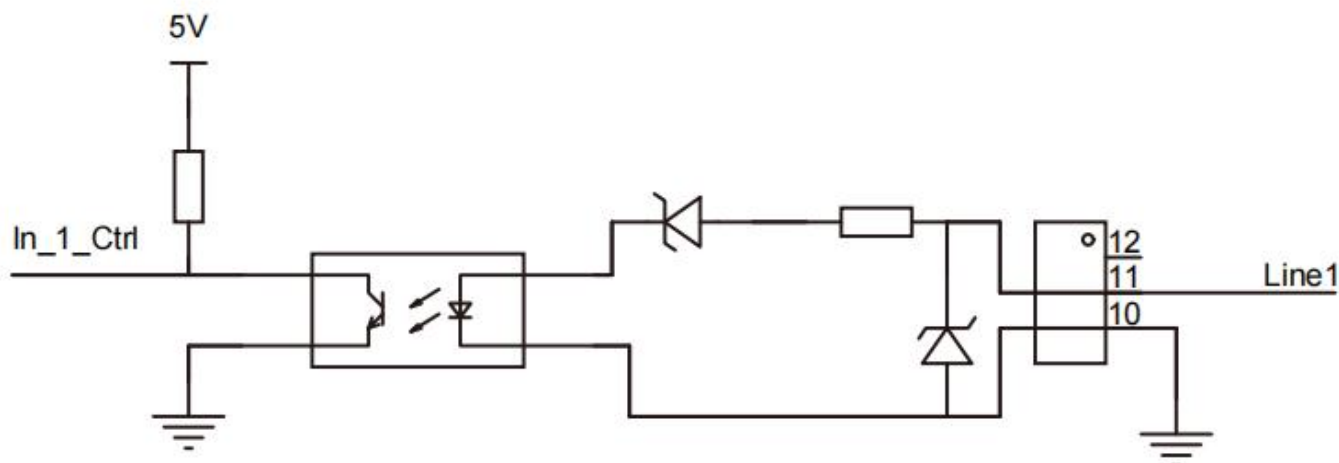


Figure 2-4 Frame Trigger Optocoupler Isolated Input Circuit

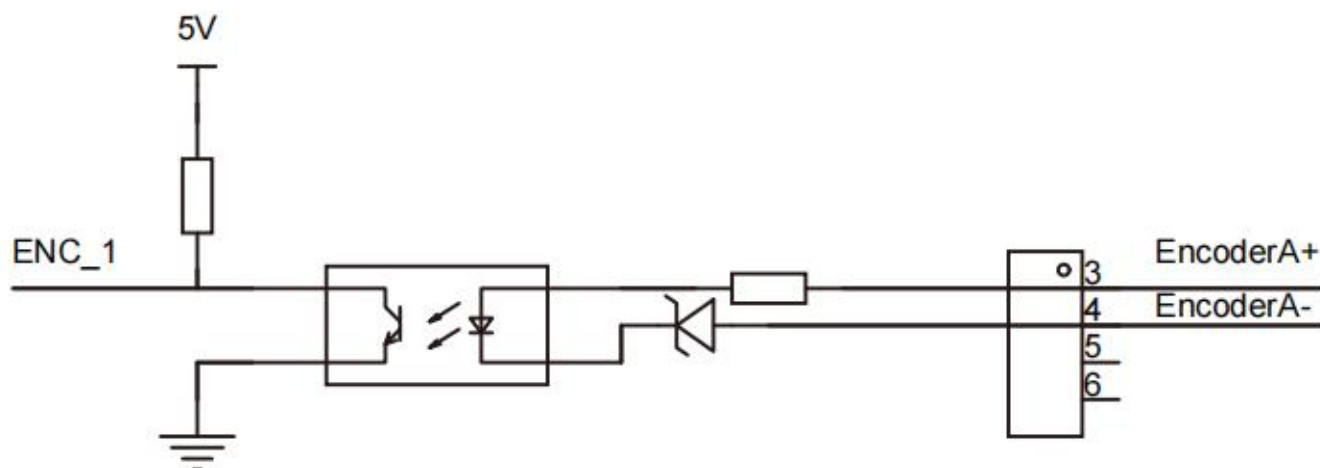


Fig. 2-5 Encoder Optocoupler Isolated Input Circuit

2.4.2.2. Optocoupler isolated output

Table 2-5 Optocoupler Isolation Output

Voltage	Description
DC 30V	Limit voltage, the input can not exceed this limit value, otherwise it will cause damage to the equipment
DC <3.3V	I/O output may be wrong
DC 3.3V~+24V	I/O Output Safe Operating Range



注意

The isolated I/O output port continuously passes a maximum of 50mA current.

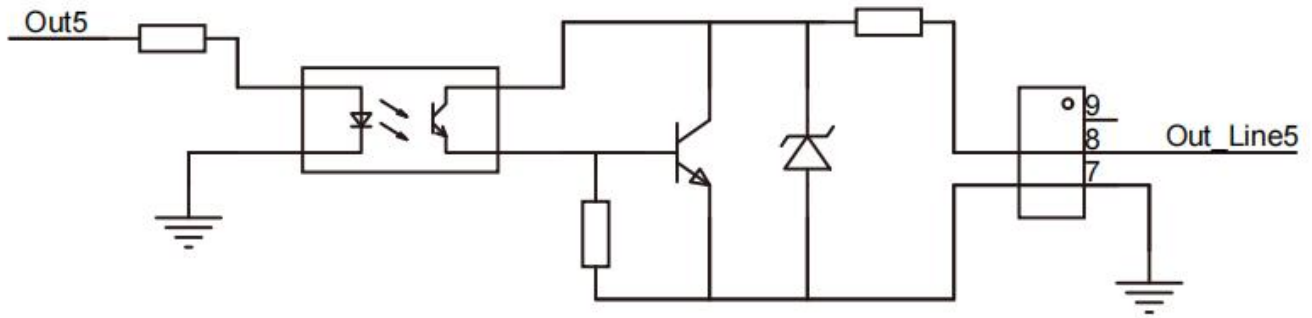


Fig. 2-6 Optocoupler Isolated Output Circuit

2.5. Camera Wiring Diagram

2.5.1. Frame trigger optocoupler isolation input

The camera input is connected to the optocoupler isolated output of the frame signal of the load

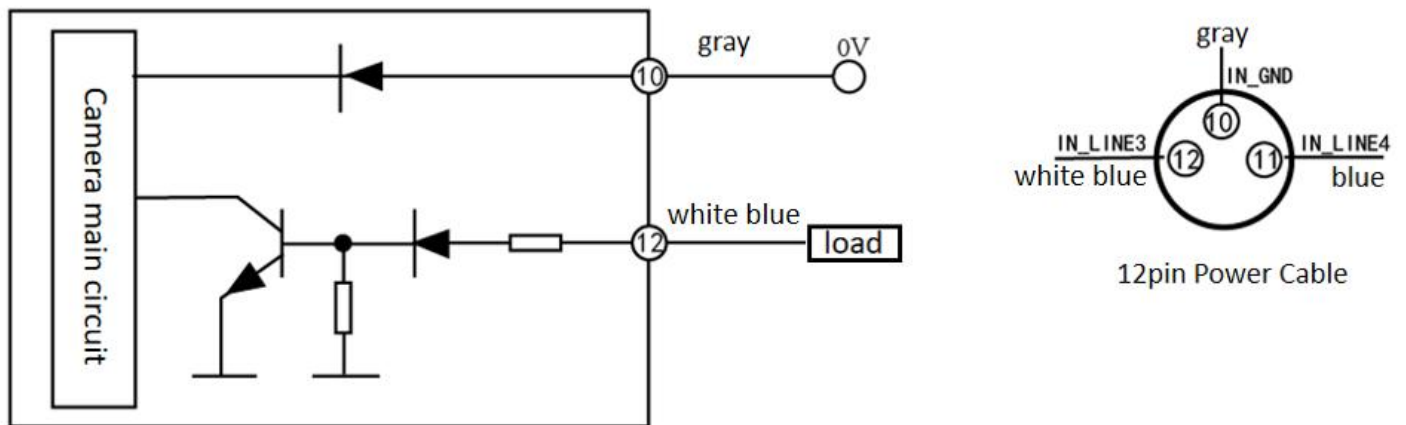


Figure 2Wiring Diagram -7 Frame Trigger Optocoupler Isolation Input

2.5.2. Encoder trigger optocoupler isolation input

The encoder input of the camera is connected to the optocoupler isolated output of the encoder signal of the load

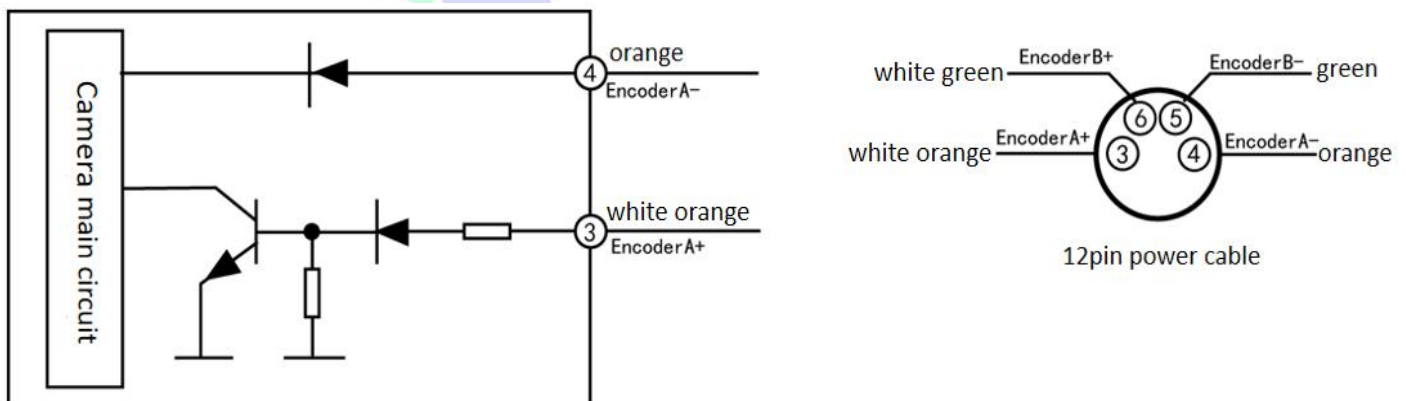


Figure 2-8 encoder trigger optocoupler isolation input wiring Diagram

2.5.3. Optocoupler Isolated Output

The optocoupler isolation output signal of the camera is connected to the input of the load, and the connection mode is divided into NPN load and PNP load.

NPN

Output Circuit Wiring Diagram

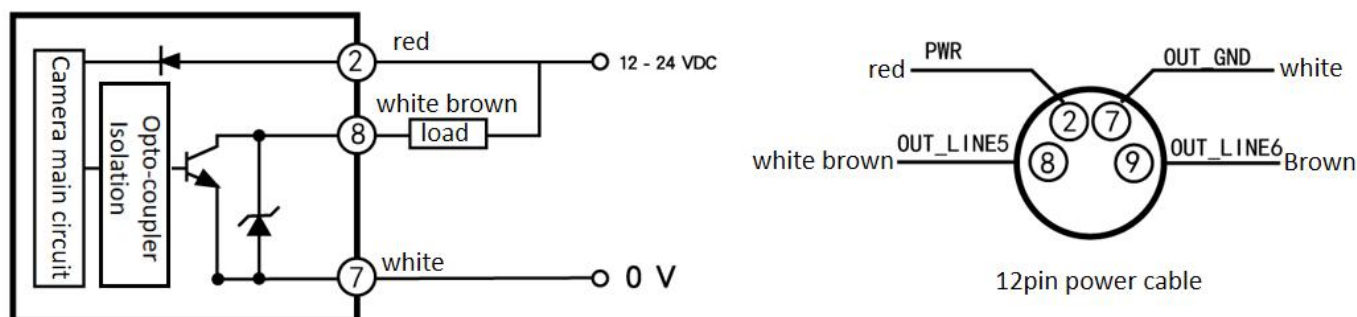


Fig2. 9 Optocoupler Isolated Output Load NPN Wiring Diagram

PNP

Output Circuit Wiring Diagram

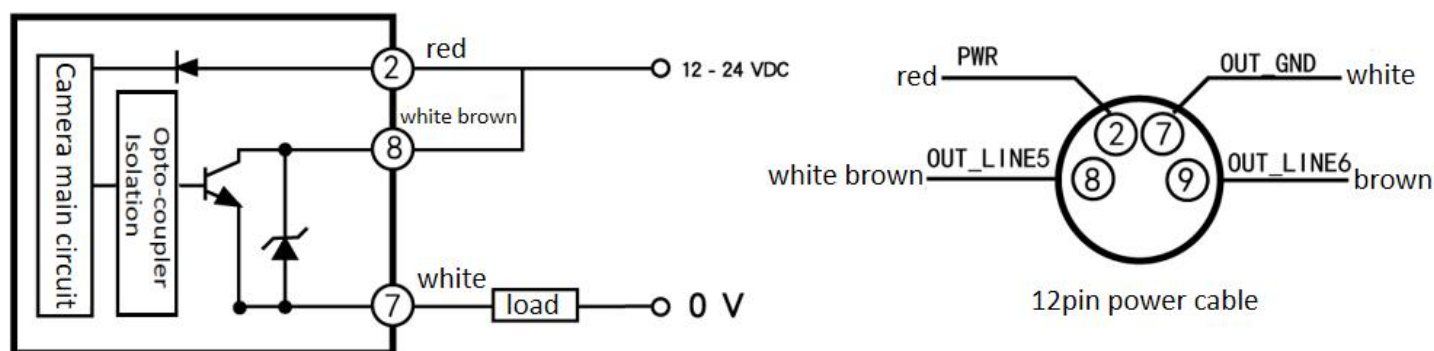


Fig2. -10 Optocoupler Isolated Output Load PNP Wiring Diagram

2.6. Status Indicator

Table 2-8 describes the status indicator of the equipment.

Table 2-8 Description of Indicator Lights

● Color and Status	● Schema tic Diagram	● Description
Close		The device is not powered
Red light flash		System startup
Green Flash		Device in free acquisition state
Green light flashing slowly		Device is in trigger acquisition mode
Red light flashing slowly		Device is in startup complete pending connection state
Red light and green light switch flashing		Device is in IAP status to be upgraded
The green light is always on		Device connection successful

Chapter 3 Product Installation

Installation is mainly divided into hardware installation and application installation.

3.1. Hardware Installation

Before installation, please check the equipment for obvious damage and confirm whether it is consistent with the matching list.

1. Fix the camera to the installation position and select the appropriate lens to install on the camera.
2. Connect the camera and 10 Gigabit network card with 10 Gigabit optical fiber cable (it is recommended to use the company's recommend 10 Gigabit network card).
3. Select any 1 of the following power supply methods.

Power supply: Use 12-pin power I/O cable and connect it to the appropriate power adapter according to the correct wiring method. For I/O interface definition, please refer to Chapter Power Supply and I/O Interface Definition 1.4.

12V power adapter power supply: use the 12PIN dedicated power cord provided by our company. the power cord is a 2-pin in-line power cord. refer to the adapter data for the line sequence.

3.2. Application Installation

The steps for the host to install the application are as follows:



Contact the relevant technical support personnel to obtain the application installation package.

1. Open the software and double-click the desktop shortcut  to open the application installation package.
2. If the driver has been installed before, a window as shown in Figure 3-1 will pop up. Confirm whether to uninstall it automatically and reinstall it as required. If yes, start uninstalling.

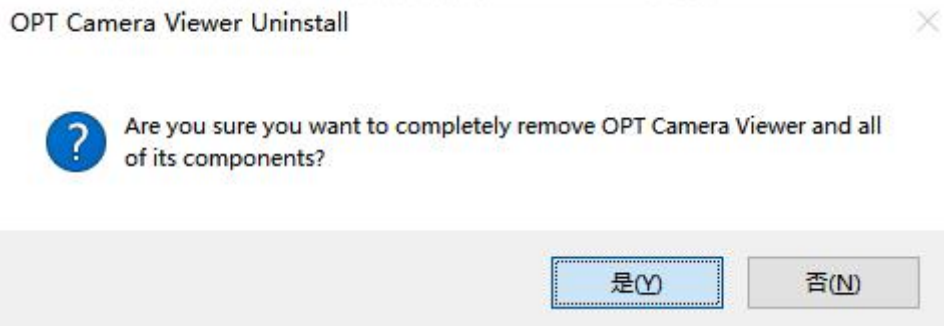


Figure 3-1 Prepare to Uninstall Window

3. Enter the uninstall installation window as shown in Figure 3-2, and wait for the uninstall (if the driver has not been installed before, steps 2 and 3 are not required)

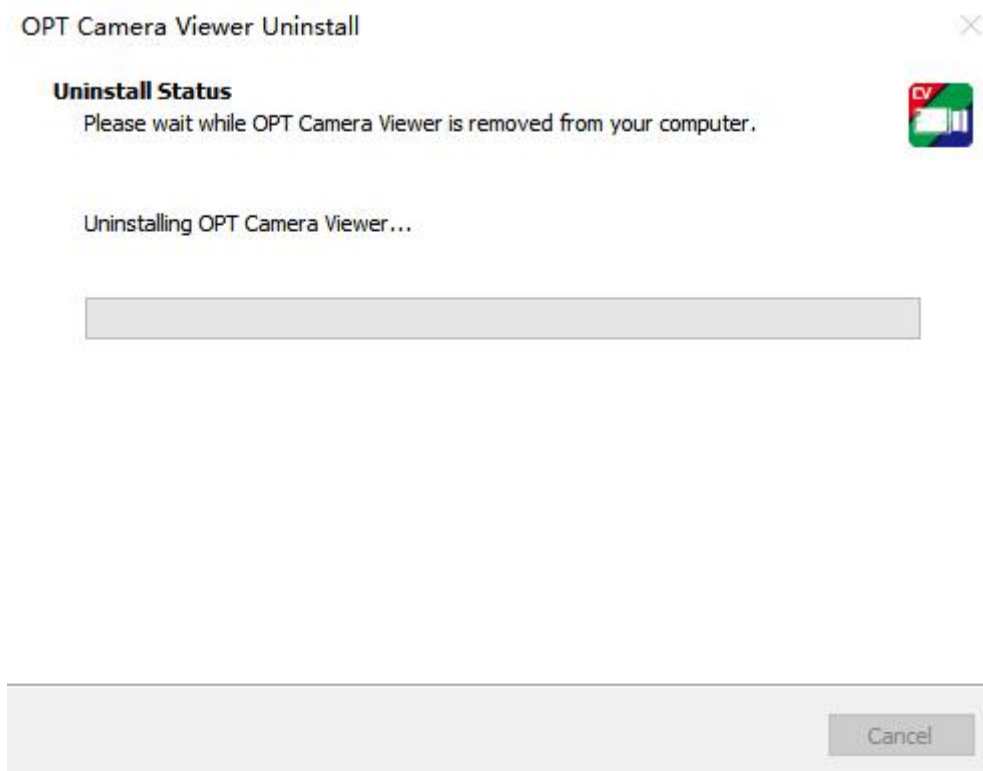


Figure 3-2 Unload Window

4. After the uninstallation is completed, directly enter the installation process, and the license agreement window as shown in Figure 3-3 will pop up. After carefully reading the license agreement, confirm that you agree to the license terms, and then click the Next button to continue the installation process.

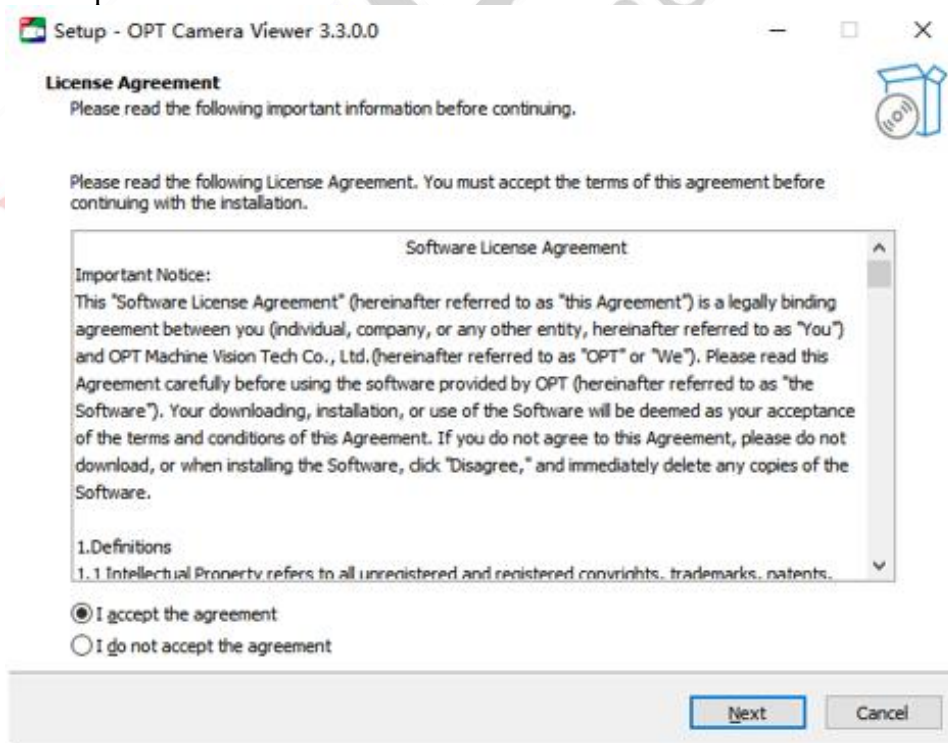


Figure 3-3 Ready to install window

5. Enter the installation folder window as shown in fig. 3-4, select the software installation path (the default path is: C:\Program Files \OPT\OPTCameraViewer Demo) and click the next button to

continue the installation process.

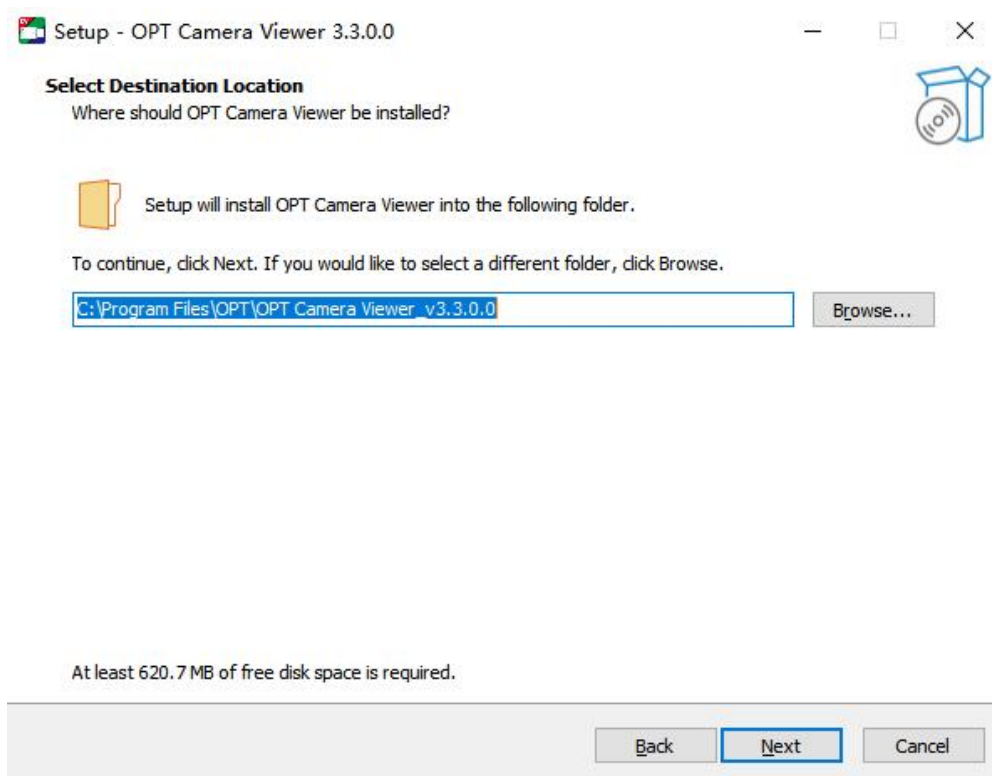


Figure 3-4 Installation folder window

6. Enter the preparation installation window as shown in Figure 3-5, check the installation summary information and click the Next button to continue the installation process.

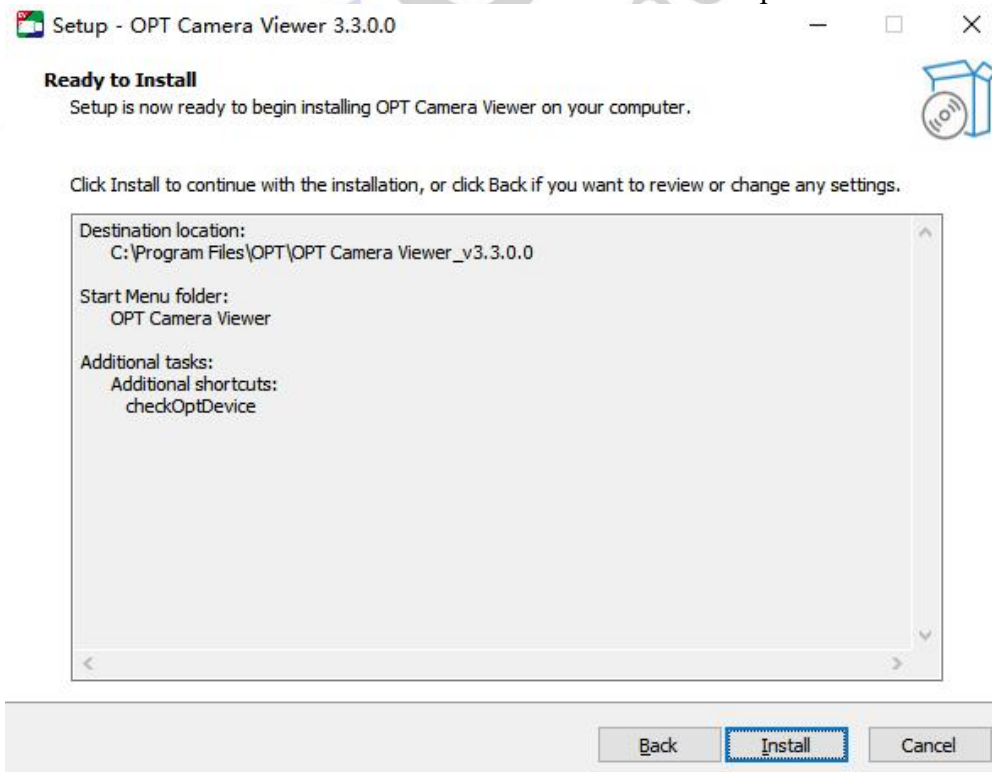


Figure 3-5 Ready to Install Window

7. Enter the installation window as shown in Figure 3-6 and wait for installation.

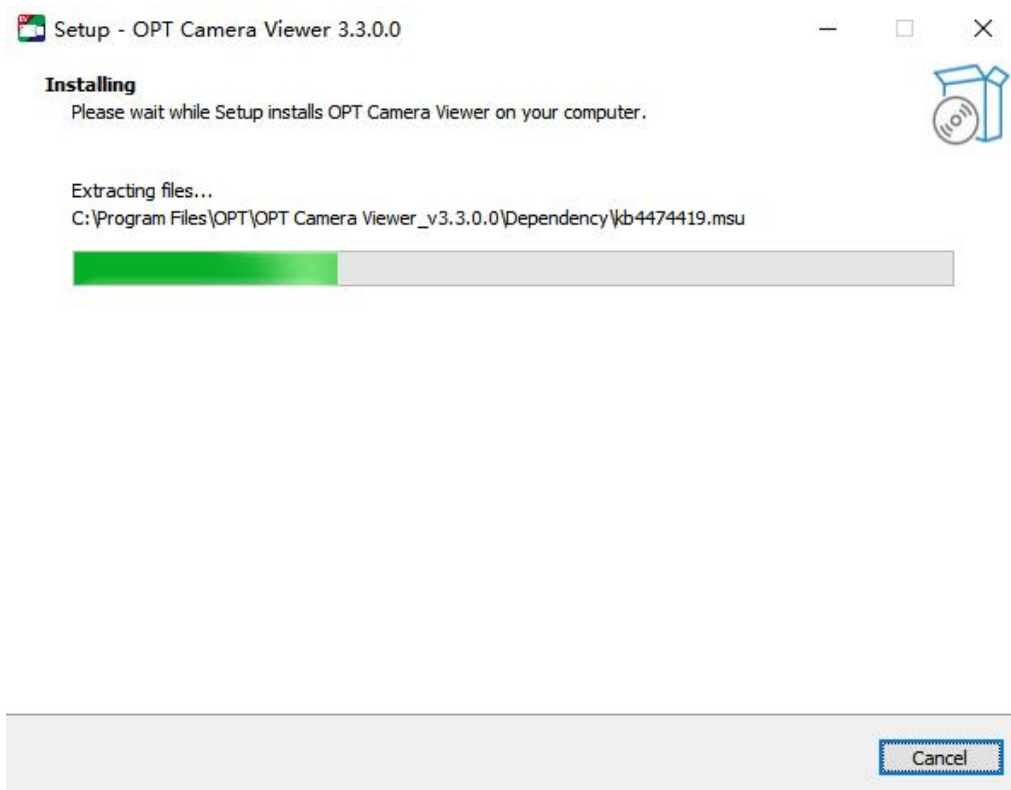


Figure 3-6 Installation window

8. The software installation success window pops up as shown in Figure 3-7. The software OPT Camera Viewer is successfully installed. Click the Finish button to end the installation process.

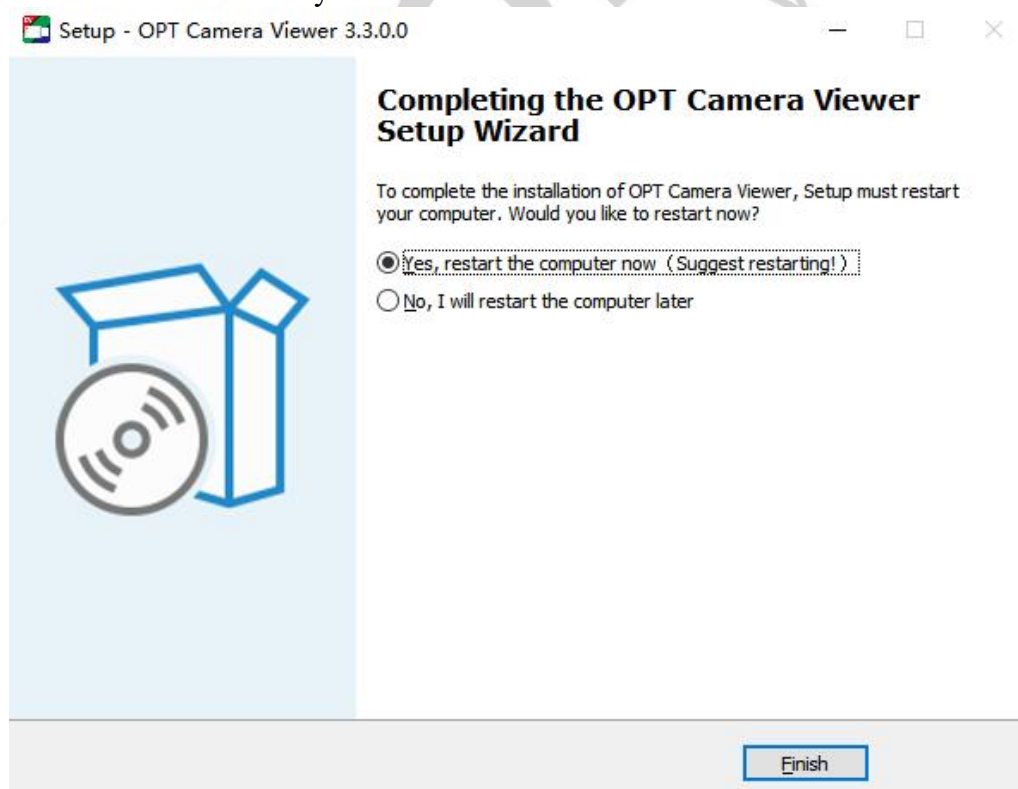


Figure 3-7 Software installation success window

Chapter4 Network Settings



注意

- Make sure the 10 Gigabit Ethernet Line Scan industrial camera is properly connected to the PC.
- Install the application on the PC. Please refer to "3.2Application Installation"" for details "

After the 10Gb Ethernet Line Scan industrial camera is connected to the cable, the application program installed in the host computer can detect the online camera and make sure that the camera IP and the local computer IP are in the same network segment, and the camera will be able to run normal operation.

The specific operation steps of network setting are as follows:

1. Open the software.

Open the application software by double-clicking the desktop shortcut . The software will automatically detect all online devices. The interface is shown in Figure 4-1.

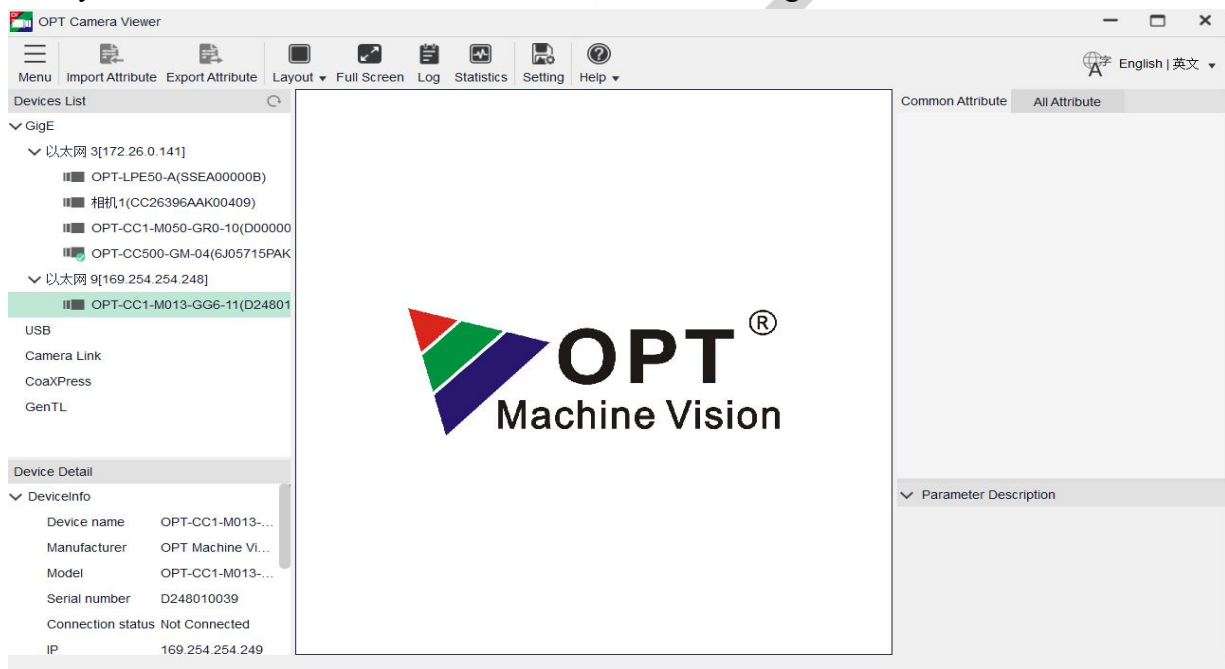


Figure 4-1 Software window

2. Camera IP settings.

Click to select the device information, and then right-click to configure the IP, as shown in Figure 4-2.

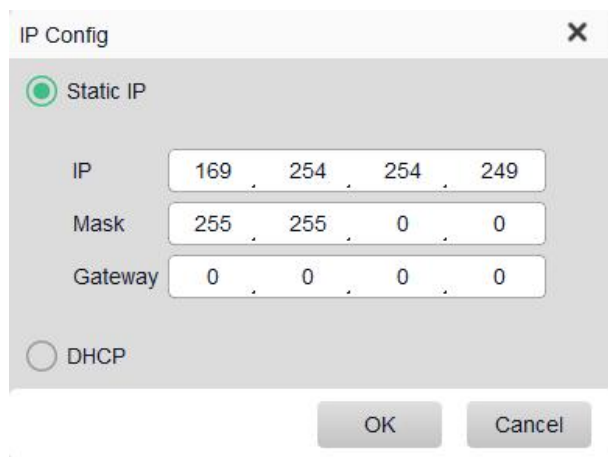


Fig. 4-2 IP setting interface

3. Equipment connection.

Select the target camera and click  to connect the device. After the connection is successful, click .

The device tab and property tab are shown in Figure 4-2.

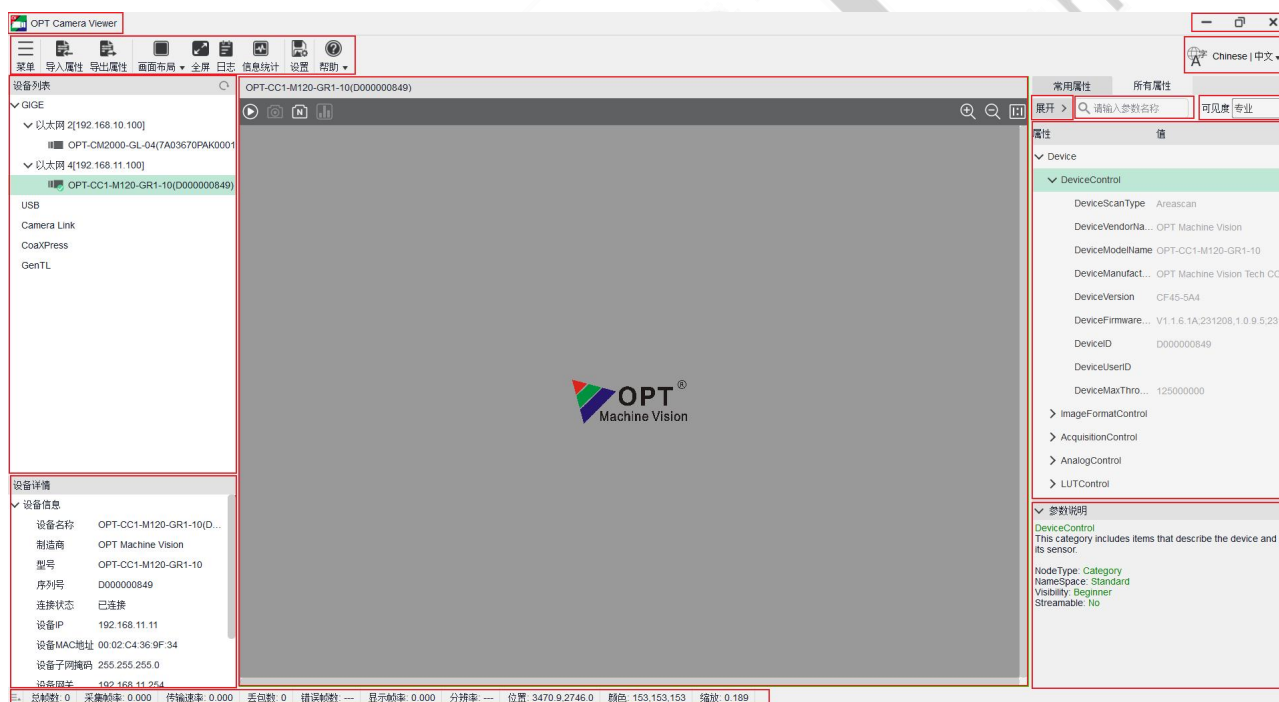


Figure 4-2 Successful device connection (Device tab)



You can click  to disconnect the device.

Table 4-1 OPT Camera Viewer parameters

Serial Number	Parameters	Parameter Description
1	Menu Bar	Provides functions for files, views, settings, tools, and help. For more information, see Table 4-2.
2	Control Tool Area	Provides quick, easy manipulation of camera images as follows:  Import Attribute : Click the icon to quickly import configuration parameter attribute information. (This icon appears gray when the camera is in stream fetching state.)  Export Attribute : Click the icon to quickly export the configuration parameter attribute information. (This icon appears gray when the camera is in stream fetching state.)  Layout ▾ : The screen layout is a display setting for the preview multi-window layout.  Full Screen : Click the icon to globally expand the image preview, press the keyboard ESC to return. (Global preview is also available by double-clicking under the Image Preview window)  Log : Quickly use the log information preview function, the information type can be customized selection and support the output to save as text view.  Statistics : Click this icon for a quick preview of the information statistics.  Setting : Click this icon to jump to the settings window for image saving and caching options.  Help ▾ : Click the icon to quickly view the software version information, etc.  English 英文 ▾ : Click this icon to select the software system display language.
3	Equipment List	Displays a list of devices that detect all online devices, Including GigE, USB, CameraLink and other common multi-protocol interface devices.  : Refresh. Click the icon to manually refresh the online device information.  Click this icon to manually configure the camera IP.:  : The device is in a connectable state.  : The device is connected.

4	Equipment Details	The details of the camera and the connection information of the interface are displayed here.
5	Image Preview Window	Display camera real-time image data, and the camera real-time information statistics and display.
6	Functional Parameter Area	Parameter items for this camera in different (operation level) roles.  : parameter visibility. You can click ▼ to select an entry, professional, or master role from the drop-down menu as needed. The parameters for each role are slightly different.
7	Parameter Interpretation Area	Click a parameter property item to display the explanation of the parameter.
8	Window Action Menu	 : Maximize the window.  : Restores the window size downward.  : Minimum speech window.  : Close the application.
9	Data Flow Area	The frame rate, total frames, transfer rate, error frames, and display frame rate in the camera capture are shown here.

Table 4-2 Menu Bar-Parameter Interpretation

Menu Bar		Description
File	Import Properties	Import configuration parameter attribute information as a file.
	Export Properties	Export configuration parameter attribute information as a file
	Save Ganicam XML	Saves the output XML file information.
View	Equipment List	
	Equipment Details	
	Common Properties	
	All Properties	
		You can choose to open or hide the above four windows.
Setup	Image Save	Set the image save path, image format, etc.
	Cache Options	Set the cache parameters for the data stream.
Tools	Driver Management	The relevant basic drivers of the OPT Camera Viewer can be loaded or enabled autonomously.
	Bandwidth Management	Monitor network bandwidth and data transmission.
	Network card property settings	Can switch and configure the computer network card parameters.
	Log	Log information preview (including device parameter update, event message channel, pull stream cache and other event notifications), information type can be customized selection and support output saved as text view
	Information statistics	Statistics can be set to capture the frame rate, bandwidth, the number of images received, frame loss rate, the number of error images.
Help	Firmware Upgrade	The camera firmware can be upgraded.
	About	View the current software version information (software version number, software belonging and official website).
	Help documentation	Path location to place the relevant Operations Guide document

Chapter5 Description of main functions

This chapter mainly explains the functional parameters related to industrial cameras. Please find the Table 4-1 specific parameter information in serial number 5.



- The industrial camera supports three types of user level selection: entry (Beginner), professional (Expert) or master (Guru). The parameter items in the attribute window corresponding to each level are slightly different. Please refer Table 4-1 to No. 5 for the user level selection operation.
- A parameter item displayed in black indicates that the parameter can be modified or set, and a parameter item displayed in gray indicates that the parameter does not support modification or setting in the current operation mode.

5.1. Device Control

You can view the device information and modify the device name in the property. For details about parameter settings, see Table 5-1.

Table 5-1 Device Management-Parameter Interpretation

Parameters	Description
DeviceScanType	The scan type of the device Sensor, such as area array or line array.
DeviceVendorName	Equipment suppliers.
DeviceModeName	Equipment model.
DeviceManufacturerInfo	Equipment manufacturer.
DeviceVersion	Device software version.
DeviceTemperature	The actual temperature value of the motherboard chip (°C).
DeviceFirmwareVersion	Device firmware version.
DeviceID	Device serial number.
DeviceUserID	User-defined device name.
DeviceMaxThroughput	The maximum data throughput of the device.
DeviceReset	Device restart button, call the API to restart the camera.

5.2. ImageFormatControl

In this attribute, you can modify the image size, image pixel format, area of interest and test image mode collected by the current device. Please refer to the table 5-2 for detailed parameter settings.



The image output format supported by the industrial camera is subject to the format supported by the camera.

Table5-2Image Format Management-Parameter Interpretation

Parameters	Description
SensorWidth	The maximum image width (in pixels) supported by the Sensor.
SensorHeight	The maximum image height (in pixels) supported by the Sensor.
WidthMax	The maximum image width (in pixels) is affected by decimation.
HeightMax	Maximum image height (in pixels), which is affected by decimation, etc.
Width	The image width (in pixels) of the actual output.
Height	The actual output image height in pixels.
OffsetX	The horizontal offset of the image, starting from the upper left corner, the maximum value is determined by the value of Width.
ReverseX	The image is flipped horizontally, based on the original size of the Sensor, not the image after the ROI.
PixelFormat	Image output format. Different models support different formats.
PixelSize	Pixel bit width.
TestImageSelector	Select the type of test image sent by the device.

5.3. AcquisitionControl

In this attribute, you can set the camera's image capture mode, trigger mode, exposure time, etc. Please refer to Table 5-3for detailed parameter settings.

Table5-3Collection Management-Parameter Interpretation

Parameters	Description
AcquisitionMode	Image acquisition mode: - SingleFrame (single frame): refers to the collection of 1 frames at a time, and the pull stream is automatically stopped after collection. - Continue (continuous): refers to continuous acquisition until the Acquisition Stop is issued to stop the acquisition of pull flow.
AcquisitionStart	SDK start/stop pull stream.
AcquisitionStop	
AcquisitionBurstFrameCount	In trigger mode, the number of images captured by the camera after receiving a trigger signal.

Parameters	Description
AcquisitionFrameRateEnable	Frame rate limiting enabled. When the value is true, the frame rate set by the AcquisitionFrameRate is valid.
AcquisitionFrameRate	Limit Frame Rate Value  说明 If the set frame rate exceeds the maximum frame rate that can be reached by the camera under the current parameters, the actual output frame rate of the camera is ResultingFrameRate instead of the AcquisitionFrameRate set frame rate.
AcquisitionLineRateEnable	Image line frequency. AcquisitionLineRate setting the limit line frequency is effective when the AcquisitionLineRateEnable is True.
AcquisitionLineRate	 说明 If the set line frequency exceeds the current mode of the camera can achieve the maximum frame rate value, the camera actual output frame rate is AcquisitionActualLineRate, rather than the AcquisitionLineRate set value.
ResultingLineRate	The maximum line frequency that the camera can achieve under the current parameters.
AcquisitionActualLineRate	The line frequency at which the actual camera captures the image.
AcquisitionStatusSelector	Select and view the collection status Select the FrameTriggerWait (frame trigger waiting status) in the AcquisitionStatusSelector and view it in the AcquisitionStatus. True means waiting for triggering, and False means triggered.
AcquisitionStatus	
TriggerSelector	Trigger type selection. Select Frame Burst Start (frame burst trigger) or LineStart (line trigger) in the TriggerSelector.
TriggerMode	Controls whether the device trigger mode is on.
TriggerSoftware	Soft trigger button. A soft trigger can be generated by clicking or calling the API.
TriggerSource	Trigger source selection. TriggerSource support SoftwareTrigger (software triggered), lineN (hardware triggered) and Counter1 (counter triggered) When a soft trigger is selected, the trigger signal is generated by the execution TriggerSoftware or the call to the API and output to the camera over the gigabit network. When selecting the signal hardware trigger, set the RisingEdge (rising edge trigger), FallingEdge (falling edge trigger) LevelHigh (high level trigger) or LevelLow (low level trigger) in the TriggerActivation, and then the corresponding type of trigger is generated by the external cable and output to the camera through the IO interface.

Parameters	Description
	When the selection counter is triggered, the trigger signal is generated by the Counter inside the camera. At this time, the trigger source of the Counter1 should be set to Line1,Counter1 when the current count value is equal to the Counter Value, the Counter1 outputs a collection trigger signal.
TriggerActivation	Trigger mode. Including rising edge, falling edge, double edge and high, low level five trigger mode, in the setting.
TriggerDelay	Trigger delay. It refers to the time when the camera receives the trigger signal and the trigger takes effect. For the trigger source, either a soft trigger or a hard trigger takes effect.
TriggerCache	Trigger cache. When the trigger mode is enabled, if the trigger process receives a new trigger signal, the signal may be retained and processed.
ExposureMode	Exposure mode and exposure time.
ExposureTime	Currently, only the Timed exposure mode is supported, and the exposure duration is determined by the specific time. The time set by the ExposureTime is the exposure time.
ExposureAuto	Automatic exposure. - Off means to turn off automatic exposure. - Once means that the camera can automatically modify the exposure once according to the ambient brightness, and the modified value is displayed in gray in the ExposureTime. The Continue indicates that the camera can continuously modify the ExposureTime according to the brightness of the environment to adapt to the change of the environment, and the modified value is displayed in gray in the ExposureTime.

5.4. AnalogControl

In this attribute, the analog signal of the image captured by the camera can be adjusted, including lookup table, black level, gamma correction, etc. Please refer Table 5- 4 for detailed parameter settings.

Table 5-4 Analog Control-Parameter Interpretation

Parameters	Description
GainSelector	Choose which gain to control.
Gain	The larger the gain value, the brighter the image, and the settable range of different models is different. The default value is 1.  说明 Enable analog gain with priority.
GammaEnable	Used to set the image gamma value.
Gamma	For correcting the 1 non-linearity of image data due to

Parameters		Description
		the non-linear response of a display or the like, the smaller the gamma value, the brighter the image. Gamma value is set from 1 to 4. If the default value is 1, gamma processing is not performed. When the EnableGamma is True, set the image gamma value to be valid.
LUT	LUTSelector	In this attribute, you can highlight the gray range of interest, which can be a linear curve or a custom mapping curve. Select the gray value of the replaced pixel in the LUTIndex. The gray value after modification by the pixel specified by the LUTIndex is set in the LUTValue. LUTIndex and LUTValue settings are only valid when the LUTEnable is True.
	LUTEnable	
	LUTIndex	
	LUTValue	

5.5. EncoderControl

In this property, you can adjust the function of the encoder; see Table 5-5 for detailed parameter settings.

Table5-5 Axis Encoder Control-Parameter Explanation

Parameters	Description
EncoderDirCtrl	Encoder direction control.
EncoderDebouncerTime	Anti-shake time of the line, in us.
EncoderFreqMulti	Encoder signal frequency doubling parameters.
EncoderFreqDeMulti	Encoder signal frequency division parameters.
EncoderMaxReverseCount	Encoder maximum reverse count set.
EncoderReverseCount	Encoder reverse counter.
EncoderClr	Encoder reverse counter reset.

5.6. AdvancedProcessing

In this property, you can set parameters for automatic functions. For details about parameter settings, see Table 5-6.

Table 5-6 Advanced Processing Parameter Item Settings-Parameter Interpretation

Parameters	Description
CalibrateSelector	Correction selector, can select bright field correction or dark field correction.

FPNEnable	Bright field correction enable.
RPNEnable	Dark field correction enabled.
FFCUserSetSelector	Flat field correction user selector. Optional Factory,UserSet1,UserSet2.
FFCUserSetload	Flat field correction is loaded by user settings.
PRNUTargetMode	Brightfield correction, correction mode, optional Maximum (maximum value), Average (average value), Target (target value) three correction modes.
PRNUTarget	When the PRNUTargetMode is set to Target (target value) correction, the parameter is valid and the image can be corrected to the target grayscale range.
FFCROIOffset	Offset of effective area of flat field correction.
FFCROIWidth	The width range of the effective area of flat field correction; the range setting must not exceed the maximum width range of the camera.
CalibrateFPN	Dark field correction, click to execute, in the environment of the dark environment for correction.
CalibratePNRU	Bright field correction, click to execute, in the environment is semi-bright (gray level above 150), for correction use.
FFCReset	The flat field correction resets the parameters and restores the image before correction.
FPNCalibrateStatus	Dark field correction state, the uncorrected state is the FPNNoCalibrate state, and the corrected state is the FPNCalibrateOverflow state.
PRNCalibrateStatus	The bright-field corrected state, the uncorrected state is PRNU, and the corrected NoCalibrate is PRNUCalibrateOverflow.

5.7. DigitalIOControl

In this property, different I/O input or output signals can be managed; see Table5-7for detailed parameter settings.

Table 5-7 Digital Input/Output Management-Parameter Interpretation

Parameters	Description
LineSelector	Lets you select the external IO lines to be configured.
LineMode	Configures the output mode of the currently selected IO line: input or output.
LineInverter	Used to control the signal inversion of the selected physical input or

Parameters	Description
	output line, True means the signal is inverted, False means the signal is not inverted.
LineStatus	Used to indicate the current state of the selected physical input or output line.
LineStatusAll	Returns the current status of all available lines.
LineSource	When the IO line is selected as the output, the trigger source can be selected. Currently, the following trigger sources are supported: ● ExposureActive: Output signal at the start of exposure. ● Timer1Active: Counter 1 output signal when full. ● Outputs user-defined values: UserOutput. ● FlashWindow: Light source control signal output.
UserOutputValue	The output value corresponding to the custom group selected by the user.

5.8. CounterAndTimerControl

In this property, device-specific delay units can be set; see Table 5-8 for detailed parameter settings.

Table 5-8 Timer Management-Parameter Interpretation

Parameters	Description
CounterSelector	Select the counter counter1.
CounterEventSource	Select the counter trigger count time, and the trigger count sets the counter trigger source according to the set trigger mode.
CounterValue	Upper counter value.
CounterCurrentValue	The current count value of the counter.
CounterResetSource	Counter reset control source, set, the original signal trigger counter current value clear 0.
CounterResetSoftware	Reset soft start, when the CounterResetSource is set to software, click the execution counter to clear 0.
CounterReset	Execute to reset the counter.
TimerSelector	Select the timer for the target to set.
TimerTriggerSource	Select the trigger source for the timer.
TimerDelay	Sets the delay time (in us) after the timer accepts the trigger.
TimerDuration	Sets the hold time (in us) for the device timer.

5.9. EventControl

In this attribute, you can select and enable the type of event notification. For details about parameter settings, see Table 5-9.

Table 5-9 Event Notification Management-Parameter Explanation

Parameters	Description
EventSelector	Select the event type for notification, including: ● ExposureEnd (exposure end event) ● FrameStart (Received Frame Trigger Event) ● AcquisitionStart (image acquisition start event) ● TriggerLose (trigger discard event)
EventNotification	Select the counter trigger count time, and the trigger count sets the counter trigger source according to the set trigger mode.

5.10. AutoFunctions

In this attribute, you can set the parameter items of the automatic function. Please refer Table 5-1 to 0

for detailed parameter settings.

Table 5-10 Automatic Function Parameter Item Setting-Parameter Interpretation

Parameters	Description
AutoTargetValue	Automatic target value. The target grayscale value, which is in the 8-bit pixel format.
AutoExposureTimeLowerLimit	The lower limit of the automatic exposure time parameter.
AutoExposureTimeUpperLimit	The upper limit of the automatic exposure time parameter.
AutoFunctionAOIWidth	AOI width for automatic function. AOI area width for auto gain, auto exposure calculation.
AutoFunctionAOIHeight	AOI height for automatic function. AOI area height used for auto gain, auto exposure calculation.
AutoFunctionAOIOffsetX	Automatic function of AOI horizontal offset. The image horizontal offset of the AOI area used for automatic gain and automatic exposure calculations, starting from the upper left corner.

5.11. TransportLayerControl

In this attribute, you can set the parameters related to the transmission protocol of the camera. Please refer Table 5-11 for detailed parameter settings.

Table 5-11 Transport Layer Management

Parameters	Description
PayloadSize	The length of each message.
GevVersionMajor	The major version of the protocol specification.
GevVersionMinor	The minor version of the protocol specification.
GevDeviceModelBigEndian	End value of the device register.
GevDeviceClass	GEV device type.
GevDeviceModeCharacterSet	The character set used by all strings in the boot register.
GevInterfaceSelector	The number of network ports of the device. The value starts from 0, so the value is 0.
GevLinkSpeed	GEV link speed. The transmission speed of the current network interface.
GevMACAddress	The MAC address of the network port.
GevSupportedIPConfigurationLLA	GEV supports LLA for IP configuration. Displays whether the device supports configuring IP addresses in LLA mode. True indicates that the device supports LLA configuration.
GevSupportedIPConfigurationDHCP	GEV supports IP configuration DHCP. Displays whether the device supports configuring IP addresses in LLA mode. True indicates that the device

Parameters	Description
	supports LLA configuration.
GevSupportedIPConfigurationPersistentIP	GEV supports IP configuration static IP. Displays whether the device supports configuring IP addresses as static IP addresses. True indicates that the device supports static IP addresses.
GevCurrentIPConfigurationLLA	Turn on the LLA function. When True is selected in the GevCurrentIPconfigurationLLA, the IP address is LLA after the device is powered on.
GevCurrentIPConfigurationDHCP	Turn on the DHCP function. When True is selected in the GevCurrentIPconfigurationDHCP, the IP address of the device is DHCP after power-on, which can automatically obtain the IP address of the device.
GevCurrentIPConfigurationPersistentIP	Static IP function. When True is selected in the GevCurrentIPconfigurationPersistentIP, the IP address is static after the device is powered on. The  说明 three IP configuration priority relationships are: Static IP>DHCP>LLA.
GevCurrentIPAddress	IP address of the current device.
GevCurrentSubnetMask	The subnet mask of the current device.
GevCurrentDefaultGateway	The gateway of the current device.
GevFirstURL	Gets the first URL address of the GenICam XML.
GevSecondURL	Gets the second URL address of the GenICam XML.
GevNumberOfInterfaces	The number of physical network interfaces supported by the device.
GevPersistentIPAddress	Set the static IP address of the device.
sGevPersistentSubnetMask	Sets the subnet mask of the static IP address of the device.
GevPersistentDefaultGateway	Set the gateway for the static IP of the device.
GevMessageChannelCount	Displays the number of message channels supported by this device.
GevStreamChannelCount	Displays the number of flow channels supported by this device.
GevHeartbeatTimeout	Set the heartbeat timeout.
GevTimestampTickFrequency	Defines the frequency of timestamps.
GevCCP	Controls the application's access to the camera. ● ExclusiveAccess: The attached camera application can modify the registers. ● ControlAccess: Applications connected to the camera

Parameters	Description
	can only read registers and cannot modify registers.
GevStreamChannelSelector	If the camera supports multiple flow channels, select the flow channel number.
GevSCPInterfaceIndex	Displays the logical channel number corresponding to the device.
GevSCPHostPort	Port number used by the camera stream channel.
GevSCPSFireTestPacket	Send a test message.
GevSCPSPDoNotFragment	If the packet is too long, whether to send it in fragments and add fragment position 1 to the IP header.
GevSCPSPBigEndian	Sets the end of the pixel data stream for the stream lane.
GevSCPSPPacketSize	Sets the message length of the stream channel.
GevSCFTD	Frame transmission delay.
GevSCBWR	Displays the percentage of bandwidth reserved for device transfers.
GevSCBWA	Displays the base bandwidth of the device transmission.
GevSCDMT	Displays the maximum number of bytes per second transmitted by the device under the current parameters.
GevSCDCT	Displays the actual transmission bandwidth of the device.
GevSCPD	The interval between control messages. 📖 说明 Modifying this value can reduce the requirements for the network card, but the maximum bandwidth will be affected to a certain extent, and the acquisition time of a single frame will be longer.
GevSCDA	The destination address of the stream channel.
GevSCSP	Source port of the flow channel.

5.12. UserSetControl

In this attribute, you can save or load the user-adjusted parameter scheme and set the default parameter configuration when the client is opened. Please refer Table 5-12 for detailed parameter settings.

Table 5-12 User Settings Management-Parameter Settings

Parameters	Description
UserSetCurrent	Displays the configuration currently in use, 0 indicates the default configuration, and the rest are user configurations.
UserSetSelector	UserSetSelector the user to set the group selection. Currently supports Default, UserSet1, UserSet2, and UserSet3.
UserSetLoad	User settings are loaded. The configuration of the camera is restored to the user-selected

Parameters	Description
	configuration.
UserSetSave	User settings are saved. Saves the current configuration to the selected group, Default saving is not supported for groups.
UserSetDefaultSelector	Default user settings for power-on. UserSet1, UserSet2, and UserSet3 need to be UserSetSave before they can be displayed here.



Chapter6 FAQ

You can solve the problems you may encounter here.

1. The application does not find the camera device.

Cause analysis:

- The camera does not start normally.
- Network cable connection is abnormal.
- The camera is not on the same LAN as the client.

Solution:

Restart the camera, check whether the network connection is abnormal, and whether the indicator light is normal, so that the camera and the client are on the same LAN.

2. The application can discover the camera device, but the connection fails.

Cause analysis:

- The camera does not start normally.
- The camera and client are not on the same network segment.
- Other clients are already connected to this camera.

Solution:

Restart the camera and try to change the IP address to make it on the same network segment as the client. Or disconnect other connected clients and connect to the client.

3. In the application, the preview screen is all black.

Cause analysis:

- The lens aperture is closed.
- The camera is working abnormally.

Solution:

Open the lens aperture, power off and restart the camera device.

4. Unable to enable external triggering.

Cause analysis:

- External trigger connection error.
- The trigger mode does not have an external trigger selected.

Solution:

Select the correct trigger mode and ensure that the external wiring is correct.

5. When the client software viewed the image, it found that the image was upside down.

Cause analysis: when the equipment is installed, the direction is wrong.

Solution: In the client software, you can correct the image by "Properties> ImageFormatControl>ReverseX (horizontal flip) or ReverseY (vertical flip).

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