Smart Camera

User Manual

UD03451B

User Manual

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These instructions are intended to ensure that the user can use the product correctly to avoid danger or property loss.

The precaution measure is divided into 'Warnings' and 'Cautions':

Warnings: Serious injury or death may be caused if any of these warnings are neglected.

Cautions: Injury or equipment damage may be caused if any of these cautions are neglected.

Warnings Follow these safeguards to prevent serious injury or death.	**Cautions** Follow these precautions to prevent potential injury or material damage.

Warnings:

- Please adopt the power adapter which can meet the safety extra low voltage (SELV) standard. And source with 12 VDC (depending on models) according to the IEC60950-1 and Limited Power Source standard.
- To reduce the risk of fire or electrical shock, do not expose this product to rain or moisture.
- This installation should be made by a qualified service person and should conform to all the local codes.
- Please install blackouts equipment into the power supply circuit for convenient supply interruption.
- Please make sure that the ceiling can support more than 50 (N) Newton gravities if the camera is fixed to the ceiling.
- If the product does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the camera yourself. (We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.)

Cautions:

- Make sure the power supply voltage is correct before using the camera.
- Do not drop the camera or subject it to physical shock.
- Do not touch sensor modules with fingers. If cleaning is necessary, use a clean cloth with a bit of ethanol and wipe it gently. If the camera will not be used for an extended period of time, put on the lens cap to protect the sensor from dirt.
- Do not aim the camera lens at the strong light such as sun or incandescent lamp. The strong light can cause fatal damage to the camera.
- The sensor may be burned out by a laser beam, so when any laser equipment is being used, make sure that the surface of the sensor not be exposed to the laser beam.
- Do not place the camera in extremely hot, cold temperatures (the operating temperature should be between 0° C to 50° C), dusty or damp environment, and do not expose it to high electromagnetic radiation.
- To avoid heat accumulation, ensure there is good ventilation to the device.
- Keep the camera away from water and any liquids.
- While shipping, pack the camera in its original, or equivalent, packing materials. Or packing the same texture.

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Chapter 1 Overview

1.1 Introduction

The smart camera adopts aviation plug to RJ45 interface to perform real-time transmission of uncompressed or compressed image through a gigabit Ethernet interface. Remote image capturing and camera control, for example, the operating mode and the image parameters adjustment, are supported by client software.

The device is mainly used for code recognition. The camera reads the multiple types of codes and the system recognizes and analysis the information of the code via algorithm processing of the client.

1.2 Main Features

- Intel E3845, Quad Cores, 1.9GHz, 4GB Memory.
- Two light source control modes: Front light source or 24 V DC external light source.
- Use hardware external trigger or software trigger to synchronize several cameras or external devices connecting with the camera.
- Real-time transmission of compressed or uncompressed image.
- Protection ingress: IP67.

1.3 Specifications

1.3.1 MV-SI622-00GM/MV-SI622-01GM Specification

Table 1. 1 MV-SI622-00GM/MV-SI622-01GM Specification

Model / Parameters	MV-SI622-00GM	MV-SI622-01GM
	5 MP 1" CMOS Smart Camera	
Camera		
Sensor Type	1" global shutter CMOS	
Resolution	2592 × 2048	
Pixel Size	4.8 μm × 4.8μm	
Frame Rate	30fps	
Dynamic Range	> 60dB	
SNR	> 40dB	
Gain margin	0 to 24dB	
Exposure Time rang	5μs to 5s	
Shutter Mode	Global shutter, supporting Auto, Manual, One-Push, etc. exposture modes.	
Data Interfac	Gigabit Ethernet, via 8-pin waterproof connector.	
RS-232	1 input serial port and 1 output serial port, supported via 12-pin Interface	
Digital I/O	12-pin I/O interface, 3 GPI Input, 3 GPI Output	
Cache	4G	
Data Format	Mono 8	
General		
Power Supply and Consumption	10VDC to 30VDC, Power Consumption < 15W without light source. 20VDC to 30VDC, Power Consumption < 45 W with light source on.	
Temprature	Working Temprature: 0°C to 50°C (32°F to 122°F), Storage Temprature: -30°C to 70°C (-22°F to 158°F)	
Dimension	126mm×66mm×50mm (4.96″×2.60″×2.38″)	
Weight	Approx. 800g (1.76lb)	
Lens Mount	C-Mount	

Light Source	No light source No lens waterproof shield	With light source With lens waterproof shield
Control Client	Smart MVS	
Protection Level	IP67(with the lens shield)	
Certifications	CE, FCC, and RoHS	

1.3.2 MV-SI622-00GM/MV-SI622-01GM Response Curve

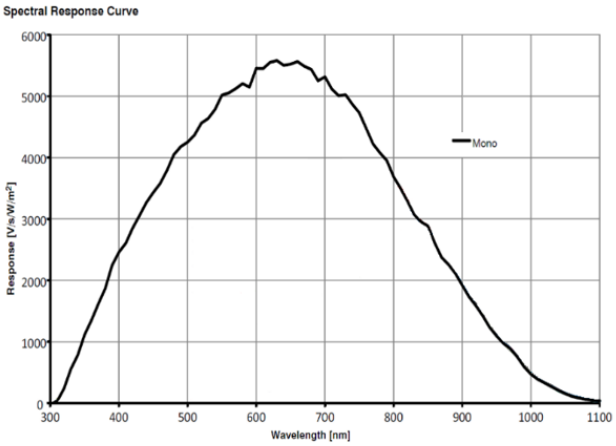

Figure 1. 2 MV-SI622-00GM/MV-SI622-01GM Response Curve

NOTE The response curve data is provided by the chip manufacture.

1.4 Camera Physical Interfaces

1.4.1 Camera Structure

The smart camera consists of camera, lens, lamp cup, and housing. The figure below shows the structure of the smart camera.

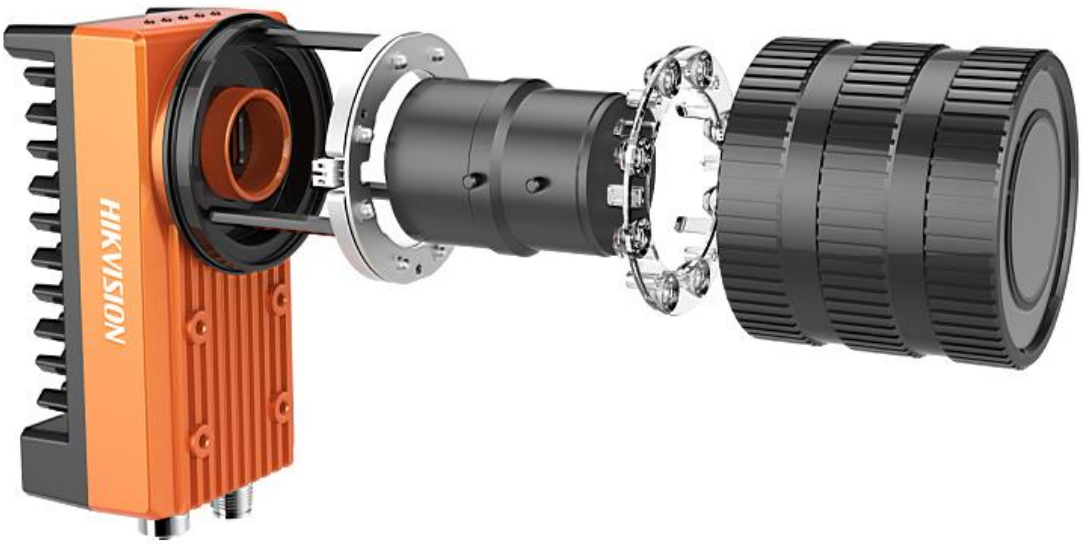

Figure 1. 3 Smart camera Structure

1.4.2 Camera Dimension

The figure below shows the dimension of the smart camera without light source and camera housing.

The camera should be installed with M4 screws from the package (supplied). Screw holes are in the each front panel and rear panel of the camera, each panel can be used to fix the camera to the bracket. If using other screws, you are recommended to adopt metric M4 screws of which the length should be less than the sum of the depth of screw holes and the installation plate thickness.

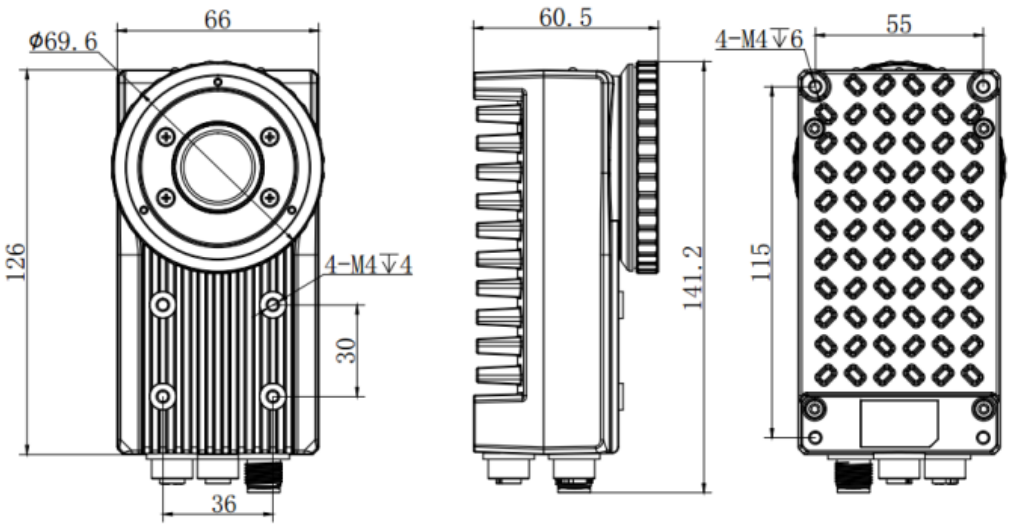

Figure 1. 4 Dimension of Smart Camera

NOTE

The camera adopts the C-Mount lens interface.

1.4.3 Interfaces Introduction

The figure below shows the interfaces of the smart camera with light source and camera housing, including aviation plug to RJ45 network interface, 12-pin power and I/O interface, and 5-pin external light source interface. The camera interfaces with screw thread for connection between camera and cable avoid loosening due to vibration.

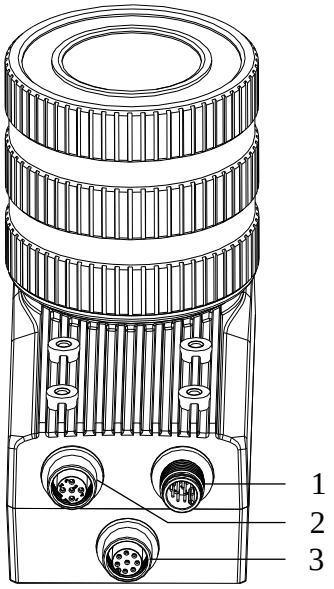

Figure 1. 5 Smart camera Interfaces

Table 1. 2 Description of the Smart camera Interfaces

No.	Description
1	Power and I/O Connector
2	External Light Source
3	Gigabit Network Interface

1.4.4 Power and I/O Interface Introduction

The description of the 12-pin power and I/O connector is shown in the table below.

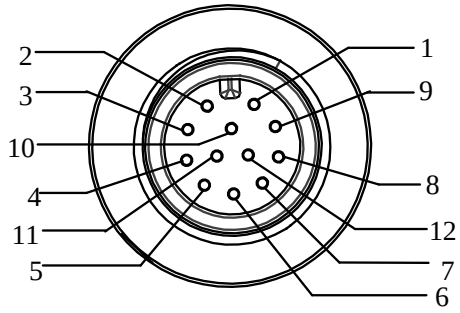

Figure 1. 6 Power and I/O Interface

Table 1. 3 Description

No.	Signal	Color	I/O Type	Description
1	DC-PWR	White	/	DC 12V +
2	GND	Brown	/	Power Grounding
3	OPTO_OUT0	Green	Output	I/O Output 0
4	OPTO_OUT1	Yellow	Output	I/O Output 1
5	OPTO_OUT2	Grey	Output	I/O Output 2
6	OUT_COM	Pink	Output	Signal Output Grounding
7	OPTO_IN0	Blue	Input	I/O Input 0
8	OPTO_IN1	Red	Input	I/O Input 1
9	OPTO_IN2	Black	Input	I/O Input 2
10	IN_COM	Purple	Input	Signal Input Grounding
11	RS232_R	Grey/Pink	/	RS-232 Serial Port Input
12	RS232_T	Red/Blue	/	RS-232 Serial Port Output

1.4.5 External Light Source Interfaces

The description of the external light source interfaces are shown in the table below.

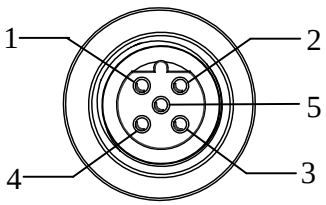

Figure 1. 7 Outer Light Source Interfaces

Table 1. 4 Description

No.	Signal	Color	I/O Type	Description
1	LED+	Brown	Output	LED +
2	LED-	White	Output	LED -
3	GND	Blue	Output	Power Grounding
4	OPTO_PWM	Black	Output	light-coupled Isolation Trigger Signal
5	OPTO_GND	Grey	Output	light-coupled Isolation Grounding

1.4.6 Installation Accessories

Prepare the installation accessories listed below before you install the smart camera.

Table 1. 5 Accessory List

No.	**Accessory Name**	**Number**	**Description**
1	Camera	1	The smart camera.
2	Power I/O Cable	1	The 12-pin cable (included) or extension cable (not included).
3	Ethernet Network Cable	1	3 meters KMbps network cable with aviation plug to RJ45 network interface
4	External Light Source Cable	1	5-pin external light source cable
5	Power adapter (Optional)	1	12 V/24 V power adapter (above 2A/1A)
6	Lens (Optional)	1	C-Mount Lens
7	Mounting Bracket (Optional)	1	The mounting bracket is for mounting the camera.
8	Waterproof Lens Case	1	Lens case meets the IP67 protection ingress.

Chapter 2 Camera Installation and Configuration

2.1 Installing the Camera

Steps:

1. Unpack the camera package, rotate the water-proof lens case anticlockwise, and take out the lamp cup.
2. Install the lens to the camera body by rotating the lens clockwise.
3. Install the IR lamp cup (first), and water-proof lens case back.

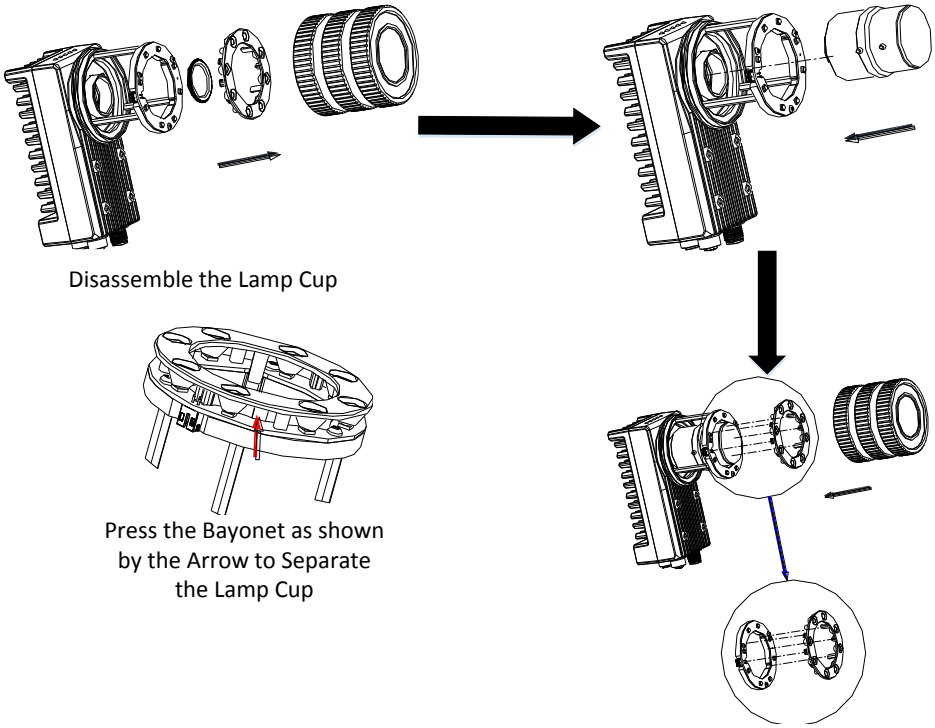

Figure 2. 1 Lens Installation

4. Install the camera to the desired position by using M4 screws. There are three installation types shown as the figures below, and choose the proper installation type according to your needs.

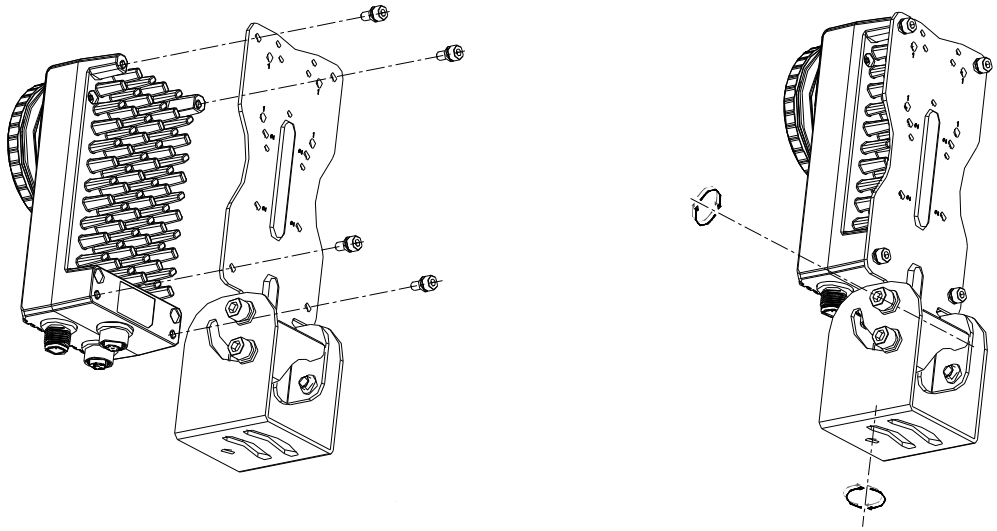

Figure 2. 2 Type I Installation

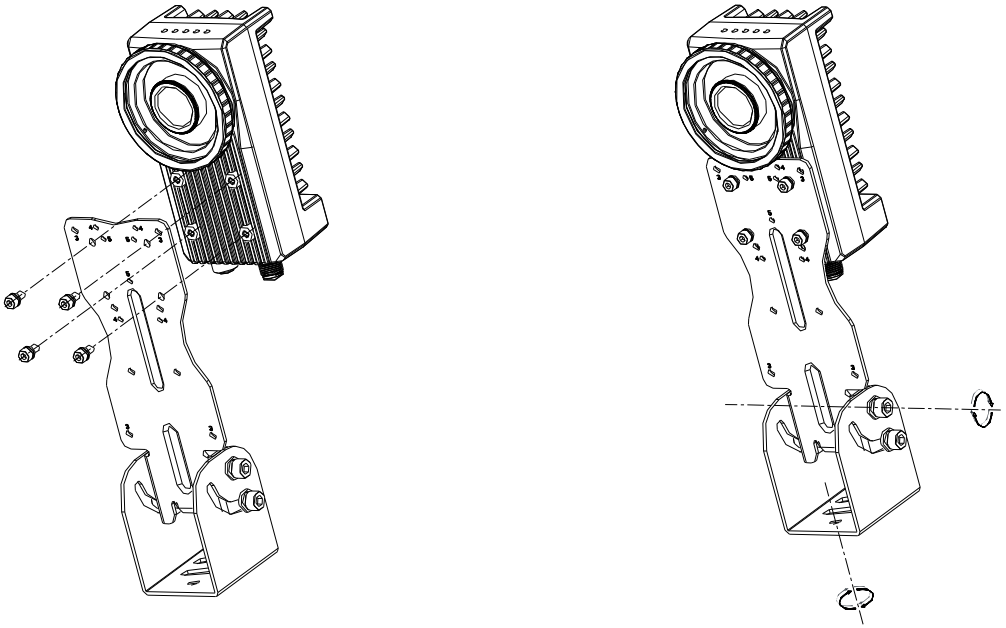

Figure 2. 3 Type II Installation

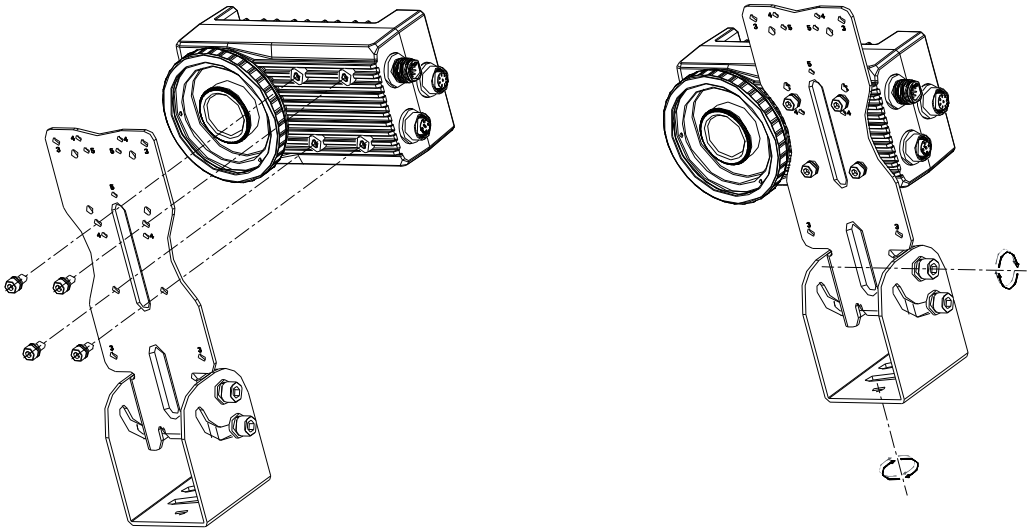

Figure 2. 4 Type III Installation

5. Use 8-pin avigation plug to RJ 45 network interface to connect the camera to a switch or a network card..

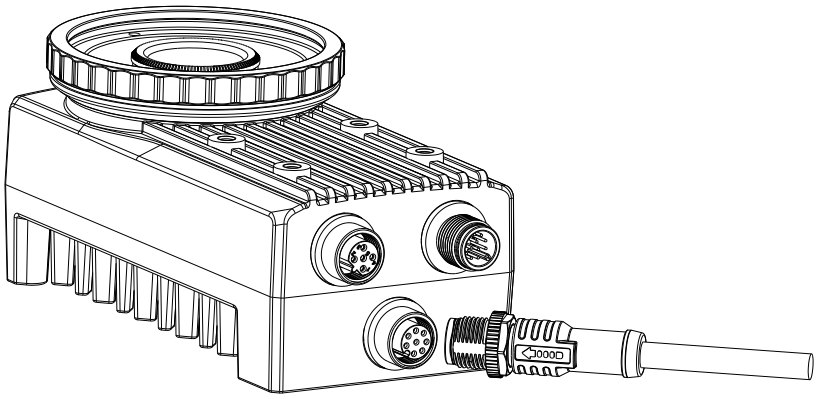

Figure 2. 5 Connect Network Cable

6. Use the supplied cable with a 12-pin power and I/O interface to connect the camera to a 24 V DC power adapter.

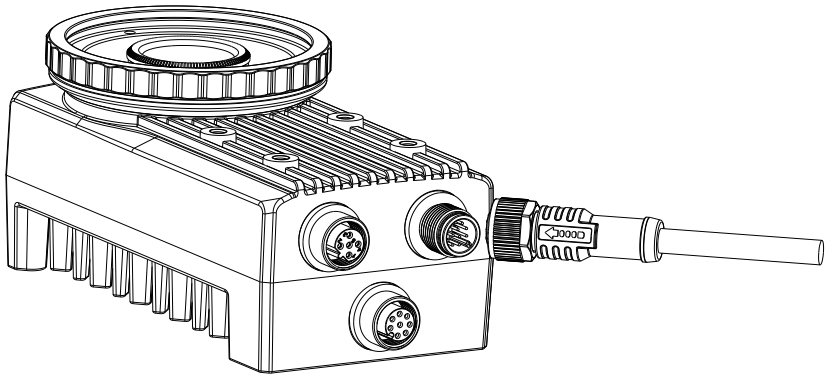

Figure 2. 6 Connect Power Cable

7. If external light source is required, connect the camera to an external light source.

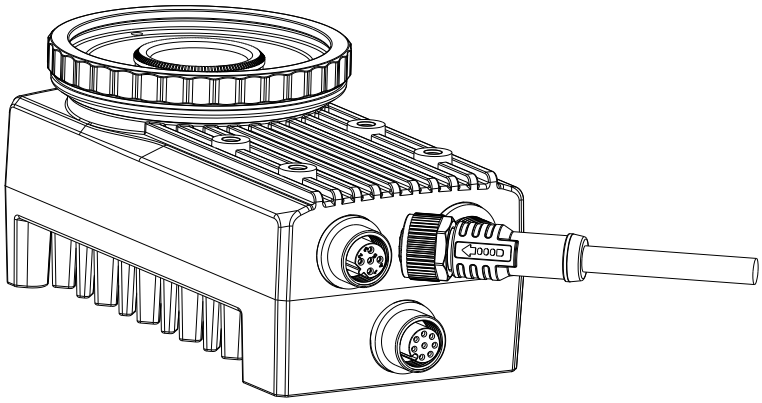

Figure 2. 7 Connect the External Light Source

NOTE

Use 10 V DC to 30 V DC without using light source, and otherwise use 20 V DC to 30 V .

2.2 Client Installation

- Windows XP /7/8 32/64bit is a requirement.
- Visit www. hikvision. com to get more information.
- The client software is integrating all hardware drivers.

Steps:

1. Get the client from the www. hikvision. com.

   Support -> Download -> Client Software

2. Double click to run the client, and click Next to choose the language according to your needs.

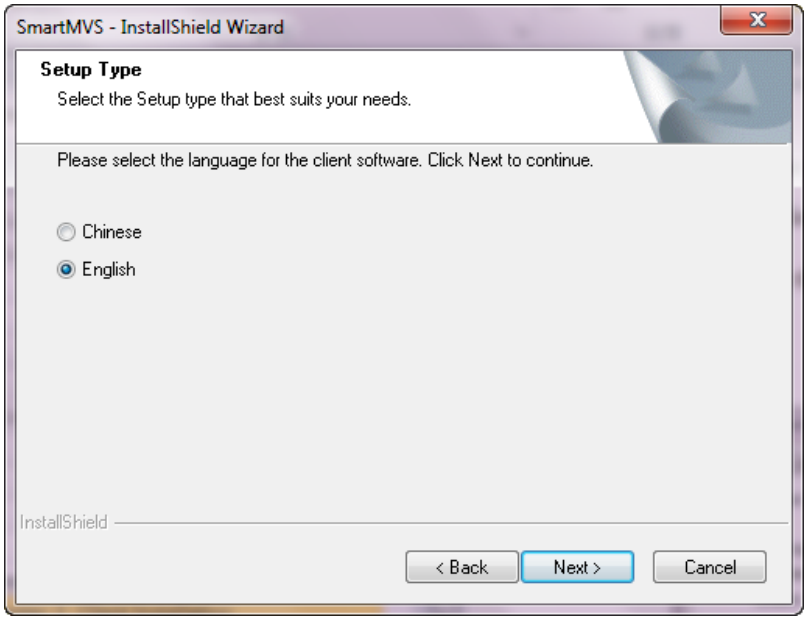

Figure 2. 8 Choose the Language

3. Click Next to install the program to the default installation directory C:\Program Files (x86)\Smart MVS, which is not recommended. You are allowed to specify the installation directory as you want by clicking Change to choose the directory from your computer, or directly entering the directory in the text field.

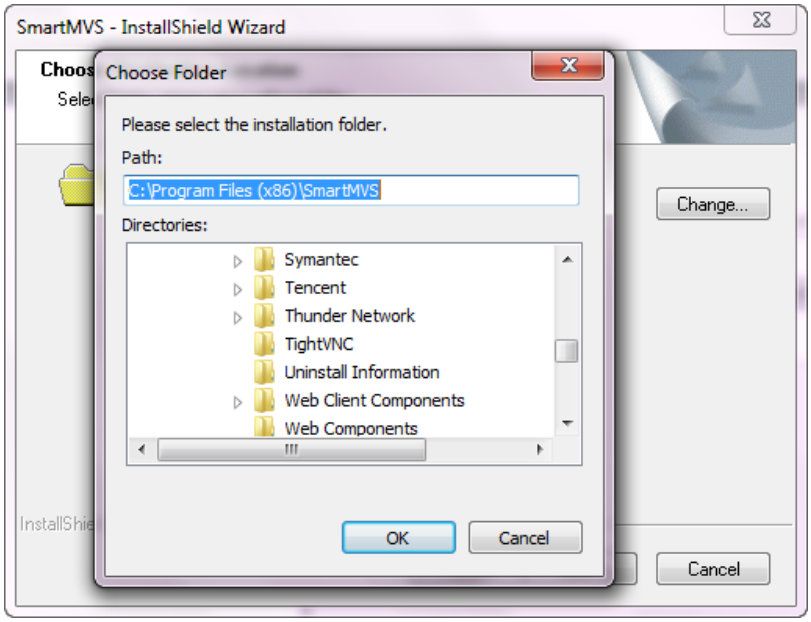

Figure 2. 9 Install the Program

4. Click Install to start the installation, and click Finish to complete the installation.

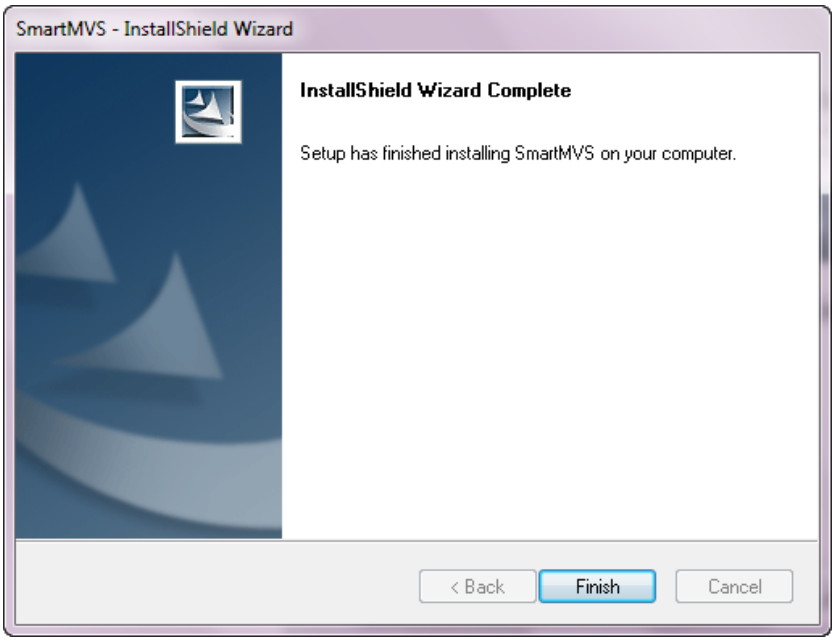

Figure 2. 10 Finish the Installation

2.3 Camera Configuration

Guarantee the camera IP and your PC IP are under the same network segment.

2.3.1 Viewing Camera IP Address

The default smart camera IP address is auto finding IP.

Step:

1. Double click to enter the main interface. Click Devices to find the Smart camera to the view relative information (e.g. IP address).

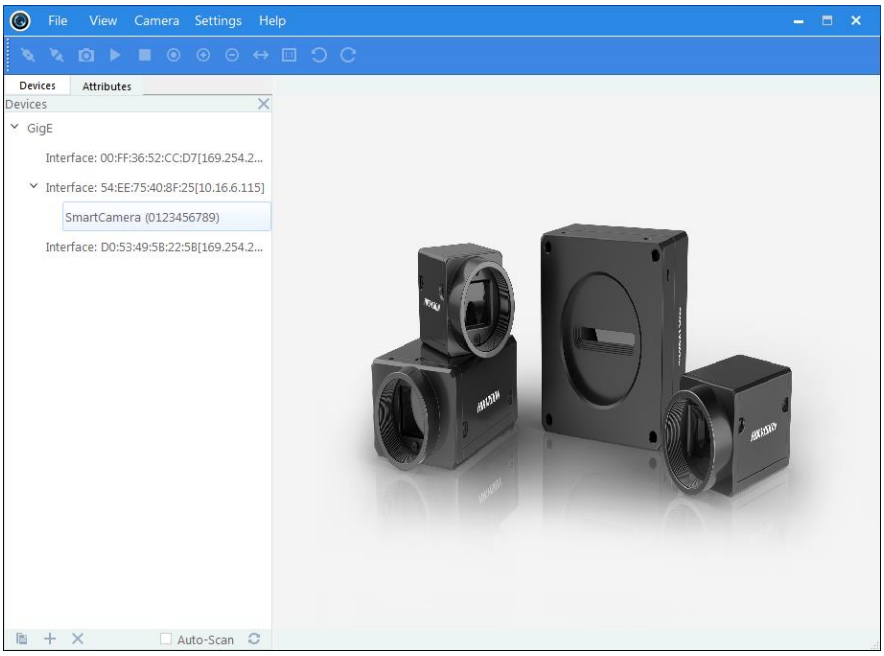

Figure 2. 11 Main Interface

2.3.2 Setting Local Network

Steps:

1. Enter Start -> Control Panel -> Network and Sharing Center -> Change Adapter Settings to find the local network connection, and click Properties.

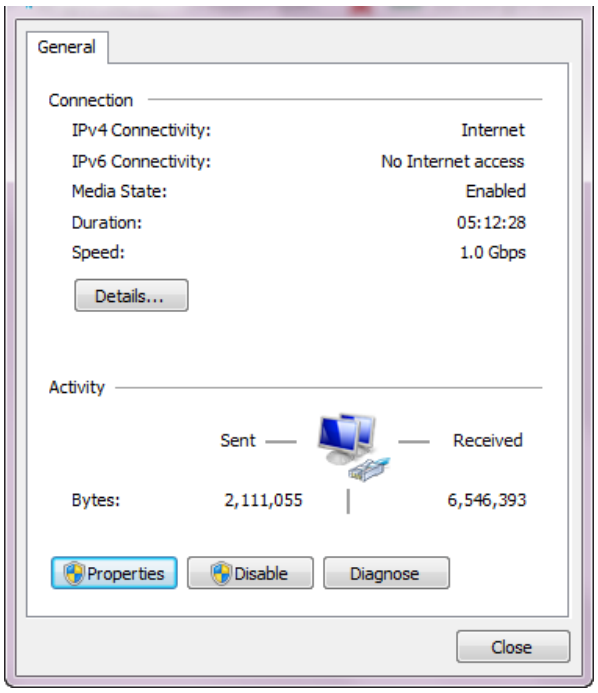

Figure 2. 12 Local Network Connection

2. Select Internet Protocol Version 4 (TCP/IPv4),and click Properties

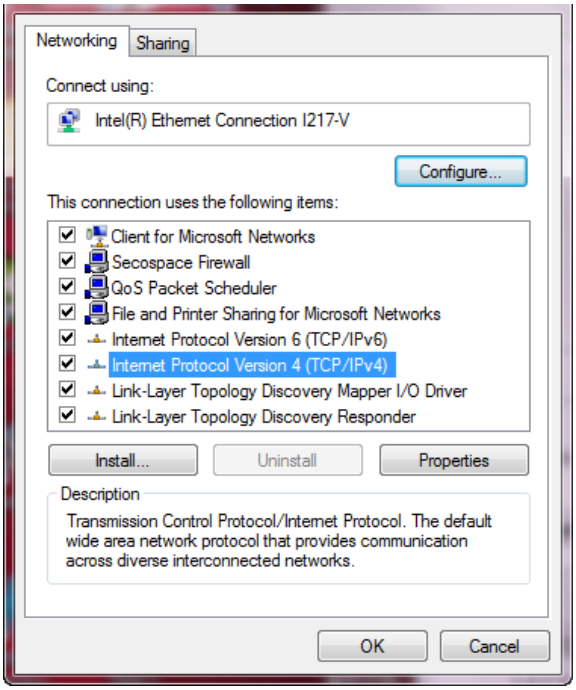

Figure 2. 13 Select Internet Protocol Version 4 (TCP/IPv4)

3. Check the radio button of Obtain an IP address automatically.

4. (Optional) You can also select Use the following IP address, and set the IP address which is under the same network segment with the camera.

5. Click OK to save the settings.

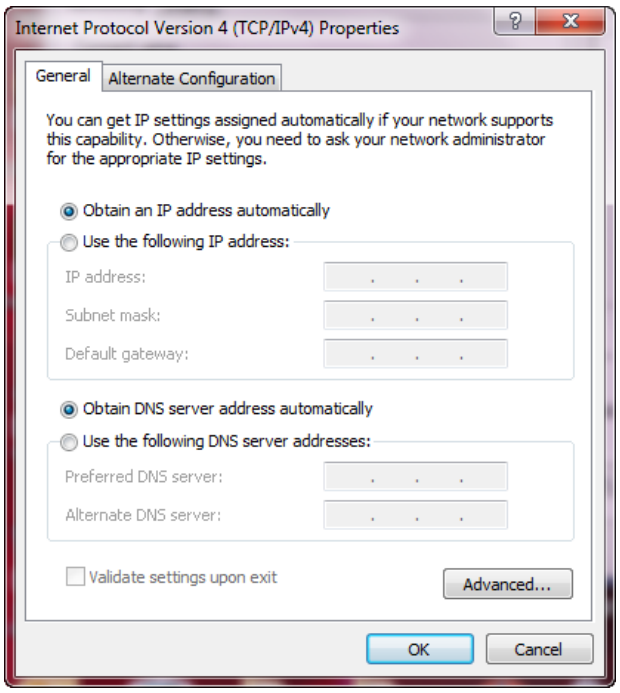

Figure 2. 14 Local Network Connection Settings

6. You also need to enable the jumbo frame of the NIC. For different operating systems, the path to setting the jumbo frame may be different. Here we take Windows 7 as an example.

1) Click Start -> Control Panel -> Hardware and Sound -> Device Manager -> Network Adapters, and double click the NIC to enter its properties interface.
2) Click **Advanced** tab.
3) Select **Jumbo Frame** from the property list and select the value as **9KB MTU**.
4) Click **OK** to save the settings.

NOTE

Jumbo frame is not supported by some types of NIC. We recommend you to use the NIC which supports jumbo frame for better image transmission.

2.3.3 Setting via Attribute Tree

The software can read the XML file of camera attributes and display it in tree format.

Steps:

1. Double click the Smart MVS icon to enter the client software. The main user interface and the description of the client software are shown in Figure 2. 15 and Table 2. 1.

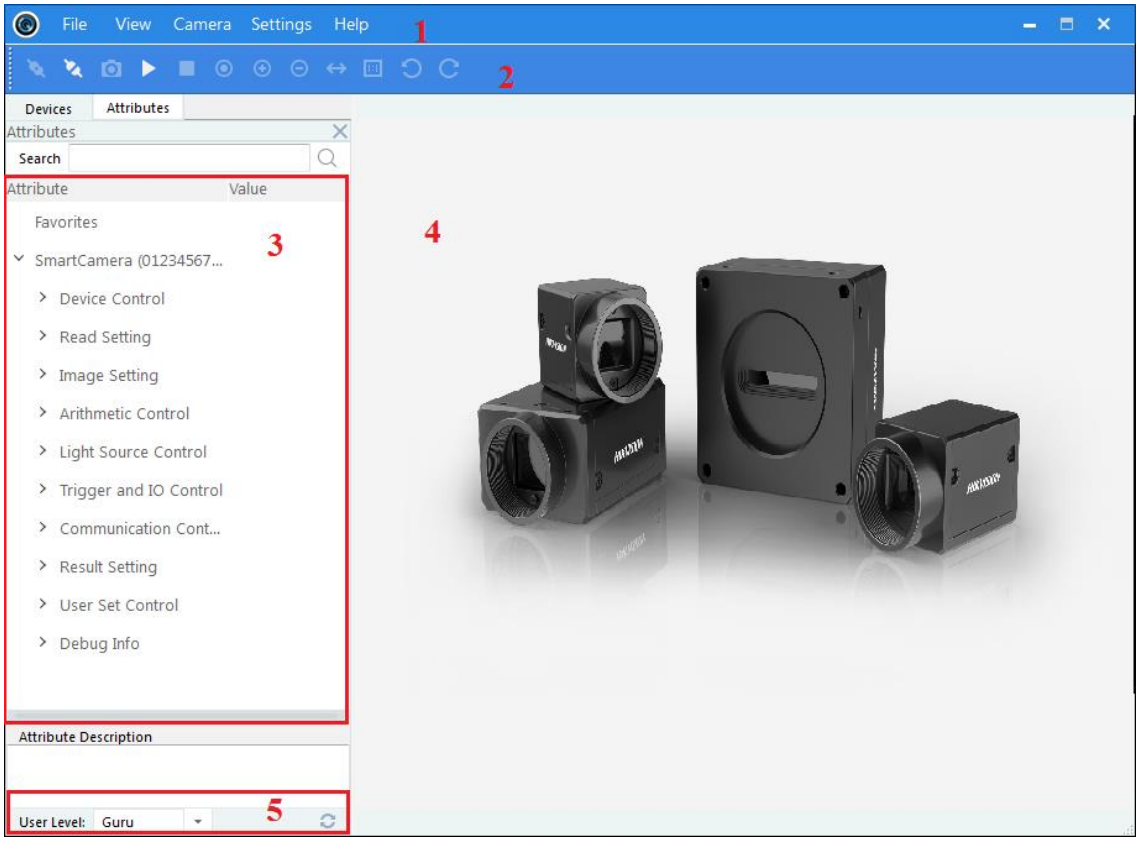

Figure 2. 15 Main User Interface of the Client Software

Table 2. 1 Description of the Main User Interface

No.	Area Name	Description
1	Menu Bar	Function modules include File, View, Camera, Settings, Settings, and Help
2	Control Toolbar	Contorls the image of live view including starting/stopping live view, zooming in/out, recording, capturing, etc.
3	Device and Attribute Tree	Displays the cameras and the device attributes
4	Live View Area	Views the live video of the selected smart camera

5	User Level Area	Switches the user level quickly as beginner, expert, or guru.

For details, refer to the *User Manual of Smart MVS Control Client*.

Double click the camera on the device list in Devices and Attributes Tree area.

Click the **Attributes** tab to enter the camera attribute page.

You can switch the user level as Beginner, Expert or Guru which displays different camera attributes. For Guru Level, it provides the most comprehensive camera attributes for professional use. Here we take Guru Level as an example.

Click the ⊡ icon before each attribute to view and edit the details.

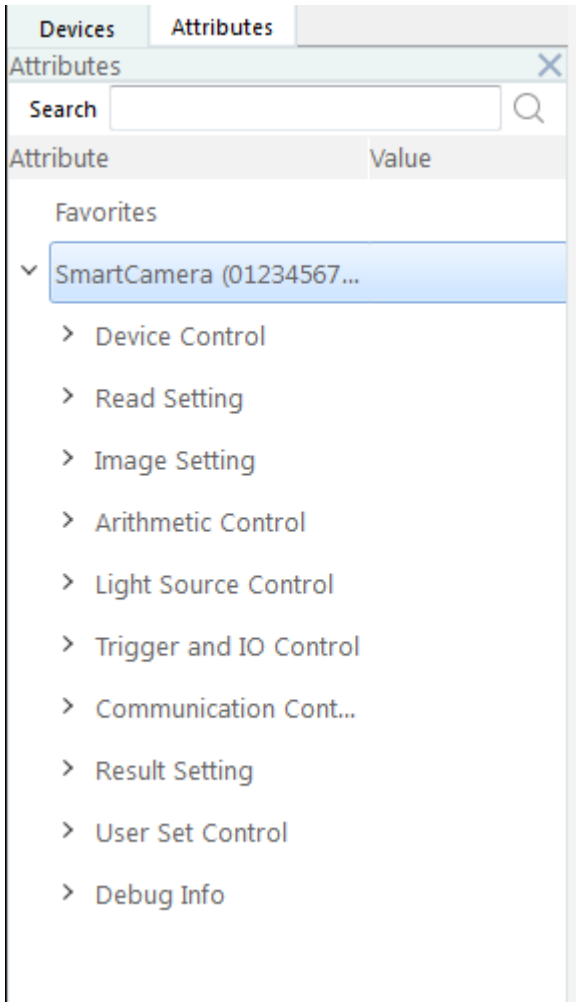

Figure 2. 16 Attribute Page

- Device Control: In the Device Control attribute, you can view the camera details include device type, version, manufacturer details, device user ID, device reset, device temperature, etc. You can modify the device user ID and reset the device.
- Read Setting: In the Read Setting attribute, you can select the object moving mode, running mode, barcode type, etc.
- Image Setting: In the Image Setting attribute, you can view the frame, setting the exposure time, gain, brightness, gamma, image width and height, pixel size, etc.
- Arithmetic Control: In the Arithmetic Control attribute, you can set the arithmetic type, code number, filter size, etc.
- Light Source Control: In the Light Source Control attribute, you can set lighting duration, flash delay, precharge time, etc.
- Trigger and I/O Control: In the Trigger and I/O Control attribute, you can set trigger mode, debouce time, trigger delay, etc.
- Communication Control: In the Communication Control attribute, you can set the size of the data package, destination IP, communication protocol, etc.
- Result Settings: In the Result Settings attribute, you can set barcode name, barcode position, barcode angle, barcode main package ID, start text, stop text, etc..
- User Set Control: In the User Set Control attribute, you can save or load the user parameter, also set the starting up default parameter, etc.

  After the connection is done, set the **Running Mode** as **Test**, and **Tigger Mode** as **Off** to view the live view.

  After the live view is available, set the aperture, focus, exposure time, gain, etc.

  Set the parameters of arithmetic control, and read settings after the image is clear enough.

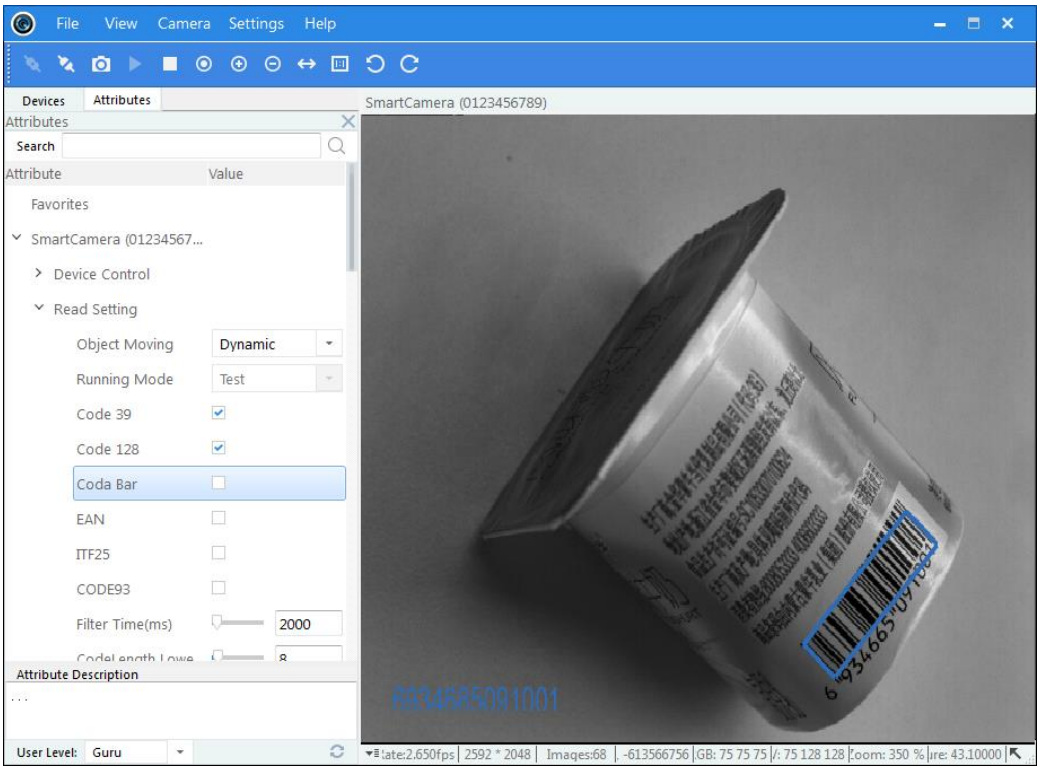

Figure 2. 17 Live View Interface

You are recommended to save the settings, after the attributes has been edited so as to avoid that the settings are back to the default sate after reboot.

- **Save Settings**：Select one type from the **User Set Selector** dropdown list and click **Execute** of **User Set Save** to save the settings.
- **Load Settings:** Select one type from the **User Set Selector** dropdown list and click Save of **User Set Load** to load the settings.
- **Set Default Settings:** Select one type from the **User Set Default** dropdown list, click **Enter** of the keyboard to validate the default settings.

Chapter 3 Functions

3.1 Device Control

Run the client software and click Device Control from the Attribute list. You will see the device manufacture, the model name, the device version, and so on. Input the device name in the textfiled of Device User ID, click the button **Execute** to reset the device, and check the sensor temperature shown in Figure 3.1.

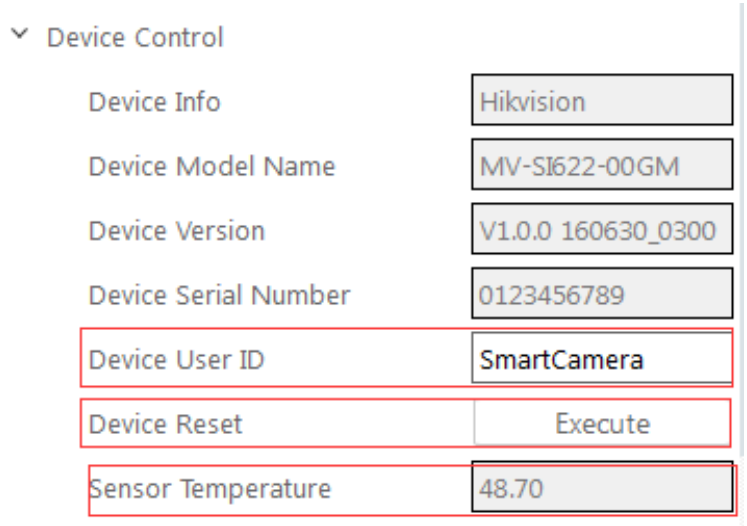

Figure 3. 1 Device Control Settings

3.2 Reading Setting

Click Read Setting from the attributes list.

3.2.2 Object Moving Mode

The camera supports two reading modes, dynamic and static, and both support reading multiple codes at the same time. The difference between two modes is that the duplicated barcodes can only be filtered under the dynamic mode which requires you to set the filter time shown as the figure 3.2.

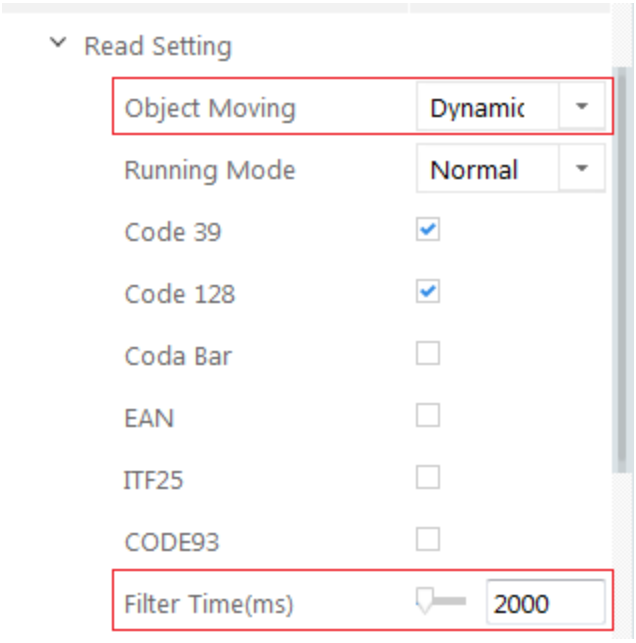

Figure 3. 2 Setting Reading Mode

3.2.3 Running Mode

The camera supports two running modes, normal and test. The client output the image and code in real time under the test mode. Under the normal mode, only the code is recognized, then the image and the code can be output.

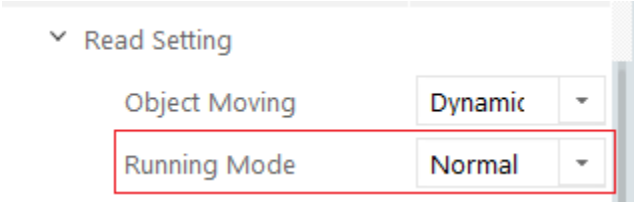

Figure 3. 3 Setting Running Mode

3.2.4 Code Parameters

The camera supports multiple types of code, Code 39, Code 128, Coda Bar, EAN, ITF25, and CODE93. Check the checkboxes before these code types according to your needs.

You can set the code length by enter the specific value in the textfields of **Code Length Lower Limit** and **Code Length Upper Limit**.

Check the checkbox of **Numeral Filter** to filter the non-numeral characters in code so

as to display number only.

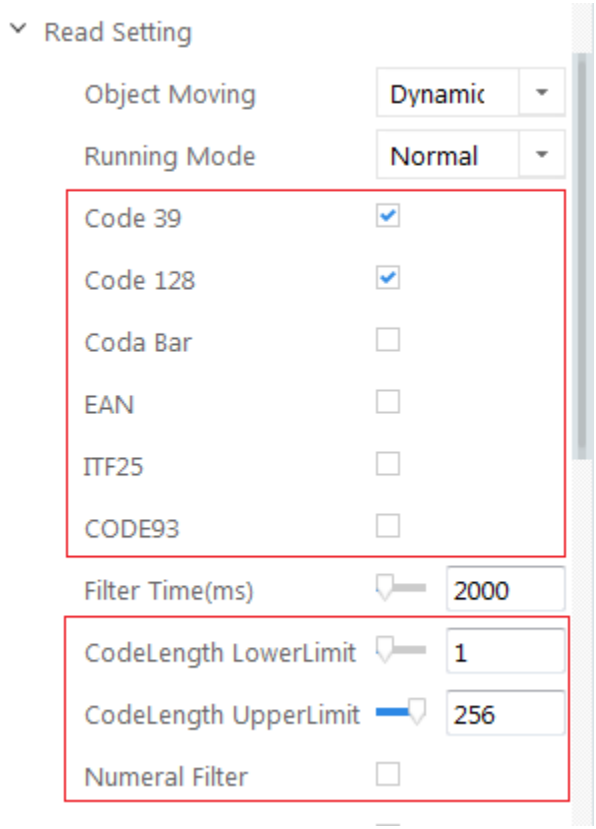

Figure 3. 4 Setting Code Parameters

3.2.5 Multi Frames Combine

The purpose of multi frames combine is raising accuracy of recognition barcode via disposing and combining multi frames image. Only the object moving is dynamic, multi frames combine is enable.

- Multi Frames Combine Enable: Enable box
- Multi Frames Combine Timeout: setting the output time upper
- Multi Frames Num: the num ber of combine frames
- Multi Frames Combine Diff: the max different character number in multi frame image

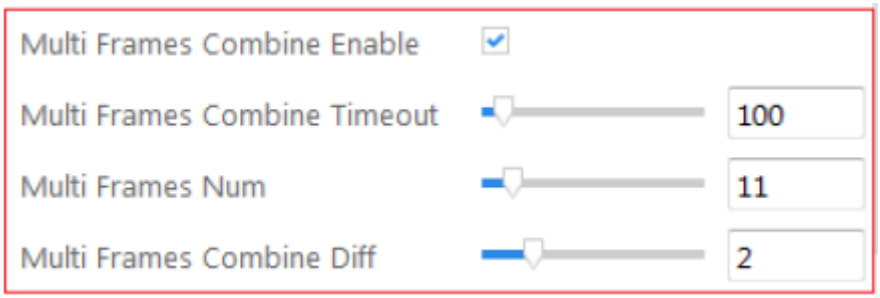

Figure 3. 5 Multi Frames combine

3.3 Image Setting

Click Image Setting from the Attributes list.

3.3.1 Camera Data Format

The camera supports Mono8 format which can be set from the dropdown list of **Pixel Format**.

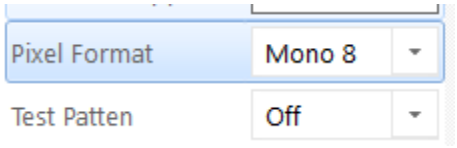

Figure 3. 6 Pixel Format

3.3.2 Acquisition Frame Rate

Frame rate can be set in the Acquisition Frame Rate box, but the value of acquisition frame rate you set cannot be more than the frame rate supported by the camera itself.

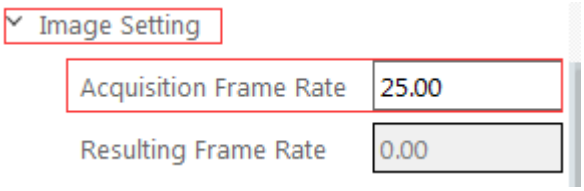

Figure 3. 7 Setting Acquisition Frame Rate

3.3.3 ROI Settings

The following three factors decide the maximum camera frame rate:

- Frame readout time: the shorter the image height, the less the readout time and the higher the frame rate.
- Exposure time: the less the exposure time, the higher the frame rate.
- Bandwidth: the wider the bandwidth, the higher the frame rate.

The camera can output ROI images depending on your requirements. ROI setting can decrease the data transmission bandwidth and increase the camera frame rate.

The frame rates decrease while exposure time increasing, so the max exposure time should be less than the reciprocal of frame rate.

You can set **Width** and **Height** values to adjust the ROI size. The value in the Offset X and the Offset Y refer to the ROI starting point at the top left corner. The following figure shows the ROI setting.

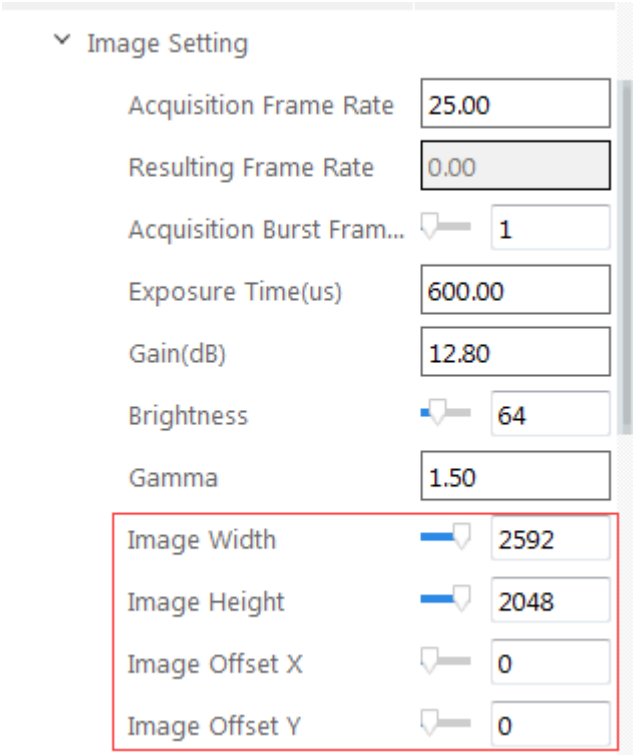

Figure 3. 8 ROI Setting

Table 3. 1 The Frame Rate Corresponding to Resolution

Resolution	2592 × 2048	1920 × 1080	1280 × 960	640 × 480
Frame Rate	25 fps	50 fps	60 fps	60 fps

3.3.4 Exposure Time

Refer to the camera technical index to acquire the supported exposure time. The exposure control supports manual mode, single mode and continuous mode. When setting trigger mode, the single mode and continuous mode are invalid. When setting

single mode or continuous mode, the exposure time will be limited to **Auto Exposure Time Lower Limit** and **Auto Exposure Time Upper Limit**. The time range should only be set between **Auto Exposure Time Lower Limit** and **Auto Exposure Time Upper Limit**.

Click Image Settings from the Attribute list. Select **Auto Exposure Time Lower Limit** and **Auto Exposure Time Upper Limit**. Input the specific value in the textfields shown in Figure 3.9.

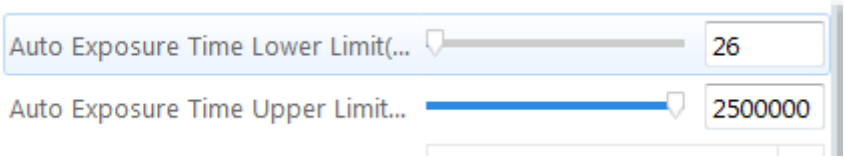

Figure 3. 9 Exposure Control

3.3.5 Gain Control

Refer to the camera technical index to acquire the supported Gain Value. Gain Control supports manual mode, single mode and continuous mode. Gain Control under these three modes is shown as follows:

Manual mode: Set Gain according to the user's setting value.

Single mode: Set Gain value automatically according to the target image brightness. Set once only.

Continuous mode: Adjusting Gain continuously according to the target image brightness.

When setting single mode or continuous mode, gain is limited to **Auto Gain Lower Limit** and **Auto Gain Upper Limit**. Gain range should only be set between **Auto Gain Lower Limit** and **Auto Gain Upper Limit**.

Click Gain Auto and select Gain Mode. Input the specific value in the textfields and finish the setting, as shown in Figure 3.10.

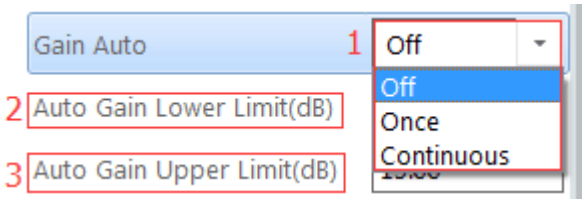

Figure 3. 10 Gain Control

The noise increases when Gain increases. Auto exposure and auto gain are mutually restricted. When the image is dark, the camera will firstly increase the exposure time. Secondly, the camera starts to adjust gain value when the exposure time turns to the maximum. When the image is bright, the camera will firstly decrease gain value. Secondly, it starts to adjust the exposure time when gain value turns to the minimum.

3.3.6 Gamma Correction

The camera supports gamma correction. Normally, the output of the camera chip and the number of photon that the sensor (on the chip) received are linear. And gamma correction provides a non-linear output. If the Gamma value is between 0.5 and 1, the image brightness decreases while the brightness of the dark area increases. If the Gamma value is between 1 and 4, the image brightness increases while the brightness of the dark area decreases.

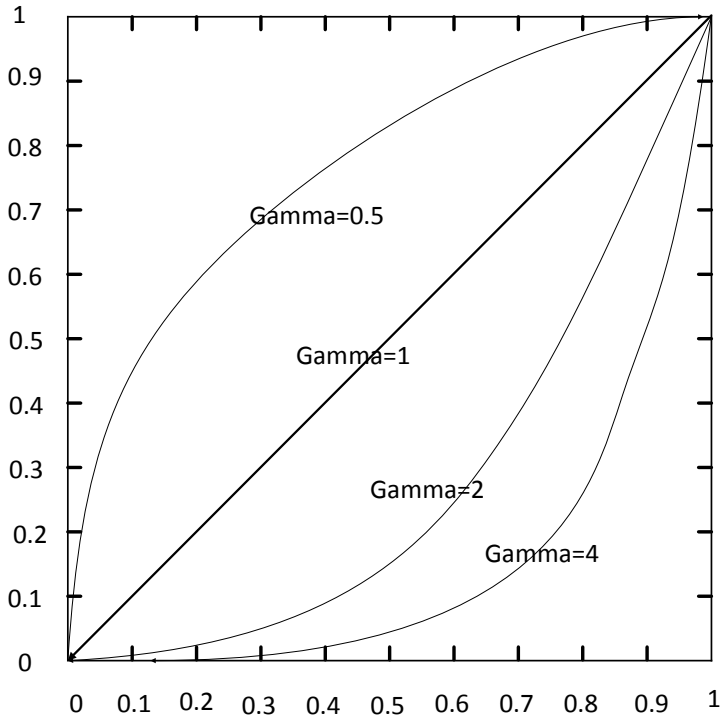

Figure 3. 11 Gamma Curve

Click Image Settings from the Attribute list. Select Gamma and set the value as shown in Figure 3.12.

Figure 3. 12 Gamma Settings

Different cameras models have different default function parameters. The figure shown above is only for reference.

3.3.7 Brightness

Camera can adjust the brightness of the exposure target. The default value is 64. The larger the value is, the brighter the image is.

Figure 3. 13 Brightness Settings

3.3.8 Image Reverse

The camera supports image horizontal mirroring. Open the mirroring function to gain the horizontal mirroring image.

Click Image Settings from the attribute list. Find Mirror X and check the checkbox before it shown in Figure 3.14.

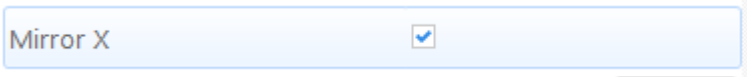

Figure 3. 14 Enable Mirror X

3.3.9 Test Pattern

Click Image Settings from the Attribute list. Select Test Pattern and set the parameter.

The default test pattern is off, shown as the figure 3.15.

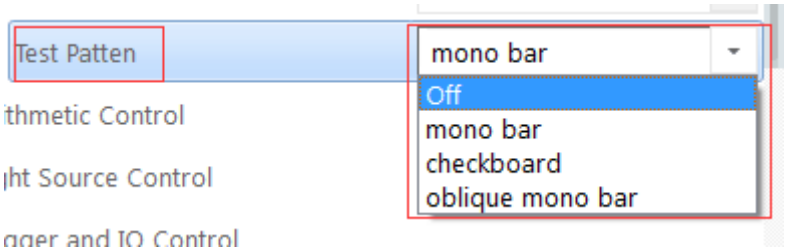

Figure 3. 15 Test Patten

The camera provides four test patterns, including Mono Bar, Vertical Color Bar, Horizontal Color Bar, and Checkboard as shown in the following three figures.

NOTE

Color camera, and mono camera have different test patterns. The specific test pattern is decided by the camera function.

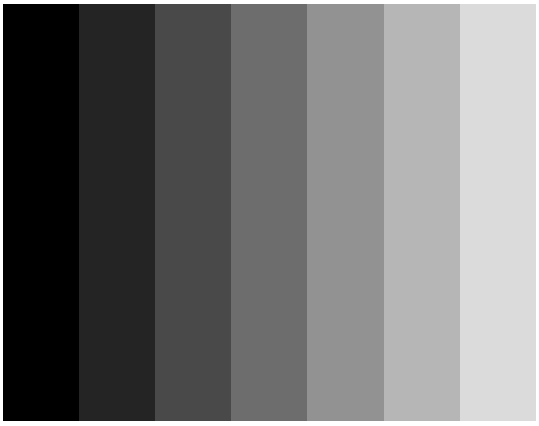

Figure 3. 16 Mono Bar Test Pattern

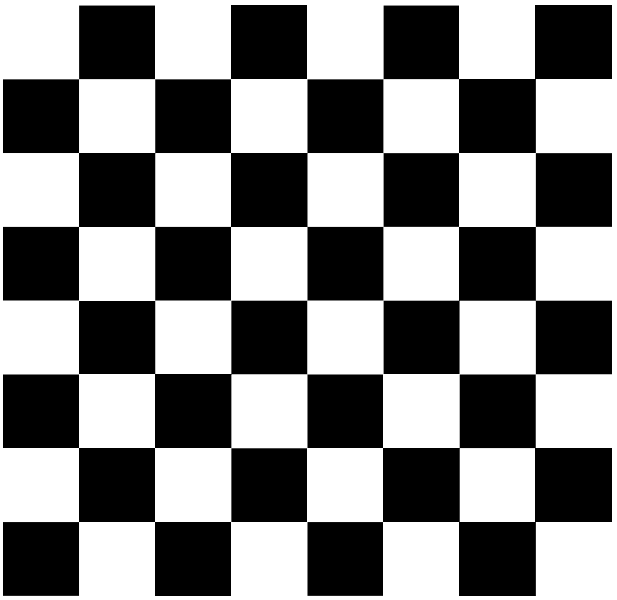

Figure 3. 17 Checkboard Test Pattern

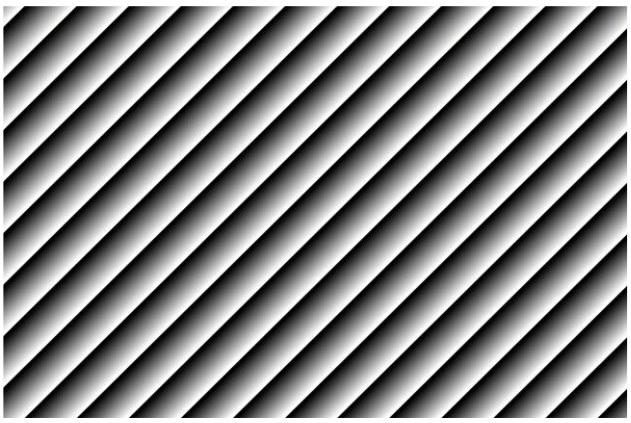

Figure 3. 18 Rolling Oblique White & Black Strip Test Pattern

3.4 Light Source Control

MV-SI622-01GM is the model with light source and lens case, which can control the light source by Smart MVS client.

Click Light Source Control from the Attribute list. Check the checkbox of **Lighting Enable** to set the parameters like **Lighting Duration**, **Flash Delay**, and **Precharge Time** shown as the Figure 3.19.

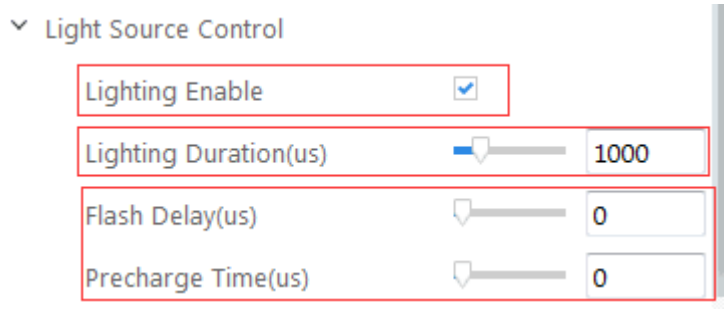

Figure 3. 19 Light Source Control

3.5 Trigger and IO Control

3.5.1 Trigger Mode

The camera support internal and external trigger modes. The camera can output one image or several images continuously under the internal trigger mode. External trigger mode includes software trigger mode, hardware external trigger mode.

Click Trigger and IO Control, click the dropdown list of **Trigger Mode**, select On to enable internal trigger mode, and select Off to enable external trigger mode.

- Software Trigger Mode

When setting software trigger mode, the client software will send command to the camera to capture and transfer images by Gigabit network.

Click Trigger and IO Control from the attribute list and select **Trigger Mode**, and then choose On to enable trigger mode. Select Software from the dropdown list of **Trigger In Source** to switch to the software external trigger status. Click Execute in **Trigger In Software** to trigger image acquisition, shown in Figure 3.20.

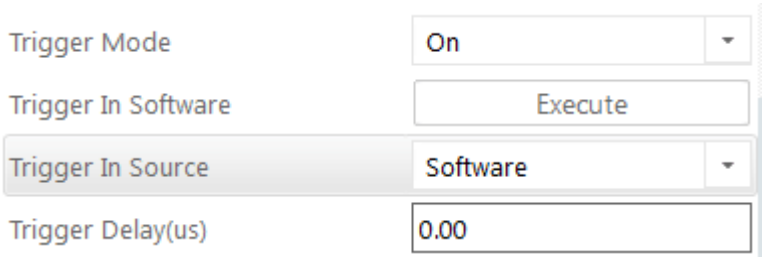

Figure 3. 20 Software Trigger Mode Setting

- Hardware External Trigger Mode

Select LineIn0, LineIn1, or LineIn2 from the dropdown list of **Trigger In Source** to switch to the hardware external trigger status.

Following parameter settings of input signal for hardware external trigger:

1) Trigger Edge Selection

Rising Edge/Falling Edge, and High Level/Low Level are available.

2) Trigger Delay

As shown in Figure 3.22(Rising Edge is the trigger signal), the camera can set delay time when receiving the trigger signal. As shown in Figure 3.22, the delay time can be set through **Trigger Delay**. The range is from 0 to 32000000 and the unit is microsecond.

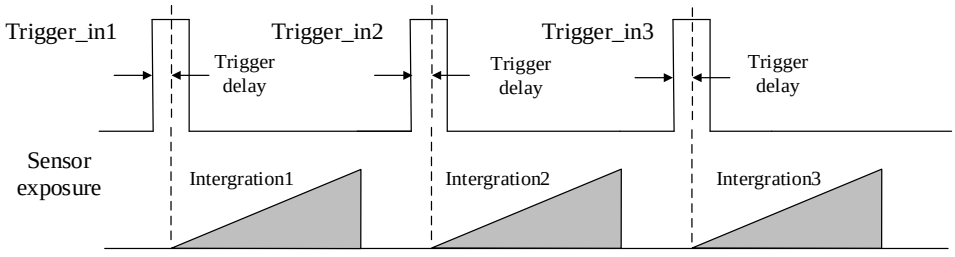

Figure 3. 21 Signal Delay Principle

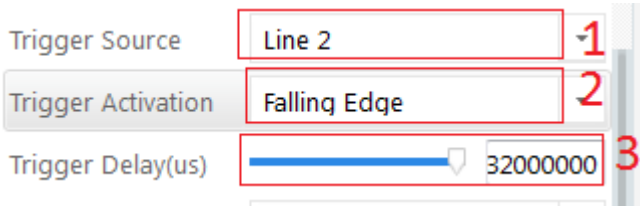

Figure 3. 22 Delay Time Setting

3) Triggering Anti-jitter

The noise may exist in external trigger's input signal and it may cause spurious triggering status if it goes into the camera. Thus the debounce is necessary. The debounce parameter can be set through Line Debouncer Time in the client software, the unit is μs. The timing sequence map is shown in Figure 3.23. The camera will ignore the trigger signal if the debouncer time is longer than the triggering signal time.

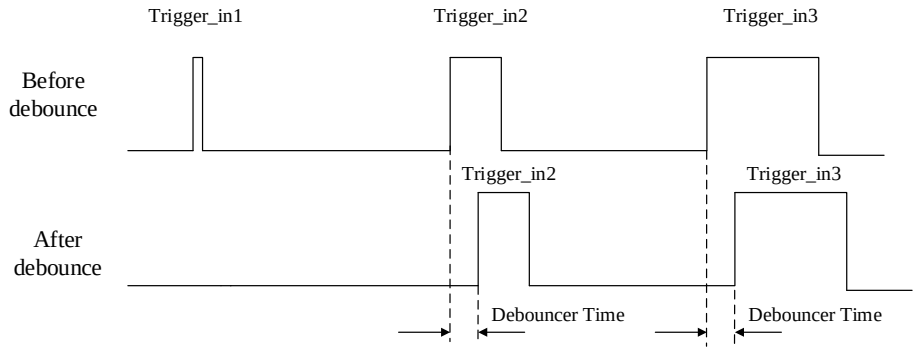

Figure 3. 23 The Debounce of Triggering Input Signal Sequence Map

4) Burst mode

The camera supports burst mode: receiving one trigger signal and outputting multiply frames images. You can set the burst number by Acquisition Burst Frame Count in the client software. The range is from 0 to 1023. The sequence map is shown in Figure 3.24. If Burst Frame Count = 3, one trigger signal will output three frames images and at the same time output three strobe signals.

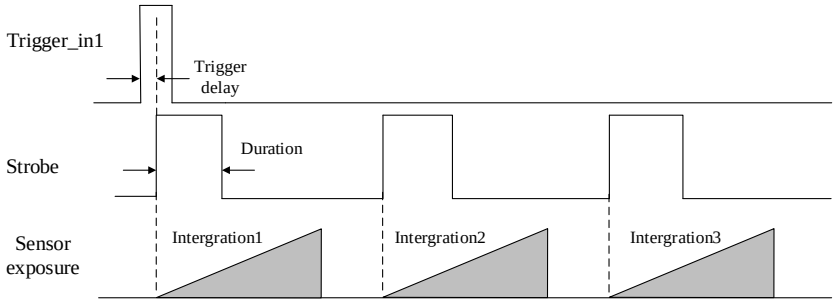

Figure 3. 24 Burst Mode Sequence Map

- Counter

The counter can divide frequencies that from external inputting trigger signal. You can control the exposure depends on your expectations. Operation steps are as follows:

As shown in Figure 3.25, click Trigger and IO Control and select Counter 0 from the dropdown list o**f Trigger In Source.**

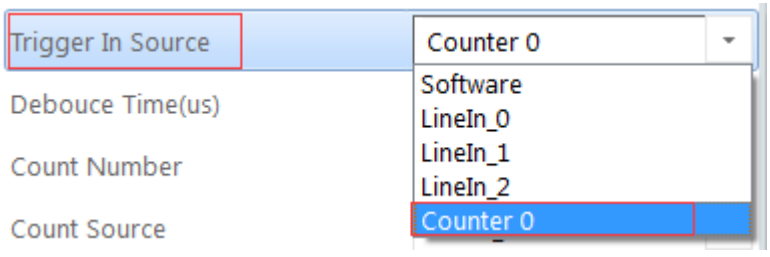

Figure 3. 25 Trigger Source Configuration

As shown in Figure 3.26, select external trigger source which needs frequency

division. Click Trigger and IO Control and select LineIn_0 from the **Count Source**, and enter the available value in count number, ranging from 1 to 1023.

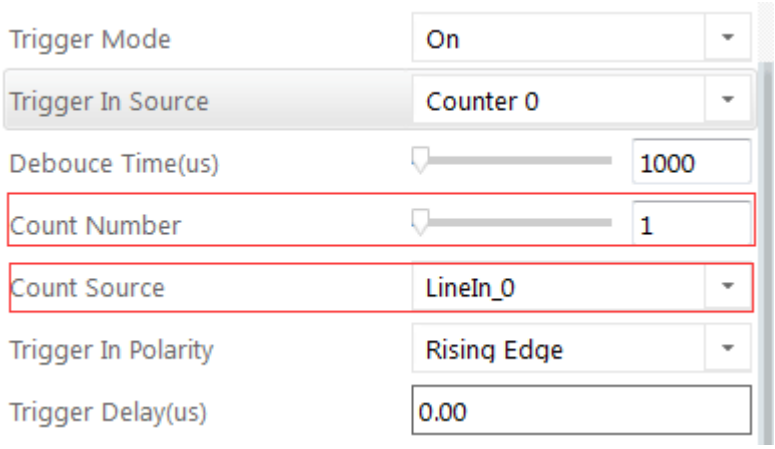

Figure 3. 26 Counter Frequency Division Configuration

3.5.2 Opto-isolated output

Click Line Out Selector as the following figure, the signals form LineOut 0, LineOut 1, LineOut 2 are transmission via 12 Pin I/O cable, PWM1 is transmitted by externa light cable, which control the external light. Check Line Out Inverter box can inverter the opto-isolated voltage between high level and the low level.

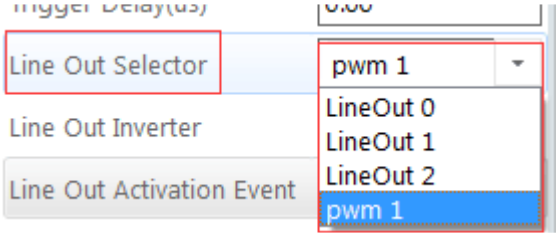

Figure 3. 27 Opto-isolated output selector

- AcqusitionStartActive: start acquisition
- AcqusitionStopActive: stop acquisition
- FrameBurstStartActive: start burst acquisition
- FrameBurstEndActive: end frame burst
- ExposureStartActive: start acquisition at exposure moment
- CountActive: counter output
- TimeActive: output pulse duty ratio and frequency

- HardTriggerActive: hardware trigger mode
- SoftTrigger: software trigger mode

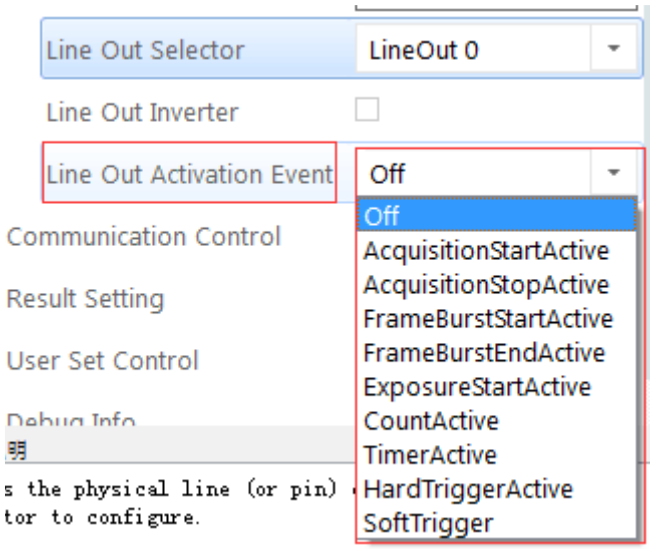

Figure 3. 28 Opto-isolated output event source

The output delay time can be set in Line Out Delay, and you can set pulse duration time in Line Out Duration according you need. When Line Out Activation Event box is Exposure Start Active, there will be an addition Flash Ahead Time in attribute tree which means the time before exposure.

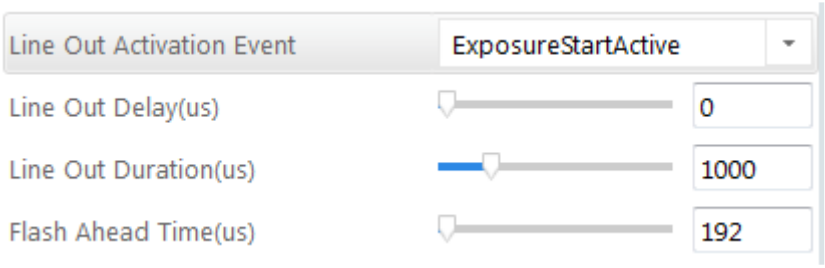

Figure 3. 29 Opto-isolated output configuration

3.5.3 Opto-isolated Input/Output Circuit

Camera contains three opto-isolated input and three opto-isolated output.

(1) I/O input circuit: (the input voltage 5~30 V DC)

- If input device signal is NPN, the device power positive is connected to the IN_COM and the signal is connected to the IN0/IN1/IN2, otherwise, reversal the cable.

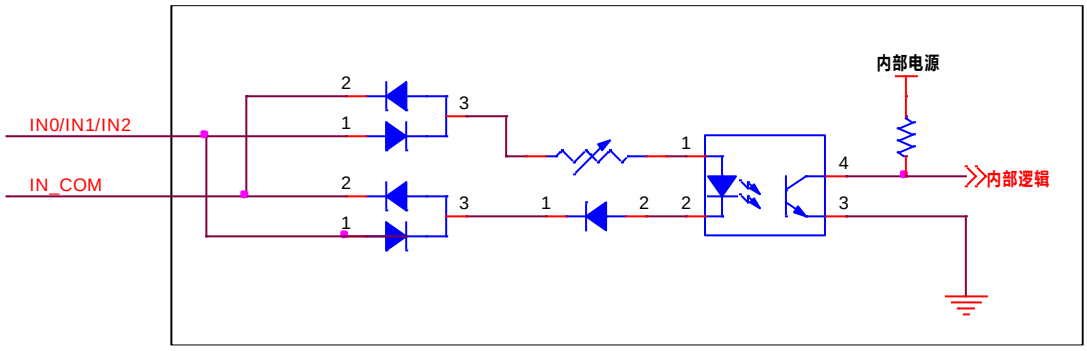

Figure 3. 30 I/O input circuit

(2) I/O output circuit: (the voltage is 5~30v, current is limited 200 mA)

- If output device signal is NPN, the device power negative is connected to the OUT_COM and the signal is connected to the OUT0/OUT1/OUT2, otherwise, reversal the cable.

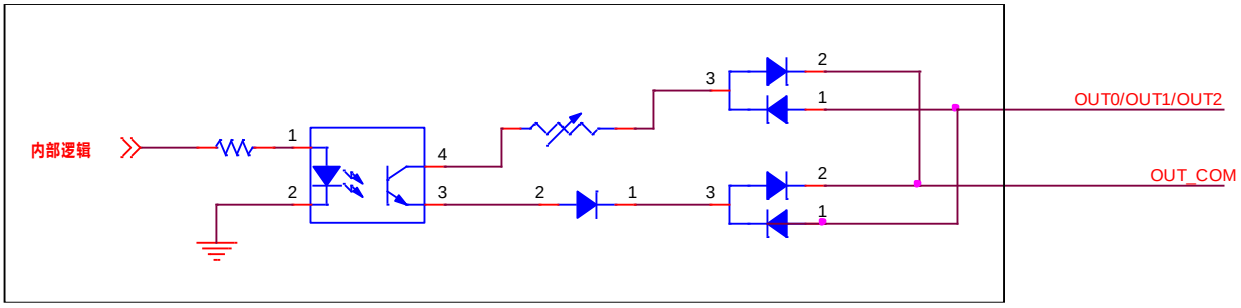

Figure 3. 31 I/O output circuit

3.6 Communication Control

Click Communication Control from the Attribute list.

3.6.1 Data Transmission

The size of data package is automatically adjusted by bandwidth and you are able to set the specific size value in the textfiled. The destination IP address can be modified according to your needs, shown as the figure below.

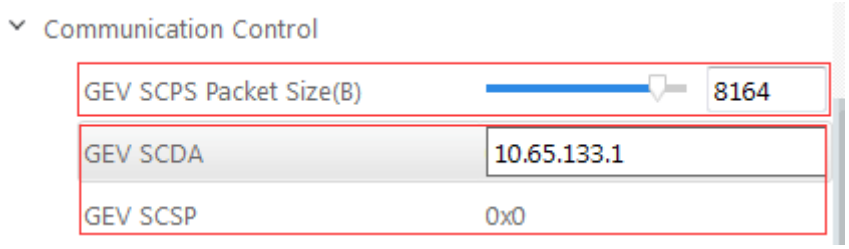

Figure 3. 32 Communication Control Settings

3.6.2 Communication Protocol

The camera supports three data communication protocols, smart SDK, TCP/IP, and Serial.

- Smart SDK: Transmit data throng SDK.
- TCP/IP: You are required to set the destination IP address and port, when adopting TCP/IP. The data transmission format can be set in Result Setting, and for detail operation, refer to *3.7 Result Setting*.

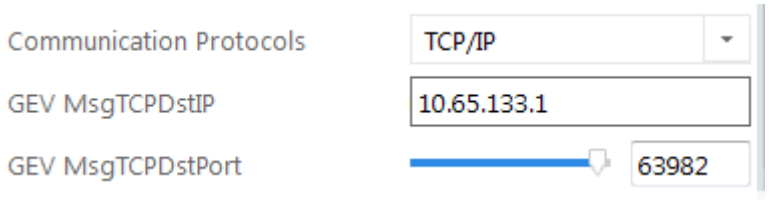

Figure 3. 33 TCP/IP Settings

- Serial: You are required to set Serial Baud Rate, Serial Data Bits, Serial Parity, and Serial Stop Bits in Result Setting, and for detail operation, refer to *3.7 Result Setting*.

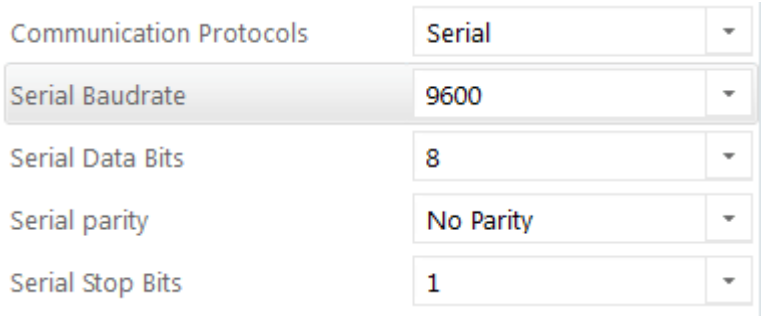

Figure 3. 34 Serial Settings

3.7 Result Setting

Click Result Setting from the Attribute list.

When adopting TCP/IP or Serial to transmit the data, you are required to set parameters shown in the figure below.

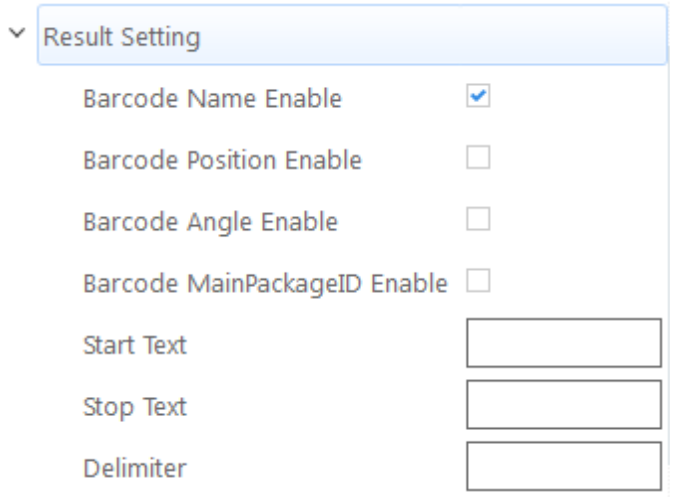

Figure 3. 35 Data Format Settings

3.8 User Set Control

Click User Set Control from the Attribute list.

3.8.1 Parameters Saving and Loading

The camera can save four groups of parameters, including one group of factory parameter and three groups of configurable parameter. You can save currently configured parameter and set corresponded default parameter when logging in next time in User Set Control in the attribute list.

- Save Parameters: Click User Set Control from the Attribute list. Select one parameter (except Default) from the dropdown list of the **User Set Selector**. Click Execute of **User Set Save** to save the settings.
- Load Parameters: Click **User Set Control** from the Attribute list. Select one parameter (except Default) from the dropdown list of the **User Set Selector**. Click Execute of **User Set Load** to load the settings.
- Default Parameters: Click **User Set Control** from the Attribute list. Select one parameter from the dropdown list of the **User Set Default**. Click Enter on the

keyboard to validate the settings.

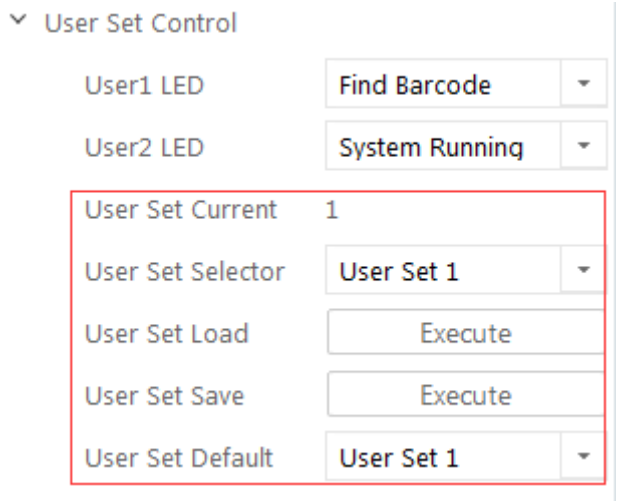

Figure 3. 36 Parameters Saving and Loading

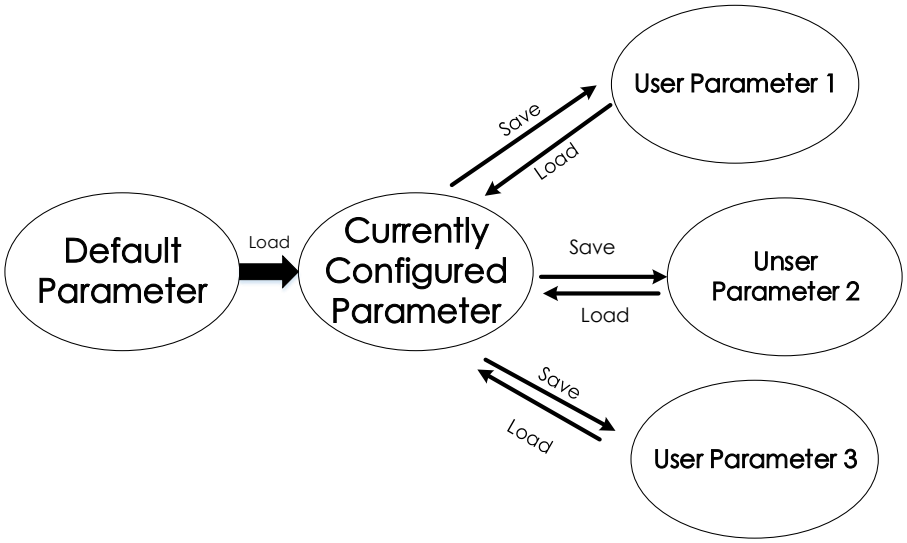

Figure 3. 37 The Relationship Among Four Groups of Parameters

3.8.2 User LED Indicator

The camera supports User LED Indicators, User LED 1, and User LED 2. You are able to judge whether the camera is running normally or not by LED indicators.

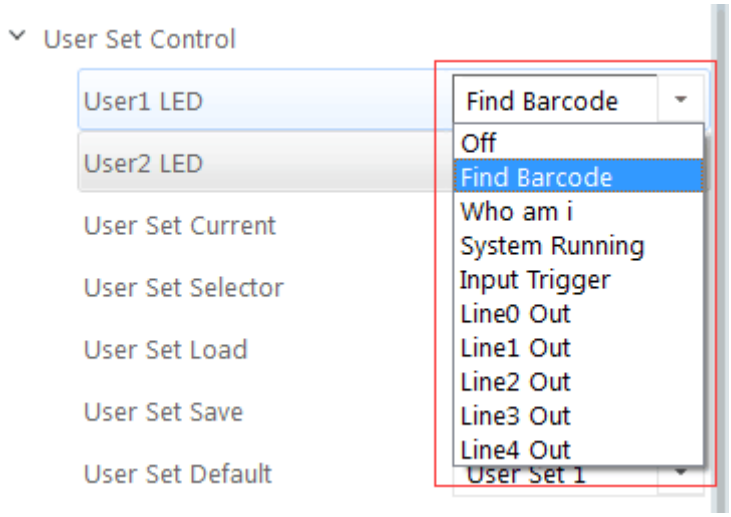

Figure 3. 38 User LED Indicator Settings

- Off: Disable the function.
- Find Barcode: The LED indicator flashes once when finding a code.
- Who am I: Used to help you judge which camera is operating. LED indicator flashes once for the operating camera.
- System Running: The LED indicator flashes once, when the Smart MVS runs.
- Input Trigger: The LED indicator flashes once, when receiving the trigger signal.
- Line0 Out: The LED indicator flashes once, when sending the Line0 Out signal.
- Line1 Out: The LED indicator flashes once, when sending the Line1 Out signal.
- Line2 Out: The LED indicator flashes once, when sending the Line2 Out signal.
- Line3 Out: The LED indicator flashes once, when sending the Line3 Out signal.
- Line4 Out: The LED indicator flashes once, when sending the Line4 Out signal.

3.9 Arithmetic Control

Click arithmetic control from the Attribute list.

3.9.1 common arithmetic parameter

According to the size of barcode and the background, the arithmetic parameter can be adjust to increase the recognition rate.

Common parameter is bellowing:

- Code Number: the max number could be recognized in one frame
- Filter Size: the size of oriented windows used to initially location
- Waiting Time: the max time used to recognition on frame image
- SegHeight Lower Limit(pixel): the min height of barcode could be recognized
- SegHeight Upper Limit: the max height of barcode could be recognized
- Seg Quiet W: barcode clear area

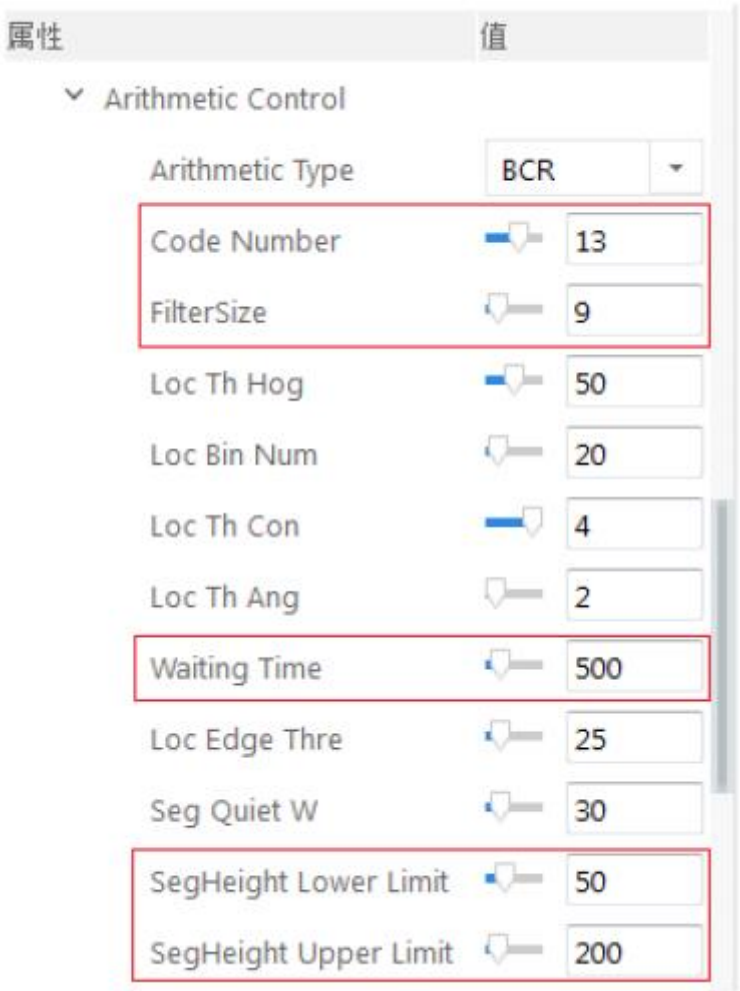

Figure 3. 39 Common arithmetic parameter

Chapter 4 Troubleshooting

4.1 Indicator Introduce

There are five LED indicators in the camera, power indicator, network linkage indicator, network transmission indicator, user indicator 1, and user indicator 2, shown as the figure below.

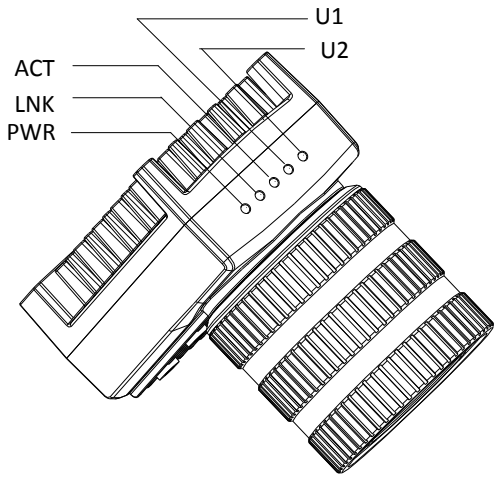

Figure 4. 1 Camera Indicator

Table 4. 1 LED Indicator Description

Name	**Description**
PWR	Power indicator
LNK	Network linkage indicator
ACT	Network transmission indicator
U1	User indicator 1
U2	User indicator 2

4.2 Indicator Status Definition

Table 4. 2 LED Indicator Status

LED Status	**Definition**
Steady On	The LED indicator keeps lights on all the time
Unlit	The LED indicator keeps unlit all the time
Fast Flicker	The LED indicator flickers every 200 ms to 300 ms
Slow Flicker	The LED indicator flickers every 1000 ms.
Extreme Slow Flicker	The LED indicator flickers every 2000 ms.

4.3 Indicator Status Description

Table 4. 3 LED Status Description

Camera Status	**Power Indicator in Blue (PWR)**	**Network Linkage in Green (LNK)**	**Network Transmission in Yellow (ACT)**	**User Indicator 1 in Blue (U1)**	**User Indicator 2 in Blue (U2)**	**Sulution**
Power off	——	——	——	——	——	
Star up	Steady On	Steady On	Slow Flicker/ Fast Flicker	Unlit	Slow Flicker	
Power Exception	Unlit	Unlit	Unlit	Unlit	Unlit	Check whether the power supply cable is connected well.
Network Exception	Steady On	Unlit	Unlit	Unlit	Slow Flicker	Check whether the network cable is connected well.
Smart MVS Exception	Steady On	Unlit	Unlit	Unlit	Slow Flicker	Reboot the client and check whether the operation system is correct.
Device Exception	Steady On	Steady On	Steady On	Steady On	Steady On	Reboot the device and check whether the client version is correct.

4.4 FAQ

Table 4. 4 FAQ

No	Problem Description	Possible Reasons	Solutions
1	1. The camera cannot be detected by the client software. 2. The camera is detected by the client software but connecting failed.	1. The camera does not work properly. 2. MVS installation error or network connection error.	Confirm that the power supply of camera is well connected (via LED indicators), and the network cable is properly connected.
2	The live view of camera is black.	1. The iris is closed. 2. The exposure time is too short.	1. Open the iris. 2. Select Once for Auto Exposure Control and Gain Auto.
3	The live view of the camera is without image.	1.Trigger mode is enabled, but no trigger signal is received. 2.No code is recognizaed, under the Normal mode	1 Select Off for the Trigger Mode. 2.Select Test for the Runding Mode.
4	The live view image is unqualified	1. The limited network transmission speed. 2.Jumbo Frame is not set.	1. Make sure the network transmission speed is 1 Gbps. 2. Set the Jumbo Frame's Value as 9 KB.
5	Code cannot be recognized.	The code type is not selected.	Click Read Setting from the Attribute list, and check the checkbox before the specific code type.
6	The output code is uncompleted.	1.The code number reaches the client's processing limit. 2.Numerical Filter is enabled. 3 The code length is limited.	1.Click Arithmetic Control in the attribute list and reset the Code Number. 2.Disable the Number Filter. 3.Rest the code length.

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